

SOUTH WEST ROCKS BELLE O'CONNOR STREET Environmental Assessment Report Volume 1

PREPARED FOR MALBEC PROPERTIES | 21 AUGUST 2009



Statement of Validity

Prepared under Part 3A of the Environmental Planning and Assessment Act, 1979 (as amended)

Environmental Assessment prepared by:

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ADDRESS	Level 8, 17 York Street, Sydney, NSW, 2000	
APPLICANT NAME	Malbec Properties	
APPLICANT ADDRESS	Level 5, 280 George St, Sydney NSW 2000	
LAND TO BE DEVELOPED	Part Lot 2 Deposited Plan 1128633, Lot 1 Deposited Plan 1128633, Lot 2 DP792945 (Belle O'Connor Street, South West Rocks)	
PROPOSED DEVELOPMENT	Residential Subdivision	

Certificate

We certify, to the best of our knowledge, that this Environmental Assessment:

- » has been prepared in accordance with the Environmental Planning and Assessment Act 1979 (NSW) and Regulation; and
- » is neither false or misleading.

Signature

Name

Angus Bruce

Date

21 August 2009

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James Rosenwax

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21 August 2009

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Abbreviations

AHIMS	Aboriginal Information Management System
AMCORD	Australian Model Code For Residential Development
ASS	Acid Sulphate Soils
ASSMAC	Acid Sulphate Soils Management Advisory Committee
CAC	Council Aboriginal Corporation
CEMP	Construction and Environmental Management Plan
CPTED	Crime prevention through environmental design
DCP	Development Control Plan
DEC	NSW Department of Environment and Conservation
DECC	NSW Department of Environment and Climate Change
DG	Director General
DoP	NSW Department of Planning
DP	Deposited Plan
FPL	Flood Planning Level
EA	Environmental Assessment
EARs	Environmental Assessment Requirements
EEC	Endangered Ecological Community
EP&A Act	Environmental Planning and Assessment Act 1979
ESD	Ecologically Sustainable Development
INP	Industrial Noise Policy
IWCM	Integrated Water Cycle Management
LALC	Local Aboriginal Land Council
LGA	Local Government Area
KSC	Kempsey Shire Council

KLEP 1987	Kempsey Shire Council Local Environmental Plan 1987
LES	Local Environmental Study
LOS	Level of Service
MUSIC	Model for Urban Stormwater Improvement Conceptualisation
NCREP 1988	North Coast Regional Environment Plan 1988
NRCAP	Northern Rivers Catchment Action Plan
OSD	On-site detention
PEA	Preliminary Environmental Assessment
REP	Regional Environmental Plan
RFS	Rural Fire Service
RLRS	Residential Land Release Strategy
RTA	Roads and Traffic Authority
SEPP	State Environmental Planning Policy
SQID	Stormwater quality improvement device
SSFCF	Swamp Sclerophyll Forest on Coastal Floodplains
STP	Sewer Treatment Plant
SWC	Sydney Water Corporation
The Minister	NSW Minister for Planning
The Proponent	Malbec Properties

Executive Summary

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Executive Summary

Introduction

This Environmental Assessment (EA) seeks the Project Application approval of the Minister pursuant to Part 3A of the Environmental Planning and Assessment Act 1979, for the subdivision and development of lands located in the township of South West Rocks on the northern coast of New South Wales. EDAW has been engaged by Malbec Properties (the Proponent) to prepare an EA as part of a Part 3A Project Application to assess the potential environmental impacts associated with the Proposal. The Director General's Environmental Assessment Requirements were issued by the Department of Planning on 17 October 2008.

Subject Site

The Subject Site is located at Belle O'Connor Street, South West Rocks, known as Part Lot 2 in Deposited Plan 1128633, Lot 1 in Deposited Plan 1128633 and Lot 2 in Deposited Plan 792945, located within Kempsey Shire Council local government area (LGA).

The Subject Site has been identified in local and regional planning instruments and strategy documents as a potential site for residential development. On 18 August 2008 the NSW Minister for Planning (the Minister) approved the S65 certificate for the proposed amendment to No.55 the Kempsey Shire Council Local Environmental Plan 1987, for rezoning of the lands known as the Saltwater Development Area, for the proposed residential and conservation uses. The Draft LEP was exhibited from 15 September 2008 to 14 November 2008. The rezoning was gazetted on 14 August 2009.

Project Description

The Proposal involves the subdivision of the Subject Site and specifically includes the following:

- » 318 residential lots ranging in size from approximately 500m² to 922m², to be constructed over eleven stages;
- » an internal public road network with access to Belle O'Connor Street to the south, with future access proposed through to Phillip Drive to the north;
- » Retention of 14.9 hectares of Conservation Area in the north of the Site as part of the rezoning of the site;
- » an Integrated Water Cycle Management Plan incorporating Water Sensitive Urban Design strategies including a wetland and a system of grassed swales throughout the Proposal;
- » construction works required to provide physical infrastructure and services;
- » perimeter fence around the site;
- » landscaping of public areas including streets and open space areas;
- » demolition and/or relocation of existing houses and structures on the site.

Executive Summary

Environmental Assessment

A site analysis has been undertaken to map the constraints and opportunities on the site and ensure that the Proposal responds to the environmental considerations and mitigates these where appropriate.

Specialist investigations were carried out for key environmental assessment areas. Results of the specialist investigations demonstrate that potential environmental impacts of the Proposal are manageable with the implementation of appropriate management and mitigation measures. The following key issues are relevant to the Proposal as outlined in the Director Generals Environmental Assessment Requirements.

ECOLOGICAL IMPACTS

An Ecological Assessment undertaken by Whelans InSites found a total of ten vegetation community types on site, one of which may constitute an EEC that is located within the proposed conservation area, as well as ten threatened fauna species primarily found in the northern portion of the site to be retained. The Proposal will involve the removal of approximately 20.36 hectares of vegetation, which has been largely defined as having low habitat value. As such, removal of this vegetation is not expected to have significant impacts on threatened species within and around the site. The proposal also includes the retention of approximately 14.9 hectares of high quality habitat along Saltwater Creek. This area, which is included in the rezoning as Environmental Conservation 7(a) and 7(b) includes several vegetation communities (including the potential EEC) and Whelans has assessed that the mitigation measures proposed will ensure that this conservation area will not be adversely affected to any significant extent). Whelans InSites has concluded that development of the land as proposed is not likely to adversely effect native biota to any significant extent and has recommended mitigation measures and management.

INTEGRATED WATER CYCLE MANAGEMENT

Martens Consulting Engineers were engaged to undertake a hydrological assessment of the proposed residential subdivision on the Subject Site. An Integrated Water Cycle Management (IWCM) Plan has been developed for the Proposal, which brings together the results of the stormwater quality and quantity assessment, hydrological assessment and flood analysis to form an overall water management plan which satisfies performance standards outlined in the Saltwater Creek and Lagoon Estuary Management Plan. The proposal includes the incorporation of Macleay Water dual-reticulation recycled water through the site.

FLOODING

A flooding assessment was carried out by WBM Oceanics which determines the flood regime for Saltwater Creek and the 1 in 100 ARI flood levels for the Site. This assessment was used to set the flood planning level (FPL) of 3.7 mAHD and identifies suitable developable areas on the Site as all lands more than 50m from the 3.0 mAHD contour. The assessment also determines that potential impacts of sea level rise and increases in rainfall intensity due to climate change on the flood regime will be readily accommodated by the adopted Site FPL and will not be of concern to the development.

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GEOTECHNICAL

A geotechnical assessment was carried out by Martens Consulting Engineers which recommends mitigation and management measures to address the site characteristics of a shallow water table and protection of road pavements and footing systems.

CONTAMINATION

Results of a preliminary contamination assessment undertaken by Martens Consulting Engineers concluded that the risks of site contamination is negligible and therefore does not preclude the proposed residential development of the site.

INFRASTRUCTURE PROVISION

Consultation with relevant service authorities indicates that all necessary services are available to the development with sufficient capacity to cater for the new loadings generated by the development.

ACID SULPHATE SOILS

Soil testing undertaken by Martens Consulting Engineers indicated the absence of ASS within the in the top 2 metres of all soil tested. While Martens concluded it was unlikely that the Site would contain any potential or actual ASS, measures have been recommended for the preparation of an ASS Management Plan to be implemented during construction.

CULTURAL HERITAGE

Site Investigation and consultation was undertaken by Jackie Collins and Associates with the Kempsey Local Aboriginal Land Council (LALC). While no archaeological evidence was found during site investigations, a number of mitigation measures have been recommended in order to ensure the proper protection and management of any archaeological items that may be discovered during construction.

A preliminary non-Indigenous heritage assessment undertaken found no locally, State, Regionally or Federally significant heritage items exist on or in the vicinity of the Subject Site. Consideration of items in South West Rocks found no visual link to the subject site, and the Proposal is unlikely to have any impact on any heritage items in the South West Rocks area.

TRAFFIC AND TRANSPORT

Colston Budd Hunt and Kafes were engaged to undertake a traffic and transport assessment for the proposed residential subdivision of the Subject Site. Results of the assessment conclude that the existing road network and intersections currently operate at good levels of service and the addition of traffic as a result of the Proposal will not pose significant impacts on traffic and transport. The assessment also identified a number of opportunities for future road connections and extension of the existing South West Rocks public transport system to service the Subject Site post construction. Pedestrians and cyclists are well-catered for in the proposal and link effectively to the surrounding areas. A number of mitigation measures have been recommended in this regard.

Executive Summary

VISUAL ASSESSMENT

EDAW were engaged to undertake a visual assessment of the proposed residential subdivision of the Subject Site. Results of the visual assessment indicated that there will be minimal impact on the visual amenity of the surrounding area as a result of the Proposal. Detailed requirements for street trees and streetscape landscaping have been recommended to ensure future built form is screened from any adjoining areas.

AIR QUALITY AND NOISE ASSESSMENT

SKM was engaged to undertake an Odour and Noise Assessment to assess the noise and odour emissions from the existing sewage treatment plant (STP) located to the north of the Subject Site, and consider potential impacts from future upgrades to the STP. Modelling results demonstrated acceptable levels of odour concentrations at a distance of approximately 100m from the plant and odour emission concentrations were found to be below the determined DECC odour criteria. Noise emissions from the existing and potential future upgraded STP operations were found to be negligible. Based on these investigations a 150m buffer zone requirement has been recommended.

BUSHFIRE RISK

Australian Bushfire Protection Planners (ABPP) were engaged to undertake the bushfire assessment for the Proposal due to the presence of bushfire prone land within the Subject Site. Mitigation measures including the provision of asset protection zones (APZ), are considered to be adequate in reducing the risk from bushfire to any future development, provided specific mitigation measures are implemented. ABPP undertook an assessment of the proposed subdivision layout against the deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006* and made appropriate recommendations on mitigation and management measures. The Proposal satisfies these requirements.

SOCIO-ECONOMIC IMPACTS

A social impact assessment carried out by Key Insights indicates that the Proposal is consistent with a number of existing policy and planning documents for the area. The Proposal will contribute to increasing supply of land, improving land affordability, increasing the choice of housing stock and promoting in-migration of residents within the Kempsey Shire Council LGA. Furthermore, the Proposals associated increase in population will contribute to an overall increase in economic activity in the area which is expected in turn, to enhance the viability of current services and the demand for newer improved services.

Consultation

Consultation with local and state government authorities and agencies, along with the local community has been undertaken as part of the environmental assessment process. Issues raised as a result of this consultation have informed the design of the Proposal.

Conclusions

Where relevant, this EA includes recommended methods of managing and mitigating potential environmental impacts of the Proposal. These specific mitigation measures are summarised in the form of a draft *Statement of Commitments* (**Chapter 8**) to which the Proponent would commit if the Proposal receives Project Approval.

Specialist investigations have been undertaken on the Subject Site, resulting in a number of potential environmental impacts being identified. This EA has been produced to ensure that all key environmental issues that may cause potential impacts as a result of the Proposal are assessed, and that appropriate mitigation measures are recommended and incorporated into the design of the proposal to ensure potential impacts on the environmental and socio-cultural environment are managed and mitigated where appropriate.

It is considered that the Proposal for the subdivision of the land for the purpose of future residential development as outlined in this Environmental Assessment Report is an appropriate form of development for the Subject Site.

1.0

Introduction

1.1 Description of the Proposal

This Environmental Assessment Report (EA) has been prepared pursuant to the provisions of Part 3A of the *Environmental Planning and Assessment (EP&A) Act 1979* and in accordance with the Environmental Assessment Requirements (EARs) issued by the Director General of the Department of Planning (DoP) on 17 October 2008. This EA seeks Project Approval from the Minister for the subdivision of 318 residential lots located at 52 Belle O’Connor Street, South West Rocks, known as Lot 52 in Deposited Plan 831284 and Lot 84 DP 792945, located within Kempsey Shire Council local government area (LGA). The application has been lodged by Malbec Properties (the Proponent) and specifically includes:

- » 318 residential lots ranging in size from approximately 500m² to 922m², to be constructed over eleven stages;
- » an internal public road network with access to Belle O’Connor Street to the south, with future access proposed through to Phillip Drive to the north;
- » Retention of 14.9 hectares of Conservation Area in the north of the Site as part of the rezoning of the site;
- » an Integrated Water Cycle Management Plan incorporating Water Sensitive Urban Design strategies including a wetland and a system of grassed swales throughout the Proposal;
- » construction works required to provide physical infrastructure and services;
- » perimeter fence around the site;
- » landscaping of public areas including streets and open space areas;
- » demolition and/or relocation of existing houses and structures on the site.

The Director General’s EARs are at **Appendix A** to this report, and the compliance of the Proposal with each of the EARs is discussed within the relevant Chapters of this EA as listed in **Table 1.1** Director General’s Requirements.

Table 1.1 Director General’s Requirements

Director General EAR	EA Chapter in which it is considered
General Requirements	
1. An Executive Summary	An Executive Summary is provided within this EA.
2. A detailed description of the Proposal including: » any development options; » justification of the project taking into consideration any environmental impacts of the project, the suitability of the site and whether the project is in the public interest; » outline of the staged implementation of the project if applicable.	Section 1.5 Section 1.4 Section 2.2.5
3. A thorough site analysis including constraints mapping and description of existing environment.	Section 2.1 and accompanying drawing package.

4. Consideration of any statutory and non-statutory provisions and identification of any non-compliances with such provisions, in particular relevant provisions arising from environmental planning instruments, Regional Strategies (including draft Regional Strategies) and Development Control Plans.	Chapter 3
5. Consideration of the consistency of the project with the objectives of the <i>Environmental Planning and Assessment Act 1979</i> .	Section 3.2.1
6. Consideration of impacts, if any, on matters of National Environmental Significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> .	Section 3.1.1
7. An assessment of the potential impacts of the project and a draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures to be implemented to minimise any potential impacts of the project.	Chapter 5 and Chapter 8
8. The plans and documents outlined in Attachment 2.	All required plans and documents have been included within relevant Sections of this EA Report, and/or its Appendices.
9. A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading.	See inside of cover page
10. An assessment of the key issues specified below and a table outlining how these key issues have been addressed.	Table 1.1
Key Issues	
1. Strategic Planning	
1.1 Ensure that the proposal is consistent with the draft Local Environmental Plan for the site (Amendment 55 to Kempsey Local Environmental Plan 1987).	Section 3.4.1
1.2 Justify the proposal with reference to local, regional and State planning strategies. Provide justification for any inconsistencies with these planning strategies.	Chapter 3
1.3 Consider the provisions of the Saltwater Creek and Lagoon Estuary Management Plan and Saltwater Creek Catchment Floor Study in regard to all relevant issues, including but not limited to, water quality and quantity, flooding and flora and fauna.	Section 5.2.4 and Appendix D2
2. Subdivision Design, Layout and Desired Future Character	
2.1 Demonstrate the consistency of the proposal with the character of existing development in terms of the locality, street frontage, scale, building envelopes and future built form controls, aesthetics, energy and water efficiency and safety.	Chapter 2
2.2 Demonstrate the consistency of the proposed subdivision design and layout with the Coastal Design Guidelines for NSW, NSW Coastal Policy 1997 and SEPP 71 - Coastal Protection.	Section 3.6.2, Section 3.6.1 and Section 3.2.3.3

Introduction

2.3 Identify the type of subdivision proposed across the site i.e. community, Torrens, strata. A draft community management stage should be provided if community title is proposed.	Section 2.2.3
2.4 Provide details of potential building envelope, built form and design quality controls and the means for implementing them.	Section 2.2.2 and Appendix E
2.5 Provide details of any staging that demonstrates the lots will be released in an orderly and coordinated fashion.	Section 2.2.5
2.6 Provide details of land proposed to be used for recreational purposes. Outline the long-term management and maintenance of these areas of open space and any conservation areas including ownership control, management and maintenance funding, public access, revegetation and rehabilitation works and bushfire management.	Section 2.2.4 and Section 2.2.6
3. Visual Impact	
3.1 Address the visual impact of the proposal in the context of surrounding development and relevant mitigation measures in particular address impacts on the amenity of the foreshore, overshadowing of public reserves, loss of views from public places and cumulative impacts.	Chapter 5.6
4. Infrastructure Provision	
4.1 Address existing capacity and requirements of the development for sewerage, water, electricity, waste disposal, telecommunications and gas in consultation with relevant agencies. Identify and describe staging, if any, of infrastructure works.	Section 2.3 and Appendix D2
4.2 Address and provide the likely scope of any planning agreements and/or development contributions with Council/Government agencies (including relevant community/state infrastructure contributions).	Section 2.2.6
5. Traffic and Access	
5.1 Prepare a traffic impact study in accordance with Table 2.1 of the RTA's Guide to Traffic Generating Developments.	Chapter 5.5 and Appendix D4
6. Hazard Management and Mitigation	
<i>Contamination</i>	
6.1 Identify any contamination on site and appropriate mitigation measures in accordance with the provisions of SEPP 55 – Remediation of Land.6.2 Identify the presence and extent of acid sulphate soils on the site and, where relevant, appropriate mitigation measures. Identify the need for an Acid Sulphate Management Plan (prepared in accordance with ASSMAC Guidelines).	Section 5.3.4 and Appendix D2
<i>Acid Sulphate Soils</i>	
6.2 Identify any contamination on site and appropriate mitigation measures in accordance with the provisions of SEPP 55 - Remediation of Land.	Section 5.3.3 and Appendix D2
<i>Bushfire</i>	
6.3 Address the requirements of Planning for Bush Fire Protection 2006 (RFS).	Chapter 5.9 and Appendix D7
<i>Geotechnical</i>	
6.4 Provide an assessment of any geotechnical limitations that may occur on the site and if necessary, appropriate design considerations tat address these limitations.	Section 5.2.3 and Appendix D2
<i>Flooding</i>	

6.5 Provide an assessment of any flood risk on site (for the full range of floods including events greater than the design flood, up to probable maximum flood; and from coastal inundation, catchment based flooding or a combination of the two) and having consideration of any relevant provisions of the NSW Floodplain Development Manual 2005. The assessment should determine: the flood hazard in the area; address the impact of flooding on the proposed development, address the impact of the development (including filling) on flood behaviour of the site and adjacent lands; and address adequate egress and safety in flood event.	Chapter 5.2 and Appendix D2
6.6 Assess the potential impacts of sea level rise and an increase in rainfall intensity on the flood regime of the site and adjacent lands with consideration of Practical Consideration of Climate Change – Floodplain Risk Management Guideline (DECC, October 2007).	Chapter 5.2 and Appendix D2
Air Quality	
6.7 Address the potential odour impacts from the adjacent sewage treatment plan and mitigation measures propose with reference to Assessment and Management of Odour from Stationary Sources in NSW (DEC 2006).	Chapter 5.7 and Appendix D6
Mosquito Risk	
6.8 Address the potential impacts of nearby potential mosquito habitat for future residents of the development.	Section 2.2.1.1
Rural Land	
6.9 Address the provisions of Living and Working in Rural Areas: A handbook for managing land use conflict issues on the NSW North Coast.	Section 3.6.3
7. Water Cycle Management	
7.1 Address and outline measures for Integrated Water Cycle Management (including stormwater) based on Water Sensitive Urban Design principles which addresses impacts on the surrounding environment, drainage and water quality controls for the catchment and erosion and sedimentation controls at construction and operational stages.	Chapter 5.2 and Appendix D2
7.2 Assess the impacts of the proposal on surface and groundwater hydrology and quality during both construction and occupation of the site.	Chapter 5.2 and Appendix D2
8. Heritage and Archaeology	
8.1 Identify whether the site has significance to Aboriginal cultural heritage and identify appropriate measures to preserve any significance. The assessment must address the information and consultation requirements of the draft Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation (DEC 2005) and Interim Community Consultation Requirements for Applicants (DEC 2004).	Chapter 5.4 and Appendix D3
9. Flora and Fauna	
9.1 Assess the potential direct and indirect impacts of the development on flora and fauna taking into consideration impacts on any threatened species, populations, ecological communities and/or critical habitats and any relevant recovery plan in accordance with DECC's Guidelines for Threatened Species (2005). Particular consideration should be given to SEPP 14 wetland no. 439 and any endangered ecological communities associated with it. Provide measures for the conservation of flora and fauna, where relevant with consideration of the Saltwater Creek and Lagoon Estuary Management Plan and Saltwater Creek Catchment Flood Study.	Chapter 5.1 and Appendix D1
9.2 Outline measures for the conservation of existing wildlife corridor values and/or connective importance of any vegetation on the subject land.	Chapter 5.1 and Appendix D1

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FIGURE 1.2.1 LAND OWNERSHIP MAP

9.3 Address measures to protect and manage the riparian corridor and adjacent aquatic habitats.	Chapter 5.1 and Appendix D1
9.4 Assess the impacts of any native vegetation clearing including details of an offset strategy, where relevant, to ensure that there is no net loss of native vegetation.	Chapter 5.1 and Appendix D1
10. Socio-economic Impacts	
10.1 Provide a social impact assessment for the development. Address the social and economic context of the development in terms of infrastructure requirements, public transport, community services and facilities (including schools and medical services)	Chapter 5.11 and Appendix D8
You should undertake appropriate and justified level of consultation with the following agencies during the preparation of the environmental assess:	Chapter 4
(a) Agencies or other authorities:	
» Kempsey Shire Council	
» Department of Environment and Climate Change	
» Department of Primary Industries	
» NSW Rural Fire Services	
» Department of Water and Energy	
» Roads and Traffic Authority	
» Department of Lands	
» State Emergency Services	
» Northern Rivers Catchment Management Authority	
» Local Aboriginal Land Council	
» Mid North Coast Water	
» Utility and Infrastructure providers	
(b) Public:	
» Document all community consultation undertaken to date or discuss the proposed strategy for undertaking community consultation. This should include any contingencies for addressing any issues arising from the community consultation and an effective communications strategy.	

1.2 Overview & Background

The Subject Site has been identified in local and regional planning instruments and strategy documents as a potential site for residential development. On 21 January 1997 Council resolved to have lands including the Subject Site rezoned for residential purposes, and in October/November 2008 the draft LEP Amendment No.55 was publicly exhibited. The Local Environmental Study (LES) prepared in conjunction with the rezoning application, identified the areas of the Site that are suitable for residential purposes and those which were recommended to be retained for conservation purposes, thereby setting the developable areas and intended land uses across the Subject Site.

In August of 2007 a Preliminary Environmental Assessment (PEA) was provided to the NSW Department of Planning (DoP). The PEA, prepared by JBA Urban Planning Consultants, was submitted for the purpose of attaining confirmation from DoP that the proposed subdivision is indeed a Part 3A Major Project, and to inform DoP of the general details of the proposed subdivision

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application so that the Director General's Environmental Assessment Requirements (DG's EARs) could be issued. In a letter dated 17 October 2008, DoP issued the DG's EARs for the Part 3A Project Application. On 14 August 2009 Amendment No. 55 to Kempsey Local Environmental Plan 1987 was gazetted.

1.3 The Proponent

Malbec South West Rocks Pty Ltd is the development entity which controls the land subject of the Proposal and is the Proponent for the Project Application.

1.4 Need and Justification

This Part 3A Project Application has been prepared in support of the subdivision of the Subject Site into 318 residential lots, conservation area, and the construction of roads and other civil infrastructure. The Subject Site is located in South West Rocks which is a town on the mid-north coast of NSW. South West Rocks has been identified in several planning policy and strategy documents as a growth area for increased population, as envisaged in the mid-north coast strategy, primarily through the release of new greenfield urban release areas. The following Sections outline the need and justification for the Proposal with regard to the following:

- » consistency of the Proposal with the existing strategic planning framework;
- » environmental constraints and suitability of the Subject Site for the Proposal; and
- » whether the Proposal is in the public interest.

1.4.1 Strategy Documents

Anticipated population growth, both in the Mid-North Coast Region and more specifically within South West Rocks is referred to in two key documents, these being the *Draft Mid-North Coast Regional Strategy* prepared by the NSW Department of Planning (DoP) and the Kempsey Shire Council Residential Land Release Strategy 1997 (RLRS).

DRAFT MID-NORTH COAST REGIONAL STRATEGY

The *Draft Mid-North Coast Regional Strategy* has identified South West Rocks as one of the towns that is to accommodate part of the projected additional 91,000 people expected within the Mid-North Coast Region. The purpose of the Strategy is to ensure that there is adequate land available, appropriately located to accommodate the projected housing and employment needs of the region over the next 35 years (2006-31).

The Subject Site is shown as part of an overall proposed future urban release area located to the east of South West Rocks on the draft exhibition maps that accompany the Strategy. As illustrated on the Strategy maps, a large area of land located to the west of the South West Rocks village centre is also highlighted as a proposed future urban release area. This land however, is shown to have significant environmental constraints, with processes currently underway to determine any development potential in this area. As such, the Subject Site and surrounding area are likely to be the primary growth areas in South West Rocks.

KEMPSEY SHIRE COUNCIL RESIDENTIAL LAND RELEASE STRATEGY 1997

The Kempsey Shire Council RLRS stated at section 3.3.1 that South West Rocks was the fastest growing urban area in the Kempsey Shire local government area (LGA). The RLRS document prepared in 1997, provided that the population would reach 7,597 in 2016. Census data showed it was 4,069 in 2006 (ABS website). The RLRS predicted that there would be a shortfall of land available for housing in the area of approximately 30ha by 2011 and 64ha by 2016, with the land available in 1997 being

the equivalent of approximately 1-2 years growth. In order to meet the medium to long-term needs of the population growth in South West Rocks the RLRS identified lands for rezoning. The Subject Site is one of the areas that was identified for rezoning and release in the medium-term (approximately 5 years from 1997 ie. 2002) and is identified in the 'Residential Supply Register' in Schedule 2 of the RLRS as a residential release area. It should be further noted that the demand figures we calculated on occupancy rates as 1.8 persons/household. Dwelling growth increased by 3% pa since 2001. Based on the 2006 census the occupancy rate has fallen to 1.5 in SWR (which is in line with DOP and ABS projections), further exacerbating land supply. The delay in land release as planned in the RLRS has exacerbated affordability and the proposal seeks to redress this situation.

The Proposal, which is the subject of the Project Application will contribute to the population growth needs of the South West Rocks area, Kempsey Shire Council LGA and the Mid-North Coast Region as a whole. The population projections and local and regional strategies all point to a need to increase the number of dwellings within South West Rocks. The proposal aims to provide 318 residential lots within the ecological constraints that characterise the South West Rocks area, partially alleviating the need for new land release within the locality and the Kempsey LGA as a whole.

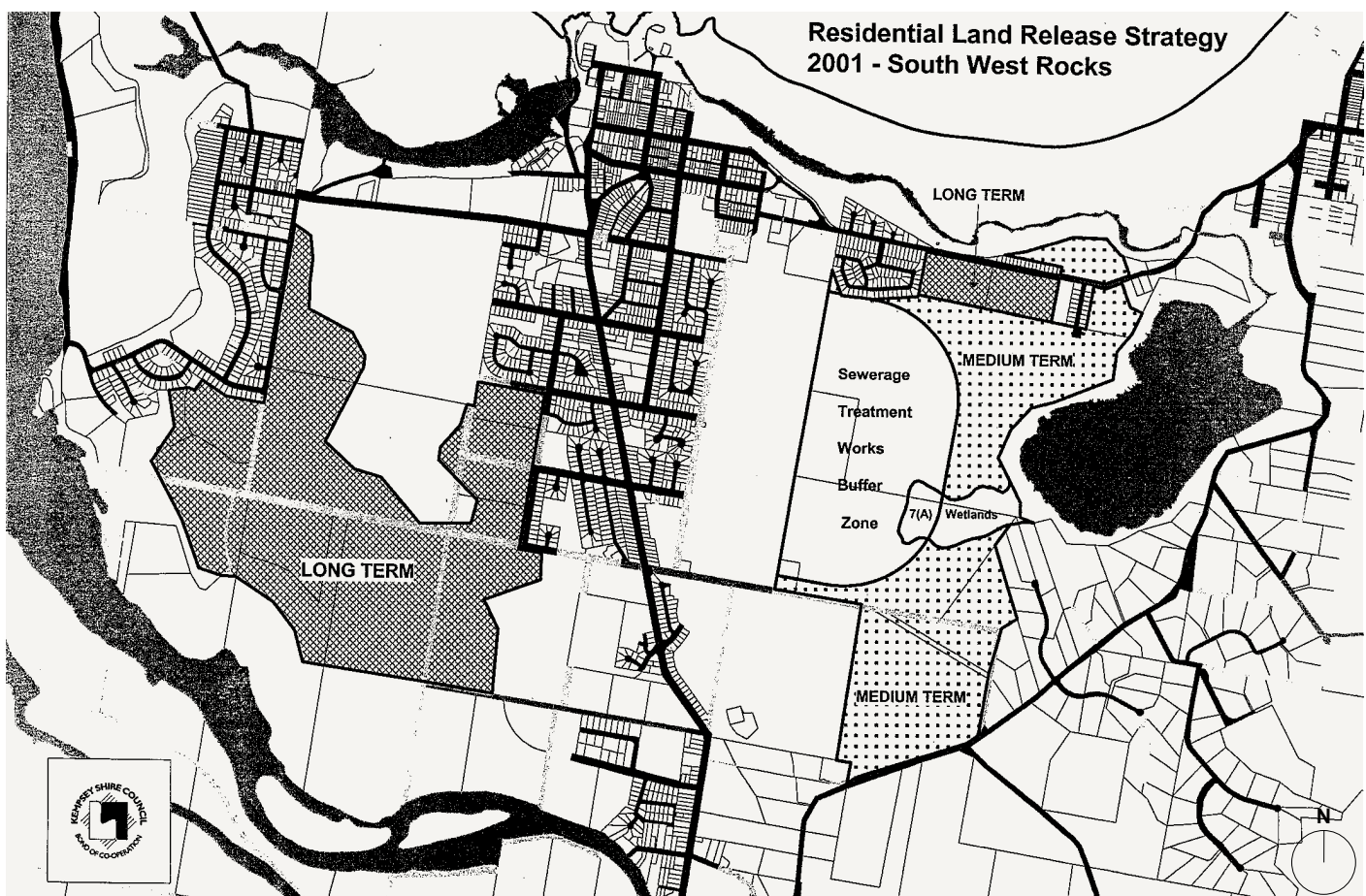


FIGURE 1.4.1 KEMPSEY COUNCIL RLRS LANDS PROPOSED FOR REZONING 1997-2002

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FIGURE 1.4.2 LEP ZONE LINE (DEVELOPMENT AND CONSERVATION)

1.4.2 Site Suitability

On 21 January 1997 Kempsey Shire Council resolved to rezone the lands located at the Saltwater Development Area, Phillip Drive & Belle O'Connor Street South West Rocks, for the purpose of residential development, in response to the increased population projected for the area in previous planning instruments. This rezoning supports the suitability of the Subject Site for the Proposal. The LES investigations identified the land suitable for development based on environmental considerations.

The lands were the subject of a Local Environmental Study (LES) as part of the rezoning process. The area proposed for rezoning incorporated the lands identified in the Schedule 2 Maps of the RLRS, within which the Subject Site was located (see **Figure 1.4.1**).

In October/November 2008 the proposed amendment to the Kempsey Shire Council Local Environmental Plan 1987 rezoning the lands known as the Saltwater Development Area was publicly exhibited, for the purpose of mixed residential and conservation uses.

The Subject Site is located within this area that has been rezoned. As stated previously the proposed Project Application will serve to meet the need for new dwelling lots on local, LGA –wide and regional scales. The projected population increases for the area are considered to be justification for the need to provide additional residential accommodation in South West Rocks.

It is considered that the suitability of the proposed Project Application for the subdivision of the land for the purpose of residential purposes is further justified by the resolution of Council for the preparation of the recent LES with the intention of rezoning for residential purposes.

The extensive investigations carried out as part of the Part 3A application including flora and fauna traffic, land capability (flooding, geotech, contamination, archaeological, noise/odour, social, water cycle management, visual and provision of services has shown the land to be suitable for residential development. Further, the subdivision design complies with the relevant planning controls and the planning framework.

1.4.3 Public Interest

The Proposal is considered to be in the public interest by providing additional housing for the Kempsey Shire Council area, in accordance with the Draft Mid-North Coast Regional Strategy and Kempsey Shire Council RLRS. By providing additional housing, the Proposal will contribute to the overall housing stock in the South West Rocks area, increasing access to a greater range of housing choice for the local population and in-migration population. As detailed in **Chapter 2** of this EA report, the Proposal includes the provision of 318 Torrens title residential lots which range in area from approximately 500m² – 922m². By incorporating a variety of land sizes, the Proposal provides greater housing choice for current and future residents, further increasing access to housing for a wider population.

The Proposal also provides quality open space areas, public domain and landscapes, that do not pose significant environmental or social impacts. This is largely as a result of the development area being situated within areas of the Site that have previously been cleared and have lower biodiversity quality.

Further, as advised by the Proponent Malbec, the construction of the subdivision works would have positive benefits to the local economy, generating 150 direct full-time equivalent jobs in the construction and wholesale industries, and 70 full-time equivalent jobs indirectly resulting from flow on impacts from the construction works on the retail sector.

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1.5 Alternatives

Throughout the master planning process, a number of options and alternatives were presented and considered for the Site. The development of these was driven by the need to provide the best possible design response to the environmental constraints of the Site.

The alternative design options that are discussed below fall into two broad categories, being stormwater management options and urban design options. The preferred option was influenced by factors such as environmental considerations, stormwater management, access and circulation within the Site, connectivity to adjoining areas, design for crime prevention and bushfire constraints.

1.5.1 Stormwater Management Options

As outlined in detail in **Chapter 5.2** of this report, an Integrated Water Cycle Management (IWCM) Plan has been developed for the Site, in order to manage a number of hydrological, flooding and stormwater impacts associated with the Proposal. The IWCM Plan proposes a combination of engineering solutions for the treatment of stormwater, conveyance of flows, groundwater replenishment, protection of built infrastructure and protection of surrounding wetland ecosystems. The fundamental engineering elements of the proposed IWCM Plan include the incorporation of roadside and central drainage swales, creation of an artificial wetland and construction of sub-soil drains.

The IWCM Plan identified two primary options for management of stormwater quantity and quality being provision of roadside and open space drainage swales or provision of a traditional piped drainage network. The topography of the Site is relatively flat and as a result has heavily influenced the stormwater management process selected for the Site. The need to balance the infiltration of stormwater into the groundwater system to maintain the hydrological regime to sensitive downstream habitats is also a driving factor.

The flat nature of the site limits the effectiveness and practicality of a piped drainage system, which would require significant quantities of fill to be imported to the Site. Major filling of the Site would alter the natural overland flows of the Subject Site which was considered an undesirable outcome and would have undesirable environmental impacts.

Provision of a Water Sensitive Urban Design (WSUD) approach incorporating road-side drainage swales along a number of north-south roadways was considered an optimum solution for the Site as their provision minimises the need for importation of fill and maintains the natural topography between adjoining residential lands to the south through the Subject Site to the conservation areas to the north that flow to the SEPP 14 wetlands within and to the northeast of the Subject Site, whilst providing water to landscaped and vegetated areas.

1.5.2 Design Options

A number of urban design options were explored during the master planning process. These options relate to the road network layout, access and circulation, bushfire, connectivity to adjoining areas and safety and security as discussed in detail below.

Perimeter roads vs allotments backing directly onto 7(b) zoned land. This option of backing lots directly onto 7(b) zoned land was considered for lots along the northern boundary of the Subject Site, however the preferred option of providing perimeter roads between the allotments and the 7(b) zone

was adopted. These roads act as Asset Protection Zones (APZ), provide ready public access to the 7(b) zone and protect the Conservation Area from private intrusion by urban areas that can occur if lots back onto Conservation Areas.

Road network configuration and external access. Access to the Subject Site has been provided via an extension to Belle O'Connor Street, which runs along the southern boundary of the Subject Site. Although not part of this Proposal, it is envisaged that as a result of future development to the north of the Subject Site, a road connection to Phillip Drive in the north will be created. The preferred road layout option supports this future connection.

Open space configuration. Open space within the development area, including the long strip of open space running adjacent to Road 8, as well as the integrated open space system incorporating swales that run north-south through the Site, have been situated in order to provide easy access to open space areas for all residents, as well as important habitat linkages. These vegetated linkages or fingers of open space extend out from the Conservation Area to the north of the site. This style and location of open space is preferable to alternative options of isolated pocket parks located in less central parts of the Site in an effort to increase connectivity to the adjoining Conservation Area. The linear solution also allows for the integration of pedestrian and bicycle paths within these open space areas, while offering attractive environments for future residents. A number of recreational facilities are also proposed within the 7 (b) zone providing passive open space, while also ensuring effective management of bushland, which would otherwise be unmanaged. The design intent of the open space configuration is simply to layer the various open space uses with the functionality of drainage and access services so that they are integrated, rather than dealt with as separate parts.

Tree retention. Within the development area, the trees located within the open space area adjacent to Road 8 are considered to be the most significant and as a result, are retained for amenity purposes. The subdivision layout was also designed to retain trees elsewhere within open space and road reserves where it is practicable. All trees and vegetation within the Conservation Area, which are considered to be of much higher habitat significance than those within the development area, are protected as part of the Proposal.

Internal road layout. The primary aim of the road layout design was to provide interlinking streets that followed a grid like pattern providing good legibility, permeability and connectivity for vehicles, pedestrians and cyclists. This approach was preferable to a road pattern that incorporates cul-de-sacs and meandering roads which would result in irregular shaped lots. The grid pattern has provided a uniform lot-layout that provides several north-south connections and east-west connections, and has allowed for the largely uninterrupted provision of drainage swales to facilitate the movement of stormwater across the site. Cul-de-sacs have been avoided and dead ends have been provided only where connections to future adjoining development are proposed.

1.5.3 Preferred Option

The preferred option for this Project Application is shown in **Figure 1.5.1** and has been selected based on the consideration of environmental and design outcomes.

The preferred design responds to the environmental constraints of the Site. In line with Kempsey Shire Council's recent LEP Amendment No. 55 (rezoning), the preferred option includes a Conservation Area, protecting the riparian corridor and SEPP 14 wetland in the north of the Subject Site. The design also responds to the flooding and drainage issues which occur in the area and integrates a water sensitive stormwater drainage solution for the Site.

The proposed drainage swale system water treatment elements which will improve the water quality of runoff before it enters the Conservation Area, and minimises the cut and fill required to construct a conventional drainage system, thereby minimising the overall environmental impacts from the proposal.

Integration of the major drainage swales into the final design was a key consideration ensuring easy maintenance and the prevention of it creating "dead space". The two major drainage swales will also serve as passive public open space, with the provision of pathways, essentially acting as corridors running through the Subject Site from Belle O'Connor Street to the Conservation Area in the north, which will also include passive recreational functions, including bush tracks, as well as other passive uses to increase the amenity of the natural areas.

The preferred option presents a subdivision layout which comprises a mix of lot types and sizes ranging from approximately 500m² to 922m², the majority being for development of single dwelling allotments, with some provision for dual occupancy development lots. This approach will help meet the needs of the changing local demographic. Census data shows the households in South West Rocks are primarily couples without children (56%), with couples with children households accounting for only 27% of the dwellings in the area (ABS Website 2006 data).

The design has considered connections to both existing and future residential land release areas, ensuring that the proposed subdivision is not isolated from other residential areas. Access has been provided to the west of Belle O'Connor Street, and provision has been made for a future connection to the north, toward the South West Rocks town centre via Philip Drive. The designed access to the Site is important for traffic reasons and also for the purpose of emergency access/egress from the Site, in particular for bushfire.



FIGURE 1.5.1 LOT LAYOUT PLAN

2.1 Subject Site

The Subject Site is located at Belle O'Connor Street, South West Rocks, within the Kempsey Shire Council local government area (LGA), on the north coast of New South Wales (NSW). The Site is comprised of Part Lot 2 in Deposited Plan 1128633, Lot 1 in Deposited Plan 1128633 and Lot 2 in Deposited Plan 792945.

Currently the Site is unused vacant land. Much of the northern portion of the Site is covered by thick heathland and dense scribbly gum forest. The southern portion of the Site is largely cleared, with remnant trees scattered throughout. The Site has largely been utilised for agricultural and grazing purposes in the past. An existing rural dwelling is located in the southern portion of the Site.

Located at the base of local foothills, the Site is bound in the south partly by rural lands and partly residential (eg. Seascopes Grove), which are progressively being rezoned and developed for urban residential uses. The northern parcel was the subject of a recent rezoning as part of amendment No.55 to KLEP, which was gazetted on 14 August 2009. To the west of the Site is the South West Rocks Golf Course and to the east of the Site is existing rural residential lands. Further to the north and east of the Site is the Hat Head National Park and the Pacific Ocean. Surrounding land uses include:

- » East - land zoned 1(c) Rural (Small Holdings) C. Some rural-residential dwellings existing to the east of the Site.
- » South - the recently approved residential development of 'Seascopes Grove'. Construction for the first stage of this development has been completed. The balance of the land is zoned rural but is earmarked for rezoning in the medium term (ie. by 2003) in the RLRS.
- » West – the South West Rocks Golf Course is located to the west of the Subject Site. A right-of-way easement road providing access to the South West Rocks STP runs along the eastern boundary of the Golf Course.
- » North – Saltwater Creek and Lagoon are located immediately to the north-east with an area categorised as a SEPP 14 wetland. The land to the north of the Subject Site has also been rezoned as part of KLEP 1987 Amendment No. 55.

Figure 2.1.1 Site Map illustrates the Subject Site within its immediate locality.

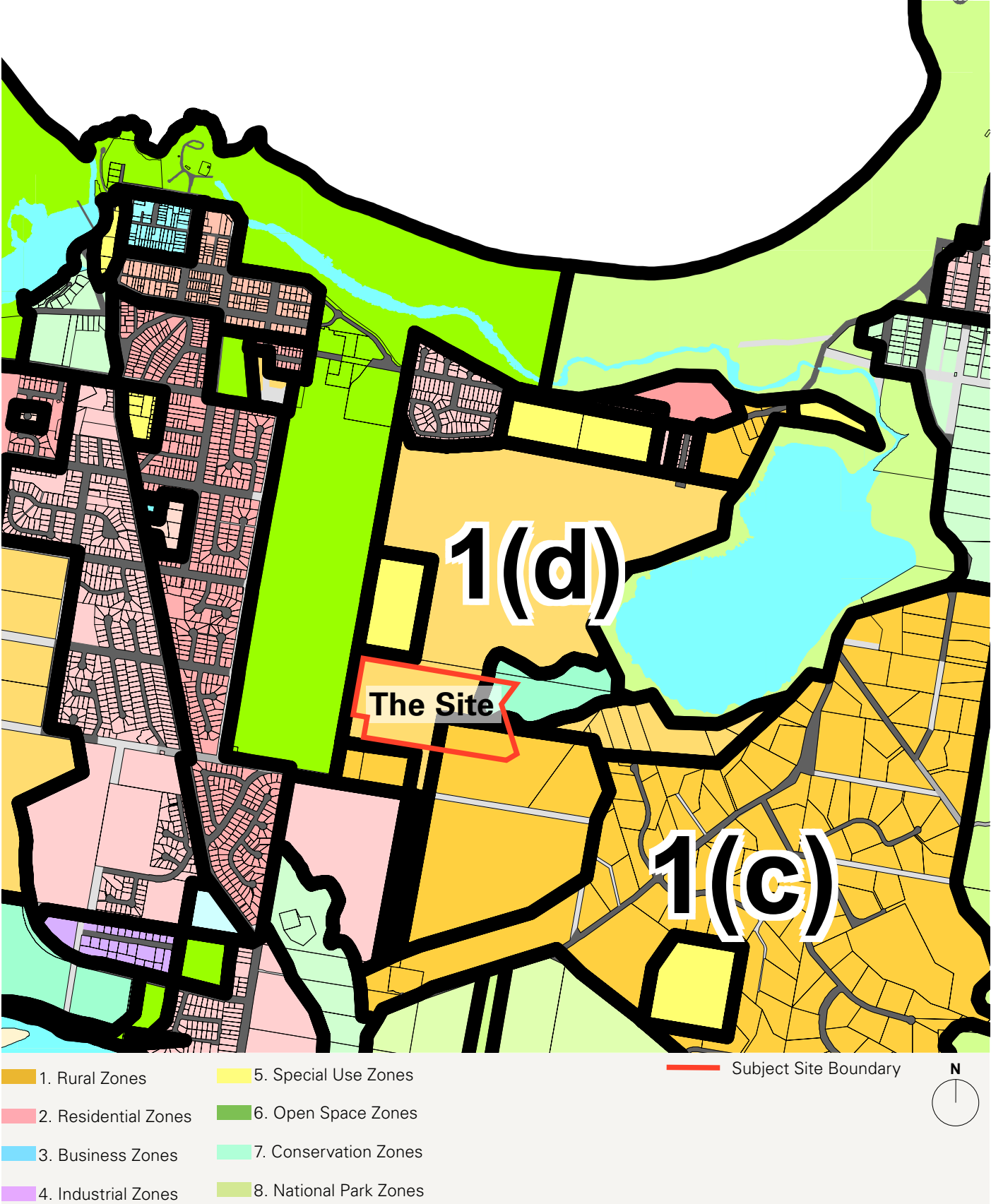


FIGURE 2.1.1 PREVIOUS ZONING UNDER KLEP

Project Design

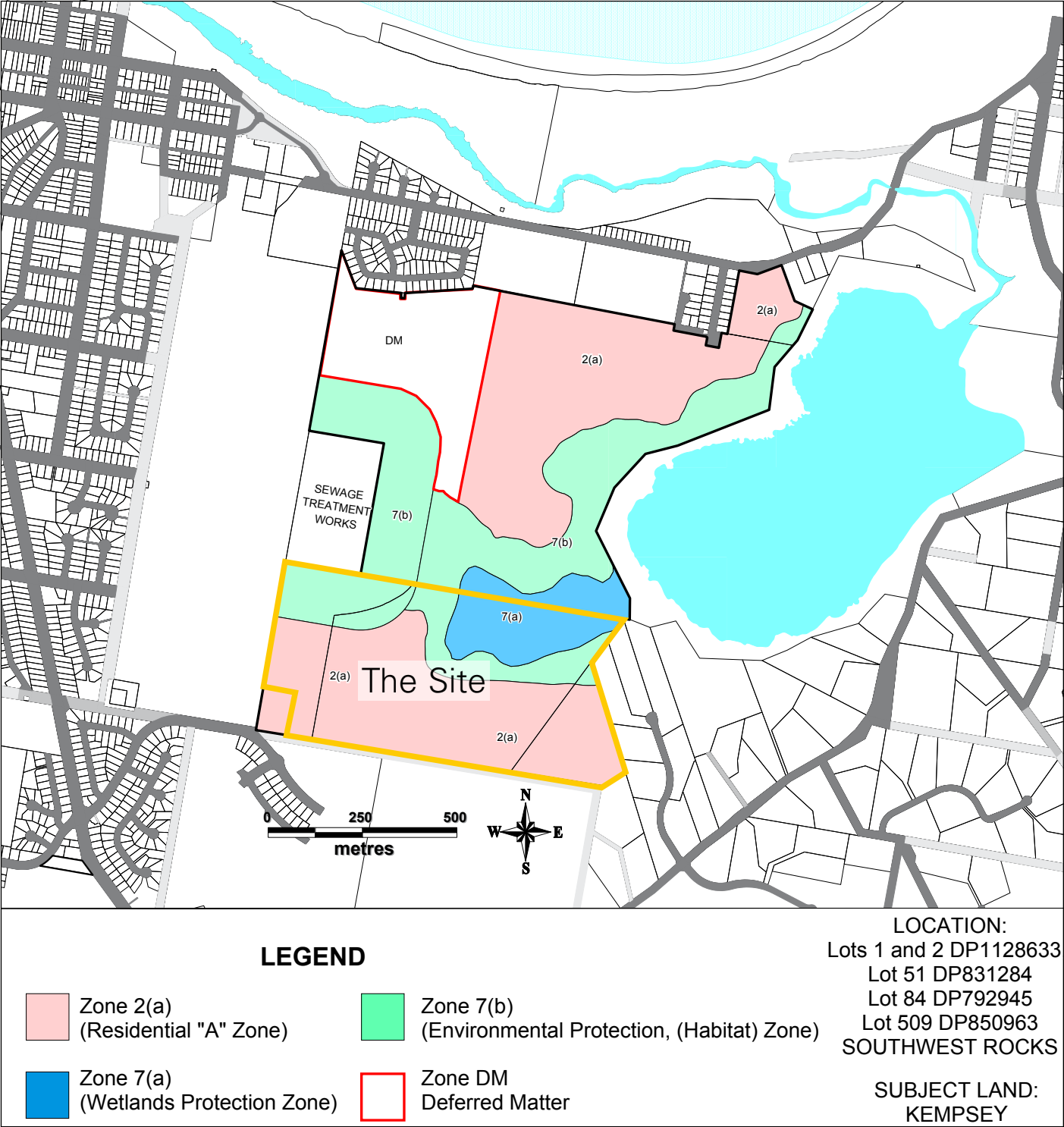


FIGURE 2.1.2 RECENT REZONING UNDER KLEP AMENDMENT NO. 55

2.1.1 Local Context & Character

Located on the mid-north coast of NSW near the mouth of the Mceleay River, South West Rocks is a small town situated on a north facing beach and dune system having a population of approximately 4,000 people (2006 census). It is approximately 37km north-east of Kempsey which is a major regional town. The Pacific Highway runs through Kempsey, with access to South West Rocks being along South West Rocks Road which intersects at the Pacific Highway. South West Rocks is reliant upon industries including tourism, agriculture and horticulture. The commerical town centre is located adjacent to Trial Bay and the Macleay River floodplain.

A major local topographical feature of South West Rocks is the coastline and associated beaches located to the north and east of the town, a low-scale coastal mountain range along the eastern seaboard and the mouth of the Macleay River. These features distinguish South West Rocks as a desirable holiday destination, located between the towns of Port Macquarie to the south, Coffs Harbour to the north, with the Macleay River to the west.

Prominent landscape features include Smoky Cape Range, consisting of several steep hills adjacent to the coastline, low-lying areas of the Saltwater Lagoon and Creek catchment, and the Macleay River floodplain to the west.

Landuse in the local area is predominantly residential however a large proportion of the land surrounding the beach is National Park land. Amenities including public swimming pools, ovals, and sporting facilities, the National Parks with associated walking tracks, and the Trial Bay Gaol provide a plethora of activities available to residents and tourists alike. Retail and community facilities and services currently available in South West Rocks include:

- » a range of sporting facilities, including a bowling club, public swimming pool, tennis and squash courts, and 2 hectares of sports fields adjacent to the South West Rocks Country Club;
- » a medical centre adjacent to 'The Rocks' Shopping Centre, with the nearest base hospital located in Kempsey;
- » foreshore open space areas in the form of parks and beachside areas at Horseshoe Cove and Front Beach;
- » primary schools and preschools, including South West Rocks Public (Gregory Street), with secondary schooling available in Kempsey;
- » a waste transfer station located on Arakoon Road; and
- » a Community Hall and library in the town centre.

Tourist related facilities within the South West Rocks local area include a golf course, Country Club, surf club, caravan park, Trial Bay Gaol and water inlets connecting to the Saltwater Lagoon which is identified as a SEPP 14 wetland.

Several areas of relatively new residential development exist within South West Rocks in the vicinity of the Subject Site. Development generally consists of low density residential subdivisions with brick veneer dwellings, with some dual occupancy and medium density development.

Figure 2.1.2 Local Context Map provides a description of the local context of the Subject site.

Project Design

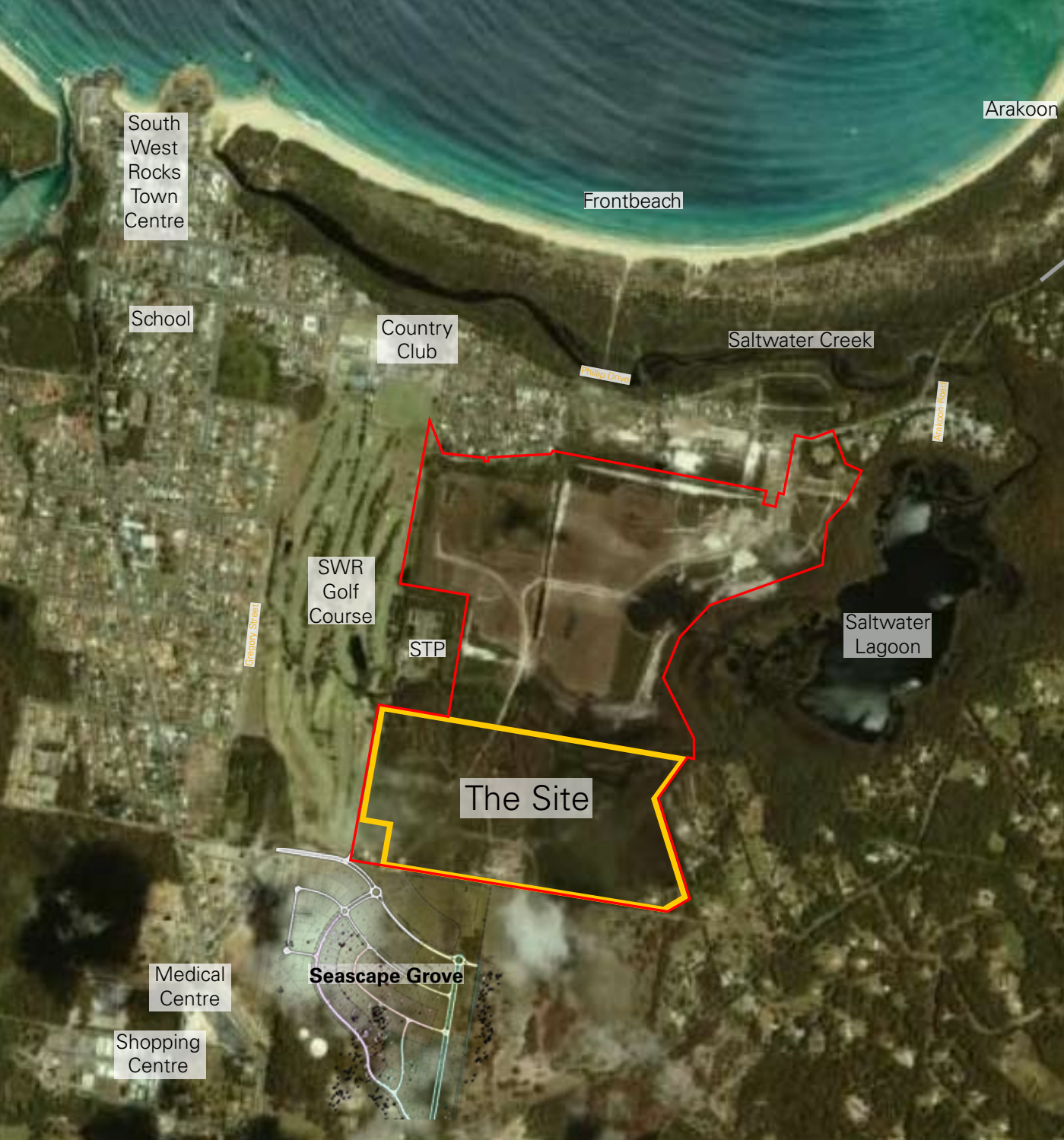


FIGURE 2.1.3 LOCAL CONTEXT MAP (SOURCE: GOOGLE EARTH)



FIGURE 2.1.4 REGIONAL CONTEXT MAP (GOOGLE EARTH)

2.1.2 Regional Context & Character

Kempsey Shire Council is situated in the heart of the mid-north coast with the Macleay River valley producing the desirable features of sand, bush, surf and sun, located approximately halfway between Sydney and Brisbane.

The regional landscape is dominated by relatively flat coastal and riverine plains of the Macleay Valley, grading to the steep slopes of the Great Dividing Range to the west. The Macleay River, a major river on the NSW north coast, flows past the town of Kempsey and enters the Pacific Ocean at South West Rocks, which is the major tributary passing through and around the township. The coastline in the area is dominated by prominent headlands, long sandy beaches and dunal wetlands. Several ranges of hills occur along the coast.

Kempsey Shire is home to approximately 30,000 people and provides a variety of industries including agriculture, horticulture and tourism. Fruit, dairy products, potatoes and seafood are just some of the items with an industry base in the local areas.

Figure 2.1.3 Regional Context Map provides a description of the regional context of the subject site.

2.1.3 Topography

The Subject Site is relatively flat with a fall across the Site from south to north/ northeast towards the creek. Maximum site elevations are approximately 5.0 – 5.5 metres AHD and minimum site elevations in the vicinity of the creek are 1.0 – 1.5 metres AHD. Rising to the east of the Site to a height of 311 metres is the Smoky Cape Range, then dropping to the sea along the eastern coastline. With a peak at 311 metres on Big Smoky, the range falls away to Monument Hill which peaks at 70 metres located in the north on the peninsula that is Laggars Point.

The Site drains to Saltwater Creek and Saltwater Lagoon to the north and northeast of the Site respectively, which eventually joins the ocean at Monument Point, Front Beach.

Figure 2.1.4 Topography Map illustrates the contours across the subject site and the surrounding area of South West Rocks.

2.1.4 Climate

The climate in the area is sub-tropical with lower rainfall and temperatures representative of the winter conditions with warmer and more tropical rainfall conditions experienced in the summer months. Average maximum and minimum summer temperatures are 28 and 18 degrees Celsius respectively, and winter maximum and minimum averages are 19 and 6 degrees Celsius respectively. Average annual rainfall is 1,220mm.



FIGURE 2.1.5 TOPOGRAPHY MAP

2.1.5 Future Character

Existing trends in population, tourist activity and findings of strategic planning reports suggest future development in the vicinity of South West Rocks is likely to consist primarily of residential development and tourist accommodation. Commercial development would support such growth, including further retail areas and service industry. The pressures for residential development will generate demand for:

- » further low density residential subdivisions;
- » gradual redevelopment of older residential areas as property prices rise;
- » light industrial development, although the areas available for further industrial development in the South West Rocks locality are constrained;
- » expansion of local community services and amenities, including medical and sporting facilities; and
- » expansion of commercial centres including town centre retail areas and neighbourhood shopping centres.

The existing residential character of SWR generally consists of low density dwellings, including dual occupancies, with areas of medium density development. As detailed in **Section 2.2.2.1**, design guidelines have been developed for this Proposal. These guidelines allow flexibility in the design and siting of homes, and whilst ensuring that the overall visual quality of the locality is enhanced. The guidelines have been designed to work with existing development controls, namely, DCP 22, ensuring future residential development within the Site is consistent with the existing local character and scale of development within SWR.

2.2 Project Design

2.2.1 Site Constraints & Opportunities

The Subject Site was recently investigated as part of a local environmental study (LES) of a larger area of land for the purpose of re-zoning. The LES examined the LES Study Area for the purpose of identifying the developable area and that which should be conserved for environmental reasons. The LES recommended the Subject Site to be developed as a 65/35 split of residential/environmental conservation respectively.

A site analysis has been undertaken to map the constraints and opportunities on the site to ensure that the Proposal responds to the environmental constraints of the Site and mitigates these where appropriate. Constraints identified for the Subject Site include:

- » a portion of the Subject Site is determined by the Saltwater Creek and Lagoon Estuary Management Plan to be within the 1:100 year ARI flood line requiring a 50 metre buffer to protect downstream habitat and SEPP 14 wetland which determines the developable area on the Subject Site;
- » a portion of the Site in the north west is within the 150m buffer from the Sewage Treatment Plant boundary to contain odour and noise effects to an acceptable level;
- » protection of the water quality and hydrological regime to the habitat area within the 7(b) zone which includes a SEPP 14 Wetland and a potential endangered ecological community (EEC);
- » the need to mitigate effects on the threatened fauna species found within the 7(b) zone;

- » the need to convey stormwater flows through the development area from two catchments to the south of the site, including the Seascope Grove development;
- » the relatively flat nature of the site requires an integrated stormwater solution as part of the site design utilising WSUD principles;
- » presence of soil types characterised by poor drainage and high run off, which have potential for foundation hazards if not suitably managed;
- » management of a relatively high water table that has the potential to have effects on road pavements, footing systems and site drainage;
- » management of indigenous archaeology items if found on the Site during construction;
- » maintenance of the hydrological regime to the existing wetland areas in the north of the Site which may consequently impact on habitats within the 7(b) zone;
- » potential bushfire risk from surrounding vegetated areas;
- » possible exposure of acid sulphate soils at depths greater than 2 metres; and
- » possible risks from nearby potential mosquito habitats for future residents.

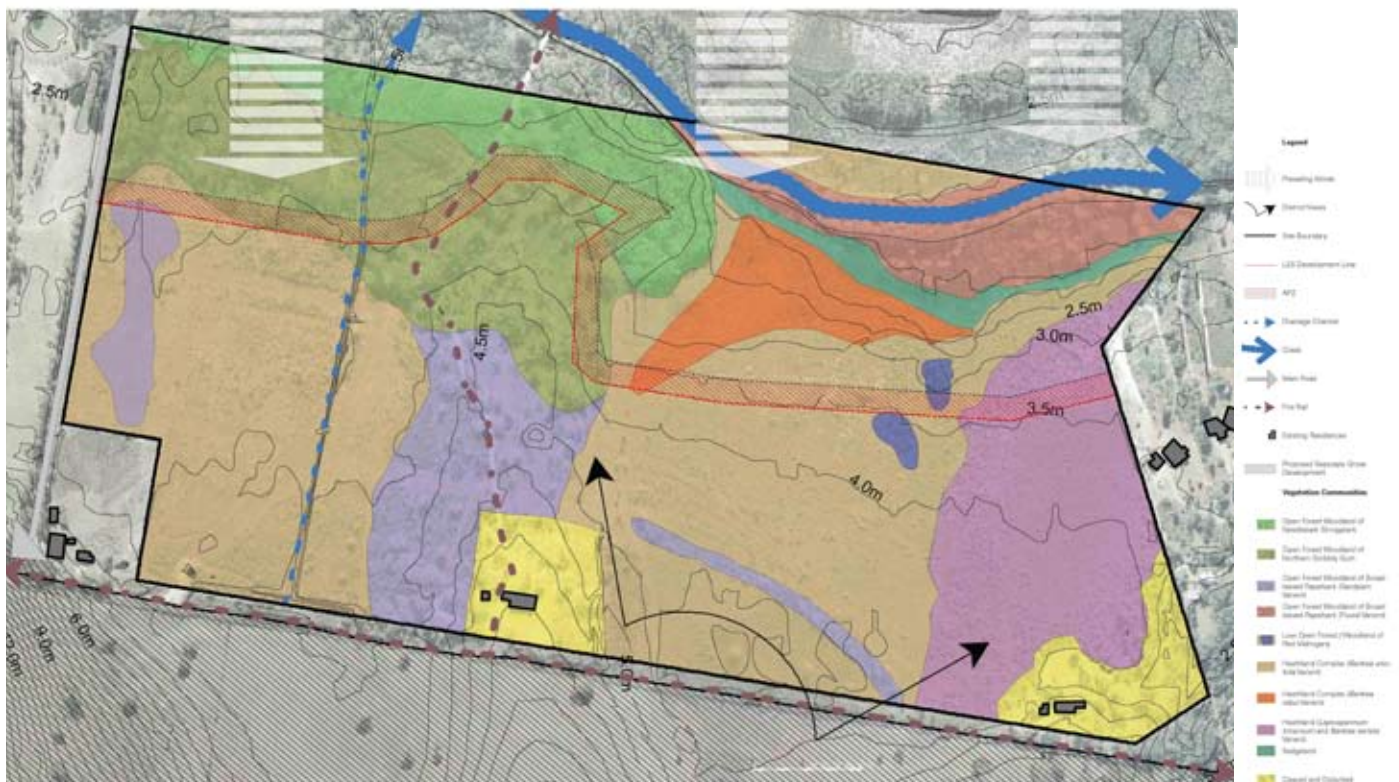


FIGURE 2.2.1 SITE ANALYSIS

SEE APPENDIX G FOR FULL SCALE PLAN

In addition to site constraints, a number of opportunities have been identified which have influenced the design process including:

- » controlled public access to the 7(b) zone to the north of the development area through the provision of bush tracks and information signage;
- » a relatively flat site which maximises the potential for the integration of WSUD;
- » views to the 7(b) conservation zone and the coastal range of Big Smoky and Little Smoky beyond;
- » potential for the maximisation of solar passive design and natural ventilation from coastal sea breezes and solar access;
- » the potential for increased pedestrian and cycle access to various local points of interest including the Trial Bay Gaol, the beaches and the village atmosphere of the South West Rocks township;
- » provision of a more direct road and pedestrian/cycleway access for the Proposal and residential areas south of the site to the coastal foreshore and village centre with a future connection through to Phillip Drive; and
- » the Site represents the last remaining release area within South West Rocks that is relatively unconstrained and is capable of providing land to accommodate the townships future growth.

2.2.1.1 MOSQUITO RISK

The Site is adjacent to wetland areas and as such, there is a risk of potential exposure to diseases carried by certain species of mosquito which may breed in this habitat. Measures that seek to reduce the potential nuisance and discomfort caused by these insects are required to be considered.

Potential mosquito risk has been considered within the LES prepared in conjunction with the Sites rezoning application. This LES mosquito assessment identifies appropriate measures that may combat mosquito risk. The design of the Proposal has responded to these measures where appropriate, as outlined in Table 2.1.

Table 2.1 Potential Mosquito Risk and Proposal Design Response

LES Identified Measure	Design Response in EAR
Creation of open buffers around identified mosquito breeding areas, to minimise dispersal of the insects.	The creation of the 7(b) Conservation Zone at the north of the Site provides a buffer between the Proposal and the Saltwater Creek and Lagoon to the north and north-east.
Identifying land uses suitable for areas between new urban areas and the breeding habitat.	The 7(b) Conservation Area has been identified as a suitable use between the urban area and Saltwater Lagoon and Creek. The presence of existing rural residential properties to the north-east also provides a buffer to the Lagoon.
Provide cleared breaks, or tree-thinned corridors in heavily vegetated areas.	The subdivision design provides for a perimeter road and cleared Asset Protection Zone (reduced vegetation area) between the open space areas and any heavily vegetated areas.
Minimise or eliminate disruption to natural drainage lines when undertaking earthworks.	The two formed channels through the Site drain upstream catchments and ensure there is no trapped water. These channels will be appropriately landscaped to minimise mosquito risk.

LES Identified Measure	Design Response in EAR
Eliminate water impoundment when creating water bodies or wetlands.	The design guidelines for the artificial wetland created at the end of the formed channel incorporate standard practice for minimising mosquito breeding risk including: » batters around constructed wetlands will be as steep as possible to minimise shallow water; » normal water levels will be maintained at a minimum of 500mm except for margins; » basin margins will not be planted with shrubs or trees to improve opportunities for wind action to keep water surface disturbed; » aquatic macrophytes will not be planted in more than 60% of shallow water around the margin (will be clumped with separations of water).
Avoid increasing tidal influences.	The Proposal will not increase tidal influences.
Consideration of prevailing winds in the design and layout of built form.	The road and lot layout optimises aspect for capturing prevailing winds (i.e. primarily from the north to north-east), with roads extending from the northern edge of the Proposal running north-south into the Site and a predominance of east-west lots (with their wider axis perpendicular to the wind direction) to capture breezes.
Landscape with tall, thinly foliated trees and avoid any form or dense landscaping at or near ground.	The landscape design and species selection has ensured that vegetation consists of predominantly tall, thinly foliated trees and avoids any dense landscaping at or near ground level.
Ensuring fitting of insect-proof screens to indoor (houses and apartments) and outdoor (patios and decks) habitable areas.	The design guidelines include recommended measures for minimising mosquito breeding risk including: » Standard-type mosquito screening should be fitted to windows and external doors to restrict entry of mosquitoes. » Rainwater tanks installed within the Proposal should be protected by having mosquito-proof screens fitted to openings such as inspection openings and overflows. Screens should be made of durable material such as brass, copper or stainless steel. Mesh size should not provide an aperture of more than 1mm.

2.2.2 Design Philosophy

The proposed residential subdivision has been designed with due consideration paid to several site and design factors.

Conservation: The Subject Site is located on a flat expanse of land at the western base of Big and Little Smokey, within the Hat Head National Park. The Site has been subject to a Local Environmental Study (LES) which encompassed a much larger Study Area. As a result of the LES process, approximately 14.8 hectares in the north of the Site is to be re-zoned 7(b) for environmental protection, to preserve the riparian area around Saltwater Creek, which runs into the SEPP 14 classified wetland of Saltwater Lagoon, before being discharged into the sea to the north of the Site.

Topography and Views: The orientation of the subdivision has been selected to maximise vistas toward the national park in the east, including Big and Little Smokey, and the 7(b) vegetation zone in the north. Due to the flat nature of the Site, it will be difficult to attain views for future dwellings. The opportunity for views to the surrounding landscape has been achieved through the orientation of as many lots as possible to the east and north. Internally where lots overlook streets relief has been provided in the landscape. The two large drainage swales, together with the linear open space corridor provided in the centre of the Site provide corridors of plantings that reflect the natural environment of the site, and a visual relief to the future residences.

Breezes and Solar Access: The Site has prevailing northern and easterly breezes from the ocean to the north and east. The design solution for the Site optimises solar access and breeze capture through orientation, aspect and landscape.

Landscape and Visual Amenity: The streetscape of the proposed subdivision will use plantings of only native endemic species. Plant species for landscaping works have been selected for suitability of form and scale, appropriateness to local vegetation character, appropriateness to micro-climate, maintenance of sightlines and Crime Prevention Through Environmental Design (CPTED) criteria. Being conscious of the fact that as the Site is progressively developed, views of rooftops of dwellings will replace those of the existing natural landscape, the streetscape has been provided with a robust street tree planting scheme, incorporating:

- » tree heights at least 50% higher than the heights of the proposed buildings; and
- » trees with dense foliage, e.g. *Melaleuca quinquenervia*, or broad canopies, e.g. *Eucalyptus racemosa*, both at reasonably close spacings, e.g. 10 – 12m centres.

Additionally, the site entry, adjacent housing and public open space areas within the Seascope Grove Development, South West Rocks Golf Course, will be planted with street trees as described above, in conjunction with a partial screen planting layer between the ground and lower extent of the mature canopy.

WSUD: The relatively flat topography of the Subject Site, has resulted in constraints on the stormwater engineering provisions for the future development of the site. In order to minimise the requirement for cut and fill to accommodate a traditional drainage system on site an alternative solution was sought. The application of a WSUD approach resulted in the provision of drainage swales on Site, both as street drainage, and as a means of conveying major stormwater flows from the adjoining development to the south of the site. The Subject Site has a slight fall from south to north, with water flowing toward Saltwater Creek, located in the 7(b) zone on the northern portion of the Site. A series of north south

swales have been designed into the subdivision layout doubling as vegetation corridors. There are two major drainage swales which will convey the major stormwater flows from the adjoining urban development to the south through the subject site to an existing drainage depression, and a constructed wetland located within the 7(b) zoned area of the Subject Site. These swales will provide a degree of filtration as the water passes through. They will also be vegetated with endemic plant species and incorporate a cycle way/pedestrian link with the plantings, facilitating fauna movement by creating vegetated linkages from the 7(b) zoned lands in the north, through the Subject Site.

Connectivity: The grid-pattern of the subdivision facilitates clearly defined vehicular and pedestrian access to and through the Site. Perimeter roads along the northern and southern boundaries, together with a central east-west spine road, provide a continuous connection between all the north-south cross streets through the Site, enabling quick and easy access/egress from all areas of the Site.

The provision of a future connection to the north in the direction of Philip Drive, together with the formalisation of Belle O'Connor Street, acts to tie the Subject Site into the existing road network of South West Rocks. Belle O'Connor Street will be connected into Gregory Street, which is the main road from the south into the South West Rocks town centre.

The major north-south connection through the site includes a major 16 metre wide drainage swale within the road reserve. This swale includes a pedestrian/cycle path linking the built area of the Subject Site with the 7(b) conservation area in the north. The pathway, creates a continuous link from the residential areas into the 7(b) zone, and follows the asset protection zone, along the boundary of the 7(b) zone, to the proposed constructed wetland in the east. The network of paths provides east-west connection across the Site, and provides access to the area in the north which can be used for passive recreation by future residents.

2.2.2.1 DESIGN GUIDELINES

The Proposal has been designed to be a liveable residential environment seeking good integration between individual dwellings and the overall coastal landscape. In order to ensure this, design guidelines have been developed for the Proposal. These guidelines allow flexibility in the design and siting of individual homes, whilst ensuring that the overall visual quality of the locality is enhanced.

The Guidelines, which are included as **Appendix E** of this EA, provide guidance for the future character and built form for development within the Subject Site and outline controls for street frontages, scale, building envelopes, energy and water efficiency and safety.

While the design guidelines have been developed specifically for the Proposal, they are provided as a guide only for use during Council's approvals process for future development. In this regard, these guidelines should be read in conjunction with all planning control documents that may apply to the Subject Site including Council's LEP, Council's DCP's, specifically DCP 22 – Local Housing and the *NSW Planning for Bushfire Protection Guidelines*. This ensures consistency in all future development within the South West Rocks area, while also demonstrating consistency of the Proposal and associated future development with the character of existing surrounding development. As discussed in detail in **Chapter 3** of this EA, the Proposal is consistent with the *Coastal Design Guidelines for NSW*.

Project Design



FIGURE 2.2.2 SUBDIVISION PLAN

SEE APPENDIX G FOR FULL SCALE PLAN



FIGURE 2.2.3 LANDSCAPE PLAN

SEE APPENDIX G FOR FULL SCALE PLAN

Project Design



FIGURE 2.2.4 STAGING PLAN

SEE APPENDIX G FOR FULL SCALE PLAN

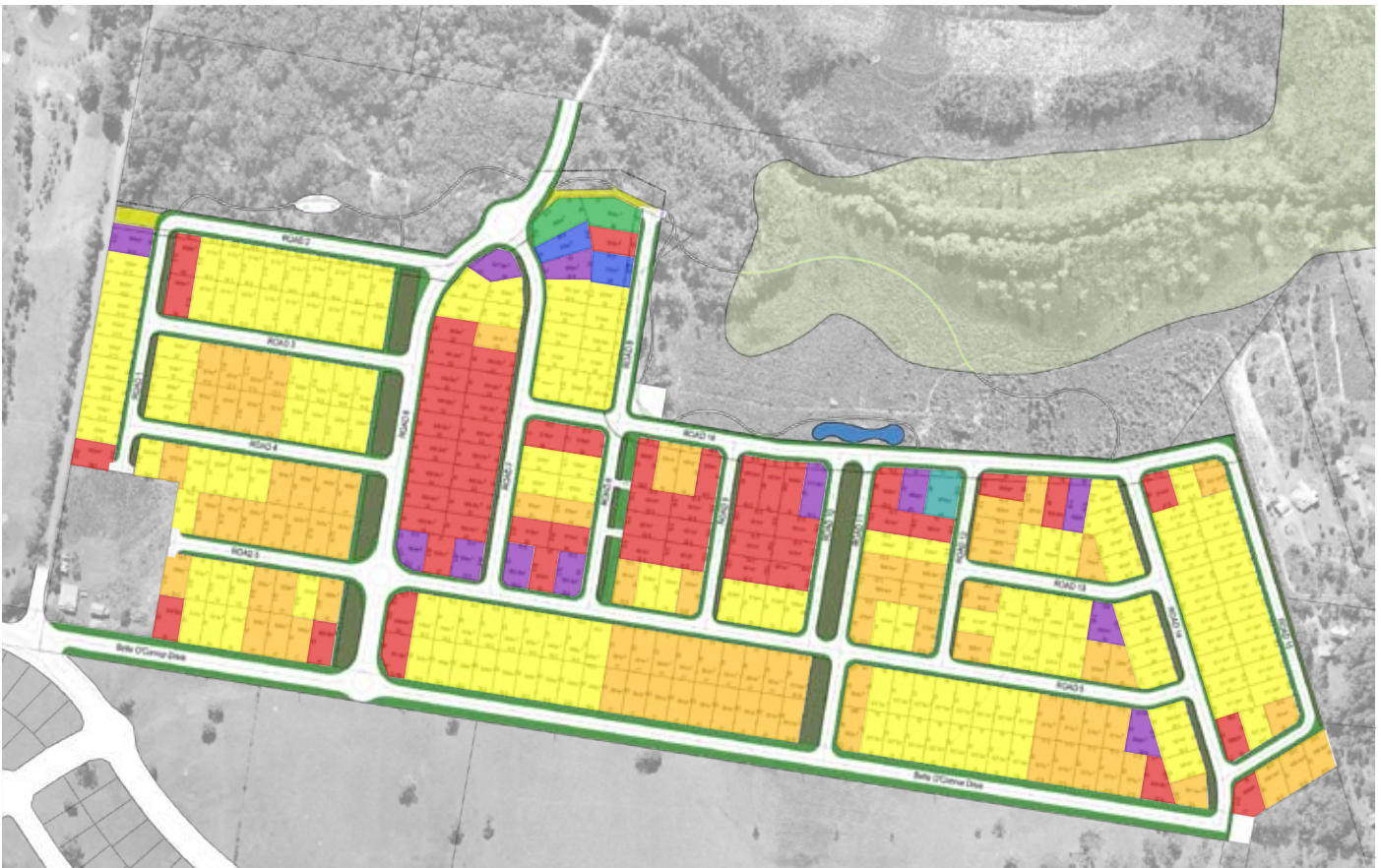


FIGURE 2.2.5 LOT SIZE PLAN SEE APPENDIX G FOR FULL SCALE PLAN

SEE APPENDIX G FOR FULL SCALE PLAN

Project Design



FIGURE 2.2.6 BUILDING ENVELOPE PLAN

SEE APPENDIX G FOR FULL SCALE PLAN

Project Design



Note: all bike paths to be 2.5m wide, all footpaths to be 1.5m wide.



FIGURE 2.2.7 INDICATIVE SECTIONS

SEE APPENDIX G FOR FULL SCALE PLAN

2.2.3 Subdivision Pattern

A number of factors have influenced the subdivision plan design, with a primary influence being the Subject Sites relationship to surrounding land. A subdivision plan has recently been developed for land to the south of the Subject Site. Given the changing nature of landuses in the area, the master plan for the Subject Site has sought to integrate as much as possible with future uses and development on adjoining and nearby land.

2.2.3.1 LOT SIZE AND LAYOUT

The proposal seeks approval for the subdivision of the Subject Site into 318 Torrens title allotments. The proposed allotments vary in size from a minimum of 500m², to a maximum of approximately 922m². The majority of allotments proposed have a site area of between approximately 500 m² and 550m². Allotment frontages range from 15.5 metres to 30 metres. The breakdown of lot sizes and numbers are illustrated in **Figure 2.2.5** (also see **Appendix G**) and listed as follows:

- » 160 Lot Type 1 (500 – 549 m²);
- » 84 Lot Type 2 (550 – 599 m²);
- » 57 Lot Type 3 (600 – 649 m²);
- » 12 Lot Type 4 (650 – 699 m²);
- » 2 Lot Type 5 (700 – 799m²);
- » 1 Lot Type 6 (800m² - 899m²); and
- » 2 Lot Type 67 (900m² +).

The block pattern of the Proposal responds to the topographic character of the site and provides a modified grid structure with a legible hierarchy. Blocks have been orientated to maximise opportunities to provide views and more energy efficient houses through the capturing of sea breezes and solar access.

As outlined in **Figure 2.2.3**, a number of lots have been identified for possible dual occupancy development, being corner lots, or lots with a frontage of 20m+. While these lots have been earmarked for potential dual occupancy development, the suitability of these sites to accommodate such development is to be assessed on a site by site basis as part of future development applications.

2.2.3.2 ROAD LAYOUT AND STREET HIERARCHY

The subdivision pattern also includes provision for vehicular site access and an internal road network. One vehicular access point has been provided to the Site via an extension of Belle O'Connor Street on the southern side of the Subject Site. In addition to this access point, provision has been made for the potential connection to future residential development to the north of the Subject Site through to Philip Drive in the north. Street hierarchy for the Proposal is as follows:

- » **Local streets** - characterised by areas in which the residential environment dominates. Traffic volumes and speeds are generally low, with pedestrian movements being encouraged and cycling generally being provided on-street. Elements such as street length, parked cars, landscape design, built form and general activity along the frontage, control vehicular speed limits.
- » **Collector streets** - generally carry higher traffic flows as they collect traffic from access streets. Restrictions on traffic volumes and vehicular speeds, as well as elements such as street alignment, parked cars, street length, intersection design and built form helps control vehicular traffic speeds and uphold residential amenity and safety.

All local streets within the Subject Site are generally 7-9 metres wide carriageway (with local accessways having 6m wide carriageway), while the main collector roads within the Site are 11 metres wide carriageway. The subdivision plan proposes three roundabouts within the internal road network, with a fourth roundabout being proposed at the intersection of existing Belle O'Connor Street and the proposed Belle O'Connor Street extension.

2.2.3.3 SWALES

The Proposal integrates a network of roadside swales and two main drainage swales, designed to improve stormwater quality and allow considerable infiltration, and direct flows downstream to end of line treatment structures. As well as providing important water treatment functions, these swales, which will be vegetated with endemic plant species will also provide habitat for fauna and act as vegetation corridors through to the Conservation Zone and SEPP 14 wetlands in the north of the Site. Typical swale sections are illustrated in **Figure 2.2.2**.

2.2.3.4 PEDESTRIAN AND CYCLE PATHS

The development is to be bicycle and pedestrian friendly, as illustrated in **Figure 2.2.2**, and incorporates the following:

- » physical infrastructure, such as on and off-road cycleways and pedestrian pathways;
- » bicycle friendly streets throughout;
- » passive links to the Conservation Area and SEPP 14 wetlands, with possible future links to the foreshore areas.

2.2.4 Landscape Plan

A Landscape strategy including native street tree plantings and landscaping for drainage swales has been designed for the Proposal. Design of the Landscape Plan (see **Figure 2.2.2** and **Figure 2.2.3** and **Appendix G**) was influenced by a number of elements including:

- » desire to maintain existing vegetated character of the Subject Site and surrounding area;
- » specification of vegetation that will improve connections to the 7(b) zoned land to the north of the site;
- » specification of appropriate plantings within drainage swales in order to provide water treatment functions;
- » specification of street trees in order to provide streetscape amenity;
- » design of streetscape planting that complies with the principles of CPTED by ensuring good visibility and separation of vegetation in the public domain.

2.2.4.1 RECREATION FACILITIES

A number of recreation areas are integrated within the Proposal as follows:

1. Bushland park. Situated on a bike path which winds through the forest woodland area within the north western portion of the Conservation Zone. This informal bushland clearing includes picnic facilities.
2. BBQ area and playground. The BBQ area, located at the north of Road 8 consists of an informal bushland clearing with the potential for formal parking, given its proximity to the Road. The playground, located on the corner of Road 16 and Road 8 contains casual playground equipment and seating.

- 3. Water treatment area. This stormwater treatment pond, located to the north of Road 10 and Road 11 is to be vegetated in a naturalistic aesthetic. A path winds around the edge of the treatment area and seating is incorporated into the landscaping.
- 4. Linear open space corridor. This centrally located green bike corridor, located adjacent to Road 8 and connecting Roads 5 and 16 consists of a bike path and informal planting, as well as retention of existing trees where possible.

2.2.5 Staging

The Proposal is to be staged as illustrated in **Figure 2.2.4** (also see **Appendix G**) to progress development from Belle O'Connor Street in parcels extending from north to south and progressing generally in an easterly direction, while deferring development of the land on the west of the Road 6. A total of thirteen (13) stages are proposed. This staging program demonstrates a logical development pattern with regard to the location of existing road connections and sewer and water connections, and will ensure orderly and flexible timing for release of land parcels in response to market conditions.

Table 2.2 Proposed Number of Lots Per Stage

Stage	Number of Lots
Stage 1a	15 Lots
Stage 2	27 Lots
Stage 3	16 Lots
Stage 4	23 Lots
Stage 5	20 Lots
Stage 6a	19 Lots
Stage 6b	32 Lots
Stage 7a	29 Lots
Stage 7b	53 Lots
Stage 8	30 Lots
Stage 9	27 Lots
Stage 10	12 Lots
Stage 11	13 Lots

2.2.6 Open Space Management

Negotiations are currently being undertaken between the Proponent and Kempsey Shire Council regarding the management of open space areas within the Proposal. In this regard, the Proponent will enter into a Voluntary Planning Agreement (VPA) with Kempsey Shire Council under Section 75F(6) of the EP&A Act with regard to the management and dedication of the 7(a) and 7(b) zoned Conservation Area on the site. The principles of the VPA are as follows:

- » the proponent will prepare and implement a vegetation management plan in respect of the Conservation Area;
- » the proponent will maintain and manage the land in accordance with an approved Vegetation Management Plan until the last stage subdivision certificate is approved;
- » the proponent will provide access to the land for Council before it is dedicated;
- » the proponent will then dedicate the land to Council;
- » Council will offset the value of the land against Section 94 contributions;
- » the proponent will fund \$30,000 for the Council to manage the land over a 3 year period.

2.3 Existing Services and Facilities in SWR

The proposal includes the provision of all associated services infrastructure including telecommunications, sewer, electricity and water services. A site servicing investigation was undertaken by Martens Consulting Engineers (2009) in order to identify the potential for the development of the Subject Site and inform the subdivision design.

Martens undertook assessment and consultation with utility providers to identify opportunities and/or constraints for potential servicing options for the Subject Site for water, sewer and other utilities. Results of these investigations are summarised in **Table 2.2**.

Table 2.3 Results of Site Servicing Investigations (Source: Martens 2009)

Utility	Contact	Servicing Available (Y/N)
Water	Kempsey Shire Council	Y
Sewer	Kempsey Shire Council	Y
Power	Country Energy	Y
Telecommunications	Telstra	Y
Gas	AGL	N
	ELGAS (gas cylinders)	Y

With the exception of town gas, investigations show that all utilities, including water, sewer, power and telecommunications are readily available to the Site. While town gas is not provided to the South West Rocks area, ELGAS does provide a service which delivers 'top-up' gas cylinders to homes on an individual basis.

Consultation with Kempsey Shire Council indicates that upgrades to water and sewer infrastructure would be required in order to service the Site and surrounding new residential development. Details of proposed improvements to the existing Sewer Treatment Plant (STP) located to the north of the Subject Site are outlined in a number of specialist reports compiled by SKM, who were commissioned to undertake noise and odour impact assessments of the STP upgrades. Potential impacts of the STP upgrade on future residential development on the Subject Site and surrounds are discussed in details in **Chapter 5.7** and **Chapter 5.8** of this report.

Preliminary discussions with Macleay Water suggested that during the initial phase of development, connection to an existing 100mm water supply main (currently servicing adjacent development to the south of Belle O'Conner Drive) may be possible. Ultimately it was suggested the site would be connected to a 300-450mm potable trunk supply main from the Macleay Water town water reservoirs to the south of the site.

Where levels allow, connection of site development to the Macleay Water sewage pump station is considered acceptable by Macleay Water. The need for possible augmentation of pumps and chamber capacity shall be assessed by Macleay Water as the proposal progresses. Where levels do not allow connection to the existing SPS, an alternative solution shall be developed in accordance with Macleay Water. Consideration of STP capacity has not been undertaken.

Macleay Water indicated that both water and sewer would be readily available to the site and provision of these services is scheduled for the development time frame.

Macleay Water also highlighted an opportunity for the Proposal to connect to their existing dual reticulation grey water pipeline that passes the western edge of the Subject Site from the new Water Recycling Plant at the STP.

Ongoing discussions are being held with Macleay Water regarding the likely connection points to the sewer and water network and the sizing of mains to connect to this system. Details of these discussions are included in **Appendix C** of this EA Report

Planning and Legislative Provisions

3.0

Planning and Legislative Provisions

3.1 Commonwealth Legislation

3.1.1 Environment Protection and Biodiversity Conservation Act 1999

Part 3 of the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* provides that an action which “has, will have or is likely to have a significant impact on a matter of national environmental significance” may not be undertaken without prior approval from the Commonwealth Minister for the Environment and Heritage, as provided for under the provisions of Part 9 of the EPBC Act. The EPBC Act provides the following as matters of national environment significance for which Ministerial approval is required:

- » World Heritage properties;
- » Wetlands of International Significance (Including Ramsar wetlands);
- » Listed threatened species and communities;
- » Listed Migratory Species protected under international agreements (CAMBA and JAMBA);
- » Protection of the Environment from Nuclear Actions; and
- » Marine Environment.

The Administrative Guidelines for the EPBC Act set out criteria intended to assist in determining whether an action requires approval. In particular, the Guidelines contain criteria for determining whether a proposed action is likely to have a significant impact on a matter of national environmental significance.

A search of the EPBC on-line database has revealed that the Site is not located within a World Heritage area, a Commonwealth marine environment, nor does the Proposal involve nuclear activities. However, the preliminary review of the database has revealed that threatened ecological communities, threatened species, migratory species and listed marine species may occur on or near Subject Site.

An Ecology Assessment (flora and fauna) has been undertaken by Whelans Insites, and is appended at **Appendix D1** of this report. The Ecology Report found that the Proposal does not pose a threat to the EPBC listed species, and therefore a referral to the Minister is not required. See **Chapter 5** of this EA Report for further detail.

3.2 State Legislation

3.2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment (EP&A) Act 1979* and its supporting Regulation, the *Environmental Planning and Assessment (EP&A) Regulation 2000*, provide the framework for the assessment and approval of development proposals within NSW. Assessment provisions are provided in three parts of the EP&A Act, Part 3A, Part 4 and Part 5.

The Proposal for the Subject Site for the purpose of residential sub-division containing 318 lots within the coastal zone falls under the provisions of Part 3A of the Act. Part 3A of the EP&A Act provides processes for the assessment of development applications which are considered to be a "Major Project" as declared by a State Environmental Planning Policy (SEPP), or by order of the Minister in the Government Gazette.

The Proposal is considered to be a Major Project under the provisions of SEPP 2005 (Major Projects) by virtue of:

- » Clause 1(1)(j) of Schedule 2: as it will result in the subdivision of more than 25 lots not within the metropolitan coastal zone.

Under the provisions of Part 3A a developer is required to submit an application to the Department of Planning (DoP) for a development to be assessed as a Project Application under Part 3A. Malbec Properties applied to DoP for assessment under Part 3A on 18th June 2008. The application included a Preliminary Environmental Assessment. On 17th October 2008 DoP issued a letter to the Proponent confirming the status of the project as a Major Project under Part 3A and issued EARs as part of this letter.

As outlined in Table 3.1, the Proposal is consistent with the objectives of the EP&A Act.

Table 3.1 Consistency with Objectives of the EP&A Act

Objectives	Consistency
The Objects of this Act are:	
(a) to encourage:	
(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,	The proposed residential subdivision will take place on land zoned for residential purposes as part of LEP Amendment No. 55 and, as detailed in this EA, will not result in any significant adverse environmental impacts on the natural environment. The social and economic welfare of the community is best served by development which is permissible under the relevant planning regime and predominantly in accordance with the prevailing planning controls. This is the case with the Proposal. As detailed in Section 5.11 and Appendix D8, there will be positive social and economic impacts resulting from the Proposal.

Planning and Legislative Provisions

Objectives	Consistency
(ii) the promotion and co-ordination of the orderly and economic use and development of land,	The orderly and economic use of land is best served by development which is permissible under the relevant planning regime and predominantly in accordance with the prevailing planning controls. The Proposal will involve a residential subdivision of land zoned for residential purposes, which is a permissible use on the Subject Site. As detailed in this EA, the Proposal will not result in any significant adverse environmental impacts.
(iii) the protection, provision and co-ordination of communication and utility services,	The Proposal is consistent with this object as the local services authorities (Macleay Water, Country Energy etc) have made adequate provision for the servicing of the development. Refer to Section 2.3 and Appendix D2.
(iv) the provision of land for public purposes	It is envisaged that the 7(b) and 7(a) zoned conservation land will be dedicated to the Council as part of the VPA.
(v) the provision and co-ordination of community services and facilities, and	Council has adopted a Section 94 Contributions Plan that has set the contributions to be payable as part of the development for community services and facilities.
(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and	As detailed in this EA, the Proposal will not result in any significant adverse environmental impacts. Refer to Section 5.1 and the Ecological Issues and Assessment Report in Appendix D1.
(vii) ecologically sustainable development, and	The Proposal is consistent with ESD principles as detailed in Chapter 6 of this EA.
(viii) the provision and maintenance of affordable housing, and	The proposed residential subdivision will create a variety of lot sizes and will enable a variety of housing types to be developed. This will increase the housing stock within SWR and assist with meeting housing demand, as well as placing downward pressure on house prices.
(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and	As detailed in Section 3.2.1 of this EA, the Proposal is subject to the provisions of Part 3A of the EP&A Act where the Minister is the consent authority.
(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.	Any relevant public representations will need to be considered by the Department of Planning during the processing of the Part 3A application.

3.2.2 Other Acts

While the EP&A Act provides the framework for the planning and development approvals system within NSW, there are several other Acts and Regulations which contribute to the environmental and planning system.

Pursuant to Section 75U of the EP&A Act, Part 3A has removed the application of integrated development provisions for Major Projects and therefore, there are no concurrent licensing provisions that apply to Part 3A development, and therefore the Proposal.

There are however several Acts that, if not for the provisions of Part 3A, would be relevant to the Proposal. While compliance with the provisions of these Acts is not mandatory their consideration in the design and incorporation into the project ensures that the project will have a negligible environmental impact and will contribute positively to the environmental and socio-economic position of the South West Rocks locality. Relevant Acts include:

- » *Threatened Species Conservation (TSC) Act 1995*
- » *Heritage Act 1977*
- » *National Parks and Wildlife (NPW) Act 1974*
- » *Water Management Act 2000*
- » *Coastal Protection Act 1979*

3.2.3 State Environmental Planning Policies

State Environmental Planning Policies (SEPPs) are planning instruments under the EP&A Act that address more specific planning matters, where it is not considered appropriate for the Act to provide the detail, and are required to be considered by Part 3A Applications and assessment.

The following SEPPs are relevant to the proposed Part 3A Project Application.

4.1.1.1 STATE ENVIRONMENTAL PLANNING POLICY (SEPP) – MAJOR PROJECTS (2005)

It is considered that the Proposal would constitute a Major Project under the provisions of Schedule 2 of the Major Projects SEPP under clause 1(1)(j).

Schedule 2 Clause 1(1)(j) Coastal Area provides that:

“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”

The Subject Site is located within the coastal zone, on the far north coast of NSW, near Kempsey. The project will involve the subdivision of the Subject Site into 318 lots, therefore triggering the provisions of Part 3A Major Projects.

A Preliminary Environmental Assessment (PEA), prepared by JBA Urban Planning Consultants was provided to DoP for the purpose of attaining confirmation that the proposed subdivision is indeed a Part 3A Major Project, and to inform DoP of the general details of the proposed subdivision application. Advice provided from the DoP confirmed that the proposed subdivision application was a Part 3A Major Project.

Planning and Legislative Provisions



FIGURE 3.2.1 SEPP 14 WETLANDS BOUNDARY

Planning and Legislative Provisions

3.2.3.1 STATE ENVIRONMENTAL PLANNING POLICY (INFRASTRUCTURE) 2007

State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP 2007) has repealed several previous SEPPs relating to all forms of infrastructure including roads, rail, waste disposal, as well as such things as group homes, prisons, telecommunications, and water supply. It has also repealed the former SEPP 11 – Traffic Generating Development which would have otherwise applied to the Proposal.

Of relevance to this Project Application are the provisions of the Infrastructure SEPP 2007 relating to traffic generating developments, in particular clause 104, relating to Traffic Generating Development, and when referral to the NSW Roads and Traffic Authority (RTA) is required.

Schedule 3 (Traffic Generating Development to be referred to the RTA) of the Infrastructure SEPP 2007 has replaced the provisions of SEPP 11. It provides that developments for the purpose of the subdivision of land, resulting in the creation of 200 or more allotments, where the subdivision includes the opening of a public road must be referred to the NSW Roads and Traffic Authority (RTA). The DoP, being the consent authority for the application, will be responsible for referring the application to the RTA within 7 days after the application is made.

The proposed subdivision will result in the creation of 318 allotments, significantly more than the 200 allotment requirement, and the opening of public roads for access through the Site. Therefore this Project Application must be referred to the NSW RTA within seven (7) days of this Project Application being lodged.

Table 3.2 Traffic Generating Development to be referred to RTA – Schedule 3 of SEPP

Purpose of development NB the development may be the erection of new premises or the enlargement or extension of existing premises	Size or capacity – site with access to any road	Size or capacity – site with access to classified road or to road that connects to classified road (if access within 90m of connection, measured along alignment of connecting road)
Sub-division of land	200 or more allotments where the subdivision includes the opening of a public road	50 or more allotments

3.2.3.2 STATE ENVIRONMENTAL PLANNING POLICY NO 14—COASTAL WETLANDS

The SEPP applies to many wetlands on the coast of NSW and is designed to protect wetlands from ad hoc clearing, draining, filling and levee construction. The SEPP does apply to the Subject Site. There are some SEPP 14 wetlands located in the north-east of the Subject Site (see **Figure 3.2.1** SEPP 14 Boundary).

It should be noted that the proposed vegetation corridor and the proposed stormwater mitigation measures located around the riparian corridor on the northern part of the Site protect the creek and surrounding vegetation and the SEPP 14 wetlands. The proposed development is set back from of the SEPP 14 Wetland by at least 50m, and has incorporated a range of stormwater treatment measures designed specifically inter alia to avoid the discharge of contaminants, the modification of the hydrological regime or the imposition of adverse impacts upon the SEPP 14 Wetland.

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The proposed drainage system outlined above and throughout this report protects the SEPP 14 wetlands as follows;

- 1. Roadside swales allow infiltration from hardstand areas to the aquifer. By preventing any significant impact on groundwater systems, the SEPP 14 wetlands are protected.
- 2. The outlet structures (flow spreaders and energy dissipaters) ensure that during high flow events (i.e. storm events) scour and erosion of SEPP 14 wetlands does not occur.
- 3. The proposed bioremediation system for the site achieves water quality targets and so protects downstream environments, including the SEPP 14 wetlands from water quality related degradation; such as eutrophication.

3.2.3.4 STATE ENVIRONMENTAL PLANNING POLICY NO 44 – KOALA HABITAT PROTECTION
State Environmental Planning Policy (SEPP) No 44 aims to protect the Koala and its habitat by identifying matters for consent authorities to consider during assessment of relevant proposals. The Kempsey LGA is listed on Schedule 1 of SEPP 44 as an area to which the policy applies. As the subject land meets the relevance criteria of having an area greater than 1ha, SEPP 44 applies to the Subject Site.

The Ecology Assessment (flora and fauna) undertaken by Whelans InSites found that due to the presence of the species *Eucalyptus signata* within forested areas, the Site is defined as ‘potential koala habitat’. However as there have been no recent records of Koalas either on the Site or in the locality and the fact that the Site does not constitute ‘core koala habitat’ there is no need for the preparation of a Koala Plan of Management for the Site.

3.2.3.3 STATE ENVIRONMENTAL PLANNING POLICY NO 71—COASTAL PROTECTION
The SEPP 71 is intended to provide a uniform approach to planning within the Coastal Zone. Clause 8 Matters for Consideration within State Environmental Planning Policy (SEPP) 71 are to be taken into consideration by an authority when it determines a development application to be carried out on lands within the Coastal Zone. The Subject Site is located within the Coastal Zone, and is subject to these considerations, which are addressed in **Table 3.2** below.

Table 3.3 – Clause 8 Matters for Consideration

8 Matters for Consideration	Compliance
(a) The aims of this Policy set out in clause 2.	The proposal complies with the aims of the Policy by responding to the environmental constraints of the Site. It includes the provision of the conservation area protecting the riparian corridor that extends into the SEPP 14 wetland area within and to the northeast of the Subject Site. It also responds to the flooding and drainage issues affecting the area (see Chapter 5.2).
(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.	While the Site is located within the coastal zone, it does not have access to the coastal foreshore, therefore this requirement is not applicable.

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8 Matters for Consideration	Compliance
(c) Opportunities to provide new public access to and along the coastal foreshore for pedestrians or persons with a disability.	The Site is considered to be within the coastal zone as it is located within 1km of Saltwater Creek and Saltwater Lagoon. Provision is to be made however for walking trails through the Conservation Area which could then link with the Salt Water Lagoon and enhance access throughout the coastal foreshore.
(d) The suitability of development given its type, location and design and its relationship with the surrounding area.	As outlined in Chapter 5 of this report, an environmental assessment has been carried out as part of this Part 3A application, including consideration of the existing environmental constraints. This assessment demonstrates the sites suitability for the Proposal. Furthermore, as outlined in Chapter 1 of this report, a Local Environment Study has been undertaken for the Subject Site and surrounding area, which resulted in the rezoning of land in order to permit residential development in the southern section of the Site and environmental protection in the northern portion of the Site. The suitability of the Site was considered during the site planning process and as such the Site is considered suitable for the Proposal.
(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.	A visual impact assessment carried out for the Proposal demonstrates that the proposal will not cause any overshadowing of the coastal foreshore or impede views to the coastal foreshore area. Substantial hydrological investigations have been undertaken in order to mitigate potential impacts of the Proposal on the existing wetland located to the northeast of the Site. It is considered that these measures will ensure that the Proposal does not detrimentally impact the coastal zone (see Chapter 5.6).
(f) The scenic qualities of the New South Wales coast, and means to protect and improve these qualities.	A visual impact assessment carried out for the Proposal demonstrates that the proposal will not detract from the scenic qualities of the New South Wales coast (see Chapter 5.6)
(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.	A thorough flora and fauna assessment has been undertaken for the Subject Site and surrounding area, which has identified a number of threatened fauna species. Hydrological assessments have also been undertaken in order to determine and mitigate potential impacts of the Proposal on the habitat of threatened species. Chapters 5.1 and 5.2 discuss the Proposal's potential impact on these threatened species and recommends mitigation measures to ameliorate any adverse impacts.

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8 Matters for Consideration	Compliance
(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.	A minor creekline exists within the northern section of the Subject Site, with Saltwater Creek and Saltwater Lagoon being located to the north and northeast of the Site respectively. A detailed hydrological assessment has been undertaken and recommendations have been made in order to ensure stormwater quality and quantity is managed as to not adversely impact downstream fish habitat and marine vegetation (see Chapter 5.2).
(i) Existing wildlife corridors and the impact of development on these corridors.	As part of the rezoning process of the Site and surrounding land, a large portion of the Subject Site in the northern section has been set aside for conservation purposes. Maintaining this areas for conservation purposes provides habitat for the threatened species, while also providing an important east-west corridor linking Saltwater Lagoon and Hat Head National Park.
(j) The likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards.	The proposal responds to the flooding and drainage issues affecting the Site. A flood assessment was carried out for the Saltwater Creek, Lagoon and catchment in conjunction with the Saltwater Creek Estuary Management Plan. This determined a management regime for the sand berm at the outlet to the ocean and for the lagoon to manage the coastal processes and hazards applicable to development in the catchment. These effects have been considered in the design of the Proposal so as to mitigate any likely impacts on coastal processes and coastal hazards. (see Chapter 5.2 and Appendix D2).
(k) Measures to reduce the potential for conflict between land-based and water-based coastal activities.	While the Subject Site is located within the coastal zone, it is not directly adjacent to a coastal foreshore area and as such, conflict between land and water based coastal activities is considered to be negligible.
(l) Measures to protect the cultural places, values, customs, beliefs and traditional knowledge of Aboriginals.	Investigations of the Site, revealed no archaeological sites during surveys, and consultation with the Kempsey LALC and the Dunghutti Elders CAC provided that there are no known surviving sites or places of cultural/social significance to the local indigenous community (see Chapter 5.4 and Appendix D4).

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8 Matters for Consideration	Compliance
(m) Likely impacts of development on the water quality of coastal waterbodies.	An Integrated Water Cycle Management Plan has been developed for the Proposal which brings together the results of the stormwater quality and quantity assessment, hydrological assessment and flood analysis to form an overall water management plan which satisfies objectives for future development management outlined in the Saltwater EMP. Stormwater quality modelling undertaken as part of the IWCM Plan development demonstrates that the treatment train measures proposed for the treatment of stormwater will meet the set water quality criteria of being equal to or less than pre-development levels. It is therefore considered that the Proposal will not create water quality impacts for nearby waterbodies in coastal areas (see Chapter 5.2 and Appendix D2).
(n) The conservation and preservation of items of heritage, archaeological or historic significance.	The Aboriginal Heritage Assessment undertaken for the Subject Site found no archaeological evidence on the Site and concluded that the chance of any undetected archaeological finds occurring on the Subject Site is negligible. However mitigation measures have been recommended in order to ensure the proper protection and management of any archaeological items that may be discovered during construction. A preliminary desk-top assessment found no items of non-indigenous heritage located on the Site. A number of listed heritage items are located with the South West Rocks area however not within close proximity of the Site. It is therefore anticipated that the Proposal will not have any direct impact on any of the heritage items within South West Rocks (see Chapter 5.4).
(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.	N/A
(P) Only in cases in which a development application in relation to proposal is determined: (i) The cumulative impacts of the Proposal on the environment. (ii) Measures to ensure that water and energy usage by the Proposal is efficient.	N/A

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3.3 Regional Planning Instruments

3.3.1 North Coast Regional Environmental Plan (REP) 1988

Under the provisions of Part 3A of the EP&A Act consideration of regional environmental plans (REP) is not required in the preparation of the Proposal, however in order to ensure a thorough consideration of all regional issues, the following assessment has been undertaken.

The North Coast Regional Environmental Plan (NCREP) 1988 applies to the Kempsey LGA, including the Subject Site. The function of the NCREP is to provide the basis for new urban and rural development, with an emphasis on protection and management of the natural environment and creating efficient and attractive built environments.

As outlined in Part 3 Division 2 of the Policy, the NCREP sets out specific objectives with regard to coastal planning as follows:

- (a) to enhance the visual quality of the coastal environment;
- (b) to provide for the appropriate recreational use of beaches;
- (c) to protect the water quality of the coastal environment;
- (d) to minimise risks to people and property resulting from coastal processes;
- (e) to minimise changes to coastal processes resulting from development; and
- (f) to encourage retention of natural areas and regeneration of those natural areas which are already degraded.

It is considered that the Proposal is consistent with the coastal planning objectives as outlined below.

The Subject Site is well located with regard to visual prominence from adjoining areas, in that:

- » it is not viewed from any listed heritage items; and
- » it is not significantly viewed from any conservation areas, including Arakoon State Recreation Area, Hat Head National Park and Saltwater Lagoon (SEPP 14 Wetland).

It is likely that the roofs of the proposed development will comprise of either a

- » partial view from Francis Diamond Street (Observer Location 3) and the Seascape Grove Development (Observer Location 6); or
- » prominent view from Peter Mark Circuit (Observer Location 8) and the Corner of Hill Street and Sturt Street (Observer Location 10).

Therefore, in order to mitigate the impact of a potentially visually prominent 'roofscape' view from the above observer locations, a robust street tree planting scheme has been recommended, incorporating:

- » tree heights at least 50% higher than the heights of the proposed buildings;
- » trees with dense foliage, e.g. *Melaleuca quinquenervia*, or broad canopies, e.g. *Eucalyptus racemosa*, both at reasonably close spacings, e.g. 10 – 12m centres.

As a result of past agricultural and development practices, much of the Site has been modified from its original form, with natural areas being cleared and degraded. It is considered that this proposal, which includes the conservation of a large portions of native vegetation in the northern part of the Site, will lead to the regeneration of natural areas by providing for natural habitats.

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Substantial hydrological investigations have been undertaken in order to mitigate potential impacts of the Proposal on the existing wetland located to the northeast of the Site. It is considered that these measures will ensure that the Proposal does not detrimentally impact the coastal zone.

An IWCM Plan has been developed for the Site which includes treatment train measures which will ensure stormwater runoff as a result of the Proposal will meet the set water quality criteria of being equal to or less than pre-development levels.

3.3.2 Northern Rivers Catchment Management Plan

The Northern Rivers Catchment Action Plan (NRCAP) applies to Subject Site and most of the NSW north coast area within the Northern Rivers Catchment Management Authority area. The priority of the NRCAP, which is a statutory, but non-regulatory plan, is to prioritise and deliver natural resource management outcomes by identifying long-term directions to address issues that adversely impact on the catchment and sustainable development within the area and establish a clear direction for the rehabilitation and repair of natural resources in the catchment which are under stress.

The NRCAP outlines a number of Statewide Targets and CAP themes. These targets fall under four themes being biodiversity, water, land and community and generally relate to the improvement of existing habitats, ecosystems and environments and the prevention of decline in condition of these habitats, ecosystem and environments.

The proposal is consistent with the targets outlined in the NRCAP. The northern portion of the Site has been identified as having important biodiversity and habitat value, and as such, has been retained for conservation. This will ensure threatened species in the area such as the Wallum Froglet are protected from potential impacts that may arise as a result of the Proposal. Detailed geotechnical and hydrological investigations have resulted in a number of mitigations measures, which will serve to alleviate potential impacts on soil and water resources.

3.4 Local Planning Instruments

3.4.1 Kempsey Local Environmental Plan 1987

The Subject Site has been identified in local and regional planning instruments and strategy documents as a potential site for residential development. In January 1997 a submission was made to Council to rezone lands to permit residential development. At this time the land was zoned 1(d) (Rural (Investigation) D Zone) pursuant to Kempsey Local Plan (KLEP) 1997. Council subsequently resolved to have an LES prepared for the Subject Site and surrounding area and Section 117 terms were issued by the DoP. An LES was prepared in conjunction with the rezoning application, which resulted in the Subject Site being rezoned from 1(d) (Rural) to 2(a) (Residential "A" Zone) and 7(b) (Environmental Protection (Habitat) Zone).

As a result of the above, KLEP 1997 (Amendment No. 55) has recently been amended to rezone the Subject Site. Amendment 55 was gazetted on 14 August 2009. Therefore under the provisions of KLEP 1997 the proposed subdivision application is permissible subject to development consent. The aims of KLEP Amendment No. 55 (included as Appendix B of this EA) seek to protect environmentally sensitive lands while permitting residential development in certain areas of the Site in a controlled manner which will ensure the values of the environmentally sensitive land are not compromised. The Amendment also requires that adequate infrastructure, facilities and services precede any proposed residential development on the Subject Site.

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As well as outlining specific permissible and prohibited land uses appropriate for the Site, the provisions of the Amendment also state that an application for development should not be granted before adequate plans have been developed to protect the environment and future development, including but not limited to environmental management for endangered ecological communities, riparian areas and threatened species; stormwater management; hazard management, including bushfire hazard and acid sulphate soils; transport management; urban development; and staging and sequencing of development. The following provides an assessment of the Proposal against the relevant zoning provisions of KLEP 1997.

Table 3.4 KLEP 1987 Zoning Provisions

Relevant Clause under KLEP 1997	Comment
Clause 9 Zone objectives and development control table	
Zone No 2 (a) (Residential “A” Zone)	
1 Objectives of zone The objective is to provide areas for low density residential development.	The southern section of the Subject Site is being rezoned specifically for urban expansion and is therefore, considered to be suitable for low density residential development.
2. Without development consent Dwelling-houses.	The subdivision plan has been designed in order to enhance the existing low density residential character of the South West Rocks area.
3. Only with development consent Any purpose other than a purpose included in Item 2 or 4.	The subdivision plan has been designed with a combination of lots sizes which range from 500 m ² to 922 m ² , which are consistent with low density residential housing, while still providing a variety of housing sizes.
4. Prohibited Aerodromes; agriculture; airline terminals; animal boarding and breeding establishments; aquaculture; bulk stores; bus depots, bus stations; camping grounds; caravan parks; car repair stations; clubs; commercial premises; equestrian centres; extractive industries; forestry; generating works; helipads; heliports; holiday cabins; hospitals; hotels; industries; institutions intensive animal husbandry; junk yards; light industries; liquid fuel depots; marinas; marine service centres; medical centres; mineral sand mines; mines; miscellaneous forestry; motels; motor showrooms; offensive or hazardous industries; places of assembly; plant nurseries; public buildings; recreation areas; recreation establishments; recreation facilities; refreshment rooms; road transport terminals; roadside stalls; rural industries; rural tourist facilities; rural workers dwellings; sawmills; service stations; shops; stock and saleyards taverns; timber yards; tourist facilities; transport terminals; veterinary establishments; warehouses.	The primary land use proposed within the 2(a) is residential. Dwelling-houses are permissible within the zone without development consent. The 2(a) zone lists a number of prohibited uses. The Proposal does not seek to establish any of the listed prohibited uses.

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Relevant Clause under KLEP 1997	Comment
Zone No 7 (b) (Environmental Protection (Habitat) Zone) 1 Objectives of zone The objectives are: (a) to protect the environmental qualities and values of natural habitats, and (b) to permit the roads and services to cross habitat areas in a manner that has minimal adverse impacts on habitat values. 2. Without development consent Nil 3. Only with development consent Advertisements, roads, recreation areas (other than sporting fields), utility installations (other than radio or television transmission towers). 4. Prohibited Any purpose other than a purpose included in Item 3.	The northern section of the Subject Site is being rezoned specifically for environmental habitat protection, and is therefore considered to be appropriate for the conservation of natural habitats within the area. The Proposal does include the construction of a road and services linking toward the north within the habitat area. These uses however, are permissible within the zone subject to development consent and will be designed to have minimal impacts by following the route of an existing private access road in this location. As described in Section 2.2.4.1 of this EA Report, the Proposal incorporates a number of recreational facilities within the 7(b) zone. These facilities are permitted with development consent. It is considered that these facilities are integral to the amenity of the future residents of the area, while also allowing for passive recreation in a managed and controlled way. The provision of a Voluntary Planning Agreement currently being negotiated between the Proponent and Council, will ensure the Proposal provides for passive recreational facilities within the 7(b) zone, while protecting and managing the riparian area and the SEPP 14 catchment, which would otherwise remain unmanaged.

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3.4.2 Development Control Plans

Under the provisions of Part 3A of the EP&A Act consideration of Development Control Plans (DCP) is not required in the preparation of the Proposal. However, a number of existing Council DCPs have guided the design of the subdivision plan and informed a number of specialist investigations and assessments as follows:

- » DCP 22 – Local Housing Strategy (Urban Areas other than Crescent Head) 2003;
- » DCP 10 - Provision of Open Space for South West Rocks and Immediate Districts;
- » DCP 36 – Guidelines for Engineering and Subdivision;
- » DCP 30 – Acid Sulphate Soils.

In addition to the above, Council's Crime Prevention Through Environmental Design (CPTED) Guidelines were also utilised during the design of the Proposal.

DCP 22 LOCAL HOUSING STRATEGY

DCP 22 is primarily written for the design and siting of housing. As the Proposal is for the subdivision of land, the relevance of the DCP is to ensure that the lots are sized and oriented appropriately to achieve the requirements of the DCP. This is demonstrated in the following section. The DCPs landscaping and open space configuration requirements are also relevant to the Proposal and have been considered in the design of the subdivision layout.

The aims of DCP 22 are to 'achieve a balance between maximising lot and dwelling yields for more efficient and effective use of land, infrastructure and services, whilst making our residential areas desirable places to live' and 'provide certainty to developers and existing residents with regard to the density of housing development throughout Council's urban areas'

Objectives of the DCP are:

- i. to provide areas within Council's principle towns and villages for varying levels of residential density;*
- ii. to ensure that development densities are not beyond the capacity of the infrastructure, services and topographical constraints of each area;*
- iii. to ensure lands that are identified for higher density development are not developed for low density development;*
- iv. to provide wider housing choices in residential zones where there are minimal development constraints;*
- v. to encourage innovative building design and site usage;*
- vi. to encourage more efficient and effective use of land and minimise cost of providing infrastructure and servicing; and*
- vii. to encourage the design of energy efficient housing.*

The aims of DCP 22 are met through the Proposal design by achieving a balance of development yield density with a range of reasonable sized lots within a legible grid road system, as well as retaining up to 40 percent of the Site for environmental conservation purposes that will provide a desirable place to live through the provision of open space linkages to natural areas.

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The objectives are met through providing an appropriate level of density and yield that is suitable within the 2(a) Residential zone, and ensure that these densities do not exceed the Subject Sites infrastructure, services and topographical constraints. This has been addressed in the design of the Proposal and through liaison with service authorities, who have confirmed that there is sufficient capacity in the existing services infrastructure to facilitate the proposed yield.

The Subject Site has been identified for low density residential and is being developed as such and is therefore not taking away the opportunity of developing higher density land. The Proposal will provide a wider housing choice through a range of lot sizes (from 500 square metres to 922 square metres), some dual occupancies and orientations with varying lot widths and depths. Innovative building design and site usage is encouraged through the Design Guidelines (Appendix E). The land is effectively and efficiently being utilised, being adjacent to existing developed land on the edge of the SWR village, and is close to existing infrastructure and services. The orientation, size and shape of lots maximises solar access and therefore affords maximum opportunity for the design of energy efficient housing.

DCP 10 PROVISION OF OPEN SPACE FOR SOUTH WEST ROCKS AND IMMEDIATE DISTRICTS
DCP 10 divides open space into 4 main categories:

- » Type 1 – Small Parks and Playgrounds.
- » Type 2 – Playing Fields and Sportsgrounds.
- » Type 3 – Other Sporting Facilities.
- » Type 4 – Other Parks.

Type 1 – Small Parks and Playgrounds

The DCP identifies that SWR has very few small parks and children's playgrounds west of Gregory Street and the southern end of SWR. Existing parks of this type are concentrated near the beaches and older residential areas. The DCP recommends that this type of open space should be within easy walking distance (400 metres) of residential areas.

A small local park and children's playground along with an open space BBQ area are provided as part of the Proposal at the northern end of the development, which is located within 400 metres of the residential areas. The DCP specifies the provision of this type of open space to be 0.5 hectares / 1,000 population. For the Proposal, assuming an occupancy rate of 1.5 people per dwelling (from the 2006 Census), this equates to 477 people, which requires the provision of 2,500 square metres of this type of open space. The small park/children's playground provided within the Proposal totals 2,500 square metres.

Type 2 – Playing Fields and Sportsgrounds

The DCP indicates that the provision of this type of open space is adequate in the form of multi-use ovals provided just to the north of the Subject Site, adjacent to the SWR Country Club. These playing fields cater for cricket, soccer, touch football and 2 mini-soccer fields. As specified by the DCP, these facilities are easily accessible by car from the Subject Site.

Type 3 – Other Sporting Facilities

The DCP also indicates that these types of facilities are reasonably well catered for in SWR. Open space of this type is included as part of the SWR Sports Complex and Golf Course located just to the north of the Subject Site.

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Type 4 – Other Parks (eg beaches, National Parks and natural bushland areas)

The DCP states that the provision of these types of parks in SWR is more than adequate. The provision of an additional 14.8 hectares of Conservation Area in the northern portion of the Site will increase the availability of this type of natural bushland park and will enhance the amenity of the residential area.

DCP 36 GUIDELINES FOR ENGINEERING AND SUBDIVISION

DCP 36 generally addresses the specification requirements for construction works and engineering design standards associated with subdivision works e.g. stormwater piped drainage, road pavements, concrete works, sewerage design etc. which are relevant at the construction certificate (detailed design) stage. The elements of DCP 36 relevant to the project approval phase of the design include the urban design criteria, road network, road design geometric standards, road hierarchies, cycleway design, intersection and turning areas, parking and bus route design.

With respect to these items, the road network and hierarchies, road reserve and carriageway widths, road geometric standards (ie road horizontal curves), concept intersection and turning area layouts, cyclepath and pedestrian footpath widths for the subdivision layout have all been designed generally in accordance with DCP 36.

DCP 30 ACID SULPHATE SOILS

As detailed in Section 5.3.3 of this EA, an acid sulphate soil investigation has been undertaken for the Proposal that addresses the requirements of DCP 30. In this regard, no acid sulphate soils have been identified to a depth of 2 metres. For earthworks deeper than 2 metres, an acid sulphate soil management plan is required to be prepared. Appropriate mitigation measures have been recommended in this regard.

3.5 Draft Planning Instruments

3.5.1 Draft Mid-North Coast Regional Strategy

The *Draft Mid-North Coast Regional Strategy* prepared by the NSW Department of Planning (DoP) covers the north coast area from Hawkes Nest in the south, to Iluka in the north and as far west as Dorrigo and Stroud. The Kempsey Shire Council area falls within this region, and therefore will be subject to the provisions of the Strategy once it is adopted. The purpose of the Strategy is to ensure that there is adequate land available and appropriately located to accommodate the projected housing and employment needs of the region over the next 35 years (2006-31).

Over the past 25 years the population in the region has increased by 70% and the Strategy predicts a further increase of over 27% between 2006 and 2031, equivalent to an additional 91,000 people, requiring an additional 58,400 dwellings. It is anticipated that 60% of the new dwellings will be in greenfield sites with the remaining 40% to be located in existing urban areas, meeting the need to consolidate densities and accommodate smaller household sizes.

South West Rocks is identified in the strategy as a "Town" which is defined as:

"Like major towns, towns are larger settlements, however their service catchments are limited relative to major towns. They have a small to medium scale concentration of retail, health and other services with lower density residential. They are reliant on major regional centres and major towns for high order services, retailing and employment".

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South West Rocks is also identified as having “Priority Shipping Entrances for Navigation” under the Strategy.

Despite the Strategy identifying significant ecological and environmental constraints in the South West Rocks area, it provides that development will occur in the area, mainly in new release areas. The Subject Site is shown as part of an overall proposed future urban release area on the draft exhibition maps that accompany the Strategy. Furthermore, the Subject Site is located within a new release area as identified by the *Kempsey Shire Council Residential Land Release Strategy 1997*, and as per the proposed rezoning for residential purposes in KLEP 1997 Amendment No.55 currently off public exhibition.

3.6 Other Plans and Policies

3.6.1 NSW Coastal Policy 1997

The 1997 Coastal Policy sets direction for coastal zone management, planning and conservation in NSW by providing a framework that balances and co-ordinates the management of the coast’s unique physical, ecological, cultural and economic attributes. The Policy contains nine (9) goals, each with relevant strategic actions relating to coastal planning and management. These goals relate to:

- » protection and rehabilitated of natural environments;
- » recognition of coastal processes and hazards;
- » protection of aesthetic qualities;
- » protection and enhancement of cultural heritage;
- » sustainable use of resources;
- » sustainable human settlement;
- » appropriate public access and use;
- » effective management; and
- » integrated planning and management.

The Proposal is consistent with the Coastal Policy goals. A portion of the Site is being rezoned for conservation and as such, a large part of the Site will be protected, ensuring protection of natural resources and a sustainable human settlement pattern within areas of the Site considered to be appropriate for development. Detailed hydrological investigations ensure that potential coastal hazards have been assessed and mitigation measures recommended where appropriate. Consultation undertaken throughout the development of the Proposal, as well as the ongoing consultation proposed as part of the Part 3A assessment process will facilitate an integrated planning and management approach for the Proposal.

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3.6.2 Coastal Design Guidelines for NSW

These Guidelines consider the NSW coast in terms of a hierarchy of settlements. This provides a framework for analysing and understanding the important relationships between settlements and the local, urban and natural areas, and between neighbouring settlements and reserves. Seven settlement types are identified in the Guidelines:

- » coastal cities;
- » coastal towns;
- » coastal villages;
- » coastal hamlets;
- » inland coastal centres;
- » new coastal settlements; and
- » isolated coastal dwellings.

Given its size, population, existing facilities and services, South West Rocks is defined as a coastal town. As outlined in the Guidelines, coastal towns generally accommodate growth predominantly within their boundaries without compromising ecosystem functions and biodiversity values.

The Proposal is located within an area identified within Kempsey Shire Councils RLRS and maintains consistency with the Guidelines by respecting the original landform, topography and natural features of the Site. The Proposal creates physical and visual connections to the Conservation Area in the north of the Subject Site and SEPP 14 wetlands beyond and is based on a clear and legible street hierarchy laid out in a traditional grid pattern. Design Guidelines (**Appendix E**) for buildings, have been formulated which seek to interpret the architectural character of local coastal towns and inform future residential built form.

3.6.3 Living and Working in Rural Areas

The document, *Living and Working in Rural Areas: A handbook for managing land use conflict issues on the NSW North Coast*, prepared by the Department of Primary Industries acknowledges that changes are taking place on the NSW North Coast as a result of population, growth, expansion of urban areas and the changing nature of rural industry and production. Potential for conflicts within communities may arise as a result of the subdivision of rural areas and the encroachment of development into sensitive environmental areas and important natural resources.

Rural land use conflicts at the interface are generally associated with incompatibility with views, expectation and values. In relation to the Proposal, these values may include for the following:

- » intrinsic value of the environment;
- » maintenance of water quality;
- » protection of wildlife and native vegetation;
- » personal or community health;
- » clean air; and
- » recognition and protection of indigenous culture heritage.

The handbook also provides recommendations for minimum buffers between potentially conflicting land uses in order to reduce the risk of land use conflict and impacts of incompatible land uses through the separation of these land uses via buffers. An example of the use of buffers around potentially conflicting land uses is demonstrated within this Proposal, via the 7(b) zoned land surrounding the STP to the north of the Site. This buffer provides an appropriate distance separation that will ensure any potential noise and odour concerns from the STP do not impact the future residents of the Subject Site.

While there is not doubt that buffers are important with regard to hazardous land uses, the handbook does state that they do not lessen the need for sound planning practices, in particular strategic planning process of appropriate zoning and land use strategy development. The handbook also states that buffers do not replace the need for individual assessment based on specific site characteristics and the locality.

The Subject Site adjoins land zoned rural to the east. It is considered however, that the Proposal is consistent with the above values. With regard to the provision of buffers, it is considered that all potential land use conflicts with regard to adjoining rural land to the east has been considered during the strategic planning phase, namely, the LES. Furthermore, it is considered that the environmental assessment process undertaken during the formulation of the Proposal and supporting relevant specialist reports establishes consistency with the above-mentioned values, and demonstrates that the Proposal is a suitable development in the present locality.

4.0

Consultation

4. Consultation

4.1 Overview

Consultation with local and State government authorities and agencies, along with the local community has been undertaken as part of the environmental assessment process. Consultation is necessary in order to provide an avenue for participation in the environmental assessment process and to allow for potential impacts to be considered. The following sections identify relevant stakeholders and their role in the environmental assessment process, strategies that have been undertaken to carry out consultation, issues raised by stakeholders and how those matters have been considered in the environmental assessment.

4.2 Consultation Strategy

4.2.1 LES COMMUNICATIONS STRATEGY

As a result of the LES prepared in conjunction with the rezoning application, the Site has been the subject of consultation strategies in the past. A Communications Strategy was prepared to guide consultation through the LES process. Objectives of the Communications Strategy were to:

- » Ensure stakeholders had the opportunity to participate in the LES process;
- » Facilitate community understanding and acceptance of the rezoning proposal;
- » Facilitate the involvement of relevant government agencies to allow issues of concern to be addressed during the LES investigations; and
- » Ensure that internal stakeholders in Council were informed of the study process and provided opportunity for input at appropriate stages.

The Communications Strategy identified key stakeholders and identified timing for consultation, which included a number of Community Meetings and a workshop, consultation with relevant government agencies and a Planning Focus Meeting. Full details of the LES Communications Strategy can be viewed in *Kempsey Shire Council: Saltwater Development Area; Phillip Drive & Belle O'Conner Street, South West Rocks, Local Environmental Study*, prepared by Connell Wagner (2007).

4.2.2 PROCEDURAL CONSULTATION

Pursuant to Section 75F of the EP&A Act, prior to the issue of the EARs, the Director General undertook consultation with relevant government agencies in order to realise potential key issues and assessment requirements. Responses received as a result of this consultation have assisted in the formulation of the EARs. While these responses do not form part of the EARs, issues raised have been considered and have informed the environmental assessment process where possible.

In addition to agency consultation undertaken by the Director General, a number of agencies have been consulted individually during the assessment process either by the Proponent or relevant specialist consultants. This consultation was undertaken in the form of:

- » Provision of an information package to specific agencies;
- » Consultation by specialist consultants during the preparation of their individual studies; and
- » Face to face meetings undertaken by the proponent.

4.3 Authority and Agency Consultation

A number of regulatory and other relevant local and state authorities and agencies were consulted during the environmental assessment process. The methods of authority and agency consultation and related outcomes are listed below. Further agency consultation will be undertaken as a result of the public exhibition of the EA report and accompanying documentation. All formal responses provided to DoP and/or the Proponent as a result of agency consultation are included in **Appendix C** of this EA.

KEMPSEY SHIRE COUNCIL

Extensive consultation was undertaken with Kempsey Shire Council during the LES process and subsequently during rezoning of the site. More recently, a meeting was held between the Proponent and Council Officers on 11 November 2008 to discuss the Proposal. At this meeting, Council was advised of the site analysis undertaken for the Subject Site, as well as preliminary designs for the Proposal. Issues discussed with Council at the meeting included:

- » liaison with the DECC regarding 7(a) and 7(b) land acquisition;
- » liaison with Council regarding the Voluntary Planning Agreement (VPA);
- » methodology for calculating the contribution for maintenance of the 7(b) land;
- » north / south connection across Saltwater Creek – consideration of traffic catchment and volume;
- » proposed 7(b) boundary adjustment south of STP.

Feedback from Council as a result of consultation has been considered during the proposal design and environmental assessment. Ongoing dialogue with Council is currently taking place with regard to the Voluntary Planning Agreement and management of the 7(a) and 7(b) lands.

DEPARTMENT OF ENVIRONMENT AND CLIMATE CHANGE (DECC)

A meeting was held between the Proponent and DECC in Grafton on 2 May 2008. This meeting was undertaken as part of the finalisation of the Section 65 Certificate for LEP Amendment No. 55.

In addition to this matter, the opportunity was taken to discuss the Proposal. Discussions from this meeting have been incorporated into the DECC's response provided to the DoP during the formulation of the EARs. Key issues raised by DECC include:

- » impacts on local surface water quality;
- » assessment of local air quality and possible odour impacts;
- » impacts of the project on threatened species and their habitats;
- » impacts of the project on Aboriginal cultural heritage values;
- » assessment of any land contamination; and
- » mitigation measures taken to avoid or compensate impacts of any unavoidable impacts associated with the above.

A number of specialist investigations have been undertaken as part of this EA which assess the Proposal and its potential impacts with regard to hydrology, ecology, heritage, contamination and odour. As discussed in relevant Chapters of this EA, these investigations have found the Proposal to be satisfactory with regard to potential impacts raised by DECC, and recommend measures to mitigate impacts where appropriate.

DEPARTMENT OF PRIMARY INDUSTRIES (DPI)

DPI was consulted by DoP during the formulation of the EARs and separately by EDAW during the environmental assessment process through the provision of an information package. Key issues raised by DPI relate to the following:

- » potential rural land use conflicts, and consideration of the publication *Living and Working in Rural areas: a handbook for managing land use conflict issues on the NSW North Coast*; and
- » fisheries protection, stormwater management and future sea level rise, including ensuring consistency with Saltwater Creek and Lagoon Estuary Management Plan and Saltwater Creek Catchment Flood Study.

Potential rural land use conflicts are discussed within **Section 3.6.3** of this EA. Detailed investigation into potential impacts of the Proposal with regard to hydrology and stormwater management has been undertaken by Martens and are discussed in **Chapter 5.2** of this EA.

NSW RURAL FIRE SERVICES (RFS)

The RFS was consulted by the DoP during the formulation of the EARs. Consultation was also undertaken directly by Australian Bushfire Protection Planners with an RFS Development Control Officer to understand potential bushfire constraints of the Site. Key issues raised by the RFS relate to compliance with the requirements of *Planning for Bushfire Protection 2006*. The Proposal has been assessed with regard to this policy, details of which are discussed in **Chapter 5.9** of this EA report.

DEPARTMENT OF WATER AND ENERGY (DWE)

DWE was consulted as part of the environmental assessment through the provision of an information package. No feedback from DWE has been received to date.

ROADS AND TRAFFIC AUTHORITY (RTA)

The RTA was consulted by Connell Wagner during the preparation of the LES. Feedback from the RTA has been considered during the environmental assessment of the Proposal in the form of a traffic report prepared for the residential subdivision of the Subject Site. The report investigates issues raised by the RTA, including the cumulative impact of the Proposal on the local road network and implications of the Proposal on traffic and transport situations in the local area, including the potential for increased public transport services, proposed access and internal layout. In addition to the assessment, recommendations provided by the RTA have been incorporated into the Proposal design, including provisions for shared pathways, pedestrian access and cycle access.

As the Proposal is a Schedule 3 development under SEPP (Infrastructure) 2007, a formal referral will be made to the RTA for its comment by the consent authority as part of the assessment process.

DEPARTMENT OF LANDS (DOL)

DoL was consulted by DoP during the formulation of the EARs and separately by EDAW during the environmental assessment process through the provision of an information package. Feedback from the Department relates to proposed works on Crown land and required transfer of ownership to Council prior to these works being carried out.

STATE EMERGENCY SERVICES (SES)

The SES was consulted as part of the environmental assessment through the provision of an information package. No feedback from SES has been received to date.

NORTHERN RIVERS CATCHMENT MANAGEMENT AUTHORITY (NRCMA)

The NRCMA was consulted by DoP during the formulation of the EARs and separately during the environmental assessment process through the provision of an information package. Feedback from the NRCMA relates to consideration of the Native Vegetation Act 2003 and its application to the Conservation Zone. Pursuant to Section 75U of the EP&A Act, Part 3A has removed the application of integrated development provisions for Major Projects and therefore, there are no concurrent licensing provisions under Section 12 of the Native Vegetation Act 2003 that apply to Part 3A development, and therefore the Proposal.

LOCAL ABORIGINAL LAND COUNCIL

Consultation was undertaken with the Kempsey Local Aboriginal Land Council (LALC) and the Dunghutti Elders Council Aboriginal Corporation (CAC) in 2004, including a site visit with the LALC Officers and Indigenous community representatives. In this regard, the Kempsey LALC and the Dunghutti Elders CAC both provided advice to Jacqueline Collins, in the preparation of the Aboriginal Heritage Assessment, details of which are discussed in **Chapter 5.4** of this EA report.

More recent consultation has been undertaken by the Proponent with Kempsey LALC and the Dunghutti Elders CAC, advising these groups of the Proposal (August 2009). A public notice was also placed in the The Macleay Argus local newspaper on the 11 August 2009 requesting registration of interest from local Aboriginal stakeholders to comment on the public exhibition of this EA. See **Appendix D3** for details.

UTILITY AND INFRASTRUCTURE PROVIDERS

Martens Consulting Engineers consulted with all relevant infrastructure and utility providers as part of a site servicing investigation. Providers consulted include Kempsey Shire Council, Country Energy, Telstra, AGL and ELGAS in order to assess the provision of water, sewer, power, telecommunications and gas services. Details of this investigation are provided in **Chapter 2** of this EA.

MACLEAY WATER

A meeting was held between the Proponent, Martens Consulting Engineering and Macleay Water on 26 August 2008 to discuss the servicing of the Proposal. Based on indicative development envelopes and an estimated yield of 350 lots, Macleay Water indicated that the recent upgrade of the Sewage Treatment Plant (STP) would be able to cater for the Proposal and their sewerage system has sufficient capacity to service the Proposal.

Ongoing discussions are being held with Macleay Water and the Proponent regarding the likely connection points to the sewer and water network and the sizing of mains to connect to this system.

4.4 Community Consultation

Extensive community consultation was undertaken during the LES process. The process provided interested parties with the opportunity to raise any concerns with regard to the rezoning and future development of the Site. Issues raised related to:

- » future land use;
- » development footprint, lot yield and density;
- » ecological conservation;
- » community services;
- » access;
- » drainage and hydrology; and
- » contamination and acid sulphate soils.

Issues raised by the community during the LES consultation have informed the design of the proposal.

More recently, a public information meeting was held by Kempsey Shire Council in order to inform local residents of LEP Amendment No. 55. The meeting, which was held on 27 October 2007 was attended by 34 residents. A number of issues were raised at this meeting. Relevant issues to the Proposal include:

- » access to environmental information;
- » provision of adequate infrastructure for new development in the area;
- » density;
- » flooding concerns;
- » existing impacts from the STP;
- » potential impacts of sea level rise;
- » economic feasibility of new residential development; and
- » potential acid sulphate soil impacts.

As a result of the environmental constraints analysis and associated specialist studies undertaken as part of this EA, it is considered that all issues raised by the public have been considered and appropriately addressed through the Proposals' design and mitigation measures where relevant. A meeting was arranged between the Proponent and the South West Rocks Citizens Ratepayers Association. The meeting was later cancelled however as the group's chairperson was not able to attend at the arranged time. The Proponent also contacted the representative for the Friends of South West Rocks and was informed that the group has been suspended as they were not able to find representatives to act as office bearers, following the relocation of two of the group's most prominent members out of South West Rocks.

Further community consultation will be undertaken as a result of the public exhibition of the EA report and accompanying documentation, as outlined below.

4.5 Public Exhibition

In addition to the consultation previously undertaken as part of the LES and the subject Proposal, further consultation will be required to be carried out by the DoP during the Part 3A assessment process. In this regard, Section 75H of the EP&A Act outlines the process for public consultation during the environmental assessment process. Specifically, the EA report is required to be made available to the public for a minimum of 30 days, during which time any person, including a public authority, can make a written submission in relation to the Proposal.

As such, the Proposal, including the EA report will be made publicly available for comment during the assessment process. It is therefore considered that further consultation will be undertaken as part of the Project application assessment process.

Environmental Assessment

5.0

5.1

Ecology

5.1 Ecology

5.1.1 Introduction

Whelans InSites Pty Ltd (Whelans InSites) was engaged to undertake an ecological assessment of the Subject Site. This Chapter discusses the flora and fauna issues potentially affecting the Subject Site and proposal. The Whelans InSites report discusses site investigations, findings and recommendations with regard to impact of development on native vegetation and wildlife, including threatened species and endangered ecological communities. The full Whelans InSites Report is included as **Appendix D1** of this EA.

5.1.2 Methodology

The flora and fauna assessment carried out by Whelans InSites is based on their recent fieldwork as well as the ecological investigation conducted over the Site by Cumberland Ecology in 2008. The assessment also includes the collation and review of the findings from a number of previous site investigations carried out over the site for the purposes of the LES by Connell Wagner, Parker and Kendall and Kendall. Relevant information provided from the fieldwork and previous site investigation studies and reports was collated and reviewed. This base information was supplemented by Whelans InSites and Cumberland Ecology and a number of supplementary field surveys being carried out. These flora and fauna investigations, carried out in 2008, included the following:

- » targeted fauna surveys including trapping, playback, spotlighting and survey;
- » ground truthing of previously mapped vegetation communities;
- » the collection of a flora species list using Random Meander technique; and
- » call playback survey targeting the Wallum Froglet *Crinia tinnula*.

The Whelans InSites report also specifies additional sources used to obtain information, including published scientific information, vegetation mapping (DEC & DNR 2001), the NSW National Parks and Wildlife Service *Wildlife Atlas* and other investigations of various sites undertaken by a range of environmental consultants in the locality.

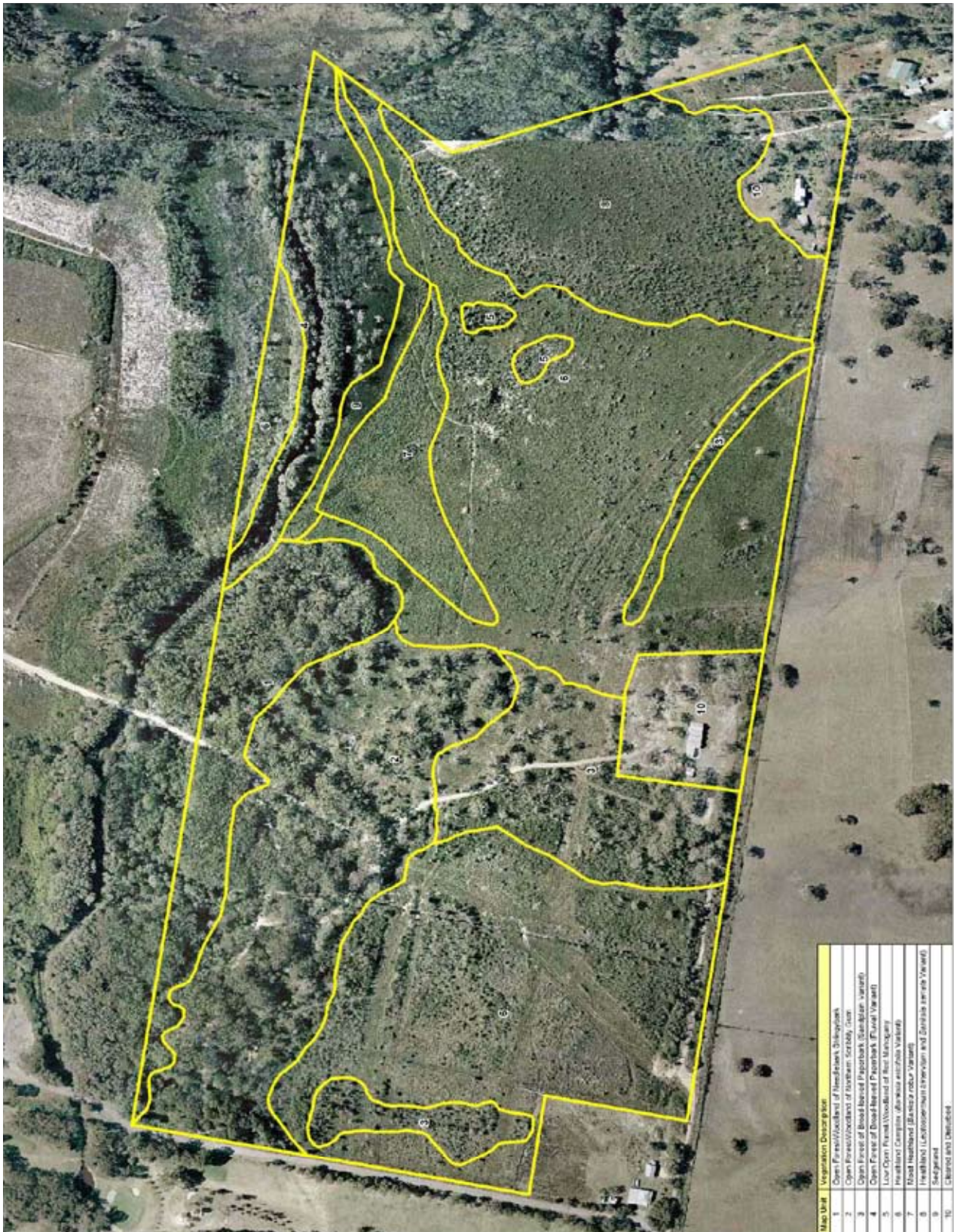
All investigations undertaken by Cumberland Ecology and Whelans InSites were carried out in accordance with the *Threatened Biodiversity and Assessment Guidelines for Development and Activities – Working Draft* (DEC 2004). These draft guidelines, prepared by the Department of Environment and Climate Change (DECC) (previously DEC) seek to provide a basis for field investigation conducted for threatened biota.

5.1.3 Existing Flora and Vegetation

5.1.3.1 VEGETATION MAPPING

Vegetation mapping and site investigations have found a total of ten vegetation community types, as well as a number of variants, existing on the Subject Site. The location and extent of these vegetation community types is illustrated in **Figure 5.1.1**, and include the following:

- » Vegetation Type 1 - Open Forest/Woodland of Needlebark Stringybark;
- » Vegetation Type 2 - Open Forest/Woodland of Northern Scribbly Gum;
- » Vegetation Type 3 - Open Forest of Broad-leaved Paperbark (Sandplain Variant);
- » Vegetation Type 4 - Open Forest of Broad-leaved Paperbark (Fluvial Variant);
- » Vegetation Type 5 - Low Open Forest/Woodland of Red Mahogany;
- » Vegetation Type 6 - Heathland Complex (Banksia ericifolia Variant);



5.1.1 VEGETATION MAPPING (WHELANS INSITES - VEGETATION COMMUNITIES FIGURE 3)
SEE APPENDIX D1 FOR FULL SCALE PLAN

- » Vegetation Type 7 - Moist Heathland (*Banksia robur* Variant);
- » Vegetation Type 8 - Moist Heathland (*Leptospermum trinervium* and *Banksia serrata* Variant);
- » Vegetation Type 9 – Sedgeland; and
- » Vegetation Type 10 - Cleared and Disturbed.

As illustrated in **Figure 5.1.1**, the vegetation community type primarily affected by the Proposal is Type 6 - Heathland Complex (*Banksia ericifolia* Variant). Portions of Vegetation Type 3 - Open Forest of Broad-leaved Paperbark and Vegetation Type 8 - Moist Heathland are also located within the developable area. Following extensive surveys, no threatened flora species were recorded within these vegetation types and these effected communities do not form part of any listed endangered ecological communities (EECs).

5.1.3.1 NATIVE, INTRODUCED AND THREATENED PLANT SPECIES RECORDINGS

Site investigations have resulted in a total of 213 plant species being recorded on the Subject Site. Of these, 188 are native plant species and 25 are introduced species.

Despite searches for species known to occur in the locality, site investigations have not resulted in the recording of any threatened plant species. Although five threatened flora species have been recorded within a 10km radius of the Site habitat for these species is not present on the Subject Site.

5.1.3.3 ENDANGERED ECOLOGICAL COMMUNITIES

Vegetation type 4 – Open Forest of Broad-leaved Paperbark – Fluvial Variant, appears to corresponds to the *Final Determination* of the endangered ecological community (EEC) known as *Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* (SSFCF), at least in floristic terms. Vegetation type 4 is of swampy character, and includes scatters and stands of typical SSFCF species such as the Swamp Oak and Swamp Mahogany. Groundcovers such as the Bare-twigg Rush *Baumea juncea* which is also characteristic of the SSFCF, make up the predominant groundcover. This vegetation is situated along and adjacent to Saltwater Creek, which flows along the northern parts of the Subject Site into Saltwater Lagoon. The *Final Determination* for the SSFCF community contains 59 plant species. Six of these plant species were recorded within the Fluvial Variant of the Broad-leaved Paperbark community. Vegetation type 4 is wholly contained within the proposed *Conservation Area*.

As outlined by Whelans InSites, whether or not Vegetation type 4 is located on a Coastal Floodplain, is a moot point. In this regard, while the landscape element on which that vegetation occurs clearly involves a swampy area which is subject to periodic inundation, soils present in the portion of the Site where Vegetation type 4 is found do not appear to be silts, mud, or humic loams soils. Therefore, Whelans InSites notes that there is some considerable doubt as to whether that part of the Subject Site constitutes a Coastal Floodplain, and therefore whether the vegetation present constitutes the SSFCF EEC.

Vegetation type 3 – Broad-leaved Paperbark Open Forest (Sandplain Variant) has a dryer character. This vegetation type is located in the southern central parts of the Site, well above the 1:100 year floodline. Species in this vegetation type are not usually swampy in character, particularly in the understorey and groundcover layers. Several species that are typical of Vegetation Type 3 are not swamp species and do not appear in areas that are inundated for long periods of time. As a result of its location above the 1:100 floodline and dryer characteristics, Whelans InSites concludes that Vegetation Type 3 does not constitute SSFCF, despite its proximity to Saltwater Creek.

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Whelans InSites notes that Vegetation type 9, present in the northern parts of the Subject Site may conform to the EEC listed as Freshwater Wetlands on Coastal Floodplains (FWCF). Identification of Vegetation type 9 as an EEC is ambiguous however, as:

- » only seven (7) of the plant species present within that area of vegetation are listed in the 'Characteristic Assemblage of Species' identified in the Final Determination for the FWCF community;
- » the dominant species located in that community are not included in the 'Characteristic Assemblage of Species'; and
- » there are uncertainties regarding whether the subject site is located on a *coastal floodplain*.

Whelans InSites concludes that whether Vegetation type 4 and type 9 constitute examples of EECs or not, their classification is somewhat immaterial, due to the location of both Vegetation types within the proposed Conservation Area. Both Vegetation types are located some distance from proposed development activities on the Site and in both instances, the vegetation is separated by a substantial distance of greater than 70m, from development areas. Furthermore, the Proposal has incorporated management of stormwater volumes and quality so as to avoid adverse impacts on those swamp communities. As such it is concluded that there is no likelihood of a significant effect being imposed on an EEC, even assuming that an EEC is in fact present on the Subject Site.



5.1.2 LOCATION OF RECORDED THREATENED SPECIES (WHELANS INSITES - THREATENED SPECIES LOCATIONS FIGURE 4) SEE APPENDIX D1 FOR FULL SCALE PLAN

5.1.4 Vegetation Significance

The proposal will involve the removal of approximately 20.36 hectares of mostly heathland and Broad-leaved Paperbark Open Forest/Woodland. Based on an assessment of existing vegetation communities, levels of disturbance and relevance of vegetation to known threatened fauna in the area, the Proposal provides for a *Conservation Area*, being approximately 14.8 hectares (38% of the Site) located across the northern portion of the Site. This area corresponds to proposed rezoning to 7(b) land under KLEP 1997 (Amendment 55). This area is core habitat for the Wallum Froglet while also representing the higher quality habitat area comprising forested and woodland vegetation on site which is known to provide habitat and resources for a number of terrestrial and aerial threatened species.

Through the retention of the *Conservation Area*, the Proposal has been designed to concentrate development within areas of the Site that have been found to have lower conservation values. These areas, which are primarily in the southern portion of the Site, are generally characterised as having high levels of disturbance and being comprised of vegetation types that are unlikely to support threatened species.

In addition, the loss of low quality vegetation and habitat constitutes only 0.27% of the total high quality habitat contained and preserved in the surrounding Hat Head National Parks (7,524ha), located adjacent to and 2-3kms south of the Subject Site.

Table 5.1.1 identifies areas of vegetation to be removed form the subject site. No vegetation will be removed from the Open Forest of Broad-leaved Paperbark (Sandplain Variant), Moist Heathland (Banksia robur Variant), or Sedgeland communities.

Table 5.1.1 Vegetation Communities - Areas of Removal / Conservation (Source: Whelans InSites, 2009)

MU	Vegetation Community	Total Area (ha)	Vegetation to be Conserved (ha)	Vegetation to be Removed (ha)
1	Open Forest/Woodland of Needlebark Stringybark	2.65	2.56	0.09
2	Open Forest/Woodland of Northern Scribbly Gum	5.84	3.37	2.47
3	Open Forest of Broad-leaved Paperbark (Sandplain Variant)	3.76	0.01	3.75
4	Open Forest of Broad-leaved Paperbark (Fluvial Variant)	2.27	2.27	0
5	Low Open Forest/Woodland of Red Mahogany	0.19	0.09	0.1
6	Heathland Complex (Banksia ericifolia Variant)	16.15	3.15	12.99
7	Moist Heathland (Banksia robur Variant)	1.47	1.47	0.001
8	Heathland (Leptospermum trinervium and Banksia serrata Variant)	4.58	0.8	3.78
9	Sedgeland	0.62	0.62	0
10	Cleared and Disturbed	2.42	0	2.42

5.1.5 Existing Fauna and Fauna Habitats

5.1.5.1 FAUNA ON SITE

Fauna surveys undertaken on site by Cumberland Ecology and Whelans InSites recorded a total of 134 native species of mammals, birds and amphibians, as well as four introduced species.

Of the native species identified ten are listed threatened fauna species. These threatened species, which were recorded during field surveys of 2007 and 2008 are listed as Vulnerable pursuant to Schedule 2 of the TSC Act. Species include the Wallum Froglet, Squirrel Glider, Grey-headed Flying Fox, Yellow-bellied Sheath-tail Bat, Eastern Free-tail Bat, Hoary Wattled Bat, Little Bent-wing Bat, Greater Broad-nosed Bat, Eastern Cave Bat and Glossy Black Cockatoo. The location of the threatened fauna species recorded during the Whelans InSites 2008 surveys are illustrated in **Figure 5.1.2**.

5.1.5.2 AVIFAUNA

The numbers and species of birds recorded are reflected by the variety of foraging sources and nesting habitats existing on the Site and surrounding land. Bird species were generally found to fit into one of four categories as follows:

- » waterbirds using Saltwater Creek and standing pools;
- » more aggressive predatory birds with large home ranges;
- » granivorous and nectarivorous terrestrial species which utilise forests and heathlands; and
- » smaller terrestrial birds which utilise dense heath for shelter.

While a number of threatened birds have been recorded in the surrounding area, including the Osprey and Black-necked Storks, no birds listed under the TSC Act were recorded on the Subject Site as a result of field surveys.

5.1.5.3 REPTILES AND AMPHIBIANS

Due to the Site's existing environmental characteristics including the availability of water, depth of leaf litter and general vegetation types, it is likely that widespread and abundant species of reptiles would be present on site at various times. Despite this, no reptile species were recorded on site during field investigations. Whelans InSites notes that given the habitat and resources present, it is unlikely that threatened reptile species would be present on the Site.

Ten amphibious species, including the Wallum Froglet were recorded on the northern extent of the Subject Site and along Saltwater Creek during field investigations. Investigations undertaken by Cumberland Ecology in 2008 recorded sightings of the Wallum Froglet in the forested community within the conservation area and recorded the species calling from woodland areas in this northern portion of the Site. Call playback surveys undertaken by Whelans InSites in May 2008 failed to record any Wallum Froglet calls on the Subject Site, however calls were recorded in low numbers to the north and the south of the Site. No other threatened amphibian species have been identified on the Subject Site and it is considered unlikely that any additional threatened amphibious species are present on the Site.

5.1.5.4 MAMMALS

Nineteen native and three introduced mammal species were recorded primarily in the northern portion of the Site during field investigations including terrestrial, arboreal and aerial species. Arboreal species such as the Common Brushtail Possum and the Squirrel and Sugar Gliders utilise tree hollows in open forest and woodland communities, and exhibit varying levels of tolerance for disturbance. Individual Squirrel Gliders were recorded in the conservation area located in the north-western area of the Site during the tree-mounted Elliot trap survey undertaken by Cumberland Ecology in 2008.

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A number of species common in the locality, including small terrestrial mammals like the bandicoot, as well as large macropods including the Eastern Grey Kangaroo and Swamp Wallaby were also recorded. Generally, these species are considered to be relatively disturbance-tolerant and continue to use resources around residential areas. A variety of flying-fox and microchiropteran bats utilise the hollow-bearing trees on site for roosting and foraging purposes. The majority of these trees are located within the forested areas that are to be retained in the 7(b) zoned lands. These species however, are highly mobile and wide-ranging and are unlikely to be reliant on a single area of bushland for habitat and will travel long distances in the locality which possesses a large area of continuous habitat associated with the national parks and conservation areas.

Three introduced species were recorded on site, namely, the European Rabbit, Black Rat and Domestic Mouse. Rabbits are known to cause disturbance to understorey vegetation and compete with native wildlife for foraging resources, while rats prey on the eggs of native birds.

5.1.5.5 FAUNA HABITATS

Open forest, swamp forest and wet heathland vegetation on the Subject Site and surrounding lands provides a range of habitat for fauna. In addition, the Site's connection to the north-eastern forested wetlands and sedgeland associated with Saltwater Lagoon provide additional habitat, while cleared areas, particularly in the south-western portion of the Site provide areas for grazing mammals however these areas have generally low habitat diversity, quality and value.

Roosting and denning habitats of tree hollows are prevalent throughout the forested section primarily found in the north of the Site, particularly where the Scribbly Gum and Broad-leaved Paperbark dominate in the Conservation Area. While the majority of these forested areas are located outside of the developable area, there are a number of mature Broad-leaved Paperbarks that will be disturbed as a result of the Proposal. Whelans InSites has concluded however, that these hollows are unlikely to be very deep and provide only limited habitat for a number of fauna species.

Ephemeral ponds located in the closed wet heath located in the northern portion of the Site, proposed for conservation provides potential breeding habitat for the Wallum Froglet, while vegetation in this area provides habitat for a range of bird species, native rodents, reptiles and amphibians. Despite intensive surveys, the Wallum Froglet species was not recorded by Whelans InSites within the boundaries of the Subject Site.

Areas on site that present good quality fauna habitat are largely located outside of the development area. Generally, areas of the Site that are to be developed consist of existing disturbed and modified areas which have been subject to degrading activities such as slashing and grazing. A small portion of forested area will be cleared for the development, however this area is of much lower conservation value than areas in the northern part of the Site, which have been identified as having high conservation value and are to be retained within a Conservation Area as part of the rezoning.

5.1.6 Threatened Species Significance

As noted above, ten threatened fauna species were recorded on the Subject Site, primarily in the Conservation Area. The potential impacts of the Proposal on these species is summarised in **Table 5.1.2**.

The conservation of the vegetation within the 7(b) zone in the northern part of the Site results in the most important and significant habitats being retained on the Site. In this regard, hollow-bearing trees, foraging areas and general resources relied upon by the Squirrel Glider and microchiropteran bats are located within the 7(b) zone. While some hollow-bearing trees will be removed from within the development area, as well as some heathland habitat for certain species of microchiropteran bats, Whelan InSites maintains that it is not likely that the long term viability of threatened species and/or location populations of the species would be adversely affected.

The *Conservation Area* also provides critical habitat and separation from the development for the Wallum Froglet. The inclusion of a vegetated linkage associated with the drainage swale constructed through the centre of the eastern part of the Proposal will provide an opportunity for potential movement of the Wallum Froglet, should movement occur through the landscape.

A small loss of food source for the Glossy Black Cockatoo (mainly *Allocasurina*), will result from the Proposal. However as this species is highly mobile and wide-ranging, the loss of this food source will not affect individuals or a local population of the species.

In addition to the threatened species recorded on site, other threatened fauna species known to occur in the general vicinity, such as the Osprey and other microchiropteran bats could potentially utilise the Site. However the development area of the Site only contains marginal foraging habitat for these species, and the vegetation present is not regarded as of particular value or significance for these species as more appropriate habitat and resources are present in the locality. In this regard, the developable area is comparable to only 0.27% of the total high quality habitat contained and preserved in the surrounding Hat Head National Parks (7,524ha), located 2-3kms south of the Subject Site.

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Table 5.1.2 Threatened fauna recorded on the Subject Site or on immediately adjoining land (Source: Whelans InSites, 2009)

Species	Habitat Requirements	Significance of Site
Wallum Froglet	Paperback swamps and sedgelands.	Small loss of foraging habitat; all potential breeding habitat to be retained in the Conservation Area; breeding and refuge habitat is available in adjoining Conservation Reserves.
Squirrel Glider	Forest and woodland for foraging; tree-hollows for nesting or denning.	The majority of the eucalypt forest is to be retained within the Conservation Area; small loss of foraging habitat.
Grey-headed Flying Fox	Variety of habitats; roosts in large camps.	No camps were recorded; small loss of foraging habitat; substantial habitat retained within the Conservation Area and adjoining Reserves in the locality.
Yellow-bellied Sheath-tail Bat	Forages in a diverse range of habitats; roosts in tree-hollows.	Small loss of foraging habitat; few hollow-bearing trees to be removed; substantial habitat retained within the Conservation Area and Reserves in the locality.
Eastern Free-tail Bat	Forest and woodland for foraging; tree-hollows for roosting.	Small loss of foraging habitat; few hollow-bearing trees to be removed; substantial habitat retained within home range in the Conservation Area and Reserves in the locality.
Hoary Wattled Bat	Open forest and woodland and coastal scrub; roosts in tree-hollows in eucalypts.	Small loss of foraging habitat; few eucalypt hollow-bearing trees to be removed; substantial habitat retained within the Conservation Area and Reserves in the locality.
Little Bent-wing Bat	Well timbered areas; roosts in caves.	Small loss of foraging habitat; no roosting habitat available; substantial habitat retained within the Conservation Area and Reserves in the locality.
Greater Broad-nosed Bat	Prefers mist gullies; roosts in hollow tree trunks and branches.	Small loss of limited foraging habitat; few hollow-bearing trees to be removed; substantial habitat retained within home range in the Conservation Area and Reserves in the locality.
Eastern Cave Bat	Tropical mixed woodland and wet sclerophyll forest; roosts in caves.	Small loss of foraging habitat; no roosting habitat available; substantial habitat within the Conservation Area and Reserves in the locality.
Glossy Black Cockatoo	<i>Allocasurina</i> forests for foraging; large tree-hollows for nesting.	Very limited loss of foraging habitat; substantial habitat retained within the Conservation Area and Reserves in the locality.

5.1.7 Key Threatening Processes

Several Key Threatening Processes (KTP) may operate on the Subject Site, either currently or as a consequence of the proposed development, including:

- » alteration to the natural flow regimes of rivers, streams, floodplains & wetlands;
- » clearing of native vegetation;
- » competition and grazing by the feral European rabbit;
- » loss of hollow-bearing trees;
- » predation by feral cats;
- » predation by the European red fox;
- » invasion of native plant communities by bitou bush and boneseed; and
- » invasion of native plant communities by exotic perennial grasses.

However, the proposed development will not relevantly exacerbate the impact of KTPs on the Subject Site or the surrounding lands given:

- » The water cycle management system proposed by Martens will avoid any significant impacts to the 'natural flow regimes' of Saltwater Lagoon or its tributaries. Any increased stormwater flows will only occur temporarily during infrequent storm events, and total downstream flow volumes (ie combined surface and groundwater system) will not be significantly affected during normal conditions given the stormwater infiltration measures and water dissipation systems proposed.
- » 14.9ha of the subject site will be retained and managed as conservation land.
- » The proposed development does not include large grassed areas which could provide suitable foraging habitat for the feral European rabbit, and the Site will in any case be monitored.
- » The majority of hollow-bearing trees will be retained within the Open Forest vegetation communities. Any hollow-bearing tree to be removed will be compensated for using either the original (salvaged) tree- hollows or artificial nest boxes.
- » The implementation of responsible pet management within the development area will be encouraged through appropriate signage.
- » The proposed residential development is not likely to exacerbate the impacts of predation of the European red fox or feral cat, or competition by the European rabbit.
- » The proposed development is not likely to exacerbate the impacts of the bitou bush or exotic perennial grasses on the subject site given the management and monitoring works proposed in Appendix G of the Whelans Insites report.

5.1.8 Conclusions

The Whelans Insites Ecological Assessment (2009) and addendum by Cumberland Ecology (2008) indicate that there are no areas of constraint due to threatened flora and fauna within the development envelope proposed for the site that would preclude development.

The Ecological Assessment undertaken by Whelans InSites found a total of ten vegetation community types, on the Site. Investigations also found ten threatened species on site, which were primarily found within the Conservation Area which has the highest habitat value on the Site.

The proposal will involve the removal of approximately 20.36 hectares of mostly heathland and Broad-leaved Paperbark Open Forest/Woodland. This vegetation however, has been largely defined as having low habitat value, and removal of vegetation within these areas is not expected to have significant impacts on threatened species within and around the Site. Furthermore, the loss of this vegetation is considered to be insignificant in relation to the amount of available habitat in the adjacent Saltwater Lagoon and Hat Head National Park located in close proximity to the south of the Site.

The proposal also includes the retention and conservation of approximately 14.9 hectares of high quality habitat along Saltwater Creek in the northern portion of the site which constitutes approximately 35% of the site area. The conservation of such a substantial portion of the site as part of the development provides a positive ecological benefit of securing higher value habitat area under conservation with the management that will come with this. This area includes several vegetation communities including, forest, sedge and heath communities which provides high quality habitat for a number of threatened mammals and birds, as well as the Wollum Froglet.

In addition, the loss of 20.36ha of low quality vegetation and habitat comprises only 0.27% of the total area of Hat Head National Park. Further, there are few other large land parcels available for development in the surrounding area and therefore cumulative effects from development are minor.

In order to ensure the proper protection and management during construction and occupation of the Site, mitigation measures have been recommended by Whelans InSites.

5.1.9 Management and Monitoring

The Ecological Assessment undertaken by Whelans InSites includes a number of amelioration and environmental management measures to be implemented as part of the Proposal. In addition to the retention and management of the 7(b) zoned land, mitigation measures for the protection of flora and fauna on the Subject Site are summarised in **Table 5.1.3 below**.

Table 5.1.3 Proposed Ecological Mitigation Measures

Issue	Mitigation Measure
Bushfire management	The sensitive and appropriate management of <i>Asset Protection Zones</i> (APZs) both to ensure the provision of appropriate bushfire protection and to facilitate the use of those areas by native biota (including threatened species).
Tree protection and retention	Where tree removal is required for bushfire protection purposes, preference should be given to the retention of hollow-bearing trees and mature trees over smaller or younger specimens.
Bushfire management	The clearing of understorey for bushfire protection purposes should be undertaken insofar as is possible in a patchy manner, retaining areas of shrubs and avoiding the potential for the introduction of weeds;
Landscape rehabilitation	Any stormwater detention basins or drainage swales should be planted and/or rehabilitated in a manner which provides additional habitat and/or movement opportunities for native fauna, especially the Wallum Froglet.
Construction Management	The use of sediment fences and other appropriate control measures during excavation, clearing and construction activities to avoid erosion and sediment discharge and/or the discharge of other contaminants into the natural environment.
Construction Management	The implementation of a management regime during the construction process to ensure that no wastes (including building rubble, garbage, contaminants, fuels, oils, paints or other chemicals) are discharged from the construction area, and that all such wastes and contaminants are appropriately managed.
Weed / pest management	The avoidance of invasive or noxious plant species in subsequent landscaping within the development area.
Vegetation management	The collection of native vegetation removed from development areas and its re-use within the <i>Conservation Area</i> for bushland rehabilitation and/or landscaping purposes or the provision of that material to council for bushland management purposes.
Weed/pest management	The destruction or appropriate removal of weeds within the development area.
Vegetation management	The implementation of a <i>Vegetation Management Plan</i> (VMP) for the vegetation to be retained in the north of the Subject Site (the <i>Conservation Area</i>) in accordance with the Vegetation Management Principles Plan prepared for the conservation area (see Appendix G of Whelans InSites report). This Plan identifies the principles of a detailed Vegetation Management Plan (VMP) which would be prepared once the development is approved.

the 'information' and 'communication' fields. The 'information' field is defined as:

...the study of the processes of information production, distribution, access, use and evaluation, and the study of the social, cultural, economic and political contexts in which these processes take place. (p. 10)

The 'communication' field is defined as:

...the study of the processes of communication production, distribution, access, use and evaluation, and the study of the social, cultural, economic and political contexts in which these processes take place. (p. 10)

The 'information science' field is defined as:

...the study of the processes of information production, distribution, access, use and evaluation, and the study of the social, cultural, economic and political contexts in which these processes take place. (p. 10)

The 'information studies' field is defined as:

...the study of the processes of information production, distribution, access, use and evaluation, and the study of the social, cultural, economic and political contexts in which these processes take place. (p. 10)

The 'information technology' field is defined as:

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The 'information systems' field is defined as:

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The 'information management' field is defined as:

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The 'information policy' field is defined as:

...the study of the processes of information production, distribution, access, use and evaluation, and the study of the social, cultural, economic and political contexts in which these processes take place. (p. 10)

The 'information law' field is defined as:

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The 'information ethics' field is defined as:

...the study of the processes of information production, distribution, access, use and evaluation, and the study of the social, cultural, economic and political contexts in which these processes take place. (p. 10)

5.2

Hydrology

5.2 Hydrology

5.2.1 Introduction

Martens Consulting Engineers were engaged to undertake a hydrological assessment of the proposed residential subdivision on the Subject Site. This Chapter discusses information outlined in the Martens report, including existing hydrological and environmental site issues and constraints and site management recommendations for hydrological, flooding and stormwater management. The full Martens Report is included as **Appendix D2** of this EA.

5.2.2 Methodology

The Engineering Services Assessment carried out by Martens comprises a detailed site assessment and identification of environmental issues as follows:

- » hydrological assessment including investigation of subsurface conditions, water table and flow directions, groundwater and surface water quality, and salt water intrusion;
- » flood assessment including investigation of flood frequency and flood conveyance capacity;
- » preliminary site contamination assessment;
- » acid sulphate soils assessment; and
- » geotechnical assessment.

Investigations and assessment undertaken in relation to site contamination and the acid sulphate soils assessment are discussed in detail in **Chapter 5.3** of this report. The following discussion relates to hydrological and flooding issues affecting the Proposal.

As part of this assessment, field investigations were undertaken in order to identify any existing environmental conditions that may have the potential to impact the Subject Site and surrounds. In addition to site investigations, a number of previously prepared reports for the Site were utilised in order to assess the environmental constraints and potential impacts. These specialist reports include the following:

- » Douglas Partners (2007), Hydrological and Contamination Assessment;
- » Hackett Laboratory Services (2003), Acid Sulphate Soils Assessment;
- » WBM Oceanics Australia Pty Ltd (2005), Flood Study; and
- » Connell Wagner Pty Ltd (2007), Flora and Fauna, Wallum Froglet Studies.

Relevant planning controls and principles were considered and implemented in the stormwater management for the Site including Kempsey Shire Council Local Environmental Plan 1987 and Kempsey Shire Council DCP 36 – Guidelines for Engineering and Subdivision.

A number of simulation models were utilised to determine hydrological, flooding and stormwater management for the Site, as well as provide recommendations for site and land management. A brief description of these models and their application to hydrological investigations undertaken by Martens, is outlined below.

MUSIC – MUSIC is designed to simulate urban stormwater systems operating at a range of temporal and spatial scales. The model was used to evaluate pre and post development pollutant loads from the Subject Site and to assess the hydrological impact on the wetland vegetation area to the north of the Subject Site and the water quality implications of the development.

DRAINS – DRAINS is a Stormwater Drainage System design and analysis program and was used to analyse site hydrology and to design road side swales.

RAFTS – XP RAFTS is a runoff model and was used to assess the impact of the development on catchment flows and to assess on site detention system requirements.

5.2.3 Existing Site Characteristics

5.2.3.1 EXISTING SOILS AND GEOTECHNICAL ASSESSMENT

The existing soil profile of the Subject Site is made up of two soil landscapes. The majority of the Site is Clybucca, which is characterised by back barrier swamps overlying Pleistocene sand at typical elevations of less than 5m AHD. The remainder of the Site, namely two smaller portions in the south-western and south-central section of the Site contains the Korogoro landscape, which consists of low transgressive Pleistocene dunes.

Potential issues associated with the soil type include poor drainage, localised acid sulphate soil potential, high run off, flood and foundation hazard, shallow water table and groundwater pollution hazard. Surface ponding in low lying areas and perching of groundwater as a result of rainfall penetration are also likely issues for the Proposal which needs to be addressed.

Site investigations undertaken by Douglas Partners in 2007 confirm that the Site is underlain by basement clay layers which are overlain with sand inter-bedded with clay layers increasing in depth in the north east to about 6m or more. No indurated (hard-setting) sand was recorded on the Site.

Boreholes drilled as part of Douglas Partners investigations indicate that the watertable is shallow in parts of the Site, with some areas showing evidence of surface ponding. Martens have advised that shallow groundwater and potential ponding will have implications for the Proposal with regard to impact on building footings, pavements, drainage and services and serviceability of parks and gardens. As such, management and mitigation measures have been recommended to mitigate potential impacts.

No acid sulphate soils were located within soil samples taken from the site, and as a result investigations concluded it was unlikely that the site would contain any potential or actual ASS within the top 2metres of soil.

5.2.3.2 RECEIVING WATER AND HABITAT PROTECTION ASSESSMENT

Drainage lines which convey flows from upstream, as well as site runoff, drain to the lower areas of the Subject Site adjacent to Saltwater Creek. Ecological investigation (see **Chapter 5.1**) have identified a portion of the site adjacent to Saltwater Creek, which is proposed to be rezoned for Conservation purposes, as having habitat of higher biodiversity value. This, along with the location of SEPP 14 wetlands and potential Endangered Ecological Community (EEC) requires the stormwater management regime for the Subject Site to include provision for the protection of this vegetation community and wetland, including the management of the water quality and quantity as well as the maintenance of hydrological regime. Proper stormwater management including the monitoring of nutrient and sediment loads during construction and occupation of the Subject Site will protect these sensitive habitats from potential adverse impacts.

5.2.3.3 HYDROLOGICAL ASSESSMENT

Detailed site investigations were undertaken for the Site by Douglas Partners in July and August of 2007. These investigations included the following:

- » drilling of 10 bore holes to a depth of 5m (4 bore holes were located on site);
- » installation of groundwater monitoring wells at each bore;
- » rising head (slug) tests on each well;
- » determination of field chemical parameters;
- » measurement of groundwater depths;
- » survey of bores; and
- » cone penetration test at one bore located on site.

With regard to water table and flow direction, results of the surveys show that the hydraulic gradient was generally around 0.005 m/m, with a typically northern flow towards the creek. Permeable sand in the eastern portion of the Site affords a seepage velocity of around 3 to 100 m/per year. In comparison, the western area of the Site is characterised by very low flow rates.

Groundwater data shows salinity measurements representative of freshly recharged groundwater, indicating that rainwater and surface flows are the primary sources of recharge.

5.2.3.4 HYDROLOGICAL IMPLICATIONS OF PROPOSAL

A number of hydrological implications have been raised in regard to future residential development of the Site and surrounding area as a result of the discussed site investigations undertaken by Douglas Partners. Potential contamination impacts have been addressed in **Chapter 5.3** of this EA. Possible minor impacts include:

- » potential impact on the hydrological regime of the wetland to the north of the Proposal; and
- » management of the high water table.

While there is potential for these impacts to occur mitigation measures have been incorporated into the design as discussed later in this Chapter to mitigate these impacts.

5.2.3.5 FLOOD ASSESSMENT

In 2005 Kempsey Shire Council commissioned WBM to undertake a flood study for South West Rocks. Modelling was undertaken in order to determine the flooding regime in Saltwater Creek and the impacts of flooding events including the 1%, 5%, 20% Annual Exceedance Probability (AEP) and probable maximum flood (PMF) levels. Results of these investigations show that the 1% AEP flood level is 3.2m AHD for the Subject Site. Crest elevations of the sand berm were also modelled at 2.0, 2.5 and 3.0m AHD for the 1% AEP in order to determine the effect of the berm on the hydrology of Saltwater Creek and its role in the control of flooding during rainfall/runoff events.

Results of the flood analysis indicate that the flood levels for the larger flood events upstream of Phillip Drive Bridge are controlled by bridge hydraulics and not the sand berm conditions. For more frequent events Phillip Drive Bridge has sufficient flood conveyance capacity and flood levels on the site are controlled by channel hydraulics and catchment generation and not the downstream berm conditions.

As outlined in the Martens Report, the site is not impacted by coastal inundation as ocean levels are much below the site levels to influence creek water levels at the site during both dry weather and all flooding events in the 1 in 100 year event. In this regard, coastal inundation under normal tidal conditions peaks at a level of 0.986 mAHD, which is considerably below the creek bed level adjacent to the site.

The effects of storm surge would be comparable to the effects (in modelling) of the outlet berm height. Therefore, even with the concurrence of storm surge / tidal conditions of 2.5m AHD and 1 in 100 year flood, the Site is not adversely impacted.

Developable areas have been identified on the site as all lands more than 50m from the 3.0 mAHD contour. This places the Proposals development envelope outside of lands impacted by inundation by the design 1% AEP flood event. Furthermore, a development flood planning level (FPL) of 3.7 mAHD is recommended for the site, which is 0.5m above the 1% AEP in accordance with recommendations of the NSW Government Floodplain Development Manual (2005).

5.2.3.5 EFFECT OF CLIMATE CHANGE INDUCED SEA LEVEL RISE & RAINFALL PATTERN CHANGE

As outlined in the abovementioned WBM (2005) study, Phillip Drive Bridge is the hydraulic control for the Saltwater Creek flood regime upstream of the bridge and therefore the Subject Site. Current predicted sea level rise over 100 years varies from 0.18m to 0.91m, depending on the parameters adopted.

As outlined in the Martens Report, assuming a climate induced sea level rise of 0.91m above the existing mean high water summer solstice, the resultant mean high water summer solstice may rise as high as 1.9m AHD. This figure is below the outlet height of 2.5m AHD and as such, the modelling demonstrates that the Bridge remains the hydraulic control for flood levels on the Subject Site irrespective of climate change induced sea level rise and is therefore not a concern for the Proposal.

Martens outlines that increased rainfall intensity predictions for the Northern Rivers area are currently in the order of 5 – 10%. A 10% increase in flow which may equate to an additional 5m³/s passing the site. Taking into account an approximate flow width of 250m and flood velocities of approximately 0.1m/s the predicted rise in flood levels is 200mm. This possible future increase in flood levels as a result of changed rainfall pattern will be readily accommodated within the adopted Site FPL.

5.2.4 Site Management

5.2.4.1 PLANNING FRAMEWORK

A number of controls and policy documents have informed the stormwater management for the Subject Site as follows:

- » Kempsey Shire Council DCP No. 36 - Stormwater Drainage Design
- » WBM Oceanic Australia (2006) Estuary Management Study and Plan: Saltwater Creek and Lagoon
- » WBM Oceanic Australia (2006) Saltwater Creek Flood Study: Final Draft

Kempsey Shire Council DCP No. 36 - Stormwater Drainage Design

DCP No. 36 requires the provision of a detention basin where development increases the peak flow rate in order to limit post-development flows to less than or equal to the pre-development flows for all storms up to and including the 1 in 100 year event. Alternatively, the downstream drainage system is to be upgraded to accommodate the increase in peak flow rate.

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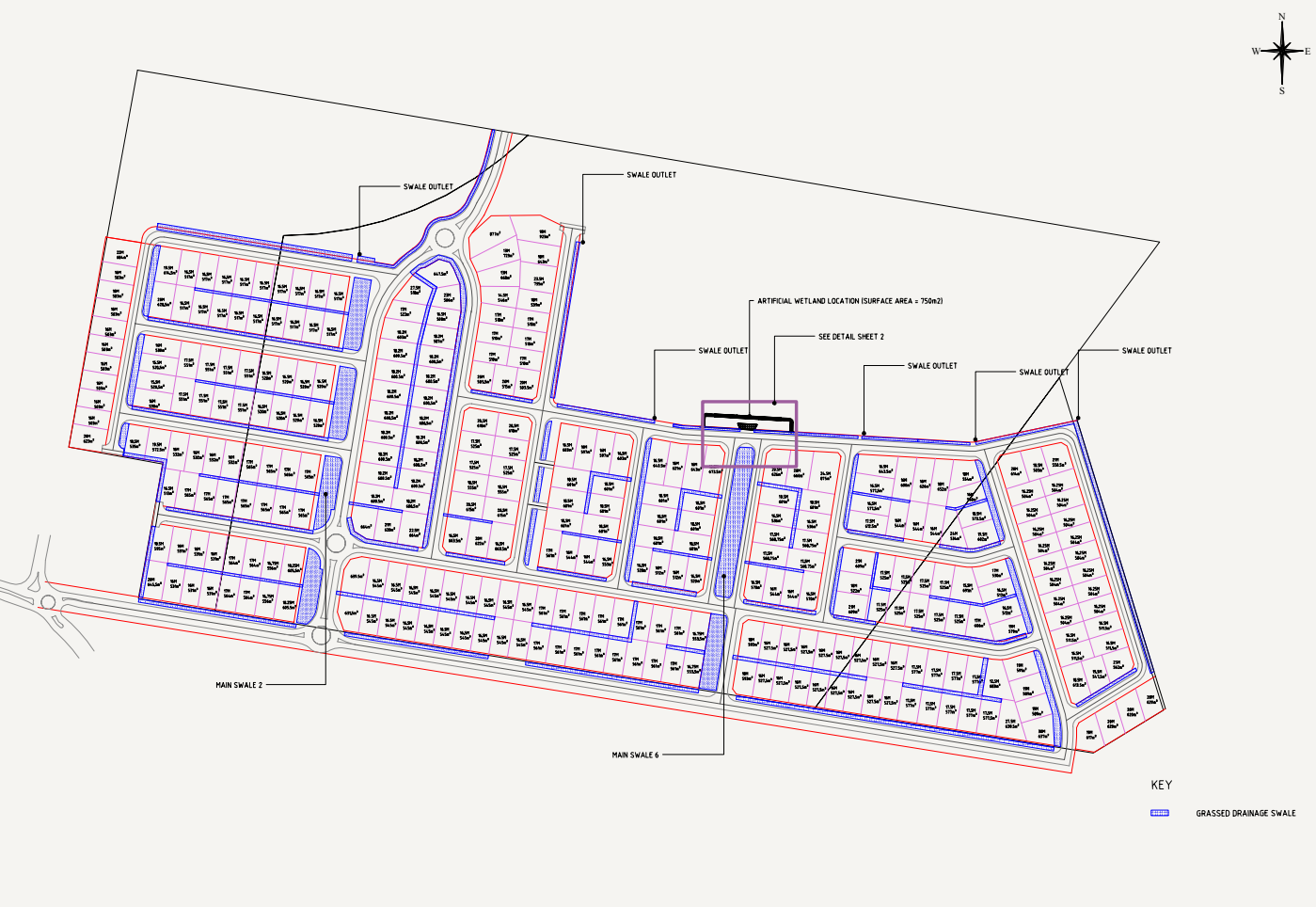


FIGURE 5.2.1 PROPOSED STORMWATER DRAINAGE MANAGEMENT SYSTEM (SOURCE: MARTENS 2009)
SEE APPENDIX D2 FOR FULL SCALE PLANS

The proposed development area drains to Saltwater Lagoon via Saltwater Creek and adjacent vegetated lands. Built infrastructure affected by flows from Saltwater Creek consists of the road bridge at Phillip Drive over the creek. As outlined in the Martens Report, stormwater modelling shows that the increase in flow to Saltwater Creek as a result of the Proposal is insignificant in comparison to the total flow in Saltwater Creek. Furthermore, Saltwater Lagoon will serve to attenuate any marginal increases in flow before they reach the bridge at Phillip Drive. Consequently, it is considered that any increase in flows from the Subject Site post-development would be attenuated and would not impact on existing stormwater infrastructure and therefore onsite detention is not required.

Estuary Management Study and Plan: Saltwater Creek and Lagoon (Saltwater EMP)

The primary aim of the Saltwater EMP is to achieve an equitable balance between opportunities for future development and ensuring such development does not degrade the natural values of the area. The EMP outlines a number of objectives for future management in the catchment. The objectives relevant to stormwater management and water quality at the site are summarised in **Table 5.2.1**.

Table 5.2.1. Development compliance with Saltwater EMP water quality objectives
(Source: Martens, March 2009)

Saltwater EMP Water Quality Objectives	
Objective	Compliance
Reduce the existing urban stormwater pollutant loads entering Saltwater Creek and Lagoon.	Stormwater management at the site aims to treat water to a standard that is equal to or better than the existing water quality.
Ensure that the water quality of Saltwater Creek and Lagoon is compatible with the recreational uses of the estuary.	The proposed development will supply runoff to the estuary system which is of equal or better quality than that of the existing and thus have no impact on the current recreational use of the Creek and Lagoon.
Ensure that the contamination of the former oil terminal sites does not degrade the existing or future estuarine environment of Saltwater Creek and Lagoon.	Not applicable. The proposed development will not result in the former oil terminal sites being a source of contamination.
Reduce the impact of on-site sewage treatment systems on the surface water quality of Saltwater Creek and Lagoon.	Not Applicable. The development will be serviced by reticulated town sewer.
Prevent the generation of acidic runoff resulting from activities carried out on potentially acid sulphate soils surrounding Saltwater Creek and Lagoon.	As a risk management measure, an ASS Management Plan will be instigated for works that are proposed at depth of 2m or more.

Saltwater Creek Flood Study

The WBM Oceanics (2004) Flood Study determined flood levels for the Subject Site. Further, the LES for the rezoning of the site incorporated the recommendations from the Saltwater Creek and Lagoon Estuary Management Plan, specifically, the adoption of a 50m buffer to the 3.0 mAHD contour. The adaptation of this setback by the Proposal means the development footprint is clear of 1% AEP flood inundation extent.

5.2.4.2 HYDROLOGICAL (GROUNDWATER) MANAGEMENT

The Subject Site has been identified as having shallow and variable groundwater, which if not mitigated by engineering works, has the potential to cause a number of implications for the Subject Site and surrounding land, including the degradation of road pavements and foundation settlement and general poor drainage.

A number of engineering works have been recommended by Martens to manage groundwater on site including:

- » construction of sub-soil drainage for road pavements to maximise soil stability of sub-grade and pavements;
- » stormwater drainage across the Site in the form of road drainage swales to restrict the rise of the groundwater table; and
- » installation of sub-soil drainage systems within building foundation zones to maximise soil moisture stability and facilitate discharge to road drainage swales.

The increase in hardstand area on site as a result of the Proposal will result in the lowering of the watertable, which is desirable as this removes the ability for the water table to rise above the level of drainage swales during rainfall events. While the lowering of the water table has potential benefits for development and stormwater management it poses other environmental risks that need assessment and mitigation where necessary. The impacts on groundwater dependant ecosystems downstream of the Site through off-site water table lowering, particularly the potential for effects to the hydrological regime of downstream wetland systems to the north of the Subject Site which provide valuable habitat for a variety of fauna and vegetation are required to be managed.

A number of mitigation measures have been designed to alleviate the potential impacts of watertable lowering using the MUSIC modelling system. The aim of mitigation measures is to ensure the post development hydrological regime in sensitive areas downstream of the Subject Site and surrounding areas is comparable with the pre-development flow regime, whilst ensuring net overall impact is managed.

As concluded by Martens, potential hydrological impacts on downstream vegetation are appropriately mitigated by maintaining the overall rate of groundwater recharge. The following design components are considered to be appropriate in order to achieve this:

- » Use of constructed grass swales to increase infiltration of stormwater, reducing the effect of increased urban hardstand surfaces, achieving site drainage and replenishing the watertable; and
- » Inclusion of an infiltration/surface flow spreading structure at the end of the two main drainage swales entering downstream habitat areas conveying through the Site from upstream catchments .

5.2.4.3 FLOOD MANAGEMENT

The flood assessment undertaken by WMB shows that the 1% AEP flood level is 3.2m AHD for the Subject Site. In order to reduce flooding risk, Martens therefore recommends a flood planning level be set at 3.7m AHD this being 0.5m above the local 1 in 100 year inundation level determined by WMB. The FPL should be adopted as the minimum floor level for any habitable rooms in future developments on the site. Furthermore, areas within 50m from the 3.0m AHD contour have been excluded from the development area and are included within the Conservation Zone, effectively placing the development envelope outside lands of levels impacted by the design 1% AEP flood level.

Flood levels determined by WBM also shows that during the 1% AEP, the Subject Site has connectivity to the South West Rocks area via Belle O'Conner Street, providing egress for occupiers from the Site during such an event.

Based on these management measures, the Proposal complies with the provisions in the NSW Floodplain Development Manual as follows:

- » the Proposal employs a merit approach to comply with the Flood Prone Land Policy by recognising flood prone areas of the Subject Site.;
- » FPL's have been set to provide a 0.5m freeboard above the 1% AEP flood level;
- » future impacts of climate change have been considered;
- » flood risks for three categories, being existing, future and continuing flood risk have been considered and management measures have been recommended accordingly;
- » the FPL has been set in line with results of WBM's Flood Study, which determines hydrologic aspects, as well as water levels, velocities, hazard categories and controlling features; and
- » potential impacts and mitigation options have been developed based on advice provided by a number of experts in the field.

5.2.4.4 STORMWATER QUANTITY

A stormwater management system has been designed by Martens in order to provide for the conveyance of urban stormwater resulting from the Proposal as provided in **Figure 5.2.1**.

The system consists of a series of roadside drainage swales which will allow for on site infiltration of stormwater into the groundwater table to ensure adequate recharge to the wetlands to the north of the site, as well as providing water quality treatment and stormwater infiltration functions. Level spreaders, or similar, are to be used at the outlet points of the swales which discharge into wetland areas in order to evenly disperse and control upslope flows. Outlet points will be designed to maintain the natural dispersion of stormwater and will be designed in order to prevent erosion and scour.

Modelling using the DRAINS Model Set-up has been undertaken to determine appropriate sizing of swales for the Proposal. The DRAINS model has determined that required roadside swale widths range from 2.0m to 5.5m, with corresponding centre line depths of 200mm to 550mm and have the following requirements:

- » swales are to be located on one side of the road only;
- » a minimum horizontal distance of 1.0m is required between the top of bank and edge of road pavement;
- » swale slopes are been designed to be 1(V) in 5(H);
- » pavement centre line is located on the road reserve centre line;
- » swales are designed to contain the 1 in 5 year flow;
- » swales and an additional 2.5m of adjoining gutter will contain the 1 in 100 year flow; and
- » roads are assumed to have a single crossfall towards the swale.

To ensure compliance with Council drainage guidelines, depths and depth by velocity product resulting from the 1 in 100 year ARI critical duration storm were analysed for each of the main trunk

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drainage swales within the subdivision. Analysis undertaken by Martens indicates that the depth by velocity product for the swales is considered to be acceptable.

The requirement for stormwater retention on site has been modelled using the RAFTS Model Set-up. The site was modelled as two separate nodes for both existing and developed conditions, in order to ascertain whether there is a requirement for OSD.

RAFTS modelling results show that discharge of stormwater from the Proposal to the Saltwater Creek system without OSD results in minor local increases in flow. Attenuation of these increased flows through other catchments effects and passage through the large retarding basin of Saltwater Lagoon mean that at the Phillip Drive Bridge development impacts are minimal. Furthermore, analysis shows that the modelled change in water levels within Saltwater Lagoon are extremely small being 4.1mm and 4.3mm for the 1 in 20 and 1 in 100 year ARI events respectively. These modelled changes are all considered to be within the RAFTS model's margin of error and indicate effectively no change.

MUSIC modelling was undertaken in order to assess the potential impact of surface water flows on the downslope wetlands. Modelling demonstrated that as a result of the Proposal, the existing downslope surface water flow would be decreased by 32%. This decrease is a result of stormwater being diverted to the groundwater table via swale infiltration, as opposed to stormwater flows travelling overland. The surface and groundwater systems are intrinsically connected at the site. Water enters the shallow groundwater system which remains accessible to wetland plants, thus having a negligible impact on the wetland and downstream vegetation communities. In the event of possible localised effects of instantaneous flows from the Proposal, swale outlets are designed to spread the stormwater flows over a wide area, dissipating the velocity of the flow and reducing the risk of erosion associate with point discharges.

5.2.4.5 STORMWATER QUALITY

Council's planning controls do not specify water quality objectives, however the Saltwater Creek EMP specifies a reduction in stormwater pollutant loads, therefore water quality modelling was carried out to meet the criteria of equal or better than pre-development quality. This criteria is supported by objectives for future development management outlined in the Saltwater EMP.

A treatment train system has been identified as the preferred option for stormwater quality treatment. Treatment trains focus on water conservation at the source and end of line, and generally incorporate a number of stormwater quality improvement devices (SQID). The treatment train system developed for the Site by Martens proposes two main types of SQIDs as follows:

1. a network of roadside swales and two main drainage swales, designed to remove suspended solids and pollutants and allow considerable infiltration, and direct flows downstream to end of line treatment structures; and
2. a swale outlet structure/flow spreader with an end of line artificial wetland where macrophytes and wetland vegetation filter out nutrients and sediments prior to stormwater discharge to the Conservation Zone.

The MUSIC modelling system was utilised in order to ensure water quality objectives are achievable under the proposed treatment train system. Models were run for two scenarios, post development with no treatment provided and post development with treatment provided. The results are outlined in **Table 5.2.2.**

Table 5.2.2. Pre-verses Post-development (without and with treatment)
(Source: Martens, 2009)

Without Treatment					
Pollutant	Pre-Development (kg/yr)	No Treatment (kg/yr)	With Treatment (kg/yr)	% Load Reduction (pre vs with treatment)	Criteria Met (Y/N)
Suspended Solids	32 100	75 300	5 660	82	Y
Phosphorus	125	190	43	65	Y
Nitrogen	531	1070	474	11	Y
Flow	50 ML/yr	616 ML/yr	339 ML/yr	32	Y

Results detailed above demonstrate that the proposed treatment train system will meet the set water quality criteria of being equal to or less than pre-development levels. In this case the proposed treatment train system will improve stormwater quality when compared to pre development levels.

5.2.5 Conclusions

Site investigation, review of existing specialist reports, and modelling techniques were utilised in order to determine existing site characteristics and potential hydrological impacts as a result of the Proposal, and to make recommendations for hydrological, flooding and stormwater management.

The shallow groundwater table of the Subject Site and surrounding area was identified as an issue to be managed, with potential impacts including affects on the hydrological regime on downstream habitat. The proposal also had the potential to impact surface water flows and water quality if not appropriately managed.

Martens has developed an Integrated Water Cycle Management (IWCM) Plan, which brings together the results of the stormwater quality and quantity assessment, hydrological assessment and flood analysis to form an overall water management plan which satisfied performance standards adopted for the Site.

The primary objective of the IWCM Plan formulated in order to manage hydrological impacts of the Proposal was to ensure the post-development hydrological regime is maintained and improves on the pre-development water quality. The potential for the developed IWCM Plan to achieve this objective was assessed using a number of modelling systems. Modelling undertaken using MUSIC, DRAINS and RAFT modelling software demonstrated that this objective is achievable.

5.2.6 Management and Mitigation

The Engineering Services report undertaken by Martens Consulting Engineers recommends the following mitigation measure to be implemented as part of the Integrated Water Cycle Management Plan for the Proposal.

Table 5.2.3 Proposed IWCM Measures

Issue	Mitigation Measure
Stormwater management	Road side swales are to be included on the Site to safely and effectively convey flows to downslope wetlands and receiving waters; provide a means to infiltrate increased runoff into the groundwater table; and for water quality treatment.
Stormwater management	Two main swales (Swale 2 and 6) are proposed to direct drainage from upslope catchments (catchment 2 and 6) across the Site and into receiving waters. As with road side swales, these also provide groundwater replenishment and significant water quality treatment.
Stormwater management	Flow Spreader proposed to provide an 'end of line' treatment structure at the end of Swale 6. This structure will remove nutrients and suspended solids and shall provide for the even distribution of flows over a wide area before discharging into the downstream habitat and receiving waters.
Groundwater management	Sub-soil drains are to be provided to manage episodically shallow groundwater and protection of road pavements and other assets from damage.

Environmental Assessment

5.3

Soils and Contamination

5.3 Soils and Contamination

5.3.1 Introduction

This Chapter discusses the methodology employed, findings and recommendations for soil and contamination hazards potentially affecting the Subject Site and Proposal. An overview of the existing soil profile and geotechnical environment on the Subject Site is outlined in the **Chapter 5.2 Hydrology** of this report. The full Martens Report is included as **Appendix D2** of this EA.

5.3.2 Methodology

As part of their Engineering Services Report undertaken for the Subject Site, Martens Consulting Engineers were engaged to undertake a site capabilities analysis for the proposed residential subdivision of the Site. As part of this assessment, field investigations were undertaken to identify any soil and contamination hazards that have the potential to impact the Subject Site. In addition to site investigations, Martens reviewed and utilised a number of previous investigations undertaken for the Site to identify potential impacts and provide mitigation strategies where necessary. Previous investigations include:

- » Douglas Partners (2007), Hydrological and Contamination Assessment;
- » Hackett Laboratory Services (2003), Acid Sulphate Soils Assessment; and
- » Connell Wagner Pty Ltd (2007), Flora and Fauna, Wallum Froglet Studies.

In addition to field investigations and literature review of the above reports, Martens assessment included the following tasks:

- » an acid sulphate soils assessment;
- » preliminary contamination assessment;
- » assessment of the impact that future development may have on the Sites soil resources; and
- » management recommendations, including opportunities for impact mitigation and site protection.

5.3.3 Acid Sulphate Soils Assessment

GIS mapping information of the Site illustrates that the Site has high potential for the presence of acid sulphate soils (ASS). As shown in **Figure 5.3.1**, portions of the Site near the northern boundary along an existing drainage line have been identified as potentially containing ASS 1m below ground level (Class 2), while the remainder of the Site is likely to contain Class 4 ASS, being located at depths of greater than 2m below ground level.

As a result of these preliminary investigations, soil testing was undertaken by Hackett Laboratory Services to a depth of 2m. A total of six testpits were sampled across a larger investigation area. Testpit 5 and Testpit 6 were the two testpits located on the Subject Site. Results of these samples are recorded in **Table 5.3.1**.

Table 5.3.1 Testpits 5 and 6 ASS Sampling Results (Source: Martens, March 2009)

Test pit	Sample Depth (mm)	Watertable Depth (mm)	pH _f ¹	pH _{Fox} ²	Peroxide Reaction ³
5	0-400	-	-	-	-
	400-800	-	5.13	4.89	0
	800-1200	1200	4.82	4.79	0
	1200-2000	-	4.83	4.80	0
6	0-400	-	5.51	4.94	-
	400-2000	1600	5.36	5.02	0
	2000+	-	5.71	4.81	1

Note: 1 In-situ pH of saturated soil sample. 2 In-situ pH with 30% peroxide reaction. ³

Peroxide rating as follows: 0 = No reaction after 5 mins; 1= Slight reaction within 5 mins; 2= Medium reaction within 5 mins; 3= Strongly effervescent within 5 mins.

Based on pH_f and post peroxide oxidation pH_{Fox} criteria development by the Acid Sulphate Soils Management Advisory Committee (ASSMAC), the above results indicate the following:

- » soils within a pH of less than or equal to 4.0 are considered to be actual ASS; and
- » soils with pH_f of greater than 4.0 and less than 3.0 are classified as potential ASS.

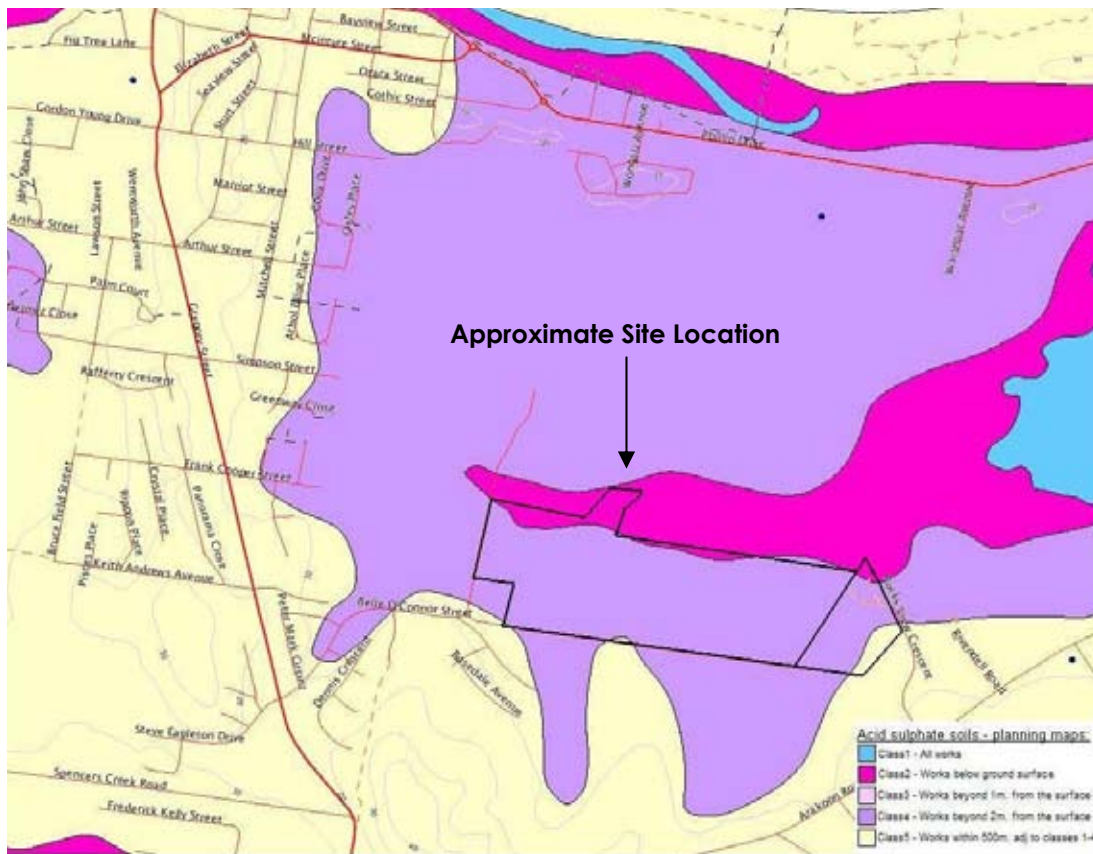


FIGURE 5.3.1 ACID SULPHATE SOILS SITE MAP (SOURCE MARTENS 2009)
SEE APPENDIX D2 FOR FULL SCALE PLAN

Based on the above, testing of the soils sampled from the Subject Site showed that none were found to contain actual or potential ASS and it is likely that the Site does not contain any potential or actual ASS within the top 2m of soil. However, as no testing was undertaken in the high risk portion of the Site which is located in the northern part of the Subject Site, Martens recommends an ASS Management Plan be instigated if works are proposed at depths below 2m below ground level or that are likely to result in water table changes below this point. It is noted that a considerable majority of the area nominated as high risk is located within the Conservation Zone where no development is proposed.

5.3.4 Preliminary Contamination Assessment

A preliminary contamination assessment was undertaken by Martens in order to assess the potential for contamination risks, specifically, potential for contamination of the Subject Site from the former Caltex and Shell depots located on Philip Drive appropriately 1km north of the Site. The assessment involved the following investigations:

- » review of previously completed studies by other specialist consultants;
- » review of the DA consent history of the Subject Site, through a search of Kempsey Shire Council record; and
- » analysis of historical aerial photography.

In 1996 a Preliminary Contamination Assessment was carried out by Douglas Partners of the South West Rocks area. This assessment found traces of minor heavy metal and toluene concentrations in soil samples from the area to the north of the creek, however these traces were found to be lower than that considered to be a contamination risk by the EPA and are located 1km north of the Subject Site. Both Caltex and Shell have carried out sampling and analysis in order to assess potential contamination to the south of their land as a result of their operations during the 1970's and 1980's. The investigations have shown little or no migration of contaminants, which has been confirmed by subsequent Douglas Partners assessments. Martens has concluded that due to the distance from these terminals to the Subject Site, being in excess of 1km and the evidence that any potential contamination would migrate to the north, the risk of contamination of the Subject Site is negligible and therefore not a risk to the Proposal.

Aerial photos illustrating the history of the Site since 1956 to the present were also examined in order to assess how land uses have impacted on and changed the Subject Site and surrounding area, as well as identify potential sources of land contamination. As noted above, the former Caltex and Shell sites are identified as potential sources of contamination in the locality. However based on the distance between the former Caltex and Shell sites and the Subject Site of 1km, remediation works that have been undertaken since the decommissioning of these sites and information obtained from previous specialist investigations, the risk of contamination from these former uses is considered to be negligible at the Subject Site.

In addition to the above, a DA consent history search undertaken for the Subject Site of past land uses has led to the conclusion that the risk of contamination on the site is characterised as negligible.

Results of the preliminary contamination assessment concluded that the risk of site contamination from past uses is negligible and potential contamination risks do not preclude the proposed residential development of the Site.

5.3.5 Conclusions

A number of investigations were carried out to assess the existing soil and contamination issues potentially affecting the Site and Proposal. The most recent investigations of soil and contamination undertaken by Martens Consulting Engineers include a preliminary site contamination assessment based on previous uses, aerial photograph history and information provided by past specialists. An assessment of the likelihood of existing ASS was also conducted, based on soil samples taken from the Site and evaluated against the ASSMAC criteria for potential and actual ASS.

Results of the preliminary contamination assessment conclude that the risk of site contamination is negligible and contamination and ASS soil hazard risks do not preclude the proposed residential development of the Site.

No ASS was found within soil samples taken from the Site, and as a result investigations concluded it was unlikely that the Site would contain any potential or actual ASS within the top 2m of soil. For works proposed to depths greater than 2m or are likely to result in water table changes below 2m Martens has recommended an ASS Management Plan be instigated.

5.3.6 Management and Mitigation

The Engineering Services report undertaken by Martens Consulting Engineers recommends the following mitigation measure to be implemented as part of the Proposal.

Table 5.3.2 Proposed Contamination Mitigation Measures

Issue	Mitigation Measure
ASS management	Prior to the commencement of any works, at depths below or likely to result in water table changes below 2m below ground level, an ASS Management Plan should be instigated.

5.4

Cultural Heritage

5.4 Cultural Heritage

This Chapter discusses the methodology employed, findings and recommendations for heritage and archaeological matters, indigenous and non-indigenous, potentially affecting the Subject Site and proposal.

5.4.1 Indigenous Heritage and Archaeology

5.4.1.1 INTRODUCTION

Kempsey Shire Council resolved to have a local environmental study (LES) prepared in support of the rezoning of Lots 509 & 19 DP 850963, Lot 52 DP 831284 and Lot 84 DP 792945 in South West Rocks, for the purpose of residential development. As a component of the LES process Jacqueline Collins (Adise Pty Ltd) was engaged as a Consultant Archaeologist to undertake an Aboriginal Heritage Assessment of the LES Study Area.

The LES Study Area incorporates approximately 118 hectares, including the 25.3 hectares which comprises the Subject Site for this Project Application. As a result of the initial study covering the Subject Site it is considered that the existing Aboriginal Heritage Assessment report is appropriate for use in this Environmental Assessment Report. The full Collins Report is included as **Appendix D3** of this EA.

5.4.1.2 METHODOLOGY

The Indigenous Heritage Assessment undertaken by Jacqueline Collins for the LES was undertaken in accordance with the provisions of the *National Parks and Wildlife Act 1974* and the *Environmental Planning and Assessment Act 1979*. The Assessment included the following tasks:

- » literature review and compilation of existing data;
- » consultation with Kempsey Local Aboriginal Land Council and Dunghutti Elders Council Aboriginal Corporation;
- » selective field inspection of the study area;
- » assessment of the impact that future development may have on the Aboriginal cultural heritage resource; and
- » management recommendations, including opportunities for impact mitigation and site protection.

The Aboriginal Heritage Assessment undertaken by Jacqueline Collins was prepared in August 2004, prior to the commencement of the DEC's (now DECC) draft *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation (2005)* and *Interim Community Consultation Requirements for Applicants (2004)*, which came into force in 2005. As outlined in further detail within this Chapter, appropriate consultation was undertaken with the local Aboriginal community during the preparation of the Collins report and as such, the existing Aboriginal Heritage Assessment report is considered appropriate for the assessment of potential impacts with regard to indigenous heritage and archaeology.

5.4.1.3 CULTURAL AND ARCHAEOLOGICAL CONTEXT

The LES Study Area, including the Subject Site, was home to the Dunghutti, with the Ngaku dialect being the language spoken across the lower Macleay district. The Dunghutti were a "healthy people, the majority of whom lived on the floodplain and its surrounds, relying heavily on aquatic resources" (Callaghan 1980:25) at the time of the European arrival. Local diet consisted mainly of fish, with shellfish, and terrestrial flora and fauna were integral to the local economy. Captain Cook named the

cape Smoky Cape after observing the many fires in the locality used by the Aboriginal population during hunting practices.

Within the South West Rocks Golf Course, on a low bedrock ridge, there is a known site, approximately 250m west of the LES Study Area, and Subject Site. A naturally occurring granite boulder marks the Site, which represents the grave of the cultural hero Birrogon who was speared during a tribal battle, and often referred to as the “Aboriginal Jesus”. The Site is no longer in its original condition, with the Site having been used for race-meets from the 1870s and with the relocation of the boulder in the 1960s to make way for the seventh fairway.

5.4.1.4 SURVEY RESULTS

Aboriginal Heritage Information Management Systems (AHIMS)

A search of the Aboriginal Information Management System (AHIMS) database, managed by the NSW Department of Environment and Climate Change (DECC) was undertaken as a component of the Aboriginal Heritage Assessment undertaken by Jacqueline Collins. The search found that there are no known sites located within the Study Area. It also found 63 listed site between the Macleay River/Spencers Creek and the Coastline north of Jerseyville. Of these 6 were located within one (1) kilometre of the Study Area.

Table 5.4.1 Items of Indigenous Significance

Site Number	Location/name	Site Type	Environmental Context
22-4-35	Birrogon’s Grave	Natural mythological	Crest of bedrock spur.
22-4-08	Arakoon	Midden	Front dune.
22-4-90	South West Rocks	Midden/burial	Wetland margin.
22-4-48	Spencers Creek	Burial ground	Foot-slope of sand ridge near perennial creek.
22-4-18	Big Smoky	Midden	Bedrock foot-slope adjacent to wetland.
22-4-94	Spencers Creek	Midden/open camp	Sand plain near perennial creek.

Figure 5.4.1 Items of Indigenous Heritage Significance Illustrates the locations of each of these items on map of the South West Rocks area.

The proposed development of the Study Area in which the Subject Site is located is not anticipated to have any impact on these sites primarily due to the distance between the significant sites and boundaries of the Study Area.

Previous Surveys in the LES Study Area

Previous surveys within the Study Area included:

- » a three day survey undertaken by the Kempsey LALC (Sites Officer Neville Cohen) of a 60 hectare section of the Study Area lowland (then Lot 510 DP 850963) in 1997 in high visibility conditions (due to fire);

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FIGURE 5.4.1 ITEMS OF INDIGENOUS HERITAGE SIGNIFICANCE (JACQUELINE COLLINS)

- » consultation with the Elders of the South West Rocks Aboriginal community requesting details of any knowledge of culturally significant sites in the area;
- » two days of monitoring of the drain digging through the Study Area, including a further two days of monitoring the spreading out of drain spoil/topsoil; and
- » survey of the vegetated hind-dune in the north-eastern corner of the Study Area, and the better drained area in the south-west, as advised by Harold Smith and Greg Blair.

None of these surveys found existence of, or knowledge of any items or areas of cultural significance.

5.4.1.5 SURVEY

The field survey was undertaken in conjunction with representatives from the Kempsey Local Aboriginal Land Council (LALC) and the Dunghutti Elders Council Aboriginal Corporation (CAC) in May of 2004. A logbook was kept, recording the relevant environmental observations and site photographs. The conditions were good, fine weather with good lighting conducive to the location of archaeological materials.

A selective sampling strategy was employed due to the low-lying topography of the Study Area and the history of mechanical disturbance. The intention was to maximise coverage of lesser disturbed surfaces, and subsurface sediments, and to inspect areas identified as having potential heritage significance.

In addition to the surface and subsurface surveys, an assessment was undertaken of the mature trees in an attempt to identify any evidence of Aboriginal scarring.

A combination of parallel transects and single traverses were undertaken, with the distance between surveyors tailored to suit the type of exposure being inspected. On linear features (eg drains) two surveyors walked the margins, checking the opposite cutting for subsurface evidence. Elsewhere, the inspection was carried out by two or three surveyors walking up to five metres apart, resulting in the coverage of a 10-15 metre wide strip. Particular attention was paid to degraded surfaces which were more conducive to artefact exposure and detection than those churned during recent slashing and harrowing.

Table 5.4.2 Survey Results (adapted from Table 3. Survey coverage data from Jacqueline Collins' Aboriginal Heritage Assessment, 1994 attached in full at **Appendix D3**.)

Survey Unit	Surveyed Area	% Surface Exposed	% Visibility on Exposures	Effective Coverage (m ²)	No. Sites Recorded
M	9,200	10	100	920	0
N	1,200	10	100	120	0

The Study Area was divided into survey unit areas, for the purpose of surveying the entire area. The survey units which apply to the Site that is the subject of this Project Application are survey units:

- » M, described as remnant open woodland on slight rise no exposure off roads/drain; and
- » N, described as swampy lowland heath no exposure off tracks.

The findings of the survey are illustrated in **Table 5.4.2** above.

The survey results for the Study Area, and therefore the Subject Site, found that there were no artefacts, scarred trees or potential archaeological deposits identified during the survey.

5.4.1.6 CONSULTATION

Consultation was undertaken with the Kempsey Local Aboriginal Land Council (LALC) and the Dunghutti Elders Council Aboriginal Corporation (CAC) in May of 2004. Consultation included a

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site visit with the LALC Officers, Dunghutti Elder Harold Smith and Figtree Aboriginal community representative Greg Blair on 18 May 2004. An additional site visit was held on 25 Jun 2004 to include Dunghutti Elders CAC Sites Officer David Hoskins.

The findings of the survey were discussed with the LALC and CAC representatives, and correspondence exchanged culminating in the development of management principles and mitigation measures for the protection and management of any items of significance found to exist within the Study Area.

The Kempsey LALC and the Dunghutti Elders CAC both provided advice to Jacqueline Collins, in the preparation of the Aboriginal Heritage Assessment. The advice provided that given the survey results, environmental character of the Study Area and the level of disturbance of the Study Area as a result of previous activities, there were no fundamental objections to the development of the Study Area, which includes the Subject Site, for residential purposes, provided that the mitigation measures recommended in Jacqueline Collin's report are implemented.

More recent consultation has been undertaken by the Proponent with Kempsey LALC and the Dunghutti Elders CAC, advising these groups of the Proposal (August 2009). A public notice was also placed in the The Macleay Argus local newspaper on the 11 August 2009 requesting registration of interest from local Aboriginal stakeholders to comment on the public exhibition of this EA. See **Appendix D3** for details.

5.4.1.7 CULTURAL SIGNIFICANCE OF THE SUBJECT SITE

The heritage value/significance of a site (or grouping of sites) is defined by the Australian Heritage Council as including aesthetic, historic, scientific or social, or other significance for current and future Australian generations. The two most important criteria for significance for Aboriginal sites and places are social and scientific. The *National Parks and Wildlife Act 1974* is the statute enacting the protection of all items of indigenous cultural heritage and archaeological significance.

The Study Area, including the Subject Site, revealed no archaeological sites during surveys, and consultation with the Kempsey LALC and the Dunghutti Elders CAC provided that there are no known surviving sites or places of cultural/social significance to the local indigenous communities. Jacqueline Collins' report provided that there is no high expectation that significant undetected sites occur within the Subject Site, or greater Study Area.

5.4.1.8 CONCLUSIONS

The Aboriginal Heritage Assessment found that only the well drained and reasonably intact parts of the landscape on the higher land in the northeast hind dune adjacent to Phillip Drive and remnant forested areas adjacent to the south boundary of the STP presented opportunity of undetected items of archaeological potential.

While no archaeological evidence was found the possibility of undetected sites occurring in proximity to the Site and in particular in the vicinity of the creek channel can not be ruled out entirely. The vegetation/development buffer located in the northern part of the Subject Site is part of a larger protected area set by the development structure plan contained in the South West Rocks Local Environmental Study (LES). The Aboriginal Heritage Assessment prepared by Jacqueline Collins states that the protection of this area, and the woodland it contains will offer protection to potential undetected archaeological sites provided that management and maintenance of the understorey does not result in a modified ground surface.

Therefore it is concluded that the possibility of undetected archaeological finds occurring on the Subject Site is negligible. However, in order to ensure the proper protection and management of any archaeological items that may be discovered during construction, mitigation measures have been provided in **Section 5.4.1.6** of this Environmental Assessment Report.

5.4.1.9 MANAGEMENT AND MONITORING

The Aboriginal Heritage Assessment undertaken for the LES included several recommendations for management and mitigation measures for the protection of the indigenous heritage and archaeological significance of the LES Study Area which includes the Subject Site. The mitigation measures provided are based on the requirements and standards provided by:

- » *National Parks and Wildlife Act 1974*;
- » advice from Kempsey LALC and Dunghutti Elders CAC representatives;
- » DEC AHIMS search and background research into the history and archaeology of South West Rocks;
- » results of the field survey;
- » assessed significance of the Study Area; and
- » consideration of the potential impacts of the Proposal on Aboriginal sites and values.

Of relevance to the Subject Site the mitigation measures proposed consider potential undetected sites and general construction matters, as are summarised in **Table 5.4.2 below**.

Table 5.4.2 Proposed Indigenous Heritage Mitigation Measures

Issue	Mitigation Measure
Undetected Sites	
Isolated Artefacts from itinerant resource-gathering activities may occur in parts of the Study Area.	Conservation of woodland vegetation in potentially sensitive areas in remnant Scribbly gum woodland south and south-east of the Sewerage Treatment Plant (the proposed Conservation Area).
Saltwater Lagoon margin may contain undisturbed occupation sites.	The needlebark stringybark woodland fringing Saltwater Lagoon should be retained in its existing condition.
General Construction	
Legal Obligations of Construction Contractors	All construction contractors and their employees are to be advised of their legal obligations with regard to Aboriginal Cultural Material. This advice is to form a component of a Construction and Environmental Management Plan (CEMP) prepared for the Site, and the CEMP should be forwarded to the DEC Northern Aboriginal Heritage Unit (Coffs Harbour) for its records.
All Aboriginal places and objects are protected under the NSW <i>National Parks and Wildlife Act 1974</i> . This protection includes Aboriginal places and objects which have not been identified in this report, but which may be identified during construction.	Should any previously unidentified Aboriginal objects or places be identified during excavation and construction, all works must cease in the vicinity of the find and the following be notified: » NSW Department of Environment and conservation; » A qualified archaeologist; and » Aboriginal stakeholders.

5.4.2 Non-Indigenous Heritage and Archaeology

5.4.2.1 INTRODUCTION

The Subject Site is largely undeveloped land which has been used for the purpose of grazing and agricultural uses in the past. There are no heritage items of non-indigenous significance on or in the near vicinity of the Subject Site, and therefore EDAW undertook a preliminary heritage assessment of the Study Area to ensure that there was no need for a thorough heritage assessment or heritage impact statement to be prepared.

5.4.2.2 METHODOLOGY

EDAW has undertaken a preliminary desk-top assessment of the non-indigenous heritage items located within the vicinity of the Subject Site. The desktop review included a review of the NSW State Heritage Inventory/Register, Kempsey Council's LEP, and the Commonwealth Australian Heritage on-line databases.

5.4.2.3 DATABASE REVIEW RESULTS

The review found that there were no items listed on the NSW State Heritage Register protected under the provisions of the NSW *Heritage Act 1977*. There was one item listed in a Regional Environmental Plan (REP) this being the Pacific Guest House at 21-23 Livingston Street, South West Rocks.

The remainder of items were considered to be of local significance being listed on the Kempsey LEP1987, and included:

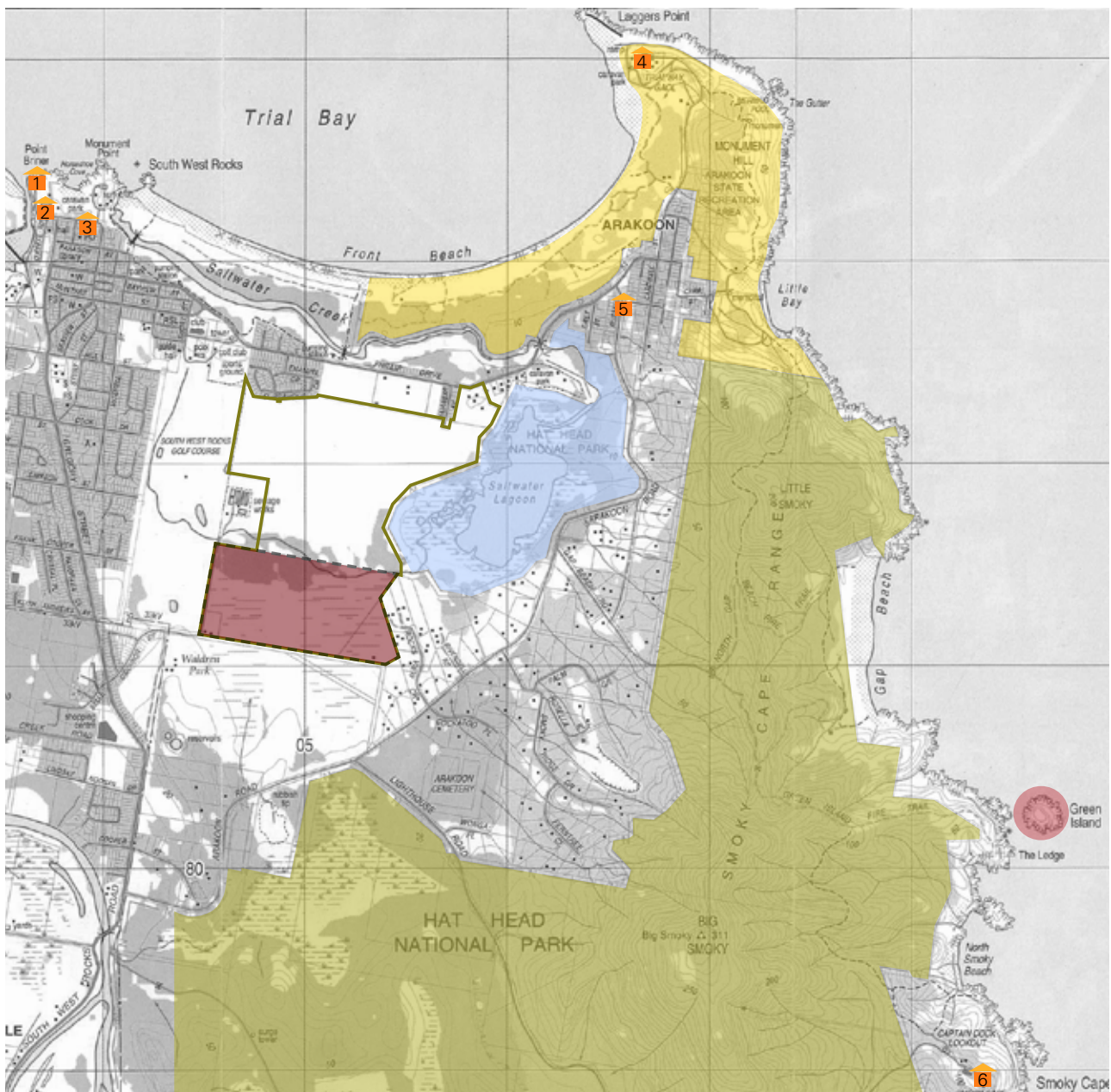
- » Smoky Cape Lighthouse Group:
 - lighthouse and generator annexe;
 - two residences;
 - coach house and stables;
 - ancillary structures;
- » Trial Bay Gaol, Lager's Point;
- » Arakoon House, Trial Bay;
- » Pacific Guest House, 21-23 Livingstone Street;
- » Flagstaff at Flagstaff Headland; and
- » Pilot Station Group:
 - pilot's residence;
 - 3 boatmans' cottages.

The review of the Australian Heritage Databases revealed four areas of interest within the South West Rocks area on the various Commonwealth heritage listings, including:

- » Arakoon State Recreation Area Carri Street, Listed on the Register of the National Estate;
- » Boatmans Cottage No 2, Pilot Station Group 5 Ocean Dr, Indicative Place on the Register of the National Estate;
- » Fish Rock Grey Nurse Shark Habitat, Place rejected for Emergency Listing on the National Heritage List; and
- » Green Island Grey Nurse Shark Habitat, Place rejected for Emergency Listing on the National Heritage List.

None of the listed heritage items are within close proximity of the Subject Site, as is depicted in **Figure 5.4.2.**

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- | | |
|---------------------------------|---------------------------------------|
| 1 Flagstaff At Briner Point | Arakoon State Recreation Area |
| 2 Pilot Station Complex | Green Island Grey Nurse Shark Habitat |
| 3 The Heritage Guesthouse | Hat Head National Park |
| 4 Trial Bay Goal | Sepp 14 Wetland |
| 5 Arakoon House | Malbec Lands Development Site |
| 6 Smoky Cape Lighthouse Complex | Local Environment Study Area |

FIGURE 5.4.2 ITEMS OF NON-INDIGENOUS SIGNIFICANCE

5.4.2.4 ANTICIPATED IMPACT

Given that none of the listed heritage items are located on, or in the immediate vicinity of the Subject Site it is anticipated that the proposed Project Application for the subdivision of the Site, and future development for residential purposes, will not have any direct impact on known heritage items within South West Rocks.

Indirectly, as the Subject Site is on low lying land, the visual assessment undertaken by EDAW as a component of this Project Application (see **Chapter 5.6**) considered views to and from the Subject Site from all of the listed heritage items. This assessment reveals that none of the known heritage items have views to the Subject Site.

5.4.2.5 CONCLUSIONS

The preliminary heritage assessment undertaken found no locally, State, Regionally or Federally significant heritage items exist on or in the vicinity of the Subject Site. Investigation of heritage items in the South West Rocks locality found that none have a visual link to the subject site. Therefore the proposed development is unlikely to have any impact on any heritage items in the South West Rocks area.

5.4.2.6 MANAGEMENT AND MONITORING

Table 5.4.3 Proposed Non-Indigenous Heritage Mitigation Measures

Issues	Mitigation Measure
Potential impact on views from heritage items in South West Rocks.	Provide screening in form of native vegetation to minimise any potential impacts.

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5.5

Traffic and Transport

5.5 Traffic and Transport

5.5.1 Introduction

Colston Budd Hunt and Kafes Pty Ltd (Colston Budd) were engaged to undertake a transport report for the proposed residential subdivision of the Subject Site. This Chapter discusses the existing traffic and transport conditions surrounding the Subject Site and evaluates potential traffic and transport issues that may affect the Subject Site and Proposal. The full Colston Budd Report is included as **Appendix D4** of this EA.

5.5.2 Methodology

In order to gauge traffic conditions, understand existing road network capacity and function, and evaluate existing transport and traffic conditions, a number of surveys and investigations were undertaken by Colston Budd. These investigations included an evaluation of the existing road network and public transport in the area, as well as traffic flow counts at various intersections and surveys and modelling using the SIDRA program to evaluate the capacity of intersections to cater for peak period traffic flow.

Implications of the Proposal on traffic and transport situations in the local area were also investigated, including the potential for increased public transport services, proposed access and internal layout and traffic generation and associated effects as a result of the Proposal.

Proposed traffic generation figures and intersection operations analyses were based on RTA standards and modelled using the SIDRA program.

As outlined by Colston Budd, the transport report has been prepared with reference to the RTA's Guide to Traffic Generating Developments and Kempsey Shire Council's DCP No. 36 - Guidelines for Engineering and Subdivision.

5.5.3 Existing Traffic Conditions

5.5.3.1 ROAD NETWORK ANALYSIS

The Subject Site is located to the south west of the main town area of South West Rocks. The road network in the immediate vicinity of the Site includes Gregory Street, Phillip Drive, Waianbar Avenue and Belle O'Connor Street.

Gregory Street, which has a speed limit of 50km/hr is located to the west of the Site and provides the main north-south connection in South West Rocks. This street consists of one lane in each direction with sealed shoulders, and in sections of the street, parking lanes are provided on both sides of the road. The Rocks shopping centre is located along Gregory Street. A median is located adjacent to the shopping centre just south of the Site, where a bus stop is provided.

An east-west connection is provided via Phillip Drive, which is located to the north of the Site and the golf course. It provides for one lane in each direction and has a traffic speed limit of 60km/hr.

Belle O'Connor Street, which is located to the southwest of the Subject Site intersects Gregory Street at a roundabout. This street affords one lane in each direction, a central landscaped median and one parking lane on each side. Belle O'Connor Street terminates in a dead-end at the south-eastern corner of the Subject Site.

Located to the northeast of the Site and running south off Phillip Drive is Waianbar Avenue. This short road, which connects with Phillip Drive at a t-intersection provides access to residential development to the north of the Subject Site. Currently, there is no road connection linking Waianbar Avenue to Belle O'Connor Street.

5.5.3.2 TRAFFIC FLOW COUNTS

Traffic flow counts were undertaken at a number of intersections during weekday peak morning and afternoon periods. The results, which are summarised in **Table 5.5.1** show the greatest traffic flows occurring along Gregory Street, with some 300 to 650 vehicles per hour two-way during the morning and afternoon peak periods. Lower flows were recorded on Landsborough Street (west of Phillip Drive), Belle O'Connor Street and Phillip Drive at around 100 to 200 vehicles per hour two-way during peak hours. Less than 100 vehicles were surveyed per two-way journey during peak morning and afternoon periods at Waianbar Avenue and Steve Eagleton Drive (located off Belle O'Connor Street).

Table 5.5.1 Existing two-way (sum of both directions) peak hour traffic flows

(Source: Colston Budd, 2008)

Road	Location	AM Peak Hour	PM Peak Hour
Gregory Street	North of Landsborough Street	315	325
	South of Landsborough Street	405	430
	North of Belle O'Connor Street	595	620
	South of Belle O'Connor Street	580	615
Landsborough Street	East of Gregory Street	140	205
Belle O'Connor Street	East of Gregory Street	105	105
Steve Eagleton Drive	West of Gregory Street	60	50
Phillip Drive	East of Waianbar Avenue	120	130
	West of Waianbar Avenue	125	140
Waianbar Avenue	South of Phillip Drive	15	20

5.5.3.3 INTERSECTION OPERATIONS ANALYSIS

The capacity of a number of existing intersections around the Subject Site was determined using the SIDRA program in order to ascertain the ability of the intersections and road networks to cater for peak period traffic flows. The SIDRA program considers intersections controlled by signals, roundabouts or signs and produces a number of measures of intersection operations. For the subject traffic and transport analysis, the most useful measure produced by SIDRA is the average delay per vehicle conveyed in seconds per vehicle, which provides intersection estimated level of service (LOS).

Results from the intersection analysis showed that during morning and evening peak periods the roundabout intersection of Gregory Street with Belle O'Connor Street and Steve Eagleton Drive is currently operating with average delays for the highest delayed movement of less than 15 seconds per vehicle. This represents a good level of service, with acceptable delays and spare capacity.

Similarly, the unsignalised intersections of Gregory Street with Landsborough Street and Phillip Drive with Waianbar Avenue are also operating with average delays for the highest delayed movement of less than 15 seconds per vehicle, demonstrating a good level of service, with acceptable delays and spare capacity.

Future upgrades to a number of roads and intersections are identified in Council's Section 94 plan. Identified works include roads and intersection upgrades along Gregory Street, Landsborough Street, Phillip Drive and Arakoon Road.

5.5.3.4 PUBLIC TRANSPORT

A local bus service is currently provided in the area, connecting local streets in South West Rocks and Kempsey. One such service currently runs along Gregory Street, with a stop being located on Gregory Street adjacent to the shopping centre south-west of the Subject Site.

5.5.4 Assessment of Proposal

5.5.4.1 ACCESS AND INTERNAL LAYOUT

Internal road layout and access provisions will be designed in accordance with Council's DCP 36 - Guidelines for Engineering and Subdivision works. These guidelines are based on AMCORD requirements, which distinguish two levels of streets as follows:

- » **Local streets** - characterised by areas in which the residential environment dominates. Traffic volumes and speeds are generally low, with pedestrian movements being encouraged and cycling generally being provided on-street. Elements such as street length, parked cars, landscape design, built form and general activity along the frontage, control vehicular speed limits.
- » **Collector streets** - generally carry higher traffic flows as they collect traffic from access streets. Restrictions on traffic volumes and vehicular speeds, as well as elements such as street alignment, parked cars, street length, intersection design and built form helps control vehicular traffic speeds and uphold residential amenity and safety.

Road access to the proposed 318 lot subdivision will be provided through an eastern extension of Belle O'Connor Street on the southern side of the Subject Site. This extension will run along the southern boundary for the length of the Site and a total of 10 internal roads will run north-south through the Site perpendicular to the Belle O'Connor extension, with roundabouts being provided as necessary. The first road connection from the west of the Belle O'Connor extension will act as the main north-south link through the development and to future development to the north of the Subject Site north of Saltwater Creek, providing a connection to Phillip Drive in the future.

The extension of Belle O'Connor Street will be provided within a 22 metre reserve, including a 9 metre carriageway and minimum 5.5 metre verge. Road 6, being the main north-south connector road will be provided with a minimum 34.5 metre road reserve, 11 metre carriageway, 16 metre swale and minimum 2.5 metre to 4.5 metre verges. Local streets are generally provided with 16 metre road reserves, 3.5 metre verges and nine metre carriageways and remaining access streets will be afforded 15 metres reserves with four metre verges and seven metre carriageways. Major drainage swales are incorporated into the design of two of the north-south connections off Belle O'Connor Street, being Road 6 and Road 11. Road 6 consists of an 11 metre, two-way carriageway adjacent to a 16 metre drainage swale, while Road 11 consists of a 9 metre two-way carriage way adjacent to a 16 metre drainage swale in the southern section, before splitting into two 6 metre carriageways on either side of the drainage swale, creating Road 10 as a result of the split. A summary of internal road widths is outlined in **Table 5.5.2**.

Internal carriageway widths have been designed generally in accordance with Council's DCP No. 36 Guidelines for Engineering and Subdivision. Roads 10 and 11 however, present a minor departure to the Guidelines, with carriageways of 6 metres being proposed. The minor reduction in carriageway widths for these roads is as a result of the inclusion of a drainage swale, which is located between Roads 10 and 11 and having driveway access and residences from one side of the road only. Due to the inclusion of the drainage swale which is integral to the overall WSUD strategy for the site, these roads only service a small number of lots along one side only and as such, 6 metre carriageways are considered to be appropriate for Roads 10 and 11, being short, low order roads.

Reserve widths have been designed generally in accordance with Council's DCP No. 36. A number of reserve widths are wider than the minimum standards prescribed due to the provision of drainage swales and pedestrian and bicycle paths.

Environmental Assessment



FIGURE 5.5.1 EXISTING ROAD NETWORK (GOOGLE EARTH)

Environmental Assessment

While not included as part of this proposal, it is recommended that in addition to connections provided to release areas to the north of the Site, a link be made to Phillip Drive in the north through Waianbar Avenue or an alternative connection. This northern connection would assist in distributing traffic move evenly around the local road network, provide greater accessibility for vehicles, pedestrians and cyclists from the Proposal and areas south of the Subject Site to the South West Rocks village centre and the coastal foreshore areas and reduce overall kilometres travelled. This connection will also increase safety by adding an additional access route for emergency services vehicles.

Table 5.5.2 Proposed Internal road widths

Road	Reserve Width	Verge Width	Carriageway Width	Swale & EOC
Road 1	17 m	3.5m x 1	7m	6.5m including swale
Roads 2, 3, 4, 5, 13	16m	3.5m x 2	9m	-
Road 6 north	34.5m	3.5m x 1 4m x 1 cycleway	11m	16m
Road 6 south	36m	3.5m x 1 2.5m x 1	11m (5m x 2 4m x 1 median)	16m
Road 7	17m	3.5m x 1	9m	4.5m
Road 8 north	15m	3.5m x 2	8m	-
Road 8 south	25m	3.5m x 1 8.275m x 1	8m	5m
Road 9	15.5m	3.5m	7m	5m
Road 10	10.5m	3.5m x 1	6m	17m (shared with Road 11)
Road 11 north	10.5m	3.5m x 1	6m	17m (shared with Road 11)
Road 11 south	29m	4m x 1 cycleway	9m	16m
Road 12	15m	4m x 1	7m	4m
Road 14	18.5m	3.5m x 1	9m	6m
Road 15	15m	3.5m x 1	7m	4.5m
Road 16	16m	3.5m x 2	9m	-
Belle O'Connor Street extension east	22m	6m x 1 7m x 1	9m	-
Belle O'Connor Street extension west	22.75m	6.25m x 1 5.5m x 1	11m	-

7.9.4.1 TRAFFIC GENERATION IMPACTS

Based on surveys undertaken by the RTA, residential subdivisions generate approximately 0.85 two-way vehicular movements per hour per lot during peak hours. Therefore, it is predicted that the proposed subdivision will generate some 270 two-way vehicle movements per hour during the morning and afternoon peak periods. Around 70 percent of traffic generated in the morning peak period would be outbound, with the situation reversed to majority inbound during the evening peak period. Roads within the proposed subdivision would generally carry traffic flows of less than 100 two-way movements per hour.

Existing traffic flows and the additional traffic envisaged as a result of the Proposal have been assigned to the road network and have re-analysed existing conditions using SIDRA. A summary of proposed traffic generation is outlined in **Table 5.5.3**.

Table 5.5.3 Projected two-way peak hour traffic flow (Source: Colston Budd, 2008)

Road	Location	AM Peak Hour	AM Peak Hour	PM Peak Hour	PM Peak Hour
		Existing	Plus Development	Existing	Plus Development
Gregory Street	North of Landsborough Street	315	+30	325	+30
	South of Landsborough Street	405	+30	430	+30
	North of Belle O'Connor Street	595	+70	620	+70
	South of Belle O'Connor Street	580	+180	615	+180
Landsborough Street	East of Gregory Street	140	-	205	-
Belle O'Connor Street	East of Gregory Street	105	+250	105	+250
Steve Eagleton Drive	West of Gregory Street	60	-	50	-
Phillip Drive	East of Waianbar Avenue	120	+5	130	+5
	West of Waianbar Avenue	125	+15	140	+15
Waianbar Avenue	South of Phillip Drive	15	+20	20	+20

An examination of the post-development SIDRA results show that the Proposal will not decrease levels of service to a number of surrounding intersections, and the surrounding road network will be able to sufficiently accommodate additional traffic generated by the Proposal. In this regard, the roundabout intersection of Gregory Street with Belle O'Connor Street and Steve Eagleton Drive would continue to operate with average delays for the highest delayed movement of less than 15 seconds per vehicle during morning and afternoon peak periods, which represents a good level of service, with acceptable delays and spare capacity.

Environmental Assessment

Similarly, the unsignalised intersections of Gregory Street with Landsborough Street and Phillip Drive with Waianbar Avenue will also continue to operate with average delays for the highest delayed movement of less than 15 seconds per vehicle, demonstrating a good level of service, with acceptable delays and spare capacity.

It should be noted that the traffic increase predictions outlined in **Table 5.2.3** are based on a through connection being provided from the Site to Phillip Drive in the north. However as this connection does not make up part of the Proposal, all access would be from the Belle O'Connor Street extension via Gregory Street in the interim.

5.5.4.3 PUBLIC TRANSPORT

The proposal and associated increase in population will present opportunity for additional public transport services in the area by strengthening demand. The proposed main north-south through road within the internal road layout of the Proposal, which will connect Belle O'Connor Street and Phillip Drive, will be designed with appropriate width to accommodate buses. This will encourage the extension of services to the new residential area proposed on the Site and adjoining proposal to the north.

5.5.4.4 CONSTRUCTION TRAFFIC IMPACTS

While detailed construction methodology for the Proposal is yet to be defined, indicative peak construction flows have been estimated to be some 200 vehicles two-way daily. These flows include peak deliveries of construction materials of some 40 to 50 deliveries per day. Based on an average working day of 8 hours, the peak traffic generation of 200 vehicles per day equates to an average of 25 vehicles per hour two-way. It is considered that the surrounding road network is capable of accommodating these construction movements.

5.5.5 Conclusions

A number of surveys and investigations were undertaken by Colston Budd in order to assess potential traffic impacts of the Proposal. These investigations included an evaluation of the existing road network and public transport in the area, as well as traffic flow counts at various intersections and surveys and modelling using the SIDRA program to evaluate the capacity of intersections to cater for peak period traffic flow.

Results of the traffic assessment conclude that the existing road network and intersections currently operates at good levels and the addition of traffic as a result of the Proposal will not have significant traffic and transport impacts.

The assessment also identified a number of opportunities for future road connections and expansion of the existing South West Rocks public transport system to service the Subject Site post construction. A number of mitigation measures have been recommended in this regard.

5.5.6 Management and Monitoring

Table 5.5.4 Proposed Traffic and Transport Mitigation Measures

Issue	Mitigation Measure
Road Design	All proposed internal roads are to be designed in accordance with AMCORD and Council's Guidelines for Engineering and Subdivision works.
Road Design	Internal roads are to be designed to accommodate the swept paths of garbage trucks and furniture delivery vans.
Future Works	Provision is to be made for future connection between the Proposals internal road network and Phillip Drive in the north.
Public Transport Provision	Investigation into the expansion of existing bus services to service the Site.

5.6

Visual Impact Assessment

Environmental Assessment

5.6 Visual Impact Assessment

5.6.1 Introduction

5.6.1.1 SITE INFORMATION

The Subject Site is approximately 945 metres long at its longest point from eastern and western boundaries, 225 metres deep at its narrowest point and 385 metres deep at its widest point between the northern and southern boundaries. It is a relatively flat site, with the highest point at the middle of the southern boundary of the site, at 6 metres above sea level. The site slopes northwards, to a water course. A corridor of 7(b) zoned protected land encloses the saltwater creek water course, conserving a buffer zone of protected vegetation either side of the creek. The boundary of developable land roughly follows the 3.5 metre contour that runs east to west through the site, therefore the lowest point of the developable land is just under 3.5 metres above sea level in the North-Western corner of the site. The site drains into Saltwater Lagoon, a SEPP 14 protected wetland.

5.6.1.2 DEVELOPMENT INFORMATION

The development comprises 318 lots, with the majority of lot sizes falling between 550 and 650 square metres in area. Housing throughout the estate is proposed not to exceed two storeys in height.

Open space within the development will be provided for in the adjoining 7(b) lands. The developable area of land will comprise a homogeneous cover of housing and roads.

5.6.2 Methodology

5.6.2.1 PHOTOGRAPHS

For each site, three photographs or groups of photographs (to create a panorama) were taken with three different focal lengths to show the view towards the Subject Site, as follows:

28mm digital focal length: Panorama.

These were taken to show the context of the development or view towards the development in relation to the surrounding area.

33mm digital focal length: Normal View.

These photos equate to 50 degrees in 35mm film format, which equates to the view as seen unaided by the human eye. This format of photo is required when presenting evidence within the New South Wales Land and Environment Court.

80mm digital focal length: Detail View.

Provides detail greater than can be seen unaided with the human eye.

Each photo or panorama shows the approximate width of the Subject Site relative to the observer location.

5.6.2.2 OBSERVATION LOCATIONS

Observation locations were chosen using a combination of topographic map interpretation and substantial exploration of the surrounding area by car and on foot. Points were chosen as significant or potentially significant viewing areas from publicly accessible areas around the Site.

Sites that were not included in this report were either deemed not significant due to low observer numbers, or the site being completely obscured from view by landform or by other factors, e.g. housing, trees, etc.

Environmental Assessment

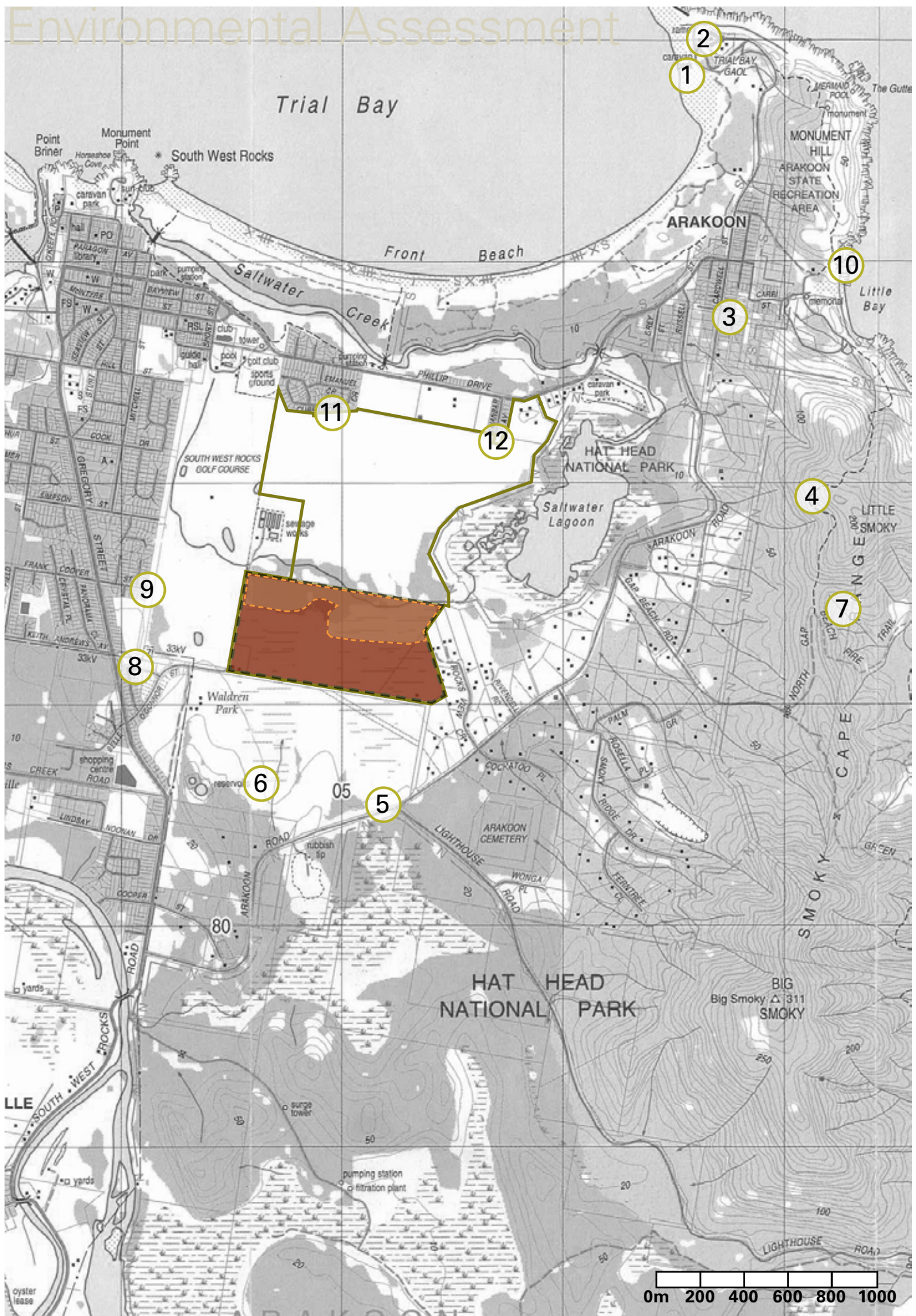


FIGURE 5.6.1 MAP OF OBSERVER LOCATIONS

Environmental Assessment

LEGEND

- 1** LAGGERS POINT CARAVAN PARK BEACH
Laggers Point Caravan Park is a popular tourist destination located within the Arakoon State Recreation Area.
- 2** TRIAL BAY GOAL WATCHTOWER
Trial Bay Goal was built entirely out of granite from the site, and entices day visitors to walk around the goal and museum. The watchtower provides commanding views of the area.
- 3** FRANCIS DIMOND STREET
Situated on the crest of a hill adjoining Salt Water Lagoon and adjacent valley, this small street includes nine residences that share a spectacular view of surrounding areas.
- 4** LITTLE SMOKY BUSHWALKING TRACK
A popular bushwalking trail that begins at Monument Hill and joins Little Bay, Little Smoky and Smoky Cape Lighthouse Complex.
- 5** SEASCAPE GROVE DEVELOPMENT: SOUTH-EAST BOUNDARY FROM ROAD
Development that lies south and at a higher elevation of the Subject Site. Photos taken from Arakoon Road.
- 6** SEASCAPE GROVE DEVELOPMENT: SOUTHERN BOUNDARY WITHIN LOTS
A new development in the early stages of land sales. The land has been cleared but only limited construction has taken place. This site sits adjacent to the Site.
- 7** BEECH PLACE
Situated within a development area that has already had a majority of residential construction completed. The development contains numerous high points that have views over the site.
- 8** PETER MARK CIRCUIT
Houses within this development are around the same age as Beech Place. The development contains numerous high points that have views over the site.
- 9** FRANK COOPER STREET
An older, low-lying residential area adjacent to the golf course. Photos are taken from the end of the cul-de-sac, over looking the golf course.
- 10** CORNER OF HILL STREET AND STURT STREET
An older residential area but situated on the crest of a hill, so has views overlooking the valley over the golf course and site towards Big Smoky.
- 11** CURRAWONG CRESCENT
Older development site situated adjacent to the Local Environmental Study Area. Low lying land with views of surrounding areas blocked by vegetation and landform.
- 12** WAIANBAR AVENUE
New, low lying development with only some lots built on as yet. Character photos of new development on sandy soils similar to Malbec Lands Site.



Subject Site



Local Environment Study Area



LES Line - 7(b) Corridor

Observer Location 1:

Laggers Point Camping Ground / Beach

APPROXIMATE DISTANCE TO CENTRE OF SITE: 3KMS

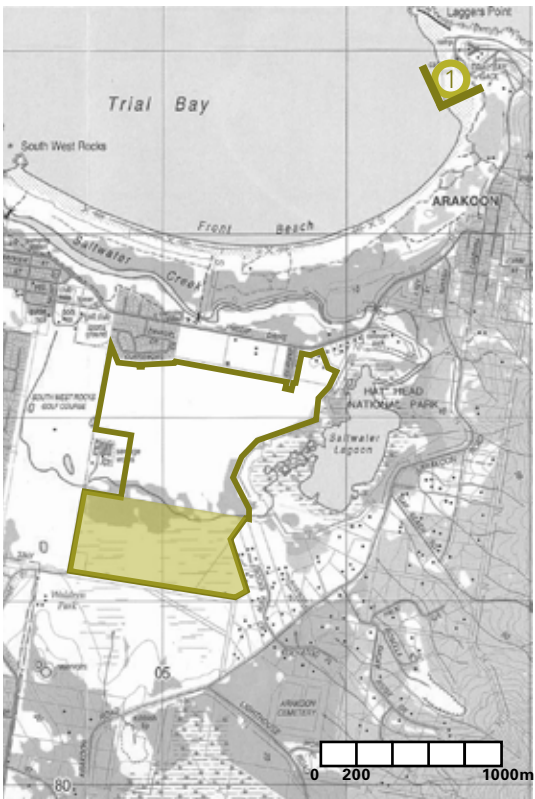
Laggers Point Camping Ground and Beach is situated on the western side of Laggors point, in the Arakoon State Recreation Area. This site is an important observer location, being a popular tourist destination with high visitation, especially during peak holiday periods. Its popularity is due to its natural setting and direct access to the adjacent beach.

The Subject Site sits within a saddle of low lying land on the horizon. It should not be visible from this observer location, assuming that the buildings will not exceed two (2) storeys in height.

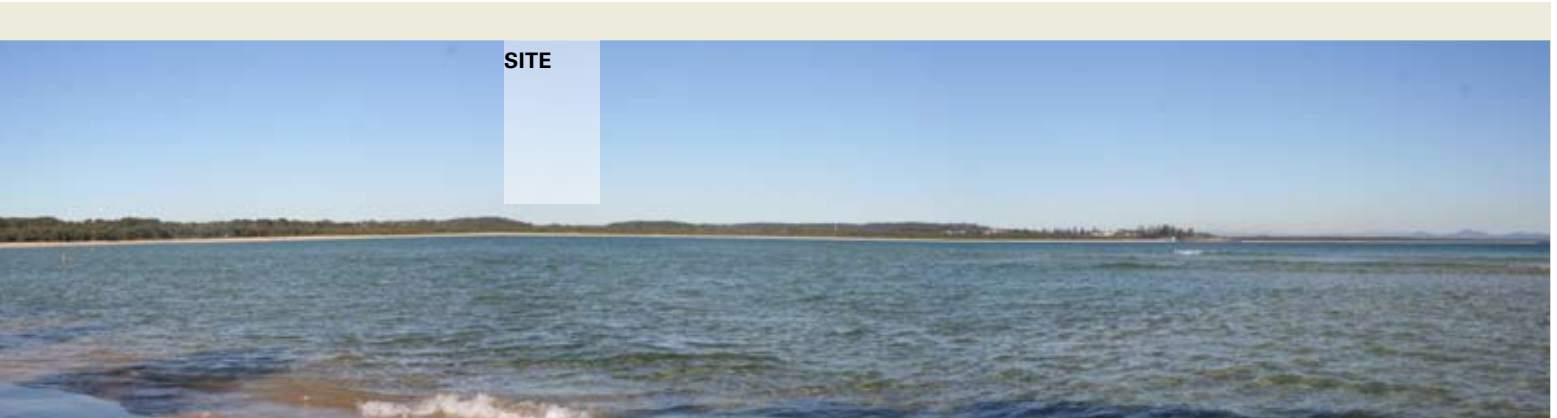
The visual impact of the proposed development from this observer location is therefore deemed to be nil.



28MM PANORAMA



Environmental Assessment



SITE



33MM NORMAL VIEW: CONTEXT



SITE

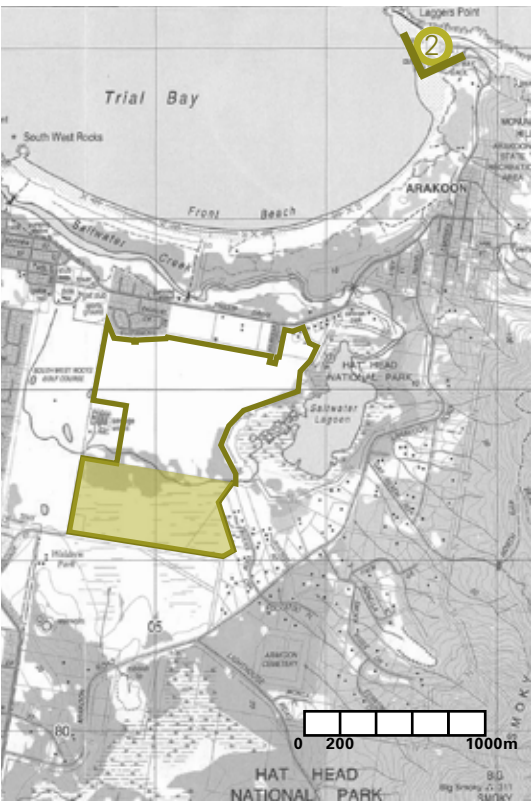
80MM DETAIL

Observer Location 2: Trial Bay Goal Watchtower

APPROXIMATE DISTANCE TO CENTRE
OF SITE: 3.2KMS

The Trial Bay Goal is a popular tourist attraction with high visitation rates, especially during the peak holiday seasons. The watchtower in the Goal is a highly significant observer location as virtually every visitor to the Goal climbs the tower for its commanding view of the surrounding area. The visitors experience of the site is one of overwhelmingly naturalness, with views of urban development substantially restricted. Any further urban development within the visual catchment of the site should be avoided. The Subject Site sits within the saddle on the low point of the horizon.

On the basis of what has been proposed in terms of building heights, it is unlikely that the Subject Site will be seen from this vantage point. The visual impact of the proposed development from this site is therefore deemed to be nil.



28MM PANORAMA

WATCHTOWER



Environmental Assessment



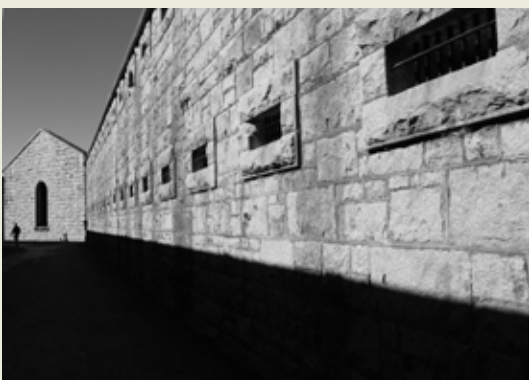
28MM PANORAMA



33MM NORMAL VIEW



80MM DETAIL VIEW



GOAL CHARACTER PHOTOS

Observer Location 3:

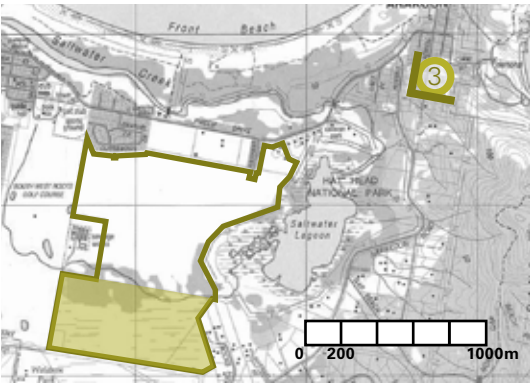
Francis Diamond Street

APPROXIMATE DISTANCE TO CENTRE
OF SITE: 2.3KMS

This observer location provides commanding views across Salt Water Lagoon and across the Subject Site, to the suburbs of South West Rocks. The western suburbs of the town stretch as a linear band of housing between the protected vegetation adjacent to Salt Water Lagoon and the vegetated hillsides beyond. Seascape Grove, the proposed development to the south of the Site, will be observed as a continuation of this linear band of development to the south. It is currently viewed as a cleared area of land.

We have assumed that nine (9) houses that occupy this observer location around Francis Dimond Street have similar views across the landscape. We believe that the Subject Site will be significantly screened by the forest vegetation in the south west corner of Salt Water Lagoon, which is conserved under SEPP 14. In addition, the developed area would also be screened by the conserved 7(b) zone corridor on the northern boundary of the Subject Site.

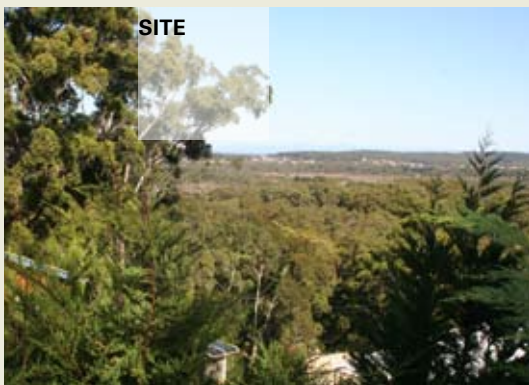
Therefore, while there may be some rooftops of the Subject Site seen from this vantage point, most should be screened from view by the vegetation of the 7(b) zone corridor and the vegetation associated with Salt Water Lagoon. We anticipate a low visual impact from this observer location as a result of the proposed development, heavily mitigated by existing and protected vegetation screening.



Environmental Assessment



28MM PANORAMA



33MM NORMAL VIEW



80MM DETAIL VIEW

Observer Location 4: Little Smoky Bushwalking Track

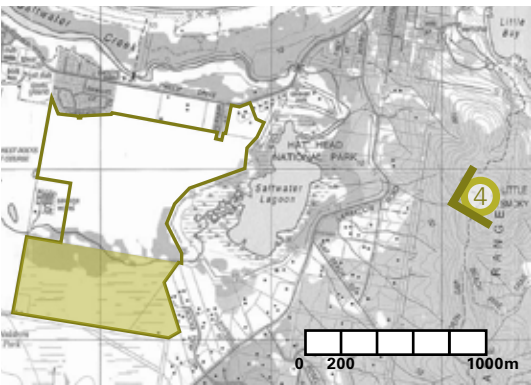
APPROXIMATE DISTANCE TO CENTRE
OF SITE: 2.25KMS

This walking track begins at Monument Hill in the Arakoon State Recreation Area and joins Little Bay, Little Smoky and Smoky Cape Lighthouse Complex through Hat Head National Park. The steep nature of the track makes it a difficult walk. It is anticipated that the track has a relatively low rate of use by visitors in comparison to other attractions in the area, for example Trial Bay Goal.

While ascending Little Smoky on the trail from the south, the walker has his back to the view of the Subject Site, while on the descent, the walker faces the view out over the landscape towards the site. The view out over the landscape is heavily screened by tall, dense vegetation, so visitors only get occasional glimpses out over the landscape. The observers' primary visual experience is almost exclusively of detail bushland and the trail.

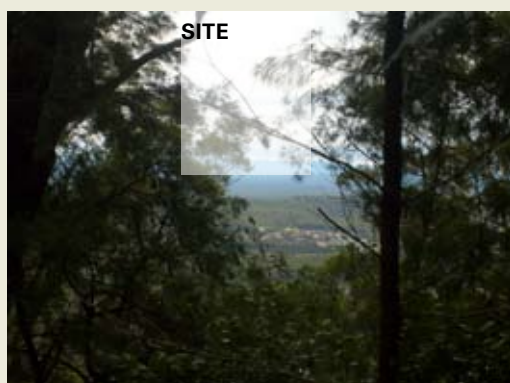
Where the landscape is glimpsed from the trail, it incorporates a major visual component of urban developments, so much so that an area of land the size of the Subject Site developed with housing would not have a significant visual impact on the view from this walking track.

Therefore even though glimpses of the Subject Site can be seen from this observer location, the limited number of users, coupled with the existing nature of the view, suggest there will be no significant negative visual impact from this location as a result of the proposal.



VEGETATION CHARACTER PHOTOS

Environmental Assessment



28MM GLIMPSE VIEW



33MM NORMAL VIEW



80MM DETAIL VIEW

Environmental Assessment

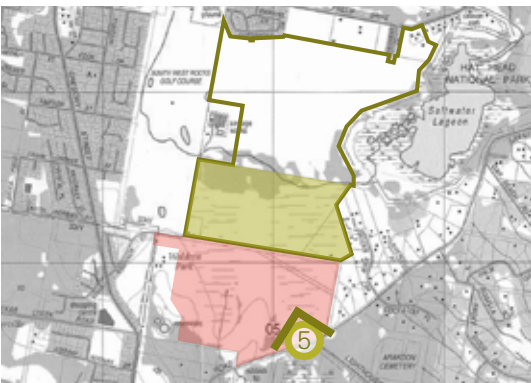
Observer Location 5: Seascape Grove; South-East Boundary From Road

APPROXIMATE DISTANCE TO CENTRE
OF SITE: 0.75KMS

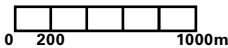
Seascape Grove is a proposed development to the south of the Subject Site, sited in part on a hill overlooking the Site. The approximate boundary of this new development has been shown on the key plan to the left.

At present people driving along Arakoon Road (the southern perimeter road of Seascape Grove) can see the Subject Site from across the as yet undeveloped land of Seascape Grove. Arakoon Road lies slightly higher than the Subject Site, but when Seascape Grove is fully developed, the passer-by will only see the houses within this development, which will obstruct the view through to the Site completely.

It is therefore anticipated that after Seascape Grove is fully developed there will be no visual impact caused by the future development of the Subject Site from this observer location.



Approximate area of
Seascape Grove



Environmental Assessment



SEASCAPE GROVE

28MM PANORAMA



33MM NORMAL VIEW



80MM DETAIL VIEW

Observer Location 6:

Seascope Grove: Southern Boundary Within Lots

APPROXIMATE DISTANCE TO CENTRE OF SITE: 0.5KMS

At present, Seascope Grove is in the first stage of development. Therefore the land still remains relatively treeless, with a small complement of stage 1 housing in place. When observed in its current state, the Subject Site is clearly visible from this observer location within the Seascope Grove development.

However, once Seascope Grove is fully developed, most of the views from within the development will be of the neighbouring houses, due to the relatively flat nature of the majority of the Seascope grove site.

Where residents do have views across to Hat Head National Park they will, in some cases, also be able to observe the new community within the Site. Although these houses will be able to see much of the adjacent roofscape of Subject Site, the impact will diminish as the street trees within the Site grow taller than the houses.

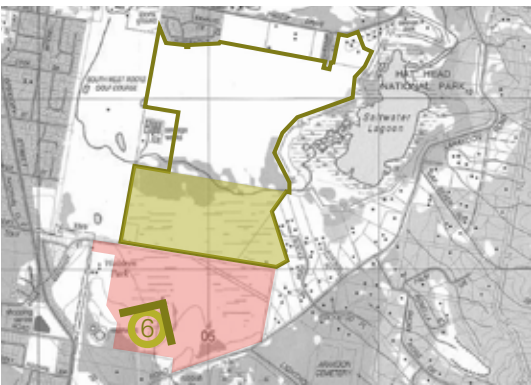
Therefore, although some of the residents of the proposed suburb of Seascope Grove will be able to see the roofs of the future development on the Subject Site, this impact will significantly diminish as the street trees of the Site grow. The view towards the Subject Site from most of the lower lying area within Seascope Grove will be obstructed by adjacent buildings.



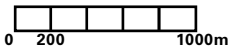
28MM PANORAMA FROM HIGHEST POINT IN DEVELOPMENT



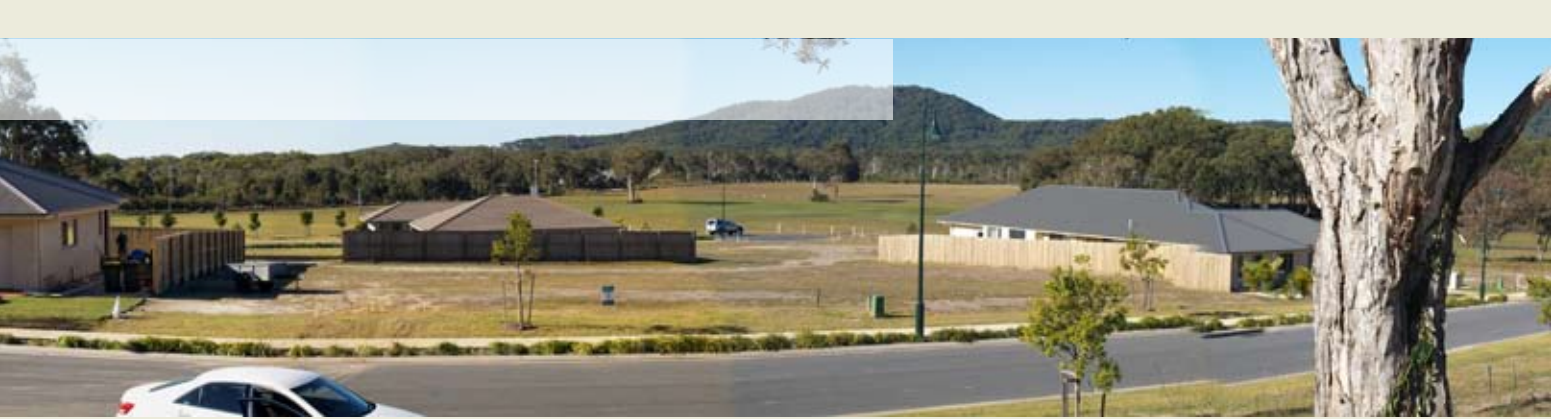
33MM PANORAMA FROM HIGH CUL-DE-SAC IN DEVELOPMENT



Approximate area of Seascope Grove



Environmental Assessment



SITE



80mm Detail View from cul-de-sac



CHARACTER SHOT - ENTRY STATEMENT

Observer Location 7:

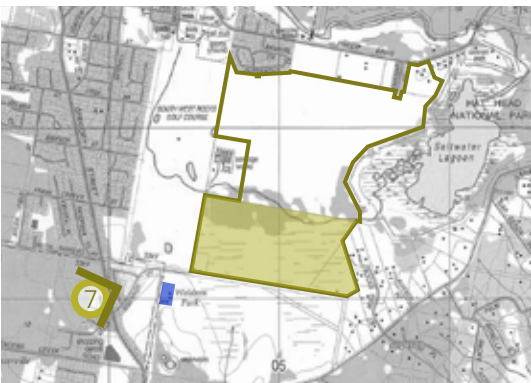
Beech Place

APPROXIMATE DISTANCE TO CENTRE
OF SITE: 0.5KMS

Beech Place is a relatively new development south-west of the South West Rocks township. It is situated on a hillside facing east towards Little and Big Smoky, and Hat Head National Park.

From this point, a vegetated spur lies between part of the Subject Site and Beech Place, and associated houses. Of particular importance to the visual impact from this location is the Waldren Park site (refer Key Plan) which provides screening to the southern portion of the site. However, due to the elevation of Beech Place, some of the building on the Subject Site may be visible from this observer location.

With the growth of street trees on the Subject Site above roof level, much of the new development will be screened. Therefore we conclude that there will not be a significant visual impact caused by the Proposal from this observer location.



Environmental Assessment



33MM PANORAMA



80MM DETAIL VIEW



CHARACTER SHOT

Environmental Assessment

Observer Location 8:

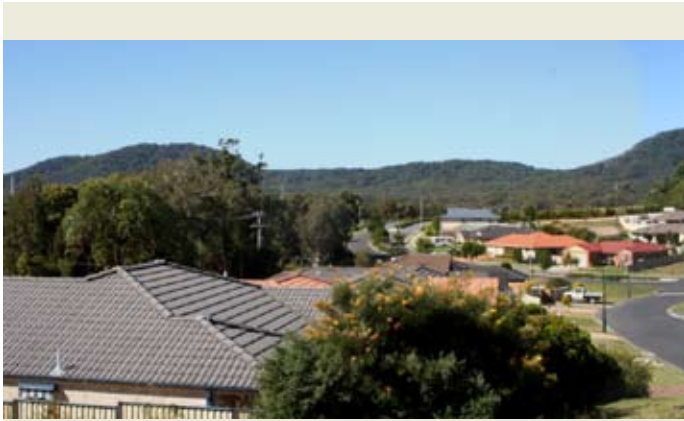
Peter Mark Circuit

APPROXIMATE DISTANCE TO CENTRE OF SITE: 0.5KMS

This observer location consists of a small number of houses that make up the high point of Peter Mark Circuit. It is slightly closer to the Subject Site than Beech Place, as well as being further north of the vegetated spur that screens much of Beech Place from the Site.

Therefore it is anticipated that from this location, much of the roofscape of the Subject Site will be seen clearly. Over time the view of the future development will be obstructed as the street trees in the Site grow higher than the rooftops, breaking up the conglomeration of houses and screening some of the development.

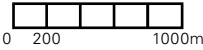
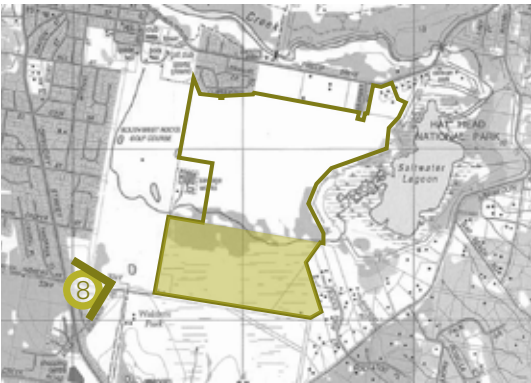
Although the Subject Site will be visible from this observer location, it is expected that the visual impact will be low, due to the small number of observers that are affected from this observer location, and the mitigating impact of street trees on the Site over time.



33MM PANORAMA: STREET CONTEXT



80MM DETAIL PANORAMA



Environmental Assessment



SITE



33MM VIEW OF SITE



Observer Location 9:

Frank Cooper Street

APPROXIMATE DISTANCE TO CENTRE OF SITE: 0.75KMS

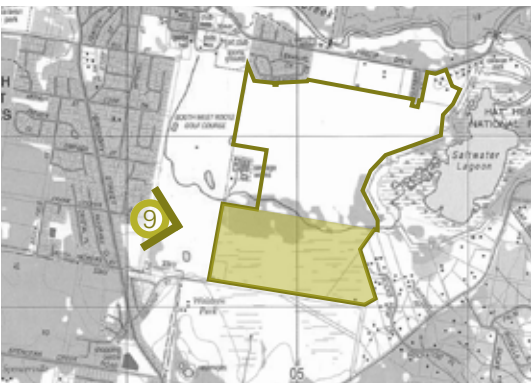
This observer location lies on the western side of the South West Rocks Golf Course in an established suburb, at a similar elevation to the proposed development. The similarity of height between the observer point and the Subject Site, coupled with the trees between the fairways means that the observation point is substantially screened from the Proposal, and new housing should be significantly screened as long as it is limited to two (2) storeys in height.

Future residential development on the Subject Site will be visible to golfers using the course. In order to substantially mitigate any potential visual impacts from the golf course, shrubby inter-fairway understorey plantings will be provided.

It is therefore concluded that there will be no significant visual impact by the Proposal from this observer location.



CHARACTER SHOT - TREE HOUSE AND SWING



Environmental Assessment

SITE



28MM VIEW

SITE



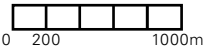
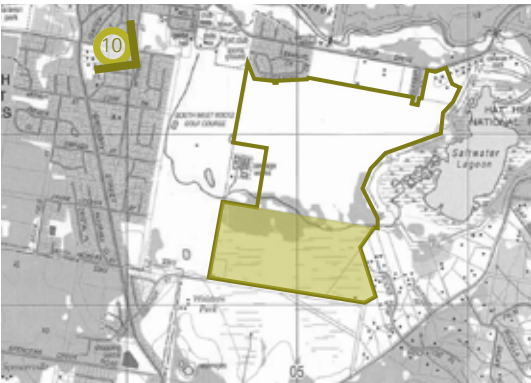
33MM PANORAMA

Observer Location 10: Corner of Hill and Sturt Streets

APPROXIMATE DISTANCE TO CENTRE
OF SITE: 1.5KMS

The junction of Hill and Sturt Streets sits on the crest of a hill overlooking the valley with Big Smoky in the background. It is an older urban development area within the township of South West Rocks.

From this vantage point, there is a feature view to Big Smoky over the golf course and the Subject Site. Although the Site is visible from this point, the golf course trees and surrounding vegetation help to screen the site. It is likely that rooftops will be visible from this point, however once the street trees in the Site begin to grow taller than the rooftops of the development, this should significantly reduce the visual impact of the Proposal. The incorporation of substantial street tree planting within the Proposal will result in a low visual impact from this observer location.



Environmental Assessment



28MM VIEW



33MM PANORAMA



80mm Detail View

Observer Location 11: Currawong Crescent

APPROXIMATE DISTANCE TO CENTRE
OF SITE: 1KM

Currawong Crescent is an older development within South West Rocks, with one and two storey houses and established street trees. From the roadway of Currawong Crescent, the Subject Site is not visible, being screened by the houses themselves as well as the surrounding vegetation.

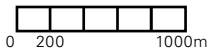
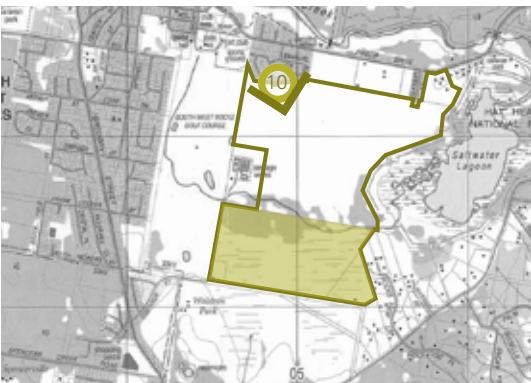
The 7(b) zone corridor of protected vegetation will also screen this area from any future visual impact of the Proposal.

It is therefore concluded that there will be little to no visual impact on this observer location by the Proposal.

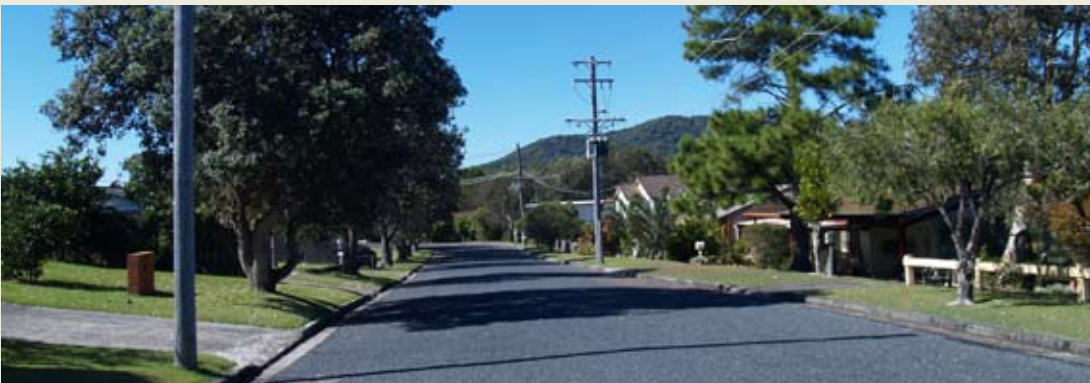
CHARACTER SHOTS



SITE



Environmental Assessment



Observer Location 12: Waianbar Avenue

APPROXIMATE DISTANCE TO CENTRE
OF SITE: 1KM

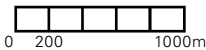
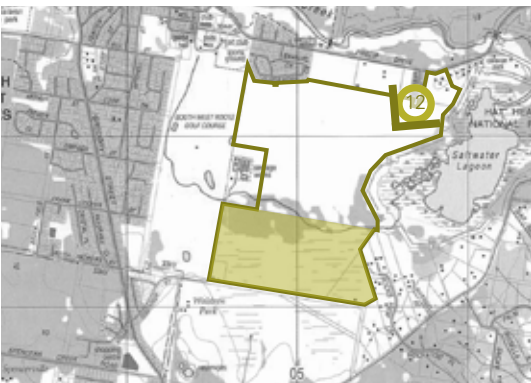
Waianbar Avenue is a new subdivision with only a proportion of the lots sold and built onto date. The subdivision is low and relatively flat, with only a gentle slope towards the Subject Site. The Site is screened from the view of the residents of Waianbar Avenue by a mixture of vegetation and topography. The protected 7(b) zone corridor vegetation on the Site will continue to screen these developments from one another.

It is anticipated that the Proposal will have little to no visual impact on this observer location.

CHARACTER SHOTS



KEY PLAN



Environmental Assessment



5.6.3 Conclusions

The Subject Site is well located with regard to visual prominence from adjoining areas, in that:

- » it is not viewed from any listed heritage items;
- » it is not significantly viewed from any conservation areas, including Arakoon State Recreation Area, Hat Head National Park and Saltwater Lagoon (SEPP 14 Wetland); and
- » where it is viewed, it is either:
 - from a substantial distance with relatively few observers, i.e. Francis Dimond Street, Little Smoky Bushwalking Track, or
 - as a partial view from observer locations with relatively few users, e.g. Beech Place, Peter Mark Circuit and Frank Cooper Street.

The Site is not significantly visible from the water on Saltwater Lagoon, due to substantial conserved fringing vegetation within the SEPP 14 gazetted land and the 7(b) corridor.

Due to the nature of the proposed development within the Site (i.e. development within the developable land area comprises primarily of streets and housing lots with a vegetated links), there is limited opportunity to break up views across the roofs of the development, other than through the use of substantial street tree plantings. This is particularly relevant to views from elevated views in the west of the site, from which direction the development will stretch for nearly one (1) kilometre in length.

It is likely that the roofs of the future development on the Subject Site will comprise either a:

- » partial view from Francis Dimond Street (Observer Location 3) and the Seascope Grove Development (Observer Location 6); or
- » prominent view from Peter Mark Circuit (Observer Location 8) and the Corner of Hill Street and Sturt Street (Observer Location 10).

In order to mitigate the impact of a potentially visually prominent 'roofscape' view from the above observer locations, it will be important to provide a robust street tree planting scheme, incorporating:

- » tree heights at least 50% higher than the heights of the proposed buildings; and
- » trees with dense foliage, e.g. *Melaleuca quinquenervia*, or broad canopies, e.g. *Eucalyptus racemosa*, both at reasonably close spacings, e.g. 10 – 12m centres.

Additionally, adverse impacts on existing views from:

- » the site entry, adjacent housing and public open space areas within the Seascope Grove Development, and
- » South West Rocks Golf Course,

would be mitigated through the planting of street trees as described above, in conjunction with a partial screen planting layer between the ground and lower extent of the mature canopy.

In summary, we believe that subject to the implementation of the above recommendations, the Proposal and any future development on the Subject Site will not have a significant visual impact within the landscape of South West Rocks.

5.6.4 Management and Monitoring

The Visual Assessment undertaken by EDAW included the following amelioration and environmental management measures to be implemented as part of the proposal.

TABLE 5.6.1 PROPOSED VIA IMPACT MITIGATION MEASURES

Issue	Mitigation Measure
Visual Impact	Prepare a robust street tree planting scheme to be designed incorporating the following: » trees with heights at least 50% higher than the heights of the proposed buildings; and » trees with dense foliage, e.g. <i>Melaleuca quinquenervia</i>, or broad canopies, e.g. <i>Eucalyptus racemosa</i>, both at reasonably close spacings, e.g. 10 – 12m centres.

5.7

Air Quality

5.7 Air Quality

5.7.1 Introduction

In 2005, SKM was engaged by Kempsey Shire Council to undertake an Odour and Noise Assessment as part of the LES undertaken for rezoning of the Subject Site. The Study Area includes the Subject Site for this Project Application. The 2005 SKM investigations sought to assess the noise and odour emissions from the existing sewage treatment plant (STP) located to the north of the Subject Site, and consider potential impacts from future upgrades to the STP. Details relating to the noise impact assessment are outlined in **Chapter 5.8** of this report. The full SKM Report is included as **Appendix D6** of this EA.

The 2005 investigations concluded that areas within the recommended 400m buffer zone were potentially usable. An independent assessment conducted by HL A-Environsciences in 2007 supported this conclusion, however both investigations recommended further work in order to properly justify the use of areas within the Study Area for development. This additional work was subsequently carried out by SKM in 2008.

Council intends to upgrade the plant by installing 2x Sequential Batch Reactors (SBRs) and associated mobile belt press (MBP), which will increase the capacity of the STP from its present 6,000 EP to 12,000 EP. As a result, SKM was engaged to undertake further investigations in order to assess the buffer zone requirements for the existing STP and potential future expansion, as well as whether the proposed future expansion of the STP will result in increased odour impacts for receptors within the buffer zone area. The further SKM study, which was completed in 2008 (**Appendix D5**) concluded that a 150m buffer from the STP boundary would be sufficient to mitigate odour to acceptable levels. Following the receipt of comments on that assessment from the Department of Environment and Climate Change (DECC) and Macleay Water, Council commissioned SKM to conduct additional modelling using odour measurements taken during the STP's peak operating period (summer) and revised plant upgrade details. The full 2008 SKM Report and Addendum 2009 Report which includes the additional modelling are included as **Appendix D5** of this EA.

5.7.2 Methodology

The potential impacts of future upgrades to the STP, were determined by SKM through a number of investigations, which included the following tasks:

- » assessment and evaluation of the existing air quality;
- » determination of odour criteria;
- » development of a modelling approach to assist in the assessment of predicted odour levels, following an upgrade to the STP; and
- » recommendations and mitigations measures for the Proposal.

Future odour concentrations were determined using the AUSPLUME v6.0 model. This model takes into account the emissions sources and rates, topographical data, locations of sensitive receptors and meteorological conditions in determination of predicted odour concentrations following a potential future STP upgrade.

SKM also reviewed a number of previously undertaken odour assessment studies from the STP including:

- » Environmental Engineering and Planning Consultants (Jelliffe) (1997), Buffer Zone Assessment South West Rocks STP For the Proposed Subdivision Development South West Rocks;

- » Holmes Air Sciences (1998), Air Quality Assessment – Establishment of a Suitable Buffer Zone for South West Rocks STP;
- » Sinclair Knight Merz (2004), South West Rocks STP – Odour and Noise Assessment;
- » Sinclair Knight Merz (2005), South West Rocks STP – Odour and Noise Assessment; and
- » HLA-Envirosciences (2007), Odour and Noise Impact Assessment – South West Rocks Sewage Treatment Plan.

The Jelliffe and HAS reports (previously prepared) were based on odour criteria which has since been superseded and as such, were not utilised in the current assessment. The previous SKM or HLA assessments did not measure odour emissions from the existing plant, but rather used odour emissions data from other existing STPs.

5.7.3 Air Quality Criteria and Existing Odours

The determination of odour criteria was guided by the NSW Department of Environment and Climate Change (DECC) odour criteria objectives for odour producing activities. Pursuant to the *Protection of the Environment Operations Act 1997*, the STP is not permitted to emit offensive odour beyond the boundary of the required buffer zone. An offensive odour is generally described as being harmful to, or interfering with comfort of a person, with regard to its strength, nature, duration, character or quality.

As odour perception can be very subjective, the DECC objectives were determined in order to take into account population densities and odour sensitivity within a community. For odour impact assessment in residential areas, the urban odour performance criterion of 2 OU (complex mixtures of odorous air pollutants) is typically used. This criteria was adopted for the subject assessment.

No major industrial uses exist in the vicinity of the STP, resulting in the STP being the primary source of odour in the area. Odour sources from the STP investigated during this assessment were derived from a number of sources including inlet works, pasveer channels, sludge lagoons, mobile belt press and two sequential batch reactors. Odour samples were collected by Stephenson Environmental Management Australia on 22 May 2008, in accordance with AS4323.3. The samples were analysed by the NATA accredited Odour Research Laboratories Australia.

In addition to existing odour levels derived from samples, data stored in the Sydney Water Corporation (SWC) Odour Database was also examined. Specifically, odour data relating processes was examined.

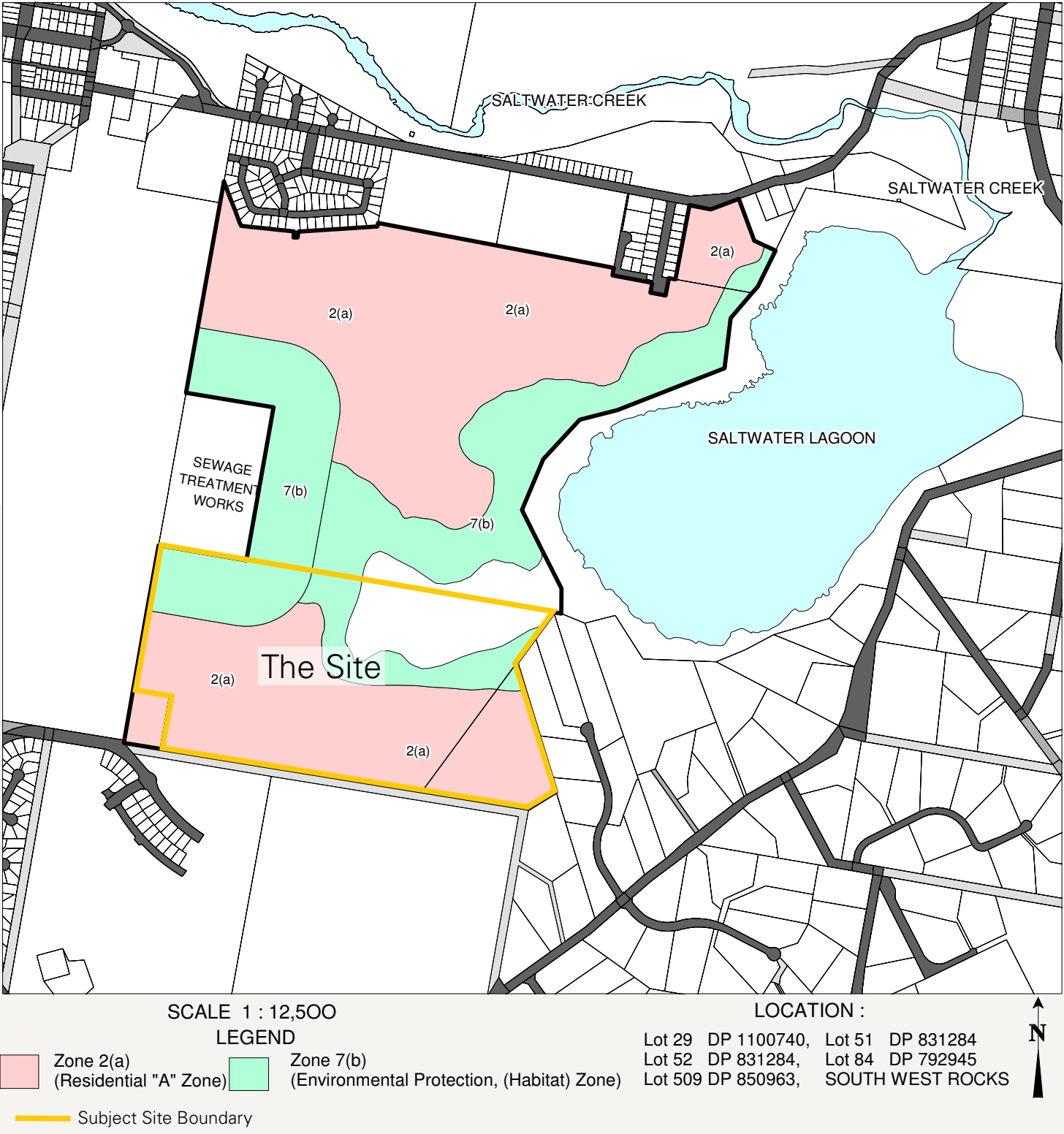
5.7.4 Predicted Odour Levels and Buffer Assessment

Using existing odour levels derived from samples taken on the STP site, as well as relevant odour data from the SWC Odour Database, three main modelling scenarios were generated from the AUSPLUME v6.0 model as follows:

- » Scenario 1 - measured emission levels at the existing STP in Autumn 2008 and anticipated worst-case emissions from the future SBRs and MBP;
- » Scenario 2 – assumes that STP odour emission levels are equivalent to the average of SWC odour database emission for like sources, as well as worst-case emissions from the future SBRs and MBP; and
- » Scenario 3 – assumes STP odour emission levels are equivalent to the seasonal worst case averages of the SWC odour database emission for like sources, as well as worst-case emissions from the future SBRs and MBP.

Results for odour modelling of the three scenarios are included in **Appendix D5**.

Environmental Assessment



Results of the modelling showed a range of odour concentrations from existing and proposed STP and while three scenarios were modelled, SKM considered that Scenario 1 predicted the most accurate odour concentrations, as odour measurements used in the model were derived from on-site measurements at the actual STP under investigation, as opposed to database stored information from SWC which in some cases over-estimated results.

The on-site measurements were collected in autumn, which may not pick up the summer holiday peak period, along with hot summer conditions, which may result in increased emissions from the STP during the summer period. When analysing forecast prediction emissions, SKM found that the source of emissions having the highest concentration in summer consisted of inlet works odours only. Given the comparatively small size of the inlet works, combined with the low sensitivity of inlet works within the odour model, SKM concludes that there is no reason that odours would be worse during summer months. Based on this analysis, SKM recommends a buffer zone of 150m. This distance is considered to be acceptable in order to alleviate existing odour impacts, as well as those following the proposed plant upgrade.

The above buffer requirement of 150m is recommended without the need for odour control measures. However a number of suggestions for odour control have been identified within the SKM investigation, should they be required.

5.7.5 Addendum 2009 Odour Assessment

Additional modelling was undertaken by SKM in 2009 using odour measurements taken during the STP's peak operating period (summer) and revised plant upgrade details. Sampling of the STP was undertaken by Stephenson Environmental Management Australia on 5 January 2009 in accordance with the DECC guidelines. The sampling locations were the same as those sampled in July 2008.

Three scenarios were investigated using dispersion modelling:

- » Scenario 1: Measured peak load odour levels (including two MBPs), January 2009; and
- » Scenario 2: Worst case measured odour levels for each odour source, (May 2008 and Jan 2009 odour sampling) including two MBPs (i.e. the worst odour level measured at sludge lagoon 1 was used for sludge lagoon 1).

Results from the 2009 modelling are illustrated in **Figure 5.7.2**.

The results of the January 2009 odour assessment indicate that under measured peak load conditions (January 2009) odour concentrations are limited to acceptable levels within a distance of approximately 100m from the STP property boundary, which is well below the previously recommended 150m buffer. As such, this odour assessment which utilises peak load measurements, together with a sensitivity analysis combining worst-case data from both May 2008 and January 2009, supports the findings of the previous SKM (2008) recommendation that a buffer zone of 150m from the STP property boundary is adequate to manage odour impacts from the STP to acceptable levels.

Environmental Assessment

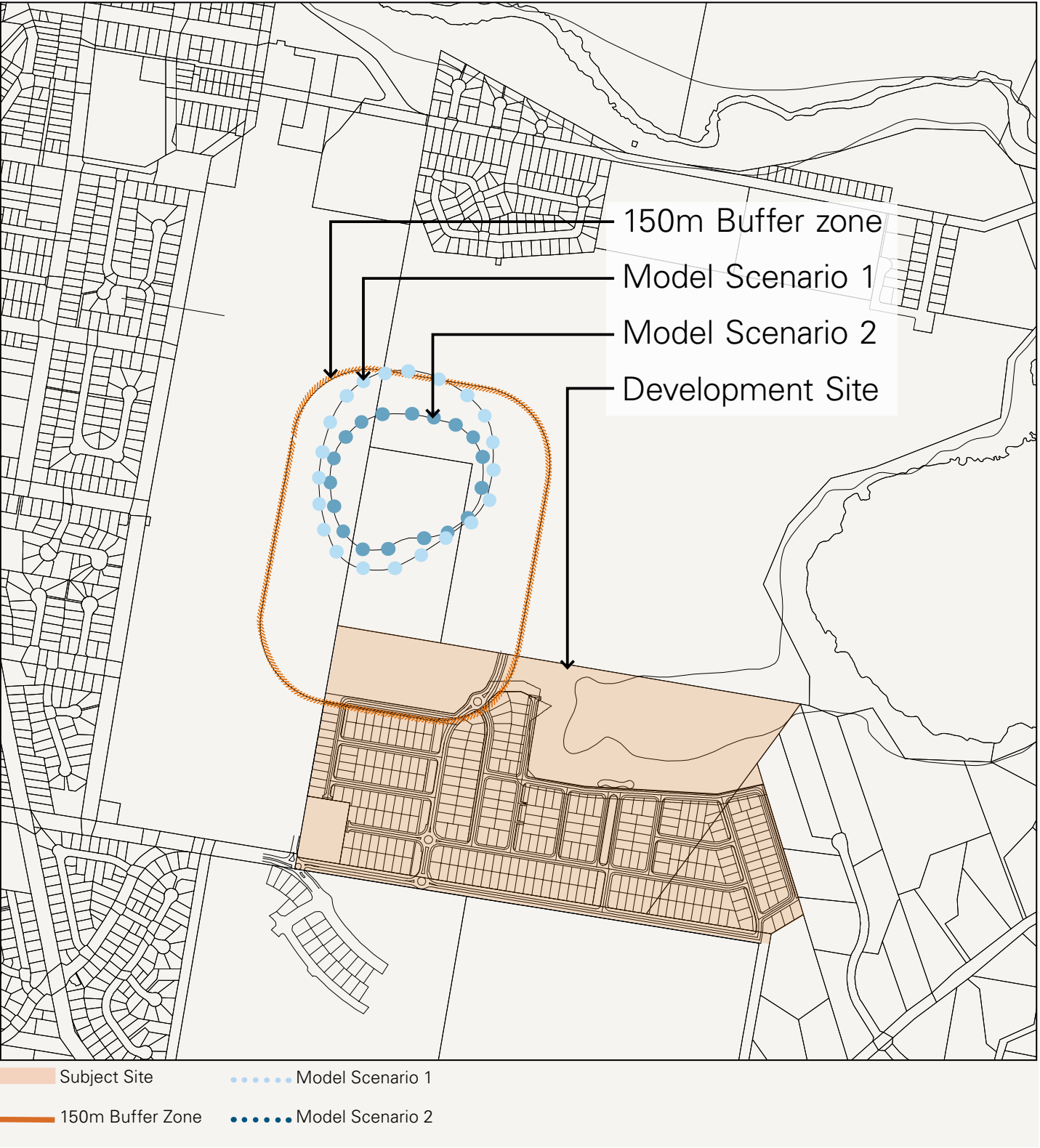


FIGURE 5.7.2 2009 SKM SCENARIO MODELLING RESULTS

5.7.6 Conclusions

A Buffer Zone Odour Impact Assessment was undertaken in 2008 by SKM for the upgrading of Council's existing STP located to the north of the Subject Site. This assessment included the determination of acceptable odour criteria and examination of existing air quality, development of a modelling approach to assist in the assessment of predicted odour levels, following an upgrade to the STP and buffer zone recommendations for the upgraded STP.

Modelling results demonstrated that scenario 1, which was based on odour measurement samples taken from the subject plant, showed acceptable levels of odour concentrations at a distance of approximately 100m from the plant. Furthermore, odour emission concentrations were found to be below the determined DECC odour criteria of 2 OU/m³ at a distance of 100m. Based on this modelling, as well as consideration of worst-case summer odour sampling from SWC data, a 150m buffer zone requirement was recommended by SKM.

SKM concludes that odour emissions from the existing and upgraded STP operations can be managed with a buffer area of 150m without the need for additional mitigation measures to control odour.

5.7.7 Management and Monitoring

The following mitigation measures are to be implemented as part of the Proposal.

Table 5.7.1 Proposed Odour Mitigation Measures

Issue	Mitigation Measure
Odour impacts on residents	Provide 150m buffer to any future adjoining development.

5.8

Noise Impact

Environmental Assessment

5.8.1 Introduction

In 2005, SKM was engaged to undertake an Odour and Noise Assessment by Kempsey Shire Council as part of an LES for a larger Study Area of which the Subject Site forms the southern portion. The investigations sought to assess the noise and odour emissions from the existing sewage treatment plant (STP) located to the north of the Subject Site, and consider potential impacts from future upgrades to the STP. Details relating to the odour air quality assessment are outlined in **Chapter 5.7** of this report. The following section discusses the existing and potential noise impacts relating to the STP, as well as recommendations and mitigation measures that may be required in the event of upgrades being required to the STP, as a result of the proposed residential subdivision and accumulated surrounding development. The full 2005 SKM Report is included as **Appendix D6** of this EA.

5.8.2 Methodology

In order to fully understand the potential impacts of future upgrades to the STP, SKM employed a number of methods. These methods include the assessment and evaluation of the existing noise environment, determination of operational noise objectives including intrusive and amenity noise criteria and the development of a modelling approach to assist in the assessment of predicted noise levels and determine recommendations and mitigations measures for the Proposal.

The measurement of the existing noise environment, as well as the determination of noise objectives and criteria was guided by the NSW Industrial Noise Policy (INP). Future noise level predictions were determined using the CONCAWE algorithms as implemented within the SoundPLAN suite of noise prediction programs. This model takes into account the effects of terrain, meteorology, the location of representative receivers and the levels of noise emission for the various work activities in determination of predicted noise levels.

In order to provide background to the noise assessment, SKM also reviewed and compared two noise investigations previously undertaken for the Site, being:

- » Environmental Engineering and Planning Consultants (1997), Buffer Zone Assessment South West Rocks STP For the Proposed Subdivision Development South West Rocks; and
- » Sinclair Knight Merz (2004), South West Rocks STP – Odour and Noise Assessment.

This review found large discrepancies in buffer zone recommendations, with the Jelliffe report recommending a buffer zone of 650m around the STP to meet night-time period noise criteria, while the 2004 SKM report suggested a buffer of only 100m was required in order to meet the same criteria. With such considerable variances between buffer zone recommendations, SKM concludes that it is not possible to compare the results from the two reports. This is largely as a result of noise measurements being made at different distances from the source for each report, as well as upgrading of STP equipment following the Jelliffe Report.

5.8.3 Existing Noise Environment

The only continuous source of dominant noise at the treatment plant are the surface aerators used in the three pasveer channels. A mobile pump and sludge dewatering plant are also used on occasion, however use of this equipment is limited to day-time only.

In order to determine the current ambient noise levels, the INP recommends that 15 minutes of ambient noise monitoring be undertaken for those times when the STP is operational, at locations that are considered to be the most “affected noise sensitive locations”. To facilitate this, SKM set up two environmental noise loggers, which operated for 10 days. Locations of the noise loggers are illustrated in **Figure 5.8.1**. A summary of the noise statistics determined from the noise loggers is outlined in **Table 5.8.1**.

Table 5.8.1 Summary of Unattended Noise Monitoring (Source: SKM, November 2005)

Northern LES Area		
Statistic	Time	Median Noise Level – dB(A)
L _{Aeq} over the monitoring period	Day	34.0
	Evening	34.4
	Night-time	33.8
	Day	51.4
	Evening	40.6
	Night-time	45.1
Southern LES Area		
Statistic	Time	Median Noise Level – dB(A)
Rating Background Level (L90)	Day	48.5
	Evening	41.3
	Night-time	43.6
L _{Aeq} over the monitoring period	Day	53.6
	Evening	50.5
	Night-time	51.3

Table 5.8.1 shows median noise levels, however the lowest noise level recorded in both the Northern and Southern LES Study Area were documented during a site visit on 14 October 2005. Measured background (LA90) noise levels were 30 – 32 dB(A) during day, evening and night-time periods. SKM concludes that the higher levels recorded by the loggers may be as a result of inclement weather not being entirely excluded from the noise survey data, causing an increase in the ambient noise levels.

Results in **Table 5.8.1** illustrate that existing noise levels in the southern part of the LES Study Area are higher than the northern portion of the LES area. Additional noise monitoring undertaken on the evening of 4 November 2005 identified insect noise as the reason behind the difference in noise levels, as the southern part of the LES Study Area is significantly more vegetated compared to the northern part which is largely cleared.

Environmental Assessment

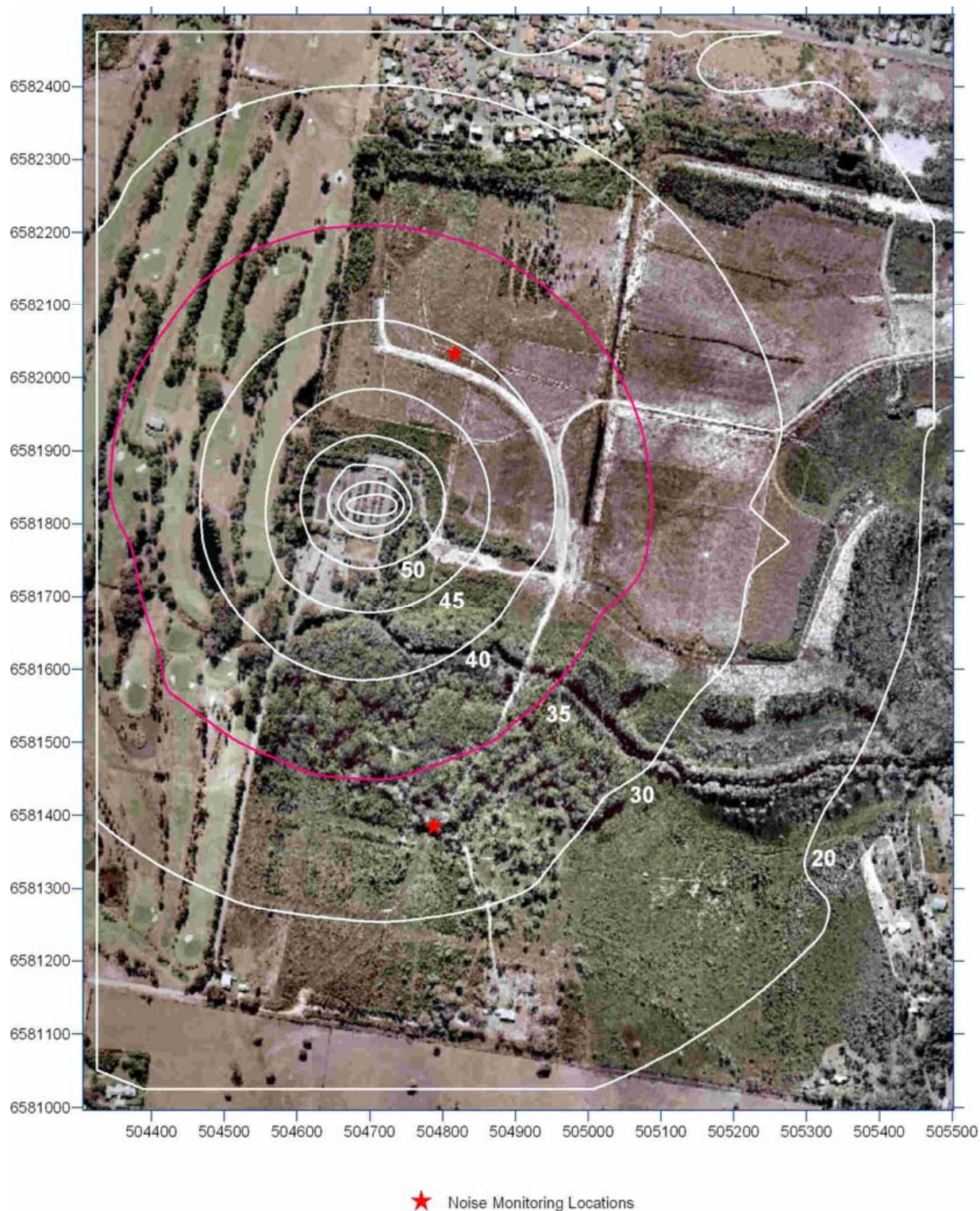


FIGURE 5.8.1 NOISE LOGGER LOCATIONS (SKM)
SEE APPENDIX D6 FOR FULL SCALE PLAN

5.8.4 Noise Criteria

The INP provides a framework for the assessment of noise impacts from industrial noise sources and is targeted at assessing the potential for noise impacts expected at a community level and based on reactions to social surveys. Three noise criteria are determined, being the intrusive noise criteria, amenity noise criteria and project specific criteria.

Intrusive noise criteria relates to the difference between the noise being assessed and the background noise level. In this regard, a noise source is considered to be intrusive if the $L_{Aeq, 15 \text{ minute}}$ level exceeds the rating background level by more than 5 dB(A) for each of the day, evening and night-time periods. Based on the rating background noise levels measured at the closest existing residential dwellings to the LES Study Area, the intrusive noise objective has been established as an L_{Aeq} level of 35.0 dB(A) within the general vicinity of any residential dwelling. This objective noise level is a result of the lowest rating background level of 30 dB(A), with an additional 5 dB(A).

The amenity noise criteria is based on the land zoning, the landuse of the receiver location and the existence of existing industrial noise in the area. Based on the determination that the surrounding land use is rural, the following amenity noise criteria are set:

- » Day: 50 dB(A);
- » Evening: 45 dB(A); and
- » Night-time: 40 dB(A).

Project specific noise criteria is equivalent to the potential for intrusive noise as outlined by the intrusive noise criteria. As such, the project specific noise criteria is 35 dB(A), which should not be exceeded in the vicinity of any future residential dwellings. This criteria is raised to 40 dB(A) for day-time only operations.

5.8.5 Predicted Noise Levels and Impact Assessment

Using the CONCAWE algorithms as implemented within the SoundPLAN suite of noise prediction programs, predicted noise levels for five noise investigation scenarios have been determined. **Table 5.8.2** illustrates the five noise investigation scenarios.

Table 5.8.2 Noise Investigation Scenarios (Source: SKM, November 2005)

Scenario	Noise Source	No.	Meteorological Conditions
1. Two pasveer channels	Aerator	4	night-time temperature inversion (F-class stability), calm winds, relative humidity: 70%, temp: 10°C
2. Three pasveer channels	Aerator	6	night-time temperature inversion (F-class stability), calm winds, relative humidity: 70%, temp: 10°C
3. Four pasveer channels	Aerator	8	night-time temperature inversion (F-class stability), calm winds, relative humidity: 70%, temp: 10°C
4. Four pasveer channels and 1.9m NOISE WALL along N and E perimeter of pasveers	Aerator	8	night-time temperature inversion (F-class stability), calm winds, relative humidity: 70%, temp: 10°C
5. Four pasveer channels and one sludge dewatering pump	Aerator Sludge Dewatering	8 1	daytime atmospheric lapse conditions (D-class stability), calm winds, relative humidity: 55%, temp: 20°C

Two arbitrary sensitive receivers were inputted into the model at a height of 1.5m above ground level, in the same locations as the environment noise loggers. The calculated L_{Aeq} noise levels at the arbitrary receiver locations for the five different investigation scenarios are summarised in **Table 5.8.3**.

Table 5.8.3 Predicted L_{Aeq} Noise Levels (dB(A)) (Source: SKM, November 2005)

Receiver Location	Predicted L_{Aeq} Noise Levels (dB(A))					Criteria
	Scenario 1	Scenario 2	Scenario 3	Scenario 4 (including noise wall)	Scenario 5 (non-adverse meteorology)	
Northern LES Area	37.6	39.2	40.7	34.4	37.8	35 dB(A) Scenario 1-4
						40 dB(A) Scenario 5
Southern LES Area	30.0	31.6	33	32.4	28.9	35 dB(A) Scenario 1-4
						40 dB(A) Scenario 5

In order to assess how the inclusion of a 1.9m noise wall would reduce the noise impact of the STP, results from scenarios 3 and 4 are illustrated as noise contour plots in **Figure 5.8.2** and **5.8.3**.

Environmental Assessment

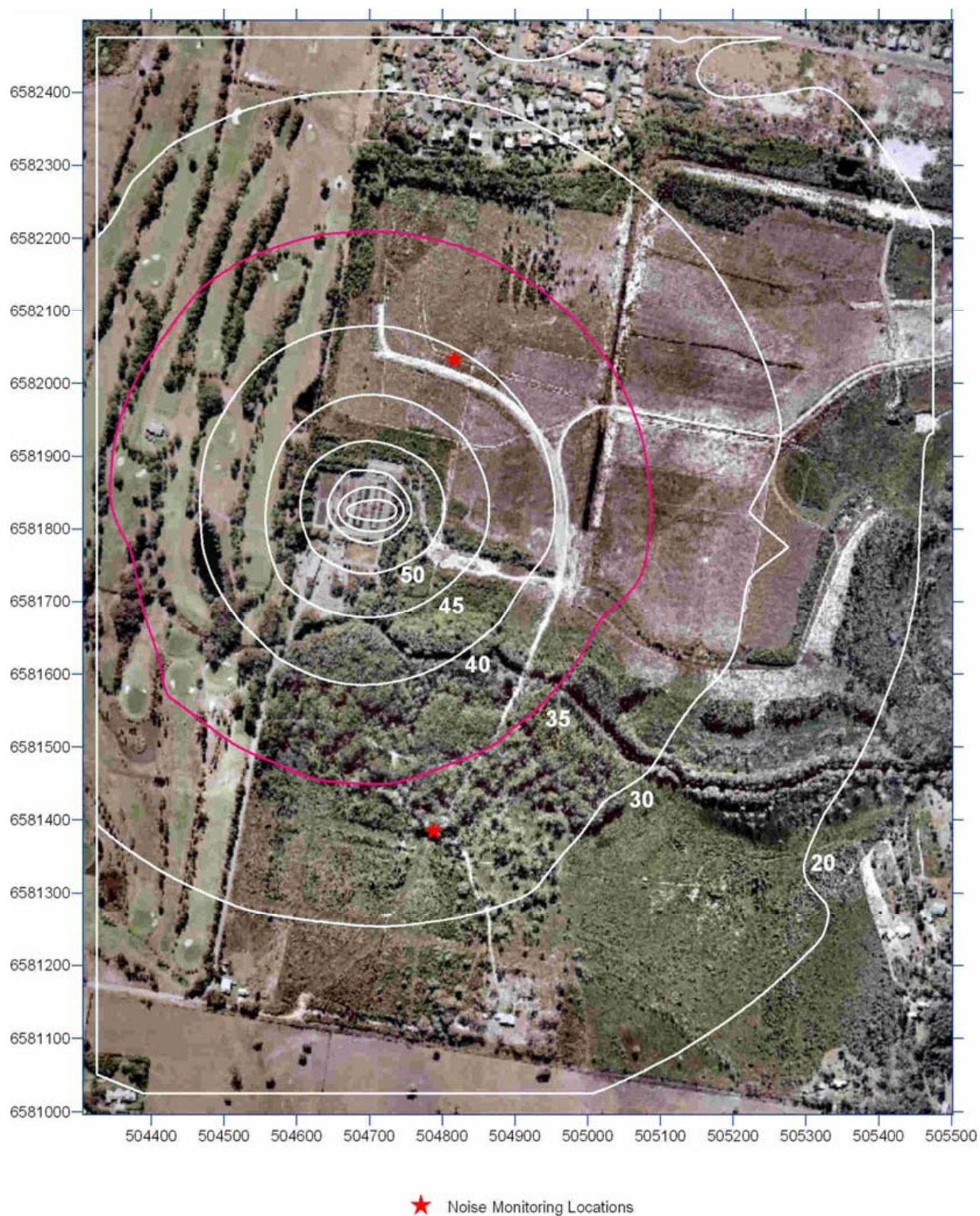


FIGURE 5.8.2 PREDICTED NOISE LEVEL CONTOUR - SCENARIO 3
SEE APPENDIX D6 FOR FULL SCALE PLAN

Environmental Assessment



FIGURE 5.8.3 PREDICTED NOISE LEVEL CONTOUR - SCENARIO 4
SEE APPENDIX D6 FOR FULL SCALE PLAN

Results of the noise modelling show that within the Southern LES Study Area where the Subject Site is located, beyond 100m of the treatment plant boundary, noise levels do not exceed the predetermined night-time noise level criteria of 35 dB(A) for both the exiting or upgraded STP operational scenarios. For the Northern LES Area however, the 35 dB(A) criteria is exceeded up to 200m from the treatment plant boundary. The placement of a 1.9m noise wall along the northern and eastern boundary of the perimeter of the pasveer channel area of the plant ensures compliance with the 35 dB(A) criteria at locations within 150m of the treatment plant boundary. Investigations also show that instead of the noise wall, which may be costly, the provision of covers over the aerators reducing the sound power levels by 5 dB(A) may also be a feasible amelioration measure, subject to agreement by Council and STP operators.

5.8.6 Conclusions

The Odour and Noise Assessment was undertaken in 2005 by SKM for the LES which included the Subject Site. This assessment included the determination of existing noise environments, in order to compare predicted impacts of noise generated as a result of future upgrades to the STP. A total of five future noise scenarios were modelled for the analysis.

Modelling results demonstrated that scenario 3, which was based on aerator noise from four pasveer channels exceed the predetermined noise level criteria of 35 dB(A). However results from scenario 4, which included the placement of a 1.9m noise wall located along the northern and eastern perimeter of the pasveer channel area of the plant demonstrated that noise impacts could be mitigated for beyond 150m of the STP boundary for the Northern LES area. For the Subject Site however, noise levels do not exceed the predetermined night-time noise level criteria of 35 dB(A) for both the exiting or upgraded STP operational scenarios beyond 100m of the STP boundary. As such, the recommended 150m buffer is sufficient to mitigate against noise impacts on the Subject Site without the requirement for additional noise mitigation measures.

SKM concludes that noise emissions from the existing and potential future upgraded STP operations would not be substantial, and that the plant can be managed with a buffer area of 150m.

5.8.7 Management and Monitoring

The Odour and Noise Assessment undertaken by SKM included the following amelioration and environmental management measures to be implemented as part of the Proposal.

Table 5.8.4 Proposed Noise Impact Mitigation Measures

Issues	Mitigation Measure
Noise Impact	Provide 150m buffer to any future adjoining development.

5.9

Bushfire Risk Assessment

5.9 Bushfire Risk Assessment

5.9.1 Introduction

Australian Bushfire Protection Planners (ABPP) was engaged to undertake the bushfire assessment for the Proposal for the Subject Site at South West Rocks for the purpose of residential subdivision. The assessment of bushfire issues has been based on subdivision of the Subject Site to accommodate 318 residential lots, with the provision of a vegetation corridor in the north of the Site as depicted in **Figure 5.9.1**. The full ABPP Report is included as **Appendix D7** of this EA.

Major east-west access to the Subject Site is from Belle O'Connor Street, along its southern boundary, with the major north-south access passing through the centre of the Site, through the property to the north, known as Lot 19 in DP 882846, owned by Saltwater Developments, and joining with Phillip Drive via a connection in the northeast in the future.

A perimeter road, which acts as part of an asset protection zone (APZ) has been provided along the northern extent of the developable area of the Site, separating the residential area from the vegetation corridor. This APZ has been provided to meet with the requirements of the legislation and NSW Department of Planning's *Planning for Bushfire Protection 2006*.

5.9.2 Methodology

The Bushfire Protection Assessment Report prepared by ABPP was prepared with due regard to the Part 3A Major Projects provisions of the *Environmental Planning and Assessment Act 1979* and *Planning for Bushfire Protection 2006 (RFS)*. *Planning for Bushfire Protection 2006* provides guidance for development control measures in relation to bushfire protection for residential development, in particular "Special Fire Protection" and Class 5 – 8 and 10 buildings in bushfire prone areas.

5.9.2.1 DOCUMENT REVIEW

In addition to undertaking the Assessment in accordance with the relevant legislative provisions, the Assessment also reviewed the following documents:

- » South West Rocks Local Environmental Study (LES) prepared by Connell Wagner;
- » Subdivision Plan prepared by EDAW (as presented in **Figure 5.9.1**);
- » Kempsey Council Bushfire Prone Land Map;
- » *Planning for Bushfire Protection 2006* prepared by the NSW Rural Fire Service;
- » Australian Standard AS3959 *Construction of Buildings in Bushfire Prone Areas*; and
- » *Rural Fires Regulation 2002*.

5.9.2.3 SITE INSPECTION

A site visit was undertaken by ABPP on 27 March 2008, and included the surrounding areas. The Site visit was intended to assess the topography, slope, and vegetation classification both within and adjoining the Subject Site, as well as to test the compliance of the proposed subdivision layout with deemed-to-satisfy asset protection zones (APZs) and access provisions. The adjoining properties were surveyed in order to assist in determining land-use and vegetation communities land management.

5.9.2.3 AUTHORITY CONSULTATION

Consultation was undertaken with Mr Copeland, Development Control Officer with the NSW Rural Fire Service on 3 March 2008, in accordance with the Director General's Environmental Assessment Requirements, issued under Part 3A of the *Environmental Planning and Assessment Act 1979*.

No Issues were raised by Mr Copeland that would warrant modification of the development layout or the contents of the report prepared by ABPP, in respect of the provision of fire protection measures and compliance with the deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006*.



FIGURE 5.9.1 LOT LAYOUT PLAN

5.9.3 Findings

5.9.3.1 TOPOGRAPHY

Under Appendix 2 of *Planning for Bushfire Protection 2006* the topography of a site should be assessed over a distance of no less than 100 metres from a development site, and that the gradient should determine which will most significantly affect fire behaviour to the Subject Site.

The Subject Site is located in the low lying land at the base of the slope of the ridgeline that rises to the south of the Site falling (<2 degrees) to Saltwater Creek in the north. The land to the north of the vegetation corridor continues to fall north, at less than 2 degrees, to Saltwater Creek. The Subject Site's cross fall from east to west is between 1 and 2 degrees.

Land to the east of the Subject Site falls by approximately 2-3 degrees to the north from Arakoon Road. It then turns to the northeast from the southeast of the Subject Site, continuing at a fall of between 2 and 3 degrees.

The residential land adjoining immediately to the south of the Subject Site rises to the south at less than 5 degrees.

Land to the West falls at less than 2 degrees toward the north, however it rises at less than 2 degrees to the southwest.

5.9.3.2 VEGETATION

Under *Planning for Bushfire Protection 2006* a methodology is provided that determines the predominant vegetation over a distance of at least 140 metres in all directions for future development. The vegetation on the Subject Site, according to the ecological survey undertaken by Whelan InSites, as a component of this Environmental Assessment, found that the predominant vegetation type within the proposed developable area of the Subject Site is Type 6 - Heathland Complex (*Banksia ericifolia* Variant) (see **Figure 5.9.2**).

Vegetation within 140 metres of the Subject Site in particular, within 140 metres of the proposed developable area of the Site is described here. To the north of the developable area of the Subject Site Open Forest/Woodland of Needlebark Stringybark, Open Forest/Woodland of Northern Scribbly Gum, Heathland Complex and Moist Heathland are the dominant vegetation types located within the vegetation corridor to Saltwater Creek. For the purpose of defining bushfire vegetation formation, the Site visit undertaken by ABPP in March 2008, found that the Scribbly Gum Woodland was in fact Low Open Forest with a shrubby understorey and the Coastal Heath/Swamp Forest in the vegetation corridor is Forested Wetlands Vegetation as defined in Keith *"Ocean Shores to Desert Dunes"*.

To the northeast, east and southeast of the Subject Site the predominant bushfire prone vegetation is Coastal Heath/Forested Wetlands, located within the riparian corridor to the creek which flows northeast into Saltwater Lagoon. Consisting of disjointed small pockets, set within managed cartilages to the adjoining dwellings it is not considered to be bushfire prone vegetation as defined under the NSW Rural Fire Service *"Guideline for Bushfire Prone"*.

To the south of the Subject Site are managed grasslands and landscaped gardens. This area immediately to the South of the Site is already largely rezoned, and approved for residential development. The remainder is used for grazing lands.

The western boundary of the Subject Site is comprised of the managed lawns of the South West Rocks Golf Course, and therefore does not pose increased risk from bushfire.

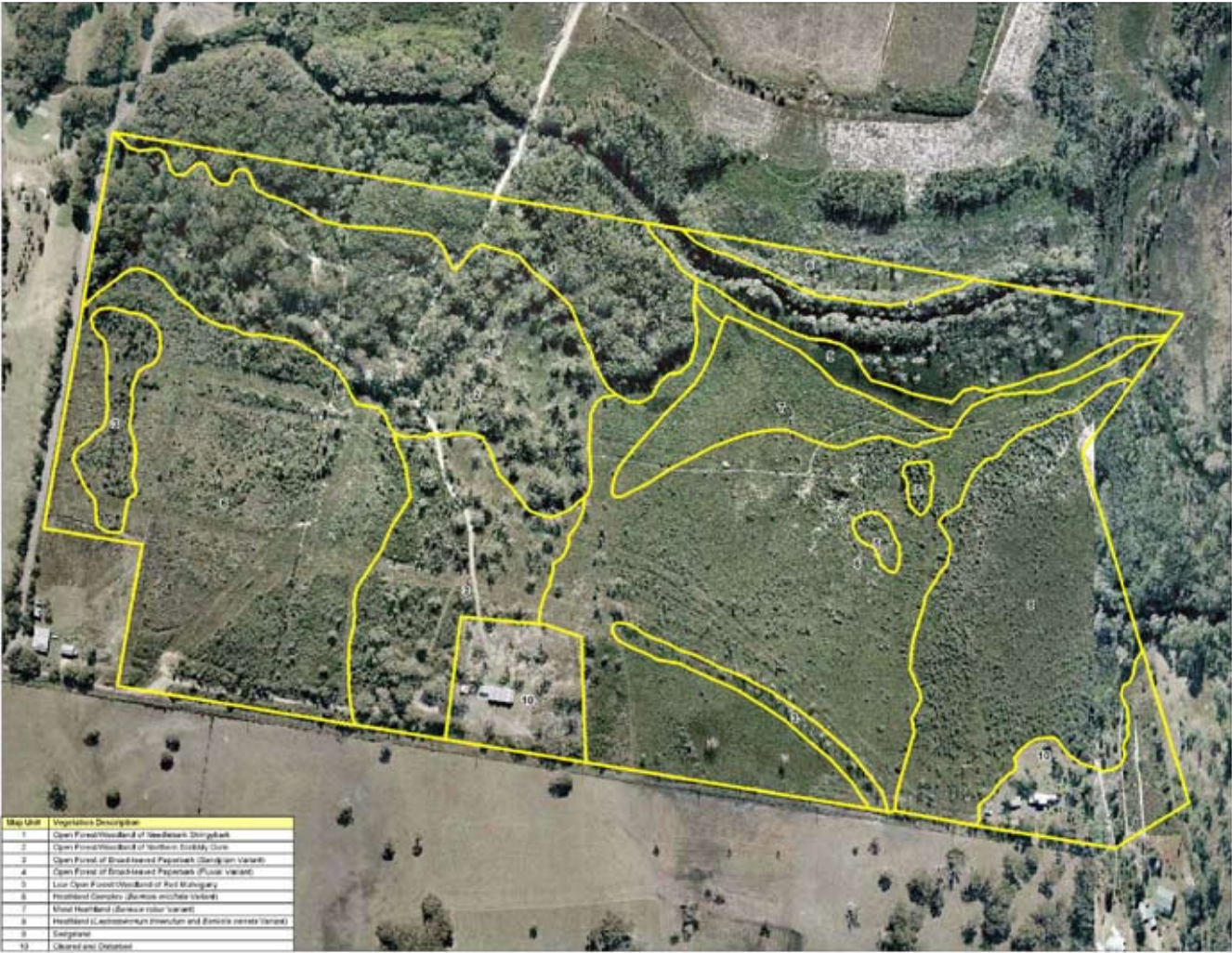
5.9.3.3 PRECINCT LEVEL ASSESSMENT

The information provided in **Table 5.9.1** below is a summary of the existing site condition as described above, and determines the developable areas of the Subject Site which would require an asset protection zone (APZ).

Table 5.9.1 Precinct Level Assessment (Source: ABPP, 2005)

Aspect	Existing Land Use	Predominant Vegetation within 140m of Development	Predominant Vegetation Class [Table A2.1 BfBFP 2006]	Effective Slope of Land for 100m	Comments
North of development site (within northern portion of Lot 52 DP 831284).	Vacant Land within buffer zone to Saltwater Creek.	Stringybark Forest, Scribbly Gum Forest and Heathland.	Low Open Forest and Forested Wetland.	<2 Degrees Down Slope.	The vegetation within the buffer zone to Saltwater Creek is bushfire prone.
East of development site (east of Lot 84 DP 792945).	Rural Residential Development.	Landscaped Gardens.	Nil.	<2 Degrees Down Slope.	The adjoining vegetation on the rural residential development is not bushfire prone.
South of Development Site (south of Lots A and B).	New Residential Estate.	Managed Grasslands/ Landscaped Gardens.	Nil.	<5 Degrees Upslope.	The vegetation to the south of the development site is not bushfire prone.
West of Lot A.	Golf Course.	Managed Grasslands.	Nil.	<2 Degrees Upslope to the South West and Level to the East.	The vegetation within the Golf Course to the west is not bushfire prone.

Environmental Assessment



**FIGURE 5.9.2 VEGETATION MAPPING (WHELANS INSITES - VEGETATION COMMUNITIES FIGURE 3)
SEE APPENDIX D1 FOR FULL SCALE PLAN**

5.9.3.4 BUSHFIRE PROTECTION ASSESSMENT

Assessment was undertaken under the provisions of Appendix 2 of *Planning for Bushfire Protection 2006* which provides the requirements associated with the setting of the widths of APZs to protect residential development. **Table 5.9.2** summarises the assessment undertaken by ABPP which resulted in the recommended APZ widths.

Table 5.9.2: Determination of APZ to Future Residential Development on Subject Site

(Source: ABPP, 2008)

Aspect	Vegetation within 140m of Development	Predominant Vegetation Formation	Effective Slope of Land	Width of Asset Protection Zone [Table A2.5 of BfBFP]	Width of Asset Protection Zone Provided	Compliance with Table A2.5
Northwest sector of Lots A and B.	Scribbly Bark "Woodland" within the northern portion of Lot 52 DP 831284.	Forest.	<2 degrees down slope to the north.	20m of Level 3 construction to the future buildings.	20m separation to Bushfire Prone vegetation provided by APZ.	Yes.
Northeast sector of Lot B.	Swamp Forest and Coastal Heath.	Forested Wetland and Tall Heath.	<2 degrees down slope to the north.	20m to Forested Wetland; 15m to Tall Heath.	>20m separation provided by perimeter road and building setback.	Yes.
East of Lot 84 DP 792945.	Managed curtilage in rural residential lots.	Nil.	<2 degrees down slope to the northeast.	Nil.	>100m separation provided by APZ within adjoining lands.	Yes.
South of Lots A and B and Lot 84.	Managed grassland/ curtilages on residential estate.	Nil.	<5 degrees upslope to the south.	Nil.	>100m separation provided by APZ within adjoining lands.	Yes.
West of Lot A	Managed curtilage and Golf Course.	Nil.	<2 degrees down slope to the southwest and level to the west.	Nil.	>100m separation provided by managed Golf Course and existing residential development.	Yes.

The assessment found that, with the exception of the dwellings located in the northern –central part of the Site, all the residential development lots proposed by this Project Application are in excess of 100 metres from any bushfire prone vegetation, and therefore do not require APZs to be implemented.

The residential lots proposed for the northern –central part of the Subject Site (see **Figure 5.9.3**), are located adjacent to bushfire prone lands. The proposed lot layout has allowed for the provision of a twenty (20) metre APZ between the boundary of the proposed residential lots and the bushfire prone vegetation located within the vegetation corridor. This proposed APZ is considered to exceed the requirements for an APZ in this context under the provisions of Planning for Bushfire Protection 2006.

5.9.3.5 ASSESSMENT OF BUSHFIRE ATTACK (CONSTRUCTION STANDARDS)

An assessment was undertaken to determine the level of bushfire attack across the Subject Site and to recommend the required construction standards, under the Australian Standards and BCA, for future dwellings to be located within 100 metres of the bushfire prone vegetation to be retained in the vegetation corridor. **Table 5.9.3** summarises this assessment.

Table 5.9.3 Bushfire Attack Assessment – Determination of Construction Standards

(Source: ABPP, 2008)

Aspect	Predominant Vegetation Class (Table A2.1 PfPFP 2006)	Effective Slope of Land	Minimum Width of APZ (Table A2.5 PfPFP 2006)	Level of Bushfire Attack (by calculation)	Construction Standard in accordance with A.S. 3959
North	Forest and Forested Wetland within the vegetation corridor to Saltwater Creek (within the northern portion of Lot 52 DP 831284).	2 degrees down slope to the north.	>20 metres separation to bushfire prone vegetation provided by APZ/ perimeter road and building setback.	Extreme.	Level 3 construction standards required.
East	Managed curtilage.	2 degrees down slope of the northeast.	>100 metres.	Low.	Nil specific construction standards required.
South	Managed grassland and landscaped gardens.	<5 degrees upslope.	>100 metres.	Low.	Nil specific construction standards required.
West	Managed curtilage within Gold Course.	Level to the west.	>100 metres.	Low.	Nil specific construction standards required.

As per Table 5.9.3 it is recommended that any future dwellings to be constructed on the proposed residential lots located in the central northern part of the Subject Site (see **Figure 5.9.4**) will be required to be constructed to Level 3, under the provisions of A.S. 3959-1999 *Construction of Buildings in Bushfire Prone Areas*. The future dwellings located beyond the first row up to 100m from the bushfire hazard are required to be constructed to Level 1 as provided by A.S. 3959-1999 *Construction of Buildings in Bushfire Prone Areas*.

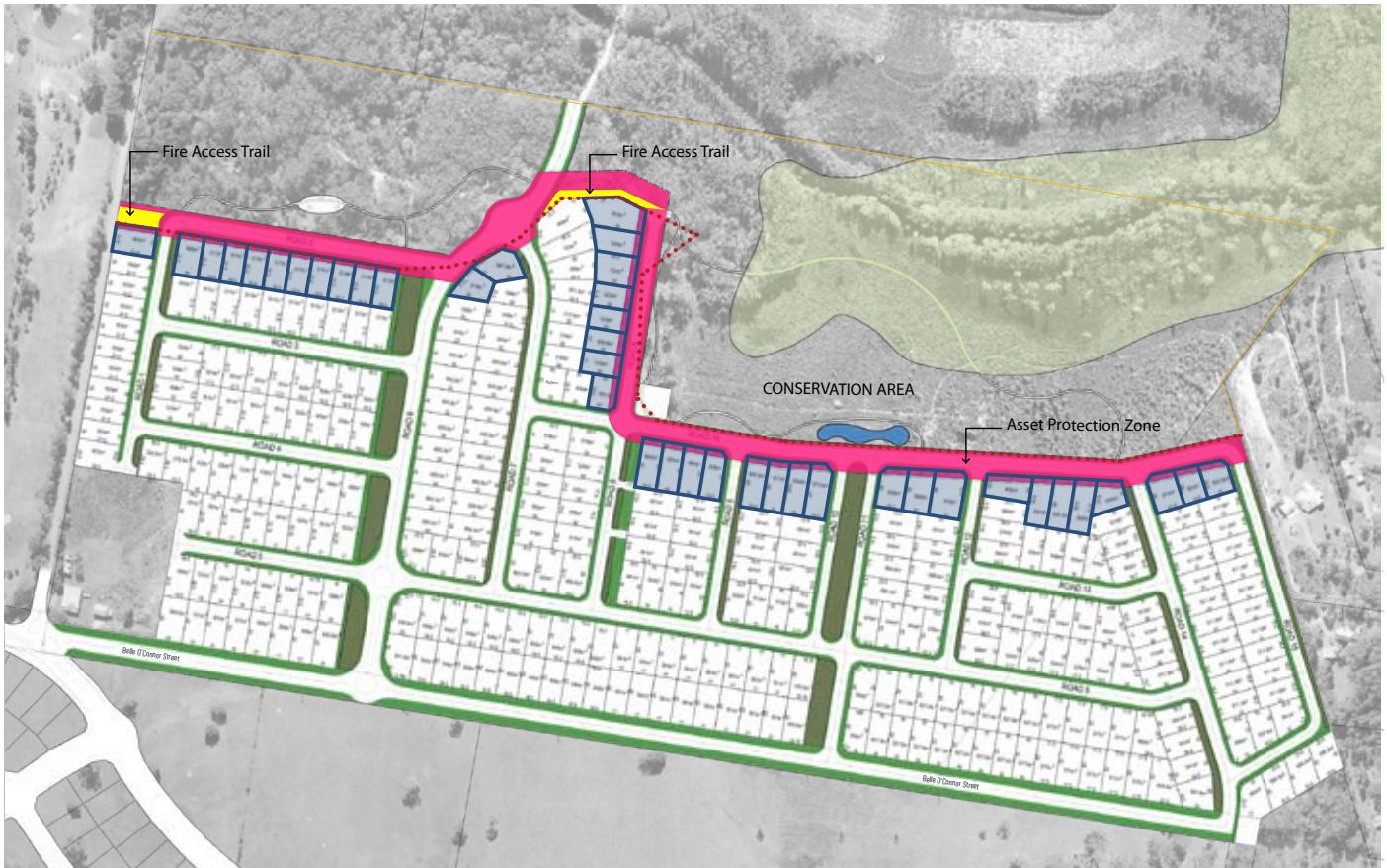


FIGURE 5.9.3 BUSHFIRE CONSTRAINTS PLAN

SEE APPENDIX G FOR FULL SCALE PLAN

Environmental Assessment

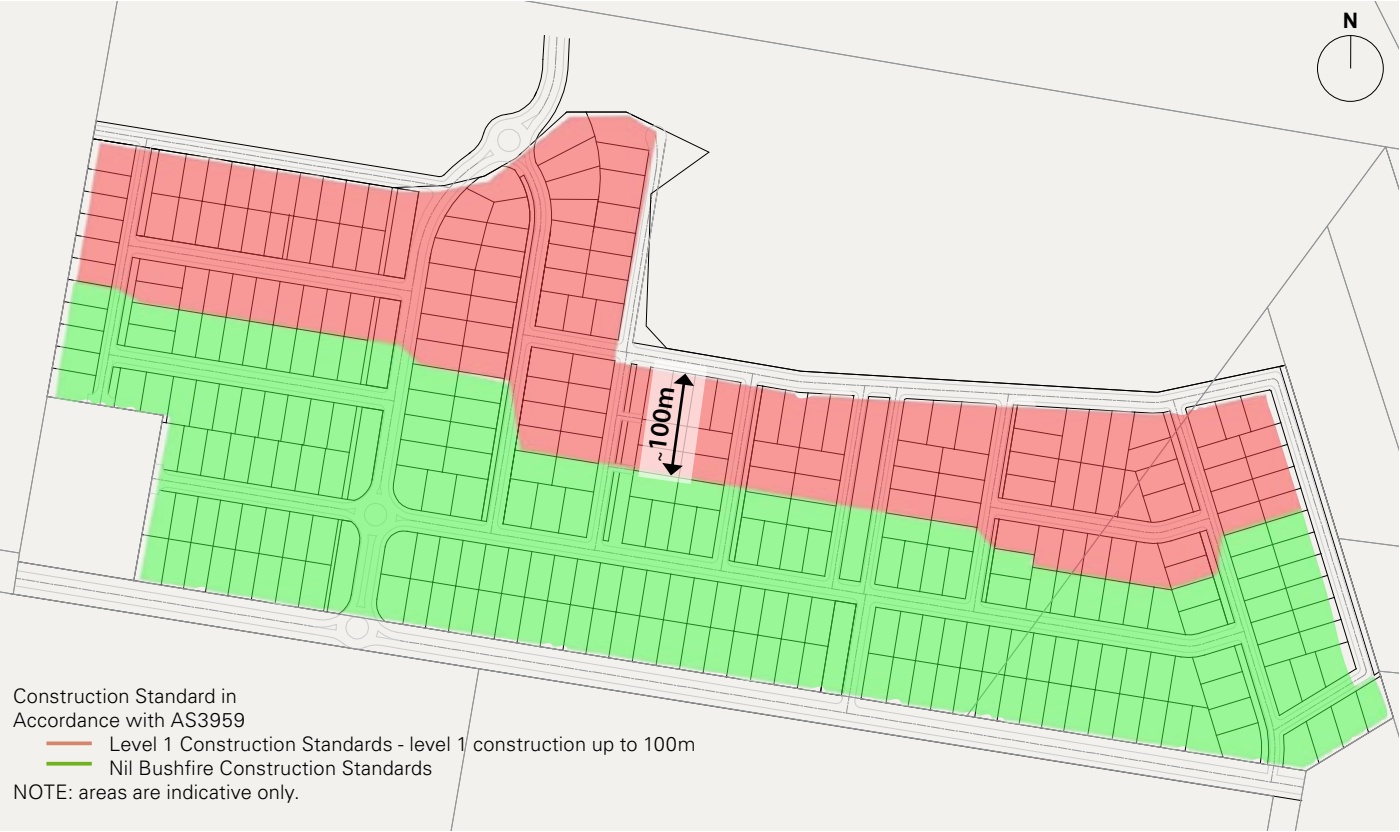


FIGURE 5.9.4 CONSTRUCTION STANDARDS FOR DWELLINGS ON SUBJECT SITE

5.9.3.6 WATER SUPPLIES FOR FIRE FIGHTING OPERATIONS

The existing reticulated water supply that feeds the surrounding residential areas will be extended to service the residential subdivision proposed by the Project Application. The extension of this same reticulated water system will include the provision of a water supply main with hydrants which will be installed to meet Australian Standard AS 2419.32. The minimum flow rate of these hydrants will be 10litres/second.

Delineated by blue markers located on the hydrant side of the road centre the line, the hydrant locations will be no more than twenty (20) metres from areas where NSW Rural Fire Service (RFS) tankers can park. In addition to the future habitable dwellings to be developed on site (subject to future development applications) will need to be located so that the furthest extremity of the Site can be reached by fire-fighters using two (2) thirty (30) metre hose lines and a ten (10) metre water jet. The maximum distance between a hydrant and the furthest part of a building can not exceed ninety (90) metres.

5.9.3.7 ACCESS FOR FIRE FIGHTING OPERATIONS

Planning for Bushfire Protection 2006 provides requirements for public roads within proposed subdivisions designed to ensure that any new internal road network in an area that is considered bushfire prone will be able to accommodate traffic in an emergency bushfire event. The proposed road network has been designed to comply with Section 4.1.3 of *Planning for Bushfire Protection 2006* as follows.

Subdivision Roads

The subdivision layout provides for a looped road network with perimeter roads located between the bushfire prone vegetation and the future dwellings located along the northern aspect of the subdivision. This road network layout complies with the deemed-to-satisfy provisions of Section 4.1.3 - Access [1] – Public Roads of *Planning for Bushfire Protection 2006*.

The deemed-to-satisfy width of perimeter roads shall be 8.0 metres. An examination of the width of perimeter Road No. 2 [9m], No. 6 [11m], No. 8 [8m] and No. 16 [9m] confirms compliance with this specification.

The minimum deemed-to-comply width of internal public roads is 6.5 metres with 'No Parking' to one side of the road pavement. Examination of the proposed internal road widths confirms that the proposed roads comply with, or exceed, this minimum standard. Roads No. 10 & No. 11 have a carriageway width of 6 metres however they form a two lane road with each carriageway providing a width of 6 metres [the minimum width required by *Planning for Bushfire Protection 2006* is 3.5m for dual lane roads].

Emergency Access/Egress

Clear emergency access/egress from the Subject Site has been provided through the proposed subdivision layout. The extension of Belle O'Connor Street along the southern boundary of the Site, from the existing road network in the east, along the existing road easement, provides egress for residents and emergency services, away from bushfire events within the Conservation Zone. Additional fire operational access in the form of a fire trail is provided along the northern boundary of lots within the north-western corner and central portion of the Proposal.

The subdivision layout provides several north-south roads linking to Belle O'Connor Street in the south and to a proposed perimeter road along the northern boundary of the developable area of the Subject Site and the vegetation corridor, providing significant egress from the Site away from any potential bushfire events within the vegetation corridor.

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There is also provision for a future major north-south connection to Phillip Drive, crossing Saltwater Creek, connecting the Site with existing firetrails and future development areas, and the residential areas located close to the South West Rocks town centre.

5.9.3.8 ADEQUACY OF BUSHFIRE MAINTENANCE PLANS AND FIRE EMERGENCY PROCEDURES

A fuel management plan is recommended for the vegetation corridor to Saltwater Creek. It is considered that the Kempsey Bushfire Risk Management and Operations Plans adequately address bushfire maintenance and emergency procedures for the management of vegetation and operational procedures during bushfire events within the Kempsey LGA.

5.9.3.9 EMERGENCY MANAGEMENT FOR FIRE PROTECTION/EVACUATION

The only area of the Subject Site at direct risk from fire that may be required to be evacuated in case of fire is the central northern part where proposed residential lots back directly onto the vegetation corridor and associated APZ to the north. Despite this, it is considered that a site specific evacuation plan is not required for the Subject Site as there are more than adequate escape routes toward the south via the proposed internal road network throughout the Subject Site. It is anticipated that should evacuation be required the emergency management and evacuation will be initiated and managed by the Police.

5.9.3.10 BUSHFIRE HAZARD MANAGEMENT

In order to:

- » prevent the hazard and risk associated with flame contact with built structures;
- » ensure the reduction of radiant heat to below ignition thresholds;
- » minimise wind driven embers; and
- » reduce the impact of smoke on residents and fire-fighters, bushfire management practices have been developed.

Fuel management, in particular within the proposed APZ and vegetation corridor is key to ensuring the safety of the dwellings in the central northern part of the Subject Site. All vegetation within the area of the Subject Site proposed for development will be managed in accordance with Appendix A5.4 and Appendix A5.5 of *Planning for Bushfire Protection 2006* and the Rural Fire Service “*Standards for Asset Protection Zones*”. The ABPP Report recommends that the landscaped gardens within the Subject Site be required to undertake specific practices to minimise the potential risk from bushfire, this are detailed in **Section 6.9.5** of this EA Report.

5.9.3.11 ADEQUACY OF SPRINKLER SYSTEMS AND OTHER FIRE PROTECTION MEASURES

No sprinkler systems are required or recommended for the proposed subdivision.

5.9.3.12 STAGED DEVELOPMENT

As the development of the Subject Site is scheduled to be undertaken in a total of eleven (11) stages, it is recommended that the entire development be managed as an Outer Protection Area (OPA) until the completion of construction. A number of temporary measures have been recommended including:

- » provision of a 100m temporary Inner Protection Area (IPA) for each stage to edges which do not include the permanent APZ;
- » construction of temporary ‘T’ turning heads to facilitate egress for all internal and perimeter roads; and
- » provision of temporary fire trails within the temporary IPA.

5.9.4 Conclusions

The assessment undertaken by ABPP, and reported in full in **Appendix D7** to this EA Report, found that there was bushfire prone land in the vegetation corridor to the north of the area of the Subject Site that is proposed for development. The proposed asset protection zone (APZ) coupled with the perimeter road along the northern boundary between the developable area and the vegetation corridor are considered to be adequate in reducing the risk from bushfire to any future development, provided specific measures are implemented as provided in **Section 6.9.5** of this EA Report.

ABPP undertook an assessment of the propose subdivision layout against the deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006* as provided in **Table 5.9.4** which found that the Proposal met the requirements of the deemed-to-satisfy provisions of *Planning for Bushfire Protection 2006* and is therefore recommended for approval.

Table 5.9.4 Deemed to satisfy compliance (Source ABPP 2008)

Bushfire Protection Measure	Compliance with Deemed-to-Satisfy Provisions of PfBFP 2006
(i) Asset Protection Zone setbacks.	YES – width of APZ complies with Table A2.5 of <i>Planning for Bushfire Protection 2006</i> .
(ii) The siting and adequacy of water supplies for fire fighting.	YES – Hydrant supply to be installed in accordance with AS 2419.2.
(iii) Design of public roads.	YES – Perimeter public road provided and roads to comply with the specification of 4.1.3(a) of <i>Planning for Bushfire Protection 2006</i> .
(iv) Design of fire trail network.	YES – Fire trail provided within APZ to the north of residential lots in the centre-north of the Subject Site. Fire trails to be constructed to comply with the specifications of Section 4.1.3(c) of <i>Planning for Bushfire Protection 2006</i> .
(v) Adequacy of emergency response access and egress.	YES – Road network provides two-way perimeter road plus internal road network that permits egress away from the bushfire hazard interface.
(vi) Adequacy of bushfire maintenance plans and fire emergency procedures.	YES – Fire Management Plan should be prepared for vegetation within the vegetation corridor to Saltwater Creek.
(vii) Building construction standards.	YES – Level 3 construction requires for buildings located within 27 metres of hazard interface; Level 1 construction required for buildings located 28-100 metres from bushfire hazard interface.
(viii) Adequacy of sprinkler systems and other fire protection measures to be incorporated into the development.	Not Applicable.

5.9.5 Management and Monitoring

Several recommendations have been made in the bushfire assessment prepared by ABPP. The recommendations refer to provision of asset protection zones (APZs), road widths and turning circles, fire trails, site access/egress, building setbacks, provision for fire-fighting, construction standards, and general requirements under *Planning for Bushfire Protection 2006*.

Table 5.9.5 provides details of mitigation measures proposed to protect the Subject Site and any future residential development from bushfire hazards and reduce the risk to life and property from a bushfire event, in particular adjacent to the vegetation corridor to the north.

Table 5.9.5 Proposed Bushfire Mitigation Measures

Issue	Mitigation Measure
Asset Protection Zones	
Proposed residential lots running along the northern boundary (see Figure 5.9.3).	A twenty (20) metre APZ is required between the northern boundary of the proposed residential lots and the vegetation corridor.
Entire Subject Site	APZs will be provided in accordance with Table 5.9.4 above.
Maintenance	All APZs will be maintained in accordance with Appendix 5 of <i>Planning for Bushfire Protection 2006</i> and Rural Fire Service's <i>Specifications for Asset Protection Zones</i> .
Bushfire Attack – Construction Standards	
Proposed residential lots located in the northwest corner of the Subject Site within twenty-seven (27) metres of the adjoining the APZ (see Figure 5.9.3).	Any future dwellings will be required to be constructed to Level 3, under the provisions of A.S. 3959-1999 <i>Construction of Buildings in Bushfire Prone Areas</i> .
Proposed residential lots located twenty-eight (28) to one hundred (100) metres of the adjoining APZ (see Figure 5.9.3).	Any future dwellings to be constructed are required to be constructed to Level 1 as provided by A.S. 3959-1999 <i>Construction of Buildings in Bushfire Prone Areas</i> .
Proposed residential lots located within one hundred (100) metres of the adjoining APZ (see Figure 5.9.3).	The roof gutters/valley of any future dwellings shall be fitted with a protective device that minimises the accumulation of combustible materials in the gutter/valleys. The protection device shall have a flammability index of less than 5 as measured under A.S. 1530.2-1993 <i>Methods for fire tests on building materials, components and structures - Test for flammable material</i> .

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Water Supply	
Extension of Mains	Extension of the existing water supply mains will be undertaken in accordance with Australian Standard AS 2419.2.
Hydrants	All hydrants installed in the proposed subdivision are to be installed in accordance with Australian Standard AS 2419.2.
Hydrants	Hydrant markings will be provided on the hydrant side of the road centre line in blue.
Hydrants	Hydrants shall have a flow rate of 10 litres / second.
Hydrant Location	Hydrants will be located such that a tanker can park no more than twenty (20) metres from the hydrant.
Hydrant Location	Hydrants will be located so that a fire in the furthest part of any future dwelling can be reached by fire-fighters using two (2) thirty (30) metre hose lines and a ten (10) metre water jet.
Hydrant Location	There must be a clear unobstructed path of no more than ninety (90) metres between the hydrant and the most distant point on any future building within the Subject Site.
Access for Fire-Fighting	
Public Roads	All public roads proposed will be constructed to the specifications for public roads under Section 4.1.3 (Access) of <i>Planning for Bushfire Protection 2006</i> .
Public Roads	Roads shall be designed for two-wheel drive all weather access.
Public Roads	Perimeter roads adjacent to the bushfire hazard interface shall be two-way with a minimum carriageway width of eight (8) metres (kerb to kerb) with shoulders on each side.
Public Roads	Roads shall be through roads, where practical.
Public Roads	Dead-ends shall not be more than 200 metres in length and incorporate a twelve (12) metre outer radius turning circle.
Public Roads	The capacity of road surfaces/bridge in a subdivision with reticulated water supply will be fifteen (15) tonnes.
Public Roads	Curves of roads will have a minimum inner radius of six (6) metres and a minimum outer radius of twelve (12) metres.
Public Roads	Vertical clearance above the road surface shall be four (4) metres.
Public Roads	All public roads between six and a half (6.5) and eight (8) metres in width shall be no parking on one side with service hydrants located on opposite side.
Public Roads	Public roads less than 6.5m in width shall provide parking bays clear of the road formation and locate services outside the parking bays.
Public Roads	All public roads 8 metres wide shall locate services outside parking reserves to ensure accessibility to the reticulated water supply.
Public Roads	Single lane one-way roads will be a minimum of three and a half (3.5) metres in width with parking bays provided clear of the road formation.
Public Roads	Parking bays will be two and two thirds (2.6) metres wide from the kerb to the edge of the road formation.

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Public Roads	All access roads directly interfacing the bushfire hazards will provide roll top kerbing to the hazard side of the road.
Fire Trails	All fire trails within the Subject Site shall be constructed to comply with the deemed-to-satisfy provisions of Section 4.1.3 of <i>Planning for Bushfire Protection 2006</i> .
Fire Trails	Any fire trail within the Subject Site will have a minimum carriageway of four (4) metres with an additional one (1) metre clearance provided to each side which is kept clear of grasses and shrubs.
Fire Trails	Locked fire trail access gates shall be provided at the intersection with the public road network.
Fire Trails	The carrying capacity of the fire trail surface will be fifteen (15) tonnes for reticulated areas.
Fire Trails	A minimum vertical distance of four (4) metres will be provided clear of overhanging branches, trees and shrubs.
Hazard Management	
APZ	A Section 88B Instrument, under the <i>Conveyancing Act 1919</i> will be created on the lots directly adjoining the APZ (see Figure 5.9.3). The section 88B instrument relating to the creation and management of the Asset Protection Zones shall apply to those lots identified as containing the Asset Protection Zone as follows: » Lot 1 » Lots 12 to 21 » Lots 138, 139 » Lots 165 to 172 » Lots A87 to 190 » Lots 204 to 207 » Lots 208 to 210 » Lots 277 to 281 » Lots 289 to 291 The management of the landscaped gardens shall apply to all lots within the subdivision, by way of an 88B instrument on the title of the lots.
Fuel Management	The vegetation within the developable area of the Subject Site will be managed in accordance with Appendix A5.4 and Appendix A5.5 of <i>Planning for Bushfire Protection 2006</i> and the <i>Rural Fire Service Standards for Asset Protection Zones</i> .
Landscaped Gardens	Maintain a clear area of low cut lawn or pavement adjacent to the buildings.

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Landscaped Gardens	Keep areas under fences, fence posts, gates & trees raked and clear of combustible fuels.
Landscaped Gardens	Utilise non-combustible fencing and retaining wall structures.
Landscaped Gardens	Separate the tree canopy and shrub connectivity with defined landscaped garden beds.
Landscaped Gardens	Maintain tree canopies and shrubs so that they are clear of the building by at least two metres.
Landscaped Gardens	Utilise non-flammable materials such as Scoria, pebbles and recycled crushed bricks as ground cover to landscaped gardens in close proximity to buildings.
Landscaped Gardens	Maintain minimal fine fuel loading at ground level within the Inner Protection Area and landscaped area (nominally 3 tonnes / hectare).
Landscaped Gardens	Trees and shrubs are acceptable provided that they are spread out and do not form a continuous canopy, are not species that retain dead material and are located away from the buildings to minimize radiant heat and direct flame attack.
Landscaped Gardens	Landscape species selection shall be drawn from those that are considered to be species which are “fire retardant” and do not promulgate the spread of fire.
Staging	
Staging	The entire development precinct shall be managed to the standard of an Outer Protection Area [OPA] until the completion of the subdivision.
Staging	Each stage shall be provided, to those edges which do not include the permanent Asset Protection Zone, a 100 metre wide temporary Inner Protection Area [IPA].
Staging	Internal and perimeter roads constructed within each stage shall have temporary “T” turning heads constructed within the adjoining stage so as to permit fire appliance egress in a forward direction.
Staging	Temporary fire trails shall be provided within the temporary Inner Protection Area so as to provide fire fighting access to the perimeter of the stage.

5.10

Safety and Security in Design

5.10.1 Introduction

Creation of a safe and secure environment for residents is key to the design of all new residential developments and release projects. The NSW Department of Planning (DoP), formerly the Department of Urban Affairs and Planning, has produced a guideline, under the provisions of the *Environmental Planning and Assessment (EP&A) Act 1979* for crime prevention and the assessment of development applications. The intention of the guidelines is to enable consent authorities to identify crime risk and to minimise this through appropriate assessment of development applications.

Crime prevention through environmental design (CPTED) is intended to influence the design of built form and places through:

- » increasing the perception of risk to criminals by increasing the possibility of detection, challenge and capture;
- » increasing the effort required to commit crime by increasing the time, energy or resources which need to be expended;
- » reducing the potential rewards of crime by minimising, removing or concealing 'crime benefits'; and
- » removing conditions that create confusion about required norms of behaviour.

The NSW State government considers designing for safety to be important in reducing overall crime rates, and has developed a strategy that includes the following measures:

the preparation of guidelines under Section 79C of the EP&A Act, to assist implementation of the CPTED Principles;

Safer by Design training program run by the NSW Police Service that enables councils to understand and apply principles contained in these guidelines;

- » working with the Australian Building Codes Board to include crime prevention strategies in the future BCA; and
- » continuing to encourage crime prevention strategies as good design principles (eg *Better Urban Living*, *NSW Model Code*, future design based planning controls).

Crime prevention is a required consideration under Section 79C of the EP&A Act within Part 4. The proposed subdivision is a Part 3A Major Project by virtue of its location within the Coastal Zone, and therefore the requirements of Section 79C do not apply to the project. Regardless of the statutory status of this project, it is considered that crime prevention is a universal responsibility and therefore the CPTED Principles are relevant to the proposed subdivision. For this reason the proposed layout, as illustrated in **Figure 5.10.1** was designed with the CPTED Principles in mind, and the compliance of the proposed layout is discussed in this Chapter.

Environmental Assessment



FIGURE 5.10.1 SUBDIVISION PLAN

SEE APPENDIX G FOR FULL SCALE PLAN

5.10.2 The Design

There are two components of this Project Application that need to be considered within the context of the CPTED Principles, these being the subdivision design and the recommended landscape design of public realm spaces on the Subject Site.

The layout of the proposed subdivision is presented in **Figure 5.10.1**. The subdivision is based on a grid pattern, growing from Belle O'Connor Street which forms the Subject Site's southern boundary. The majority of streets run in a north-south direction from Belle O'Connor Street to a perimeter road along the northern boundary between the Proposal lots and the vegetation corridor. Provision has been made for the potential connection to future residential development to the north of the Subject Site through to Philip Drive in the north through Waianbar Avenue or an alternative connection. Provision is also made for connection to Lot 51 DP831284 located immediately to the southwest of the Site, should this lot be developed for residential purposes in the future. Areas of open space have been provided in the form of a bicycle path running adjacent to the western drainage swale, landscaping within the western and eastern swales and an open space area located in the centre of the Site running vertically between two of the local roads.

A Landscape strategy including native street tree plantings and landscaping for drainage swales has been designed for the Proposal. As demonstrated in **Figure 2.2.2** and **Figure 2.2.3**, the Landscape Master Plan and streetscape layout was designed in order to comply with the principles of CPTED by ensuring good visibility and separation of vegetation in the public domain.

5.10.3 Compliance with Crime Prevention through Environmental Design (CPTED)

The four CPTED Principles as presented in the DoP Guideline are defined as follows:

- » **Surveillance:** the attractiveness of crime targets can be reduced by providing opportunities for effective casual surveillance, both natural and technical.
- » **Access Control:** physical and symbolic barriers can be used to attract, channel or restrict the movement of people, thereby minimising opportunities for crime and increase the effort required to commit crime.
- » **Territorial Reinforcement:** community ownership of public space sends positive signals, people feel comfortable in and are more likely to visit places that feel owned and cared for. Well used places reduce opportunities for crime and increase risk to criminals.
- » **Space Management:** popular public space is often attractive, well maintained and well used space. Linked to the principle of territorial reinforcement, space management ensures that space is appropriately utilised and well cared for.

The subdivision design, coupled with the landscape design of the proposed public domain areas and the design guidelines, have been prepared to ensure that the principles of CPTED are considered. The intention is to minimise the likelihood of criminal activity within the Subject Site, and thereby create a safe and secure neighbourhood, where residents are encouraged through the design to utilise their local environment, formal and informal open space provided in pocket parks and within the vegetation corridor respectively.

Kempsey Shire Council has prepared a Shire specific document entitled "*Crime Prevention through Environmental Design (CPTED) Guidelines*" which provides details of planning provisions which need to be addressed by new developments. The consideration of these CPTED Principles and planning provisions within the design of the Subject Site, and within the proposed design guidelines is discussed below.

5.10.2.1 SUBDIVISION LAYOUT ASSESSMENT

Surveillance

The proposed master plan has been designed with a landscaping and streetscape strategy which encourages casual surveillance of public areas through:

- » specification of low shrubs;
- » specification of tall trunked trees;
- » 10 metres separation between trees;
- » no hedges;
- » minimal dual frontages; and
- » APZ in edge of 7(b) zone to reduce hiding places.

Vegetation has been positioned to avoid clumping and streetscape landscaping is sufficiently low so as not to provide opportunities for concealment or block opportunities for surveillance, while taller vegetation required for shading can be managed by pruning of lower branches.

The proposal also avoids the creation of lots with double frontages, which present poor urban design and safety and security outcomes as result of high fences to the public domain which afford poor casual surveillance.

Access Control

The proposal has been provided with a network of straight and open roads. All local streets within the Subject Site are at least 7 metres in width, while the main collector roads within the Site are at least 11 metres in width, affording wide channels for the movement of vehicles, bicycles and pedestrians.

Presently, the Proposal includes a number of road terminations. Long dead end streets are undesirable from an access control point of view. These terminations however are the result of the provision of future connection to land located to the north of the Subject Site, as well as the pocket of land located in the southwest corner of the Subject Site. It is considered important that the Proposal is provided with ample opportunity for through road connection to adjoining lands to ensure future development does not create further dead ends. Furthermore, the majority of dead end streets are not of considerable length and shorter dead end streets do not create major access control issues. A long dead end street does exist (Road 8), located in the centre of the Site running north towards the vegetation corridor. For CPTED purposes, this street is provided with a paved vehicle and pedestrian firetrail, which connects to the road network near the northern roundabout.

Territorial Reinforcement

Delineation between land uses and public verse private domain has been achieved through:

- » separation of swale and residential land uses by roads or bike paths;
- » separation of residential land uses and the vegetation corridor by roads and asset protection zones (APZ);
- » obvious delineation between private allotments and footpaths through streetscape planting; and
- » Proposal identification in the form of an entry statement located along the Belle O’Conner Street extension.

Space Management

Appropriate management of open space areas will be provided though a landscape and open space maintenance plan for the Proposal. This will ensure attractive, well maintained and well utilised spaces. Adequate lighting in open space areas will be provided and street lighting will be provided in accordance with relevant Australian Standards.

5.10.4 Conclusions

The Proposals design incorporates CPTED Principles and it is considered that the Proposal is consistent with the NSW Police, DoP and Kempsey Shire Council guidelines on minimising crime risk. Surveillance and sight lines are maximised through the design of a street layout based on a grid pattern, with dead-end streets being only provided in order to facilitate future connection to adjoining land. Linear open space areas have been centrally located with good visibility.

A number of mitigation measures relating to public areas are recommended in order to ensure appropriate ongoing management of these spaces.

5.10.5 Management and Monitoring

Table 5.10.1 provides details of mitigation measures proposed to ensure CPTED principles are central to the design and operation of the Proposal.

Table 5.10.1 Proposed CPTED Mitigation Measures

Issue	Mitigation Measure
Landscaping Management	A Landscape Management and Maintenance Plan is to be developed in order to ensure appropriate management and maintenance of open space and public domain areas.

Environmental Assessment

5.11

Social Impact Assessment

5.11 Social Impact Assessment

5.11.1 Introduction

Key Insights Pty Ltd (Key Insights) was engaged to undertake a social impact assessment for the proposed residential subdivision of the Subject Site. This Chapter discusses the existing demographic profile of the area, service supply and demand impacts that may affect the Subject Site and Proposal. The full Key Insights assessment is included as Appendix D8 of this EA.

5.11.2 Methodology

Key Insights conducted desktop research on the likely social costs and benefits of the Proposal, in order to produce a social impact comment. The social impact comment and scoping report was undertaken in order to research the following:

- » the social context within which the Proposal would proceed;
- » the range of potential residents likely to be interested in living in the Proposal and the factors which would encourage and discourage diversity among residents;
- » opportunities to mitigate risk and support social sustainability through the provision of social infrastructure and/or specific facility management/service delivery options.

Population and housing trend profiles used for the assessment were derived from the South West Rocks Urban Centre/Locality (UCL) geographic region as identified by the Australian Bureau of Statistics (ABS). The South West Rocks UCL boundary, which remained unchanged between the 2001 and 2006 census, includes the residential areas of South West Rocks, Arakoon, New Entrance and Spencerville. Where relevant, NSW State data for the 2006 Census is provided for comparative purposes.

5.11.3 Demographic Profile

POPULATION CHARACTERISTICS

The social profile of South West Rocks is dominated by its historical context as a holiday and retirement destination. This is reflected in an examination of household types, which shows that South West Rocks UCL as having proportionally more lone person households and proportionally fewer family households than in NSW. Statistics also reveal a significantly higher level of family households being couples without children. In 2006, 75% of occupied dwellings in South West Rocks UCL had only one or two persons resident.

Further supporting the areas attraction to early/retirees and semi-retires is the increase in population between 2001 and 2006 of 32 people in the 55-59 years age bracket, which subsequently raised the areas medium age from 50 to 51 years. Significant growth was also evident in the 10-24 year age bracket during this time period, revealing a strong in-migration of families with children. Despite these increases labour force rates are comparatively low in the South West Rocks UCL, with participation rates of only 39.9% compared to the NSW average of 58.9%. While unemployment rates dropped by 5.3% between 2001 and 2006, the 2006 rate of 9% is still higher than the NSW rate of 5.9%. Industries providing the greatest employment opportunities in South West Rocks also reflect the areas characteristics as a tourism and retirement destination, with the top three employment industries being accommodation and food, retail trade and construction.

As outlined by Key Insights, South West Rocks is similar to many coastal regional areas of NSW which are seen as ideal retirement locations for the older population, but which lack the employment and/or educational opportunities to attract or retain its younger residents. To a degree these findings explain the lower incomes found in South West Rocks where households are more likely to earn in the low and middle income ranges, with comparatively few households in the high or very high income brackets. However, while the median house hold income in the South West Rocks UCL is lower than the NSW average income, the costs of housing are also comparatively lower.

DWELLING CHARACTERISTICS

Investigations by Key Insights have revealed that the number of houses in the South West Rocks UCL has increased by 379 dwellings or 3.1% per annum between 2001 and 2006. This in turn equates to a fall in the average number of persons per household (from 1.8% to 1.5%), which is consistent with projections made by the NSW Department of Housing and the ABS.

Housing in South West Rocks UCL is overwhelmingly of the separate house type, which represents 78% of occupied dwellings across the region and accounts for 199 of the 379 new dwellings noted above. Flats, units and apartments make up just 10% of occupied dwellings, while a comparatively high proportion of nearly 9% (compared to NSW figures of 1.4%) of South West Rocks UCL dwelling types are caravans, cabins and houseboats. As noted by Key Insights, this suggests a demand for smaller households in the low to middle income range of the housing market.

In the South West Rocks UCL dwelling ownership rates are higher than across broader NSW. The cost of housing, in terms of median rent and median home loan repayments, is lower in South West Rocks than elsewhere across the state. This could be seen to encourage diversity within the potential incoming population of the Proposal.

Only 8.4% of households in the South West Rocks UCL did not own a motor vehicle, compared to the NSW figure of 11.6%, suggesting that residents in the area rely highly on private vehicles for transportation.

5.11.4 Socio-economic Implications of the Proposal

PREDICTED POPULATION CHANGE

Future population statistics as a result of the Proposal, including increased population and average household size have been predicted using calculations from 2006 South West Rocks UCL Census data. For the purpose of this assessment, Key Insights have projected populations for the Proposal based on housing densities of 2.3 persons per house (low estimate) and 2.8 persons per house (high estimate). Results of the predictions (see Table 5.11.1) show estimates of the annual population growth and dwelling growths associated with the 10 year release of the Proposal as between 731 and 890 in separate house dwellings. Key Insights notes that the estimated dwelling growth rate associated with these predictions is 1.5% per annum, which is lower than the ABS Census growth rate of 3.1% per annum between 2001 and 2006.

Table 5.11.1 Population Projection Associated with the Proposal (Source: Key Insights, November 2008)

Projected Age Profiles	Projected Population*	
	Low Density (2.3 persons per dwelling)	High Density (2.8 persons per dwelling)
0-14 years	119	147
15-44 years	187	227
45-64 years	222	270
65 years and over	203	248
TOTAL	731	892

* Numbers are rounded

IMPLICATIONS FOR EXISTING SERVICES

Population increases as a result of the Proposal are likely to highlight demand for services and facilities being provided both within the Subject Site and the South West Rocks township as a whole. In turn, services and facilities will be supported by the increased population resulting from the Proposal, further contributing to the social and economic sustainability of the area. As outlined by Key Insights, these services will be in the key areas of education, community amenities, health, hospitals and transport.

5.11.5 Planning Documents

A number of relevant planning documents were reviewed by Key Insights in the preparation of their social impact assessment. A brief description of these document and the key issues which are relevant to the Proposal are summarised below.

KEMPSEY DRAFT SOCIAL PLAN (2004 - 2009)

Council's 2004 Social Plan highlights a number of key issues that have been identified by eight community sectors. With regard to the Proposal the most relevant issue is the provision of affordable and suitable housing.

The Proposal responds to this issue by providing a variety of lot sizes, which range from approximately 500m² to 922m². This diversity in lot size will allow for a mixture of housing sizes and types, including the provision of dual occupancy housing in some instances.

KEMPSEY SHIRE COMMUNITY STRATEGIC PLAN - 20 YEAR VISION

The Community Strategic Plan underlines five goals for the community in the areas of ecological and economic sustainability; social, cultural and community relations; infrastructure; relationships; and effectiveness, efficiency and accountability.

As outlined by Key Insights, the Proposal is consistent with the following strategy actions set out in the Plan:

- » ensure development takes place at a sustainable rate and is relevant to the Shire's capacity to service that development; and
- » to have a positive impact of development on social wellbeing by maximising opportunities to provide developer funded services and facilities through Services provided/contributed to by developer contributions.

KEMPSEY SHIRE COUNCIL RESIDENTIAL LAND RELEASE STRATEGY 1997

The Kempsey Shire Council RLRS analysed population growth, the potential impact of this growth on demand, the impact of services and the implications of these factors on the release of residential land.

The Subject Site was one of five parcels of land in South West Rocks identified for medium term release, within a five year time horizon - that is by 2003. It is evident that the land release strategy has failed to meet its release target for the Subject Site, creating a local land release issue, which can lead to spikes in pricing and limited choice and affordability in housing options. The Proposal seeks to alleviate this issue by providing the staged release of land.

SOUTH WEST ROCKS SECTION 94 CONTRIBUTIONS PLAN

Council's Section 94 Contributions Plan outlines the public facilities and amenities that will be required to meet the needs of the incoming population of South West Rocks up to 2017. The Plan summarises the key population and housing trends in order to understand the potential impacts of population growth on the current and future usage of existing facilities, as well as the type and size of facilities required.

The report states that future residents of South West Rocks are likely to need:

- » recreation facilities including open space and bushland;
- » improvements to the urban environment such as public domain, streetscape; cycle ways and traffic, and transport facilities;
- » additional community facilities including library and community centre facilities;
- » water management facilities, including storm water, drainage and water quality facilities; and
- » resident protection facilities including bushfire and surf life saving.

The Proposal will be subject to Section 94 levies, which will contribute to the provision of infrastructure identified in the plan including a new library, community hall, public domain and roads, pathways and cycleways.

COMMUNITY INFRASTRUCTURE NEEDS AND PRIORITIES FOR SOUTH WEST ROCKS (2004)

This report documents the outcomes from a facilitated public meeting, held by Council in 2004 to discuss local community infrastructure needs and priorities for South West Rocks. The following relevant components were considered important by the community for new developments:

- » the incorporation of wildlife corridors into any new development;
- » provision of off road bicycle ways and pedestrian paths;
- » retention of trees should be a priority with any new development and the proposal should also incorporate native landscaping; and
- » incorporation of playgrounds into new developments.

As a result of recent rezoning, the Subject Site incorporates a large Conservation Area, supporting biodiversity and providing wildlife habitat. Within the development area, the Proposal incorporates native planting, pedestrian footpaths and cycleways within the overall landscape strategy, as well as the provision of a playground in the north of the Subject Site.

5.11.6 Conclusions

The social impact assessment undertaken by Key Insights found that the Proposal is consistent with a number of existing policy and planning documents for the mid-north coast and more specifically the South West Rocks area.

The Proposal will contribute to increasing supply of land, improving land affordability, increasing the choice of housing stock and promoting in-migration of residents within the Kempsey Shire Council LGA. Furthermore, the Proposals associated increase in population will contribute to an overall increase in economic activity in the area which is expected in turn, to enhance the viability of current services and the demand for newer improved services.

Key Insights concludes that the type of housing eventually developed within the Proposal will largely determine the demographic of incoming residents. With a mix of lot sizes and types, the Proposal is aimed at target markets of 2 to 3 bedroom homes with outdoor areas not requiring a large amount of maintenance. These housing types will provide suitable and affordable accommodation for the existing and predicted population demographic of higher numbers of retirees living in one and two person households requiring smaller, more manageable dwellings.

5.11.7 Management and Mitigation

The Social Impact report undertaken by Key Insights recommends the following mitigation measure to be implemented as part of the Proposal in order to enhance potentially positive impacts.

Table 5.11.2 Proposed Socio-economic Mitigation Measures

Issue	Mitigation Measure
Community well-being	Plan for good connectivity between the site and external land with appropriate pedestrian and cycle links and high quality public domains.
Community well-being	Set aside an area within the development for residents wanting to socialise/meet. This could be in the form of an open area with/without a rotunda.
Community well-being	Promote local employment and utilise local and regional industries, businesses, training organisations, resources and materials during construction phase.

Environmental Assessment

Ecological Sustainable Development

6.0

Under the objects of the *Environmental Planning and Assessment Act 1979* the Act aims to encourage ecologically sustainable development (ESD) (Section 5(a)(vii)). This Chapter provides a discussion of the principles relating to ESD and climate change impacts, and outlines their relevance and application to the project throughout the design, development and environmental assessment stages of the process.

6.1 ESD Principles

The intent of ESD is to apply an approach to development that ensures new development in all sectors and the ongoing operation of these activities meets the needs of the present generation without compromising the ability of future generations to meet their own.

The application of ESD to decision making in Australia has been refined in the National Strategy for Ecologically Sustainable Development (NSES), and as a result requirements for ESD to be considered in the life-cycle of all development have been built into the various Commonwealth, State and regional statutes that govern development within Australia and NSW.

Of direct relevance to this Project Application is Clause 8B of the *Environmental Planning and Assessment Regulation 2000* provides that the “sustainability of the Site for the project” as a matter for environmental assessment and Ministerial consideration.

In July 2007 Kempsey Shire Council formally adopted their Ecologically Sustainable Development Strategy 2007, which states the Council’s vision and goals for ESD within the LGA. Council’s ESD Strategy adopts the four guiding principles of ESD pursuant to Clause 6 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*.

The four principles of ESD:

- » The Precautionary Principle;
- » Intergenerational Equity;
- » Conservation of Biological Diversity and Ecological Integrity; and
- » Improved Valuation and Pricing of Environmental Resources;

and their application to the proposed subdivision and master plan for the Subject Site at South West Rocks are discussed below.

6.1.0.1 PRECAUTIONARY PRINCIPLE

The precautionary principle provides “that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation”. When applying the precautionary principle decisions should be guided by “careful evaluation to avoid, serious or irreversible damage to the environment, and an assessment of the risk-weighted consequences of various options”.

This Project Application has involved careful and thorough environmental assessment of all facets of the Subject Site to ensure that the proposed development of the Site for residential uses would not result in irreversible damage to the environment of South West Rocks. Section 5 Environmental Assessment is comprised of a series of Chapters which assessed the Subject Site’s existing conditions, and the anticipated impacts of proposed development. Section 5 assesses the ecological, hydrological, soils and contamination, cultural heritage, traffic and transport, visual, noise, and air quality conditions and anticipated impacts.

In addition to the specialist studies determining that the Subject Site is suitable for the proposed development, mitigation and management measures have been recommended for the construction and operation of the project in order to ensure that there will not be any irreversible impacts to the Site and the surrounding areas.

Based on the detailed specialist investigations and recommendations that have been undertaken throughout the development of the Proposal, there is little uncertainty that all potential threats of serious or irreversible environmental damage have been considered and can be managed where appropriate.

6.1.0.2 INTERGENERATIONAL EQUALITY

Inter-generational equity is the application of the concept that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

The Subject Site was recently part of an LES of a larger area of land for the purpose of re-zoning. The LES sought to examine the environmental capability of the LES Study Area to accommodate future urban growth. The LES recommended a combination of residential and environmental conservation land-uses, resulting in the subsequent rezoning of 14.8ha of the Subject Site to the conservation of the natural environment of South West Rocks, its ecology and biodiversity.

It is considered that the project will maintain the health, diversity and productivity of the existing environment through the conservation of this northern area of the Site as a result of the LES and rezoning. To further increase this protection a variety of management measures are proposed which seek to ensure that the existing and proposed environments on site can be maintained to their full health and productivity.

6.1.0.3 CONSERVATION OF BIOLOGICAL DIVERSITY AND ECOLOGICAL INTEGRITY

This principle intends that conservation of biological diversity and ecological integrity should be a fundamental consideration of any proposed development.

In its existing state, parts of the Subject Site present adequate biodiversity and ecological integrity. Overall however, much of the Site is cleared as a result of pastoral land management practices and land clearing. The proposal seeks to conserve and revegetate parts of the Site. By protecting and conserving existing vegetated areas in the north of the Subject Site, as discussed above, biological diversity and ecological integrity is improved, as healthier environments allow for greater variety, number and abundance of species which in turn increases ecological value. The project also proposes to create a small freshwater wetland environment that was not previously present on the Site. The inclusion of this new environment will serve to support and improve the variety of local plant and animal species that currently exist in the surrounding area, significantly improving biodiversity and ecological integrity.

6.1.0.4 IMPROVED VALUATION AND PRICING OF ENVIRONMENTAL RESOURCES

Improved valuation, pricing and incentive mechanisms refer to requirement of environmental factors being included in the valuation of assets and services, such as:

"(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste, and

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems".

A number of strategies have been implemented that seek to increase the value of natural resources through protection and conservation. The Integrated Water Cycle Management Plan developed for the Proposal will aid in pollution control by treating stormwater, as well as harvesting stormwater and surface water flow in order to replenish groundwater tables. There is also potential for the use of recycled materials within the construction phase of the development. In addition the design of lower impact stormwater measures (swales not conventional pit and pipe) has enabled the provision of additional vegetation through the Site, including the proliferation of native grasses which in addition to increasing the biodiversity of the vegetation on Site also filter the stormwater run-off from the Site before it re-enters the natural system of Saltwater Creek and the SEPP wetlands.

The utilisation of the Macleay Water dual - reticulation recycled water pipeline running adjacent to the site will promote the sustainable use of water.

6.2 Conclusions

The principles of ESD have been considered throughout the design and development stages of this project. The assessment of all potential environmental, social and economic considerations has been undertaken in line with precautionary, equality, biodiversity and valuation principles. Based on the social benefits accruing from the Proposal, and assessed impacts on the environment, it is considered that the development is in line with the principles of ESD and will present an ecologically sustainable outcome. Where issues have been identified, mitigation measures and management practices have been recommended and incorporated in the draft Statement of Commitments outlined in **Chapter 8** of this report.

Conclusions and Recommendations

7.0

Conclusions and Recommendations

Conclusions and Recommendations

This Environmental Assessment (EA) has been undertaken in order to assess the potential environmental impacts that may result from the Proposal. Specialist investigations have been undertaken on the Subject Site, resulting in a number of potential environmental impacts being identified including:

- » presence of a potential endangered ecological community (EEC) located in the northern portion of the LES investigation area and primarily within the Conservation Area in the northern portion of the Site;
- » identification of ten threatened fauna species within the LES area, primarily within the Conservation Area in northern portion of the Subject Site;
- » soil types characterised by poor drainage, high run off and flooding, and foundation hazard;
- » shallow water table in parts of the Site that may result in perching of groundwater as a result of obstruction of rainfall penetration, as well as surface ponding in low lying areas;
- » effects on the hydrological regime of downstream wetland areas in the north of the site which may consequently impact on habitat;
- » possible exposure of acid sulphate soils;
- » while probability is low, potential location of indigenous archaeology items located on the site; and
- » potential air and noise impacts from the proposed upgrade to Council's existing Sewer Treatment Plant (STP) to the north of the site.

The management of potential environmental impacts as a result of these constraints has shaped the design of the proposal and as a result, the proposal responds to the environmental constraints of the site. Furthermore, a number of mitigation measures have been recommended in order to manage and ameliorate potential impacts.

These include the development of an Integrated Water Cycle Management Plan designed to maintain and improve the existing hydrological regime, including groundwater levels. In addition, careful monitoring during the construction phase of the proposal will manage potential exposure of any acid sulphate soils or contamination that may be present on the Subject Site. The retention of a large portion of 7(b) zoned land as a result of Council's rezoning process will ensure the conservation of large portions of high quality habitat for the area, as well as providing an ample buffer in order to manage potential noise and odour impacts as a result of the STP upgrade and visual impacts, safety and security considerations, heritage impacts and bushfire risk of the Proposal have all been assessed. The Proposal has been found to be satisfactory with regard to these issues and appropriate mitigation measures have been recommended where relevant.

It is considered that the Proposal for the subdivision of the land for the purpose of residential development is an appropriate form of development on the Subject Site.

Statement of Commitments

8.0

Statement of Commitments

ISSUE	MITIGATION MEASURE	RESPONSIBILITY (When/Who)
Ecological Mitigation Measures		
Bushfire management	The sensitive and appropriate management of <i>Asset Protection Zones</i> (APZs) both to ensure the provision of appropriate bushfire protection and to facilitate the use of those areas by native biota (including threatened species).	Operational
Tree protection and retention	Where tree removal is required for bushfire protection purposes, preference should be given to the retention of hollow-bearing trees and mature trees over smaller or younger specimens.	Construction / Construction Contractor
Bushfire management	In addition, the clearing of understorey for bushfire protection purposes should be undertaken insofar as is possible in a patchy manner, retaining areas of shrubs and avoiding the potential for the introduction of weeds;	Construction / Construction Contractor
Landscape rehabilitation	Any stormwater detention basins or drainage swales should be planted and/or rehabilitated in a manner which provides additional habitat and/or movement opportunities for native fauna, especially the Wallum Froglet.	Construction / Landscape Contractor
Construction Management	The use of sediment fences and other appropriate control measures during excavation, <i>clearing and construction activities to avoid erosion and sediment discharge and/or</i> the discharge of other contaminants into the natural environment.	Construction / Construction Contractor
Construction Management	The implementation of a management regime during the construction process to ensure that no wastes (including building rubble, garbage, contaminants, fuels, oils, paints or other chemicals) are discharged from the construction area, and that all such wastes and contaminants are appropriately managed.	Construction / Proponent and Construction Contractor
Weed / pest management	The avoidance of invasive or noxious plant species in subsequent landscaping within the development area.	Design / Construction Landscape Architect and Landscape Contractor
Vegetation management	The collection of native vegetation removed from development areas and its re-use within the <i>Conservation Area</i> for bushland rehabilitation and/or landscaping purposes or the provision of that material to council for bushland management purposes.	Pre-construction / Ecologist and/or Horticulturalist

Statement of Commitments

ISSUE	MITIGATION MEASURE	RESPONSIBILITY (When/Who)
Weed / pest management	The destruction or appropriate removal of weeds within the development area.	Construction and Operational / Proponent
Vegetation management	The implementation of a <i>Vegetation Management Plan</i> (VMP) for the vegetation to be retained in the north of the Subject Site (the <i>Conservation Area</i>) in accordance with the Vegetation Management Principles Plan prepared for the conservation area (see Appendix G of Whelans Insites report). This Plan identifies the principles of a detailed Vegetation Management Plan (VMP) which would be prepared once the development is approved.	Construction and Operational / Proponent and Construction Contractor
IWCM Mitigation Measures		
Stormwater management	Road side swales are to be included on the Site to safely and effectively convey flows to downslope wetlands and receiving waters; provide a means to infiltrate increased runoff into the groundwater table; and for water quality treatment.	Design, Construction and Operation / Project Engineer and Construction Contractor
Stormwater management	Two main swales (Swale 2 and 6) are proposed to direct drainage from upslope catchments (catchment 2 and 6) across the Site and into receiving waters. As with road side swales, these also provide groundwater replenishment and significant water quality treatment.	Design, Construction and Operation / Project Engineer and Construction Contractor
Stormwater management	Flow Spreader proposed to provide an 'end of line' treatment structure at the end of Swale 6. This structure will remove nutrients and suspended solids and shall provide for the even distribution of flows over a wide area before discharging into the downstream habitat and receiving waters.	Design, Construction and Operation / Project Engineer and Construction Contractor
Groundwater management	Sub-soil drains are to be provided to manage episodically shallow groundwater and protection of road pavements and other assets from damage.	Design, Construction and Operation / Project Engineer and Construction Contractor

Statement of Commitments

ISSUE	MITIGATION MEASURE	RESPONSIBILITY (When/Who)
Contamination Mitigation Measures		
ASS management	Prior to the commencement of any works, at depths below or likely to result in water table changes below 2m below ground level, an ASS Management Plan should be instigated.	Pre Construction / Proponent
Non-Indigenous Heritage Mitigation Measures		
Potential impact on views from heritage items in South West Rocks.	Provide screening in form of native vegetation to minimise any potential impacts.	Design and Construction / Proponent and Landscape Architect
Indigenous Heritage Mitigation Measures		
Undetected Sites		
Isolated Artefacts from itinerant resource-gathering activities may occur in parts of the Study Area.	Conservation of woodland vegetation in potentially sensitive areas in remnant Scribbly gum woodland south and south-east of the Sewerage Treatment Plant (the proposed Conservation Area).	Construction / Proponent and Construction Contractor
Saltwater Lagoon margin may contain undisturbed occupation sites.	The needlebark stringybark woodland fringing Saltwater Lagoon should be retained in its existing condition.	Design
General Construction		
Legal Obligations of Construction Contractors	All construction contractors and their employees are to be advised of their legal obligations with regard to Aboriginal Cultural Material. This advice is to form a component of a Construction and Environmental Management Plan (CEMP) prepared for the Site, and the CEMP should be forwarded to the DEC Northern Aboriginal Heritage Unit (Coffs Harbour) for its records.	Construction / Proponent and Construction Contractor
All Aboriginal places and objects are protected under the NSW <i>National Parks and Wildlife Act 1974</i> . This protection includes Aboriginal places and objects which have not been identified in this report, but which may be identified during construction.	Should any previously unidentified Aboriginal objects or places be identified during excavation and construction, all works must cease in the vicinity of the find and the following be notified: » NSW Department of Environment and conservation; » A qualified archaeologist; and » Aboriginal stakeholders.	Construction / Proponent and Construction Contractor

Statement of Commitments

ISSUE	MITIGATION MEASURE	RESPONSIBILITY (When/Who)
Traffic and Transport Mitigation Measures		
Road Design	All proposed internal roads are to be designed in accordance with AMCORD and Council's Guidelines for Engineering and Subdivision works.	Detailed Design / Traffic Engineer
Road Design	Internal roads are to be designed to accommodate the swept paths of garbage trucks and furniture delivery vans.	Future DA / Proponent
Future Works	Provision is to be made for future connection between the Proposals internal road network and Phillip Drive in the north.	Future DA / Relevant Land Owners
Public Transport Provision	Investigation into the expansion of existing bus services to service the Site.	Post-approval / Proponent
Visual Assessment Mitigation Measures		
Visual Impact	Prepare a robust street tree planting scheme to be designed incorporating the following: » trees with heights at least 50% higher than the heights of the proposed buildings; and » trees with dense foliage, e.g. Melaleuca quinquenervia, or broad canopies, e.g. Eucalyptus racemosa, both at reasonably close spacings, e.g. 10 – 12m centres.	Design and Construction Contraction / Landscape Architect and Landscape Contractor
Odour Impact Mitigation Measures		
Odour impacts on residents	Provide 150m buffer to any future adjoining development.	Design and Construction/ Proponent
Noise Impact Mitigation Measures		
Noise Impact	Provide 150m buffer to any future adjoining development.	Construction of DA

Statement of Commitments

ISSUE	MITIGATION MEASURE	RESPONSIBILITY (When/Who)
Bushfire Mitigation Measures		
Asset Protection Zones		
Proposed residential lots running along the northern boundary of Lots A and B (see Figure 5.9.3).	A twenty (20) metre APZ is required between the northern boundary of the proposed residential lots and the vegetation corridor.	Design / Proponent
Entire Subject Site	APZs will be provided in accordance with Table 5.9.4 above.	Construction / Proponent and Construction Contractor
Maintenance	All APZs will be maintained in accordance with Appendix 5 of <i>Planning for Bushfire Protection 2006</i> and Rural Fire Service's <i>Specifications for Asset Protection Zones</i> .	Operational
Bushfire Attack - Construction Standards		
Proposed residential lots located in the northwest corner of the Subject Site within twenty-seven (27) metres of the adjoining the APZ (see Figure 5.9.3).	Any future dwellings will be required to be constructed to Level 3, under the provisions of A.S. 3959-1999 <i>Construction of Buildings in Bushfire Prone Areas</i> .	Construction / Proponent and Construction Contractor
Proposed residential lots located twenty-eight (28) to one hundred (100) metres of the adjoining APZ (see Figure 5.9.3).	Any future dwellings to be constructed are required to be constructed to Level 1 as provided by A.S. 3959-1999 <i>Construction of Buildings in Bushfire Prone Areas</i> .	Construction / Proponent and Construction Contractor
Proposed residential lots located within one hundred (100) metres of the adjoining APZ (see Figure 5.9.3).	The roof gutters/valley of any future dwellings shall be fitted with a protective device that minimises the accumulation of combustible materials in the gutter/valleys. The protection device shall have a flammability index of less than 5 as measured under A.S. 1530.2-1993 <i>Methods for fire tests on building materials, components and structures - Test for flammable material</i> .	Construction / Lot Owners and Construction Contractor
Water Supply		
Extension of Mains	Extension of the existing water supply mains will be undertaken in accordance with Australian Standard AS 2419.2.	Construction / Proponent and Construction Contractor
Hydrants	All hydrants installed in the proposed subdivision are to be installed in accordance with Australian Standard AS 2419.2.	Construction / Proponent and Construction Contractor

Statement of Commitments

ISSUE	MITIGATION MEASURE	RESPONSIBILITY (When/Who)
Hydrants	Hydrant markings will be provided on the hydrant side of the road centre line in blue.	Construction / Proponent and Construction Contractor
Hydrants	All hydrants are to have a minimum flow rate of ten (10) litres/second.	Construction / Proponent and Construction Contractor
Hydrant Location	Hydrants will be located such that a tanker can park no more than twenty (20) metres from the hydrant.	Construction / Proponent and Construction Contractor
Hydrant Location	Hydrants will be located so that a fire in the furthest part of any future dwelling can be reached by fire-fighters using two (2) thirty (3) metre hose lines and a ten (10) metre water jet.	Construction / Proponent and Construction Contractor
Hydrant Location	There must be a clear unobstructed path of no more than ninety (90) metres between the hydrant and the most distant point of any future building within the Subject Site,	Construction / Proponent and Construction Contractor
Access for Fire-Fighting		
Public Roads	All public roads proposed will be constructed to the specifications for public roads under Section 4.1.3 (Access) of <i>Planning for Bushfire Protection 2006</i> .	Construction / Proponent and Construction Contractor
Public Roads	Roads shall be designed for two-wheel drive all weather access.	Construction / Proponent and Construction Contractor
Public Roads	Perimeter roads adjacent to the bushfire hazard interface shall be two-way with a minimum carriageway width of eight (8) metres (kerb to kerb) with shoulders on each side.	Construction / Proponent and Construction Contractor
Public Roads	Roads shall be through roads, where practical.	Design / Proponent and Construction Contractor
Public Roads	Dead-ends shall not be more than 200 metres in length and incorporate a twelve (12) metre outer radius turning circle.	Design / Proponent and Construction Contractor
Public Roads	The capacity of road surfaces/bridge in a subdivision with reticulated water supply will be fifteen (15) tonnes.	Construction / Proponent and Construction Contractor

Statement of Commitments

ISSUE	MITIGATION MEASURE	RESPONSIBILITY (When/Who)
Public Roads	Curves of roads will have a minimum inner radius of six (6) metres and a minimum outer radius of twelve (12) metres.	Construction / Proponent and Construction Contractor
Public Roads	Vertical clearance above the road surface shall be four (4) metres.	Design / Proponent and Construction Contractor
Public Roads	All public roads between six and a half (6.5) and eight (8) metres in width shall be no parking on one side with service hydrants located on opposite.	Design / Proponent and Construction Contractor
Public Roads	Public roads less than 6.5 metres in width shall provide parking bays clear of the road formation and locate services outside the parking bays.	Design / Proponent and Construction Contractor
Public Roads	All public roads 8 metres wide shall locate services outside parking reserves to ensure accessibility to the reticulated water supply.	Design / Proponent and Construction Contractor
Public Roads	Single lane one-way roads will be a minimum of three and a half (3.5) metres in width with parking bays provided clear of the road formation.	Design / Proponent and Construction Contractor
Public Roads	Parking bays will be two and two thirds (2.6) metres wide from the kerb to the edge of the road formation.	Design / Proponent and Construction Contractor
Public Roads	All access roads directly interfacing the bushfire hazards will provide roll top kerbing to the hazard side of the road.	Design / Proponent and Construction Contractor
Fire Trails	All fire trails within the Subject Site shall be constructed to comply with the deemed-to-satisfy provisions of Section 4.1.3 of <i>Planning for Bushfire Protection 2006</i> .	Design / Proponent and Construction Contractor
Fire Trails	Any fire trail within the Subject Site will have a minimum carriageway of four (4) metres with an additional one (1) metre clearance provided to each side which is kept clear of grasses and shrubs.	Design / Proponent and Construction Contractor
Fire Trails	Locked fire trail access gates shall be provided at the intersection with the public road network.	Design / Proponent and Construction Contractor
Fire Trails	The carrying capacity of the fire trail surface will be fifteen (15) tonnes for reticulated areas.	Design / Proponent and Construction Contractor
Fire Trails	A minimum vertical distance of four (4) metres will be provided clear of overhanging branches, trees and shrubs.	Design / Proponent and Construction Contractor

Statement of Commitments

ISSUE	MITIGATION MEASURE	RESPONSIBILITY (When/Who)
Hazard Management		
APZ	A Section 88B Instrument, under the <i>Conveyancing Act 1919</i> will be created on the lots directly adjoining the APZ (see Figure 5.9.3).	Design / Proponent
Staging		
Staging	The entire development precinct shall be managed to the standard of an Outer Protection Area [OPA] until the completion of the subdivision.	Design / Proponent and Construction Contractor
Staging	Each stage shall be provided, to those edges which do not include the permanent Asset Protection Zone, a 100 metre wide temporary Inner Protection Area [IPA].	Design / Proponent and Construction Contractor
Staging	Internal and perimeter roads constructed within each stage shall have temporary "T" turning heads constructed within the adjoining stage so as to permit fire appliance egress in a forward direction.	Design / Proponent and Construction Contractor
Staging	Temporary fire trails shall be provided within the temporary Inner Protection Area so as to provide fire fighting access to the perimeter of the stage.	Design / Proponent and Construction Contractor
CPTED Mitigation Measures		
Landscaping Management	A Landscape Management and Maintenance Plan is to be developed in order to ensure appropriate management and maintenance of open space and public domain areas.	Operational

Statement of Commitments

ISSUE	MITIGATION MEASURE	RESPONSIBILITY (When/Who)
Construction and Waste Mitigation Measures		
CEMP is to be kept on site at all times.	A detailed CEMP is to be developed prior to the commencement of works and should address:	Pre-Construction /
The CEMP will be prepared in partnership with local Aboriginal community groups.	» Induction and training of contractors, subcontractors, delivery contractors and all other staff on site; » Reporting and induction of visitors to site; » Emergency and clean-up procedures; » Noise mitigation (operational and machinery) through temporary noise walls; » Maintenance of machinery; » Location and storage of all fluids/oils/fuels on site for machinery to be in bunded areas; » Use of sediment traps; » Minimisation of stockpiling and correct management practices; » Soil and dust management; » Traffic management measures, including management of truck and machinery movements, to and from the Site; » Disruption of services; » Mosquito Management; and » Waste disposal.	Proponent
Socio-economic Mitigation Measures		
Community well-being	Plan for good connectivity between the site and external land with appropriate pedestrian and cycle links and high quality public domains.	Design / Proponent
Community well-being	Set aside an area within the development for residents wanting to socialise/meet. This could be in the form of an open area with/without a rotunda.	Design / Proponent
Community well-being	Promote local employment and utilise local and regional industries, businesses, training organisations, resources and materials during construction phase.	Operational / Community Groups

Statement of Commitments

ISSUE	MITIGATION MEASURE	RESPONSIBILITY (When/Who)
Waste Management		
Waste Management	A detailed WMP is to be developed as part of the construction phase of the development. The plan is to include (but is not limited to) disposal of demolition materials, recycling options, location of approved waste disposal depots or approved landfill sites which will be utilised for disposal and treatment and disposal of waste water in accordance with relevant pollution control legislation and guidelines.	Pre-Construction / Proponent
Open Space Management Mitigation Measures		
Open Space Management	The Proponent is to enter into a Voluntary Planning Agreement (VPA) with Kempsey Shire Council under Section 75F(6) of the EP&A Act in regards to the management and dedication of the 7(a) and 7(b) zoned Conservation Area on the site. The principles of the VPA are as follows: » the proponent will prepare and implement a vegetation management plan in respect of the Conservation Area; » the proponent will maintain and manage the land in accordance with an approved Vegetation Management Plan until the last stage subdivision certificate is approved; » the proponent will provide access to the conservation zone for Council before it is dedicated; » the proponent will then dedicate the conservation zone to Council; » Council will offset the value of the conservation zone against Section 94 contributions; and » the proponent will fund \$30,000 for the Council to manage the conservation zone over a 3 year period.	Operational / Proponent

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