COMCERT Building Certification Services

18 February 2004

The General Manager
Pittwater Council
PO Box 882
MONA VALE NSW 1660

Dear Sir/Madam

CONSTRUCTION CERTIFICATE
PROPOSAL: New Dwelling
PREMISES: 8 Ingleside Rd, Ingleside
DEVELOPMENT APPLICATION N^{O} 618/03

I refer to the above matter and accordingly submit the following documentation for your records:

- Construction Certificate No. 04/8
- Form 7
- Landscape Plan prepared by cat Mackenzie landscape by design Dwg No: LP01
- Stormwater Details prepared by AFCE Dwg No: 347048/D1 & D2
- Architectural Drawings prepared by Meadowbank Homes Pty Ltd Dated June 2003
- Structural Details prepared by Appleyard Forrest Sheet No: S1 - S14
- Home Owners Warranty Insurance
- Bushland Management Concept Plan prepared by Conacher Travers
- Flora & Fauna Assessment Report prepared by Conacher Travers
- Bushfire Protection Assessment
- Certification of Bushland Management Plan

In addition to the above please be advised that the builder for this project will be Meadowbank Homes Pty Ltd, Licence No 39196.

Should you have any queries in relation to this matter, please contact us immediately.

Yours Sincerely

Greg Hough
MANAGER
CERTIFICATION SERVICES

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COMCERT Building Certification Services

CONSTRUCTION CERTIFICATE N° 04/8

Issued under the *Environmental Planning and Assessment Act 1979* Sections 109C (1)(b), 81A (2) and 81A (4)

APPLICANT

Meadowbank Homes Pty Ltd
B3A, 2 Central Ave
THORNLEIGH NSW 2120

OWNER

Sean & Dita Nicholls
c/- Meadowbank Homes Pty Ltd
B3A, 2 Central Ave
THORNLEIGH NSW 2120

LAND TO BE DEVELOPED

Lot N°: 78 DP N°: 11784 House N°: 8
Street: Ingleside Rd Suburb: Ingleside

PROPOSED DEVELOPMENT

New Dwelling

DETAIL PLANS AND SPECIFICATION REFERENCES

- Landscape Plan prepared by cat Mackenzie landscape by design Dwg No: LP01
- Stormwater Details prepared by AFCE Dwg No: 347048/D1 & D2
- Architectural Drawings prepared by Meadowbank Homes Pty Ltd Dated June 2003
- Structural Details prepared by Appleyard Forrest Sheet No: S1 - S14

RIGHT OF APPEAL

Under Section 109K of the Environmental Planning & Assessment act where the Certifying Authority is a Council, an applicant may appeal to the Land and Environment Court against the refusal to issue a Construction Certificate within 12 months from the date of the decision.

CONSTRUCTION CERTIFICATE

CERTIFICATE

I certify that the work, if completed in accordance with these plans and specifications will comply with the requirements of the *Environmental Planning & Assessment Regulation 2000* as referred to in Section 81A(5) of the Environmental Planning & Assessment Act 1979.

Signature ---------- Date of Endorsement ---18/2/04---

Note: PRIOR TO COMMENCEMENT OF WORK SECTIONS 81a(2(b) AND (c), AND/OR SECTION 81A(4)(b) AND (c) OF THE ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979 MUST BE SATISFIED (SEE FORM 7).

CERTIFYING AUTHORITY

Greg Hough, Comcert Pty Ltd
Accreditation Number: P0006
13/265-271 Pennant Hills Road, Thornleigh NSW 2120
Phone (02) 9481 7413 Facsimile (02) 9481 7416

DEVELOPMENT CONSENT

Development Consent No 618/03 Date of Determination: 19 December 2003

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Home Warranty

certificate

of insurance

HIA INSURANCE SERVICES P/L
ABN 84 076 460 967
An associated company of
Aon Risk Services Australia Ltd
PO Box 241
Ryde NSW 2112
Telephone (02) 9808 7222
Facsimile (02) 9808 7233
CLAIMS ENQUIRY LINE
1800 554 255

Meadowbank Homes Pty Ltd
Unit B 3a
2 Central Ave
THORNLEIGH NSW 2120

Certificate No: 302941
Local Authority Copy
Issue Date 13/01/2004

FORM 1

HOME BUILDING ACT 1989

Section 92

Certificate in respect of insurance

CONTRACT WORK

A contract of insurance complying with Section 92 of the Home Building Act 1989 has been issued by: Vero Insurance Limited ABN 48 005 297 807

Please note that Aon Risk Services Australia Ltd ABN 17 000 434 720 is arranging the insurance policy as agent of the insurer below.

They also act as agent of the insurer below and not as agent of the insured in dealing with or settling any claim.

In Respect Of: Single Dwelling

At: Lot No: 78 Unit No: House No:
Ingleside Rd
INGLESIDE NSW 2101

Carried Out By: Meadowbank Homes Pty Ltd
Licence No: 39196
ABN: 59003210320

Subject to the Act and the Home Building Regulation 1997 and the conditions of the insurance contract, cover will be provided to a beneficiary described in the contract and successors in title to the beneficiary.

Total Includes Policy Fees, Stamp Duty and GST.

Insurer:

- Vero Insurance Limited
ABN 48 005 297 807

Signed for and on behalf of the insurer:

AON HIA INSURANCE SERVICES Tailormade for the trade

Malcolm Bruce BA (MacQuarie University)

Environmental Consultant and Arborist

NPWS Scientific Licence S10357
Animal Care and Ethics Permit AW/98/106

ABN 97 363 034 490

Inspection and Report 8 Ingleside Road, Ingleside

The allotment No. 8 (Lot 78) Ingleside Road, Ingleside was inspected on Wednesday 10th February 2004for the purposes of complying with Environmental Conditions (B15, C7, C8, D20, D21 and D27). The following is a report and certification of the activities viewed on the allotment

Condition B15

The Applicants have been required by the Rural Fire Service to treat the entire allotment to form an Inner Protection Area (*Planning for Bushfire Protection, NSW Planning 2001*). This has resulted in complete removal of all shrubs and ground covers on the allotment. Effectively this has negated the Applicant's Bushland Management Concept Plan vegetation management section. However, the Applicants have engaged an Experienced and Qualified Landscape Designer to develop a Landscape Plan that is sympathetic to the original Bushland Management Concept Plan. The Landscape Plan has been completed and envisages the replacement of several indigenous trees, i.e. *Eucalyptus punctata*. Additionally, the Landscape Plan proposes to replace indigenous shrubs and ground covers in a manner that is in keeping with the management of the allotment, as an Inner Protection Area (*Planning for Bushfire Protection, NSW Planning 2001*).

I am satisfied that the Landscaping Proposal is in keeping with the requirements of the Department of Urban Affairs, Pittwater Councils Planning Divisions Urban Bushland Management and will assist in the maintenance of biodiversity within the area.

Condition C7

The Applicants have provided a siltation fence along the Northern boundary of the subject site. This is providing protection for the remaining *Allocasuarina distyla/Banksia ericifolia* Closed Scrub on the adjoining allotment. Additionally, the siltation fence has been install across the rear of the allotment at approximately two thirds into the allotment. At the rear of the allotment indigenous vegetation appears to have been *Corymbia gummifera/Angophora costata/Eucalyptus punctata* Tall Open Woodland. Several *Corymbia gummifera* have been retained on the allotment. These trees are located behind the siltation fence and have been physically separated from the proposed area of construction. Temporary fencing barriers have been installed inside the siltation fence providing additional protection for natural features out side the area bounded by the siltation fence. The temporary fencing barriers will also provide additional protection for the trees located at the rear of the allotment.

There are no other natural features, including bush rock, rock shelves or other vegetative features on this allotment. As has been required by the Rural Fire Service the entire allotment has been treated to form an Inner

Protection Area (*Planning for Bushfire Protection, NSW Planning 2001*). This has resulted in complete removal of all shrubs and ground covers on the allotment.

I am satisfied that the Applicants have provided protective barriers for the remaining trees on the allotment, by excluding them from the proposed construction area and that there are no other features on the this or adjoining allotments that require protection. This activity has assisted the Applicants in complying with Conditions D20 and D21.

Condition C8

The Rural Fire Service (Condition D27) has required that the entire allotment be treated as an Inner Protection Area (*Planning for Bushfire Protection, NSW Planning 2001*). This treatment has been carried out. This has been fore filled by under scrubbing the allotment, which has not altered any of the natural soil profiles.

I am satisfied that the requirements of the Rural Fire Service have been carried out and that this has not altered the natural soil profile of the allotment.

Malcolm Bruce
Bushland Management and Ecological Consultant
10th February 2004

WAINWRIGHT FIRE SERVICE

'Fire goes out for lack of fuel' - Proverb

A.B.N: 61 508 942 172

P.O. BOX 397, COLLAROY, N.S.W 2097

BUSHFIRE PROTECTION ASSESSMENT

Inspection Date: Thursday 3rd April 2003
WFS Officer: Mr C. E. Wainwright
Property Location: Lot 78 Ingleside Road, Ingleside NSW
Property Description: Proposed New Class 1A Dwelling, Pool, Cabana, Tennis Court
Referenced Documents: Site Plan Sketch, Aerial Photography March 2002
Property Owner: Dita and Shaun Nicholls
Agent:
Contact Phone: 9972 3034 **Fax:** 9972 3474

FACTOR	INFORMATION	CATEGORY OF BUSHFIRE ATTACK RISK
i. **Water**	Offsite: Reticulated water main with fire hydrants.	Low
ii. **Fuel Type**	Offsite: Dry sclerophyll closed scrub. Onsite: Dry sclerophyll closed scrub. Will be mitigated with development.	Flamezone Flamezone
iii. **Fuel Loading**	Offsite: NSW Rural Fire Service document *'Planning for Bushfire Protection'* indicates 25 tonnes per hectare. Onsite: NSW Rural Fire Service document *'Planning for Bushfire Protection'* indicates 25 tonnes per hectare. Will be mitigated with development.	Flamezone Flamezone
iv. **Access**	Good via Ingleside Road , which may be impeded during the passage of a wild fire.	High
v. **Slope**	Offsite: Greater than 10 degrees. Onsite: Greater than 5 degrees.	High Medium
vi. **Aspect**	Site looks to east over bush land.	Flamezone
vii. **Exposures**	Bush blocks to north, south and east. Class 1A Dwelling to west.	Flamezone Low
viii. **Wind**	Site is exposed to north west bush fire wind.	Extreme
ix. **Environmental Sensitivity**	This development will have an impact on environmental sustainability or sensitivity of native bushland. Gardens and lawns should be maintained in a bush fire fuel modified state. A pre bushfire danger period inspection of site should be conducted on an annual basis by WFS.	High
x. **Equipment Recommended**	1. sufficient lengths of kink resistant garden hose with brass fittings and nozzles. 2. An extension ladder capable of safely reaching the roof. 3. Gutter plugs for down pipes. 4. An emergency action and evacuation plan. 5. Level 1 Personal Protective Equipment (PPE) 6. WFS approved pumpset and training package. 7. Stored water source. 8. An external water sprinkler system to WFS specifications. 9. Knapsack Fire Fighter Units.	Not Rated

Contact: Wainwright Fire Service
Ph: 9939 6400 Mb: 0417 403 791 Fax: 9939 6411
Email: wainwrightfire@hotmail.com

xi. Recommendations:

According to site assessment methodology for bushfire attack, this site is exposed to <Flamezone> bushfire attack risk.

It is recommended that the construction conform to AS3959-1999 Level <Three>. Flamezone is beyond the scope of AS 3959.

a. Site dimensions do not allow establishment of an Asset Protection Zone of compliant width, therefore all of site not built upon must be established and maintained as an Asset Protection Zone.
b. Heat Shield Fencing is to be placed to south and north of dwelling.

Should development conform, then the bushfire protection is reasonable and should survive the passage of a wild fire.

This development together with existing development on the site and any occupants will be reasonably protected from the impact of bush fire hazard in accordance with requirements specified by the State Government through the relevant legislation and advisory documents.

References:

Environmental Planning and Assessment Act 1979 Section 79C
Rural Fires Act 1997
Australian Standard AS 3959-1999
Planning for Bushfire Protection – Guideline (RFS)

The above report is the professional opinion of the consultant with reference to the above documents and specific detailed assessment of the subject property. The final assessment and recommendation remains subject to additional review and assessment by the local council and Rural Fire Service, as applicable, who have the right to review the report findings in their own opinion, and with reference to other factors, and determine a final requirement for the property.

Yours Faithfully,

Chris Wainwright

Chris Wainwright
Fire Protection Manager

Contact: Wainwright Fire Service
Ph: 9939 6400 Mb: 0417 403 791 Fax: 9939 6411
Email: wainwrightfire@hotmail.com

WAINWRIGHT FIRE SERVICE

'Fire goes out for lack of fuel' - Proverb

A.B.N: 61 508 942 172

P.O. BOX 397, COLLAROY, N.S.W 2097

BUSHFIRE PROTECTION CERTIFICATE

REFERENCES:

Environmental Planning and Assessment Act 1979
Rural Fires Act 1979
Australian Standard AS3959-1999
Planning for Bushfire Protection 2001

CERTIFICATE

Type of Statement:	DEVELOPMENT APPLICATION BUSHFIRE PROTECTION ASSESSMENT
Date:	3rd April 2003
Identification of Site:	Lot 78 Ingleside Road, Ingleside NSW
Agent Details:	
Property Owner:	Dita and Shaun Nicholls
Owner Address:	As above
Certifier Statement:	I, CHRISTOPHER EDWIN WAINWRIGHT OF WAINWRIGHT FIRE SERVICE, PO BOX 397, COLLAROY, NSW, 2097

CERTIFY

that:

a) Each bushfire protection assessment factor, and category specified, in this statement has been assessed by a properly qualified person.

b) A properly qualified person (whether the person referred to in paragraph (a) or another person) has inspected the site & has certified that, as at the date of inspection, the category of bushfire attack risk is <Flamezone>.

c) The proposed development is to comply with AS3959-1999 level <Three>.

d) This development together with existing development on the site and any occupants will be reasonably protected from the impact of bush fire hazard in accordance specified by State Government through the relevant legislation and advisory documents.

e) The information contained in this certificate is, to the best of my knowledge & belief, true and accurate.

BUSHFIRE PROTECTION ASSESSMENT FACTOR	*CATEGORY OF BUSHFIRE ATTACK RISK*
Water	Low
Fuel Type	Flamezone
Fuel Loading	Flamezone
Access	High
Slope	High
Aspect	Flamezone
Exposures	Flamezone
Wind	Extreme
Environmental Sensitivity	High

Flamezone is beyond the scope of AS 3959.

Certified by: C.E. Wainwright

Certifying Officer – Mr C. E. Wainwright

Contact: Wainwright Fire Service
Ph: 9939 6400 Mb: 0417 403 791 Fax: 9939 6411
Email: wainwrightfire@hotmail.com

Definition of Categories of Bushfire Attack

(as described in the NSW Rural Fire Service Document *'Planning for Bushfire Protection'*)

CATEGORY	DESCRIPTION
Low	Minimal attack from radiant heat and flame due to the distance of the site from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements.
Medium	Attack by burning debris is significant with radiant heat and flame attack insufficient to threaten building elements (unscreened glass). Specific construction requirements are therefore warranted.
High	Attack by burning debris is significant with radiant heat levels and flame threatening some building elements (screened glass). Specific construction requirements are therefore warranted.
Extreme	Attack by burning debris is significant and radiant heat levels and flame could threaten building integrity. Specific construction requirements are warranted.
Flame Zone	Flames and radiant heat levels likely to significantly threaten building integrity and result in significant risk to residents who will not be adequately protected.

It is noted that attack from burning debris increases as the category of bushfire attack becomes more severe.

Contact: Wainwright Fire Service
Ph: 9939 6400 **Mb:** 0417 403 791 **Fax:** 9939 6411
Email: wainwrightfire@hotmail.com

LANDSCAPE MAINTENANCE STRATEGY

General
The owner shall maintain the landscaping for a 12 months after the date of Practical Completion, with any maintenance of the works prior to the date of Practical Completion not to be included as part of this period.

Planting Establishment Period
Twelve months. Throughout the Planting Establishment Period, the owner is to continue to carry out recurrent works of a maintenance nature including, but not limited to, watering, weeding, rubbish removal, fertilising, pest and disease control, returfing, staking and tying, replanting, topping-up mulch, cultivation, pruning, hedge clipping, aerating, renovating, top dressing, and keeping the site neat and tidy.

Plantings
The owner is to continue to ensure that the general appearance and presentation of the landscape and the quality of the plant material is maintained for the life of the development.
Replacements: Continue to replace failed, dead and/or damaged plants at minimum 2/3 week intervals as necessary.
Pruning Any pruning, such as formative and general works must be done by a qualified tree worker or arborist.
Generally trees are to be pruned to remove diseased or damaged growth, rubbing branches, or to be directionally or formatively pruned. Work on trees, even young trees, should be performed by an experienced horticulturist/arborist/tree worker with advanced knowledge of trees. Young trees that are showing signs of unhealthy or poor development, or are damaged (for instance damage to terminal leader, development of included bark at branch junctions, or damage at root crown) should be replaced while young.
Good initial stock selection is vital to help avoid these and other problems.
No topping, lopping, flush cuts or overthinning to be performed.
Remove dead palm fronds.

Fertilising
Fertilising should be done at periods as indicated by soil testing results and in response to plant performance. Soil should be tested every two years, more frequently if conditions require it or where specific problems exist.
Generally, a twelve-month all-purpose slow release fertiliser of N:P:K ratio appropriate to the plant material may be applied at manufacturer's recommended rates, normally in early Spring.

Pest and disease control
The owner shall be responsible for control of any pest or disease which may affect plants. Correct identification and treatment will be required, with strict adherence to manufacturer's recommended rates, and safe handling and application practices.

Weeding
Remove all weed growth by hand or spray with approved herbicide throughout all planting and mulched areas. Execute regularly, minimum monthly intervals. Vigorous ground covers to be maintained 200mm away from the base of any shrub or tree.

Rubbish removal
Any bottles, papers, etc shall be removed from site.

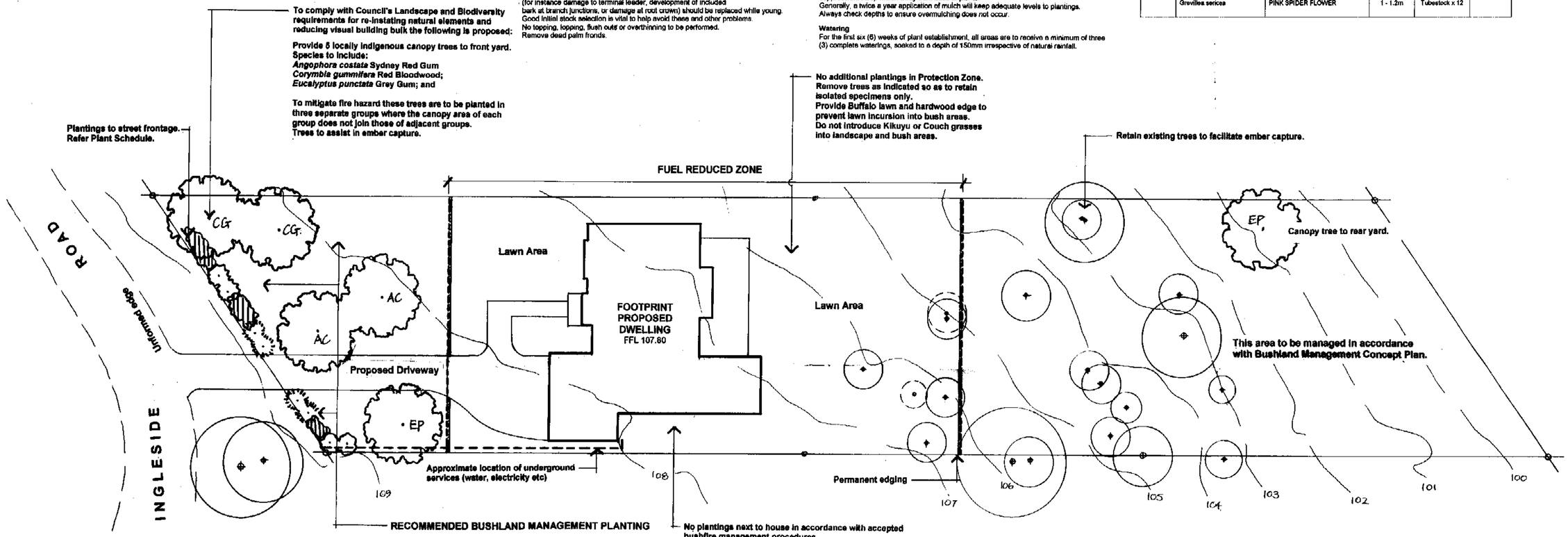
Leaf litter
Leaf litter shall be removed from turf and re-distributed over mulched areas.

Mulched areas
Depth of shall be inspected and maintained at approx. 75mm cover to ensure weed suppression. Keep mulch away from base of plants.
Generally, a twice a year application of mulch will keep adequate levels to plantings.
Always check depths to ensure overmulching does not occur.

Watering
For the first six (6) weeks of plant establishment, all areas are to receive a minimum of three (3) complete waterings, soaked to a depth of 150mm irrespective of natural rainfall.

PLANT SCHEDULE – Canopy trees and street frontage

SYMBOL	BOTANIC NAME	COMMON NAME	MATURE SIZE	CONTAINER SIZE and No.	STAKING REQ.
	Trees				
AC	Angophora costata	SYDNEY RED GUM	6 - 10m	150mm x 2	No
CG	Corymbia gummifera	RED BLOODWOOD	8 - 20m	150mm x 2	"
EP	Eucalyptus punctata	GREY GUM	8 - 20m	150mm x 2	"
	Shrubs				
	Acacia suaveolens	SWEET-SCENTED WATTLE	1 - 2m	Tubestock x 4	
	Banksia spinulosa var. spinulosa	HAIR-PIN BANKSIA	2 - 2.5m	Tubestock x 4	
	Low Plants				
	Actinotus helianthi	PLANNEL FLOWER	1m	Tubestock x 30	
	Dianella caerulea	BLUE FLAX LILY	600mm	Tubestock x20	
	Epacris longiflora	NATIVE FUCHSIA	1 - 1.5m	Tubestock x10	
	Glycine clandestina	LOVE CREEPER	Groundcover	Tubestock x 20	
	Grevillea sericea	PINK SPIDER FLOWER	1 - 1.2m	Tubestock x 12	



LEGEND

- Existing trees to be removed
- Existing trees to be retained
- Site boundaries

Acacia binervia
Acacia floribunda
Acacia longissima
Acacia ulicifolia
Allocasuarina distyla
Angophora hispida
Banksia ericifolia
Banksia serrata
Caustis flexuosa
Crowea saligna
Culcita dubia
Dianella revoluta
Dodonaea triquetra
Elaeocarpus reticulatus
Exocarpos cupressiformis
Gahnia melanocarpa
Grevillea sericea
Hakea teretifolia
Imperata cylindrica
Kunzea ambigua
Leptospermum attenuatum
Leucopogon microphyllus
Lomandra gracilis
Melaleuca hypericifolia
Pittosporum revolutum
Tetragonia tetragonioides
Themeda australis
Woolsia pungens
Xanthorrhoea latifolia

NOTES

- Five locally indigenous canopy trees have been provided on the front (west) outer asset protection zone in accordance with consent condition B45a/1.
- All plants provided to be of tubestock size to minimise site disturbance and allow fast plant establishment.
  Numbers of plants to be in accordance with recommendations of Bushland Manageme
- Consultation with Mr George Sheppard, Community Fire Officer, Rural fire Service in accordance with consent condition B45a/12.
  No canopy trees to be provided in inner asset protection zone to avoid litter in this area.
- A schedule of materials is not required.
  No additional mulch is to be introduced on this site in accordance with Bushfire controls. No introduced soils, level changes or surface treatments other than turfgrass are proposed.
  No permanent irrigation or onslab planting is proposed.
- Permanent edge treatment in accordance with consent condition B45a/27.
  Concrete edge 200mm wide x 200mm depth.
  To prevent incursion of non-native grasses into outer asset protection zones.
  No invasive turf species such as kikuyu or couch grass to be used.
- In accordance with 4.2.2 of the Planning for Bushfire Protection 2001, and in an attempt to comply with consent condition B45a/11, landscaping has been provided to the street frontage of the site.
- One canopy tree has been provided to the rear of the site so as to comply with consent condition B45a/10.

PLAN CERTIFICATION

I am a qualified Horticulturist and Landscape Designer
I hold the following qualifications:
Horticulture Certificate (1985 Hons), Associate Diploma of Applied Science (Landscape, 2000 Dist).

Further, I am appropriately qualified to certify this component of the project.

I hereby state that these plans or details comply with the conditions of development consent and Pittwater Council's DCP 23 *Landscape and Vegetation Management*.

Catriona Mackenzie 22/01/04

CONSTRUCTION CERTIFICATE No. 048
THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY COMCERT PTY LTD

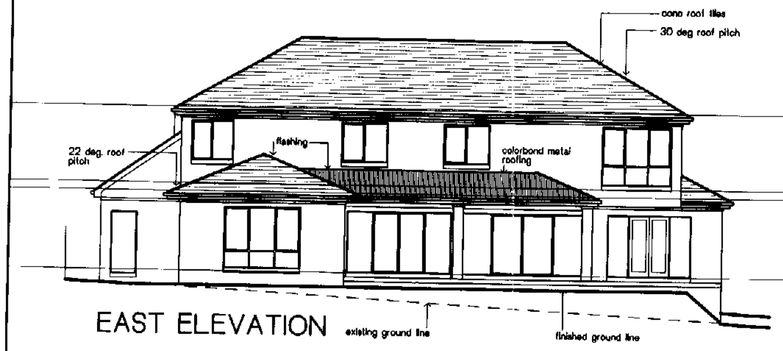
LANDSCAPE PLAN

6 INGLESIDE ROAD, INGLESIDE

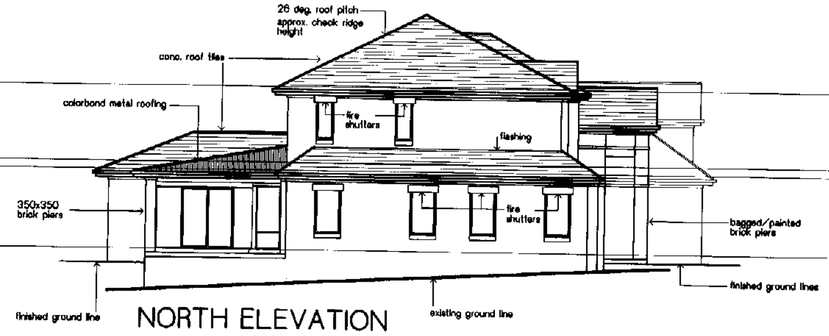
for Sean and Dita Nichols

SCALE 1 :200 DATE: 22/01/04 DWG No. LP01

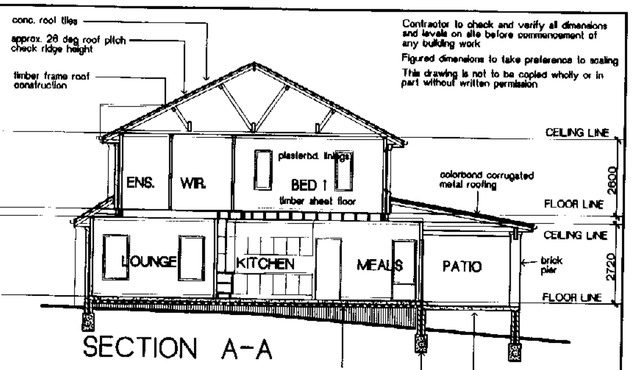
cat mackenzie landscape by design
consultations, designs and management solutions to suit all urban landscape needs
Ph (02) 9918 9833 - Fax (02) 9918 9844 - email cmackenzie1@bigpond.com
Mobile 0414 997 417
PO BOX 151 NEWPORT BEACH, NSW 2106



EAST ELEVATION



NORTH ELEVATION

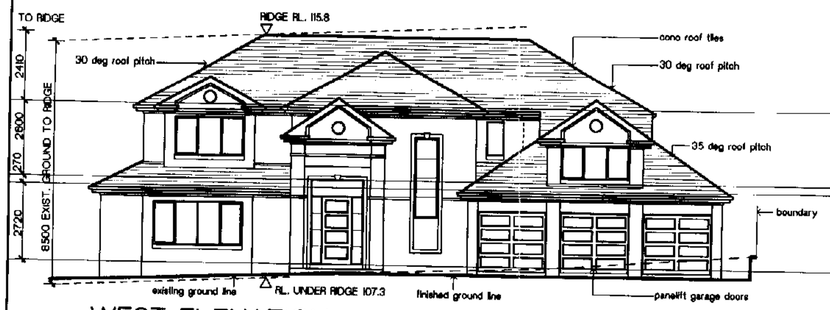


SECTION A-A

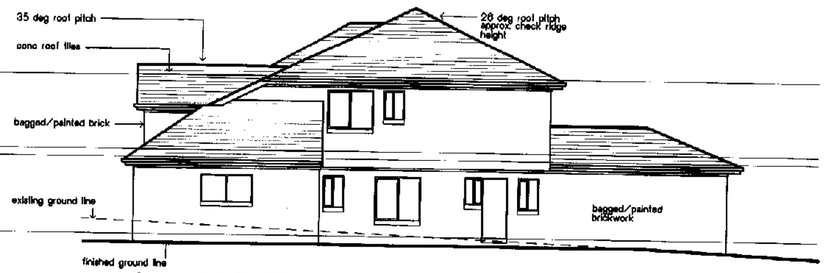
Contractor to check and verify all dimensions and levels on site before commencement of any building work

Figured dimensions to take preference to scaling

This drawing is not to be copied wholly or in part without written permission



WEST ELEVATION



SOUTH ELEVATION

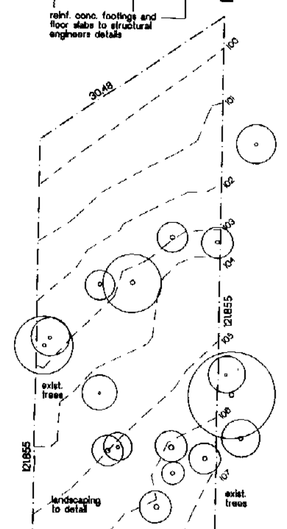
NOTE

35, 30, 26 and 22 degree roof pitch

conc. roof tiles and colorbond metal sheet roofing with sarking under

bagged and painted external brickwork

aluminium framed awning sash windows
aluminium sliding and glazed doors
aluminium framed sliding windows



CONSTRUCTION CERTIFICATE No. 04 8
THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE ISSUED BY COMCERT PTY LTD

INGESIDE ROAD

SITE PLAN D

DEVELOPMENT DATA

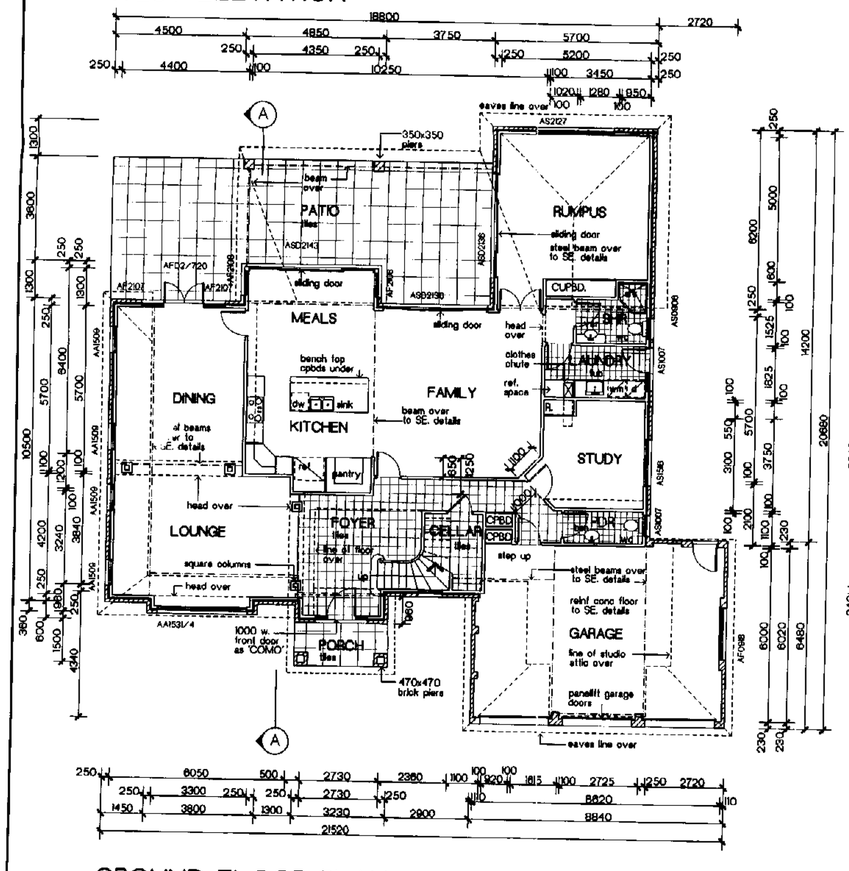
FLOOR AREAS		
GROUND FLOOR	229	sq. m.
FIRST FLOOR (Includes 13 sqm. void)	192	sq. m.
GARAGE	55	sq. m.
PORCH + PATIO	59	sq. m.
TOTAL	535	sq. m.

FLOOR SPACE RATIO		
SITE AREA EXCLUDES ACCESS HANDLE	3054	sq. m.
GROUND + FIRST FLOOR AREA	421	sq. m.
F.S.R. 421/3054	0.13 : 1	

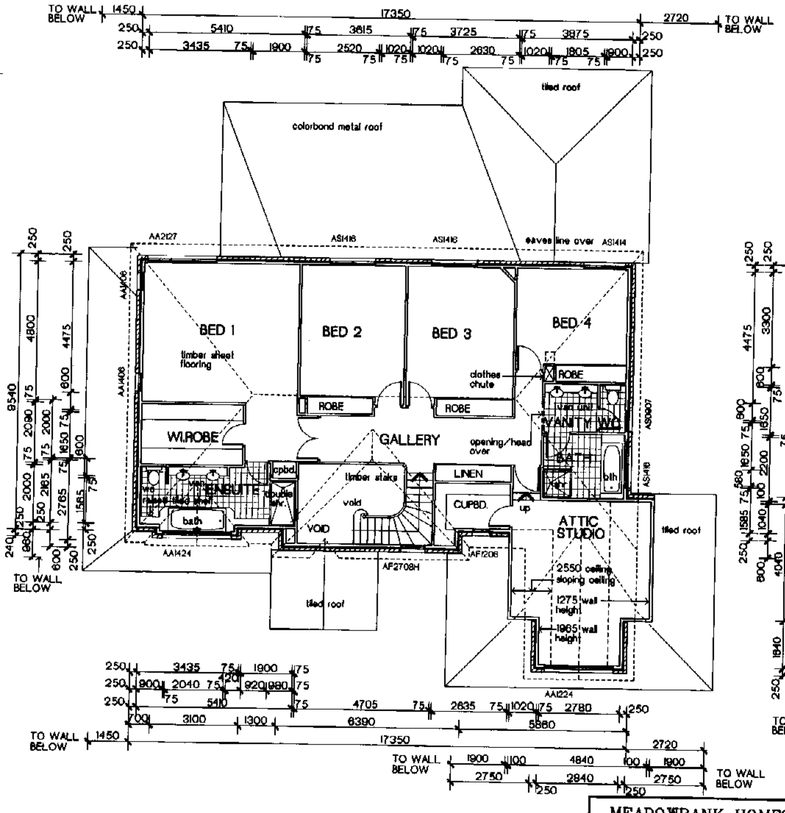
BUILT UPON AREA		
RESIDENCE (Includes porch, patio)	340	sq. m.
DRIVEWAY	112	sq. m.
TOTAL	452	sq. m.
SITE COVER 452/3054	15	%

amendment		date
A	changes to roof pitch mirror reverse ldry & shr	29.7.03
B	minor changes	31.7.03
C	minor changes	3.9.03
D	window changes fire shutters added to north elevation	5.2.04

NOTE
SURVEY PREPARED BY CONSULTING SURVEYORS phone 99138525



GROUND FLOOR PLAN



FIRST FLOOR PLAN

MEADOWBANK HOMES PTY. LTD.
ACN 003 210 320
Central Park 89A 2 Central Avenue Thornleigh NSW 2120
phone (02) 9875 4411 fax (02) 9484 4837

scale 1 : 100, 1 : 400 | date JUNE 2003

PROPOSED TWO STOREY RESIDENCE
at : LOT 78 INGLESIDE ROAD INGLESIDE. DP. 11784
for : Mr. & Mrs. S. NICHOLLS

Our Reference: 333290/bak:kmw

Your Reference:

17 February 2004

Appleyard Forrest
Consulting Engineers

The Manager
Efsee Investments Pty Ltd
PO Box 221
THORNLEIGH NSW 2120

Attn: Mr Dermott O'Connell

Dear Sir

Re: Proposed Residential Development
61 Kenthurst Road, St Ives
Interallotment Stormwater Drainage - Certification

We refer to your instructions in relation to this matter. We confirm having attended the subject site on 17 February 2004.

The purpose of our inspection was to verify the correct installation of the interallotment stormwater drainage system in accordance with the design requirements depicted on the AFCE Environment + Building document reference 333290/1D1/0.

At the time of our inspection we obtained site measurements and levels over this section of stormwater system.

As a consequence of our inspection we are of the opinion that the as-constructed interallotment stormwater drainage system is generally constructed in accordance with the design requirements and therefore may be deemed hydraulically adequate for its intended purpose.

We have enclosed the original work-as-executed plan dated 16 February 2004 for your lodgement with Ku-ring-gai Council.

Should you have any further queries in relation to this matter please do not hesitate to contact Bruce Kenny in our Gosford office.

Yours faithfully
Appleyard Forrest Consulting Engineers Pty Ltd

Per:

Encl.

W:\Project Docs\333290-20040216.doc

Appleyard Forrest
Consulting Engineers Pty Ltd
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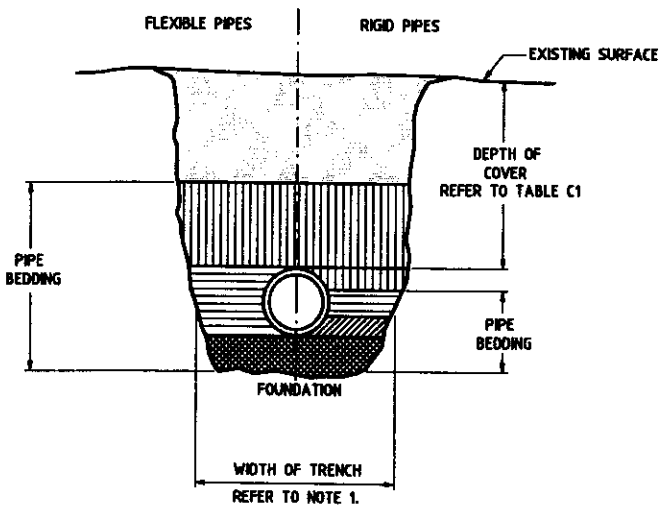
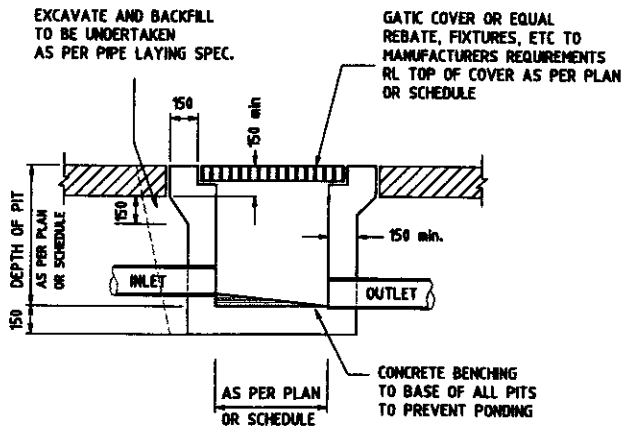
PROPOSED RESIDENTIAL DEVELOPMENT
LOT 78, DP 11784
INGLESIDE ROAD INGLESIDE

STORMWATER MANAGEMENT PLANS

CONSTRUCTION CERTIFICATE No. 0418

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY COMCERT PTY LTD





TYPICAL SECTIONAL ELEVATION

SHEET INDEX	
SHEET No.	DESCRIPTION
D1	COVER SHEET AND NOTES
D2	STORMWATER MANAGEMENT PLAN

GENERAL NOTES

1. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 3500.3.2:1998 AND THE REQUIREMENTS OF THE LOCAL COUNCIL'S POLICIES AND CODES.
2. THE MINIMUM SIZE OF STORMWATER DRAINS SHALL NOT BE LESS THAN DN90 FOR CLASS 1 BUILDINGS AND DN100 FOR OTHER CLASSES OF BUILDING OR AS REQUIRED BY THE REGULATORY AUTHORITY.
3. THE MINIMUM GRADIENT OF STORMWATER DRAINS SHALL BE AS GIVEN IN THE TABLE BELOW:

NOMINAL SIZE mm	MIN GRADIENT %
DN 90	1.00
DN 100	1.00
DN 150	1.00
DN 225	0.5
DN 300	0.40
DN 375	0.35

4. COUNCIL'S TREE PRESERVATION ORDER IS TO BE STRICTLY ADHERED TO. NO TREES SHALL BE REMOVED UNTIL PERMIT IS OBTAINED.
5. PUBLIC UTILITY SERVICES ARE TO BE ADJUSTED AS NECESSARY AT THE CONTRACTORS EXPENSE.
6. ALL PITS TO BE BENCHED AND STREAMLINED. PROVIDE STEP IRONS FOR ALL PITS OVER 1.2m DEEP.
7. CATCH DRAINS ARE TO BE CONSTRUCTED AS REQUIRED BY COUNCIL'S ENGINEER.
8. MAKE SMOOTH JUNCTION WITH ALL EXISTING WORK.
9. VEHICULAR ACCESS AND ALL SERVICES TO BE MAINTAINED AT ALL TIMES TO ADJOINING PROPERTIES AFFECTED BY CONSTRUCTION.
10. SUITABLE EASEMENTS TO DRAIN WATER TO BE PROVIDED OVER DRAINAGE LINES THROUGH ALLOTMENTS AND SUBSEQUENT PIPE TO BE CENTRALLY LOCATED.(WHERE REQUIRED BY DESIGN)
11. ALL RUBBISH, SHEDS, BUILDINGS AND FENCES TO BE REMOVED. SERVICES SHOWN ON THESE PLANS HAVE BEEN LOCATED FROM INFORMATION SUPPLIED BY THE RELEVANT AUTHORITIES AND FIELD INVESTIGATIONS AND ARE NOT GUARANTEED COMPLETE OR CORRECT AND ARE TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
12. ADEQUATE PROVISION TO BE MADE FOR SCOURING AND SEDIMENTATION TO ALL DRAINAGE WORKS AS DIRECTED.
13. ANY VARIATION TO THE WORKS AS SHOWN ON THE APPROVED DRAWINGS ARE TO BE CONFIRMED BY THE DESIGN ENGINEER PRIOR TO THEIR COMMENCEMENT.

	EXISTING	PROPOSED
KERB AND GUTTER		
ROAD CENTRELINE		
DRAINAGE PIPELINE (ROAD)		
DRAINAGE PIPELINE (PROPERTY)		
INLET PIT (ROAD)		
INLET PIT (PROPERTY)		
JUNCTION PIT (ROAD)		
SURFACE LEVEL	+672.0	+672.0
SURFACE CONTOUR	--672--	--672--
WATERMAIN	-W-	
UNDERGROUND POWER CABLES	-P-	
GAS MAIN	-G-	
UNDERGROUND PHONE CABLES	-T-	
POWER POLES		
SEWER	-S-	
INDICATES PIPE RISERS		
INDICATES SERVICE TYPE	DP1	
INDICATES SERVICE SIZE	100x75	
INDICATES SERVICE DROPPERS		

PRINT ISSUED

0 1 2 3 4 5

BASE SCALE FOR A1 PLAN 1:100

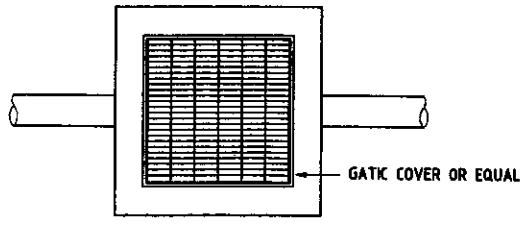
NOTE A

STORMWATER DRAINS CONSTRUCTED OF OTHER THAN CAST IRON, DUCTILE IRON OR GALVANISED STEEL HAVING COVER LESS THAN THAT SPECIFIED IN TABLE C1 SHALL BE COVERED WITH AT LEAST 50mm OVERLAY AND SHALL BE PAVED WITH AT LEAST —

(a) 100mm THICKNESS OF REINFORCED CONCRETE WHERE SUBJECT TO HEAVY VEHICULAR LOADING

LEGEND - TRENCH BACKFILL

SYMBOL	FLEXIBLE PIPES	RIGID PIPES
	BACKFILL	
	PIPE OVERLAY	
	PIPE SIDE SUPPORT	SIDE ZONE
	—	HAUNCH ZONE
	PIPE UNDERLAY	BED ZONE



PLAN

TYPE 1 - GRATED STORMWATER INLET PIT

MINIMUM PIPE COVER - TABLE C1

LOCATION	CAST IRON, DUCTILE IRON, GALVANISED STEEL	uPVC
	MINIMUM DEPTH OF COVER	
NOT SUBJECT TO VEHICULAR LOADING —		
(a) FOR CLASS 1 BUILDINGS	NIL	100
(b) FOR OTHER THAN CLASS 1 BUILDINGS	NIL	300
SUBJECT TO VEHICULAR LOADING —		
(a) OTHER THAN ROADS	300	450
(b) ROADS —		
(i) SEALED	300	
(ii) UNSEALED	300	REFER TO NOTE A
SUBJECT TO CONSTRUCTION EQUIP.	300	

REVISION DETAILS	DRAWN	APPR.	DATE

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KM Australasia Pty Ltd ACN 082 278 260
AFCE Environment + Building
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SUITE 1, 487-489 DARLING STREET, ROZELLE NSW 2039 TEL (02) 9810 9977 FAX (02) 9810 9588

CLIENT/BUILDER: MEADOWBANK HOMES - NICHOLLS

PROJECT: PROPOSED RESIDENTIAL DEVELOPMENT LOT 78 INGLESIDE ROAD INGLESIDE

DRAWING TITLE: COVER SHEET AND NOTES

DRAWN	CF	2/2004	APPROVED
DESIGNED	CF	2/2004	
CHECKED	BAK/LDA		

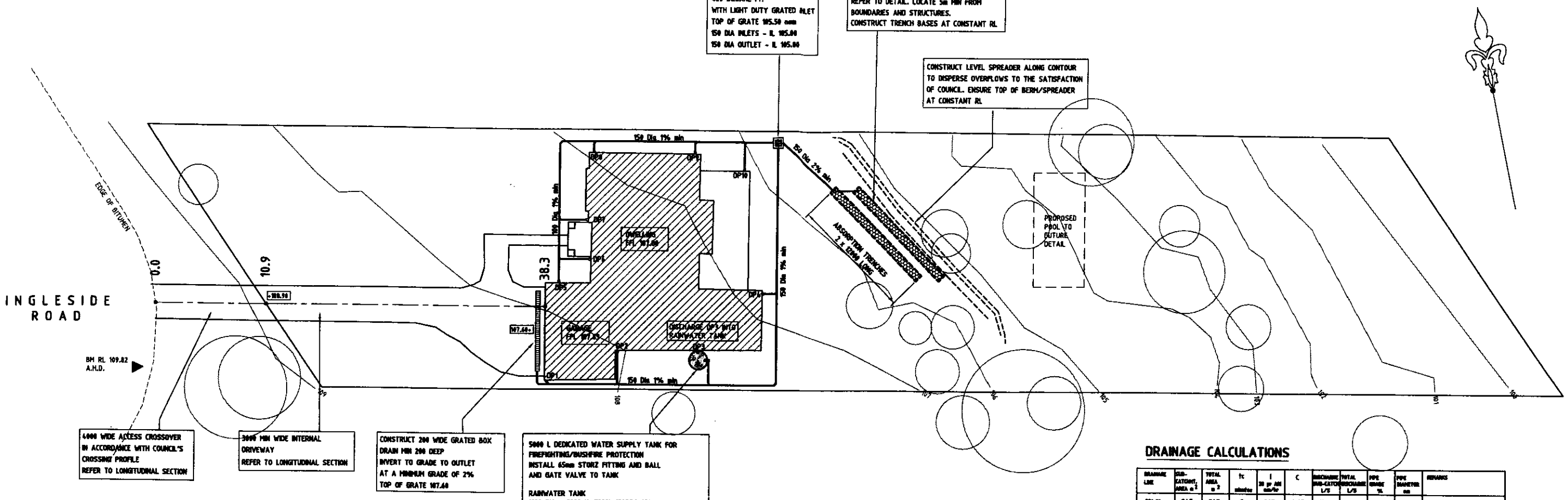
JOB No. 347048 SHEET 1 OF 2 DRAWING No. 347048/D1 REV. 0

Leigh D Appleyard MIE Aust CP Eng NPER - 3 (Civil and Structural Colleges)

PIT P1 - SILT ARRESTOR PIT
450 SQUARE PIT
WITH LIGHT DUTY GRATED INLET
TOP OF GRATE 105.50 mm
150 DIA INLETS - IL 105.00
150 DIA OUTLET - IL 105.00

PROVIDE 2 x 12m LONG ABSORPTION TRENCHES.
REFER TO DETAIL. LOCATE 5m MIN FROM
BOUNDARIES AND STRUCTURES.
CONSTRUCT TRENCH BASES AT CONSTANT RL

CONSTRUCT LEVEL SPREADER ALONG CONTOUR
TO DISPERSE OVERFLOWS TO THE SATISFACTION
OF COUNCIL. ENSURE TOP OF BERM/SPREADER
AT CONSTANT RL



4000 WIDE ACCESS CROSSOVER
IN ACCORDANCE WITH COUNCIL'S
CROSSING PROFILE
REFER TO LONGITUDINAL SECTION

3000 MIN WIDE INTERNAL
DRIVEWAY
REFER TO LONGITUDINAL SECTION

CONSTRUCT 200 WIDE GRATED BOX
DRAIN MIN 200 DEEP
INVERT TO GRADE TO OUTLET
AT A MINIMUM GRADE OF 2%
TOP OF GRATE 107.60

5000 L DEDICATED WATER SUPPLY TANK FOR
FIREFIGHTING/BUSHFIRE PROTECTION
INSTALL 65mm STORZ FITTING AND BALL
AND GATE VALVE TO TANK

RAINWATER TANK
1000 DIA x 2200 H, 5000L 'CORRO 95' AQUAPLATE OR
2/2400 L x 1150 W x 700 H 'SLIMLINE' 2500 L TANKS
PROVIDE HIGH LEVEL
OVERFLOW 100 DIA INTO STORMWATER SYSTEM
FINAL LOCATION TO BE SITE
CONFIRMED IN CONJUNCTION WITH THE CLIENT
NOTE ONE DOWNPIPE MIN IS TO
BE CONNECTED INTO THE TANK AS SHOWN

PLAN - STORMWATER DRAINAGE
SCALE 1:200

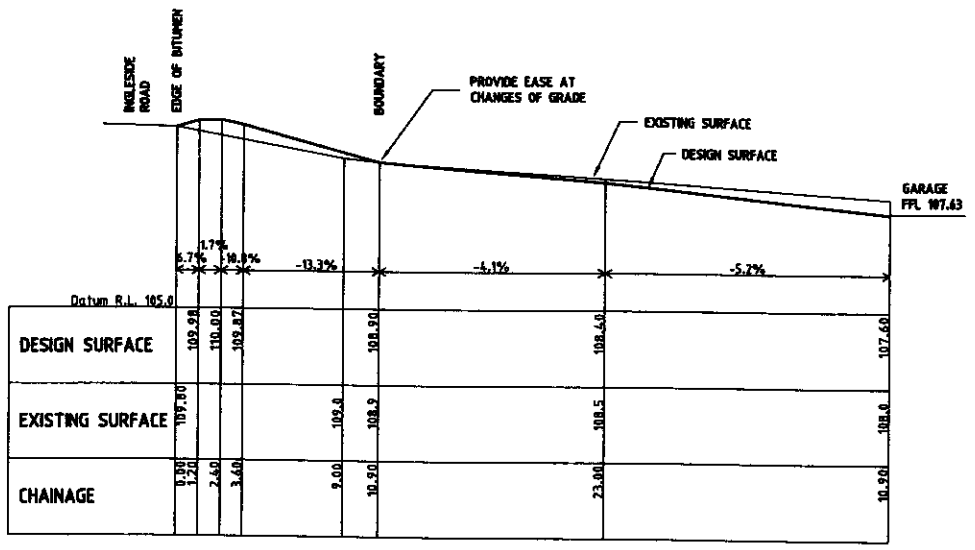
DRAINAGE CALCULATIONS

DRAINAGE LINE	SUB-CATCHMENT AREA m^2	TOTAL AREA m^2	t_c minutes	I 20 yr ARI mm/hr	C	MICROMARK SUB-CATCHMENT L/S	TOTAL MICROMARK L/S	PIPE GRADE %	PIPE DIAMETER mm	REMARKS
RP1-P1	245	245	5	285	0.95	18.3	18.3	1.0	150	
RP5-P1	218	218	5	285	0.95	11.4	11.4	1.0	150	
P1-TRENCH		455	5	285	0.95		24.6	2.0	150	

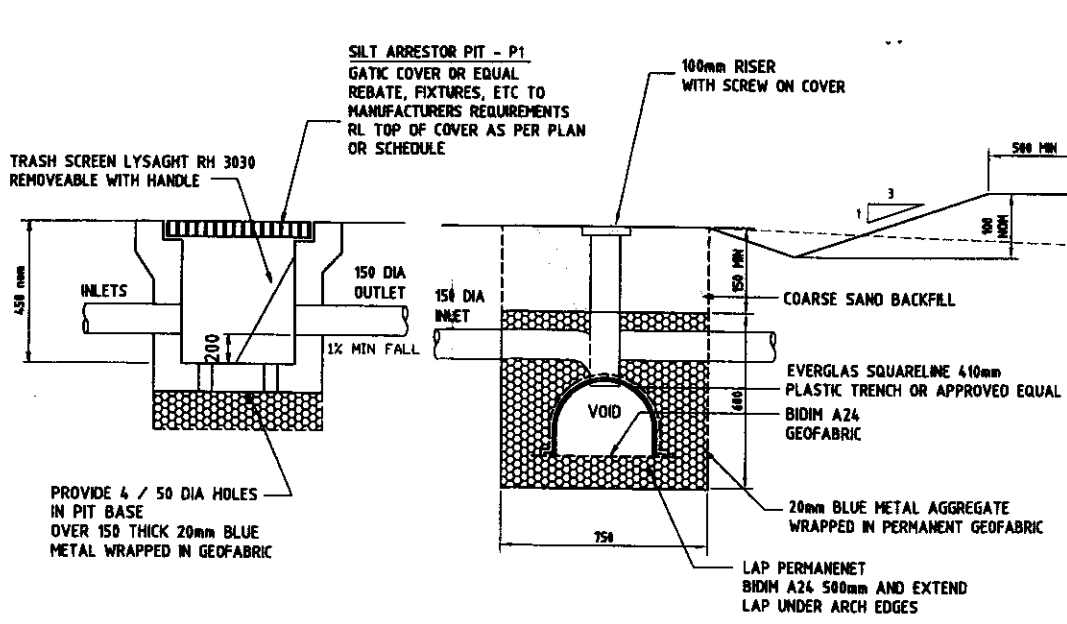
CONSTRUCTION CERTIFICATE No. 0418

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY PITTWATER COUNCIL

Leigh D Appleyard MIE Aust CP Engineer
NPER - 3 (Civil and Structural Colleges)



LONG SECTION - PROPOSED DRIVEWAY CENTRELINE
SCALE 1:200 HORIZONTAL
1:100 VERTICAL



TYPICAL SECTION THRU ABSORPTION TRENCH
N T S

DRAINAGE CALCULATIONS

SITE AREA (m^2) 3054
DWELLING IMPERVIOUS AREA (m^2) 340
DRIVEWAY IMPERVIOUS AREA (m^2) 112
TOTAL NEW IMPERVIOUS AREA (m^2) 452
TOTAL NEW IMPERVIOUS AREA (%) 15

DETERMINE VOLUMETRIC RUNOFF FROM 20 yr ARI STORM, 5 min DURATION

$q_{20} = 1 \times 285 \times 0.0349/360$
$= 0.020\ m^3/s$

VOLUME OF RUNOFF

$V = 5 \times 60 \times 0.020$
$= 6.0\ m^3$
THEREFORE STORAGE REQUIREMENT = $6.0\ m^3$

PROPOSED DISPOSAL SYSTEM 'EVERGLAS SQUARELINE 410' PLASTIC TRENCH
DRAIN 750 WIDE x 600 DEEP TRENCH (ABSORPTION AREA 2.0 m^2/m
STORAGE VOLUME 0.275 m^3/m)

LENGTH OF TRENCH REQUIRED TO STORE $6.0\ m^3 = 6.0/0.275 = 21.2$ m
ADOPT 24 m

DESIGN BASED ON PITTWATER COUNCIL'S DEVELOPMENT CONSENT CONDITIONS
B.20 & D.27, AS 3500, AR&R AND GENERAL ENGINEERING PRACTICE

PRINT ISSUED

REVISION DETAILS	DRAWN	APPR.	DATE

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AFCE Environment + Building
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SUITE 1, 447-449 DOVE STREET, DUBBO NSW 2830 Ph. (02) 6882 1007 FAX (02) 6882 1300

CLIENT/BUILDER:
MEADOWBANK HOMES - NICHOLLS

DRAWING TITLE:
STORMWATER MANAGEMENT PLAN

PROJECT:
PROPOSED RESIDENTIAL DEVELOPMENT
LOT 78 INGLESIDE ROAD INGLESIDE

DRAWN	CF	2/2004	APPROVED
DESIGNED	CF	2/2004	
CHECKED	BAK/LDA		

JOB No. 347048 | SHEET 2 OF 2 | DRAWING No. 347048/D2 | REV. 0

A. GENERAL

A.1 THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ARCHITECT'S DRAWING.

A.2 ALL SET OUT DIMENSIONS ARE TO BE OBTAINED FROM THE ARCHITECT'S DRAWING UNLESS SPECIFIC DIMENSIONS ARE GIVEN ON THE ENGINEERING DRAWINGS.

A.3 THIS DRAWING SHOULD NOT BE SCALED.

A.4 ALL MATERIALS AND WORKMANSHIP ARE TO BE OF THE HIGHEST STANDARD AND IN ACCORDANCE WITH ANY RELEVANT S.A.A. CODE RELATING TO THEIR APPLICATION. CERTIFICATES TO THIS EFFECT FROM A N.A.T.A APPROVED TESTING LABORATORY SHALL BE FURNISHED ON REQUEST.

A.4 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART OF THE STRUCTURE SHALL BE OVER STRESSED.

A.6 STRUCTURAL ELEMENTS HAVE BEEN DESIGNED FOR THE FOLLOWING SUPERIMPOSED LIVE LOADINGS:

INTERNAL: 1.5kPa

GARAGE: 3.0kPa

B. EXCAVATOR

B.1 ALL EXCAVATION AND BACKFILL SHALL BE CARRIED OUT NEATLY TO THE LINES, LEVELS AND GRADES SPECIFIED.

B.2 ANY BACKFILL MATERIAL REQUIRED OR SPECIFIED SHALL BE COMPACTED GENERALLY TO A DENSITY EQUIVALENT TO AT LEAST 95% OF ITS MAXIMUM DRY DENSITY (TEST METHOD IN ACCORDANCE WITH AS1289-E1.1- STANDARD COMPACTIVE EFFORT).

B.3 FILL MATERIAL BENEATH EDGE BEAMS IS TO BE COMPACTED IN ACCORDANCE WITH CLAUSE 6.4.2 OF AS2870-1996 & AS SPECIFIED IN NOTE B2.

C. FOOTINGS

C.1 FOOTINGS HAVE BEEN DESIGNED FOR AN ALLOWABLE BEARING PRESSURE OF 600 kPa ON ROCK FOUNDATION MATERIAL SHALL BE APPROVED PRIOR TO CONSTRUCTION PROCEEDING.

C.2 IF THE SITE HAS BEEN THE SUBJECT OF A GEOTECHNICAL INVESTIGATION REQUIRING ADHERENCE TO PARTICULAR CONSTRUCTION PROCEDURES AND/OR TECHNIQUES, THE REQUIREMENTS OF THE APPROPRIATE GEOTECHNICAL ENGINEER'S REPORT SHALL BE COMPLIED WITH IN FULL.

C.3 IF THE SITE CONDITIONS ENCOUNTERED APPEAR TO DIFFER SUBSTANTIALLY FROM THE CONDITIONS DEPICTED ON THIS PLAN OR REPORTED IN THE GEOTECHNICAL REPORT, THE STRUCTURAL ENGINEER AND/OR THE GEOTECHNICAL ENGINEER SHOULD BE NOTIFIED IMMEDIATELY.

C.4 <u>STRIP FOOTINGS AND STIFFENED RAFTS</u>

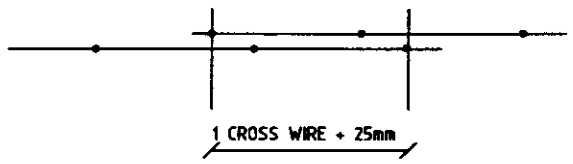
STRIP FOOTING AND EDGE BEAM DEPTHS ARE MINIMUM REQUIREMENTS ONLY AND SHOULD BE INCREASED AS REQUIRED TO PENETRATE TOP SOIL COVER AND PROVIDE A MINIMUM PENETRATION OF 100mm INTO FIRM AND UNIFORM NATURAL MATERIAL.

D. STEEL FIXER

D.1 ALL REINFORCING BAR AND FABRIC SHALL BE DESIGNATED AS SHOWN IN THE FOLLOWING TABLE AND SHALL COMPLY WITH THE APPROPRIATE CODES AS NOTED BELOW:

SYMBOL	TYPE
R	STRUCTURAL GRADE ROUND BARS TO AS4671-2001 (230MPa)
S	STRUCTURAL GRADE DEFORMED BARS TOAS4671-2001 (230MPa)
N	TEMPCORE DEFORMED BARS TO AS1671-2001 (500MPa)
RL/SL	FABRIC TO AS4671-2001 (500MPa)
TM	TRENCH MESH TO AS4671-2001 (500MPa)
NOTE: THE NUMBER FOLLOWING THE SYMBOL IS THE BAR DIAMETER IN MILLIMETRES.	

D.2 MINIMUM LAP TO FABRIC TO BE AS SHOWN IN THE DIAGRAM BELOW:



D.3 TRENCH MESH SHALL BE SPLICED WHERE NECESSARY BY A LAP OF 500mm. ALL CROSS WIRES TO TRENCH MESH SHALL BE CUT FLUSH WITH OUTER MAIN WIRES.

D.4 SPLICES IN REINFORCEMENT SHALL BE MADE IN ACCORDANCE WITH THE PROVISIONS OF AS3600-2001 OR IN ACCORDANCE WITH THE FOLLOWING TABLE:-

BAR SIZE	N12	N16	N20	N24	N28	N32
SPLICE LENGTH	400	600	800	1200	1350	1650

D.5 REINFORCEMENT SHALL BE SUPPORTED AT 1000mm MAXIMUM CENTRES TO MAINTAIN THE NOMINATED POSITION AND COVER UNLESS REDUCED SPACING IS SPECIFIED.

D.6 WELDING OF REINFORCEMENT OTHER THAN TACK WELDING FOR PURPOSE OF MAINTAINING BARS IN CORRECT POSITION IS NOT PERMITTED UNLESS SPECIFICALLY NOMINATED ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER.

D.7 REINFORCING BARS SHALL HAVE A LAP LENGTH AT SPLICES NOT LESS THAN 500mm. AT 'T' AND 'L' INTERSECTIONS, THE BARS SHALL BE CONTINUED ACROSS THE FULL WIDTH OF THE INTER-SECTION. AT L-INTERSECTIONS, ONE OUTER BAR SHALL BE BENT AND CONTINUED 500mm, OR A BENT LAP BAR 500mm LONG ON EACH LEG SHALL BE PROVIDED.

THIS DRAWING HAS BEEN ASSIGNED AN ELECTRONIC CODE IN THE BOX MARKED BELOW.

THE PRESENCE OF THIS CODE SIGNIFIES THAT THE DRAWING HAS BEEN CHECKED AND APPROVED BY:

L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL & STRUCT)

ELECTRONIC SIGNATURE CODE: YZE 871/01

ELECTRONIC ISSUE DATE: 27.01.04

E. CONCRETE

E1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 EXCEPTWHERE VARIED BY THE CONTRACT DOCUMENTS.

E2. CONCRETE QUALITY:

ELEMENT	SLUMP	MAX. SIZE AGG.	CEMENT TYPE	AS3600 F'c	ADMIXTURE	MIN. CEMENT CONTENT PER M^3
FOOTINGS/ SLAB	80	20	GP/GB	20MPa	NIL	250 Kg

E3. DESIGN COVER TO THE REINFORCEMENT SHALL BE 40mm TO UNPROTECTED GROUND, 40MM TO EXTERNAL EXPOSURE; 30mm TO THE MEMBRANE IN CONTACT WITH THE GROUND AND 20mm TO THE INTERNAL SURFACE. THE SLAB FABRIC SHALL BE PLACED TOWARDS THE TOP OF THE SLAB PLACED TOWARDS THE TOP OF THE SLAB WITHIN THE ZONE

H. RESIDENTIAL STRUCTURAL STEELWORK

H.1 ALL STRUCTURAL STEELWORK SHALL COMPLY WITH AS 1111, AS 1112, AS 1163, AS 1554, AS 4100, AND THE A.C.S.E. STRUCTURAL STEEL FABRICATION & ERECTION SPECIFICATIONS WHERE DEEMED APPROPRIATE BY THE CONTRACT DOCUMENTS.

H.2 ABBREVIATIONS USED ARE AS FOLLOWS :
UB - UNIVERSAL BEAM
UC - UNIVERSAL COLUMN
PFC - PARALLEL FLANGE CHANNEL
EA - ROLLED STEEL EQUAL ANGLE
UA - ROLLED STEEL UNEQUAL ANGLE
RHS - RECTANGULAR HOLLOW SECTION
SHS - SQUARE HOLLOW SECTION
B.W.- BUTT WELD
F.W.- FILLET WELD

H.3 THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION IS THE BUILDER'S RESPONSIBILITY. ADEQUATE TEMPORARY BRACING SHALL BE PROVIDED WHERE NECESSARY AND AS DIRECTED BY THE SUPERVISING ENGINEER.

H.4 ALL SHOP CONNECTIONS SHALL BE FULLY WELDED UNLESS NOTED OTHERWISE.

H.5 PROVIDE 6mm MINIMUM FILLET WELDS, M20 BLACK BOLTS & 10mm CONNECTION PLATES UNLESS SPECIFICALLY NOTED OTHERWISE.

H.6 ALL BOLTS SHALL BE IN 2mm CLEARANCE HOLES UNLESS NOTED OTHERWISE.

H.7 SURFACE TREATMENT AND COATINGS SHALL BE AS SPECIFIED IN THE TABLE :

MEMBER	MARK	SURFACE PREPARATION	COATING
INTERNAL		ABRASIVE BLAST CLASS 1	R.O.Z.P. (1 COAT)
EXTERNAL		ABRASIVE BLAST CLASS 2.5	R.O.Z.P. (2 COATS) OR GALVANISED

PIERING WORKS NOTES

(BRICK VENEER CONSTRUCTION)

P1 FINAL DEPTH & EXTENT OF PIERING WORKS TO BE DETERMINED ON SITE SUBJECT TO THE RESULTS OF THE TEST HOLE/INITIAL EXCAVATION AND VERIFICATION BY THE STRUCTURAL ENGINEER.

P2 WHERE REQUIRED, PIER THROUGHOUT AT ALL CORNERS, ENDS AND INTERSCETIONS AND CONFORM TO THE FOLLOWING TABLE:

BEARING STRATA	DESIGN BEARING CAPACITY	DOUBLE STOREY
ROCK	600 kPa	400mmØ BORED PIERS @ 1800mm MAX. C/C.

P3 PIER REINFORCEMENT TO BE DIRECTED BY ENGINEER ON SITE.

P4 WHERE SHALE OR ROCK STRATA IS ENCOUNTERED LESS THAN 600mm BELOW FINISHED GROUND LEVEL, PROVIDE PIERS TO SHALE OR ROCK STRATA IN ACCORDANCE WITH PIERING WORKS NOTES ABOVE.

P5 WHERE PIERS ARE REQUIRED ADJACENT TO SERVICE TRENCHES, THE STRATA ENCOUNTERED ADJACENT TO THESE SERVICE TRENCHES MUST BE ADOPTED THROUGHOUT THE REMAINDER OF THE DWELLING.

<u>CURING:</u>

THE CONCRETE SLAB SHALL BE CURED USING AN APPROVED COMMERCIAL CURING COMPOUND AND IN ACCORDANCE WITH CLAUSE 19.1.5 OF AS3600-1994. CURING OF THE CONCRETE SHALL START IMMEDIATELY AFTER FINISHING.

<u>WIND CLASSIFICATION</u>

REFER AS4055-1992, WIND LOADS FOR HOUSING SECTION:

TERRAIN CATEGORY	2.5
SHIELDING CLASSIFICATION	PS
TOPOGRAPHIC CLASSIFICATION	T1
WIND CLASSIFICATION	W33N

CONSTRUCTION CERTIFICATE No. 048

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY COMCERT PTY LTD

PRINT ISSUED 27 JAN 2004

REV			
A	ISSUED FOR CONSTRUCTION	SW	27.01.04

Appleyard Forrest Consulting Engineers Pty. Ltd. ACN No. 002 610 522

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JOB NO.	SHEET	REVISION
347048	S1	A

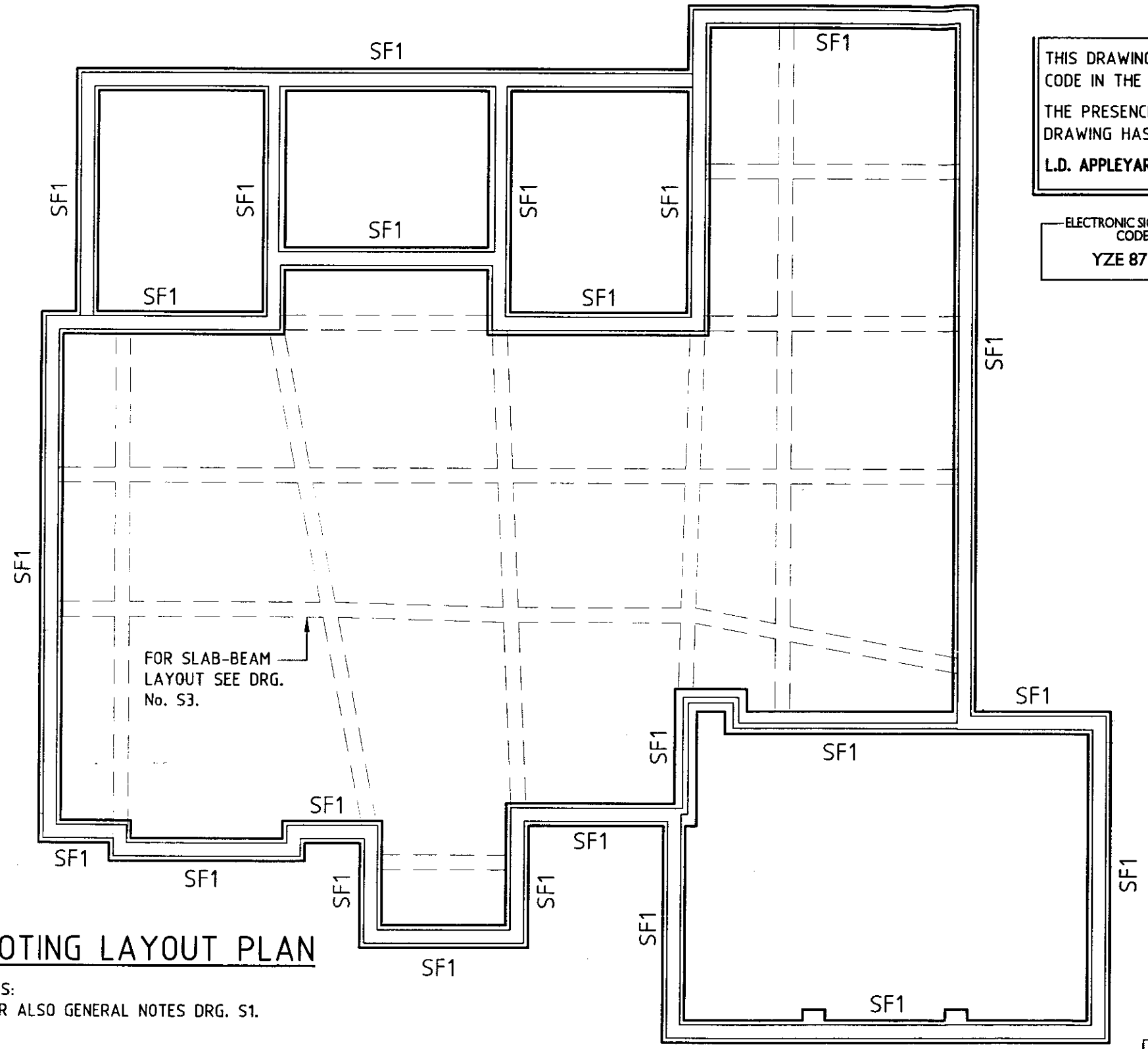
PROJECT: PROPOSED RESIDENCE FOR MR & MRS S NICHOLLS
AT LOT 78 INGLESIDE ROAD, INGLESIDE
BUILDER: MEADOWBANK HOMES

YOUR REF:

DRAWN	CHECKED	SCALE
SW		NTS
DESIGNED	DATE	
PG	09.10.03	

L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL AND STRUCTURAL)

SHEET 1 SET OF 14



FOOTING LAYOUT PLAN

NOTES:
REFER ALSO GENERAL NOTES DRG. S1.

THIS DRAWING HAS BEEN ASSIGNED AN ELECTRONIC CODE IN THE BOX MARKED BELOW.

THE PRESENCE OF THIS CODE SIGNIFIES THAT THE DRAWING HAS BEEN CHECKED AND APPROVED BY:

L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL & STRUCT)

ELECTRONIC SIGNATURE CODE	ELECTRONIC ISSUE DATE
YZE 871/01	27.01.04

EASEMENT NOTE

DOCUMENTATION ON DEPTH AND LOCATION OF THE EASEMENT(S) ADJACENT TO THIS RESIDENCE IS NOT CURRENTLY AVAILABLE.

FULL EVALUATION OF THE EFFECTS OF THE EASEMENT(S) WILL BE COMPLETED UPON RECEIPT OF FURTHER INFORMATION. THIS INFORMATION WILL BE DOCUMENTED AS AN AMENDMENT TO THIS DETAIL (IF REQUIRED)

ALL CONCRETE FOR THE SLAB CONSTRUCTION TO BE COMPACTED WITH A MECHANICAL VIBRATOR

PATIO PIERING REQUIREMENTS:

▨ DENOTES LOAD BEARING AREA - TO BE PIERED IN ACCORDANCE WITH PIERING NOTES - PATIO EDGE BEAM TO BE PIERED UNDER LOAD BEARING POINTS - REFER ARCHITECTURAL DETAILS

REFER FILL & PIERING NOTES - SHEET 1

TREE NOTE

ALL SUBGRADE DISTURBED DUE TO THE REMOVAL OF TREE ROOTS TO BE RECOMPACTED AS PER NOTE B2. WHERE DISTURBED AREA BELOW EDGE BEAM EXCEEDS 800mm PIER AS PER PIERING NOTES.

NOTE

WHERE SHALE STRATA ENCOUNTERED IS LESS THAN 500mm BELOW UNDERSIDE OF EDGE BEAMS, PROVIDE PIERS THROUGHOUT TO SHALE STRATA.

CONSTRUCTION CERTIFICATE No. 0478

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY COMCERT PTY LTD

BRICKWORK NOTE:

JOINTS TO BE PROVIDED TO BRICKWORK TO SUIT TYPE AND QUALITY OF BRICKWORK USED AND IN COMPLIANCE WITH BUILDING CODE OF AUSTRALIA

PRINT ISSUED
27 JAN 2004

REV			
A	ISSUED FOR CONSTRUCTION	SW	27.01.04

SITE CLASSIFICATION PURSUANT TO CLAUSE 2.1.1 OF AS 2870-1996

Classification by: L.D. APPLEYARD M.I.E. AUST. CPENG
Site Classification: M Dated: 12 AUGUST 2003

THE FOOTING SYSTEM SPECIFIED ON THESE DRAWINGS WILL MEET THE PERFORMANCE REQUIREMENTS SET OUT IN CLAUSE 1.3 OF AS2870-1996 (RESIDENTIAL SLABS AND FOOTINGS CODE). THE FOOTINGS SYSTEM IS INTENDED TO ACHIEVE ACCEPTABLE PROBABILITIES OF SERVICEABILITY AND SAFETY OF THE BUILDING DURING ITS DESIGN LIFE. APPENDIX B OF AS2870-1996 PROVIDES INFORMATION AND GUIDANCE ON THE MAINTENANCE OF FOUNDATION SITE CONDITIONS. SUBJECT TO ADOPTION OF THESE RECOMMENDATIONS THE BUILDING MAY EXPERIENCE MINOR DAMAGE BUT OF A SEVERITY NOT EXCEEDING THE LEVELS DEFINED IN APPENDIX C OF AS2870-1996.

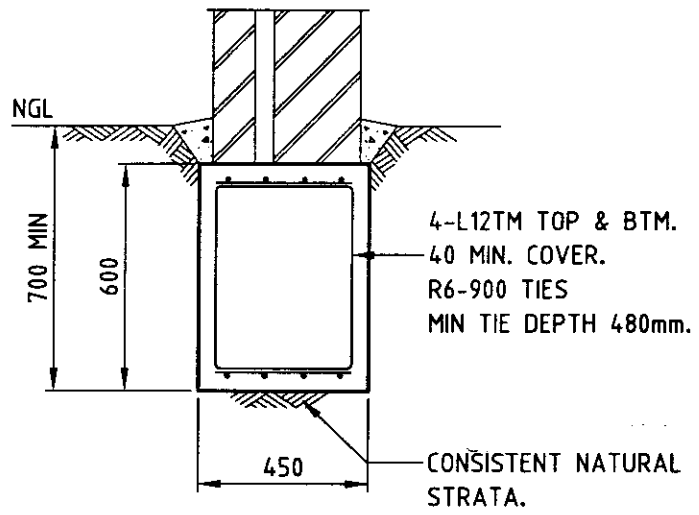
Appleyard Forrest Consulting Engineers Pty. Ltd. ACN No. 002 610 522
58 HILLS STREET, GOSFORD NSW 2250 TEL (02) 4324 3499 FAX (02) 4324 2951
UNIT 35, 7 ANELLA AVENUE, CASTLE HILL NSW 2154 TEL (02) 9634 6311 FAX (02) 9634 6544
SUITE 1, 407-409 BONG BONG STREET, BOWRAL NSW 2576 TEL (02) 4862 1507 FAX (02) 4862 1568

PROJECT PROPOSED RESIDENCE FOR MR & MRS S NICHOLLS
AT LOT 78 INGLESIDE ROAD, INGLESIDE
BUILDER: MEADOWBANK HOMES

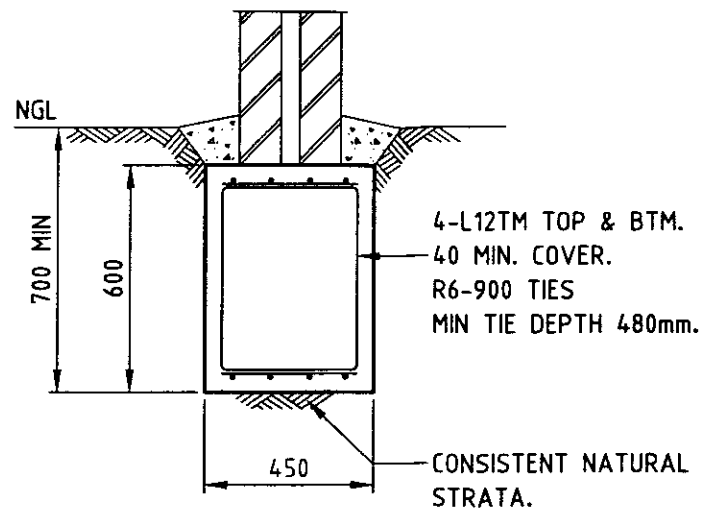
YOUR REF:

L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL AND STRUCTURAL)

JOB NO.	SHEET	REVISION
347048	S2	A
DRAWN SW	CHECKED	SCALE 1:100
DESIGNED PG	DATE 09.10.03	
SHEET 2	SET OF 14	

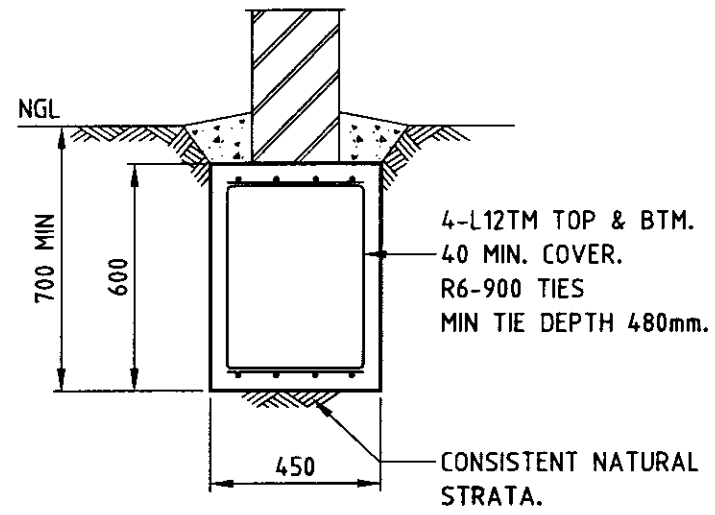


SF1 DETAIL



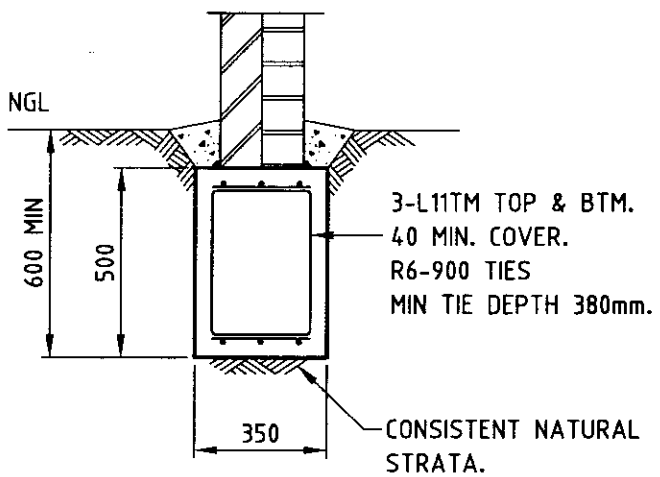
SF1 DETAIL

ALTERNATIVE WALL TYPE



SF1 DETAIL

ALTERNATIVE WALL TYPE



SF2 DETAIL

CONSTRUCTION CERTIFICATE No. . 048 .

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY COMCERT PTY LTD

THIS DRAWING HAS BEEN ASSIGNED AN ELECTRONIC CODE IN THE BOX MARKED BELOW.

THE PRESENCE OF THIS CODE SIGNIFIES THAT THE DRAWING HAS BEEN CHECKED AND APPROVED BY:

L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL & STRUCT)

ELECTRONIC SIGNATURE CODE	ELECTRONIC ISSUE DATE
YZE 871/01	27.01.04

PRINT ISSUED
27 JAN 2004

REV			
A	ISSUED FOR CONSTRUCTION	SW	27.01.04

Appleyard Forrest Consulting Engineers Pty. Ltd. ACN No. 002 610 522
58 HILLS STREET, GOSFORD NSW 2250 TEL (02) 4324 3499 FAX (02) 4324 2951
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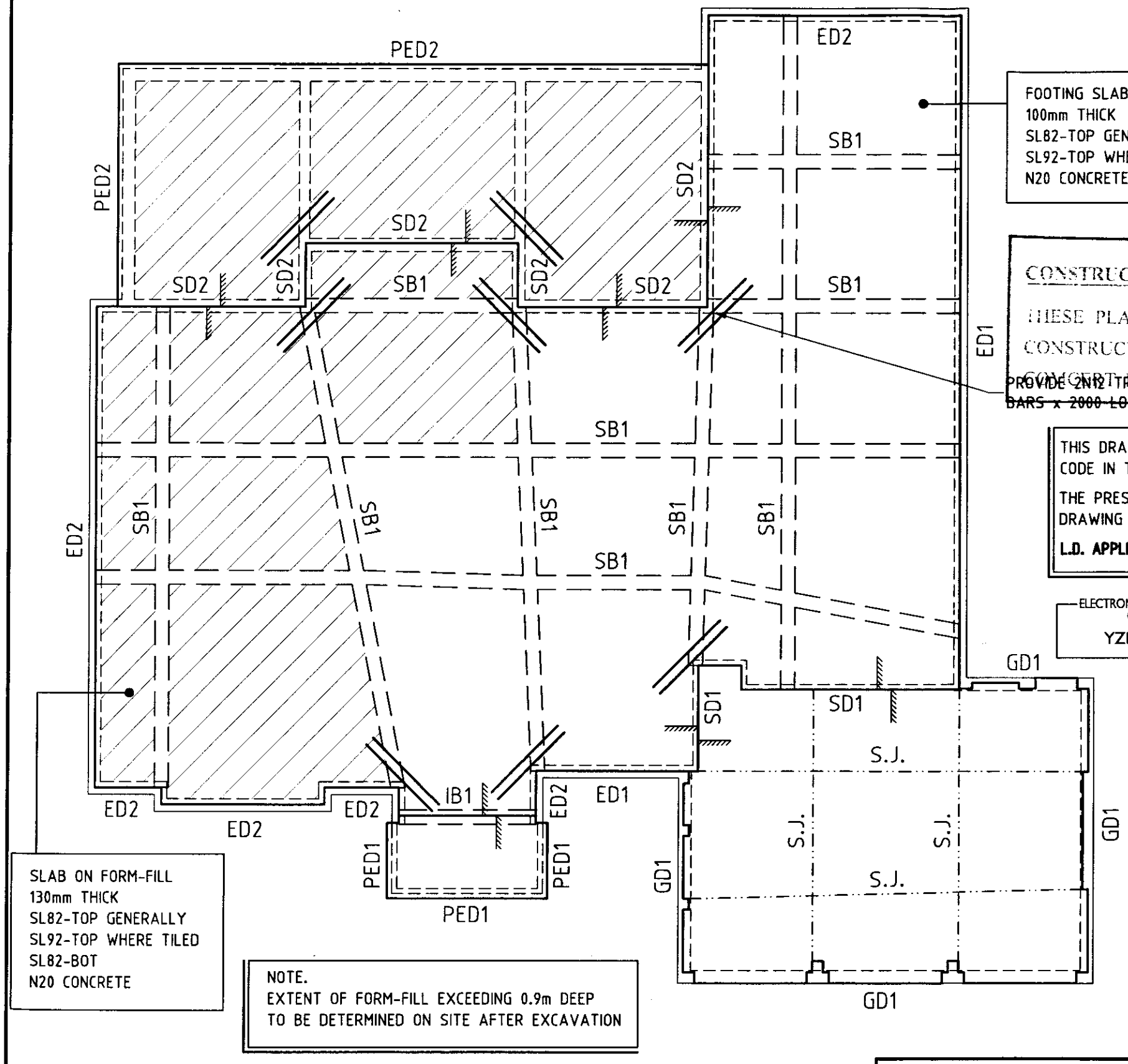
JOB NO.	SHEET	REVISION
347048	S3	A

PROJECT PROPOSED RESIDENCE FOR MR & MRS S NICHOLLS
AT LOT 78 INGLESIDE ROAD, INGLESIDE
BUILDER: MEADOWBANK HOMES

YOUR REF:

DRAWN	CHECKED	SCALE
SW		1:20
DESIGNED PG	DATE 09.10.03	
SHEET 3	SET OF 14	

L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL AND STRUCTURAL)



FOOTING SLAB
100mm THICK
SL82-TOP GENERALLY
SL92-TOP WHERE TILED
N20 CONCRETE

SLAB ON FORM-FILL
130mm THICK
SL82-TOP GENERALLY
SL92-TOP WHERE TILED
SL82-BOT
N20 CONCRETE

NOTE.
EXTENT OF FORM-FILL EXCEEDING 0.9m DEEP
TO BE DETERMINED ON SITE AFTER EXCAVATION

CONSTRUCTION CERTIFICATE No. 0418

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY CONCERT PTY LTD

PROVIDE 2N12 TRIMMER BARS x 2000 LONG TYP.

THIS DRAWING HAS BEEN ASSIGNED AN ELECTRONIC CODE IN THE BOX MARKED BELOW.

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L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL & STRUCT)

ELECTRONIC SIGNATURE CODE: YZE 871/01

ELECTRONIC ISSUE DATE: 27.01.04

PRINT ISSUED: 27 JAN 2004

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☒ DENOTES LOAD BEARING AREA - TO BE PIERED IN ACCORDANCE WITH PIERING NOTES - PATIO EDGE BEAM TO BE PIERED UNDER LOAD BEARING POINTS - REFER ARCHITECTURAL DETAILS

REFER FILL & PIERING NOTES - SHEET 1

TREE NOTE

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NOTE

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BRICKWORK NOTE:

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REV			
A	ISSUED FOR CONSTRUCTION	SW	27.01.04

SLAB LAYOUT PLAN

S.J. - 15mm DEEP TOOLED, SAWN OR FORMED SLAB JOINTS WHERE SHOWN

NOTES:
REFER ALSO GENERAL NOTES DRG. S1.

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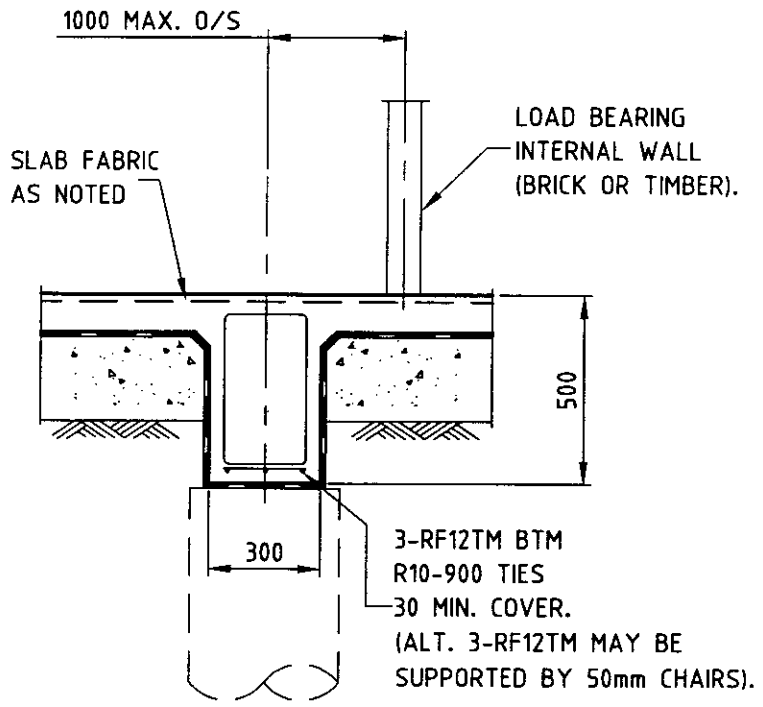
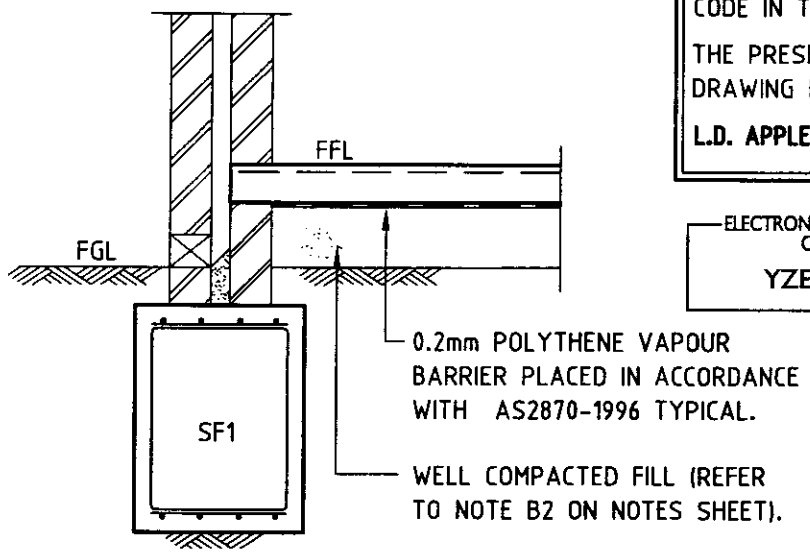
YOUR REF:

L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL AND STRUCTURAL)

JOB NO.	SHEET	REVISION
347048	S4	A
DRAWN SW	CHECKED	SCALE
DESIGNED SW	DATE 09.10.03	1:100
SHEET 4	SET OF 14	



STIFFENING BEAM DETAIL SB1



EXTERNAL WALL DETAIL (ED1)

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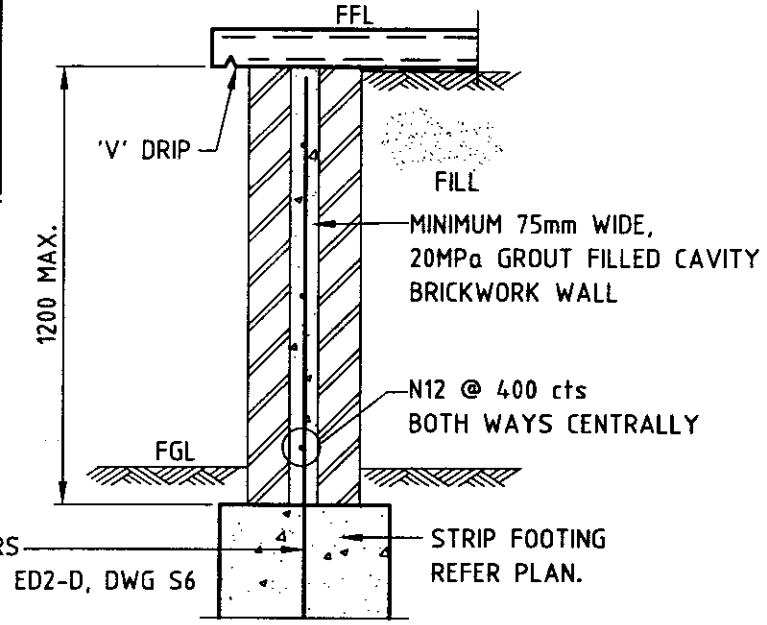
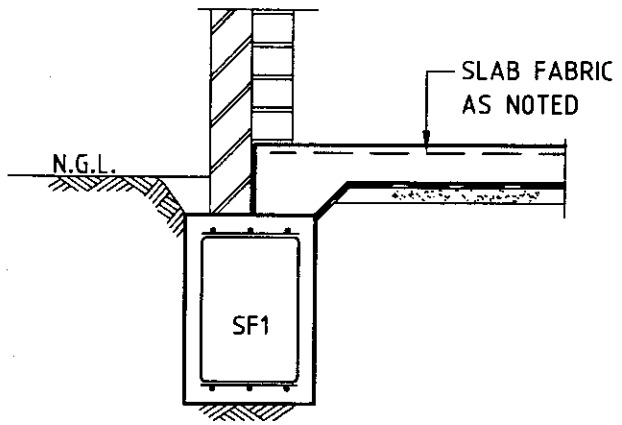
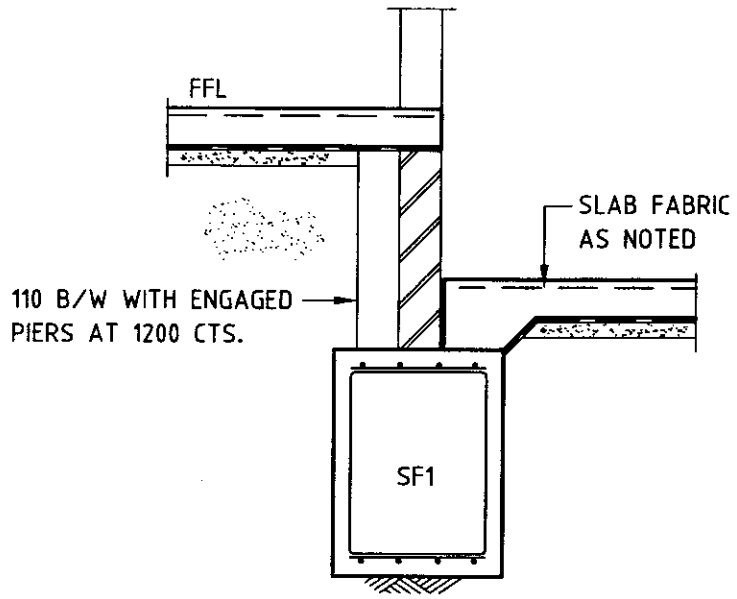
YZE 871/01	27.01.04



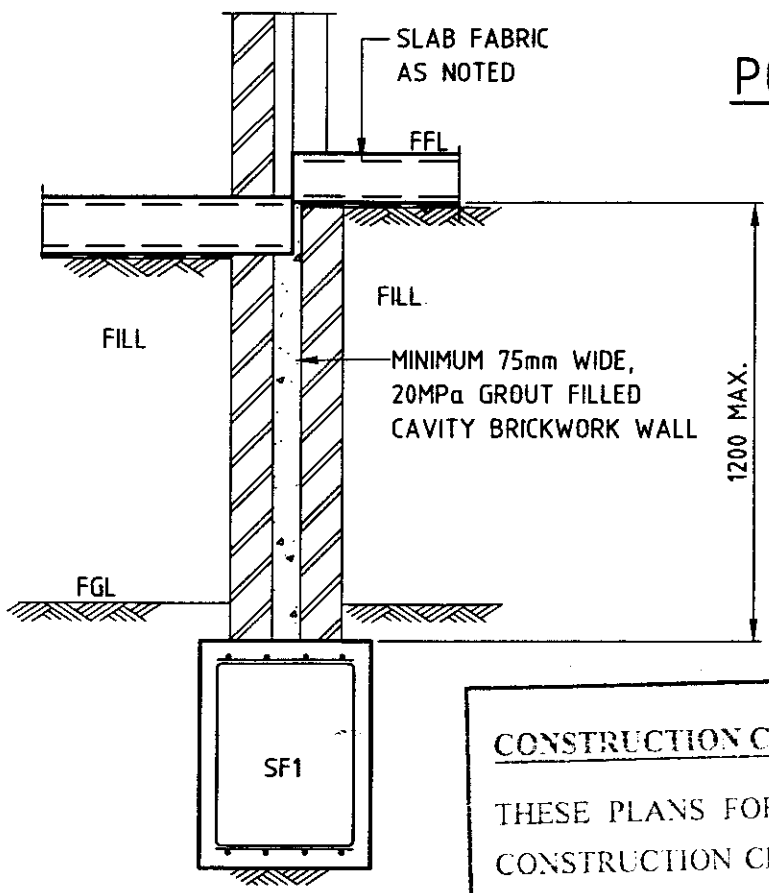
PORCH RETAINING WALL DETAIL (PED2)



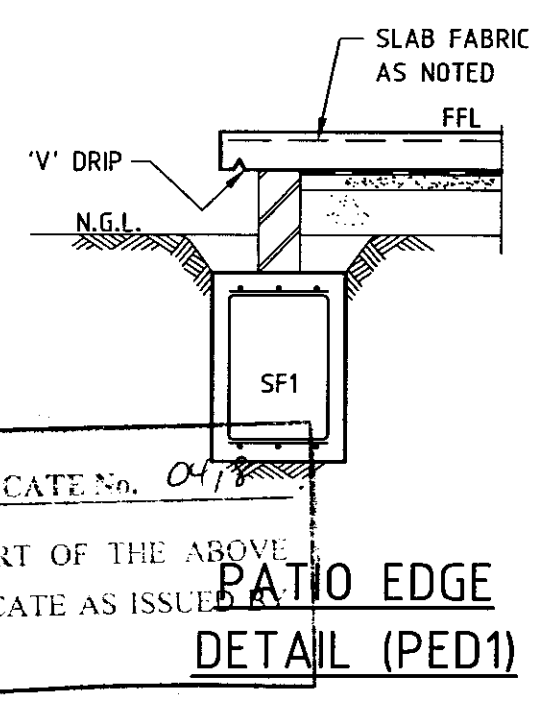
GARAGE EDGE DETAIL (GD1)



GARAGE STEP DETAIL (SD1)



INTERNAL STEP DETAIL (SD2)



PATIO EDGE DETAIL (PED1)

CONSTRUCTION CERTIFICATE No. 0418

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY:

COMCERT PTY LTD

REV	ISSUED FOR CONSTRUCTION	SW	27.01.04
A			

PRINT ISSUED
27 JAN 2004

Appleyard Forrest Consulting Engineers Pty. Ltd. ACN No. 002 610 522
5B HILLS STREET, GOSFORD NSW 2250 TEL (02) 4324 3499 FAX (02) 4324 2951
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BUILDER: MEADOWBANK HOMES

YOUR REF:

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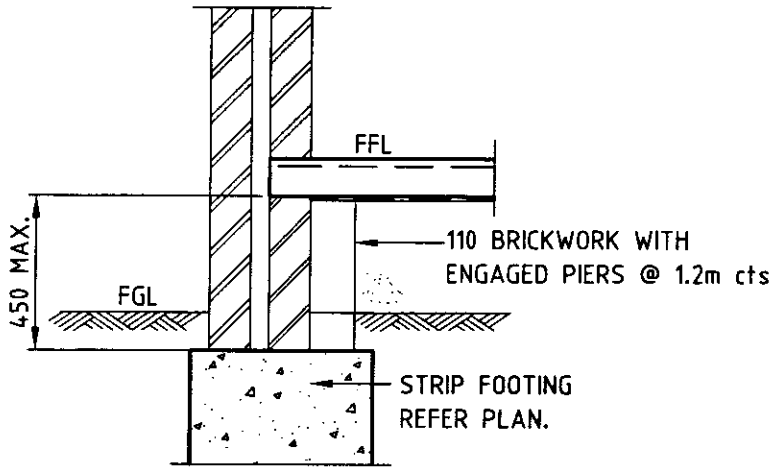
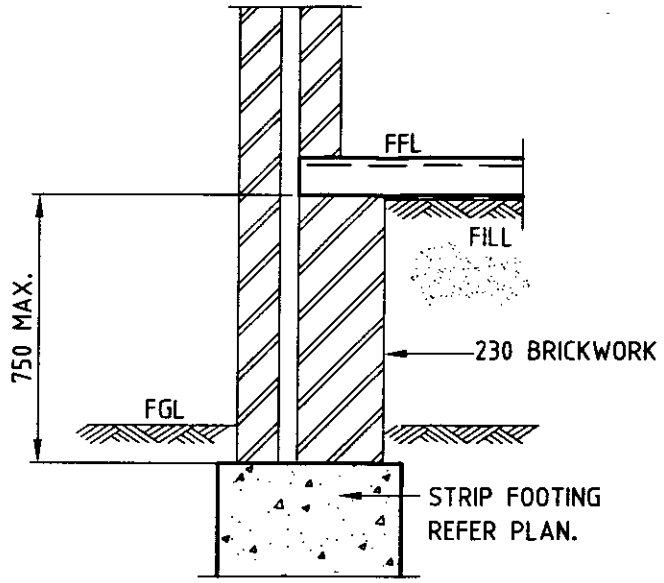
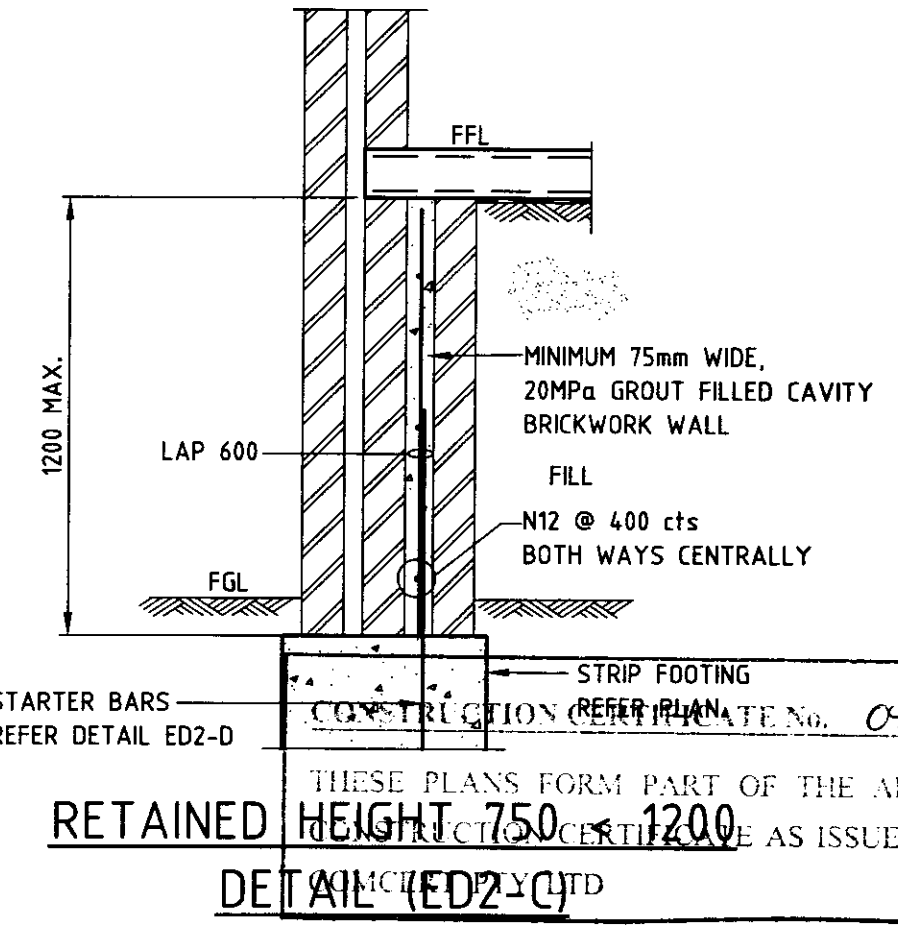
JOB NO.	SHEET	REVISION
347048	S5	A
DRAWN SW	CHECKED	SCALE
DESIGNED PG	DATE 09.10.03	1:20
SHEET 5	SET OF 14	



RETAINED HEIGHT < 450
DETAIL (ED2-A)



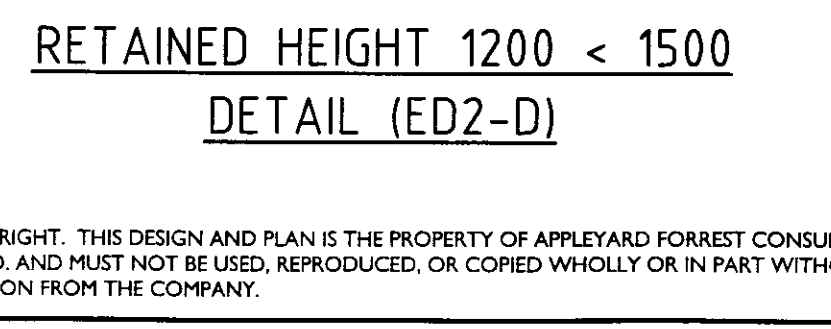
RETAINED HEIGHT 450 < 750
DETAIL (ED2-B)



RETAINED HEIGHT 750 < 1200
DETAIL (ED2-C)

CONSTRUCTION CERTIFICATE No. 048

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY ACMCIL PTY LTD



RETAINED HEIGHT 1200 < 1500
DETAIL (ED2-D)

SUBFLOOR RETAINING WALL
DETAIL (ED2)

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L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL & STRUCT)

ELECTRONIC SIGNATURE CODE	ELECTRONIC ISSUE DATE
YZE 871/01	27.01.04

PRINT ISSUED
27 JAN 2004

REV			
A	ISSUED FOR CONSTRUCTION	SW	27.01.04

Appleyard Forrest Consulting Engineers Pty. Ltd. ACN No. 002 610 522
58 HILLS STREET, GOSFORD NSW 2250 TEL (02) 4324 3499 FAX (02) 4324 2951
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PROJECT PROPOSED RESIDENCE FOR MR & MRS S NICHOLLS
AT LOT 78 INGLESIDE ROAD, INGLESIDE
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YOUR REF:

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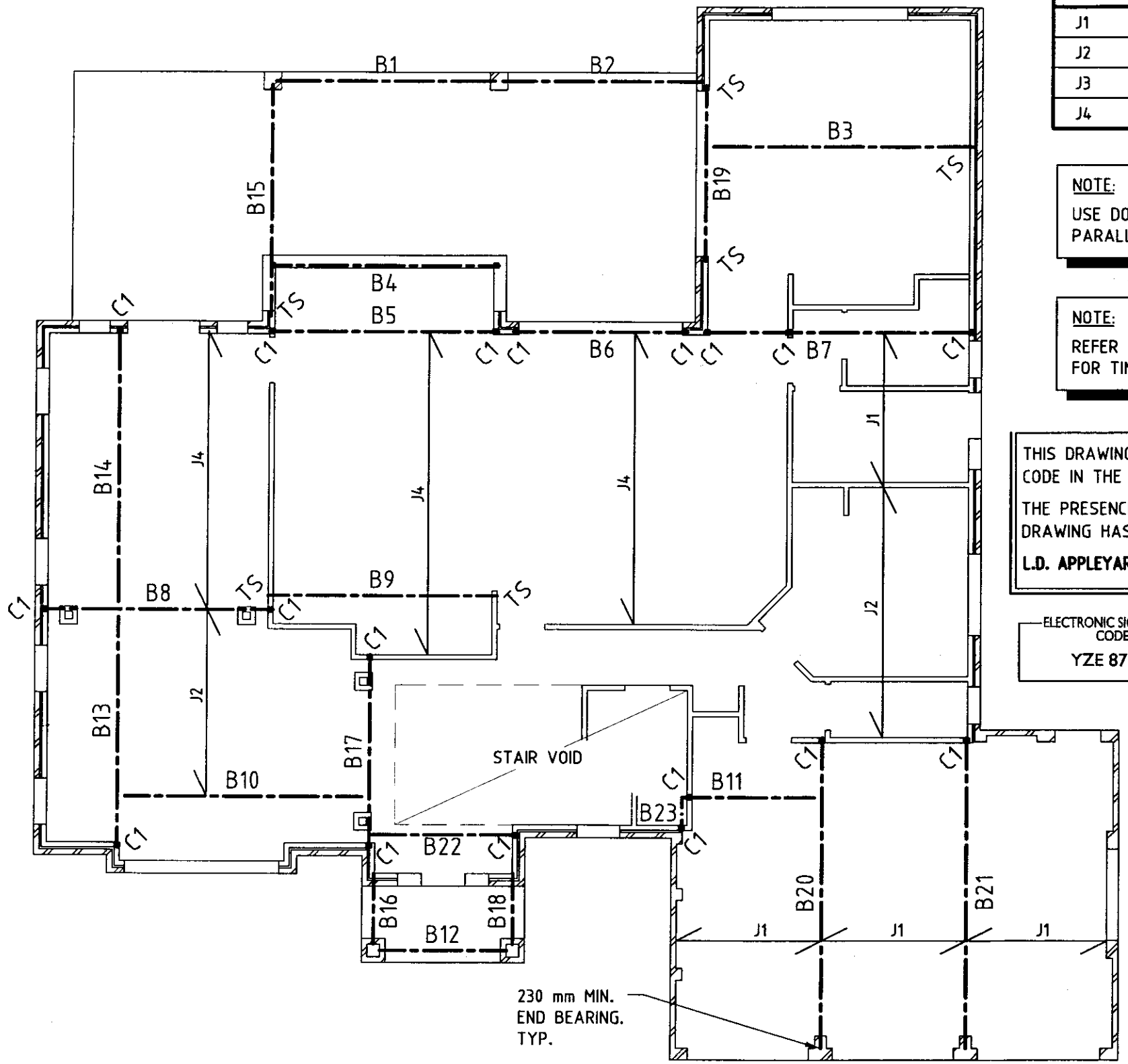
JOB NO.	SHEET	REVISION
347048	S6	A
DRAWN SW	CHECKED	SCALE
DESIGNED PG	DATE 09.10.03	1:20
SHEET 6	SET OF 14	



JOIST SCHEDULE	
J1	200 X 50 F5 @ 450 C/C
J2	250 X 50 F5 @ 450 C/C
J3	300 X 50 F5 @ 450 C/C
J4	2/300 X 50 F5 @ 225 C/C

NOTE:
USE DOUBLE JOISTS UNDER ALL PARALLEL LOADBEARING WALLS.

NOTE:
REFER TO ROOF STEELWORK DRG. No. S8 FOR TIMBER FIXING NOTES.

THIS DRAWING HAS BEEN ASSIGNED AN ELECTRONIC CODE IN THE BOX MARKED BELOW.

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L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL & STRUCT)

ELECTRONIC SIGNATURE CODE
YZE 871/01

ELECTRONIC ISSUE DATE
27.01.04

STEELWORK MEMBER SCHEDULE

MARK	SIZE	REMARKS
B1	150UB18	BEAM
B2	150UB18	BEAM
B3	200UB25.4	BEAM
B4	150UB18	BEAM
B5	250UB37.3 OR 310UB32	BEAM
B6	250UB25.7	BEAM
B7	250UB25.7	BEAM
B8	310UB40	BEAM
B9	250UB31	BEAM
B10	310UB32 + 10mm PLATE OR 250UC73 + 10mm PLATE	BEAM
B11	180UB18	BEAM
B12	200 x 200 x 7 GALINTEL T-BAR WITH MIN. 3C/S 230 BRICKWORK ABOVE	LINTEL
B13	310UB32 OR 250UB25.7 IF SUPPORTING BEAM B10 & BRICKWORK ONLY	BEAM
B14	310UB40 OR 250UB31 IF SUPPORTING BRICKWORK ONLY	BEAM
B15	150UB18	BEAM
B16	200 x 200 x 7 GALINTEL T-BAR WITH MIN. 3C/S 230 BRICKWORK ABOVE	LINTEL
B17	250UB25.7	BEAM
B18	200 x 200 x 7 GALINTEL T-BAR WITH MIN. 3C/S 230 BRICKWORK ABOVE	LINTEL
B19	180UB18	BEAM
B20	360UB50.7 + 10mm PLATE AS REQUIRED	BEAM
B21	360UB44.7 + 10mm PLATE AS REQUIRED	BEAM
B22	150UB18	BEAM
B23	100 x 100 x 6 GALINTEL ANGLE WITH MIN. 3C/S 230 BRICKWORK ABOVE	LINTEL
C1	75 x 75 x 4 SHS	COLUMN
TS	TRIPLE STUD	

CONSTRUCTION CERTIFICATE NO. 84/8

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY COMCERT PTY LTD

PRINT ISSUED
27 JAN 2004

REV			
A	ISSUED FOR CONSTRUCTION	SW	27.01.04

FIRST FLOOR - BEAMS & JOISTS

NOTES:
REFER ALSO GENERAL NOTES DRG. S1.

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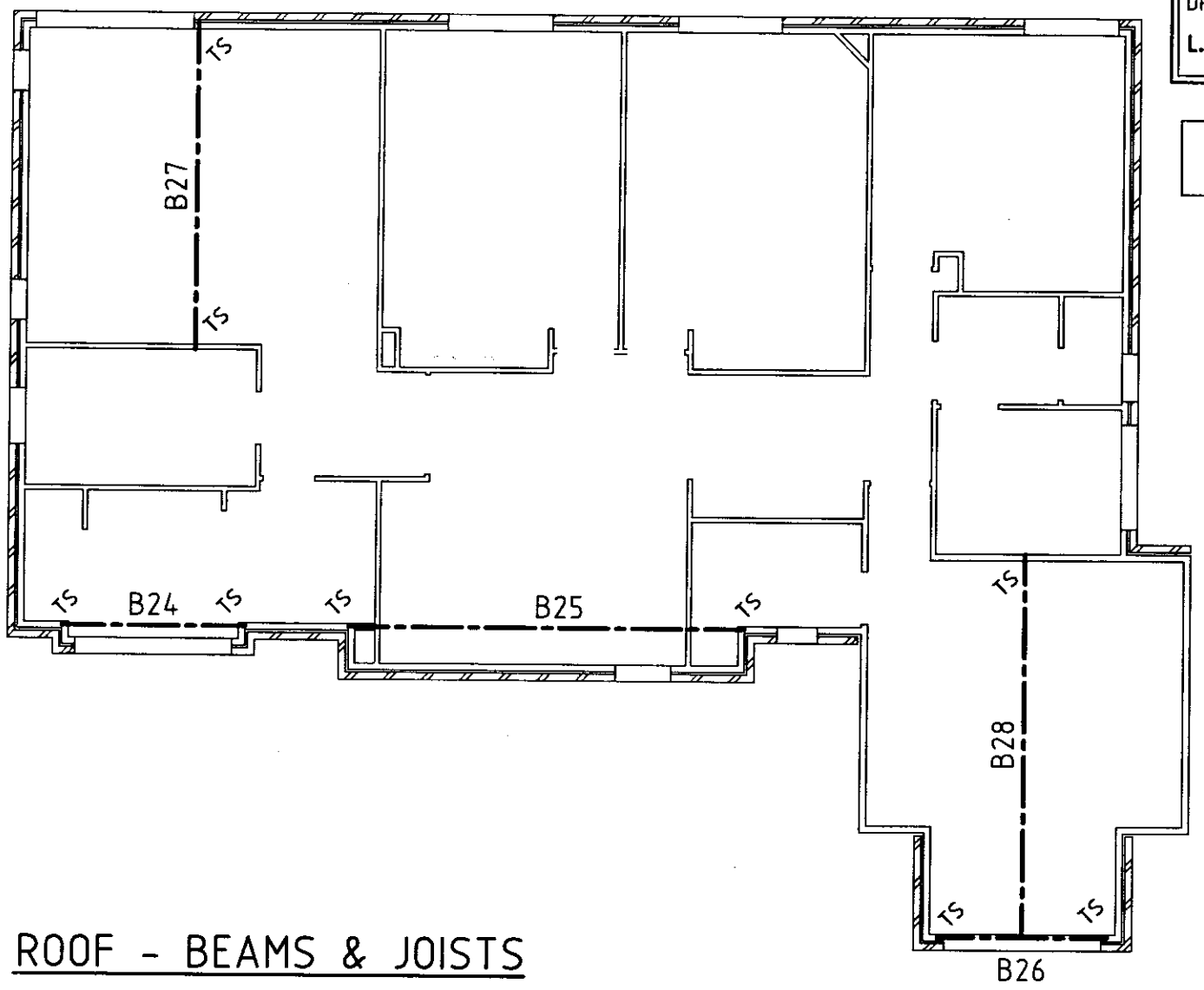
JOB NO.	SHEET	REVISION
347048	S7	A
DRAWN SW	CHECKED	SCALE 1:100
DESIGNED PG	DATE 09.10.03	
SHEET 7	SET OF 14	



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L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL & STRUCT)

ELECTRONIC SIGNATURE CODE	ELECTRONIC ISSUE DATE
YZE 871/01	27.01.04

JOIST FIXING NOTE:

SOLID TIMBER JOISTS ARE NOT TO BE NOTCHED IN EXCESS OF THE RECOMMENDATIONS OF AS1684-1992. WHERE NECESSARY, PROVIDE TIMBER TOP PLATE OVER STEEL BEAM SUPPORTING JOISTS & FIX JOISTS USING TOP MOUNT HANGERS.
FOR ENGINEERED TIMBER JOISTS/FLOOR TRUSSES, FIXING TO SUPPORT BEAMS IS TO BE STRICTLY IN ACCORDANCE WITH MANUFACTURERS' SPECIFICATION.

TIMBER FRAMING NOTE:

FINAL DETERMINATION OF FLOORING SIZES, LINTELS, BEAMS, AND COMPOSITION BY TIMBER FRAMER.

FRAME FIXING NOTE:

ALL TIMBER FRAMING TO BE POSITIVELY CONNECTED TO STEEL BEAMS USING M10 BOLTS AT 1000 NOMINAL CRS. OR EQUIVALENT.

NOTE:

IT IS THE BUILDERS' RESPONSIBILITY TO ENSURE THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION. ADEQUATE TEMPORARY BRACING MUST BE PROVIDED WHERE NECESSARY & AS DIRECTED BT THE SUPERVISING ENGINEER.

ROOF - BEAMS & JOISTS

NOTES:
REFER ALSO GENERAL NOTES DRG. S1.

STEELWORK MEMBER SCHEDULE		
MARK	SIZE	REMARKS
B24	150UB14	BEAM
B25	200UB22	BEAM
B26	150UB18	BEAM
B27	180UB22	BEAM
B28	200UB25.4	BEAM
TS	TRIPLE STUD - 3/90 x 45 F11	

NOTE:

EQUIVALENT APPROVED ITEMS MAY BE SUBSTITUTED FOR PROPRIETARY ITEMS OR SPECIFIC TYPES OF TIMBER ELEMENTS.

CONSTRUCTION CERTIFICATE No. 04/8

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY COMCERT PTY LTD

PRINT ISSUED
27 JAN 2004

REV			
A	ISSUED FOR CONSTRUCTION	SW	27.01.04

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JOB NO.	SHEET	REVISION
347048	S8	A

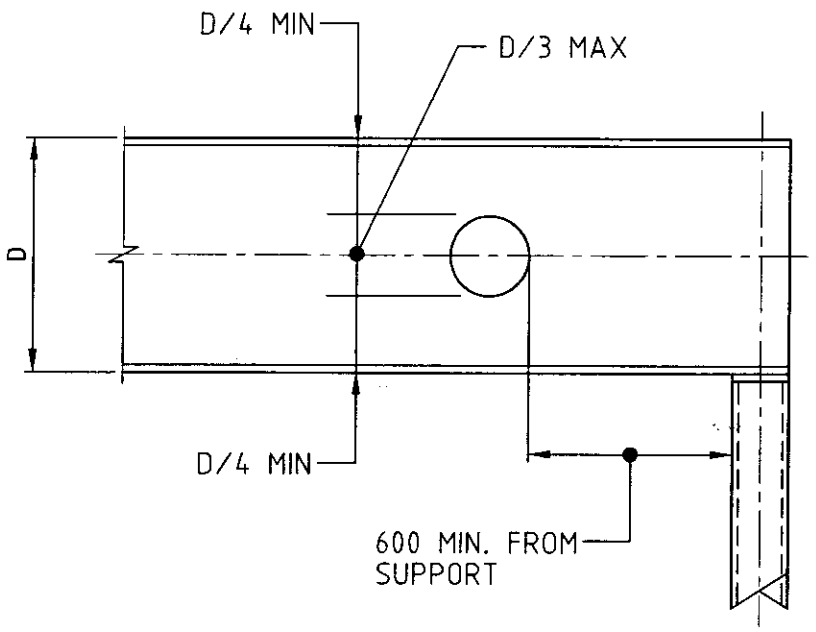
PROJECT PROPOSED RESIDENCE FOR MR & MRS S NICHOLLS
AT LOT 78 INGLESIDE ROAD, INGLESIDE
BUILDER: MEADOWBANK HOMES

YOUR REF:

DRAWN	CHECKED	SCALE
SW		1:100
DESIGNED	DATE	
PG	09.10.03	

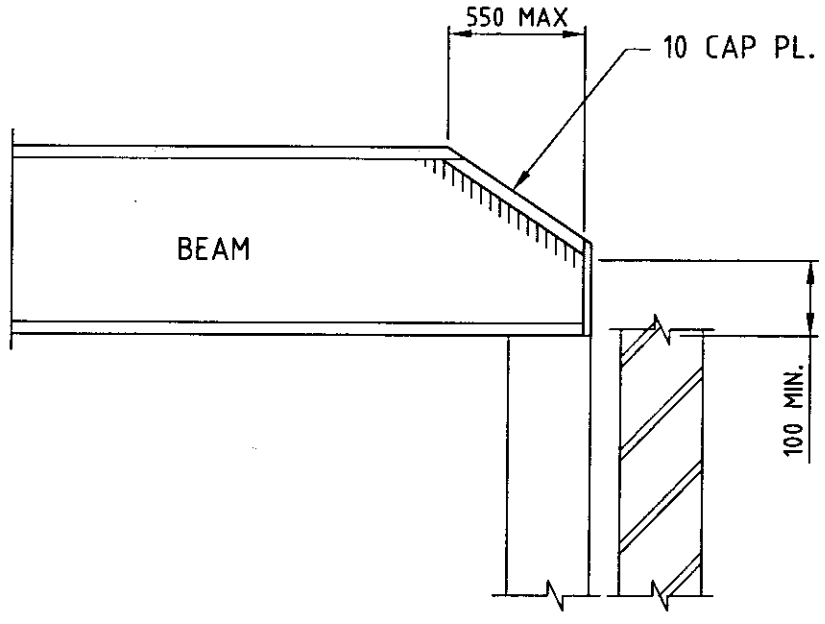
L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL AND STRUCTURAL)

SHEET 8 SET OF 14



TYPICAL BEAM PENETRATION DETAIL

(NOTE: UNIVERSAL BEAM OPTION SHOWN, CHANNEL OPTION SIMILAR)



TYPICAL BEAM CHAMFER DETAIL

ADOPT AS REQUIRED

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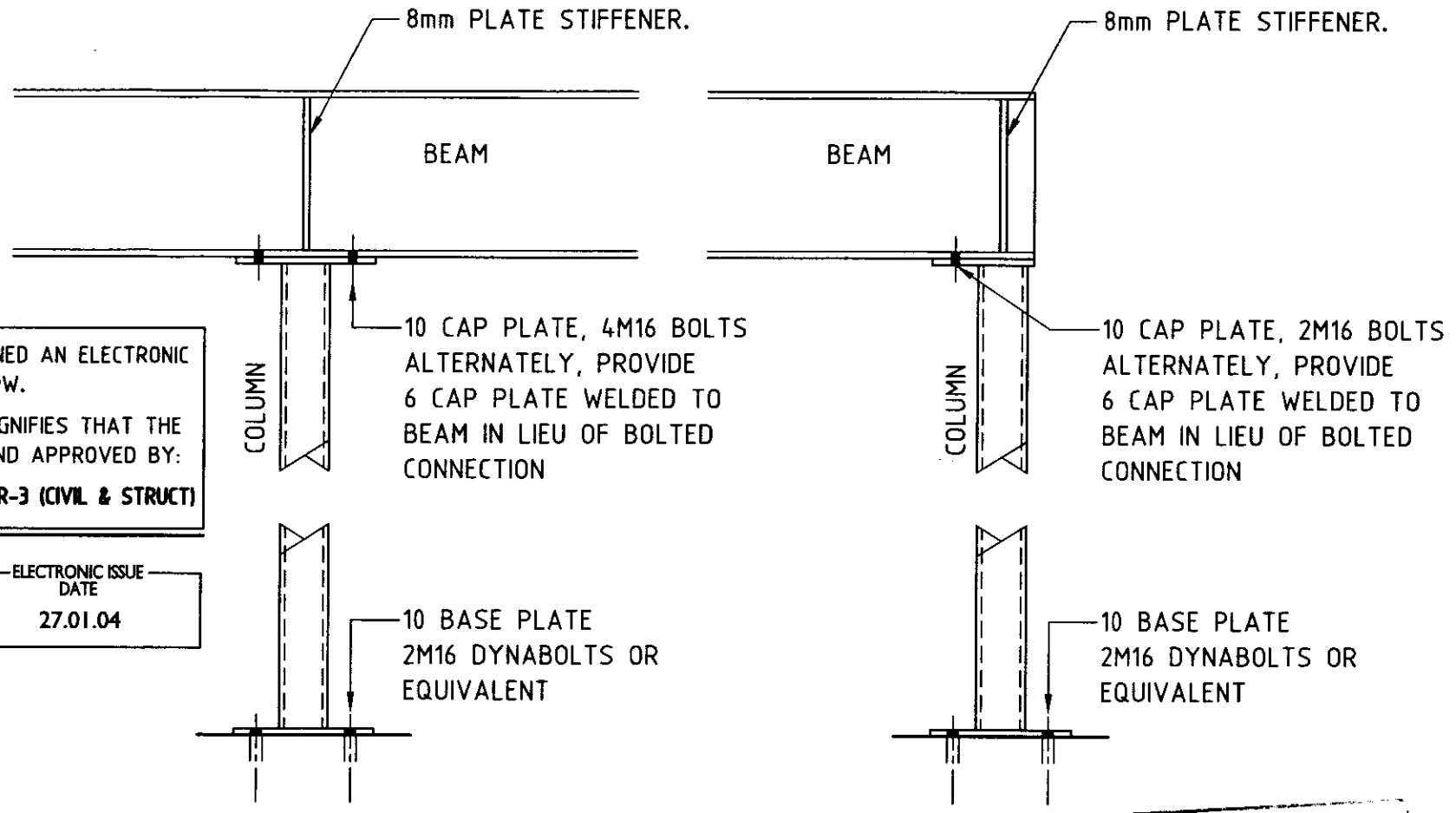
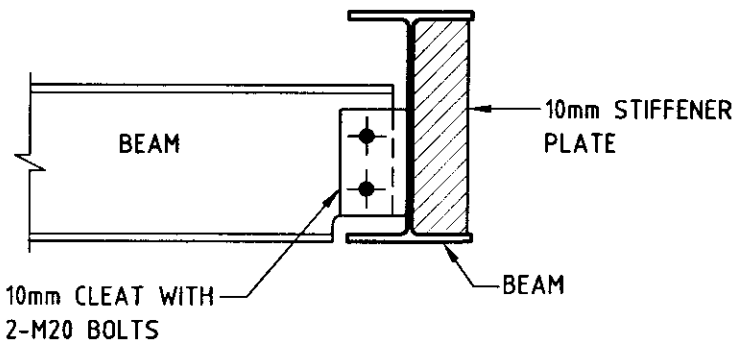
L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL & STRUCT)

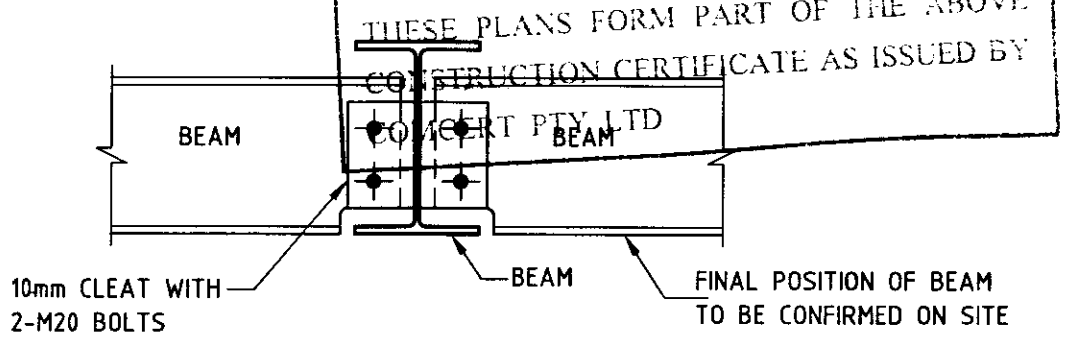
ELECTRONIC SIGNATURE CODE	ELECTRONIC ISSUE DATE
YZE 871/01	27.01.04



TYPICAL COLUMN DETAILS U.N.O.



TYPICAL BEAM CONNECTION DETAIL



TYPICAL MULTIPLE BEAM CONNECTION DETAIL

CONSTRUCTION CERTIFICATE No. 048

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY CONCERT PTY LTD

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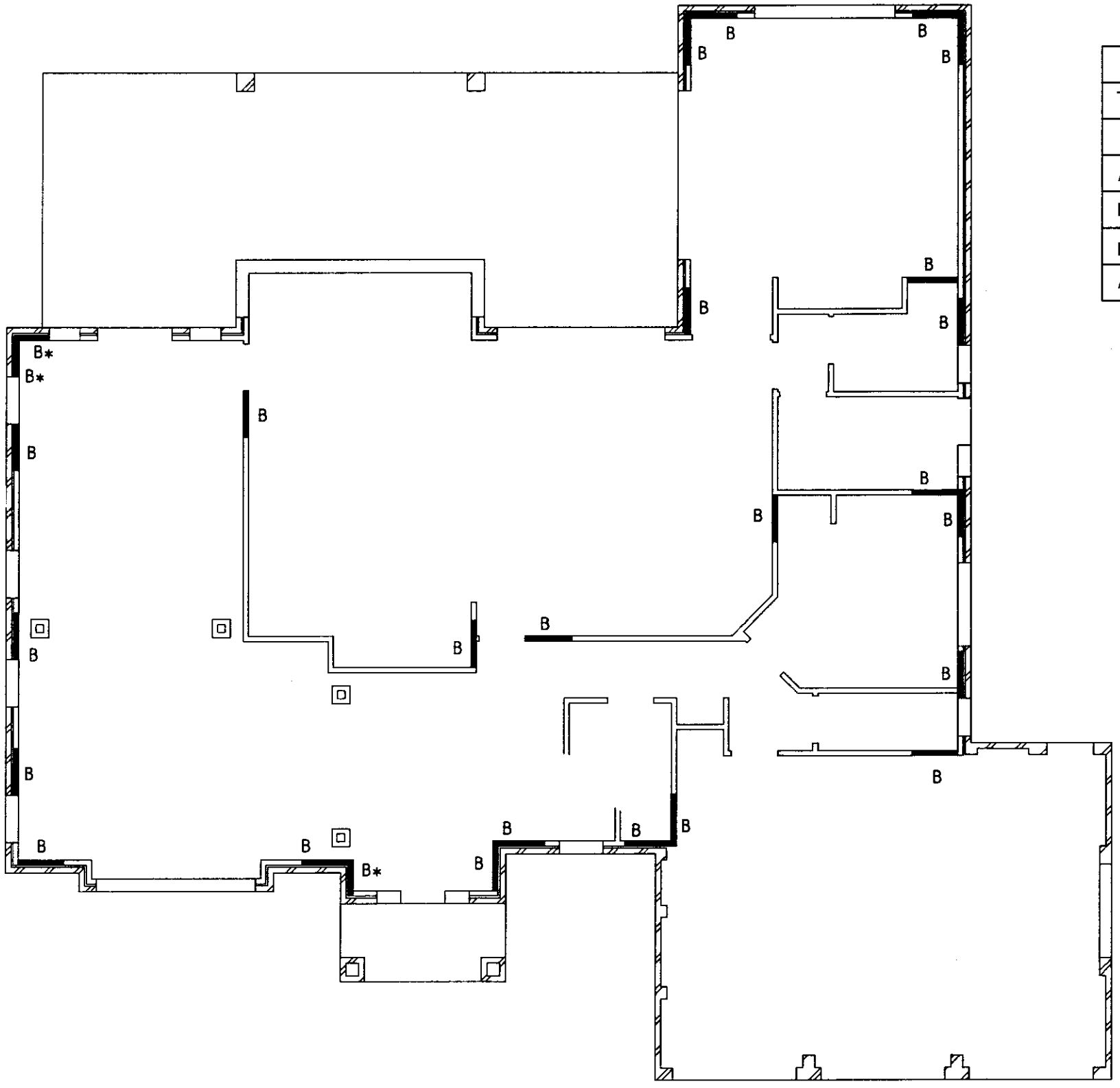
UNIT 35, 7 ANELLA AVENUE, CASTLE HILL NSW 2154 TEL (02) 9634 6311 FAX (02) 9634 6544
SUITE 1, 407-409 BONG BONG STREET, BOWRAL NSW 2576 TEL (02) 4862 1507 FAX (02) 4862 1568

PROJECT PROPOSED RESIDENCE FOR MR & MRS S NICHOLLS
AT LOT 78 INGLESIDE ROAD, INGLESIDE
BUILDER: MEADOWBANK HOMES

YOUR REF:

L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL AND STRUCTURAL)

JOB NO.	SHEET	REVISION
347048	S9	A
DRAWN SW	CHECKED	SCALE 1:10
DESIGNED PG	DATE 09.10.03	
SHEET 9	SET OF 14	



CALCULATIONS BASED ON W28N WIND CLASSIFICATION		
TYPE	DESCRIPTION	COMMENT
A	PLY 'A' BRACE 900 WIDE	CAN SUBSTITUTE WITH STRAP BRACE
A*	PLY 'A' BRACE FULL AVAILABLE LENGTH	
B	PLY 'B' BRACE 900 WIDE	CAN SUBSTITUTE WITH STRAP BRACE
B*	PLY 'B' BRACE FULL AVAILABLE LENGTH	
ALL BRACING TO BE FIXED IN ACCORDANCE WITH AS 1684-1999		

CONSTRUCTION CERTIFICATE No. 048

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YZE 871/01	27.01.04

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GROUND FLOOR - WALL BRACING LAYOUT

NOTES:
REFER ALSO GENERAL NOTES DRG. S12 & S13 & S14.

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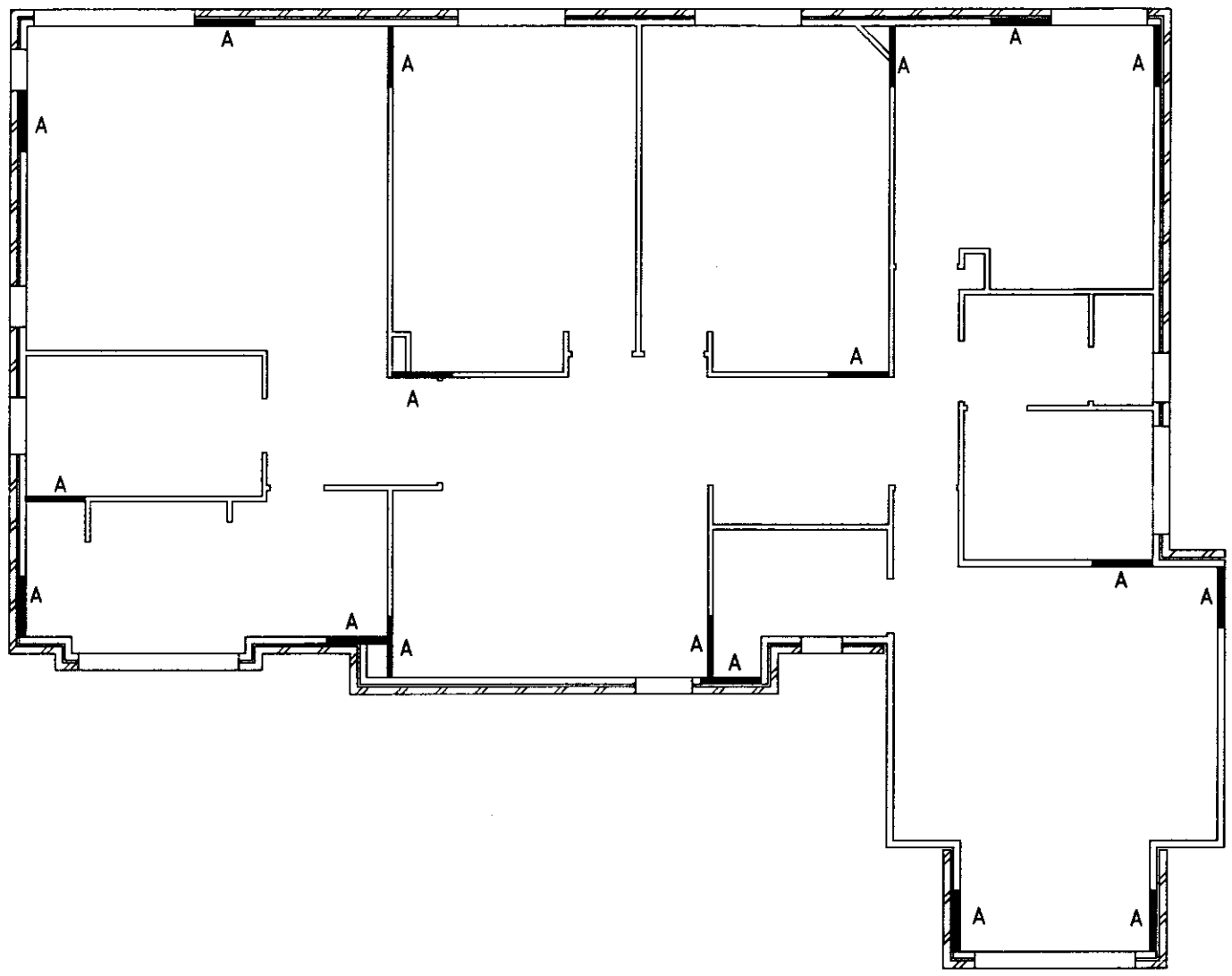
JOB NO.	SHEET	REVISION
347048	S10	A
DRAWN SW	CHECKED	SCALE 1:100
DESIGNED PG	DATE 09.10.03	
SHEET 10	SET OF 14	



CALCULATIONS BASED ON W28N WIND CLASSIFICATION		
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ALL BRACING TO BE FIXED IN ACCORDANCE WITH AS 1684-1999		

CONSTRUCTION CERTIFICATE No. /

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PRINT ISSUED 27 JAN 2004

FIRST FLOOR - WALL BRACING LAYOUT

NOTES:
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JOB NO.	SHEET	REVISION
347048	S11	A

PROJECT PROPOSED RESIDENCE FOR MR & MRS S NICHOLLS
AT LOT 78 INGLESIDE ROAD, INGLESIDE
BUILDER: MEADOWBANK HOMES

YOUR REF:

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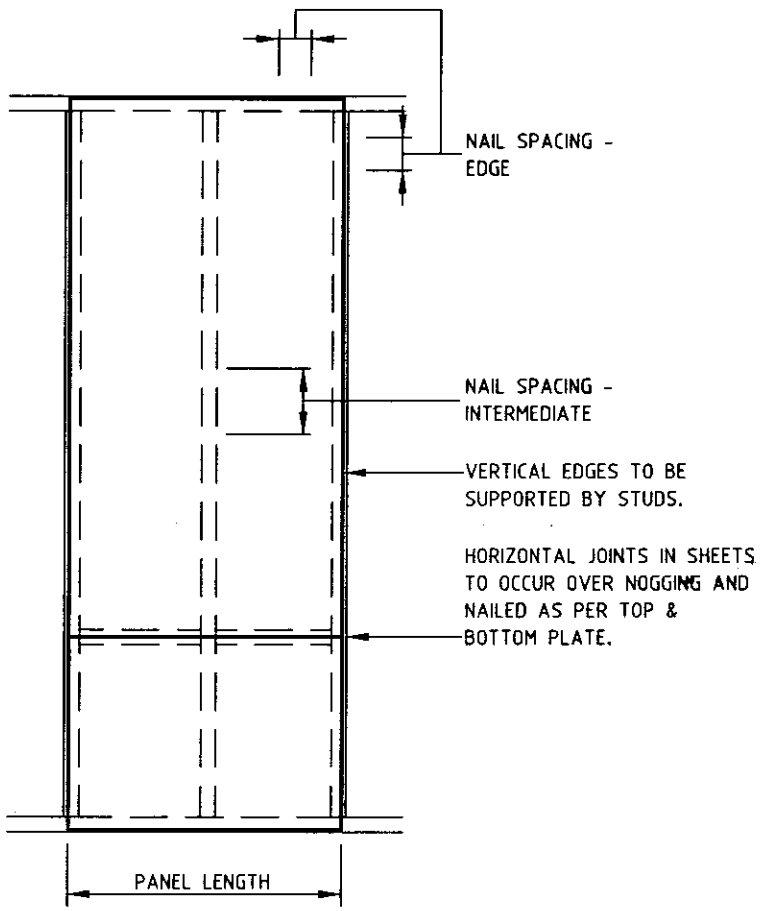
SW		1:100
DESIGNED PG	DATE 09.10.03	
SHEET 11	SET OF 14	

L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL AND STRUCTURAL)

PRODUCT	AUSTRALIAN STANDARD	TYPE/ GRADE	MINIMUM THICKNESS (mm) FOR STUD SPACING (mm).		PANEL LENGTH (mm)	NAIL SIZE (mm)	NAIL SPACING (mm)		SPECIAL REQUIREMENTS
			450	600			EDGE	INTERMEDIATE	
PLYWOOD	AS 2269	F8 F11 F14 F27	7 4.5 4 3	9 7 6 4.5	900	2.8 x 30 GALV.	150	300	NO NOGGING REQ'D EXCEPT AT SHEET ENDS. NAILS SHALL BE 7mm FROM ALL EDGES.
HARDBOARD (MASONITE)	AS 2458	G.P.	6.4	6.4	900	2.8 x 25 GALV.	100	300	NAILS TO BE 10mm FROM VERTICAL EDGES AND 20mm FROM HORIZONTAL EDGES. NO NOGGING REQ'D EXCEPT AT SHEET ENDS.



TYPE A - SHEET BRACING UNITS

NOTES - 1. PANEL LENGTHS GREATER THAN THOSE LISTED ABOVE CAN BE CONSIDERED AS A NUMBER OF BRACING UNITS DIRECTLY PROPORTIONED TO THEIR INSTALLED LENGTH, I.E A 12000mm PANEL OF PLYWOOD EQUALS 1200/900 = 1.33 BRACING UNITS.

2. PLYWOOD PANEL LENGTHS OF 600mm ARE EQUIVALENT TO 1/3 OF A TYPE A BRACING UNIT.

3. FOR STUD SPACING OF 600mm CTS., WHERE NOGGINGS ARE INSTALLED AND THE PLYWOOD BRACING PANELS ARE NAILED TO THE NOGGINGS AT 150mm CTS, THE PLYWOOD THICKNESS MAY BE AS FOR STUD SPACING AT 450mm CTS.

4. REFER TO TABLE 1 ON SHEETS B1 & B2 FOR TOP & BTM PLATE FIXING DETAILS.

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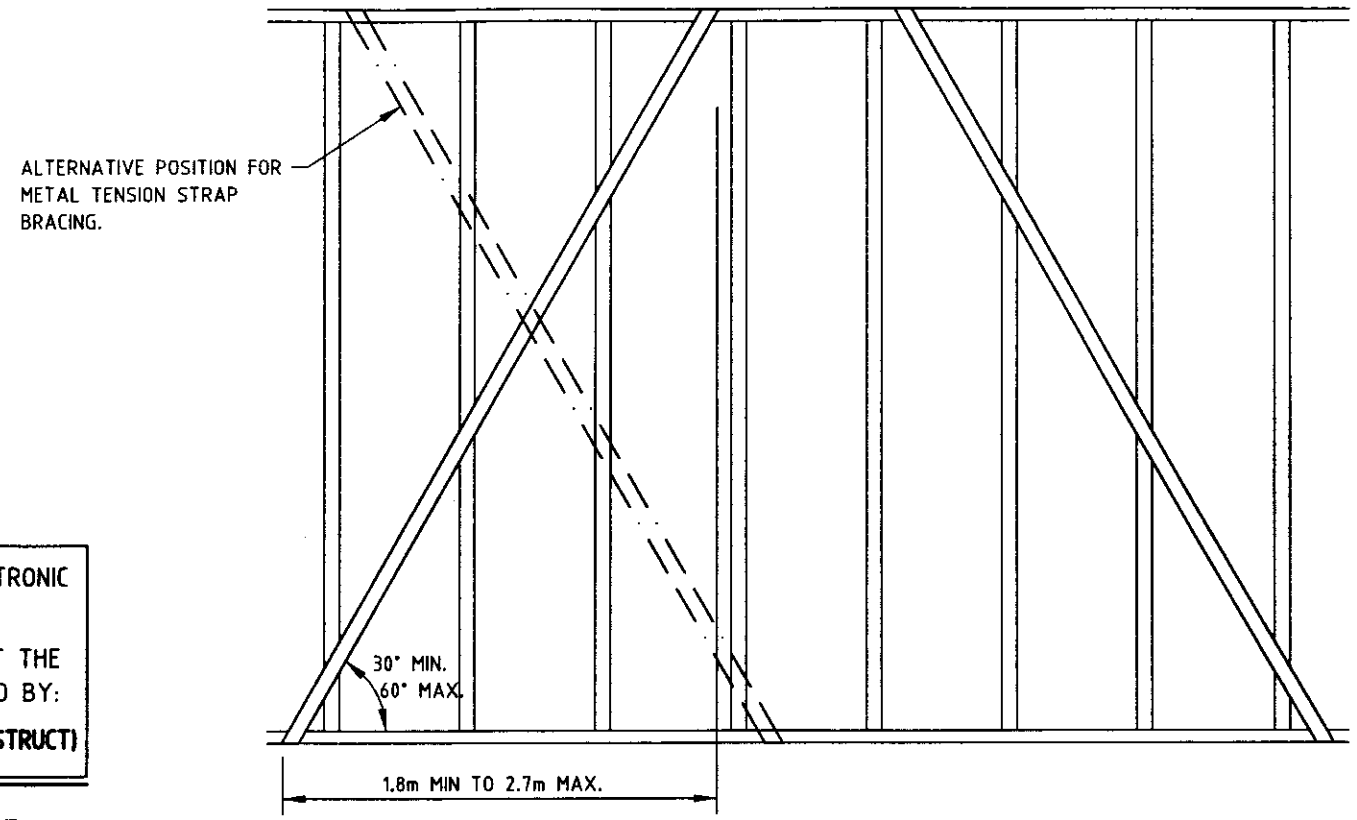

TYPE A - PAIRED DIAGONAL TIMBER OR METAL BRACING UNITS

NOTES : 1. A COMBINATION OF ANGLE & STRAP BRACING CAN BE USED.

2. REFER TO TABLE 1 ON SHEETS B5 FOR TOP & BTM PLATE FIXING DETAILS.

TYPE OF DIAGONAL BRACE	MATERIAL & SIZE	NAILING REQUIREMENTS		SPECIAL REQUIREMENTS
		TO EACH STUD	TO EACH PLATE	
TIMBER	50 x 19mm FOR STUDS TO 2.7m LONG.	1/50 x2.8 mm Ø	1/50 x2.8 mm Ø	TIMBER BRACES TO BE FREE FROM KNOTS AND END SPLITS. DRILL HOLES IF NECESSARY TO PREVENT NAIL SPLITTING.
	75 x 19mm FOR STUDS LONGER THAN 2.7m	1/50 x2.8 mm Ø	1/50 x2.8 mm Ø	
	50 x 15mm FOR SINGLE STOREY STUDS	1/50 x2.8 mm Ø	1/50 x2.8 mm Ø	
METAL ANGLE	GALVANIZED ANGLE, NOM. SECTION 20 x 18 x 1.2mm MIN. NET SECTION 42mm²	1/30 x 2.8mmØ GALV. FLAT HEAD NAIL.	2/30 x 2.8mmØ GALV. FLAT HEAD NAIL.	DRILL HOLES IF NECESSARY TO PREVENT NAIL SPLITTING.
TENSION STRAP	GALVANIZED FLAT METAL TENSION STRAPPING OF MIN. THICKNESS 0.8mm & MIN. NET SECTION OF 15.2mm²	1/30 x 2.8mmØ GALV.FLAT HEAD NAIL.	1/30 x 2.8mmØ GALV. FLAT HEAD NAIL.	STRAPS MUST BE PROPERLY TENSIONED.

CONSTRUCTION CERTIFICATE No. 048

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JOB NO.	SHEET	REVISION
347048	S12	A

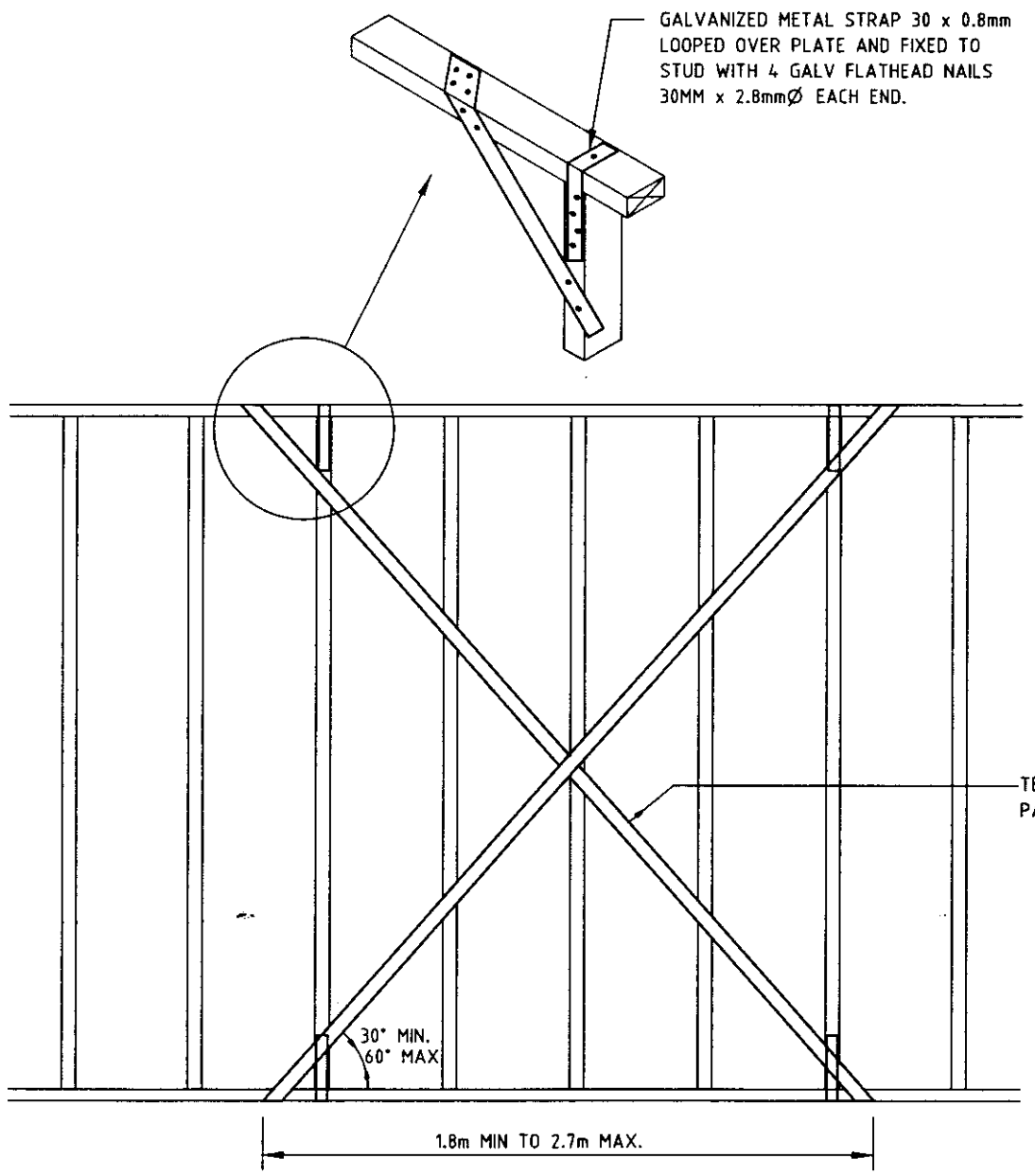
PROJECT PROPOSED RESIDENCE FOR MR & MRS S NICHOLLS
AT LOT 78 INGLESIDE ROAD, INGLESIDE
BUILDER: MEADOWBANK HOMES

YOUR REF:

DRAWN	CHECKED	SCALE
SW		NTS
DESIGNED	DATE	
PG	09.10.03	

L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL AND STRUCTURAL)

SHEET 12 SET OF 14

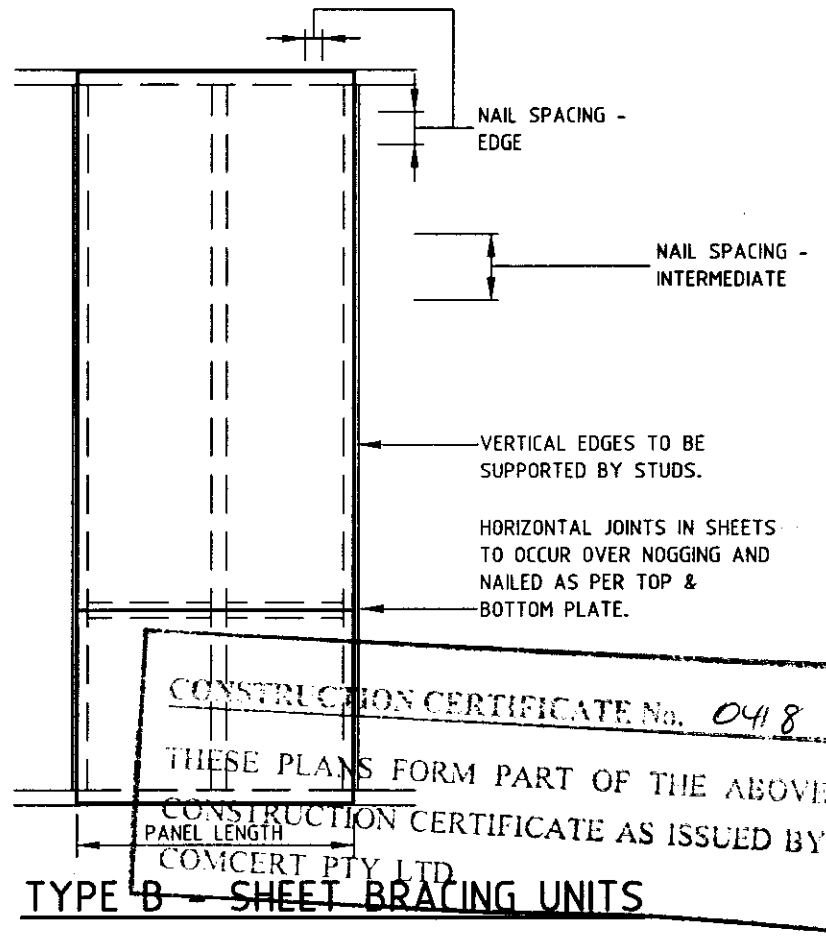


TYPE B - DIAGONAL METAL TENSION STRAP BRACING

NOTE : REFER TO TABLE 1 ON SHEETS B5 FOR TOP & BTM PLATE FIXING DETAILS.

TYPE OF DIAGONAL BRACE	MATERIAL & SIZE	NAILING REQUIREMENTS		SPECIAL REQUIREMENTS
		TO EACH STUD	TO EACH PLATE	
TENSION STRAP	GALVANIZED FLAT METAL TENSION STRAP NOM SIZE 30 x 0.8mm & MIN. SECTION OF 24mm²	2/30 x 3.15mmØ GALV. FLATHEAD NAILS.	4/30 x 3.15mmØ GALV. FLATHEAD NAILS.	STRAPS MUST BE PROPERLY TENSIONED AND STRAP MUST RETURN OVER TOP PLATE & UNDER BOTTOM PLATE. THE STUD NEAREST TO EACH END OF EACH DIAGONAL STRAP SHALL BE FIXED TO THE PLATES WITH STRAPS OR FRAMING ANCHORS 4/30 x 2.8mmØ NAILS AT EACH END.

PRODUCT	AUSTRALIAN STANDARD	TYPE/ GRADE	MINIMUM THICKNESS (mm) FOR STUD SPACING (mm).		PANEL LENGTH (mm)	NAIL SIZE (mm)	NAIL SPACING (mm)		SPECIAL REQUIREMENTS
			450	600			EDGE	INTERMEDIATE	
PLYWOOD	AS 2269	F8 F11 F14 F27	7 6 4 4	9 7 6 4.5	900	2.8 x 30 GALV.	50 TO PLATES & 150 TO EDGE STUDS.	300	NO NOGGING REQ'D EXCEPT AT SHEET ENDS. NAILS SHALL BE 7mm FROM ALL EDGES.
HARDBOARD (MASONITE)	AS 2458	G.P.	6.4	6.4	900	2.8 x 25 GALV.	50	300	NAILS TO BE 10mm FROM VERTICAL EDGES AND 20mm FROM HORIZONTAL EDGES. NO NOGGING REQ'D EXCEPT AT SHEET ENDS.



TYPE B - SHEET BRACING UNITS

NOTES - 1. PANEL LENGTHS GREATER THAN THOSE LISTED ABOVE CAN BE CONSIDERED AS A NUMBER OF BRACING UNITS DIRECTLY PROPORTIONED TO THEIR INSTALLED LENGTH, I.E A 12000mm PANEL OF PLYWOOD EQUALS 1200/900 = 1.33 BRACING UNITS.

2. REFER TO TABLE 1 ON SHEETS B5 FOR TOP & BTM PLATE FIXING DETAILS.

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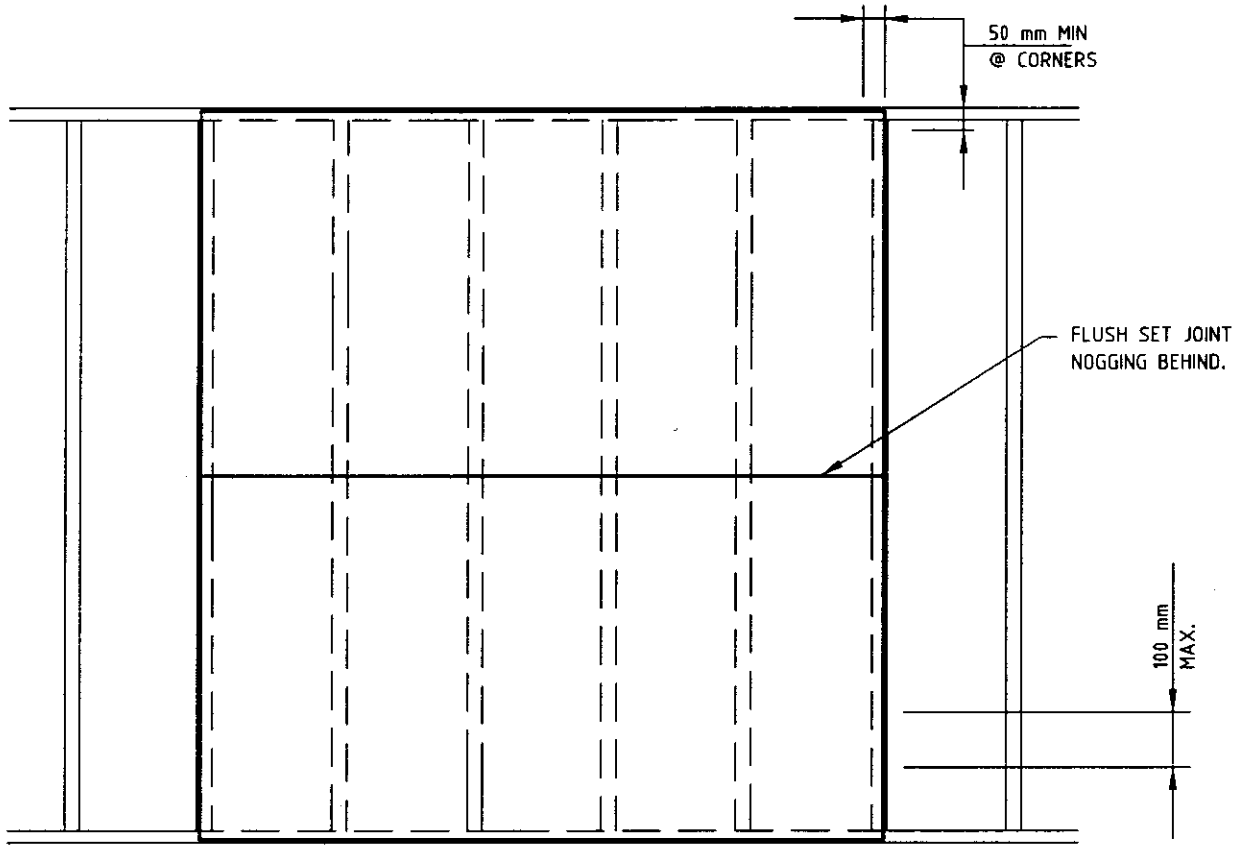
PROJECT PROPOSED RESIDENCE FOR MR & MRS S NICHOLLS
AT LOT 78 INGLESIDE ROAD, INGLESIDE
BUILDER: MEADOWBANK HOMES

YOUR REF:

L.D. APPLEYARD M.I.E. AUST. NPER-3 (CIVIL AND STRUCTURAL)

JOB NO.	SHEET	REVISION
347048	S13	A
DRAWN SW	CHECKED	SCALE
DESIGNED PG	DATE 09.10.03	NTS
SHEET 13	SET OF 14	



HARDIES VILLABOARD BRACING DETAILS

BRACING TYPE	PLATE	FIXING DETAILS
TYPE A	BOTTOM PLATE TO JOISTS	2/75mm NAILS @ 600mm CENTRES ALONG JOIST FOR PLATES TO 388mm THICK AND 2/90mm NAILS @ 600mm CENTRES ALONG JOIST FOR PLATE TO 50mm THICK.
	BOTTOM PLATE TO SLAB	1/75mm MASONRY NAIL AT MAXIMUM 1200mm CENTRES FOR 38mm THICK PLATES. 1/90mm MASONRY NAIL AT MAXIMUM 1200mm CENTRES FOR 50mm THICK PLATES.
TYPE B	BOTTOM PLATE TO JOISTS	1/M10 BOLT OR 1/30 x 0.8 GALVANISED METAL STRAP AT MAXIMUM 1200mm CENTRES ALONG JOIST OR TO EVERY SECOND JOIST. STRAP TO HAVE 3/30 x 2.8mm Ø NAILS EACH END.
	BOTTOM PLATE TO SLAB	1/M10 BOLT OR CAST IN GALVANISED METAL BOTTOM PLATE CONNECTOR AT EACH END OR BRACING UNIT AND AT 1200mm MAXIMUM CENTRES.
ALL TYPE A or B	TOP PLATE TO CEILING OR ROOF FRAMING	JOISTS, BATTENS OR RAFTERS SHALL BE FIXED TO TOP PLATES WITH 2/75mm NAILS AT EACH CROSSING AT MAXIMUM OF 1200mm CENTRES ALONG THE TOP PLATE. TRUSSES CAN BE FIXED TO TOP PLATE USING BLOCKING OR PROPRIETARY CONNECTORS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

NOTES: 1) FIXING SHOULD COMMENCE AS CLOSE AS POSSIBLE TO THE ENDS OF EACH BRACING UNIT.
2) TRUSS TO TOP PLATES MUST BE DESIGNED TO PROVIDE LATERAL LOAD TRANSFER WHILE ALLOWING TRUSS TO SETTLE UNDER DEAD LOAD.

SUB FLOOR BRACING:

ALL BRACING SHALL BE FIXED TO THE FLOOR OR FOOTING BELOW AND THE FLOOR ABOVE TO ENABLE THE TRANSFER OF THE FULL DESIGN STRENGTH OF THE BRACING SYSTEM.

BRACING IN THE SUB-FLOOR SHALL BE EVENLY DISTRIBUTED. THE MAXIMUM DISTANCE BETWEEN BRACING SETS, STUMPS, PIERS, WALLS OR POSTS, ETC. UNDER A PLATFORM STRIP OR SHEET TIMBER FLOOR SYSTEM SHALL BE 1400mm PROVIDED THE MINIMUM WIDTH OF THE FLOOR IS 6000mm.

SHEETS SHOULD BE FIXED TO TIMBER FRAMED BRACING WALLS WITH 30 x 2.8mm FIBRE CEMENT NAILS. (GALVANISED)

NAILS SHOULD BE DRIVEN JUST BELOW THE SURFACE OF THE SHEET USING THE HAMMER FACE ONLY.

NAILS MUST NOT BE PUNCHED.

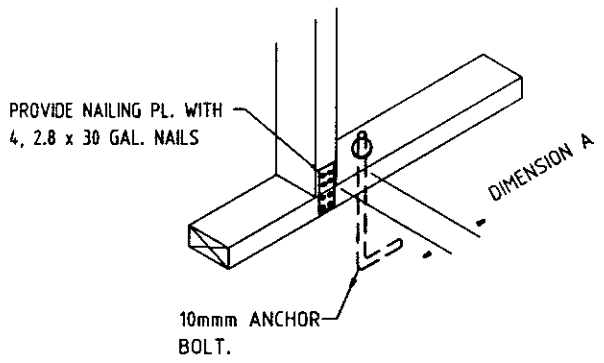
ANCHOR BOLTS MUST BE PLACED AT BOTH ENDS OF EACH SECTION OF BRACING WALL & NOT AT MORE THAN 2.4M CTS.

ANCHOR BOLTS MUST BE LOCATED WITHIN DIMENSION 'A' OF THE ADJACENT FACE OF THE END STUDS AS SHOWN ABOVE AND IN THE TABLE FOLLOWING.

BETWEEN ANCHOR BOLTS ONE M10 BOLT SHALL BE PROVIDED AT A MAXIMUM OF 1.2M CTS TO FURTHER FIX THE BOTTOM PLATE TO THE SUB-STRUCTURE.

MAXIMUM DIMENSION 'A' WITH TOP & BOTTOM PLATE OF		
75 x 38 F14	70 x 45 F5	70 x 35 F5
220	110	60

ANCHORING DETAIL



TYPICAL NAILING PLATE & ANCHOR BOLT

ANCHOR BOLTS ARE 10mm " AND ARE FOR TYING THE WALL'S BTM PLATE TO THE SUB-STRUCTURE.
A STANDARD 30MM " FLAT ROUND WASHER MUST BE USED UNDER EACH NUT , EXCEPT WHERE TIE DOWN STRAPS ARE USED.
M10 CHEMSET ANCHORS MAY REPLACE ANCHOR BOLTS.

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JOB NO.	SHEET	REVISION
347048	S14	A

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BUILDER: MEADOWBANK HOMES

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SHEET 14 SET OF 14

CONACHER TRAVERS

bushfire & ecological consultants

BUSHLAND MANAGEMENT CONCEPT PLAN

LOT 78 (No. 6) INGLESIDE ROAD INGLESIDE

MAY 2003
(REF: 3177V)

Conacher Travers Pty Ltd - ABN 49 083 610 173
70 Chivers Road, Somersby NSW 2250, PO Box 7128 Kariong NSW 2250 • **phone: (02) 4372 1244** • fax: (02) 4372 1528
email: ecology@conachertravers.com.au • bushfire@conachertravers.com.au

BUSHLAND MANAGEMENT CONCEPT PLAN

LOT 78 (No. 6) INGLESIDE ROAD
INGLESIDE

MAY 2003

CONACHER TRAVERS PTY LTD

Environmental Consultants

70 Chivers Rd Somersby
(ph: 4372 1244 fax: 4372 1528)
email: ecology@conachertravers.com.au

Document No	Issue	Description	Preparation date	Verification by Director	Approved by Director
3177V	May 2003	Final	April 2003	PC	

PREFACE

This Bushland Management Concept Plan has been prepared by *Conacher Travers Pty Ltd* to identify matters in relation to the proposed development of land at Lot 78 (No. 6) Ingleside Road, Ingleside, as identified in Pittwater Councils Development Control Plan – No 25 Conservation of Biodiversity (2000).

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TABLE OF CONTENTS

SECTION 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This Bushland Management Concept Plan (BMCP) has been prepared by *Conacher Travers Pty Ltd* to provide details on the management of vegetation on the site during and after the proposed development of land at Lot 78 (No. 6) Ingleside Road, Ingleside. The purpose of this BMCP is to provide details to Council in regards to:

- The procedures that were utilised in the assessment of the trees and vegetation on the site;
- The proposed works required for vegetation management and the methodology for the undertaking of such works;
- The likely impacts of the proposed works, both within and external to the site;
- The proposed measures to mitigate against the impacts that may occur, including a works program and specification detailing the timely implementation of mitigating measures corresponding to the staging of works.

In preparing this BMCP information from various documents or site reports was utilised. Brief details on these are provided below:

1. **Development Control Plan N° 25 - Conservation of Biodiversity (Pittwater Council, August 2000a).**

   Council have identified that a BMCP is required in accordance with the DCP for the Conservation of Biodiversity due to the area of vegetation. Section 4.2d of DCP for the Conservation of Biodiversity identifies that a BMCP should include:

   i) Conservation of flora and fauna – protection of retained native vegetation, habitat or elements of biodiversity;
   ii) Domestic and feral animal control;
   iii) Noxious and bushland weed control with follow up weeding and maintenance of bushland on site;
   iv) The recommended fire regime for the ecology of the site;
   v) Soil management and drainage issues that impact on bushland;
   vi) Planting of 80% locally indigenous plants;
   vii) Site management - during construction works including silt fencing and exclusion fencing around native vegetation habitats and natural features.

2. **Flora and Fauna Assessment Report (Conacher Travers, May 2003)**

   A detailed Flora and Fauna Survey was completed by *Conacher Travers* to determine the flora and fauna species on the site and to provide an assessment in relation to threatened species in accordance with the Threatened Species Conservation Act (1995). This report identified the vegetation on the subject site as being Low Open Woodland / Open Scrub.

   The following threatened species were considered to have suitable habitat present.

   - Rosenberg's Goanna;

- Glossy Black-Cockatoo;
- Superb Fruit-dove;
- Regent Honeyeater;
- Swift Parrot;
- Barking Owl;
- Sooty Owl;
- Masked Owl;
- Powerful Owl;
- Squirrel Glider;
- Southern Brown Bandicoot;
- Eastern Pygmy Possum;
- Grey-headed Flying-fox;
- Common Bentwing-bat;
- Little Bentwing-bat;
- Eastern Freetail-bat;
- Eastern False Pipistrelle;
- Greater Broad-nosed Bat.

The site is located within the area identified as containing the following endangered populations.

- Koalas in the Pittwater Local Government Area.

3. Urban Bushland Management Guidelines (Dept. of Planning, 1991)

The Development Control Plan N° 25 - Conservation of Biodiversity (Pittwater Council, 2000a) states that the Dept. of Urban Affairs and Planning's Guidelines for Preparing Management Plans for Urban Bushland should, in conjunction with the DCP, be followed when preparing a management plan.

The Urban Bushland Management Guidelines (Dept. of Planning, 1991) contain a number of relevant strategies, which are aimed at maintaining and enhancing native flora and fauna and their habitats. These strategies identified are also included in the Draft Development Control Plan for the Conservation of Biodiversity in Pittwater: Requirements for Development Applications (Pittwater Council, 2000a).

4. Management Plan for Threatened Fauna and Flora in Pittwater (Pittwater Council, 2000b).

The Development Control Plan N° 25 - Conservation of Biodiversity (Pittwater Council, 2000) states that Management Plan for Threatened Fauna and Flora in Pittwater should, in conjunction with the DCP, be followed when preparing a management plan.

The Management Plan for Threatened Fauna and Flora in (Pittwater Council, 2000) contains a number of management issues and relevant strategies, which are aimed at maintaining and enhancing threatened native flora and fauna habitats.

1.2 PROCEDURE FOR PREPARING BUSHLAND MANAGEMENT CONCEPT PLAN

This BMCP is the culmination of detailed site investigations, consultations with the client and incorporation of information as required by Pittwater Councils DCP for the Conservation of Biodiversity.

The following procedures were implemented during the preparation of the BMCP:

i) Initial project meeting with client to discuss project;

ii) Vegetation field survey by environmental consultant;

iii) Consideration of the location of the proposed dwellings and associated infrastructure within the subject site to minimise the impact on areas of natural vegetation where possible or where considered practical in regards to location of the future dwellings;

iv) Recommendations on the preparation of landscape plan identifying principal species proposed for planting, and details regarding planting and maintenance.

The following section of this BMCP identifies issues relevant to construction of the proposed dwellings, retention of vegetation and future management of the site in relation to vegetation management.

1.3 VEGETATION CHARACTERISTICS

The vegetation of the subject site consists of approximately 0.3 hectares of a mosaic of Low Open Woodland and Open Scrub. This vegetation is similar to the Hawkesbury Sandstone Heath described in Pittwater Council (2000a) and Coastal Sandstone Heath: Open Heath – Closed Scrub: *Allocasuarina distyla – Banksia ericifolia* (Map unit 21g iii) described by Benson and Howell (1994). The low open woodland is most similar to the Sydney Sandstone Ridgetop Woodland: Woodland / Low Woodland: *Corymbia gummifera - Eucalyptus haemastoma – E. umbra – Angophora costata* (Map Unit 10ar i) described by Benson and Howell (1994). A description of this vegetation community is provided below while a detailed species list for the site is provided in Table 1.

No threatened flora species as listed in the *Threatened Species Conservation Act* (1995) or significant plant species as listed in DCP No 25 – Conservation of Biodiversity (Pittwater Council, 2000) were observed on the subject site.

LOW OPEN WOODLAND / OPEN SCRUB

Structure:

Trees: To 10 metres in height, with a variable projected foliage cover (PFC) to 15%.

Shrubs: To 4.5 metres in height with 60 - 70% PFC.

Groundlayer: To 1.5 metres in height with a PFC up to 55%.

Floristics:

(Main Species Present)

Trees: *Corymbia gummifera* (Red Bloodwood), *Angophora costata* (Smooth-barked Apple), *Eucalyptus umbra* (Broad-leaved White Mahogany), *Eucalyptus punctata* (Sydney Grey Gum) and *Eucalyptus multicaulis* (Whip-stick Ash).

Shrubs: *Allocasuarina distyla* (Scrub She-oak), *Banksia ericifolia* (Heath-leaved Banksia), *Hakea gibbosa*, *Darwinia fascicularis subsp. fascicularis*, *Leptospermum squarrosum* and *Leptospermum trinervium* (Flaky-barked Tea Tree).

Groundlayer: *Entolasia stricta* (Wiry Panic), *Actinotus minor* (Lesser Flannel Flower), *Caustis pentandra*, *Xanthosia tridentata* (Rock Xanthosia), *Lepyrodia scariosa* (Scale Rush), *Paspalum dilatatum* (Paspalum), *Dianella caerulea* var. *producta* (Blue Flax Lily), *Conyza albida** (Fleabane) and *Hemigenia purpurea* (Narrow-leaved Hemigenia).

Disturbance:
This community has been disturbed by trampling, weed invasion and minor clearing of understorey vegetation for survey purposes.

Weed Invasion:
This community exhibits generally low levels of weed invasion however along the edge of Ingleside Road and the southern boundary, disturbances have led to moderate to high levels of invasion.

Variation:
The density of trees is generally greater along Ingleside Road and the south-eastern boundary of the subject site. The height and cover of shrubs is generally greater towards the east and north.

Location and Distribution:
This vegetation community occupies the entire subject site.

TABLE 1
FLORA SPECIES OBSERVED ON THE SUBJECT SITE

Scientific Name	Common Name
TREES	
Acacia elata	Cedar Wattle
Angophora costata	Smooth-barked Apple
Angophora hispida	Dwarf Apple
*Cinnamomum camphora**	Camphor Laurel
Corymbia gummifera	Red Bloodwood
Eucalyptus multicaulis	Whip-stick Ash
Eucalyptus punctata	Grey Gum
Eucalyptus umbra	Broad-leaved White Mahogany
Syncarpia glomulifera	Turpentine
SHRUBS	
Acacia saligna	Orange Wattle
Acacia floribunda	Sally Wattle
Acacia longifolia var. *longifolia*	Sydney Golden Wattle
Acacia lunata	Box-leaved Wattle
Acacia terminalis	Sunshine Wattle
Acacia ulicifolia	Prickly Moses
Allocasuarina distyla	Scrub She-oak
Allocasuarina littoralis	Black She-oak
Astrotricha longifolia	Long-leaf Star-hair
Banksia ericifolia	Heath-leaved Banksia
Banksia oblongifolia	-
Banksia serrata	Old Man Banksia

TABLE 1 (Cont.)
FLORA SPECIES OBSERVED ON THE SUBJECT SITE

Scientific Name	Common Name
SHRUBS (Cont.)	
Bauera rubioides	River Rose
Boronia ledifolia	Sydney Boronia
Bossiaea scolopendria	-
Callistemon citrinus	Crimson Bottlebrush
Darwinia fascicularis subsp. fascicularis	-
Dillwynia retorta subsp. retorta	Eggs and Bacon
Elaeocarpus reticulatus	Blueberry Ash
Epacris longiflora	Native Fuschia
Epacris microphylla	Coral Heath
Epacris pulchella	NSW Coral Heath
Eriostemon australasius subsp. australasius	Pink Wax Flower
Glochidion ferdinandi	Cheese Tree
Gompholobium minus	Dwarf Wedge-pea
Grevillea buxifolia subsp. buxifolia	Grey Spider Flower
Grevillea sericea	Pink Spider Flower
Hakea dactyloides	Broad-leaved Hakea
Hakea gibbosa	-
Hakea teretifolia	Dagger Hakea
Kunzea ambigua	Tick Bush
*Lantana camara**	Lantana
Leptospermum polygalifolium subsp. polygalifolium	Lemon Scented Tea Tree
Leptospermum squarrosum	-
Leptospermum trinervium	Flaky-barked Tea Tree
*Ligustrum sinense**	Small-leaved Privet
Melaleuca hypericifolia	-
*Ochna serrulata**	Mickey Mouse Plant
Omalanthus populifolius	Bleeding Heart
Persoonia lanceolata	Lance-leaved Geebung
Petrophile pulchella	Conesticks
Phebalium squamulosum subsp. squamulosum	-
Phyllota phylicoides	Heath Phyllota
Pittosporum undulatum	Sweet Pittosporum
Platysace linearifolia	Narrow-leafed Platysace
*Polygala myrtifolia**	-
Polyscias sambucifolia	Elderberry Panax
Pultenaea tuberculata	-
Senna pendula var. *glabrata**	-
Styphelia tubiflora	-
GROUNDCOVERS	
*Acetosa saggitata**	Turkey Rhubarb
Actinotus minor	Lesser Flannel Flower
*Agapanthus praecox**	Agapanthus

TABLE 1 (Cont.)
FLORA SPECIES OBSERVED ON THE SUBJECT SITE

Scientific Name	Common Name
GROUNDCOVERS (Cont.)	
*Ageratina adenophorum**	Crofton Weed
Alternanthera denticulata	Lesser Joyweed
*Amaranthus sp.**	-
*Bidens pilosa**	Cobbler's Pegs
Caustis pentandra	-
*Conyza albida**	Fleabane
*Cortaderia selloana**	Pampas Grass
Cynodon dactylon	Common Couch
Dianella caerulea var. *producta*	Blue Flax Lily
Empodisma minus	-
Entolasia marginata	Bordered Panic
Entolasia stricta	Wiry Panic
Hemigenia purpurea	Narrow-leaved Hemigenia
Hibbertia fasciculata	-
Hypolepis muelleri	Harsh Ground Fern
Imperata cylindrica var. *major*	Blady Grass
Lepidosperma laterale	Variable Sword-sedge
Lepyrodia scariosa	Scale Rush
Lomandra filiformis var. *filiformis*	Wattle Mat-rush
Lomandra glauca	-
*Nephrolepis cordifolia**	Fish-bone Fern
Oplismenus aemulus	Basket Grass
*Paspalum dilatatum**	Paspalum
*Plantago lanceolata**	Ribwort
*Protasparagus aethiopicus**	Asparagus Fern
Pteridium esculentum	Bracken
*Sida rhombifolia**	Paddy's Lucerne
*Tagetes minuta**	Stinking Roger
Tetratheca ericifolia	Black-eyed Susan
*Tradescantia fluminensis**	Wandering Jew
*Verbena bonariensis**	Purpletop
Xanthorrhoea resinosa subsp. resinosa	-
Xanthosia tridentata	Rock Xanthosia
VINES	
*Araujia hortorum**	Mothvine
Billardiera scandens var. *scandens*	Apple Dumplings
Glycine tabacina	Twining Glycine
*Passiflora edulis**	Common Passionfruit
Smilax glyciphylla	Sarsaparilla
Stephania japonica var. *discolor*	Snake Vine

Species name[TS] = Threatened Species

* = Introduced Species

SECTION 2

VEGETATION MANAGEMENT STRATEGY

2.1 ISSUES TO BE ADDRESSED IDENTIFIED IN PITTWATER COUNCIL (2000a)

Due to the small size of the site, existing disturbance, location within a residential area and the type of proposed development the opportunities to conserve and/or manage any retained bushland on the site are very limited. In this situation it is recommended that the management of weed species be the priority for this site, thus reducing impacts on bushland adjoining to the east.

2.1.1 CONSERVATION OF NATIVE FLORA AND FAUNA

Due to the small size of the site the retention of native vegetation will be limited. The site however adjoins a large area of natural bushland to the east and it is recommended that with weed management this bushland will adequately provide for the conservation and preservation of the local flora and fauna. Furthermore, the incorporation of native species in landscaped areas is also considered to maintain potential foraging resources for possums, gliders, nectivorous birds and insects.

2.1.2 DOMESTIC AND FERAL ANIMAL CONTROL

The subject site forms part of a natural area of bushland that is part of a larger remnant of vegetation that extends to the east. The subject site is bounded by Ingleside Road to the west with bushland interspersed with developed areas existing to the north and south of the subject site.

The location of the subject site indicates that implementing any feral or domestic animal controls on the subject site alone would be difficult. It is considered that the retention of dense native vegetation between Ingleside Road and the remainder of the lot will provide the best means of protecting native fauna by providing protection from predation from feral animals.

2.1.3 BUSHLAND MAINTENANCE AND REHABILITATION WORKS

Weed invasion within the subject site is a result of previous and current disturbances such as vegetation clearing, urban runoff, surrounding urban development and garden escapes.

It is the objective of maintenance works to maintain the natural vegetation and to prevent degredation of the adjoining bushland to the east of the site. This will involve the removal of weed infestations and the planting of suitable native species in landscaped areas.

To complete these works, the following will need to be undertaken:

- The vines *Araujia hortorum* (Moth vine) and *Passiflora edulis* (Common Passionfruit) are to be scraped and painted with suitable systemic herbicide. Alternatively these plants can be removed by hand ensuring all root systems remain off the ground.

- Ochna serrulata (Mickey Mouse Plant)(W4b) should also be stem scraped and poisoned with suitable herbicide.

- *Acetosa sagittata* (Turkey Rhubarb)(W4b), *Cortaderia selloana* (Pampas Grass)(W2), *Nephrolepis cordifolia* (Fish-bone Fern) and *Protasparagus aethiopicus* (Asparagus), are to be dug out ensuring all underground rhizomes, root systems and bulbs are removed from site or remain stockpiled off the ground.

- All other weed species, such as *Cinnamomum camphora* (Camphor Laurel), *Lantana camara* (W2), *Ligustrum sinense* (Small-leaved Privet)(W4b), *Polygala myrtifolia*, *Senna pendula var. glabrata*, *Bidens pilosa* (Cobbler's Pegs), *Ageratina adenophora* (Crofton Weed), *Amaranthus* sp. (Amaranthus), *Conyza albida* (Fleabane), *Paspalum dilatatum* (Paspalum), *Plantago lanceolata* (Ribwort), *Sida rhombifolia* (Paddy's Lucerne), *Tagetes minuta* (Stinking Roger), *Tradescantia fluminensis* (Wandering Jew) and *Verbena bonariensis* (Purple Top), are to be removed by appropriate methods such as digging from the ground (for smaller specimens) or cutting / sawing the trunks of larger specimens. Remaining stumps are to be poisoned with a suitable systemic herbicide (Roundup bioactive or similar) following the manufacturers recommendations. All seed heads from exotic species are to be removed from site.

- Weeds and exotic vegetation will be stockpiled ensuring root systems are not in contact with the ground in a clear area away from adjoining vegetation. If required this stockpile will be removed from the site at a convenient time. As part of the regular maintenance of the area any regrowth of the exotic plant species will be removed and disposed of appropriately.

- Ongoing maintenance of the site will involve a continual weed removal program.

The initial stages of the plan are estimated to take approximately two weeks, the ongoing maintenance period for the restoration process should continue for at least two years to be effective.

Monitoring of the progress of weed removal and natural regeneration should be undertaken on a quarterly basis with progress reports, including photographs, prepared and forwarded to Pittwater Council.

2.1.4 RECOMMENDED ECOLOGICAL FIRE REGIME

Given that the subject site is within an urban area it is not possible to have an ecologically beneficial fire regime. Bushfire hazard reduction procedures will need to include the physical removal of ground fuel and combustible shrub material on a continual basis.

2.1.5 SOIL EROSION AND DRAINAGE ISSUES

The objective of storm water management is to ensure drainage from the proposed development does not adversely impact on vegetated areas. This is best achieved by diverting storm water away from vegetated areas. Stormwater management in the form of retention tanks and controlled flow structures are accepted components of the storm water design for this type of development. Details regarding the erosion and sediment control measures and storm water management measures are detailed in the engineering plans and reports accompanying the Development Application.

Erosion and sediment control measures are to be implemented to minimise adverse effects as a result of increased erosion and sediment loading. These include: the safe disposal of waste products, coordinated work practices aimed at minimising land disturbance, the disposal of 'clean' water off site, The minimisation of groundcover disturbance through the dedication of 'no go areas', routine site inspections of drains, channels, sediment control structures and water quality.

The minimisation of soil erosion will be achieved through soil stabilisation measures and water control techniques. Soil stabilisation measures to be implemented include, immediate revegetation of cleared surfaces via seeding, planting of native species, mulching and the installation of biodegradable blankets. Water control measures include, construction of earth banks and catch drains, grassed and armoured waterways, rock earth and sand bag dams and outlet protection systems.

2.1.6 LANDSCAPING AND REVEGETATION

At this stage no detailed landscape or vegetation replacement plan has been prepared. It would be appropriate that such a plan be prepared in accordance with Council's DCP 25 - Conservation of Biodiversity.

2.1.7 SITE MANAGEMENT DURING CONSTRUCTION

Inspections of the site by the Environmental Consultant will be undertaken prior to and during the construction operations to ensure that habitats designated for retention are adequately marked and that other appropriate protection procedures are being maintained.

Construction and landscape works are likely to alter the environment and soil properties surrounding the vegetation retained on site. Therefore, the following management strategies are proposed to minimise damage to trees retained during the construction period.

Exclusion zones
The compaction of soil surrounding retained vegetation is detrimental to root growth by reducing water infiltration and soil oxygenation rates. A protection zone will be established surrounding vegetation to be retained which is in the vicinity of clearing or earthworks using star pickets and flagging tape. This will reduce the effects of soil compaction by prohibiting vehicle access and the stockpiling of construction material, soil and woodchips within the vegetation protection zone.

Silt Fencing
Erosion and sediment control measures are to be implemented to minimise adverse effects of increased erosion and sediment loading. These include: the safe disposal of waste products, coordinated work practices aimed at minimising land disturbance, the disposal of 'clean' water off site, the minimisation of vegetation disturbance through the dedication of 'no go areas', routine site inspections of drains, channels, sediment control structures and water quality.

The minimisation of soil erosion will be achieved through soil stabilisation measures and water control techniques. Soil stabilisation measures to be implemented include the immediate revegetation of cleared surfaces via seeding, planting of native species, mulching and the installation of biodegradable blankets. Water control measures include, construction of earth banks and catch drains, grassed and armoured waterways, rock earth and sand bag dams and outlet protection systems.

Mulching
Mulching is an efficient method to impede the establishment of weed species, soil erosion, compaction and desiccation. Woodchip or other suitable mulch is to be placed at a depth of 75-100mm covering any areas of tree replanting or landscape areas. Areas surrounding the trunks of trees are to be kept free from mulch, thereby reducing the incidence of collar rot on retained trees.

SECTION 3

IMPACT ASSESSMENT

3.1 SITE CLEARING

The proposed development will involve the clearing of the majority of vegetation throughout the site for the access route, proposed dwelling, and bush fire protection zones.

3.2 IMPACT MITIGATION

The mitigation of potential adverse impacts of construction to vegetation will be implemented through the following procedures:

i. Implementation of erosion and sediment control measures in accordance with Council's Policy;

ii. The implementation of the landscape strategy prepared in accordance with Council's DCP - Conservation of Biodiversity;

iii. Weed management of the site to minimise weed impact on the surrounding bushland.

iv. Protection of trees and vegetation outside of the areas of the construction area during building;

v. Regular inspections and reports on tree protection and vegetation management measures.

REFERENCES

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CONACHER TRAVERS

bushfire & ecological consultants

FAUNA AND FLORA ASSESSMENT REPORT

LOT 78 (No. 6) INGLESIDE ROAD INGLESIDE

CONSTRUCTION CERTIFICATE No. 048

THESE PLANS FORM PART OF THE ABOVE CONSTRUCTION CERTIFICATE AS ISSUED BY COMCERT PTY LTD

MAY 2003
(REF: 3177F)

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FAUNA AND FLORA ASSESSMENT REPORT

LOT 78 (No. 6) INGLESIDE ROAD
INGLESIDE

MAY 2003

CONACHER TRAVERS PTY LTD

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PREFACE

This Assessment Report has been prepared by *Conacher Travers Pty Ltd* to provide information regarding flora and fauna, threatened species habitat, endangered ecological communities and endangered populations on Lot 78 (No. 6) Ingleside Road, Ingleside. This Report provides an assessment of the proposed development according to Section 5(A) of the *Environmental Planning and Assessment (EP&A) Act* (1979).

PROJECT TEAM

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TABLE OF CONTENTS

SECTION 1

INTRODUCTION

1.1 INTRODUCTION

This report provides an assessment of flora and fauna, threatened species habitat, endangered ecological communities and endangered populations on Lot 78 (No. 6) Ingleside Road, Ingleside in accordance with Section 5A of the *EP&A Act* (1997). Additionally. This report also provides an assessment in accordance with Development Control Plan No. 25 – Conservation of Biodiversity (Pittwater Council, 2000a).

The planning and cadastral details of the subject site are provided in Table 1.1 while Table 1.2 summarises the geographical characteristics of the site.

TABLE 1.1
SITE DETAILS

Location	Lot 78 (No. 6) Ingleside Road, Ingleside
Area	Approximately 0.3 hectares
Topographic Map	Mona Vale 1:25 000
Grid Reference	340200 E, 6270900 N
Local Government Area	Pittwater
Existing Land Use	Vacant
Proposed Development	Proposed residential development

TABLE 1.2
SITE CHARACTERISTICS

Topography	Gently sloping plateau
Slope	Approximately 100m AHD – approximately 8-10% slope
Aspect	East
Soil Type	Shallow sandy soils with sandstone outcrops in the Oxford Falls Soil Landscape
Catchment	Narrabeen Lakes
Drainage	Overland flow into Mullet Creek which flows into Narrabeen Lakes. .
Vegetation	Low Open Woodland / Open Heath

1.2 PROPOSED DEVELOPMENT

The proposed development is for the construction of a residential building with associated infrastructure and bushfire hazard protection zones.

SECTION 2

FLORA CHARACTERISTICS

2.1 FLORA SURVEY METHODOLOGY

To determine the likely and actual occurrence of flora species and plant communities on the subject site field survey work was undertaken to supplement literature reviews and previous flora surveys of the area. The methods utilised for the flora survey included:

Literature Review

A review of available literature for the area was undertaken to obtain reference material and background information for this study. These documents are listed in the References section of this Report.

A search of the Atlas of NSW Wildlife (NPWS, 2003) was undertaken to identify records of threatened flora species located within 10km of the site. The Sydney 1:100,000 Scale Map Sheet was accessed to provide a predictive list of threatened flora species likely to occur within the habitats found on the site.

Field Survey

Field surveys consisting of foot traverses of the site were conducted to identify the occurrence of flora species and the extent and location of vegetation communities present on the subject site. This survey was undertaken on the 15th April 2003.

Specimens of plants not readily discernible in the field were collected for identification. Determination of species composition and structural descriptions of the vegetation on the site was also carried out according to Specht *et. al.* (1995).

Shrub and Tree Survey

Three linear transects (approximately 50 metres long) covering all vegetation communities on the subject site were traversed on foot with observation and recording of all species occurring within 10 metres either side of the transect being undertaken. As part of the transects, a detailed search was conducted for threatened flora species known to occur in the area.

Any hollow bearing trees located within the area covered by these transects were assessed for their habitat value during this survey. Any additional hollow bearing trees located during the survey that were not within these transects were also assessed.

Forb and Herb Survey

Five X $1m^2$ quadrats were distributed along each of the transects and were sampled for the smaller flora species such as herbs and orchids.

A detailed general search was also carried out for the smaller herbs, grasses and terrestrial orchids during the flora survey.

2.2 VEGETATION COMMUNITIES

The vegetation of the subject site consists of approximately 0.3 hectares of a mosaic of Low Open Woodland and Open Scrub. This vegetation is similar to the Hawkesbury Sandstone Heath described in Pittwater Council (2000a) and Coastal Sandstone Heath: Open Heath – Closed Scrub: *Allocasuarina distyla – Banksia ericifolia* (Map unit 21g iii) described by Benson and Howell (1994). The low open woodland is most similar to the Sydney Sandstone Ridgetop Woodland: Woodland / Low Woodland: *Corymbia gummifera - Eucalyptus haemastoma – E. umbra – Angophora costata* (Map Unit 10ar i) described by Benson and Howell (1994). A description of this vegetation community is provided below while a detailed species list for the site is provided in Table 2.1.

No threatened flora species as listed in the *Threatened Species Conservation Act* (1995) or significant plant species as listed in DCP No 25 – Conservation of Biodiversity (Pittwater Council, 2000a) were observed on the subject site.

LOW OPEN WOODLAND / OPEN SCRUB
Structure:

Trees: To 10 metres in height, with a variable projected foliage cover (PFC) to 15%.

Shrubs: To 4.5 metres in height with 60 - 70% PFC.

Groundlayer: To 1.5 metres in height with a PFC up to 55%.

Floristics:
(Main Species Present)

Trees: *Corymbia gummifera* (Red Bloodwood), *Angophora costata* (Smooth-barked Apple), *Eucalyptus umbra* (Broad-leaved White Mahogany), *Eucalyptus punctata* (Sydney Grey Gum) and *Eucalyptus multicaulis* (Whip-stick Ash).

Shrubs: *Allocasuarina distyla* (Scrub She-oak), *Banksia ericifolia* (Heath-leaved Banksia), *Hakea gibbosa*, *Darwinia fascicularis subsp. fascicularis*, *Leptospermum squarrosum* and *Leptospermum trinervium* (Flaky-barked Tea Tree).

Groundlayer: *Entolasia stricta* (Wiry Panic), *Actinotus minor* (Lesser Flannel Flower), *Caustis pentandra*, *Xanthosia tridentata* (Rock Xanthosia), *Lepyrodia scariosa* (Scale Rush), *Paspalum dilatatum* (Paspalum), *Dianella caerulea* var. *producta* (Blue Flax Lily), *Conyza albida** (Fleabane) and *Hemigenia purpurea* (Narrow-leaved Hemigenia).

Disturbance:
This community has been disturbed by trampling, weed invasion and minor clearing of understorey vegetation for survey purposes.

Weed Invasion:
This community exhibits generally low levels of weed invasion however along the edge of Ingleside Road and the southern boundary, disturbances have led to moderate to high levels of invasion.

Variation:
The density of trees is generally greater along Ingleside Road and the south-eastern boundary of the subject site. The height and cover of shrubs is generally greater towards the east and north.

Location and Distribution:
This vegetation community occupies the entire subject site.

TABLE 2.1
FLORA SPECIES OBSERVED ON THE SUBJECT SITE

SCIENTIFIC NAME	COMMON NAME
TREES	
Acacia elata	Cedar Wattle
Angophora costata	Smooth-barked Apple
Angophora hispida	Dwarf Apple
*Cinnamomum camphora**	Camphor Laurel
Corymbia gummifera	Red Bloodwood
Eucalyptus multicaulis	Whip-stick Ash
Eucalyptus punctata	Grey Gum
Eucalyptus umbra	Broad-leaved White Mahogany
Syncarpia glomulifera	Turpentine
SHRUBS	
Acacia saligna	Orange Wattle
Acacia floribunda	Sally Wattle
Acacia longifolia var. *longifolia*	Sydney Golden Wattle
Acacia lunata	Box-leaved Wattle
Acacia terminalis	Sunshine Wattle
Acacia ulicifolia	Prickly Moses
Allocasuarina distyla	Scrub She-oak
Allocasuarina littoralis	Black She-oak
Astrotricha longifolia	Long-leaf Star-hair
Banksia ericifolia	Heath-leaved Banksia
Banksia oblongifolia	-
Banksia serrata	Old Man Banksia
Bauera rubioides	River Rose
Boronia ledifolia	Sydney Boronia
Bossiaea scolopendria	-
Callistemon citrinus	Crimson Bottlebrush
Darwinia fascicularis subsp. fascicularis	-
Dillwynia retorta subsp. retorta	Eggs and Bacon
Elaeocarpus reticulatus	Blueberry Ash
Epacris longiflora	Native Fuschia
Epacris microphylla	Coral Heath
Epacris pulchella	NSW Coral Heath
Eriostemon australasius subsp. australasius	Pink Wax Flower
Glochidion ferdinandi	Cheese Tree
Gompholobium minus	Dwarf Wedge-pea

TABLE 2.1 (Cont.)
FLORA SPECIES OBSERVED ON THE SUBJECT SITE

SCIENTIFIC NAME	COMMON NAME
SHRUBS (Cont.)	
Grevillea buxifolia subsp. buxifolia	Grey Spider Flower
Grevillea sericea	Pink Spider Flower
Hakea dactyloides	Broad-leaved Hakea
Hakea gibbosa	-
Hakea teretifolia	Dagger Hakea
Kunzea ambigua	Tick Bush
*Lantana camara**	Lantana
Leptospermum polygalifolium subsp. polygalifolium	Lemon Scented Tea Tree
Leptospermum squarrosum	-
Leptospermum trinervium	Flaky-barked Tea Tree
*Ligustrum sinense**	Small-leaved Privet
Melaleuca hypericifolia	-
*Ochna serrulata**	Mickey Mouse Plant
Omalanthus populifolius	Bleeding Heart
Persoonia lanceolata	Lance-leaved Geebung
Petrophile pulchella	Conesticks
Phebalium squamulosum subsp. squamulosum	-
Phyllota phylicoides	Heath Phyllota
Pittosporum undulatum	Sweet Pittosporum
Platysace linearifolia	Narrow-leafed Platysace
*Polygala myrtifolia**	-
Polyscias sambucifolia	Elderberry Panax
Pultenaea tuberculata	-
Senna pendula var. *glabrata**	-
Styphelia tubiflora	-
GROUNDCOVERS	
*Acetosa saggitata**	Turkey Rhubarb
Actinotus minor	Lesser Flannel Flower
*Agapanthus praecox**	Agapanthus
*Ageratina adenophorum**	Crofton Weed
Alternanthera denticulata	Lesser Joyweed
*Amaranthus sp.**	-
*Bidens pilosa**	Cobbler's Pegs
Caustis pentandra	-
*Conyza albida**	Fleabane
*Cortaderia selloana**	Pampas Grass
Cynodon dactylon	Common Couch
Dianella caerulea var. *producta*	Blue Flax Lily
Empodisma minus	-
Entolasia marginata	Bordered Panic
Entolasia stricta	Wiry Panic
Hemigenia purpurea	Narrow-leaved Hemigenia

TABLE 2.1 (Cont.)
FLORA SPECIES OBSERVED ON THE SUBJECT SITE

SCIENTIFIC NAME	COMMON NAME
GROUNDCOVERS (Cont.)	
Hibbertia fasciculata	-
Hypolepis muelleri	Harsh Ground Fern
Imperata cylindrica var. *major*	Blady Grass
Lepidosperma laterale	Variable Sword-sedge
Lepyrodia scariosa	Scale Rush
Lomandra filiformis var. *filiformis*	Wattle Mat-rush
Lomandra glauca	-
*Nephrolepis cordifolia**	Fish-bone Fern
Oplismenus aemulus	Basket Grass
*Paspalum dilatatum**	Paspalum
*Plantago lanceolata**	Ribwort
*Protasparagus aethiopicus**	Asparagus Fern
Pteridium esculentum	Bracken
*Sida rhombifolia**	Paddy's Lucerne
*Tagetes minuta**	Stinking Roger
Tetratheca ericifolia	Black-eyed Susan
*Tradescantia fluminensis**	Wandering Jew
*Verbena bonariensis**	Purpletop
Xanthorrhoea resinosa subsp. resinosa	-
Xanthosia tridentata	Rock Xanthosia
VINES	
*Araujia hortorum**	Mothvine
Billardiera scandens var. *scandens*	Apple Dumplings
Glycine tabacina	Twining Glycine
*Passiflora edulis**	Common Passionfruit
Smilax glyciphylla	Sarsaparilla
Stephania japonica var. *discolor*	Snake Vine

Species name^{TS} = Threatened Species * = Introduced Species

2.3 CONNECTIVITY OF VEGETATION

An inspection of the 1:25,000 aerial photograph of the local area and site observations indicates that the subject site has connectivity to large areas of vegetation to the east, and is adjoined by rural-residential development with small fragments of remnant vegetation to the north and south with Ingleside Road to the west.

2.4 THREATENED FLORA SPECIES

A search of the Atlas of NSW Wildlife (NPWS 2003) was undertaken to identify records of threatened flora species located within 10km of the subject site. This allowed for a specific search for threatened flora to be undertaken to determine if any threatened species were present on the site. Details on the threatened plant species, as listed in Schedules 1

(Endangered) and 2 (Vulnerable) of the *Threatened Species Conservation Act* (1995), with a known distribution in the local area are provided in Table 2.2.

TABLE 2.2
THREATENED FLORA SPECIES OF THE AREA

SPECIES	TSC ACT	EPBC ACT	GROWTH FORM AND HABITAT REQUIREMENTS	COMMENTS
Chamaesyce psammogeton	E	-	A prostrate perennial herb which grows on fore dunes and exposed sites on headlands.	No suitable habitat is present. Not observed during floristic survey.
Cryptostylis hunteriana	V	V	Saprophytic terrestrial herb lacking leaves with erect flowers to 45cm tall. Grows in swamp heath on sandy soils south from Gibraltar Range. Flowers Dec to Feb.	No suitable habitat is present. Not observed during floristic survey.
Darwinia biflora	V	V	Erect or spreading shrub to 80cm high. Associated with habitats where weathered shale capped ridges intergrade with Hawkesbury Sandstone, where soils have a higher clay content (NPWS 1999, NPWS 1997). Cheltenham to Hawkesbury River.	No suitable habitat is present. Not observed during floristic survey.
Epacris purpurascens var. *purpurascens*	V	-	Erect shrub to 1.5m high growing in sclerophyll forest and scrub and near creeks and swamps on Sandstone. Distribution limits N-Gosford S- Blue Mountains	No suitable habitat is present. Not observed during floristic survey.
Eucalyptus camfieldii	V	V	Stringybark to 10 m high. Grows on coastal shrub heath and woodlands on sandy soils derived from alluviums and Hawkesbury sandstone. Distribution limits N - Norah Head S – Royal NP.	Suitable habitat is present. Not observed during floristic survey.
Grevillea caleyi	E	E	Shrub mostly 1-3 metres high. Grows in laterite. Distribution limits Terry Hills-Belrose area.	No suitable habitat is present. Not observed during floristic survey.
Kunzea rupestris	V	V	Erect shrub to 1.5m high. Grows in woodland and heath on sandstone, usually on rock platforms in Marramarra National Park and nearby areas.	No suitable habitat is present. Not observed during floristic survey.

TABLE 2.2 (Cont.)
THREATENED FLORA SPECIES OF THE AREA

SPECIES	TSC ACT	EPBC ACT	GROWTH FORM AND HABITAT REQUIREMENTS	COMMENTS
Lasiopetalum joyceae	V	V	Erect shrub to 2 m high. Grows in heath and open forest on Hawkesbury sandstone. Distribution limits Hornsby Plateau.	No suitable habitat is present. Not observed during floristic survey.
Leptospermum deanei	V	V	Shrub to 5 m high. Grows on forested slopes. Distribution limits Near watershed of Lane Cove River.	No suitable habitat is present. Not observed during floristic survey.
Melaleuca deanei	V	V	Shrub to 3 m high. Grows in heath on sandstone. Distribution limits N - Gosford S - Nowra.	Suitable habitat is present. Not observed during floristic survey.
Microtis angusii	E	E	Not known to occur outside of disturbed habitats in the local area. Pittwater Council (2000) consider the likely habitat of this species to be the Duffys Forest Vegetation Community.	Suitable habitat is present. Not observed during floristic survey.
Persoonia hirsuta	E	E	Spreading to decumbent shrub with young branchlets moderately to densely hairy. Grows predominantly in low woodland to scrub / heath on sandstone with a clay influence in the shale sandstone ecotone.	No suitable habitat is present. Not observed during floristic survey.
Pimelea curviflora var. curviflora	V	V	Woody herb or sub-shrub to 0.2-1.2 m high. Grows on Hawkesbury sandstone near shale outcrops. Distribution Sydney.	No suitable habitat is present. Not observed during floristic survey.
Syzygium paniculatum	V	V	Small tree. Subtropical and littoral rainforest on sandy soil. Distribution limits N - Forster S - Jervis Bay.	No suitable habitat is present. Not observed during floristic survey.

TABLE 2.2 (Cont.) THREATENED FLORA SPECIES OF THE AREA				
SPECIES	**TSC ACT**	**EPBC ACT**	**GROWTH FORM AND HABITAT REQUIREMENTS**	**COMMENTS**
Tetratheca glandulosa	V	V	Spreading shrub to 0.2 m high. Sandy or rocky heath or scrub. Distribution limits N - Mangrove Mountain S - Sydney.	Suitable habitat present. Not observed during the floristic survey
E = Endangered Species			V = Vulnerable Species	

There is suitable habitat on the subject site for *Eucalyptus camfieldii, Melaleuca deanei, Microtis angusii* and *Tetratheca glandulosa*. No threatened flora species, as listed on Schedule 1 (Endangered) or Schedule 2 (Vulnerable) of the *Threatened Species Conservation Act* (1995) and *Environment Protection & Biodiversity Conservation Act* (1999) were observed on the site.

2.5 ENDANGERED ECOLOGICAL COMMUNITIES

Four endangered ecological communities are known to occur in the local area. These communities are the Pittwater Spotted Gum Forest, Duffys Forest, Sydney Coastal Estuary Swamp Forest and Sydney Freshwater Wetlands. Each of these endangered ecological communities is individually assessed below.

2.5.1 Pittwater Spotted Gum Forest (PSGF)

General Description:
This community is restricted to the Pittwater Local Government Area, on the Barrenjoey Peninsula and Pittwater Foreshores. This community normally has open forest structure, however it may now exist as woodland or remnant trees (NSW Scientific Committee). This community incorporates vegetation that has previously been described by Benson and Howell (1994) as 9ag (ii) Open Forest: *Eucalyptus* (now *Corymbia*) *maculata – Eucalyptus paniculata*.

Habitat Requirements and Characteristics:
- Geology / Soils: Narrabeen Group – Newport Formation.
- Topography: Lower hill slopes.
- Characteristic Canopy Species: *Corymbia maculata* and *Eucalyptus paniculata*.

Conservation Status and Distribution:
Listed as an Endangered Ecological Community on Part 3 of Schedule 1 (*TSC Act* 1995) as a result of the small size of existing remnants and continuing threatening processes. This community is restricted to the Pittwater Local Government Area on the Barrenjoey Peninsula and Pittwater Foreshores.

Key Threatening Processes:
Clearing for houses and related infrastructure, fire mitigation measures, weed invasion, inappropriate fire regimes and the small size of reserves are identified as processes impacting on this endangered ecological community.

Occurrence in Subject Site:
The habitat requirements and species that characterise this community are absent from the subject site. The subject site is not mapped as PSGF and is not connected or in the vicinity of vegetation mapped as PSGF (Pittwater Council, 2000b; Benson and Howell 1994).

2.5.2 Duffys Forest

General Description:
Duffys Forest is open forest seven to eighteen metres high with a mid-dense canopy with canopy species such as *Eucalyptus sieberi*, *E. capitellata*, *E. oblonga*, *E. haemastoma*, *Angophora costata* and *Corymbia gummifera*. Variation appears related to soil depth and type, with deeper soils containing more *E. pilularis* and *Syncarpia glomulifera* (Benson & Howell, 1994).

Habitat Requirements:
Duffys Forest occurs on sandstone ridgetops with remnant shale lenses, often characterised by ironstone gravels. Soils are part of the Somersby or Blacktown Soil Landscapes.

Conservation Status and Distribution:
Duffys Forest has been listed as an endangered ecological community under the *TSC Act* (1995) due to only a small number of fragments occurring within Ku-ring-gai Chase and Garigal National Parks and the prevalence of threatening processes on DFVC outside of conservation reserves.

Duffys Forest, according to the definition provided within the *TSC Act* (1995), is found in the Duffys Forest / Terry Hills / Ingleside / Belrose area within the Warringah, Pittwater and Ku-ring-gai Local Government Areas on soils that are part of the Somersby or Blacktown Soil Landscapes.

Key Threatening Processes:
Threatening processes identified by the NSW Scientific Committee are: land clearing, habitat degradation by rubbish dumping and access by people, trail bikes and other vehicles, weed invasion facilitated by urban runoff, an inappropriate fire regime and unauthorised horse riding activities in the area.

Occurrence in Subject Site:
The presence of sandstone rock outcrops throughout the naturally vegetated areas present on the site indicate the absence of remnant shale lenses. The Low Open Woodland / Open scrub vegetation is considered to differ structurally from DFVC described in Smith and Smith (2000), and the Final Determination of the NSW Scientific Committee (1998) and Benson and Howell (1994).

Community composition corresponds most closely to Benson and Howell (1994) classification of Map Unit 10ar and 21g and not that of Duffys Forest as described in Smith and Smith (2000) or the Final Determination of the NSW Scientific Committee (1998) or Benson and Howell (1994). Further, the subject site is not mapped as DFVC in Benson and Howell (1994) or Smith and Smith (2000).

As such, it is considered that the habitat requirements, community structure and a large number of species that characterise this community are absent from the subject site.

2.5.3 Sydney Coastal Estuary Swamp Forest Complex (SCESFC)

General Description:
A variable complex of vegetation structures, ranging from forests to scrub to reedland. This complex includes species such as *Eucalyptus robusta* and *E. botryoides*, *Livistona australis*, *Melaleuca sp.* and *Phragmites australis*. This complex includes vegetation described previously as Coastal Swamp Forest Complex (Benson & Howell, 1994) and is part of the Alluvial Forest described by Chafer (1997).

Habitat Requirements:
- Geology / Soils: waterlogged estuarine alluvial soils.
- Topography: Low lying estuarine areas with periodically poor drainage.
- Characteristic Canopy Species: Variable, includes species such as *Eucalyptus robusta, E. botryoides*, *Livistona australis* and *Melaleuca sp.*

Conservation Status and Distribution:
Occurs from the Lake Macquarie Local Government area in the north to the Shell Harbour and Kiama Local Government Areas in the south. Small areas are known to be reserved in the Cockle Bay Nature Reserve, Garigal and Royal National Parks.

Key Threatening Processes:
Waste filling, clearing associated with urban development, urban and agricultural runoff, weed invasion, grazing and trampling.

Occurrence in Subject Site:
The habitat requirements and species that characterise this community are absent from the subject site. As such, this community is not considered to occur on the subject site.

2.5.4 Sydney Freshwater Wetlands (SFW)

General Description:
Restricted to freshwater swamps in swales and depressions on sand dunes and low nutrient sand plain sites in coastal areas. Characterised by sedges and aquatic flora such as *Eleocharis sphacelata*, *Baumea juncea*, *B. rubignosa*, *B. articulata*, *Gahnia sieberiana*, *Ludwigia peploides* and *Persicaria sp.*

Habitat Requirements:
- Geology / Soils: Generally on the Warriewood and Tuggerah Soil Landscapes (Chapman & Murphy, 1989).
- Topography: swales and depressions on sand dunes and sand plain sites.
- Characteristic Species: *Eleocharis sphacelata*, *Baumea juncea*, *B. rubignosa*, *B. articulata*, *Gahnia sieberiana*, *Ludwigia peploides* and *Persicaria sp.*

Conservation Status and Distribution:
Known to occur from the Lake Macquarie Local Government Area in the north to the Wollongong Local Government Area in the south, but may occur outside this area. Small areas of this complex have been reported in Wyrrabalong, Royal and Botany Bay National Parks.

Key Threatening Processes:
Small size, clearing disturbance and degradation.

Occurrence in Subject Site:
The habitat requirements and species that characterise this community are absent from the subject site. As such, this community is not considered to occur on the subject site.

SECTION 3

FAUNA CHARACTERISTICS

3.1 FAUNA SURVEY METHODOLOGY

In order to detect the occurrence of threatened fauna species, specific methods for targeting these species were employed in addition to the standard fauna survey methods of nocturnal spotlighting and habitat searches. Due to the small area of the site and absence of suitable habitats a detailed small mammal trapping survey was not completed. However a specific survey for the Southern Brown Bandicoot was completed using hair tube samplings.

The methods used for the fauna survey, as detailed in Appendix I, are as follows:

- Terrestrial hair tubing trapping (3 lines of 5 tubes set for ten nights);
- Amphibian searches;
- Habitat searches;
- Diurnal and nocturnal bird surveys.

Fauna surveys were conducted on 22nd of April 2003 between 10:00 and 12:30. Weather conditions were as follows 6/8 cloud cover, no wind, no rainfall (rain had fallen within the 12hrs leading up to the survey), 22^{0}C

Fauna survey locations are shown on figure 1. The results of these surveys are provided in Section 3.2 and Table 3.2.

Literature Review:

A review of local resource documents and a search of the Atlas of NSW Wildlife (NPWS 2003) was undertaken to identify records of threatened fauna species located within 10km of the subject site.

3.2 FAUNA

A number of fauna species were observed within the subject site. A detailed search of the subject site found no evidence of habitation by any threatened fauna species. All species as listed in Table 3.2 are considered to be relatively common in the local area.

TABLE 3.2
FAUNA OBSERVED AND RECORDED ON THE SUBJECT SITE

COMMON NAME	*SCIENTIFIC NAME*	METHOD
Reptiles		
Grass Skink	*Lampropholis delicata*	S
Birds		
Spotted Turtle-Dove *	*Streptopelia chinensis*	OC
Sulphur-crested Cockatoo	*Trichoglossus haematodus*	OC
Rainbow Lorikeet	*Alisterus scapularis*	OC
Eastern Rosella	*Platycercus eximius*	OC
Fan-tailed Cuckoo	*Cacomantis flabelliformis*	OC
Laughing Kookaburra	*Malurus cyaneus*	OC
Brown Thornbill	*Manorina melanocephala*	O
Red Wattlebird	*Anthochaera carunculata*	OC
Noisy Miner	*Psophodes olivaceus*	OC
Lewin's Honeyeater	*Meliphaga lewinii*	OC
Yellow-faced Honeyeater	*Lichenostomus chrysops*	OC
Eastern Spinebill	*Acanthorhynchus tenuirostris*	OC
Eastern Yellow Robin	*Eopsaltria australis*	OC
Red-whiskered Bulbul *	*Pycnonotus jocosus*	OC
Eastern Whipbird	*Cracticus torquatus*	OC
Grey Butcherbird	*Gymnorhina tibicen*	OC
Magpie-lark	*Grallina cyanoleuca*	OC
Australian Magpie	*Strepera graculina*	OC
Pied Currawong	*Corvus coronoides*	OC
Australian Raven	*Hirundo neoxena*	C
Welcome Swallow	*Trichoglossus haematodus*	O
Mammals		
Long-nosed Bandicoot	*Perameles nasuta*	Ht
	Macropus spp.	Sc
Dog *	*Canis familiaris*	O Sc
Amphibians		
Common Eastern Froglet	*Crinia signifera*	C

Key to Methods of Observation

O	-	Observation	S	-	Search
C	-	Call identification	A	-	Anabat II
Sp	-	Spotlight	Sc	-	Scat, Track or Sign
E	-	Elliott Trap	Ht	-	Hair tube

Note: * indicates introduced species ᵛ indicates threatened species

3.3 KOALA HABITAT ASSESSMENT

Eucalyptus punctata, a Koala food tree species listed on Schedule 2 of State Environmental Planning Policy No. 44 - Koala Habitat Protection, was observed within the study area. These trees comprised approximately 5-8% of the total number of trees within the study area, which is less than the 15% indicated by SEPP 44 for classification as Potential Koala Habitat. Despite the presence of marginal habitat, neither the Koala nor signs of its presence, namely scats, were located on the subject site. As such, it is considered that the subject site does not form Core Koala Habitat in accordance with the provisions of SEPP N° 44.

3.4 DEVELOPMENT CONTROL PLAN № 25 – CONSERVATION OF BIODIVERSITY

Pittwater Council have identified that the DCP for Conservation of Biodiversity applies to the subject site, as there is Fragmented Bushland present on the subject site.

Development Control Plan N° 25 identifies developments that occur within fragmented bushland that intensify land use, remove significant trees, impact on adjoining bushland, wetlands or waterways or remove more than $50m^2$ of vegetation as requiring a Flora and Fauna Assessment and Bushland Management Concept Plan. It is considered that the proposed development may intensify land use, remove significant trees, impact on adjoining bushland, and remove more than $50m^2$ of vegetation, as such the required Bushland Management Concept Plan has been prepared *(Conacher Travers Pty Ltd,* 2003) as a separate document to this report.

3.5 IMPACT ON THREATENED SPECIES DETAILS

A search of the Atlas of NSW Wildlife (NPWS, 2003) database of threatened flora and fauna records was undertaken to identify records of threatened species located within 10km of the subject site. Details on these species are provided in Table 3.3 Due to a lack of suitable habitat within the subject site oceanic or pelagic fauna species will not be included in Table 3.3

TABLE 3.3
RECORDED AND POTENTIAL THREATENED SPECIES OF THE AREA

COMMON NAME *Scientific Name*	**TSC Act**	**EPBC Act**	**PREFERRED HABITAT**	**COMMENTS**
Giant Burrowing Frog *Heleioporus australiacus*	V	V	Inhabits open forests and riparian forests along non-perennial streams, digging burrows into sandy creek banks. Distribution Limit- N-Near Singleton. S-South of Eden	No suitable habitat present. Not observed during survey.
Red-crowned Toadlet *Pseudophryne australis*	V	-	Prefers sandstone areas, breeds in grass and debris beside non-perennial creeks or gutters. Individuals can also be found under logs and rocks in non breeding periods. Distribution Limit- N-Pokolbin S-Near Wollongong	Suitable habitat present. Not observed during survey.
Green and Golden Bell Frog *Litoria aurea*	E	V	Prefers the edges of permanent water, streams, swamps, creeks, lagoons, farm dams and ornamental ponds. Often found under debris. Distribution Limit - N-Byron Bay. S-South of Eden	No suitable habitat present. Not observed during survey.
Rosenberg's Goanna *Varanus rosenbergi*	V	-	Hawkesbury sandstone outcrop specialist. Inhabits woodlands, dry open forests and heath sheltering in burrows, hollow logs, rock crevices and outcrops. Distribution Limit- N-Nr Broke S-Nowra Located in scattered patches near Sydney, Nowra and Goulburn.	Suitable habitat present. Not observed during survey.
Australasian Bittern *Botaurus poiciloptilus*	V	-	Inhabits shallow freshwater or brackish wetlands with tall dense beds of reeds, sedges or rush species and swamp edges. Distribution Limit - N-North of Lismore. S- Eden.	No suitable habitat present. Not observed during survey.
Black Bittern *Ixobrychus flavicollis*	V	-	Freshwater and brackish streams and ponds. Distribution Limit - N-Tweed Heads. S-South of Eden.	No suitable habitat present. Not observed during survey.

TABLE 3.3 (Cont.)
RECORDED AND POTENTIAL THREATENED SPECIES OF THE AREA

COMMON NAME *Scientific Name*	TSC Act	EPBC Act	PREFERRED HABITAT	COMMENTS
Osprey *Pandion haliaetus*	V	-	Utilises waterbodies including coastal waters, inlets, lakes, estuaries and offshore islands with a dead tree for perching and feeding. Distribution Limit - N-Tweed Heads. S-South of Eden.	No suitable habitat present. Not observed during survey.
Sanderling *Calidris alba*	V	-	Inhabits broad ocean beaches of firm sand with wave action, river mouths. Distribution Limit. N-Tweed Heads. S-Eden.	No suitable habitat present. Not observed during survey.
Great Knot *Calidris tenuirostris*	V	-	Inhabits tidal mudflats, estuaries, shallow saline and freshwater swamps. N- Tweed Heads. S- Eden.	No suitable habitat present. Not observed during survey.
Bush Stone-curlew *Burhinus grallarius*	E	-	Utilises open forests and savanna woodlands, sometimes dune scrub, savannah and mangrove fringes. Distribution Limit- N-Border Ranges National Park S-Near Nowra	No suitable habitat present. Not observed during survey.
Beach Stone-curlew *Esacus neglectus*	E	-	Inhabits remote and secluded beaches, coral reefs and cays, mangrove fringes and estuarine mudflats. Distribution Limit - N-Tweed Heads. S-Shoalhaven River	No suitable habitat present. Not observed during survey.
Sooty Oystercatcher *Haematopus fuliginosus*	V	-	Exclusively coastal in distribution foraging along rocky coastlines and estuaries. Distribution Limit- N-Tweed Heads S-South of Eden.	No suitable habitat present. Not observed during survey.
Pied Oystercatcher *Haematopus longirostris*	V	-	Inhabits coastal beaches and estuarine flats. Distribution Limit N-Tweed Heads S-South of Eden.	No suitable habitat present. Not observed during survey.
Wompoo Fruit-dove *Ptilinopus magnificus*	V	-	Inhabits large undisturbed patches of lowland and adjacent highland rainforest and moist Eucalypt forests where it feeds on fruit. Distribution Limit - N-Tweed Heads. S-Sydney.	No suitable habitat present. Not observed during survey
Superb Fruit-dove *Ptilinopus superbus*	V	-	Rainforests, adjacent mangroves, eucalypt forests, scrubland with native fruits. Distribution Limit - N-Border Ranges National Park. S-Bateman's Bay.	No suitable habitat present. Not observed during survey
Glossy Black-Cockatoo *Calyptorhynchus lathami*	V	-	Open forests with *Allocasuarina* species and hollows for nesting. Distribution Limit - N-Tweed Heads. S-South of Eden.	Sub-optimal habitat present. Not observed during survey
Swift Parrot *Lathamus discolor*	E	E	Inhabits Eucalypt forests and woodlands with winter flowering Eucalypts. Distribution Limit - N-Border Ranges National Park. S-South of Eden.	Sub optimal foraging habitat present. Not observed during survey.

TABLE 3.3 (Cont.)
RECORDED AND POTENTIAL THREATENED SPECIES OF THE AREA

COMMON NAME *Scientific Name*	TSC Act	EPBC Act	PREFERRED HABITAT	COMMENTS
Turquoise Parrot *Neophema pulchella*	V	-	Inhabits coastal scrubland, open forest and timbered grassland, especially ecotones between dry hardwood forests and grasslands. Distribution Limit - N-Near Tenterfield. S-South of Eden.	No suitable foraging habitat present. Not observed during survey.
Barking Owl *Ninox connivens*	V	-	Inhabits principally woodlands but also open forests and partially cleared land and utilises hollows for nesting. Distribution Limits- N-Border Ranges National Park S-Eden	Sub optimal foraging habitat present. Not observed during survey.
Masked Owl *Tyto novaehollandiae*	V	-	Open forest and woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting. Distribution Limit - N-Border Ranges National Park. S-Eden	Sub optimal foraging habitat present. Not observed during survey.
Powerful Owl *Ninox strenua*	V	-	Forests containing mature trees for shelter or breeding and densely vegetated gullies for roosting. Distribution Limits - N-Border Ranges National Park. S-Eden	Sub optimal foraging habitat present. Not observed during survey.
Regent Honeyeater *Xanthomyza phrygia*	E	E	Found in temperate Eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts. Distribution Limit - N-Urbanville. S-Eden	Sub optimal foraging habitat present. Not observed during survey.
Spotted-tailed Quoll *Dasyurus maculatus*	V	V	Dry and moist open forests containing rock caves, hollow logs or trees. Distribution Limit- N-Mt Warning National Park S-South of Eden.	No suitable habitat present. Not observed during survey.
Eastern Quoll *Dasyurus viverrinus*	E	-	Dry and moist sclerophyll forests containing hollow logs, rock caves, abandoned burrows or trees with open grazing land interspersed. Distribution Limit- N-Kempsey S-South of Eden	No suitable habitat present. Not observed during survey.
Southern Brown Bandicoot *Isoodon obesulus*	E	-	Utilises a range of habitats containing thick ground cover - open forest, woodland, heath, cleared land, urbanised areas and regenerating bushland. Distribution Limit - N-Kempsey. S-South of Eden.	Suitable habitat present. Not observed during survey.
Koala *Phascolarctos cinereus*	V	-	Inhabits both wet & dry Eucalypt forest on high nutrient soils containing preferred feed trees. Distribution Limit - N-Tweed Heads. S-South of Eden	No suitable habitat present. Not observed during survey.
Squirrel Glider *Petaurus norfolcensis*	V	-	Mixed aged stands of eucalypt forest & woodlands including gum barked & high nectar producing species & hollow bearing trees. Distribution Limit - N- Tweed Heads S-Albury	Sub optimal foraging habitat present. Not observed during survey.

TABLE 3.3 (Cont.) RECORDED AND POTENTIAL THREATENED SPECIES OF THE AREA				
COMMON NAME *Scientific Name*	**TSC Act**	**EPBC Act**	**PREFERRED HABITAT**	**COMMENTS**
Eastern Pygmy Possum *Cercatetus nanus*	V	-	Found in a variety of habitats from rainforest through open forest to heath. Feeds on insects but also gathers pollen from banksias, eucalypts and bottlebrushes. Nests in banksias and myrtaceous shrubs. Distribution Limit – N – Tweed Heads S - Eden	Some marginal habitat present. Not observed during survey.
Grey-headed Flying-fox *Pteropus poliocephalus*	V	V	Inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas.	Suitable foraging habitat present. Not observed during survey.
Common Bentwing-bat *Miniopterus schreibersii*	V	-	Prefers areas where there are caves, old mines, old buildings, storm water drains & well timbered areas. Distribution Limit - N-Border Ranges National Park. S-South of Eden.	Suitable foraging habitat present. Not observed during survey.
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	V	-	Recorded roosting in caves, old buildings and tree hollows. Distribution Limit- N-Border Ranges National Park S-Pambula	Suitable foraging habitat present. Not observed during survey.
Greater Broad-nosed Bat *coteanax rueppellii*	V	-	Inhabits areas containing moist river & creek systems especially tree lined creeks. Distribution Limit - N-Border Ranges National Park. S-Pambula.	Suitable foraging habitat present. Not observed during survey.
E = Endangered Species			V = Vulnerable Species	

3.6 ENDANGERED POPULATIONS

Two endangered populations have been identified locally within the *TSC Act* (1995) within the Pittwater LGA. These are the population of Squirrel Gliders (*Petaurus norfolcensis*) on the Barrenjoey Peninsula and the Koala (*Phascolarctos cinereus*) in the Pittwater Local Government Area. Details on these populations are provided below.

3.6.1 Squirrel Glider (*Petaurus norfolcensis*)

General Description:
The Squirrel Glider has blue-grey to brown-grey fur above and a dark mid-dorsal stripe between the eyes to the mid-back (Strahan, 1995). The belly fur is white to creamy white and there is a gliding membrane from wrist to ankle. The long tail is very bushy and has a black tip. Maximum head and body size is 210mm and there is no sexual dimorphism (Strahan, 1995).

The Squirrel Glider is an arboreal, tree dwelling mammal that feeds on nectar, pollen, eucalypt sap, *Acacia* gum, honeydew and arthropods (Quin, 1993). This species tends to forage more in the upper canopy where flowering trees are abundant but also forages over other sections of the tree in search of other food types (Davey, 1984).

A social animal, the Squirrel Glider lives in small family groups of 5-6 animals (Quin, 1993). In August females produce two young which remain in the pouch for about 30 days. Mortality of young is high for the first 12 months of life (Suckling, 1995).

Habitat Requirements:
The Squirrel Glider inhabits the dry hardwood forest and woodland over most of its range (Suckling, 1995). The habitat of this species includes the drier woodland areas of the western slopes of the Great Dividing Range, open forests dominated by River Red Gum (*Eucalyptus camaldulensis*) (Menkhorst *et al.*, 1988; Quin, 1993; Traill, 1991) and moist hardwood forests bordering rainforest (SFNSW, 1995). In Victoria, the Squirrel Glider is known to occur in disjunct populations in remnant woodlands and open forests that have mature or mixed-age stands of several eucalypt species (Menkhorst *et al.*, 1988).

Mixed-aged stands which support the Squirrel Glider invariably include gum-barked and high nectar-producing species including some which flower in winter (Menkhorst *et al.*, 1988). Riparian open forests inhabited by the Squirrel Glider typically contain mature *Acacia dealbata* which may act as an important winter carbohydrate source when other food sources are scarce (Menkhorst *et al.*, 1988). The presence of mature, hollow-bearing eucalypts is a critical characteristic of habitat occupied by Squirrel Gliders and are utilised for nesting and breeding (Suckling, 1995).

Squirrel Gliders live in small groups of 5-6 animals that occupy home ranges of 2 to 4 hectares at population densities of 0.9 to 1.5 individuals per hectare (Quin 1993). Microhabitat observations suggest Squirrel Gliders forage at all levels in the forest strata to obtain its diet of plant exudates and arthropods. (Menkhorst Collier 1988).

Conservation Status:
Squirrel Gliders on the Barrenjoey Peninsula are considered to be an Endangered Population under Part 2 of Schedule 1 of the *TSC Act* (1995) due to:

- The population being the largest known in metropolitan Sydney and the only known east of the Hawkesbury River;
- Being effectively isolated by urban development at the base of the Barrenjoey Peninsula;
- The reduction in forest cover in the Barrenjoey Peninsula from 705ha in 1946 to 125ha in 1989;
- The population may be partially nomadic needing to access flowering trees and shrubs that are scattered across the landscape. This is considered to leave this population particularly vulnerable to clearing of corridors and seasonally important habitats.

The population is restricted to habitat forming an area considered likely to be approaching the lower limits required to enable the persistence of this species in the long term. Given this and the urban location of this bushland habitat, the conservation status of this species is unlikely to change.

Distribution and Abundance:

State: The Squirrel Glider is distributed along the coast, ranges, western slopes and plains from north-east coastal Queensland through NSW, Victoria into far south-east South Australia. In NSW it has a northern limit of the Border Ranges National Park and a southern limit near Albury (NPWS, 2001).

Regional: The Squirrel Glider has been recorded at a number of locations regionally including Fern Bay (1994), Ravensworth State Forest and Glenbawn Dam (Resource Planning, 1994), Corlette, Anna Bay, Salamander Bay, Gan Gan

Reserve, Wollemi National Park, Yengo National Park, Barrenjoey Head, Blue Mountains National Park, Prospect Reservoir, Grose Vale, Glossodia, Cranebrook (NPWS, 2001), and within several of the State Forests in the Morisset Forestry District including Olney and Aberdare State Forests (Ecotone Environmental Consultants, 1995).

Local: This species is locally restricted to a small area on the Barrenjoey Peninsula, north of Bushrangers Hill. The area of known habitat is centred around Hewitt Park to the north and Attunga Reserve to the south.

Subject Site: The subject site is outside the area that contains the endangered population (*TSC Act*, 1995). The distance from Barrenjoey Peninsula indicates that the subject site is unlikely to provide core refuge and breeding habitat for this species (Pittwater Council, 2000b).

3.6.2 Koala (*Phascolarctos cinereus*)

General Description:
The Koala has thick, pale to dark grey fur on its back and lighter on the underside. Head and body size may reach 780mm for males and 730mm for females (Strahan, 1995) excluding the vestigial tail.

The Koala is an arboreal nocturnal species that feeds predominantly on the foliage of Eucalypts (Lee & Martin, 1988). Koalas sleep in a fork of trees during the day and feeding activity peaks just after sunset (Lee & Martin, 1988). Distribution of the Koala is influenced by the occurrence of tree species that are favoured for feeding with these trees being generally restricted to soils of high nutrient status (Martin, 1988).

The Koala is a generally solitary species, with breeding occurring in summer. Females become sexually active at two years of age with one young produced each year. Weaning occurs at 12 months with dispersal taking place by 18 months. Mortality rate tends to be high during dispersal (Martin, 1988).

Habitat Requirements:
Koalas inhabit forested areas with acceptable Eucalypt food trees however they will also utilise non-Eucalypt species as a food source. Koalas inhabit both wet and dry Eucalypt forests that contain a canopy cover of approximately 10 to 70% (Reed *et al.*, 1991) growing on high nutrient soils.

In NSW, 55 species of *Eucalyptus* and 11 non-eucalypt tree species are known to be used and eaten by the Koala (Reed *et al.*, 1991). Preferred feed trees as listed on Schedule 2 of the *State Environmental Protection Policy No. 44 - Koala Habitat Protection* (SEPP 44) are: Tallowood (*Eucalyptus microcorys*), Manna Gum (*E. viminalis*), Grey Gum (*E. punctata*), Forest Red Gum (*E. tereticornis*), River Red Gum (*E. camaldulensis*), Broad-leaved Scribbly Gum (*E. haemastoma*), Scribbly Gum (*E. signata*), White Box (*E. albens*), Bimble Box (*E. populnea*) and Swamp Mahogany (*E. robusta*) (Dept. of Planning, 1995).

Pittwater Council (2000b) found *Eucalyptus punctata*, *E. haemastoma* and *E. robusta* to be favoured food trees in the local area. Other tree species were browsed, however were considered to be under–exploited relative to their abundance.

Conservation Status:
The Koalas in the Pittwater Local Government Area are considered to be an Endangered Population under Part 2 of Schedule 1 of the *TSC Act* (1995) due to:

- The population being one of the few known in the Sydney region;

- The decline in population size, predominantly due to habitat loss and fragmentation, and also associated threats such as road deaths and predation when moving into urban areas in search of food.

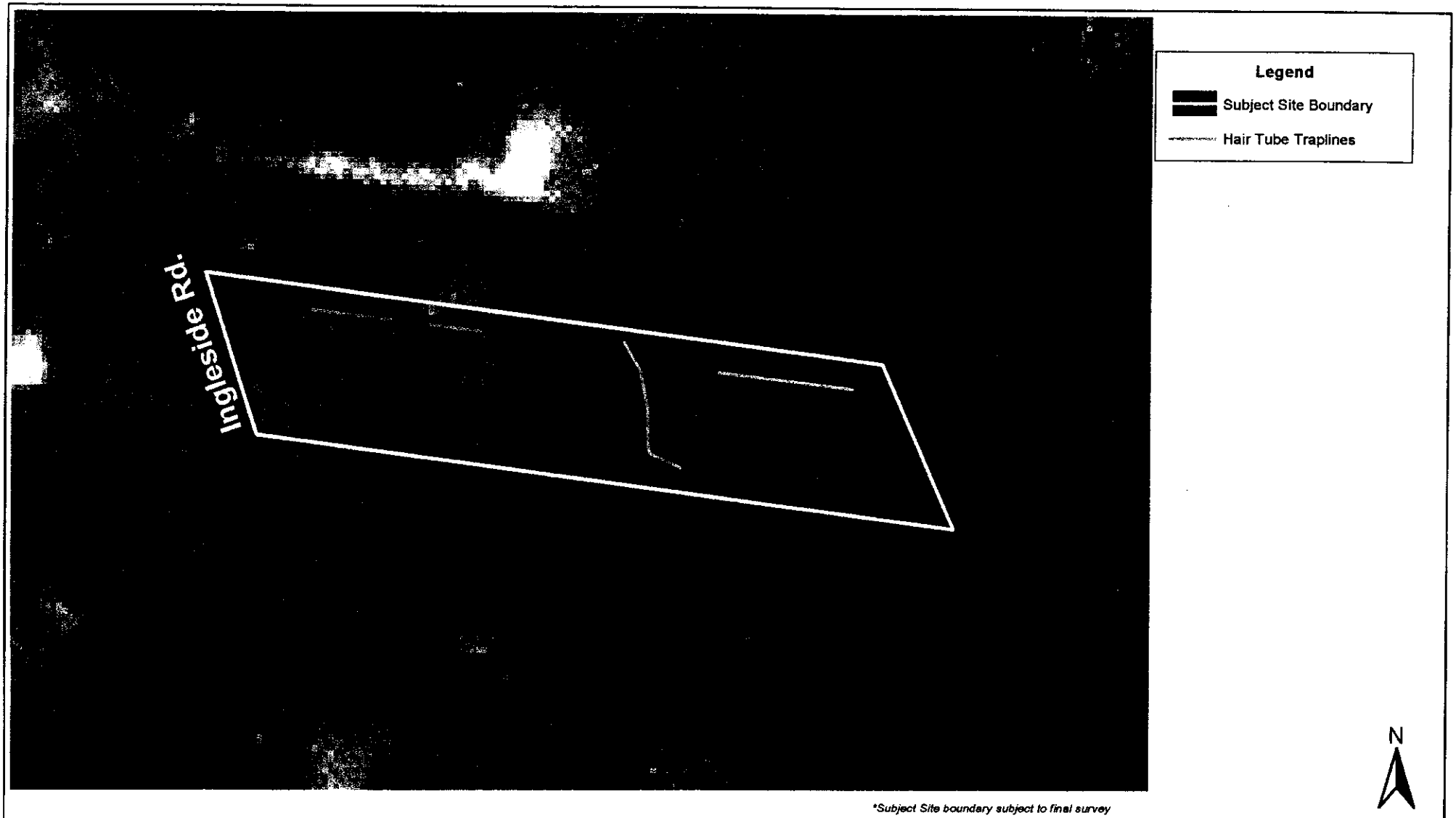
Distribution and Abundance:

State: The Koala is widespread throughout south-eastern Australia from northern, coastal, central and southern Queensland through NSW, Victoria and South Australia (Kennedy, 1992) with the main concentration of the population occurring in north-eastern NSW. In NSW, the Koala has a northern limit of Tweed Heads and a southern limit in the near Eden (NPWS, 1999).

Regional: The Koala has been detected at a number of locations across the region including Yengo National Park, Dharug National Park, St Albans, Brisbane Water National Park, Ku-ring-gai Chase National Park, Barrenjoey Peninsular, Garigal National, Wollongong, Campbelltown, Heathcote National Park (NPWS, 2001), Marramarra National Park (Reed *et al.*, 1991). A 1986-97 survey of Koalas within New South Wales identified the Port Stephens area on the lower reaches of the Hunter River, just north of Newcastle as one of the richest Koala sites in the State (Reed *et al.*, 1991). Comprehensive Regional Assessments have located 170 records for this species in the northern NSW region, and 13 in the Sydney Basin (Environment Australia, 2000).

Local: Small populations are present in Barrenjoey Peninsula, Ku-ring-gai Chase National Park and possibly Garigal National Park. Occasional records of Koalas elsewhere in Pittwater appear to be wandering individuals from these populations (Pittwater Council, 2000b).

Subject Site: Koalas or signs of Koala habitation such as scratches on tree trunks or scats were not observed on the subject site. The subject site does not provide potential habitat (greater than 15% feed trees) under the criteria set by SEPP No 44.



*Subject Site boundary subject to final survey

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10 0 10 20 30 40 metres

Scale 1:1,000

Figure 1 -
Fauna Survey Locations

Ver.F1
22/0403
Ref.No.3177

Source: DLWC 1:25,000 Aerial Photograph, Sydney, Run 5, 10-10-94

SECTION 4

ASSESSMENTS AND CONCLUSION

4.1 IMPACT ON THREATENED SPECIES

With regard to threatened species, endangered ecological communities and endangered populations which may utilise the subject site due to the presence of suitable habitat, the following matters as identified in Section 5(A) of the *EP&A* Act (1979) need to be addressed to determine whether or not a significant effect on threatened species, populations, ecological communities or their habitats is likely to result from the proposed development.

(a) in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction,

Threatened Flora

Eucalyptus camfieldii

Eucalyptus camfieldii has been described as being associated with number of habitats. One is shallow sandstone soils bordering coastal heath in association with other stunted or mallee eucalypts, often in areas with restricted drainage (Benson and McDougall 1998; Harden 1994). Another association is for laterite influenced soils (Benson & Howell 1995; Carolin & Tindale 1994). The presence of such laterite influenced soils, containing *E. camfieldii*, is thought to be associated with proximity to shale (Benson & Howell 1995).

The presence of shallow sandy soils indicates that the subject site provides potential habitat for this species. Despite a detailed search this species was not found on the subject site. It is considered that the life cycle of the species is unlikely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

Melaleuca deanei

This species is associated with woodland on broad flat ridgetops, dry ridges and slopes with sandy loams and sometimes lateritic soils (Benson and McDougall 1998; Travers Morgan 1990). It is considered that the Low Open Woodland / Open Scrub vegetation is structurally similar to vegetation known to contain this species.

Despite the presence of suitable habitat, this species was not located during surveys of the subject site. This, combined with the local abundance of larger areas of similar habitat within Garigal and Ku-ring-gai Chase National Parks and adjacent bushland, indicates that the proposed development is unlikely to disrupt the life cycle of these species within the local area such that a viable local population of these species would be placed at risk of extinction

Microtis angusii

This species is known from two locations at Ingleside and Sunny Corner State Forest. The natural habitat of this species is unknown as both known locations are highly disturbed. Pittwater Council (2000) indicate that, if this species were to occur naturally in the local area, its habitat would most likely be the Duffys Forest Vegetation Community, as listed under the *TSC Act* (1995). The vegetation present on the subject site is not Duffys Forest, however the habitat requirements of this species is not fully known. Therefore the subject site may provide suitable habitat.

Despite detailed targeted searches, this species was not observed on the subject site. Due to the retention of similar habitat as found on the subject site within local conservation reserves, it is considered that the life cycle of this species is unlikely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

Tetratheca glandulosa

This species is restricted to the Central Coast (Mangrove Mountain to the Blue Mountains and Sydney). *Tetratheca glandulosa* is found on exposed Hawkesbury sandstone ridges and upper slopes. Semi-shade is needed for establishment and growth. Throughout the duration of the flora survey of the subject site it was identified that the Low Open Woodland / Open Scrubt vegetation community provides suitable habitat for this species. During the survey of the subject site, no specimens of the *Tetratheca glandulosa* were observed. Despite the presence of suitable habitat for *Tetratheca glandulosa* within the subject site, it is considered that the future development of the site is unlikely to disrupt the habitat of a local viable population of this species such that it is likely to be placed at risk of extinction.

Threatened Fauna

Red-crowned Toadlet *(Pseudophryne australis)*

Red-crowned Toadlet's use small ephemeral drainage lines, which feed water from the top of ridges to perennial creeks below. Totally confined to the Hawkesbury sandstone formation. Breeding congregations occur deep in grass and debris beside non-perennial creeks, gutters etc. in sandstone areas: at other times individuals disperse and are found under rocks, logs etc. on sandstone ridges. (Cogger, HG. 2000).

The subject site contains suitable shelter and breeding habitat for this species. This species was not detected during surveys. It is considered that the proposed development is not likely to disrupt the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

Rosenberg's Goanna (*Varanus rosenbergi*)

On the east coast of NSW Rosenberg's Goanna is a Hawkesbury-Nepean sandstone outcrop specialist. It inhabits humid woodlands, dry hardwood forests and heathland where it shelters in self-dug burrows, hollow logs, rock crevices and sandstone outcrops (Cogger, 2000).

The subject site contains suitable shelter and breeding habitat for this species. This species was not detected during surveys. It is considered that the proposed development is not likely to disrupt the life cycle of this species such that a viable local population is likely to be placed at risk of extinction.

Glossy Black-Cockatoo (*Calyptorhynchus lathami*)

The Glossy Black-Cockatoo inhabits mountain forests, coastal woodland, open forest and trees bordering watercourses where there are substantial stands of *Allocasuarina*. Foraging within *Allocasuarina* tends to be concentrated on trees with greater crops of cones (Clout, 1989). This species nests in large trees with large hollows either dead or alive. The Glossy Black-Cockatoo will forage close to the nest but is capable of travelling up to 20km away and requires a water source. The Glossy Black- Cockatoo is dependent on adult *Allocasuarina littoralis,* however they will occasionally use alternative foods (Environment Australia, 2000).

In the Pittwater Local Government Area, *Allocasuarina littoralis* and *A. torulosa* have been observed to be the most commonly utilised food resource of this species, however, *Allocasuarina distyla* has been observed to be an occasional source of

foraging material (Pittwater Council 2000b). A number of *Allocasuarina distyla* are present on the subject site.

Despite the presence of potential foraging habitat for the Glossy Black-Cockatoo within the subject site this species was not observed during the fauna survey. It is considered that the proposal is unlikely to disrupt a viable local population of the Glossy Black- Cockatoo such that it is likely to be placed at risk of extinction.

Swift Parrot *(Lathamus discolor)*
This species feeds mainly on nectar and lerp from eucalypt flowers, particularly Blue Gum (*Eucalyptus globulus*). On the mainland, the Swift Parrot congregates where winter flowering species such as Red Ironbark (*Eucalyptus sideroxylon*), White Box (*Eucalyptus albens*), Yellow Gum (*Eucalyptus leucoxylon*) and Swamp Gum (*Eucalyptus ovata*) (Brown, 1989). The Swift Parrot is a migratory species that breeds in Tasmania and its offshore islands in summer (Shepherd, 1994). In late March almost the entire population migrates to mainland Australia (Schodde and Tidemann, 1986).

The subject site provides sub-optimal foraging habitat for this species. This species was not detected within the subject site. It is considered that the proposed development is unlikely to disrupt the life cycle of these species within the local area such that a viable local population of these species is likely to be placed at risk of extinction.

Barking Owl (*Ninox connivens*)
The Barking Owl mainly inhabits areas of savannah woodland, open eucalypt wetland and riverine forest. It is generally absent from the arid interior (Lindsey, 1992). This species breeds in large hollows in large, live trees near or on floodplains. They are often associated with forest types with sparse groundcover including dry forest woodland with dense thickets of eucalypt, paperbark or viny scrub (Environment Australia, 2000).

Barking Owls require thickets such as those characterised by tea trees and wattles for shelter. As a consequence of the diverse diet of the Barking Owl, species rich habitats such as woodlands and ecotones are considered to be important habitats for this species (Environment Australia, 2000).

The subject site is considered to provide sub-optimal foraging habitat only. No roosting or breeding hollows were present on the subject site. Due to the lack of breeding habitat, absence of this species from the subject site during surveys and retention of native vegetation it is considered that the proposed development is not likely to disrupt the life cycle of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

Masked Owl (*Tyto novaehollandiae*)
The Masked Owl is widespread through forests and woodlands, utilising caves for shelter in treeless country. The Masked Owl is known to utilise forest margins and isolated stands of trees within agricultural land (Hollands 1991; Hyem 1979). This species is often found in heavily disturbed forest where its prey of small and medium sized mammals can be readily obtained (Kavanagh and Peake 1993). The Masked Owl requires old mature trees with large hollows for breeding and as diurnal roosting sites, being dependent upon hollow bearing trees all year round rather than only during the breeding season (Hyem, 1979).

The subject site is considered to provide sub-optimal foraging habitat only. No roosting or breeding hollows were present on the subject site. Due to the lack of

breeding habitat, absence of this species from the subject site during surveys and retention of native vegetation it is considered that the proposed development is not likely to disrupt the life cycle of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

Powerful Owl (*Ninox strenua*)
The Powerful Owl inhabits mature rainforest and wet and dry eucalypt forest (Schodde & Tidemann, 1986). The Powerful Owl utilises Eucalypt forests and woodlands and adjacent cleared areas for foraging. Large trees with hollows at least 0.5m deep are required for shelter and breeding (Schodde *et al.*, 1980; SWC Consultancy, 1993). Mated pairs of Powerful Owl roost together or separately, maintaining several roost sites throughout their territory which are used in rotation shifting with the availability of prey (Lindsey, 1992).

The subject site is considered to provide sub-optimal foraging habitat only. No roosting or breeding hollows were present on the subject site. Due to the lack of breeding habitat, absence of this species from the subject site during surveys and retention of native vegetation it is considered that the proposed development is not likely to disrupt the life cycle of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

Regent Honeyeater (*Xanthomyza phrygia*)
The Regent Honeyeater utilises eucalypt forests and woodlands for foraging and breeding habitats during winter migrations from various locations within south-eastern and eastern Australia.

The subject site provides sub-optimal foraging habitat for this species. The Regent Honeyeater was not detected during surveys. It is considered that due to the availability of greater areas of habitat in the local area including the nearby Ku-ring-gai Chase National Park, that the loss of a small number of foraging trees is not likely to disrupt the life cycle of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

Southern Brown Bandicoot (*Isodon obesulus*)
The Southern Brown Bandicoot has been detected in a range of habitats including open forest, woodland, heaths, agricultural land and urban areas, preferring areas with thick ground cover which provide protection from predators (Braithwaite, 1988). Environment Australia (2000) recorded this species from a range of habitat types, though it was more typically found in heathland environments on sandy friable soils. However, the Southern Brown Bandicoot has also been located in forests and woodlands with a heathy or shrubby understorey characterised by *Acacia*, *Banksia*, *Daviesia*, *Epacris*, *Hakea*, *Leptospermum*, *Melaleuca* and *Platylobium* species.

The subject site contains suitable habitat for this species within the low open woodland with low heath understorey vegetation, which is present throughout the subject site. The presence of the Southern Brown Bandicoot in the Pittwater Council area is yet to be confirmed (Pittwater Council, 2000b). Foraging marks of bandicoot species were detected within the subject site. Hair tubing to detect the presence of this species detected only Long-nosed Bandicoots *(Perameles nasuta).*

Due to the availability of similar areas of suitable habitat for Southern Brown Bandicoot within Ku-Ring-Gai Chase National Park, Garigal National Park and the adjoining council reserve of Ingleside Park, it is considered that the proposed development is not likely to disrupt the life cycle of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

Squirrel Glider (*Petaurus norfolcensis*)
The Squirrel Glider inhabits the dry hardwood forest and woodland over most of its range (Suckling 1995). Mixed-aged stands which support the Squirrel Glider invariably include gum-barked and high nectar-producing species including some which flower in winter (Menkhorst *et al.* 1988). The presence of mature, hollow-bearing eucalypts is a critical characteristic of habitat occupied by Squirrel Gliders and are utilised for nesting and breeding (Suckling 1995).

Due to sparse nature of the potential food trees for this species within the subject site it is considered that the subject site provides sub-optimal foraging habitat only for this species only. This species was not detected within the subject during surveys however. Due to the availability of greater areas of higher quality habitat within Ku-Ring-Gai Chase National Park, Garigal National Park and the adjoining council reserve of Ingleside Park, the proposed development is not likely to disrupt the life cycle of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

Eastern Pygmy Possum (*Cercatetus nanus*)
The Eastern Pygmy-possum is found from rainforest through sclerophyll forest to tree heath. Banksia and myrtaceous shrubs and trees are favoured (Turner and Ward, 1995). An important determinant of habitat quality may be the proportion of the year in which pollen is available and the species is usually associated with floristically diverse shrub community, especially those including *Banksia* species. However populations also occur in box-ironbark associations where the understorey is sparse but relatively diverse (Menkhorst, 1996).

Eastern Pygmy-possums usually shelter alone in tree cavities, rotten stumps, holes in the ground, disused bird nests and possum dreys and in vegetation thickets such as *Xanthorrhoea* species (Menkhorst, 1996). This species has a preference for hollows with a small entrance (Environment Australia, 2000).

The subject site provides potential foraging habitat for this species only. This species was not detected within the subject during surveys however. Due to the proximity of urban areas to the subject site and availability of greater areas of higher quality habitat within Ku-Ring-Gai Chase National Park the proposed development is not likely to disrupt the life cycle of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

Grey-headed Flying-fox (*Pteropus poliocephalus*)
The Grey-headed Flying-fox inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas. The subject site contains a number of species identified in the diet of the Grey-headed Flying-fox in the local area (Parry-Jones & Augee, 2001). These are *Eucalyptus paniculata* (Grey Ironbark), *Erythrina sp.* (Coral Tree), *Ligustrum lucidum* (Large-leaved Privet), *Ligustrum sinense* (Small-leaved Privet), *Pittosporum undulatum* (Sweet Pittosporum) and *Livistona australis* (Cabbage Tree Palm). It is considered likely that *Corymbia maculata* also falls into the *Eucalyptus spp.* category of Parry-Jones and Augee (2001).

The subject site provides suitable foraging habitat for this species, however, no suitable breeding or camp habitat was located during the survey. The species was not detected foraging within the subject site.

It is considered that the lack of camp habitat indicates that the proposed development is not likely to disrupt the life cycle of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

Common Bentwing-bat (*Miniopterus schreibersii*)
The Common Bentwing-bat forages above and below the canopy within open forests and woodlands, feeding on small insects. The Common Bentwing-bat is known to roost in a range of habitats including storm water channels, under bridges, occasionally in buildings, old mines and in particular caves. Caves are an important resource for this species, particularly for breeding where maternity caves must have suitable temperature, humidity and physical dimensions to permit breeding (Dwyer, 1995a). Roost sites in tree hollows have not been reported within the literature reviewed.

No suitable roosting habitat was located on the subject site for the Common Bentwing-bat. However, the subject site is considered to provide a small amount of suitable foraging habitat for the Common Bentwing-bat within the canopy trees. This species was not detected during surveys.

The lack of breeding or roosting habitat and absence of the Common Bentwing-bat from previous surveys conducted within the local area indicates that the proposed development is not likely to disrupt the life cycle of this species within the local area such that a viable local population of this species is likely to be placed at risk of extinction.

Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
The Eastern False Pipistrelle inhabits warm to cool temperate moist and dry open forests (Strahan 1995). Little is known about the biology of this species although it has been recorded in logged and unlogged areas (QEM, 1994), preferring open areas for foraging (O'Neill & Taylor 1989). The Eastern False Pipistrelle roosts mainly in tree hollows, occasionally utilising caves and abandoned buildings (Parnaby, 1992; Phillips *et al.*, 1986).

No roosting habitat was identified on the subject site. As such, the subject site is not considered to provide suitable roosting habitat for this species. The subject site is considered to provide suitable foraging habitat for this species however it was not detected during surveys.

The lack of breeding or roosting habitat and absence of the Eastern False Pipistrelle from previous surveys conducted within the local area indicates that the proposed development is not likely to disrupt the life cycle of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

Greater Broad-nosed Bat (*Scoteanax rueppellii*)
The Greater Broad-nosed Bat inhabits open forests and woodlands, foraging throughout these forest types and also along creeks and small river systems. This species roosts in tree hollows and occasionally old buildings (Hoye & Richards, 1995).

No roosting habitat was identified on the subject site. As such, the subject site is not considered to provide suitable roosting habitat for this species. The subject site is considered to provide suitable foraging habitat for this species however it was not detected during surveys.

The lack of breeding or roosting habitat and absence of the Eastern False Pipistrelle from previous surveys conducted within the local area indicates that the proposed development is not likely to disrupt the life cycle of this species within the local area such that a viable local population is likely to be placed at risk of extinction.

(b) **in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised,**

Squirrel Glider (*Petaurus norfolcensis*)
Although the subject site is considered to contain sub-optimal habitat for this species the site is not within the area occupied by the endangered population. Eucalypts on the subject site, which include gum-barked and high nectar-producing species, are considered to provide some suitable foraging habitat for this species. This species was not detected on the subject site.

Of the twelve known habitat features for the Squirrel Glider in the local area (Pittwater Council, 2000a) five were present within the subject site, these included the presence of food trees *Corymbia gummifera, Banksia serrata, Banksia spinulosa,* and shrub species *acacia longifolia, and Xanthorrhoea* species. Three potential food sources (*Angophora costata, Banksia ericifolia* and *Eucalyptus punctata*) are also located on the subject site.

Due to the sub-optimal quality of the vegetation within the subject site and the availability of greater areas of higher quality habitat for Squirrel Gliders within Ku-Ring-Gai Chase National Park, Garigal National Park and the adjoining council reserve of Ingleside Park, It is considered that the proposed development is not likely to disrupt the life cycle of the endangered population in the area such that the viability of the population is likely to be significantly compromised.

Koala (*Phascolarctos cinereus*)
Eucalyptus punctata, a Koala food tree species listed on Schedule 2 of State Environmental Planning Policy No. 44 - Koala Habitat Protection, was observed within the study area. These trees comprised approximately 5-8% of the total number of trees within the study area, which is less than the 15% indicated by SEPP 44 for classification as Potential Koala Habitat. Despite the presence of marginal habitat, neither the Koala nor signs of its presence, namely scats, were located on the subject site. As such, it is considered that the subject site does not form Core Koala Habitat in accordance with the provisions of SEPP N° 44.

Pittwater Council (2000b) found *Eucalyptus punctata, E. haemastoma* and *E. robusta* to be favoured food trees in the local area. Other tree species were browsed, however were considered to be under-exploited relative to their abundance. One of these locally favoured food tree species *Eucalyptus punctata* was located on the subject site.

In addition to this, no characteristic signs of koala presence were located on the subject site. This indicates that the proposed development is not likely to disrupt the life cycle of the endangered population in the area such that the viability of the population is likely to be significantly compromised.

(c) **in relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed,**

Threatened Species
No threatened flora or fauna species were located on the subject site during surveys. As such, the subject site is not considered to be known habitat for threatened species. Further, the subject site is a small area of habitat in relation to the larger areas of similar habitat within Garigal, Ku-ring-gai Chase National Park and adjacent bushland (Benson and Howell, 1994).

As such, it is not considered that the proposed development is likely to remove or modify a regionally significant area of known habitat for threatened flora or fauna species.

Endangered Populations
Two endangered populations occur in the local area – the Squirrel Glider (*Petaurus norfolcensis*) in the Barrenjoey Peninsula and the Koala (*Phascolarctos cinereus*).

The Final Determination for the Pittwater population of the Squirrel Glider (Scientific Committee, 1996) lists the threatened population as occurring north of Bushrangers Hill. The subject site is approximately 6km to the south west of Bushrangers Hill, and as such it is not considered that the Pittwater population of the Squirrel Glider is relevant to the subject site.

The Koala was not located on the study site during surveys. As such, the subject site is not considered to be known habitat for this species. Further, the subject site is a small area of habitat in relation to the larger areas of similar habitat within Garigal, Ku-ring-gai Chase National Park and adjacent bushland (Benson and Howell, 1994). As such, it is not considered that the proposed development is likely to remove or modify a regionally significant area of known habitat for this population.

Endangered Ecological Communities
There are a number of Endangered Ecological Communities known to occur in the local area. These are: Duffys Forest, Pittwater Spotted Gum Forest, Sydney Coastal Estuary Swamp Forest Complex and Sydney Freshwater Wetlands.

The habitat requirements and species that characterise these communities are absent from the subject site, as detailed in Section 2.5 of this report. The subject site is not mapped as containing any Endangered Ecological Community, and is not connected or in the vicinity of vegetation recognised as an Endangered Ecological Community (Smith and Smith, 2000; Benson and Howell, 1994).

This, combined with larger areas of similar habitat within Garigal and Ku-ring-gai Chase National Parks and adjacent bushland (Benson and Howell 1994), indicates that the proposed development is not likely to remove or modify a regionally significant area of known habitat for a threatened ecological community.

(d) whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community,

No threatened species, populations or communities were located on the subject site during survey. As such, it is not considered that the subject is known habitat for any threatened flora or fauna species.

Impediments to the movement of threatened species include the presence of Ingleside Road and developed areas to the north and south. It is considered that the location of the subject site, and the absence of threatened species during survey, indicates that less mobile species are unlikely to utilise the subject site as a movement corridor. However, these impediments are not considered likely to inhibit the movement of more mobile species, namely birds and bats. The mobility of these species indicates that the proposed development is unlikely to impede the movement of these species in the local area.

As such, it is considered unlikely that an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species or population.

The subject site is not mapped as being connected to or in the vicinity of vegetation recognised as an Endangered Ecological Community (Smith and Smith, 2000; Benson and Howell, 1994). As such, it is considered unlikely that the proposed development will isolate an area of known habitat from currently interconnecting or proximate areas of habitat for a Endangered Ecological Community.

(e) whether critical habitat will be affected,

The site has not been identified as critical habitat within the provisions of the *TSC Act* (1995). Therefore, this matter does not require further consideration at this time.

(f) whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region,

Threatened species, populations or ecological communities which have been identified within the local area are generally not considered to be adequately represented in conservation reserves.

(g) whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process,

A final determination exists within the *Threatened Species Conservation Act* (1995) for "Clearing of native vegetation" as a Key Threatening Process and as such the proposal is of a class of development recognised as a threatening process.

(h) whether any threatened species, population or ecological community is at the limit of its known distribution.

With the exception of the following locally restricted threatened species (*Grevillea caleyi, Kunzea rupestris, Micromyrtus blakelyi, Microtis angusii*), populations (Squirrel Glider, Koala) and Ecological Communities (Pittwater Spotted Gum Forest, Duffys Forest), an assessment of the distribution of threatened species, population or ecological communities listed on the Atlas of NSW Wildlife (NPWS, 2003) indicates that no threatened species, population or ecological communities is at the limit of its known distribution in the local area.

4.2 COMMONWEALTH LEGISLATION

The *Environment Protection and Biodiversity Conservation Act, (1999)* requires that Commonwealth approval be obtained for certain actions. The Act provides an assessment and approvals systems for actions that have a significant impact on matters of national environment significance (NES). These may include:-

- Wetlands protected by international treaty (the RAMSAR Convention);
- Nationally listed threatened species and ecological communities;
- Nationally listed migratory species.

Actions are projects, developments, undertakings, activities, series of activities or alteration of any of these. An action that needs Commonwealth approval is known as a controlled action. A controlled action needs approval where the Commonwealth decides the action would have a significant effect on a NES matter.

Where a proposed activity is located in an area identified to be of NES, or such that it is likely to significantly affect threatened species, ecological communities, migratory species or their habitats, the matter needs to be referred to Environment Australia.

No threatened species or endangered ecological communities listed in the EP&BC Act (1999) were identified on or near to the site. It is considered that a referral of this project to Environment Australia is not required as it is not likely to impact on a significant population of threatened species or on an endangered ecological community.

4.3 CONCLUSIONS

Based on the detailed field survey and information provided in this report it is concluded that:

1. No threatened flora or fauna species, populations or ecological communities were detected on the subject site;

2. The proposed development is not likely to have a significant effect on threatened species, populations or endangered ecological communities or their habitats;

3. It is considered that a referral of this project to Environment Australia is not required

4. A Species Impact Statement should not be required for the proposed development;

5. A Bushland Management Concept Plan should be prepared for the subject site.

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APPENDIX I

FAUNA SURVEY METHODOLOGY

FAUNA SURVEY METHODOLOGY

Introduction

Fauna survey methods used by *Conacher Travers Pty Ltd* are based upon the standard methods utilised by the NSW National Parks and Wildlife Service (NSW NPWS 2000a), State Forests of NSW (York *et al.* 1991) and Wyong Shire Council - Draft (Forest Fauna Surveys *et al.* 1998). Specific fauna groups are targeted using methods specific to that group. This appendix provides specific information on each of the fauna survey methods applied for this survey. During each of the methods used the following data is gathered relating to weather conditions:

- Air temperature;
- Moon (where relevant) (eg none, 1/4 moon, 1/2 moon, 3/4 moon, full moon);
- Rain (eg none, light drizzle, heavy drizzle, heavy rain);
- Recent rain events (where relevant);
- Wind Strength eg calm, light (leaves rustle), moderate (moves branches), strong (moves tree crowns).

Details on survey methods used in this report for each fauna group are provided below.

1. *Diurnal Birds*

a. Bird Census

- A diurnal bird census is undertaken on each day of the survey. Each census involved a 20 minute site-based search at each trapping transect. A bird census is undertaken during peak activity periods (6am-9am and 3pm-6pm or later depending on season) and birds are identified through observation and call identification. Specific habitats of threatened species are also targeted across the study areas either during the bird census or opportunistically.

- Opportunistic bird counts are also made while undertaking other survey work and during spotlight surveys of the site.

- Birds are observed and identified using binoculars. Calls are generally identified in the field by the observer. If an unknown call is heard it is recorded and identified using reference libraries.

b. Opportunistic Sampling

- When carrying out any particular method of fauna survey, any birds observed or heard are recorded. Signs of birds such as feeding stations are also noted and analysed. This provides a wider opportunity for observation of species.

2. *Arboreal Mammals*

a. Habitat Assessment

- Habitat assessment involved searching for likely roost such as hollow bearing trees, dreys and other signs of arboreal mammal habitation.

3. *Terrestrial Mammals*

a. Habitat Assessment

- Habitat assessment involved searching for likely roost such as hollow logs, run ways through heath diggings and scat analysis and other signs of terrestrial mammal habitation.

b. Hair Tubing

- Hair tubes consist of a 200mm length of PVC stormwater pipe (90mm diameter) fitted with a PVC plug and cap at one end which creates a bait chamber. Bait is placed in the bait chamber between the cap and the plug which has several holes drilled into it. This allows the smell of the bait to permeate from the tube without allowing access to the bait chamber. Strips of Schafco Advance Tape are placed around the inner surface of the tube opening to catch the hairs of fauna visiting the hair tubes.

- For terrestrial fauna surveying Hair Tubes are placed along each of the terrestrial trapping transects and are left in place for periods of one to three weeks. Along each of the hair tube transects, one of the hair tubes is baited with sardine cat food while the other four hair tubes are baited with a mixture of peanut butter, rolled oats and honey.

- When the hair tubes are collected, the hair samples are sent to Barbara Triggs for analysis.

4. *Amphibians*

a. Habitat Search

- Habitat searches involve searching likely niches such as dense undergrowth, around trees, under logs and rocks, and aquatic and gully habitats. Amphibian species observed during habitat searches are noted and the calls of species not observed are recorded onto a personal cassette recorder for later comparison with call reference libraries. Captured individuals were identified on site using field reference texts and released.

- The egg and tadpole stages of some frog species are susceptible to predation by predatory fish species. If aquatic habitats are present on the site they are sampled for the presence of particular fish species. A small dip net is passed through the waterbody a number of times to sample the fish stock of the aquatic habitat.

- Opportunistic sightings of any reptiles or amphibians are also made while undertaking other survey work and during spotlight surveys of the site.

- Field traverses are made across the study area 0.5 hours at a time. Optimal times for conducting habitat searches are early morning, late afternoon or when favourable weather conditions for a particular species prevail.

5. *Reptiles*

a. Habitat Search

- Habitat searches involve searching likely niches such as dense undergrowth, around trees, under logs and rocks, and aquatic and gully habitats. Destructive searches whereby bark, logs, debris, rocks and ant-nests are displaced are also carried out. Reptile species observed during habitat searches are noted and if individuals are captured they are identified on site using field reference texts and released.

- Opportunistic sightings of any reptiles is also made while undertaking other survey work.

- Field traverses are made across the study area for up to 3 hours at a time, usually by one person. Optimal times for conducting habitat searches are between from 6am to 9am and 3pm to 6pm depending on the season or in suitable weather conditions.

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