Statement of Environmental Effects

Property:
Lot 1 DP 1131868
58 Edith Street, Waratah

Development:
Proposed six storey building above basement car park for 47 seniors living self care apartments

Applicant:
Maroba

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1.0 Introduction

1.1 INTRODUCTION

ADW Johnson Pty Limited has been commissioned by Maroba to prepare a Statement of Environmental Effects to support a Development Application to Newcastle Council for a proposed six storey building above basement car parking to accommodate 47 Seniors Living self care apartments.

This Statement of Environmental Effects has been prepared pursuant to the Environmental Planning and Assessment Act 1979 and accompanying regulations, and addresses the necessary issues that require assessment to assist Newcastle Council ("Council") in making a determination on the subject application.

1.2 BACKGROUND

1.2.1 About Maroba

Maroba are a not for profit Christian organisation that provide a range of aged care accommodation, care, and services to older citizens. The key elements of Maroba's mission are to:

- "Focus on our people:
  - Safety
  - Welfare
  - Flexibility
  - Empowerment
- Provide leadership in Aged Care
- Provide modern, innovative, environmentally friendly and flexible infrastructure
- Pro-actively foster mutually beneficial relationships within the Community
- Offer diverse range of services and accommodation
- Ensure profitability of the organisation"

The key values of Maroba are:

- "Uniqueness, worth and dignity of each person in an beyond our sphere of influence
- Informed, competent and compassionate care and service
- Co-operative work relationships, teamwork and friendship
- Reasonable stewardship in the management of all resources
- Innovation, diversity and creativity
- Visionary leadership that raises up and releases others into their God given potential"

Maroba Nursing Home has a long and well established reputation for quality care for older people and has over 56 years experience in the Aged Care Sector.

The Maroba team is made up of approximately 175 full time, part time and casual staff that provides personal care, nursing, hospitality, administration, maintenance and gardening services.

1.2.2 History

The subject site forms part of the landholding owned by Maroba which contains a seniors living community development comprised of a hostel, nursing home and self care units. The subject site is a vacant and cleared Brownfield site.

Maroba have identified the land as being ideally located to facilitate self care seniors living housing given its proximity to the existing Maroba facilities, the Mater Hospital and public transport.

1.2.3 Consultation

ADW Johnson and representatives from Maroba have previously met with Newcastle Council in April 2010 to discuss the proposal. Council confirmed that the proposal would be required to address the following:

- Justify departures from current and likely future development controls for the site in relation to height; and

- Justify departures from current and likely future development controls for the site in relation to FSR.

Council acknowledged at the meeting that given the significant social benefits that the proposal would generate, that the project has merit.

1.3 DEVELOPMENT SUMMARY

- The application is for the development of the site for a six storey building above basement car parking for 47 senior living self care apartments.

- The land is located in Newcastle Local Government Area and the proposal specifically relates to Lot 1 DP 1131868 comprising a total area of approximately 3,005 square metres.

- The zoning of the site is 2(a) Residential Zone under the provisions of Newcastle Local Environmental Plan 2003. The proposal is defined as seniors housing and is permissible with consent of the Hunter and Central

Coast Region Joint Regional Planning Panel (JRPP) (as the Capital Investment Value exceeds $10 million) under the provisions of State Environmental Planning Policy (Housing for Seniors and People with a Disability) 2004.

- The proposal is considered to be an integrated development under section 100B of the Rural Fires Act 1997 and section 15 of the Mine Subsidence Compensation Act 1961.

- The site is currently a vacant Brownfield site adjacent to the existing Maroba seniors living community.

- The proposal is generally consistent with the Newcastle Development Control Plan 2005.

- Development issues have been addressed in the context of:

  - Zoning and Permissibility;
  - Bushfire;
  - Traffic, Access and Carparking;
  - Mine Subsidence;
  - Landscaping;
  - Views and Visual Impacts;
  - Acoustic Impacts;
  - Social and Economic Impacts;
  - Crime Prevention;
  - Utility Services;
  - Development Control Plan 2005;
  - SEPP (Housing for Seniors and People with a Disability) 2004; and
  - SEPP 65 – Design Quality of Residential Flat Buildings.

- The detailed investigations have demonstrated that the site is ideal for the proposed development and has been designed appropriately in terms of its surroundings. The use of the subject land for seniors living self care

apartments is a logical use given its location in close proximity to the existing Maroba health care facilities the Mater Hospital and public transport.

- It has been demonstrated that any environmental impacts can be appropriately mitigated.

- Given the significant social benefits that will be generated by the proposal, in particular providing quality seniors housing that will contribute towards satisfying the growing demand for seniors living accommodation within the Newcastle LGA, it is considered that the application can be supported by way of approval.

2.0 Proposed Development

2.1 OBJECTIVES OF THE PROPOSAL

The proposal is for the erection of a six storey architecturally designed building above basement car parking to accommodate 47 seniors living self care apartments. The development will facilitate affordable seniors living housing with excellent access to assisted living services, health services associated with the Mater Hospital, public transport and the Waratah Village Shopping Centre.

2.2 SUMMARY OF DEVELOPMENT

The proposed development involves the construction of a modern six storey building above basement car parking to accommodate the following:

- 47 seniors living self care apartments comprised of:
  - 4 x 1 bedroom;
  - 18 x 2 bedroom;
  - 25 x 2 bedroom + Study; and
  - Total of 115 beds.

The key components of the proposal are as follows:

Basement Floor

- Provision of a 44 space secure basement carpark.
- The carpark will accommodate two way vehicular movement.
- Vehicular entry to the carpark will be provided from a single two way access point from the north. This point of entry to the carpark will be accessed off a driveway from Myall Road to the north of the site.
- Pedestrian access points to the basement carpark will be provided from the following:
  - The Edith Street frontage;
  - Two lifts;
  - An access door at the north western corner of the carpark; and
  - Internal stairwells adjacent to the lifts and at the south eastern and south western sections of the carpark.
- Provision of a central area designated for scooter charging and storage.
- Provision of two bin storage areas.

Floor Level 1

- 11 self care units comprised of:
  - 4 x 1 bedroom;
  - 4 x 2 bedroom; and
  - 3 x 2 bedroom + study.
- Community room with patio.

- Private balconies for units 1.01, 1.05, 1.06, 1.08, 1.09, 1.10 and 1.11
- Private patios for units 1.02 – 1.03 and 1.07.
- Pedestrian entry to Floor Level 1 will be provided from (1) the Edith Street frontage and (2) an entry at the northern side of the building.
- Two lifts and adjacent stairwells will be available.

Floor Level 2

- 10 self care units comprised of:
    - 5 x 2 bedroom; and
    - 5 x 2 bedroom + study.
- Private balconies will be provided for all units.
- Access to units 2.01 – 2.05 will be provided from lift 1 and an adjacent stairwell.
- Access to units 2.06 – 2.10 will be provided from lift 2 and an adjacent stairwell.

Floor Level 3

- 9 self care units comprised of:
    - 5 x 2 bedroom; and
    - 4 x 3 bedroom.
- Private balconies will be provided for all units.
- Access to units 3.01 – 3.05 will be provided from lift 1 and an adjacent stairwell.
- Access to units 3.06 – 3.09 will be provided from lift 2 and an adjacent stairwell.

Floor Level 4

- 7 self care units comprised of:
    - 2 x 2 bedroom; and
    - 5 x 2 bedroom + Study.
- Private balconies will be provided for all units.
- Access to units 4.01 – 4.03 will be provided from lift 1 and an adjacent stairwell.
- Access to units 4.04 – 4.07 will be provided from lift 2 and an adjacent stairwell.

Floor Level 5

- 7 self care units comprised of:
    - 2 x 2 bedroom; and
    - 5 x 2 bedroom + study.
- Private balconies will be provided for all units.
- Access to units 5.01 – 5.03 will be provided from lift 1 and an adjacent stairwell.
- Access to units 5.04 – 5.07 will be provided from lift 2 and an adjacent stairwell.

Floor Level 6

- 3 self care units comprised of:
  - 3 x 2 bedroom.
- Private balconies will be provided for all units.
- Access to unit 6.01 will be provided from lift 1 and an adjacent stairwell.
- Access to units 6.02 & 6.03 will be provided from lift 2 and an adjacent stairwell.

South East Photo Montage

North East Photo Montage

2.3 DOCUMENTATION

The following documentation has been provided to support the proposed development:

- Architectural drawings prepared by EJE Architecture (**Appendix A**).
- BASIX Certificate (**Appendix B**).
- Traffic Impact Assessment prepared by BJ Bradley and Associates Consulting Civil and Traffic Engineers (**Appendix C**).
- Bushfire Threat Assessment (**Appendix D**) prepared by Newcastle Bushfire Consulting.
- SEPP 65 - Design Quality of Residential Flat Development Report prepared by EJE Architecture (**Appendix E**).
- Noise Impact Assessment prepared by Reverb Acoustics Noise and Vibration Consultants (**Appendix F**).
- Geotechnical and Contamination Assessment (**Appendix G**).
- Concept stormwater plan prepared by Michael Fitzgerald Consulting Engineers (**Appendix H**).
- Landscaping plan prepared by Terras Landscape Architects (**Appendix I**).
- Quantity Survey Cost Estimate prepared by Madden & Associates (**Appendix J**).

3.0 Characteristics of the Site & Locality

3.1 PROPERTY DESCRIPTION

The site is described as Lot 1 DP 1131868, No. 58 Edith Street, Waratah.

The site has an area of approximately 3,005m^2 and frontage to Edith Street. The owner of the land is Maroba.

3.2 LOCALITY

The subject parcel of land is located in Waratah. Waratah is located north east of Newcastle. Travel time to the site via Griffiths Road from Newcastle is approximately 14 minutes. The general locality of the site is shown in **Figure 1**.

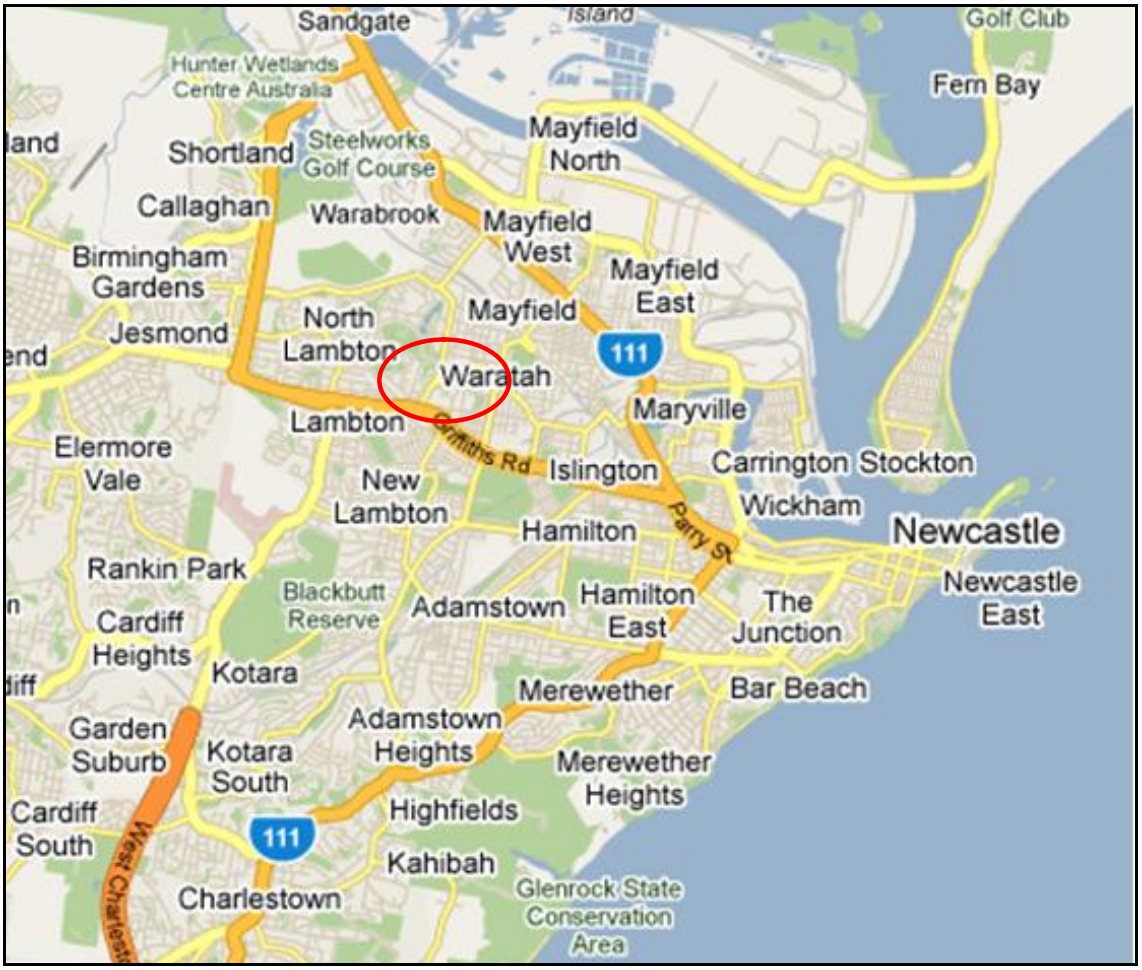


Figure 1: Location Plan within Broader LGA Context.

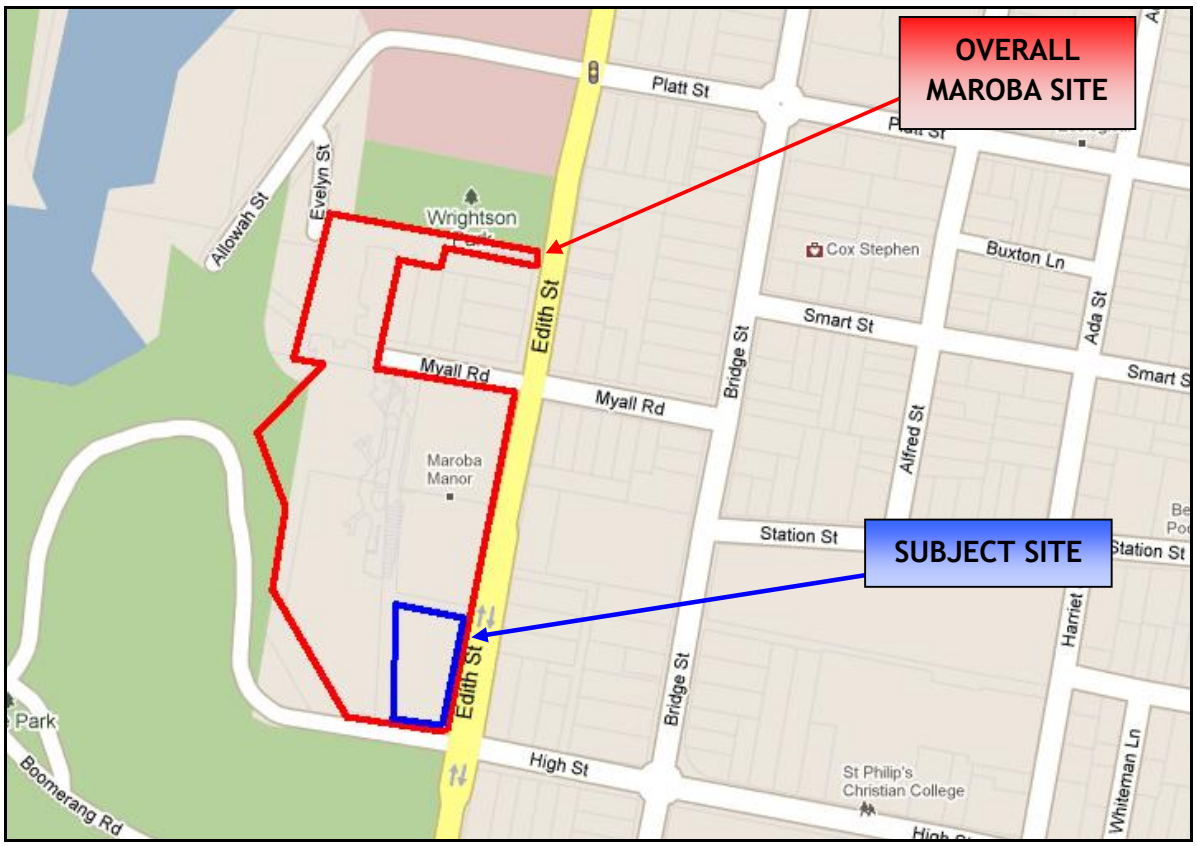


Figure 2: Site Location within Local Context.

3.3 LAND USES INCLUDING ADJOINING AND CURRENT USES ON THE SITE

The subject site is currently a vacant brownfield site.

The site is located at the south eastern section of the Maroba landholding which is currently developed with the following:

- ***Maroba Manor***

Maroba Manor comprises 100 beds divided into four areas which provide a mix of specific and general nursing care needs.

- ***Maroba Lodge Hostel***

Maroba Lodge Hostel is a contemporarily designed 55 bed home offering a high level of individual care to residents. Maroba Lodge seeks to provide a 'home away from home' for residents who can no longer manage their lifestyle within their family home.

Maroba Lodge Hostel contains a 12 bed boutique dementia specific unit and state of the art alarm system which monitors all doors and external areas and allows comprehensive coverage of residents' whereabouts within the wing.

Respite services are also provided within the Maroba Lodge Hostel.

- ***Maroba Terrace Village***

Maroba Terrace Village is comprised of 23 self care units. The 23 self care units are divided in a range of one, two and three bedroom homes.

The Village seeks to provide residents with 'the best of both worlds' as residents are provided the opportunity to interact with others through the numerous functions and events taking place each week or alternatively enjoy their own privacy.

Figure 3 below provides an aerial image of the site.

Figure 3: Aerial Image of Site (2010).

(Current aerial showing existing buildings and vacant area for development in the foreground)

The following is noted in relation to surrounding land:

- To the north of the site is the existing Maroba development. Further north is a small number of residences, Myall Road and Wrightson Reserve (Public Open Space). To the north of Wrightson Reserve is the Mater Hospital.
- The site is bound to the east by Edith Street. Further east of Edith Street is established residential development.
- The site is bound to the south by High Street. Further south of High Street is Braye Park (Public Open Space).
- The site is bound to the west by Braye Park (Public Open Space).

The aerial photo below gives an indication of the current built form and pattern of development in the area.

Figure 4: Aerial Image of Site & Surrounds (2010).

(Current aerial showing existing buildings and vacant area for development in the foreground)

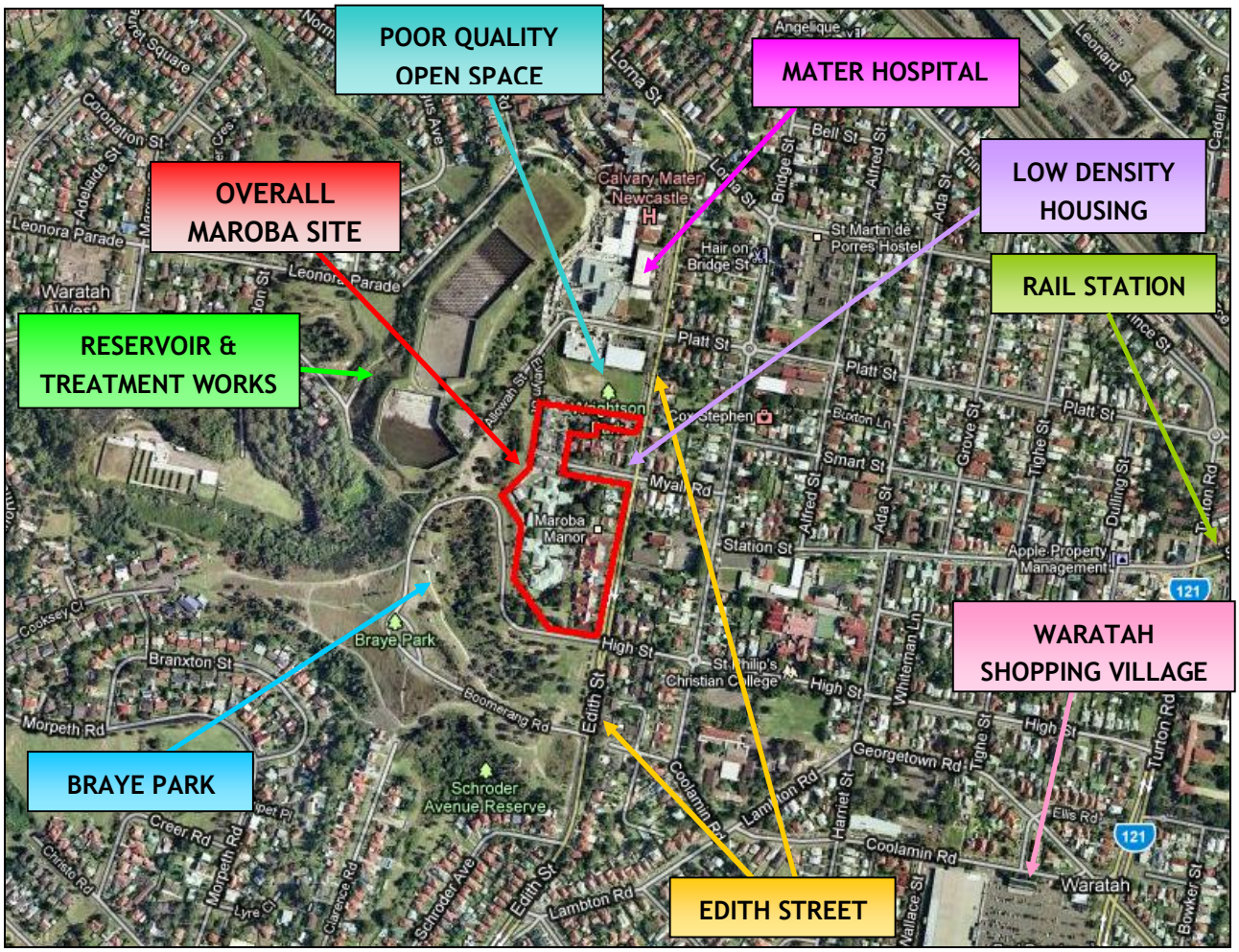


Figure 5: Aerial image of site and surrounds.

(NB: the buildings at the south eastern corner of the site (on Lot 1 DP 1131868) have been demolished)

3.4 TOPOGRAPHY, DRAINAGE & FLOODING

The site is topographically positioned towards the bottom of a hill. The topography rises around the site to the north (along Edith Street), south (along Edith Street) and west (Braye Park). The site currently drains to the existing infrastructure in Edith Street to the east.

The site is not identified as being flood prone.

3.5 CONTAMINATION AND GEOTECHNICAL CHARACTERISTICS

3.5.1 Contamination

A Geotechnical and Contamination Assessment has been undertaken by Coffey Geotechnics. This matter is further discussed in Section 5 of this SoEE.

3.5.2 Mine Subsidence

The subject site is located within a Mine Subsidence district and will require referral to the Mine Subsidence Board.

3.5.3 Acid Sulfate Soils

The subject site is not affected by acid sulphate soils.

3.6 VEGETATION

The subject land is a vacant brownfield site that does not contain any significant vegetation.

3.7 BUSHFIRE

The subject site is identified on Council's Bushfire Prone Land Map as being within bushfire prone land and will require referral to the NSW Rural Fire Service.

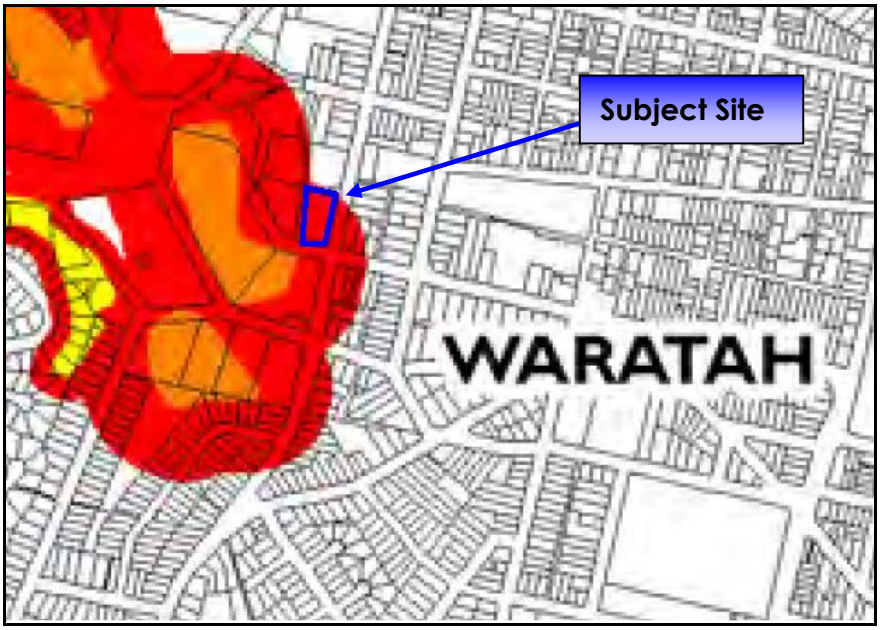


Figure 6: Extract from Council's Bushfire Prone Land Map.

Bushfire is further addressed within Section 5 of this SoEE.

3.8 HERITAGE

The subject site is not located within a heritage conservation area nor does it contain any items of heritage significance.

3.9 ABORIGINAL ARCHEOLOGY

The site is not known to contain any items of archaeological significance. Furthermore, given that the site has been significantly disturbed due to previous development, aboriginal archaeology is not an issue in relation to this application.

3.10 TRAFFIC, ACCESS & ROAD NETWORK

The subject site is located on Edith Street, Waratah, which is accessed via Griffiths Road to the South and Lorna Street to the North. Edith Street is a two-lane, two-way road that carries moderate flows of traffic.

A Traffic Impact Assessment has been prepared by BJ Bradley and Associates Consulting Civil and Traffic Engineers. The Traffic Impact Assessment is discussed further in Section 5 of this SoEE and provided with **Appendix C**.

3.11 UTILITY SERVICES

Public utility services including reticulated water and sewer, electricity, telecommunications and gas are available to the site.

3.12 OBSERVATIONS FROM THE SITE CHARACTERISTICS & LOCALITY

The subject site is ideally located for the development of seniors living self care apartments given the availability of excellent access to existing health services and facilities both on the Maroba site and the Mater Hospital. Given that the site is located within the existing Maroba landholding, development of the site will allow a logical extension of the Maroba development to maximise the available accommodation on the site. This will allow Maroba to more effectively cost deliver its services than if it were to have a number of facilities scattered around the city.

In addition to the above, the site is strategically located with excellent access to the road network and public transport routes available. The site is within walking distance to public transport which accesses all necessary services including Waratah Shopping Village, Waratah train station and the Newcastle CBD.

The western side of Edith Street is characterised by seniors living, hospital and public open space usage. The proposal will further contribute to the established character of this area through the provision of modern architecturally designed self care seniors living housing.

4.0 Planning Controls

4.1 STATE PLANNING CONTROLS

A review of all State Environmental Planning Policies reveals that the following policies are relevant to this proposal.

4.1.1 SEPP No. 65 – Design Quality of Residential Flat Development

This SEPP raises the design quality of residential flat development across the state through the application of a series of design principles. It provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

It is understood that the proposed development will be referred to the Newcastle Urban Design Consultative Committee.

A SEPP 65 Analysis has been prepared by EJE Architecture and is provided in **Appendix E**.

4.1.2 SEPP (Housing for Seniors or People with a Disability) 2004

Under the provisions of SEPP (Housing for Seniors or People with a Disability) 2004, the proposed development of the site for a six (6) storey building above basement carparking is defined as 'seniors housing'.

Pursuant to Clause 4(1)(a) and 10(c) of the SEPP, the proposed development is permissible in the 2(a) Residential Zone of the Newcastle LEP 2003 given that a 'dwelling-house' and 'residential flat building' (defined as 'urban housing') are permitted on the land. Clause 4 of the SEPP states:

(1) ***General***
This Policy applies to land within New South Wales that is land zoned primarily for urban purposes or land that adjoins land zoned primarily for urban purposes, but only if:

(a) development for the purpose of any of the following is permitted on the land:

(i) dwelling-houses,
(ii) residential flat buildings,

(iii) hospitals,

(iv) development of a kind identified in respect of land zoned as special uses, including (but not limited to) churches, convents, educational establishments, schools and seminaries,

Specific Clauses of SEPP (Housing for Seniors or People with a Disability) 2004

Relevant Clause	Comment
13 Self-contained dwellings (1) **General term: "self-contained dwelling"** In this Policy, a ***self-contained dwelling*** is a dwelling or part of a building (other than a hostel), whether attached to another dwelling or not, housing seniors or people with a disability, where private facilities for significant cooking, sleeping and washing are included in the dwelling or part of the building, but where clothes washing facilities or other facilities for use in connection with the dwelling or part of the building may be provided on a shared basis. (2) **Example: "in-fill self-care housing"** In this Policy, ***in-fill self-care housing*** is seniors housing on land zoned primarily for urban purposes that consists of 2 or more self-contained dwellings where none of the following services are provided on site as part of the development: meals, cleaning services, personal care, nursing care. (3) **Example: "serviced self-care housing"** In this Policy, ***serviced self-care housing*** is seniors housing that consists of self-contained dwellings where the following services are available on the site: meals, cleaning services, personal care, nursing care.	The proposed development represents 'serviced self-care housing'.
14 Objective of Chapter The objective of this Chapter is to create opportunities for the development of housing that is located and designed in a manner particularly suited to both those seniors who are independent, mobile and active as well as those who are frail, and other people with a disability regardless of their age.	The proposed development is entirely consistent with the objective based on the following: • The development site is ideally located given that it will form an extension of the existing Maroba facility and will make more efficient use of the Maroba services (ie. care, meals, washing,

	etc). • The site is located very close to the Mater Hospital. • Excellent access to public transport is available. • Waratah shopping village is located in close proximity to the site. • Public recreation areas adjoin the subject site.
15 What Chapter does This Chapter allows the following development despite the provisions of any other environmental planning instrument if the development is carried out in accordance with this Policy: (a) development on land zoned primarily for urban purposes for the purpose of any form of seniors housing, and (b) development on land that adjoins land zoned primarily for urban purposes for the purpose of any form of seniors housing consisting of a hostel, a residential care facility or serviced self-care housing.	The proposal is consistent with 15(a) given that the subject site is zoned 2(a) Residential Zone under the provisions of the Newcastle LEP 2003.
16 Development consent required Development allowed by this Chapter may be carried out only with the consent of the relevant consent authority unless another environmental planning instrument allows that development without consent.	The consent of the Hunter and Central Coast Region Joint Regional Planning Panel (JRPP) is sought to undertake the proposed development.
18 Restrictions on occupation of seniors housing allowed under this Chapter (1) Development allowed by this Chapter may be carried out for the accommodation of the following only: (a) seniors or people who have a disability, (b) people who live within the same household with seniors or people who have a disability, (c) staff employed to assist in the administration of and provision of services to housing provided under this Policy.	The proposal remains consistent with clause 18(1).

(2) A consent authority must not consent to a development application made pursuant to this Chapter unless: (a) a condition is imposed by the consent authority to the effect that only the kinds of people referred to in subclause (1) may occupy any accommodation to which the application relates, and (b) the consent authority is satisfied that a restriction as to user will be registered against the title of the property on which development is to be carried out, in accordance with section 88E of the *Conveyancing Act 1919*, limiting the use of any accommodation to which the application relates to the kinds of people referred to in subclause (1).	It is noted that a condition will be imposed to the effect that only persons described in clause 18(1) may occupy the development.
(3) Subclause (2) does not limit the kinds of conditions that may be imposed on a development consent, or allow conditions to be imposed on a development consent otherwise than in accordance with the Act.	Noted.
26 Location and access to facilities (1) A consent authority must not consent to a development application made pursuant to this Chapter unless the consent authority is satisfied, by written evidence, that residents of the proposed development will have access that complies with subclause (2) to: (a) shops, bank service providers and other retail and commercial services that residents may reasonably require, and (b) community services and recreation facilities, and (c) the practice of a general medical practitioner. (2) Access complies with this clause if: (a) the facilities and services referred to in subclause (1) are located at a distance of not more	In response to sub clauses (1) and (2) there is public transport availability on Edith Street within 400 metres of the site (confirmed by the Traffic Report in Appendix C) that provides access to all necessary services including shops, bank service providers, other retail and commercial services, community services and recreation areas. It is noted that the proposal will allow Maroba to provide residents with already established high quality health care associated with the existing Maroba development. It is also noted that the Mater Hospital is within 400m of the subject site.

than 400 metres from the site of the proposed development that is a distance accessible by means of a suitable access pathway and the overall average gradient for the pathway is no more than 1:14, although the following gradients along the pathway are also acceptable: (i) a gradient of no more than 1:12 for slopes for a maximum of 15 metres at a time, (ii) a gradient of no more than 1:10 for a maximum length of 5 metres at a time, (iii) a gradient of no more than 1:8 for distances of no more than 1.5 metres at a time, or (3) For the purposes of subclause (2) (b) and (c), the overall average gradient along a pathway from the site of the proposed development to the public transport services (and from the transport services to the facilities and services referred to in subclause (1)) is to be no more than 1:14, although the following gradients along the pathway are also acceptable: (i) a gradient of no more than 1:12 for slopes for a maximum of 15 metres at a time, (ii) a gradient of no more than 1:10 for a maximum length of 5 metres at a time, (iii) a gradient of no more than 1:8 for distances of no more than 1.5 metres at a time. (4) For the purposes of subclause (2): (a) a ***suitable access pathway*** is a path of travel by means of a sealed footpath or other similar and safe means that is suitable for access by means of an electric wheelchair, motorised cart or the like, and (b) distances that are specified for the purposes of that subclause are to be measured by reference to the length of any such pathway. (5) In this clause: ***bank service provider*** means any bank, credit union or building society or any post office that provides banking services.	The pedestrian pathway along Edith Street that provides access to the public transport and Mater Hospital remains consistent with sub clauses (2), (3) and (4). Noted and the proposal is compliant.

27 Bush fire prone land (1) A consent authority must not consent to a development application made pursuant to this Chapter to carry out development on land identified on a bush fire prone land map certified under section 146 of the Act as "Bush fire prone land—vegetation category 1", "Bush fire prone land—vegetation category 2" or "Bush fire prone land—vegetation buffer" unless the consent authority is satisfied that the development complies with the requirements of the document titled *Planning for Bush Fire Protection*, ISBN 0 9751033 2 6, prepared by the NSW Rural Fire Service in co-operation with the Department of Planning, dated December 2006.	In response to subclause (1) and (3) bushfire is addressed within Section 5 of this SoEE. The site is identified as Bushfire Prone Land (vegetation buffer) and concurrence is required from the NSW Rural Fire Service under Section 100B of the Rural Fires Act. A Bushfire Threat Assessment is provided in **Appendix D**.
(2) A consent authority, in determining a development application made pursuant to this Chapter to carry out development on land in the vicinity of land identified on a bush fire prone land map certified under section 146 of the Act as "Bush fire prone land—vegetation category 1", "Bush fire prone land—vegetation category 2" or "Bush fire prone land—vegetation buffer", must take into consideration the general location of the proposed development, the means of access to and egress from the general location and other relevant matters, including the following: (a) the size of the existing population within the locality, (b) age groups within that population and the number of persons within those age groups, (c) the number of hospitals and other facilities providing care to	The subject site remains consistent with subclause (2) based on the following: • The subject land is located within a well established urban area, adjacent to the existing Maroba facility and in very close proximity to the Mater Hospital. • There are a number of schools within the Waratah area. • The established road network offers excellent opportunity for evacuation should it be required and offers excellent availability for use by emergency vehicles.

the residents of the facilities within the locality, and the number of beds within those hospitals and facilities, (d) the number of schools within the locality and the number of students at those schools, (e) existing development within the locality that has been carried out under this Policy or *State Environmental Planning Policy No 5—Housing for Older People or People with a Disability*, (f) the road network within the locality and the capacity of the road network to cater for traffic to and from existing development if there were a need to evacuate persons from the locality in the event of a bush fire, (g) the adequacy of access to and from the site of the proposed development for emergency response vehicles, (h) the nature, extent and adequacy of bush fire emergency procedures that are able to be applied to the proposed development and its site, (i) the requirements of New South Wales Fire Brigades. (3) In exercising its functions under subclause (1) or (2), a consent authority must consult with the NSW Rural Fire Service and have regard to its comments.	Addressed above.
28 Water and sewer (1) A consent authority must not consent to a development application made pursuant to this Chapter unless the consent authority is satisfied, by written evidence, that the housing will be connected to a reticulated water	All major services including water, sewer, electricity, telecommunications and gas are available to be connected to the site to service the development.

system and have adequate facilities for the removal or disposal of sewage. (2) If the water and sewerage services referred to in subclause (1) will be provided by a person other than the consent authority, the consent authority must consider the suitability of the site with regard to the availability of reticulated water and sewerage infrastructure. In locations where reticulated services cannot be made available, the consent authority must satisfy all relevant regulators that the provision of water and sewerage infrastructure, including environmental and operational considerations, are satisfactory for the proposed development.	
29 Consent authority to consider certain site compatibility criteria for development applications to which clause 24 does not apply (1) This clause applies to a development application made pursuant to this Chapter in respect of development for the purposes of seniors housing (other than dual occupancy) to which clause 24 does not apply. **Note.** Clause 24 (1) sets out the development applications to which that clause applies. (2) A consent authority, in determining a development application to which this clause applies, must take into consideration the criteria referred to in clause 25 (5) (b) (i), (iii) and (v). (3) Nothing in this clause limits the matters to which a consent authority may or must have regard (or of which a consent authority must be satisfied under another provision of this Policy) in determining a development application to which this clause applies.	Clause 24 does not apply to the proposed development. Therefore clause 25(5)(b)(i),(iii) and (v) must be considered. *(5) The Director-General must not issue a site compatibility certificate unless the Director-General:* *(b) is of the opinion that the proposed development is compatible with the surrounding land uses having regard to (at least) the following criteria:* *(i) the natural environment (including known significant environmental values, resources or hazards) and the existing uses and approved uses of land in the vicinity of the proposed development,* *(iii) the services and infrastructure that are or will be available to meet the demands arising from the proposed development (particularly, retail, community, medical and transport services having regard to the location and access requirements set out in clause 26) and any proposed financial arrangements for infrastructure provision,* *(v) without limiting any other criteria,*

	the impact that the bulk, scale, built form and character of the proposed development is likely to have on the existing uses, approved uses and future uses of land in the vicinity of the development, **Comment:** The proposal remains consistent with the above based on the following: • This SoEE and accompanying specialist studies confirm that the site is appropriate to facilitate the proposal in respect of natural hazards and surrounding land use. • All necessary servicing infrastructure is available to the subject site. • The proposal is acceptable in terms of bulk, scale and built form (see section 4.3, 5.3 and Appendix E of this SoEE). • The subject site is a brownfield site and no clearing of vegetation is required.
30 Site Analysis	EJE Architecture have provided development plans that satisfy the Site Analysis requirements outlined by the SEPP (see **Appendix A**).
33 Neighbourhood amenity and streetscape The proposed development should: (a) recognise the desirable elements of the location's current character (or, in the case of precincts undergoing a transition, where described in local planning controls, the desired future character) so that new buildings contribute to the quality and identity of the area, and (b) retain, complement and sensitively harmonise with any heritage conservation areas in the vicinity and any relevant heritage items that are identified in a local environmental plan, and (c) maintain reasonable neighbourhood amenity and appropriate residential character by: (i) providing building setbacks to	The proposal remains consistent with clause 33 based on the following: • The subject site is considered ideal to facilitate the proposed development given that the proposal will form an extension to the existing Maroba facility, is located within an urban area with excellent public transport availability and is located within close proximity to the Mater Hospital. • Refer to SoEE section 4.3 in relation to comment on the desired future character of the site. • The subject site is located

reduce bulk and overshadowing, and (ii) using building form and siting that relates to the site's land form, and (iii) adopting building heights at the street frontage that are compatible in scale with adjacent development, and (iv) considering, where buildings are located on the boundary, the impact of the boundary walls on neighbours, and (d) be designed so that the front building of the development is set back in sympathy with, but not necessarily the same as, the existing building line, and (e) embody planting that is in sympathy with, but not necessarily the same as, other planting in the streetscape, and (f) retain, wherever reasonable, major existing trees, and (g) be designed so that no building is constructed in a riparian zone.	adjacent to Braye Park (public open space area). • The proposed development will result in an architecturally designed building on a brownfield parcel of land that will contribute to the established character of Edith Street. • The proposal is acceptable in terms of height, bulk and scale (refer SoEE section 4.3, 5.3 and Appendix E). • There are no heritage items on the site in the locality that will be affected by the proposal. • The proposal will incorporate appropriate landscaping (refer SoEE section 5 and **Appendix I**). • The site is free of any significant vegetation or riparian zones.
34 Visual and acoustic privacy The proposed development should consider the visual and acoustic privacy of neighbours in the vicinity and residents by: (a) appropriate site planning, the location and design of windows and balconies, the use of screening devices and landscaping, and (b) ensuring acceptable noise levels in bedrooms of new dwellings by locating them away from driveways, parking areas and paths.	The subject site is adjoined by the following: • The established Maroba development to the north. • Edith Street to the east. • High Street and Braye Park to the south. • The Maroba site and Braye Park to the west. Based on this it is evident that external visual privacy will not be issue in relation to the proposed development. In terms of internal design visual privacy, the EJE Architecture design (see **Appendix A**) has ensured that the location of windows and balconies of units within the development do not generate visual privacy issues. Acoustic impacts are addressed within Section 5 of this SoEE.
35 Solar access and design for climate The proposed development should: (a) ensure adequate daylight to the main living areas of neighbours in the vicinity and residents and adequate sunlight to substantial areas of private	The proposed development has been designed with regard to clause 35. Provided in **Appendix B** is a BASIX certificate that confirms that the proposal development is acceptable in terms of

open space, and (b) involve site planning, dwelling design and landscaping that reduces energy use and makes the best practicable use of natural ventilation solar heating and lighting by locating the windows of living and dining areas in a northerly direction.	thermal comfort, water and energy considerations.
36 Stormwater The proposed development should: (a) control and minimise the disturbance and impacts of stormwater runoff on adjoining properties and receiving waters by, for example, finishing driveway surfaces with semi-pervious material, minimising the width of paths and minimising paved areas, and (b) include, where practical, on-site stormwater detention or re-use for second quality water uses.	The proposal remains consistent with clause 36. Provided in **Appendix H** is a stormwater plan.
37 Crime prevention The proposed development should provide personal property security for residents and visitors and encourage crime prevention by: (a) site planning that allows observation of the approaches to a dwelling entry from inside each dwelling and general observation of public areas, driveways and streets from a dwelling that adjoins any such area, driveway or street, and (b) where shared entries are required, providing shared entries that serve a small number of dwellings and that are able to be locked, and (c) providing dwellings designed to allow residents to see who approaches their dwellings without the need to open the front door.	The proposal remains consistent with crime prevention considerations. Crime prevention is addressed in Section 5 of this SoEE.
38 Accessibility The proposed development should: (a) have obvious and safe pedestrian links from the site that provide access to public transport services or local facilities, and (b) provide attractive, yet safe, environments for pedestrians and motorists with convenient access and parking for residents and visitors.	The Traffic Assessment Report provided in **Appendix C** confirms that adequate pedestrian and vehicle safety will be provided by the proposed development.
39 Waste management The proposed development should be provided with waste facilities that	Appropriate waste management facilities will be provided by the proposed

maximise recycling by the provision of appropriate facilities.	development.
40 Development standards—minimum sizes and building height (1) **General** A consent authority must not consent to a development application made pursuant to this Chapter unless the proposed development complies with the standards specified in this clause. (2) **Site size** The size of the site must be at least 1,000 square metres. (3) **Site frontage** The site frontage must be at least 20 metres wide measured at the building line.	The subject site is greater than 1,000m^2 (3,005m^2) and has a frontage greater than 20 metres wide (72 metres).
41 Standards for hostels and self-contained dwellings (1) A consent authority must not consent to a development application made pursuant to this Chapter to carry out development for the purpose of a hostel or self-contained dwelling unless the proposed development complies with the standards specified in Schedule 3 for such development. (2) Despite the provisions of clauses 2, 7, 8, 9, 10, 11, 12, 13 and 15–20 of Schedule 3, a self-contained dwelling, or part of such a dwelling, that is located above the ground floor in a multi-storey building does not have to comply with the requirements of those provisions if the development application is made by, or by a person jointly with, a social housing provider.	The proposed development remains consistent with clauses 41(1) and 42(2) in terms of compliance with Schedule 3 considerations including: • Siting standards for wheelchair access; • Security; • Mail service; • Private Car accommodation (refer to Section 5 of this SoEE and **Appendix C**); • Accessible entry; • Interior design compliance with relevant Australian Standards; • Bedroom, bathroom, toilet, surface finishes, door hardware and ancillary item compliance with relevant Australian Standards; and • Design of living room, kitchen, access to kitchen, main bedroom, bathroom and toilet, lifts, laundry, storage and garbage storage remains consistent with the relevant Australian Standards.
50 Standards that cannot be used to refuse development consent for self-contained dwellings A consent authority must not refuse consent to a development application	The following is noted in relation to clause 50: • Building height, density and scale are addressed in Sections 4.3, 5.3

made pursuant to this Chapter for the carrying out of development for the purpose of a self-contained dwelling (including in-fill self-care housing and serviced self-care housing) on any of the following grounds: (a) **building height:** if all proposed buildings are 8 metres or less in height (and regardless of any other standard specified by another environmental planning instrument limiting development to 2 storeys), (b) **density and scale:** if the density and scale of the buildings when expressed as a floor space ratio is 0.5:1 or less, (c) **landscaped area:** if: (i) in the case of a development application made by a social housing provider—a minimum 35 square metres of landscaped area per dwelling is provided, or (ii) in any other case—a minimum of 30% of the area of the site is to be landscaped, (d) **Deep soil zones:** if, in relation to that part of the site (being the site, not only of that particular development, but also of any other associated development to which this Policy applies) that is not built on, paved or otherwise sealed, there is soil of a sufficient depth to support the growth of trees and shrubs on an area of not less than 15% of the area of the site (the ***deep soil zone***). Two-thirds of the deep soil zone should preferably be located at the rear of the site and each area forming part of the zone should have a minimum dimension of 3 metres, (e) **solar access:** if living rooms and private open spaces for a minimum of 70% of the dwellings of the development receive a minimum of 3 hours direct sunlight between 9am and 3pm in mid-winter, (f) **private open space for in-fill self-care housing:** if: (i) in the case of a single storey dwelling or a dwelling that is located, wholly or in part, on the ground floor of a multi-storey building, not less than 15 square metres of private open space per dwelling is provided and, of this open space, one area is not less than 3 metres wide and 3 metres	and Appendix E of this SoEE. • Landscaping has been addressed in Section 5 and Appendix I of this SoEE. • Solar access has been addressed within Appendix E. • Carparking has been addressed within Section 5 and Appendix C of this SoEE. The proposal has a floor space ratio of 2.1:1. The proposal provides a landscaped area of 37.1% (1,115m^2) of the area of the site. The proposal provides a deep soil zone of 21.6% (650m^2) of the area of the site. All units have good solar access exceeding the 70% requirement. The proposal is not for in fill self care housing. In any case provision has been made for balconies and open space.

long and is accessible from a living area located on the ground floor, and (ii) in the case of any other dwelling, there is a balcony with an area of not less than 10 square metres (or 6 square metres for a 1 bedroom dwelling), that is not less than 2 metres in either length or depth and that is accessible from a living area, **Note.** The open space needs to be accessible only by a continuous accessible path of travel (within the meaning of AS 1428.1) if the dwelling itself is an accessible one. See Division 4 of Part 4. (g) (Repealed) (h) **parking:** if at least the following is provided: (i) 0.5 car spaces for each bedroom where the development application is made by a person other than a social housing provider, or (ii) 1 car space for each 5 dwellings where the development application is made by, or is made by a person jointly with, a social housing provider.	The proposal generates the requirement of 45 car spaces. The proposal provides 44 car spaces, 1 space less than the requirement. This matter is further addressed in Section 5 of this SoEE.

Overall, it is considered that the proposed development is consistent with the provisions of SEPP (Housing for Seniors or People with a Disability) 2004.

4.1.3 SEPP (Major Development) 2005

The SEPP defines certain developments that are major projects under Part 3A of the Environmental Planning and Assessment Act 1979 which require determination by the Minister for Planning. The SEPP also lists State significant sites and confirms which type of development constitutes Regional Development.

Clause 13B(1) 'General Development to which this Part applies' of Part 3 'Regional Development' confirms the following:

"(1) This Part applies to the following development:
(a) development that has a capital investment value of more than $10 million,

(b) development for any of the following purposes if it has a capital investment value of more than $5 million:

(i) affordable housing, air transport facilities, child care centres, community facilities, correctional centres, educational establishments, electricity generating works, electricity transmission or distribution networks, emergency services facilities, health services facilities, group homes, places of public worship, port facilities, public administration buildings, public ferry wharves, rail infrastructure facilities, research stations, road infrastructure facilities, roads, sewerage systems, telecommunications facilities, waste or resource management facilities, water supply systems, wharf or boating facilities,

(c) Crown development that has a capital investment value of more than $5 million,

(d) development for the purposes of eco-tourism facilities that has a capital investment value of more than $5 million,

(e) designated development,

(f) subdivision of land into more than 250 lots."

The proposal represents a 'Regional Development' given that it has a capital investment of more than $10 million. Therefore the Consent Authority for the Development Application will be the Hunter and Central Coast Region Joint Regional Planning Panel (JRPP).

4.1.4 SEPP (Infrastructure) 2007

This SEPP provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

Clause 104 'Traffic Generating Development' and Schedule 3 'Traffic Generating Development to be Referred to the RTA' confirms that development of '75 or more dwellings' for 'apartments or residential flat buildings' (for a site with access to a classified road or to a road that connects to a classified road (if access is within 90m of connection) triggers this element of the SEPP. Given that this Development Application seeks consent for the development of 47 seniors living self care apartments, the provisions of the SEPP are not relevant to this proposal.

4.2 REGIONAL PLANNING CONTROLS

4.2.1 Lower Hunter Regional Strategy

The Lower Hunter Regional Strategy was adopted in October 2006. The purpose of the strategy is to provide broad guidance to future planning of the Lower Hunter with the following general aims:

- Promote Newcastle as the regional city, with a hierarchy of urban centres;
- Provide for a forecast housing demand of up to 115 000 new dwellings by 2031;
- Identify new release areas;
- Ensure an adequate supply of employment land;
- Focus a higher proportion of new housing in centres which will reduce pressure on existing established suburbs;
- Enable the release of 5300 hectares of rural land for a series of new communities and extensions to existing urban areas;
- Ensure that greenfield land is released in a coordinated way with improved neighbourhood design and more efficient use of infrastructure; and
- Ensure the protection of biodiversity through a Regional Conservation Plan.
- The proposed development is considered to be consistent with the aims and objectives of the Lower Hunter Regional Strategy, supporting the promotion of Newcastle as the regional city of the Lower Hunter and providing increased seniors living residential accommodation on a brownfield site.

4.3 LOCAL PLANNING CONTROLS

4.3.1 Newcastle Local Environmental Plan 2003

The site is zoned 2(a) Residential Zone under the provisions of the Newcastle Local Environmental Plan 2003 (NLEP 2003). The objectives of this zone are to:

a) *To accommodate a diversity of housing forms that respect the amenity, heritage and character of surrounding development and the quality of the environment.*

b) *To accommodate home-based business and community facilities that do not unreasonably or significantly detract from the amenity or character of the neighbourhood and the quality of the environment.*

c) *To require the retention of existing housing stock where appropriate, having regard to ESD principles.*

The proposal remains consistent with objective (a) given that it will provide an architecturally designed senior's living residential building within an established residential and seniors living / hospital precinct. The proposal will facilitate the extension of the existing Maroba seniors living development on a vacant brownfield site. The proposal has been designed in accordance with the sites natural topographical features and surrounding development and will contribute to the character of the area.

Objectives (b) and (c) are not particularly relevant to the proposal.

Figure 7 is an extract from Newcastle LEP 2003 and illustrates the site's zoning in the context of the surrounding locality.

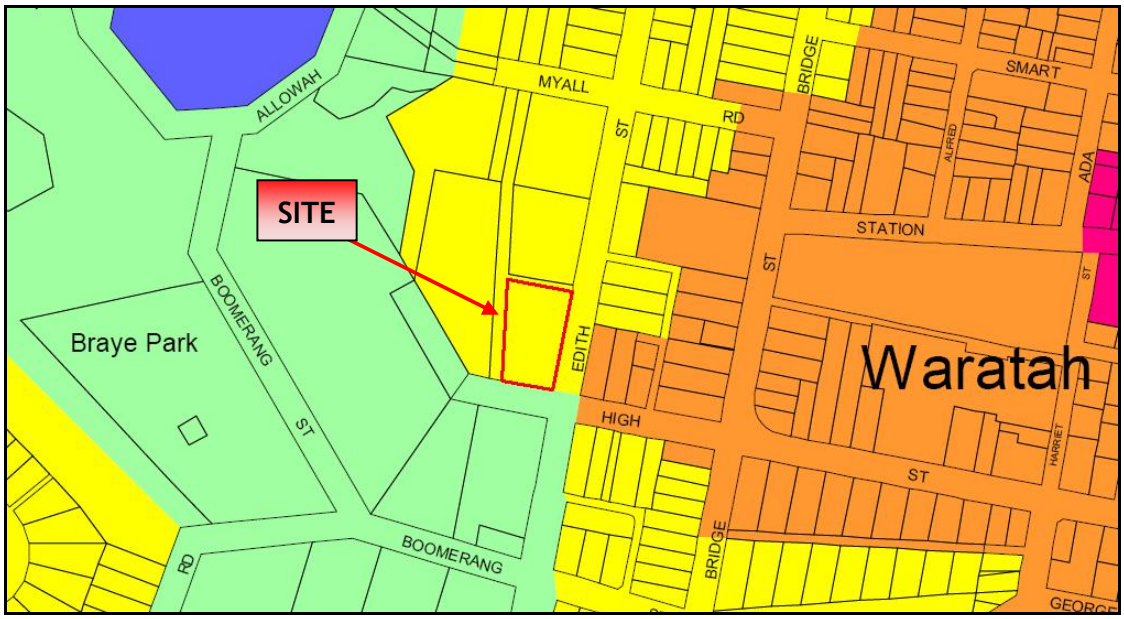


Figure 7: Zoning Extract from Newcastle LEP 2003.

4.3.2 Specific Newcastle LEP 2003 Clause

The following clause from the Newcastle LEP 2003 is the only clause deemed relevant to this proposal:

- **Clause 26** – Bushfire Prone Land.

The objective of this clause is to ensure that the consent authority, when assessing a development application to carry out development on bushfire prone land, is satisfied with the measures proposed to be taken with respect to the development, to protect persons, property and the environment from any danger that may arise from a bushfire.

A Bushfire Threat Assessment is provided within **Appendix D**.

4.3.3 Draft Newcastle LEP 2011

Draft Zoning

The subject land is identified in the draft Newcastle LEP 2011 within the *R2 Low Density Zone*. '*Seniors Housing*' is permitted given that a 'dwelling-house' is a permissible use in the zone.

An extract of the zoning map from the draft LEP 2011 is provided below.

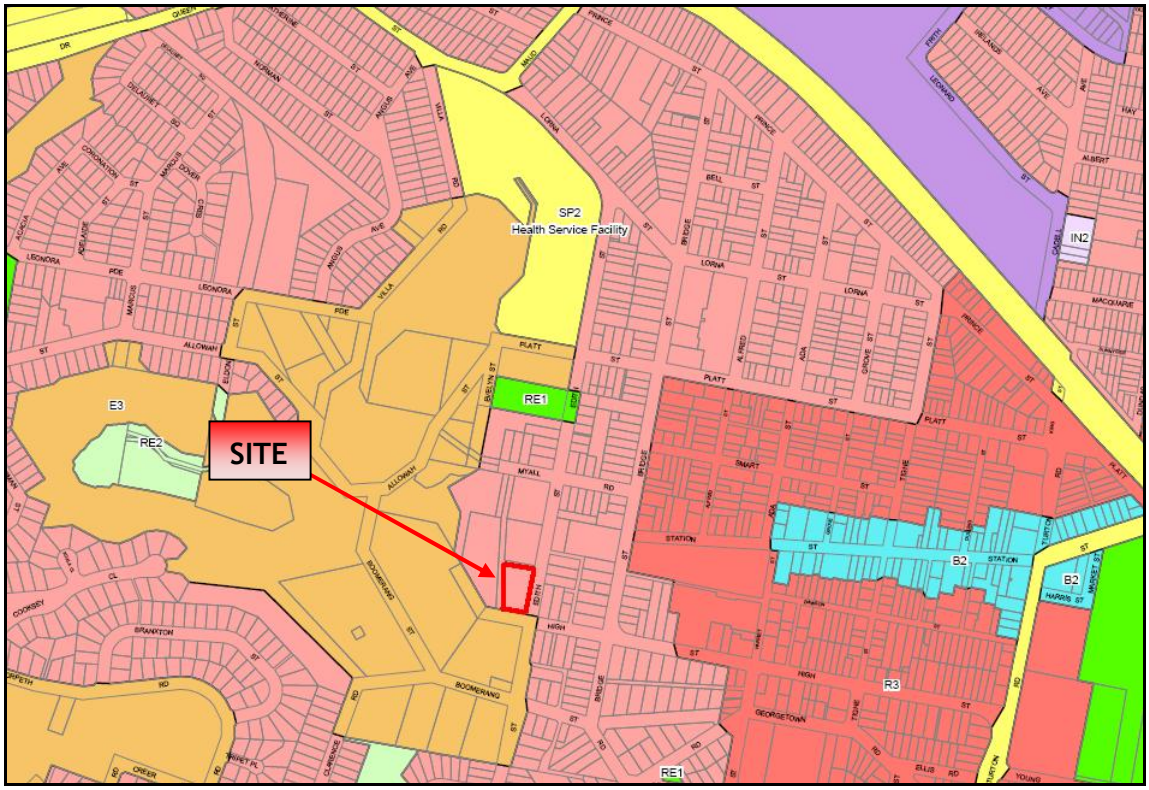


Figure 8: Extract from Newcastle Draft LEP 2011 zone map.

Permissibility

'Dwelling Houses' are a permissible use in the *R2 Low Density Zone* and therefore the proposed development of the site for 'seniors housing' is a permissible use.

It is noted however that a '*residential flat building*' is prohibited within the *R2 Low Density Zone*. Therefore Part 4, Division 1, Clause 40(4) of SEPP (Housing for Seniors or People with a Disability) 2004, will apply to the proposal:

> "*(4)* ***Height in zones where residential flat buildings are not permitted***
> *If the development is proposed in a residential zone where residential flat buildings are not permitted:*
>
> *(a) the height of all buildings in the proposed development must be* ***8 metres or less****, and*
>
> ***Note.*** *Development consent for development for the purposes of seniors housing cannot be refused on the ground of the height of the housing if all of the proposed buildings are 8 metres or less in height. See clauses 48 (a), 49 (a) and 50 (a).*
>
> *(b) a building that is adjacent to a boundary of the site (being the site, not only of that particular development, but also of any other associated development to which this Policy applies) must be not more than 2 storeys in height, and*
>
> ***Note.*** *The purpose of this paragraph is to avoid an abrupt change in the scale of development in the streetscape.*
>
> *(c) a building located in the rear 25% area of the site must not exceed 1 storey in height."*

The abovementioned provision will result in an 8m or less height restriction being placed on the subject site for future seniors living development.

It is noted that the draft Newcastle LEP 2011 identifies the site as having a maximum developable height of 8.5 metres.

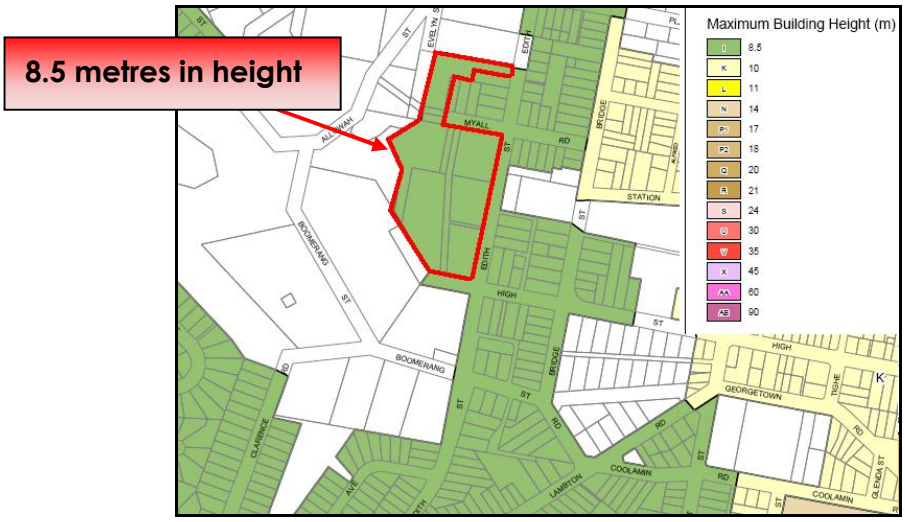


Figure 9: Extract from Newcastle Draft LEP 2011 HOB map.

It is further noted that the draft Newcastle LEP 2011 identifies the site as having a maximum floor space ratio of 0.6.

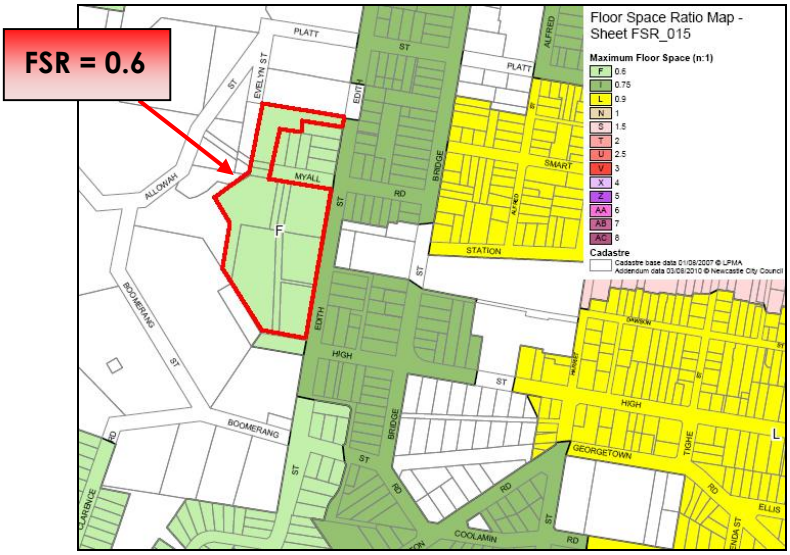


Figure 10: Extract from Newcastle Draft LEP 2011 FSR map.

In October 2010, during the exhibition period of the draft LEP 2011, ADW Johnson made a submission to Newcastle City Council in relation to this matter and also the draft LEP 2011 building height and floor space ratio that is proposed to apply to the subject site. The submission suggested that Council consider zoning the entire Maroba site (inclusive of the subject site) *R4 High Density* on the basis that residential flat building scale of development would sit comfortably in this location. This matter is continuing to be considered by Council.

Review of the draft LEP 2011 zoning provided in Figure 8 above demonstrates a transition in residential density extending out toward the site from the R4 High Density Residential along Hanbury Street to B2 Local Centre at Station Street Waratah to R3 Medium Density Residential to R2 Low Density and to E3 Environmental Management. This is consistent with good planning practice for increasing density within proximity of goods and services.

The assigning of the R2 zone to the Maroba site whilst apparently consistent with the practice to reduce density and scale further out from the Local Centre does not recognise a different and unique set of circumstances on the western side of Edith Street. It can be seen on the proposed zoning plan that there would only be a small pocket of R2 zone extending from just north of Myall Road to Braye Park in the south, other surrounding lands are for hospital and park. It is considered that the pocket of land warrants a zoning that supports a more intensive development outcome such as the Maroba development proposal noting the following:

- Maroba own the land to the west and north of the subject site and therefore there is minimal opportunity for direct impact on immediate neighbours. Indeed there are no immediately adjoining neighbours to the proposed development site. Lower Density housing is located on the other side of Edith Street and so appropriately separated from the Maroba site.

- The subject site is topographically positioned toward the bottom of a hill. The topography rises around it to the north (along Edith Street), south (along Edith Street) and west (Braye Park) and so serves as a backdrop and context to allow for increased height. Increased height and scale of development on this will not impact a ridge line or interrupt any public or private view corridors. This is demonstrated in the image below:

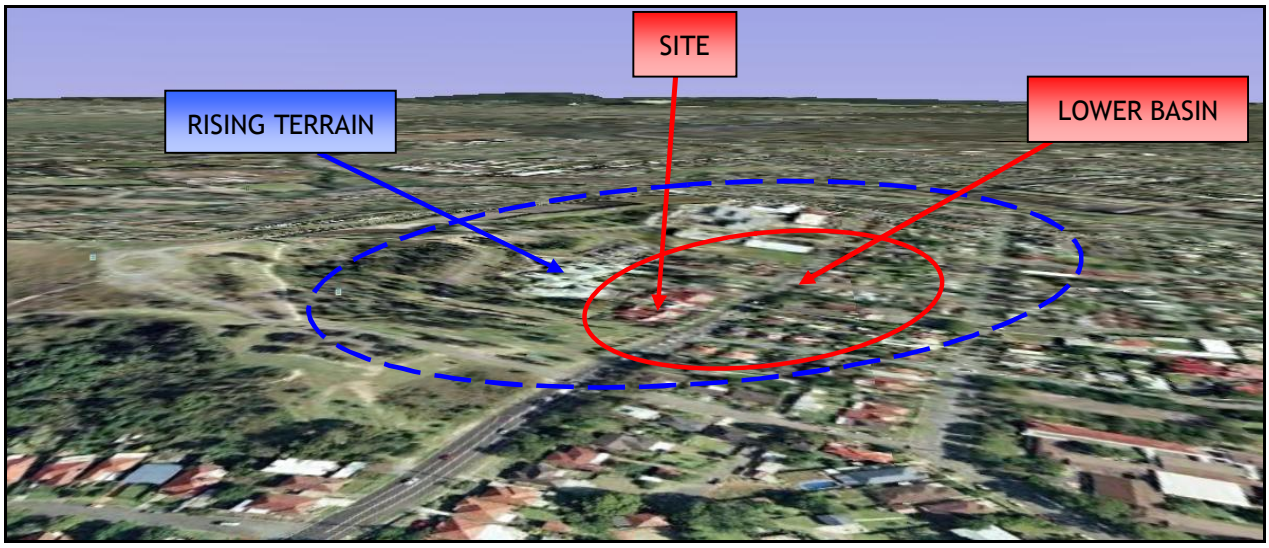


Figure 11: Plan Demonstrating Site & Surrounding Topography.

- A larger built form is not foreign to the overall streetscape and experience of driving along this section of Edith Street. As you come to the top of the hill at the cross section of Boomerang Road and look along the length of Edith street, the large form of the Mater Hospital can be seen at the other end of Edith Street. A larger built form on the Maroba Site at the other end of Edith Street will compliment the Mater and will sit comfortably within the street.

  Based on the above, it is considered that an increased height and density is appropriate for the subject site to facilitate the proposed development.

4.3.4 Newcastle Development Control Plan 2005

Newcastle Development Control Plan 2005 (DCP 2005) applies to the proposed development. The purpose of the DCP 2005 is to provide detailed provisions relating to matters of environmental planning significance for Newcastle to be taken into consideration by Newcastle City Council when exercising its environmental assessment and planning functions under the Environmental Planning and Assessment Act 1979.

We have reviewed DCP 2005 and have deemed the following elements as being relevant for consideration;

- **Element 3.01 – Public Participation**

It is understood that the proposed development will be exhibited in accordance with the provisions of this element of the DCP.

- **Element 4.01 – Car Parking**

The proposal remains consistent with this element of the DCP. This matter is addressed in Section 5 and **Appendix C** of this SoEE.

- **Element 4.04 – Landscaping**

The proposal remains consistent with this element of the DCP. This matter is addressed further in Section 5 and **Appendix I** of this SoEE.

- **Element 4.05 – Water Management**

The proposal remains consistent with this element of the DCP. This matter is addressed further in Section 5 and **Appendix H** of this SoEE.

- **Element 4.06 – Waste Management**

The proposal remains consistent with this element of the DCP. This matter is addressed further in Section 5 of this SoEE.

- **Element 5.02 – Urban Housing**

This element provides design oriented guidelines for urban housing that encourage high quality urban design and residential amenity, sustainability, efficient use of residential land and expand the variety of housing types, and set appropriate environmental criteria for assessment by the consent authority.

A report addressing SEPP 65 Design Quality of Residential Flat Development has been prepared by EJE Architecture and is provided in **Appendix E** of this SoEE.

- **Element 9.01 – Precinct Maps**

This element prescribes precincts to guide the extent of growth in the Newcastle LGA.

The subject site is located in the Limited Growth Precinct identified in the Newcastle DCP 2005.

Figure 12 is an extract from the Newcastle DCP 2005 and shows the prescribed growth precinct for the subject site.

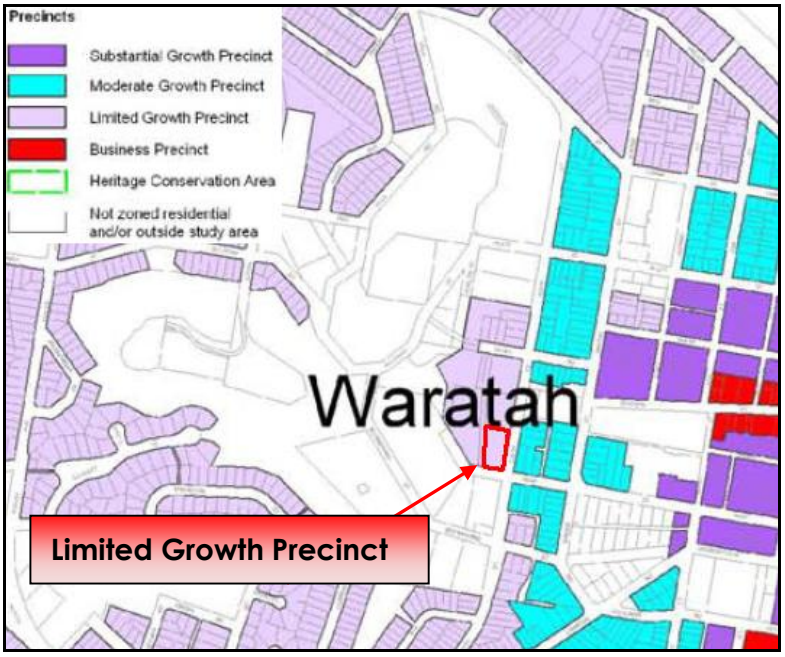


Figure 12: Extract from Residential Density Strategy Maps (Precincts) January 2010.

- **Element 9.02 – Floor Space Ratio**

This element provides provisions for floor space ratios for the Newcastle LGA.

The subject site is prescribed a maximum floor space ratio of 0.6 under the Newcastle DCP 2005. The floor space is not proposed to change under the provisions of the draft LEP 2011.

Figure 13 is an extract from the Newcastle DCP 2005 and shows the prescribed floor space ratio limit for the subject site.

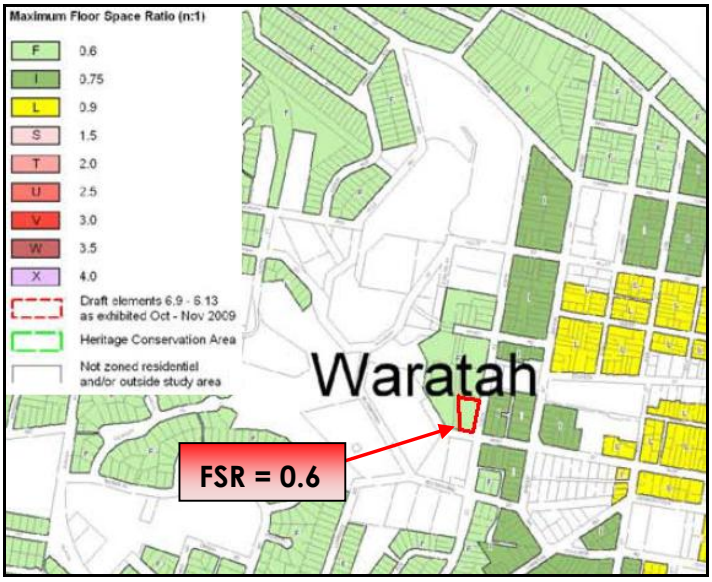


Figure 13: Extract from Residential Density Strategy Maps (FSR) January 2010.

- **Element 9.03 – Height of Building**

This element prescribes building height limits for the Newcastle LGA.

The subject site is prescribed a maximum building height of 10m under the Newcastle DCP 2005. The maximum building height is not proposed to change under the provisions of the draft LEP 2011.

Figure 14 is an extract from the Newcastle DCP 2005 and shows the prescribed maximum building height for the subject site.

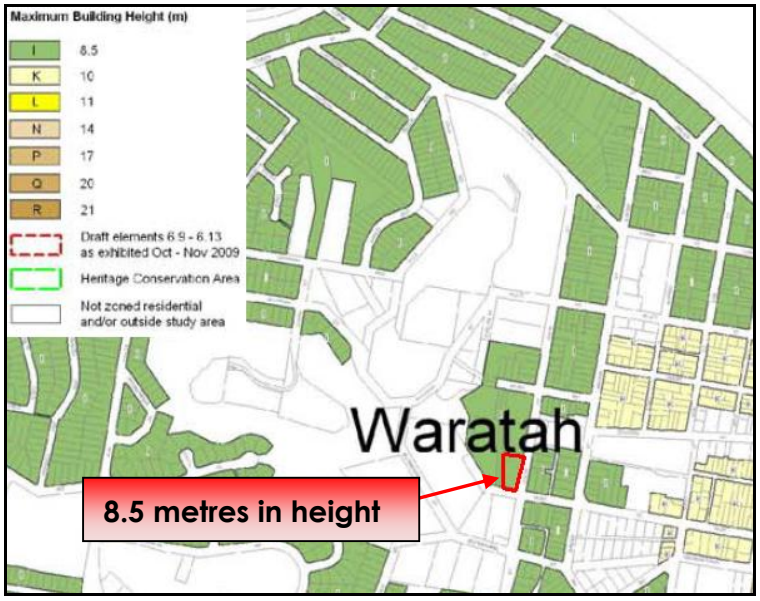


Figure 14: Extract from Residential Density Strategy Maps (Height of Buildings) January 2010.

4.4 SECTION 91 OF THE ACT 1979

The proposed development is considered to be an integrated development under Section 91 of the Environmental Planning and Assessment Act, 1979, given that the site is identified as bushfire prone land and is located within a proclaimed Mine Subsidence District. Approval is required under Section 100B of the Rural Fires Act 1997 and Section 15 of the Mine Subsidence Compensation Act 1961.

4.5 POLICIES AND OTHER CONTROLS

4.5.1 Social Impact

Newcastle City Council has adopted a Social Impact Assessment Policy to ensure that, where relevant, social considerations are an integral part of the development assessment system. In order to realise this objective the policy seeks to:

(a) Indicate which development applications should include comment regarding social impacts or a detailed social impact statement.

(b) Provide clear guidelines as to how social impact assessments should be conducted.

(c) Enhance consistency, certainty and transparency in Council's assessment of the social impact of development proposals.

(d) Ensure that the process of assessing social impact has statutory legitimacy.

(e) Assist Council staff to improve their understanding and assessment of social issues relating to development applications.

This policy does not require the preparation of a Social Impact Statement for the proposed development; however social impact is addressed further within Section 5 of this report.

4.5.2 Newcastle Urban Strategy

The Newcastle Urban Strategy has been adopted by Newcastle City Council as a means of providing direction to future development patterns throughout the city of Newcastle. The Strategy is designed to analyse, influence and determine:

- Land use, transport and development practices;
- Corresponding social, economic and ecological impacts;
- Social and economic trends and their implications for city growth;
- Role each neighbourhood and district plays, e.g. residential, industrial or commercial areas; and
- Roles Newcastle plays locally, regionally and globally.

The proposed development is consistent with this Strategy, by providing much needed seniors housing strategically located close to the established Maroba facility, the Mater Hospital and public transport.

4.5.3 Crime Prevention

In 2001 the then Department of Urban Affairs & Planning produced a guideline titled "Crime prevention and the assessment of development applications". The purpose of the guidelines is to assist councils identify

crime risk and minimise opportunities for crime through the appropriate assessment of development proposals. The guidelines advise that:

Crime prevention through environmental design seeks to influence the design of buildings and places by:

- 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 guideline provides four basic design principles, these are:

Surveillance

The attractiveness of crime targets can be reduced by providing opportunities for effective surveillance, both natural and technical.

Access Control

Physical and symbolic barriers can be used to attract, channel or restrict the movement of people. They minimise opportunities for crime and increase the effort required to commit crime.

Territorial Reinforcement

Community ownership of public space sends positive signals. People often feel comfortable in, and are most likely to visit places which feel owned and cared for. Well used places also 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.

Crime prevention is discussed further in Section 5 below.

5.0 Development Issues

This section includes discussion on the issues arising out of the characteristics of the locality and development site, the development proposal and the planning controls identified in previous sections.

5.1 ZONING AND PERMISSIBILITY

Pursuant to Clauses 10(c) and 4(1)(a) of SEPP (Housing for Seniors or People with a Disability) 2004, the proposal is defined as 'seniors housing'. Given that a 'dwelling house' and 'residential flat building' (defined as 'urban housing by the Newcastle LEP 2003) are permissible in the 2(a) Residential Zone, the proposed 'seniors living' development is a permissible use.

5.2 STREETSCAPE, VIEWS AND VISUAL IMPACTS

The proposal will not result in the loss of identified public or private view corridors. As previously noted within this SoEE, the subject site is topographically positioned at the bottom of a hill. The topography rises around the site to the north (along Edith Street), south (along Edith Street) and west (Braye Park). This locational context, particularly given that there is no development to the west overlooking the site, ensures that no loss of public or private view corridors will be generated by the proposed development.

In terms of aesthetics, the proposed development will result in an enhanced outcome from that of an unattractive brownfield site. Given the established development along the western side of Edith Street, which includes the large built form of the Mater Hospital to the north, parkland and the existing Maroba development to the south, the built form of the proposal will complement this existing development and contribute to the established streetscape character.

Attached is a report addressing SEPP 65 Design Quality of Residential Flat Development that has been prepared by EJE Architecture (**Appendix E**). This report outlines the architectural features of the development and confirms that the proposal will remain consistent with the established streetscape character of Edith Street.

5.3 HEIGHT, SCALE & DENSITY

It has been identified that the proposed development exceeds the height guidelines under Council's DCP of 8.5m. It has also been identified that the proposal as it sits on its immediate site has a FSR of 2.1:1 which exceeds Council's FSR of 0.6:1. Under normal circumstances departures of this type are not readily supported. However, the proposal presents a unique set of circumstances that are considered to enable the development to be supported. These are:

- The site is uniquely positioned in terms of its topography and separation from other residential forms and together within the context of the overall streetscape noting the taller built forms of the Mater Hospital it is considered that the proposed height and FSR will sit comfortably on this site and within the overall context of the street and locality.

- The proposed additional height has no impact on surrounding neighbours in terms of privacy or overshadowing.

- The proposed density is considered acceptable noting that future residents will be well catered for on site by the existing Maroba facilities and noting the social benefits that are also documented in this report. In particular there is a strong social argument to support greater density noting the benefits of maximising existing aged care facilities and the community need for additional seniors housing on a not for profit basis.

5.4 BUSHFIRE

A Bushfire Threat Assessment Report has been prepared by Newcastle Bushfire Consulting to accompany the Development Application (see **Appendix D**). The report has assessed the proposed development against the requirements of s100B of the *Rural Fires Act 1997*, *AS3959 (2009) Building in Bushfire Prone Areas* and *Planning for Bushfire Protection, 2006.*

Under the provisions of Section 100B of the *Rural Fires Act 1997* as amended, a Bushfire Safety Authority is required from the Commissioner of the NSW Rural Fire Service.

The Bushfire Threat Assessment Report complies with the *Rural Fires Regulation* Clause 44 Application for Bushfire Safety Authority. The assessment encompasses the subject site and neighbouring areas.

The recommendations provided within the report address the aim and objectives of *Planning for Bushfire Protection 2006* to provide safe defendable space to firefighters and emergency service personnel defending the proposal in a bushfire event.

The Bushfire Threat Assessment confirmed that the proposed development was acceptable in terms of bushfire considerations provided the following recommendations are implemented:

> 1. The proposed building works shall comply with BAL□12.5 in accordance with AS 3959□2009 and the construction requirements of Planning for Bushfire Protection 2006 Appendix 3 (amended May 2010).
> 2. At the commencement of building works and for the life of the development the entire site shall be maintained as an Inner Protection Area (IPA) as outlined within section 4.1.3 and Appendix 5 of *Planning for Bush Fire*

Protection 2006 and the NSW Rural Fire Service's document *Standards for asset protection zones*.

3. Landscaping is to be undertaken in accordance Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained in perpetuity.

4. The new facility should be added to the existing Maroba emergency management plan developed in accordance with AS 4083 "Planning for emergencies – for health care facilities" and consider bushfire risk.

5. The pedestrian bridge should be clearly signposted with the minimum clearance height of 3.3 metres and this should be communicated in the emergency management plan provided to local fire fighting agencies.

6. Fire Hydrant services should be designed in accordance with AS2419.1 2005.

The Bushfire Threat Assessment concluded that the proposed development offers compliance with Planning for Bushfire Protection. There is potential for bushfire attack at this site however the recommendations outlined adequately reduce that risk.

It is considered that the proposed development can be supported in terms of bushfire considerations.

5.5 TRAFFIC, ACCESS AND CAR PARKING

A Traffic Assessment Report has been prepared by BJ Bradley & Associates Consulting Civil and Traffic Engineers to accompany the Development Application (see **Appendix C**). The report notes the following:

Traffic

The RTA Guide to traffic Generating Developments indicates that traffic generation rates for "Housing for aged and disabled persons" should be:

Daily vehicle trips = 1-2 per dwelling

Evening peak hour trips = 0.1-0.2 per dwelling

The traffic generation from the proposed redevelopment at the Maroba Aged Care Facility will therefore be:

47 units @ 0.2 trips per unit = 9.4 trips, Say 10 trips.

The additional traffic generation of 10 trips from the proposed extensions to the Maroba Aged Care Facility will have negligible impact on Myall Road and also on Edith Street.

Traffic signals at Platt Street and also Griffiths Road provide substantial gaps in traffic flow along Edith Street.

Car Parking

Council's DCP 2005 Element 4.1 Car Parking requires parking to be provided for Seniors Housing as follow:

> At minimum, parking for residents, staff, visitors and ambulance to be provided in accordance with State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004.
>
> The State Environmental Planning (Housing for Seniors or People with a Disability) 2004 parking requirements for self contained dwelling is as follows;
>
> ***0.5 car spaces for each bedroom where the development application is made by a person other than a social housing provided.***

The proposed Maroba Aged Care Facility will provide basement car parking for 44 car spaces. Car spaces have been designed in accordance with AS NZS 2890.6 – 2009 Car parking – Off street parking for people with disabilities.

The number of staff employed within the Maroba Aged Care Facility will not increase as a result of the proposed additional self care units.

The proposal will require the provision of parking in accordance with State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004, as follows:

4 x 1-bedroom units @ 0.5 spaces per bedroom	2 spaces
18 x 2-bedroom units @ 0.5 spaces per bedroom	18 spaces
25 x 2-bedroom + study units @ 0.5 spaces per bedroom	25 spaces

Total SEPP (Housing for Seniors or People with a Disability) 2004

Requirement 45 spaces

The existing Maroba Aged Care facility provides ambulance parking.

The proposal will provide 44 basement car spaces which is 1 space less than the SEPP requirement.

Given the nature of the development, the apparent parking shortfall of 1 space is considered satisfactory as it is likely that some residents of the self –care apartments will not actually own a private car. Additionally there is surplus parking in the adjacent Maroba car parking areas which is available to the apartment residents and visitors.

Public Transport Availability

Newcastle Buses and Ferries operate two bus routes along Bridge Street, Myall Road and Edith Street in the vicinity of the Maroba Aged Care facility. The two

services provide reasonably close access to buses which connect with other routes and facilities. Bus stops are located on both sides of Edith Street just north of Platt Street, approximately a 400m walk from the proposed self care apartments.

Access Driveways

The existing Maroba Aged Care Facility has two vehicular access points. These are:

Myall Road –two (2) driveways at the western extremity; and

Edith Street – one (1) exit driveway.

The access road from Myall Road provides access to the existing Maroba Nursing Home, the Maroba Hostel and the Maroba Terrace self care units.

The existing access on Edith Street is an exit-only driveway, approximately 6 metres wide that provides access from rear car parking spaces at the Maroba Nursing Home.

The existing entry driveway on Myall Road will provide entry to the proposed basement car parking area for the proposed self care apartment and the existing exit driveway on Edith Street will provide access along the one-way roadway with left-out exit only movements possible onto Edith Street.

Pedestrian Activity

The proposed redevelopment is unlikely to generate additional pedestrian activity onto Edith Street or Myall Road as there are no close attractions for pedestrians in the vicinity of the Maroba Aged Care facility.

The existing pedestrian refuge facility off Edith Street just north of the existing exit driveway on Edith Street from the Maroba Aged Care facility provides a safe crossing facility.

Servicing

The proposal will not generate an additional number of service movements.

Sight Distances

The available sight distances at the exit driveway on Edith Street and also the Myall Road intersection satisfy AS2890.1-2004.

The Traffic Assessment Report confirms the following findings:

- Edith Street is a local road providing a connector road function.

- The existing southern exit-only driveway onto Edith Street for the existing Maroba Aged Care facility will be retained and utilised for the proposed self care apartment building. The redevelopment will not alter the existing trip generation patterns.

- The proposal will not generate significant additional traffic volumes (10 trips in the weekday evening peak).

- Service movements involve infrequent trips by light vehicles or refrigerated trucks and the proposed self care apartments will not require any additional service trips.

- Approval of the proposed development will have no adverse affect of the Level of Service, capacity or traffic safety of Edith Street or Myall Road, Waratah.

- On site parking provision will provide an additional 44 spaces, 1 less than the SEPP (Housing for Seniors or People with a Disability) 2004 requirement. It is likely that not all residents will own a private car and the shortfall of 1 car space is considered satisfactory.

- Newcastle Buses and Ferries operate two bus routes along Bridge Street, Myall Road and Edith Street.

The Traffic Assessment Report concludes that the proposal to provide 47 self care apartments in a new building be approved on the basis that traffic impacts on Edith Street and Myall Road would be negligible.

5.6 GEOTECHNICAL & CONTAMINATION

Geotechnical investigations of the site were undertaken by Coffey Geotechnics and a report presenting the results of the geotechnical investigation and preliminary contamination assessment is provided in **Appendix G** of this SoEE.

The methodology of the study involved the following:

- Three (3) site visits where a total of 13 boreholes were made (the location of each borehole is noted within the report);

- Observation and mapping of relevant site features;

- Consideration of surface conditions;

- Consideration of sub surface conditions; and

- Laboratory testing of the borehole samples.

The report made a number of recommendations in relation to the following matters:

- Site preparation;
- Excavation conditions and considerations;
- Pavement design;
- Foundations; and
- Site Classification.

In terms of potential site contamination, the report noted that soils used as backfill behind existing retaining walls and access road formation contains bottom ash slag mixtures sourced from an unknown location. Field investigations confirmed the presence of bottom ash slag soils behind the southern retaining wall and underlying the middle entrance to the existing nursing home.

The comparison of the laboratory results from the borehole samples to the contamination criteria (DECCW Guidelines for Contaminated Sites) indicates that Polycyclic Aromatic Hydrocarbons (PAHs) and metals were either not detected above the laboratory limit of reporting or were detected below the health investigation levels for residential land use with gardens and accessible soil.

The results of the chemical validation testing on the two samples taken from the boreholes show the soil would be acceptable for use on the site under residential land use. The fill soils would require a waste classification in order to be transported off site.

Inspection and additional testing should be conducted on fill material encountered at the site during earthworks to identify any possible deleterious and contaminated material that differs from those encountered during the current investigation.

The contamination investigation should not be viewed as a waste classification for the site and should be used as an indication of contaminants present at the site only. If fill soils are to be removed from the site, a dedicated waste classification assessment should be conducted when the presence, extent and nature of fill soils present are identified.

The report further notes that examination should be made in the proposed building area for the presence of footings, service trenches and other subsurface structures associated with previous development of the lot. It is recommended that removal and remediation of all such facilities be documented by a geotechnical authority at the time of the bulk examination.

The report concludes that the findings contained in the investigation are the result of discrete/specific methodologies used in accordance with normal practice and standards. Footings and excavations should be observed by a suitably qualified engineer during construction to confirm conditions that were assumed in the assessment. Should any site conditions be encountered during construction that vary significantly from those discussed in the report, Coffey should be advised and appropriate action taken.

5.7 STORMWATER

Michael Fitzgerald Consulting Engineers have prepared following drawings to accompany the Development Application (see **Appendix H**):

- Stormwater drainage & reuse;
- Stormwater drainage details; and
- Sediment & erosion control.

The plans demonstrate that the proposal is acceptable in terms of stormwater drainage.

5.8 ACOUSTIC

A Noise Impact Assessment has been prepared by Reverb Acoustics Noise and Vibration Consultants and is located within **Appendix F**.

The purpose of the assessment was to theoretically determine the noise impact from activities associated with nearby commercial development and passing traffic on Edith Street within habitable spaces of the proposed development, and to ensure that noise levels comply with the requirements of AS/NZS 2107-2000, DECCW, NSW DoP and Newcastle City Council.

Further assessment was also undertaken to determine the noise impact operation of the development may have upon nearby neighbours (mechanical plant). Given the location of the development in relation to nearest residences and Edith Street, Reverb considered that assessment of site traffic is not required in this instance.

The assessment recorded the existing acoustic environment by undertaking a background and road traffic noise level survey using a Type 1, Svan 949 environmental noise logging monitor, set midway along the east boundary and approximately 6 metres from the rear lane of traffic on Edith Street. Sound levels were continuously monitored from 12 February 2011 to 19 February 2011, to determine existing background and ambient noise levels for the area.

The assessment considered the background noise levels recorded against relevant criteria for (1) road traffic noise; (2) site noise / mechanical plant; and (3) short term noise events. Analysis was undertaken in relation to (1) received noise – road traffic; (2) received noise – nearby noise sources; and (3) received noise – site mechanical plant.

The assessment made a number of noise control recommendations resulting in a scheme of minimum glazing thickness and types, roof/ceiling and wall construction, balcony construction and mechanical plant operation to ensure the amenity of future occupants of the development (see section 8 of the assessment).

EJE have confirmed that the development plans (**Appendix A**) satisfy the recommendations made.

The report concluded that the site is considered to be suitable for the intended purpose, providing the recommendations are implemented. The report noted that noise from passing road traffic, and activities associated with nearby buildings will comply with the requirements of the AS/NZS2107-2000, the DECCW, NSW DoP; and Newcastle City Council within habitable spaces of the proposed development. Reverb confirms that there is no acoustic reason why the proposal should be denied.

5.9 LIGHTING

Appropriate lighting will be installed as necessary for residents and for security purposes as part of the proposed development. It is considered that no adverse lighting impacts will be generated by the proposal. A lighting plan can be submitted to Council post determination of the Development Application.

5.10 CRIME PREVENTION

It is noted Newcastle City Council has adopted a memorandum of understanding with the Newcastle Police Service for the consideration of crime in assessment of development. This proposal has been considered relative to the principles of surveillance; access control; territorial reinforcement; and space management as documented in the publication "*Crime prevention and the assessment of development applications*" published by the Department of Infrastructure Planning & Natural Resources.

ADW Johnson has undertaken the following:

- Review of the proposed development plans; and
- Site visit and assessment of the proposed development area and its surrounds.

Surveillance
The proposal will result in permanent residential occupation of the site, maintaining excellent opportunities for casual surveillance by a large number of people. The design incorporates territorial reinforcement through frontages to Edith Street and to the access driveway to the north creating common public areas and the residential building will be adequately secured.

The proposal incorporates:

- Clear sightlines between public and private spaces; and
- No landscaping that allows opportunity for offenders to hide or entrap victims.

Access Control

Appropriate resident access control will be incorporated into the development.

Territorial Reinforcement

The design ensures a clear distinction as to what areas of the site / building are public versus private.

Space Management

The proposal will represent an extension of the Maroba facility and physical spaces will be maintained by management to ensure that the building is well kept and therefore deter crime.

General Response to Crime Prevention Design Criteria

It is considered that anti-social behaviour and nuisance will not be a significant issue for the proposed development based on the following:

- The proposed development will form an extension to the Maroba facility. All established security arrangements will be extended to cater for the proposed development.
- Access controls will be provided at each access point of the building / carpark.
- Given that the proposal seeks to develop 47 self care units, significant passive surveillance opportunity will exist to deter anti social behaviour.
- The site is located within an established residential area (both the established Maroba facility and established residential development on the opposite side of Edith Street) and significant passive surveillance opportunity will be available.
- The subject site is not located on a route frequented by pedestrians.

- Maroba staff will be on hand at all times.
- A regular 'walk through' by management will be undertaken as a means of providing ongoing monitoring and a quick response to any issues (ie. vandalism that may arise).
- Appropriate lighting will be installed throughout the development.

Given that the proposal is consistent with the CPTED considerations, it is considered that Council can support the proposal in terms of crime prevention.

5.11 LANDSCAPING

A landscaping plan has been prepared by Terras Landscape Architects to accompany the Development Application (see **Appendix I**). Aesthetically pleasing landscape treatment similar to the existing Maroba development will be provided by the proposal.

It is considered that the proposal is acceptable in terms of landscaping provision.

5.12 WASTE MANAGEMENT

The existing waste management procedures of Maroba will be extended to service the proposed development. This includes opportunities for storage and collection of general waste as well as recyclables.

5.13 SOCIAL AND ECONOMIC IMPACTS

The demand for aged care including self care accommodation in NSW is well beyond available supply. This is widely acknowledged by all levels of government and is the experience of service providers. Maroba advises that there is the equivalent of a 45 year waiting list to get into Maroba. The demand is not only because of the lack of supply but it is an acknowledgment of the reputation of Maroba and of the excellent location of Maroba within the Newcastle LGA, being a central location to provide for aged care relative to their families living within broader Newcastle and relative to services.

Maximising the available accommodation on this site is considered to make good planning sense, particularly noting that Maroba are able to offer a high level of service to these future occupants. It makes good economic sense to consolidate accommodation for aged persons onto the Maroba site, it allows Maroba to more cost effectively deliver its services than if it were to have a number of facilities scattered around the city. This is particularly important for a not for profit organisation. The following observations are made in relation to the desired outcome:

- Reduced capital housing cost can be achieved through economies of scale which will result in more affordable accommodation for seniors. Given that Maroba is a not for profit organisation, this is particularly relevant.
- Efficient and cost effective operations with direct access to the higher care facilities of Maroba for seniors within self care apartments (for examples access to prepared meals). Again, given that Maroba is a not for profit organisation, this is particularly relevant.
- Reducing capital costs and improving cost effectiveness will allow Maroba to offer improved services and facilities to occupants.
- The proposal is consistent with the principles of aging in place with the ability to move from the proposed self care facilities to nursing facilities within the same facility.

It should also be noted that there is an opportunity for social interaction between Maroba and the Waratah West Primary School on the north western side of Braye Park. Maroba management has held discussions with the school principal and it was agreed by both parties that this matter should be investigated. This interaction is also encouraged given that there is an existing pathway across Braye Park between the two facilities.

There are strong social and economic grounds that support the proposed development. It is considered that this can be achieved without significant adverse impact on the amenity of the area.

5.14 PUBLIC INTEREST

Given the significant social and economic benefits to the local community that will be generated by the proposal and the suitability of the site to accommodate the proposed senior living self care apartments as demonstrated by this SoEE, it is considered the proposal is within the 'public interest'.

6.0 Conclusion

Based on the issues relevant to this application, it is considered that the proposed six storey architecturally designed building above basement car parking to accommodate 47 seniors living self care apartments can be supported by Council for the following reasons:

- The proposal complies with the objectives of SEPP (Housing for Seniors or People with a Disability) 2004, the Newcastle LEP 2003 and is permissible within the 2(a) Residential Zone.

- The proposal is consistent with the objectives of the Newcastle Development Control Plan 2005.

- There are strong social and economic grounds for the proposal to proceed that together with the unique site location and attributes warrants departure from Council's adopted height and FSR provisions.

- The SoEE has demonstrated that all key matters associated with the proposal can be addressed, in particular:

    - Traffic, access and car parking;

    - Noise;

    - Bushfire;

    - Contamination;

    - Stormwater;

    - Crime prevention through environmental design;

    - Views and visual impacts; and

    - Landscaping.

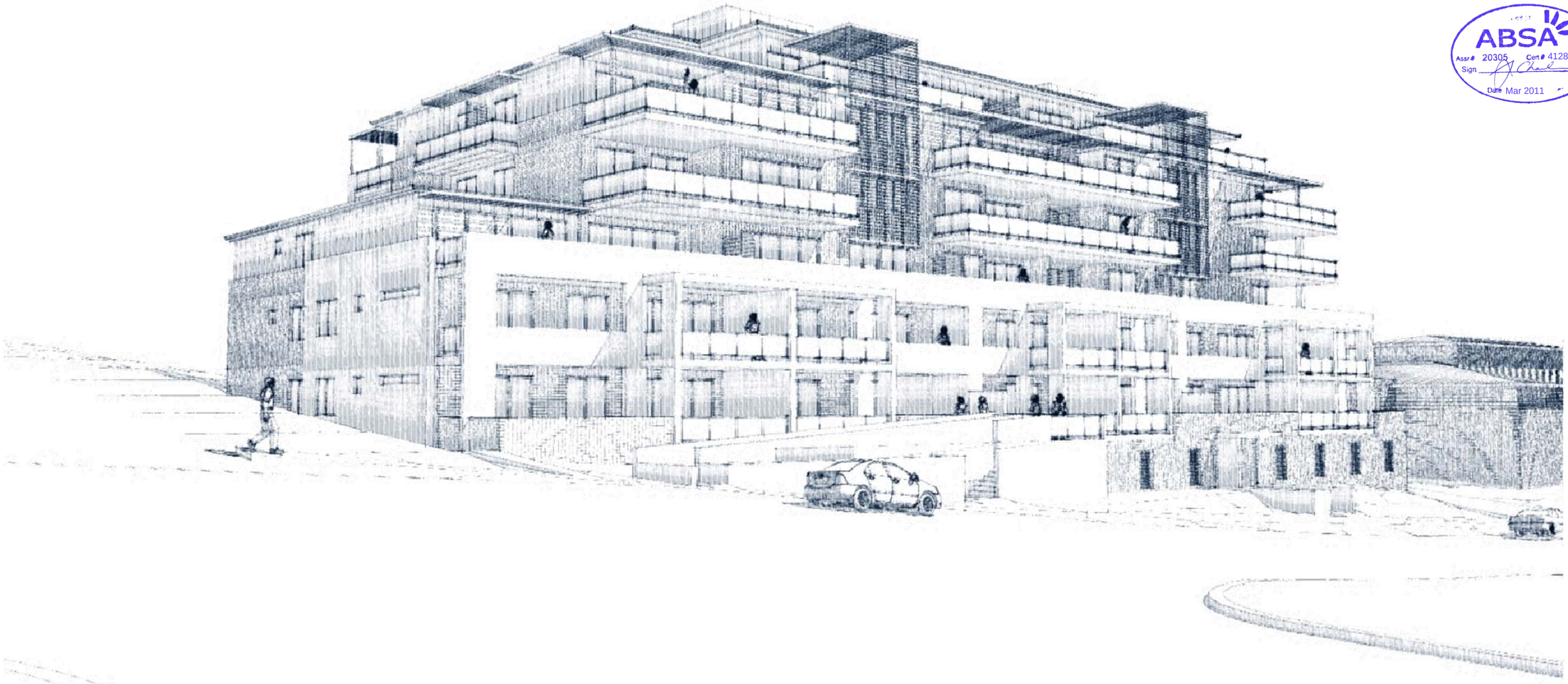
This SoEE has illustrated that the proposed six storey architecturally designed building above basement car parking to accommodate 47 seniors living self care apartments is an ideal development for the locality and will make a positive contribution to the locality and the Newcastle LGA. It is considered that there is no matter which should preclude approval of the proposed development.

Appendix A

Architectural Plans

MAROBA SENIORS LIVING SELF-CARE APARTMENTS

EDITH ST., WARATAH



DRAWING SCHEDULE

Building Sustainability Assessments **Ph: 4962 3439**
enquiries@buildingsustainability.net.au **www. buildingsustainability.net.au**

Important Note for Development Applicants:
The following specification details the requirements necessary to achieve the thermal performance values as indicated on the ABSA Assessor Certificate. Once the development is approved by Council, these specifications will become a condition of consent and must be included in the built works. If you do not want to include these requirements, or need further information, please contact Building Sustainability Assessments.

ABSA Assessor #20305	**Certificate # - Refer to stamp**	**March 2011**

Thermal Performance Specifications - BSA Ref: 6352 (Edith Street)

These are the Specifications upon which the Certified Assessment is based. If they vary from drawings or other written specifications, these Specifications shall take precedence. If only one specification option is detailed for a building element, that specification must apply to all instances of that element for the whole project. If alternate specifications are detailed, the location and extent of the alternate specification must be detailed below and / or clearly indicated on referenced documentation.

External Wall Construction	*Insulation*	*Colour (Solar Absorptance)*	*Detail*
Brick Veneer & Lightweight	R2.0	Any	
Internal Wall Construction	*Insulation*	*Detail*	
Plasterboard on studs & Brick	none		
Ceiling Construction	*Insulation*	*Detail*	
Plasterboard	R3.5 to ceilings adjacent to roof space		
Roof Construction	*Insulation*	*Colour (Solar Absorptance)*	*Detail*
Metal	Foil + R1.0 blanket	Any	
Floor Construction	*Insulation*	*Covering*	*Detail*
Concrete	none	As drawn (if not noted default values used)	

Windows	*Glass and frame type*	*U*	*SHGC*	*Area sq m*	*Detail*
Generic	Single clear Aluminium			As drawn on plans	

Skylights	*Glass and frame type*	*U*	*SHGC*	*Area sq m*	*Detail*

U and SHGC values are according to NFRC. Alternate products may be used if the U value is lower and the SHGC is less than 10% higher or lower than the above figures.

External Window Cover	*Detail*
Fixed shading - Eaves	*Width includes guttering, offset is distance above windows*
Width: 0 Offset: 0	Nominal only, refer to plan for detail
Fixed shading - Other	*Verandahs, Pergolas (type and description)*
Shaded areas as drawn	

Ventilation and Infiltration to Habitable Rooms			
Open fire no damper	no	*Exhaust fans no dampers*	no
Door and window seals	yes	*Vented skylights*	no
Vented downlights	no	*Fixed wall or ceiling vents*	no

"No" means that the item was not included in the assessment and shall not be installed.
Yes to door & window seals means that seals are to be fitted to all external doors and windows.

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DEVELOPMENT SCHEDULE

SITE AREA = 3,008m²

SITE FRONTAGE WIDTH = 72.08m

LEVEL 1 GFA = 1,337m²
LEVEL 2 GFA = 1,312m²
LEVEL 3 GFA = 1,154m²
LEVEL 4 GFA = 1,013m²
LEVEL 5 GFA = 1,013m²
LEVEL 6 GFA = 481m²

TOTAL GFA = 6,310m²

FLOOR / SPACE RATIO = 2.1 : 1

LEVEL 1 (4x1-BED. + 4x2-BED. + 3x2-BED+STUDY) = 11 UNITS
LEVEL 2 (5x2-BED. + 5x2-BED+STUDY) = 10 UNITS
LEVEL 3 (5x2-BED. + 4x2-BED+STUDY) = 9 UNITS
LEVEL 4 (2x2-BED. + 5x2-BED+STUDY) = 7 UNITS
LEVEL 5 (2x2-BED. + 5x2-BED+STUDY) = 7 UNITS
LEVEL 6 (3x2-BED.) = 3 UNITS

TOTAL No. of 2-BED. UNITS = 4
TOTAL No. of 2-BED. UNITS = 18
TOTAL No. of 2-BED. + STUDY UNITS = 25

TOTAL No. of UNITS = 47

TOTAL No. of BEDSROOMS = 115

No. of CARS = 44

LANDSAPED AREA = 1,380.5m² (45.9% of SITE)

MAX. HEIGHT = 21.9m

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
Fax : (02) 4926 3069
Email : mail@eje.com.au
Web Site : http://www.eje.com.au

0 25mm 100mm 200mm ON ORIGINAL A1

REV	DATE	COMMENTS
A	26-02-2011	DA ISSUE

DRN | CHKD | VRFD | PROJECT : | SITE :
PH SS

CLIENT : maroba living communities

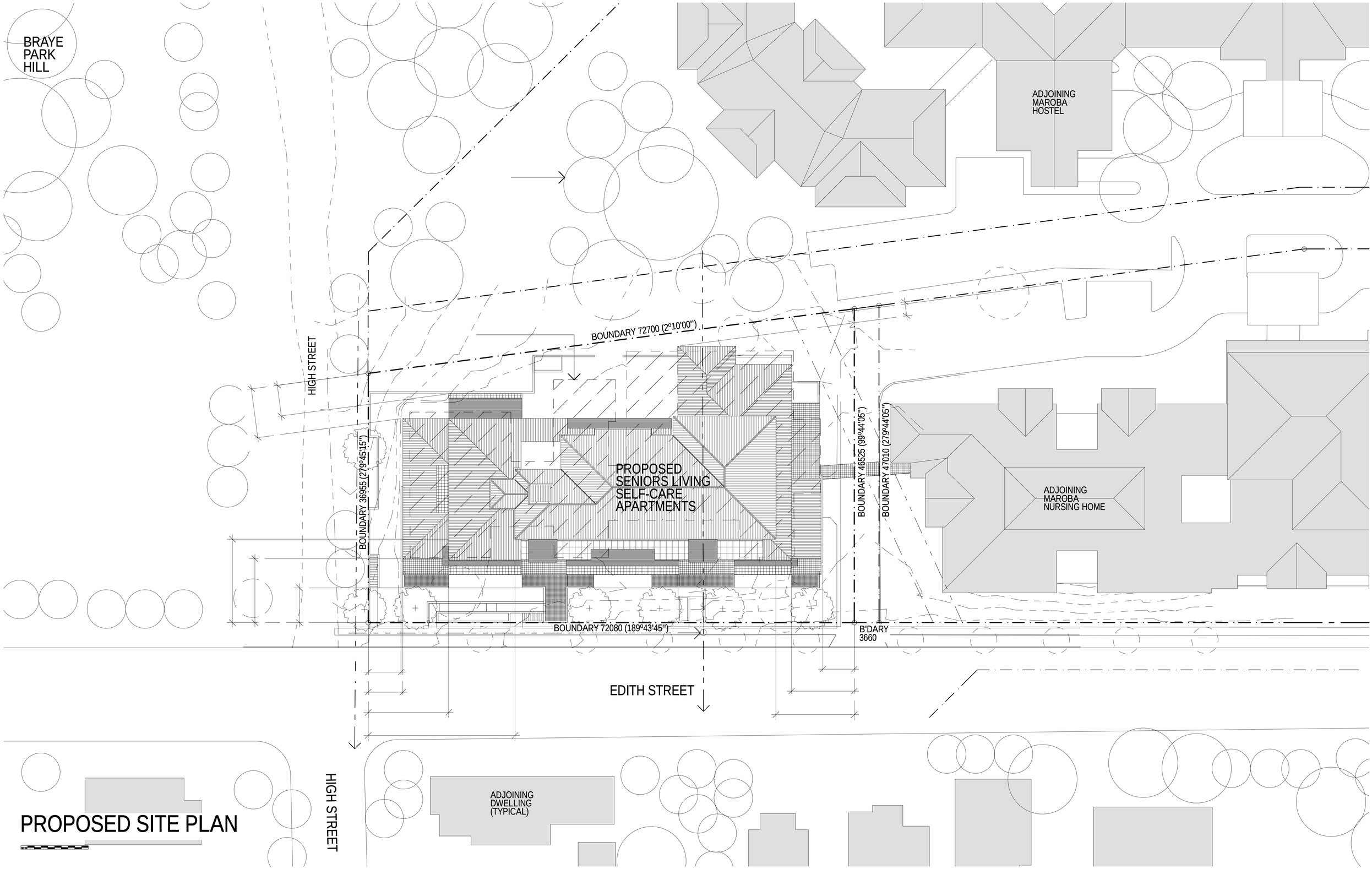
DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	n/a

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A000	A

EJE architecture



PROPOSED SITE PLAN

N

EJE ARCHITECTURE
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Fax : (02) 4926 3069
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0 25mm 100mm 200mm ON ORIGINAL A1

REV	DATE	COMMENTS
A	26-02-2011	DA ISSUE

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN	CHKD	VRFD
PH	SS	

PROJECT :

SITE :

CLIENT : maroba living communities

DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
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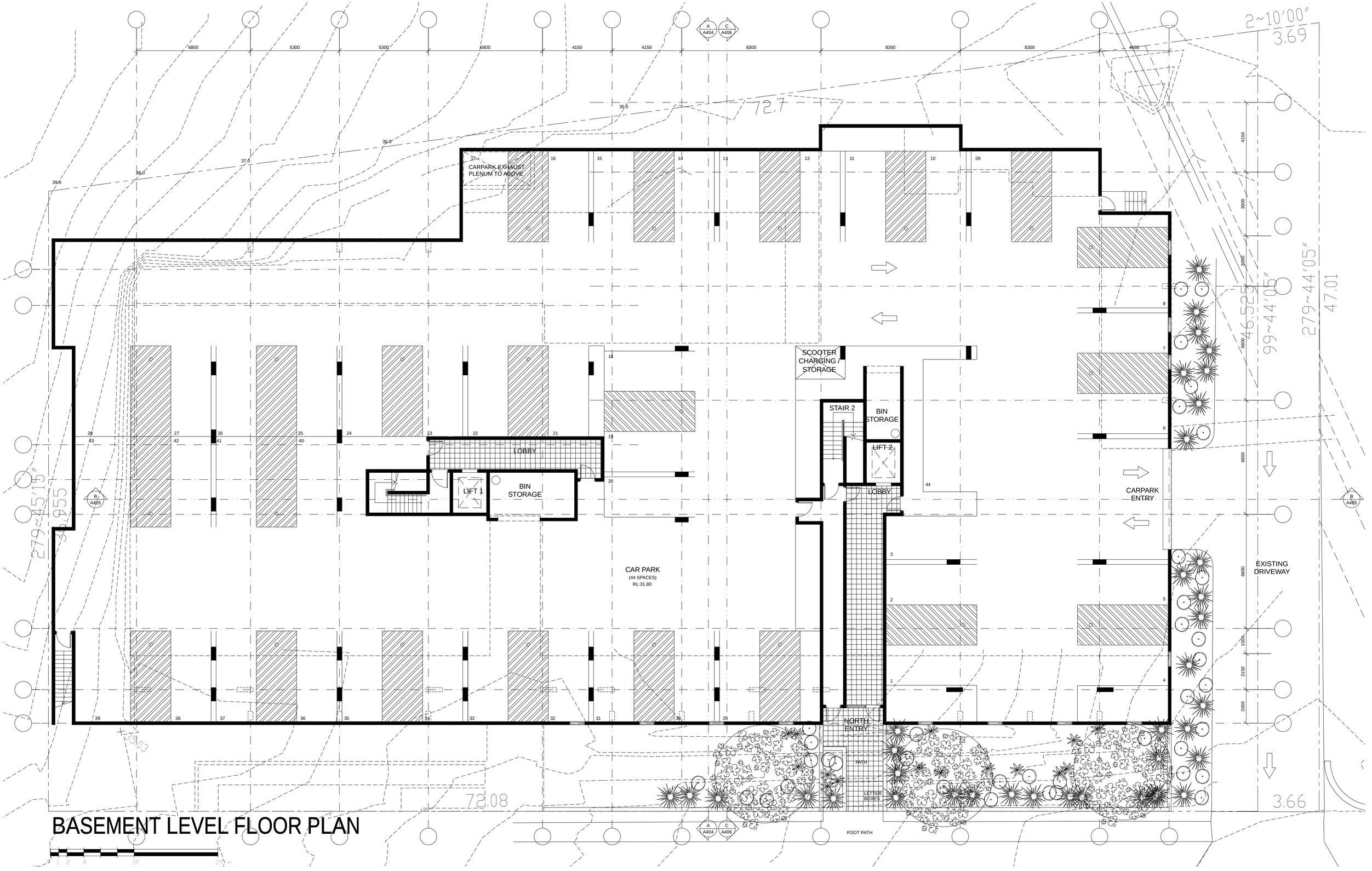
EJE architecture



BASEMENT LEVEL FLOOR PLAN

0 1 2 4 10 20 m

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
Fax : (02) 4926 3069
Email : mail@eje.com.au
Web Site : http://www.eje.com.au

0 25mm 100mm 200mm ON ORIGINAL A1

REV	DATE	COMMENTS
A	26-02-2011	DA ISSUE

DRN	CHKD	VRFD
PH	SS	

PROJECT :

SITE :

CLIENT : maroba living communities

DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
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PROJECT No :	PHASE :	DRAWING No :	REV :
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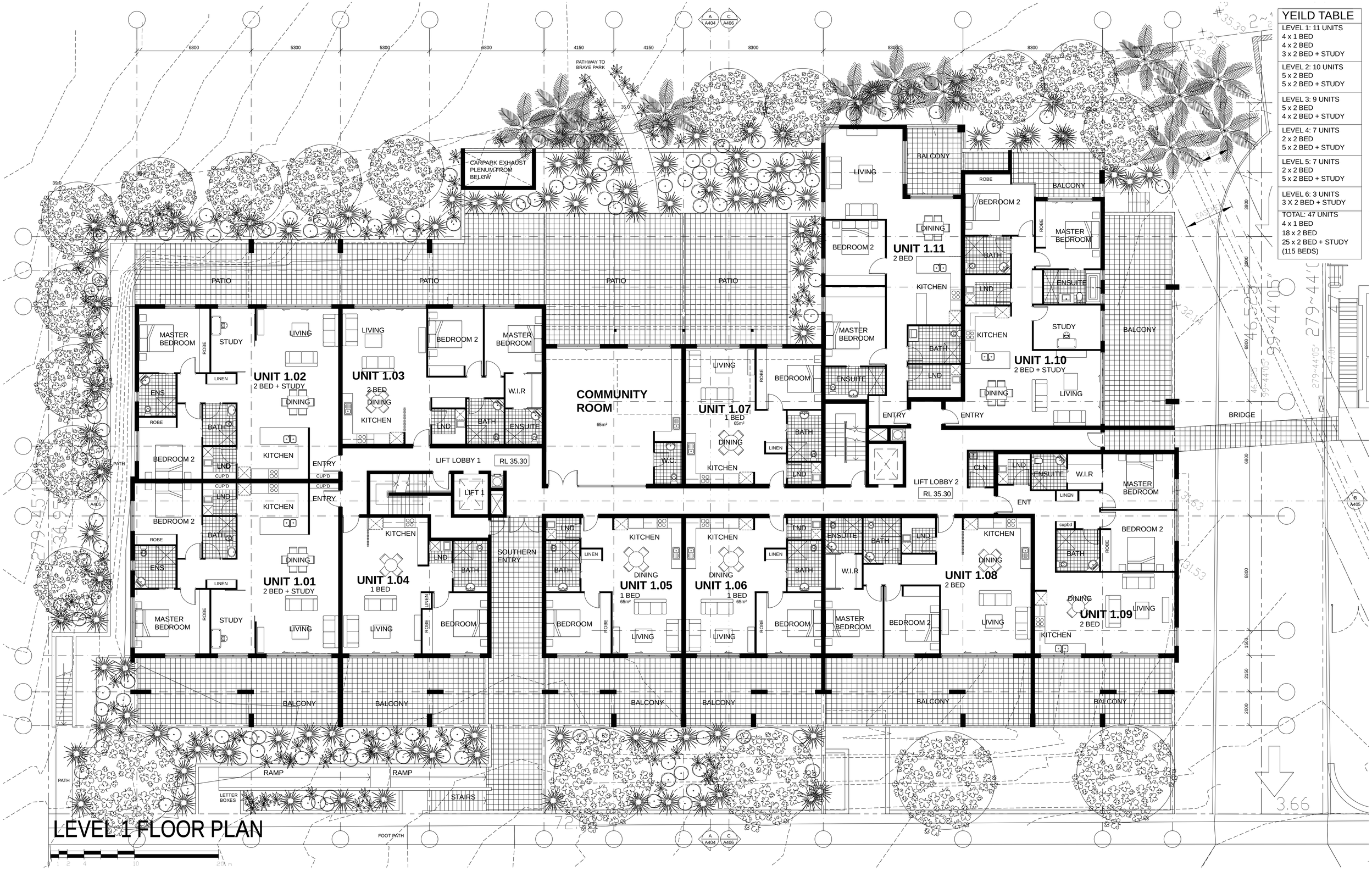
EJE architecture



LEVEL 1 FLOOR PLAN

YEILD TABLE
LEVEL 1: 11 UNITS 4 x 1 BED 4 x 2 BED 3 x 2 BED + STUDY
LEVEL 2: 10 UNITS 5 x 2 BED 5 x 2 BED + STUDY
LEVEL 3: 9 UNITS 5 x 2 BED 4 x 2 BED + STUDY
LEVEL 4: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 5: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 6: 3 UNITS 3 X 2 BED + STUDY
TOTAL: 47 UNITS 4 x 1 BED 18 x 2 BED 25 x 2 BED + STUDY (115 BEDS)

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
Fax : (02) 4926 3069
Email : mail@eje.com.au
Web Site : http://www.eje.com.au

REV	DATE	COMMENTS
A	26-02-2011	DA ISSUE

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN	CHKD	VRFD
PH	SS	

PROJECT :

SITE :

CLIENT : maroba living communities

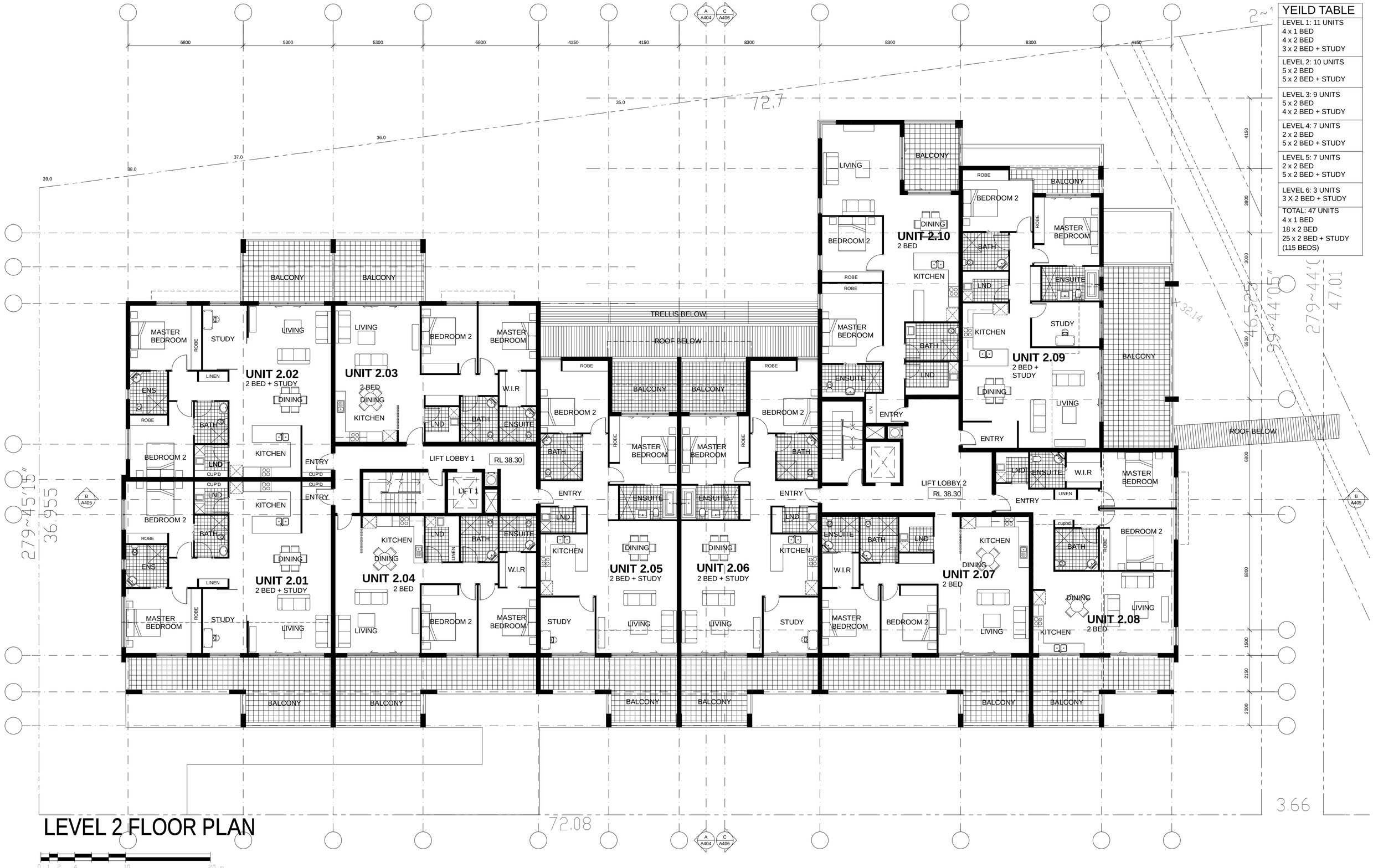
DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A301	A

EJE architecture



LEVEL 2 FLOOR PLAN

0 1 2 4 10 20 m

YEILD TABLE
LEVEL 1: 11 UNITS 4 x 1 BED 4 x 2 BED 3 x 2 BED + STUDY
LEVEL 2: 10 UNITS 5 x 2 BED 5 x 2 BED + STUDY
LEVEL 3: 9 UNITS 5 x 2 BED 4 x 2 BED + STUDY
LEVEL 4: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 5: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 6: 3 UNITS 3 X 2 BED + STUDY
TOTAL: 47 UNITS 4 x 1 BED 18 x 2 BED 25 x 2 BED + STUDY (115 BEDS)

EJE ARCHITECTURE
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Ph : (02) 4929 2353
Fax : (02) 4926 3069
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N

0 25mm 100mm 200mm ON ORIGINAL A1

REV	DATE	COMMENTS
A	26-02-2011	DA ISSUE

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN	CHKD	VRFD
PH	SS	

PROJECT :

SITE :

CLIENT : maroba living communities

DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A302	A

EJE architecture

YEILD TABLE
LEVEL 1: 11 UNITS 4 x 1 BED 4 x 2 BED 3 x 2 BED + STUDY
LEVEL 2: 10 UNITS 5 x 2 BED 5 x 2 BED + STUDY
LEVEL 3: 9 UNITS 5 x 2 BED 4 x 2 BED + STUDY
LEVEL 4: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 5: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 6: 3 UNITS 3 X 2 BED + STUDY
TOTAL: 47 UNITS 4 x 1 BED 18 x 2 BED 25 x 2 BED + STUDY (115 BEDS)

LEVEL 3 FLOOR PLAN

0 1 2 4 10 20 m

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
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Email : mail@eje.com.au
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REV	DATE	COMMENTS
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ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN	CHKD	VRFD
PH	SS	

PROJECT :

SITE :

CLIENT : maroba living communities

DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A303	A

EJE architecture

YEILD TABLE
LEVEL 1: 11 UNITS 4 x 1 BED 4 x 2 BED 3 x 2 BED + STUDY
LEVEL 2: 10 UNITS 5 x 2 BED 5 x 2 BED + STUDY
LEVEL 3: 9 UNITS 5 x 2 BED 4 x 2 BED + STUDY
LEVEL 4: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 5: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 6: 3 UNITS 3 X 2 BED + STUDY
TOTAL: 47 UNITS 4 x 1 BED 18 x 2 BED 25 x 2 BED + STUDY (115 BEDS)

LEVEL 4 FLOOR PLAN

0 1 2 4 10 20 m

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
Fax : (02) 4926 3069
Email : mail@eje.com.au
Web Site : http://www.eje.com.au

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REV	DATE	COMMENTS
A	26-02-2011	DA ISSUE

ABSA
Assr# 20305 Cert# 41284391
Sign
Date Mar 2011

DRN	CHKD	VDFD
PH	SS	

PROJECT :

SITE :

CLIENT : maroba living communities

DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A304	A

EJE architecture

YEILD TABLE
LEVEL 1: 11 UNITS 4 x 1 BED 4 x 2 BED 3 x 2 BED + STUDY
LEVEL 2: 10 UNITS 5 x 2 BED 5 x 2 BED + STUDY
LEVEL 3: 9 UNITS 5 x 2 BED 4 x 2 BED + STUDY
LEVEL 4: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 5: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 6: 3 UNITS 3 X 2 BED + STUDY
TOTAL: 47 UNITS 4 x 1 BED 18 x 2 BED 25 x 2 BED + STUDY (115 BEDS)

UNIT 5.01
2 BED + STUDY

UNIT 5.02
2 BED + STUDY

UNIT 5.03
2 BED + STUDY

UNIT 5.04
2 BED + STUDY

UNIT 5.05
2 BED + STUDY

UNIT 5.06
2 BED

UNIT 5.07
2 BED

LIFT LOBBY 1 RL 47.30

LIFT LOBBY 2 RL 41.30

LEVEL 5 FLOOR PLAN

0 1 2 4 10 20 m

EJE ARCHITECTURE
ACN 002 912 843
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REV	DATE	COMMENTS
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ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN	CHKD	VRFD
PH	SS	

PROJECT :

SITE :

CLIENT : maroba living communities

DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A305	A

EJE architecture

YEILD TABLE
LEVEL 1: 11 UNITS 4 x 1 BED 4 x 2 BED 3 x 2 BED + STUDY
LEVEL 2: 10 UNITS 5 x 2 BED 5 x 2 BED + STUDY
LEVEL 3: 9 UNITS 5 x 2 BED 4 x 2 BED + STUDY
LEVEL 4: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 5: 7 UNITS 2 x 2 BED 5 x 2 BED + STUDY
LEVEL 6: 3 UNITS 3 X 2 BED + STUDY
TOTAL: 47 UNITS 4 x 1 BED 18 x 2 BED 25 x 2 BED + STUDY (115 BEDS)

LEVEL 6 FLOOR PLAN

0 1 2 4 10 20 m

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
Fax : (02) 4926 3069
Email : mail@eje.com.au
Web Site : http://www.eje.com.au

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REV	DATE	COMMENTS
A	26-02-2011	DA ISSUE

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN	CHKD	VRFD
PH	SS	

PROJECT :

SITE :

CLIENT : maroba living communities

DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A306	A

EJE architecture

EAST ELEVATION

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
Fax : (02) 4926 3069
Email : mail@eje.com.au
Web Site : http://www.eje.com.au

0 25mm 100mm 200mm ON ORIGINAL A1

REV	DATE	COMMENTS
A	26-02-2011	DA ISSUE

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN	CHKD	VRFD
PH	SS	

PROJECT :

SITE :

CLIENT : maroba living communities

DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A400	A

EJE architecture

NORTH ELEVATION

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
Fax : (02) 4926 3069
Email : mail@eje.com.au
Web Site : http://www.eje.com.au

0 25mm 100mm 200mm ON ORIGINAL A1

REV	DATE	COMMENTS

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN	CHKD	VRFD

PROJECT :

SITE :

CLIENT : maroba living communities

DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A401	A

EJE architecture

SOUTH ELEVATION

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
Fax : (02) 4926 3069
Email : mail@eje.com.au
Web Site : http://www.eje.com.au

0 25mm 100mm 20mm ORIGINAL A1

REV	DATE	COMMENTS

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN	CHKD	VRFD

PROJECT :

SITE :

CLIENT : maroba living communities

DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A402	A

EJE architecture

WEST ELEVATION

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
Fax : (02) 4926 3069
Email : mail@eje.com.au
Web Site : http://www.eje.com.au

0 25mm 100mm 20mm ON ORIGINAL A1

REV	DATE	COMMENTS

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN | CHKD | VRFD

PROJECT :

SITE :

CLIENT : maroba living communities

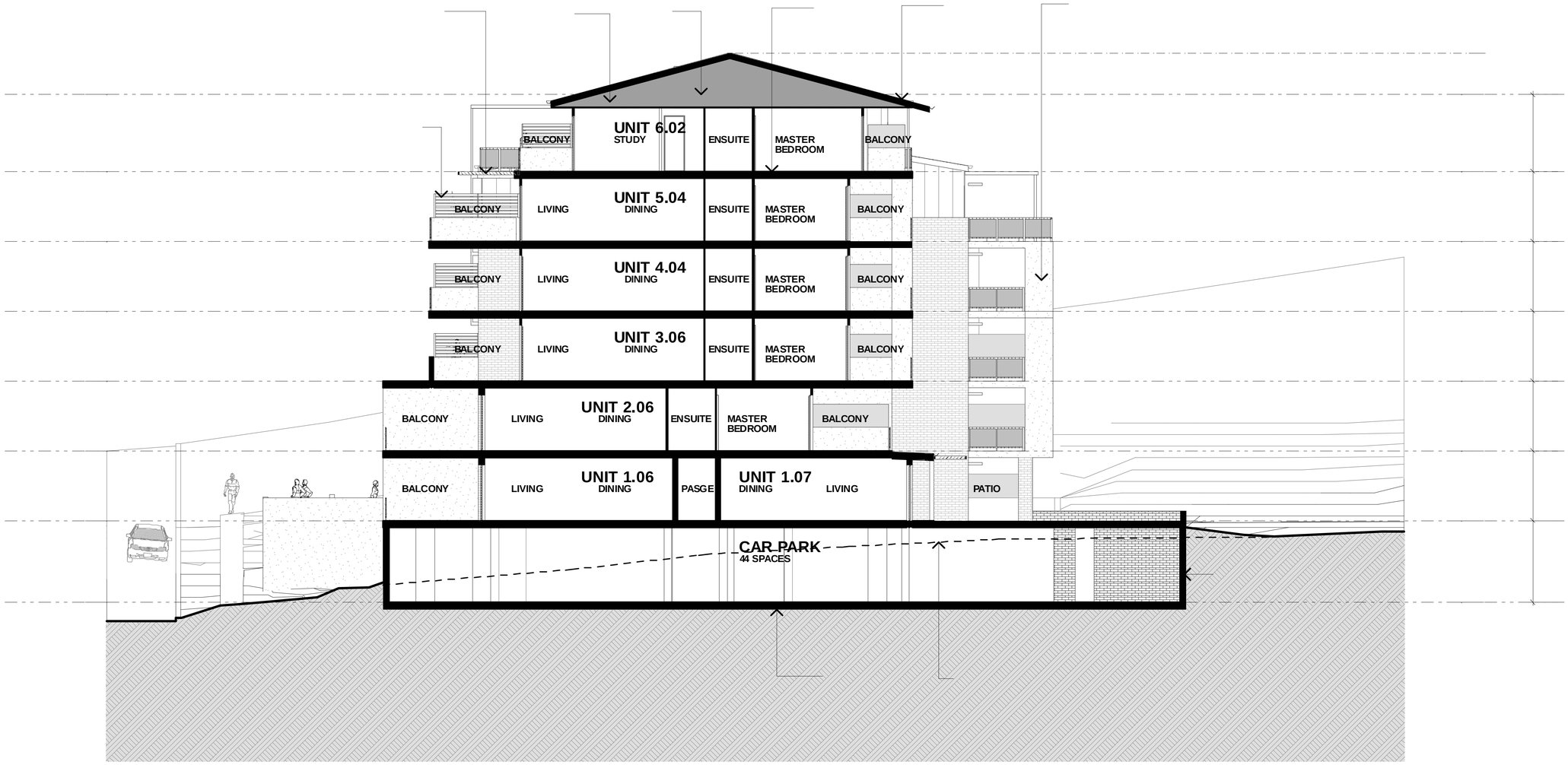
DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A403	A

EJE architecture



SECTION A-A

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
Fax : (02) 4929 3069
Email : mail@eje.com.au
Web Site : http://www.eje.com.au

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| REV | DATE | COMMENTS |

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

| DRN | CHKD | VRFD |

PROJECT :

SITE :

CLIENT : maroba living communities

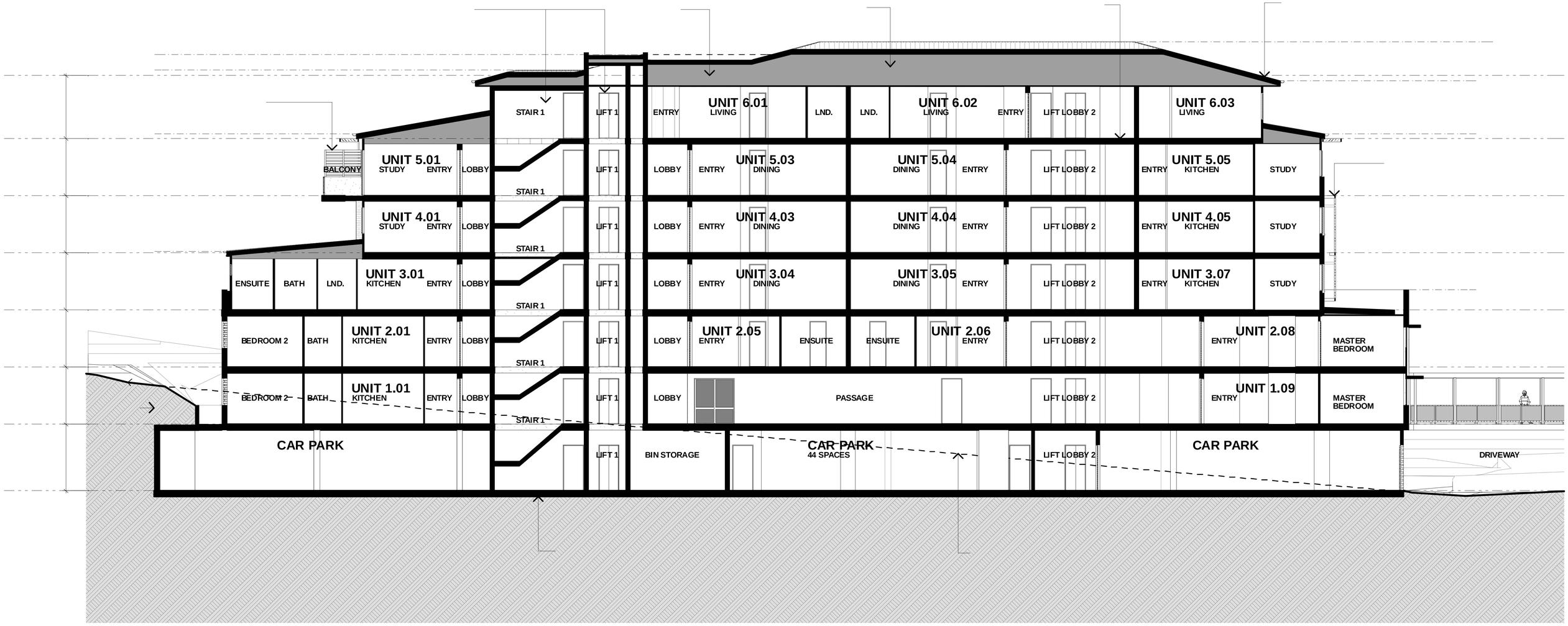
DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A404	A

EJE architecture



SECTION B-B

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300
Ph : (02) 4929 2353
Fax : (02) 4926 3069
Email : mail@eje.com.au
Web Site : http://www.eje.com.au

0 25mm 100mm 200mm ON ORIGINAL A1

REV	DATE	COMMENTS

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN	CHKD	VRFD

PROJECT :

SITE :

CLIENT : maroba living communities

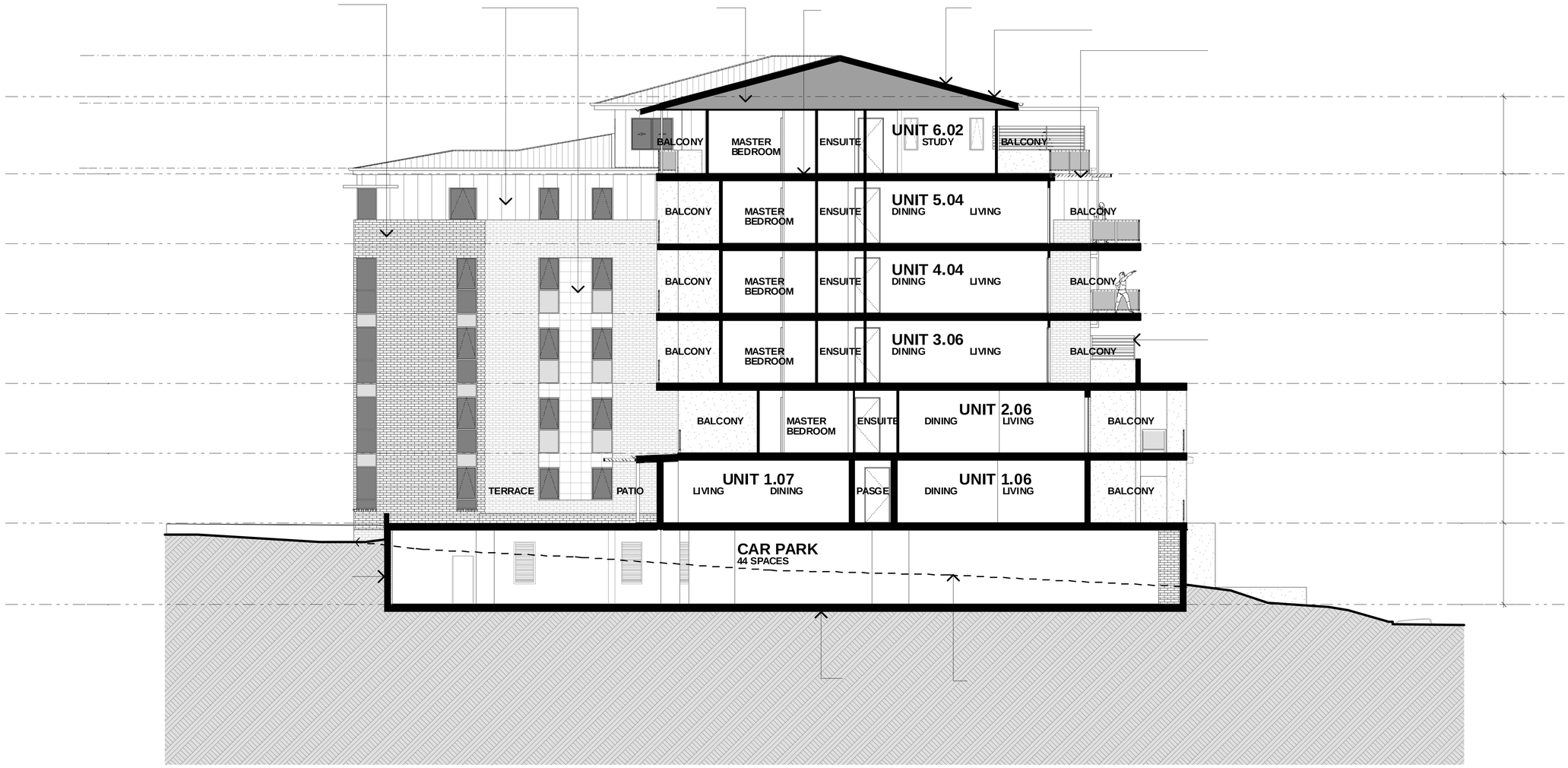
DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A405	A

EJE architecture



SECTION C-C

EJE ARCHITECTURE
ACN 002 912 843
ABN 82 644 649 849
412 King St NEWCASTLE NSW 2300

Ph : (02) 4929 2353
Fax : (02) 4926 3069
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REV	DATE	COMMENTS

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

DRN	CHKD	VRFD

PROJECT :

SITE :

CLIENT : maroba living communities

DRAWING :

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
PH	DEC 2009	1:100 (A1) 1:200 (A3)

PROJECT No :	PHASE :	DRAWING No :	REV :
7480	SK	A406	A

EJE architecture

Appendix B

BASIX Certificate

BASIX® Certificate

Building Sustainability Index www.basix.nsw.gov.au

Multi Dwelling

Certificate number: 363929M

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 29/06/2009 published by the Department of Planning. This document is available at www.basix.nsw.gov.au

Director-General
Date of issue: Friday, 04 March 2011

NSW GOVERNMENT | Planning

Project summary		
Project name	6352 - EJE - Maroba Apartments.	
Street address	L1 Edith Street Waratah 2298	
Local Government Area	Newcastle City Council	
Plan type and plan number	deposited 1131868	
Lot no.	1	
Section no.	-	
No. of unit buildings	1	
No. of units in unit buildings	47	
No. of attached dwelling houses	0	
No. of separate dwelling houses	0	
Project score		
Water	✓ 40	Target 40
Thermal Comfort	✓ Pass	Target Pass
Energy	✓ 21	Target 20

Certificate Prepared by

Building SustainabilityAssessments
(ABN: 27 131 950 064)

Phone: 02 4962 3439 Fax: 02 4962 3470 Email: enquiries@buildingsustainability.net.au

Description of project

Project address	
Project name	6352 - EJE - Maroba Apartments.
Street address	L1 Edith Street Waratah 2298
Local Government Area	Newcastle City Council
Plan type and plan number	deposited 1131868
Lot no.	1
Section no.	-

Project type	
No. of unit buildings	1
No. of units in unit buildings	47
No. of attached dwelling houses	0
No. of separate dwelling houses	0

Site details	
Site area (m²)	3004
Roof area (m²)	1267
Non-residential floor area (m²)	0
Residential car spaces	43
Non-residential car spaces	0

Common area landscape	
Common area lawn (m²)	0
Common area garden (m²)	758
Area of indigenous or low water use species (m²)	-

Assessor details	
Assessor number	20305
Certificate number	41284391
Climate zone	15

Project score		
Water	✓ 40	Target 40
Thermal Comfort	✓ Pass	Target Pass
Energy	✓ 21	Target 20

Description of project

The tables below describe the dwellings and common areas within the project

Unit building - Building1, 47 dwellings, 7 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
101	2	122.0	0.0	0	0
105	1	66.0	0.0	0	0
109	2	106.0	0.0	0	0
202	2	119.0	0.0	0	0
206	3	126.0	0.0	0	0
210	2	118.0	0.0	0	0
304	2	96.0	0.0	0	0
308	2	112.0	0.0	0	0
403	3	124.0	0.0	0	0
407	2	118.0	0.0	0	0
504	3	124.0	0.0	0	0
601	2	142.0	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
102	2	119.0	0.0	0	0
106	1	66.0	0.0	0	0
110	3	114.0	0.0	0	0
203	2	94.0	0.0	0	0
207	2	98.0	0.0	0	0
301	2	96.0	0.0	0	0
305	3	124.0	0.0	0	0
309	2	118.0	0.0	0	0
404	3	124.0	0.0	0	0
501	3	138.0	0.0	0	0
505	3	136.0	0.0	0	0
602	2	134.0	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
103	2	94.0	0.0	0	0
107	1	66.0	0.0	14	0
111	2	118.0	0.0	0	0
204	2	98.0	0.0	0	0
208	2	106.0	0.0	0	0
302	2	119.0	0.0	0	0
306	3	124.0	0.0	0	0
401	3	138.0	0.0	0	0
405	3	136.0	0.0	0	0
502	3	138.0	0.0	0	0
506	2	112.0	0.0	0	0
603	3	140.0	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
104	1	65.0	0.0	0	0
108	2	98.0	0.0	0	0
201	2	122.0	0.0	0	0
205	3	126.0	0.0	0	0
209	3	124.0	0.0	0	0
303	2	94.0	0.0	0	0
307	3	136.0	0.0	0	0
402	3	138.0	0.0	0	0
406	2	112.0	0.0	0	0
503	3	124.0	0.0	0	0
507	2	118.0	0.0	0	0

Description of project

The tables below describe the dwellings and common areas within the project

Common areas of unit building - Building1

Common area	Floor area (m²)
Car park area (LB)	1946
Garbage rooms (LB)	22
Ground floor lobby type (LB)	91
Hallway/lobby type (L3)	69
Hallway/lobby type (L6)	43

Common area	Floor area (m²)
Lift car (No. 1)	-
Community room (L1)	65
Hallway/lobby type (L1)	108
Hallway/lobby type (L4)	69

Common area	Floor area (m²)
Lift car (No. 2)	-
cleaners room (L1)	3
Hallway/lobby type (L2)	74
Hallway/lobby type (L5)	69

Schedule of BASIX commitments

1. Commitments for unit building - Building1
    - (a) Dwellings
        - (i) Water
        - (ii) Energy
        - (iii) Thermal Comfort
    - (b) Common areas and central systems/facilities
        - (i) Water
        - (ii) Energy

2. Commitments for attached dwelling houses

3. Commitments for separate dwelling houses

4. Commitments for common areas and central systems/facilities for the development (non-building specific)
    - (i) Water
    - (ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for unit building - Building1

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✓	✓	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✓	✓
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✓	✓
(e) The applicant must install:			
(aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and		✓	✓
(bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✓	✓
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✓	✓	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✓	
(g) The pool or spa must be located as specified in the table.	✓	✓	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✓	✓	✓

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	3 star (> 4.5 but <= 6 L/min)	3 star	5 star	5 star	no	-	-	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
None	-	-	-	-	-	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✓	✓	✓
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✓	✓
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✓	✓
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✓	✓

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✓	✓	✓
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must:			
(aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and		✓	
(bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✓	
(h) The applicant must install in the dwelling:			
(aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below;		✓	
(bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and		✓	✓
(cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✓	
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✓	

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	gas instantaneous 5 star	individual fan, ducted to façade or roof	interlocked to light	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
603	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	0	0	no	no	no	no	1	yes
109, 208, 401, 402, 501, 502, 601, 602	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	0	0	no	no	no	no	0	yes
101, 102, 110, 201, 202, 209, 210, 301, 302, 308, 309, 406, 407, 506, 507	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	0	0	no	no	no	no	1	no

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
103, 104, 105, 106, 107, 108, 111, 203, 204, 205, 206, 207, 303, 304, 305, 306, 307, 403, 404, 405, 503, 504, 505	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	1-phase airconditioning EER 2.5 - 3.0 (zoned)	0	0	no	no	no	no	0	no

	Individual pool		Individual spa		Appliances & other efficiency measures							
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	electric cooktop & electric oven	-	no	-	-	-	no	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.			
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.			
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✓	✓
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✓	✓	✓
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✓	✓	✓

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
101	17	13
104	19	10
105	18	9
106	12	8
107	2	7

	Thermal loads	
Dwelling no.	**Area adjusted heating load (in mJ/m²/yr)**	**Area adjusted cooling load (in mJ/m²/yr)**
110	21	11
111	18	10
201	18	13
208	6	11
209	5	15
301	20	19
302	16	17
304	10	17
307	22	17
401	19	16
402	21	15
501	20	28
502	26	31
505	26	18
506	9	17
601	20	29
602	20	33
603	11	20
102, 202	9	13
205, 206	17	9
405, 507	22	14
503, 504	11	15
103, 203, 303	10	11
108, 204, 207	15	11
109, 308, 406	4	11
210, 309, 407	20	11
All other dwellings	13	10

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	3 star	5 star	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

	Common area ventilation system		Common area lighting		
Common area	**Ventilation system type**	**Ventilation efficiency measure**	**Primary type of artificial lighting**	**Lighting efficiency measure**	**Lighting control system/BMS**
Car park area (LB)	ventilation exhaust only	carbon monoxide monitor + VSD fan	fluorescent	daylight sensor and motion sensor	No
Lift car (No. 1)	-	-	fluorescent	connected to lift call button	No
Lift car (No. 2)	-	-	fluorescent	connected to lift call button	No
Garbage rooms (LB)	ventilation exhaust only	-	fluorescent	motion sensors	No
Community room (L1)	no mechanical ventilation	-	fluorescent	daylight sensor and motion sensor	No
cleaners room (L1)	no mechanical ventilation	-	fluorescent	manual on / manual off	No
Ground floor lobby type (LB)	no mechanical ventilation	-	fluorescent	daylight sensor and motion sensor	No
Hallway/lobby type (L1)	no mechanical ventilation	-	fluorescent	daylight sensor and motion sensor	No
Hallway/lobby type (L2)	no mechanical ventilation	-	fluorescent	daylight sensor and motion sensor	No
Hallway/lobby type (L3)	no mechanical ventilation	-	fluorescent	daylight sensor and motion sensor	No
Hallway/lobby type (L4)	no mechanical ventilation	-	fluorescent	daylight sensor and motion sensor	No
Hallway/lobby type (L5)	no mechanical ventilation	-	fluorescent	daylight sensor and motion sensor	No
Hallway/lobby type (L6)	no mechanical ventilation	-	fluorescent	daylight sensor and motion sensor	No

Central energy systems	Type	Specification
Lift (No. 1)	geared traction with V V A C motor	Number of levels (including basement): 7
Lift (No. 2)	geared traction with V V A C motor	Number of levels (including basement): 7

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	3 star	5 star	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✓" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✓" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✓" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).

Assessor Certificate

Multiple Dwellings

Certificate Version 6.1. Prior versions not valid after 1 March 2006

Issued in accordance with
BASIX Thermal Comfort Simulation Method.

ABSA
Association of Building Sustainability Assessors

Assessor					
Name:	Gavin Chambers	**Company:**	Building Sustainability Assessments	**ABSA #:**	20305
Address:	7 William Street, HAMILTON NSW 2303				
Phone:	(02) 4962 3439	**Fax:**	(02) 4962 3470	**Email:**	enquiries@buildingsustainability.net.au
Declaration of interest:	None				
Client					
Name:		**Company:**	EJE Architecture		
Address:	412 King Street NEWCASTLE NSW 2300				
Phone:		**Fax:**		**Email:**	
Project					
Address:	Lot 1 Edith Street WARATAH NSW 2298				
Applicant:				**Climate Zone:**	15
Assessment					
Date:	3 Mar 11	**File ref:**	6352	**Software:**	BERS **Version:** 4.1
Documentation					

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

Thermal Performance Spec:
Attached, Affixed to drawings Page#: A00

Drawings: (Title, Ref.#, Revision, Issue date, etc)
EJE Architecture – Project No: 7480

Building Specifications: (Title, Ref.#, Revision, Issue date, etc)
None

Unit No.	Certificate number	Floor area		Predict. loads (MJ/M^2/y)		
		Cond.	Uncond.	Heat	Cool (Sens & Lat)	
101	41284391	122	0	17	13	
102	26197505	119	0	9	13	
103	30482806	94	0	10	11	
104	95713846	65	0	19	10	
105	48286642	66	0	18	9	
106	82877285	66	0	12	8	
107	77669898	66	0	2	7	
108	53631745	98	0	15	11	
109	73837776	106	0	4	11	
110	37175138	114	0	21	11	
111	37421971	118	0	18	10	
201	57769587	122	0	18	13	
202	26197505	119	0	9	13	

Building Sustainability Assessments	**Ph: 4962 3439**
enquiries@buildingsustainability.net.au	**www. buildingsustainability.net.au**

Important Note for Development Applicants:
The following specification details the requirements necessary to achieve the thermal performance values as indicated on the ABSA Assessor Certificate. Once the development is approved by Council, these specifications will become a condition of consent and must be included in the built works. If you do not want to include these requirements, or need further information, please contact Building Sustainability Assessments.

ABSA Assessor #20305 **Certificate # - Refer to stamp** **March 2011**

Thermal Performance Specifications - BSA Ref: 6352 (Edith Street)

These are the Specifications upon which the Certified Assessment is based. If they vary from drawings or other written specifications, these Specifications shall take precedence. If only one specification option is detailed for a building element, that specification must apply to all instances of that element for the whole project. If alternate specifications are detailed, the location and extent of the alternate specification must be detailed below and / or clearly indicated on referenced documentation.

External Wall Construction	*Insulation*	*Colour (Solar Absorptance)*	*Detail*
Brick Veneer & Lightweight	R2.0	Any	

Internal Wall Construction	*Insulation*	*Detail*
Plasterboard on studs & Brick	none	

Ceiling Construction	*Insulation*	*Detail*
Plasterboard	R3.5 to ceilings adjacent to roof space	

Roof Construction	*Insulation*	*Colour (Solar Absorptance)*	*Detail*
Metal	Foil + R1.0 blanket	Any	

Floor Construction	*Insulation*	*Covering*	*Detail*
Concrete	none	As drawn (if not noted default values used)	

Windows	*Glass and frame type*	*U*	*SHGC*	*Area sq m*	*Detail*
Generic	Single clear Aluminium			As drawn on plans	

Skylights	*Glass and frame type*	*U*	*SHGC*	*Area sq m*	*Detail*

U and SHGC values are according to NFRC. Alternate products may be used if the U value is lower and the SHGC is less then 10% higher or lower then the above figures.

External Window Cover	*Detail*

Fixed shading - Eaves	*Width includes guttering, offset is distance above windows*
Width: 0 Offset: 0	Nominal only, refer to plan for detail

Fixed shading - Other	*Verandahs, Pergolas (type and description)*
Shaded areas as drawn	

Ventilation and Infiltration to Habitable Rooms			
Open fire no damper	no	*Exhaust fans no dampers*	no
Door and window seals	yes	*Vented skylights*	no
Vented downlights	no	*Fixed wall or ceiling vents*	no

"No" means that the item was not included in the assessment and shall not be installed.
Yes to door & window seals means that seals are to be fitted to all external doors and windows.

ABSA Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

Unit No.	Certificate number	Floor area		Predict. loads (MJ/M^2/y)		
		Cond.	Uncond.	Heat	Cool (Sens & Lat)	
203	30482806	94	0	10	11	
204	53631745	98	0	15	11	
205	60713639	126	0	17	9	
206	60713639	126	0	17	9	
207	53631745	98	0	15	11	
208	27223819	106	0	6	11	
209	28565169	124	0	5	15	
210	66533927	118	0	20	11	
301	95505592	96	0	20	19	
302	75348223	119	0	16	17	
303	30482806	94	0	10	11	
304	68081768	96	0	10	17	
305	27149174	124	0	13	10	
306	27149174	124	0	13	10	
307	70268264	136	0	22	17	
308	62452544	112	0	4	11	
309	66533927	118	0	20	11	
401	83862152	138	0	19	16	
402	75444287	138	0	21	15	
403	27149174	124	0	13	10	
404	27149174	124	0	13	10	
405	43822753	136	0	22	14	
406	62452544	112	0	4	11	
407	66533927	118	0	20	11	
501	92366413	138	0	20	28	
502	13632110	138	0	26	31	
503	77142848	124	0	11	15	
504	77142848	124	0	11	15	
505	15213467	136	0	26	18	
506	73811672	112	0	9	17	
507	81314834	118	0	22	14	
601	87362718	142	0	20	29	
602	97409322	134	0	20	33	
603	24486109	140	0	11	20	

ABSA
Assr # 20305 Cert # 41284391
Sign
Date Mar 2011

Appendix C

Traffic Assessment Report

TRAFFIC ASSESSMENT REPORT

FOR

PROPOSED

REDEVELOPMENT

OF

MAROBA

AGED CARE FACILITY

EDITH STREET

WARATAH

23 FEBRUARY 2011

BJ Bradley & Associates
Consulting Civil and Traffic Engineers
P O Box 2030
Gateshead Business Centre
GATESHEAD NSW 2290
Phone and Fax: 02 49485212
Mobile: 0412 490 859
Email: bjbradle@tpg.com.au

1.0 INTRODUCTION

This Traffic Assessment Report examines the potential traffic impacts of proposed redevelopment of the existing Maroba Aged Care Facility on Edith Street, Waratah.

The site is located on the western side of Edith Street, and south of Myall Road, Waratah.

The Maroba Aged Care Facility has operated on the site for many years and requires further expansion to cater for increasing demand.

The development will involve construction of a new building containing self care apartments within the existing Aged Care Facility to replace an old 79 bed facility on the site that was demolished in 2008.

2.0 LOCALITY DIAGRAM

3.0 ADJACENT DEVELOPMENTS

The majority of existing properties in this general area are residential.

The Mater Hospital complex is located a block further north of the existing Maroba Aged Care Facility Facility, on both sides of Platt Street.

4.0 TRAFFIC ENVIRONMENT ON EDITH STREET

Edith Street in the vicinity of the Maroba Aged Care Facility is a Local Road that provides a connector road function. Edith Street has a single travel / parking lane along the frontage of the Maroba Aged Care Facility.

Edith Street is approximately 13 metres wide between kerb faces.

Edith Street has kerb and gutter along both sides. There is a raised concrete median of variable width adjacent to the High Street junction just south of the Maroba Aged Care Facility that prevents right turns into High Street from Edith Street.

Edith Street has a straight horizontal alignment and a variable downhill gradient towards the north in the vicinity of the existing Maroba Aged Care Facility.

The existing speed zone along Edith Street is 60km/h.

There is a pedestrian refuge facility at the northern end of the seagull merge lane, just north of the existing central driveway from the Maroba Aged Care Facility.

There are traffic signals at the intersection of Edith Street and Platt Street, just north of the Maroba Aged Care Facility.

5.0 TRAFFIC ENVIRONMENT ON MYALL ROAD

Myall Road is a short local street west of Bridge Street terminating at the Maroba Aged Care Facility just west of Edith Street.

Myall Road has kerb and gutter along both sides and has a carriageway width of 9.2 m between kerb faces.

Myall Road has an uphill gradient towards the west from Bridge Street and has a straight horizontal alignment.

There is no linemarking on Myall Road.

There are grassed footways along both sides of Myall Road between the Maroba Aged Care Facility and Edith Street, and has concrete footpaths along both sides between Edith Street and Bridge Street.

There is street lighting along Myall Road.

The speed zone on Myall Road is 50km/h, with a 40km/h School Zone near Bridge Street.

6.0 PROPOSED AGED CARE FACILITY REDEVELOPMENT

The Maroba Aged Care Facility currently provides:

- A 52 bed low car facility including 12 dementia specific beds
- A 100 bed high care facility including 25 dementia specific beds
- A self care village containing 23 residences

The proposed redevelopment of the Maroba Aged Care Facility involves the provision of a new building at the existing Aged Care Facility to accommodate increasing demand on a vacant part of the site that was previously occupied by an old building that accommodated 79 beds. The new apartment building will accommodate 47 unit self care units within the existing Maroba Aged Care Facility.

7.0 TRAFFIC GENERATION FROM PROPOSED AGED CARE FACILITY REDEVELOPMENT

The proposed redevelopment of the Maroba Aged Care Facility will provide a new building containing 47 self care units.

The RTA Guide to Traffic Generating Developments indicates that traffic generation rates for “Housing for aged and disabled persons” should be:

Daily vehicle trips = 1 – 2 per dwelling
Evening peak hour vehicle trips = 0.1 – 0.2 per dwelling

For the purpose of this report, traffic generation at the higher rate will be assumed. The additional traffic generation from the proposed redevelopment at the Maroba Aged Care Facility will therefore be:

47 units @ 0.2 trips per unit = 9.4 trips, Say 10 trips

The additional traffic generation of 10 trips from the proposed extensions to the Maroba Aged Care Facility will have a negligible impact on Myall Road and also on Edith Street.

Traffic signals at Platt Street and also at Griffiths Road provide substantial gaps in traffic flow along Edith Street.

8.0 PROPOSED PARKING PROVISION

Council's DCP 2005 Element 4.1 Car Parking requires parking to be provided for Seniors Housing as follows:

> At minimum, parking for residents, staff, visitors and ambulance to be provided in accordance with State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004.
>
> The SEPP (Housing for Seniors or People with a Disability) 2004 parking requirements for self contained dwellings is as follows;
>
> ***0.5 car spaces for each bedroom where the development application is made by a person other than a social housing provided.***

The new self care apartment building will provide basement car parking for 44 car spaces. Car spaces have been designed in accordance with AS NZS 2890.6 – 2009 Car parking – Off-street parking for people with disabilities.

The number of staff employed within the Maroba Aged Care Facility will not increase as a result of the proposed additional self care units.

The proposed self care apartment building will require the provision of parking in accordance with State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004, as follows:

4 x 1-bedroom units @ 0.5 spaces per bedroom	2 spaces
18 x 2-bedroom units @ 0.5 spaces per bedroom	18 spaces
25 x 2-bedroom + study units @ 0.5 spaces per bedroom	25 spaces

Total SEPP (Housing for Seniors or People with a Disability) 2004

The existing Maroba Aged Care Facility provides ambulance parking.

The proposed self care apartment building will provide 44 basement car spaces which is 1 space less than the requirement in accordance with the requirement of SEPP (Housing for Seniors or People with a Disability) 2004.

The apparent parking shortfall of 1 space is considered satisfactory as it is likely that some residents of the self-car apartments will not actually own a private car.

9.0 PUBLIC TRANSPORT AVAILABILITY

Newcastle and Ferries operates two bus routes along Bridge Street, Myall Road and Edit Street in the vicinity of the Maroba Aged Care Facility. The two routes are:

Route 104	Daily service between Jesmond, University, Waratah West, Waratah, Mayfield, Mayfield East, Carrington, Newcastle and Newcastle East.
Route 111	Monday to Saturday service between Mount Hutton, Charlestown, Kotara, Waratah, Mayfield, Maryville, and Newcastle.

The two services provide reasonably close access to buses which connect with other routes and facilities.

Bus stops are located on both sides of Edit Street just north of Platt Street, approximately a 400m walk from the proposed elf care apartments.

10.0 ACCESS DRIVEWAYS

The existing Maroba Aged Care Facility has two vehicular access points. These are:

Myall Road – two (2) driveways at the western extremity
Edith Street– one (1) exit driveway

The access road from the Myall Road provides access to the existing Maroba Nursing Home, the Maroba Hostel and the Maroba Terrace self-care units.

The existing access on Edith Street is an exit-only driveway, approximately 6 metres wide that provides access from rear car parking spaces at the Maroba Nursing Home.

The existing entry driveway on Myall Road will provide entry to the proposed basement car parking area for the proposed self care apartment and the existing exit driveway on Edit Street will provide access along the one-way roadway with left-out exit only movements possible onto Edit Street.

11.0 PEDESTRIAN ACTIVITY

The proposed redevelopment is unlikely to generate additional pedestrian activity onto Edith Street or Myall Road as there are no close attractions for pedestrians in the vicinity of the Maroba Aged Care Facility.

The existing pedestrian refuge facility on Edith Street just north of the existing exit driveway on Edit Street from the Maroba Aged Care Facility provides a safe crossing facility.

12.0 SERVICING REQUIREMENTS

Servicing of the Maroba Aged Care Facility redevelopment will essentially be the same as the existing servicing requirements. The residents of the new self care apartment at the Maroba Aged Care Facility will essentially self cater.

The proposed new self care apartment building at the Maroba Aged Care Facility will not require an additional number of service movements.

Garbage bins will be stored in the basement parking area and will be conveyed to the existing collection point by a caretaker.

13.0 SIGHT DISTANCES

Available sight distance at the existing / proposed accesses on Edith Street, are as follows:

Edith Street - Exit Driveway

Right (generally south) along Edith Street	≈ 220 metres
Left (generally north) along Edith Street	> 400 metres

Myall Road Intersection

Right (generally south) along Edith Street	> 300 metres
Left (generally north) along Edith Street	> 300 metres

AS2890.1 – 2004 sight distance recommendations are:

Frontage Road Speed (km/h)	Minimum Sight Distance (m)	Desirable Sight Distance (m)
60	65	83

The available sight distances at the existing exit driveway on Edith Street and also at the Myall Road intersection satisfy AS2890.1 - 2004 recommendations.

14.0 SUMMARY

a) Edith Street is a Local Road providing a connector road function.

b) The existing southern exit-only driveway onto Edith Street for the existing Maroba Aged Care Facility will be retained and utilised for the proposed self care apartment building. The redevelopment will not alter the existing trip generation patterns.

c) The proposed Maroba Aged Care Facility redevelopment not generate significant additional traffic volumes (10 trips in the weekday evening peak).

d) Service movements involve infrequent trips by light vehicles or refrigerated trucks and the proposed self care apartments will not require any additional service trips.

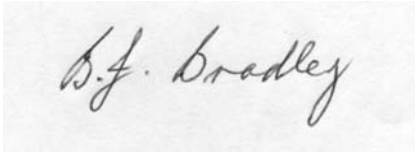
e) Approval to the proposed Aged Care Facility redevelopment would have no adverse affect on the Level of Service, capacity or traffic safety of Edith Street or Myall Road at Waratah.

f) On-site parking provision will provide an additional 44 spaces, 1 less than the requirement calculated. It is likely that not all residents will own a private car and the shortfall of 1 car space is considered satisfactory.

g) Newcastle and Ferries operates two bus routes along Bridge Street, Myall Road and Edit Street.

15.0 RECOMMENDATION

I recommend that the proposal to redevelop the existing Maroba Aged Care Facility to provide 47 self care apartments in a new building be approved on the basis that traffic impacts on Edith Street and Myall Road would be negligible.



B J Bradley BE Grad Dip Man MIEAust CPEng

APPENDIX A –

SITE PHOTOGRAPHS

Photo No. 1: Looking generally west across Edith Street showing the existing exit-only driveway at the Maroba Aged Care Facility. The site of the proposed self care apartment is just to the left of the exit driveway.

Photo No. 2: Looking right (generally south) along Edith Street from the existing exit-only driveway showing the existing traffic environment and available sight distance.

Photo No. 3: Looking generally west along Myall Road showing he existing access to the Maroba Nursing Home, the Maroba Hostel and the Maroba Terrace Self-Care Units.

Appendix D

Bushfire Threat Assessment

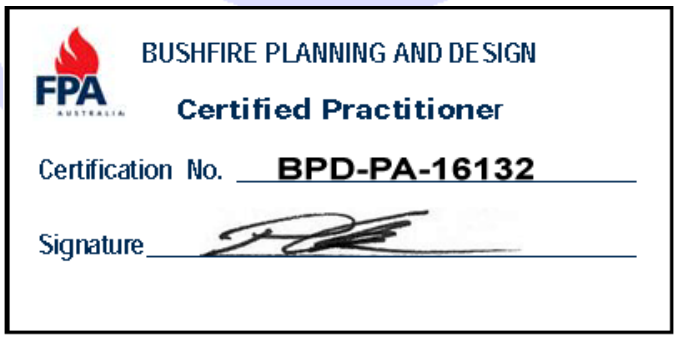
BUSHFIRE THREAT ASSESSMENT REPORT

PROPOSED SENIORS LIVING SELF-CARE APARTMENTS

LOT 1 DP 113186
58 Edith Street, Waratah

Date: **25/03/2011**

Prepared for: **Maroba Living Communities**



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1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

The report has assessed the proposed Seniors Living Self-Care Apartments against the requirements of s100B of the *Rural Fires Act 1997,* AS3959 (2009) Building in Bushfire Prone Areas and Planning for Bushfire Protection, 2006.

The report establishes that the Seniors Living Self-Care Apartments is capable of complying with the performance criteria of Planning for Bushfire Protection 2006.

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

Applicant Name	Maroba Living Communities		
Site Address	58 Edith Street, Waratah	**Lot/Sec/DP**	Lot 1 DP 113186
Local Government Area	Newcastle	**FDI**	100
Bushfire Prone Land	Yes – within the 100 metre buffer of a Category 1 Vegetation		
Type of development	New Building	**Type of Area**	Urban
Special Fire Protection Purpose	Yes	**Flame Temperature**	1200K
Application Complies with DTS Provisions	No	**Referral to RFS required**	Yes

TABLE 2 – BUSHFIRE THREAT ASSESSMENT

	South	**West**	**North**	**East**
AS3959 (2009) Vegetation Structure	Forest	Forest	Maintained Lands	Maintained Lands
Asset Protection Zone	30 metres	90 metres	100 metres	100 metres
Accurate Slope Measure	8 degrees upslope	18 degrees upslope	N/A	N/A
Slope Range	Level/Uplsope	Level/Uplsope	N/A	N/A
PBP (2006) Table A2.6 Minimum Setbacks	60 metres	60 metres	N/A	N/A
Alternate Solution 10kw/m2 Setbacks	30 metres including road reserve	N/A	N/A	N/A
AS3959 (2009) Bushfire Attack Level (BAL)	BAL12.5	BAL-12.5	N/A	N/A

TABLE 3 – PLANNING FOR BUSHFIRE PROTECTION (2006) 4.2.7 COMPLIANCE SUMMARY

Performance Criteria	Proposed Development Determinations	Method of Assessment
Asset Protection Zone	Asset Protection Zones have been determined in accordance with AS 3959-2009 Method 2 Detailed Procedure and Planning for Bushfire Protection (2006) using 1200 Kelvin Flame and AS3959 (2009) increased forest fuel loads to determine safe defendable space of < 10kw/m2 at all points of the building. The Boomerang Drive road reserve is considered equivalent to an Asset Protection Zone.	Alternate Solution
Access – Internal Roads	The development proposes a pedestrian bridge requiring disabled access that will provide a minimum 3.3 metre vertical clearance for vehicle access. The likely responding appliances will likely be between 2.9 metres to 3.05 metres in height. A study of appliances has been provided in the property access alternate sollution. The clearance height is to be clearly indicated on the bridge. The development proposes an enclosed basement carpark and connects into the existing Maroba Internal Road Access. The development offers the potential for compliance with all other deemed to satisfy provisions.	Alternate Solution
Water Supply	Access points for reticulated water supply to SFPP developments incorporate a ring main system for all internal roads. Fire Hydrant spacing, sizing and pressures should comply with AS 2419.1 – 2005.	Acceptable Solution
Electrical Supply	The existing electrical supply to the local area is via overhead electrical transmission lines. All onsite power supply to existing Maroba facilities is located underground. All proposed onsite power supply will be located underground.	Acceptable Solution
Gas Supply	Any proposed gas supply will be located underground.	Acceptable Solution
Emergency and Evacuation Planning	The new facility should be added to the existing Maroba emergency management plan developed in accordance with AS 4083 "Planning for emergencies – for health care facilities" and consider bushfire risk.	Acceptable Solution

2.0 INTRODUCTION

2.1 PURPOSE OF REPORT

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed Seniors Living Self-Care Apartments to be constructed at Lot 1 DP 113186, 58 Edith Street, Waratah.

The assessment acknowledges the requirements of s100B of the Rural Fires Act 1997 and Planning for Bushfire Protection 2006 to protect persons, property and the environment from danger that may arise from a bushfire.

Under the provisions of section 100B of the Rural Fires Act 1997 as amended, a Bushfire Safety Authority (BFSA) is required from the Commissioner of the NSW Rural Fire Service.

This report complies with Rural Fires Regulation 2008 Clause 44 Application for Bushfire Safety Authority. The assessment encompasses the subject site and neighbouring areas.

The recommendations within this report address the aim and objectives of Planning for Bushfire Protection 2006 to provide safe defendable space to firefighters and emergency service personnel defending the Seniors Living Self-Care Apartments in a bushfire event.

2.2 PROPOSED DEVELOPMENT

The proposed development consists of a six storey freestanding building to accommodate 47 Seniors Living self care apartments and associated infrastructure. The development extends the existing Maroba aged care facility and will utilise the existing internal road network.

2.3 SIGNIFICANT ENVIRONMENTAL FEATURES

There are no known significant environmental features on the subject site. The site is cleared or vegetation following demolition of the former aged care facility.

2.4 ENVIRONMENTAL ASSETS

There are no known environmental assets on the subject site. The site is a cleared allotment.

2.5 ABORIGINAL HERITAGE

Searches of National Parks and Wildlife database identify no known aboriginal relics or aboriginal places as defined by National Parks and Wildlife Act 1974 to exist on the site. The site is a cleared allotment.

PHOTOGRAPH 1 – SITE PHOTO

View of the subject site looking north from High Street. The site is vacant with minimal vegetation onsite. Existing Maroba Aged Care Facilities extend North and Northwest of the site.

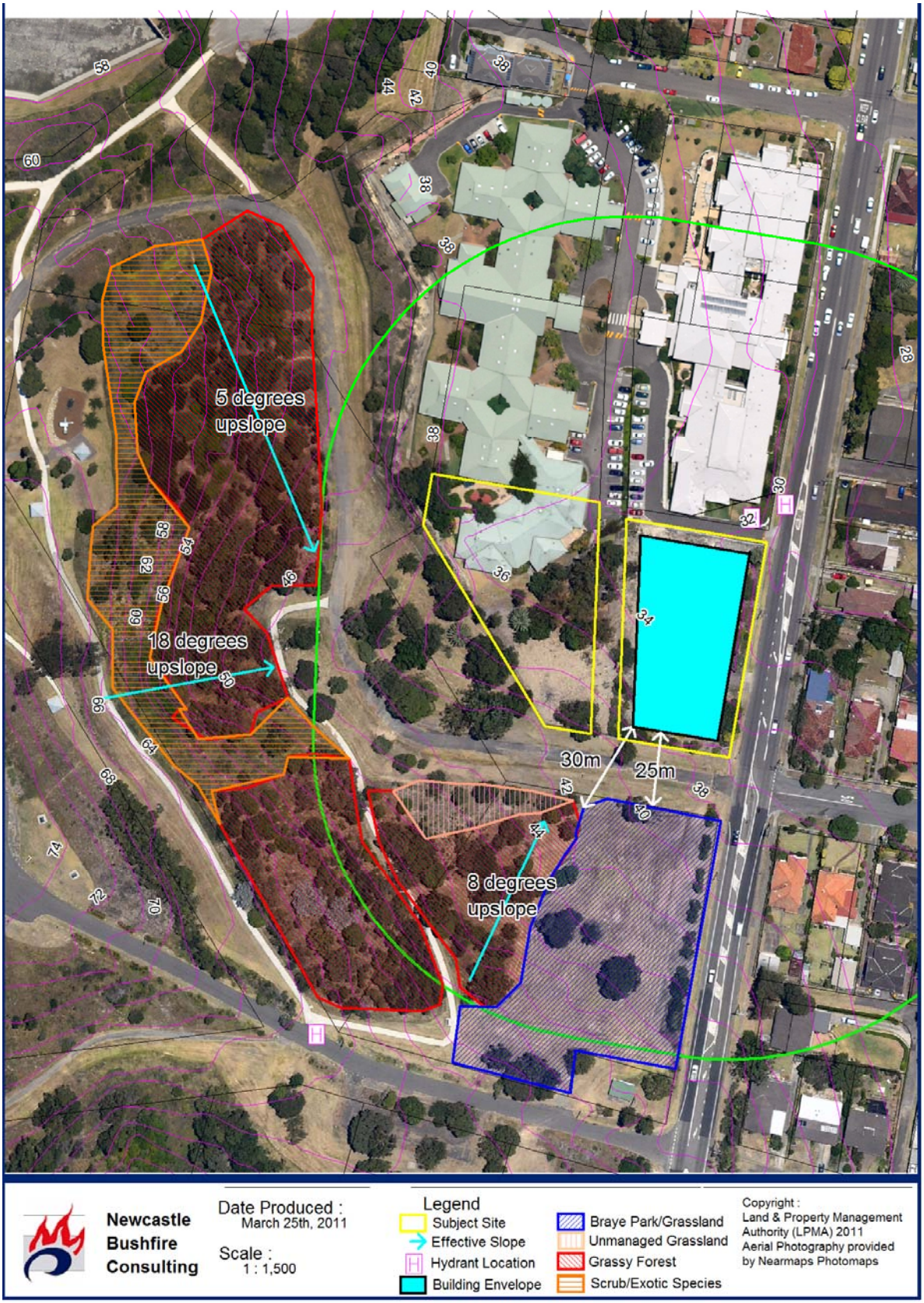

FIGURE 1 – SITE CONSTRAINTS MAP

3.0 BUSHFIRE ATTACK ASSESSMENT

3.1 VEGETATION CLASSIFICATION

Potential bushfire hazards were identified from Newcastle Council bushfire prone mapping as occurring within the investigation area. Aerial mapping and inspection of the site reveals that the bushfire prone land map is reasonably accurate in respect to the current bushfire hazard.

The major vegetative threats have been determined using Keith (2004) to derive vegetation structures listed in Planning for Bushfire Protection (2006). General vegetation structures have been translated to AS3959 (2009) groupings.

The vegetation is identified as pockets of Dry Sclerophyll Forest connected by exotic scrub vegetation. For conservatism the entirety of bushland vegetation is identified as Forest.

Primary Vegetation Structures have been identified in Figure 1 – Site Constraints Map and separation distances shown in Table 2 – Bushfire Attack Assessment.

PHOTOGRAPH 2 – VEGETATIVE THREAT

View of forest vegetation and Braye Park looking south from the subject site. The upper stratum is dominated by eucalypts. The shrub layer consists of introduced shrubs, scattered native shrubs and grasses with a low loading of surface fuel. This vegetation forms a wedge with a flame width significantly less than 100 metres.

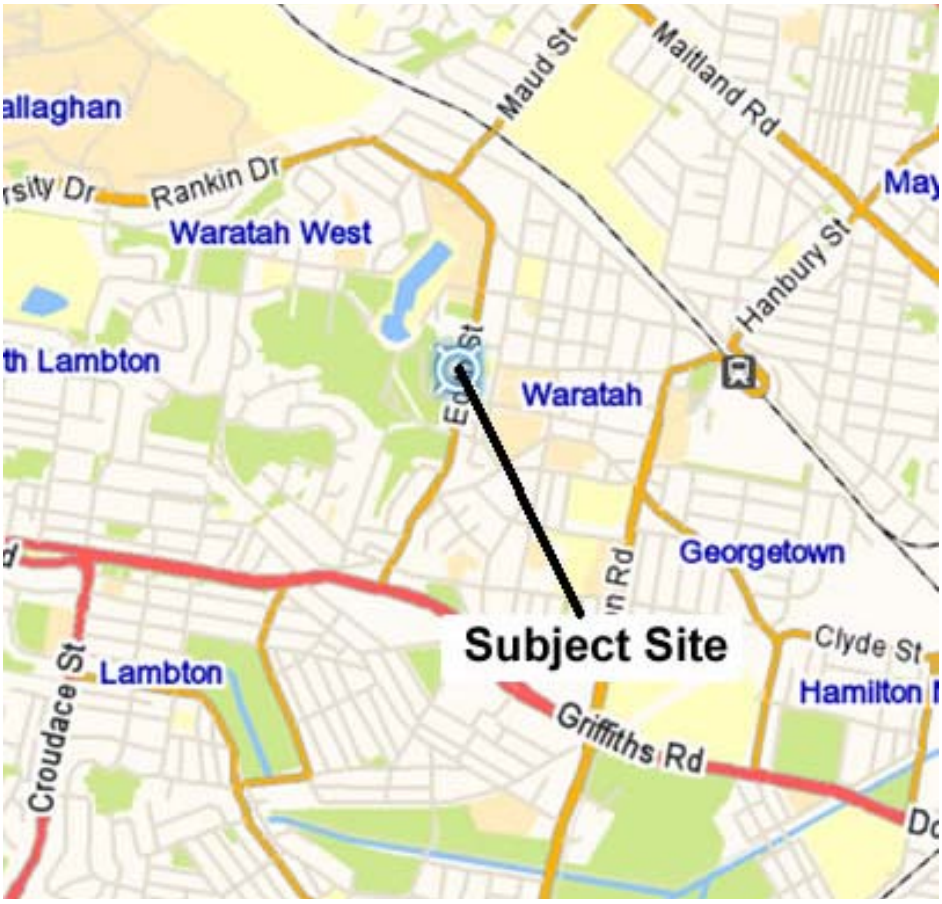

FIGURE 2 – LOCALITY MAP
www.whereis.com © Telstra Corporation Limited

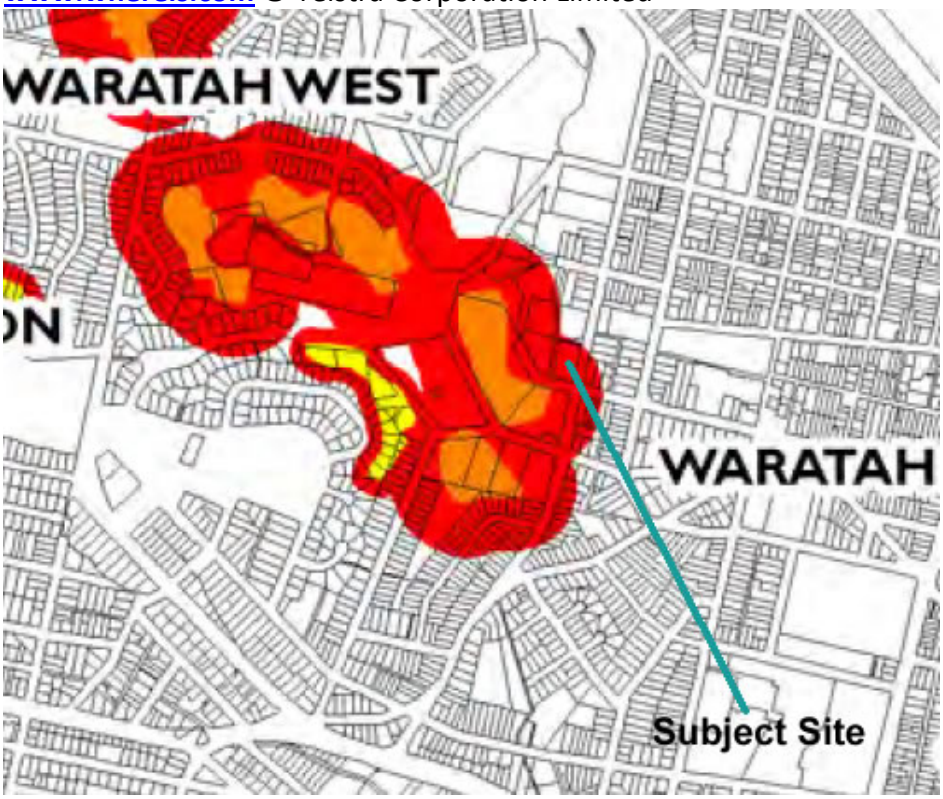

FIGURE 3 – COUNCIL'S BUSHFIRE PRONE LAND MAP

3.2 EFFECTIVE SLOPE

Methodology
Effective slope was measured using 2 metre contour data obtained from Department of Lands and verified by a laser hypsometer on site. The laser hypsometer verified slope within the vegetation calculating effective fire run slope from 5 separate measurements in each dominant direction.

Effective Slopes have been identified in Figure 1 – Site Constraints Map and slope ranges are shown in Table 2 – Bushfire Threat Assessment.

3.3 MINIMUM SETBACKS AND ASSET PROTECTION ZONES – ALTERNATE SOLUTION

Asset Protection Zones have been determined in accordance with AS 3959-2009 Method 2 Detailed Procedure and Planning for Bushfire Protection (2006), using 1200 Kelvin Flame and AS3959 (2009) increased forest fuel loads to determine safe defendable space of < 10kw/m2 at the building face. This is deemed a conservative assessment due to Planning for Bushfire Protection (2006) Table A2.7 utilising significantly lower fuel loads.

Due to the wedge like shape of the forest vegetation interfacing the site, multiple sensitivity models have been completed determining radiant heat flux at varying distances into the vegetation. Sensitivity models also consider future revegetation of the bushland into dense forest as the majority of vegetation directly interfacing the site at present is a Grassy Woodland/Unmanaged Grassland Formation. The concept of varying distances has been illustrated in Figure 5.

The High Street reserve is considered equivalent to an Asset Protection Zone. There is no Plan of Management for Braye Park guaranteeing that the presently well maintained park will be maintained in perpetuity. A final sensitivity study has been completed considering the park to revegetate to a 100 metre wide body of unmanaged grassland outside the road reserve.

<u>Review of Alternate Solution</u>
Sensitivity Models show that if the bushland revegetated to dense forest fuel loads a maximum radiant heat exposure of 8.3 kw/m2, will be achieved at the building face from a fire moving in full equilibrium state 40 metres from the building. This includes a redundancy of increased forest fuels loads as specified by AS3959 (2009) and an instantaneous flame temperature of 1200 Kelvin. In my considered opinion Safe Defendable Space is fully achieved considering the proposed building position and the existing road reserve identified as equivalence to an asset protection zone.

The proposed alternate solution in conjunction with Appendix 1.0 Monitoring and Fuel Management Program represents compliance with the Performance Criteria of Planning for Bushfire Protection (2006)

A summary of Bushfire Attack Models are presented below. Full calculations are shown in Appendix 2 Bushfire Attack Model.

Scenario	Asset Protection Zone	Vegetation Width	Radiant Heat Flux
Current Formation	30 metres	10 metres	5.79 kw/m2
Forest – Significant Regrowth Scenario 1	35 metres	20 metres	7.79 kw/m2
Forest – Significant Regrowth Scenario 2	40 metres	30 metres	8.3 kw/m2
Forest – Significant Regrowth Scenario 2	50 metres	40 metres	6.69 kw/m2
Grassland – Braye Park Unmaintained	25 metres	100 metres	9.05 kw/m2

3.4 BUSHFIRE ATTACK LEVELS

Bushfire attack levels and relevant construction levels in accordance with AS3959 (2009) have been demonstrated in Section 1 Executive Summary and Compliance Tables, Table 2 Bushfire Threat Assessment. The building will be subject to reduced levels of radiant heat and should offer ember protection via BAL-12.5 construction.

PHOTOGRAPH 3 – SECONDARY VEGETATIVE THREAT

A secondary vegetative threat is identified as tall heath/scrub consisting of scattered emergent eucalypts and introduced species up to 2 metres in height. This vegetation separates the pockets of forest and will result in reduced intensity bushfire behaviour particularly with the steep upslope and concrete footpaths intersecting the vegetation.

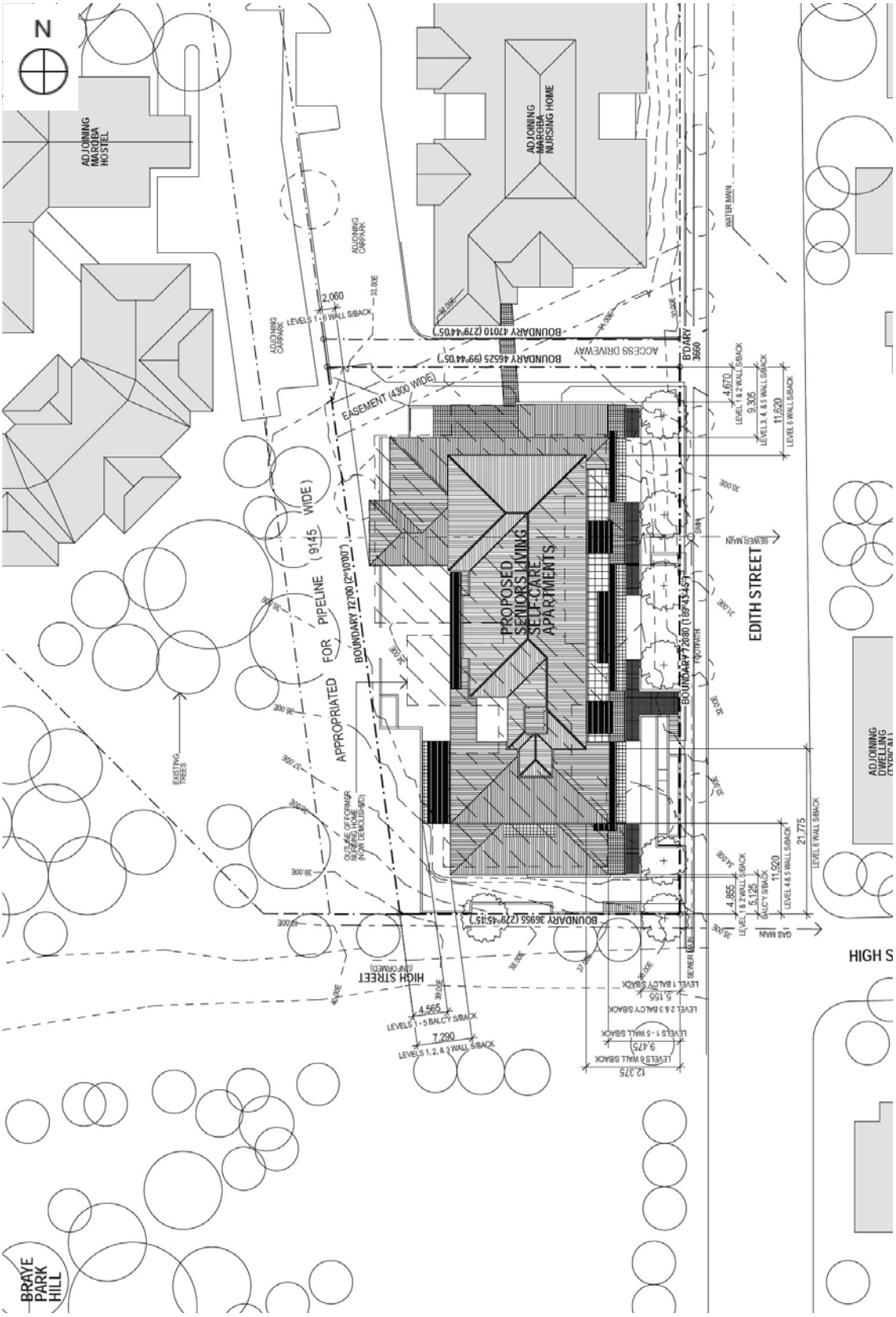

FIGURE 4 – SITE PLAN

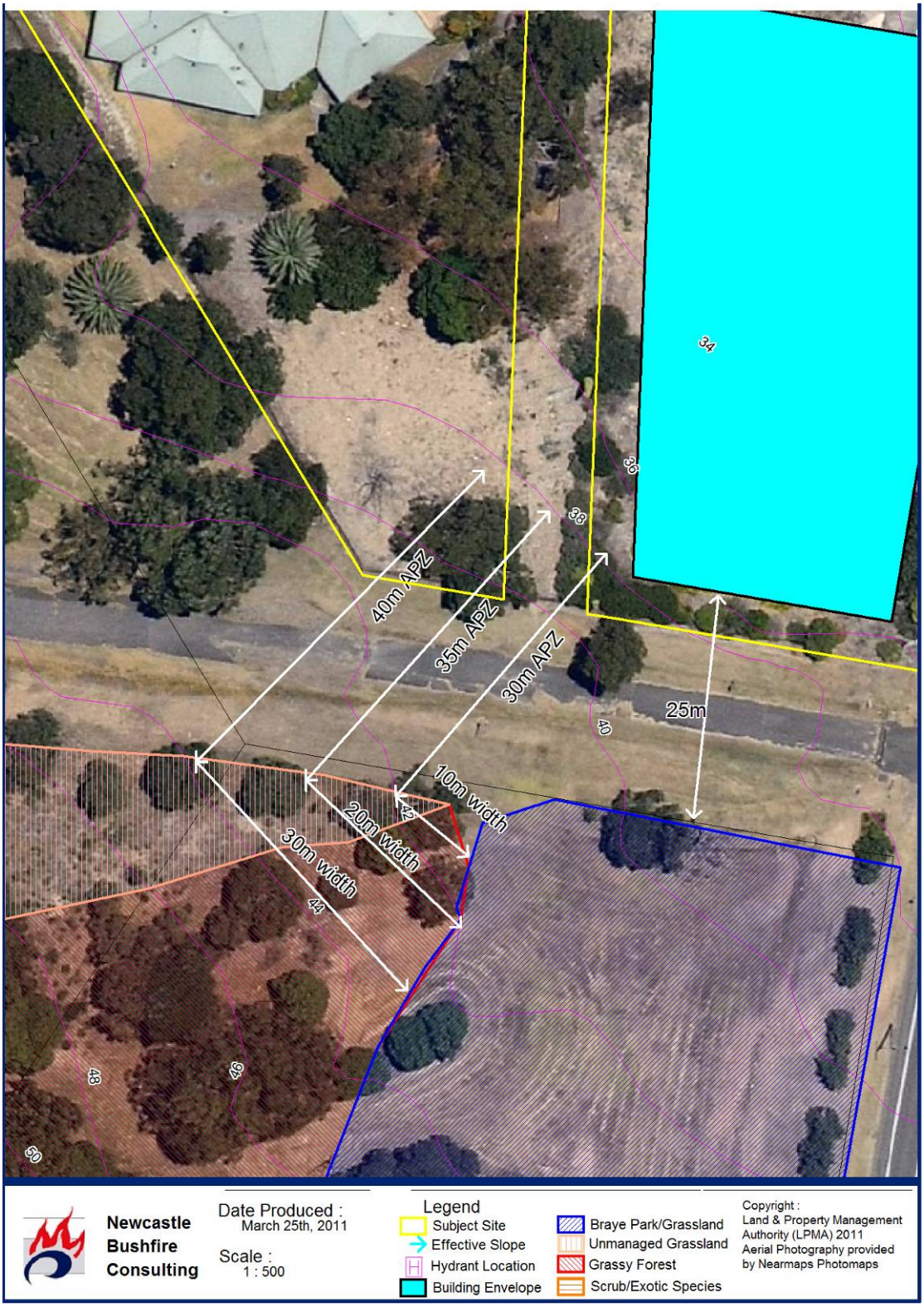

FIGURE 5 – SAFE DEFENDABLE SPACE MODELING MAP

4.0 UTILITY SERVICES AND INFRASTRUCTURE

4.1 WATER SERVICES

A reticulated water supply and street hydrant access is available from Edith Street, however the hydrants do not provide full coverage of the development in accordance with AS 2419.1 – 2005. Water supply should be designed in accordance with AS 2419.1 – 2005.

4.2 ELECTRICITY SERVICES

The existing electrical supply to the local area is via overhead electrical transmission lines. All proposed onsite power will be located underground and has no further requirements.

4.3 GAS SERVICES

Gas supply lines will be located underground. Metal piping is to be used for any above ground lines.

5.0 PROPERTY ACCESS AND PUBLIC ROAD SYSTEM CAPACITY – ALTERNATE SOLUTION

Public Road Access

The subject site is located on Edith Street being a dual carriageway road interconnecting into the local road network. Emergency Services are expected to have good access to the area at most times.

The public road network circles the forest via High Street providing good access for firefighting vehicles and pre-established control lines. High Street interconnects into Boomerang Road.

Edith Street is a major arterial road for the immediate area within Waratah and may present a congestion point in wide scale evacuation of the local area. Alteration of the public road network is outside the scope of this development.

Property Access

Property access is provided by way of existing road network for Maroba Aged Care Facilities. The access is a through road 200 metres in length interconnecting into Myall Road. The proposed basement carpark will be located 16 metres off Edith Street.

Property access roads shall comply with sections 4.1.3 and 4.2.7 of Planning for Bush Fire Protection 2006 as detailed below.

- internal roads are two-wheel drive, sealed, all-weather roads;
- internal perimeter roads are provided with at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb) and shoulders on each side, allowing traffic to pass in opposite directions;
- roads are through roads. Dead end roads are not more than 100 metres in length from a through road, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end;
- traffic management devices are constructed to facilitate access by emergency services vehicles.
- curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.
- the minimum distance between inner and outer curves is six metres.
- maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees.
- crossfall of the pavement is not more than 10 degrees.
- roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge).
- roads are clearly sign-posted and bridges clearly indicate load ratings.
- the internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).

Alternate Solution

The development does not offer compliance with property access provision of:

- a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches.

The development proposes a pedestrian bridge for disabled access that will provide a 3.3 metre vertical clearance for vehicle access. Waratah is an urban area with Newcastle Local Government Area having all Fire Fighting operations catered for by NSW Fire Brigades. Discussions with Station Officer Chris Frost of Lambton Brigade clarified that Class 2 (Isuzu FTR800) and Class 5 (VSV Commander Mk2) Pumpers are the typical fire appliance utilised throughout Newcastle. NSW Fire Brigades website states the height dimension of these appliances to be:

- Class 2 appliance – 3.1 metres high.
- Class 5 appliance – 3.05 metres high.

In the unlikely event that NSW RFS assist the expected fire appliance will be a Cat 11 tanker being 2.9 metres high. Due to the fragmented form of bushland it is expected that any bushfire in vegetation adjacent the site will be reduced intensity and easily fought via parallel and direct attack methods. High Street circles the entirety of the vegetation where within 140 metres of the site and the steep hill of Braye Park means that any other bushfire effects will be limited to lofted ember attack. It is

believed that any bush fire fighting response will be adequately managed from High Street with adequate Safe Defendable Space available. The proposed clearance height is greater than all Class 1 to Class 5 Fire Brigade pumpers and NSW RFS tankers which have a maximum height of 3.2 metres. The clearance height of 3.3 metres is to be clearly indicated on the pedestrian bridge.

Review of Alternate Solution

High Street provides suitable fire fighting access for any bushfire. The internal property access road will be limited to use for structural fire fighting response and it is believed that adequate clearance is available for all currently available fire appliances that will attend the site. The property access is shielded from bushfire affects and exits away from the bushland threat.

The pedestrian bridge should be clearly signposted with the minimum clearance height of 3.3 metres and this should be communicated in the emergency management plan provided to local fire fighting agencies.

6.0 LANDSCAPING MAINTENANCE

It is recommended that landscaping is undertaken in accordance Appendix 5 of Planning for Bushfire Protection 2006 and maintained for the life of the development.

Trees should be located greater than 2 metres from any part of the roofline of a building. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

The landscaped area should be maintained free of leaf litter and debris. The gutter and roof should be maintained free of leaf litter and debris.

Landscaping should be managed so that flammable vegetation is not located directly under windows.

Ground fuels such as fallen leaves, twigs (less than 6mm in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and where possible green.

7.0 EMERGENCY AND MAINTENANCE PLANS

7.1 BUSHFIRE MAINTENANCE PLANS

A draft monitoring and fuel management plan has been prepared for the site and included in Appendix 1. A condition of development is to maintain the entire site as an Inner Protection Area which should be monitored by the facility manager.

7.2 FIRE EMERGENCY PROCEDURES

The new facility should be added to the existing Maroba emergency management plan developed in accordance with AS 4083 “Planning for emergencies – for health care facilities” and consider bushfire risk. The developer should provide a copy of the above document to the local Bush Fire Management Committee for their information prior to the occupation of the building.

An emergency/evacuation plan is prepared consistent with the RFS Guidelines for the Preparation of Emergency/Evacuation Plan.

8.0 RECOMMENDATIONS

Based upon an assessment of the plans and information received for the proposal, it is recommended that development consent be granted subject to the following conditions.

1. The proposed building works shall comply with BAL-12.5 in accordance with AS 3959-2009 and the construction requirements of Planning for Bushfire Protection 2006 Appendix 3 (amended May 2010).
2. At the commencement of building works and for the life of the dwelling the entire site shall be maintained as an Inner Protection Area (IPA) as outlined within section 4.1.3 and Appendix 5 of *Planning for Bush Fire Protection* 2006 and the NSW Rural Fire Service's document *Standards for asset protection zones*. A draft monitoring and fuel management plan has been included in Appendix 1 and should be updated on a regular basis.
3. Landscaping is to be undertaken in accordance Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained in perpetuity.
4. The new facility should be added to the existing Maroba emergency management plan developed in accordance with AS 4083 “Planning for emergencies – for health care facilities” and consider bushfire risk.
5. The pedestrian bridge should be clearly signposted with the minimum clearance height of 3.3 metres and this should be communicated in the emergency management plan provided to local fire fighting agencies.
6. Fire Hydrant services should be designed in accordance with AS2419.1 -2005.

9.0 CONCLUSION

The final recommendation is that the proposed development offers compliance with Planning for Bushfire Protection. There is potential for bushfire attack at this site and a list of recommendations has been included in the above assessment to reduce that risk.

10.0 APPENDIX 1.0 – DRAFT MONITORING AND FUEL MANAGEMENT PLAN

Fuel management plan
The asset protection zone extends from the building and should have vegetation maintained in accordance with an Inner Protection Area (IPA).

Monitoring of Maintenance
Build-up of leaf litter and debris across the site will be monitored on a regular basis using visual estimation techniques. Grass should be maintained to a level of lower than 5 centimetres in length. Maintenance should increase over the summer months when peak fire weather occurs.

The Monitoring and Fuel Management Plan should be updated annually in accordance with the development occurring throughout the subject site.

Asset Protection Zones
Below is a summary of Asset Protection Zones outlined in Appendix 5 of Planning for Bushfire Protection (2006) and the NSW Rural Fire Services "Standards for Asset Protection Zones". The property owner should familiarise themselves with their content.

Inner Protection Area (IPA)
The inner protection area is located adjacent to the asset and is identified as a fuel free zone.

A. Shrubs (consisting of plants that are not considered to be trees)

1. Shrubs must be located away from a buildings glazing and vent openings.
2. Avoid planting around entry ways if the vegetation is flammable.
3. A maximum 30% of the Inner Protection Area may contain shrubs.
4. A minimum 1.5 metre separation of shrubby vegetation from the building shall be maintained.
5. Shrubs must not have a connection with the tree canopy layer; remove/trim shrubs or underprune trees.
6. Ensure turf is suitably mown and/or grasslands are continually slashed to restrict to max 100mm high.

B. Trees: Maintain a minimum 2-5 metre canopy separation.

1. Trees are allowed in the inner protection area however they should not touch or overhang buildings. No tree should be within 2 metres of the roofline.
2. Underprune branches between the shrub layer and the canopy layer.
3. Ensure branches do not overhang buildings.
4. Ensure all trees in the IPA within 3m of buildings do not provide a serious fire threat.
5. Trees should have lower limbs removed up to a height of 2 metres above the ground.

11.0 APPENDIX 2.0 – BUSHFIRE ATTACK MODEL – AS3959 (2009) METHOD 2 – DETAILED BAL ASSESSMENT

Bushfire Attack Assessment Report

AS3959 (2009) Version 1.4.3

Print Date: 25/03/2011 **Assessment Date:** 25/03/2011

Site Street Address: 58 Edith Street, Waratah

Assessor: Phillip Couch; Newcastle Bushfire Consulting

Fire Danger Index: 100 (Fire Weather Area: Greater Hunter)

Local Government Area: Newcastle **Alpine Area:** No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001
Rate of Fire Spread: Noble et al., 1980
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005
Peak Elevation of Receiver: Tan et al., 2005
Peak Flame Angle: Tan et al., 2005

Run Description: Forest - Current Formation 30m APZ 10m wide flame

Vegetation Information

Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	8 Degrees	**Vegetation Slope Type:**	Upslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35

Site Information

Site Slope	8 Degrees	**Site Slope Type:**	Upslope
Elevation of Receiver(m)	2.1	**APZ/Separation(m):**	30

Fire Inputs

Veg./Flame Width(m):	10	**Flame Temp(K)**	1200

Calculation Parameters

Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5		

Program Outputs

Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	10.54
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	31237
Radiant Heat(kW/m2):	4.87	**Flame Angle (degrees):**	51
Flame Length(m):	15.43	**Maximum View Factor:**	0.053
Rate Of Spread (km/h):	1.73	**Inner Protection Area(m):**	24
Transmissivity:	0.825	**Outer Protection Area(m):**	6

Run Description:	Forest - Regrowth 35m APZ 20m wide flame		
Vegetation Information			
Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	8 Degrees	Vegetation Slope Type:	Upslope
Surface Fuel Load(t/ha):	25	Overall Fuel Load(t/ha):	35
Site Information			
Site Slope	8 Degrees	Site Slope Type:	Upslope
Elevation of Receiver(m)	2.1	APZ/Separation(m):	35
Fire Inputs			
Veg./Flame Width(m):	20	Flame Temp(K)	1200
Calculation Parameters			
Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg	18600	Ambient Temp(K):	308
Moisture Factor:	5		
Program Outputs			
Category of Attack:	LOW	Peak Elevation of Receiver(m):	11.53
Level of Construction:	BAL 12.5	Fire Intensity(kW/m):	31237
Radiant Heat(kW/m2):	6.68	Flame Angle (degrees):	57
Flame Length(m):	15.43	Maximum View Factor:	0.074
Rate Of Spread (km/h):	1.73	Inner Protection Area(m):	28
Transmissivity:	0.812	Outer Protection Area(m):	7

Run Description:	Forest - Regrowth 40m APZ 30m wide flame		
Vegetation Information			
Vegetation Type:	Forest	Vegetation Group:	Forest and Woodland
Vegetation Slope:	8 Degrees	Vegetation Slope Type:	Upslope
Surface Fuel Load(t/ha):	25	Overall Fuel Load(t/ha):	35
Site Information			
Site Slope	8 Degrees	Site Slope Type:	Upslope
Elevation of Receiver(m)	2.1	APZ/Separation(m):	40
Fire Inputs			
Veg./Flame Width(m):	30	Flame Temp(K)	1200
Calculation Parameters			
Flame Emissivity:	95	Relative Humidity(%):	25
Heat of Combustion(kJ/kg	18600	Ambient Temp(K):	308
Moisture Factor:	5		
Program Outputs			
Category of Attack:	LOW	Peak Elevation of Receiver(m):	12.49
Level of Construction:	BAL 12.5	Fire Intensity(kW/m):	31237
Radiant Heat(kW/m2):	7.25	Flame Angle (degrees):	61
Flame Length(m):	15.43	Maximum View Factor:	0.081
Rate Of Spread (km/h):	1.73	Inner Protection Area(m):	32
Transmissivity:	0.801	Outer Protection Area(m):	8

Run Description:	Regrowth Grassland - 25m APZ 100m wide flame		
Vegetation Information			
Vegetation Type:	Grassland	**Vegetation Group:**	Grassland
Vegetation Slope:	8 Degrees	**Vegetation Slope Type:**	Upslope
Surface Fuel Load(t/ha):	4.5	**Overall Fuel Load(t/ha):**	4.5
Site Information			
Site Slope	8 Degrees	**Site Slope Type:**	Upslope
Elevation of Receiver(m)	2.1	**APZ/Separation(m):**	25
Fire Inputs			
Veg./Flame Width(m):	100	**Flame Temp(K)**	1200
Calculation Parameters			
Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg	18600	**Ambient Temp(K):**	308
Moisture Factor:	5		
Program Outputs			
Category of Attack:	LOW	**Peak Elevation of Receiver(m):**	5.93
Level of Construction:	BAL 12.5	**Fire Intensity(kW/m):**	17403
Radiant Heat(kW/m2):	8.72	**Flame Angle (degrees):**	76
Flame Length(m):	4.97	**Maximum View Factor:**	0.094
Rate Of Spread (km/h):	7.49	**Inner Protection Area(m):**	25
Transmissivity:	0.827	**Outer Protection Area(m):**	0

12.0 REFERENCES AND DISCLAIMER

References

Standards Australia (2009) AS3959 Construction of Buildings in Bushfire-Prone Areas

Keith D. (2004) "Ocean Shores to Desert Dunes", Department of Environment and Conservation, Sydney.

Environmental Planning and Assessment Act (1979)

New South Wales Rural Fire Service (2006) Planning for Bushfire Protection

New South Wales Rural Fire Service (2010) Planning for Bushfire Protection Appendix 3 Amendment

New South Wales Rural Fire Service (2011) website accessed 29/3/2011
http://www.rfs.nsw.gov.au/dsp_content.cfm?cat_id=1118

NSW Fire Brigade Pumpers (2011) website accessed 29/3/2011
http://www.nswfb.nsw.gov.au/page.php?id=237

Disclaimer

Despite the recommendations in this report, it is impossible to remove the risk of fire damage to the building entirely. This report assesses and provides recommendations to reduce that risk to a manageable level. It is of paramount importance that the recommendations are adhered to for the life of the structure and that all maintenance is performed, to ensure a level of protection is provided to the building, occupants and fire fighters.

Planning for Bushfire Protection (2006) states that not withstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small always remains.

AS3959 (2009) Building in Bushfire Prone Areas states that the standard is designed to lessen the risk of damage to buildings occurring in the event of the onslaught of bushfire. There can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.

Appendix E

SEPP 65 Analysis

SEPP65 ANALYSIS

MAROBA APARTMENTS
EDITH STREET,
WARATAH NSW 2298

Prepared by EJE Architecture
March 2011
Ref: 7480-SEPP65-001

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Appendices

1. INTRODUCTION

In line with SEPP 65 – Design Quality of Residential Flat Development, all new residential flat buildings three storeys or more must respond to the ten design principles of this planning instrument with an accompanying Design Verification Statement. The ten design principles are listed below and discussed in more detail in the body of this report.

SEPP 65 DESIGN PRINCIPLES

1. Context
2. Scale
3. Built Form
4. Density
5. Resource, Energy & Water Efficiency
6. Landscape
7. Amenity
8. Safety & Security
9. Social Dimensions
10. Aesthetics

2. PRINCIPLE 1: CONTEXT

"Good design responds and contributes to its context. Context can be defined as the key natural and built features of an area.

Responding to context involves identifying the desirable elements of a location's current character or, in the case of precincts undergoing transition, the desired future character as stated in planning and design policies. New buildings will thereby contribute to the quality and identity of the area."

The proposed development site was until recently occupied by a single storey nursing home that dated back to the 1950's. The construction of a new aged care facility of the adjacent site included the replacement and demolition of this aged and outdated nursing home. This demolition has left a development site that forms a part of the Maroba aged care precinct and is the last development site on that precinct. Maroba wants to maximise the development on the site to ensure that as many aged residents as possible can enjoy the facilities that the site as a whole offers. These advantages include companionship, security, access to food support, access to laundry support, access to nursing care, access to communal transport, access to pharmacy supply, access to medical support, access to community functions and fellowship, and access to the nearby Mater Hospital.

Whilst the site is uniquely located adjacent to other aged residential facilities it is also located adjacent to Brake Park offering extensive viewing opportunities for the residents as well as physical access to the park. The topography of the site and the adjacent Braye Park allows a tall building to be located without overshadowing other residences or blocking existing view corridors. The steep backdrop of Braye Park allows the multistorey building to blend into the scale of the surroundings rather than dominate it. The topography of Edith Street ensures that view lines are not dominated by the height and bulk of the building.

A new building such as the Maroba Apartments is consistent with the other nearby Mater Hospital multistorey new buildings and will contribute to the consistency of the bulk and scale on the western side of Edith Street.

3. PRINCIPLE 2: SCALE

"Good design provides an appropriate scale in terms of bulk and height that suits the scale of the street and the surrounding buildings.

Establishing an appropriate scale requires a considered response to the scale of the existing development. In precincts undergoing a transition, proposed bulk and height needs to achieve the scale identified for the desired future character of the area."

The proposed development site presents a number of opportunities to maximise the height and density of the building to allow the benefit that the site offers to a large number of aged residents.

The proposed development is sited with the backdrop of Braye Park and adjacent to the newly constructed three storey aged care facility of Maroba. The scale of the proposed new building is consistent with the nearby and newly completed Mater Hospital. In addition the building nestles into the hill to the south preventing long distance vistas to that side of the building. A multi storey building on this site does not overshadow any other buildings nor does it interrupt any existing view corridors. The main view corridor over the site is from the top of Braye Park and as this view point is considerably higher than the site the view is over the tree line and roof of the proposed building.

A larger built form is not foreign to the overall streetscape and experience of driving along this section of Edith Street. As you come to the top of the hill at the cross section of Boomerang Road and look along the length of Edith Street, the large form of the Mater Hospital can be seen at the other end of Edith Street. A larger built form on the Maroba site at the Southern end of Edith Street will compliment the Mater Hospital and will sit comfortably within the overall streetscape.

4. PRINCIPLE 3: BUILT FORM

"Good design achieves an appropriate built form for a site and the building's purpose, in terms of building alignments, proportions, building type and the manipulation of building elements.

Appropriate built form defines the public domain, contributes to the character of streetscapes and parks, including their views and vistas, and provides internal amenity and outlook."

The proposed new building has been designed using a variety of wall types, forms, textures, materials, window fenestration, balcony and roof forms to break the scale and building bulk into forms that reflect the surrounding built environment. These elements have been designed to provide visual depth and human scale.

The building has a face brick masonry base that is reflective of the newly completed Maroba Manor aged care facility adjacent. There is middle section is designed with predominantly rendered masonry walls with vertical blades and geometric penetrations in a solid horizontal blade. These elements are coloured to provide a link with the adjacent building and to add colour to the visual interface with Edith Street. Above this is the top of the building which is set back from the building base and incorporates recessive masonry walls and extensive elements of glass in both windows and balustrades. This provides a visually lighter top to the building. The upper most floor is significantly recessed back from the alignment of the other upper stores so it provides a very recessive appearance especially when viewed from close vantage points. Vertical screen elements and broken balcony forms assist in breaking the length of the building and provides a pattern of rhythm, proportion and modulation.

The building also steps back on the northern and southern sides to provide broken end forms and visual softening of the ends. This building form texture together with the variety of materials and colours allows the building bulk to be visually softened and introduces significant light and shade patterns to the building appearance.

The roof elements have been designed to be elegant and simple so that they do not dominate the visual height especially when viewed from a distance. The stepped massing of the building allows the roof forms to be broken down to provide visual interest to the roofscape. The roof pitch and form reflects the design of the adjacent Maroba Manor aged care facility.

The facade modulation, balconies, blades, balustrades and screens define the building and enhance the street character by providing a visual balance to the Edith Street streetscape between this building and the Mater Hospital.

5. PRINCIPLE 4: DENSITY

"Good design has a density appropriate for a site and its context; in terms of floor space yields (or number of units or residents).

Appropriate densities are sustainable and consistent with the existing density in an area or, in precincts undergoing a transition, are consistent with the stated desired future density. Sustainable densities respond to the regional context, availability of infrastructure, public transport, community facilities and environmental quality."

This site has significantly unique properties and needs to be judged in this context. This site is part of the overall Maroba aged care precinct and will allow the residents of the new building to tap into the existing and significant amenity offered by Maroba as a whole.

The demand for aged care including self care accommodation in NSW is well beyond available supply. This is widely acknowledged by all levels of government and is the experience of service providers. Maroba advises that there is the equivalent of a 45 year waiting list to get into Maroba. This demand is not only because of the lack of supply but is an acknowledgement of the reputation of Maroba and of the excellent location of Maroba within the Newcastle local government area, being a central location to provide for aged care relative to their families living in the broader Newcastle and relative to services.

Maximising the available accommodation on this site is considered to make good planning sense, particularly noting that Maroba are able to offer a high level of service to these future occupants. It makes good economic sense to consolidate accommodation for aged persons onto the Maroba site, it allows Maroba to more cost effectively deliver its services than if it were to have a number of facilities scattered around the city.

Maximising the density on this site has distinctive planning advantages for the seniors in the community. Reduced capital housing cost can be achieved through economies of scale which will result in affordable accommodation for seniors. This is particularly relevant considering that Maroba is a not for profit organisation and all profits made are put back into the provision of aged care. Maximising the density on this site is consistent with the principles of ageing in place with the ability to move from the proposed self care apartments to nursing facilities within the same facility and on the same site.

6. PRINCIPLE 5: RESOURCE, ENERGY & WATER EFFICIENCY

"Good design makes efficient use of natural resources, energy and water throughout its full life cycle including construction.

Sustainability is integral to the design process. Aspects include demolition of existing structures, recycling of materials, selection of appropriate and sustainable materials, adaptability and reuse of buildings, layouts and built form, passive solar design principles, efficient appliances and mechanical services, soil zones for vegetation and reuse of water."

The proposed development has been designed to take into account the efficient use of natural resources, energy and water. The site planning has produced a footprint to maximise daylight access to habitable rooms and provide cross ventilation to many of the apartments. Apartments are orientated to optimise solar access with none of the apartments having only a southerly aspect. Solar access is also provided to the communal outdoor area. All apartments have large covered external balconies with louvre screens to control unwanted sun where required.

The hot water systems will be instantaneous gas.

As many of the apartments have cross ventilation it is envisaged that although each apartment will be fitted with split cycle air conditioning the need to use that air conditioning will be limited especially as many of the apartments will open towards the prevailing north easterly summer cooling breezes. All apartments will be nominated to be provided with energy efficient light fixtures and appliances.

Storm water is to be stored on site and re-used as outlined in the Stormwater Management Plan included in the Statement of Environmental Effects.

Deep soil zones are provided in the communal courtyard.

Recycling of materials will occur during demolition and construction. A Waste Management plan outlining the extent is included in the Statement of Environmental Effects.

7. PRINCIPLE 6: LANDSCAPE

"Good design recognises that together landscape and buildings operate as an integrated and sustainable system, resulting in greater aesthetic quality and amenity for both occupants and the adjoining public domain.

Landscape design builds on the existing site's natural and cultural features in responsible and creative ways. It enhances the development's natural environmental performance by coordinating water and soil management, solar access, microclimate, tree canopy and habitat values. It contributes to the positive image and contextual fit of development through respect for streetscape and neighbourhood character, or desired future character."

The existing Maroba site is extensively landscaped. Indeed this is a major feature of the Maroba facility as it is necessary to provide the ambience that Maroba uses for marketing the facility. It is proposed that the new apartments will be provided with extensive landscaping that will be an extension of the existing Maroba landscape quality. It is important that this new building reads as an integrated and important part of the Maroba facility.

8. PRINCIPLE 7: AMENITY

"Good design provides amenity through the physical, spatial and environmental quality of a development.

Optimising amenity requires appropriate room dimensions and shapes, access to sunlight, natural ventilation, visual and acoustic privacy, storage, indoor and outdoor space, efficient layouts and services areas, outlook and ease of access for all age groups and degrees of mobility."

All apartments are provided with excellent amenity with generous room sizes, access to sunlight, natural ventilation and efficient layouts. All apartments are provided with large covered decks off the living areas and bedrooms. All apartments are accessed from the carpark or street level by passenger lifts. Two lift lobbies are provided to minimise internal circulation corridors and maximise cross ventilation.

Each apartment will enjoy visual and acoustic privacy through acoustic partition division walls internally and balcony partition walls externally. All apartments have visual privacy from each other.

A major advantage of the development site is that it offers excellent views to all sides of the site including expansive views over the city to the east, views to Braye Park to the west and over the Maroba gardens to the north. All apartments will enjoy expansive views even at low level.

9. PRINCIPLE 8: SAFETY AND SECURITY

"Good design optimises safety and security, both internal to the development and for the public domain.

This is achieved by maximising overlooking of public and communal spaces while maintaining internal privacy, avoiding dark and non-visible areas, maximising activity on streets, providing clear, safe access points, providing quality public spaces that cater for desired recreational uses, providing lighting appropriate to the location and desired activities, and clear definition between public and private spaces."

One of the main advantages of an apartment facility on the Maroba site is that it enjoys the sharing of the safety and security of the existing Maroba facilities. This includes full time staff located on the site at all times, access call buttons from all apartments to this full time staff day and night, secure direct access from the existing Maroba Manor aged care facility to all apartments via an enclosed access bridge, external security lighting and the advantage of approximately 190 other elderly residents located on the site.

The new apartment building will have security swipe card access to all external publically accessible access doors including automatic operation roller shutter doors to the basement car park as well as security pass access requirements on the lift access to each floor. Security within the new building is a major requirement as the aged are vulnerable.

10. PRINCIPLE 9: SOCIAL DIMENSIONS

"Good design responds to the social context and needs of the local community in terms of lifestyles, affordability and access to social facilities.

New developments should optimise the provision of housing to suit the social mix and needs in the neighbourhood or, in the case of precincts undergoing transition, provide for the desired future community."

Due to the nature of this project and the type of residents that it will accommodate there is no question that the facility is of the highest social benefit to the Newcastle community. The whole Maroba community provides a high class facility for many of the aged in the community by providing safety, security, access to nursing care when required, access to meals, access to laundry facilities, access to community support, access to companionship, access to transport using the Maroba bus, access to entertainment that is frequently held on the site, and access to spiritual support if required.

Maximising site density will expose access to all these facilities to as many aged residents as possible.

11. PRINCIPLE 10: AESTHETICS

"Quality aesthetics require the appropriate composition of building elements, textures, materials and colours and reflect the use, internal design and structure of the development. Aesthetics should respond to the environment and context, particularly to the desirable elements of the existing streetscape or, in precincts undergoing transition, contribute to the desired future character of the area."

The building has been designed with a clear base, middle and top, helping to break its scale down and relate to the streetscape. Many issues discussed in Principle 3: Built Form are applicable to Principle 10 as well.

The modern appearance of the building is articulated with strong grids, coloured planes, a mixture of materials and textures as well as louvred screens. The appearance of the building is functional, its character relying on its structural expression and its relationship to its context.

APPENDIX A

COMPLIANCE STATEMENT
RESIDENTIAL FLAT CODE

COMPLIANCE STATEMENT
RESIDENTIAL FLAT DESIGN CODE

MAROBA APARTMENTS
EDITH STREET
WARATAH NSW 2298

TABLE OF CONTENTS

1. INTRODUCTION

The Residential Flat Code

This document supports the 10 design quality principles identified in SEPP 65 and gives greater detail in how to achieve these principles. The document addresses residential flat development in the following three distinct sections:

- Part 01 - Local Context
- Part 02 - Site Design
- Part 03 - Building Design

The following summary outlines the proposed development's compliance with each of these sections.

2. PART 01 – LOCAL CONTENT

2.1 RESIDENTIAL FLAT BUILDING TYPES

The proposed development is a rectangular, creating a street edge and taking advantage of the expansive views to the east, north and west.

2.2 AMALGAMATION AND SUBDIVISION

The proposed development is located on a lot that was recently purchased by Maroba from the Department of Lands and has a requirement that it be developed with a use that relates to housing for the aged. The lot is separated from the remaining Maroba site which is leased by Maroba from the Department of Lands for aged care usage.

2.3 PRIMARY BUILDING CONTROLS

a) Building Height

Objectives:

- To ensure future development responds to the desired scale and character of the street and local area.
- To allow reasonable daylight access to all developments and the public domain.

Although the proposed building height exceeds the guidelines we have argued that this increased height is an appropriate scale given the uniqueness of the site. The proposed development site presents a number of opportunities to maximise the height and density of the building to allow the benefit that the site offers to a large number of aged residents.

The proposed development is sited with the backdrop of Braye Park and adjacent to the newly constructed three storey aged care facility of Maroba. The scale of the proposed new building is consistent with the nearby and newly completed Mater Hospital. In addition the building nestles into the hill to the south preventing long distance vistas to that side of the building. A multi storey building on this site does not overshadow any other buildings nor does it interrupt any existing view corridors. The main view corridor over the site is from the top of Braye Park and as this view point is considerably higher than the site the view is over the tree line and roof of the proposed building.

A larger built form is not foreign to the overall streetscape and experience of driving along this section of Edith Street. As you come to the top of the hill at the cross section of Boomerang Road and look along the length of Edith Street, the large form of the Mater Hospital can be seen at the other end of Edith Street. A larger built form on the Maroba site at the Southern end of Edith Street will compliment the Mater Hospital and will sit comfortably within the overall streetscape.

"In considering an application for consent to the erection of a building the whole or part of which exceeds 9 metres, the consent authority must take into consideration whether that height is compatible with the heights of other buildings in the immediate vicinity or locality."

The proposed building does not overshadow any existing buildings. The existing Maroba Manor aged care facility is to the north of the building, Braye Park is located to the west and south of the building and Edith Street is located to the east of the building. The setback from Edith Street and Braye Park together with the stepped form of the building ensures that any overshadowing of these public areas is minimised.

b) Building Depth

Objectives:

- To ensure that the bulk of the development is in scale with the existing or desired future context.
- To provide adequate amenity for building occupants in terms of sun access and natural ventilation.
- To provide for dual aspect apartments.

The building depth is similar to the depth of the newly completed adjacent Maroba Manor aged care facility providing a consistency with that building. The design and orientation of the building ensures that all apartments enjoy solar access for at least 3 hours per day for every day of the year. There are no apartments that are solely south facing and eleven of the apartments face both east and west enjoying solar access for most of the day. Thirty four (72%) apartments have orientation to two directions facilitating cross ventilation.

c) Building Separation

Objectives:

- To ensure that new development is scaled to support the desired area character with appropriate massing and spaces between buildings.
- To provide visual and acoustic privacy for existing and new residents.
- To control overshadowing of adjacent properties and private or shared open space.
- To allow for the provision of open space with appropriate size and proportion for recreational activities for building occupants.
- To provide deep soil zones for stormwater management and tree planting, where contextual and site conditions allow.

Building separation between the proposed development and the existing Maroba Manor aged care facility is 10.2m. There are no other adjacent buildings so building separation is not considered to be an issue.

This degree of separation provides significant visual privacy for both buildings. All of the proposed new apartments will enjoy long distance views and only eight of the apartments have balconies overlooking the existing Maroba Manor and most of these have distance views over the roof of that building. There are only four of the 100 bedrooms in Maroba Manor that have views to the proposed building and these have landscaped areas between them and the new building.

The distance between the proposed building and Maroba Manor together with the significant acoustic requirements for the windows of both buildings due to the traffic generated noise from Edith Street ensures that the acoustic issues are adequately dealt with.

There is no overshadowing of any buildings or their private open space by the proposed new building.

The occupants of the new apartments each enjoy balconies of significant size and they are able to share in the expansive landscaped areas throughout the Maroba precinct. As all of the residents will be aged their use of open space tends to be either a visual use of the spaces or very passive use of the spaces.

Deep soil zones are provided around the perimeter of the building as well as on the rest of the Maroba precinct. There are many large trees located on the Maroba precinct as well as extensive treed areas in Braye Park to the west and south.

d) Street Setbacks

Objectives:

- To establish the desired spatial proportions of the street and define the street edge.
- To create a clear threshold by providing a transition between public and private space.
- To assist in achieving visual privacy to apartments from the street.
- To create good quality entry spaces to lobbies, foyers or individual dwelling entrances.
- To allow an outlook to and surveillance of the street.
- To allow for street landscape character.

The proposed design meets the above objectives.

The building has a 6.0m setback from Edith Street which is consistent with the adjacent Maroba Manor and most of the other buildings fronting Edith Street. The landscaping concept between the existing Maroba Manor and Edith Street will be extended in front of the proposed building including the continuation of the boundary fence. This clearly defines the street edge and there is a clear transition from public and private space.

Visual privacy is achieved from the street as there is a step/ramp up from the street defining the entry to the building. This vertical separation ensures visual privacy is achieved at the lowest apartment level.

All of the eastern apartments have an outlook to the street providing passive surveillance to the street. In addition there will be electronic surveillance of all entries to the building.

e) Side and Rear Setbacks

Objectives – side setbacks:

- To minimise the impact of development on light, air, sun, privacy, views and outlook for neighbouring properties, including future buildings.
- To retain or create a rhythm or pattern of development that positively defines the streetscape so that space is not just what is left over around the building form.

Objectives – rear setbacks:

- To maintain deep soil zones to maximise natural site drainage and protect the water table.
- To maximise the opportunity to retain and reinforce mature vegetation.
- To optimise the use of land at the rear and surveillance of the street at the front.
- To maximise building separation to provide visual and acoustic privacy.

This development site has no side or rear setback issues as Braye Park is located on the southern boundary and the Maroba precinct and Braye Park are located on the western side. There are no adjacent buildings on these sides of the building. The setback to the north is technically 4.67m to the northern boundary however this is a boundary on 'paper' only as it is all part of the Maroba precinct in that area. There is no possibility of a building being constructed on the southern side of the site as this land is Braye Park. To the immediate western side of the building site is a 9.145m wide Hunter Water easement which does not allow construction of a building over it as it contains a 900mm diameter water main. The northern side building is the newly constructed Maroba Manor which has a proposed life of at least 50 years so further development on the northern side is restricted and in addition both sites have the same controlling user.

These extensive setbacks allow significant landscaping which is predominantly already there.

f) Floor Space Ratio

No floor space ratio currently applies to this development site. However the floor space ratio of the development based on a site area of 3,008m^2 is 2.1:1.

3. PART 02 – SITE DESIGN

3.1 SITE ANALYSIS

A full site analysis has been prepared for this development application submission and is included as an appendix to the Statement of Environmental Effects.

3.2 SITE CONFIGURATION

a) Deep Soil Zones

Objectives:

- To assist with management of the water table
- To assist with management of water quality.
- To improve the amenity of developments through the retention and/or planting of large and medium size trees.

Deep soil zones are provided around the perimeter of the proposed building and generally throughout the Maroba precinct. The landscaped area of the site 1,380.5m^2 representing 45.9% of the site. All of this is deep soil area

Site stormwater is to be collected in an on-site tank and reused on site.

See the Stormwater Management Plan included as an appendix to the Statement of Environmental Effects.

b) Landscape Design

Objectives:

- To add value to resident's quality of life within the development in the forms of privacy, outlook and views.
- To provide habitat for native indigenous plants and animals.
- To improve stormwater quality and reduce quantity.
- To improve the microclimate and solar performance within the development.
- To improve urban air quality.
- To contribute to biodiversity.

A Landscape Design Report has been prepared for this submission and is included as an appendix to the Statement of Environmental Effects. A Landscape Plan is also included.

Landscaping is currently a major feature of the Maroba precinct and it is proposed that the new building will have landscape that is an extension of the existing Maroba concept and standard. There are already numerous significant trees on the Maroba precinct and these trees are an extension of the trees species that are located within Braye Park encouraging wildlife to inhabit the Maroba precinct.

All the landscaping contributes to achieving the above landscaping objectives.

c) Open Space

Objectives:

- To provide residents with passive and active recreational opportunities.
- To provide an area on site that enables soft landscaping and deep soil planting.
- To ensure that communal open space is consolidated, configured and designed to be useable and attractive.

- To provide a pleasant outlook.

The open space available to the occupants of the apartment building is significant in size and quality and easily complies with the open space objectives.

Each apartment has access to their own private balcony as well as the open space available within the Maroba precinct. The Maroba precinct provides walking paths, seating areas, turfed areas, garden areas and treed areas for both visual and active use by the occupants of the apartment building. Occupants will also have direct access to Braye Park.

The open spaces of the Maroba precinct together with expansive views over the city of Newcastle and over Braye Park provide a stunning outlook from every apartment. Indeed these views are a major feature of the proposed development.

d) Orientation

Objectives:

- To optimise solar access to residential apartments within the development and adjacent development.
- To contribute positively to desired streetscape character.
- To support landscape design of consolidated open space areas.
- To protect the amenity of existing development.
- To improve the thermal efficiency of new buildings.

An important consideration in the design of the development is to reinforce a strong streetscape character by aligning the building to the street. The building will have a streetscape consistency and balance with the existing Mater Hospital buildings.

The building has a north/south axis ensuring that the main elevations to the east and west enjoy solar access. Twelve apartments (25%) have sole access to the eastern orientation. These apartments will have a minimum of 3 hours of solar access every morning. Fourteen apartments (30%) have sole access to the western orientation. These apartments will have a minimum of 3 hours solar access every afternoon. The height of Bray Park hill and the extensive number of large trees on the western side of the building help to shield the western elevation of the building from the low summer sun. Ten apartments (21%) enjoy solar access to both the eastern and western orientations ensuring they enjoy extensive solar access in the mornings and afternoons. A further eleven apartments (24%) have northern solar access. There are no apartments that only have southern solar access.

The north/south axis minimises the shadowing over the landscaped area of the site and does not overshadow any existing buildings.

See Section 4.2 Building Amenity- “Daylight Access” in the following section.

e) Planting on Structures

Objectives:

- To contribute to the quality and amenity of communal open space on roof tops, podiums and internal courtyards.
- To encourage the establishment and healthy growth of trees in urban areas.

As the building is part of the Maroba precinct with its extensive landscaping and large tree growth elevated planting has not been provided. In addition as all of the building occupants will be elderly it is considered inappropriate to provide elevated planting as the elderly will not be able to maintain these planted areas. Depending however on the frailty of the occupants some may elect to provide their own elevated planting in potted gardens. Each apartment has a

generously sized balcony suitable for a potted garden and each balcony will have a tap for the provision of water for cleaning, maintenance and irrigation.

f) Stormwater Management

Objectives:

- To minimise the impacts of residential flat development and associated infrastructure on the health and amenity of natural waterways.
- To preserve existing topographic and natural features, including watercourses and wetlands.
- To minimise the discharge of sediment and other pollutants to the urban stormwater drainage system during construction activity.

As required a Stormwater Drainage and Reuse Plan has been prepared as part of this submission and is included as an appendix to the Statement of Environmental Effects. This plan will provide for roof stormwater retention and site stormwater detention. The retention will be stored for reuse in toilets and laundries within the building as well as some irrigation. Stormwater retention and reuse is currently part of the water management of the adjacent Maroba Manor and the apartment building will be an extension of the Maroba attitude to energy and resource conservation.

Sedimentation and Erosion Control is also covered in these plans.

3.3 SITE AMENITY

a) Safety

Objectives:

- To ensure residential flat developments are safe and secure for residents and visitors.
- To contribute to the safety of the public domain.

The proposed design provides excellent safety for all residents. There is a clear distinction between public and private space. The development provides well lit safe ground floor entry. All access to the apartments and car parking is through a controlled electronic access system. Direct access from the basement car park is provided to all units via two separate lift cores.

Both the adjacent Maroba Manor aged care facility and the Maroba Lodge have staff on duty 24 hours per day every day and are able to be contacted by residents of the apartment building in an emergency. The whole Maroba precinct has security lighting at night.

b) Visual Privacy

Objectives:

- To provide reasonable levels of visual privacy externally and internally, during the day and at night.
- To maximise outlook and views from principle rooms and private open space without compromising visual privacy.

Visual privacy to apartments has been provided by several means including the planning of the individual units. These have been planned to minimise overlooking between rooms and private open spaces. Screen walls and adjustable louvre panels have also been included to maintain this privacy. Generally glazed door and window units are well set back from the edge of the building to assist with the provision of privacy.

The building has been designed with two vertical circulation cores limiting the number of apartments using each Lobby to a maximum of five. This provides privacy to the occupants by limiting the number of people using the core on each level.

3.4 SITE ACCESS

a) Building Entry

Objectives:

- To create entrances which provide a desirable residential identity for the development.
- To orientate the visitor.
- To contribute positively to the streetscape and building façade design.

The building has one distinct entry from Edith Street for apartment access. This entrance provides both stair and ramp access. This access allows for pedestrian entry from Edith Street however it is envisaged that most residents will enter the building from the car park level which has direct access to each building core.

The Edith Street entrance provides an obvious entrance to the building and leads to the secure entrance door where there will be an intercom system to gain entry to the building. All apartments will be provided with individual mail boxes located at the street podium level.

Access is also available through the Community Room via the Communal Balcony to the Maroba rear gardens, Maroba Lodge and to Braye Park. There is also direct access from Level 1 into Maroba Manor via an elevated connection bridge providing direct and level connection for security, staff, residents and delivery of meals to the apartments.

b) Parking

Objectives:

- To minimise car dependency for commuting and recreational transport use and to promote alternative means of transport (public transport, bicycling and walking).
- To provide adequate car parking for the building's users and visitors, depending on building type and proximity to public transport.
- To integrate the location and design of car parking with the design of the site and the building.

Whilst the objectives are to minimise car dependency many of the residents of the Maroba Apartments will be aged and fairly frail. It is unlikely that they will be walking or using bicycles. Some of the residents may make use of public transport and there is a bus stop located nearby in Edith Street. Many of the residents however will use their car if they have one or will be transported by their families in private vehicles.

A basement car park is provided for secure car parking for 44 vehicles all with disabled compliant car parking spaces. Access to this car parking will be controlled by remote control. This car parking provides direct access to all the apartments over via a lift.

The car parking for the project has been addressed in detail in the Traffic Assessment as an appendix to the Statement of Environmental Effects. This Traffic Assessment advises that the car parking provided is deficient on the required number of space by one space. There is supplementary car parking on the rest of the Maroba site and in Edith Street and in Myall Road adjacent to the site.

Maroba owns a Toyota Coaster bus that is garaged on the Maroba site. Maroba staff regularly organise outings for the Maroba residents to off-site functions, shopping centres, parks etc. This bus will be available for use by the Maroba Apartments residents.

The design of the basement car parking area utilises the natural slope of the land to minimise the extent of excavation and to minimise visual exposure and visual dominance. This basement car parking will be mechanically ventilated in accordance with the relevant Australian Standards.

Secure bicycle parking is provided in the basement level.

c) Pedestrian Access

Objectives:

- To promote residential flat development which is well connected to the street and contributes to the accessibility of the public domain.
- To ensure that residents, including users of strollers and wheelchairs and people with bicycles are able to reach and enter their apartment and use communal areas via minimum grade ramps, paths, access ways or lifts.

The building has ramp and stair access to Edith Street and to the rest of the Maroba precinct. Once a person is either located in the basement or on Level 1 they are able to gain access to their apartment via use of a lift. They can also gain level access to the Ground Floor of the adjacent Maroba Manor which provides direct and level access to the rest of the Maroba facilities. This will allow wheelchair access from Edith Street or the basement to all apartments and to all the facilities located in Maroba Manor and Maroba Lodge and to most of the self care units.

Ramps and basement car parking is in accordance with AS 1428. All apartments have barrier free access.

d) Vehicle Access

Objectives:

- To integrate adequate car parking and servicing access without compromising street character, landscape or pedestrian amenity and safety.
- To encourage the active use of street frontage.

Car parking to the basement car park is via the main Maroba entrance in Myall Road and via the on-site road directly into the basement car park. This means that there is no direct access to the Maroba precinct facilities from Edith Street. The Maroba on-site road has a left only, egress only function onto Edith Street. This allows traffic control on the site and minimises any danger associated with aged drivers and the busy traffic on Edith Street.

As there is no vehicle access directly off Edith Street associated with the proposed new building the street character is not compromised by the introduction of vehicle access points.

4. PART 03 – BUILDING DESIGN

4.1 BUILDING CONFIGURATION

a) Apartment Layout

Objectives:

- To ensure the spatial arrangement of apartments is functional and well organised.
- To ensure that apartment layouts provide high standards of residential amenity.
- To maximise the environmental performance of apartments.
- To accommodate a variety of household activities and occupants needs.

All apartment layouts have been designed to maximise residential amenity with all apartments having views to either Newcastle to the east or Braye Park to the west. Daylight access and natural ventilation has been considered in the design of all apartments as well as maintaining visual and acoustic privacy.

All apartments have open private space directly off their living areas. In the case of the cross-through units, two open private spaces are provided. All layouts provide open planning to living areas which minimises circulation corridors and creates planning flexibility and access for wheelchairs and walking frames.

A high percentage of apartments are cross-through or corner apartments which maximises opportunities to facilitate natural ventilation and to capitalise on natural daylight.

All kitchens are part of an open plan living area and in all the back of the kitchen is within 8.0 metres of a window.

Cross over units range from 15 to 17 metres deep but are 7.8 metres wide, well above the minimum 4.0 metre width recommended in the code.

b) Apartment Mix

Objectives:

- To provide a diversity of apartment types which cater for different household requirements now and in the future.
- To maintain equitable access to new housing by cultural and socio-economic groups.

The proposed development provides 47 apartments comprising of the following:

- 4 x 1 bedroom apartments
- 18 x 2 bedroom apartments
- 25 x 2 bedroom apartments with a study

All of the smaller apartments are located at Level 1 so that their price can be maintained at a low level so that they are affordable to the lower end of the market. The larger apartments with large balconies are located on Level 6 where the views are more expansive and the price will be higher.

The increased density of apartments on the Maroba precinct not only allows more aged residents to take full advantage of the facilities and services that Maroba offers but also allows for economies of scale and resultant more affordable prices for an increased percentage of the population.

c) Balconies

Objectives

- To provide all apartments with private open space.
- To ensure balconies are functional and responsive to the environment thereby promoting the enjoyment of outdoor living for apartment residents.
- To ensure that balconies are integrated into the overall architectural form and detail of residential flat buildings.
- To contribute to the safety and liveliness of the street by allowing for casual overlooking and address.

All apartments are provided with a private open space located directly off the main living area. The minimum depth of all these balconies is 2.6 metres, well above the recommended 2.0 metre minimum. Many of the apartments are larger than 2.8 metres. All balconies are large enough to allow a table with seating on all sides.

In many apartments this private open space extends across the bedrooms and/or the Study to improve the apartments amenity. In the case of cross-through apartments an additional balcony is provided for the bedrooms.

In general, balconies face north, west or east and where required are supplemented with sun screens, pergolas or operable louvre panels to provide sunscreen or privacy. Balustrading is generally glazed and to allow the residents to maximise the use of their expansive views. Due to the elevation of all floor levels above the street level and the proximity of the site to Braye Park the glazed handrails are appropriate to allow views out of the building where there is little opportunity to facilitate views into the buildings and affecting occupant privacy.

d) Ceiling Heights

Objectives:

- To increase the sense of space in apartments and provide well proportioned rooms.
- To promote the penetration of daylight into the depths of the apartment.
- To contribute to flexibility of use.
- To achieve quality interior spaces while considering the external building form requirements.

Floor to floor heights between units is 3.0 metres. This will allow for 2.7 metre ceiling heights to living areas but final heights will be dependent on service locations and acoustic floor treatments. Non-habitable rooms will be provided with ceilings ranging from 2.25 to 2.4 metres.

e) Flexibility

Objectives:

- To encourage housing designs which meet the broadest range of the occupants needs possible.
- To promote 'long life loose fit' buildings which can accommodate whole or partial changes of use.
- To encourage adaptive re-use.
- To save the embodied energy expended in building demolition.

The proposed development is based on an 8.0 metre structural grid that extends from the basement carpark to the uppermost floor. This provides the framework around which all the units are planned and means that all internal apartment walls are non-load bearing. This in turn allows for greater flexibility in the planning of the apartments.

The open planning of all units plus windows to all habitable rooms accommodates a changing use for rooms as well as providing for a variety of furniture layout opportunities. Two bedroom apartments plus a Study can easily be converted to one or two bedroom units with increased living space or even an office.

Multiple entry cores also increase planning flexibility.

f) Ground Floor Apartments

Objectives:

- To contribute to the desired streetscape of an area and to create active safe streets.
- To increase the housing and lifestyle choices available in apartment buildings.

The proposed development does have a few ground floor apartments at the southern end of the Edith Street frontage but there security concerns about street level apartments. The elderly are very concerned about security as they are some of the most vulnerable members of the community. There is little pedestrian activity in this part of Edith Street as there are few pedestrian generating facilities to the south of the site and most people who go to either Maroba or the Mater Hospital drive private vehicles or catch public transport. In either case they will park or alight from a bus to the north of the site rather than the south of the site. Edith Street in this location is very busy, has poor sight lines and no on-street parking facility. Hence there is little need for an active street frontage in this location.

Most Level 1 floor apartments open out onto the communal landscaped grounds of Maroba. In each of these cases the external outdoor terrace has been extended to up to 3.8 metres deep.

g) Internal Circulation

Objectives:

- To create safe and pleasant spaces for the circulation of people and their personal possessions.
- To facilitate quality apartment layouts, such as dual aspect apartments.
- To contribute positively to the form and articulation of the building façade and its relationship to the urban environment.
- To encourage interaction and recognition between residents to contribute to a sense of community and improve perceptions of safety.

With the provision of two individual entry / lift lobbies there is minimal common circulation space and virtually no common corridors on Levels 2 to 6. These multiple cores support more dual aspect and cross-through apartments with better daylight access and cross ventilation. Level 1 has a central corridor allowing the provision of smaller sized low cost apartments and allows access from Maroba Manor via the bridge over the access road. This facilitates access to both vertical transport cores allowing disabled access directly to and from Maroba Manor and Maroba Lodge. It also allows all residents to gain access to the Community Room and the access to the Maroba precinct gardens through the Community Room.

No lift lobby services more than five apartments at each floor, well below the limit of eight as recommended by the code.

h) Mixed Use

Objectives:

- To support the integration of appropriate retail and commercial uses with housing.
- To create more active, lively streets and urban areas, which encourage pedestrian movement, service the needs of the residents and increase the area's employment base.
- To ensure that the design of mixed use developments maintains residential amenities and preserves compatibility between uses.

The proposed development does not contain any mixed use. The purpose of the project is to maximise the residential density on the site so that as many aged residents as possible can take advantage of the Maroba support, services and facilities. Mixed use in this area would be inappropriate.

i) Storage

Objectives:

- To provide adequate storage for everyday household items within easy access of the apartment.
- To provide storage for sporting, leisure, fitness and hobby equipment.

Most aged residents do not have items that are sporting or bulky in nature. Storage in each unit includes wardrobes in each bedroom, linen cupboard and laundry storage.

4.2 BUILDING AMENITY

a) Acoustic Privacy

Objectives:

- To ensure a high level of amenity by protecting the privacy of residents within residential flat buildings both within the apartments and in private open spaces.

External outdoor areas and balconies are separated by extended party walls or adjustable louvre screens. All internal separating walls and floors between units will be constructed to comply with the requirements of the BCA with regard to both airborne noise and impact noise.

b) Daylight Access

Objectives:

- To ensure that daylight access is provided to all habitable rooms and encouraged in all other areas of residential flat development.
- To provide adequate ambient lighting and minimise the need for artificial lighting during daylight hours.
- To provide residents with the ability to adjust the quantity of daylight to suit their needs.

All apartments are provided with optimal daylight access. Many of the plans (66%) are either a cross through or corner configuration providing windows on at least two elevations to different orientations. All living areas and many bedrooms have direct access to a balcony or open private terrace. All balconies have overhead floors or awnings to provide weather protection and sun control. This natural daylight means the need for artificial lighting during daylight hours will be greatly minimised. There are no apartments that are only south facing. The balcony and living areas of all apartments enjoy a minimum of three continuous hours of direct sunlight each day of the year. This represents over 70% of the total apartments and meets the recommendations of the code.

All apartments will be provided with internal blinds that are adjustable allowing residents to adjust the quantity and quality of daylight to suit their needs.

c) Natural Ventilation

Objectives:

- To ensure that apartments are designed to provide all habitable rooms with direct access to fresh air and to assist in promoting thermal comfort for occupants.
- To provide natural ventilation in non-habitable rooms, where possible.
- To reduce energy consumption by minimising the use of mechanical ventilation, particularly air conditioning.

All apartments are provided with openable windows allowing access to fresh air. Many of the plans (66%) are either a cross through or corner configuration providing windows on at least two elevations to different orientations promoting the ability for cross flow natural ventilation. All living areas have large openable sliding doors allowing balcony access and significant natural ventilation opportunity.

The building depth of all units ranges from 16.0 metres to 17.0 metres which is in the 10 to 19 metre range that will facilitate natural ventilation.

All apartments will have split cycle air conditioning which will be individually controlled within each apartment. These air conditioning units will have a time control which prevents air conditioning units to be left on over long periods of time without being reset. This ensures that air conditioning units are not left running when the apartments are not occupied for extensive periods of time. All apartments have large openable windows and doors, good access to prevailing winds and will be well insulated all minimising the need to use air conditioning.

4.3 BUILDING FORM

a) Awnings and Signage

Objectives:

- To provide shelter for public streets.
- To ensure signage is in keeping with desired streetscape character and with the development in scale, detail and overall design.

The proposed new building does not have awnings above public spaces such as the Edith Street footpath as this is not appropriate in this area.

Signage will be kept to a minimum. The overall Maroba precinct already has adequate identification signage. New signage will be limited to the building name and addition of on-site directional signage to the apartment building from the Myall Road entrance.

b) Facades

Objectives:

- To promote high architectural quality in residential flat buildings.
- To ensure that new development shave facades which define and enhance the public domain and desired street character.
- To ensure that building elements are integrated into the overall building form and façade design.

The developments façade has been designed in response to the building's use and its desired contextual character. It has been divided horizontally with a base, middle and recessed, more lightweight top and expressed vertically with strong breaks supplemented by highlighted structural grids.

This is further articulated by modulating the apartment facades and layering the façade with louvred panels and highlighted frames.

The facade treatment will compliment the adjacent Maroba Manor in use of materials, rhythm and some proportioning. The facade horizontality and colours will also compliment the nearby Mater Hospital buildings.

c) Roof Design

Objectives:

- To provide quality roof designs, which contribute to the overall design and performance of residential flat buildings.
- To integrate the design of the roof into the overall façade, building composition and desired contextual response.
- To increase the longevity of the building through weather protection.

The roof design has been integrated into the overall façade treatment to provide a simple stepping form that is reflective of the adjacent Maroba Manor. The stepping, articulated form

helps to reduce the length and scale of the overall façade treatment to both the street and courtyard. This simple and low profile roof form ensures that the roof is not a viusually dominant element considering the size of the overall building form.

4.4 BUILDING PERFORMANCE

a) Energy Efficiency

Objectives:

- To reduce the necessity for mechanical heating and cooling.
- To reduce reliance on fossil fuels.
- To minimise greenhouse gas emissions.
- To support and promoted renewable energy initiatives.

Many (66%) of the apartments are either a cross through or corner plan which optimises natural daylight and cross ventilation. All apartment plans can be isolated into zones for separate heating and cooling requirements. Bedroom zones can be separated from living zones with the introduction of doors between these areas.

Hot water will be solar and gas powered and all showers, taps and cisterns will be triple A rated. The reliance on artificial lighting will also be reduced due to the narrow floor plans increased natural daylight.

A BASIX assessment has been prepared as part of this submission and is included as an appendix to the Statement of Environmental Effects.

b) Maintenance

Objectives:

- To ensure long life and ease of maintenance for the development.

All building materials and finishes have been selected for their durability. Anti-graffiti materials will be selected in the public areas including the ground floor. Landscaping will be provided with an irrigation system to ensure ease of maintenance.

The majority of windows are able to be cleaned from balconies. Adjustable louvre screens are to be manually operated.

Maroba looks after their facilities as can be seen by looking at their Maroba Lodge building. This was constructed in 1992 and is in as new condition. This preventative maintenance approach ensures that the overall precinct is always in prime condition and that the buildings, roads and gardens last for long periods without need for replacement.

c) Waste Management

Objectives:

- To avoid the generation of waste through design, material selection and building practices.
- To plan for the types, amount and disposal of waste to be generated during demolition, excavation and construction of the development.
- To encourage waste minimisation, including source separation, reuse and recycling.
- To ensure sufficient storage and collection of waste and quality design of facilities.

Demolition of the building previously located on this site was included as part of the Maroba Manor development completed in 2009. The site is now cleared ready for construction. Waste minimisation during construction will be encourage through a recycling clause in the construction documentation.

Operational waste collection and disposal will be as outlined below:

- Residential waste is disposed of on each apartment level into two proprietary garbage chutes located in each lift lobby. These chutes are connected to two garbage rooms in the basement which collect the waste in bulk waste bins. These will be removed by Maroba staff to their central waste collection area located within the adjacent Maroba Manor building. Waste will be separated into specialist recycle containers. A contracted waste removal company empties these containers at regularly agreed times that suit the overall operation of Maroba.

d) Water Conservation

Objectives:

- To reduce mains consumption of potable water.
- To reduce the quantity of urban stormwater run off.

A Stormwater Management Plan has been prepared as part of this submission and is included as an appendix to the Statement of Environmental Effects.

Water conservation strategies include stormwater collection and reuse including garden watering and toilet flushing. Triple A rated appliances will be incorporated to minimise water use.

Appendix F

Noise Impact Assessment

REVERB ACOUSTICS

Noise and Vibration Consultants

Noise Impact Assessment
Maroba Self-Care Residential Apartments
58 Edith Street
Waratah NSW

February 2011

Prepared for EJE Architecture
Report No. 10-1526-R1

Building Acoustics-Council/DECCW Submissions - Modelling - Compliance - Certification

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1 INTRODUCTION

Reverb Acoustics has been commissioned to conduct a noise impact assessment for the proposed Maroba Self-Care Residential Apartments at 58 Edith Street, Waratah. The purpose of this assessment is to theoretically determine the noise impact from activities associated with nearby commercial development and passing traffic on Edith Street within habitable spaces of proposed development, and to ensure that noise levels comply with the requirements of AS/NZS2107-2000, Department of Environment, Climate Change and Water (DECCW), Department of Planning (DoP), and Newcastle City Council (NCC).

Further assessment has also been undertaken to determine the noise impact operation of the development may have upon nearby neighbours (mechanical plant). Given the location of the development in relation to nearest residences and Edith Street, we believe assessment of site traffic is not required.

The assessment was requested by EJE Architecture to form part of and in support of a Development Application to NCC and to ensure any noise control measures are incorporated into the design of the new building.

2 TECHNICAL REFERENCE / DOCUMENTS

AS 2107-2000 *"Acoustics-Recommended Design Sound Levels and Reverberation Times for Building Interiors".*

AS 1276.1-1999 *"Acoustics – Rating of sound insulation in buildings and of building elements. Part 1: Airborne sound insulation".*

Department of Planning (2008). *"Development near Rail Corridors and Busy Roads - Interim Guidelines".*

NSW Environment Protection Authority (1999). *Environmental Criteria for Road Traffic Noise*

Department of Environment, Climate Change and Water (2010). *Draft Road Noise Policy.*

NSW Environment Protection Authority (2000). *Industrial Noise Policy*

Department of Environment and Climate Change NSW (2007). *Noise Guide for Local Government.*

NSW Environment Protection Authority (1992). *Environmental Noise Control Manual*

Plans supplied by EJE Architecture. Note that variations from design, supplied to us, may affect our acoustic recommendations.

A Glossary of commonly used acoustic terms is presented in Appendix A to aid the reader in understanding the Report.

3 DESCRIPTION OF THE PROPOSAL

The proposal includes construction of 6 levels of residential self-care apartments and basement level carparking. The site fronts Edith Street, with Maroba Manor adjacent and to the north, Maroba Hostel to the west and residences to the east across Edith Street. As such, passing cars and heavy vehicles on Edith Street and activities associated with nearby buildings (vehicle movements, mechanical plant, etc) have the potential to create unacceptable noise for future occupants of apartments. Nearest neighbours and noise sources identified during our site visits are shown below in Figure 1.

Figure 1 – Location Plan

LEGEND:

R1 Residential receivers
R2 Narnia Pre-School
R3 Maroba Manor
R4 Maroba Hostel

4 EXISTING ACOUSTIC ENVIRONMENT

Consideration must be given to the extent of the existing acoustic environment and whether such levels are appropriate for the land use of the receiver area. As such, a background and road traffic noise level survey was conducted using a Type 1, Svan 949 environmental noise logging monitor, installed in a weatherproof security cage, midway along the east site boundary, and approximately 6 metres from the near lane of traffic on Edith Street (see Figure 1). The selected location is representative of the acoustic environment in the receiver area and is considered an acceptable location for determination of the background noise levels in accordance with Appendix B of the Department of Environment, Climate Change and Water's (DECCW's) - Industrial Noise Policy (INP).

Sound levels were continuously monitored from 12 February to 19 February 2011, to determine the existing background and ambient noise levels for the area. The instrument was programmed to accumulate environmental noise data continuously and store results in internal memory. The data were then analysed to determine 15 minute Leq and statistical noise levels using dedicated software supplied with the instrument. The instrument was calibrated with a Brüel and Kjaer 4230 sound level calibrator producing 94dB at 1kHz before and after the monitoring period, as part of the instrument's programming procedure, and showed an error less than 0.5dB.

Tables 1 and 2 shows results of our noise survey, included in Table 1 are the Assessment Background Levels (ABL's), for the day, evening and night periods. From these ABL's the Rating Background Level (RBL) has been calculated, according to the procedures described in the DECCW's INP and by following the procedures and guidelines detailed in Australian Standard AS1055-1997, "Acoustics - Description and Measurement of Environmental Noise, Part 1 General Procedures". A complete set of logger results is not shown, but available on request.

Table 1: Summary of Noise Logger Results – Edith Street, dB(A)

Time Period	Background L90			Ambient Leq		
	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am
12-13 Feb	50	41.4	34.4	70.1	66.8	63.9
13-14 Feb	45.1	42.7	38.7	69.6	67.2	63.9
14-15 Feb	56.9	42.9	32.4	71.7	68	67.4
15-16 Feb	57.1	43.6	34.9	72.6	68.2	66.3
16-17 Feb	53.6	47.7	42.4	71.3	67.9	66.3
17-18 Feb	54.7	49.3	40.9	71.2	68.7	66.4
18-19 Feb	56.3	47.0	42.3	71.4	67.9	63.9
RBL*	**54.7**	**43.6**	**38.7**	**--**	**--**	**--**
LAeq	**--**	**--**	**--**	**71.2**	**67.9**	**65.7**

* RBL - Rating Background Level, median value of each ABL over the entire monitoring period. The ABL is a single figure representing the "L90 of the L90's", as recommended by the DEC, for each separate day of monitoring.

Table 2: Measured Traffic Noise Levels – Edith Street

Descriptor	Noise Level dB(A)	Time Interval
Leq,1hr (day)	70.5	07:00 to 22:00
Leq,1hr (night)	68.7	22:00 to 07:00
Leq,9hr	65.7	22:00 to 07:00
Leq,15hr	70.5	07:00 to 22:00
Leq,24hr	68.9	06:00 to 06:00

Site, weather and measuring conditions were all satisfactory during our noise surveys. We therefore see no serious reason to modify the results because of influencing factors related to the site, weather or our measuring techniques.

A summary of the measured noise environment appears in Table 3, taken from our logger results. The measured noise levels are typical for residential areas near a busy road and commercial district.

Table 3: Existing Source Noise levels

Time Period	Leq		L1		L10		L90	
	Range	Average	Range	Average	Range	Average	Range	Average
Day	66-87	71	75-98	79	70-85	74	41-71	57
Evening	65-72	68	74-79	76	70-75	72	40-70	50
Night	52-75	64	65-82	75	40-78	66	32-65	42

The Sound Power Level's (Lw's) of additional noise sources identified during our site visits are listed below:

Item	*Lw, dB(A),Leq*	*Location/Comments*
Employee/visitor vehicles	78	access rd, N side proposal
Small delivery trucks	84	access rd, N side proposal
Mech plant Maroba Manor/House	72	well removed from proposal

5 CRITERIA

5.1 Road Traffic Noise

Criteria for the assessment of quasi-steady-state noise sources, such as continuous road traffic and mechanical services, are sourced from AS/NZS 2107-2000 *"Acoustics-Recommended Design Sound Levels and Reverberation Times for Building Interiors"* and are detailed below.

Room Type	dBA
RESIDENTIAL BUILDINGS	
Houses and apartments near major roads	
Living areas	35 – 45
Sleeping areas	30 – 40

DoP's *"Development near Rail Corridors and Busy Roads - Interim Guidelines*" (released in December 2008) is a more recent document for assessment of road traffic noise impacts on residential developments. Limits specified within the Policy, which are virtually identical to those in AS/NZS2107-2000 are shown below:

Type of Occupancy	*Noise Level in dB(A)*	*Applicable Time Period*
Sleeping areas (bedroom)	35	Night 10pm to 7am
Other habitable rooms (excluding garages, kitchens bathrooms & hallways)	40	At any time

The RTA describes cognate criteria for the assessment of road traffic noise upon residential developments in their Environmental Noise Management Manual. Reference to Page 160 of the RTA's Manual, indicates that noise reduction measures for new developments should endeavour to meet the noise level targets set out in the Department of Environment, Climate Change and Water (DECCW's) Environmental Criteria for Road Traffic Noise (ECRTN).

The ECRTN is currently in the process of being superceded by the Draft Road Noise Policy (DRNP) which contains a number of criteria applied to a variety of road categories (freeway, collector and local roads) and situations (new, upgraded roads and new developments affected by road traffic). Table 4 shows the relevant category, taken from Table 3 of the DRNP:

Table 4: - Extract from Table 3 of DRNP Showing Relevant Criteria.

Road Category	Day	Night
New residential developments affected by noise from existing freeway/arterial /sub-arterial roads	55 LAeq,15hr	50 LAeq,9hr

Road categories are defined in the DRNP are as follows:

Freeway/arterial Support major regional and inter-regional traffic movement. Freeways and motorways usually feature strict access control via grade separated interchanges.

Sub-arterial Provide connection between arterial roads and local roads. May provide a support role to arterial roads during peak periods. May have been designed as local streets but can serve major traffic generators or non-local traffic functions. Previously designated as “collector” roads in ECRTN.

Local road Provide vehicular access to abutting property and surrounding streets. Provide a network for the movement of pedestrians and cyclists, and enable socials interaction in a neighbourhood. Should connect, where practicable, only to sub-arterial roads.

Based on the above definitions Edith Street is classified as an arterial road.

The DECCW prefer internal noise level criteria to be set by the relevant planning authority. The internal levels that are set may vary depending on the type of development the planning authority wants to encourage for an area. However, in the absence of any local codes the DECCW recommends internal noise levels for multi-residential developments. Note (v) on Page 12 of the ECRTN suggests an internal noise level within the centre of the room 10dB(A) below the external criterion with windows open, i.e. 20% of window area left open.

Table 5 summarises satisfactory internal noise levels for residences, used for the basis of this assessment.

Table 5: Internal Noise Level Criterion (Residential)

Location	**Criterion – dB(A),Leq**		**Remarks**
	Day	**Night**	
Sleeping areas	-	35	Windows closed
	-	40	Windows open
Other habitable rooms	40	-	Windows closed
	45	-	Windows open

Note: Provision for air conditioning will be available, therefore windows open criteria do not apply in this case.

Note that limits specified in the DECCW documents are in agreement with those contained in AS/NZS 2107-2000 and DoP’s Guideline. Therefore, the aim of the assessment is to ensure that the allowable noise levels shown above and in Table 4 are not (theoretically) exceeded within any habitable room due to road traffic noise. Transmission paths considered in the assessment are windows and doors with allowances made for shielding by balconies, intervening buildings/terraces, etc.

5.2 Site Noise/Mechanical Plant

Noise from industrial noise sources scheduled under the Protection of Environment Operations Act is assessed using the DECCW's INP. However, local Councils may also apply the criteria for land use planning, compliance and complaints management. The INP specifies two separate criteria designed to ensure existing and future developments meet environmental noise objectives. The first limits intrusive noise to 5dB(A) above the background noise level and the other aims to protect against progressively increasing noise in developing areas, based on the existing (Leq) noise level from industrial noise sources. Project Specific Noise Levels are established for new developments by applying both criteria to the situation and adopting the more stringent of the two.

The existing L(A)eq for the receiver area is dominated by traffic on nearby roads and some commercial activity during the day and evening. Reference to Table 2.1 of the INP shows that the area is classified as urban, i.e. acoustic environment dominated by traffic generated urban hum, and industrial noise contributions are more than 6dB(A) below the recommended Leq, so the recommended Acceptable Noise Level (ANL) applies in this case, i.e. no ANL reduction required for industrial noise contributions. At night however, average industrial noise contributions are as high as 44dB(A),Leq, therefore adjustments to the Acceptable Noise Level (ANL) must be applied. In high traffic areas where the existing traffic noise levels are at least 10dB above the Acceptable Noise Level, the high traffic amenity criterion applies.

Table 6 specifies the applicable base objectives for the proposal at nearest residences. In high traffic areas where the existing traffic noise levels are at least 10dB above the Acceptable Noise Level, the high traffic amenity criterion applies.

Table 6: - Base Noise Level Objectives

Period	Intrusiveness Criterion	Amenity Criterion
Day	60 (55+5)	61 (71-10)
Evening	49 (44+5)	58 (68-10)
Night	44 (39+5)	56 (66-10)
Receiver Type: Urban (See DECCW's INP - Table 2.1)		

Project specific noise levels, determined as the more stringent of the intrusiveness criterion and the amenity / high traffic criterion, are as follows:

Day **60dB LAeq,15 Minute** 7am to 6pm Mon to Sat or 8am to 6pm Sun and Pub Hol.
Evening **49dB LAeq,15 Minute** 6pm to 10pm
Night **44dB LAeq,15 Minute** 10pm to 7am Mon to Sat or 10pm to 8am Sun and Pub Hol.

The INP's criteria are external limits, therefore internal criteria must also be applied for habitable rooms within future units. Section 4.1.2 of the DECCW's Interim Construction Noise Guideline (ICNG) suggests a conservative estimate of the difference between internal and external noise levels is 10dB, which we are in agreement with for a window open 20% to provide ventilation. Section 4.1.2 also suggests that the greater reductions can be achieved for fixed glazing and once again we are in agreement. Based on the above, the following internal criteria apply for habitable rooms within any future residence:

Living Areas:
49dB(A),Leq – 10dB(A) = **39dB(A),Leq (internal)**
Bedrooms:
44dB(A),Leq – 10dB(A) = **34dB(A),Leq (internal)**

5.3 Short Term Noise Events

Section 2.4.5 of the DECCW's Noise Guide for Local Government and Chapter 19-3 of their Environmental Noise Control Manual (ENCM) state *"the L1 level of any specific noise source should not exceed the background noise level (L90) by more than 15dB(A) when measured outside the bedroom window"*. This criterion is applied to residential situations between the hours of 10.00pm and 7.00am where a receptor's sleep may be interrupted by noise. It is applied in this case to future residents likely to receive noise from activities associated with nearby buildings (emergency pickups and deliveries, etc). Based on an average minimum background noise level of 39dB(A),L90 for night (10pm-7am) the sleep arousal criterion is set at **54dB(A),L1(1min)** at the bedroom window of any affected residential receiver.

5.4 Criteria Summary

Various criteria are described in previous Sections of this report for external noise sources such as traffic on public roads and activities associated with sporting activities and people on city streets. The adopted criteria for this assessment are summarised below:

Living Areas:		
	Industrial Noise	**49dB(A),Leq (external/res bdry)**
		39dB(A),Leq (internal)
	Road Traffic:	**40dB(A),Leq (internal) windows closed**
		45dB(A),Leq (internal) windows open
Bedrooms:		
	Industrial Noise	**44dB(A),Leq (external/res bdry)**
		34dB(A),Leq (internal)
		54dB(A),L1 (external) sleep arousal
		44dB(A),L1 (internal) sleep arousal
	Road Traffic:	**35dB(A),Leq (internal) windows closed**
		40dB(A),Leq (internal) windows open

6 METHODOLOGY

6.1 Road Traffic

Applicable noise level metrics, namely, Leq (day peak) and Leq (night) are those calculated from our measurements at the site, following the methodology outlined in the DECCW's ECRTN and DRNP. A +2.5dB(A) facade adjustment must be applied, since our measurements were conducted in the free field.

received noise (free field) + *facade correction* = *received noise*

Applying the above formula gives:

Day	70.5dB(A) + 2.5dB(A) =	**73dB(A) Leq1hr**	(7am-10pm)
Night	68.7dB(A) + 2.5dB(A) =	**71.2dB(A) Leq1hr**	(10pm-7am)

For assessment purposes, noise levels are usually measured over the entire day (7am to 10pm) and night (10pm to 7am) periods. However, we consider the DECCW criteria to be a minimum design goal for residences near a commercial area and busy road, therefore, for the purposes of this assessment, we have assumed that the noise level during peak traffic periods to be constant over the full assessment period.

The implications are that calculated noise levels will be higher, resulting in more stringent noise control recommendations, which will in turn benefit future occupants.

RTA traffic stations indicate that approximately 21,000 vehicles pass the site each day along Edith Street the year 2004. Based on growth rates indicated in the RTA publication, this equates to 21,500 vehicles projected to the year 2011. A figure of 7% heavy vehicles has been adopted. The AADT for the year 2011 was applied to our computer programme, based on the DECCW and RTA approved CORTN Method of Traffic Noise Prediction, and noise levels were calculated to the theoretical facades of each future residential unit. The CoRTN values are merely arbitrary, as calculated noise levels are adjusted to correlate with our measured peak external noise levels, with the intention is to provide a (theoretical) means of determining the degree of noise control required for a particular building component.

Equivalent continuous noise levels were calculated for each traffic lane separately on the basis that the noise source (i.e. the traffic) was located in approximately the centre of the respective lane. In particular, this gives an accurate estimation of the location of bus and truck exhausts which are generally located on the right hand side, being approximately at the same point for both traffic directions. Our calculations have been modified to compensate for the differing acoustic centres of cars and heavy vehicles, by modelling each separately and logarithmically adding received noise levels.

Once the traffic noise level at the outer face of each building element was determined, the required Rw was calculated in accordance with the mathematical procedure given in AS3671-1989 *"Acoustics - Road traffic noise intrusion - Building siting and construction"*. This procedure is based on the required internal noise level shown in Section 5.3.

6.1.1 CoRTN Model Conversion

The DECCW released their ECRTN in June 1999, which specifies modified assessment periods for day and night, namely, Leq,15hr (7am to 10pm) and Leq,9hr (10pm to 7am). These assessment periods have rendered the original Australian version of the CoRTN model invalid, which was designed to assess the impact over a single 24 or 18 hour period. Consequently, modification of the Model is required to adequately describe the new metrics.

The CoRTN algorithm pertaining to traffic flow percentages has been modified by inserting all AADT figures for arterial roads, contained in RTA publications - Traffic Volume Data for Hunter and Northern Regions, 1998, and establishing AADT figures for the applicable day and night periods. Our CoRTN model was then calibrated against long term measurements made at locations with reliable AADT figures.

7 ANALYSIS AND DISCUSSION

7.1 Received Noise – Road Traffic

Sample Calculation
Shown below are sample calculations detailing the procedure followed in order to calculate required glazing for the Level 1 Bedroom of Unit 1.05 that fronts Edith Street. The traffic noise level at the outer face of the glazing is calculated as follows:

Table 7: - Sample Calculation – Road Traffic Noise Impact
First Level Bedroom – Unit 1.05

		Octave band Sound Pressure Levels, dB(A)							
Propagation calculation	**dB(A)**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Facade traffic noise, Leq[1]	67	47	55	57	60	62	59	53	45
Architectural shielding[2]		2	2	2	2	2	2	2	2
Directivity[3]		1	1	1	1	1	1	1	1
Traffic noise at window	64	44	52	54	57	59	56	50	42

1. Traffic noise level projected to the year 2011, distance correction applied, where applicable. 2. Enclosed balustrade, awning, etc.
3. Includes angle of incidence correction.

As the criterion for the Living Room is 35dB(A), see Section 5.1, the required traffic noise reduction is *TNR* = 64-35 = 29dB(A). The traffic noise attenuation, *TNA*, required for the glazing is calculated according to the equation given in Clause 3.4.2.6 of AS 3671,

$$TNA = TNR + 10\log_{10}[(S/S_f) \times 3/h \times 2T_{60} \times C] \qquad \textit{Equation 1}$$

where S = Surface area of glazing = $4.5m^2$
S_f = Surface area of floor = $11m^2$
h = Ceiling height, assumed to be 2.4m
T_{60} = Reverberation time, s
C = No. of components = 2 (glazing, wall)

Assuming that the room is acoustically average (neither too 'live' nor too 'dead') equation 9.26 in *Noise and Vibration Control*, L.L. Beranek, 1971, gives a reverberation time of 0.46s. Consequently, the value of 0.5s was used in equation 1.

Using the values listed above gives
TNA = 29dB(A) for the glazing

Substituting this value into the equation given in Clause 3.4.3.1 of AS3671 gives
Rw = $TNA + 6 \approx 35$

As can be seen by the above results, the glazing system in the Bedroom must have a tested Rw35 rating. Based on typical laboratory performance data, the glazing would consist of at least single laminated glass with acoustic seals fitted at sliders. Similar calculations to those above were performed for windows and doors on affected facades. From these calculations, a schedule of required building construction is detailed in Section 8.

7.2 Received Noise – Nearby Noise Sources

The following Table shows a sample calculation of received noise levels from activities/equipment associated with nearby buildings, propagated to nearest bedrooms on the north side of the building. All calculations are based on distances scaled from plans supplied by EJE Architecture and through measurement during our site visits.

Table 8: Received Noise – Nearby Noise Sources, dB(A),Leq Propagated to First Level Bedroom

Activity	Vehicles	Deliveries	Mech Plant	People
Lw dB(A)	78	84	72	76
Ave Dist to rec (m)	10	10	50	25
Duration of event	10 sec	10 sec	15 min	30 sec
No. of events	20	4	1	5
Rec dB(A),Leq	**43.5**	**42.5**	**18.0**	**24.3**
Combined	**46**			
Criteria (night)	**44dB(A),Leq (15 min)**			
Impact	**2**			

As can be seen by the above results, noise from nearby external activities/equipment is predicted to be exceed the night criterion by 2dB(A). Glazing to habitable rooms must therefore be modified acoustically. See Section 8 for glazing schedule and required design modifications.

Short-term noise events also have the potential to disturb residents at night. The sleep arousal criterion of 54dB(A) implies a maximum allowable sound power level of 82dB(A), when considering distance loss to nearest habitable rooms. Vehicles will be travelling at approximately 10-15km/h and will be under acceleration at times. Previous noise tests by Reverb Acoustics suggest that a vehicle in good mechanical order will produce a sound power level of 85-90dB(A) under these conditions, however wide variations are noted particularly with smaller modern cars and larger V8 or diesel powered vehicles.

Based on the above scenario noise as high as 52dB(A),L1 is predicted within rooms. Peak vehicle noise is 8dB(A) above the sleep arousal criterion. Windows are typically the acoustic weak spot and standard 3-4mm glass will only achieve 10-15dB attenuation if the window frames are fully sealed into the parent wall, therefore, where appropriate, thicker glazing has been specified (See Section 8).

Laminated glass typically attenuates 20dB or more at speech frequency (500Hz-1kHz), depending on the thickness and orientation of the glazing. So, based on an exterior noise level of 62dB, noise within units is not expected to exceed 44dB(A),L1 and is considered acceptable. Ambulance sirens and unusually loud vehicles are considered as spurious.

It should be acknowledged that assessment of sleep arousal need only be applied to dedicated bedrooms and compliance within recreational and transitory areas such as living rooms or entries is not required. In saying this, apartments in commercial districts are generally subjected to high noise levels for longer periods in the early evening and assessment within these rooms seems appropriate, given the situation. Furthermore, noise transfer between contiguous areas is more significant in open plan dwellings, typical of modern apartment design.

7.3 Received Noise - Site Mechanical Plant

Council prefers the background noise level of the area to be maintained, although, in certain circumstances may permit the noise level in question to exceed the prevailing background noise level by 5dB(A), provided the sound is bland and free from impulsive and/or tonal components. This is in agreement with conditions contained within the DECCW's INP. In respect to the above, a planning limit of **44dB(A),Leq** for night (10pm-7am) applies at the boundary of nearest residential neighbours.

The number and location of noise generating items associated with the development is unknown at this time, although we understand quiet split system air conditioning units will more than likely be installed on the balcony of each residential unit. Additional mechanical plant will also be located on the dedicated Level 6 plant deck at the south west corner of the building. A Carpark exhaust outlet on the west side of the building is also proposed for the basement carpark. We have therefore listed below the anticipated type and number of plant items for a typical development of this size.

Option 1:

Location	*Plant Item*
Apartment Balconies	Split system air con
Roof	Carpark exhaust/intake (x2)
Level 6 plant deck	Air con/refrig (x5)

As the exact type of plant is not known at this stage, we have sourced information from our library of technical data. The sound power of the proposed plant is propagated to residential locations taking into account sound intensity losses due to spherical spreading and barrier insertion loss provided by intervening structures, with additional minor losses such as molecular absorption, directivity and ground absorption ignored in the calculations. As a result, predicted received noise levels are expected to slightly overstate actual received levels and thus provide a measure of conservatism. Comparison of the predicted noise levels produced by the plant and the allowable level are then compared to give the noise impact at the receiver.

A sample calculation of noise produced by nearest future air conditioning condensers on Unit balconies is shown in Table 8 below, propagated to nearest receivers.

Table 9: Calculated SPL – Air Conditioning Condensers on Balconies

		Octave Band Centre Frequency, Hz							
Item	**dB(A)**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Combined Lw, (x5)	**75**	49	61	64	66	68	71	65	55
Barrier loss[1]		4	4	5	6	8	10	12	14
SPL at receiver	**34**	12	24	26	27	27	28	20	8
Criterion (night)	**39**								
Impact	**0**								

1. Enclosed balustrade 800-900mm in height.

As can be seen by the above results, noise from plant on balconies will be compliant with the criteria at nearest residential boundaries providing solid glass or similar balustrade is erected at balcony perimeters.

See Section 8 for necessary noise control modifications.

8 NOISE CONTROL RECOMMENDATIONS

8.1 Roof/Ceiling Construction

a) Roof construction may consist of *either* reinforced concrete *or* sisalation or wire mesh laid down on roof trusses. This is to be completely covered with a 50mm foil faced building blanket hard under the roof sheeting (in situations where joists are at centres close enough to avoid excessive sagging of the blanket, the sisalation/wire mesh may be omitted). Close off gaps between purlins and roof sheeting with Unisil Eaves Filler Strips, bituminous compound, or similar. Install an impervious ceiling of 1 sheet of taped and set 10mm plasterboard. To further assist in low frequency attenuation, all upper level ceiling voids should contain a layer of fibreglass or rockwool insulation. The insulation is to be installed in addition to, not in lieu of the building blanket. Specialised acoustic insulation is preferred, however, dense thermal insulation (eg, R3 batts) will suffice and is much less expensive ($15/m^2 for Rockwool 350 and $5/m^2 for R3 batts).

8.2 Wall Construction

b) Brick veneer/masonry construction is acceptable. Where external brickwork stops below the height of the stud frame, plasterboard, Villaboard, or similar, is to be fixed to the outside of the stud frame to fill the void. The infill material is to extend from the top of the top plate to a point in line with the bottom of the top course of brickwork. Alternatively, an overside noggin is to be fixed to the underside of the top plate to project within 10-20mm of the inside surface of the external wall.

c) Lightweight cladding (12mm Shadowclad 9mm compressed FC sheeting, or similar) should include lining to external walls (residential units noted in Table 9 only) 1 sheet taped and set 13mm rated plasterboard, and a cavity infill of R1.5/S1.5 fibreglass or polyester insulation. All lightweight cladding such as (vinyl weatherboards, Colorbond, etc) is to be backed with either 6mm fibre cement sheeting (Villaboard, Hardiflex) or 10mm construction plywood.

8.3 Glazing Windows/Sliding Doors

d) Glass installed in window assemblies must comply with AS1288-1994. Materials, construction and installation of all windows are to comply with the requirements of AS2047-1999. Similar calculations to those in Section 7 were performed for all building elements of the proposed development. From these calculations, a schedule of required glazing has been compiled, shown below. ***Note that our calculations account for the cumulative noise impact from all significant noise sources***. The glazing systems, sighted in the following Tables, are presented as a guide for the supplier:

Glazing Systems: Type A: Standard glazing. No acoustic requirement.
Type B: Single-glaze 6-8mm clear float glass.
Type C: Single glaze laminated glass
Type D: IGU or double-glaze.

Note: The typical glazing shown in the following Table should be used as a guide only. The supplier of the window/door must be able to provide evidence from a registered laboratory that the complete system will achieve the specified Rw performance, i.e. do not simply install our recommended glass in a standard window frame.

Table 10: Glazing Schedule

Facade	Unit No/Location	Room Use	Required Rw Must Achieve for Compliance	Typical Glazing System (Not for Specification)
LEVEL 1, LEVEL 2, LEVEL 3				
East	1.01,1.09,2.01	All Bed	**36**	Type C or D
	2.08,3.01,3.07	All Study/Living	**34**	Type C or D
	1.05,1.06,2.05	All Bed	**35**	Type C or D
	2.06,3.05,30.6	All Liv/Study	**33**	Type C
North	1.09,2.08,3.07	All Bed	**35**	Type C or D
		All Study/Living	**34**	Type C or D
	1.10,2.09,3.08	All Bed	**34**	Type C or D
		All Liv/Din/Study	**33**	Type C
		All Ensuite	**30**	Type C
West	1.10,1.11,2.09	All Bed	**33**	Type C
	2.10,3.08,3.09	All Liv/Din	**32**	Type C
		All Ensuite	**29**	Type B or C
	1.03,1.07,Comm Rm	All Bed	**31**	Type C
	2.03,2.05,2.06	All Study	**29**	Type B or C
	3.03,3.05,3.06	Comm Rm	**29**	Type B or C
	1.02,2.02,3.02	All Bed	**32**	Type C
		All Liv/Study	**30**	Type C
South	1.02,2.02,3.02	All Bed	**33**	Type C
		All Ensuite	**30**	Type C
	1.01,2.01,3.01	All Bed	**34**	Type C or D
		All Ensuite	**31**	Type C
LEVEL 4, LEVEL 5				
East	4.01,4.05,5.01,5.05,	All Bed	**35**	Type C or D
		All Kitch/Study/Liv	**33**	Type C
	4.03,4.04,5.03,5.04	All Liv/Study	**34**	Type C or D
North	4.05,5.05	All Liv/Din/Study	**32**	Type C
	4.06,5.06	All Bed	**34**	Type C or D
		All Liv/Din	**33**	Type C
West	4.06,4.07,5.06,5.07	All Ensuite	**30**	Type C
		All Liv/Din	**33**	Type C
	4.03,4.04,5.03,5.04	All Bed	**31**	Type C
	4.02,5.02	All Liv/Kitch	**31**	Type B or C
South	4.02,5.02	All Kitch/Study	**33**	Type C
	4.01,5.01	All Study	**33**	Type C
LEVEL 6				
East	6.01,6.03	All	**34**	Type C or D
	6.02	All	**33**	Type C
North	6.03	All Bed	**32**	Type C
		All Liv/Din	**31**	Type C
		All Ensuite	**29**	Type B or C
West	6.03	All Bed	**32**	Type C
		All Study	**30**	Type C
	6.02	All	**30**	Type C
	6.01	All	**33**	Type C
South	6.01	All	**33**	Type C

8.4 Balconies

e) To reduce the field of view of the noise source (i.e. traffic, external noise sources), enclosed balustrade 800-900mm in height is recommended for balconies to all residential units, consisting of FC sheeting, plexiglass, masonry or fixed glass panels. A suitable gap of say 50-100mm is permitted at floor level to allow cleaning, hosing, etc

8.5 Mechanical Plant

f) All carpark exhaust discharge points must be suitably attenuated. Any exhaust plant in an exposed location that produces a sound pressure level in excess of 68dB(A) at a distance of 1 metre from the discharge point must be acoustically treated. Available noise control options include installation of in-duct silencers, internal acoustic insulation to risers, or erecting acoustic barriers.

g) As previously stated, enclosed balustrade 800-900mm in height, is recommended for all residential unit balconies (also see Section 8.5).

h) Acoustic barriers must be erected along the perimeter of the Level 6 plant deck. The barriers must be equivalent in height to the top of the highest plant item. . Barrier construction options include masonry, Hebel Powerpanel, stud wall, etc.

Should impervious acoustic barriers create ventilation problems for the plant decks or any plant room walls, we recommend installing acoustic louvres. The louvres must have the following insertion loss values (typically Fantech SBL1, Nap Silentflo 300S Line or Robertson Type 7010):

Required Insertion Loss Values for Acoustic Barriers – dB

	Octave Band Centre Frequency, Hz							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
NR	10	12	15	19	20	18	18	14
STL	4	6	9	13	14	12	12	8

i) Once selection and location of all plant has been finalised, details should be forwarded to the acoustic consultant for approval. Review may result in a reduction in height of acoustic barriers, construction details, etc.

j) It should be noted that no penalties have been applied for tonality in our calculations, therefore attention is drawn to the fact that mechanical plant is near sensitive receivers and it is vitally important that units are free from specifically annoying characteristics (eg. tones, squeaks, pulsations etc). Careful selection of plant, equipment, piping and ducting systems is recommended to ensure quiet and vibration free operation in compliance with the specified noise criteria. Replacement and/or modification will be necessary to all systems causing undue noise or vibration exceeding the specified criteria.

k) The contractor responsible for supplying and installing the plant should be asked to supply evidence that installed plant meets this noise emission limit, or that noise control included with the plant is effective in reducing the sound level to the specified limit. Once the plant layout has been finalised, details should be forwarded to the acoustic consultant to incorporate appropriate acoustic measures.

9 CONCLUSION

A noise impact assessment for the Maroba Self-Care Residential Apartments, has been completed. The report has shown that the site is suitable for the intended purpose, providing our recommendations are implemented. An assessment of external noise impacting upon the development has resulted in the compilation of a schedule of minimum glazing thicknesses and types, roof/ceiling and wall construction, etc, to ensure the acoustic amenity of future occupants is ensured. **The typical glazing systems shown in Table 10 should be used as a guide only. The supplier of the window/door must be able to provide evidence from a registered laboratory that the complete system will achieve the specified Rw performance**. **Do not simply install our recommended glass in a standard window frame.**

The guidelines herein are preliminary in that the selection of building materials depends on user/client requirements, space limitations, budgetary constraints and practicalities that relate to the acoustic design of suites. Adequate building facade design may be achieved through many different combinations of materials, all of which may achieve the same result, subject to review by us.

In conclusion, providing the recommendations given in this report are implemented, noise from passing road traffic, and activities associated with nearby buildings will comply with the requirements of the AS/NZS2107-2000, the DECCW, the DoP and NCC within habitable spaces of the proposed development. We therefore see no acoustic reason why the proposal should be denied.

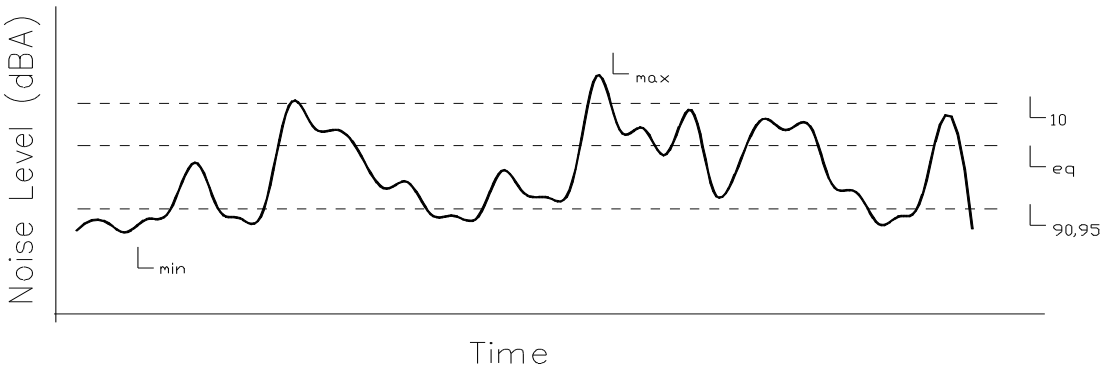
REVERB ACOUSTICS

Steve Brady A.A.A.S. M.A.S.A.
Principal Consultant

APPENDIX A
Definition of Acoustic Terms

Definition of Acoustic Terms

Term	Definition
dB(A)	A unit of measurement in decibels (A), of sound pressure level which has its frequency characteristics modified by a filter ("A-weighted") so as to more closely approximate the frequency response of the human ear.
ABL	*Assessment Background Level* – A single figure representing each individual assessment period (day, evening, night). Determined as the L90 of the L90's for each separate period.
RBL	*Rating Background Level* – The overall single figure background level for each assessment period (day, evening, night) over the entire monitoring period.
Leq	Equivalent Continuous Noise Level - which, lasting for as long as a given noise event has the same amount of acoustic energy as the given event.
L90	The noise level which is equalled or exceeded for 90% of the measurement period. An indicator of the mean minimum noise level, and is used in Australia as the descriptor for background or ambient noise (usually in dBA).
L10	The noise level which is equalled or exceeded for 10% of the measurement period. L_{10} is an indicator of the mean maximum noise level, and is generally used in Australia as the descriptor for intrusive noise (usually in dBA).



Appendix G

Geotechnical & Contamination Report

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

PROPOSED REDEVELOPMENT - MAROBA AGED CARE FACILITY

EJE Architecture

GEOTSGTE20243AA-AB
28 March 2007

Coffey Geotechnics Pty Ltd ABN 93 056 929 483
13 Mangrove Road Sandgate NSW 2304 Australia

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

28 March 2007

EJE Architecture
412 King Street
NEWCASTLE NSW 2300

Attention: Peter Johnson

Dear Peter

RE: PROPOSED REDEVELOPMENT

MAROBA AGED CARE FACILITY

EDITH STREET, WARATAH

UPDATED GEOTECHNICAL ASSESSMENT

Please find enclosed a report describing geotechnical investigations carried out on the above site. The purpose of the assessment was to provide geotechnical information for the design and construction of foundations for proposed buildings at the above site.

Guidance on the uses and limitations of this report is presented in the attached sheet, ‘ ’, which should be read in conjunction with this report.

If you have any further questions regarding this matter, please do not hesitate to contact Shannon Kelly or the undersigned.

For and on behalf of Coffey Geotechnics Pty Ltd

Arthur Love

Principal Geotechnical Engineer

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CONTENTS

1 INTRODUCTION

This report presents the results of a geotechnical investigation and preliminary soil contamination assessment carried out by Coffey Geotechnics Pty Ltd (Coffey) on behalf of EJE Architecture (EJE), for the proposed new Maroba Aged Care Facility to be located at 58 Edith Street, Waratah.

An investigation was carried out for the proposed development in 2006 which was described in Coffey Geosciences Report N09925/01-AB, dated 8 June 2006. In February 2007 Peter Johnson of EJE requested additional investigations to produce an improved geotechnical model of the site. This report presents the results of the additional investigations as well as the results presented in Coffey Report N09925/01-AB.

The original work was commissioned by Peter Johnson of EJE in a facsimile dated 3 April 2006. The additional work was commissioned by Peter Johnson of EJE in a facsimile dated 5 February 2007.

The proposed development is understood to comprise an 80 bed aged care facility to be constructed in place of the existing facility located at Edith Street, Waratah. The construction is understood to comprise a lower ground floor and ground floor of aged care accommodation and a first floor dedicated to administration. New car parking and access areas are also proposed for the site.

The purpose of the investigation was to alert the parties involved in the project to the geotechnical issues at the site and provide geotechnical data in a format that will assist in planning and design. In particular:

- Site Preparation;
- Excavation conditions;
- The suitability of the site soils for reuse as fill and on fill construction procedures;
- Alternative footing types and founding levels, including recommendations as to allowable bearing pressure;
- Site classification to AS2870-1996, ‘Residential Slabs and Footings’;
- Pavement design and construction;
- Special requirements for construction procedures and on-site drainage.

The following report presents the results of field investigations and laboratory testing, and provides discussion and recommendations relevant to the above scope of work.

2 FIELD WORK

Field work for the initial investigation was carried out on 23 April 2006 and 11 May 2006 and comprised:

- Seven boreholes numbered BH1 to BH6 drilled to a maximum depth of 7.2m. The boreholes were drilled using a small truck mounted drilling rig equipped with solid spiral flight augers and ‘V’ bit to the depths indicated on the logs. Standard Penetration Tests (SPT’s) were conducted at regular intervals and thin wall (U50) tube samples where collected from nominated boreholes for subsequent laboratory testing;

- Two boreholes numbered BH7 and BH8 drilled using a hand auger to a maximum depth of 0.6 in the existing garden beds fronting Edith Street, and samples taken for environmental testing;
- Observation and mapping of relevant site features.

Field work for the additional investigation was carried out on 19 February 2007 and comprised:

- Four boreholes numbered BH9 to BH12 drilled to depths of between 4.59m and 5.25m. The boreholes were drilled using a four wheel drive mounted drilling rig equipped with solid spiral flight augers. Standard Penetration Tests (SPT's) were conducted at regular intervals and thin wall (U50) tube samples where collected from nominated boreholes for subsequent laboratory testing.

All field work was carried out in the full time presence of an Engineering Geologist or a Geotechnical Engineer from Coffey who located the boreholes, directed the sampling and testing and produced field logs of the boreholes.

Engineering logs of the boreholes are presented in Appendix A, together with explanation sheets defining the terms and symbols used in their preparation. Due to the existing structures and the presence of services, boreholes locations were limited to the locations presented on Figure AB1. The boreholes were located approximately in plan by tape measurements relative to existing site features. Reduced levels of the boreholes have been interpolated from contours to Australian Height Datum (AHD) marked on the survey plan provided by EJE, on which Figure AB1 is based.

3 SITE CONDITIONS

3.1 Surface Conditions

The site is situated on the western side of Edith Street and is bordered by Myall Street to the north, Braye Park to the south and the existing recent additions to the facility to the west.

The site is situated within gently to moderately undulating topography with relief in the order of 20m to 30m. The site slopes to the north east at a general slope angle of 5° to 8°, but is modified in several areas to accommodate the existing facility and residential dwellings.

The site is currently occupied by the existing Maroba aged care facility and residential dwellings. The Maroba Aged Care Facility comprises two double storey brick buildings connected by an overhead enclosed walkway of steel and weather board construction. The existing buildings appear in fair to good condition with no significant signs evident of distress due to ground movement.

The existing residential dwellings comprise mainly weatherboard single storey structres with maintained lawns and gardens and appear to be in fair to good condition.

Two retaining walls exist in front of both of the existing facility buildings alongside Edith Street supporting internal access roads. The northern retaining wall is approximately 4.3m high and comprises a concrete covered batter that is sloped to approximately 1H: 1V. The southern retaining wall consists of three tiers approximately 0.8m to 1.0m high supported by a brick wall at street level and a rock and mortar bond wall for the upper tiers. Gardens with small trees exist between each tier. Both retaining walls appear to be in good condition.

A 'loc-a-bloc' retaining wall exists between the existing facility buildings toward the rear of the site; the wall is 2m to 2.5m high and is curved in plan form. The wall appears to be in good condition with no significant evidence of deformation obvious.

The existing facility is accessed by bitumen paved roads that appear in poor to fair condition with several areas of patch work and longitudinal cracking noted. A dedicated internal stormwater drainage system exists at the facility, directing runoff into the local stormwater system.

3.2 Subsurface Conditions

Reference to the 1:100000 scale Newcastle Regional Coalfield Geology Map indicates that the site is situated on the stratigraphical boundary of the Waratah Sandstone belonging to the Newcastle Coal Measures overlying the Tomago Coal Measures of Middle Permian age. The south western portion of the site is underlain by the Waratah Sandstone, exposures of which were observed outcropping in a quarry face behind the existing aged care development. The north eastern portion of the site is underlain by rocks belonging to the Tomago Coal Measures, described as siltstone, sandstone, coal and tuff.

Subsurface investigations conducted over the site generally confirm the information provided in the 1:100000 scale Newcastle Regional Geology Map.

The subsurface profiles encountered in the boreholes are presented on the appended engineering logs, and a summary of geological units presented in Table 1 below:

TABLE 1 – SUMMARY OF GEOLOGICAL UNITS

GEOLOGICAL UNIT	MATERIAL TYPE	MATERIAL DESCRIPTION
1A	FILL	Sandy GRAVEL, fine to medium grained subrounded gravel, fine to coarse grained sand, brown, moist with a dense consistency (existing pavement materials).
1B	FILL	Gravelly Clayey SAND, Sandy GRAVEL: fine to coarse grained sand, fine to medium gravel, brown, dry with a loose to medium dense consistency (bottom ash slag mixtures in places).
1C	FILL	Sandy CLAY, medium plasticity, fine to medium sand, brown.
2	TOPSOIL	Silty SAND: fine to medium grained, grey. A sandy layer judged to be of alluvial origin was encountered in BH11.
3	RESIDUAL	Sandy CLAY: high plasticity, fine grained sand, grey/ orange in colour, moisture content greater than plastic limit and a very stiff to hard consistency.
4	XW / HW SILTSTONE	Sandy CLAY: low to medium plasticity mottled red, grey and brown, moisture content lower than plastic limit and a hard consistency.
5	XW / HW SANDSTONE	Clayey Gravelly SAND, fine to coarse grained sand, fine to medium grained gravel, pale brown, pale grey, dry with a hard consistency. BH9 comprised highly weathered SANDSTONE with layers of Sandy CLAY.

A summary of the depth that each geological unit was encountered in the boreholes is presented in Table 2.

TABLE 2 – SUMMARY OF DISTRIBUTION OF GEOLOGICAL UNITS IN BOREHOLES

BOREHOLE LOCATION	DEPTH ENCOUNTERED BELOW EXISTING GROUND LEVELS (m)						
	UNIT 1A	UNIT 1B	UNIT 1C	UNIT 2	UNIT 3	UNIT 4	UNIT 5
BH1	0.00 - 0.10	-	-	-	0.10 - 2.50	2.50 - >5.95	-
BH2	0.00 - 0.10	-	-	-	-	-	0.10 - >2.20
BH3	-	-	-	0.00 - 0.50	0.50 - 7.15	>7.15	-
BH4	-	-	-	0.00 - 0.50	0.50 - >2.95	-	-
BH5	0.00 - 0.01	0.01 - 0.60	0.60 - 2.00	-	2.00 - 5.80	>5.80	-
BH6	0.00 - 0.30	0.30 - >0.50	-	-	-	-	-
BH7	0.00 - 0.15	0.15 - 0.60	-	-	-	-	-
BH8	0.00 - 0.15	0.15 - 0.60	-	-	-	-	-
BH9	-	0.00 - 0.50	-	-	-	-	0.50 - >5.25
BH10	-	0.00 - 1.40	-	-	1.40 - 3.80	3.80 - >4.59	-
BH11	0.00 - 0.25	0.25 - 1.90	-	1.90 - 3.10	3.10 - >4.95	-	-
BH12	0.00 - 0.35	-	0.35 - 0.60	-	0.60 - 4.80	>4.80	-

Groundwater inflows were encountered in BH5 at a depth of 1.5m below existing ground surface. A water level was observed in BH10 at a depth of 4.4m and a water level was observed in BH11 at a depth of 2.9m. No standing groundwater levels were observed in the other boreholes during the limited time that each remained open on the days of the field work. It should be noted that fluctuations in groundwater levels can occur as a result of variations in temperature, rainfall and other similar factors, the influence of which may not have been apparent at the time of the assessment.

4 LABORATORY TESTING

4.1 General

Samples considered representative of conditions on site for the proposed development were returned to Coffey's NATA-accredited Newcastle laboratory for the testing suites described in the following sections.

4.2 Shrink/Swell Index (I_{ss})

Three samples of clayey soil considered representative of foundation conditions for the proposed buildings were tested for soil volume change over an extreme moisture content range to assess their shrink/swell (I_{ss}) indexes.

The results of laboratory shrink/swell tests are presented in Appendix B and are summarised in Table 3.

TABLE 3 – SHRINK / SWELL TEST RESULTS SUMMARY

SAMPLE	MATERIAL	FIELD MOISTURE CONTENT	SHRINK SWELL INDEX I_{ss} (%)
BH1 0.50 to 0.72m	Sandy CLAY (CH), high plasticity, grey, brown and red	19.1	1.7
BH4 1.00 to 1.25m	Sandy CLAY (CH), high plasticity, grey and orange	17.7	1.6
BH10 1.50 to 1.75	Sandy CLAY (CH), high plasticity, pale grey	27.9	4.7

4.3 California Bearing Ratio (CBR)

One sample of soil considered representative of subgrade conditions for proposed areas of car parking and internal roads was subjected to a laboratory compaction and a California Bearing Ratio (CBR) test.

The results of CBR testing are included in Appendix B, and are summarised in Table 4.

TABLE 4 – SUMMARY OF LABORATORY CBR TEST RESULTS

LOCATION	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION	FIELD MOISTURE CONTENT (FMC) (%)	OPTIMUM MOISTURE CONTENT (OMC) (%)	CBR (%)
BH3	0.4 - 0.7	(CH) Sandy CLAY	21.4	19.0	5.0

5 DISCUSSION AND RECOMMENDATIONS

5.1 General

The existing surface levels over the majority of the site range from about RL29m in the north eastern corner of the site on the RL35m (AHD) near the western edge of the site. It is understood that prior to redevelopment of the site the proposed building areas will be levelled by cutting and filling to create a level platform with a surface level of approximately RL31.5m.

Cutting will be deepest on the western part of the site which is underlain by the Waratah Sandstone member. Extremely weathered to highly weathered sandstone was encountered on this part of the site in BH2 and BH9 at depths shallower than 0.5m. The sandstone was mainly of estimated low to medium strength.

The majority of the material below the existing buildings and pavement materials on the remainder of the site is expected to comprise residual sandy clay. Fill and loose alluvial sands were encountered in the vicinity of the drainage easement which runs from a culvert at the rear of the site through to Edith Street at the front of the site. This fill is judged to be uncontrolled.

Footings should not be founded in uncontrolled fill. Shallow footings may be suitable where shallow natural rock or clay is encountered. Where uncontrolled fill exists within the zone of influence of proposed footings, the footings should be deepened to the natural clays and rock or founded on controlled fill placed in accordance with the recommendations of Section 5.2, following the removal of all uncontrolled material.

Feasible footings for the proposed development would include shallow footings such as strip, pad, raft slab and pier and beam systems where natural soils are encountered at or close to the proposed construction level, and deep footings such as driven piles or bored piles where deep uncontrolled and engineered fill or loose alluvial soils are encountered at the construction level.

5.2 Site Preparation

Site preparation and earthworks suitable for pavement and structure support should include the following recommendations:

- Prior to construction of roads and placement of any fill, the proposed areas should be stripped to remove all vegetation, topsoil, fill, building rubble, root affected or other potentially deleterious material, including decommissioned buried pipes and cables. Stripping is generally expected to be required to depths of about 0.2m to 0.4m plus any fill present;

- Following stripping, the exposed subgrade materials should be proof rolled to identify any wet or excessively deflecting material. Any such areas should be over-excavated and backfilled with an approved select material;
- Approved fill beneath roads should be placed in layers not exceeding 300mm loose thickness and compacted to a minimum density ratio of 95% Standard Compaction in accordance with AS1289.5.1.1 or equivalent. Clay subgrade fill should be placed and maintained at 60% to 90% of Optimum Moisture Content (OMC);
- The top 300mm of natural subgrade below pavements or the final 300mm of road subgrade replaced should be compacted to minimum density ratio of 100% Standard Compaction or equivalent within the above stated moisture range;
- Site fill beneath structures should be compacted to a minimum density ratio of 95% Standard Compaction within ±2% of OMC;
- All fill should be supported by properly designed and constructed retaining walls or else battered at 1V:2H or flatter and protected against erosion.

The expertise of the contractor, the nature of the fill material and the degree of supervision of the filling will determine footing designs required for structures placed on fill that is constructed in the manner discussed above.

Earthworks should be carried out in accordance with the recommendations outlined in Australian Standard AS3798-2007, .

Site preparation should include provision of drainage and erosion control as required as well as sedimentation control measures. Importantly, recognition should be taken of the tendency for soils on site to soften rapidly with exposure to water.

All earthworks should be planned and executed so as to minimise the total area of subgrade exposed by bulk excavation at any particular time, as far as practicable.

5.3 Excavation Conditions

The small truck mounted drilling rig and trailer mounted drilling rig used for the drilling of the boreholes experienced penetration rates ranging from moderate resistance to refusal during the investigation. It is expected that excavations could be achievable using conventional dozer blade or excavator bucket at least to the depth of 'V'-bit refusal indicated on borehole logs. It is expected that excavations within Unit 5 material will require ripping and or breaking using hydraulic hammers/rippers fitted to conventional construction equipment prior to excavation (that is, machines equal to or larger than Caterpillar D6 dozers / 320 excavators or equivalent). The depths of the geological units present at the site are summarised in Table 2.

In using the information presented herein to assess the likely excavation conditions for the proposed development, the following points should be noted:

- The information collected is specific to borehole locations only and is intended to provide an indication of conditions at selected locations across the site. Caution should be used with extrapolation of information to other specific locations;

- Although efforts have been made to distribute boreholes to give a good spatial coverage and to encounter as wide a range of subsurface conditions as possible, it is unlikely the information is sufficient to pre-empt the full range of conditions which will be encountered during construction.

5.4 Pavement Design

5.4.1 Design Parameters

A design traffic loading of 2.0×10^4 ESA's has been adopted for the internal roads and car park proposed for the site.

Based on the results of the field and laboratory testing, a design CBR value of 5% has been adopted for natural clay subgrades (Unit 4) and a design CBR value of 10% has been adopted for existing gravelly fill soils that can be prepared to specification as outlined in Section 5.1.

Where weathered sandstone is encountered at subgrade level, a design CBR value of 10% may be adopted.

5.4.2 Flexible Pavement Design

Flexible pavement design has been conducted with reference to Austroads and APRG Report 21.

The recommended material, construction specification and pavement make-up are presented on the attached Pavement Thickness Design Summary.

The time period required for subgrade preparation is likely to be dependant on the prevailing weather conditions at the time of construction. At the time of the field investigation, moisture content of the clay subgrades was assessed to be about 2.5% wet of standard Optimum Moisture Content (OMC). It should therefore be anticipated that some moisture conditioning involving drying of the subgrade soils may be necessary prior to compaction and placement of pavement materials. Alternatively, if over-wet subgrades exist at the time of construction, these materials may be over-excavated and replaced with a minimum depth of 300mm of well graded granular select material of CBR greater than 10%.

Where pavements are to be constructed on area containing existing fill, the fill will need to be removed to a depth of 0.5m below finish road level and replaced in accordance with the specifications outlined in Section 5.2, and on the attached Pavement Thickness Design Summary, prior to placement and compaction of the overlying pavement materials.

The enclosed Pavement Thickness Design Summary assumes the provision of adequate surface and subsurface drainage of the pavement and adjacent areas. It is recommended that subsoil drains be installed around the perimeter of all pavements.

5.5 Reuse of Materials

The following comments are made regarding the suitability of the site materials for reuse in filled areas:

- Where site regrade is proposed, all existing topsoil, vegetation or other potentially deleterious material should be removed to spoil or stockpiled for reuse as landscaping materials only. Stripping is generally expected to be required to depths of about 0.2m to 1.3m;
- It is expected that existing fill soils could be re used for engineering purposes subject to approval from the geotechnical authority on the site;

- The underlying stiff to hard clays and weathered rock should be carefully stripped as necessary and stockpiled for reuse as general site fill;
- The clayey soils on-site are moderately to highly reactive (susceptible to volume changes with variation in moisture content) as indicated by the laboratory testing and will need to be placed and compacted close to the specifications below to minimise reactive soil movements.

5.6 Foundations

5.6.1 Support Options

The buildings may be supported on shallow footings such as strip, pad, raft slab and pier and beam systems in areas where the fill is not too deep such as on the western side of the site, and deep footings such as driven piles or bored piles where deeper fill exists such as in the vicinity of the drainage easement.

A possible foundation option in the areas of deeper fill is to support all the walls and settlement sensitive structures on piers founded in the natural soil or rock profile beneath all fill and rest the floor slab on grade, articulated and isolated from the pile supported elements by suitable construction joints, after proof rolling the fill surface and replacement of any soft spots with clean fill.

5.6.2 Shallow Footings

Shallow footings to be founded in UNIT 3 materials should be proportioned for a maximum allowable bearing pressure of 200kPa. Shallow footings to be founded in UNIT 4 or UNIT 5 should be proportioned for a maximum allowable bearing pressure of 300kPa. It is anticipated that settlement of such footings should not exceed 1% of maximum footing width.

5.6.3 Deep Footings

Structures may be supported on bored piers or piles founded in residual soil (UNIT 3), weathered Siltstone (UNIT 4) or Sandstone (UNIT 5). A summary of founding parameters for soil and rock is presented in Table 5.

TABLE 5 – SUMMARY OF PIER DESIGN PARAMETERS *(4)*

DESCRIPTION	APPROX. DEPTH RANGE TO BASE OF UNIT	SERVICEABILITY END BEARING CAPACITY *(1&3)*	ULTIMATE END BEARING CAPACITY *(2&3)*	ULTIMATE SHAFT ADHESION *(3)*	ELASTIC MODULUS
COTROLLED FILL					
UNIT 3					
UNIT 4					
UNIT 5					

Notes to Table 3:

(1) End bearing pressure to cause settlement of <1% of minimum footing dimension;

(2) Ultimate values occur at large settlements (>5% of minimum footing dimensions);

(3) Assumes a roughness Category of 'R2 or better', defined as grooves to 1mm to 4mm depth and width greater than 2mm and spacing of 50mm to 200mm. Augers and drilling buckets do not clean and roughen sockets adequately unless they are fitted with tools that protrude laterally from the sides of the auger or bucket;

(4) Based on papert by Pells et al, "Foundations on Shale and Sandstone in the Sydney Region", Australian Geomechanics Society, December, 1998;

A geotechnical strength reduction factor of $\phi_g = 0.5$ should be adopted for use with the above ultimate soil and rock parameters.

All structural footings (including edge beams, internal beams and load support thickenings) on the above allotments should be founded as follows:

- All footings are founded in controlled fill (if applicable) or in the natural soils below all non-controlled fill, topsoil material and root zones, and fill under slab panels meets the requirements of AS2870, in particular, the root zone must be removed prior to the placement of fill materials beneath slab floors;
- Footings are founded outside of or below all zones of influence resulting from existing or future service trenches, such as the existing stormwater and sewer trenches, unless such trenches are backfilled to "Level 1" control, as defined in AS3798-2007, 'Guidelines on Earthworks for Commercial and Residential Developments'.

All footings should be designed and constructed in accordance with the requirements of AS2870-1996. Adequate surface and stormwater drainage should be installed and maintained on the building site. All collected stormwater and roof run-off should be discharged into the inter-allotment or street stormwater disposal system.

5.7 Site Classification

Variable conditions exist on the site and the proposed development of the site is understood to involve site regrading works involving cutting or filling to create a level construction platform at approximately RL31.5m AHD.

In areas such as the western side of the site where Unit 4 or Unit 5 weathered rock is exposed at founding level, foundations may be designed on the basis of a Class **M**, **Moderately Reactive** site classification as defined in AS2870-1996, and a design free surface movement of less than 40mm. In areas where deep residual clays are exposed at founding level foundations may be designed on the basis of a Class **H**, **Highly Reactive** site classification as defined in AS2870-1996, and a design free surface movement of less than 60mm. The effects of changes to the soil profile by additional cutting and filling and the effects of past and future trees should be considered in selection of the design value for differential movement.

Fill and loose alluvial sands were also encountered in the vicinity of the access roads at the front of the site and the drainage easement which runs from a culvert at the rear of the site through to Edith Street at the front of the site. In BH5, BH10 and BH11 which were conducted in these areas fill was encountered to depths of 2m, 1.4m and 1.9m, respectively. In BH11 the fill was underlain by loose alluvial sand to a depth of 3.1m.

Footings should not be founded in these materials. The site classification of all areas with more than 0.4m of fill is Class **P** which requires all footings to be supported on piles or piers founded on natural clayey soils or weathered rock unless the fill soils are removed and replaced with suitable controlled fill.

If the fill used for site regrading comprises approved materials placed as controlled fill (AS2870-1996) under Level 1 conditions as defined in Australian Standard AS3798-2007, it is anticipated that shallow footings could then be placed directly on the fill. The site classification after placement of additional fill would depend on the materials used and on the level of supervision and compaction of fill placement. It is recommended that the controlled fill material is a sufficiently blended mixture of clay, sand and gravel such that it has a characteristic shrink/swell index of less than about 2%.

The classification presented above is provided on the basis that the performance expectations set out in Appendix B of AS2870-1996 are acceptable and that site maintenance complies with the provisions of CSIRO Sheet BTF 18, ‘ , a copy of which is attached.

5.8 Preliminary Waste Classification

5.8.1 Background

It is understood that soils used as backfill behind the existing retaining walls and access road formation contains bottom ash slag mixtures sourced from an unknown location. Field investigations confirmed the presence of bottom ash slag soils behind the southern retaining wall and underlying the middle entrance to the existing nursing home. Due to access constraints and the lack of information regarding buried services, no sampling behind the northern retaining wall was conducted.

5.8.2 Sampling

Two samples were collected from boreholes BH5 and BH8 using procedures and protocols outlined in Coffey's Environmental Field Manual (QP 15/5-E, June 1995, revised September 1997), which is based on industry accepted standard practice.

5.8.3 Laboratory Analysis

Soil samples were dispatched to ALS Laboratories (ALS), a NATA registered laboratory for the analysis undertaken, under chain of custody conditions. Sample analysis details are presented in Table 2.

TABLE 6 –SAMPLING AND ANALYSIS SCHEDULE

SAMPLE ID	LOCATION	SAMPLE DEPTH (mbg)	MATERIAL	ANALYSIS
			Gravely SAND	
	Southern Retaining Wall – Backfill		Gravely SAND	
NOTES: *Mbg – Metres below ground level*				

5.8.4 Results of Validation Samples

The laboratory analytical reports are presented in Appendix C. Laboratory results are summarised in Table LR1.

The samples tested were compared with the Department of Environment and Conservation Guidelines for Contaminated Sites, Appendix 2 - Soils Investigation Levels for Urban Development Sites in NSW.

A comparison of the laboratory results from the borehole samples to the contamination criteria indicates that PAHs and metals were either not detected above the laboratory limit of reporting or were detected below the health investigation levels for residential land use with gardens and accessible soil.

The results of chemical validation testing on the two samples taken from the boreholes show the soil would be acceptable for use on the site under residential land use. The fill soils would require a waste classification in order to be transported off site.

Inspection and additional testing should be conducted on fill material encountered at the site during earthworks to identify any possible deleterious and contaminated material that differs from those encountered during the current investigation.

The contamination investigation should not be viewed as a waste classification for the site and should be used as an indication of contaminants present at the site only. If fill soils are to be removed from the site, a dedicated waste classification assessment should be conducted when the presence, extent and nature of fill soils present are identified, preferably upon demolition of the existing structures.

5.9 Special Construction Requirements

Careful examination should be made in the proposed building area for the presence of footings, service trenches and other subsurface structures associated with previous development of the lot. It is recommended that removal and remediation of all such facilities be documented by a geotechnical authority at the time of the bulk excavation.

6 CONSTRUCTION RISK

The findings contained in this report are the result of discrete/specific methodologies used in accordance with normal practices and standards. To the best of our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.

Footings and excavations should be observed by a suitably qualified engineer during construction to confirm conditions that have been assumed in this assessment. Should any site conditions be encountered during construction that vary significantly from those discussed in this report, Coffey should be advised and appropriate action taken.

Contactors using this report as a basis for preparation of tender documents should avail themselves of all relevant background information regarding the site before deciding on selection of construction materials and equipment.

For and on behalf of Coffey Geotechnics Pty Ltd

Arthur Love

Principal Geotechnical Engineer

Coffey Geosciences Pty Ltd A.C.N. 056 335 516 JUN07-01

Geotechnical | **Resources** | Environmental | **Technical** | Project Management

13 Mangrove Road, Sandgate, NSW, 2304
Ph: (02) 4967 6377 Fax (02) 4967 5402

pavement thickness design summary

client : *EJE ARCHITECTURE*
job no : *N09925/01*

principal :
laboratory : *NEWCASTLE*

project : *PROPOSED NURSING HOME*
report date : *June 07, 2006*

location : *EDITH STREET, WARATAH*
test report : *JUN07-01/1*

council : *NEWCASTLE CITY COUNCIL*
designed by : *AMT* checked by :

road name or type :		*Internal Access Road*	*Internal Access Road*		
chainage interval :	(m)	*As per Design*	*As per Design*		
design traffic loading:	(ESA)	*2×10^4*	*2×10^4*		
wearing course thickness :	(mm)	*25*	*25*		
basecourse thickness:	(mm)	*100*	*100*		
sub-base thickness:	(mm)	*175*	*100*		
select thickness:	(mm)	-	-		
total thickness :	(mm)	*300*	*225*		
CBR used for design :	(%)	*5*	*10*		

design traffic loading : Design traffic loading is the number of equivalent standard axles (E.S.A.) in the design lane during the design period. For definitions, refer Appendix 1.1 "Pavement Design" AUSTROADS. Refer covering letter/report.

Material Quality

wearing course : *RTA QA Specification R116*

basecourse : *Conforming to ARRB Special Report No 41*

sub-base: *Conforming to ARRB Special Report No 41*

select :

Note : Recommended material types may vary from those of job specification or statutory authority. Refer covering letter/report.

Compaction Requirements

wearing course : *RTA QA Specification R116*

basecourse : *98% MODIFIED*

sub-base : *95% MODIFIED*

select :

subgrade : *100% STANDARD*

fill below : *95% STANDARD*

Modified: Minimum required dry density ratio, AS1289 5.4.1-1993, calculated using field dry density determined by AS1289 5.3.1-2004 or equivalent, and the maximum dry density obtained using AS1289 5.2.1-2003 or equivalent.

Standard: As above, but maximum dry density obtained using AS1289 5.1.1-2003 or equivalent.

Density Index: Minimum required Density Index AS1289 5.6.1-1998, calculated using field dry density determined by AS1289 5.3.1-2004 or equivalent, and laboratory values of maximum and minimum density obtained by AS1289 5.5.1-1998 or equivalent.

Note: Recommendations for compaction may vary from those of job specification or statutory authority. Refer covering letter/report.

Drainage: The design assumes the provision of adequate surface and subsurface drainage of the pavement and adjacent areas. Refer covering letter/report.

TABLE LR1 - RESULTS OF CHEMICAL ANALYSES (concentrations in mg/kg)

Client: **EJE ARCHITECHTURE PTY LTD**

Project: **MAROBA NURSING HOME**

Location: **EDITH STREET, WARATAH**

	SAMPLE LOCATION	DEPTH (m)	PID (ppm)	TOTAL PETROLEUM HYDROCARBONS C6-C9	C10-C14	C15-C28	C28-C36	TOTAL	PAH Total	b-a-p	Phenols	Pesticides (Total) OCP	OPP	BTEX Benzene	Toluene	Ethyl Ben.	Xylene	HEAVY METALS As	Cd	Cr*	Cu	Pb	Ni	Zn	Hg
Primary Samples	BH5 0.5 -0.6							0	1	<0.5								<5	*<1*	9	34	31	9	89	<0.1
	BH8 0.3 - 0.4							0	<0.5	<0.5								20	*<1*	8	15	37	8	106	<0.1
								0																	
								0																	
								0																	
								0																	
								0																	
								0																	
								0																	
								0																	
								0																	
								0																	
								0																	
Duplicates								0																	
								0																	
								0																	
								0																	
								0																	
QC	Wash Blank							0																	
	Trip Blank							0																	
	Sample size:			0	0	0	0	13	1	0	0	0	0	0	0	0	0	1	0	2	2	2	2	2	0
	Mean:			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0	1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	20	#DIV/0!	9	25	34	9	98	#DIV/0!
	Maximum:	Calculations are based on Primary Samples only		0	0	0	0	0	1	0.0	0	0	0	0.0	0.0	0.0	0.0	20	0.0	9	34	37	9	106	0.0
	Minimum:			0	0	0	0	0	1	0.0	0	0	0	0.0	0.0	0.0	0.0	20	0.0	8	15	31	8	89	0.0
	Standard Deviation:			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	#DIV/0!	0.5	9.5	3.0	0.5	8.5	#DIV/0!
	Student's t:			#N/A	#N/A	#N/A	#N/A	1.78	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	6.31	6.31	6.31	6.31	6.31	#N/A
	95% UCL of Mean			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	#N/A	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#N/A	#DIV/0!	10.7	66.9	47.4	10.7	135.4	#DIV/0!
	CRITERIA																								
	Human Health(1):								20	1	8500							100	20	100**	1000	300	600	7000	15

NOTES:

<PQL Results Below Practical Quantifiable Limit

ITALIC Results Below PQL but half the detection limit has been adopted for statistical calculations

SHADED Value exceeds Environmental soil investigation guidelines from ANZECC 1992, Table 2

BOLD Value exceeds guidelines for human health criteria

* Total Chromium (digested by laboratory)

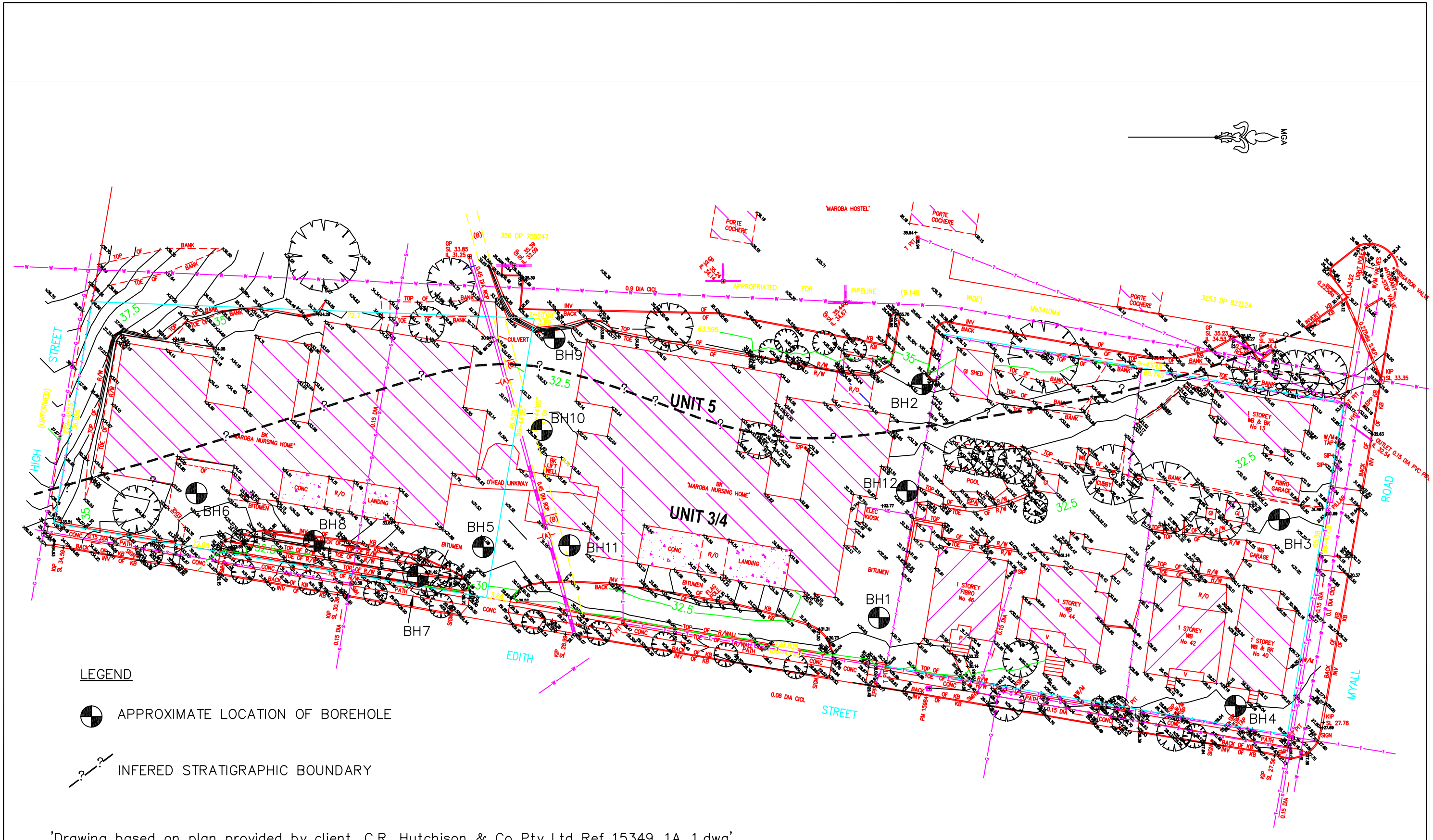
**Chromium VI (6+ oxidation state)

*** Chromium III

CRITERIA:

Human Health criteria - Health Investigaion Levels (HIL's) for residential sites with gardens and accessible soil, Appendix 2, Column 1 (NSW DEC 2006)

Figures



'Drawing based on plan provided by client, C.R. Hutchison & Co Pty Ltd Ref 15349_1A_1.dwg'

revision	description	drawn	approved	date

0 6 12 24 36

Scale (metres)

drawn	NLS
approved	
date	27-03-07
scale	~1:600
original size	A3

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SPECIALISTS MANAGING THE EARTH

client: EJE ARCHITECTURE PTY LTD

project: PROPOSED AGED CARE FACILITY
EDITH STREET, WARATAH

title: SITE PLAN

project no: GEOTSGTE20243AA

figure no: AB1

Appendix A

Results of Field Investigations

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Engineering Log - Borehole

Borehole No. **BH 1**

Sheet 1 of 2

Project No: **N09925/01**

Client: **EJE ARCHITECTURE**

Date started: **23.4.2006**

Principal:

Date completed: **23.4.2006**

Project: **PROPOSED NURSING HOME, EDITH STREET, WARATAH**

Logged by: **AMT**

Borehole Location: **REFER TO FIGURE AB1**

Checked by: SOK

drill model and mounting: Custom Mitsubishi | Easting: 380335 | slope: -90° | R.L. Surface: 31.4

hole diameter: 100 mm | Northing 6358794 | bearing: | datum: AHD

drilling information

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres
ADV		N	None Observed		31.0	0.5
				U_{50}		
					30.5	1.0
				SPT 2,2,2 N=4		
					30.0	1.5
					29.5	2.0
					29.0	2.5
				SPT 10,21,>10 N*=R		
					28.5	3.0
					28.0	3.5
					27.5	4.0

material substance

graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
	GP	**BITUMINOUS SEAL:** 7/14 blend.	D	D		BITUMEN
	CH	**FILL:** Sandy GRAVEL, fine to medium grained, subrounded gravel, sand fine to coarse grained, brown.	M M>Wp	VSt		PAVEMENT
		Sandy CLAY: high plasticity, mottled grey/brown/red.				RESIDUAL
				St		
		Sandy CLAY: medium to low plasticity, mottled red, grey/brown.	M<Wp	H		EXTREMELY WEATHERED TUFF 10 blows 2.80-2.85m Hammer Bouncing Alternate drilling penetration

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey geotechnics

Engineering Log - Borehole

Borehole No. **BH 1**

Sheet 2 of 2

Project No: **N09925/01**

Client: **EJE ARCHITECTURE**

Date started: **23.4.2006**

Principal:

Date completed: **23.4.2006**

Project: **PROPOSED NURSING HOME, EDITH STREET, WARATAH**

Logged by: **AMT**

Borehole Location: **REFER TO FIGURE AB1**

Checked by: SJK

drill model and mounting: Custom Mitsubishi | Easting: 380335 | slope: -90° | R.L. Surface: 31.4

hole diameter: 100 mm | Northing 6358794 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
ADV		N	None Observed		27.0	4.5			**Sandy CLAY:** medium to low plasticity, mottled red, grey/brown. *(continued)*	M<Wp	H		
					26.5	5.0							
					26.0	5.5							
				SPT 3,10,17 N=27	25.5	6.0							
									Slow / very slow progress. Borehole BH 1 terminated at 5.95m				
					25.0	6.5							
					24.5	7.0							
					24.0	7.5							
					23.5	8.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey geotechnics

Engineering Log - Borehole

Borehole No. **BH 2**
Sheet 1 of 1
Project No: **N09925/01**

Client: **EJE ARCHITECTURE**
Date started: **24.4.2006**
Principal:
Date completed: **24.4.2006**
Project: **PROPOSED NURSING HOME, EDITH STREET, WARATAH**
Logged by: **AMT**
Borehole Location: **REFER TO FIGURE AB1**
Checked by: SJK

drill model and mounting: Custom Mitsubishi | Easting: 380298 | slope: -90° | R.L. Surface: 34.5
hole diameter: 100 mm | Northing 6358800 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADV		N	None Observed	SPT 12,5,R N*=R	34.0	0.5		GP	**BITUMINOUS SEAL:** 5/10 Blend.	M	H		
								SP	**FILL:** Sandy GRAVEL, fine to medium grained, subrounded, sand fine to coarse grained, brown, grey.	D			EXTREMELY WEATHERED SANDSTONE
					33.5	1.0			**Clayey Gravelly SAND:** fine to coarse grained, gravel fine to medium grained, low plasticity fines, pale brown, pale grey.				SPT hammer bouncing 5 blows 0.65m-0.67m.
					33.0	1.5							
					32.5	2.0							
					32.0	2.5			V bit refusal. Borehole BH 2 terminated at 2.2m				
					31.5	3.0							
					31.0	3.5							
					30.5	4.0							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

support
M mud N nil
C casing

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

BOREHOLE N09925-01.GPJ COFFEY.GDT 27.3.07
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Engineering Log - Borehole

Borehole No. **BH 3**

Sheet 1 of 2

Project No: **N09925/01**

Client: **EJE ARCHITECTURE**

Date started: **24.4.2006**

Principal:

Date completed: **24.4.2006**

Project: **PROPOSED NURSING HOME, EDITH STREET, WARATAH**

Logged by: **AMT**

Borehole Location: **REFER TO FIGURE AB1**

Checked by: SGK

drill model and mounting: Custom Mitsubishi | Easting: 380311 | slope: -90° | R.L. Surface: 31.3

hole diameter: 100 mm | Northing 6358856 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADV		N	None Observed		31.0	0.5		SM	**TOPSOIL:** Silty SAND, fine to medium grained, dark grey.	D			TOPSOIL
				U_{50}				CH	**Sandy CLAY:** high plasticity, sand fine to medium grained, mottled brown, grey, red.	M>Wp	VSt/H	×	RESIDUAL
				SPT 2,3,4 N=7	30.5	1.0							
					30.0	1.5							
					29.5	2.0							
								CH	**CLAY:** high plasticity, some ironstained gravel fine grained, sand fine grained, pale grey.		VSt		
				SPT 2,3,6 N=9	29.0	2.5						×	
					28.5	3.0						×	
					28.0	3.5						×	
					27.5	4.0							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

support
M mud N nil
C casing

penetration
1 2 3 4 no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

BOREHOLE N09925-01.GPJ COFFEY.GDT 27.3.07

Form GEO 5.3 Issue 3 Rev.2

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Engineering Log - Borehole

Borehole No. **BH 3**

Sheet 2 of 2

Project No: **N09925/01**

Client: ***EJE ARCHITECTURE***

Date started: ***24.4.2006***

Principal:

Date completed: ***24.4.2006***

Project: ***PROPOSED NURSING HOME, EDITH STREET, WARATAH***

Logged by: ***AMT***

Borehole Location: ***REFER TO FIGURE AB1***

Checked by: SJK

drill model and mounting: Custom Mitsubishi | Easting: 380311 | slope: -90° | R.L. Surface: 31.3

hole diameter: 100 mm | Northing 6358856 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADV		N	None Observed	SPT 3,6,7 N=13	27.0	4.5		CH	**CLAY:** high plasticity, some ironstained gravel fine grained, sand fine grained, pale grey. *(continued)*	M>Wp	H	×	
					26.5	5.0							
					26.0	5.5							
					25.5	6.0							
					25.0	6.5							10 blows 7.15m-7.20m hammer bouncing.
					24.5	7.0							
					24.0	7.5			Slow progress. Borehole BH 3 terminated at 7.2m				
					23.5	8.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Borehole

Borehole No.	**BH 4**
Sheet	1 of 1
Project No:	**N09925/01**
Client:	**EJE ARCHITECTURE**
Date started:	**23.4.2006**
Principal:	
Date completed:	**23.4.2006**
Project:	**PROPOSED NURSING HOME, EDITH STREET, WARATAH**
Logged by:	**AMT**
Borehole Location:	**REFER TO FIGURE AB1**
Checked by:	SGK

drill model and mounting:	Custom Mitsubishi	Easting:	380347	slope:	-90°	R.L. Surface:	29.0
hole diameter:	100 mm	Northing	6358851	bearing:		datum:	AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADV		N	None Observed		28.5	0.5		SM	**TOPSOIL:** Silty SAND, fine to medium grained, grey.	S			TOPSOIL
								CH	**Sandy CLAY:** high plasticity, sand fine grained, grey/orange.	M>Wp	H		RESIDUAL
				U_{50}	28.0	1.0							
					27.5	1.5						×	
					27.0	2.0			Becoming pale grey/red.				
				SPT 2,5,6 N=11	26.5	2.5							
					26.0	3.0			Borehole BH 4 terminated at 2.95m				
					25.5	3.5							
					25.0	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support: M mud, C casing, N nil

penetration: 1 2 3 4 — no resistance ranging to refusal

water: 10/1/98 water level on date shown; water inflow; water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description: based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey geotechnics

Engineering Log - Borehole

Borehole No. **BH 5**

Sheet 1 of 2

Project No: **N09925/01**

Client: ***EJE ARCHITECTURE***

Date started: ***23.4.2006***

Principal:

Date completed: ***23.4.2006***

Project: ***PROPOSED NURSING HOME, EDITH STREET, WARATAH***

Logged by: ***AMT***

Borehole Location: ***REFER TO FIGURE AB1***

Checked by: SOK

drill model and mounting: Custom Mitsubishi | Easting: 380323 | slope: -90° | R.L. Surface: 31.0

hole diameter: 100 mm | Northing 6358727 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADV		N						SP	**BITUMINUOUS SEAL:** 14mm Blend. **FILL:** Sandy GRAVEL, fine to coarse grained, fine to medium grained, some ash mixtures, brown.	D	MD		BITUMEN FILL
				E	30.5	0.5							
								GC	**FILL:** Sandy Clayey GRAVEL, fine to coarse grained, siltstone gravel, low plasticity fines, sand fine to medium grained, grey/dark grey.	M			
					30.0	1.0							
								SM	**Clayey Silty SAND:** fine to medium grianed, low plasticity fines, brown.				
			▶		29.5	1.5				W			
					29.0	2.0		CL	**Sandy CLAY:** medium plasticity, sand fine to medium grained, grey/brown.	M>Wp	H		RESIDUAL
					28.5	2.5							
				U_{50}									
					28.0	3.0						×	
					27.5	3.5							
					27.0	4.0							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix e.g. ADT

support
M mud N nil
C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

coffey geotechnics

Engineering Log - Borehole

Borehole No. **BH 5**
Sheet 2 of 2
Project No: **N09925/01**

Client: ***EJE ARCHITECTURE***
Date started: ***23.4.2006***
Principal:
Date completed: ***23.4.2006***
Project: ***PROPOSED NURSING HOME, EDITH STREET, WARATAH***
Logged by: ***AMT***
Borehole Location: ***REFER TO FIGURE AB1***
Checked by: SPK

drill model and mounting: Custom Mitsubishi | Easting: 380323 | slope: -90° | R.L. Surface: 31.0
hole diameter: 100 mm | Northing 6358727 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADV		N		SPT 5,8,10 N*=18	26.5	4.5		CL	**Gravelly Sandy CLAY:** low to medium plasticity, sand fine to coarse grained, rounded gravel fine to coarse grained, orange, grey.	M>Wp	H		
					26.0	5.0							
					25.5	5.5							
					25.0	6.0			V bit refusal. Borehole BH 5 terminated at 5.8m				
					24.5	6.5							
					24.0	7.0							
					23.5	7.5							
					23.0	8.0							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix e.g. ADT

support
M mud N nil
C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey geotechnics

Engineering Log - Borehole

Borehole No. **BH 6**
Sheet 1 of 1
Project No: **N09925/01**

Client: **EJE ARCHITECTURE**
Date started: **24.4.2006**
Principal:
Date completed: **24.4.2006**
Project: **PROPOSED NURSING HOME, EDITH STREET, WARATAH**
Logged by: **AMT**
Borehole Location: **REFER TO FIGURE AB1**
Checked by: SJK

drill model and mounting: Custom Mitsubishi | Easting: 380317 | slope: -90° | R.L. Surface: 33.7
hole diameter: 100 mm | Northing 6358685 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
ADV		N	None Observed		33.5			GP	**FILL:** 7/14 Blend.	D			BITUMEN
									FILL: Sandy GRAVEL, fine to coarse grained, sand fine to coarse grained, grey, cement bound.				PAVEMENT GRAVEL
						0.5		CL	**FILL:** Sandy CLAY, medium plasticity, sand fine to medium grained, brown.	M>Wp			FILL
													Sewer PVC
					33.0				End of Borehole due to broken service. Borehole BH 6 terminated at 0.55m				
						1.0							
					32.5								
						1.5							
					32.0								
						2.0							
					31.5								
						2.5							
					31.0								
						3.0							
					30.5								
						3.5							
					30.0								
						4.0							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

support
M mud N nil
C casing

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Engineering Log - Borehole

Borehole No. **BH 7**
Sheet 1 of 1
Project No: **N09925/01**

Client: **EJE ARCHITECTURE**
Date started: **11.5.2006**
Principal:
Date completed: **11.5.2006**
Project: **PROPOSED NURSING HOME, EDITH STREET, WARATAH**
Logged by: **AMT**
Borehole Location: **REFER TO FIGURE AB1**
Checked by: SJK

drill model and mounting: Hand Auger | Easting: 380327 | slope: -90° | R.L. Surface: 31.4
hole diameter: 100 mm | Northing 6358718 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA		N	None Observed	E	31.0	0.5		CL	**TOPSOIL:** Sandy CLAY, low plasticity, sand fine to medium grained, dark grey, some organics.	M			TOPSOIL
								SP	**FILL:** Gravelly SAND, fine to coarse grained, gravel fine grained, brown, grey.				FILL (Bottom Ash Slag)
					30.5	1.0			Hand Auger Refusal Borehole BH 7 terminated at 0.6m				
					30.0	1.5							
					29.5	2.0							
					29.0	2.5							
					28.5	3.0							
					28.0	3.5							
					27.5	4.0							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

support
M mud N nil
C casing

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Borehole

Borehole No. **BH 8**

Sheet 1 of 1

Project No: **N09925/01**

Client: **EJE ARCHITECTURE**

Date started: **11.5.2006**

Principal:

Date completed: **11.5.2006**

Project: **PROPOSED NURSING HOME, EDITH STREET, WARATAH**

Logged by: **AMT**

Borehole Location: **REFER TO FIGURE AB1**

Checked by: SGK

drill model and mounting: Hand Auger | Easting: 380319 | slope: -90° | R.L. Surface: 34.3

hole diameter: 100 mm | Northing 6358699 | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA		N	None Observed		34.0	0.5		CL	**TOPSOIL:** Sandy CLAY, low plasticity, sand fine grained, dark grey, some organics.	M			TOPSOIL
								SP	**FILL:** Gravelly SAND, fine to coarse grained, gravel fine grained, brown, grey.				FILL (Bottom Ash Slag)
					33.5	1.0			Borehole BH 8 terminated at 0.6m				Hand Auger Refusal .
					33.0	1.5							
					32.5	2.0							
					32.0	2.5							
					31.5	3.0							
					31.0	3.5							
					30.5	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey geotechnics

Engineering Log - Borehole

Borehole No. **BH 9**
Sheet 1 of 2
Project No: **GEOTSGTE20243AA**

Client: **EJE ARCHITECTURE**
Date started: **19.2.2007**
Principal: **MAROBA**
Date completed: **19.2.2007**
Project: **AGED CARE FACILITY, EDITH STREET, WARATAH**
Logged by: **SJK**
Borehole Location: **REFER TO FIGURE AB1**
Checked by: SJK

drill model and mounting: Trailer Mounted | Easting: | slope: -90° | R.L. Surface: 33.3
hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information							material substance					
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADV		N			33.0	0.5		SC	**FILL:** Clayey SAND, fine to coarse grained, grey, clay low plasticity, some gravel fine to medium grained.	M			FILL
ADT			None Observed		32.5	1.0		CH	**SANDSTONE:** fine to medium grained, pale brown to orange.				HIGHLY WEATHERED SANDSTONE V bit refusal.
				U_{50}	32.0	1.5			**Sandy CLAY:** medium to high plasticity, pale grey and brown, sand fine to medium grained.				
					31.5	2.0			**SANDSTONE:** fine to medium grained, pale grey and pale brown to orange.	D-M			HIGHLY TO MODERATELY WEATHERED SANDSTONE U50 refusal, V bit refusal. Water added by driller.
					31.0	2.5			Some clayey seams.				
					30.5	3.0		CL	**Sandy CLAY:** medium plasticity, pale grey and orange, sand fine to medium grained.	M=Wp			CLAY SEAM
				U_{50}	30.0	3.5			**Silty SANDSTONE:** fine to medium grained, pale grey with trace orange, some clayey bands.				U50 refusal. HIGHLY WEATHERED SILTY SANDSTONE - estimated low strength with some medium strength bands.
					29.5	4.0							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

support
M mud N nil
C casing

penetration
1 2 3 4
no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

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Engineering Log - Borehole

Borehole No.	**BH 9**
Sheet	2 of 2
Project No:	**GEOTSGTE20243AA**
Client:	**EJE ARCHITECTURE**
Date started:	**19.2.2007**
Principal:	**MAROBA**
Date completed:	**19.2.2007**
Project:	**AGED CARE FACILITY, EDITH STREET, WARATAH**
Logged by:	**SJK**
Borehole Location:	**REFER TO FIGURE AB1**
Checked by:	SJK

drill model and mounting: Trailer Mounted | Easting: | slope: -90° | R.L. Surface: 33.3

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADT		N	None Observed	SPT R N*=R	29.0	4.5			**Silty SANDSTONE:** fine to medium grained, pale grey with trace orange, some clayey bands. *(continued)*	M=Wp			SPT 15 blows for 90mm, bouncing.
					28.5	5.0							
					28.0	5.5			Borehole BH 9 terminated at 5.25m				
					27.5	6.0							
					27.0	6.5							
					26.5	7.0							
					26.0	7.5							
					25.5	8.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support: M mud, C casing, N nil

penetration: 1 2 3 4 — no resistance ranging to refusal

water: 10/1/98 water level on date shown; water inflow; water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey geotechnics

Borehole No. **BH10**

Sheet 1 of 2

Project No: **GEOTSGTE20243AA**

Engineering Log - Borehole

Client: ***EJE ARCHITECTURE***

Date started: ***19.2.2007***

Principal: ***MAROBA***

Date completed: ***19.2.2007***

Project: ***AGED CARE FACILITY, EDITH STREET, WARATAH***

Logged by: ***SJK***

Borehole Location: ***REFER TO FIGURE AB1***

Checked by: SJK

drill model and mounting: Trailer Mounted | Easting: | slope: -90° | R.L. Surface: 31.8

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADV		N			31.5	0.0		SC	**TOPSOIL / FILL:** Clayey SAND, fine to coarse grained, brown, clay low to medium plasticity.	M			FILL - TOPSOIL
									FILL: Clayey Gravelly SAND, fine to coarse grained, grey, gravel fine to medium grained, clay low to medium plasticity.				FILL - Imported.
					31.0	0.5		SC	**FILL:** Gravelly Clayey SAND, fine to medium grained, pale brown, clay medium to high plasticity, gravel fine to coarse grained, angular, Silty Sandstone, some nodules of Sandy CLAY.				FILL - Local.
					30.5	1.0		SC	**FILL:** Clayey SAND, fine to medium grained, brown to grey, clay medium plasticity, piece of metal.	M-W			FILL - Disturbed alluvial soil.
				SPT 1,2,2 N*=4	30.0	1.5		CH	**Sandy CLAY:** high plasticity, pale grey with orange to pale brown mottle, sand fine to medium grained, trace gravel fine grained, subrounded, some rootlets.	M>Wp	St	×	RESIDUAL SOIL
					29.5	2.0						×	
				SPT 3,6,13 N*=19	29.0	2.5							
					28.5	3.0							
ADT					28.0	3.5							Water added by driller.
						4.0							Practical V bit refusal. Grading into Extremely Weathered Siltstone.

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey geotechnics

Engineering Log - Borehole

Borehole No. **BH10**

Sheet 2 of 2

Project No: **GEOTSGTE20243AA**

Client: ***EJE ARCHITECTURE***

Date started: ***19.2.2007***

Principal: ***MAROBA***

Date completed: ***19.2.2007***

Project: ***AGED CARE FACILITY, EDITH STREET, WARATAH***

Logged by: ***SJK***

Borehole Location: ***REFER TO FIGURE AB1***

Checked by: SJK

drill model and mounting: Trailer Mounted | Easting: | slope: -90° | R.L. Surface: 31.8

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADT		N	19-02-07 ▼	SPT R N*=R	27.5	4.5		CH	**Sandy CLAY:** high plasticity, pale grey with orange to pale brown mottle, sand fine to medium grained, trace gravel fine grained, subrounded, some rootlets. *(continued)*	M>Wp	St		
									SPT refusal.				SPT 15 blows for 90mm, bouncing.
					27.0	5.0			Borehole BH10 terminated at 4.59m				
					26.5	5.5							
					26.0	6.0							
					25.5	6.5							
					25.0	7.0							
					24.5	7.5							
					24.0	8.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

▼ 10/1/98 water level on date shown

► water inflow

◄ water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey geotechnics

Engineering Log - Borehole

Borehole No. **BH11**

Sheet 1 of 2

Project No: **GEOTSGTE20243AA**

Client: ***EJE ARCHITECTURE***

Date started: ***19.2.2007***

Principal: ***MAROBA***

Date completed: ***19.2.2007***

Project: ***AGED CARE FACILITY, EDITH STREET, WARATAH***

Logged by: ***SJK***

Borehole Location: ***REFER TO FIGURE AB1***

Checked by: SJK

drill model and mounting: Trailer Mounted | Easting: | slope: -90° | R.L. Surface: 31.5

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADT		N						GP	**FILL:** Bituminous seal.	D			FILL - Bitumen.
									FILL: Sandy GRAVEL, fine to coarse grained, grey, sand fine to coarse grained.				FILL - Pavement gravel.
								SC	**FILL:** Clayey SAND, fine to coarse grained, dark grey, clay low to medium plasticity.	M			FILL - Imported.
					31.0	0.5							
								GP	**FILL:** Sandy GRAVEL, fine to coarse grained, grey to brown, sand fine to coarse grained, fine to medium grained, mainly ash.				
					30.5	1.0							
ADV					30.0	1.5							
				SPT 1,0,1 N*=1									
					29.5	2.0		SC	**Clayey SAND:** fine to medium grained, grey, clay low to medium plasticity.	M-W	L		ALLUVIAL SOIL
					29.0	2.5							
			▼ 19-02-07		28.5	3.0							
				SPT 0,2,4 N*=6				CH	**Sandy CLAY:** high plasticity, grey with some pale brown to orange, sand fine to medium grained.	M>Wp	St	× ×	RESIDUAL SOIL
					28.0	3.5							
					27.5	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration

1 2 3 4 — no resistance ranging to refusal

water

▼ 10/1/98 water level on date shown

► water inflow

◄ water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE 20243AA LOGS.GPJ COFFEY.GDT 27.3.07

Form GEO 5.3 issue 3 Rev.2

coffey geotechnics

Engineering Log - Borehole

Borehole No. **BH11**
Sheet 2 of 2
Project No: **GEOTSGTE20243AA**

Client: **EJE ARCHITECTURE**
Date started: **19.2.2007**

Principal: **MAROBA**
Date completed: **19.2.2007**

Project: **AGED CARE FACILITY, EDITH STREET, WARATAH**
Logged by: **SJK**

Borehole Location: **REFER TO FIGURE AB1**
Checked by: SJK

drill model and mounting: Trailer Mounted | Easting: | slope: -90° | R.L. Surface: 31.5
hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADV		N						CH	**Sandy CLAY:** high plasticity, grey with some pale brown to orange, sand fine to medium grained. *(continued)*	M>Wp	St		
				SPT 5,12,15 N*=27	27.0	4.5							
					26.5	5.0			Borehole BH11 terminated at 4.95m				
					26.0	5.5							
					25.5	6.0							
					25.0	6.5							
					24.5	7.0							
					24.0	7.5							
					23.5	8.0							

method
AS auger screwing*
AD auger drilling*
RR roller/tricone
W washbore
CT cable tool
HA hand auger
DT diatube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

support
M mud N nil
C casing

penetration
1 2 3 4 no resistance ranging to refusal

water
10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
U_{63} undisturbed sample 63mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
V vane shear (kPa)
P pressuremeter
Bs bulk sample
E environmental sample
R refusal

classification symbols and soil description
based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

BOREHOLE 20243AA LOGS.GPJ COFFEY.GDT 27.3.07
Form GEO 5.3 Issue 3 Rev.2

coffey geotechnics

Engineering Log - Borehole

Borehole No.	**BH12**
Sheet	1 of 2
Project No:	**GEOTSGTE20243AA**
Client:	**EJE ARCHITECTURE**
Date started:	**19.2.2007**
Principal:	**MAROBA**
Date completed:	**19.2.2007**
Project:	**AGED CARE FACILITY, EDITH STREET, WARATAH**
Logged by:	**SJK**
Borehole Location:	**REFER TO FIGURE AB1**
Checked by:	SJK

drill model and mounting: Trailer Mounted | Easting: | slope: -90° | R.L. Surface: 33.0

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
ADT		N						GP	**FILL:** Bituminous seal.	D			Bitumen.
									FILL: Sandy GRAVEL, fine to coarse grained, grey, sand fine to coarse grained, cemented.				Pavement Gravel - mainly slag.
					32.5	0.5		CH	**FILL:** Sandy CLAY, medium to high plasticity, grey and brown, sand fine to medium grained.	M>Wp			FILL - Disturbed local soil?
								CH	**Sandy CLAY:** high plasticity, pale brown to orange and pale grey, sand fine to medium grained.		St/VSt	×	
					32.0	1.0				=Wp			
								CL-SC	**Sandy CLAY:** medium plasticity, pale grey with some orange, sand fine to medium grained, some silt, trace ironstone gravel.	D-M<Wp	H/Fb		RELICT ROCK STRUCTURE
ADV			None Observed	SPT 7,11,12 N*=23	31.5	1.5						×	
													Water added by driller.
					31.0	2.0			Bands of Extremely to Highly Weathered Silty Sandstone.				
ADT													Practical V bit refusal.
					30.5	2.5							
								CH	**CLAY:** high plasticity, pale grey with some pale brown and brown to red.		VSt	×	
ADV				SPT 4,6,7 N*=13	30.0	3.0						×	
					29.5	3.5							
					29.0	4.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support: M mud, C casing, N nil

penetration: 1 2 3 4 — no resistance ranging to refusal

water: 10/1/98 water level on date shown; water inflow; water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

coffey geotechnics

Engineering Log - Borehole

Borehole No.	**BH12**
Sheet	2 of 2
Project No:	**GEOTSGTE20243AA**
Date started:	**19.2.2007**
Date completed:	**19.2.2007**
Logged by:	**SJK**
Checked by:	SJK

Client: **EJE ARCHITECTURE**

Principal: **MAROBA**

Project: **AGED CARE FACILITY, EDITH STREET, WARATAH**

Borehole Location: **REFER TO FIGURE AB1**

drill model and mounting: Trailer Mounted | Easting: | slope: -90° | R.L. Surface: 33.0

hole diameter: 100 mm | Northing | bearing: | datum: AHD

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
ADV		N	None Observed					CH	**CLAY:** high plasticity, pale grey with some pale brown and brown to red. *(continued)*	D-M<Wp	VSt		
				SPT 10,21 N*=R	28.5	4.5			SPT refusal.				
					28.0	5.0			Borehole BH12 terminated at 4.8m				
					27.5	5.5							
					27.0	6.0							
					26.5	6.5							
					26.0	7.0							
					25.5	7.5							
					25.0	8.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

Appendix B

Results of Laboratory Testing

Coffey Geosciences Pty Ltd

A.C.N. 056 335 516

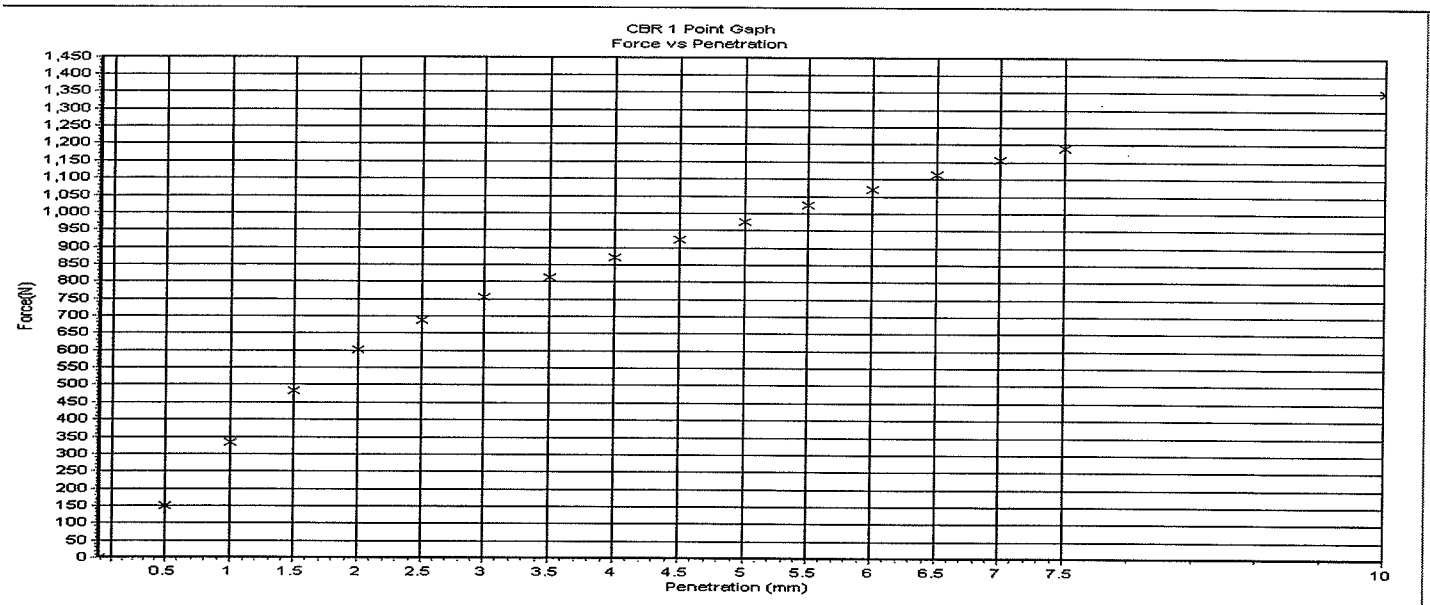
Geotechnical | Resources | Environmental | Technical | Project Management

13 Mangrove road, Sandgate, NSW 2304

Ph: (02) 4967 6377 Fax (02) 4967 5402

California Bearing Ratio Report (1 Point)

Client:	**EJE Architecture**	Report Number:	**MAY24-21**
Client address:			
Job Number:	**N09925/01**	Report Date:	**24/05/2006**
Project:	**Maroba Nursing Home Redevlopment**	Order Number:	
Location	**Edith Street , Waratah**		**Page 1 of 1**
Lab No:	**NE06/3645**	Sample Location	
Date Sampled:	**11/05/2006**	BH3	
Date Tested:	**19/05/2006**	0.4-0.7	
Sampled By:	**Engineering**	BSK2	
Sample Method:	**AS1289 1.2.1 Procedure 6.4(b)**		
Material Source:	**On Site**	Test Method :	AS1289.6.1.1
For Use As:	**Fill**	Lot Number:	-
Remarks:	-	Item Number :	-



Maximum Dry Density - MDD (t/m³) :	**1.719**	Dry Density after Soak (t/m³) :	**1.711**
Optimum Moisture Content - OMC (%) :	**19.0**	Moisture Content after Soak (%) :	**20.7**
Compactive Effort :	**Standard**	Density Ratio after Soak (%) :	**100**
Nominated % Maximum Dry Density Compaction :	**100**	Field Moisture Content (%) :	**21.4**
Nominated % Optimum Moisture Content Compaction :	**100**	Moisture Content (Top) after Penetration (%) :	**20.5**
Achieved Dry Density before Soak (t/m³) :	**1.730**	Moisture Content (Total) after Penetration (%) :	**-**
Achieved Percentage of Maximum Dry Density (%) :	**101**	CBR 2.5mm (%) :	**5**
Achieved Moisture Content (%) :	**18.3**	CBR 5.0mm (%) :	**5**
Achieved Percentage of Optimum Moisture Content (%) :	**96**	Minimum Specified CBR Value (%) :	**-**
Test Condition (Soaked/Unsoaked) / Soaking Period (Days) :	**Soaked / 4 days**	**CBR Value (%) :**	**5.0**
Swell (%) / Surcharge (kg):	**1.2 / 4.5 kg**	+19mm Material (%) **0%**	Oversize replacement **Nil**
Soil Description :	(CL) Sandy CLAY,medium plasticity,brown,fine to coarse sand.		

Approved Signatory

Alan Cullen

NATA Accred No:431

Form Number

CBR_1_3-1-32

Coffey Geosciences Pty Ltd A.C.N. 056 335 516 MAY02-30

Geotechnical | **Resources** | Environmental | **Technical** | Project Management

13 Mangrove Road, Sandgate, NSW, 2304
Ph: (02) 4967 6377 Fax (02) 4967 5402

shrink swell index test

client : *EJE ARCHITECTURE PTY LIMITED*
412 KING STREET, NEWCASTLE, NSW 2300

principal :

project : *MAROBA AGED CARE FACILITY*

location : *58 EDITH STREET, WARATAH, NSW*

job no : *N09925/01*

laboratory : *NEWCASTLE*

report date : *May 02, 2006*

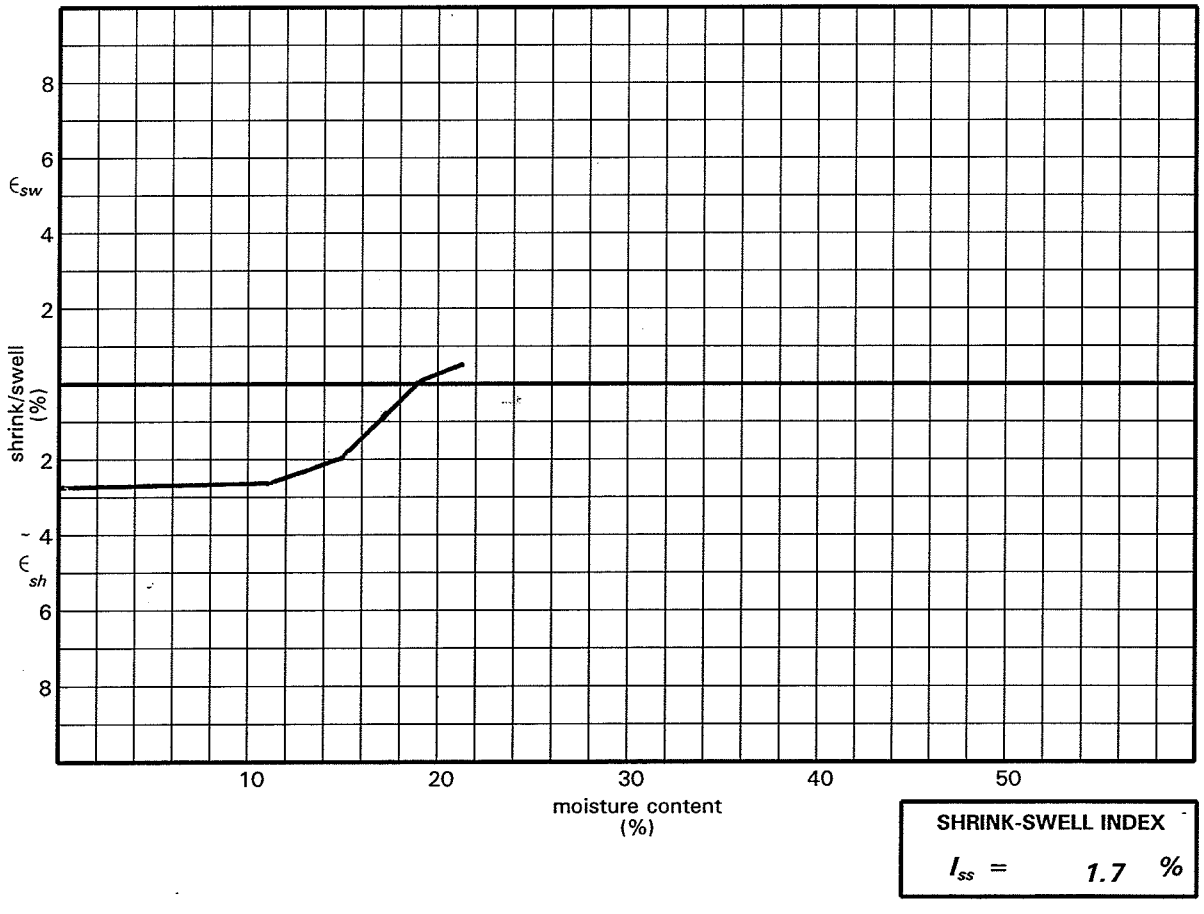
test report : *MAY02-30\2*

test procedure : *AS1289 7.1.1*

borehole : *BH 1* depth : *0.50 - 0.72m* date tested : *27-04-06*

material classification :
(CL) Sandy CLAY, low plasticity, pale grey with red mottling, sand fine to medium grained.

SWELL TEST					SHRINK TEST			
swell on saturation (%)	moisture content (%)		estimated unconfined compressive strength (kPa)		shrink on drying %	estimated inert material present %	extent of crumbling during shrinkage	extent of cracking during shrinkage
	before test	after test	before test	after test				
0.45	*19.1*	*21.5*	*300*	*210*	*2.8*	*<5*	*nil*	*nil*



SHRINK-SWELL INDEX
I_{ss} = 1.7 %

remarks:

NATA Accredited Laboratory No. 431
Authorised Signature:
Alan Cullen

Date : *2 May 2006*

Coffey Geosciences Pty Ltd A.C.N. 056 335 516 MAY02-30

Geotechnical | **Resources** | Environmental | **Technical** | Project Management

13 Mangrove Road, Sandgate, NSW, 2304
Ph: (02) 4967 6377 Fax (02) 4967 5402

shrink swell index test

client : *EJE ARCHITECTURE PTY LIMITED*
412 KING STREET, NEWCASTLE, NSW 2300

principal :

project : *MAROBA AGED CARE FACILITY*

location : *58 EDITH STREET, WARATAH, NSW*

job no : *N09925/01*

laboratory : *NEWCASTLE*

report date : *May 02, 2006*

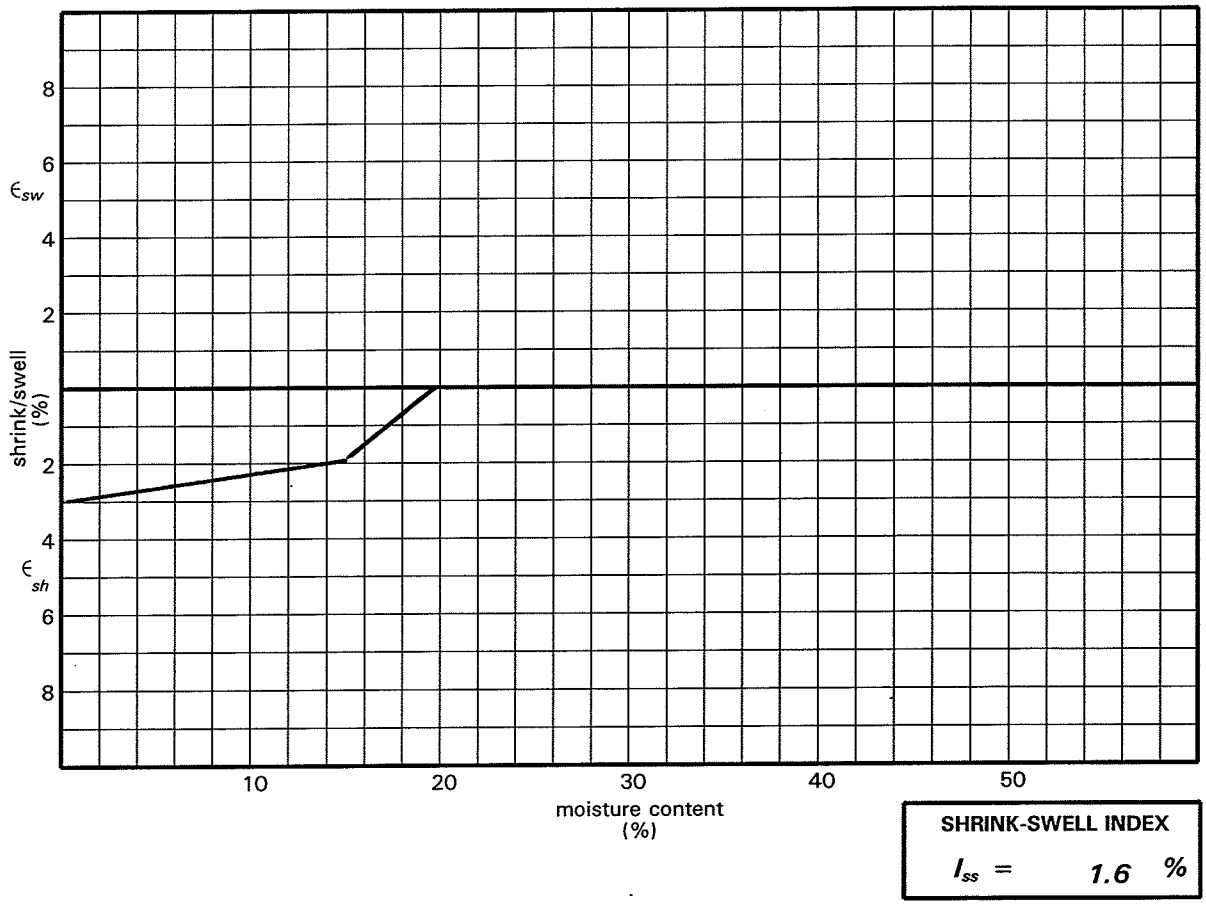
test report : *MAY02-30\1*

test procedure : *AS1289 7.1.1*

borehole : *BH 4* depth : *1.0 - 1.25m* date tested : *27-04-06*

material classification : *(CL/CH) Silty CLAY, medium plasticity, pale grey with red & yellow mottling, some gravel fine to medium grained.*

SWELL TEST					SHRINK TEST			
swell on saturation (%)	moisture content (%)		estimated unconfined compressive strength (kPa)		shrink on drying %	estimated inert material present %	extent of crumbling during shrinkage	extent of cracking during shrinkage
	before test	after test	before test	after test				
-0.20	*17.7*	*17.2*	*500*	*310*	*3.0*	*<5*	*nil*	*Very Slight*



SHRINK-SWELL INDEX
I_{ss} = *1.6* %

remarks:

NATA Accredited Laboratory No. 431
Authorised Signature: *Alan Cullen*
Date : *2 May 2006*

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

13 Mangrove Road, Sandgate, NSW, 2304
Ph: (02) 4967 6377 Fax (02) 4967 5402

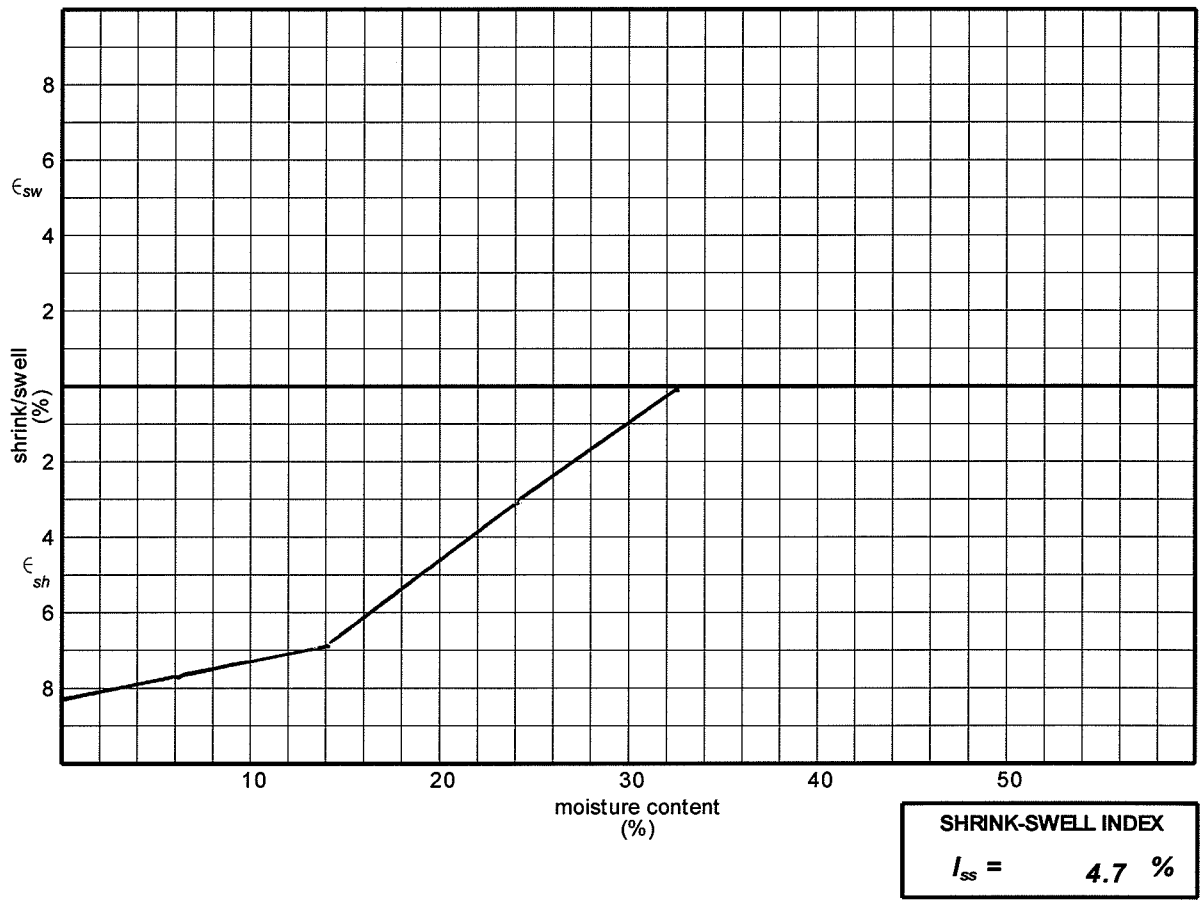
shrink swell index test

client : *COFFEY GEOTECHNICS (SANDGATE)*
job no : *LABTSGTE00111AA*
principal : *EJE ARCHITECTURE (GEOT20243AA)*
laboratory : *NEWCASTLE*
project : *AGED CARE FACILITY*
report date : *February 28, 2007*
location : *EDITH STREET, WARATAH*
test report no. : *FEB28-06*

test procedure : *AS1289 7.1.1*

borehole : **BH10** depth : *1.50 - 1.75m* date tested : *20-02-07*
material classification : *CLAY, medium to high plasticity, M> Wp, brown.*

SWELL TEST					SHRINK TEST			
swell on saturation (%)	moisture content (%)		estimated unconfined compressive strength (kPa)		shrink on drying %	estimated inert material present %	extent of crumbling during shrinkage	extent of cracking during shrinkage
	before test	after test	before test	after test				
0	*27.9*	*30.7*	*100*	*100*	*8.5*	*Nil*	*Nil*	*Nil*



SHRINK-SWELL INDEX
I_{ss} = *4.7* %

remarks:

NATA Accredited Laboratory No. 431
Approved Signatory: *Alan Cullen*
Date : *28 February 2007*

Appendix C

Results of Chemical Laboratory Testing

ALS Environmental

CERTIFICATE OF ANALYSIS

Client	: COFFEY GEOSCIENCES PTY LTD	*Laboratory*	: ALS Environmental Sydney	*Page*	: 1 of 4
Contact	: MR ANDREW TAIT	*Contact*	: Greg Vogel	*Work Order*	: ES0605800
Address	: 13 MANGROVE ROAD SANDGATE NSW AUSTRALIA 2304	*Address*	: 277-289 Woodpark Road Smithfield NSW Australia 2164		
E-mail	: andrew_tait@coffey.com.au	*E-mail*	: Greg.Vogel@alsenviro.com		
Telephone	: 02 4967 6377	*Telephone*	: 61-2-87848555		
Facsimile	: 02 4967 5402	*Facsimile*	: 61-2-87848500		
Project	: N09925/01	*Quote number*	: EN/007/05	*Date received*	: 12 May 2006
Order number	: 18061			*Date issued*	: 26 May 2006
C-O-C number	: 38524			*No. of samples*	- *Received* : 2
Site	: - Not provided -				*Analysed* : 2

ALSE - Excellence in Analytical Testing

NATA Accredited Laboratory 825

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

This document has been digitally signed by those names that appear on this report and are the authorised signatories. Digital signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatory	*Position*	*Department*
Peter Dickenson	Senior Spectroscopist	Inorganics - NATA 825 (10911 - Sydney)
Rassem Ayoubi	Senior Organic Chemist	Organics - NATA 825 (10911 - Sydney)

ALS Environmental

Comments

This report for the ALSE reference ES0605800 supersedes any previous reports with this reference. Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

This report contains the following information:

- **Analytical results for samples submitted**

When moisture determination has been performed, results are reported on a dry weight basis. When a reported 'less than' result is higher than the LOR, this may be due to primary sample extracts/digestion dilution and/or insuffient sample amount for analysis. Surrogate Recovery Limits are static and based on USEPA SW846 or ALS-QWI/EN38 (in the absence of specified USEPA limits). Where LOR of reported result differ from standard LOR, this may be due to high moisture, reduced sample amount or matrix interference. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number, LOR = Limit of Reporting. * Indicates failed Surrogate Recoveries.

- **Surrogate control limits**

The analytical procedures used by ALS Environmental are based on established internationally-recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house procedure are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported herein. Reference methods from which ALSE methods are based are provided in parenthesis.

ALS Environmental

Analytical Results

	Client Sample ID :	BH5 0.5 - 0.6	BH8 0.3 - 0.4			
	Sample Matrix Type / Description :	SOIL	SOIL			
	Sample Date / Time :	24 Apr 2006 15:00	11 May 2006 15:00			
	Laboratory Sample ID :					
Analyte	CAS number	LOR	Units	ES0605800-001	ES0605800-002	
EA055: Moisture Content						
Moisture Content (dried @ 103°C)		1.0	%	22.4	5.5	
EG005T: Total Metals by ICP-AES						
Arsenic	7440-38-2	5	mg/kg	<5	20	
Cadmium	7440-43-9	1	mg/kg	<1	<1	
Chromium	7440-47-3	2	mg/kg	9	8	
Copper	7440-50-8	5	mg/kg	34	15	
Lead	7439-92-1	5	mg/kg	31	37	
Nickel	7440-02-0	2	mg/kg	9	8	
Zinc	7440-66-6	5	mg/kg	89	106	
EG035T: Total Mercury by FIMS						
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons						
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	1.0	<0.5	
Pyrene	129-00-0	0.5	mg/kg	1.0	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	
EP075(SIM)S: Phenolic Compound Surrogates						
2-Fluorophenol	367-12-4	0.1	%	90.6	103	
Phenol-d6	13127-88-3	0.1	%	86.6	124	
2-Chlorophenol-D4	93951-73-6	0.1	%	86.2	120	
2.4.6-Tribromophenol	118-79-6	0.1	%	82.9	111	
EP075(SIM)T: PAH Surrogates						
2-Fluorobiphenyl	321-60-8	0.1	%	95.7	120	
Anthracene-d10	1719-06-8	0.1	%	89.0	109	
4-Terphenyl-d14	1718-51-0	0.1	%	96.8	118	

ALS Environmental

Surrogate Control Limits

Matrix Type: SOIL - Surrogate Control Limits

Method name	Analyte name	Surrogate Control Limits	
		Lower Limit	Upper Limit
EP075(SIM): PAH/Phenols (SIM)			
EP075(SIM)S: Phenolic Compound Surrogates	2-Fluorophenol	25	121
	Phenol-d6	24	113
	2-Chlorophenol-D4	23	134
	2,4,6-Tribromophenol	19	122
EP075(SIM)T: PAH Surrogates	2-Fluorobiphenyl	30	115
	Anthracene-d10	27	133
	4-Terphenyl-d14	18	137

ALS Environmental

QUALITY CONTROL REPORT

Client	: COFFEY GEOSCIENCES PTY LTD	**Laboratory**	: ALS Environmental Sydney	**Page**	:	1 of 10
Contact	: MR ANDREW TAIT	**Contact**	: Greg Vogel			
Address	: 13 MANGROVE ROAD SANDGATE NSW AUSTRALIA 2304	**Address**	: 277-289 Woodpark Road Smithfield NSW Australia 2164	**Work order**	:	ES0605800
				Amendment No.	:	
Project	: N09925/01	**Quote number**	: EN/007/05	**Date received**	:	11 May 2006
Order number	: 18061			**Date issued**	:	26 May 2006
C-O-C number	: 38524					
Site	: - Not provided -					
E-mail	: andrew_tait@coffey.com.au	**E-mail**	: Greg.Vogel@alsenviro.com	**No. of samples**		
Telephone	: 02 4967 6377	**Telephone**	: 61-2-87848555	**Received**	:	2
Facsimile	: 02 4967 5402	**Facsimile**	: 61-2-87848500	**Analysed**	:	2

This final report for the ALSE work order reference ES0605800 supersedes any previous reports with this reference.
Results apply to the samples as submitted. All pages of this report have been checked and approved for release.
This report contains the following information:

- Laboratory Duplicates (DUP); Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Samples (LCS); Recovery and Acceptance Limits
- Matrix Spikes (MS); Recovery and Acceptance Limits

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This document has been digitally signed by those names that appear on this report and are the authorised signatories. Digital signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatory	Department
Peter Dickenson	Inorganics - NATA 825 (10911 - Sydney)
Rassem Ayoubi	Organics - NATA 825 (10911 - Sydney)

Quality Control Report - Laboratory Duplicates (DUP)

The quality control term **Laboratory Duplicate** refers to an intralaboratory split sample randomly selected from the sample batch. Laboratory duplicates provide information on method precision and sample heterogeneity.
- Anonymous - Client Sample IDs refer to samples which are not specifically part of this work order but formed part of the QC process lot. *Abbreviations:* ***LOR*** *= Limit of Reporting,* ***RPD*** *= Relative Percent Difference.*
* Indicates failed QC. The permitted ranges for the RPD of Laboratory Duplicates (relative percent deviation) are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting:- Result < 10 times LOR, no limit - Result between 10 and 20 times LOR, 0% - 50% - Result > 20 times LOR, 0% - 20%

Matrix Type: SOIL

Laboratory Duplicates (DUP) Report

Laboratory Sample ID	Client Sample ID	Analyte name	LOR	Original Result	Duplicate Result	RPD
EA055: Moisture Content						
EA055: Moisture Content - (QC Lot: 212743)				%	%	%
ES0605752-032	Anonymous	Moisture Content (dried @ 103°C)	1.0 %	13.0	10.7	18.9
ES0605752-041	Anonymous	Moisture Content (dried @ 103°C)	1.0 %	12.7	11.5	10.2
EA055: Moisture Content - (QC Lot: 214035)				%	%	%
ES0605578-008	Anonymous	Moisture Content (dried @ 103°C)	1.0 %	23.9	26.2	9.5
ES0605741-001	Anonymous	Moisture Content (dried @ 103°C)	1.0 %	<1.0	<1.0	0.0
EG005T: Total Metals by ICP-AES						
EG005T: Total Metals by ICP-AES - (QC Lot: 213921)				mg/kg	mg/kg	%
ES0605800-002	BH8 0.3 - 0.4	Arsenic	5 mg/kg	19	20	8.2
		Cadmium	1 mg/kg	<1	<1	0.0
		Chromium	2 mg/kg	8	6	22.3
		Copper	5 mg/kg	14	23	47.3
		Lead	5 mg/kg	35	39	9.5
		Nickel	2 mg/kg	8	8	0.0
		Zinc	5 mg/kg	100	95	4.9
ES0605810-104	Anonymous	Arsenic	5 mg/kg	<5	<5	0.0
		Cadmium	1 mg/kg	<1	<1	0.0
		Chromium	2 mg/kg	8	9	0.0
		Copper	5 mg/kg	12	12	0.0
		Lead	5 mg/kg	7	8	0.0
		Nickel	2 mg/kg	<2	<2	0.0
		Zinc	5 mg/kg	8	9	0.0
EG035T: Total Mercury by FIMS						
EG035T: Total Mercury by FIMS - (QC Lot: 213922)				mg/kg	mg/kg	%
ES0605800-002	BH8 0.3 - 0.4	Mercury	0.1 mg/kg	<0.1	<0.1	0.0
ES0605810-104	Anonymous	Mercury	0.1 mg/kg	<0.1	<0.1	0.0

Matrix Type: SOIL

Laboratory Duplicates (DUP) Report

Laboratory Sample ID	Client Sample ID	Analyte name	LOR	Original Result	Duplicate Result	RPD
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons						
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - (QC Lot: 212865)				mg/kg	mg/kg	%
ES0605588-005	Anonymous	Naphthalene	0.5 mg/kg	<0.5	<0.5	0.0
		Acenaphthylene	0.5 mg/kg	<0.5	<0.5	0.0
		Acenaphthene	0.5 mg/kg	<0.5	<0.5	0.0
		Fluorene	0.5 mg/kg	<0.5	<0.5	0.0
		Phenanthrene	0.5 mg/kg	<0.5	<0.5	0.0
		Anthracene	0.5 mg/kg	<0.5	<0.5	0.0
		Fluoranthene	0.5 mg/kg	<0.5	<0.5	0.0
		Pyrene	0.5 mg/kg	<0.5	<0.5	0.0
		Benz(a)anthracene	0.5 mg/kg	<0.5	<0.5	0.0
		Chrysene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(b)fluoranthene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(k)fluoranthene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(a)pyrene	0.5 mg/kg	<0.5	<0.5	0.0
		Indeno(1,2,3,cd)pyrene	0.5 mg/kg	<0.5	<0.5	0.0
		Dibenz(a,h)anthracene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(g,h,i)perylene	0.5 mg/kg	<0.5	<0.5	0.0
ES0605626-003	Anonymous	Naphthalene	0.5 mg/kg	<0.5	<0.5	0.0
		Acenaphthylene	0.5 mg/kg	<0.5	<0.5	0.0
		Acenaphthene	0.5 mg/kg	<0.5	<0.5	0.0
		Fluorene	0.5 mg/kg	<0.5	<0.5	0.0
		Phenanthrene	0.5 mg/kg	<0.5	<0.5	0.0
		Anthracene	0.5 mg/kg	<0.5	<0.5	0.0
		Fluoranthene	0.5 mg/kg	<0.5	<0.5	0.0
		Pyrene	0.5 mg/kg	<0.5	<0.5	0.0
		Benz(a)anthracene	0.5 mg/kg	<0.5	<0.5	0.0
		Chrysene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(b)fluoranthene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(k)fluoranthene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(a)pyrene	0.5 mg/kg	<0.5	<0.5	0.0

Matrix Type: SOIL

Laboratory Duplicates (DUP) Report

Laboratory Sample ID	Client Sample ID	Analyte name	LOR	Original Result	Duplicate Result	RPD
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - continued						
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - (QC Lot: 212865) - continued				mg/kg	mg/kg	%
ES0605626-003	Anonymous	Indeno(1,2,3,cd)pyrene	0.5 mg/kg	<0.5	<0.5	0.0
		Dibenz(a,h)anthracene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(g,h,i)perylene	0.5 mg/kg	<0.5	<0.5	0.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - (QC Lot: 214680)				mg/kg	mg/kg	%
ES0605623-001	Anonymous	Naphthalene	0.5 mg/kg	<0.5	<0.5	0.0
		Acenaphthylene	0.5 mg/kg	<0.5	<0.5	0.0
		Acenaphthene	0.5 mg/kg	<0.5	<0.5	0.0
		Fluorene	0.5 mg/kg	<0.5	<0.5	0.0
		Phenanthrene	0.5 mg/kg	<0.5	<0.5	0.0
		Anthracene	0.5 mg/kg	<0.5	<0.5	0.0
		Fluoranthene	0.5 mg/kg	<0.5	<0.5	0.0
		Pyrene	0.5 mg/kg	<0.5	<0.5	0.0
		Benz(a)anthracene	0.5 mg/kg	<0.5	<0.5	0.0
		Chrysene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(b)fluoranthene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(k)fluoranthene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(a)pyrene	0.5 mg/kg	<0.5	<0.5	0.0
		Indeno(1,2,3,cd)pyrene	0.5 mg/kg	<0.5	<0.5	0.0
		Dibenz(a,h)anthracene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(g,h,i)perylene	0.5 mg/kg	<0.5	<0.5	0.0
ES0605809-049	Anonymous	Naphthalene	0.5 mg/kg	<0.5	<0.5	0.0
		Acenaphthylene	0.5 mg/kg	<0.5	<0.5	0.0
		Acenaphthene	0.5 mg/kg	<0.5	<0.5	0.0
		Fluorene	0.5 mg/kg	<0.5	<0.5	0.0
		Phenanthrene	0.5 mg/kg	1.6	1.9	19.6
		Anthracene	0.5 mg/kg	<0.5	<0.5	0.0
		Fluoranthene	0.5 mg/kg	2.5	3.1	22.9
		Pyrene	0.5 mg/kg	2.2	2.7	23.9
		Benz(a)anthracene	0.5 mg/kg	0.8	1.0	20.8

Matrix Type: SOIL

Laboratory Duplicates (DUP) Report

Laboratory Sample ID	Client Sample ID	Analyte name	LOR	Original Result	Duplicate Result	RPD
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - continued						
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - (QC Lot: 214680) - continued				mg/kg	mg/kg	%
ES0605809-049	Anonymous	Chrysene	0.5 mg/kg	0.8	0.9	12.1
		Benzo(b)fluoranthene	0.5 mg/kg	0.9	1.2	28.5
		Benzo(k)fluoranthene	0.5 mg/kg	<0.5	0.5	0.0
		Benzo(a)pyrene	0.5 mg/kg	0.6	0.9	36.8
		Indeno(1,2,3,cd)pyrene	0.5 mg/kg	<0.5	0.6	0.0
		Dibenz(a,h)anthracene	0.5 mg/kg	<0.5	<0.5	0.0
		Benzo(g,h,i)perylene	0.5 mg/kg	<0.5	0.6	25.7

Quality Control Report - Method Blank (MB) and Laboratory Control Samples (LCS)

The quality control term **Method / Laboratory Blank** refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC type is to monitor potential laboratory contamination. The quality control term **Laboratory Control Sample (LCS)** refers to a known, interference free matrix spiked with target analytes or certified reference material. The purpose of this QC type is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of actual laboratory data. Abbreviations: LOR = Limit of reporting.

Matrix Type: SOIL

Method Blank (MB) and Laboratory Control Samples (LCS) Report

Analyte name	*LOR*	*Method blank result*	*Actual Results*		*Recovery Limits*	
			Spike concentration	*Spike Recovery*	*Dynamic Recovery Limits*	
				LCS	*Low*	*High*
EG005T: Total Metals by ICP-AES						
EG005T: Total Metals by ICP-AES - (QC Lot: 213921)		mg/kg	mg/kg	%	%	%
Arsenic	5 mg/kg	----	13.1	113	70	130
	5 mg/kg	<5	----	----	----	----
Cadmium	1 mg/kg	----	2.76	102	70	130
	1 mg/kg	<1	----	----	----	----
Chromium	2 mg/kg	----	60.9	108	70	130
	2 mg/kg	<2	----	----	----	----
Copper	5 mg/kg	----	54.7	102	70	130
	5 mg/kg	<5	----	----	----	----
Lead	5 mg/kg	----	55.2	105	70	130
	5 mg/kg	<5	----	----	----	----
Nickel	2 mg/kg	----	54.8	108	70	130
	2 mg/kg	<2	----	----	----	----
Zinc	5 mg/kg	----	104	105	70	130
	5 mg/kg	<5	----	----	----	----
EG035T: Total Mercury by FIMS						
EG035T: Total Mercury by FIMS - (QC Lot: 213922)		mg/kg	mg/kg	%	%	%
Mercury	0.1 mg/kg	----	1.4	86.6	70	130
	0.1 mg/kg	<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons						
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - (QC Lot: 212865)		mg/kg	mg/kg	%	%	%
Acenaphthene	0.5 mg/kg	----	4	94.8	87	105
	0.5 mg/kg	<0.5	----	----	----	----
Acenaphthylene	0.5 mg/kg	----	4	92.0	85	107
	0.5 mg/kg	<0.5	----	----	----	----

Matrix Type: SOIL

Method Blank (MB) and Laboratory Control Samples (LCS) Report

Analyte name	LOR	Method blank result	Actual Results: Spike concentration	Actual Results: Spike Recovery LCS	Recovery Limits: Dynamic Recovery Limits Low	Recovery Limits: Dynamic Recovery Limits High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - continued						
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - (QC Lot: 212865) - continued		mg/kg	mg/kg	%	%	%
Anthracene	0.5 mg/kg	----	4	90.1	88	107
	0.5 mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	0.5 mg/kg	----	4	85.7	85	100
	0.5 mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	0.5 mg/kg	----	4	94.6	83	108
	0.5 mg/kg	<0.5	----	----	----	----
Benzo(b)fluoranthene	0.5 mg/kg	----	4	82.0	68	112
	0.5 mg/kg	<0.5	----	----	----	----
Benzo(g,h,i)perylene	0.5 mg/kg	----	4	89.4	76	109
	0.5 mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	0.5 mg/kg	----	4	109	70	129
	0.5 mg/kg	<0.5	----	----	----	----
Chrysene	0.5 mg/kg	----	4	97.7	84	111
	0.5 mg/kg	<0.5	----	----	----	----
Dibenz(a,h)anthracene	0.5 mg/kg	----	4	86.1	77	107
	0.5 mg/kg	<0.5	----	----	----	----
Fluoranthene	0.5 mg/kg	----	4	89.6	87	105
	0.5 mg/kg	<0.5	----	----	----	----
Fluorene	0.5 mg/kg	----	4	89.7	85	105
	0.5 mg/kg	<0.5	----	----	----	----
Indeno(1,2,3,cd)pyrene	0.5 mg/kg	----	4	86.3	76	110
	0.5 mg/kg	<0.5	----	----	----	----
Naphthalene	0.5 mg/kg	----	4	93.5	87	103
	0.5 mg/kg	<0.5	----	----	----	----
Phenanthrene	0.5 mg/kg	----	4	98.8	85	113
	0.5 mg/kg	<0.5	----	----	----	----
Pyrene	0.5 mg/kg	----	4	91.2	75	105
	0.5 mg/kg	<0.5	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - (QC Lot: 214680)		mg/kg	mg/kg	%	%	%

Matrix Type: SOIL

Method Blank (MB) and Laboratory Control Samples (LCS) Report

Analyte name	LOR	Method blank result	Actual Results		Recovery Limits	
			Spike concentration	Spike Recovery	Dynamic Recovery Limits	
				LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - continued						
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - (QC Lot: 214680) - continued		mg/kg	mg/kg	%	%	%
Acenaphthene	0.5 mg/kg	----	4	92.5	87	105
	0.5 mg/kg	<0.5	----	----	----	----
Acenaphthylene	0.5 mg/kg	----	4	92.1	85	107
	0.5 mg/kg	<0.5	----	----	----	----
Anthracene	0.5 mg/kg	----	4	93.0	88	107
	0.5 mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	0.5 mg/kg	----	4	94.9	85	100
	0.5 mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	0.5 mg/kg	----	4	91.5	83	108
	0.5 mg/kg	<0.5	----	----	----	----
Benzo(b)fluoranthene	0.5 mg/kg	----	4	98.1	68	112
	0.5 mg/kg	<0.5	----	----	----	----
Benzo(g,h,i)perylene	0.5 mg/kg	----	4	89.2	76	109
	0.5 mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	0.5 mg/kg	----	4	96.1	70	129
	0.5 mg/kg	<0.5	----	----	----	----
Chrysene	0.5 mg/kg	----	4	93.9	84	111
	0.5 mg/kg	<0.5	----	----	----	----
Dibenz(a,h)anthracene	0.5 mg/kg	----	4	91.8	77	107
	0.5 mg/kg	<0.5	----	----	----	----
Fluoranthene	0.5 mg/kg	----	4	94.5	87	105
	0.5 mg/kg	<0.5	----	----	----	----
Fluorene	0.5 mg/kg	----	4	92.6	85	105
	0.5 mg/kg	<0.5	----	----	----	----
Indeno(1,2,3,cd)pyrene	0.5 mg/kg	----	4	91.4	76	110
	0.5 mg/kg	<0.5	----	----	----	----
Naphthalene	0.5 mg/kg	----	4	91.1	87	103
	0.5 mg/kg	<0.5	----	----	----	----
Phenanthrene	0.5 mg/kg	----	4	92.9	85	113
	0.5 mg/kg	<0.5	----	----	----	----

Matrix Type: SOIL

Method Blank (MB) and Laboratory Control Samples (LCS) Report

Analyte name	LOR	Method blank result	Actual Results		Recovery Limits	
			Spike concentration	Spike Recovery	Dynamic Recovery Limits	
				LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - continued						
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - (QC Lot: 214680) - continued		mg/kg	mg/kg	%	%	%
Pyrene	0.5 mg/kg	----	4	95.3	75	105
	0.5 mg/kg	<0.5	----	----	----	----

Quality Control Report - Matrix Spikes (MS)

The quality control term **Matrix Spike (MS)** refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC type is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQO's). 'Ideal' recovery ranges stated may be waived in the event of sample matrix interferences. - Anonymous - Client Sample IDs refer to samples which are not specifically part of this work order but formed part of the QC process lot. *Abbreviations:* ***LOR*** *= Limit of Reporting,* ***RPD*** *= Relative Percent Difference.*

* Indicates failed QC

Matrix Type: SOIL

Matrix Spike (MS) Report

					Actual Results		Recovery Limits	
					Sample Result	Spike Recovery	Static Limits	
Analyte name	*Laboratory Sample ID*	*Client Sample ID*	*LOR*	*Spike Concentration*		*MS*	*Low*	*High*
EG005T: Total Metals by ICP-AES								
EG005T: Total Metals by ICP-AES - (QC Lot: 213921)				mg/kg	mg/kg	%	%	%
Arsenic	ES0605781-020	Anonymous	5 mg/kg	50	<5	116	70	130
Cadmium			1 mg/kg	50	<1	116	70	130
Chromium			2 mg/kg	50	41	111	70	130
Copper			5 mg/kg	250	8	117	70	130
Lead			5 mg/kg	250	22	112	70	130
Nickel			2 mg/kg	50	4	116	70	130
Zinc			5 mg/kg	250	25	117	70	130
EG035T: Total Mercury by FIMS								
EG035T: Total Mercury by FIMS - (QC Lot: 213922)				mg/kg	mg/kg	%	%	%
Mercury	ES0605781-020	Anonymous	0.1 mg/kg	5	0.1	100	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - (QC Lot: 212865)				mg/kg	mg/kg	%	%	%
Acenaphthene	ES0605585-005	Anonymous	0.5 mg/kg	10	16.5	* Not Determined	70	130
Pyrene			0.5 mg/kg	10	28.2	* Not Determined	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - (QC Lot: 214680)				mg/kg	mg/kg	%	%	%
Acenaphthene	ES0605623-001	Anonymous	0.5 mg/kg	10	<0.5	92.0	70	130
Pyrene			0.5 mg/kg	10	<0.5	97.1	70	130

Chain of Custody

No: 38524

Laboratory Quotation / Order No: 18061.

Job No: N09925/01 Sheet of

Coffey

Dispatch to: (Address & Phone No.): ALS WARABROOK	Sampled by: ANDREW TAIT	Consigning Officer: AMT
		Date Dispatched: 11/5/06
Attention:	Project Manager: (report results to) ANDREW TAIT	Courier Service: COFFEY
		Consignment Note No:

Relinquished by:	Date:	Time:	Received by:		Date:	Time:
A TAIT	11/5/06		DON ACHY	ALS NEWCASTLE	11/5/06	1615
Katie Kelly ALS Newcastle	11/5/06	4pm.	JESSIE ALS Syd		12-5-06	8:40a.m

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	Analyses Required: PAHs	TPHs	MAHs = BTEX	Metals: *	Sample Condition on Receipt
		SOIL JAR	(1) BH5 0.5-0.6	24/4/06	/			/	
		SOIL JAR	(2) BH8 0.3-0.4	11/5/06	/			/	

ALS Environmental
Sydney
Work Order
ES0605800

Report Version: WOLabel 1.01

Telephone : 61-2-87848555

Special Laboratory Instructions: * Metals - Standard 8

Detection Limits:

Turnaround Required: ASAP.

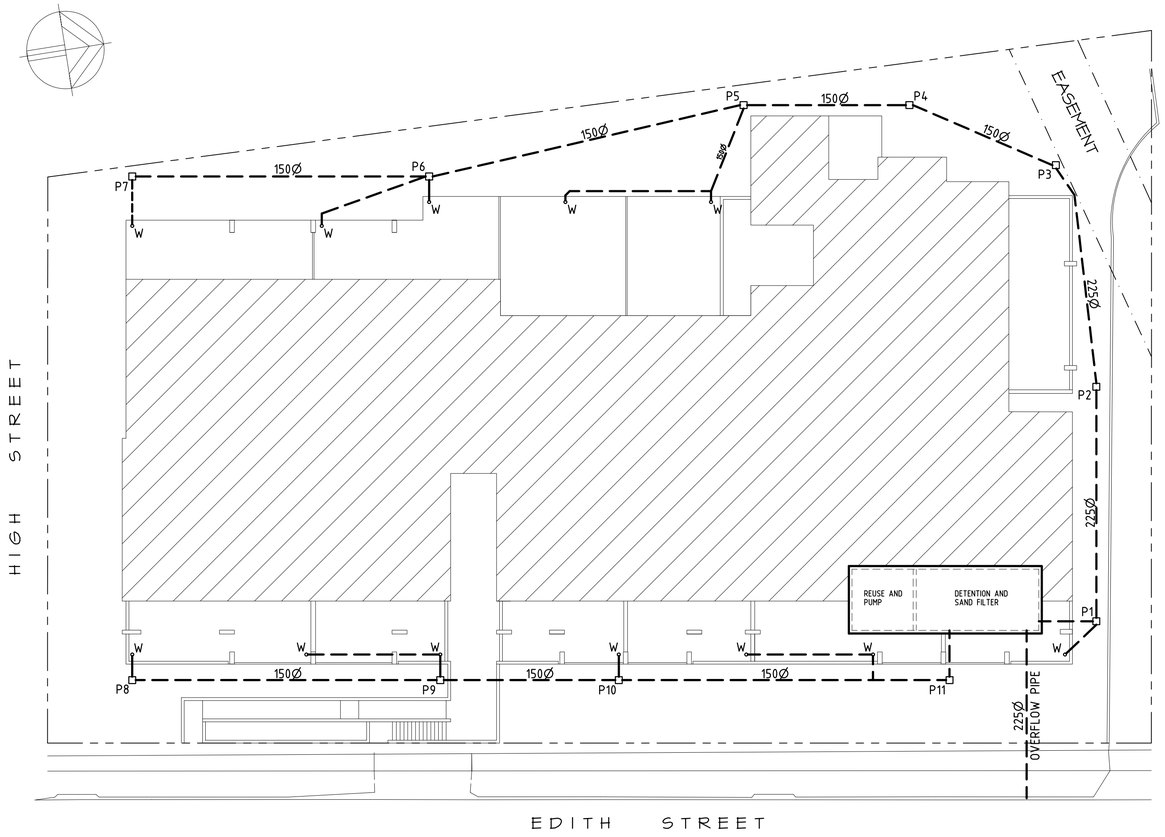
JOB NUMBER MUST BE REFERENCED ON ALL SUBSEQUENT PAGES

Copies: WHITE: Sign on release. YELLOW: If dispatched to interstate Lab, Lab to sign on receipt and fax back to Coffey. BLUE: To be returned with results.

2005311-01

Appendix H

Stormwater Plans



STORMWATER DRAINAGE PLAN - DIRTY WATER

LEGEND AND NOTES

PROPOSED BUILDING OUTLINE

150Ø — STORMWATER PIPE SIZE
sewer grade under roads and buildings

W — DECK SUMP

P4 — PRECAST CONCRETE DRAINAGE PIT - REFER SCHEDULE

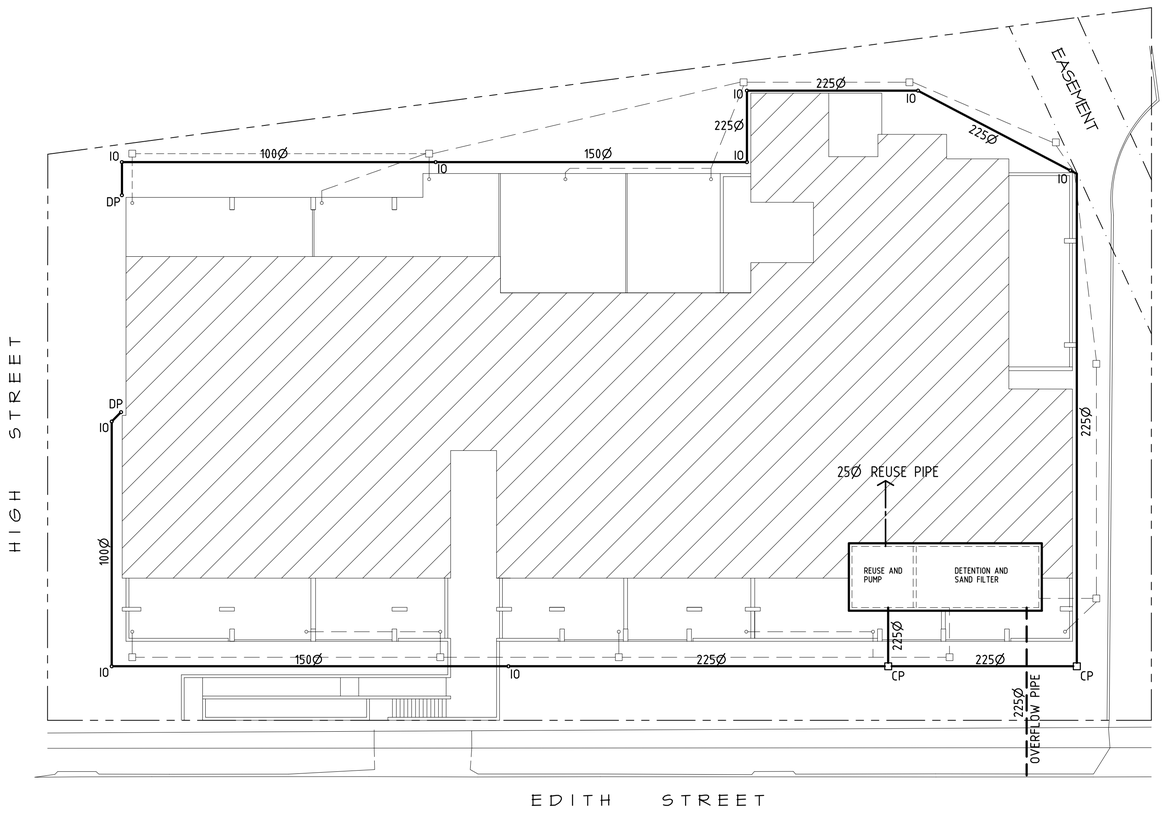
PIT SCHEDULE						
PIT	SL	IL	SIZE		COVER TYPE	
P1	31.0	29.4	450 SQ.		LIGHT DUTY	
P2	31.8	31.2				
P3	32.5	31.9				
P4	32.8	32.2				
P5	34.6	34.0				
P6	34.8	34.3				
P7	37.5	37.0				
P8	34.5	34.0				
P9	33.2	32.6				
P10	32.0	31.4				
P11	31.5	31.0				

STORMWATER DRAINAGE NOTES

1. ALL STORMWATER DRAINAGE INSTALLATION WORKS TO COMPLY WITH NATIONAL PLUMBING AND DRAINAGE CODE AS 3500, THE BCA, NSW CODE OF PRACTICE 1999, COUNCIL CONSENT CONDITIONS AND THE STATUTORY AUTHORITY'S REQUIREMENTS.
2. ALL PITS TO BE PRECAST CONCRETE STEEL REINFORCED.
3. ALL PIPES TO BE 90Ø UPVC UNLESS NOTED OTHERWISE.
4. ALL PIPE SIZES SHOWN ARE DN (DIAMETER NOMINAL) EQUIVALENT PIPE SIZES FOR THE SELECTED PIPE MATERIALS TO COMPLY WITH TABLE 1.1 AND 1.3 OF AS3500.
5. 100Ø PIPES TO BE CLASS SN6 UPVC LAID AT MINIMUM GRADE 1 IN 100.
6. 150Ø PIPES TO BE CLASS SN4 UPVC LAID AT MINMUM GRADE 1 IN 100.
7. 90Ø SUBSOIL DRAINAGE CLASS SN6 SLOTTED HARD TUBE LAID AT MINIMUM GRADE 1 IN 200.
8. ARROWS INDICATE DIRECTION OF GRADE 1.100 MINIMUM.
9. ALL LEVELS APPROXIMATE ONLY CONFIRM ON SITE
10. FLOOR LEVELS SHOWN ARE FINISHED FLOOR LEVELS.
11. COVER AND GRATE LEVELS TO BE MODIFIED AS NECESSARY ON SITE TO MATCH SURROUNDING AND ENSURE DRAINAGE TO GRATES.
12. MINIMUM COVER TO STORMWATER PIPES SHALL BE AS FOLLOWS:
    TRAFFICABLE AREAS 450mm.
    LANDSCAPED 300mm
    PIPES TO BE CONCRETE ENCASED IF MINIMUM COVERS CANNOT BE OBTAINED IN TRAFFICABLE AREAS, REFER TO CLAUSE 3.8 AS 3500.3. ALTERNATIVELY USE UPVC SEWER GRADE PIPES UNDER ROADS AND BUILDINGS.
13. ALL LANDSCAPED AREAS PROVIDE DN90 SUBSOIL DRAINS (AGROFLEX OR SIMILAR) LAID AT MINIMUM GRADE 1 IN 200. PROVIDE GEOFABRIC FILTER SOCK TO ALL PIPES.
14. USE 90Ø UPVC PIPES FROM ALL DOWNPIPES. FOR LOCATIONS OF DOWNPIPES REFER TO ARCHITECTURAL DRAWINGS.
15. ALL OUTLET PIPES TO HAVE 150 x 100 RHS HEAVY DUTY PLASTIC KERB ADAPTORS.

MAINTENANCE PROGRAMME

1. ALL STORMWATER PITS TO BE CLEANED ON A REGULAR BASIS AT MINIMUM 1 MONTH INTERVALS.
2. FLUSH SYSTEM ANNUALLY.



STORMWATER DRAINAGE PLAN - REUSE

LEGEND AND NOTES

150Ø — STORMWATER PIPE SIZE (SEALED PIPE)
sewer grade under roads and buildings

25Ø — WATER REUSE PIPE - CONNECT TO TOILETS AND LAUNDRY

DP — DOWNPIPE - REFER ARCHITECTS DRAWINGS FOR LOCATION
PROVIDE FIRST FLUSH IN DOWNPIPE

IO — INSPECTION OPENING - REFER TYPICAL DETAIL

CP — PRECAST CONCRETE CLEANOUT PIT - SEALED LID

issue	date	comment
2	9.03.2011	tank moved under building
1	24.02.2011	construction certificate issue

MICHAEL FITZGERALD
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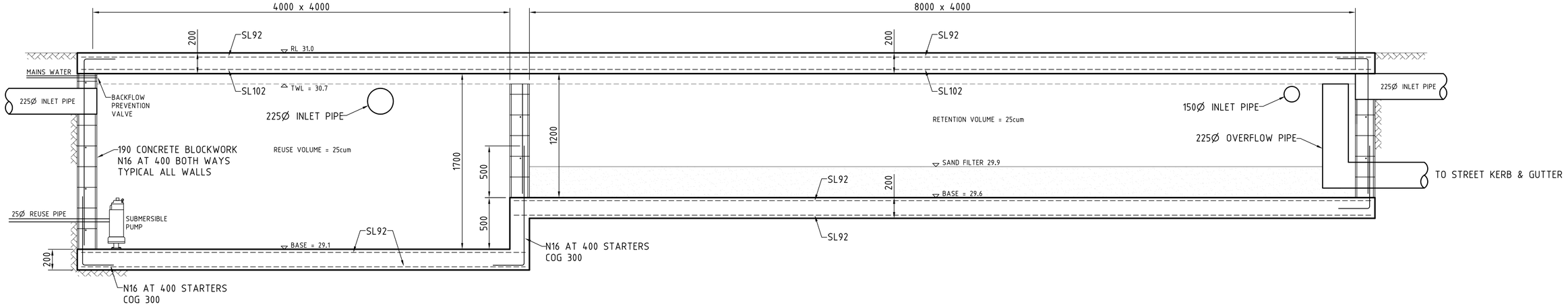
147 PARKWAY AVENUE
HAMILTON SOUTH.
N.S.W. 2303.

project
SELF CARE APARTMENTS
EDITH STREET, WARATAH
FOR MARIBA

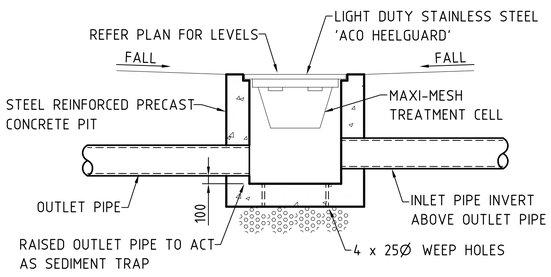
architect
EJE ARCHITECTURE

drawing
STORMWATER DRAINAGE AND REUSE

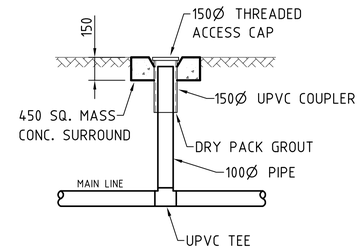
date	scales	job no.	
FEB 2011	1.200	11-3897	
drawn	cad file		
L.TAPP	2011-001		
certified		drawing no. C1	issue 2



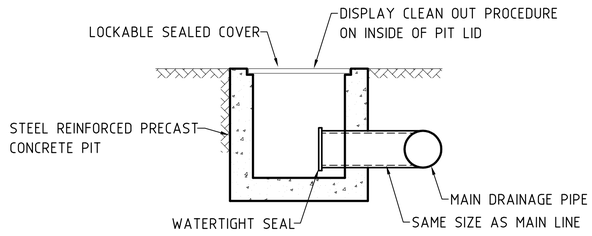
TYPICAL COLLECTION REUSE TANK



TYPICAL DRAINAGE PIT



TYPICAL INSPECTION OPENING DETAIL



TYPICAL CLEANOUT PIT

CLEANOUT PROCEDURE FOR CHARGED PIPELINES

1. REMOVE WATERTIGHT SEAL.
2. FLUSH OUT LINE.
3. REPLACE WATERTIGHT SEAL.

issue	date	comment
1	24.02.2011	construction certificate issue

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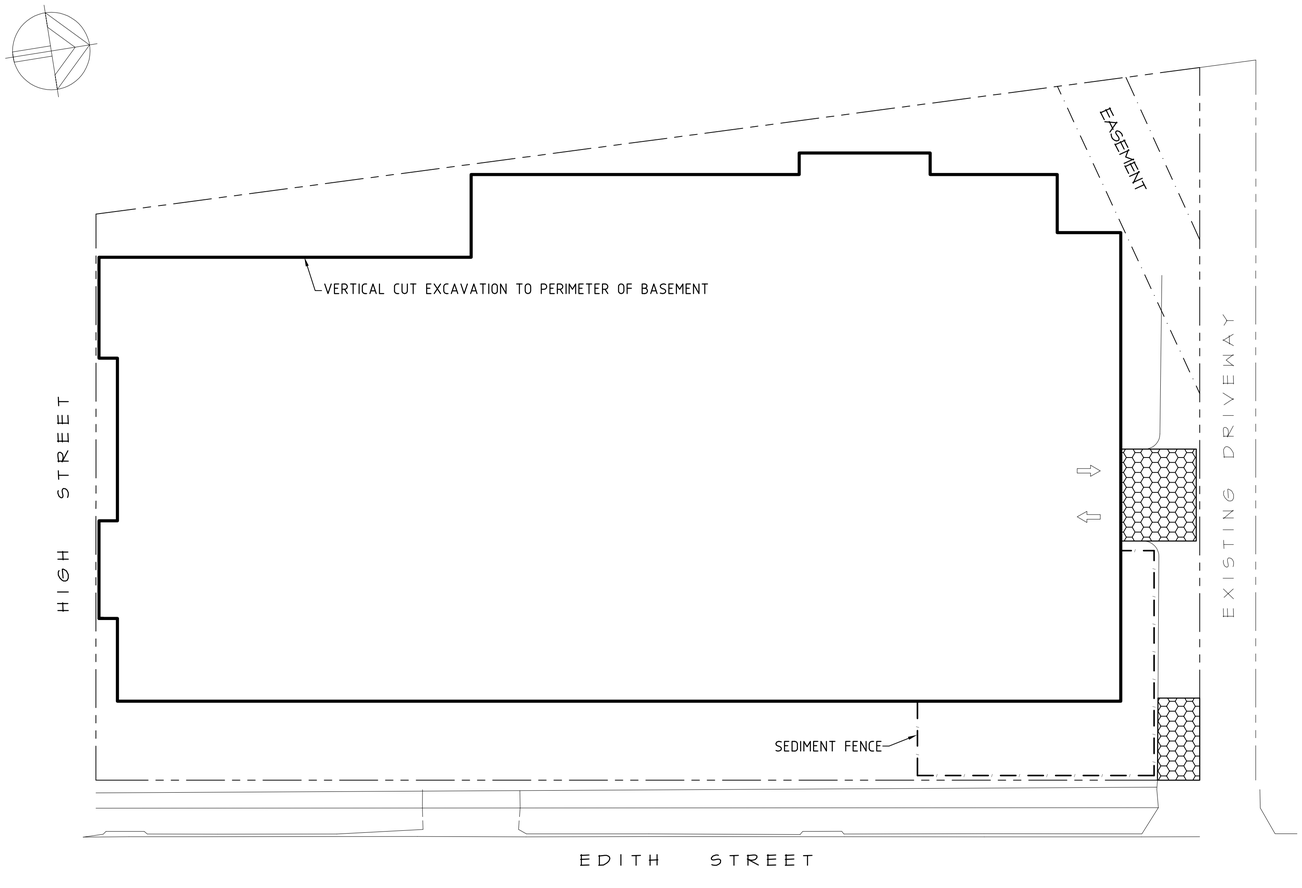
FOR MARIBA

architect
EJE ARCHITECTURE

drawing
STORMWATER DRAINAGE DETAILS

date FEB 2011	scales 1.20	job no. 11-3897
drawn L.TAPP	cad file 2011-001	
certified		drawing no. C2 / issue 1

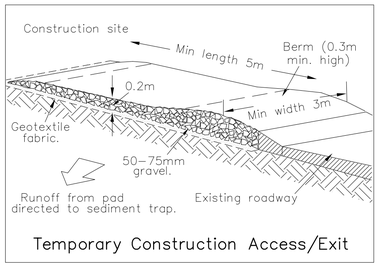


LEGEND AND NOTES

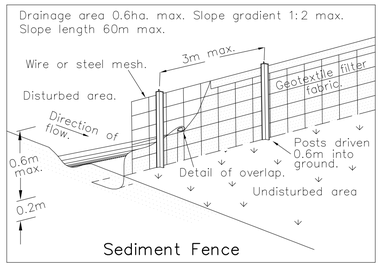
— — — SEDIMENT FENCE

TEMPORARY CONSTRUCTION ACCESS/EXIT
BLUE METAL SHAKER PAD

EXISTING ADJOINING BUILDINGS



Temporary Construction Access/Exit



Sediment Fence

GENERAL NOTES

1. All excess excavated material to be removed from site.
2. Builder to landscape and revegitate the site immediately after building works construction.
3. All existing vegetation including trees to be cleared from site. Refer to landscape plan for details.
4. The developer is responsible for ongoing maintenance of erosion and siltation control measures.
5. It is the contractors responsibility to ensure that all works are carried out in strict accordance with the OCCUPATIONAL HEALTH AND SAFETY ACT.
6. All work is to be carried out in accordance with Councils specification for subdivision works and to the satisfaction of the director of development.
7. Council are to notified prior to the commencement of any works.
8. All public utilities are to be clearly identified in the field prior to any civil works. Council does not accept any responsibility for damage or relocation costs to public utilities during the construction of this development.
9. Permission to enter, construct works and discharge stormwater on adjoining properties is to be obtained and submitted to council prior to the commencement of any works.
10. All erosion and sediment control measures are to be carried out in accordance with Council's code of practice for erosion and sedimentation and must be implemented prior to the commencement of any building of civil works.
11. The rectification of all matters arising from insufficient information being shown on the submitted plans is to be carried out to the Engineer's satisfaction.
12. These plans are to be read in conjunction with the conditions stated in Council's engineering plan approval correspondence.

SEDIMENT CONTROL NOTES

1. All sediment control devices are to be constructed, placed and maintained in accordance with 'Urban Erosion & Sediment Control', C.A.L.M. N.S.W.
2. All perimeter & siltation control measures are to be constructed as the first step in earthworks and/or cleaning.
3. All temporary earth berms, diversion & silt dam embankments are to be machine compacted, seeded and mulched for temporary vegetation cover as soon as they have been formed.
4. All sediment trapping structures and devices are to be inspected after storms for structural damage or clogging. Trapped material is to be removed to a safe approved location.
5. All topsoil is to be stockpiled on site for re-use (away from trees and drainage lines). Measures shall be applied to prevent erosion of the stockpiles.
6. All cut and fill slopes are to be seeded and mulched within 10 days of completion of formation.
7. No disturbed area is to remain denuded longer than 14 days. Hydromulch or turf as required.
8. The area over all service lines not within road reserves is to be mulched and seeded or turfed where instructed within 14 days after backfill.
9. No more than 150 metres of trench is to be open at any one time.
10. All footpaths, berms and batters and site regrading area are to be topsoiled with minimum 100mm of selected site topsoil and grassed with seed.
11. Strips of turf are to be placed immediately behind the kerb of accessways 600mm wide minimum.
12. All landscaping measures including the establishment of grassing are to be completed prior to the final inspection. All erosion devices are to be maintained until the landscaping is completed and established.

issue	date	comment
1	24.02.2011	construction certificate issue

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architect
EJE ARCHITECTURE

drawing
SEDIEMNT AND EROSION CONTROL

date FEB 2011	scales 1.200	job no. 11–3897	
drawn L.TAPP	cad file 2011-001		
certified		drawing no. C3	issue 1

Appendix I

Landscaping Plan

site analysis

seniors living self care apartments

01

february 2011

site location

Subject site shown solid red. Existing Maroba Facility shown in red shade.

Mater hospital located to the north

Views up into Braye Park

Mixed native and exotic tree planting to the west of the subject site, though still within the Maroba grounds

Existing southern boundary vegetation and rock shelf below. Views to trees beyond.

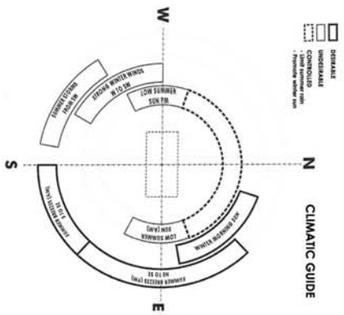
Open Space to the south. Distant views blocked by rising topography

Views into site from Edith Street

Existing vegetation made up of native and exotic trees, shrubs and groundcovers.

Extensive views to the east over Newcastle

Recently constructed Maroba Lodge to the north of subject lot



site details:
Edith Street, Waratah
client:
Maroba
date:
Feb 2011
job number:
7480.5
scale:
NTS
rev. number:
A

terras
landscape architects

landscape design report

seniors living self care apartments

02

february 2011

site - general description

The following landscape design report has been prepared in accordance with the requirements of Newcastle City Council Development Control Plan 2005.

The subject site, Lot 1 DP 1131868 is located on the western side of Edith Street, Waratah and is part of the larger Maroba aged care facility. Currently the aged care facility consists of Maroba Terrace Village which has 23 self care units and Maroba Manor and the recently built Maroba Lodge Hostel which house 167 general and high care beds.
The entire Maroba site is made up of Lots 1-3 DP 11318968 and Lots 3252-3253 DP 822124.
To the north of the site is Wrightson Reserve a moderately sloping open turf area. To the south and west is Braye Park an elevated grassy knoll with clumps of planted native trees. To the east is Edith Street and mainly residential development. The site enjoys expansive views to the east over Newcastle, while the western view encompasses Braye Park. Both aspects will provide an attractive outlook from the proposed development
Currently the subject site is vacant. All that remains of the previous building is the entry road/driveway, timber retaining walls and tree and shrub planting along the eastern and southern boundaries.

soil type

The soil within the subject site is highly modified. The site is situated within an a disused quarry with exposed rock shelves evident particularly to the south and southwest site boundaries. Little existing site topsoil will be won for the proposed landscaping. Imported soil will be required to undertake proposed landscape works.

vegetation

The eastern boundary / Edith Street frontage and the southern boundary are the most densly-planted areas of the subject site with mainly exotic shrub species such as *Abelia x grandiflora, Cotoneaster sp, Cupressus sp, Ficus pumila, Juniperus sp, Murraya paniculata* and *Tibouchina sp.* Several native species are mixed amongst the exotic shrubs, *Callistemon sp, Melaleuca bracteata "Revolution Gold"* and a large *Grevillea robusta.* A mature *Eucalyptus sp* is located in the north-western corner of the site. Beyond the subject lot to the west within the Maroba property is a grove of mature trees made up of exotic and native species. These trees will not be affected by the proposed works. It is anticipated that existing vegetation including the two above mentioned trees will require removal to accomodate the proposed building and surrounding levels.

landscape character and visual amenity

The landscape character of the western side of Edith Street from the Maroba facility north consists primarily of large scale development of modern design such as the existing Maroba facilities and the recently renovated Mater Hospital with a small section of early to mid twentieth century residential buildings between. A residential character exists to the east of the subject site this extends to railway line and commercial area of Waratah.
The greatest visual impact from the proposed development will be to residences directly across Edith Street, however the nature of the rising topography and vegetation to the west directly behind the proposal limits the impact by providing a natural backdrop and horizon line.

.proposed development

The proposed development consists of 6 storeys which include 47 seniors living self care units with 4 x 1 bedroom, 18 x 2 bedroom, 25 x 3 bedroom, each unit will have its own private balcony. A community room on the ground floor and 43 car parking spaces, scooter charging area and storage within the basement level. The proposed building will be linked to the adjacent high care nursing facility via a raised covered walkway.

proposed landscape works and objectives

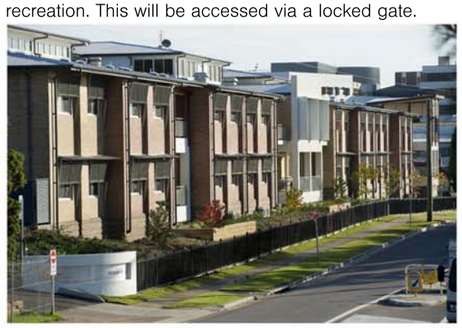
Edith Street Frontage
A five metre building setback will allow a similar landscape treatment to extend through from the recently finished Maroba Lodge. This will be achieved by running the same tree species *Sapium sebiferum* (Chinese Tallow) along the front of the building. The use of bold blocks of low maintenance understorey plants aims to introduce fragrance, colour and foliage texture to benifit lower level balconies and provide a soft interface between Edith Street and the proposed development.

Southern Boundary
The basement of the proposed building extends out to the southern boundary. It is proposed that a 600mm high retaining wall run 1m off the ground floor level walls which are set back 5m from the boundary. Fill from existing boundary levels down to the top of the retaining wall will allow for depth of soil for screen planting along the boundary and stabilising native grasses and groundcovers to the batter.

Northern Area
A 2m wide strip between the proposed building and existing driveway will be planted out with low growing species around the the basement carpark entry to provide clear sight lines and an attractive entry point. Vegetation heights will increase upslope to the west to soften the solid building facade.

Western Area
As with the southern boundary the basement footprint extends out beyond that of the ground floor footprint. It will be neccesary to build raised planters within these areas to accomodate planting. Vertical accent planting of *Archontophoenix cunninghamiana* (Bangalow Palm) and *Elaeocarpus reticulatus* (Quondong) will help scale the landscape to the building in the reasonably narrow space. Underplantings of lush foliage plants will carry on the theme created along the western side of Maroba Lodge. A shallow water feature and feature walling/pavement will be integrated into the balcony and garden area off the communal room. A pathway linking the community room to Braye Park will provide opportunities for recreation. This will be accessed via a locked gate.

Recently completed landscape works along the western side of Maroba Lodge. It is proposed to continue this theme within the proposed development.



Recently completed landscape works along Edith Street in front of Maroba Lodge. This theme of tree planting and bold blocks of planting are proposed for the new development.

site details:
Edith Street, Waratah
client:
Maroba
date:
Feb 2011
job number:
7480.5
scale:
nts
rev. number:
A

terras
landscape architects

landscape plan

seniors living self care apartments

03

february 2011

Eastern Elevation
Scale 1/400@A3

Trees to be removed shown in red dashed line.

Pathway links communal room/balcony to Braye Park via locked gateway.

2100mm high black powdercoated steel pallisade fence to southern and western boundaries.

Raised planters and retaining wall provide soil depth over protruding basement areas

Shallow water feature to garden area adjacent to community room

Lush foliage accent plantings to western side of building continues planting theme from recently completed Maroba Lodge building

Low grasses adjacent basement carpark to allow for clear sight lines.Tall hedging plants away from entry soften solid basement wall.

Overhead walkway connects proposed building with existing high care facility.

Car Park Entry

Low retaining wall on basement roof and soil batter up to existing ground levels at boundary provide deep soil for southern boundary screen planting of *Waterhousia floribunda*
Trees to southern boundary reduce the visual impact on southern approach along Edith Street

Edith Street frontage continues theme from Maroba Lodge, deciduous tree planting (*Sapium sebiferum*) and blocks of mass planting under.

Low masonry wall retains soil and defines boundary

Existing buildings - Maroba Lodge

site details:
Edith Street, Waratah
client:
Maroba
date:
Feb 2011
job number:
7480.5
scale:
1/250@A3
rev. number:
A

terras
landscape architects

suggested planting palette

seniors living self care apartments

04

february 2011

edith street frontage trees

Sapium sebiferum (Chinese Tallow)

shrubs

Acmena & Syzygium sp (Lilly Pilly)

Westringia fruticosa
Coastal Rosemary

Russelia equisetiformis (Coral Plant)

Gardenia augusta (Gardenia)

grasses & accent plants

Liriope muscari (Liriope)

Lomandra cvs (Matt-Rush)

Doryanthes excelsa (Gymea Lily

Trachelospermum asiaticum (Star Jasmine)

southern boundary trees

Waterhousia floribunda (Weeping Lilly Pilly)

shrubs

Acmena & Syzygium sp (Lilly Pilly)

grasses & accent plants

Lomandra cvs (Matt-Rush)

Trachelospermum asiaticum (Star Jasmine)

Doryanthes excelsa (Gymea Lily)

western and northern boundary trees & palms

Elaeocarpus eumundii (Quondong)

Archontophoenix cunninghamiana (Bangalow Palm)

shrubs

Acmena & Syzygium sp (Lilly Pilly)

Gardenia augusta (Gardenia)

Murraya sp (Orange Jessamine)

grasses & accent plants

Asplenium australasicum (Birdsnest Fern)

Liriope muscari (Liriope)

Lomandra cvs (Matt-Rush)

Cordyline stricta (Cordyline)

Cordyline fruticosa (Cordyline)

Strelitzia reginae (Bird of Paradise)

Bambusa (Alphonse Carr) (Clumping Bamboo)

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Maroba
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Feb 2011
job number:
7480.5
scale:
nts
rev. number:
A

terras
landscape architects

Appendix J

Quantity Surveyor Cost Estimate