

*PAID: 28/6/2006
* Receipt: 194859.



CONSTRUCTION CERTIFICATE APPLICATION

Made under the Environmental Planning and Assessment Act 1979 Sections 109C
(1) (b), 81a (2) and 81a (4)

Pittwater Council

PO Box 882, Mona Vale NSW 1660

Tel: (612) 9970 1111

Fax: (612) 9970 7150

Internet: www.pittwaterlga.com.au

Email: pittwater_council@pittwater.nsw.gov.au

SITE DETAILS

Unit/Suite:	Street No:	Street:	
	104-106	WAKEHURST PARKWAY ELANORA	
Suburb:	ELANORA NSW	Lot No:	Deposit /Strata Plan:
		10 & 11	1014199

DEVELOPMENT CONSENT

Development Application No:	Determination Date:
432/04	31/5/05

APPLICANT DETAILS

Name/Company:	Contact Person:
STUART THOR & ANDREW VAN WENSVEEN	STUART THOR.
Postal Address:	Contact Numbers:
P.O. BOX 806	Phone (H/B): 9970 6219
NARRABEEN	Mobile: 0402 943 988
	Fax: 9970 6218
Signature of Applicant:	Date:
<i>Stuart Thor</i>	24/6/06

OWNERS DETAILS

Names: STUART THOR. ANDREW VAN WENSVEEN.	If Company, contact person:
Postal Address:	Contact Numbers:
P.O. BOX 806	Phone (H/B): 9970 6219
NARRABEEN NSW	Mobile: 0402 943 988
2101.	Fax:
As the owner of the land to which this application relates, I consent to this application. I also give consent for the authorised Council Officer to enter the land to carry out inspections.	

Signature of Owners:

Date:

Stuart Thor
A. van Wensveen

24/6/06
21/06/06

If more than one owner, every owner must sign. If the owner is a company, the form must be signed by an authorised director and the common seal must be stamped on this application.
If the property has been recently purchased, written confirmation from the purchaser's Solicitor must be provided.
If the contracts have been exchanged for the purchase of the land, the current owner is to sign the application.

DEVELOPMENT DETAILS

Type of Work:	<input type="checkbox"/> Building Work
OR	
	<input checked="" type="checkbox"/> Subdivision Work
Description of proposal – (Provide brief, concise details):	
Install Driveway & Services for future New Blocks, carry out Remedial Work on Rock Cliff Landscape as necessary.	

WHO WILL BE DOING THE BUILDING WORKS?

<input checked="" type="checkbox"/> Owner Builder	
Owner Builders Permit No: 307341P	
Copy of Owner Builders permit attached:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No – to be provided with Notice of Commencement Form
<i>If you are an Owner-Builder for the residential building work exceeding \$5000 you must apply for a permit at NSW Office of Fair Trading, 1 Fitzwilliam Street, Paramatta NSW 2150 Australia. Tel: 61 2 98950111 Fax: 61 2 9895 0222.</i>	

OR

<input type="checkbox"/> Licensed Builder	
Builder's License Number	
Name of Builder:	Phone:
Contact person:	Mobile:
Address:	Fax:
Insurance Company:	Insurance Certificate attached: <input type="checkbox"/> Yes <input type="checkbox"/> No – to be provided with Notification of Commencement form
<i>If you are using a licensed builder for residential building work exceeding \$12,000 you must obtain Home Building Act Insurance. A certificate of insurance must be provided with this application or submitted with the Notification of Commencement form.</i>	

VALUE OF PROPOSED DEVELOPMENTValue of Works: \$ 235,000 (including full cost of labour and materials)**DO YOU NEED TO PAY THE BUILDING INDUSTRY LONG SERVICE LEVY?**☒ Yes☐ No*Only required if the development involves building works exceeding \$25,000.00.***OFFICE USE ONLY**

Fee Type	Cashier's Code	Fee Amount
Construction Certificate Application Fee	TCER	\$ 946
Long Service Levy Fee	QLSL	
Driveway/Street Levels	ESTR	
Sec 94 Contributions		
Bonds/Guarantees		
Other Fees		
TOTAL		
Date of Receipt: <u>28/6/2006</u>	Receipt No: <u>R/194859.</u>	Accepted By: <u>TIM FUNG.</u>

PRIVACY AND PERSONAL INFORMATION PROTECTION NOTICE

Purpose of collection:	To enable Council as the consent authority to assess your proposal.
Intended recipients	Council Staff and any other relevant government agency that may be required to assess the proposal.
Supply:	The information is required by legislation.
Consequence of Non-provision:	Your application may not be accepted, not processed or rejected for lack of information
Storage:	The Pittwater Council will store details of the application and any subsequent decision in a register that can be viewed by the public.
Retention period:	Hard copies of the application will be destroyed after 7 years and electronic records will be kept indefinitely.
Please contact Council if this information you have provided is incorrect or changes.	

CC0355/06

STATISTICAL RETURN FOR AUSTRALIAN BUREAU OF STATISTICS

What is the area of the land?	Area in square metres	4200 sqm
Gross floor area of existing building ²	Area in square metres	300 sqm
If no existing building, write "NIL"		
What is the existing building or site used for at present?	Main uses:	RESIDENTIAL
	Other uses:	
Does the site contain a dual occupancy?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Gross floor area of proposed building?	Proposed floor area in square metres	
What will the proposed building to be used for?	Main uses:	
	Other uses:	
How many dwellings:		
Are pre-existing at this property?	Dwellings:	2
Are proposed to be demolished?	Dwellings:	2
Are proposed to be constructed?	Dwellings:	4
How many storeys will building consist of?	Storeys:	2
What are the main building materials?		
Walls		Roof
Full Brick	<input checked="" type="checkbox"/>	Aluminium
Brick veneer	<input type="checkbox"/>	Concrete or slate
Concrete, masonry	<input type="checkbox"/>	Tile
Steel	<input type="checkbox"/>	Fibrous cement
Fibrous cement	<input type="checkbox"/>	Steel
Timber/weatherboard	<input type="checkbox"/>	Other
Cladding-aluminium	<input type="checkbox"/>	Unknown
Curtain glass	<input type="checkbox"/>	
Other	<input type="checkbox"/>	
Unknown	<input type="checkbox"/>	
Floor		Frame
Concrete	<input checked="" type="checkbox"/>	Timber
Timber	<input type="checkbox"/>	Steel
Other	<input type="checkbox"/>	Other
Unknown	<input type="checkbox"/>	Unknown

APPLICANTS CHECK LIST

Note: This list is intended as a guide to the type of information to be submitted. Some items may not be required and Section B of the Conditions of Development Consent for the building works may specify further additional information required with submission of your Construction Certificate Application.

Application Form –	<input type="checkbox"/> Owners Consent <input type="checkbox"/> Applicant's Signature <input type="checkbox"/> Long Service Levy <input type="checkbox"/> Driveway/Street levels Application
Supporting Documentation - (3 copies of each)	<input type="checkbox"/> Architectural Plans <input type="checkbox"/> Quick Check Plans endorsed by Sydney Water <input type="checkbox"/> Construction Specifications for Building Works <input type="checkbox"/> Structural Engineer's Plans <input type="checkbox"/> Structural/Geotechnical Certificates <input type="checkbox"/> Landscape Plans <input type="checkbox"/> Driveway Level Plans <input type="checkbox"/> On-site Stormwater Detention Plans <input type="checkbox"/> Drainage Plans on Site Storm Management <input type="checkbox"/> Erosion and Sediment Management Plan <input type="checkbox"/> Sydney Water Quick Check Plans <input type="checkbox"/> Subdivision Work Plans <input type="checkbox"/> Schedule of External Finishes/Colours <input type="checkbox"/> Fire Safety Measures Schedule <input type="checkbox"/> Form No. 2 – "Geotechnical Risk Management Policy for Pittwater" <input type="checkbox"/> Details and location of fencing for Swimming Pool to comply with AS 1926-1986 "Fences and Gates for Private Swimming Pools" <input type="checkbox"/> Specifications for construction of buildings in Bushfire-prone areas <input type="checkbox"/> Security Deposit / Section 94 contributions



Anna Williams, Principal Officer - Development
8am to 5.30pm Mon - Thurs, 8am to 5pm Fri
Phone 9970 1111

DA No N0432/04

In all correspondence please
quote this number

10 January 2006

Vaughan Milligan Development Consulting Pty Ltd
PO BOX 49 NEWPORT BEACH
NSW 2106

Dear Sir,

**Re: Deferred Commencement Conditions – Development Application N0432/04,
104-106 WAKEHURST PARKWAY, ELANORA HEIGHTS.**

I refer to the deferred commencement condition 1 contained within the aforementioned consent, and your submission of information on 11.11.05 & from the RTA dated 27.9.05.

Please be advised that pursuant to Regulation 95 (5) of the Environmental Planning and Assessment Regulation 2000, Council considers the details provided in accordance with deferred commencement Conditions 1 contained in Part 1 of the conditions of Development Consent are satisfactory. The following documentation therefore forms part of the consent documentation:

- Letter from the Roads and Traffic Authority, signed by a Mr Gordon Trotter - A/Senior Development Assessment Officer, Operations and Services Directorate and dated 27.9.05.

In this regard, the Consent becomes operative from the date of this letter subject to the conditions listed in Part 2 of the Consent.

Yours faithfully ~

Anna Williams
PRINCIPAL OFFICER - DEVELOPMENT

STUART JOHN THOR
PO BOX 806
NARRABEEN 2101

HOME BUILDING ACT 1989

OWNER BUILDER PERMIT

Permit :307341P
Receipt:AA2218623

Issued:26/04/2006
Amount:\$132.00

Building Site:

LOT 10 & 11, 104 & 106 WAKEHURST PARKWAY, ELANORA 2101

Authorised Building Work:

DA N0432/04 DEMOLITION OF EXISTING STRUCTURES,
SUBDIVISION OF 2 LOTS INTO 4 LOTS AND DRIVEWAY
CONSTRUCTION AT 104 WAKEHURST PARKWAY ELANORA.

ISSUED BY PITTWATER COUNCIL

Should the property be sold within 6 years of completion of the work it will be necessary to obtain home warranty building insurance from approved insurers if the value of the work was greater than \$12,000. A certificate of insurance must be attached to any contract for sale.

You should obtain professional advice from general insurers regarding public liability and property damage cover, etc.

Note: This permit is only valid when an official receipt has been imprinted.

If payment is made by cheque, the permit is conditional on the cheque being met at presentation.

Issuing Officer

***** END OF PERMIT *****



Business Hours:

8.00am to 5.30pm, Monday to Thursday

8.00am to 5.00pm, Friday

DA No: N0432/04

31 May 2005

S THOR & A VANWENSVEEN
C/- VAUGHAN MILLIGAN DEVELOPMENT CONSULTING
47 BEACONSFIELD STREET
NEWPORT NSW 2106

Dear Sir/Madam

Development Application for Demolition of existing structures, subdivision of 2 lots into 4 lots and driveway construction at 104 WAKEHURST PARKWAY ELANORA HEIGHTS NSW 2101.

I am pleased to advise that this application has been approved and I attach for your assistance a copy of the Development Consent, the conditions of approval and a copy of the approved plan.

As building works are involved, prior to proceeding with the proposal, it will be necessary for you to lodge a Construction Certificate Application with either Council or an accredited Certifier.

I take this opportunity to direct your attention to Section B of the Consent which details the matters to be satisfied prior to issue of the Construction Certificate.

In addition, pursuant to the provisions of Section 80(10A), of the Environmental Planning and Assessment Act, 1979, the Long Service Levy payable under Section 34 of the Building and Construction Industry Long Service Payments Act, 1996, must be paid prior to issue of the Construction Certificate.

In the event that you have paid this levy direct to the Building Services Corporation, I will require proof of that direct payment.

You will also be required to furnish a copy of the Builders Warranty Insurance Certificate OR an Owner/Builder's permit from the Department of Fair Trading must be forwarded to Council prior to release of the Construction Certificate.

If an Owner/Builder's permit is to be applied for, application must be made direct to the Department of Fair Trading. You must quote Development Application No. N0432/04 and supply an unstamped plan with your application. The permit must then be presented to Council when collecting your plans.

Please note that some sections of the Consent may require the lodgement of Building Component Certificates at various stages of the development. These Certificates must be returned to Council or the Accredited Certifier prior to issue of the Occupation Certificate or

Subdivision Certificate. **You should also note that both Council and the Accredited Certifier will charge a fee for acknowledging compliance with conditions and the issue of the Occupation or Subdivision Certificates.** . You must nominate either Council or an accredited certifier prior to commencing work.

You will be required to notify Council a minimum of 2 days prior to your commencing work on the site.

If there are any matters relating to this approval which require further explanation, please contact me prior to commencing work on the site.

Yours faithfully

A handwritten signature in black ink, appearing to read 'John Raven', written over the typed name.

John Raven
DEVELOPMENT OFFICER



Anna Williams, Principal Officer - Development
8am to 5.30pm Mon - Thurs, 8am to 5pm Fri
Phone 9970 1111

DA No N0432/04

In all correspondence please
quote this number

14 November 2005

Vaughan Milligan Development Consulting
47 Beaconsfield St
NEWPORT, NSW 2106

Dear Sir/Madam,

**Re: Deferred Commencement Conditions – Development Application N0432/04, 104 & 106
Wakehurst Parkway, Elanora heights.**

I refer to the deferred commencement condition 1 contained within the aforementioned consent, and your submission of information on 11 November 2005.

Please be advised that pursuant to Regulation 95. (5) of the Environmental Planning and Assessment Regulation 2000, Council considers the details provided in accordance with deferred commencement Conditions 1 contained in Part 1 of the conditions of Development Consent are satisfactory. The following documentation therefore forms part of the consent documentation:

- Letter and attached requirements from the Roads and Traffic Authority dated 27th September 2005 signed by Gordon Trotter from Operations and Services Directorate

In this regard, the Consent becomes operative from the date of this letter subject to the conditions listed in Part 2 of the Consent.

Yours faithfully

Anna Williams
PRINCIPAL OFFICER - DEVELOPMENT



CONSENT NO: N0432/04
ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979 (AS AMENDED)
NOTICE TO APPLICANT OF DETERMINATION
OF A DEVELOPMENT APPLICATION

Applicant's Name and Address:

**S THOR & A VANWENSVEEN, C/- VAUGHAN MILLIGAN DEVELOPMENT CONSULTING, 47
BEACONSFIELD STREET, NEWPORT NSW 2106.**

Being the applicant in respect of Development Application No N0432/04

Pursuant to section 80(3) of the Act, notice is hereby given of the determination of a **Deferred Commencement Consent** by Pittwater Council, as the consent authority, of Development Application No N0432/04 for:

Demolition of existing structures, subdivision of 2 lots into 4 lots and driveway construction

At:

Lot 11 DP 1014199

**104 WAKEHURST PARKWAY
ELANORA HEIGHTS NSW 2101**

Decision:

The Development Application has been determined by the granting of consent in accordance with plans numbered Plan of Proposed Subdivision – CMS TH02, PROPOSED SUBDIVISION MAR 04.DWG, Rev G, dated 24.9.04; Plan of Subdivision and Redevelopment CMS TH02 Model MAR 04.dwg, Rev G, dated 24.9.04; Plan of Driveway Design for Proposed Subdivision DA-CMS TH02 DRIVEWAY DESIGN, MAR 04.DWG, Rev B, dated 2.6.04; Driveway Longsection – 476 detail 200.dwg, Rev A, dated 6.4.04, prepared by CMS Surveyors Pty Ltd, as amended in red (shown clouded) or as modified by any conditions of this consent.

The reason for the imposition of the attached conditions is to ensure that the development consented to is carried out in such a manner as to achieve the objectives of the Environmental Planning and Assessment Act 1979 (as amended), pursuant to section 5(a) of the Act, having regard to the relevant matters for consideration contained in section 79C of the Act and the Environmental Planning Instruments applying to the land, as well as section 80A of the Act which authorises the imposing of the consent conditions.

Endorsement of date of consent 31 May 2005

Dennis Baker
ACTING GENERAL MANAGER

Per: 



PART 1

THE COMMENCEMENT OF THIS CONSENT IS DEFERRED UNTIL THE CONSENT AUTHORITY IS SATISFIED AS TO COMPLIANCE WITH THE FOLLOWING CONDITION/S:

1. That the consent of the Roads and Traffic Authority of NSW be obtained for the works in the Wakehurst Parkway road reserve prior to the issue of a Construction Certificate or Subdivision Certificate and within 6 months of the date of this consent.

Upon receipt of evidence within 6 months from the date of this consent satisfying the above, the consent will become operative, subject to the conditions listed in Part 2 below.

The consent will lapse if evidence satisfying the above conditions is not received within the prescribed time period.

Jeff Cox

Ken Mann

Greg Gendall



PART 2

CONDITIONS OF DEVELOPMENT CONSENT

This Consent is not an approval to commence building work. The works associated with this consent can only commence following the issue of the Construction Certificate.

A. PRESCRIBED CONDITIONS

- A1. All works are to be carried out in accordance with the requirements of the Building Code of Australia.
- A2. In the case of residential building work for which the Home Building Act 1989 requires there to be a contract of insurance in force in accordance with Part 6 of that Act, there is to be such a contract in force.
- A4. To allow a principal certifying authority or another certifying authority time to carry out critical stage inspections required by the principal certifying authority, the principal contractor for the building site, or the owner-builder must notify the principal certifying authority at least 48 hours before building work is commenced at the site if a critical stage inspection is required before the commencement of the work, in accordance with clause 162 of the Environmental Planning and Assessment Regulation 2000.
- A5. Critical stage inspections are to be carried out in accordance with clause 162A of the Environmental Planning and Assessment Regulation 2000.
- A6. A sign must be erected in a prominent position on any site on which building work, subdivision work or demolition work is being carried out:
 - a. showing the name, address and telephone number of the principal certifying authority for the work, and
 - b. showing the name of the principal contractor (if any) for any building work and a telephone number on which that person may be contacted outside working hours, and
 - c. stating that unauthorised entry to the work site is prohibited.
- A7. Any such sign is to be maintained while the building work, subdivision work or demolition work is being carried out, but must be removed when the work has been completed.
- A8. Residential building work within the meaning of the Home Building Act 1989 must not be carried out unless the principal certifying authority for the development to which the work relates (not being the council) has given the council written notice of the following information:
 - a. in the case of work for which a principal contractor is required to be appointed:
 - i. the name and licence number of the principal contractor, and
 - ii. the name of the insurer by which the work is insured under Part 6 of that Act.
 - b. in the case of work to be done by an owner-builder:
 - i. the name of the owner-builder, and



- ii. if the owner-builder is required to hold an owner-builder permit under that Act, the number of the owner-builder permit.

- A9. If arrangements for doing the residential building work are changed while the work is in progress so that the information notified under subclause (2) becomes out of date, further work must not be carried out unless the principal certifying authority for the development to which the work relates (not being the council) has given the council written notice of the updated information.
- A10. Conditions A8 and A9 do not apply in relation to Crown building work that is certified, in accordance with section 116G of the Act, to comply with the technical provisions of the State's building laws.

B. MATTERS TO BE SATISFIED PRIOR TO ISSUE OF CONSTRUCTION CERTIFICATE

NOTE: The issue of partial or limited Construction Certificates is not permissible under the terms of this consent unless otherwise specifically stated. All outstanding matters referred to in this section are to be submitted to the accredited certifier together. Incomplete Construction Certificate applications/details can not be accepted.

- 51 B9. An Ecological Sustainability Plan is required, APZ requirements from RFS are to be incorporated into the ESP (the ESP checklist is available from Council). RFS APZ Guidelines to be utilised and followed to minimum requirements (should a radiant heat shield be an RFS requirement 30cm x 30cm holes will be cut in at the base to allow wildlife to get through (access holes), one hole every 7 metres (approved by George Sheppard – RFS)). RFS requirements may not be relevant due to cliff line segregation between development sites and bushland.
- NB B20. Three sets of Drainage details showing **site stormwater management** are to be submitted prior to the release of the Construction Certificate. Such details are to be accompanied by a certificate from either a Licensed plumber or qualified practising Civil Engineer with corporate membership of the Institute of Engineers Australia (M.I.E), or who is eligible to become a corporate member and has appropriate experience and competence in the related field, that the stormwater management system complies with the requirements of section 3.1.2 "Drainage" of the Building Code of Australia Housing Provision and AS/NZS 3500.3.2 - Stormwater Drainage. The details shall include disposal of site stormwater to a public system (if the site is in a known slip area the stormwater disposal system must comply with the recommendations of a Civil (Geotechnical) Engineer's report).
- NB B26. Access driveways are to be 4m wide at the property boundary of the residential allotments in accordance with Rural Fire Service of NSW access requirements.
- B27. (a) Street Levels must be obtained from Council for all access driveways across the public road verge to road edge. The street levels provided by Council must be incorporated into and attached to design plans for the access driveway and internal driveway.
- (b) A Deed of Agreement indemnifying Council must be entered into for construction of a cosmetic access driveway i.e. other than a plain concrete finish, within the public road reserve.
- (c) All construction of the access driveway must be undertaken by a Council authorised contractor.



- (d) Council's Fees and Charges apply to Street Levels and Deed of Agreement for Access Driveway.
- B28. Three copies of plans, Street Levels provided by Council and a certificate submitted by a chartered Professional Engineer, Architect or Surveyor, confirming to the satisfaction of Council or the accredited certifier that the access driveway and internal driveway complies with Council's Pittwater 21 DCP and the Council street levels, are to be submitted with the Construction Certificate application.
- B29. Three copies of an Erosion and Sediment Management Plan are to be submitted with the Construction Certificate application. Control over discharge of stormwater and containment of run-off and pollutants leaving the site/premises shall be undertaken through the installation of erosion control devices such as catch drains, diversion drains, energy dissipaters, level spreaders and sediment control devices such as hay bale barriers, filter fences, filter dams, sedimentation basins. Such plan is to be accompanied by a certification from an appropriately qualified person, that the plans/ details have been designed in accordance with the requirements of the N.S.W. Department of Land and Water Conservation's "Urban Erosion and Sediment Control" manual.
- B45. Three sets of detailed landscape working drawings, which comply in all respects with the conditions of development consent, are to be submitted prior to release of the Construction Certificate. Each plan/sheet is to be certified by a qualified landscape architect, landscape designer/environmental designer or horticulturist, confirming that the plans/details provide for the works to be carried out in accordance with Development Control Plan No 23 - Landscape and Vegetation Management.
- B45a. In particular, the landscape working drawing is to provide full details of the following:
1. the usage of the dominant tree species growing in the area or locally indigenous species.
 2. all existing trees and vegetation to be retained, removed and proposed, including canopy spread, trunk location and condition;
 3. a plant schedule including stratum, species/common names, species' numbers, pot size and staking details;
 4. a schedule of materials (including such elements as turfing, edging, walling, paving and fencing);
 5. the proposed finished treatment of garden areas, including soil depth and mulching details;
 6. the location of underground/overhead services;
 12. plant species selection is to occur after consultation with Council's Fire Control Officer, in relation to exclusion zones and fuel free and fuel reduced areas. In terms of canopy planting, Council recommends the use of locally indigenous rainforest species which contain a natural fire retardant.
- B60. Three sets of Structural Engineering details relating to the driveway are to be submitted prior to release of the Construction Certificate. Each plan/sheet is to be signed by a qualified practising Structural Engineer with corporate membership of the Institute of Engineers Australia (M.I.E), or who is eligible to become a corporate member and has appropriate experience and competence



in the related field.

B60a. As the site is located in a slip liable area, the structural details relating to the driveway are to be endorsed by a qualified practising Geotechnical Engineer with corporate membership of the Institute of Engineers Australia (M.I.E), or who is eligible to become a corporate member and has appropriate experience and competence in the related field.

B64. Prior to issue of the Construction Certificate, details are to be submitted to Council or the Accredited Certifier that include, but are not limited to, all of the recommended conditions in the Geotechnical Report "18498Z Rpt" by Jeffery and Katauskas Pty Ltd, dated 9.6.04.

Form 2 of the "Geotechnical Risk Management Policy for Pittwater" is to be completed and submitted with the above details before issue of the Construction Certificate.

C. MATTERS TO BE SATISFIED PRIOR TO COMMENCEMENT OF WORK

NOTE: It is an offence to commence works prior to issue of a Construction Certificate.

- C4. Pre-order form/invoice for native plant selection is to be verified by Bushland Management Consultant (condition D193), planting to be done in a clumping fashion so as to provide suitable wildlife habitat/refuge.
- C10. In the event that asbestos is on a site or building under demolition or construction, WorkCover NSW is to be contacted to ascertain the appropriate response, to ensure the safety and protection of existing and future workers and residents.

An Asbestos Removal Contractor licensed by WorkCover NSW is to handle/remove/transport and dispose of any products containing asbestos in a manner approved of by the Environment Protection Authority.

Asbestos material can only be disposed of at a landfill site nominated by Waste Services NSW for that purpose. An appointment must be made with Waste Services NSW to dispose of asbestos materials at the nominated landfill.

- C15. Engineering plans and specifications for the construction of all roads, drainage and civil engineering works are to be submitted to the Private Certifying Authority with the Construction Certificate application.
The plans required are to include and provide for the following matters:
- The works in relation to that part of the Wakehurst Parkway (road) frontage of the development site including the works in relation to the access to the Development, for which the plan has been approved by Council.
 - Traffic management plan for the construction phase of the development.
 - Kerb and Guttering (vertical faced kerb only will be permitted).
 - Landscaping within the Road Reserves (existing and proposed).
 - Road shoulder and road pavement construction including pavement design and treatments up to the road centerline.
 - Footpath/cycleway.
 - Associated road drainage works.
- C20. Relocation of nominated palm species is to be carried out by a qualified contractor with proven experience in this area. Further, the contractor is to supply the project manager with a



maintenance strategy for a 12 month re-establishment period. This strategy is to address maintenance issues such as irrigation, soil testing, weeding, plant staking, fertilising, pest and disease control, remedial pruning and the like.

Further, provision is to be made for the contractor to visit the site on a 3 monthly basis from the date of the relocation. After the inspection, the contractor is to issue a report to the project manager certifying that the palms are healthy and performing to expectation.

A copy of this report is to be forwarded to Council or the accredited certifier. Where the project is being supervised by a private certifier, for the purposes of keeping a public record, a copy of the letter of confirmation is to be forwarded by the certifier to Council within 5 working days of the date of issue.

- C22. Prior to commencement of works, at least three photographs of the road reserve and footpath area adjoining the site, one front-on and one from each side of the property, are to be submitted to Pittwater Council with the notification of commencement of works, showing the condition of the street trees and road reserve. The photographs must be dated, and accompanied by a statement that they are a true and accurate representation of the scene depicted.

D. CONDITIONS TO MINIMISE THE IMPACT OF THE DEVELOPMENT ON THE NATURAL AND BUILT ENVIRONMENT

- D11. Any proposed demolition works shall be carried out in accordance with the requirements of AS2601-1991 "The Demolition of Structures".

Amongst others, precautions to be taken shall include compliance with the requirements of the WorkCover Authority of New South Wales, including but not limited to:

1. Protection of site workers and the general public.
2. Erection of hoardings where appropriate.
3. Asbestos handling and disposal where applicable.
4. Any disused service connections shall be capped off.

Council is to be given 48 hours written notice of the destination/s of any excavation or demolition material. The disposal of refuse is to be to an approved waste disposal depot.

- D12. In order to ensure safe handling of asbestos materials, the re-use or sale of asbestos building materials is prohibited.
- D17. All construction in the public road reserve must be undertaken by a Council authorised contractor.
- D20. Temporary sedimentation and erosion controls are to be constructed prior to commencement of any work to eliminate the discharge of sediment from the site.
- D21. Sedimentation and erosion controls are to be effectively maintained at all times during the course of construction and shall not be removed until the site has been stabilised or landscaped to the Principal Certifying Authority's satisfaction.
- D23. Adequate measures shall be undertaken to remove clay from vehicles leaving the site so as to maintain public roads in a clean condition.



- D24. Disturbed areas shall be rehabilitated with indigenous plant species landscaped and treated by approved methods of erosion mitigation such as mulching, and revegetation with native grasses or other suitable stabilising processes within fifteen days of the completion of works.
- D25. If the soil conditions require it, retaining walls associated with the erection or demolition of a building or other approved methods of preventing the movement of the soil, must be provided with adequate provision made for drainage.
- D28. All excavated material is to be removed from the site. This is due to the site's location in an area identified as being subject to possible landslip.
- D32. No fill is to be introduced within the drip line of canopy trees on the site.
- D33. No fill is to be introduced in the area of native vegetation or habitat remaining on the site.
- D34. All excavations and backfilling associated with the erection or demolition of a building must be executed safely and in accordance with appropriate professional standards.
- D35. All excavations associated with the erection or demolition of a building must be properly guarded and protected to prevent them from being dangerous to life or property.
- D60. The footpath and adjacent roadway is to be kept free of obstruction by building materials and/or plant. All concrete trucks, pumps and associated plant are to be kept wholly within the site. No concrete or slurry is to be discharged into the street or the street drainage system.
- D67. Palm trees, plan references 25, 51, 52, 54, 55 are to be retained or relocated on site in accordance with the Arborist's report by Eclipse Landscapes, dated 23.5.04.
- D74. A sign is to be erected in a prominent position on the site stating that unauthorised entry to the work site is prohibited and showing the name of the person in charge of the work site and a telephone number at which that person may be contacted outside working hours. No sign is required where works are internal only or where the premises are occupied continuously during and outside working hours.
- D75. Toilet facilities are to be provided at or in the vicinity of the work site during the duration of the development.
- D76. A stamped copy of the approved plans is to be kept on the site at all times, during construction.
- D89. The hours of construction are restricted to between the hours of 7.00am and 5.00pm Monday - Friday and 7.00am to 1.00pm on Saturdays. No works are to be carried out on Sundays or Public Holidays. Internal building work may be carried out at any time outside these hours, subject to noise emissions from the building or works not being audible at any adjoining boundary.
- D106. No storage of building materials or building waste, excavated fill or topsoil storage is to occur within the dripline of trees shown on the approved landscape working drawing(s) as being retained or within protective fenced areas.

Drainage is to be arranged such that fill, building materials or contaminants are not washed into protective fenced areas.

Further, the project manager is to erect signs advising all contractors and visitors to the site that



no works or storage are to take place within the dripline of existing trees.

- D107. All natural landscape features, including natural rock outcrops, natural vegetation, soil and watercourses, are to remain undisturbed except where affected by necessary works detailed on approved plans. Details of proposed protection measures are to be detailed on the landscape working drawing or associated documentation.
- D108. In accordance with Pittwater Council's Tree Preservation and Management Order, all existing trees as indicated on Survey Plan ref. "476 detail 200.dwg" shall be retained except where Council's prior written consent has been obtained, or where after approval of the relevant Construction Certificate Application/s, trees stand within the envelope of approved buildings or within the alignment of approved permanent paved vehicular access roads and parking areas.
- D122. All declared noxious weeds under the Noxious Weeds Act 1993 together with other environmental weeds are to be removed and/or controlled using an appropriate technique.
- D135. The natural ground levels of private open space areas are not to be altered.
- D143. If any Aboriginal Engravings or Relics are unearthed during construction all work is to cease immediately and the Metropolitan Local Aboriginal Land Council (MLALC) and National Parks and Wildlife Service (NPWS) are to be notified.
- D164. All stormwater is to be piped to the existing stormwater drainage system.
- D190. The removal or destruction of bush rock has been listed as a Key Threatening Process under the NSW Threatened Species Conservation Act, 1995. No bush rock is to be removed or destroyed without prior consultation and approval by NSW National Parks and Wildlife Service and Council.
- D192. Erecting six nest boxes (one large, two medium and three small) in the garden to increase the level of suitable wildlife habitat within the property boundary, thus helping to ensure the well being of future wildlife populations. Information can be obtained from the Coastal Environment Centre (CEC) ph: 9970 6905.
- D193. A further fifteen (15) native canopy trees and thirty (30) native understorey plant species to be planted, these locally endemic (native) species will assist in the preservation and enhancement of the Pittwater natural environment, may be planted around site.
- D194. Removal of dead wood and dead trees prohibited (listed as a 'Key Threatening Process' in Schedule 3 of the Threatened Species Conservation Act). Due to the proximity of the site to the nearby bushland it is seen as appropriate to implement this condition. Within NSW about 120 vertebrate species use tree hollows and most of these can utilise dead trees, relevant threatened species in the Pittwater include the Glossy Black-Cockatoo, Squirrel Glider and Barking Owl. Fallen trees (dead wood) provides habitat for a suite of invertebrate species dependent on decaying wood for their survival, these species play a crucial role in recycling nutrients within an ecosystem.
- D206. If the occupant currently owns a domestic animal it should be seen that it is kept inside at all times, in the case of a cat, cat runs can be installed/incorporated into the construction design or as in the case of a dog, an outside area dedicated and appropriately fenced to stop the dog entering other areas of the site. The dedicated dog out-door area is to be the minimum size approved by Companion Animal Act.



- D207. On site fencing will not be supported due to the sensitive nature of the lot in regards to its well-documented usage as a wildlife corridor.
- D220. A clearly legible "Site Management Sign" is to be erected and maintained throughout the course of works on the site. The sign is to be centrally located on the main street frontage of the site and is to state in clearly legible lettering the following: -
- Builder's name, builder's telephone contact number during work hours.
 - A site fence and/or silt and sediment control fence is to be erected and maintained during the course of works along any street frontage boundary to the site.
 - Street levels are to be obtained for the construction of any access driveway crossing between the site and the constructed roadway in accordance with Condition B27.
 - A Road Opening Permit, issued by Council, must be obtained for any road openings or excavation within Council's Road Reserve associated with the development of the site, including stormwater drainage, water, sewer, electricity, gas and telephone connections etc. During the course of the road opening works the Road Opening Permit must be visibly displayed at the site.
 - No other works are to be carried out in Council's Road Reserve without its approval.
 - No skip bins or materials are to be stored on Council's Road Reserve.

E. MATTERS TO BE SATISFIED PRIOR TO ISSUE OF OCCUPATION CERTIFICATE

NOTE: The issue of interim or partial Occupation Certificates is not permissible within the terms of this consent unless otherwise specifically stated. Prior to the issue of an Occupation Certificate the principal certifying authority is to ensure that Council's assets, including road, kerb and gutter and drainage facilities adjacent or near to the site have not been damaged as a result of the works. Where such damage has occurred, it is to be repaired to Council's written satisfaction prior to the issue of an Occupation Certificate or suitable arrangements put in place to effect those repairs at a future date to Council's written satisfaction. Should this process not be followed, Council will pursue action against the principal accredited certifier in relation to the recovery of costs to effect such works.

NOTE: It is an offence to occupy the building or part thereof to which this consent relates prior to issue of an Occupation Certificate.

- E10. A certificate prepared by an appropriate qualified person is to be submitted for the following building components, certifying to the principal certifying authority that the nominated works have been carried out in accordance with the Building Code of Australia, relevant Australian Standards and any conditions of Development Consent. Works are not to progress past this point until the principal certifying authority has confirmed that this condition has been satisfied (see copy of form attached).

E10e. Excavation and/or filling EX-1

E10g. Landscaping LS-1



E11c. Native vegetation planting NV-1

- E31. Prior to the issue of the Occupation Certificate, an Accredited Certifier/Licensed Builder is to certify to the satisfaction of Council or the Accredited Certifier that the attached requirements of the New South Wales Rural Fire Service, dated 24.3.05, have been satisfied.
- E45. Bushland Management Consultant to verify that nest boxes appropriately installed.
- E46. Bushland Management Consultant to verify that native plant selection and appropriate planting as per condition D193 and relevant aspects of the ESP has been implemented
- E48. Weed removal is to be certified prior to final sign-off of works.
- E53. The existing driveways are to be reinstated with kerb, footpath and suitably landscaped.
- E87. Prior to issue of the Occupation Certificate, Form 3 of the "Geotechnical Risk Management Policy" is to be completed and submitted to Council or the Accredited Certifier. Certificates are to be submitted where the recommendations of the approved Geotechnical Report "18498Z Rpt" by Jeffery and Katauskas Pty Ltd, dated 9.6.04 require sign-offs during the construction phase to achieve the "acceptable level of risk" criteria specified in the Geotechnical Risk Management Policy.
- E88. A positive covenant/ restriction on the use of land is to be created prior to the issue of the Occupation Certificate where the recommendations of the approved Geotechnical Report "18498Z Rpt" by Jeffery and Katauskas Pty Ltd, dated 9.6.04 requires on-going maintenance/inspections to ensure that the development achieves the "acceptable level of risk" criteria over the life of the development.

F. MATTERS TO BE SATISFIED PRIOR TO ISSUE OF SUBDIVISION CERTIFICATE

- F1a. A contribution of \$9,812 is to be made to Cashier Code SOPS, pursuant to Section 94 of the Environmental Planning and Assessment Act, 1979 (as amended), for Open Space Embellishment in accordance with Section 94 Contributions Plan No 2. The Contributions Plan may be inspected at Pittwater Council, Unit 11, No 5 Vuko Place, Warriewood. The Section 94 contribution is to be paid prior to issue of the Construction Certificate or Subdivision Certificate, where relevant. When making payment please complete and return the "Payment of Section 94" form attached to this consent.
- F1b. A contribution of \$1,750 is to be made to Cashier Code SLEL, pursuant to Section 94 of the Environmental Planning and Assessment Act, 1979 (as amended), for Public Library Services in accordance with Section 94 Contributions Plan No 3. The Contributions Plan may be inspected at Pittwater Council, Unit 11, No 5 Vuko Place, Warriewood. The Section 94 contribution is to be paid prior to issue of the Construction Certificate or Subdivision Certificate, where relevant. When making payment please complete and return the "Payment of Section 94" form attached to this consent.
- F1c. A contribution of \$1,754 is to be made to Cashier Code SCSF, pursuant to Section 94 of the Environmental Planning and Assessment Act, 1979 (as amended), for Community Services Facilities in accordance with Section 94 Contributions Plan No 18. The Contributions Plan may be inspected at Pittwater Council, Unit 11, No 5 Vuko Place, Warriewood. The Section 94 contribution is to be paid prior to issue of the Construction Certificate or Subdivision Certificate,



where relevant. When making payment please complete and return the "Payment of Section 94" form attached to this consent.

- F6. A plan showing details of the location of separate water, sewerage, electricity and telephone services to each lot is to be submitted to Council, prior to release of the Subdivision Certificate.
- F10. Appropriate easements are to be created where service lines or drainage lines pass through private property other than the lot which they benefit. Full details in this regard are to be submitted to Council, prior to release of the Subdivision Certificate.
- F11. Appropriate Rights of Way and Rights of Carriageway are to be created over the common driveway burdening and benefiting the proposed lots, to provide for suitable legal pedestrian access to the dwellings and appropriate vehicular access and manoeuvring to the parking areas on both lots. Full details in this regard are to be submitted to Council, prior to release of the Subdivision Certificate.
- F19. A Certificate is to be submitted by a qualified practising Civil Engineer with corporate membership of the Institute of Engineers Australia (M.I.E), or who is eligible to become a Corporate member and has appropriate experience and competence in the related field confirming to the satisfaction of Council or the accredited certifier that the driveway has been constructed in accordance with the approved plans and/or Council's DCP 21, clause B6.2 and/or AS 2890.1-1993 and relevant conditions of Development Consent. The Subdivision Certificate will not be released until this certification has been submitted and Council or the accredited certifier has confirmed that this condition has been satisfied (see copy of form DW-1 attached).
- F20. A copy of the Section 73 Compliance Certificate issued under the provisions of the Sydney Water Act, 1994, is to be forwarded to Council or the accredited certifier, prior to release of the Subdivision Certificate.
- F21. The applicant is to lodge an application for a Subdivision Certificate with Council or an accredited certifier. The Subdivision Certificate is to be obtained prior to lodgement of the plans with the Land Titles Office.

G. ADVICE

- G23. Failure to comply with the relevant provisions of the Environmental Planning and Assessment Act, 1979 (as amended) and/or the conditions of this Development Consent may result in the serving of penalty notices (on-the-spot fines) under the summary offences provisions of the above legislation or legal action through the Land and Environment Court, again pursuant to the above legislation.
- G24. The applicant is also advised to contact the various supply and utility authorities, ie Sydney Water, Sydney Electricity, Telstra etc. to enquire whether there are any underground utility services within the proposed excavation area.
- G25. It is the Project Manager's responsibility to ensure that all of the Component Certificates/certification issued during the course of the project are lodged with Council. Failure to comply with the conditions of approval or lodge the Component Certificates/certification will prevent Council from issuing the Occupation Certificate or the Building Certificate.
- G26. In accordance with Section 80A(1)(d) and (e) of the Act, any consent given shall be void if the development to which it refers is not commenced within two (2) years after the date of approval, provided that Council may, if good cause be shown, grant an extension of renewal of such consent beyond such period.



NOTE: Council may be prepared to consider an extension of this Consent period for a further 12 months, however, the request for extension would have to be received during the initial 2 year period.

- G27. To ascertain the date upon which the determination becomes effective, refer to Section 83 of the Environmental Planning and Assessment Act, 1979 (as amended).
- G28. Should any of the determination not be acceptable, you are entitled to request reconsideration under Section 82A of the Environmental Planning and Assessment Act, 1979. Such request to Council must be made in writing together with a \$500 fee, within 1 year from the date of determination.
- G29. If you are dissatisfied with this decision, Section 97 of the Environmental Planning and Assessment Act, 1979, gives you a right of appeal to the Land and Environment Court within 12 months of the date of endorsement of this Consent.

104-106 WAKEHURST PARKWAY,
ELANORA HEIGHTS



ECOLOGICAL SUSTAINABILITY PLAN

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Table A. Check List

Item	Chapter
Site Preparation Description of: <ul style="list-style-type: none"> Tree, vegetation and habitat protection, Sediment and erosion control for natural features, Weed control, Top soil/ litter layer treatment, Surface treatment and stabilisation (mulch etc), Site drainage with respect to natural features, 	2.1.1 2.1.2 2.1.3 2.1.4 2.1.5 2.1.6
Weed Removal and Regeneration <ul style="list-style-type: none"> List of Noxious and Environmental Weeds Timeline for removing Noxious Weeds and controlling/removing Environmental Weeds (<i>for updated weeds list see Dept of Agriculture web page</i>). Timeline to include the area / number of weed species acceptable as a background level. Cross reference location with Map. 	2.2.1 Table 1 2.2.2
Description of Planting (if planting) <ul style="list-style-type: none"> Planting aims, e.g. supplementary planting in a regeneration area, or a native vegetation area or planting in a landscape area. Species list recommended for planting—as appropriate (if the ESP is replacing a Landscaping Plan give details of species to be planted and size range / species). Local native species to be used (for at least 70% of plantings, 80% in Endangered Ecol. Comm.). Identify source of local native, plant stock. Description of areas for bush regeneration, trees to be retained, trees to be planted (and what size), etc A schedule of materials—including elements such as weed matting, mulch, edging, walling, paving and fencing. Description of works meeting minimum requirements of Landscaping Policy (i.e. 50% of development screened in 3 yrs). 	2.3.1 Map 1 Map 1 Map 1 Map 1
Long-term Management <ul style="list-style-type: none"> Management of habitat features, including protection during construction and for the life of development. Also include the provision of nesting boxes etc as appropriate. Maintenance period for 12 to 24 months after Issue of Occupation Certificate. NB maintenance can be by land occupier. Indicate areas that are to be maintained as 'bushland' for the life of the development Description of exclusion areas for domestic animals <i>as relevant</i> Reference to other documents if relevant (e.g. frequency and type of fuel reduction, care for on-site water disposal system) 	2.4.1 2.4.2 2.4.3 2.4.4
Check-sheets listing activities to be completed on an on-going basis. <ul style="list-style-type: none"> List of Noxious Weeds to be managed/removed (at all times). List of Environmental Weeds to be managed/removed (all times). Area of native vegetation and trees to be maintained/retained. Area from which domestic animals are not permitted. 	Table 1 Table 1 Map 1 2.4.3

RHayes

Rebecca Hayes
BSc (Environmental Biology) MEngMngt MEIANZ MECA

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104-106 WAKEHURST PARKWAY,

ELANORA HEIGHTS

ECOLOGICAL SUSTAINABILITY PLAN

May 2006

1 INTRODUCTION

1.1 Background

This Ecological Sustainability Plan has been prepared to accompany an application for a Construction Certificate for a proposed subdivision of 104 and 106 Wakehurst Parkway, Elanora Heights, within the Pittwater Local Government Area (LGA).

The purpose of this plan is to document actions to be taken on the site to maximise the long-term sustainability of the site and its ecological processes.

1.2 Existing Environment

1.2.1 General Description

Numbers 104 and 106 Wakehurst Parkway, Elanora Heights (the subject site) are two parallel allotments located on the northern side of the Wakehurst Parkway. The two allotments are together approximately 135m in length by 30.5m in width, thus approximately 4210sqm in size in total.

The southern portion of the site slopes gently up to the north, away from the Wakehurst Parkway. This area of the site has been previously cleared and disturbed, with existing dwellings located on each allotment, and occasional remnant and planted trees.

The central portion of the site slopes upwards relatively steeply, to the base of a natural sandstone escarpment. This portion of the site has also been previously cleared and disturbed, although some remnant native trees and shrubs occurs to the north, and in retained garden beds.

The northern portion of the site, above the sandstone escarpment, slopes moderately up to the rear boundary of the site. This portion of the site supports native vegetation in relatively intact condition, although with some weed-invasion.

1.2.2 Floristic Details

Native vegetation present across the central and northern portions of the site has been identified as Sydney Sandstone Gully Forest (as described by Benson & Howell 1994).

The canopy is fairly sparse, consisting of scattered occurrences of Bangalay *Eucalyptus botryoides* to approximately 20m in height.

The shrub layer, where present, is moderate to dense and dominated by Cheese Tree *Glochidion ferdinandi*, Bastard Rosewood *Synoum glandulosum*, Blueberry Ash *Elaeocarpus reticulatus*, and the exotic weed Small-leaved Privet *Ligustrum sinense*, to approximately 8m in height.

The groundcover, where not consisting of maintained lawn, varies in density from sparse to dense, and includes the following native grasses and herbs: False Bracken Fern *Calochlaena dubia*, Gristle Fern *Blechnum cartilagineum*, Native Sarsaparilla *Smilax glyciophylla* and King Fern *Todea barbara*, to 1.2m in height.

Common exotic weeds present in the groundcover include Japanese Honeysuckle *Lonicera japonica*, Wandering Jew *Tradescantia albiflora*, Crofton Weed *Ageratina adenophora*, Panic Veldt Grass *Ehrharta erecta* and Cape Ivy *Delairea odorata*.

Dense thickets and mats of Lantana and other exotic weeds have been removed from some areas in the central portion of the site.

1.3 Description of the Proposed Development

The proposed subdivision involves creation of two new allotments. One at the rear of number 104 Wakehurst Parkway, and one at the rear of 106 Wakehurst Parkway. A new dwelling would be constructed on each of the two new allotments.

The proposed subdivision has been designed to minimise impacts on native flora and fauna present on the site. However, several trees would need to be removed from the central portion of the site, for construction of new dwellings.

The sandstone escarpment and vegetation to the north of it are to be retained in a natural condition.

2 ACTIONS FOR ECOLOGICAL SUSTAINABILITY

2.1 Site Preparation

2.1.1 Protection of trees and other natural features to be retained

An exclusion fence is to be constructed to protect existing native vegetation and habitats present across the rear (upslope) portion of the site. The fence would be located approximately 2-5m downslope from the base of the natural sandstone escarpment, see accompanying Map 2.

Where native trees which are to be retained occur close to construction works, protective fencing will be installed around each tree, at a minimum distance of 1 metre outside of the dripline of the tree canopy. In the instance where construction activities are essential beneath the tree canopy, protective fencing will extend as far from the tree trunk as practicable.

A qualified arborist/tree surgeon will be engaged to treat cuts to any significant tree roots encountered during construction activities, and to manage any removal of tree limbs. This measure is intended to maximise tree health and long term viability.

All exposed bushrock and other habitat features present outside of the development footprint will be retained. The majority of these features are located away from the proposed construction zone, and do not require specific protection measures. However, where protection is necessary to avoid accidental damage by machinery or stockpiles, this will consist of fencing as for protection of retained trees.

2.1.2 Sediment and erosion control

Parts of the site not being disturbed directly for construction works are to be retained with existing vegetation cover.

Sediment and erosion control features will be located to minimise impacts on trees and other natural features to be retained on the site, in addition to standard requirements.

2.1.3 Removal of weeds

Weed control prior to construction works is intended to minimise the potential for weed propagules to be spread from the site during construction.

The native bushland present above the sandstone escarpment is in relatively intact condition. Weeds present in this area will be targeted for removal following initial construction works (refer to Chapter 2.2 below).

Weeds present in the area to be directly disturbed by construction activities will be carefully removed from the site by small machinery (eg dingo or mini-bobcat) and destroyed prior to construction works. Hand tools will be used in difficult to access areas, and in sensitive areas, such as close to natural rock features and close to trees being retained.

2.1.4 Top soil/litter layer treatment

Construction works on the site do not require extensive excavations. Landscaping of the site does not require extensive excavation works. The majority of the site is to be retained in its natural condition.

Special storage and re-spreading of top soil at this site is not required.

2.1.5 Surface stabilisation

Surfaces across the site are generally to be retained in their existing condition. Those in the vicinity of construction works are mostly lawn, and do not require further stabilisation works. Mulch will be used in areas where mats of Wandering Jew and other groundcover weeds have been removed, if required.

2.1.6 Site Drainage

Virtually all natural features on the site are located upslope of the proposed development, and would not be affected by alteration to site drainage.

2.2 Weed Removal

2.2.1 Existing Weeds

A large number of weeds have been recorded on the site (refer to previous Flora and Fauna Assessment report prepared by Hayes Environmental in June 2004). Many of these are fairly benign garden ornamentals, and do not require targeted removal from the site.

Table 1 below lists weeds that are present on the site, and which are either listed as 'noxious' for the Pittwater area under the *NSW Noxious Weeds Act 1993*, or are regarded as environmental weeds due to their invasive or otherwise destructive nature.

Table 1 Existing noxious and environmental weeds present on the site.

Status	Scientific Name	Common Name
	Shrubs/Trees	
N	<i>Ochna serrulata</i>	Mickey Mouse Plant
N	<i>Ligustrum sinense</i>	Small-leaved Privet
N	<i>Lantana camara</i>	Lantana
	Tall Groundcovers	
N	<i>Cestrum parqui</i>	Green Cestrum
N	<i>Cortaderia sellona</i>	Pampas Grass
	<i>Conyza albida</i>	Tall Fleabane
	Low Groundcovers	
	<i>Tradescantia fluminensis</i>	Wandering Jew
	<i>Ageratina adenophora</i>	Crofton Weed
	Vines	
N	<i>Acetosa sagitata</i>	Turkey Rhubarb
	<i>Lonicera japonica</i>	Japanese Honeysuckle
	<i>Hedera helix</i>	English Ivy
	Ferns	
N	<i>Protasparagus densiflorus</i>	Asparagus Fern
	<i>Nephrolepis cordifolia</i>	Fish Bone Fern

N Noxious Weed listed under the *NSW Noxious Weeds Act 1993* for the Pittwater LGA.

2.2.2 Timeframe for Weed Removal

The three shrubs and taller groundcover weeds on the site are generally single plants or clumps. The woody species will be cut and painted with herbicide such as Roundup Bioactive®, and others will be removed by either small machinery or hand tools, depending on location. Initial control of these weeds will involve removal of all adult individuals from the site, prior to or at the time of occupation of new dwellings¹. Follow-up control of seedlings of these species will be undertaken as frequently as necessary and possible by the landowner, to prevent re-infestations.

The lower groundcovers, vines and herbs are generally present in low densities amongst the lawn and native groundcover. Where mats of weeds occur in accessible areas close to the construction site, these will be removed by small machinery. Elsewhere, weeds will be removed carefully by hand (including hand tools).

Timing of removal for these weeds is less dependent upon season, and will be undertaken as frequently as necessary and possible by the landowner. With the exception of Fishbone Fern,

¹ Herbicide is generally more effective when applied during the warmer active-growing months of the year. The initial removal of these weeds could be delayed if construction occurs over winter.

Japanese Honeysuckle and English Ivy, which may be retained in small discrete areas as ornamentals, these weeds will gradually (over 2-5 years) be removed completely from the site.

2.3 Revegetation/Landscaping

2.3.1 Objectives

The dual primary purposes of revegetation/landscaping of the site are:

- to replace noxious and environmental weeds on the site with local native plants; and
- to provide screening for visual amenity from the street and for the occupants of the proposed new dwellings.

2.3.2 Details

Details of landscaping such as plant species to be used, sizes, densities, areas of bushland to be retained, and materials (edging, stepping stones, paving, etc), are illustrated on the accompanying Landscape Plan prepared by Ian Jackson Landscape Architect P/L, dated March 2006.

2.4 Long-term Management

2.4.1 Management of habitat features

Protection of habitat features during construction works is described in Chapter 2.1.1 above. Much of the sandstone escarpment, and the bushland above it at the rear of the site, is inaccessible from the new development, and therefore does not require on-going specific protection measures.

The proposed development does not involve loss of notable tree-hollows. It is therefore not necessary to impose construction or installation of nesting boxes as an environmental management requirement for the site.

Other areas of habitat such as rock boulders and native vegetation which will be within the backyards of new houses cannot practicably be protected through specific measures.

2.4.2 Areas to be maintained as bushland

The natural bushland present across the rear of the site is to be maintained in its existing condition, as 'bushland', for the life of the development. This area is essentially inaccessible from the developed part of the site, and therefore does not require on-going specific protection measures.

The disturbed bushland area in the central part of the site will be backyards for the two new houses. This area will be retained in a similar 'altered bushland' condition to that currently present, but with removal and control of noxious weeds, and with landscaping to meet asset protection zone requirements. This area does not require on-going specific protection measures.

Native vegetation being retained as bushland will not be subject to gradual introduction of exotic or non locally native ornamental plant species. Pesticides and fertilisers will not be used in these parts of the site, other than when absolutely necessary during establishment of new plantings.

2.4.3 Exclusion areas for domestic animals

Domestic pets will be contained, chained up, or kept indoors at night, to reduce the likelihood of disturbance to, and predation of, native fauna such as the Long-nosed Bandicoot *Perameles nasuta*. The rear of the site, above the sandstone escarpment, is essentially inaccessible to domestic pets from the new development. Domestic pets will be prevented from gaining access to this part of the site.

Boundary fencing will contain openings accessible to ground dwelling native fauna with a minimum dimension of 150mm, to avoid obstructing the passage of wildlife.

2.4.4 Asset Protection Zones

The lower and central parts of the site, up to the base of the sandstone escarpment, are to be managed as an Asset Protection Zone, refer to the accompanying Landscape Plan.

3 RESPONSIBILITY FOR ACTIONS

Responsibility for the actions set out in Chapter 2 above will rest with the owner of the land for the life of the development. Responsibility will transfer to new owner/s if and when the land is sold.

Tenants may be required by the owner to manage certain aspects of the ecological sustainability plan, but will not remove responsibility from the owner.

The owner may rely on advice provided by specialist consultants with regard to tree health and safety, management of ecological values within the native bushland at the rear of the site, care and maintenance of native plant landscaping, and other matters relating to ecological sustainability of the site, at their discretion.

Table B. Check List for attached plans

- Map 1 Landscape Plan, also showing existing vegetation.
- Map 2 Construction access, material storage and exclusion fencing.
- Map 3 Noxious and Environmental Weeds.
- Map 4 Native vegetation, regeneration and habitat features.

Item	Plan
All areas of native vegetation	Map 4
Native trees include species, size, condition (e.g. SULE rating)	Arborist report
Accurate survey and describe native trees within 5m of proposed works	
Trees to be retained and those to be modified/removed	Map 1
Areas with medium to high regeneration potential	Map 4
Areas of native vegetation to be retained	Map 4
Areas of vegetation proposed to be removed	Map 4
Areas of Noxious and Environmental Weeds	Map 3
Areas of habitat features, bushrock (over 2m), caves, termite mounds etc	Map 4
Footprint of house and associated works (fuel reduced zones, waste-water etc)	Map 1
Areas for exclusion fencing—during development/establishment phase	Map 2
Areas appropriate for storage of materials during construction	Map 2
Recommended access ways during construction	Map 2
Areas for bush-regeneration	Map 1
Areas for planting trees (if appropriate)	Map 1
Areas for planting low and or mid strata	Map 1
Areas for landscaping	Map 1
Fuel reduced zone	Map 1
Fuel free zone	N/a
Waste-water disposal zone	N/a
Recommended Environmental Protection Zone (EPZ) <i>if appropriate</i>	N/a
Areas for managing domestic animals (see requirements of Pittwater Council Control Documents <i>Pittwater</i> 21)	N/a
Wildlife Corridors and Core/Fragmented Bushland (as per Pittwater Council Maps)	Map 4

Eclipse Landscapes PTY LTD

23 May, 2004

Wade Chick
798 Barrenjoey Rd
Palm Beach 2108
Phone 9974 2590
Fax 9974 2591
Mobile 0411 821 806
Lic 76588C
A.C.N. 093339505
A.B.N. 42093339505

Tree report

Re: 104 & 106 Wakehurst Parkway Elanora Heights

This report is to be read with plan by C.M.S Surveyors CMS ref 476

Trees to be relocated:

All *Livistona australis* (cabbage tree palms) in the way of proposed buildings are to be transplanted and relocated on site (tree No 19, 44, 47, 50 and 53). All the affected trees are in good health with no visible disease or ill health. Prior to any demolition or excavation the palms are to be transplanted to appropriate location and protected from all building works. The transplanting of palms is to be done by a qualified tree transplanter and/or arborist. The transplanted palms are to be fenced of 2m from trunk and mulched to a depth of 75mm. The palms are to be inspected at 2 month intervals by qualified arborist to assess health and recommend appropriate treatment.

Trees to be removed:

- ◆ Tree No 49 *Syzygium oleosum* (Lillypilly) Tree is in excellent health with no visible disease or ill health. Recommend to replant 1 *Syzygium oleosum* in 45 litre container for each proposed development (4 in total to be replanted)
- ◆ Tree No 45 *Araucaria heterophylla* (Norfolk Island Pine) Tree is in good health with no visible disease or ill health. No replanting required as it is not native and is to large for proposed area in consideration with bush fire

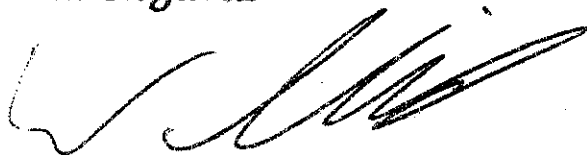
- ♦ Tree No 43 *Eucalyptus pilularis* (Blackbutt) Tree is in poor health is suckering at top. With relation to trees health and position considering bushfire and proximity to residence tree should be removed.
- ♦ Tree No 32 (mandarin). To be removed introduced species.

Trees to be retained

- ♦ Tree No 25,51,52,54, and 55 *Livistona australis* (Cabbage Tree Palm). Palms are in good health with no visible signs of disease or ill health. Palms are to be fenced off 1m from trunk and native leafmulch spread to a depth of 75mm.
- ♦ Tree No 46 *Eucalyptus pilularis* (Blackbutt). Tree in moderate health, deadwood to be removed. To be fenced off around rock outcrop and native leaf mulch spread 75mm deep.

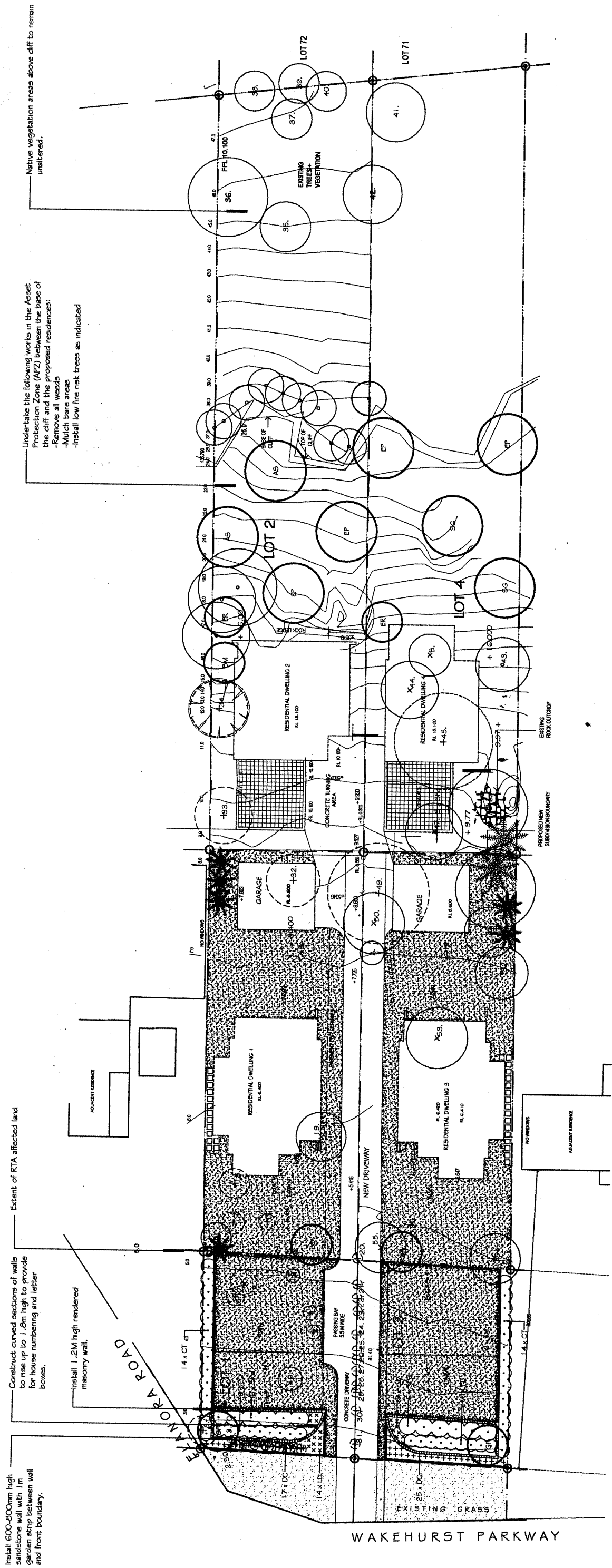
The overall impact of transplanting removal and replanting of trees for proposed development as listed will in time have a positive effect on the area. There will be more canopy with the replanting of lillypilly on each block and the retention of Cabbage tree palms.

Kind Regards



Wade Chick

Arboriculture 0503U 1991



LEGEND

- EXISTING LEVELS
- PROPOSED DESIGN LEVELS
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING PALMS TO BE RELOCATED
- POSITIONS FOR RELOCATED PALMS
- NEW TURF AREAS: COUCH
- BRICK GARDEN EDGING
- 400 x 400 mm UNIT PAVING
- STEPPING STONES
- 1M HIGH SANDSTONE GARDEN WALLS

SCHEDULE OF PLANT MATERIAL

CODE	BOTANICAL NAME	COMMON NAME	QUANTITY	HEIGHT	POT SIZE	STAKES
AS	Acmena smithii	Lily Pili	2	13m	5 litre	2
BM	Beachhouse myrtilla	Grey Myrtle	1	7m	25 litre	-
BS	Beachhouse myrtilla	Old Man Banksia	1	3m	5 litre	-
CT	Clerodendrum tomentosum	Heiry Clerodendrum	28	2m	5 litre	-
DC	Daniella caserula	Blue Flac-Lily	42	0.4m	140mm pot	-
EP	Eucalyptus punctata	Grey Gum	4	25m	25 litre	2
ER	Elaeocarpus reticulatus	Blueberry Ash	3	5m	25 litre	2
GF	Glochidion ferdinandii	Cheese Tree	2	5m	25 litre	-
LL	Lomandra longifolia	Lomandra Tanika	23	0.4m	140mm pot	-
PD	Pultenaea daphnoides	Large-leaf Bush-pea	19	1.5m	5 litre	-
SG	Syncaesia glomulifera	Turpentine	2	25m	25 litre	2
SPD	Strydom paniculatum	Dwarf Scrub Cherry	12	3m	5 litre	-

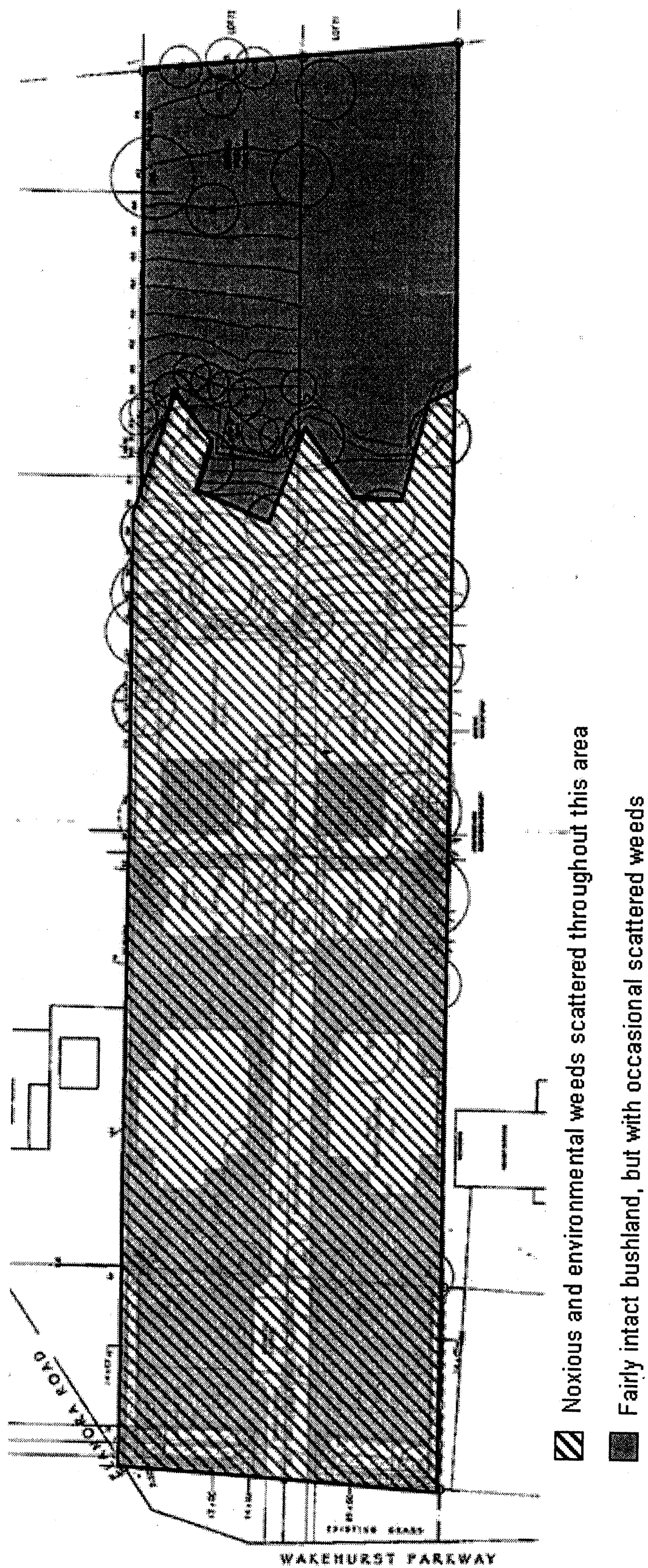
The majority of the plants in this schedule have been selected from Pittwater Council's list of indigenous plants for Lowlands and Shale Slopes (Closed Forest).

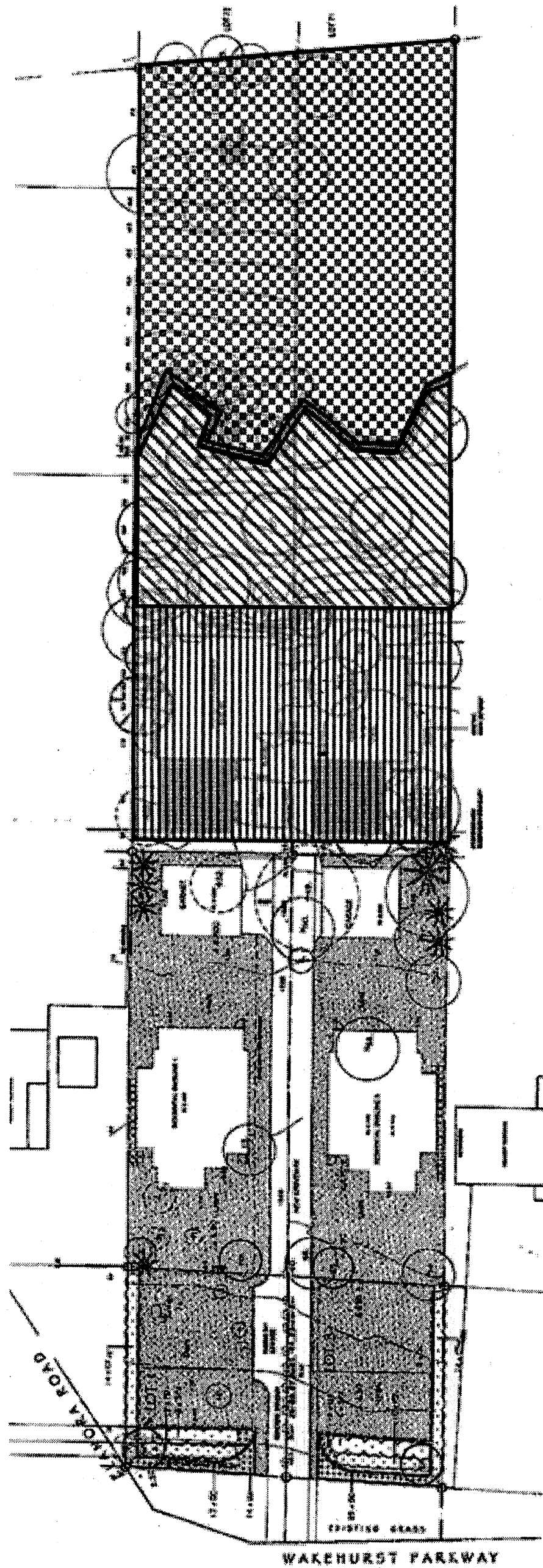
8 Canopy Trees to gain a mature height of 13m or above in accordance with Council's Landscape Officer.





7 Small trees as discussed with Council's Landscape Officer.

SCHEDULE OF EXISTING TREES

KEY	BOTANICAL NAME	COMMON NAME	HEIGHT X SPREAD
1-8	Row of Eucalyptus & Callistemon	Eucalyptus, Bottlebrush	1 x 1m
9	Morus indica	Mulberry Tree	8 x 6m
10	Callistemon sp.	Bottlebrush	3 x 2m
11-13	Canella sp.	Canella	4 x 2m
14	Prunus x domestica	Plum	3 x 4m
15	Citrus paradisi	Grapefruit	3 x 4m
16	Citrus sinensis	Orange	3 x 4m
17	Citrus sinensis	Orange	3 x 4m
18	Citrus sinensis	Orange	3 x 4m
19	Palm sp.	Palm	2 x 2m
20-24	Canella sp.	Canella	6 x 4m
25	Palm sp.	Palm	3 x 2m
26	Canella sp.	Canella	3 x 2m
27	Canella sp.	Canella	3 x 2m
28	Hibiscus sp.	Hibiscus	3 x 2m
29	Rhododendron sp.	Azalea	3 x 2m
30	Canella sp.	Canella	3 x 2m
31	Acmena smithii	Lily Pili	3 x 2m
32	Citrus reticulata	Mandarin Tree	8 x 5m
33	Prunus x domestica	Plum Tree	8 x 5m
34	Morus indica	Mulberry Tree	6 x 6m
35	Eucalyptus sp.	Gum Tree	5 x 5m
36	Eucalyptus sp.	Gum Tree	10 x 8m
37	Eucalyptus sp.	Gum Tree	7 x 4m
38	Eucalyptus sp.	Gum Tree	7 x 4m
39	Eucalyptus sp.	Gum Tree	6 x 4m
40	Eucalyptus sp.	Gum Tree	6 x 4m
41	Eucalyptus sp.	Gum Tree	7 x 6m
42	Eucalyptus sp.	Gum Tree	7 x 6m
43	Eucalyptus sp. #	Gum Tree	15 x 10m
44	Palm sp.	Palm	15 x 5m
45	Araucaria heterophylla	Norfolk Island Palm	23 x 10m
46	Eucalyptus sp.	Gum Tree	7 x 8m
47	Palm sp.	Palm	7 x 8m
48	Palm sp.	Palm	7 x 8m
49	Acmena smithii	Lily Pili	15 x 10m
50-55	Palm sp.	Palm	3 x 2m
A	Palm sp.	Palm	5 x 2m
B	Palm sp.	Palm	5 x 2m





-  Good, relatively intact bushland with high regeneration potential to be retained
-  Wildlife corridor or core/fragmented bushland (as per Pittwater Council Maps); degraded bushland with medium regeneration potential to be retained; will be managed as asset protection zone and as backyard
-  Areas of habitat features, bushrock (over 2m)
-  Degraded bushland to be removed for proposed new dwelling



DIRECTORS

Stewart McGeehan, Rick Wray, Lucas Molloy

Site Stormwater Management Design Certificate

Date: 13th April 2006
Builder: Stuart Thor

Job No. 051149
Engineer: LM

Site: 104 and 106 Wakehurst Parkway Elanora

We hereby certify that the plans prepared by NB Consulting Engineers P/L have been designed and detailed in accordance with Condition B20 of the DA approval.

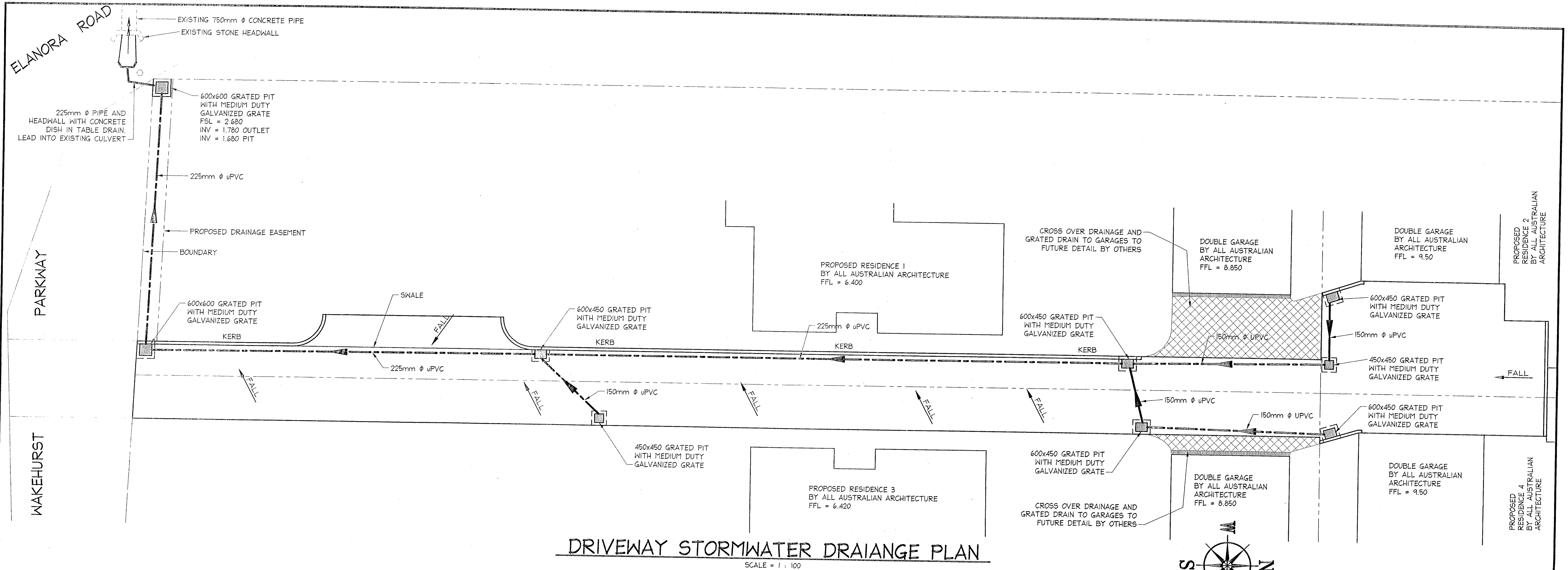
We trust that this certificate meets with your requirements. Please contact the author if further clarification is required.

NB CONSULTING ENGINEERS P/L



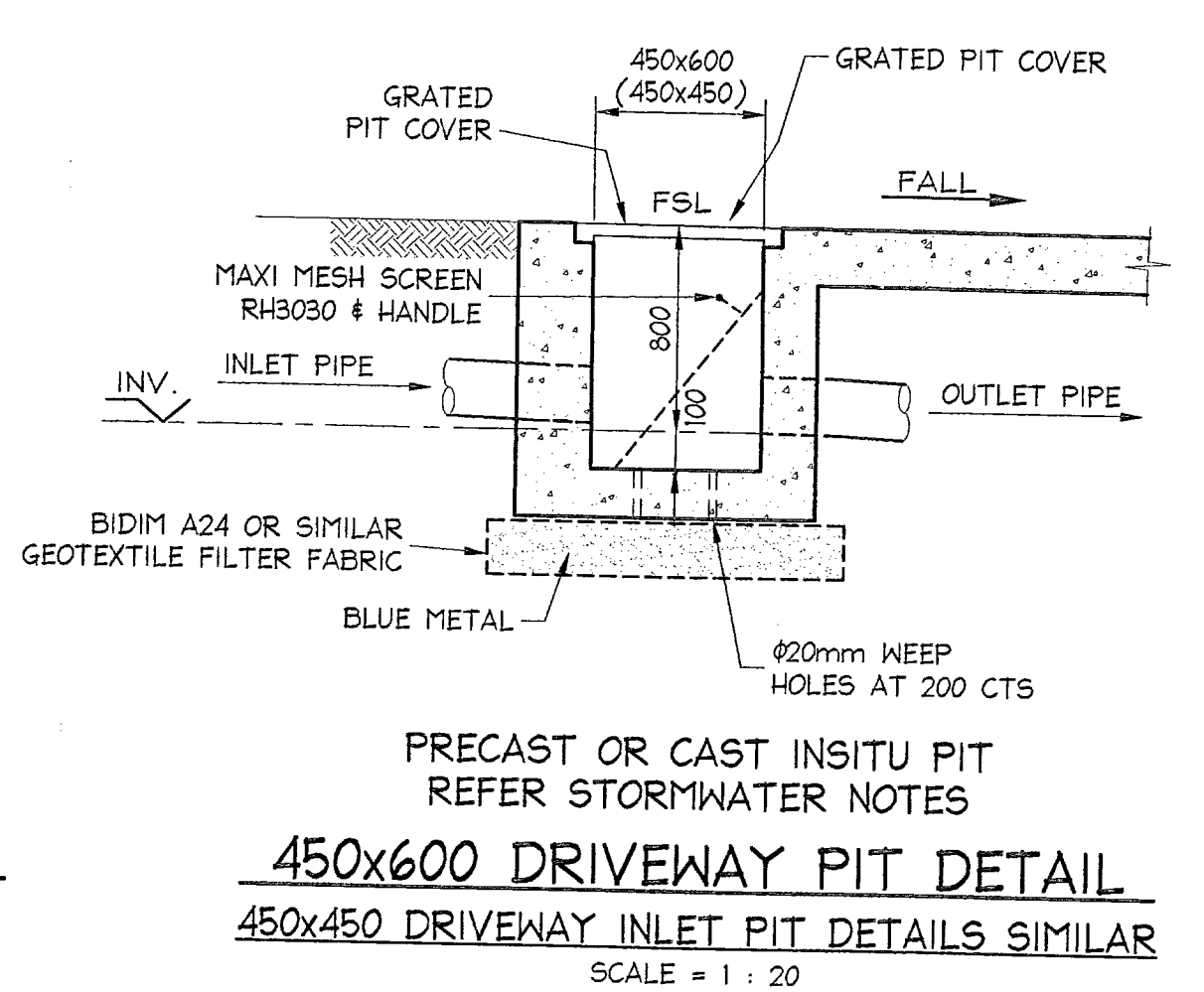
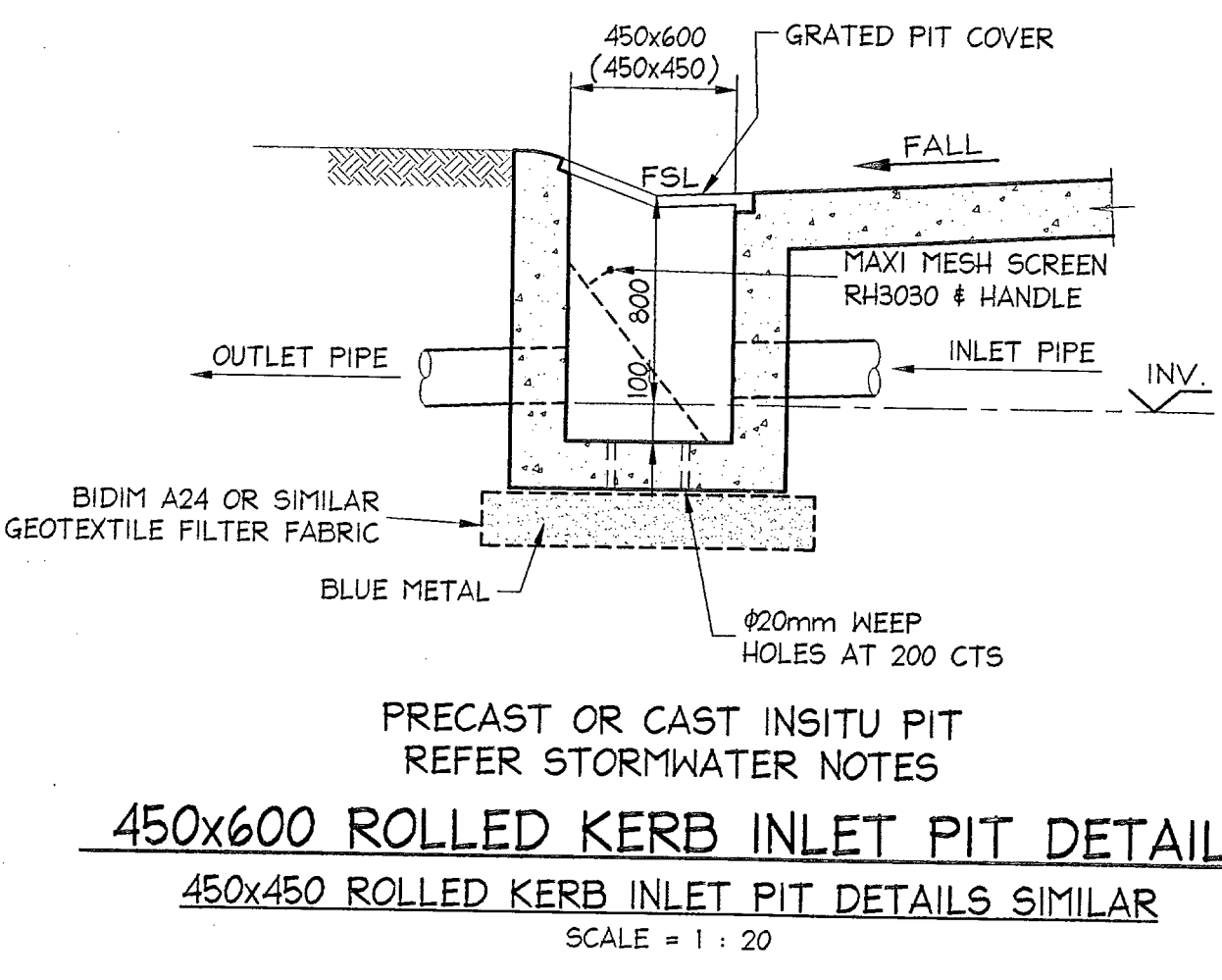
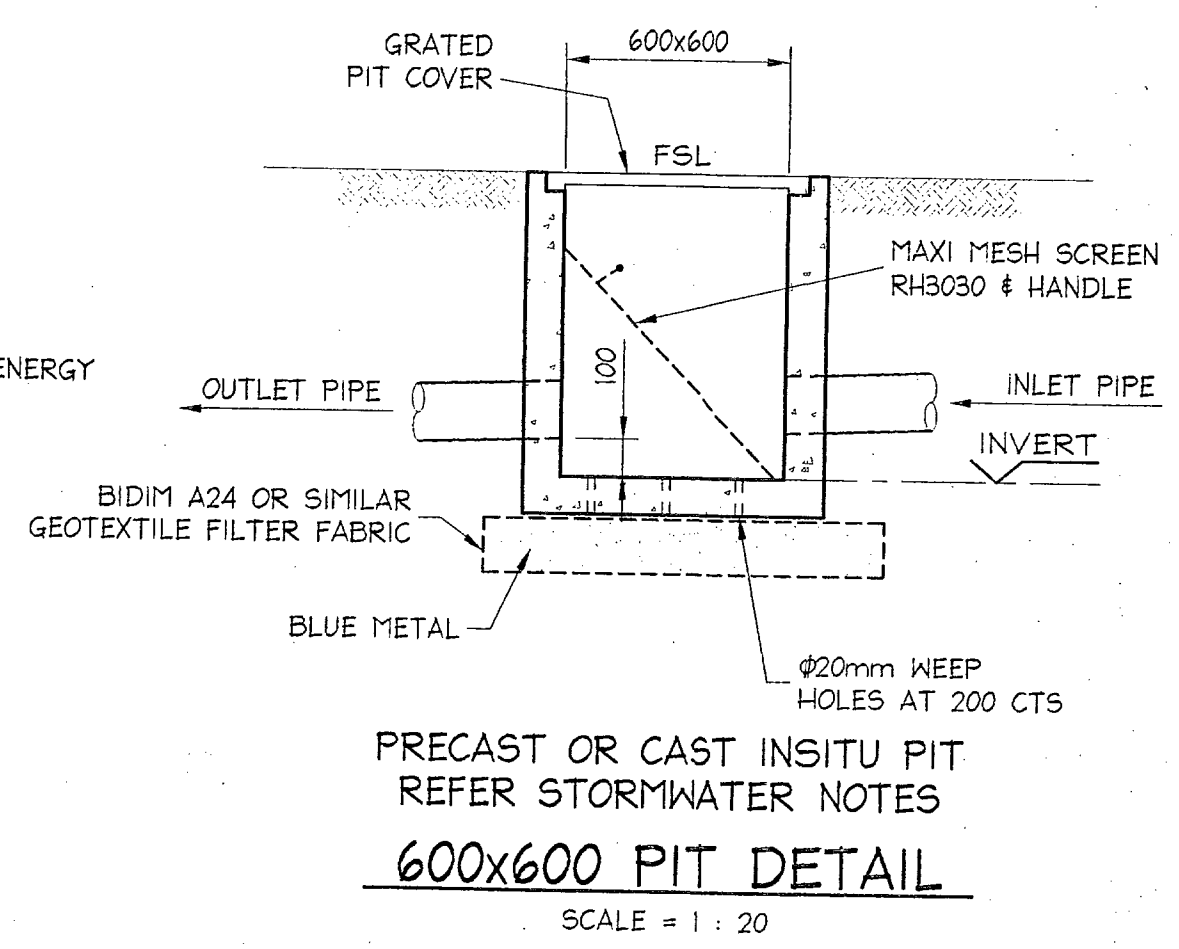
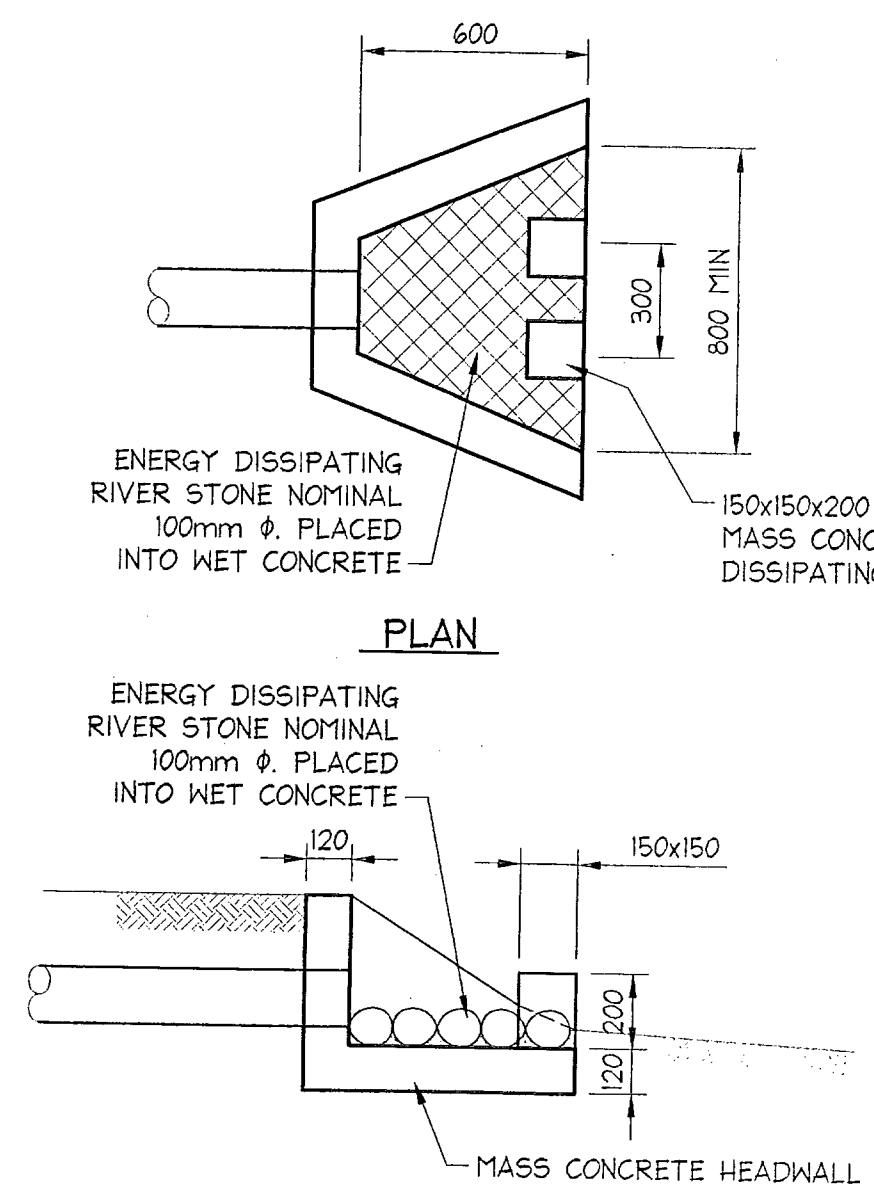
Per Lucas Molloy
BE CPEng NPER Director

NAENG NBC\2005\051149\SC001 SW Design.doc



STORMWATER NOTES:



- ALL PIPES TO BE 90mm Ø UNLESS NOTED OTHERWISE.
- ALL PIPES TO BE uPVC TO AS 1254-1973 UNLESS NOTED OTHERWISE.
- ALL PIPES TO BE LAYED AT 1 % MINIMUM GRADE UNLESS NOTED OTHERWISE.
- ALL PIPES SHALL BE LAID ON A 75mm SAND BED, COMPACTED TO 100% S.M.D. BELOW PAVEMENTS.
(NO COMPACTION REQUIRED BELOW LANDSCAPING)
COVER TO SURFACE FROM TOP OF PIPE TO BE 300mm MINIMUM. BACKFILL TO BE ADEQUATELY CONSOLIDATED AROUND PIPES BY METHOD OF RAMMING AND WATERING IN. TRENCHES TO BE FILLED WITH GRANULAR MATERIAL AS SPECIFIED.
- ALL DOWN PIPES TO BE 90mm Ø UNLESS NOTED OTHERWISE.
- DOWN PIPE LOCATIONS ARE INDICATIVE ONLY. LOCATIONS TO BE CONFIRMED WITH ARCHITECT PRIOR TO COMMENCEMENT WITH WORK.
- PROVIDE CLEANING EYES AT ALL DOWNPIPES.
- ALL PITS TO BE CAST INSITU OR, IF PRECAST, APPROVED BY ENGINEER. CAST INSITU PITS TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH 1 N2 TOP TIE UNLESS NOTED OTHERWISE. CAST INSITU PITS GREATER THAN 1000 DEEP TO BE MINIMUM 900x600 AND TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH N2 AT 300 EACH WAY UNLESS NOTED OTHERWISE.
- ALL PITS GREATER THAN 1000mm DEEP SHALL HAVE STEP IRONS AS PER COUNCIL STANDARDS.
- ALL WORK TO BE IN ACCORDANCE WITH LOCAL COUNCIL STANDARDS AND SPECIFICATIONS.
- PRIOR TO COMMENCING ANY SITE WORKS THE CONTRACTOR SHALL IMPLEMENT EROSION CONTROL MEASURES TO EPA GUIDELINES AND COUNCIL SPECIFICATIONS. ALL MEASURES TO REMAIN IN PLACE UNTIL COMPLETION AND STABILIZATION OF THE SITE TO COUNCIL SATISFACTION.
- ALL LEVELS SHOWN ARE TO AHD
- ENSURE THAT ALL PITS AND STORMWATER PIPES ARE LOCATED CLEAR FROM TREE ROOT SYSTEMS.
- ALL EXISTING EARTHENWARE PIPES TO BE UPGRADED TO uPVC.
- ALL WORKS TO BE IN ACCORDANCE WITH AS 3500-1990 NATIONAL PLUMBING DRAINAGE CODE PART 3 - STORMWATER DRAINAGE.
- 90mm Ø x 3000 LONG TAIL OUT SUBSOIL LINE TO BE PROVIDED ON THE UPSTREAM SIDE OF ALL PITS. SUBSOIL LINE TO BE COVERED WITH GEOTEXTILE FILTER SOCK FOR THE FULL LENGTH AND END COVERED.



NOTES:

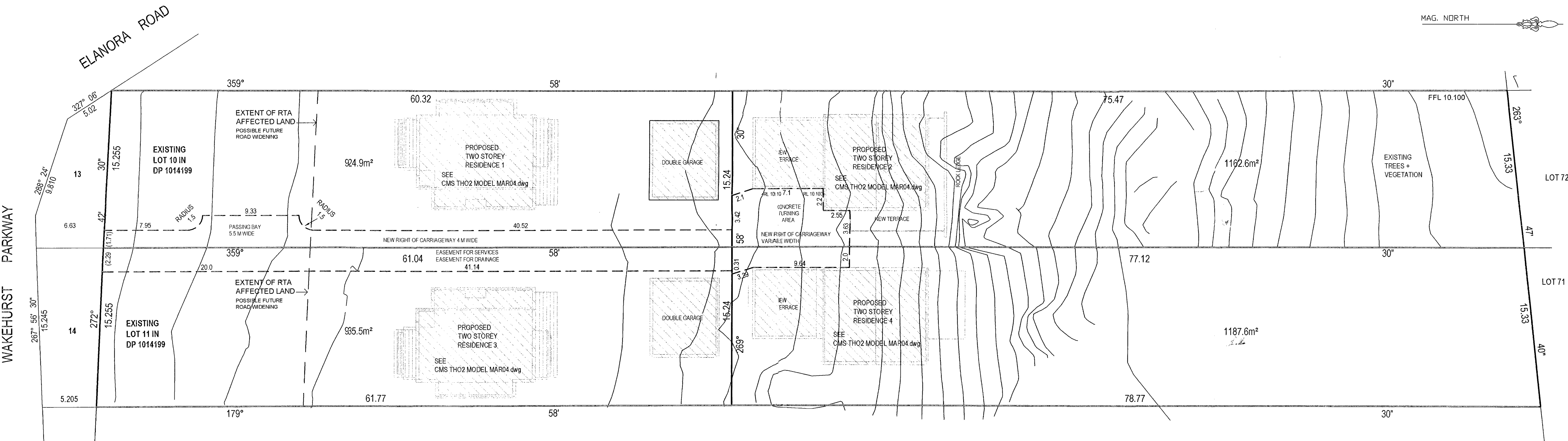
- ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
- FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: 501.

ISSUED FOR
CONSTRUCTION
CERTIFICATE
SUBMISSION ONLY

A1			DOCUMENT CERTIFICATION		I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust., NPER. Institute of Engineers Membership No. 788184 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.				NORTHERN BEACHES Consulting Engineers P/L. A.C.N. 076 121 616 A.B.N. 24 076 121 616 Suite 207, 30 FISHER ROAD DEE WHY N.S.W. 2099 Ph: (02) 9984 7000 Fax: (02) 9984 7444 e-mail: nb@nbconsulting.com.au web page: www.nbconsulting.com.au		Project: PROPOSED DEVELOPMENT at: 104 & 106 Wakehurst Parkway Elanora for: Stuart Thor		Drawing Title: STORMWATER DRAINAGE PLAN AND DETAILS The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.		CERTIFICATE SUBMISSION ONLY		2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.	
Date: Mar'06 Lucas Molloy (Director Northern Beaches Consulting Engineers)											Date: Mar 2006		Design: L.M.		Drawn: Paul R Bruce OMIEAust.		Checked: 	
Date: Rev: Amendment:													Job No: 051149		Drawing No: D02		Rev: -	

PITTWATER COUNCIL
APPROVED DEVELOPMENT CONSENT PLANS

NOTE: THESE PLANS MUST BE READ IN
CONJUNCTION WITH THE CONDITIONS OF
DEVELOPMENT CONSENT



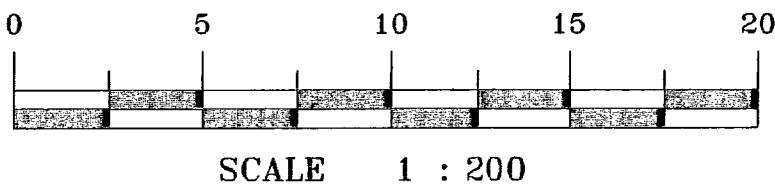
G	ROW AND AREAS AMENDED	24/09/04
F	RESIDENCE NUMBERS AMENDED	2/06/04
E	AMENDED HARD SURFACES	16/04/04
D	PRE DA MEETING ISSUE	02/04/04
REV.	AMENDMENTS	DATE

CLIENT:
STUART THOR
104 & 106 WAKEHURST PARKWAY
ELANORA HEIGHTS, NSW, 2107

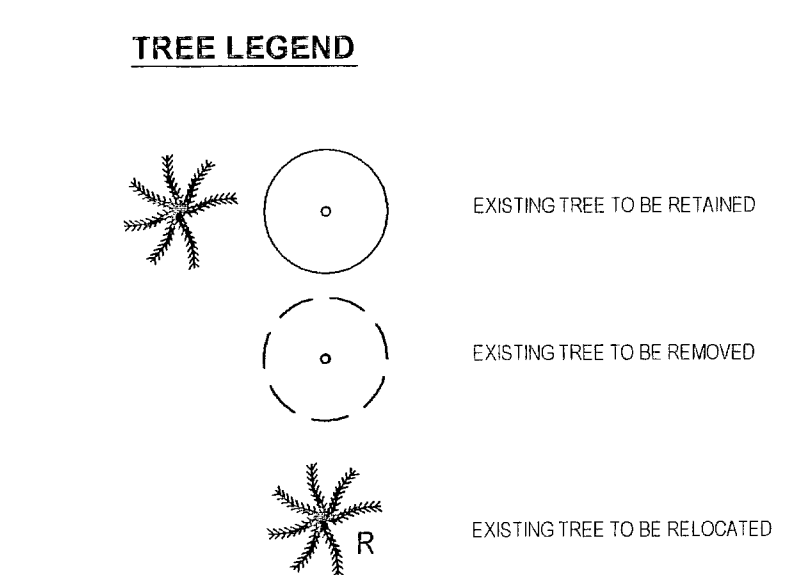
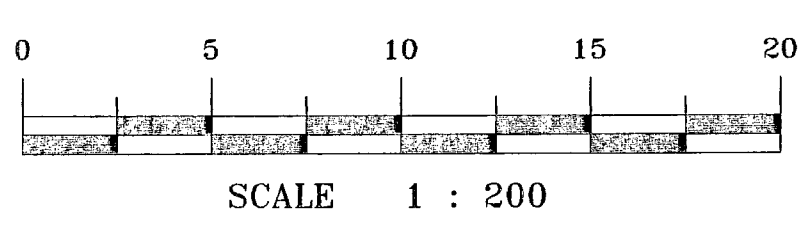
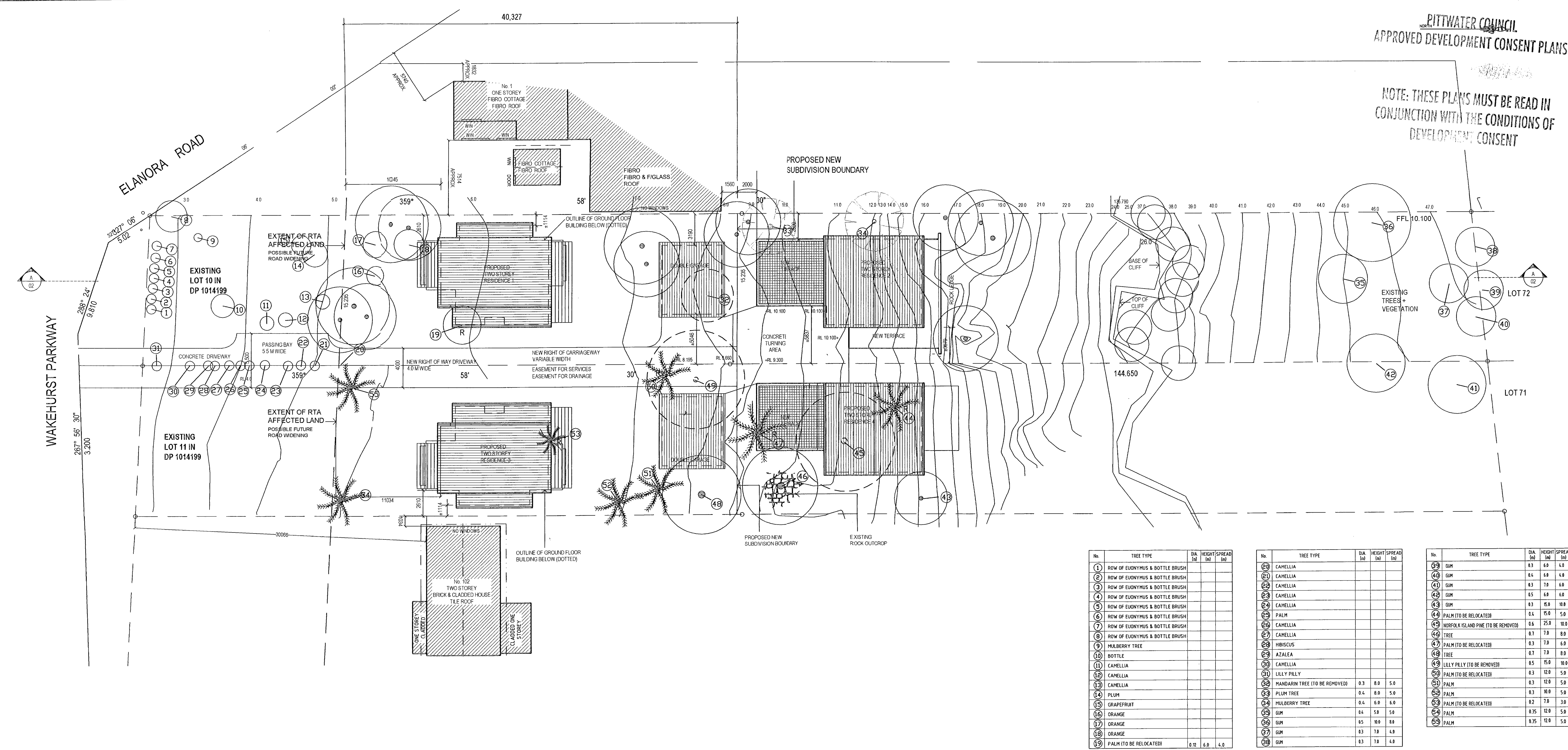
PLAN
OF PROPOSED SUBDIVISION

**C.M.S. Surveyors
Pty Limited**
ACN: 096 240 201
PO Box 463 Dee Why
NSW 2099
10/32 Campbell Avenue,
Dee Why NSW 2099
Telephone: (02) 9971 4802
Facsimile: (02) 9971 4822
E-mail: cmsurveyors@bigpond.com

CMS REF. 476	SCALE 1:200	DATE 24/09/04
DRAWING NUMBER CMS TH02 PROPOSEDSUBDIVISION MAR04.DWG	REV. G	



NOTE: THESE PLANS MUST BE READ IN
CONJUNCTION WITH THE CONDITIONS OF
DEVELOPMENT CONSENT

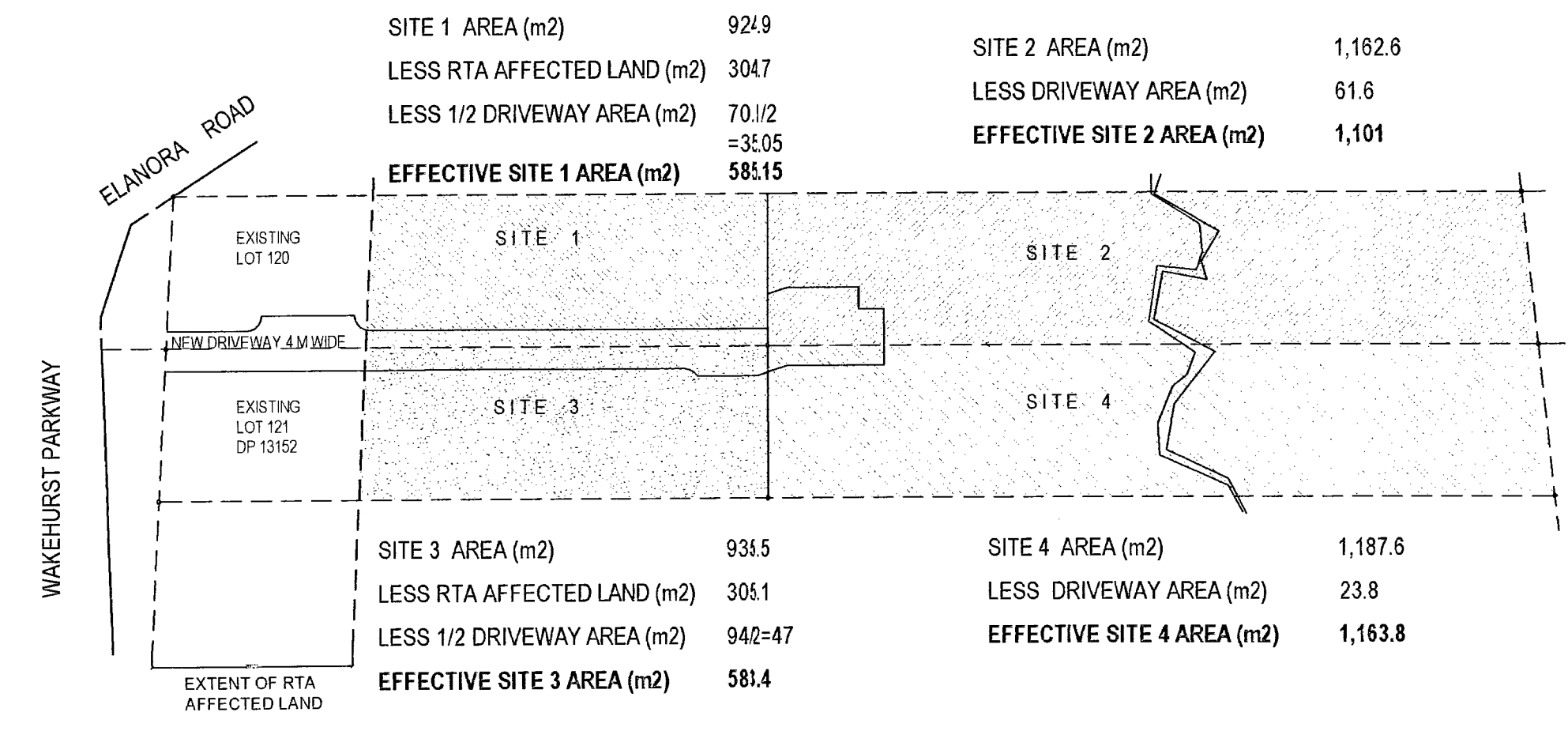


BUILDING 1	PROPOSED	ALLOWED
SITE AREA (m ²) incl. ROW	620.2	-
DWELLING FOOTPRINT (m ²)	161.5	-
DWELLING GFA (m ²)	304.7	-
ROW AND DRIVE (m ²)	96	-
BUILT UPON AREA (m ²)	257.5	-
BUILT UPON AREA %	41.5%	40% + 6%*

* 6% ADDITIONAL FUNCTIONAL OUTDOOR
LANDSCAPED AREA

BUILDING 3	PROPOSED	ALLOWED
SITE AREA (m ²) incl. ROW	630.4	-
DWELLING FOOTPRINT m ²	161.5	-
DWELLING GFA (m ²)	305.1	-
ROW AND DRIVE (m ²)	101.6	-
BUILT UPON AREA (m ²)	263.1	-
BUILT UPON AREA %	41.7%	40% + 6%*

* 6% ADDITIONAL FUNCTIONAL OUTDOOR
LANDSCAPED AREA



No.	TREE TYPE	DA (m)	HEIGHT (m)	SPREAD (m)
1	ROW OF EUONYMUS & BOTTLE BRUSH			
2	ROW OF EUONYMUS & BOTTLE BRUSH			
3	ROW OF EUONYMUS & BOTTLE BRUSH			
4	ROW OF EUONYMUS & BOTTLE BRUSH			
5	ROW OF EUONYMUS & BOTTLE BRUSH			
6	ROW OF EUONYMUS & BOTTLE BRUSH			
7	ROW OF EUONYMUS & BOTTLE BRUSH			
8	ROW OF EUONYMUS & BOTTLE BRUSH			
9	MULBERRY TREE			
10	BOTTLE			
11	CAMELLIA			
12	CAMELLIA			
13	CAMELLIA			
14	PLUM			
15	GRAPEFRUIT			
16	ORANGE			
17	ORANGE			
18	ORANGE			
19	PALM (TO BE RELOCATED)	0.12	6.0	4.0

No.	TREE TYPE	DA (m)	HEIGHT (m)	SPREAD (m)
20	CAMELLIA			
21	CAMELLIA			
22	CAMELLIA			
23	CAMELLIA			
24	CAMELLIA			
25	PALM			
26	CAMELLIA			
27	CAMELLIA			
28	HIBISCUS			
29	AZALEA			
30	CAMELLIA			
31	LILLY PILLY			
32	MANDARIN TREE (TO BE REMOVED)	0.3	8.0	5.0
33	PLUM TREE	0.4	8.0	5.0
34	MULBERRY TREE	0.4	6.0	6.0
35	GUM	0.4	5.0	5.0
36	GUM	0.5	10.0	8.0
37	GUM	0.3	7.0	4.0
38	GUM	0.3	7.0	4.0

No.	TREE TYPE	DA (m)	HEIGHT (m)	SPREAD (m)
39	GUM	0.3	6.0	4.0
40	GUM	0.4	6.0	4.0
41	GUM	0.3	7.0	6.0
42	GUM	0.5	6.0	6.0
43	GUM	0.3	5.0	10.0
44	PALM (TO BE RELOCATED)	0.4	5.0	5.0
45	NORFOLK ISLAND PINE (TO BE REMOVED)	0.6	25.0	10.0
46	TREE	0.7	7.0	8.0
47	PALM (TO BE RELOCATED)	0.3	7.0	6.0
48	TREE	0.7	7.0	8.0
49	LILLY PILLY (TO BE REMOVED)	0.5	15.0	10.0
50	PALM (TO BE RELOCATED)	0.3	12.0	5.0
51	PALM	0.3	12.0	5.0
52	PALM	0.3	16.0	5.0
53	PALM (TO BE RELOCATED)	0.2	7.0	3.0
54	PALM	0.35	12.0	5.0
55	PALM	0.35	12.0	5.0

BUILDING 2	PROPOSED	ALLOWED
SITE AREA (m ²) incl. ROW	1,162	-
DWELLING FOOTPRINT (m ²)	170.8	-
DWELLING GFA (m ²)	285	-
ROW DRIVE (m ²)	63.1	-
BUILT UPON AREA (m ²)	233.9	-
BUILT UPON AREA %	20.1%	40% + 6%*

* 6% ADDITIONAL FUNCTIONAL OUTDOOR
LANDSCAPED AREA

BUILDING 4	PROPOSED	ALLOWED
SITE AREA (m ²) incl. ROW	1,187.6	-
DWELLING FOOTPRINT m ²	166.1	-
DWELLING GFA (m ²)	285	-
ROW DRIVE (m ²)	24.5	-
BUILT UPON AREA (m ²)	190.6	-
BUILT UPON AREA %	16%	40% + 6%*

* 6% ADDITIONAL FUNCTIONAL OUTDOOR
LANDSCAPED AREA

G	ROW & AREAS AMENDED	24/09/04
F	RESIDENCE NUMBERS AMENDED	2/06/04
E	AMENDED HARD SURFACES	16/04/04
D	PRE DA MEETING ISSUE	02/04/04
REV.	AMENDMENTS	DATE

CLIENT:
STUART THOR
104 & 106 WAKEHURST PARKWAY
ELANORA HEIGHTS, NSW, 2107

PLAN
OF SUBDIVISION AND
REDEVELOPMENT

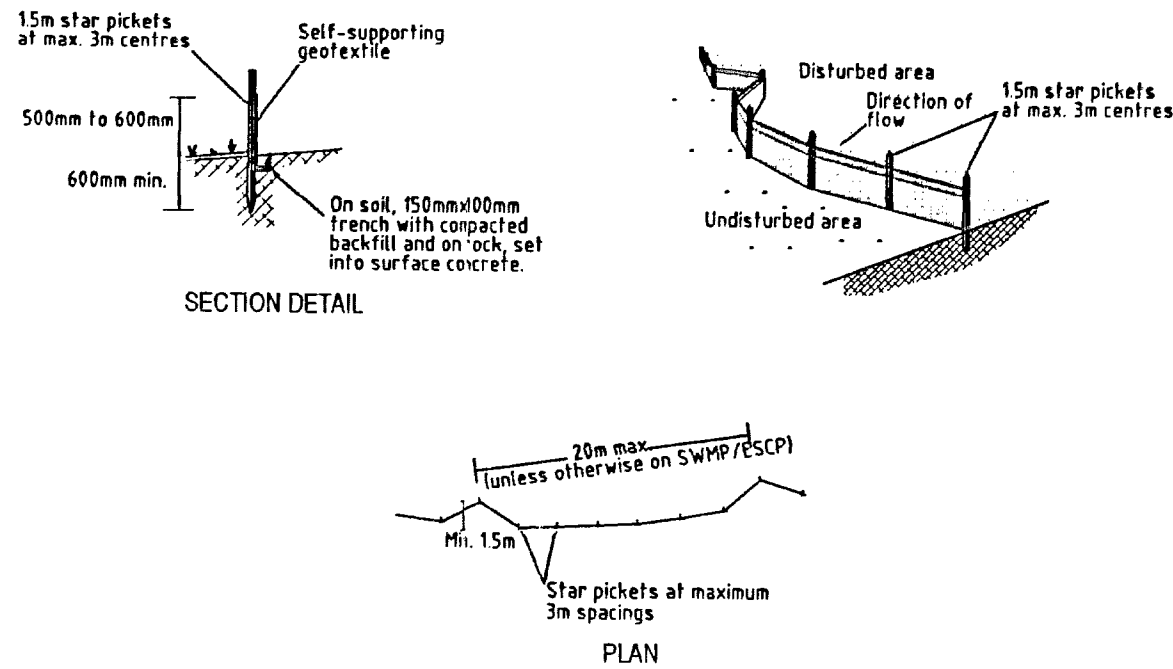
C.M.S. Surveyors
Pty Limited

ACN: 096 240 201
PO Box 463 Dee Why
NSW 2099
10/32 Campbell Avenue,
Dee Why NSW 2099
Telephone: (02) 9971 4802
Facsimile: (02) 9971 4822
E-mail: cmsurveyors@bigpond.com

CMS REF. 476	SCALE 1:200	DATE 24/09/04
DRAWING NUMBER CMS TH02 MODEL MAR04.dwg	REV. G	

NOTE: THESE PLANS MUST BE READ IN
CONJUNCTION WITH THE CONDITIONS OF
DEVELOPMENT CONSENT

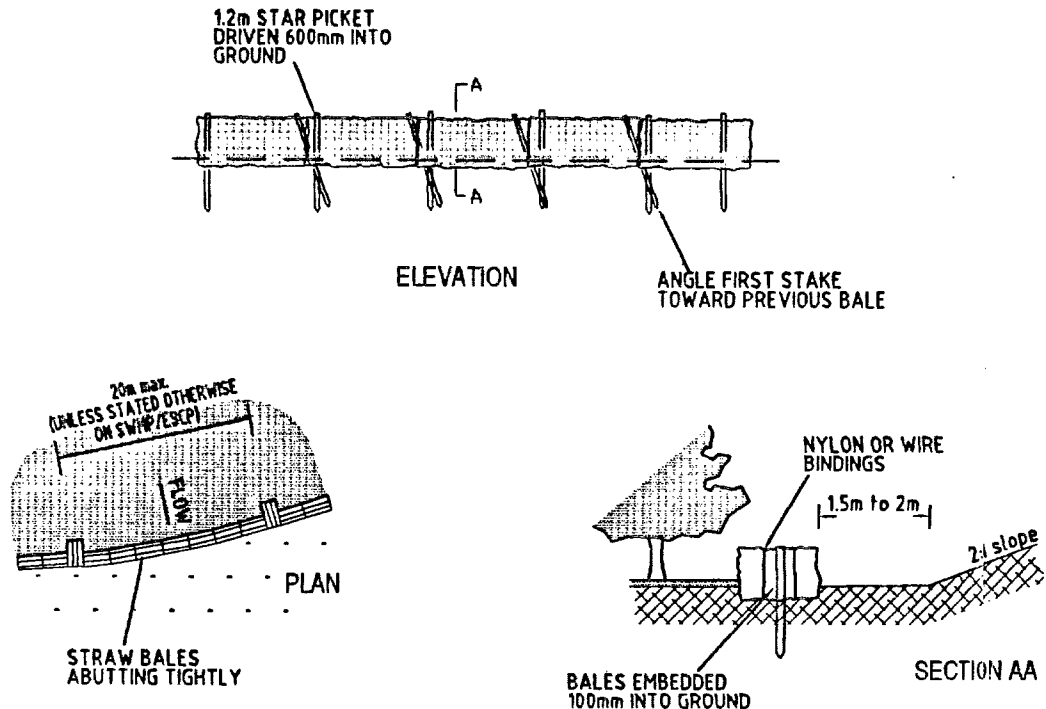
SEDIMENT FENCE



- Construction Notes
1. Construct sediment fence as close as possible to parallel to the contours of the site.
 2. Drive 15m long star picket into ground, 3m apart.
 3. Dig a 150mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
 4. Backfill trench over base of fabric.
 5. Fix self-supporting geotextile to upslope side of posts with wire ties or as recommended by geotextile manufacturer.
 6. Join sections of fabric at a support post with a 150mm overlap.

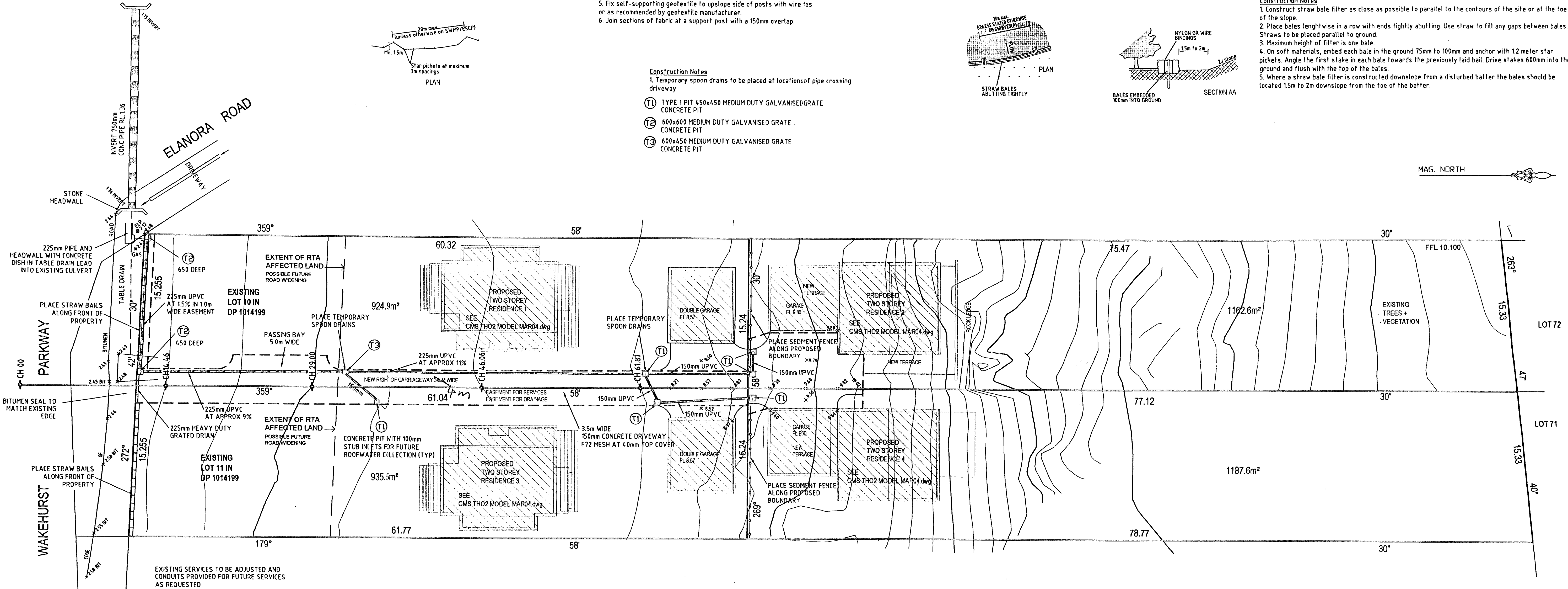
- Construction Notes
1. Temporary spoon drains to be placed at locations of pipe crossing driveway
- (T1) TYPE 1 PIT 450x450 MEDIUM DUTY GALVANISED GRATE CONCRETE PIT
- (T2) 600x600 MEDIUM DUTY GALVANISED GRATE CONCRETE PIT
- (T3) 600x450 MEDIUM DUTY GALVANISED GRATE CONCRETE PIT

STRAW BAIL FILTER



- Construction Notes
1. Construct straw bale filter as close as possible to parallel to the contours of the site or at the toe of the slope.
 2. Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws to be placed parallel to ground.
 3. Maximum height of filter is one bale.
 4. On soft materials, embed each bale in the ground 75mm to 100mm and anchor with 12 meter star pickets. Angle the first stake in each bale towards the previously laid bale. Drive stakes 600mm into the ground and flush with the top of the bales.
 5. Where a straw bale filter is constructed downslope from a disturbed batter the bales should be located 15m to 2m downslope from the toe of the batter.

MAG. NORTH



B	RESIDENCE NUMBERS AMENDED	2/06/04
A	FINAL ISSUE	6/05/04
REV.	AMENDMENTS	DATE
CLIENT: STUART THOR 104 & 106 WAKEHURST PARKWAY ELANORA HEIGHTS, NSW, 2107		
PLAN OF DRIVEWAY DESIGN FOR PROPOSED SUBDIVISION D.A.		
C.M.S. Surveyors Pty Limited ACN: 096 240 201 PO Box 463 Dee Why NSW 2099 10/32 Campbell Avenue, Dee Why NSW 2099 Telephone: (02) 9971 4802 Facsimile: (02) 9971 4822 E-mail: cmsurveyors@bigpond.com		
CHS REF.	SCALE	DATE
476	1:200	2/06/04
DRAWING NUMBER	REV.	
CHS TH02 DRIVEWAYDESIGN MAR04.DWG	B	

LEVEL	CHAINAGE (m)	SURFACE LEVEL (m)	DESIGN LEVEL EXISTING (m)
5.00	1.75	2.92	3.06
			2.91
0.00	0.00	3.00	2.96
1.75			3.01
5.00			

LEVEL 0.00m					
		KERB			
DESIGN LEVEL EXISTING (m)	4.41	4.26	4.36	4.41	
SURFACE LEVEL (m)	4.93		5.00		5.28
CHAINAGE (m)	5.00	3.25	0.00	1.75	5.00

Diagram showing a cross-section of a road with a 3% slope and 0.5m wide berms. The table below provides design level, surface level, and chainage data for three points.

DESIGN LEVEL EXISTING (m)	SURFACE LEVEL (m)	CHAINAGE (m)
6.09	6.04	5.00
5.99	6.00	0.00
6.04	6.40	0.4

7.00

1.75

SELECTED FILL IN 150mm LAYERS COMPACTED TO 98% OF MDD

NOTE: THESE PLANS MUST BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT


L'ÉL 0.00m

DESIGN LEVEL EXISTING (m)	DESIGN LEVEL PROPOSED (m)	FINISH LEVEL (m)	FINISH LEVEL (m)
5.00	6.99	7.99	7.94
1.75	0.00	7.00	7.94
0.00	1.75	6.95	5.00

CHAINAGE (m)	EXISTING SURFACE LEVEL (m)	DESIGN LEVEL (m)	WAKEHURST CENTRE LINE OF ROAD PARKWAY BOUNDARY EDGE OF PAVEMENT BOUNDARY
0.00	2.61		LEVEL 0.0
5.06	2.61		
8.84	2.45		
11.535	2.65	2.68	
14.46	3.00	2.96	
21.56	4.00	3.64	
29.00	5.00	4.36	9.6%
31.555	5.45	4.60	
39.68	6.00	5.38	
46.06	6.00	5.99	
61.87	7.00	7.89	12%
65.07		8.27	
71.07		8.87	10%
71.30	8.00		13.8%
72.57			
74.77		9.38	
75.19	9.00		
79.11	9.90		7.3%
79.41	10.00		
80.77		9.82	
83.69	11.00		
84.17		10.07	
87.01	12.00		
89.36	13.00		
91.08	14.00		
92.50	15.00		
93.85	16.00		
94.49	17.00		
94.82	18.00		

0 5 10 15

SCALE 1 : 200

		HORIZONTAL DATUM: CO-ORDINATE SYSTEM: ASSUMED		VERTICAL DATUM: DATUM: AUSTRALIAN HEIGHT DATUM (AHD) B.M. ADOPTED: P.M. 8396 R.L. 2.125 SOURCE: S.C.I.M.S.		CLIENT: S. THOR 106 WAKEHURST PAIKWAY, NORTH NARRABEEN, NSW, 2101		PLAN SHOWING LONGSECTION BETWEEN LOTS 10 & 11 IN D.P. 1014199 104 WAKEHURST PARKWAY, NORTH NARRABEEN, NSW, 2101		 C.M.S. Surveyors Pty Limited ACN: 096 240 201 PO Box 463 Deo Why NSW 2099 10/32 Campbell Avenue, Deo Why NSW 2099 Telephone: (02) 9971 4802 Facsimile: (02) 9971 4822 E-mail: cmsurveyors@bigpond.com		L.G.A. WARRINGAH SHEET 2 OF 2 <table><tr><td>SURVEYED TV</td><td>DRAWN CJR</td><td>CHECKED TV</td><td>APPROVED DL</td></tr><tr><td colspan="2">SURVEY REFERENCE 476</td><td>SCALE 1 : 200</td><td>DATE 06/04/04</td></tr><tr><td colspan="3">DRAWING NUMBER 476detail200.dwg</td><td>REV A</td></tr></table>		SURVEYED TV	DRAWN CJR	CHECKED TV	APPROVED DL	SURVEY REFERENCE 476		SCALE 1 : 200	DATE 06/04/04	DRAWING NUMBER 476detail200.dwg			REV A
SURVEYED TV	DRAWN CJR	CHECKED TV	APPROVED DL																						
SURVEY REFERENCE 476		SCALE 1 : 200	DATE 06/04/04																						
DRAWING NUMBER 476detail200.dwg			REV A																						
MARKS ADOPTED:																									
A	FINAL ISSUE	06/04/04																							
REV.	AMENDMENTS	DATE																							

DESIGN LEVEL EXISTING (m)	4.41	4.26	4.36	4.41
SURFACE LEVEL (m)	4.93		5.00	
CHAINAGE (m)	5.00	3.25	0.00	1.75
				5.00

Diagram showing a cross-section of a road with a 3% slope and 0.5m wide berms. The diagram includes a table with the following data:

DESIGN LEVEL EXISTING (m)	DESIGN LEVEL PROPOSED (m)	SURFACE LEVEL EXISTING (m)	SURFACE LEVEL PROPOSED (m)	CHAINAGE EXISTING (m)	CHAINAGE PROPOSED (m)
6.09	5.94	6.04	6.00	5.00	1.75
6.04	5.99	6.00	6.00	1.75	0.00
6.04	5.99	6.00	6.00	0.4	1.75

7.50


SELECTED FILL IN 150mm LAYERS COMPACTED TO 98% STD DENSITY

NOTE: THESE PLANS MUST BE READ IN CONJUNCTION WITH THE CONDITIONS OF DEVELOPMENT CONSENT

L'EL 0.00m

DESIGN LEVEL EXISTING (m)	7.99	7.94	7.89	7.94	
SURFACE LEVEL (m)	6.99		7.00		6.95
(HAINAGE (m)	5.00	1.75	0.00	1.75	5.00

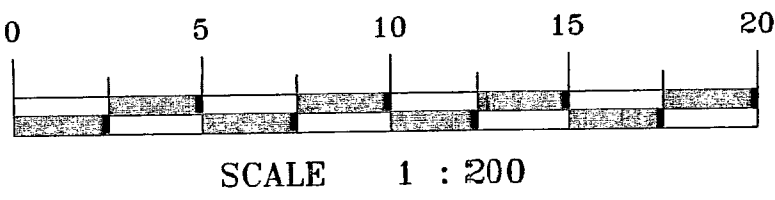
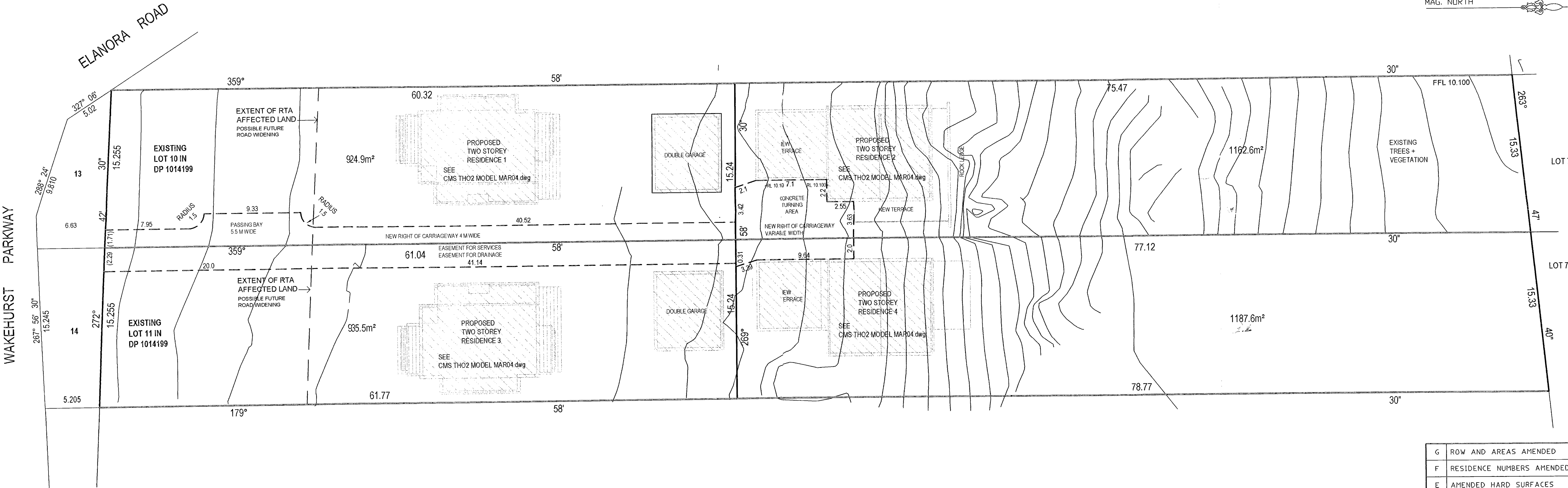
CHAINAGE (m)	EXISTING SURFACE LEVEL (m)	DESIGN LEVEL (m)	WAKEHURST CENTRE LINE OF ROAD PARKWAY
0.00	2.61		LEVEL 0.0
5.06	2.61		BOUNDARY
8.84	2.45		EDGE OF PAVEMENT
11.535	2.65	2.68	BOUNDARY
14.46	3.00	2.96	
21.56	4.00	3.64	
29.00	5.00	4.36	
31.555	5.45	4.60	FUTURE RTA ROAD
39.68	6.00	5.38	
46.06	6.00	5.99	
61.87	7.00	7.89	
65.07		8.27	
71.07		8.87	
71.90	8.00		
72.57			BOUNDARY
74.77		9.38	
75.19	9.00		
79.11	9.90		
79.41	10.00		
80.77		9.82	
83.69	11.00		
84.17		10.07	
87.01	12.00		
89.36	13.00		
91.08	14.00		
92.50	15.00		
93.95	16.00		
94.43	17.00		
94.82	18.00		

				HORIZONTAL DATUM: CO-ORDINATE SYSTEM: ASSUMED		VERTICAL DATUM: DATUM: AUSTRALIAN HEIGHT DATUM (AHD) B.M. ADOPTED: P.M. 8396 R.L. 2.125 SOURCE: S.C.I.M.S.		CLIENT: S. THOR 106 WAKEHURST PAIKWAY, NORTH NARRABEEN, NSW, 2101		PLAN SHOWING LONGSECTION BETWEEN LOTS 10 & 11 IN D.P. 1014199 104 WAKEHURST PARKWAY, NORTH NARRABEEN, NSW, 2101		 C.M.S. Surveyors Pty Limited ACN: 096 240 201 PO Box 463 Dee Why NSW 2099 10/32 Campbell Avenue, Dee Why NSW 2099 Telephone: (02) 9971 4802 Facsimile: (02) 9971 4822 E-mail: cmssurveyors@bigpond.com		L.G.A. WARRINGAH		SHEET 2 OF					
A		FINAL ISSUE		06/04/04		MARKS ADOPTED:								SURVEYED TV		DRAWN CJR		CHECKED TV		APPROVED DL	
REV.		AMENDMENTS		DATE										SURVEY REFERENCE 476		SCALE 1 : 200		DATE 06/04/04			
														DRAWING NUMBER 476detail200.dwg				REV A			

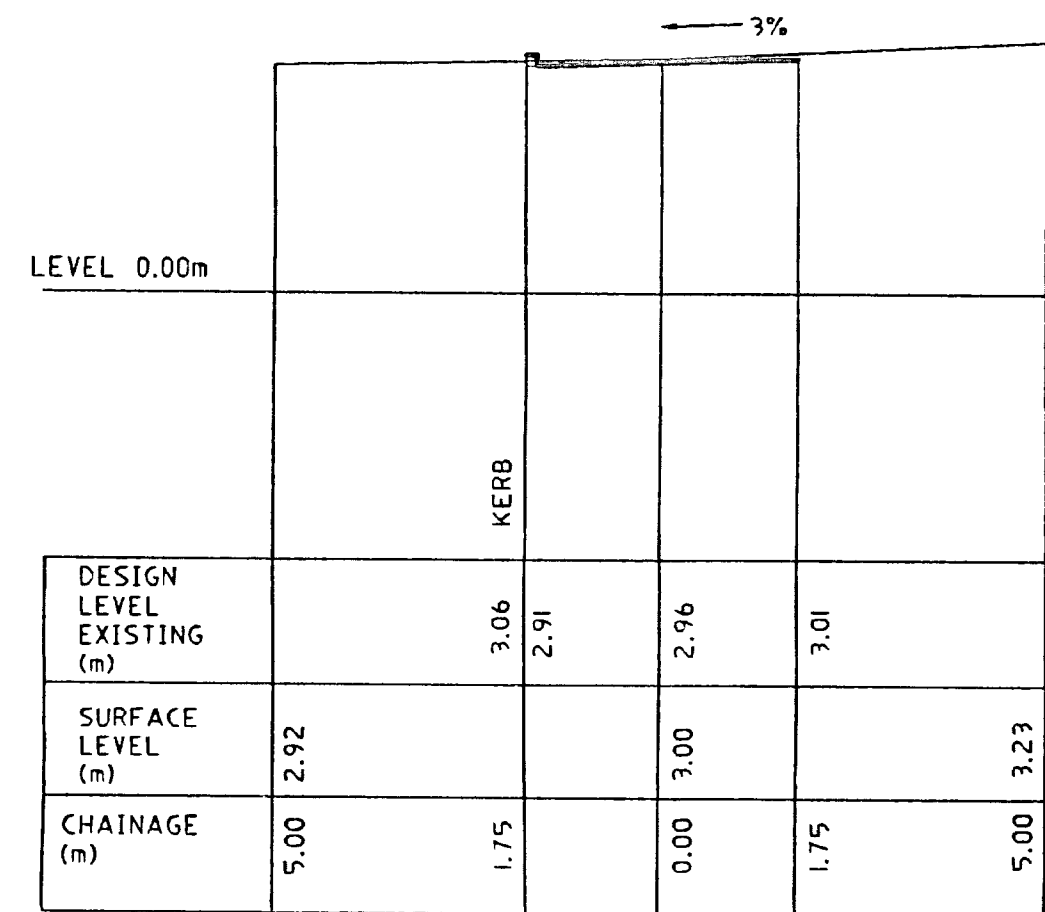
PITTWATER COUNCIL
APPROVED DEVELOPMENT CONSENT PLANS

NOTE: THESE PLANS MUST BE READ IN
CONJUNCTION WITH THE CONDITIONS OF
DEVELOPMENT CONSENT

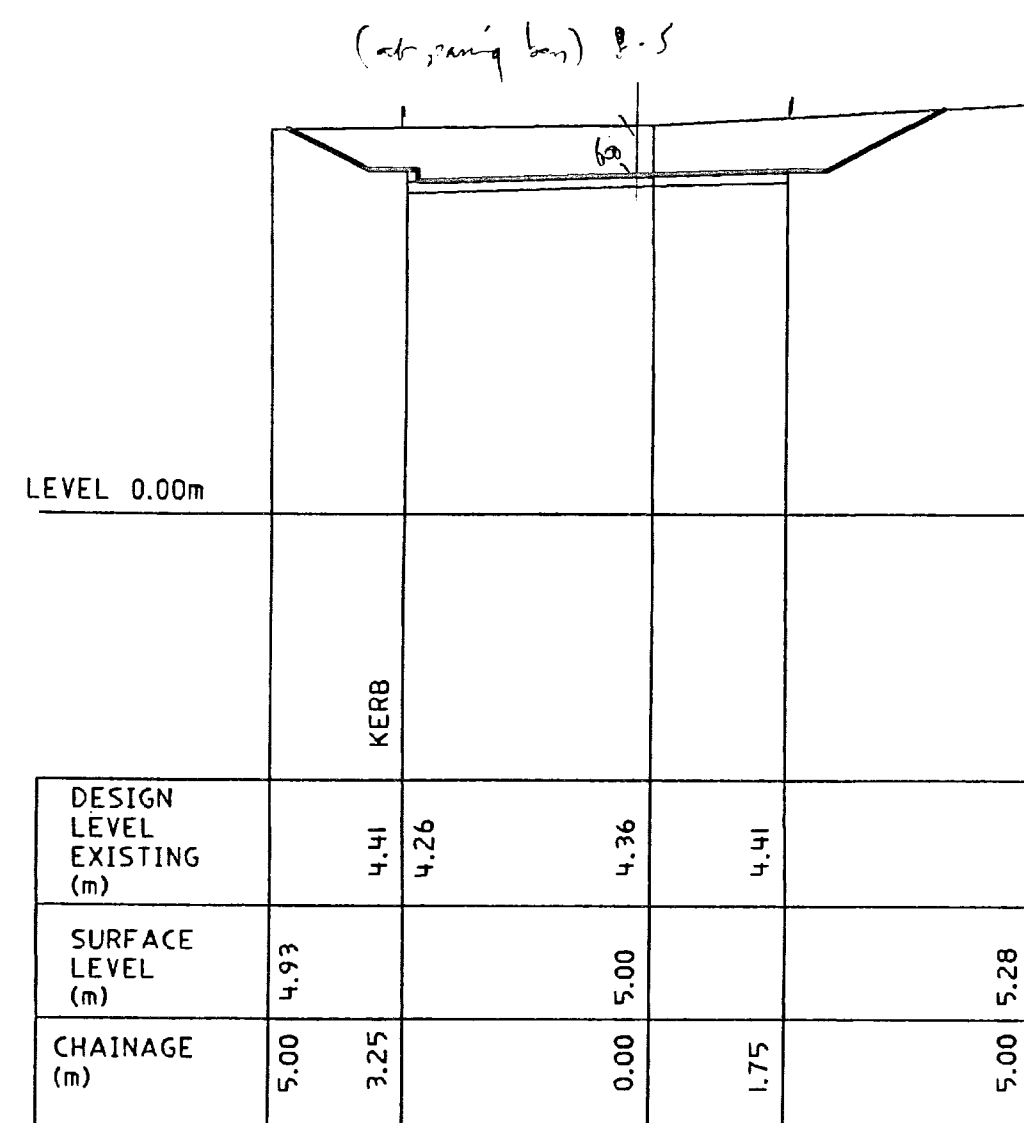
MAG. NORTH



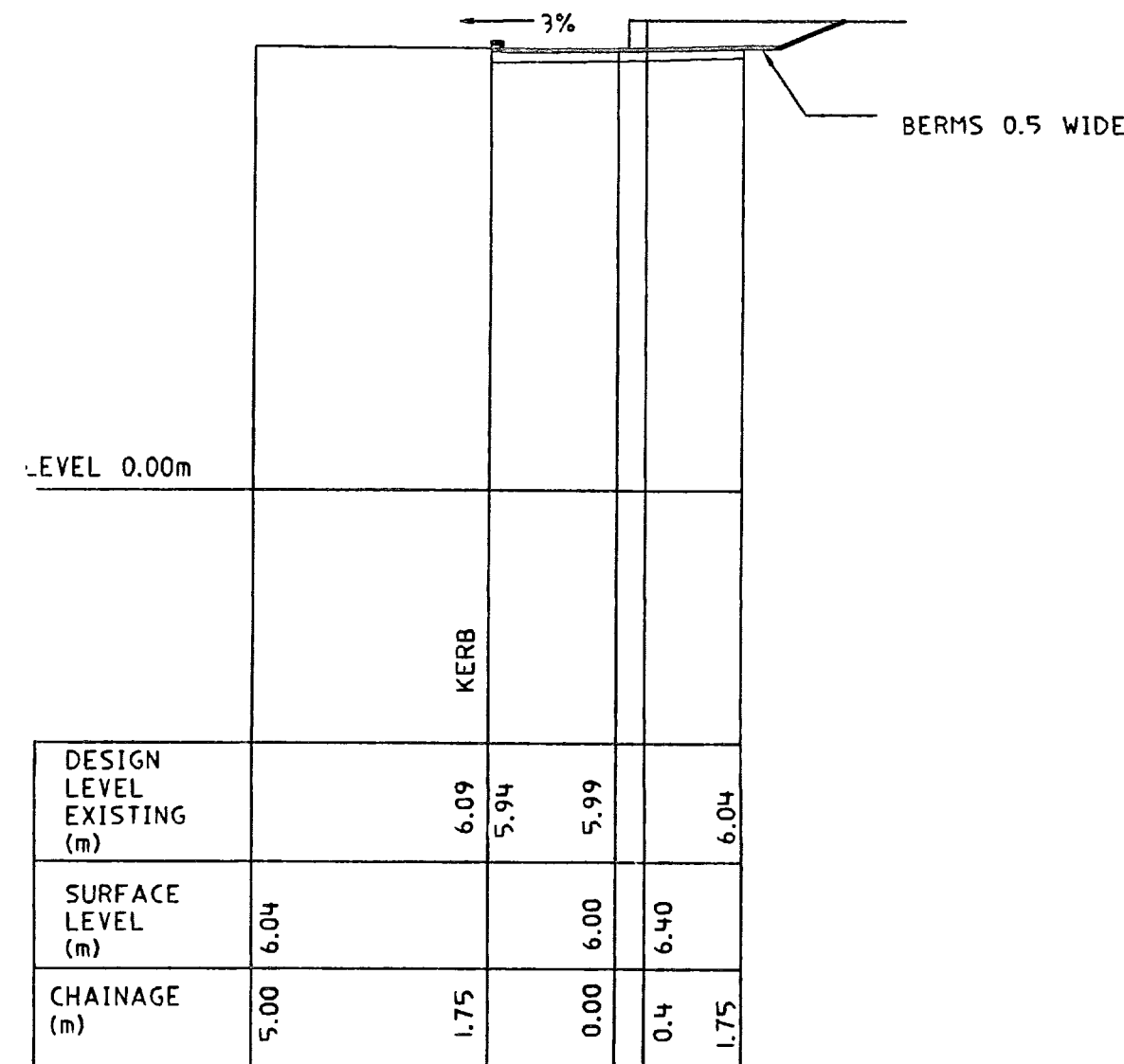
G	ROW AND AREAS AMENDED	24/09/04
F	RESIDENCE NUMBERS AMENDED	2/06/04
E	AMENDED HARD SURFACES	16/04/04
D	PRE DA MEETING ISSUE	02/04/04
REV.	AMENDMENTS	DATE
CLIENT: STUART THOR 104 & 106 WAKEHURST PARKWAY ELANORA HEIGHTS, NSW, 2107		
PLAN OF PROPOSED SUBDIVISION		
C.M.S. Surveyors CMS Pty Limited ACN: 096 240 201 PO Box 463 Dee Why NSW 2099 10/32 Campbell Avenue, Dee Why NSW 2099 Telephone: (02) 9971 4802 Facsimile: (02) 9971 4822 E-mail: cmsurveyors@bigpond.com		
CMS REF. 476	SCALE 1:200	DATE 24/09/04
DRAWING NUMBER CMS TH02 PROPOSEDSUBDIVISION HAR04.DWG	REV. 6	



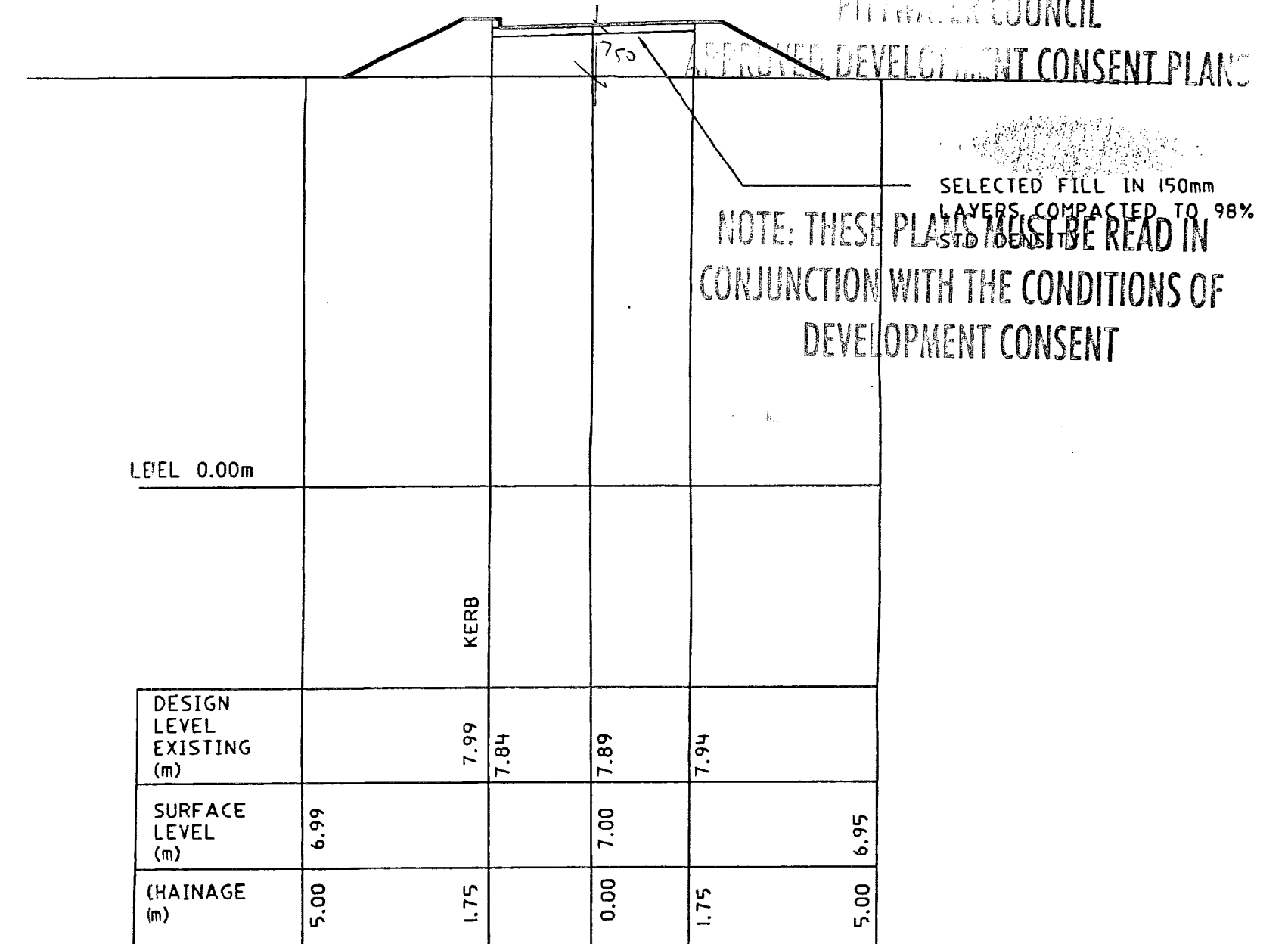
CH 14.46
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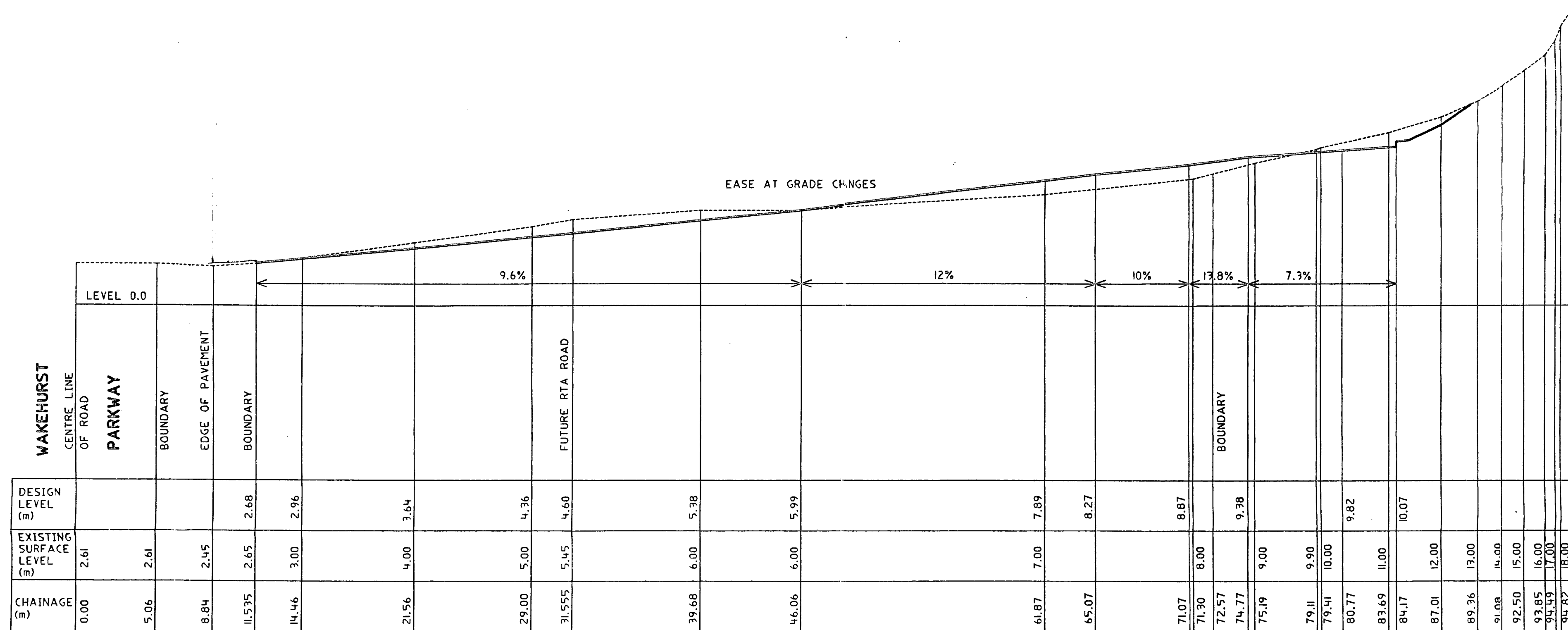
CH 29.0
SCALE 1:100 NATURAL



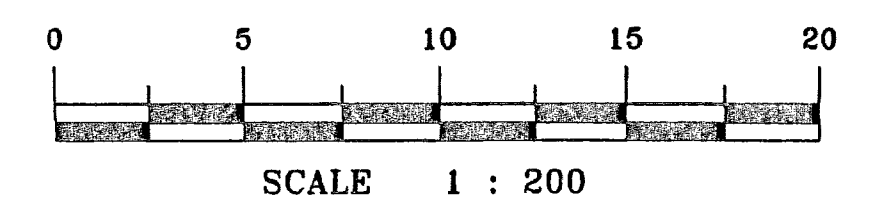
CH 46.06
SCALE 1:100 NATURAL



CH 61.87
SCALE 1:100 NATURAL

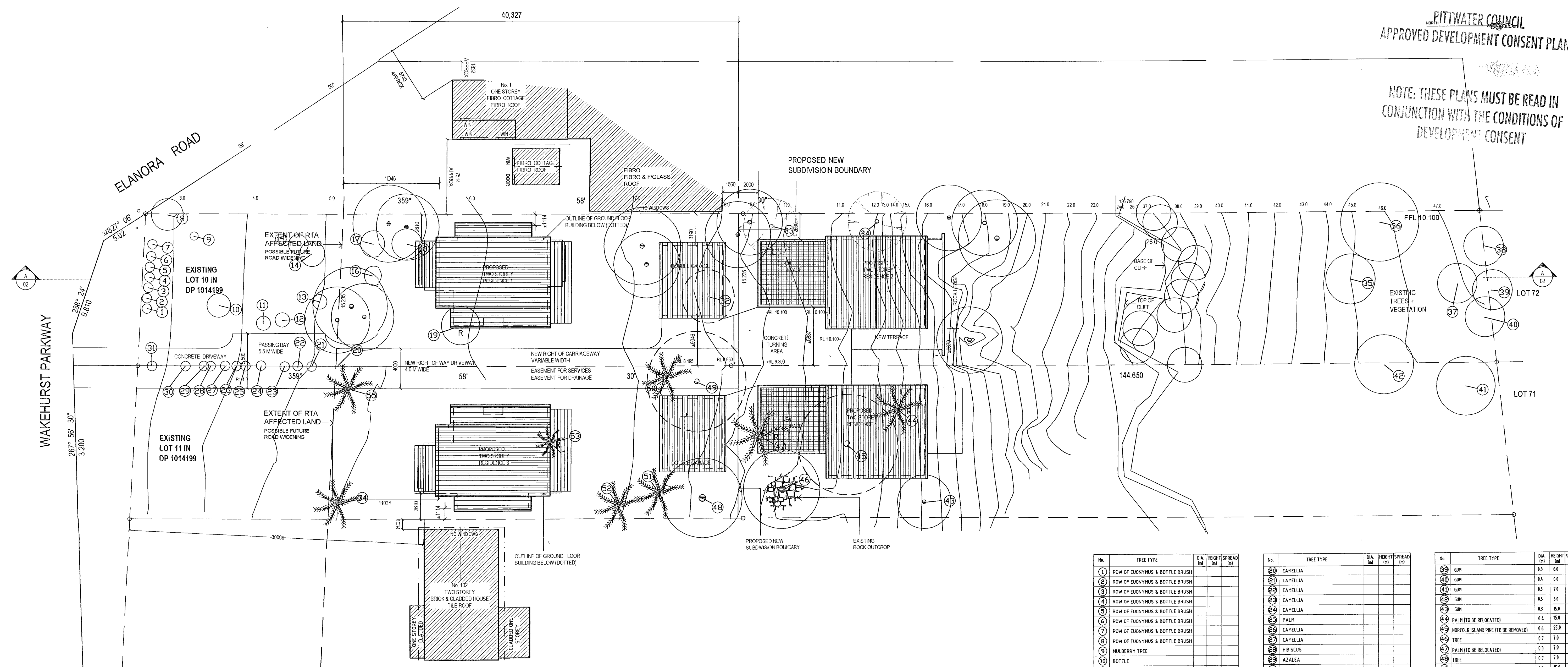


SECTION X - X
SCALE 1:200 NATURAL



HORIZONTAL DATUM: CO-ORDINATE SYSTEM: ASSUMED		VERTICAL DATUM: DATUM: AUSTRALIAN HEIGHT DATUM (AHD) B.M. ADOPTED: P.M. 8396 R.L. 2.125 SOURCE: S.C.I.M.S.		CLIENT: S. THOR 106 WAKEHURST PARKWAY, NORTH NARRABEEN, NSW, 2101		PLAN SHOWING LONGSECTION BETWEEN LOTS 10 & 11 IN D.P. 1014199 104 WAKEHURST PARKWAY, NORTH NARRABEEN, NSW, 2101		C.M.S. Surveyors Pty Limited ACN: 096 240 201 PO Box 463 Dee Why NSW 2099 10/32 Campbell Avenue, Dee Why NSW 2099 Telephone: (02) 9971 4802 Facsimile: (02) 9971 4822 E-mail: cmssurveyors@bigpond.com		L.G.A. WARRINGAH SURVEYED TV DRAWN CUR CHECKED TV APPROVED DL SURVEY REFERENCE 476 SCALE 1 : 200 DATE 06/04/04 REV DRAWING NUMBER 476detail200.dwg A	
MARKS ADOPTED:											
AMENDMENTS		DATE									
FINAL ISSUE		06/04/04									

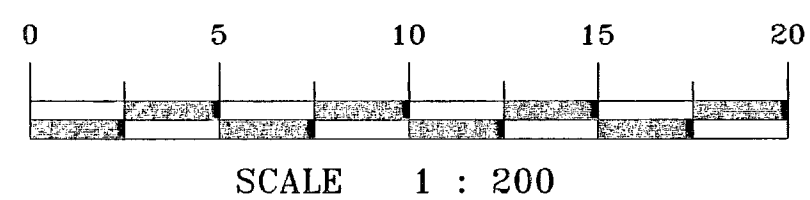
NOTE: THESE PLANS MUST BE READ IN
CONJUNCTION WITH THE CONDITIONS OF
DEVELOPMENT CONSENT



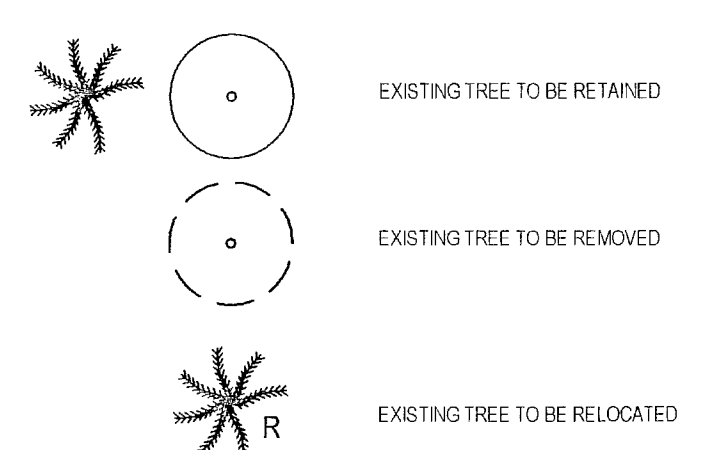
No.	TREE TYPE	DIA (m)	HEIGHT (m)	SPREAD (m)
1	ROW OF EUCALYPTUS & BOTTLE BRUSH			
2	ROW OF EUCALYPTUS & BOTTLE BRUSH			
3	ROW OF EUCALYPTUS & BOTTLE BRUSH			
4	ROW OF EUCALYPTUS & BOTTLE BRUSH			
5	ROW OF EUCALYPTUS & BOTTLE BRUSH			
6	ROW OF EUCALYPTUS & BOTTLE BRUSH			
7	ROW OF EUCALYPTUS & BOTTLE BRUSH			
8	ROW OF EUCALYPTUS & BOTTLE BRUSH			
9	ROW OF EUCALYPTUS & BOTTLE BRUSH			
10	BOTTLE			
11	CAMELLIA			
12	CAMELLIA			
13	CAMELLIA			
14	PLUM			
15	GRAPEFRUIT			
16	ORANGE			
17	ORANGE			
18	ORANGE			
19	PALM (TO BE RELOCATED)	0.12	6.0	4.0

No.	TREE TYPE	DIA (m)	HEIGHT (m)	SPREAD (m)
20	CAMELLIA			
21	CAMELLIA			
22	CAMELLIA			
23	CAMELLIA			
24	CAMELLIA			
25	CAMELLIA			
26	PALM			
27	CAMELLIA			
28	IBISCUIS			
29	HAZELBERRY TREE			
30	AZALEA			
31	CAMELLIA			
32	MANDARIN TREE (TO BE REMOVED)	0.3	8.0	5.0
33	PLUM TREE	0.4	8.0	5.0
34	PLUM TREE	0.4	6.0	5.0
35	GRAPEFRUIT	0.4	5.0	5.0
36	GUM	0.5	10.0	8.0
37	GUM	0.3	7.0	4.0
38	GUM	0.3	7.0	4.0

No.	TREE TYPE	DIA (m)	HEIGHT (m)	SPREAD (m)
39	GUM	0.3	6.0	4.0
40	GUM	0.4	6.0	4.0
41	GUM	0.3	7.0	6.0
42	GUM	0.5	6.0	6.0
43	GUM	0.3	15.0	10.0
44	PALM (TO BE RELOCATED)	0.4	15.0	5.0
45	NOBISCUIS ISLAND PINE (TO BE REMOVED)	0.6	25.0	10.0
46	TREE	0.7	7.0	8.0
47	PALM (TO BE RELOCATED)	0.3	7.0	6.0
48	TREE	0.7	7.0	8.0
49	LILLY PILLY (TO BE REMOVED)	0.5	15.0	10.0
50	PALM (TO BE RELOCATED)	0.3	12.0	5.0
51	PALM	0.3	12.0	5.0
52	PALM	0.3	10.0	5.0
53	PALM (TO BE RELOCATED)	0.2	7.0	3.0
54	PALM	0.35	12.0	5.0
55	PALM	0.35	12.0	5.0



TREE LEGEND

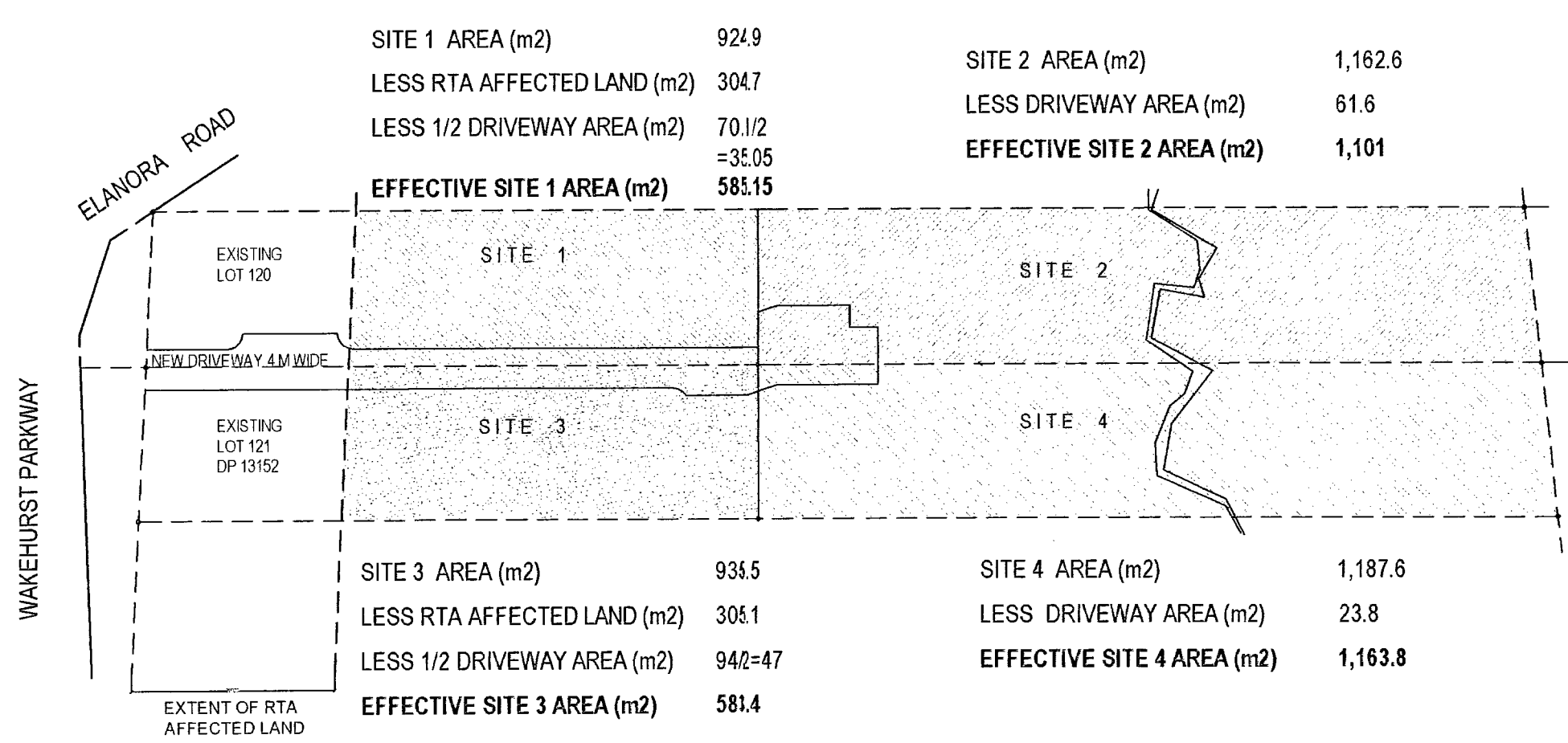


BUILDING 1	PROPOSED	ALLOWED
SITE AREA (m2) incl. ROW	620.2	
DWELLING FOOTPRINT (m2)	161.5	-
DWELLING GFA (m2)	304.7	-
ROW AND DRIVE (m2)	96	
BUILT UPON AREA (m2)	257.5	
BUILT UPON AREA %	41.5%	40% + 6%*

* 6% ADDITIONAL FUNCTIONAL OUTDOOR LANDSCAPED AREA

BUILDING 3	PROPOSED	ALLOWED
SITE AREA (m2) incl. ROW	630.4	
DWELLING FOOTPRINT m2	161.5	-
DWELLING GFA (m2)	305.1	-
ROW AND DRIVE (m2)	101.6	-
BUILT UPON AREA (m2)	263.1	-
BUILT UPON AREA %	41.7%	40% + 6%*

* 6% ADDITIONAL FUNCTIONAL OUTDOOR LANDSCAPED AREA



BUILDING 2	PROPOSED	ALLOWED
SITE AREA (m2) incl. ROW	1,162	
DWELLING FOOTPRINT (m2)	170.8	-
DWELLING GFA (m2)	285	-
ROW DRIVE (m2)	63.1	
BUILT UPON AREA (m2)	233.9	
BUILT UPON AREA %	20.1%	40% + 6%*

* 6% ADDITIONAL FUNCTIONAL OUTDOOR LANDSCAPED AREA

BUILDING 4	PROPOSED	ALLOWED
SITE AREA (m2) incl. ROW	1,187.6	
DWELLING FOOTPRINT m2	166.1	-
DWELLING GFA (m2)	285	-
ROW DRIVE (m2)	24.5	
BUILT UPON AREA (m2)	190.6	
BUILT UPON AREA %	16%	40% + 6%*

* 6% ADDITIONAL FUNCTIONAL OUTDOOR LANDSCAPED AREA

G	ROW & AREAS AMENDED	24/09/04
F	RESIDENCE NUMBERS AMENDED	2/06/04
E	AMENDED HARD SURFACES	16/04/04
D	PRE DA MEETING ISSUE	02/04/04
REV.	AMENDMENTS	DATE

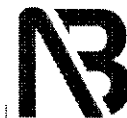
CLIENT:
STUART THOR
104 & 106 WAKEHURST PARKWAY
ELANORA HEIGHTS, NSW, 2107

PLAN
OF SUBDIVISION AND
REDEVELOPMENT

C.M.S. Surveyors
Pty Limited

ACN: 096 240 201
PO Box 463 Dee Why
NSW 2099
10/32 Campbell Avenue,
Dee Why NSW 2099
Telephone: (02) 9971 4802
Facsimile: (02) 9971 4822
E-mail: cmsurveyors@bigpond.com

CMS REF. 476	SCALE 1:200	DATE 24/09/04
DRAWING NUMBER CMS TH02 MODEL MAR04.dwg	REV. G	



DIRECTORS

Stewart McGee, Rick Way, Lucas Molloy

Access and Internal Driveway Design Certificate

Date: 13th April 2006
Builder: Stuart Thor

Job No. 051149
Engineer: LM

Site: 104 and 106 Wakehurst Parkway Elanora

We hereby certify that the plans prepared by NB Consulting Engineers P/L have been designed and detailed in accordance with Condition B28 of the DA approval.

We trust that this certificate meets with your requirements. Please contact the author if further clarification is required.

NB CONSULTING ENGINEERS P/L



Per Lucas Molloy
BE CPEng NPER Director

\\NBSBS\COMPANY\ENG\NBC\2005\051149\SC002 driveway.doc

Attention
Lucas-



22/6/05 - NADINE FAXING
REUSED RECEIPT
WITH \$286.00
NOTED

PITTWATER COUNCIL
Unit 9/5 Vuko Place, Warriewood NSW 2102
Telephone 9970 1111

Date: 15-Jun-05
Receipt No: 169572
Amount: ~~\$165.00~~

286.00

Name: Stuart Thor & Andrew Van Wensveen
Postal Address: PO Box 805
Narrabeen 2101

APPROVED ACCESS DRIVEWAY PROFILE AT:

104 & 106 Wakehurst Parkway, Elanora

The future vehicular access profile will be as per the enclosed plan NH.

WORK REQUIRED:

Construct: Vehicular access slab 3.6m long x 4.0m wide at gutter crossing to 4.0m wide at the boundary.

Type of Construction: Domestic

Note: "G" (see attached diagram) to be 450mm from edge of road and 50mm below edge of road.

VEHICULAR ACCESS

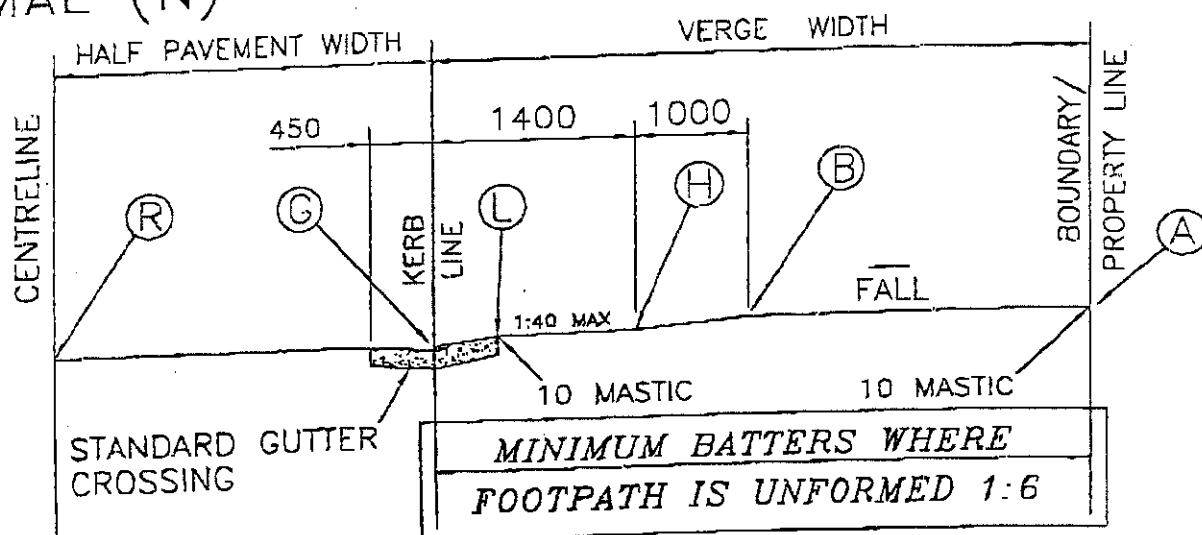
- (a) All work within the road reserve (including excavation) in connection with the above, is to be carried out by authorised contractors only.
- (b) Quotations for the work specified above should be obtained from any of the contractors on the list and should be for the whole of the work stated.
- (c) Construction of vehicular access will be strictly in accordance with the profile supplied and where the drive within the property is to be constructed first, it shall be the responsibility of the owner to have the work carried out in such a manner as to provide a smooth join and continuity of grading.

Please Note: Council will only permit an absolute maximum gradient of 25% (1 in 4) measured at any point on the driveway and that an ease may be required for access into the car stand area, carport or garage. Refer to relevant attached profile.

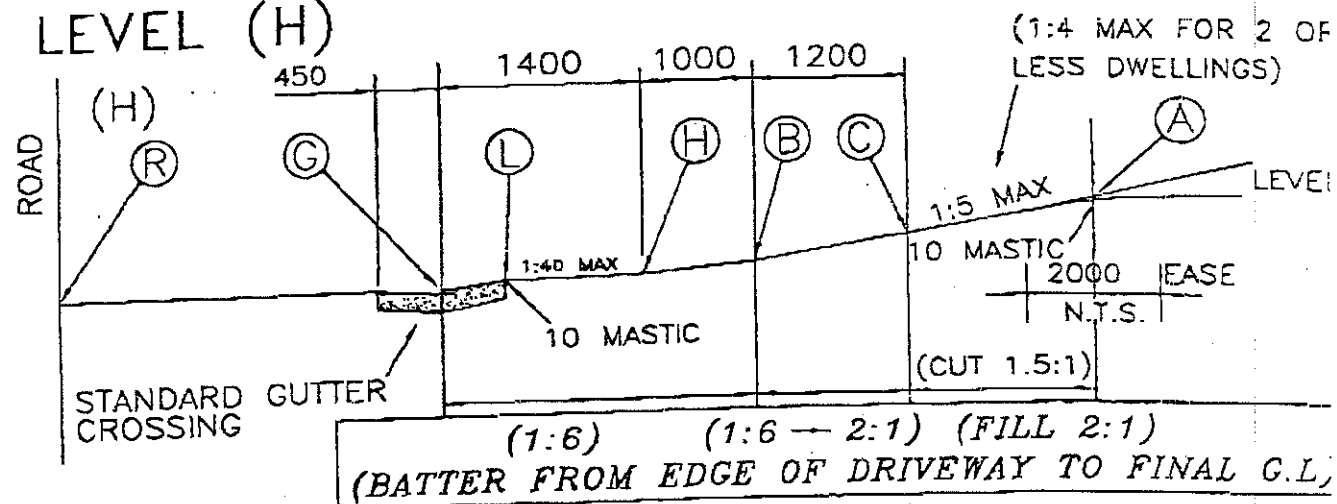
Sigi Melderis
ASSETS / RESTORATIONS OFFICER

STANDARD DRIVEWAY PROFILES FOR ALL DEVELOPMENTS

NORMAL (N)



HIGH LEVEL (H)



POINT	REMARKS	LEVELS
R	ROAD CENTRELINE	
G	INVERT OF GUTTER	
L	BACK OF LAYBACK	100 ABOVE "G"
H	1000 FROM BACK OF LAYBACK	130 ABOVE "G"
B	2400 FROM KERB LINE	MAX 200 ABOVE "G"
C	3600 FROM KERB LINE	MAX 400 ABOVE "G"
A	BOUNDARY	EASE REQUIRED AT GRADE CHANGE

- All construction within the road reserve to be in plain uncoloured 20MPa concrete unless otherwise approved by Council.
- Single dwellings - 20Mpa concrete 130mm thick.
- Dual occupancies where the crossing services both dwellings - 20Mpa concrete 150mm thick with F72 reinforcement.
- The Vehicular crossing and the driveway to 2400 behind the kerblines is to be graded parallel with the road centre line grading.
- Driveway pavers to be laid on a 100mm concrete base.



PITTWATER COUNCIL

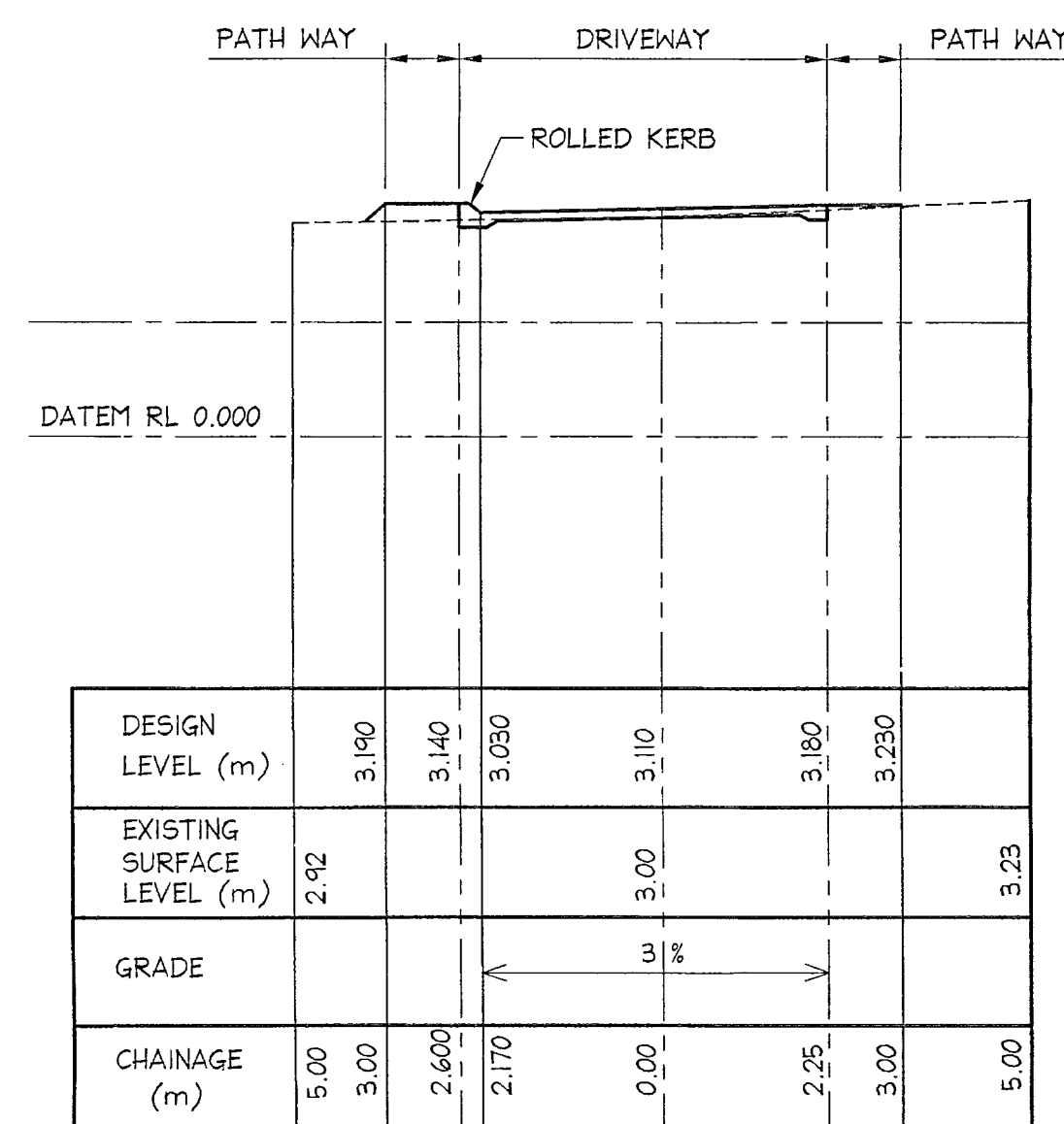
Standard Driveway Profiles

NORMAL TO HIGH

PLAN

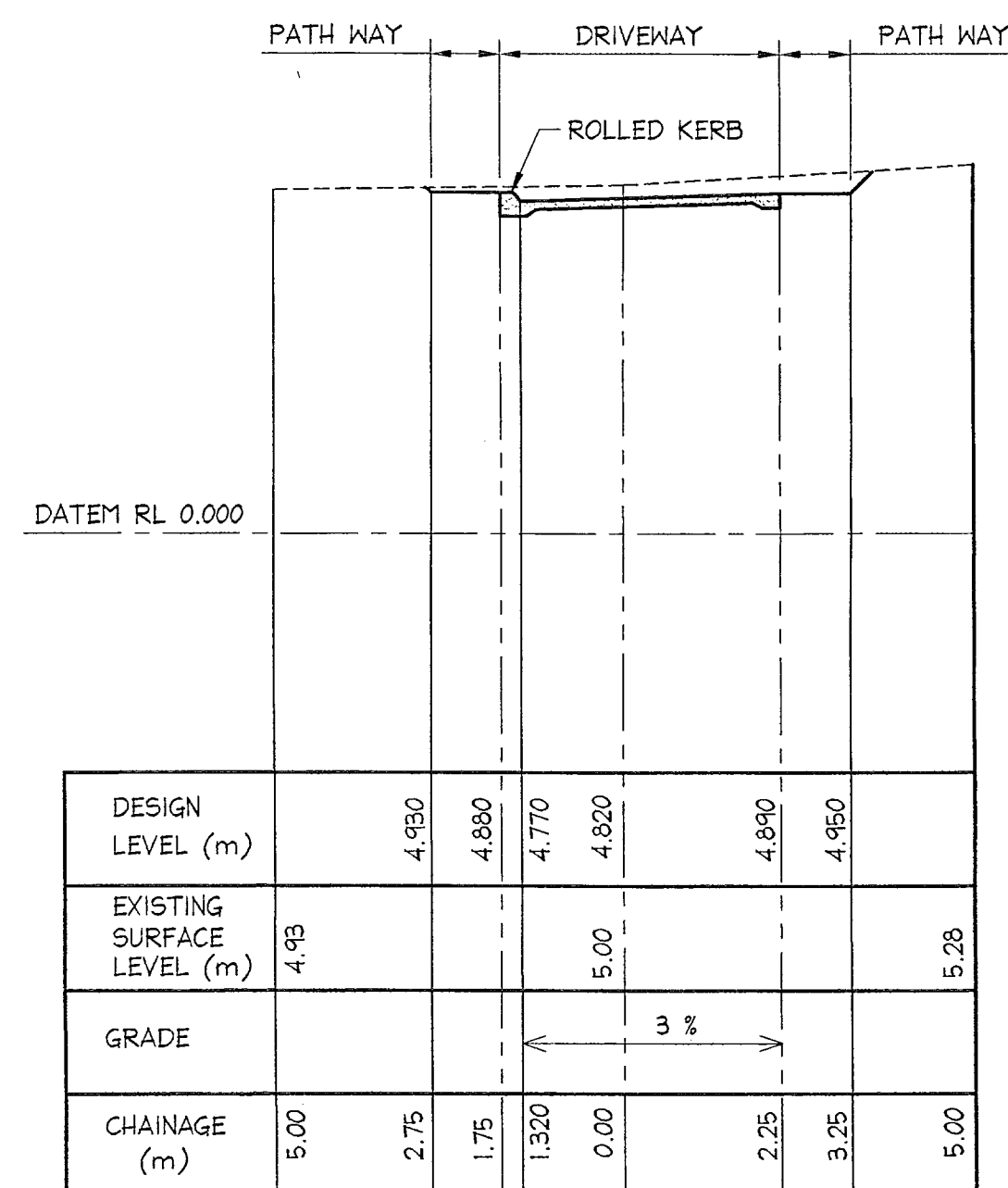
NH

POST NO.



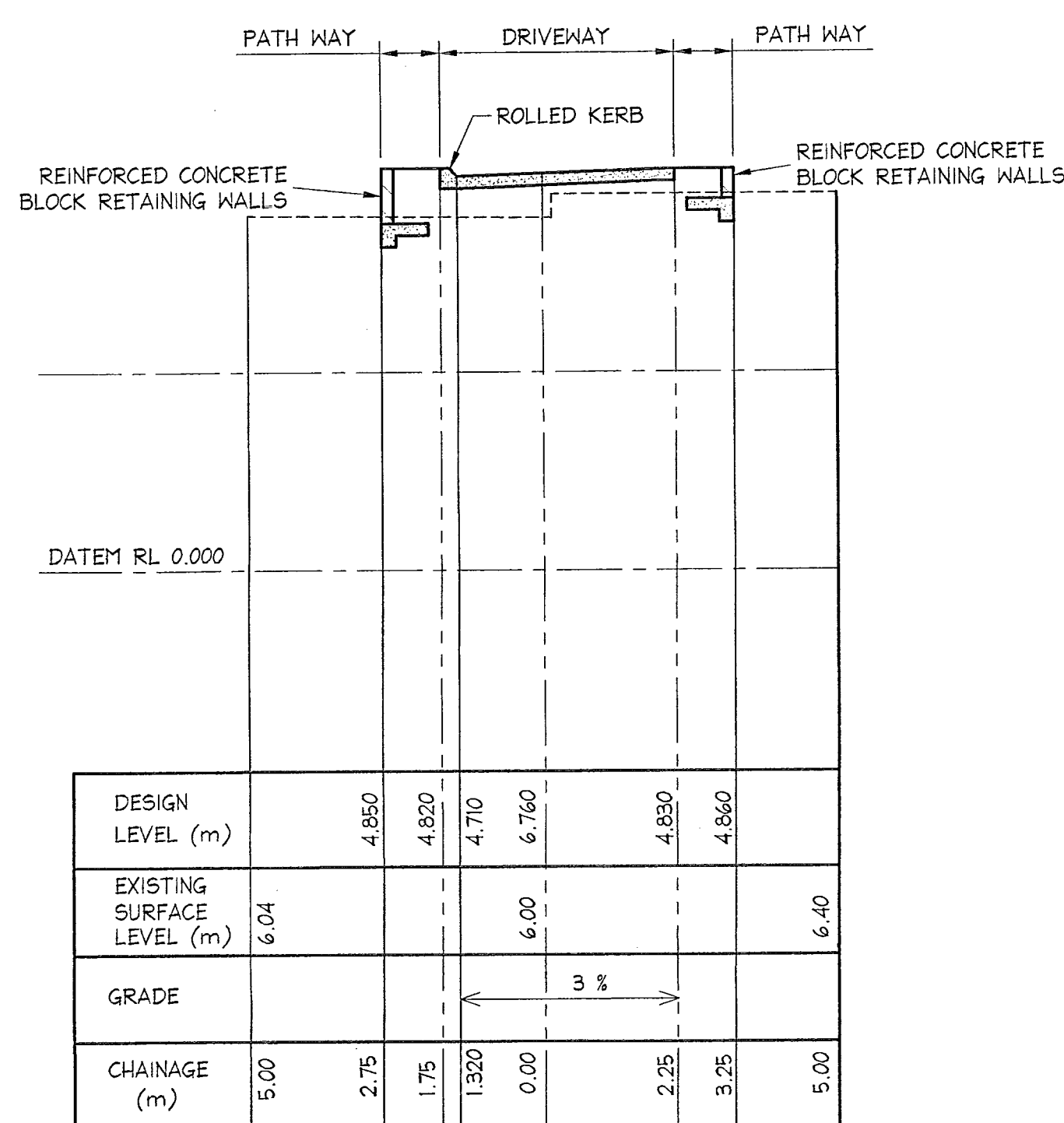
CROSS SECTION CH 14.460

SCALE = 1 : 100



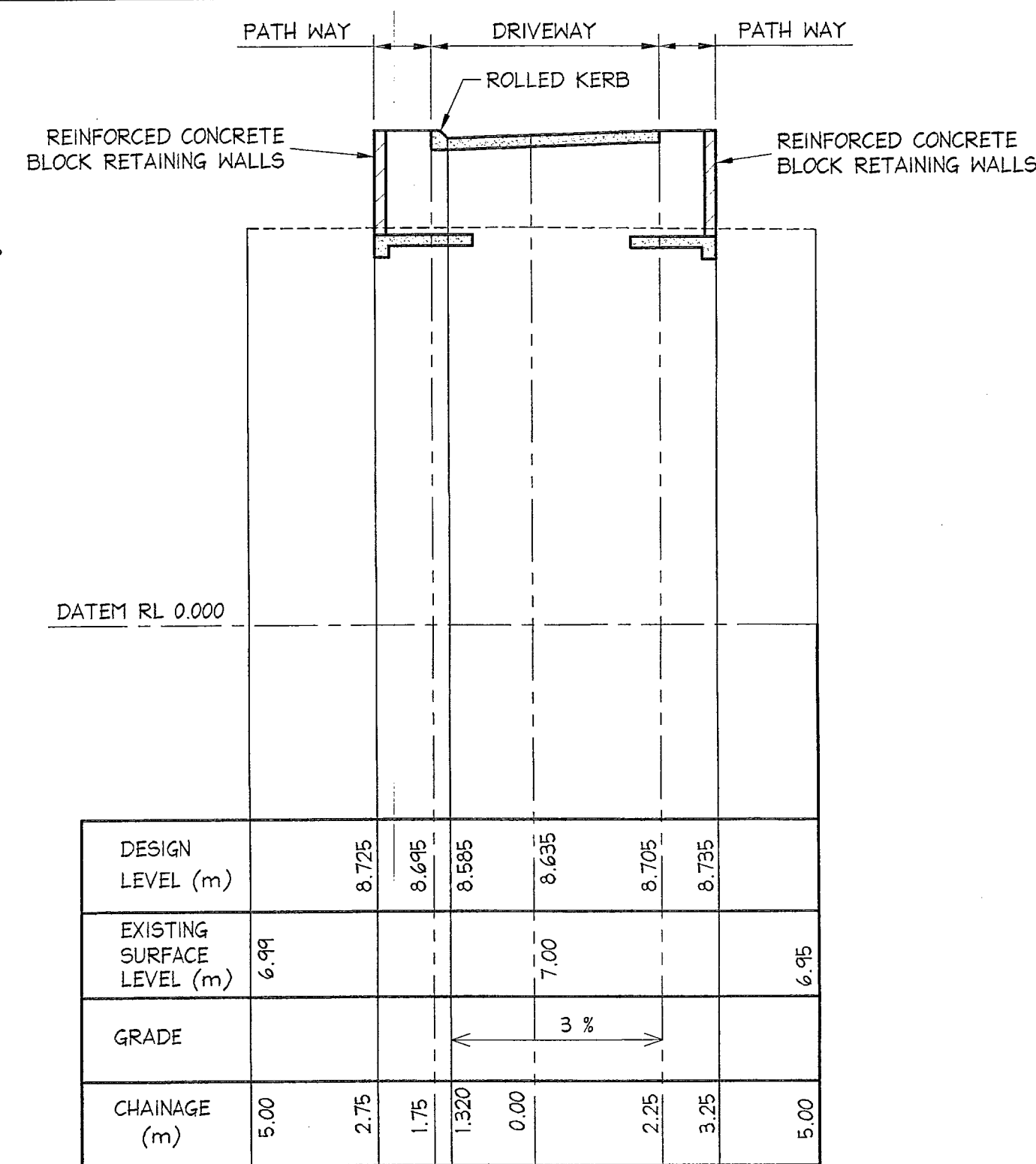
CROSS SECTION CH 29.00

SCALE = 1 : 100



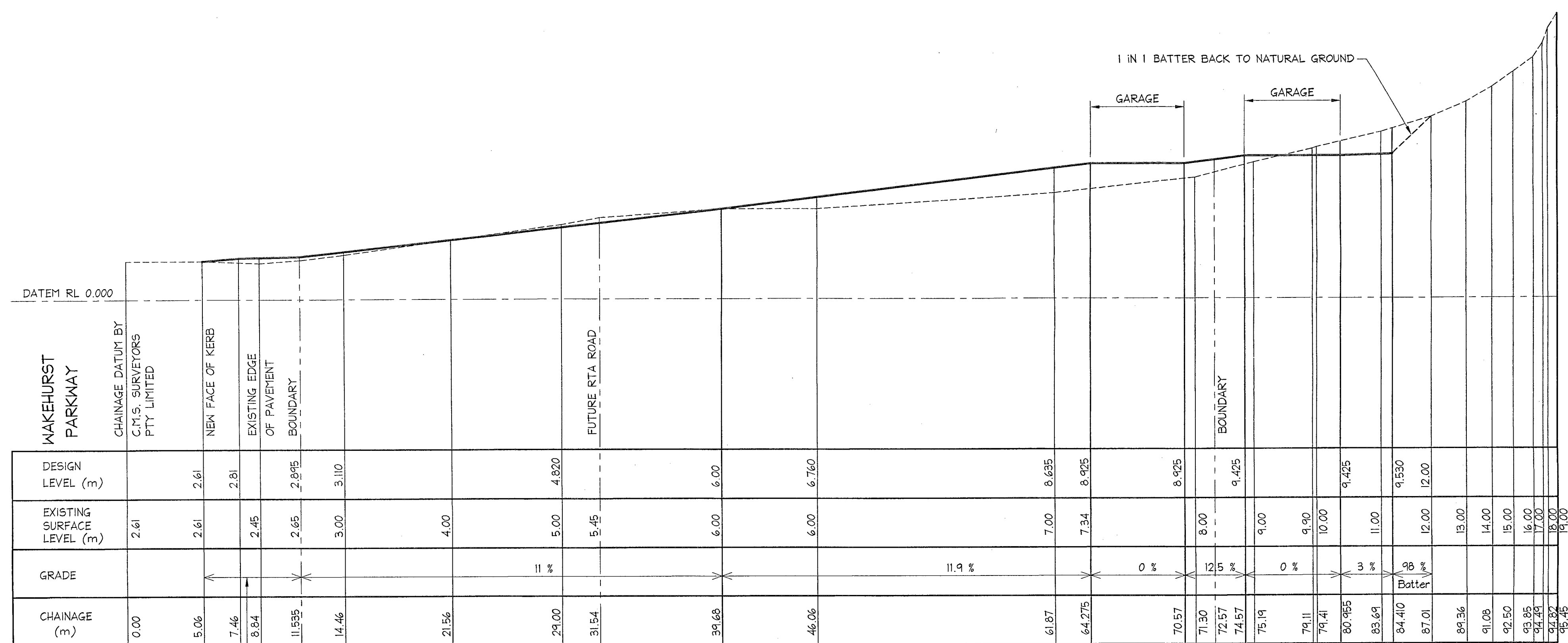
CROSS SECTION CH 46.06

SCALE = 1 : 100



CROSS SECTION CH 61.87

SCALE = 1 : 100



LONGITUDINAL SECTION

SCALE = 1 : 200

ISSUED FOR
CONSTRUCTION
CERTIFICATE
SUBMISSION ONLY

NOTES:

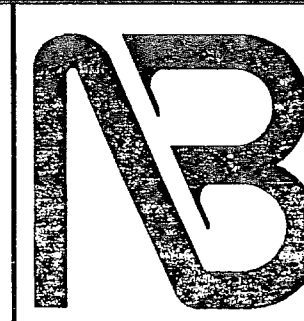
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

AI

DOCUMENT CERTIFICATION

Date: 14/06/06
Lucas Molloy
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 788184
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.



NORTHERN BEACHES
Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 24 076 121 616
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Project:

PROPOSED DEVELOPMENT
at: 104 & 106 Wakehurst Parkway
Elanora
for: Stuart Thor

Drawing Title:

DRIVEWAY LONGITUDINAL
AND CROSS SECTIONS

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Date:
Mar 2006

Design:
L.M.

Drawn:
Paul R Bruce
CMEAEust.

Checked:
RBY

Job No:

051149

Drawing No:

C05

Rev:

-



DIRECTORS

Stewart McGeehan Rick Wray Lucas Molloy

Erosion Sediment Control Design Certificate

Date: 13th April 2006
Builder: Stuart Thor

Job No. 051149
Engineer: LM

Site: 104 and 106 Wakehurst Parkway Elanora

We hereby certify that the plans prepared by NB Consulting Engineers P/L have been designed and detailed in accordance with Condition B29 of the DA approval.

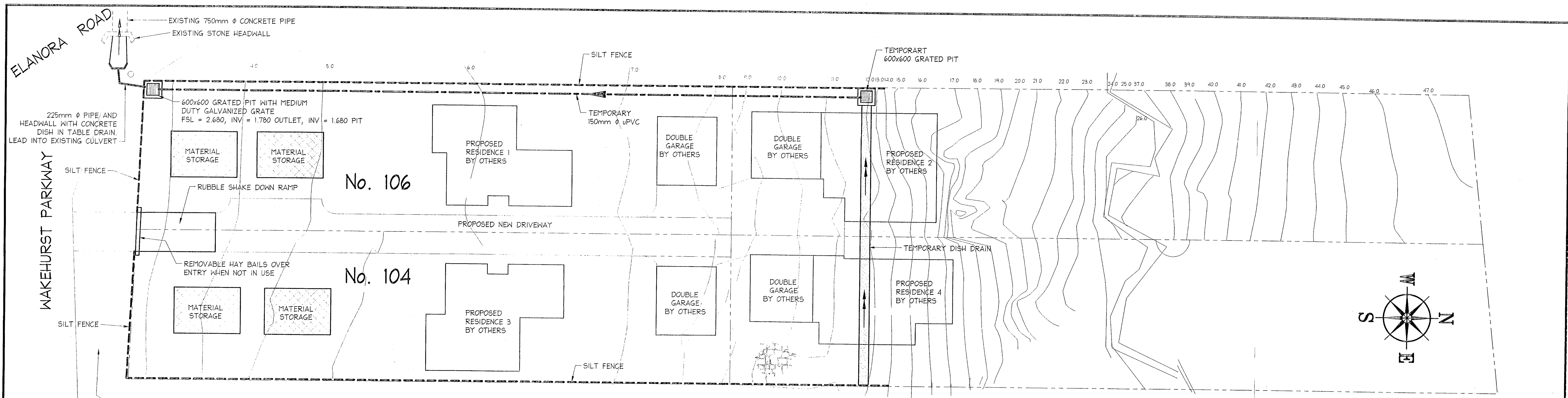
We trust that this certificate meets with your requirements. Please contact the author if further clarification is required.

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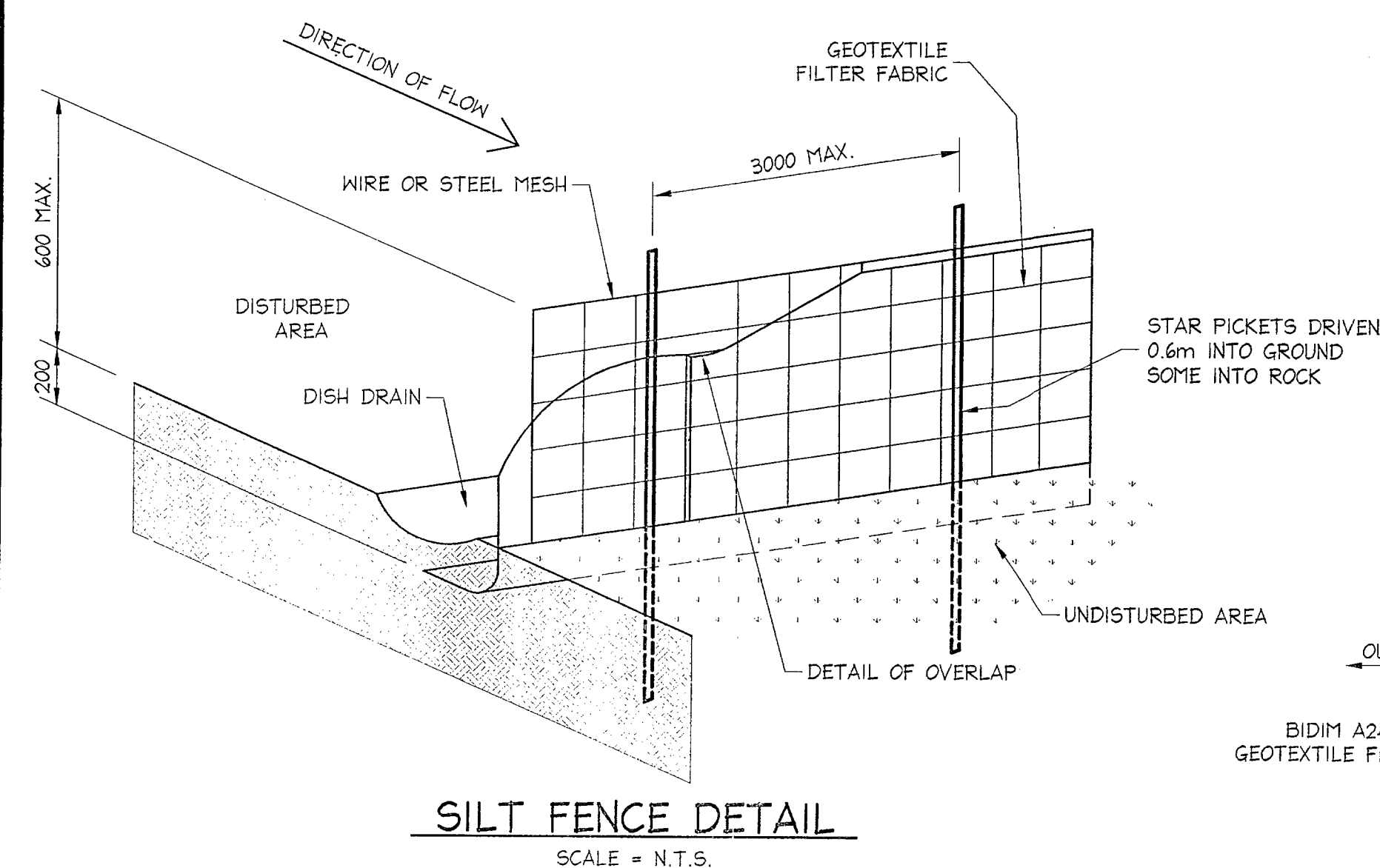
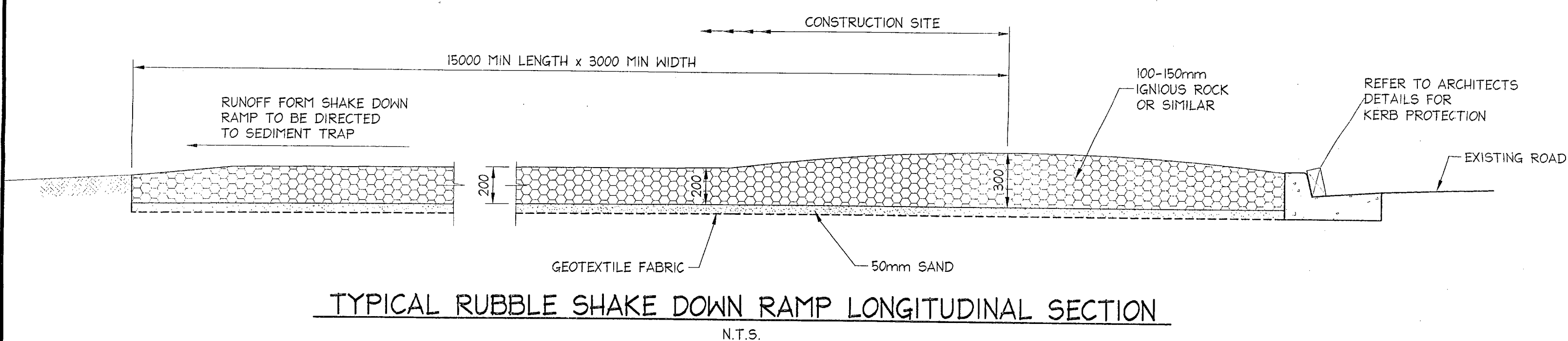
Per Lucas Molloy
BE CPEng NPER Director

NAENG NBC\2005\051149\SC003 Erosion.doc



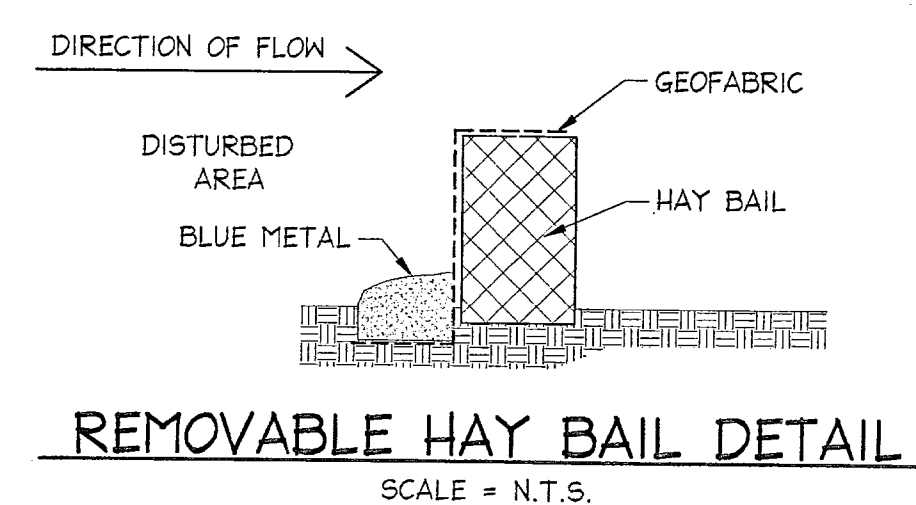
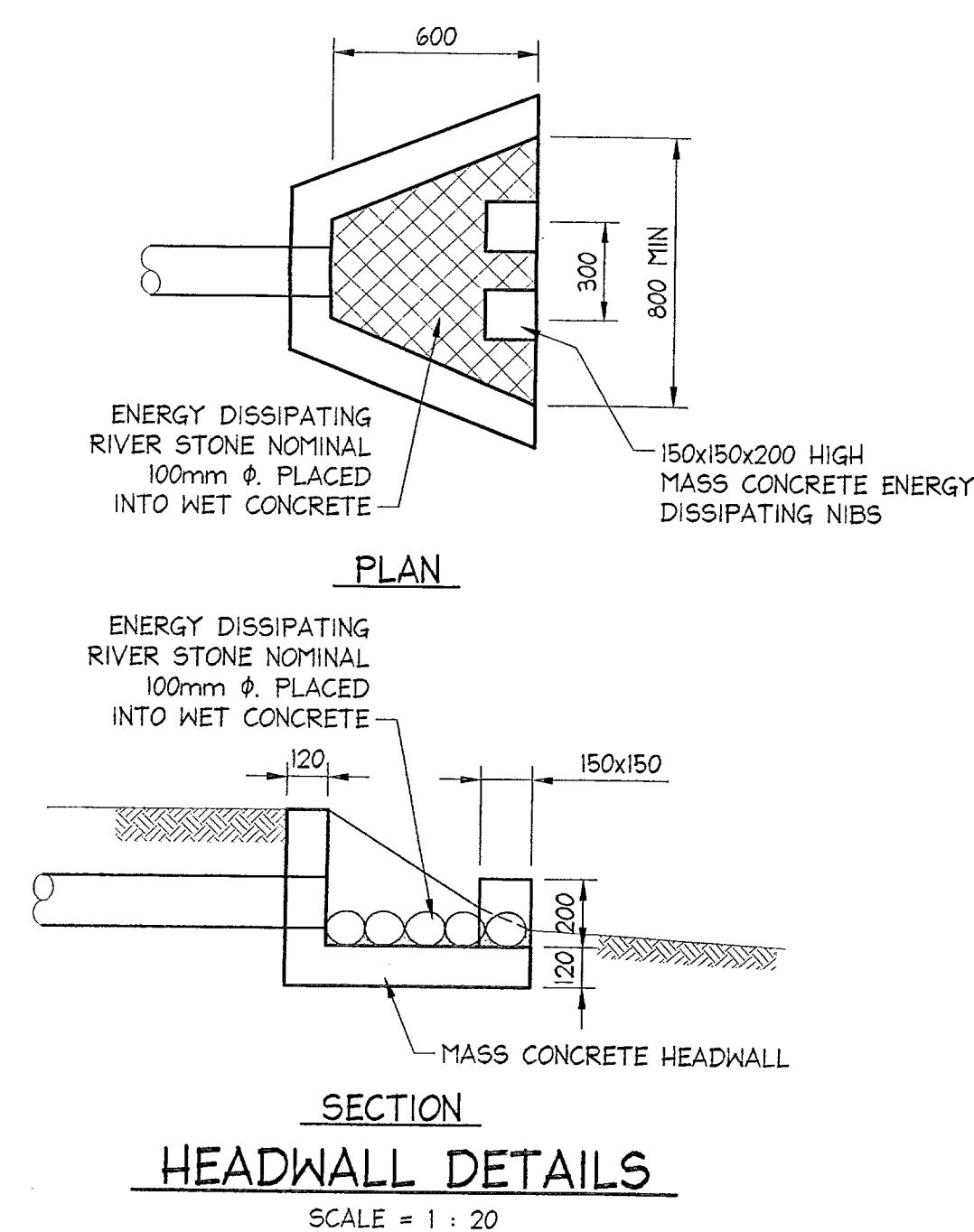
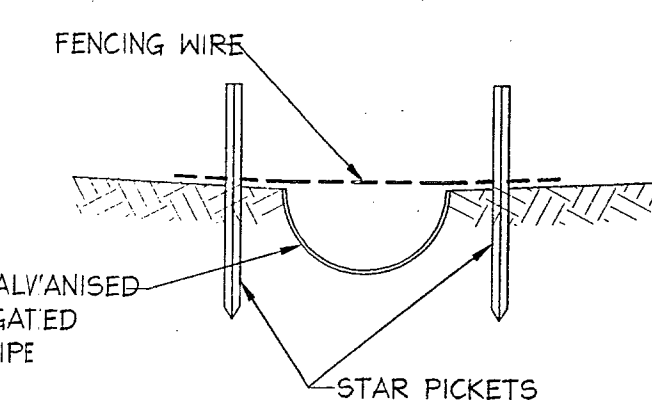
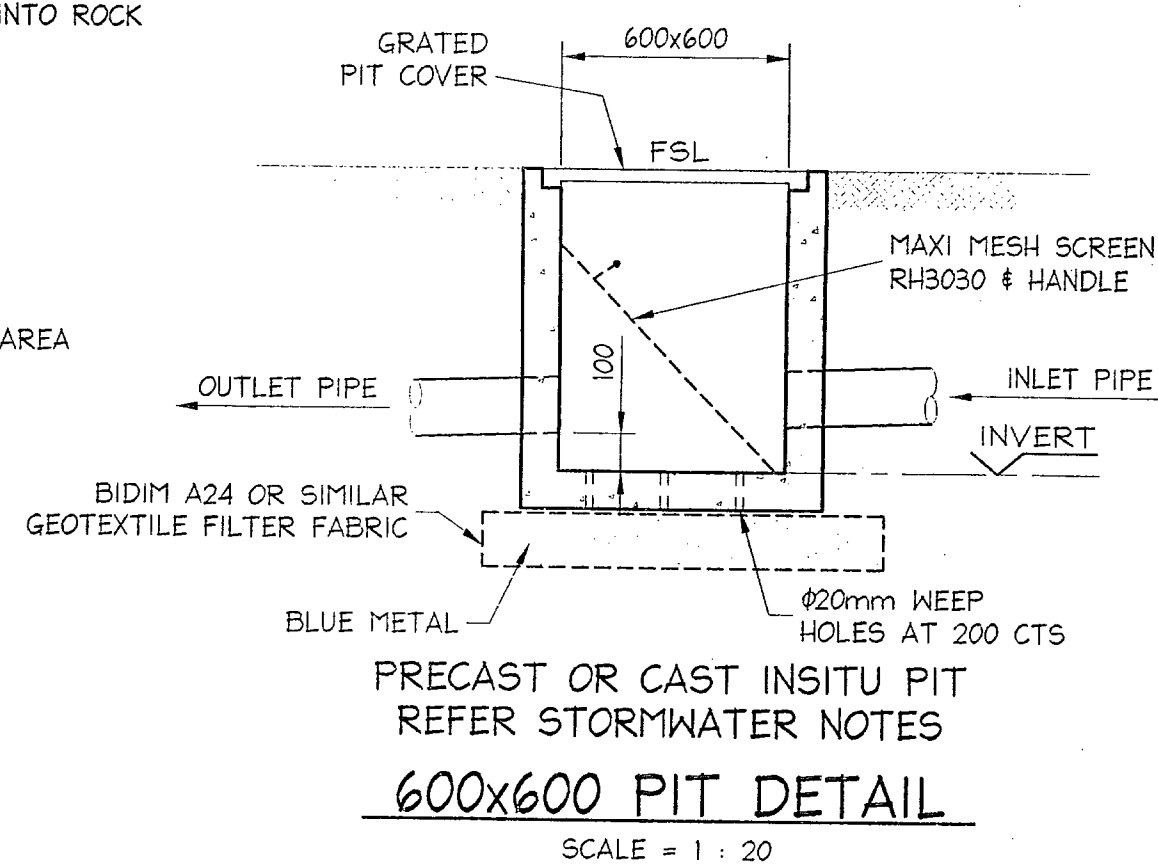
EROSION AND SEDIMENT CONTROL PLAN

SCALE = 1 : 200



SEDIMENT CONTROL:

1. INSTALL SEDIMENT CONTROL STRUCTURES IN LOCATIONS INDICATED ON DRAWINGS AND AS OTHERWISE REQUIRED TO CONTROL SEDIMENT DURING ALL EXCAVATIONS AND WHILST AREAS OF THE SITE ARE EXPOSED TO EROSION.
2. CONTROL STRUCTURES TO BE AS DETAILED OR AS OTHERWISE REQUIRED BY CERTIFYING AUTHORITY.
3. REVIEW CONTROL MEASURES AND MAINTAIN STRUCTURES DURING CONSTRUCTION.
4. IF ADDITIONAL MEASURES ARE REQUIRED FOR EROSION CONTROL OR BY COUNCIL REQUIREMENTS REFER TO "URBAN EROSION AND SEDIMENT CONTROL" GUIDELINES PREPARED BY THE DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT.



STORMWATER NOTES:

- 1 - ALL PIPES TO BE 90mm ϕ UNLESS NOTED OTHERWISE.
- 2 - ALL PIPES TO BE uPVC TO AS 1254-1973 UNLESS NOTED OTHERWISE.
- 3 - ALL PIPES TO BE LAYED AT 1% MINIMUM GRADE UNLESS NOTED OTHERWISE.
- 4 - ALL PIPES SHALL BE LAID ON A 75mm SAND BED, COMPACTED TO 100% S.M.D.D. BELOW PAVEMENTS.
(NO COMPACTION REQUIRED BELOW LANDSCAPING)
COVER TO SURFACE FROM TOP OF PIPE TO BE 300mm MINIMUM.
BACKFILL TO BE ADEQUATELY CONSOLIDATED AROUND PIPES BY METHOD OF RAMMING AND WATERING IN. TRENCHES TO BE FILLED WITH GRANULAR MATERIAL AS SPECIFIED.
- 5 - ALL DOWN PIPES TO BE 90mm ϕ UNLESS NOTED OTHERWISE.
- 6 - DOWN PIPE LOCATIONS ARE INDICATIVE ONLY. LOCATIONS TO BE CONFIRMED WITH ARCHITECT PRIOR TO COMMENCEMENT WITH WORK.
- 7 - PROVIDE CLEANING EYES AT ALL DOWNPIPES.
- 8 - ALL PITS TO BE CAST INSITU OR, IF PRECAST, APPROVED BY ENGINEER.
CAST INSITU PITS TO HAVE 150mm THICK CONCRETE WALLS AND BASE.
WALLS TO BE REINFORCED WITH 1 N12 TOP TIE UNLESS NOTED OTHERWISE.
CAST INSITU PITS GREATER THAN 1000 DEEP TO BE MINIMUM 900x600 AND TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH N12 AT 300 EACH WAY UNLESS NOTED OTHERWISE.
- 9 - ALL PITS GREATER THAN 1000mm DEEP SHALL HAVE STEP IRONS AS PER COUNCIL STANDARDS.
- 10 - ALL WORK TO BE IN ACCORDANCE WITH LOCAL COUNCIL STANDARDS AND SPECIFICATIONS.
- 11 - PRIOR TO COMMENCING ANY SITE WORKS THE CONTRACTOR SHALL IMPLEMENT EROSION CONTROL MEASURES TO EPA GUIDELINES AND COUNCIL SPECIFICATIONS. ALL MEASURES TO REMAIN IN PLACE UNTIL COMPLETION AND STABILIZATION OF THE SITE TO COUNCIL SATISFACTION.
- 12 - ALL LEVELS SHOWN ARE TO AHD
- 13 - ENSURE THAT ALL PITS AND STORMWATER PIPES ARE LOCATED CLEAR FROM TREE ROOT SYSTEMS.
- 14 - ALL EXISTING EARTHENWARE PIPES TO BE UPGRADED TO uPVC.
- 15 - ALL WORKS TO BE IN ACCORDANCE WITH AS 3500-1990 NATIONAL PLUMBING DRAINAGE CODE PART 3 - STORMWATER DRAINAGE.
- 16 - 90mm ϕ x 3000 LONG TAIL OUT SUBSOIL LINE TO BE PROVIDED ON THE UPSTREAM SIDE OF ALL PITS. SUBSOIL LINE TO BE COVERED WITH GEOTEXTILE FILTER SOCK FOR THE FULL LENGTH AND END COVERED.

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: 501.

ISSUED FOR
CONSTRUCTION
CERTIFICATE
SUBMISSION ONLY

<p>AI</p> <p>Date: _____ Rev: _____ Amendment: _____</p>	<p>DOCUMENT CERTIFICATION</p> <p>Date: <u>Mar 06</u></p> <p>Lucas Molloy</p> <p>(Director Northern Beaches Consulting Engineers)</p> <p>I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust., NPER. Institute of Engineers Membership No. 788184 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.</p>	<p>NORTHERN BEACHES Consulting Engineers P/L</p> <p>A.C.N. 078 121 616 A.B.N. 24 078 121 616 Suite 207, 30 FISHER ROAD DEE WHY N.S.W. 2099 Ph: (02) 9984 7000 Fax: (02) 9984 7444 e-mail: nb@nbconsulting.com.au web page: www.nbconsulting.com.au</p>	<p>Project:</p> <p>PROPOSED DEVELOPMENT at: 104 & 106 Wakehurst Parkway Elanora for: Stuart Thor</p>	<p>Drawing Title:</p> <p>EROSION AND SEDIMENT CONTROL PLAN AND DETAILS</p> <p>The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.</p>	<p>Date: <u>Mar 2006</u> Design: <u>L.M.</u> Drawn: <u>Paul R Bruce</u> Checked: <u>RMK</u></p> <p>Job No: <u>051149</u> Drawing No: <u>D01</u> Rev: <u>-</u></p>
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LANDSCAPE ARCHITECT'S CERTIFICATION

PROJECT: Subdivision & Driveway **DATE:** 16 June 2006
104 - 106 Wakehurst Parkway
Elanora Heights

PRINCIPAL: Mr S. Thor

This is to certify that the **Landscape Plan Dwg No. 63.06(05)/051** dated March 2006 has been prepared in accordance with Pittwater Council's Development Control Plan No. 23 – Landscape and Vegetation Management. It has also met the conditions of consent for Development Application No. N0432/04 and specifically Condition No.s B45 & B45a 1, 2, 3, 4, 5, 6 & 12..

Signed: _____

Ian Jackson
Landscape Architect



Landscape Specification

**Proposed Subdivision
104-106 Wakehurst Parkway
Elanora Heights
October 2005**

postal. 25 bent street lindfield nsw 2070 office. 16/303 pacific highway lindfield
phone. 9416 4290 fax. 9416 4735 mobile 0411 196735 email. ija@netspace.net.au acn. 097 328580

LANDSCAPE SPECIFICATION

This Landscape Specification shall cover all work to be accomplished and materials to be used in the landscape works. It is intended that this landscape specification be read in conjunction with the following documentation dated October 2005:

- Landscape Plan Dwg No. 63.05/153

1. GENERAL CONDITIONS

1.1 GENERAL CONDITIONS

Refer to main architectural specification for all general conditions.

1.2 STAGING OF WORKS

Any contractor asked to submit a tender for the landscape works must examine the program for the building works and develop a program to suit.

1.3 DEFECTS LIABILITY & PLANTING ESTABLISHMENT PERIODS

The landscape contractor shall be held responsible for replacement of any work and/or materials which fail during the first twelve (12) months following the date of issue of a final occupation certificate.

This includes the replacement of all failed plants, including any that are damaged or stolen.

Also refer to Maintenance.

Four (4) weeks before final completion an inspection shall be undertaken to ensure all works are in a satisfactory condition. The contractor shall give two (2) weeks notice of the date and time of this meeting. Any defects requiring rectification shall be issued in writing to the contractor.

A final meeting shall be held on the date of final completion and after a satisfactory inspection the project shall be handed over to the client. This shall be confirmed in writing. All retention monies shall be returned to the contractor at this time (refer to main specification).

Also refer to Council's conditions of development consent.

2. LANDSCAPE WORKS

2.1 SITE PREPARATION

Any minor levelling, either cutting or filling, shall be undertaken by the Landscape Contractor so that areas are left ready for final finishes. Adequate watering points shall be provided to enable the Landscape Contractor to maintain planted area throughout construction and the maintenance period. Weeds are to be sprayed with 'Roundup', or equal, to manufacturers directions and must be dead before being disturbed.

2.2 DEMOLITION WORKS

The following items are to be demolished and removed by the landscape contractor:

- Weeds within proposed planting and lawn areas
- Unwanted planting areas

All demolished material is removed from site (unless indicated otherwise below) and disposed of in accordance with waste management requirements. All demolished material shall be deemed the property of the landscape contractor.

2.3 WORKS BY BUILDER (prior to landscape works)

The following work shall be carried out before the commencement of the landscape works by the builder:

- Tree protection measures;
- Existing trees to be removed (unless otherwise stated below);
- All earthmoving and earthworks required to form the ground levels to the profiles and levels shown on the drawings, ie. to the finished levels to allow for pavements, mulching, topsoiling and turfing (unless stated otherwise below);
- Any required drainage works (unless stated otherwise below);
- Stencil concrete paving;
- Concrete steps;
- Masonry retaining works;
- Replacement boundary fencing;
- Internal fencing & gates;
- Concrete ramps;
- Provision of hose cocks for hand watering;
- Construction zone fencing (see 2.4 below); and
- Soil erosion control measures (see 2.5 below).

2.4 CONSTRUCTION ZONE FENCING

Refer to main architectural specification. By builder.

2.5 SOIL AND WATER MANAGEMENT WORKS

Refer to main architectural specification. By builder.

2.6 PROTECTION OF EXISTING TREES

2.6.1 Generally

There are a number of existing trees adjacent to the construction zone to be retained and protected. All existing trees which are shown on Drawings and/or specified to be retained, shall be adequately protected from damage as described hereafter. Also refer to Pittwater Council's Development Consent requirements.

2.6.2 Tree Protection Fencing

All existing trees indicated that are to be retained on the plans are to be protected during construction. Fencing for tree protection to be comprised from 1.8m high chainwire mesh and galv. tube steel frame. Fencing firmly secured four (4) metres from the trunk of each tree (if possible). All care must be taken to avoid damage to existing trees and adequately protected from damage as described hereafter.

2.6.3 Tree roots

During excavation for service or other excavation, tree roots in excess of 50mm diameter shall not be cut. Hand digging and tunnelling shall be carried out wherever necessary to avoid cutting roots and especially under the branch spread of trees. Where necessary tree roots shall be saw cut back to a clean cut and then treated with an approved bitumen emulsion dressing. Trenches dug under the branch spread of trees shall remain open for as short a time as possible. Backfilling shall remain open for as short a time as possible. Backfilling shall be carefully rammed and watered in around the roots to eliminate voids.

2.6.4 Around trees

Disturbance to existing ground levels beneath branch spread, either by compaction, heavy machinery, piling up materials or cutting away soil, shall not take place unless so specified. If ground has been unavoidably compacted by heavy machinery, the soil shall be loosened by tyning.

Construction materials generally, and particularly oil, paints, waste concrete, cleanings or other deleterious materials shall not be stored or dumped under branch spread. Concrete mixers shall be sited in positions where the deposit of wind-blown cement on the trees is reduced to a minimum. No fires shall be lit under the branch spread or where damage to trees could result.

In the event that oil or other harmful material has been spilt under the trees on the sub-grade or topsoil to be retained, the affected soil is to be excavated and the damaged vegetation removed to the approval and under the direction of the Superintendent. Dispose of soil and replace with soil as specified for mass planted areas.

2.6.5 Tree Pruning

All works to be in accordance with AS 4373-1996 Pruning Amenity Trees, modern arboricultural practices and Workcover's Code of Practice: Amenity Tree Industry - 1998.

2.6.6 Damage

The Contractor shall be responsible for damage to or destruction of any new or existing trees, unless such trees are cut or removed as specified or as directed in writing by the Superintendent.

Partial damage to any tree shall be rectified immediately damage occurs at the Contractor's expense, as specified previously and under the direction of the Superintendent.

In the case of total destruction of a tree or trees, damages shall be assessed by the Superintendent and shall be calculated as the amount necessary to replace and establish in that position a similar tree of a similar species from within a radius of 150km.

2.7 DRAINAGE WORKS

In general the mass planted areas are to be build atop existing levels to improve drainage and to deflect water runoff around the site. Due to the sloping nature of the site it is considered that sub-surface drains are not be required to drain the mass planted areas and lawns.

If the contractor considers that certain other areas require drainage then the Superintendent should be immediately notified for an inspection. Set out below are the requirements for any drainage works.

2.7.1 Materials

Agricultural drains to be 100mm flexible coil & filter sock.

Aggregate to be 10-20mm blue metal.

Connections to be 100mm black polyethylene stormwater pipe.

2.7.2 Installation

Install agricultural drains with a maximum 1:60 gradient and backfill trenches with a minimum 200mm layer of aggregate. Connect into the stormwater system for the buildings.

2.8 MASONRY WALLS

Refer to details by architect and engineer. To be constructed by main building contractor.

2.9 SANDSTONE WALLS

Refer to details by architect and engineer. To be constructed by main building contractor.

2.10 CONCRETE PAVING & STEPS

Refer to details by architect and engineer. To be constructed by main building contractor.

2.11 EXISTING PLANTING TO BE RELOCATED

2.11.1 Generally

The existing commemorative garden is to be relocated to accommodate the proposed covered outdoor area. A number of existing plants are to be removed and temporarily stored for re-use in the finished landscape works. The existing and proposed locations are indicated on the Landscape Plan. This work is to be accomplished by a qualified arborist and in general terms is to:

- Prune roots in a 600mm diameter x 600mm deep 4 - 6 weeks before transplanting and treat area with a suitable hormone powder to encourage regrowth of roots
- Excavate a hole for each palm 2 times the size of the root ball and backfill with a premium quality imported soil mix.
- Transplant on a day not exceeding max. 25 degrees
- Apply a liquid fertiliser and keep well watered for three months
- Stake with 3 x star pickets and rope for each palm. Where ropes are secured to trunk enclose in hessian to prevent bruising or rubbing.

2.12 SANDSTONE BOULDER WALLS

2.12.1 Materials

Stone to be ripped sandstone pieces with 'flattish' tops and bottoms for stability and suitable for sitting upon. It should also be hard and durable.

Some pieces to be a minimum 2 tonne (as drawn on plan) to give the landscape works a sense of scale to relate to the large open surrounding area.

2.12.2 Installation

Install bottom course of boulders on existing excavated ground with a minimum 1/3 of each rock below finished ground levels for stability. Backfill between and behind boulders with crushed sandstone. Stack boulders in a stretcher bond pattern (with each rock overlapping the two below) until desired heights are achieved (maximum 1m high). Boulders are to be machine-placed.

Refer to engineer's details for maximum batter allowances and any special drainage or backfilling requirements.

The Superintendent (or representative) is to be on site during the placement of all boulders.

2.13 PLANTING PREPARATION

2.13.1 Materials

Imported soil mix to be Organic Garden Mix from Australian Native Landscapes or equal. Samples to be shown to Superintendent for approval before installation. Also provide written breakdown of contents, pH and trace elements and suitability for improving existing soil. Soil mix to comply with AS 3743-2003: Potting mixes, AS 4419-2003: Soils for landscaping and garden use & AS 4454-2003: Composts, soil conditioners and mulches.

2.13.2 Installation

Destroy existing grass and weeds (refer above). Excavate to a minimum 350mm below finished levels. Deep rip existing base to a depth of 300mm (avoid existing tree roots) and apply Gypsum at a rate as recommended by the supplier (if required). Install imported soil mix to a depth of 300mm and cultivate into the top 300mm of existing soil to ensure the materials integrate.

2.14 PLANTS AND PLANTING METHODS

2.14.1 Materials

Trees and plants shall be true to name and variety. Substitutes in size or variety shall not be made without the approval. All plants shall be true to size, in well developed healthy condition, free from insect and diseases, with well established root systems.

Samples of each species to be shown to Superintendent prior to installation.

Water crystals to be Garden King Wettasoil Granular deep watering agent from Amgrow or equal product.

2.14.2 Installation

The contractor is to rigidly observe planting positions as shown on plan and planting shall not be carried out in dry soil or in extreme weather conditions.

The root system must be moist before planting to ensure the turgidity. The plants shall be removed from their containers with as little disturbance as possible to the root system. Plants should be planted at the same depth as the plants were in the containers and allow for a shallow saucer of soil to be formed around the plant to aid penetration of water.

Avoid hilling up of top soil around young plant stems. Firm soil around the root ball and thoroughly soak the areas after planting. On completion, cultivate, rake and leave all garden areas in a neat and tidy condition.

Fertilise with an approved 9 months formulation general purpose slow release fertiliser such as "Nutricote" or "Osmocote" that is mixed into the prepared planting space just prior to planting. Fertiliser to be applied at the rate as specified by the manufacturer for the plant size and type. Also apply water crystals around each plant (dug into the soil) in accordance with supplier's recommendations.

Labels shall be removed entirely from the plants. Stake according to the Schedule of Plant Material with 50 x 50 x 1 800mm long hardwood stakes and hessian ties. Stakes to be located outside the rootball of the nominated plant.

Maintain all plants and ties and provide adequate watering for the duration of contract.

2.15 MULCHING

2.15.1 Materials

Mulch to be comprised of maximum 25mm fresh hardwood chips such as Eucalyptus Mulch from Australian Native Landscapes or equal. Samples to be shown to Superintendent for approval before installation. Mulch to comply with AS 4454-2003: Composts, soil conditioners and mulches.

2.15.2 Installation

Mulch shall be applied to all disturbed areas where bare earth is exposed indicated on plan. Following planting, rake all garden areas and tamp lightly to give an even graded surface. Spread 75mm layer of leaf chip mulch over the surface of all new garden beds.

Care shall be taken not to mix soil and mulch together.

2.16 PRACTICAL COMPLETION

Sweep down, clean up and remove all waste landscape material from the site. Hose down paved areas, fences, footpaths, etc. Check plant ties and replace plants which fail. Regularly water and maintain landscaped areas for a six month period from completion to ensure establishment.

2.17 MAINTENANCE

To ensure the rapid establishment and long term success of the landscape works the contractor shall undertake a twelve month maintenance period after Practical Completion. During this time the contractor shall be responsible for the replacement of any failed plants or other materials.

The following general maintenance tasks shall also be undertaken:

- Hand watering of plants on a regular basis equating to four times per week for the first month and two times per week for the next two months (depending on weather conditions & subject to water restrictions).
- Checking of plants, stakes and ties every month
- Spraying of weeds every month
- Replacement of failed plants every three months
- Pruning plants (where applicable) every three months
- Topping up of mulch at the end of six months and at the end of twelve months to maintain a 100mm cover
- Re-application of water crystals around plants after six months and after twelve months
- Analysing soil after twelve months and applying fertiliser in accordance with the recommendations of the soil analysis

Install 600-800mm high sandstone wall with 1m garden strip between wall and front boundary.

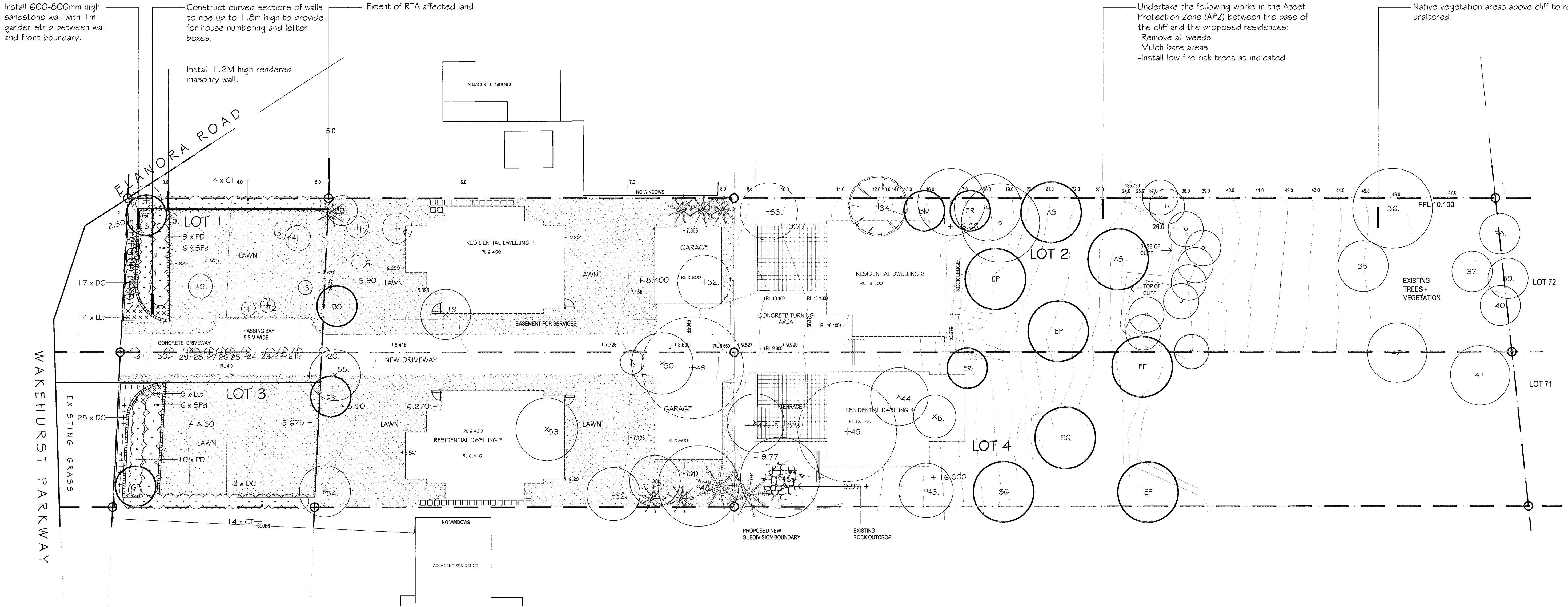
Construct curved sections of walls to rise up to 1.8m high to provide for house numbering and letter boxes.

Extent of RTA affected land

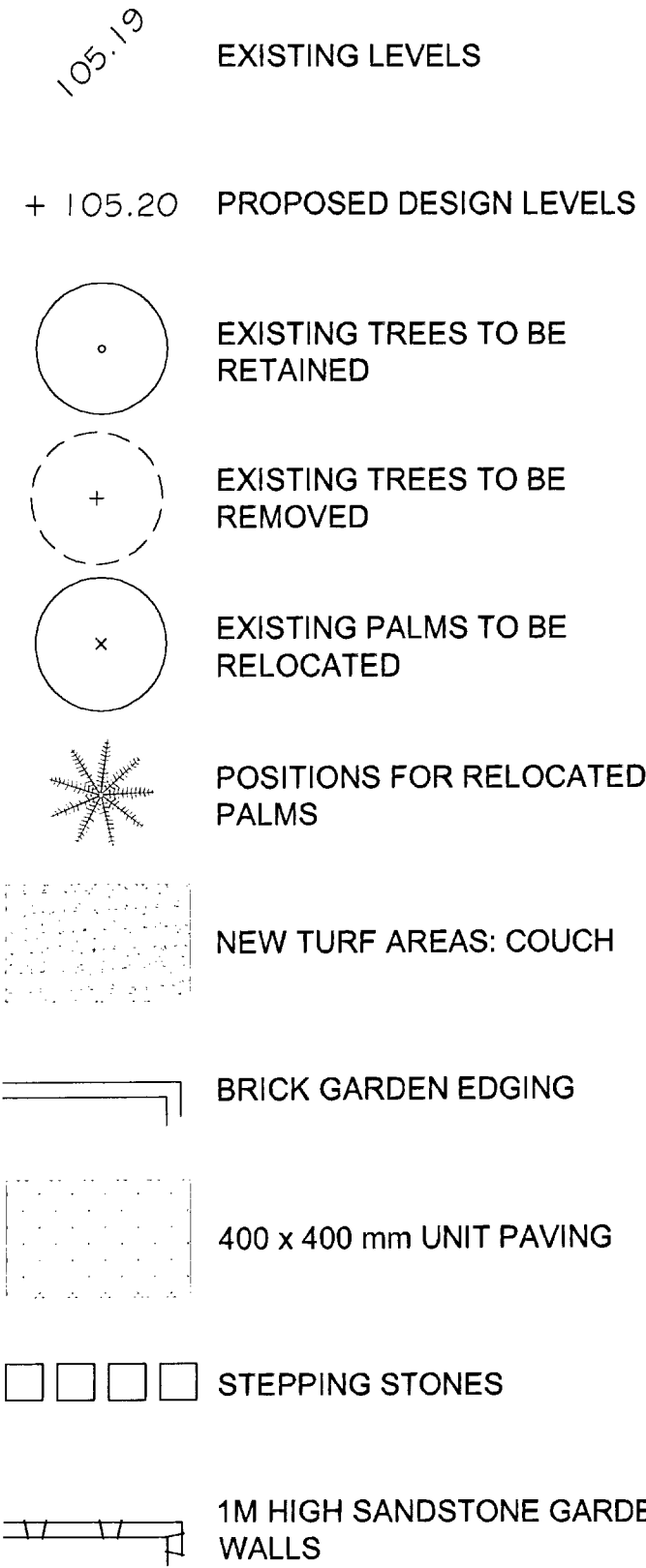
Install 1.2M high rendered masonry wall.

Undertake the following works in the Asset Protection Zone (APZ) between the base of the cliff and the proposed residences:
-Remove all weeds
-Mulch bare areas
-Install low fire risk trees as indicated

Native vegetation areas above cliff to remain unaltered.



LEGEND



SCHEDULE OF PLANT MATERIAL

CODE	BOTANICAL NAME	COMMON NAME	QUANTITY	HEIGHT	POT SIZE	STAKES
AS	Acmena smithii #	Lillypilly	2	13m	5 litre	2
BM	Backhousia myrtifolia *	Grey Myrtle	1	7m	25 litre	-
BS	Banksia serrata *	Old Man Banksia	1	3m	5 litre	-
CT	Clerodendrum tomentosum	Hairy Clerodendrum	28	2m	5 litre	-
DC	Dianella caerulea	Blue Flax-Lily	42	0.4m	140mm pot	-
EP	Eucalyptus punctata #	Grey Gum	4	25m	25 litre	2
ER	Elaeocarpus reticulatus *	Blueberry Ash	3	5m	25 litre	2
GF	Glochidion ferdinandii *	Cheese Tree	2	5m	25 litre	-
LLt	Lomandra longifolia 'Tanika'	Lomandra Tanika	23	0.4m	140mm pot	-
PD	Pultenaea daphnoides	Large-leaf Bush-pea	19	1.5m	5 litre	-
SG	Syncarpia glomulifera #	Turpentine	2	25m	25 litre	2
SPd	Syzygium paniculatum Dwarf	Dwarf Scrub Cherry	12	3m	5 litre	-

The majority of the plants in this schedule have been selected from Pittwater Council's list of indigenous plants for Lowlands and Shale Slopes (Closed Forest).

8 Canopy Trees to gain a mature height of 13m or above in accordance with Pittwater Council's guidelines.
* 7 Small trees as discussed with Council's Landscape Officer.

SCHEDULE OF EXISTING TREES

KEY	BOTANICAL NAME	COMMON NAME	HEIGHT X SPREAD
1-8.	Row of Euonymus & Callistemon	Euonymus, Bottlebrush	1 x 1m
9.	Morus indica	Mulberry Tree	8 x 6m
10.	Callistemon sp.	Bottlebrush	3 x 2m
11-13.	Camellia sp.	Camellia	4 x 2m
14.	Prunus x domestica	Plum	3 x 4m
15.	Citrus paradisi	Grapefruit	3 x 4m
16.	Citrus sinensis	Orange	3 x 4m
17.	Citrus sinensis	Orange	3 x 4m
18.	Citrus sinensis	Orange	2 x 2m
19.	Palm sp.	Palm	6 x 4m
20-24.	Camellia sp.	Camellia	3 x 2m
25.	Palm sp.	Palm	3 x 2m
26.	Camellia sp.	Camellia	3 x 2m
27.	Camellia sp.	Camellia	3 x 2m
28.	Hibiscus sp.	Hibiscus	3 x 2m
29.	Rhododendron sp.	Azalea	3 x 2m
30.	Camellia sp.	Camellia	3 x 2m
31.	Acmena smithii	Lilly Pilly	3 x 2m
32.	Citrus reticulata	Mandarin Tree	8 x 5m
33.	Prunus x domestica	Plum Tree	8 x 5m
34.	Morus indica	Mulberry Tree	6 x 6m
35.	Eucalyptus sp.	Gum Tree	5 x 5m
36.	Eucalyptus sp.	Gum Tree	10 x 8m
37.	Eucalyptus sp.	Gum Tree	7 x 4m
38.	Eucalyptus sp.	Gum Tree	7 x 4m
39.	Eucalyptus sp.	Gum Tree	6 x 4m
40.	Eucalyptus sp.	Gum Tree	6 x 4m
41.	Eucalyptus sp.	Gum Tree	7 x 6m
42.	Eucalyptus sp.	Gum Tree	6 x 6m
43.	Eucalyptus sp. #	Gum Tree	15 x 10m
44.	Palm sp.	Palm	15 x 5m
45.	Araucaria heterophylla	Norfolk Island Palm	25 x 10m
46.	Eucalyptus sp.	Gum Tree	7 x 8m
47.	Palm sp.	Palm	7 x 6m
48.	Palm sp.	Palm	7 x 8m
49.	Acmena smithii	Lilly Pilly	15 x 10m
50-55.	Palm sp.	Palm	3 x 2m
A.	Palm sp.	Palm	5 x 2m
B.	Palm sp.	Palm	5 x 2m

The Schedule of Existing Trees was prepared by Eclipse Landscapes.

NOTES

This plan is to be read in conjunction with all the documentation prepared by C.M.S Surveyors Pty Limited.

Also refer to the Landscape Specification.



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project
Proposed Subdivision
104-106 Wakehurst Parkway,
Elanora Heights

drawing
Landscape Plan

client
Mr Stuart Thor

date
March 2006
job.dwg no.
63.06 (05)/051
designed by
IJ
scale
1:200 @ A1
1:400 @ A3
no. in set
ONE/ONE
drawn by
CS



Jeffery and Katauskas Pty Ltd

CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

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E H FLETCHER BSc (Eng) ME

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F A VEGA BSc(Eng) GDE
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GLADESVILLE

NSW 2111

Tel: 02-9809 7322

02-9807 0200

Fax: 02-9809 7626

10 April 2006

Ref: 18498ZRlet2

Mr Stuart Thor
106 Wakehurst Parkway
NARRABEEN NSW 2101

Dear Stuart

REVIEW OF STRUCTURAL DRAWINGS

104 - 106 WAKEHURST PARKWAY, NARRABEEN

At your request, we have reviewed the supplied structural drawings (Job No. 051149, Drg. Ref. SO1, CO1 to CO8, inclusive and DO1, dated March 2006) prepared by Northern Beaches Consulting Engineers Pty Ltd, for the above site. However, we have not carried out a check of any aspects of the structural design.

We have provided additional hand written notes on the supplied drawings as underlined in red. With the inclusion of the additional notes, we consider that the supplied structural drawings have been completed in accordance with the recommendations presented in our geotechnical report (Ref. 18498ZRrpt) dated 9 June 2004.

Should you require any further information regarding the above please do not hesitate to contact the undersigned.

Yours faithfully

Paul Roberts
Senior Engineering Geologist
For and on behalf of
JEFFERY AND KATAUSKAS PTY LTD




ENVIRONMENTAL INVESTIGATION SERVICES, FOUNDATION AND SLOPE STABILITY INVESTIGATIONS, ENGINEERING GEOLOGY, PAVEMENT DESIGN, EXPERT WITNESS REPORTS, DRILLING SERVICES, EARTHWORKS COMPACTION CONTROL, MATERIALS TESTING, ASPHALTIC CONCRETE TESTING, QA AND QC TESTING, AUDITING AND CERTIFICATION. N.A.T.A. REGISTERED LABORATORIES



This drawing has been assessed for compliance with recommendations in our geotechnical report
Ref: 184982 related 7/6/07
No design calculations have been carried out unless noted otherwise. Compliance with the contractual documents and all dimensions are the responsibility of the Contractor.

☐ Approved
☒ Approved with Amendments shown underlined in red
☐ Not Approved - Amend and Resubmit


Signed by Paul Roberts
Date 10/4/06 Job Ref 184982R
For and on behalf of
JEFFERY AND KATAUSKAS PTY LTD 

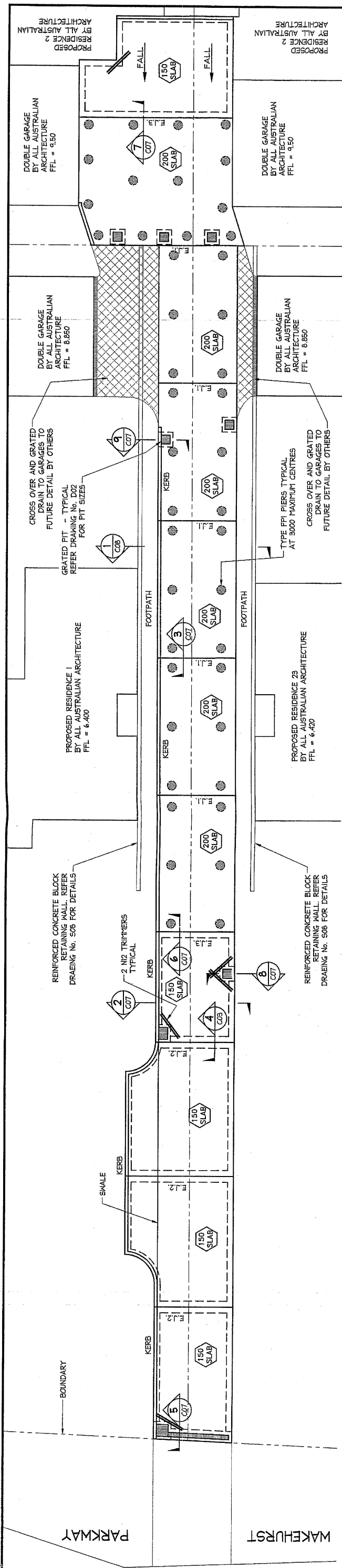
This drawing has been assessed for compliance with recommendations in our geotechnical report Ref. 18498 Revised 9/6/04

No design calculations have been carried out unless noted otherwise. Compliance with the contractual documents and all dimensions are the responsibility of the Contractor.

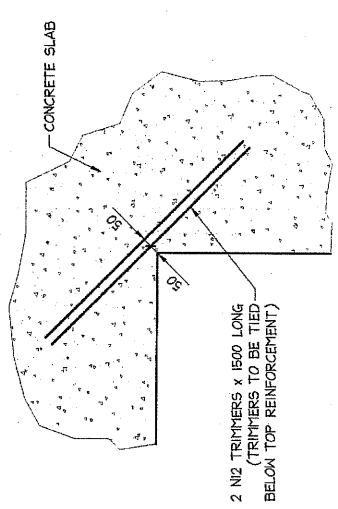
☐ Approved
☒ Approved with Amendments shown underlined in red
☐ Not Approved - Amend and Resubmit

Signed by Paul Roberts
Date 10/4/06 Job Ref 18498ZR
For and on behalf of
JEFFERY AND KATAUSKAS PTY LTD





150mm THICK SLAB ON GRADE
TO BE REINFORCED WITH SL92 TOP
200mm THICK SUSPENDED SLAB ON LOOSE FORM FILL TO BE
REINFORCED WITH N12 AT 200 EACH WAY TOP AND BOTTOM
DRIVEWAY SLAB PLAN
SCALE = 1 : 100

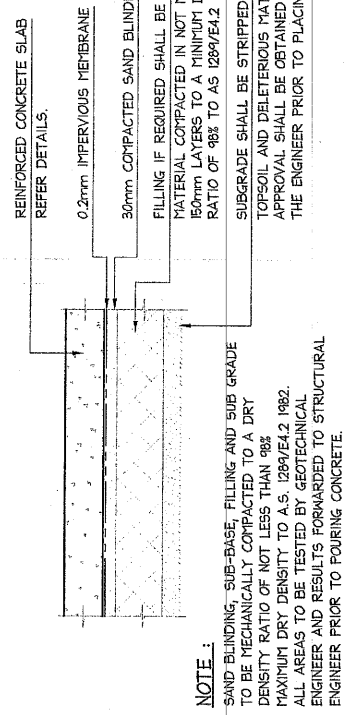
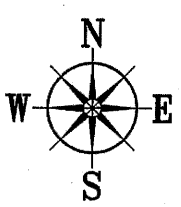


TYPICAL TRIMMER DETAIL
SCALE = 1 : 20

NOTE:
CONCRETE STRENGTH:
EXTERNAL SLABS:
f_c = 40 MPa, COVER = 45 mm

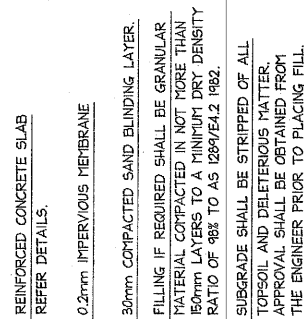
NOTE: JOINT SEALANT
USE THORFLEX 600 POURING OR GUN GRADE SEALANT
BY PATENTED TECHNOLOGIES OR APPROVED EQUIVALENT.
THORFLEX 600 POURING GRADE IS SUITABLE ONLY FOR
VERTICAL JOINTS WITH SOUND BACKING. FOR INCLINED OR
HORIZONTAL JOINTS THORFLEX 600 GUN GRADE SHOULD BE
USED. BOTH GRADES OF THORFLEX 600 SHALL BE INSTALLED
OVER A FOAM BACKING ROD AND USED IN STRICT
ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.

LEGEND: 200 SLAB
DIRECTION OF BARS
LAID 1st AND LAST
DIRECTION OF BARS
LAID 2nd AND 3rd



TYPICAL SLAB PREPARATION TYPE A
SLAB ON GRADE
N.T.S.

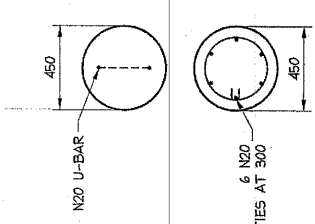
NOTE:
SAND BLINDING, SUB-BASE, FILLING AND SUB GRADE
TO BE MECHANICALLY COMPACTED TO A DRY
DENSITY RATIO OF NOT LESS THAN 98%
MAXIMUM DRY DENSITY TO A.S. 1299/EA2 1982.
ALL AREAS TO BE TESTED BY GEOTECHNICAL
ENGINEER AND RESULTS FORWARDED TO STRUCTURAL
ENGINEER PRIOR TO POURING CONCRETE.



TYPICAL SLAB PREPARATION TYPE B
SUSPENDED SLAB ON LOOSE FORM FILL
N.T.S.

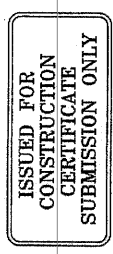
REINFORCED CONCRETE SLAB
REFER DETAILS.
0.2mm IMPERVIOUS MEMBRANE
30mm SAND BLINDING LAYER.
LOOSE FORM FILL MATERIAL SHALL BE
FREE OF ALL DELETERIOUS MATTER.
SUB GRADE SHALL BE STRIPPED OF ALL
TOPSOIL AND DELETERIOUS MATTER.

CONCRETE PIERS:
1. PIERS TO BE 450mm DIAMETER
FOUNDED IN SOUND ROCK
2. FOR DEPTH LESS THAN 1200mm
1 N20 U-BAR
3. FOR DEPTH GREATER THAN 1200mm
6 N20, R10 TIES AT 300.



TYPICAL 'FPI' FOOTING PIER SECTION
SCALE = 1 : 20

NOTE:
FOR DETAILS OF CROSS FALL
AND LEVELS OF DRIVEWAY
REFER TO DRAWING
No's. C04 & C05.



NOTES:
1. ALL DIMENSIONS TO BE VERIFIED
ON SITE BY BUILDER BEFORE
COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND
DRAWING SCHEDULE REFER
TO DRAWING NUMBER: S01.

Project: PROPOSED DEVELOPMENT at: 104 & 106 Wakehurst Parkway Elanora for: Stuart Thor		Drawing Title: DRIVEWAY SLAB PLAN AND DETAILS		Date: Mar 2006	Design: L.M.	Drawn: Paul R Bruce CHIEF/Asst.	Checked: RJK
Date:	Rev:	Amendment:	Rev:	Job No: 051149	Drawing No: C06	Rev: -	
I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil) CPBEng, NIEAust, NPER Institute of Engineers Membership No. 788184 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards. Date: Mar 06 Lucas Molloy (Director Northern Beaches Consulting Engineers)							
NORTHERN BEACHES Consulting Engineers P/L ACN 008 121 616 ABN 24 079 121 616 Suite 207, 30 FISHER ROAD DEE WHY NSW 2089 Ph: (02) 9894 7000 Fax: (02) 9894 7444 e-mail: nbc@northernbeaches.com.au web page: www.northernbeaches.com.au							
The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L							

This drawing has been assessed for compliance with recommendations in our geotechnical report
Ref: 184982 updated 9/6/04

No design calculations have been carried out unless noted otherwise. Compliance with the contractual documents and all dimensions are the responsibility of the Contractor.

- ☒ Approved
☐ Approved with Amendments shown
☐ Not Approved - Amend and Resubmit

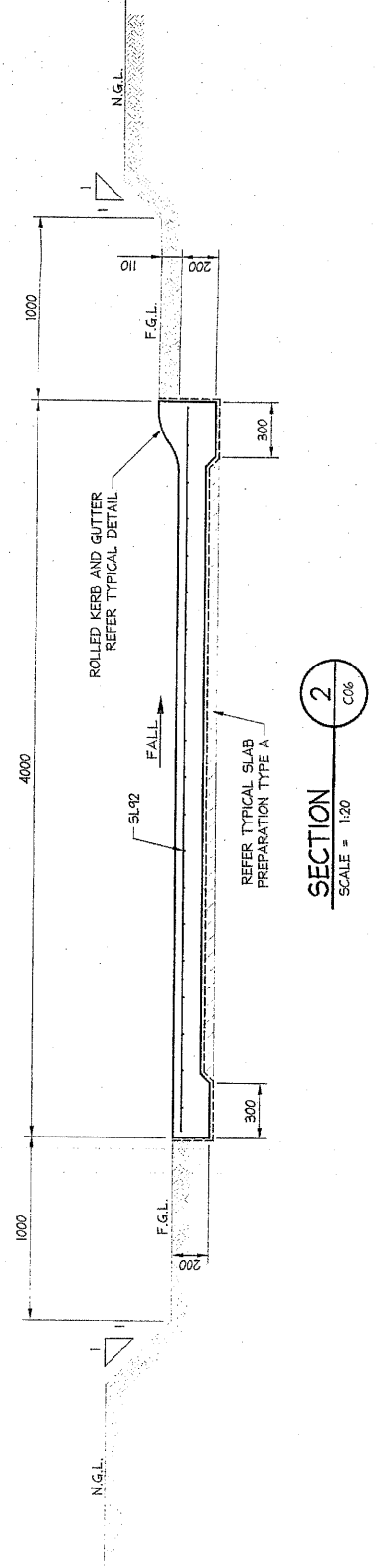
Signed by Paul Roberts

Date 10/1/06 Job Ref 184982R

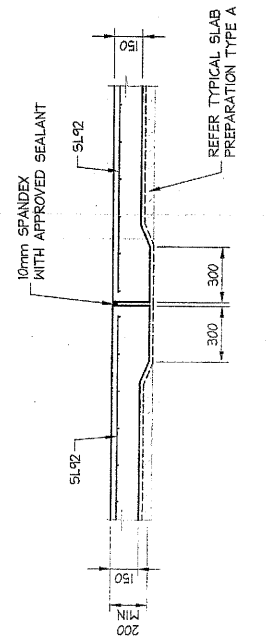
For and on behalf of

JEFFERY AND KATAUSKAS PTY LTD

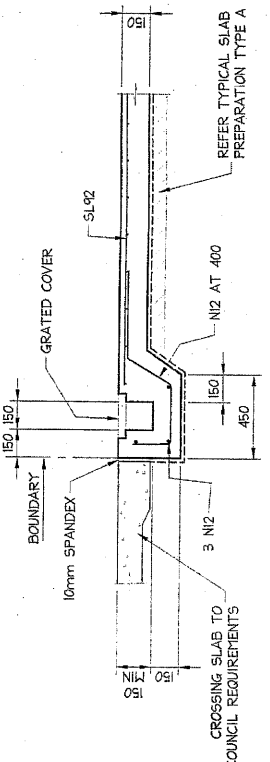




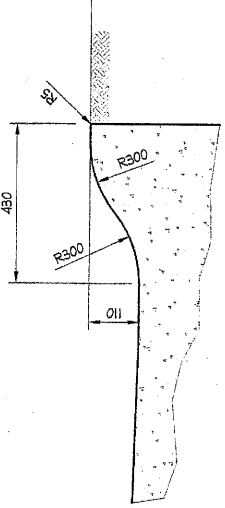
SECTION 2
SCALE = 1:20
C06



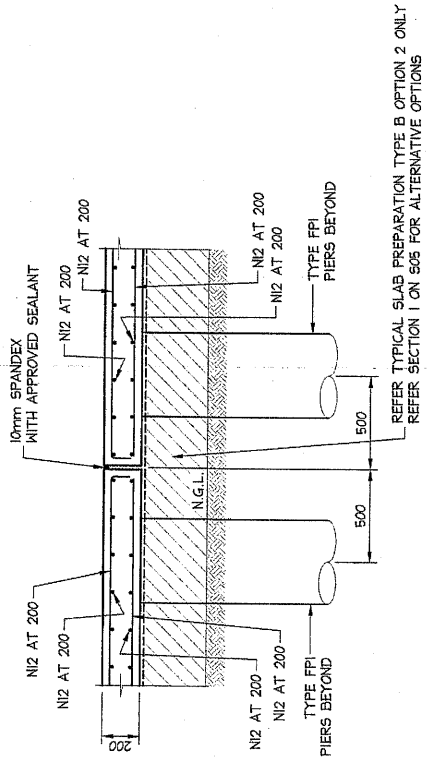
SECTION 4
SCALE = 1:20
C06



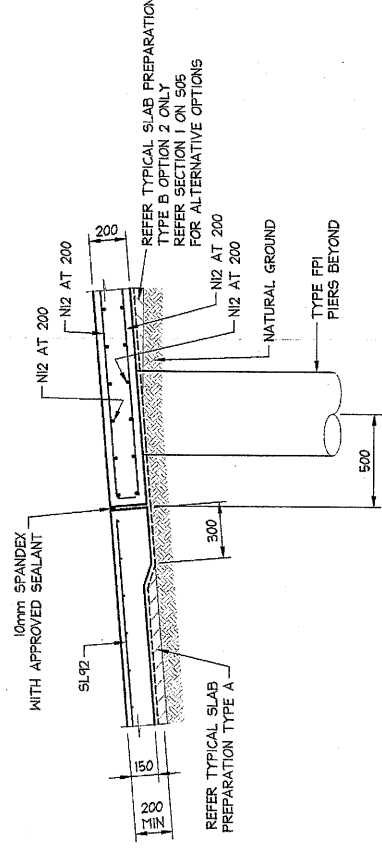
SECTION 5
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C06



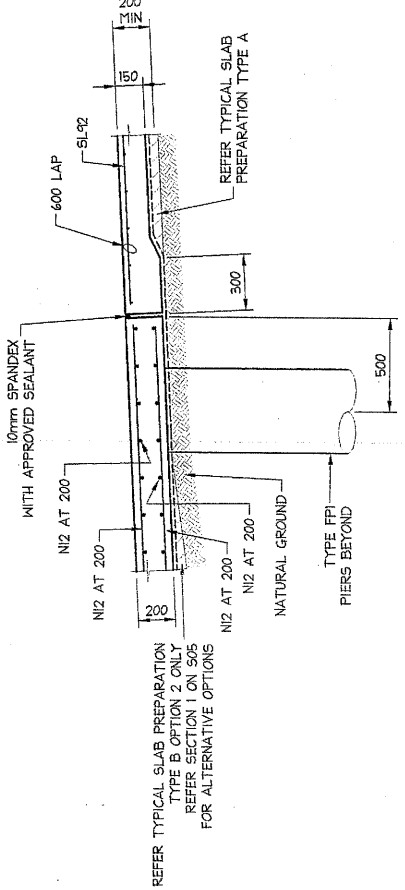
SECTION 6
SCALE = 1:20
C06



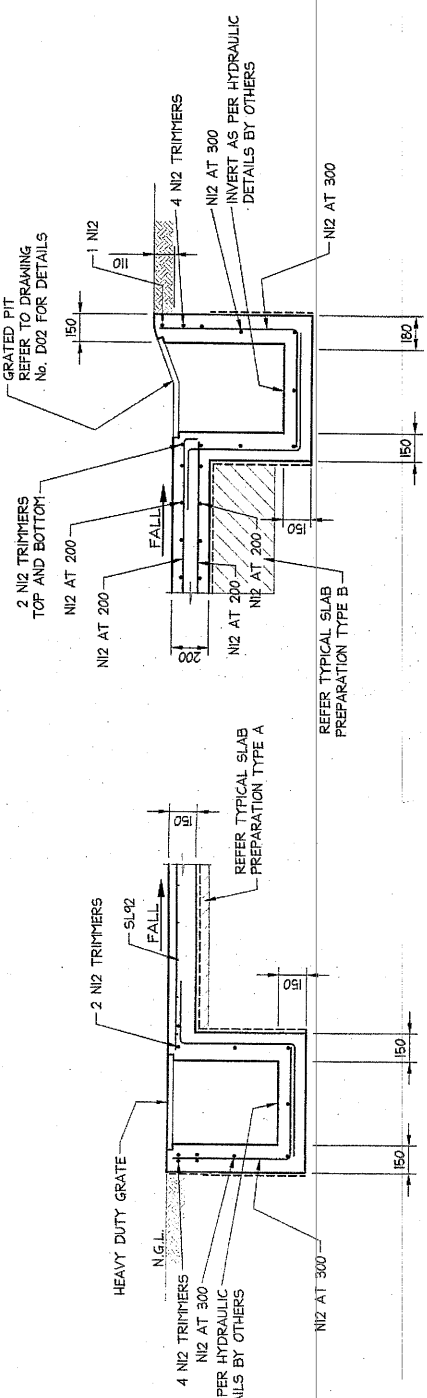
SECTION 3
SCALE = 1:20
C06



SECTION 6
SCALE = 1:20
C06



SECTION 7
SCALE = 1:20
C06



SECTION 8
SCALE = 1:20
C06

SECTION 9
SCALE = 1:20
C06

NOTE:
FOR DETAILS OF CROSS FALL
AND LEVELS OF DRIVEWAY
REFER TO DRAWING
Nos. C04 & C05.

ISSUED FOR
CONSTRUCTION
CERTIFICATE
SUBMISSION ONLY

- NOTES:
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
 2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: 501.


Project		Drawing Title		Client	
NORTHERN BEACHES Consulting Engineers P/L		PROPOSED DEVELOPMENT at: 104 & 106 Wakehurst Parkway Elanora for: Stuart Thor		DRIVEWAY SLAB DETAILS SHEET 1	
I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPREng (NIEAust), NFER Institute of Engineers Membership No. 799184 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.		Date: 14/06/06 Lucas Molloy (Director Northern Beaches Consulting Engineers)		Drawn: Paul R Bruce Checked: R. Bruce Revised: -	
DOCUMENT CERTIFICATION		Date: 14/06/06 Lucas Molloy (Director Northern Beaches Consulting Engineers)		Job No: 051149 Drawing No: C07	
Date: 14/06/06 Lucas Molloy (Director Northern Beaches Consulting Engineers)		Date: 14/06/06 Lucas Molloy (Director Northern Beaches Consulting Engineers)		Job No: 051149 Drawing No: C07	

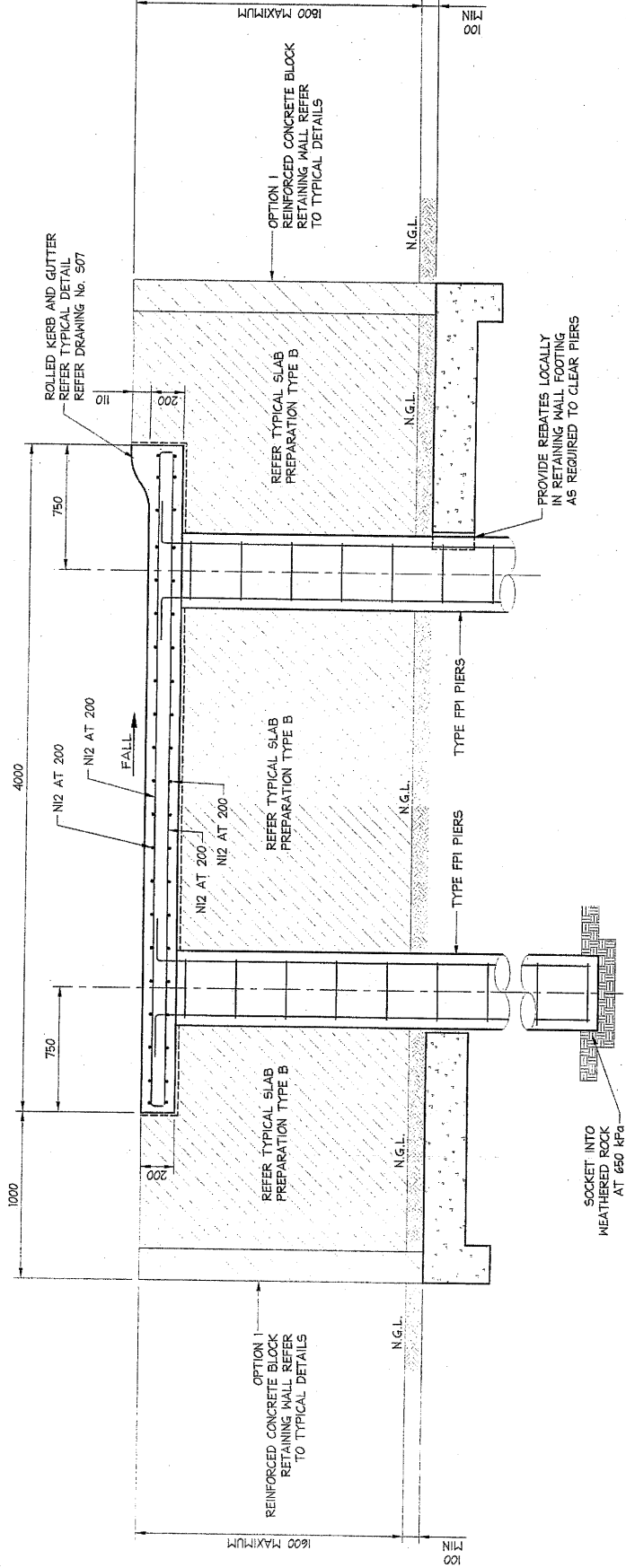
This drawing has been assessed for compliance with recommendations in our geotechnical report
Ref: ...18498 Z Rated 9/6/04
No design calculations have been carried out unless noted otherwise. Compliance with the contractual documents and all dimensions are the responsibility of the Contractor.

☒ Approved
☐ Approved with Amendments shown
☐ Not Approved - Amend and Resubmit

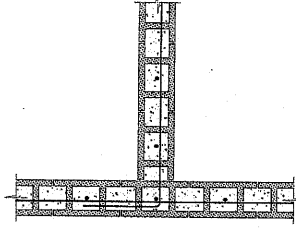
Signed by ...Paul Robb
Date ...10/4/06 Job Ref ...18498 Z R

For and on behalf of
JEFFERY AND KATAUSKAS PTY LTD





TYPICAL CORNER DETAIL
SCALE = 1 : 20



TYPICAL 'T' INTERSECTION
SCALE = 1 : 20

SECTION 1
SCALE = 1:20

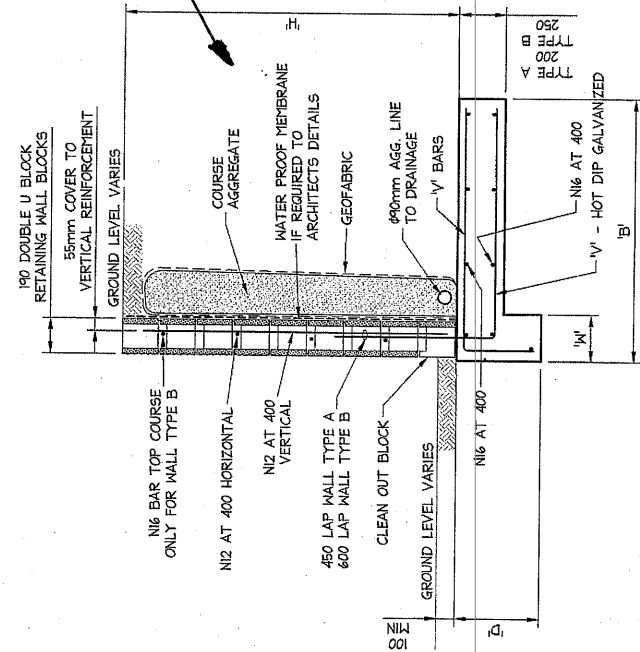
RETAINING WALL REINFORCEMENT SCHEDULE									
WALL TYPE	TOTAL WALL HEIGHT 'H'	OPTION 1				OPTION 2			
		'B'	'D'	'W'	'V' BARS	'B'	'D'	'W'	'V'
A	800	600	350	180	N12 AT 400	1000	350		
	1000	800	350	180	N12 AT 400	1200	350		
	1200	1000	350	180	N12 AT 400	1400	350		
	1400	1200	400	230	N16 AT 400	1600	400		
B	1600	1400	400	230	N16 AT 400	1800	400		
	1800	1600	400	230	N16 AT 400	2000	400		
	2000	1800	400	230	N16 AT 200	2200	400		

temporary butler slope in accordance with geotechnical report

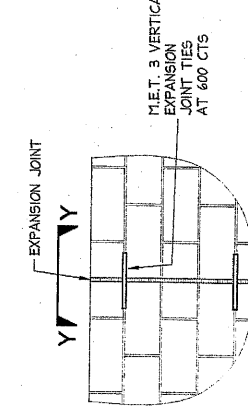
NOTE:
FOR DETAILS OF CROSS FALL AND LEVELS OF DRIVEWAY REFER TO DRAWING No's. C04 & C05.

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

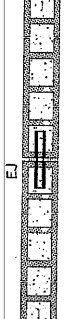
- NOTES:
- ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
 - FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.



TYPICAL BLOCK RETAINING WALL
SCALE = 1 : 20



SECTION X-X
TYPICAL EXPANSION JOINT DETAILS
SCALE = 1 : 20



SECTION Y-Y
TYPICAL EXPANSION JOINT DETAILS
SCALE = 1 : 20

DOCUMENT CERTIFICATION
Date: 14/06/06
Lucas Molloy
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE (Civil), CPENG, MIEAust, NPER,
Institute of Engineers Membership No. 789184
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.

NORTHERN BEACHES
Consulting Engineers P/L
ACN 078 121 616 ABN 24 078 121 616
Suite 207, 30 FISHER ROAD
DEE WHY NSW 2089
Ph: (02) 9984 7444
e-mail: nbc@northernbeaches.com.au
web page: www.northernbeaches.com.au

PROPOSED DEVELOPMENT
at: 104 & 106 Wakehurst Parkway
Elnora
for: Stuart Thor

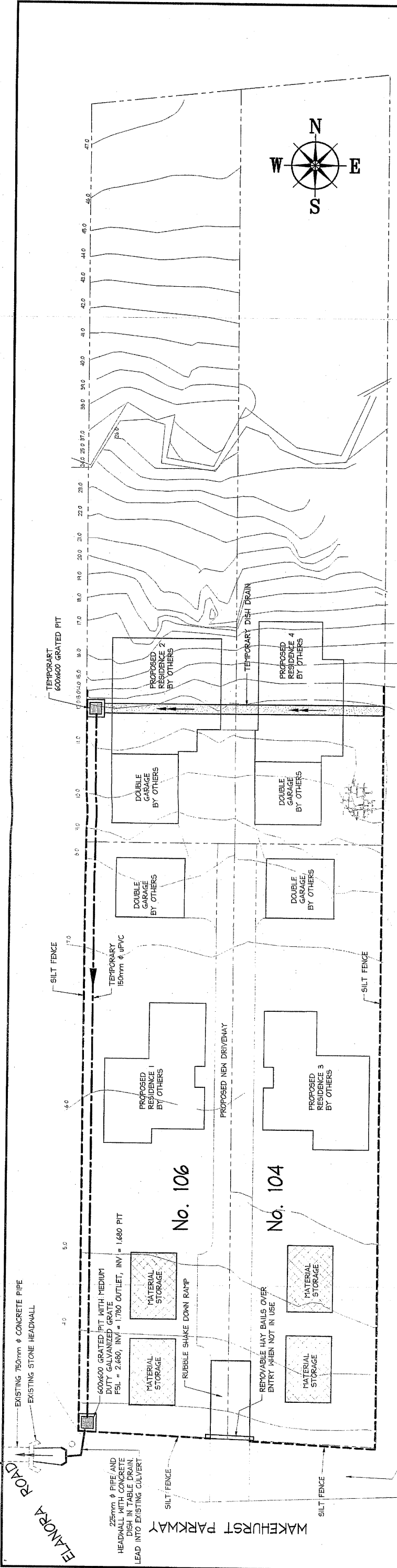
DRIVEWAY SLAB
DETAILS SHEET 2

Date: Mar 2006
Design: L.M.
Drawn: Paul R Bruce
Checked: R.W.
Drawing No: 051149
Rev: C08

This drawing has been assessed for compliance with recommendations in our geotechnical report
Ref: 18498-ZR dated 9/6/04
No design calculations have been carried out unless noted otherwise. Compliance with the contractual documents and all dimensions are the responsibility of the Contractor.

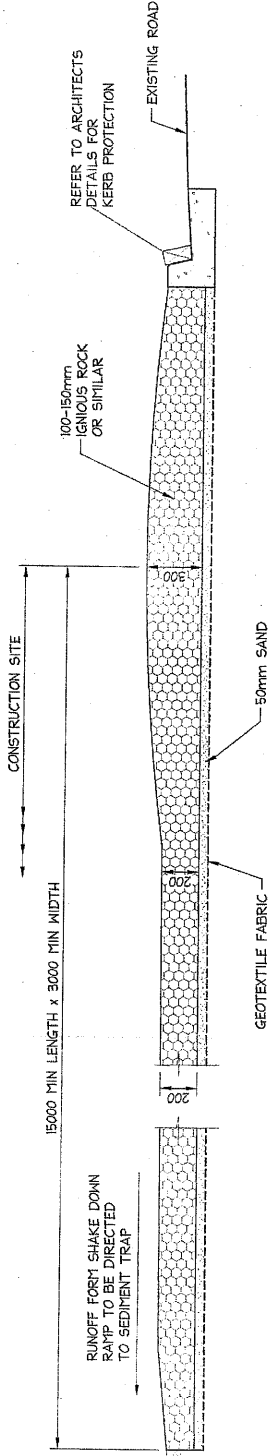
☐ Approved
☒ Approved with Amendments shown underlined in red
☐ Not Approved - Amend and Resubmit

Signed by Paul Roberts
Date 10/4/06 Job Ref 18498ZR
For and on behalf of
JEFFERY AND KATAUSKAS PTY LTD



EROSION AND SEDIMENT CONTROL PLAN

SCALE = 1 : 200

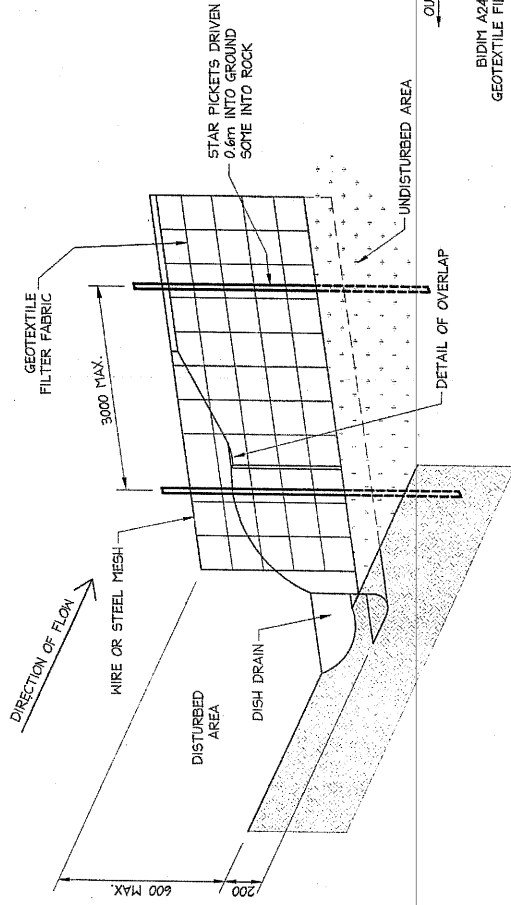


TYPICAL RUBBLE SHAKE DOWN RAMP LONGITUDINAL SECTION

N.T.S.

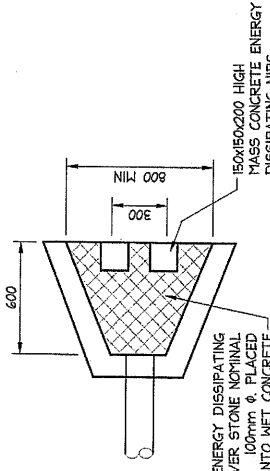
SEDIMENT CONTROL:

1. INSTALL SEDIMENT CONTROL STRUCTURES IN LOCATIONS INDICATED ON DRAWINGS AND AS OTHERWISE REQUIRED TO CONTROL SEDIMENT DURING ALL EXCAVATIONS AND WHILST AREAS OF THE SITE ARE EXPOSED TO EROSION.
2. CONTROL STRUCTURES TO BE AS DETAILED OR AS OTHERWISE REQUIRED BY CERTIFYING AUTHORITY.
3. REVIEW CONTROL MEASURES AND MAINTAIN STRUCTURES DURING CONSTRUCTION.
4. IF ADDITIONAL MEASURES ARE REQUIRED FOR EROSION CONTROL OR BY COUNCIL REQUIREMENTS REFER TO 'URBAN EROSION AND SEDIMENT CONTROL' GUIDELINES PREPARED BY THE DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT.



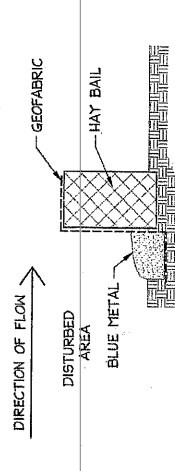
SILT FENCE DETAIL

SCALE = N.T.S.



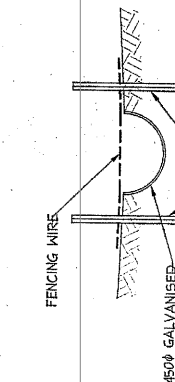
HEADWALL DETAILS

SCALE = 1 : 20



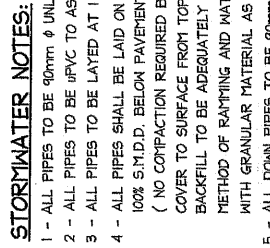
REMOVABLE HAY BAIL DETAIL

SCALE = N.T.S.



TEMPORARY DISH DRAIN

SCALE = N.T.S.



STORMWATER NOTES:

- 1 - ALL PIPES TO BE 900mm Ø UNLESS NOTED OTHERWISE.
- 2 - ALL PIPES TO BE UPVC TO AS 1264-1973 UNLESS NOTED OTHERWISE.
- 3 - ALL PIPES TO BE LAYED AT 1% MINIMUM GRADE UNLESS NOTED OTHERWISE.
- 4 - ALL PIPES SHALL BE LAID ON A 75mm SAND BED, COMPACTED TO 100% S.M.D.D. BELOW PAVEMENTS. (NO COMPACTION REQUIRED BELOW LANDSCAPING) COVER TO SURFACE FROM TOP OF PIPE TO BE 300mm MINIMUM. BACKFILL TO BE ADEQUATELY CONSOLIDATED AROUND PIPES BY METHOD OF RAMMING AND WATERING IN. TRENCHES TO BE FILLED WITH GRANULAR MATERIAL AS SPECIFIED.
- 5 - DOWN PIPE LOCATIONS ARE INDICATIVE ONLY. LOCATIONS TO BE CONFIRMED WITH ARCHITECT PRIOR TO COMMENCEMENT WITH WORK.
- 6 - PROVIDE CLEANING EYES AT ALL DOWNPIPES.
- 7 - ALL PITS TO BE CAST INSITU OR, IF PRECAST, APPROVED BY ENGINEER. CAST INSITU PITS TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH 1 N2 TOP TIE UNLESS NOTED OTHERWISE.
- 8 - CAST INSITU PITS GREATER THAN 1000 DEEP TO BE MINIMUM 900x600 AND TO HAVE 150mm THICK CONCRETE WALLS AND BASE. WALLS TO BE REINFORCED WITH N2 AT 300 EACH WAY UNLESS NOTED OTHERWISE.
- 9 - ALL PITS GREATER THAN 1000mm DEEP SHALL HAVE STEP IRONS AS PER COUNCIL STANDARDS.
- 10 - ALL WORK TO BE IN ACCORDANCE WITH LOCAL COUNCIL STANDARDS AND SPECIFICATIONS.
- 11 - PRIOR TO COMMENCING ANY SITE WORKS THE CONTRACTOR SHALL IMPLEMENT EROSION CONTROL MEASURES TO EPA GUIDELINES AND COUNCIL SPECIFICATIONS. ALL MEASURES TO REMAIN IN PLACE UNTIL COMPLETION AND STABILIZATION OF THE SITE TO COUNCIL SATISFACTION.
- 12 - ALL LEVELS SHOWN ARE TO AHD.
- 13 - ENSURE ALL PITS AND STORMWATER PIPES ARE LOCATED CLEAR FROM TREE ROOT SYSTEMS.
- 14 - ALL EXISTING EARTHENWARE PIPES TO BE UPGRADED TO UPVC.
- 15 - ALL WORKS TO BE IN ACCORDANCE WITH AS 3500-1990 NATIONAL PLUMBING DRAINAGE CODE PART 3 - STORMWATER DRAINAGE.
- 16 - 900mm Ø x 3000 LONG TAIL OUT SUBSOIL LINE TO BE PROVIDED ON THE UPSTREAM SIDE OF ALL PITS. SUBSOIL LINE TO BE COVERED WITH GEOTEXTILE FILTER SOCK FOR THE FULL LENGTH AND END COVERED.

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

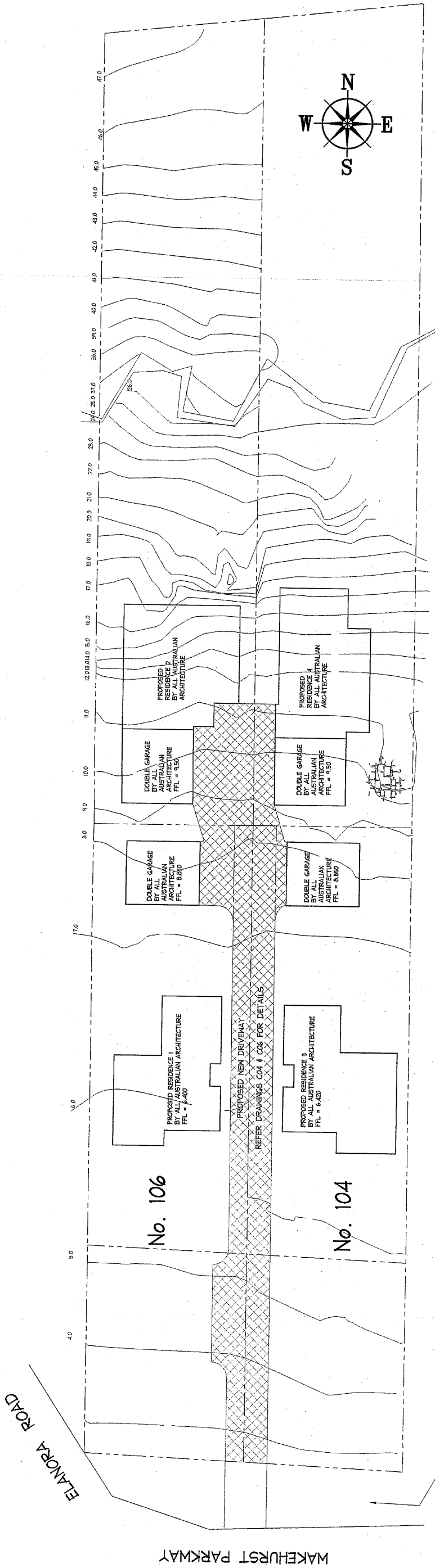
ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

Date: Mar 2006		Design: L.M.	Drawn: Paul R Bruce	Checked: R.W.
Job No: 051149		Drawing No: D01	Rev: -	
Drawing Title: EROSION AND SEDIMENT CONTROL PLAN AND DETAILS				
Project: PROPOSED DEVELOPMENT at: 104 & 106 Wakehurst Parkway Elanora for: Stuart Thor				
NORTHERN BEACHES Consulting Engineers P/L ACN 076 121 616 ABN 24 076 121 616 Suite 307, 30 FISHER ROAD DEE WHY NSW 2099 Ph: (02) 9584 7444 e-mail: nbe@northernbeaches.com.au web page: www.northernbeaches.com.au				
I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust, NPFR, Institute of Engineers Membership No. 769184 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.				
DOCUMENT CERTIFICATION Date: 14/06/06 Lucas Molloy (Director Northern Beaches Consulting Engineers)				
Date:	Rev:	Amendment:		

This drawing has been assessed for compliance with recommendations in our geotechnical report
Ref: 184982 Rpt dated 9/6/24
No design calculations have been carried out unless noted otherwise. Compliance with the contractual documents and all dimensions are the responsibility of the Contractor.

☒ Approved
☐ Approved with Amendments shown
☐ Not Approved - Amend and Resubmit

Signed by Paul T. Cole
Date 10/14/24 Job Ref 184982R
For and on behalf of JEFFERY AND KATAUSKAS PTY LTD



SITE PLAN
SCALE = 1 : 200

REFER DRAWING No. C02 FOR WORKS IN RELATION TO THAT PART OF THE WAKEHURST PARKWAY (ROAD) FRONTAGE

ISSUED FOR
CONSTRUCTION
CERTIFICATE
SUBMISSION ONLY

- NOTES:**
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
 2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

Drawing Title: SITE PLAN		Date: Mar 2006	Design: L.M.	Drawn: Paul R Bruce CIVIL/EAUT.	Checked: [Signature]
Project: PROPOSED DEVELOPMENT at: 104 & 106 Wakehurst Parkway Elanora for: Stuart Thor		Job No: 051149			
NORTHERN BEACHES Consulting Engineers P/L A.C.N. 078 21 816 A.B.N. 24 078 21 816 Suite 207, 30 FISHER ROAD DEE WHY N.S.W. 2099 Ph: (02) 9984 7444 e-mail: nb@northernbeaches.com.au web page: www.northernbeaches.com.au		DOCUMENT CERTIFICATION I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPENG, NIEAust, NPER, Institute of Engineers Membership No. 789184 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards. Date: 14/03/06 Lucas Molloy (Director Northern Beaches Consulting Engineers)			
The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L		Rev: Amendment: Date: Rev: Drawing No: C01 Rev: -			

This drawing has been assessed for compliance with recommendations in our geotechnical report
Ref: 18498 Updated 9/6/04

No design calculations have been carried out unless noted otherwise. Compliance with the contractual documents and all dimensions are the responsibility of the Contractor.

☒ Approved

☐ Approved with Amendments shown

☐ Not Approved - Amend and Resubmit

Signed by

Paul Roberts

Date

10/4/04

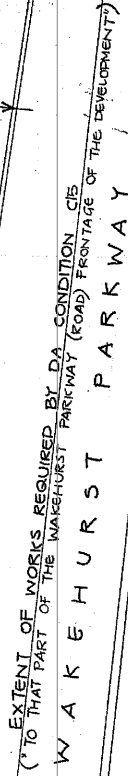
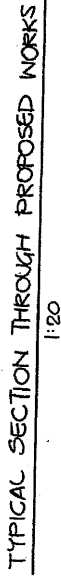
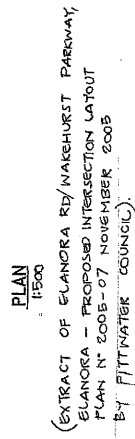
Job Ref

18498ZR

For and on behalf of

JEFFERY AND KATAUSKAS PTY LTD





(WORKS BASED ON THE ELANORA RD / WAKEHURST PARKWAY ELANORA
PROPOSED INTERSECTION LAYOUT BY PITTVATER COUNCIL
PLAN N° 2005-07 DATED NOVEMBER 2005)

Date : MAR 06
 Lucas Malloy
 (Director Northern Beaches Consulting Engineers)



Project: PROPOSED DEVELOPMENT
at: 104 & 106 Wakehurst Parkway
ELANORA
for: Stuart Thor

Date:	JAN
Job No:	05

**ISSUED FOR
CONSTRUCTION
CERTIFICATE
SUBMISSION ONLY**

NOTES:

1. ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: 501.

• PROVISIONS FOR TRAFFIC DURING CONSTRUCTION SHALL BE IN ACCORDANCE WITH AS 1742.3 AND BE REVIEWED & APPROVED BY THE RTA & COUNCIL PRIOR TO INSTALLATION & COMMENCEMENT OF WORKS.

MEASURES TO INCURB (BUT NOT LIMITED TO) THE FOLLOWING : --

- ROADWORKS 40 km/hr SIGNAGE TO BE DISPLAYED ON EASTERN SIDE OF ELANORA RD & NORTHERN SIDE OF NAKEHURST PARKWAY FOR ALL ON COMING TRAFFIC 50m FROM PROPOSED WORKS.

* MERGING LANE (FOR TRAFFIC FROM ELANORA RD) ON NORTHERN SIDE OF WAKEHURST PARKWAY TO BE CLOSED BY THE INSTALLATION OF TRAFFIC BARRIERS 1M OFF THE E1 LINE & TRAFFIC DIRECTED TO STOP BEFORE ENTERING WAKEHURST PARKWAY.

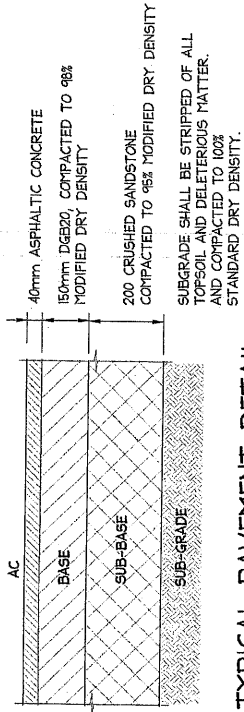
This drawing has been assessed for compliance with recommendations in our geotechnical report
Ref: 18498-3 updated 7/6/04
No design calculations have been carried out unless noted otherwise. Compliance with the contractual documents and all dimensions are the responsibility of the Contractor.

☒ Approved
☐ Approved with Amendments shown
☐ Not Approved - Amend and Resubmit

Signed by Paul R. R. R.
Date 10/14/06 Job Ref 18498-3

For and on behalf of
JEFFERY AND KATAUSKAS PTY LTD



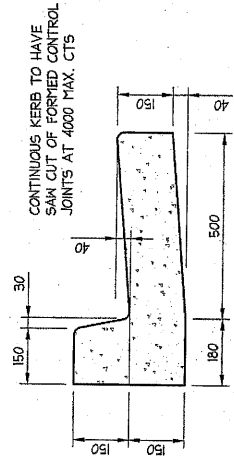


TYPICAL PAVEMENT DETAIL
SCALE = 1 : 10

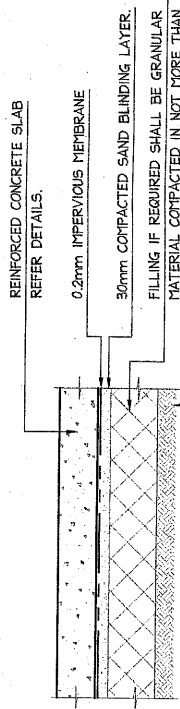
PAVEMENT DESIGN
ASSUME CR 4 % - GEOTECHNICAL ENGINEER TO CONFIRM
ASSUME ROAD CATEGORY 4 - DISTRIBUTOR/SINGLE BUS

BITUMEN PAVEMENT NOTES:

- CONSTRUCTION
SUB-BASE: 200 CRUSHED SANDSTONE
BASE: 150 DGB 20
TO CONFORM WITH THE REQUIREMENTS OF R.T.A FORM No.76 AND
COMPACTED TO A DENSITY OF 100% SDD
- AC (AC40)
TO BE PLACED IN ACCORDANCE WITH R.T.A FORM No.612
- PRIME AND SPRAY SEAL IN ACCORDANCE WITH R.T.A SPRAYED SEALING
GUIDE (OCT 98)
- TESTING
TESTING IS TO BE DONE BY NATA REGISTERED TESTING ORGANISATION.
- TEST COMPACTION OF SUBGRADE, FILL AND BASE COURSE AT RATE
OF TWO (2) FIELD, DENSITY TEST PER LAYER PER 25 LINEAL METRES
LOCATED ON A STATISTICAL BASIS.
- TEST COMPACTION OF ASPHALTIC CONCRETE IN ACCORDANCE WITH RTA
FORM 612 AND AS DIRECTED BY SUPERINTENDENT ALLOW FOR 6 FIELD
DENSITY TESTS PER ONE DAYS PRODUCTION
- TRAFFIC CONTROL
PROVISIONS FOR TRAFFIC DURING CONSTRUCTION SHALL BE IN ACCORDANCE
WITH AS1742.3 AND SHALL BE TO THE APPROVAL OF THE RTA.
- PAVEMENT MARKINGS
PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE RTA'S
SPECIFICATION FOR ROADWORKS - PART R PAVEMENT MARKINGS AND RTA
DRAWING MD.660A01A
- KERBS AND GUTTERS
ALL KERBS AND GUTTERS COMPLY WITH RTA SPECIFICATION CONCRETE SHALL
BE MINIMUM GRADE N20 80 20 AS PER A55400

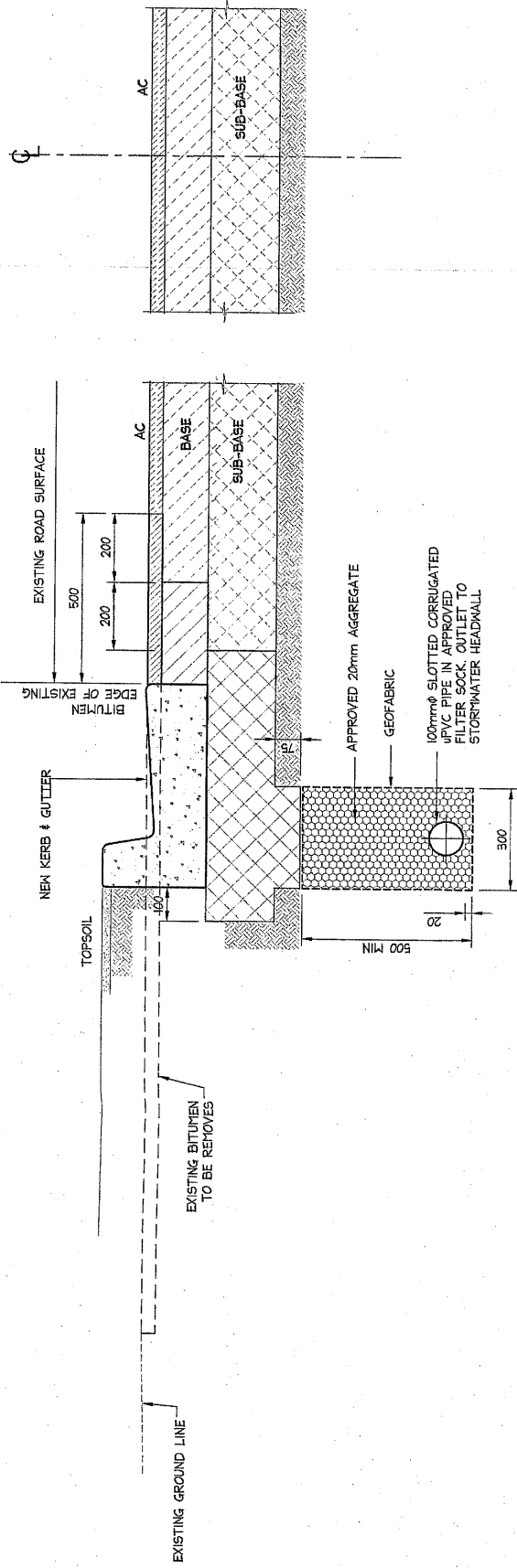


KERB & GUTTER DETAIL
SCALE = 1 : 10

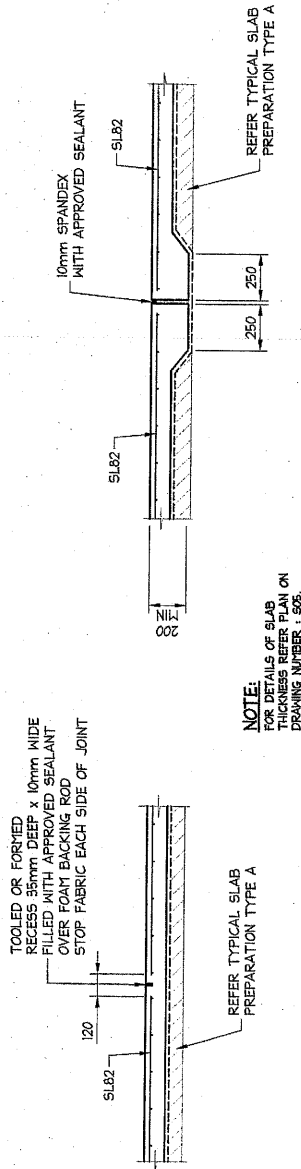


NOTE: SAND BLINDING, SUB-BASE, FILLING AND SUB GRADE TO BE MECHANICALLY COMPACTED TO A DRY DENSITY RATIO OF NOT LESS THAN 98% MAXIMUM DRY DENSITY TO A.S. 1289/E4.2 1982. ALL AREAS TO BE TESTED BY GEOTECHNICAL ENGINEER AND RESULTS FORWARDED TO STRUCTURAL ENGINEER PRIOR TO POURING CONCRETE.

TYPICAL SLAB PREPARATION TYPE A
SLAB ON GRADE
N.T.S.



KERB & GUTTER SECTION
SCALE = 1 : 10



TOOLED JOINT DETAIL
DENOTED T.J. ON PLAN
SCALE = 1 : 20

EXPANSION JOINT DETAIL
DENOTED E.J. ON PLAN
SCALE = 1 : 20

NOTE: JOINT SEALANT
USE THIOFLEX 600 POURING OR GUN GRADE SEALANT BY PARBURY TECHNOLOGIES OR APPROVED EQUIVALENT. THIOFLEX 600 POURING GRADE IS SUITABLE ONLY FOR HORIZONTAL JOINTS WITH SOUND BACKING. FOR INCLINED OR VERTICAL JOINTS THIOFLEX 600 GUN GRADE SHOULD BE USED. BOTH GRADES OF THIOFLEX 600 SHALL BE INSTALLED OVER A FOAM BACKING ROD AND USED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.

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CONSTRUCTION
CERTIFICATE
SUBMISSION ONLY

- NOTES:
- ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
 - FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: 501.

DOCUMENT CERTIFICATION	DATE: 14/06/06	Lucas Malloy (Director Northern Beaches Consulting Engineers)
DATE:	Rev:	Amendment:

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPENG, MIEAust, NPER,
Institute of Engineers Membership No. 799184
I hereby state that this drawing is in compliance
with the provisions of the Building Code of
Australia and/or relevant Australian Industry
Standards.

NORTHERN BEACHES
Consulting Engineers P/L
ACMA 078 921 818 ABN 24 078 921 816
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9884 7000 Fax: (02) 9884 7444
e-mail: nbe@nbeconsulting.com.au
web page: www.nbeconsulting.com.au

Project:
PROPOSED DEVELOPMENT
at: 104 & 106 Wakehurst Parkway
Elanora
for: Stuart Thor

Drawing Title:
WAKEHURST PARKWAY
FRONTAGE ROADWORKS
SECTIONS AND DETAILS

Date: Mar 2006	Design: L.M.	Drawn: Paul R Bruce	Checked: Ray
Job No: 051149		Drawing No: C03	Rev: -

The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L

This drawing has been assessed for compliance with recommendations in our geotechnical report
Ref: 184982.R, dated 9/6/04
No design calculations have been carried out unless noted otherwise. Compliance with the contractual documents and all dimensions are the responsibility of the Contractor.

☒ Approved

☐ Approved with Amendments shown

☐ Not Approved - Amend and Resubmit

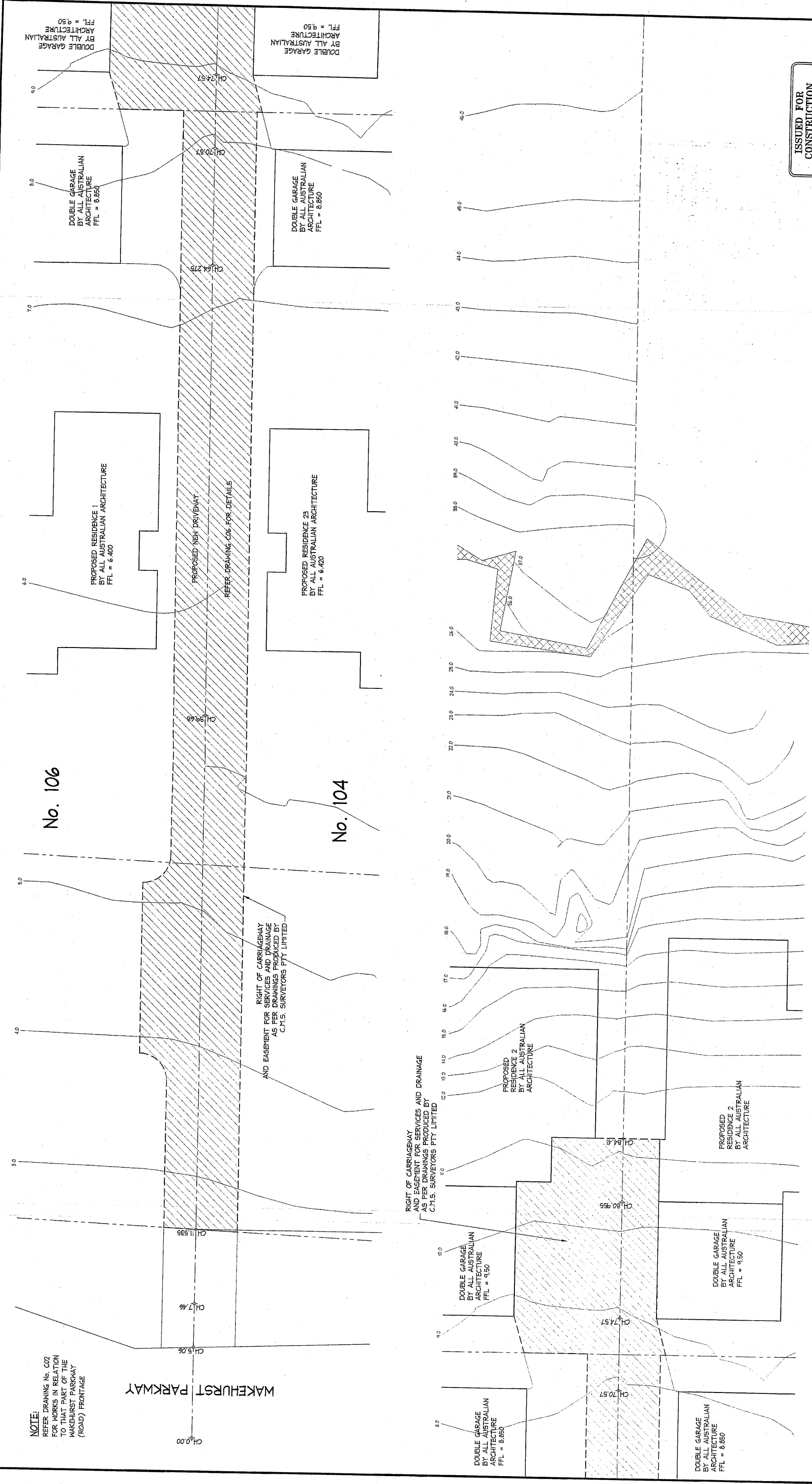
Signed by Paul Roberts

Date 10/4/06 Job Ref 184982.R

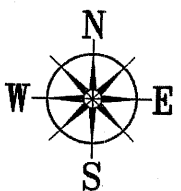
For and on behalf of

JEFFERY AND KATAUSKAS PTY LTD

K



ISSUED FOR
CONSTRUCTION
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SUBMISSION ONLY



- NOTES:
- ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
 - FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: 501.

DRIVEWAY LAYOUT PLAN

SCALE = 1 : 100

Project: PROPOSED DEVELOPMENT at: 104 & 106 Wakehurst Parkway Elanora for: Stuart Thor		Drawing Title: DRIVEWAY LAYOUT PLAN		Date: Mar 2006	Design: L.M.	Drawn: Paul R Bruce CHIEF/Asst.	Checked: R.B.
Project: NORTHERN BEACHES Consulting Engineers P/L ACN 078 121 816 ABN 24 078 121 816 Suite 207, 30 FISHER ROAD DE WYBY NSW 2099 Ph: (02) 9894 7000 Fax: (02) 9894 7444 e-mail: info@northernbeaches.com.au web page: www.northernbeaches.com.au		Project: NORTHERN BEACHES Consulting Engineers P/L ACN 078 121 816 ABN 24 078 121 816 Suite 207, 30 FISHER ROAD DE WYBY NSW 2099 Ph: (02) 9894 7000 Fax: (02) 9894 7444 e-mail: info@northernbeaches.com.au web page: www.northernbeaches.com.au		Project: NORTHERN BEACHES Consulting Engineers P/L ACN 078 121 816 ABN 24 078 121 816 Suite 207, 30 FISHER ROAD DE WYBY NSW 2099 Ph: (02) 9894 7000 Fax: (02) 9894 7444 e-mail: info@northernbeaches.com.au web page: www.northernbeaches.com.au		Project: NORTHERN BEACHES Consulting Engineers P/L ACN 078 121 816 ABN 24 078 121 816 Suite 207, 30 FISHER ROAD DE WYBY NSW 2099 Ph: (02) 9894 7000 Fax: (02) 9894 7444 e-mail: info@northernbeaches.com.au web page: www.northernbeaches.com.au	
DOCUMENT CERTIFICATION Date: 14/06/06 Lucas Molloy (Director Northern Beaches Consulting Engineers)		I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil)/CE(Eng) NIEAust, NPFR, Institute of Engineers (Membership No. 780184) I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.		I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil)/CE(Eng) NIEAust, NPFR, Institute of Engineers (Membership No. 780184) I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.		I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil)/CE(Eng) NIEAust, NPFR, Institute of Engineers (Membership No. 780184) I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.	
Date: -	Rev: -	Amendment: -	Job No: 051149				Rev: -
The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L			Drawing No: C04				

This drawing has been assessed for compliance with recommendations in our geotechnical report
Ref: 18498 ZR dated 2/6/04
No design calculations have been carried out unless noted otherwise
Compliance with the contractual documents and all dimensions are the responsibility of the Contractor

☒ Approved
☐ Approved with Amendments shown
☐ Not Approved - Amend and Resubmit

Signed by Paul Rodes
Date 10/4/06
For and on behalf of Job Ref 18498 ZR
JEFFERY AND KATAUSKAS PTY LTD

dk

GENERAL NOTES:

GENERAL

- G1. The drawings are to be read together with all Architects drawings and specifications.
- G2. Dimensions shall not be obtained by scaling from the drawings. All setting out dimensions shall be verified and discrepancies shall be referred to the Engineer prior to commencement of work.
- G3. Care is required during construction so that structural elements are not over stressed and that the works and excavations required therefore are kept stable at all times.
- G4. Design, materials and workmanship are to be in accordance with current S.A.A standards and statutory authority regulations except where varied by these documents.
- G5. Design live loads are in accordance with AS 1170.1
- G6. Builder to ensure stability of existing structures in the vicinity of excavation works.

FOOTINGS

- F1. FOUNDATION STRATA IS ASSUMED FOR DESIGN PURPOSES IN ACCORDANCE WITH AS 2870-1996 "RESIDENTIAL SLAB AND FOOTINGS-CONSTRUCTION". SEE FOOTNOTE. CLASSIFICATION TO BE VERIFIED BY A GEOTECHNICAL ENGINEER COMMISSIONED BY THE CLIENT FOR CERTIFICATION OF FOUNDATIONS.
- F2. Footings to be constructed and back filled as soon as possible following excavation to avoid softening by rain or drying out by exposure.
- F3. Footings must bear into undisturbed natural ground clear of organic material. Refer to details.
- F4. If rock or variable bearing strata is encountered during excavation of the footings all footings/piers are to be excavated to similar material of greater bearing capacity.
The Engineer is to be contacted at that time for approval or review.
- F5. Footings to be cast in approved material having an allowable capacity as follows:
- Sand Foundations:
- SA1. Required bearing capacity 100 kPa.
- SA2. Trenches must be cleaned of all debris and hand compacted prior to placement of reinforcement.
- Clay Foundations:
- CL1. Required bearing capacity 250 kPa.
- CL2. Trenches must be cleaned of all debris. Soft spots must be cut out and filled as per compacted fill notes, prior to placement of reinforcement.
- Shale Foundations:
- SH1. Required bearing capacity 400 kPa.
- SH2. Excavation for footings into shale must be cast or capped with plain concrete on the same day as excavation.
- Sandstone Foundations:
- SS1. Required bearing capacity 650 kPa.
- SS2. Scrape weathered surface to remove cleaved sandstone under footings.
- Refer adjacent for assumed Design bearing strata.
- F6. Future development of neighboring properties may effect ground water conditions on this site. Consequently, reactivity in subgrade beneath footings may be locally altered therefore putting footing at risk of differential settlement. We recommend that, particularly in clay subgrades, agricultural drainage is installed to the upstream perimeter of the building at a distance from the building which is outside the zone of influence of the footings. The agricultural drain must be installed below the fluctuating seasonal zone which should be identified by geotechnical investigation.

CONCRETE

- C1. All workmanship and materials shall be in accordance with AS 3600.
- C2. Concrete quality shall be as follows and shall be verified by tests.
- C3. All concrete unless otherwise noted shall have a slump of 80mm at point of placement, a max. aggregate size of 20 mm.
No water shall be added to the mix prior to or during placement of concrete. Strength as specified on plans.
- C4. Clear concrete cover to reinforcement shall be as follows unless otherwise shown-

ELEMENT	INTERIOR	EXTERIOR	EXTERIOR CAST AGAINST GROUND
FOOTINGS	-	-	50
COLUMNS/PEDESTALS	30 UNO	REFER TO PLAN	-
SLABS/WALLS	25	REFER TO PLAN	40 ON MEMBRANE
BEAMS	25 UNO	REFER TO PLAN	50
BLOCKWORK	55 FROM APPROPRIATE FACE		

- C5. Sizes of concrete elements do not include thickness of applied finishes.
- C6. All Construction Joints locations shall be approved by the Structural Engineer.
- C7. Beam depths are written first and include slab thickness, if any.
- C8. No holes or chases other than those shown on the structural drawings shall be made in concrete elements without the prior approval of the engineer.
- C9. Shrinkage reducing admixtures such as 'Eclipse' or approved equivalent, if specified, must be added to mix prior to pour.

- C10. Water reducing agents, if specified, must be added to mix prior to pour.
No extra water is to be added to increase slump.
- C11. Where vertical slab/beam surfaces are formed against a masonry (or other) wall, provide 10 mm styrene separation material.
- C12. Water must not be added to concrete mix prior to placement of concrete.
- C13. Above covers may have to be adjusted if fire rating is a requirement.

REINFORCEMENT

- R1. All reinforcement specified is Grade D500 unless noted otherwise.
- R2. Reinforcement is represented diagrammatically it is not necessarily shown in true projection.
- R3. Top reinforcement is to be continuous over supports.
Bottom reinforcement to be lapped at supports.
- R4. Welding of reinforcement shall not be permitted unless shown on the structural drawings.
- R5. Pipes or conduits shall not be placed within the zone of concrete cover to the reinforcement without the approval of the engineer.
- R6. All reinforcing bars and fabric shall comply with AS 4671-2001.
- R7. Reinforcement symbols:
N - Grade 500N deformed bar (D500) Normal Ductility
R - Grade 250N plain round bar (R250) Normal Ductility.
SL - Grade 500L welded deformed ribbed mesh (D500)
Square Low Ductility.
RL - Grade 500L welded deformed ribbed mesh (D500)
Rectangular Low Ductility.
The number immediately following these symbols is the number of millimeters in the bar diameter.
Example: 8 N12-250, denotes 8, Grade 500N deformed bars, 12 mm diameter at 250 cts.
- R8. Fabric reinforcement to be lapped 1 complete square + 25 mm unless noted otherwise.
- R9 All reinforcement shall be firmly supported on bar chairs spaced at a maximum of 750 centres both ways under rod and fabric reinforcement. Reinforcement shall be tied at alternate intersections.

FORMWORK

- FW1. Formwork must be cleaned of all debris prior to casting of concrete.
- FW2. Minimum stripping times for form work shall be as recommended in AS 3610 - 1990 or as directed by the engineer.
- FW3. The finished concrete shall be a dense homogeneous mass, completely filling the form work, thoroughly embedding the reinforcement and free of stone pockets. All concrete elements including slabs on ground and footings shall be compacted with mechanical vibrators.
- FW4. Curing of all concrete is to be achieved by keeping surfaces continuously wet for a period of 3 days, followed by prevention of loss of moisture for seven days followed by a gradual drying out. Approved sprayed on curing compounds may be used where no floor finishes are proposed. Polythene sheeting or wet hessian may be used if protected from wind and traffic.

BRICKWORK

- BR1. Brickwork is to be constructed to AS 3700.
- BR2. Two layers of approved greased metal based slip material shall be used over all load bearing walls that support concrete slabs and placed on smooth brickwork or trowelled mortar finish. Non load-bearing walls shall have 10 mm compressible material and ties to the slab soffit.
- BR3. No brickwork shall be constructed on suspended slabs until all propping has been removed from the underside of the slab and the concrete has the specified 28 day cylinder strength verified by tests.
- BR4. Control joints to be placed at a maximum of 8m centres or in accordance with AS 3700.
- BR5. Exposure grade bricks to be used below damp proof course.
- BR6. Vertical control joint material where specified on plan between slabs and brick walls shall be: 10 mm Spandex External UNO.
Bitumastic fibreboard internal UNO.
- BR7. Provide stainless steel wall ties below DPC to AS 3700. Provide galvanized wall ties above DPC to AS 3700 & Local Council Specifications.

BLOCKWORK

- BL1. Concrete blocks shall have a minimum compressive strength of 15 MPa and conform to AS 1500.
Masonry to be constructed to AS 3700.
- BL2. Where cores of hollow blocks are to be filled, properly compacted 20MPa concrete with 10 mm aggregate and 230 mm slump shall be used. Clean out openings must be utilized for all cores.
- BL3. Location of actual starters is critical to suit block cores, allow 55 mm cover from the outside face of blockwork. All reinforcement lap lengths to conform to AS 3600.
- BL4. Control joints to be placed at a maximum of 8 m centres or in accordance with AS 3700.
- BL5. Vertical control joint material where specified on plan between slabs and brick walls shall be: 10 mm Spandex External UNO.
Bitumastic fibreboard internal UNO.

- BL6. Retaining walls or any reinforced and concrete core filled block walls to be of Double 'U' Block Construction.
- BL7. No blockwork shall be constructed on suspended slabs until all propping has been removed from the underside of the slab and the concrete has the specified 28 day cylinder strength verified by tests. unless approved by the Structural Engineer.
- BL8. Max. pour height for unrestrained blockwork is 2000.

STEEL

- S1. All Structural steelwork to be Grade 300 or greater.
Design, fabrication and erection to be in accordance with AS 4100.
- S2. Materials and workmanship shall comply with AS 1250 - 1981, SAA Steel Structures Code and the specification for Structural Steel.
- S3. Rolled steel sections including steel plates shall comply with AS 3678 - 1990.
- S4. Cold formed steel sections shall be Grade 450 Zinc coated in accordance with AS 11538-1988.
- S5. Welded and seamless steel hollow sections shall comply with AS 1163. Grade 350.
- S6. Bolt Designation:
4.6S - Commercial bolts Grade 4.6, snug tightened.
8.8S - High Strength structural bolts Grade 8.8, snug tightened.
8.8TB - High Strength structural bolts Grade 8.8, fully tightened to AS 1511 and acting as a Bearing Joint.
8.8TF - High Strength structural bolts Grade 8.8, fully tensioned to AS 1511 and acting as a Bearing Joint.
Unless noted otherwise, all bolts will be 8.8S.
- S7. Unless shown otherwise, minimum connection shall be 2M16 bolts, 10 thick gusset plates, 6mm continuous fillet welds.
- S8. Load indicating washers shall be used in all fully tensioned joints. (8.8TF & 8.8TB).
- S9. All welding shall be carried out in accordance with AS 1554 SAA Structural Steel Welding Code.
- S10. Unless noted otherwise all welds shall be category SP using E41xx Electrodes.
All butt welds shall be complete penetration butt welds category SP.
- S11. Grouting of anchor bolt sleeves and base plates shall be completed by the contractor using High Strength, Non-Shrink grout.
- S12. Fabrication and erection tolerances for Structural Steelwork shall be in accordance with AS 4100.
- S13. Purlin bolts shall be M12 - 4.6S galvanised.
- S14. Steel work shall have one of the following grades of corrosion protection:-
INTERNAL
a. Thoroughly cleaned wire brushing, followed by two coats of zinc phosphate primer equivalent to Dulux Luxaprime applied by hand using brushes to achieve a total dry film thickness of 70 microns.
EXTERNAL ELEMENTS, & ELEMENTS WITHIN EITHER SKIN OF EXTERNAL CAVITY WALLS
b. Preparation Blast clean to a minimum standard Class 2.5 in accordance with AS 1627 Part 4.
Primer 2-pack epoxy phosphate at dft 75 microns (Dulux Durepon P14).
Barrier Coat 2-pack epoxy micaceous iron oxide, dft 100 microns
Finish Coat 2-pack epoxy high gloss acrylic to dft 75 microns (e.g. Dulux Acrathane I F) in an approved colour.
c. Hot dipped galvanized to AS 4680.
Where the galvanic (Hot Dip Galvanized) coating is compromised by welding, bolting or damage, inorganic zinc-rich paint (minimum 95% zinc content) is to be applied after wire brushing affected area (use 3 coats minimum). or Hot Metal Spray in accordance with AS 4680.
- S15. Workshop drawings shall be prepared and two copies submitted to the engineer for review prior to fabrication commencement.

TIMBER

- T1. All workmanship and materials to be in accordance with AS 1684, AS 1720 and as 3959. All soft wood to be Grade F7 unless noted otherwise. All hardwood to be minimum Grade F14 unless otherwise noted. Exposed timber to be CCA treated (to AS 1604) redried after full impregnation, or durability class 1, 2 or 3.
ALL SOFTWOOD TIMBER FRAMING TO HAVE A MINIMUM TREATMENT PROTECTION OF H2 or T2 TREATED FOR TERMITE PROTECTION UNLESS NOTED OTHERWISE.
- T2. All joists deeper than 150 to have blocking over support bearers and at a maximum 3000 centres.
- T3. Roof trusses to be designed by the manufacturer to the relevant standards. Pre camber to be an amount equal to dead load deflection u.n.o.
- T4. All holes for bolts to be exact size. Washers to be used under all heads and nuts and to be at least 2.5 times the bolt diameter. Bolts to be M16 grade 4.6 unless noted otherwise.
- T5. Treat all exposed cut ends with Reseal by Protim to manufacturers specification to achieve required Hazard Level Exposure Classification.
- T6. Battens for T & G to be Kiln Dried to 12 %.
38mm minimum deep treated pine or as recommended by supplier. Flooring to be installed no sooner than 28 days after slab pour.
- T7. Hot dip galvanized nails/clou/screws to be used with all timber connections.
- T8. Continuous nailing must not be used for any timber connections.
- T9. All exposed CCA treated pine to have an application of penetrating sealer to reduce warping and twist of the timber due to varying moisture content in service.

DRAWING SCHEDULE:

S01 - GENERAL NOTES AND DRAWING SCHEDULE

- C01 - SITE PLAN
- C02 - WORKS TO WAKEHURST PARKWAY FRONTAGE
- C03 - WAKEHURST PARKWAY FRONTAGE
ROADWORKS SECTIONS AND DETAILS
- C04 - DRIVEWAY LAYOUT PLAN
- C05 - DRIVEWAY LONGITUDINAL AND CROSS SECTIONS
- C06 - DRIVEWAY SLAB PLAN AND DETAILS
- C07 - DRIVEWAY SLAB DETAILS SHEET 1
- C08 - DRIVEWAY SLAB DETAILS SHEET 2

- D01 - EROSION AND SEDIMENT CONTROL
PLAN AND DETAILS
- D02 - STORMWATER DRAINAGE PLAN AND DETAILS

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COMPACTED FILL

- CF1. Only to be used with approval Engineer & to be certified by a geotechnical Engineer.
- CF2. Clear organic material and topsoil under proposed slabs/footings.
- CF3. Filling shall be granular material compacted in not more than 200 mm layers to a minimum dry density ratio (AS 1289/E4.2 1982) of 98 percent.
- CF4. During clearing and excavation for slabs and footings cut out soft spots and fill as above.

INSPECTIONS BY ENGINEER

48 HOURS NOTICE IS REQUIRED BEFORE ANY SITE INSPECTION

- Bearing strata of all footings prior to concrete pour.
- Any reinforcement prior to concrete pour.
- Timber and Steel framing prior to cladding or lining.
- Steel lintels after installation.
- CONTACT YOUR PCA (Principal Certifying Authority) AS TO REQUIREMENTS FOR MANDATORY CRITICAL STAGE INSPECTIONS IN ACCORDANCE WITH REVISED EP&A ACT REGULATIONS EFFECTIVE JULY 1, 2004.

ASSUMED FOUNDATION CLASSIFICATION FOR DESIGN PURPOSES - 'A' & 'M'
ASSUMED BEARING STRATA FOR DESIGN PURPOSES - ROCK, 650 kPa. & CLAY, 250 kPa
CONTRACTOR TO ENGAGE GEOTECHNICAL CONSULTANT TO
VERIFY FOUNDATION CLASSIFICATION

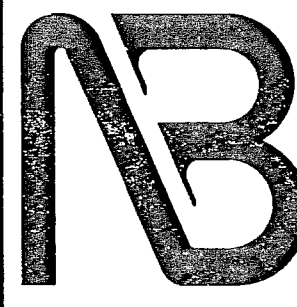
A1

Date:	Rev:	Amendment:

DOCUMENT CERTIFICATION

Date: *Mar 06*
Lucas Molloy
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER,
Institute of Engineers Membership No. 788184
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.



NORTHERN BEACHES
Consulting Engineers P/L.
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Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au
web page: www.nbconsulting.com.au

Project:

PROPOSED DEVELOPMENT
at: 104 & 106 Wakehurst Parkway
Elanora
for: Stuart Thor

Drawing Title:

GENERAL NOTES
AND DRAWING SCHEDULE

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Date:

Mar 2006

Design:

L.M.

Drawn:

Paul R Bruce

Checked:

RA

Job No:

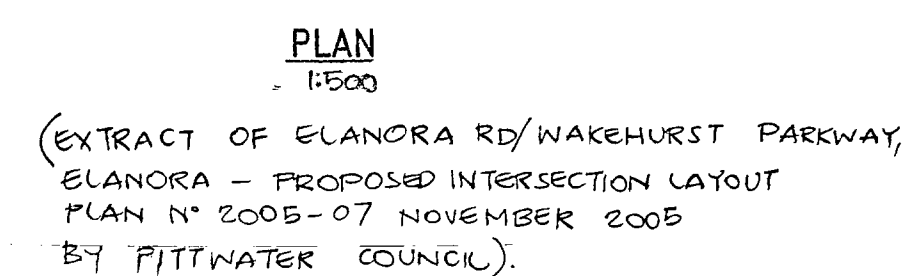
051149

Drawing No:

S01

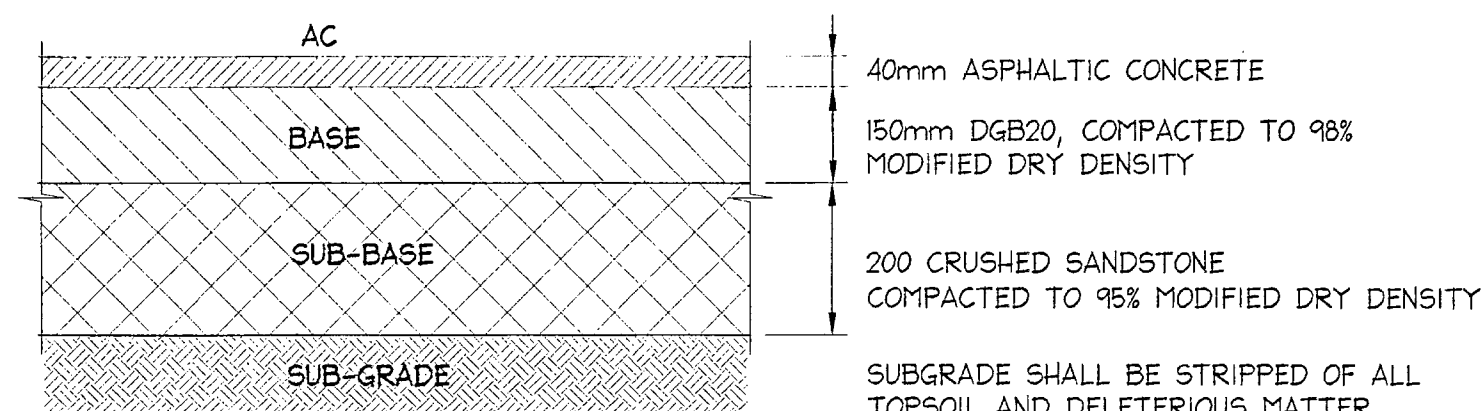
Rev:

-



- MERGING LANE (FOR TRAFFIC FROM ELANORA RD) ON NORTHERN SIDE OF WAKEHURST PARKWAY TO BE CLOSED BY THE INSTALLATION OF TRAFFIC BARRIERS 1m OFF THE EI LINE & TRAFFIC DIRECTED TO STOP BEFORE ENTERING WAKEHURST PARKWAY.

Date:	Design:	Drawn:	Checked:
JAN '06	L.M.	LFC	RGL
Job No:		Drawing No:	Rev:
051149		C02	



TYPICAL PAVEMENT DETAIL

SCALE = 1 : 10

PAVEMENT DESIGN

ASSUME: CBR 4 % - GEOTECHNICAL ENGINEER TO CONFIRM
ASSUME ROAD CATEGORY 4 - DISTRIBUTOR/SINGLE BUS

BITUMEN PAVEMENT NOTES:

CONSTRUCTION

SUB-BASE: 200 CRUSHED SANDSTONE

BASE: 150 DGB 20

TO CONFORM WITH THE REQUIREMENTS OF R.T.A FORM No.76 AND COMPACTED TO A DENSITY OF 100% SDD

AC: (AC40)

TO BE PLACED IN ACCORDANCE WITH R.T.A FORM No.612

PRIME AND SPRAY SEAL IN ACCORDANCE WITH R.T.A SPRAYED SEALING GUIDE (OCT 93)

TESTING

TESTING IS TO BE DONE BY NATA REGISTERED TESTING ORGANISATION.

TEST COMPACTION OF SUBGRADE, FILL AND BASE COURSE AT RATE OF TWO (2) FIELD, DENSITY TEST PER LAYER PER 25 LINEAL METRES LOCATED ON A STATISTICAL BASIS.

TEST COMPACTION OF ASPHALTIC CONCRETE IN ACCORDANCE WITH RTA FORM 612 AND AS DIRECTED BY SUPERINTENDENT ALLOW FOR 6 FIELD DENSITY TESTS PER ONE DAYS PRODUCTION

TRAFFIC CONTROL

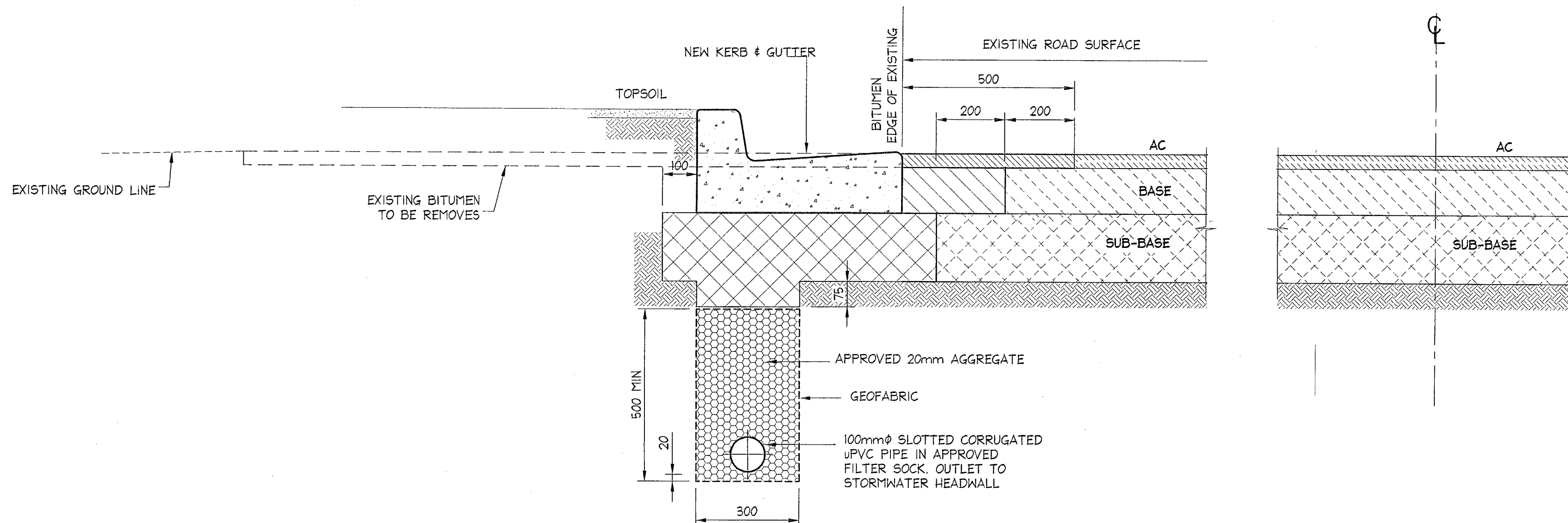
PROVISIONS FOR TRAFFIC DURING CONSTRUCTION SHALL BE IN ACCORDANCE WITH AS1742.3 AND SHALL BE TO THE APPROVAL OF THE RTA.

PAVEMENT MARKINGS

PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE RTA'S SPECIFICATION FOR ROADWORKS - PART R PAVEMENT MARKINGS AND RTA DRAWING MD.R60.A01.A

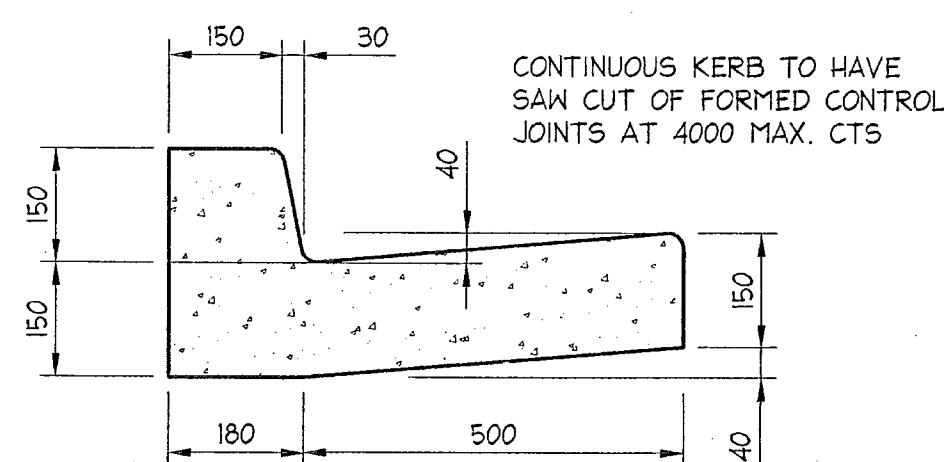
KERB AND GUTTERS

ALL KERBS AND GUTTERS COMPLY WITH RTA SPECIFICATION CONCRETE SHALL BE MINIMUM GRADE N20 80 20 AS PER AS3400



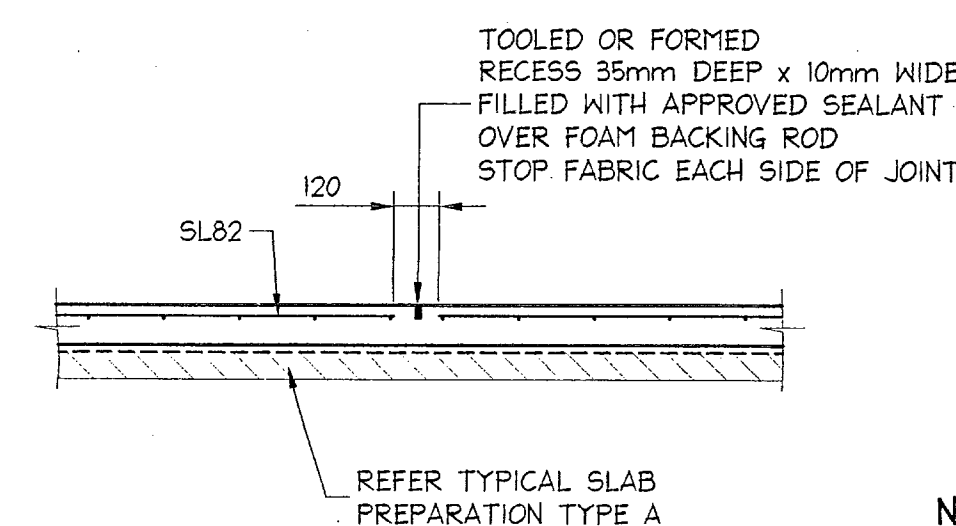
KERB & GUTTER SECTION

SCALE = 1 : 10



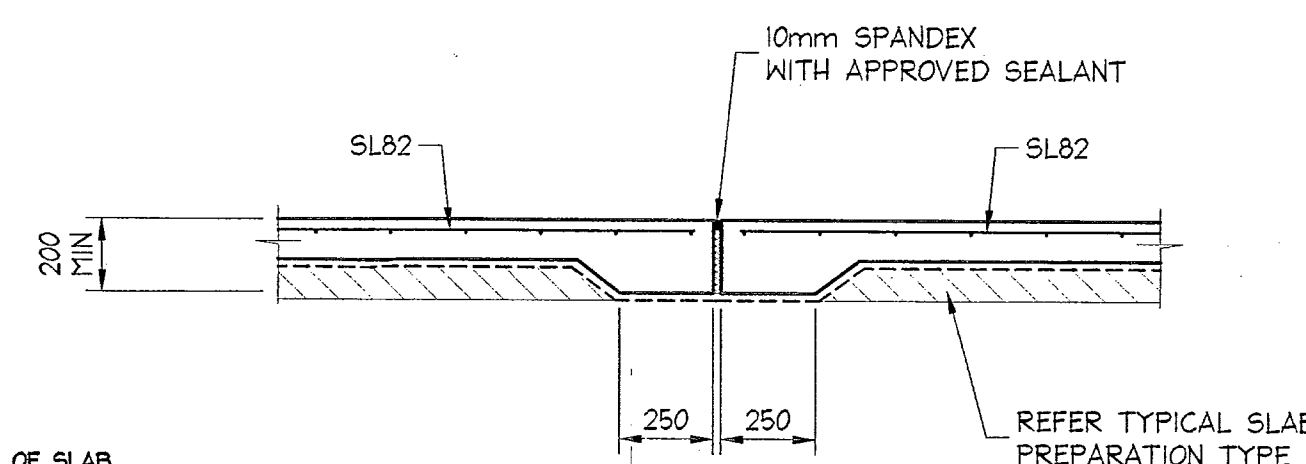
KERB & GUTTER DETAIL

SCALE = 1 : 10



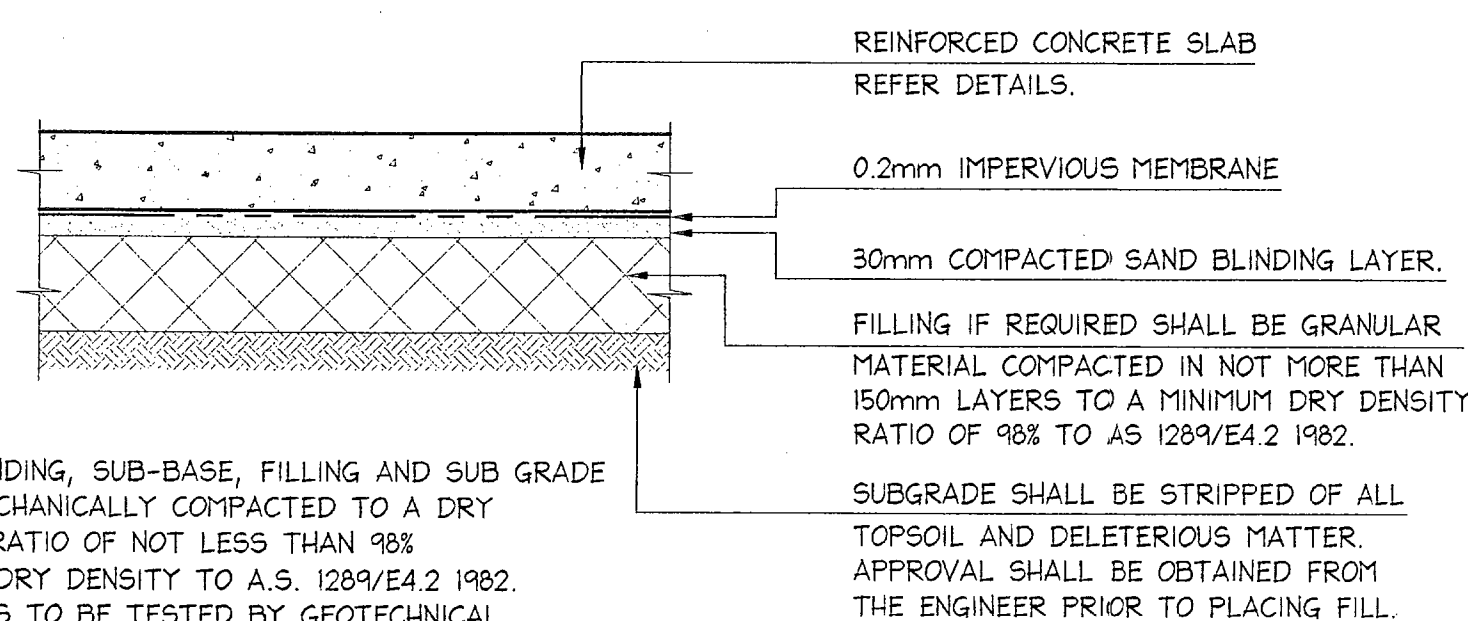
TOOLED JOINT DETAIL DENOTED T.J. ON PLAN

SCALE = 1 : 20



EXPANSION JOINT DETAIL DENOTED E.J. ON PLAN

SCALE = 1 : 20



NOTE :

SAND BLINDING, SUB-BASE, FILLING AND SUB GRADE TO BE MECHANICALLY COMPACTED TO A DRY DENSITY RATIO OF NOT LESS THAN 98% MAXIMUM DRY DENSITY TO A.S. 1289/E4.2 1982. ALL AREAS TO BE TESTED BY GEOTECHNICAL ENGINEER AND RESULTS FORWARDED TO STRUCTURAL ENGINEER PRIOR TO POURING CONCRETE.

TYPICAL SLAB PREPARATION TYPE A SLAB ON GRADE

N.T.S.

NOTE: JOINT SEALANT

USE THIOFLEX 600 POURING OR GUN GRADE SEALANT BY PARBURY TECHNOLOGIES OR APPROVED EQUIVALENT. THIOFLEX 600 POURING GRADE IS SUITABLE ONLY FOR HORIZONTAL JOINTS WITH SOUND BACKING. FOR INCLINED OR VERTICAL JOINTS THIOFLEX 600 GUN GRADE SHOULD BE USED. BOTH GRADES OF THIOFLEX 600 SHALL BE INSTALLED OVER A FOAM BACKING ROD AND USED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.

ISSUED FOR
CONSTRUCTION
CERTIFICATE
SUBMISSION ONLY

NOTES:

- ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
- FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

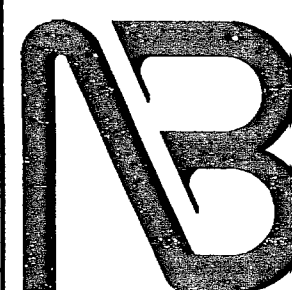
A1

Date:	Rev:	Amendment:

DOCUMENT CERTIFICATION

Date: MAR 06
Lucas Molloy
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPENG, MIEAust., NPER,
Institute of Engineers Membership No. 788184
I hereby state that this drawing is in compliance
with the provisions of the Building Code of
Australia and/or relevant Australian/Industry
Standards.



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web page: www.nbconsulting.com.au

Project:

PROPOSED DEVELOPMENT
at: 104 & 106 Wakehurst Parkway
Elanora
for: Stuart Thor

Drawing Title:

WAKEHURST PARKWAY
FRONTAGE ROADWORKS
SECTIONS AND DETAILS

The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.

Date:	Design:	Drawn:	Checked:
Mar 2006	L.M.	Paul R Bruce CPENG Aust.	RW
Job No:	Drawing No:	Rev:	
051149	C03	-	

NOTE:
REFER DRAWING No. C02
FOR WORKS IN RELATION
TO THAT PART OF THE
WAKEHURST PARKWAY
(ROAD) FRONTAGE

WAKEHURST PARKWAY

No. 106

PROPOSED RESIDENCE 1
BY ALL AUSTRALIAN ARCHITECTURE
FFL = 6.400

DOUBLE GARAGE
BY ALL AUSTRALIAN
ARCHITECTURE
FFL = 8.850

DOUBLE GARAGE
BY ALL AUSTRALIAN
ARCHITECTURE
FFL = 9.50

PROPOSED NEW DRIVEWAY
REFER DRAWING C06 FOR DETAILS

RIGHT OF CARRIAGEWAY
AND EASEMENT FOR SERVICES AND DRAINAGE
AS PER DRAWINGS PRODUCED BY
C.M.S. SURVEYORS PTY LIMITED

PROPOSED RESIDENCE 23
BY ALL AUSTRALIAN ARCHITECTURE
FFL = 6.420

DOUBLE GARAGE
BY ALL AUSTRALIAN
ARCHITECTURE
FFL = 8.850

DOUBLE GARAGE
BY ALL AUSTRALIAN
ARCHITECTURE
FFL = 9.50

No. 104

RIGHT OF CARRIAGEWAY
AND EASEMENT FOR SERVICES AND DRAINAGE
AS PER DRAWINGS PRODUCED BY
C.M.S. SURVEYORS PTY LIMITED

DOUBLE GARAGE
BY ALL AUSTRALIAN
ARCHITECTURE
FFL = 8.850

DOUBLE GARAGE
BY ALL AUSTRALIAN
ARCHITECTURE
FFL = 9.50

PROPOSED
RESIDENCE 2
BY ALL AUSTRALIAN
ARCHITECTURE

DOUBLE GARAGE
BY ALL AUSTRALIAN
ARCHITECTURE
FFL = 8.850

DOUBLE GARAGE
BY ALL AUSTRALIAN
ARCHITECTURE
FFL = 9.50

PROPOSED
RESIDENCE 2
BY ALL AUSTRALIAN
ARCHITECTURE

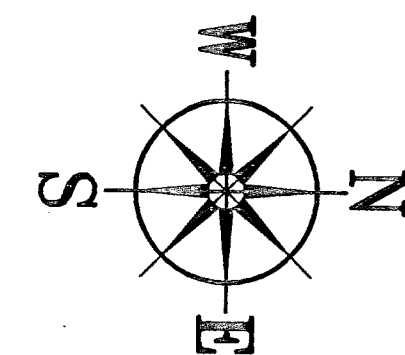
DRIVEWAY LAYOUT PLAN

SCALE = 1 : 100

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CONSTRUCTION
CERTIFICATE
SUBMISSION ONLY

NOTES:

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ON SITE BY BUILDER BEFORE
COMMENCING WITH WORK.
- FOR GENERAL NOTES AND
DRAWING SCHEDULE REFER
TO DRAWING NUMBER: S01.

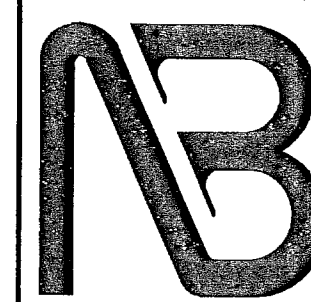


AI

DOCUMENT CERTIFICATION

Date: 14/06/06
Lucas Molloy
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER,
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e-mail: nb@nbconsulting.com.au
web page: www.nbconsulting.com.au

Project:

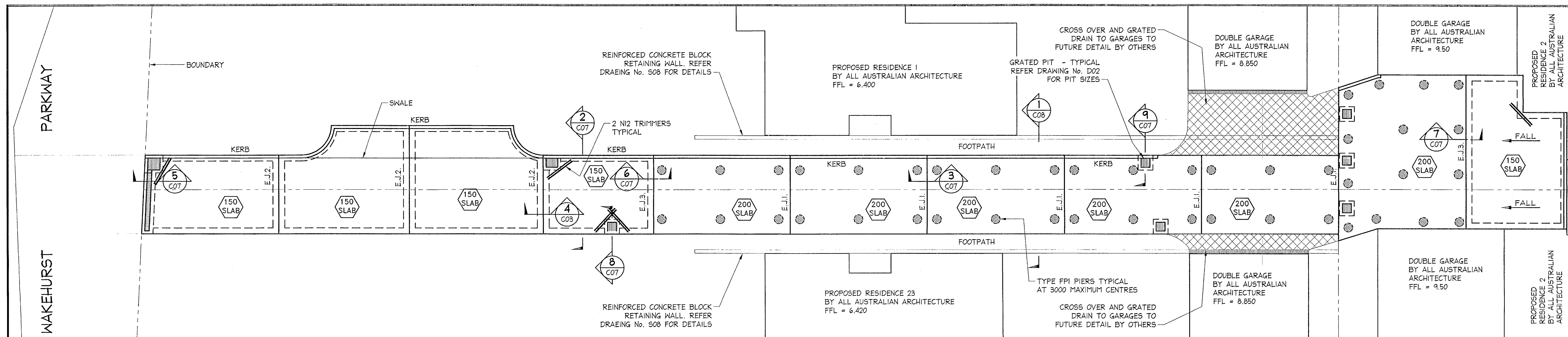
PROPOSED DEVELOPMENT
at: 104 & 106 Wakehurst Parkway
Elanora
for: Stuart Thor

Drawing Title:

DRIVEWAY
LAYOUT PLAN

Date:	Design:	Drawn:	Checked:
Mar 2006	L.M.	Paul R Bruce CP11EAust.	RJB
Job No:	Drawing No:	Rev:	
051149	C04	-	

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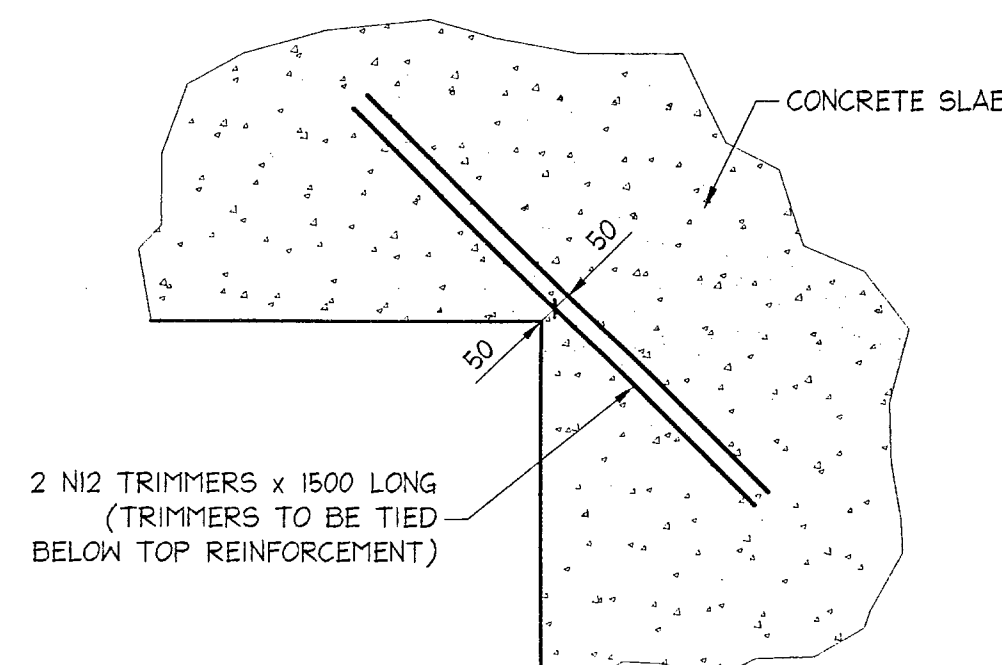
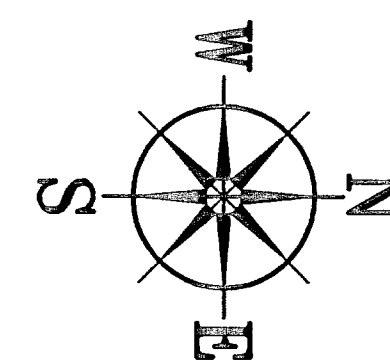


150mm THICK SLAB ON GRADE
TO BE REINFORCED WITH SL92 TOP
200mm THICK SUSPENDED SLAB ON LOOSE FORM FILL TO BE
REINFORCED WITH N12 AT 200 EACH WAY TOP AND BOTTOM
DRIVEWAY SLAB PLAN
SCALE = 1 : 100

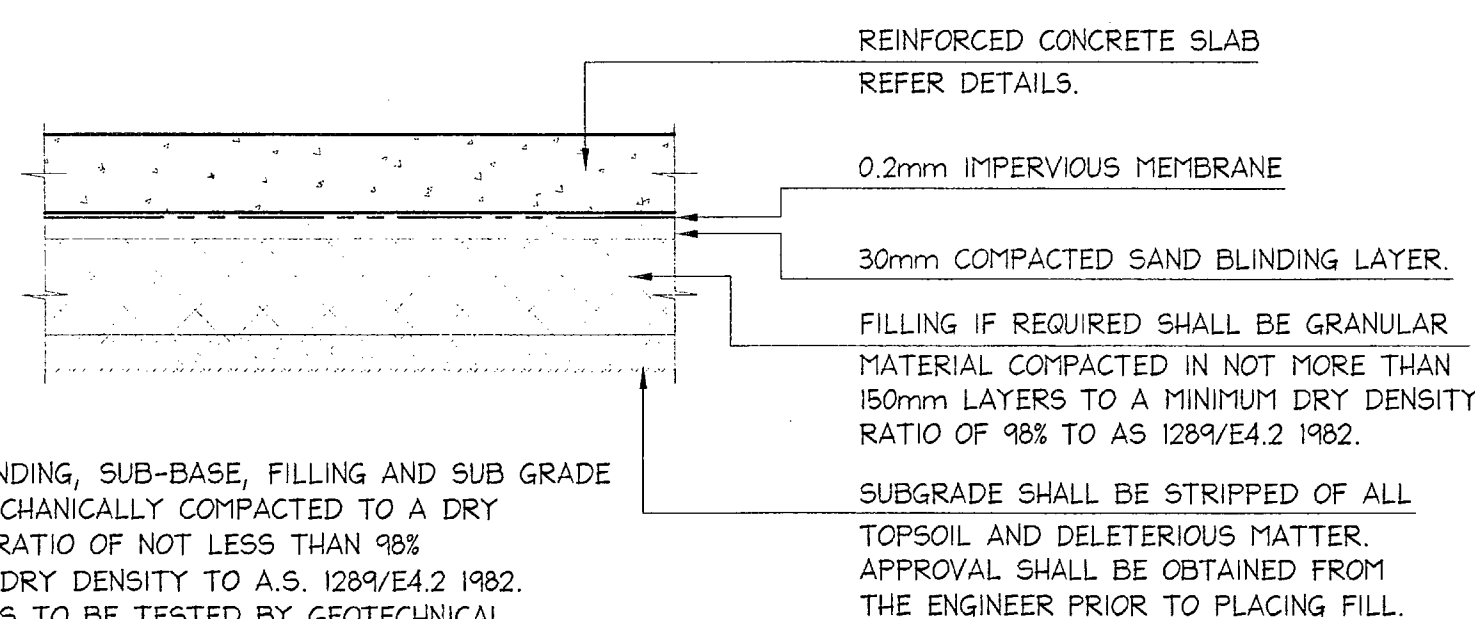
NOTE:
CONCRETE STRENGTH:
EXTERNAL SLABS:
f_c = 40 MPa, COVER = 45 mm

NOTE: JOINT SEALANT
USE THIOFLEX 600 POURING OR GUN GRADE SEALANT
BY PARBURY TECHNOLOGIES OR APPROVED EQUIVALENT.
THIOFLEX 600 POURING GRADE IS SUITABLE ONLY FOR
HORIZONTAL JOINTS WITH SOUND BACKING. FOR INCLINED OR
VERTICAL JOINTS THIOFLEX 600 GUN GRADE SHOULD BE
USED. BOTH GRADES OF THIOFLEX 600 SHALL BE INSTALLED
OVER A FOAM BACKING ROD AND USED IN STRICT
ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.

LEGEND: 200 SLAB
→ DIRECTION OF BARS
LAID 1st AND LAST
↓ DIRECTION OF BARS
LAID 2nd AND 3rd.

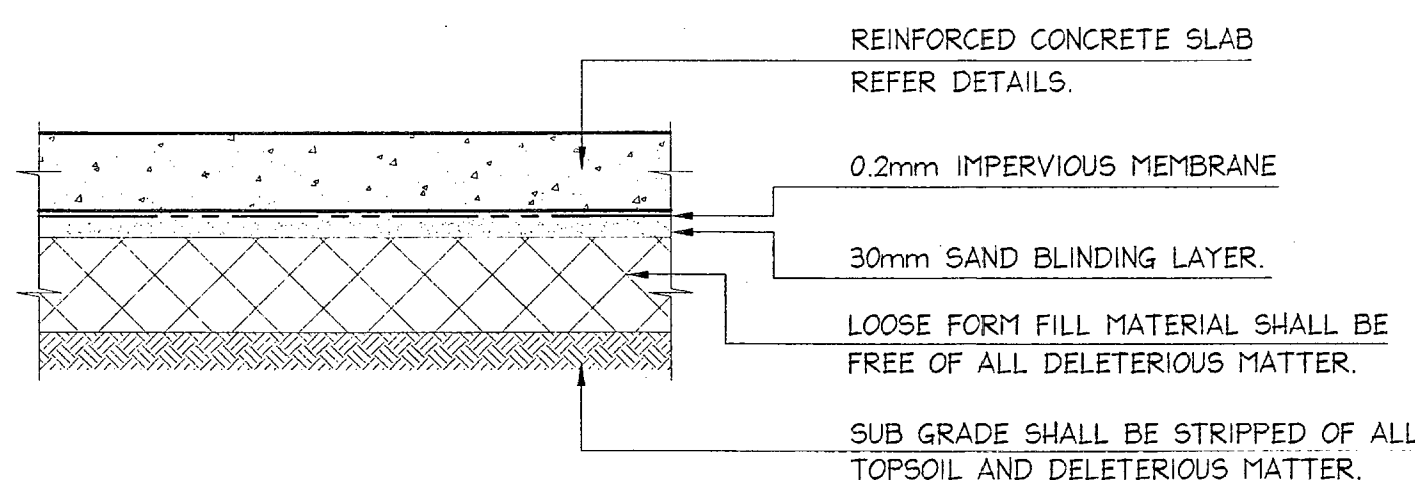


TYPICAL TRIMMER DETAIL
SCALE = 1 : 20



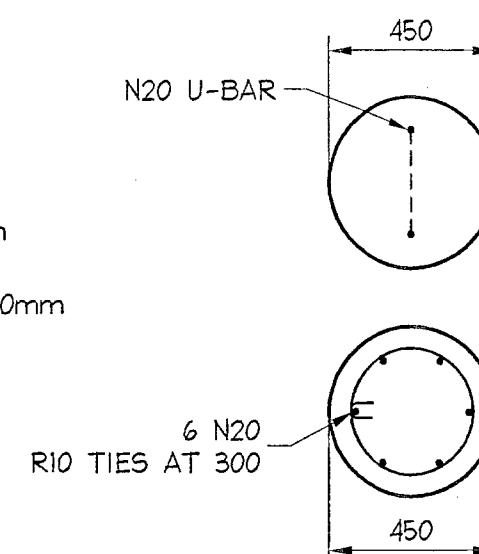
NOTE:
SAND BLINDING, SUB-BASE, FILLING AND SUB GRADE
TO BE MECHANICALLY COMPACTED TO A DRY
DENSITY RATIO OF NOT LESS THAN 98%
MAXIMUM DRY DENSITY TO A.S. 1289/E4.2 1982.
ALL AREAS TO BE TESTED BY GEOTECHNICAL
ENGINEER AND RESULTS FORWARDED TO STRUCTURAL
ENGINEER PRIOR TO POURING CONCRETE.

TYPICAL SLAB PREPARATION TYPE A
SLAB ON GRADE
N.T.S.



TYPICAL SLAB PREPARATION TYPE B
SUSPENDED SLAB ON LOOSE FORM FILL
N.T.S.

CONCRETE PIERS:
1. PIERS TO BE 450mm DIAMETER
FOUNDED IN SOUND ROCK
2. FOR DEPTH LESS THAN 1200mm
1 N20 U-BAR.
3. FOR DEPTH GREATER THAN 1200mm
6 N20, RIO TIES AT 300.



TYPE 'FPI' FOOTING PIER SECTION
SCALE = 1 : 20

NOTE:
FOR DETAILS OF CROSS FALL
AND LEVELS OF DRIVEWAY
REFER TO DRAWING
No's. C04 & C05.

**ISSUED FOR
CONSTRUCTION
CERTIFICATE
SUBMISSION ONLY**

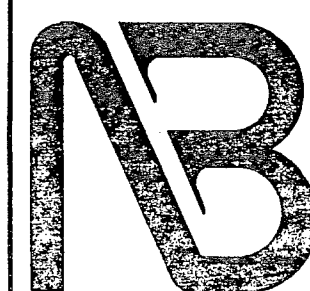
NOTES:
1. ALL DIMENSIONS TO BE VERIFIED
ON SITE BY BUILDER BEFORE
COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND
DRAWING SCHEDULE REFER
TO DRAWING NUMBER: S01.

AI

Date:	Rev:	Amendment:

DOCUMENT CERTIFICATION
Date: MAR 06
Lucas Molloy
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
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Institute of Engineers Membership No. 788184
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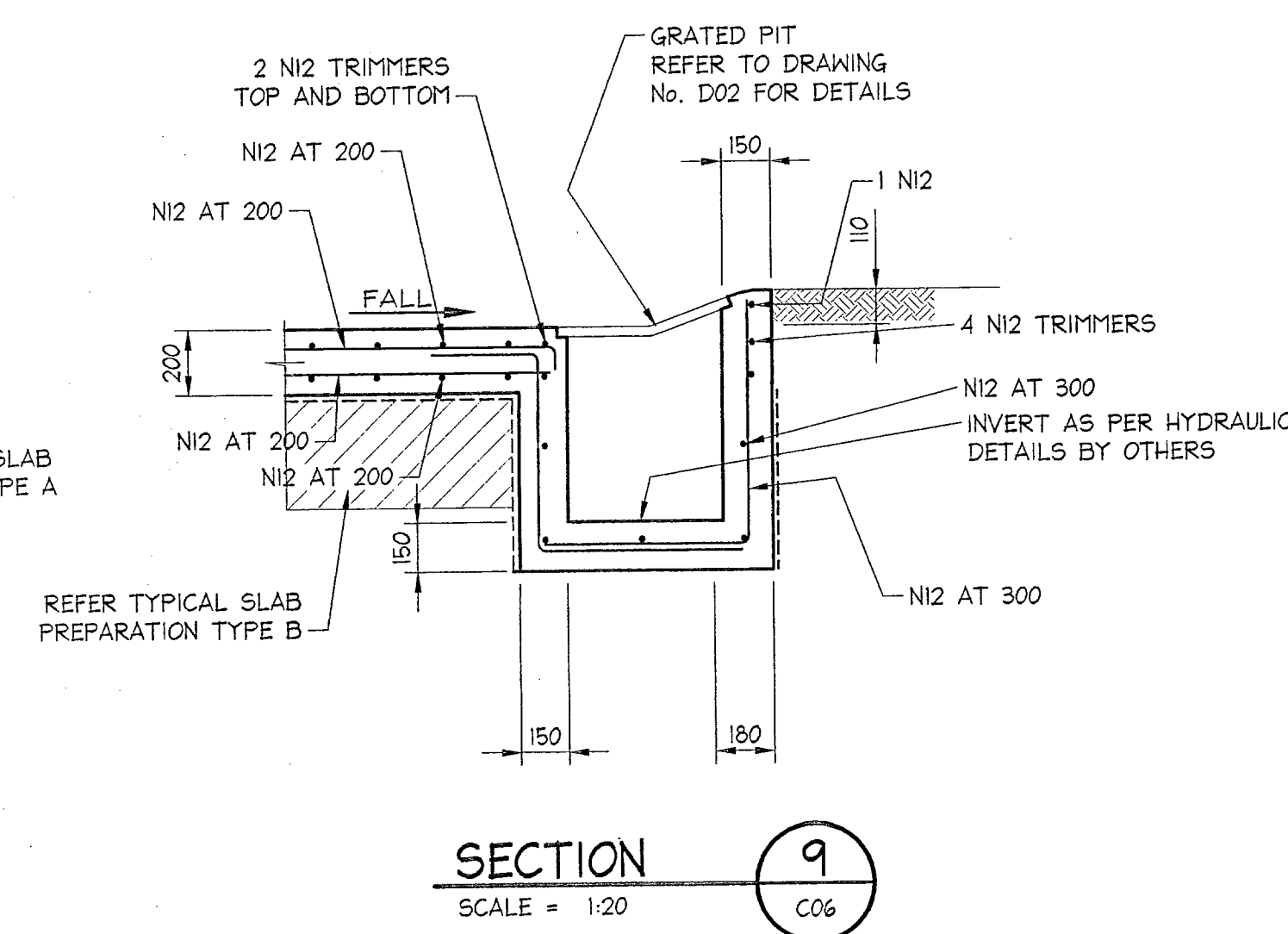
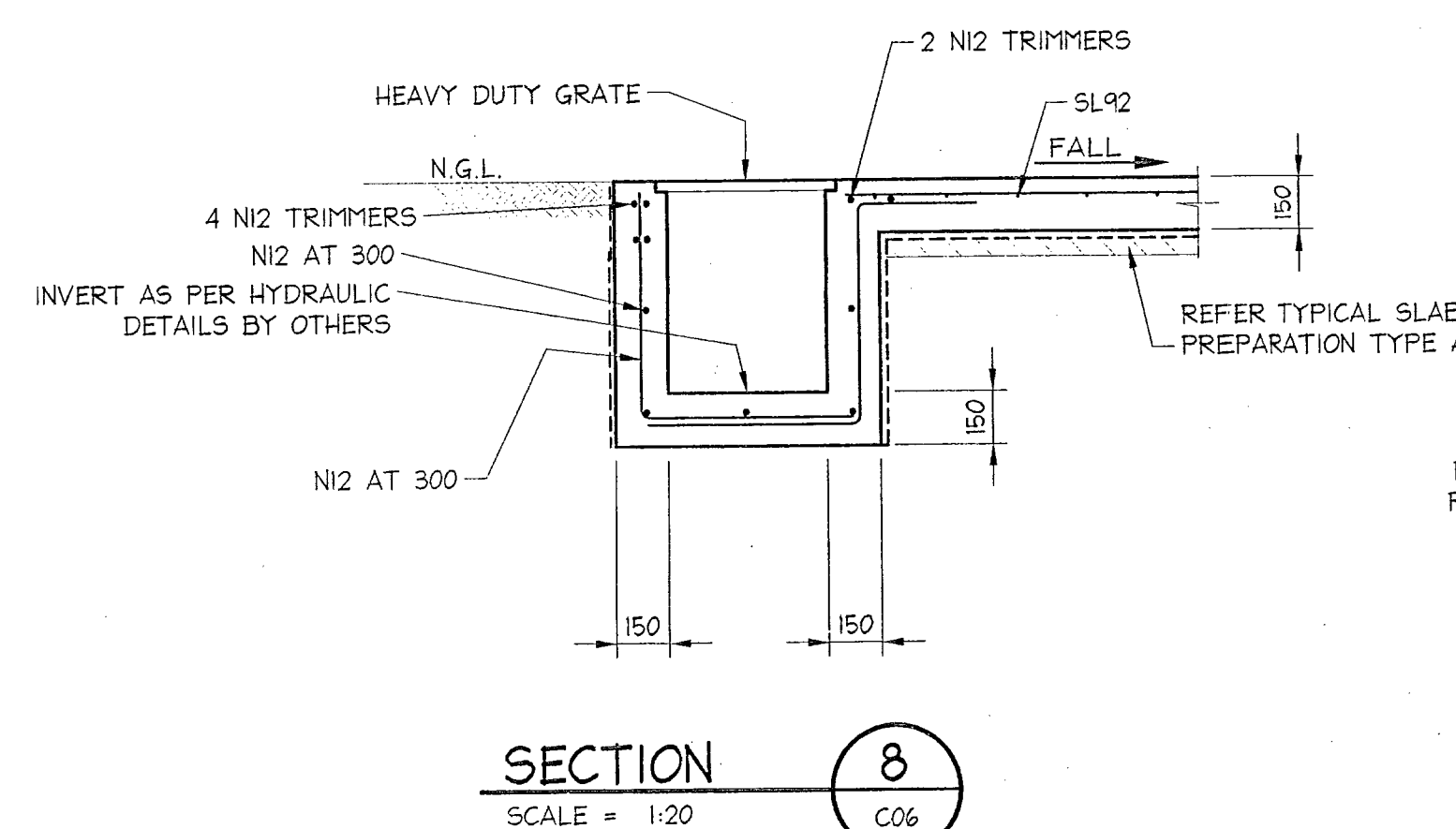
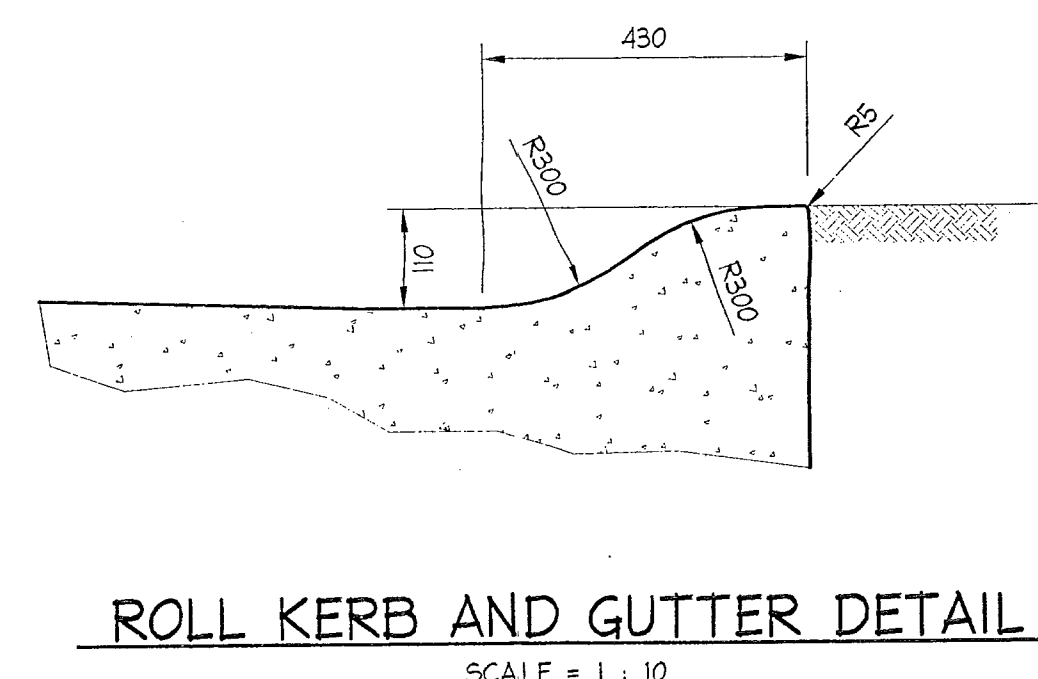
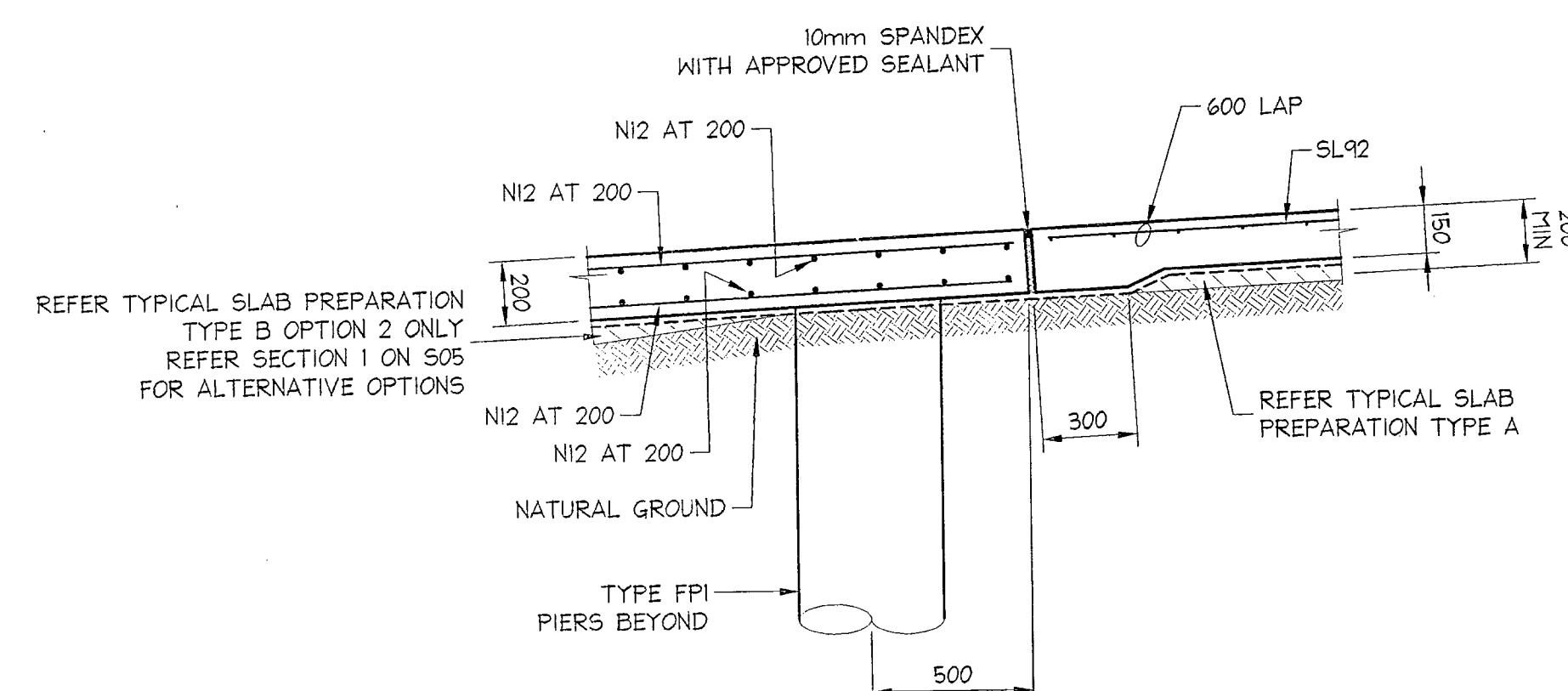
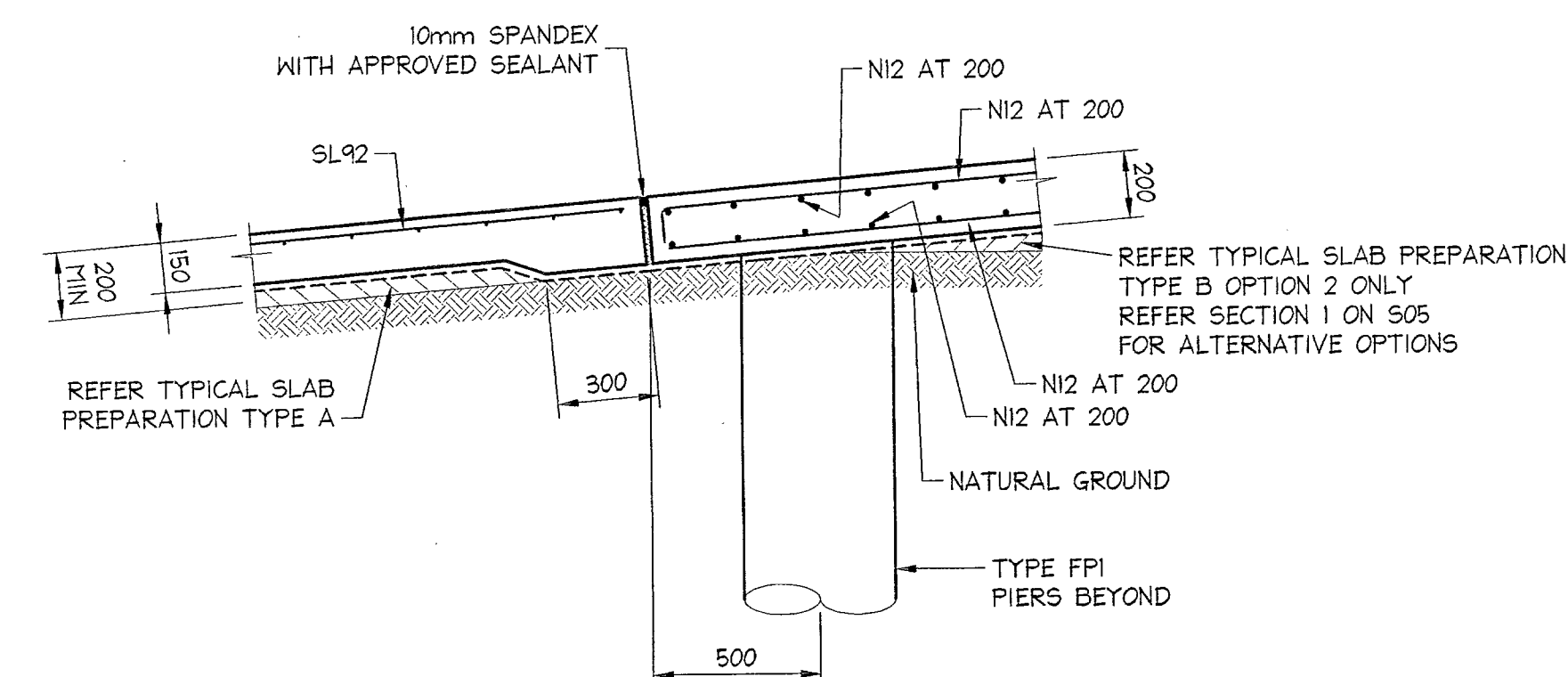
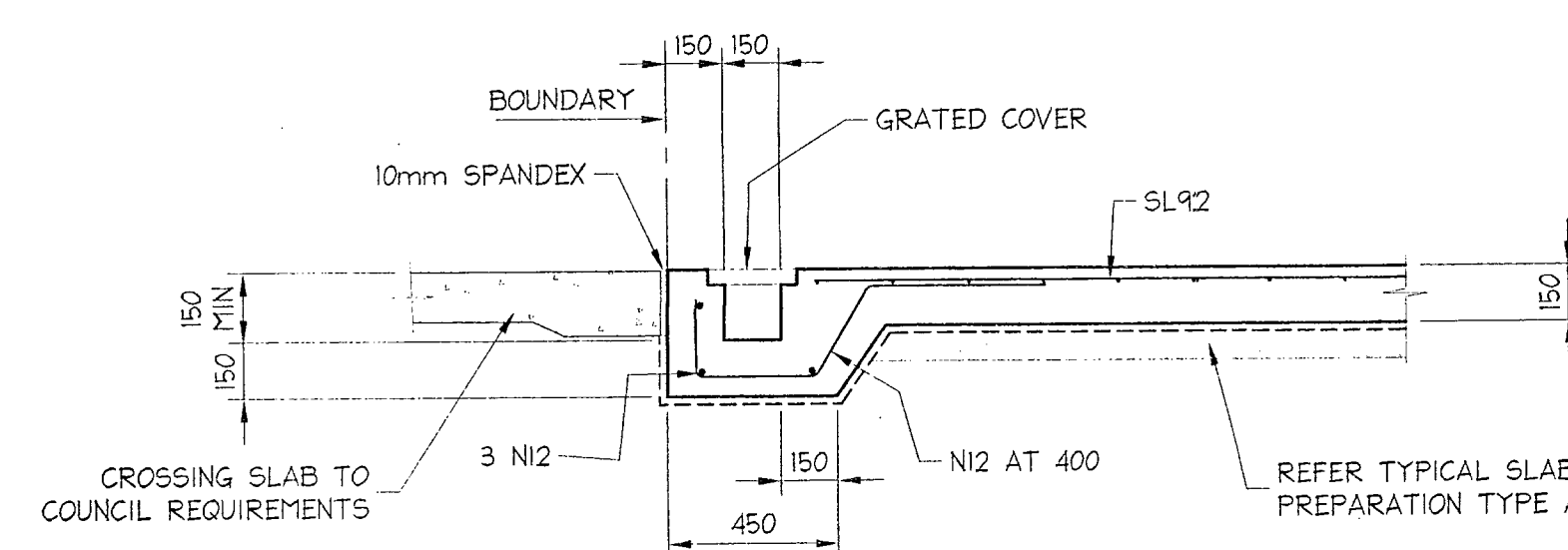
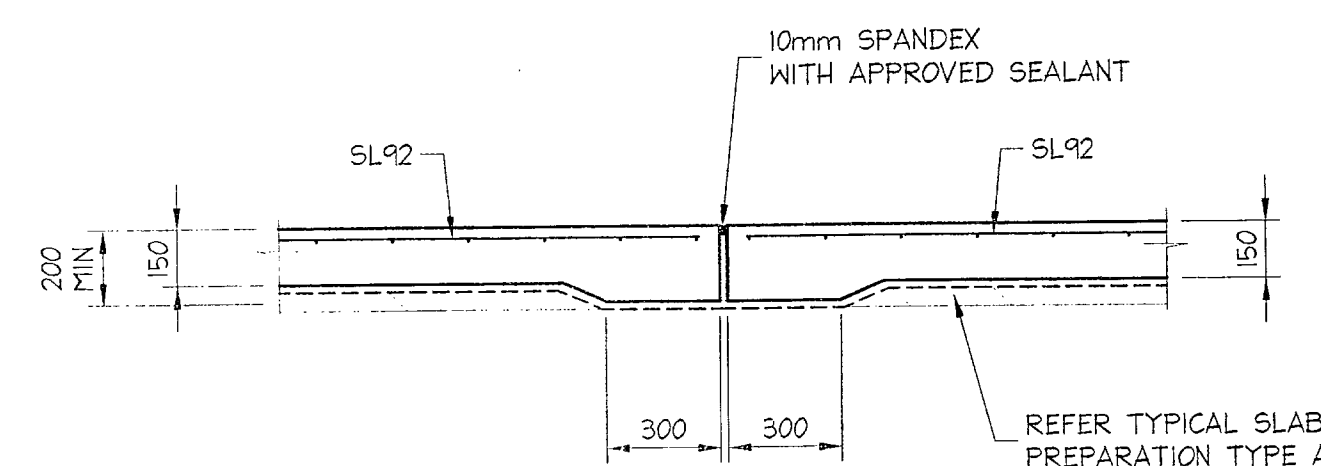
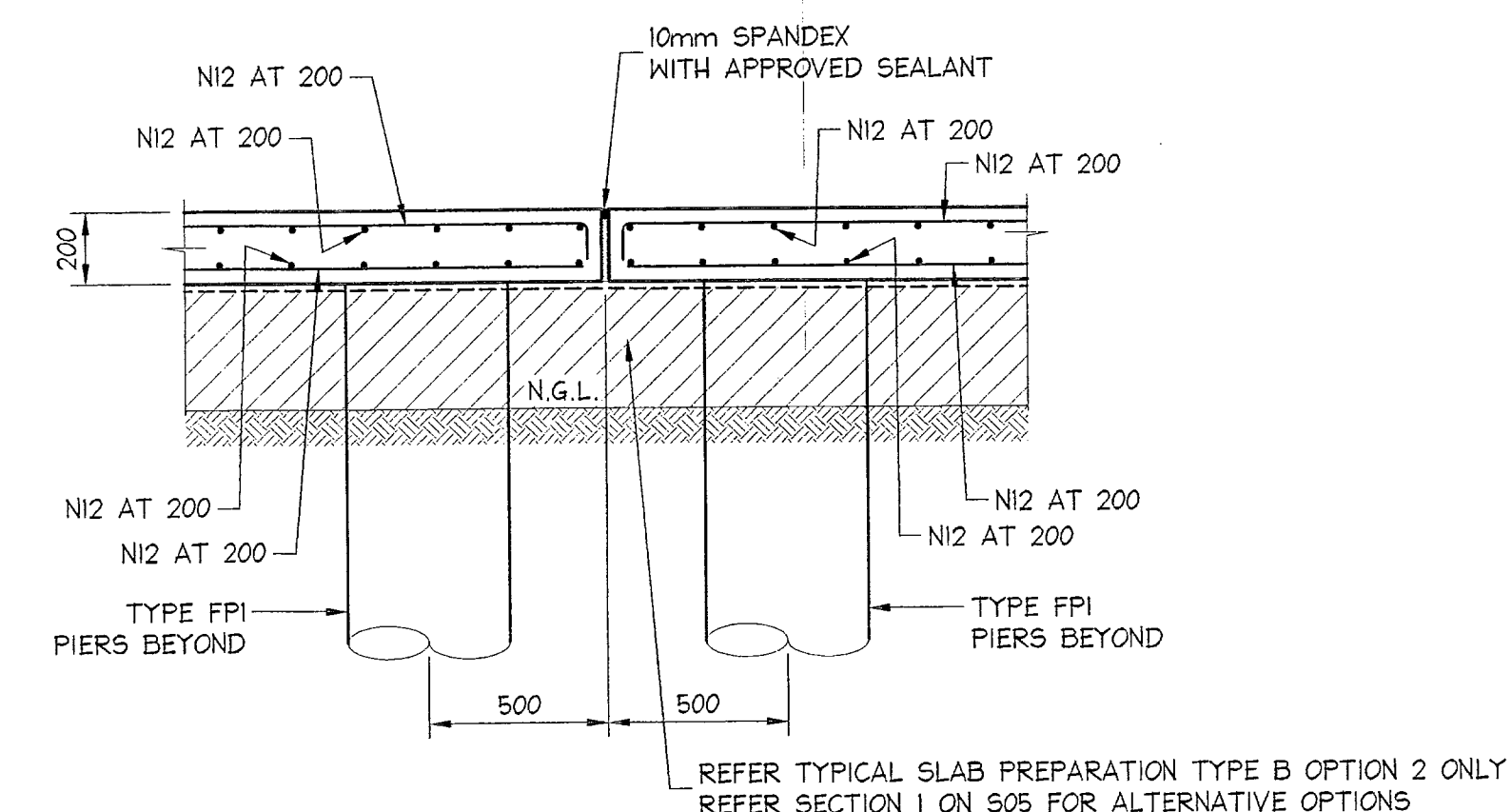
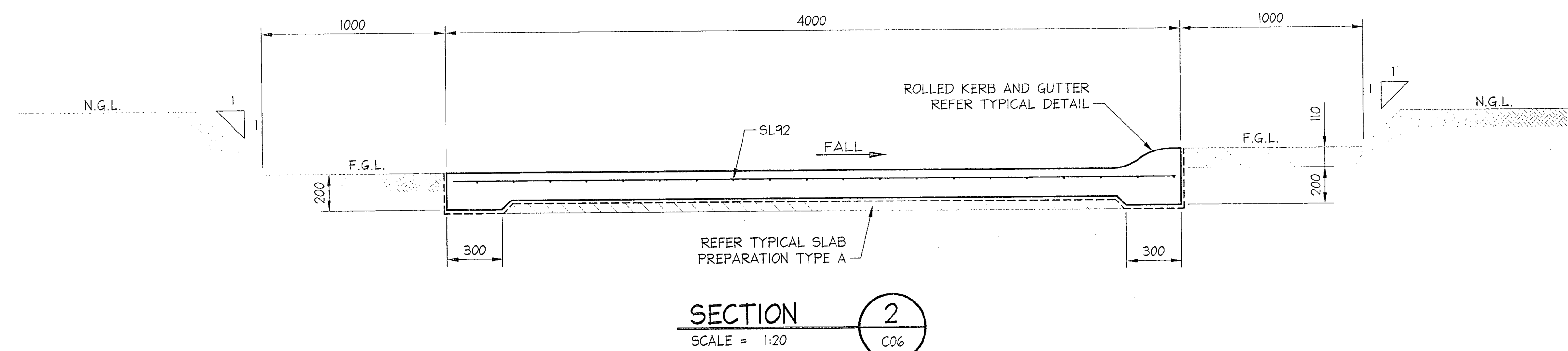


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web page: www.nbconsulting.com.au

Project:
PROPOSED DEVELOPMENT
at: 104 & 106 Wakehurst Parkway
Elanora
for: Stuart Thor

Drawing Title:
**DRIVEWAY SLAB
PLAN AND DETAILS**
The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.

Date:	Design:	Drawn:	Checked:
Mar 2006	L.M.	Paul R Bruce CM1EAust.	RKX
Job No:	Drawing No:	Rev:	
051149	C06	-	

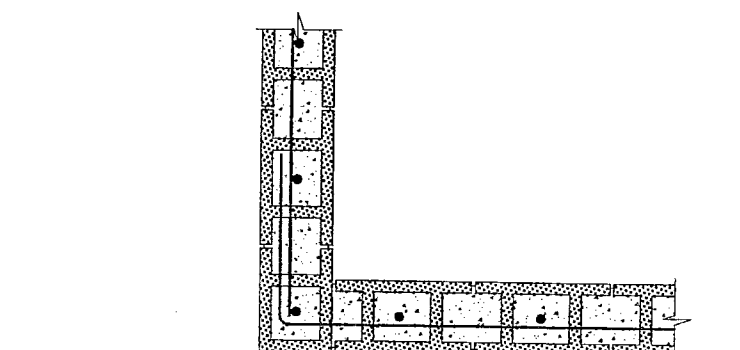
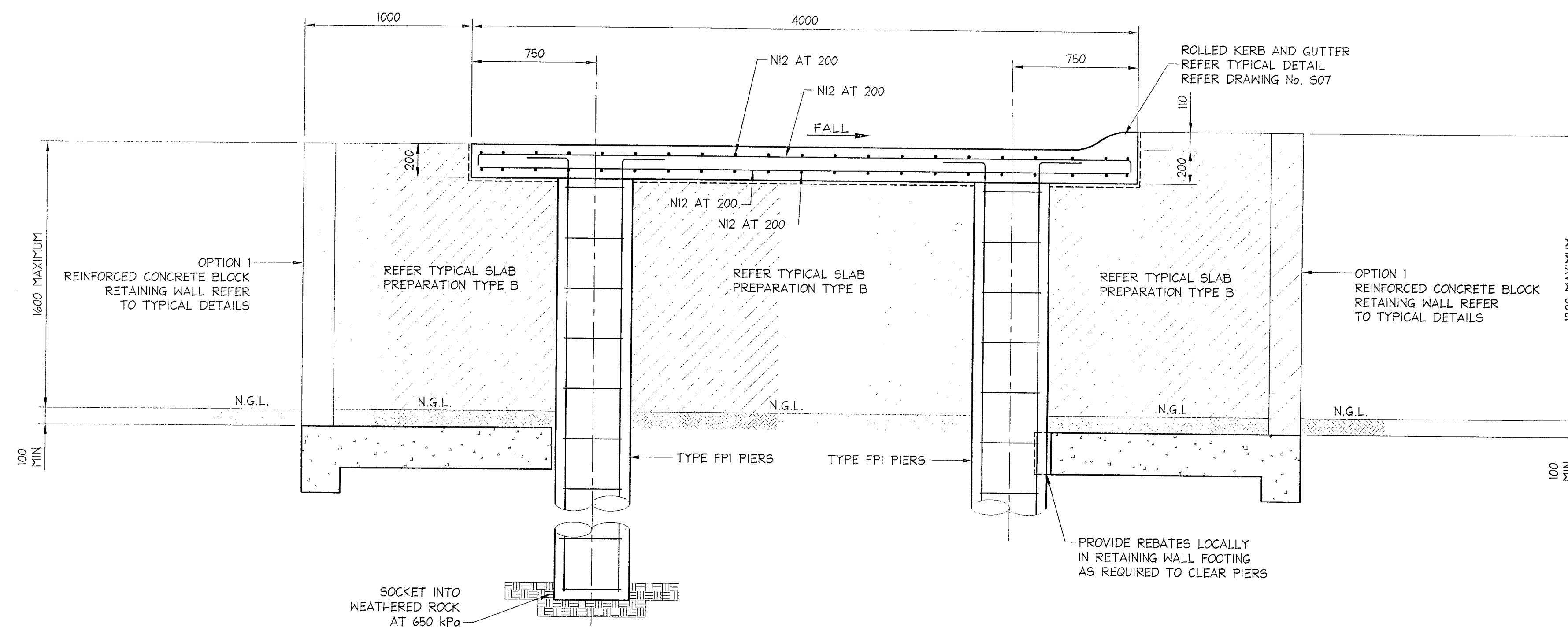


NOTE:
FOR DETAILS OF CROSS FALL
AND LEVELS OF DRIVEWAY
REFER TO DRAWING
No's. C04 & C05.

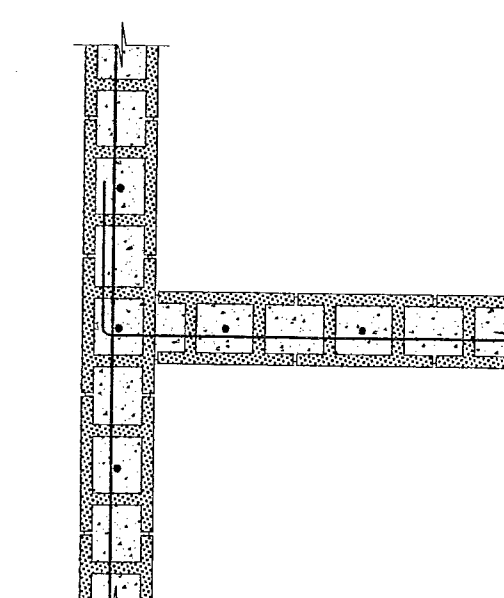
**ISSUED FOR
CONSTRUCTION
CERTIFICATE
SUBMISSION ONLY**

- NOTES:**
- ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
 - FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

<p>AI</p> <p>Date: <i>14/06/06</i></p> <p>Rev: <i>1</i></p> <p>Amendment:</p>	<p>DOCUMENT CERTIFICATION</p> <p>Date: <i>14/06/06</i></p> <p>Lucas Molloy</p> <p>(Director Northern Beaches Consulting Engineers)</p>	<p>I am a qualified Structural/Civil Engineer.</p> <p>I hold the following qualifications:</p> <p>BE(Civil), CPEng, MIEAust., NPER.</p> <p>Institute of Engineers Membership No. 788184</p> <p>I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.</p>	<p>NORTHERN BEACHES</p> <p>Consulting Engineers P/L.</p> <p>A.C.N. 076 121 616 A.B.N. 24 076 121 616</p> <p>Suite 207, 30 FISHER ROAD</p> <p>DEE WHY N.S.W. 2099</p> <p>Ph: (02) 9984 7000 Fax: (02) 9984 7444</p> <p>e-mail: nb@nbconsulting.com.au</p> <p>web page: www.nbconsulting.com.au</p>	<p>Project:</p> <p>PROPOSED DEVELOPMENT</p> <p>at: 104 & 106 Wakehurst Parkway</p> <p>Elanora</p> <p>for: Stuart Thor</p>	<p>Drawing Title:</p> <p>DRIVEWAY SLAB</p> <p>DETAILS SHEET 1</p> <p>Date: Mar 2006</p> <p>Design: L.M.</p> <p>Drawn: Paul R Bruce</p> <p>OMIEAust.</p> <p>Job No: 051149</p> <p>Drawing No: C07</p> <p>Rev: -</p>
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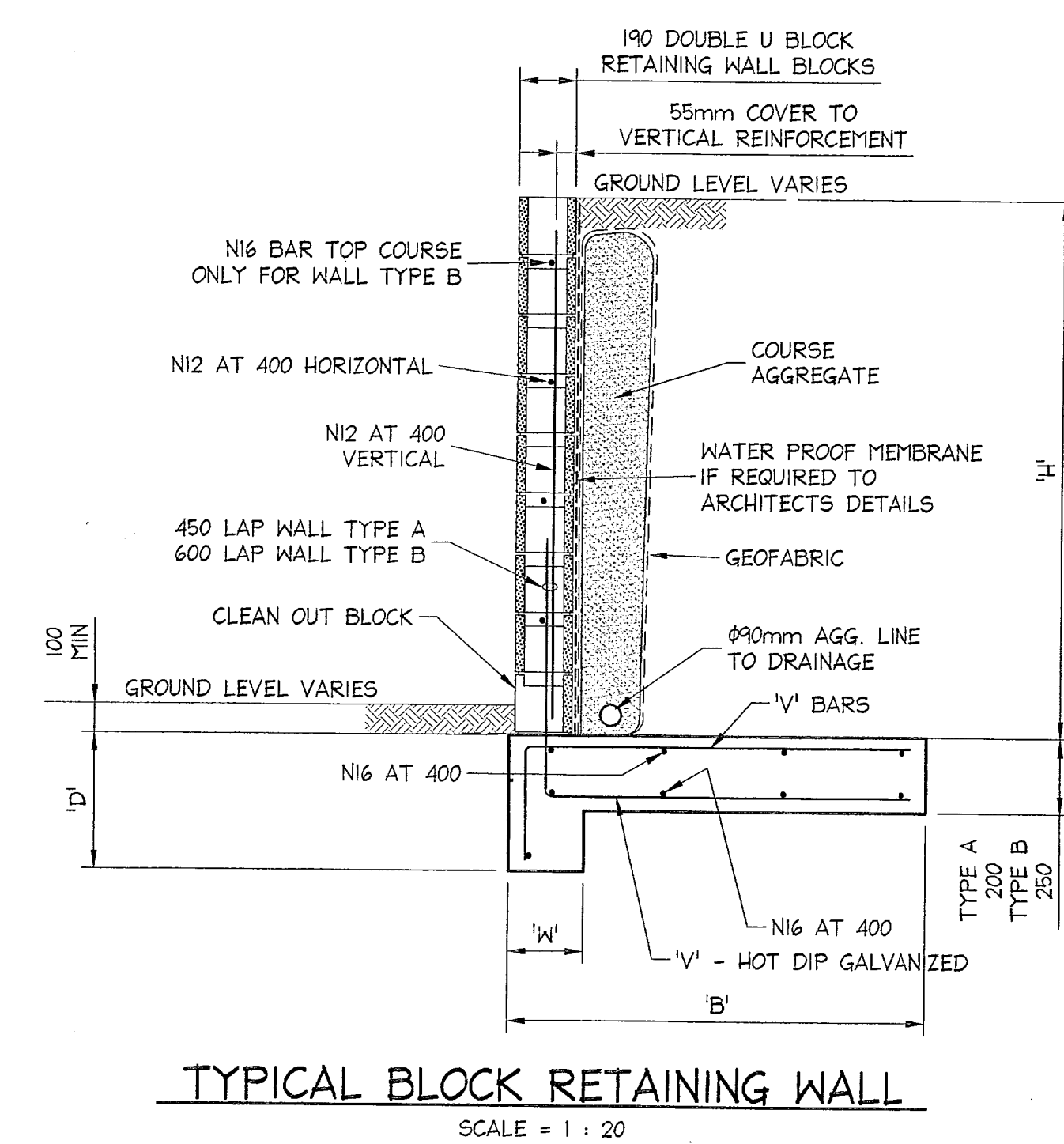
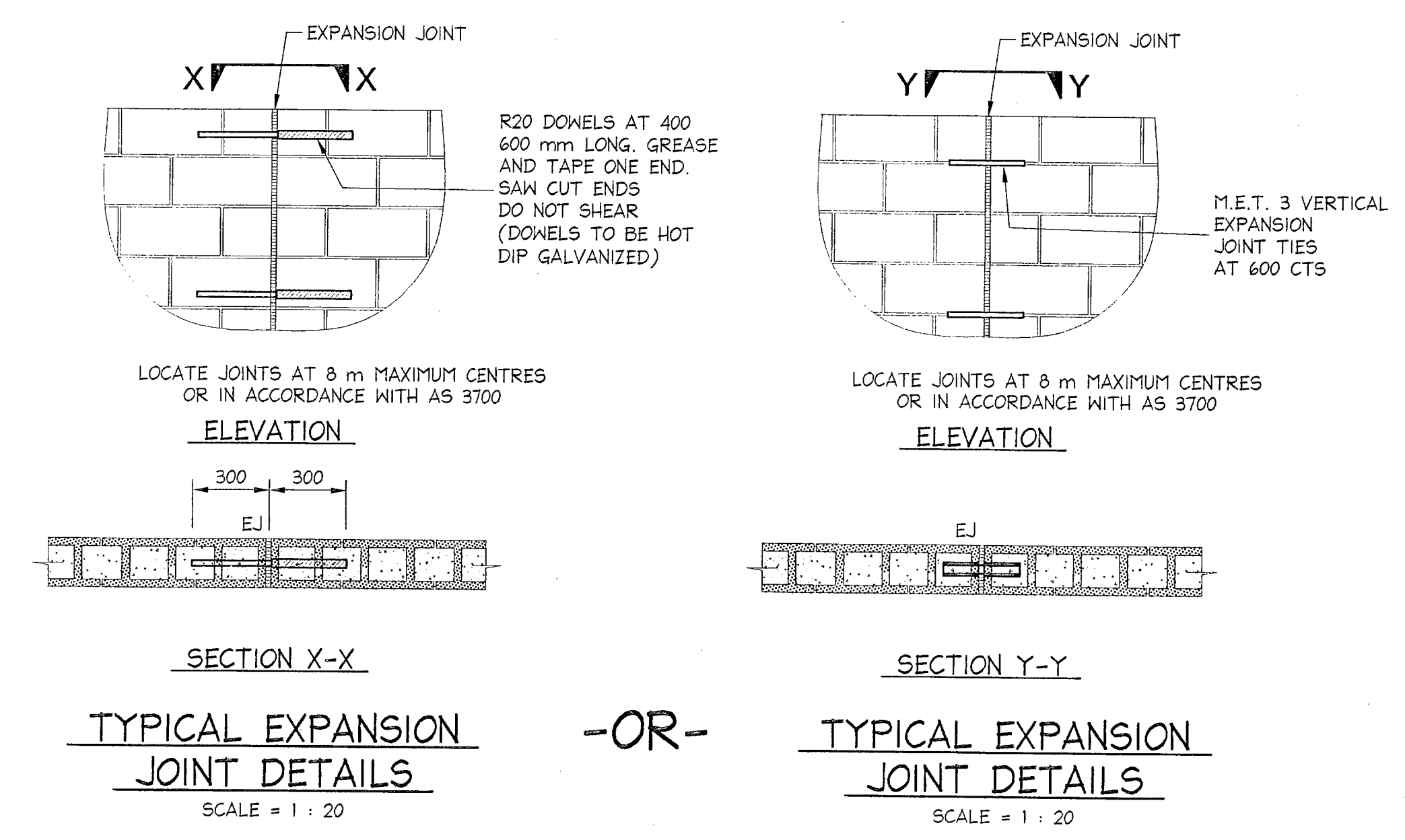
TYPICAL CORNER DETAIL
SCALE = 1 : 20



TYPICAL 'T' INTERSECTION
SCALE = 1 : 20

SECTION 1
SCALE = 1:20
C02

RETAINING WALL REINFORCEMENT SCHEDULE							
WALL TYPE	TOTAL WALL HEIGHT 'H'	OPTION 1			'V' BARS	OPTION 2	
		'B'	'D'	'W'		'B'	'D'
A	800	600	350	180	N12 AT 400	1000	350
	1000	800	350	180	N12 AT 400	1200	350
	1200	1000	350	180	N12 AT 400	1500	350
B	1400	1200	400	230	N16 AT 400	1400	400
	1600	1400	400	230	N16 AT 400	1600	400
	1800	1600	400	230	N16 AT 400	1800	400
	2000	1800	400	230	N16 AT 200	2000	400



NOTE:
FOR DETAILS OF CROSS FALL AND LEVELS OF DRIVEWAY REFER TO DRAWING No's. C04 & C05.

ISSUED FOR CONSTRUCTION CERTIFICATE SUBMISSION ONLY

- NOTES:**
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BY BUILDER BEFORE COMMENCING WITH WORK.
 2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: S01.

<p>AI</p>			<p>DOCUMENT CERTIFICATION</p> <p>I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust., NPER. Institute of Engineers Membership No. 788184 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.</p> <p>Date: <u>Mar'06</u> Lucas Molloy (Director Northern Beaches Consulting Engineers)</p>		<p>NORTHERN BEACHES Consulting Engineers P/L</p> <p>A.C.N. 076 121 616 A.B.N. 24 076 121 616 Suite 207, 30 FISHER ROAD DEE WHY N.S.W. 2099 Ph: (02) 9984 7000 Fax: (02) 9984 7444 e-mail: nb@nbconsulting.com.au web page: www.nbconsulting.com.au</p>		<p>Project:</p> <p>PROPOSED DEVELOPMENT at: 104 & 106 Wakehurst Parkway Elanora for: Stuart Thor</p>		<p>Drawing Title:</p> <p>DRIVEWAY SLAB DETAILS SHEET 2</p> <p>The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.</p>		<p>Date: <u>Mar 2006</u></p> <p>Design: <u>L.M.</u></p> <p>Job No: 051149</p>		<p>Drawn: <u>Paul R Bruce</u> O'NEAust.</p> <p>Drawing No: C08</p>		<p>Checked: <u>RSW</u></p> <p>Rev: <u>-</u></p>	
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GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 2 - To be submitted with detailed design for construction certificate

Development Application for _____

Name of Applicant _____

Address of site

104 & 106 Wakehurst Parkway Elanora

Declaration made by Structural or Civil Engineer in relation to the incorporation of the Geotechnical issues into the project design

I, Lucas Molloy

on behalf of

Northern Beaches Consulting Engineers

(insert name)

(trading or company name)

on this the

23rd June 2006

(date)

I certify that I am a Structural or Civil Engineer as defined by the Geotechnical Risk Management Policy for Pittwater. I am authorised by the above organization/company to issue this document and to certify that the organization/company has a current professional indemnity policy of at least \$2million. I also certify that I have prepared the below listed structural documents in accordance with the recommendations given in the Geotechnical Report for the above development

Geotechnical Report Details:

Report Title: GEOTECHNICAL ASSESSMENT AT 104 & 106 WAKEHURST PARKWAY, NARRABEEN
 Report Date: 9/6/04 Ref. No. 1849822R rpt
 Author: PAUL DAVID ROBERTS

Structural Documents list:DRIVEWAY ONLY:

Job #051149 - Dwg # 501, 502, 503, 504, 505, 506,
507, 508, 509, 510

I am also aware that Pittwater Council relies on the processes covered by the Geotechnical Risk Management Policy, including this certification as the basis for ensuring that the geotechnical risk management aspects of the proposed development have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure taken as at least 100 years unless otherwise stated and justified.

Lucas Molloy

(name)

(signature)

Declaration made by Geotechnical Engineer or Engineering Geologist in relation to Structural Drawings

WE prepared and/or technically verified the abovementioned Geotechnical Report as per Form 1 dated 9/6/04 and now certify that I have viewed the above listed structural documents prepared for the same development. WE are satisfied that the recommendations given in the Geotechnical Report have been appropriately taken into account by the structural engineer in the preparation of these structural documents, & including comments provided in our letter (Ref. 1849822R2) dated 10/4/06 & Ref. 1849822R1 dated 27/10/05 covering cliff stabilisation works.

Signature

Bruce F Walker 28/6/06

Name

B F WALKER

Chartered Professional Status

F.T.E. Aust. C.P. Eng

Membership No.

199312

Jeffery and Katauskas Pty Ltd

CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

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27 October 2005

Ref:18498ZRlet

Mr Stuart Thor
106 Wakehurst Parkway
NARRABEEN NSW 2101

Dear Sir

ADDITIONAL GEOTECHNICAL ASSESSMENT

104 - 106 WAKEHURST PARKWAY, NARRABEEN

Introduction

This letter presents the results of our additional geotechnical assessment carried out at the above site by our Senior Engineering Geologist on 19 August 2005. The assessment was verbally commissioned by Mr Stuart Thor on 16 August 2005 on the basis of our proposal (Ref. P18498ZRprop) dated 23 June 2005.

We note that we have previously completed a geotechnical assessment at this site (Ref. 18498ZRrpt) dated 9 June 2004 to which the reader is referred for more detail.

We have been provided with copies of two outline work method statements prepared by rock face stabilisation contractors; Bruce Garland and T.E. Peck Excavations which outline the method of removing the existing pillar of sandstone from the rock face crossing the rear portion of the site (Item B of our previous report).

The purpose of this additional assessment was to complete the scope of works outlined in Sections 7.1.2, 7.1.3 and 7.1.5 of our previous report in order to complete the inspections required by Section 7.2 of our previous report ('Conditions Recommended To The Detailed Design To Be Undertaken For The Construction Certificate'). Further, on the basis of the results of our additional assessment and



ENVIRONMENTAL INVESTIGATION SERVICES, FOUNDATION AND SLOPE STABILITY INVESTIGATIONS, ENGINEERING GEOLOGY, PAVEMENT DESIGN, EXPERT WITNESS REPORTS, DRILLING SERVICES, EARTHWORKS COMPACTION CONTROL, MATERIALS TESTING, ASPHALTIC CONCRETE TESTING, QA AND QC TESTING, AUDITING AND CERTIFICATION. N.A.T.A. REGISTERED LABORATORIES





review of the provided work method statements we provide comments and recommendations on the catch fence (recommended in our previous report), stabilisation of the potential geotechnical hazards described as Items A and B in our previous report and the existing fill described in Section 7.1.5 of our previous report.

Assessment and Subsurface Investigation Procedure

The assessment and subsurface investigation procedures are generally as outlined in our previous report. However, the current subsurface investigations comprised five Dynamic Cone Penetration (DCP) tests (DCP101 to 105) which were extended to refusal depths ranging between about 0.6m (DCP103) and 3.8m (DCP101). The test locations are indicated on the attached Figure 1 and the surface reduced levels (RLs) at the DCP locations were estimated from spot levels and contours indicated on the previously provided survey plan.

Summary Of Observations

We recommend that the summary of observations which follows be read in conjunction with the corresponding section of our previous report and the attached Figure 1.

Following clearance of vegetation from the site area extending along the base of the cliff the following additional features have been identified together with more detailed observations of previously identified geotechnical feature Item B. The lettered items below correspond to the circled letters shown on Figure 1.

Item B

The base of the pillar was partially founded on jointed sandstone bedrock (or possible detached sandstone blocks) approximately 1m to 1.5m high. The base area below the pillar comprised an intermittent cavity of about 1m to 1.5m vertical height, which locally extended back horizontal distances ranging between about 0.2m and 3m. The pillar base was formed by a bedding parting which sloped down to the south-west at about 10°. This bedding parting extended west along the base of the cliff face and



had been eroded in places to form an undercut of between about 0.1m and 0.3m height.

Item D

At the western end of the cliff face an undercut feature of at least 2m length extended west across the site boundary. The undercut was at least 0.5m vertical height and extended back a horizontal distance of about 1m. The base of the undercut revealed sandy fill materials with gravel, cobble and boulder size sandstone inclusions evident.

Item E

Towards the eastern end of the cliff face a number of stacked detached blocks of sandstone (at least about 0.5m x 1.5m x 2m) were located at the base of the cliff. In addition a gap between one of the detached blocks and the cliff face was about 1.5m wide and infilled with soil. The base of the south-western corner of the detached block was also overhanging the slope below and the overhang was about 1.5m high.

Item F

Over the western portion of the cliff base area a sub-vertical soil slope of between about 1m and 2m vertical height stepped down to the south. The slope face revealed sandy clay colluvial soils with gravel, cobble and boulder size sandstone inclusions.

Subsurface Conditions

The DCP tests were located along the length of two alternative temporary catch fence locations, one of which extended through the previously identified fill area located at the base of the western end of the cliff face. The pertinent subsurface conditions at each of the two catch fence locations are discussed below:

Catch Fence 1 – DCP101, 102 and 103

Based on the test results, the upper sandy fill materials appear to extend to about 1.3m depth and have been assessed to be poorly compacted. Below about 1.3m depth, assumed colluvial and residual soils extended to refusal depths of about 1.4m



(102) and 3.8m (101). The refusal depth of DCP103 at about 0.6m is interpreted as being due to the presence of nearby large blocks of sandstone which probably extend below the test location. The refusal depths of DCP101 and DCP102 are interpreted as indicating the top of weathered sandstone bedrock although the presence of a large detached block of sandstone or thin band of sandstone within the residual soils cannot be discounted.

Catch Fence 2 – DCP3, 104 and 105

Based on the test results, the assumed natural sandy soils extended to refusal depths of about 1.1m (DCP3), 1.3m (DCP104) and 2.0m (DCP105). The sands are generally of very loose and loose relative density, improving to loose and medium relative density below depths of about 0.8m (DCP3), 0.8m (DCP104) and 0.9m (DCP105). The DCP refusal depths may be interpreted as indicating the top of weathered sandstone bedrock although the presence of a large detached block of sandstone or thin band of sandstone within the residual soils cannot be discounted.

Comments and Recommendations

1. Proposed Catch Fence

As detailed in Section 7.1.2, prior to stabilisation works being carried out on the existing cliffline, a catch fence must be provided to prevent detached blocks that may fall from the cliffline rolling downslope and impacting existing or proposed buildings and structures. As the stabilisation works along the cliff line will be completed before construction of the new residences commences, the catch fence may be located to the north of the existing residence at either of the two locations indicated on Figure 1. Our preference is for a catch fence at location 1 as this is nearer to the cliff line thus preventing any rolling blocks of sandstone gathering significant additional momentum as they travel downslope.

The catch fence supports will need to be socketed into sandstone bedrock, expected to be encountered at depths ranging between about 1.4m (DCP102) and 3.8m (DCP101). Subject to witnessing the drilling of selected fence support drill holes and



inspection of the drill hole bases by a geotechnical engineer, the catch fence supports may be designed on the basis of an allowable lateral stress of 200kPa assuming horizontal ground in front of the toe. However the presence of a step down in the sandstone bedrock in front of the key cannot be discounted and additional probing downslope of the catch fence supports is recommended.

2. Pillar Of Sandstone - Item B

We note that it is your intention to remove the pillar of rock from in front of the cliff face and in this regard you have received two outline work method statements from stabilisation contractors. In principal the provided work method statements regarding removal of the pillar appear reasonable. However, due to the overhanging base of the pillar we consider it prudent to provide an underpin to support the base of the pillar as any movements of individual sections of the pillar during the stabilisation works may result in toppling of the pillar. Further advice from the stabilisation contractors will need to be provided and is probably best achieved by on site discussions with the undersigned. The underpins would need to be founded on bedrock as outlined in Section 7.1.8 of our previous report.

3. Stabilisation Of Features At Base Of Cliff Line

The detached sandstone blocks described as Item E should be split into smaller pieces and removed from site or re-used for landscaping purposes. Alternatively, the blocks could be rock bolted or underpinned as necessary but removal is believed to be a more cost effective solution as a stabilisation contractor will be on site and the scope of works should be extended to cover this work.

The fill covering the base of the undercut described as Item D should be excavated to reveal bedrock, which should be confirmed by geotechnical inspection. The nature and extent of stabilisation works may then be detailed and may comprise underpins and/or be incorporated into the stabilisation works associated with Item F located below this feature (see '4', below).



4. Stabilisation Of Sub-Vertical Soil Batter and Fill Slope

The sub-vertical soil batter described as Item F is inherently unstable and may be supported with a new retaining wall or laid back to a permanent batter slope in accordance with Section 7.1.5 of our previous report. The existing fill batter below is currently over steep and should be laid back to a similar permanent angle or retained as part of localised landscape works.

If the retaining wall solution is adopted for support of the sub-vertical soil batter it may be constructed using blocks of sandstone recovered from the stabilisation works and should be founded on bedrock. The retaining wall should be designed on the basis of the recommendations contained in Section 7.1.10 of our previous report. However, an 'active' earth pressure coefficient, k_a , of 0.85 should be adopted in the design, assuming a sloping retained surface of maximum 30°. The fill slope below may be similarly supported, however an 'active' earth pressure coefficient, k_a , of 0.35 should be adopted in the design, assuming a sloping retained surface of about 5°.

5. Review Of Work Method Statements

We have reviewed the provided work method statements and provide the following comments:

The catch fence will need to be socketted into bedrock as outlined in Section '1' above. The height of the fence should also be at least the height of the maximum dimension of the blocks that are to be removed (at least 1.5m). The fence should be engineer designed as there are potentially large forces associated with rolling blocks of sandstone that the fence (and supports) will need to withstand.

The type of plant to be used should also be detailed and in this regard we assume that all drilling associated with rock splitting would be completed using rotary methods only (i.e. percussive drilling methods are not suitable as ground borne vibrations may cause instability).



Once the stabilisation contractors have responded to the above points, we recommend that a site meeting be held to discuss and confirm the details and nature of the proposed stabilisation works outlined above.

General

The recommendations presented in this report include specific issues to be addressed during the construction phase of the project. In the event that any of the construction phase recommendations presented in this report are not implemented, the general recommendations may become inapplicable and Jeffery and Katauskas Pty Ltd accept no responsibility whatsoever for the performance of the structure where recommendations are not implemented in full and properly tested, inspected and documented.

It is possible that the subsurface soil, rock or groundwater conditions encountered during construction may be found to be different (or may be interpreted to be different) from those inferred from our surface observations in preparing this report. Also, we have not had the opportunity to observe surface run-off patterns during heavy rainfall and cannot comment directly on this aspect. If conditions appear to be at variance or cause concern for any reason, then we recommend that you immediately contact this office.

The offsite disposal of soil may require classification in accordance with the EPA guidelines as inert, solid, industrial or hazardous waste. We can complete the necessary classification and testing if you wish to commission us. As testing requires about seven days to complete, allowance should be made for such testing in the construction program unless testing is completed prior to construction. If contamination is found to be present then substantial further testing and delays should be expected.

This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other



purpose. Copyright in this report is the property of Jeffery and Katauskas Pty Ltd. We have used a degree of care, skill and diligence normally exercised by consulting engineers in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report. The report shall not be reproduced except in full.

Should you require any further information regarding the above please do not hesitate to contact the undersigned.

Yours faithfully
For and on behalf of
JEFFERY AND KATAUSKAS PTY LTD

Paul Roberts
Senior Engineering Geologist

Agi Zenon
Senior Associate

Attachments

Figure 1 – Geotechnical Site Plan
Dynamic Cone Penetration (DCP) test results
Report Explanation Notes

Jeffery and Katauskas Pty Ltd

CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS



DYNAMIC CONE PENETRATION TEST RESULTS

Client:		STUART THOR					
Project:		PROPOSED RESIDENTIAL DEVELOPMENT					
Location:		104 & 106 WAKEHURST PARKWAY, NARRABEEN, NSW					
Job No.		18498ZR		Hammer Weight & Drop: 9kg/510mm			
Date:		19-8-05		Rod Diameter: 16mm			
Tested By:		DL/PR		Point Diameter: 20mm			
Number of Blows per 100mm Penetration							
Test Location	RL ~21.0m	RL ~21.0m	RL ~21.5m	Test Location	101		
Depth (mm)	101	102	103	Depth (mm)	101		
0 - 100	SUNK	SUNK	SUNK	3000-3100	12		
100 - 200		16		3100-3200	15		
200 - 300		6		3200-3300	16		
300 - 400	↓		↓	3300-3400	15		
400 - 500	3		5	3400-3500	16		
500 - 600	3		8	3500-3600	14		
600 - 700	4	↓	REFUSAL	3600-3700	23		
700 - 800	3	3		3700-3800	20/50mm		
800 - 900	4	3		3800-3900	REFUSAL		
900 - 1000	6	↓		3900-4000			
1000 - 1100	5	↓		4000-4100			
1100 - 1200	4	1		4100-4200			
1200 - 1300	4	↓		4200-4300			
1300 - 1400	4	9		4300-4400			
1400 - 1500	8	REFUSAL		4400-4500			
1500 - 1600	8			4500-4600			
1600 - 1700	5			4600-4700			
1700 - 1800	6			4700-4800			
1800 - 1900	6			4800-4900			
1900 - 2000	5			4900-5000			
2000 - 2100	5			5000-5100			
2100 - 2200	4			5100-5200			
2200 - 2300	5			5200-5300			
2300 - 2400	4			5300-5400			
2400 - 2500	6			5400-5500			
2500 - 2600	6			5500-5600			
2600 - 2700	7			5600-5700			
2700 - 2800	7			5700-5800			
2800 - 2900	10			5800-5900			
2900 - 3000	12			5900-6000			
Remarks: <ol style="list-style-type: none"> 1. The procedure used for this test is similar to that described in AS1289.6.3.2-1997, Method 6.3.2. 2. Usually 8 blows per 20mm is taken as refusal 3. Datum is Australian Height Datum (AHD). 							

Jeffery and Katauskas Pty Ltd

CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS



DYNAMIC CONE PENETRATION TEST RESULTS

Client:		STUART THOR					
Project:		PROPOSED RESIDENTIAL DEVELOPMENT					
Location:		104 & 106 WAKEHURST PARKWAY, NARRABEEN, NSW					
Job No.		18498ZR		Hammer Weight & Drop: 9kg/510mm			
Date:		19-8-05		Rod Diameter: 16mm			
Tested By:		DL/PR		Point Diameter: 20mm			
Number of Blows per 100mm Penetration							
Test Location	RL ~10.0m	RL ~10.5m		Test Location			
Depth (mm)	104	105		Depth (mm)			
0 - 100	SUNK	SUNK		3000-3100			
100 - 200	↓	↓		3100-3200			
200 - 300	3	↓		3200-3300			
300 - 400	4	1		3300-3400			
400 - 500	1	1		3400-3500			
500 - 600	1	↓		3500-3600			
600 - 700	1	2		3600-3700			
700 - 800	↓	1		3700-3800			
800 - 900	3	1		3800-3900			
900 - 1000	3	3		3900-4000			
1000 - 1100	5	3		4000-4100			
1100 - 1200	6	3		4100-4200			
1200 - 1300	5	6		4200-4300			
1300 - 1400	12	6		4300-4400			
1400 - 1500	REFUSAL	3		4400-4500			
1500 - 1600		2		4500-4600			
1600 - 1700		4		4600-4700			
1700 - 1800		1		4700-4800			
1800 - 1900		8		4800-4900			
1900 - 2000		3		4900-5000			
2000 - 2100		15		5000-5100			
2100 - 2200		REFUSAL		5100-5200			
2200 - 2300				5200-5300			
2300 - 2400				5300-5400			
2400 - 2500				5400-5500			
2500 - 2600				5500-5600			
2600 - 2700				5600-5700			
2700 - 2800				5700-5800			
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REPORT EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the geotechnical report in regard to classification methods, field procedures and certain matters relating to the Comments and Recommendations section. Not all notes are necessarily relevant to all reports.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Geotechnical engineering involves gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, the SAA Site Investigation Code. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached Unified Soil Classification Table qualified by the grading of other particles present (eg sandy clay) as set out below:

Soil Classification	Particle Size
Clay	less than 0.002mm
Silt	0.002 to 0.06mm
Sand	0.06 to 2mm
Gravel	2 to 60mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose	less than 4
Loose	4 – 10
Medium dense	10 – 30
Dense	30 – 50
Very Dense	greater than 50

Cohesive soils are classified on the basis of strength (consistency) either by use of hand penetrometer, laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength kPa
Very Soft	less than 25
Soft	25 – 50
Firm	50 – 100
Stiff	100 – 200
Very Stiff	200 – 400
Hard	Greater than 400
Friable	Strength not attainable – soil crumbles

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, "Shale" is used to describe thinly bedded to laminated siltstone.

SAMPLING

Sampling is carried out during drilling or from other excavations to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, moisture content, minor constituents and, depending upon the degree of disturbance, some information on strength and structure. Bulk samples are similar but of greater volume required for some test procedures.

Undisturbed samples are taken by pushing a thin-walled sample tube, usually 50mm diameter (known as a U50), into the soil and withdrawing it with a sample of the soil contained in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling used are given on the attached logs.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All except test pits, hand auger drilling and portable dynamic cone penetrometers require the use of a mechanical drilling rig which is commonly mounted on a truck chassis.



Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for an excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Premature refusal of the hand augers can occur on a variety of materials such as hard clay, gravel or ironstone, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table. Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock fragments.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term "mud" encompasses a range of products ranging from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, an NMLC triple tube core barrel, which gives a core of about 50mm diameter, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as CORE LOSS. The location of losses are determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the top end of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" – Test F3.1.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

$$N = 13$$

$$4, 6, 7$$

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

$$N > 30$$

$$15, 30/40\text{mm}$$

The results of the test can be related empirically to the engineering properties of the soil.

Occasionally, the drop hammer is used to drive 50mm diameter thin walled sample tubes (U50) in clays. In such circumstances, the test results are shown on the borehole logs in brackets.

A modification to the SPT test is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as " N_c " on the borehole logs, together with the number of blows per 150mm penetration.



Static Cone Penetrometer Testing and Interpretation:

Cone penetrometer testing (sometimes referred to as a Dutch Cone) described in this report has been carried out using an Electronic Friction Cone Penetrometer (EFCP). The test is described in Australian Standard 1289, Test F5.1.

In the tests, a 35mm diameter rod with a conical tip is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the frictional resistance on a separate 134mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are electrically connected by wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20mm per second) the information is output as incremental digital records every 10mm. The results given in this report have been plotted from the digital data.

The information provided on the charts comprise:

- Cone resistance – the actual end bearing force divided by the cross sectional area of the cone – expressed in MPa.
- Sleeve friction – the frictional force on the sleeve divided by the surface area – expressed in kPa.
- Friction ratio – the ratio of sleeve friction to cone resistance, expressed as a percentage.

The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and occasionally very soft clays, rising to 4% to 10% in stiff clays and peats. Soil descriptions based on cone resistance and friction ratios are only inferred and must not be considered as exact.

Correlations between EFCP and SPT values can be developed for both sands and clays but may be site specific.

Interpretation of EFCP values can be made to empirically derive modulus or compressibility values to allow calculation of foundation settlements.

Stratification can be inferred from the cone and friction traces and from experience and information from nearby boreholes etc. Where shown, this information is presented for general guidance, but must be regarded as interpretive. The test method provides a continuous profile of engineering properties but, where precise information on soil classification is required, direct drilling and sampling may be preferable.

Portable Dynamic Cone Penetrometers: Portable Dynamic Cone Penetrometer (DCP) tests are carried out by driving a rod into the ground with a sliding hammer and counting the blows for successive 100mm increments of penetration.

Two relatively similar tests are used:

- Cone penetrometer (commonly known as the Scala Penetrometer) – a 16mm rod with a 20mm diameter cone end is driven with a 9kg hammer dropping 510mm (AS1289, Test F3.2). The test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various Road Authorities.
- Perth sand penetrometer – a 16mm diameter flat ended rod is driven with a 9kg hammer, dropping 600mm (AS1289, Test F3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.

LOGS

The borehole or test pit logs presented herein are an engineering and/or geological interpretation of the sub-surface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible or justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The attached explanatory notes define the terms and symbols used in preparation of the logs.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than "straight line" variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or "reverted" chemically if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after stabilising at intervals ranging from several days to perhaps



weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg bricks, steel etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably determine the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse engineering characteristics or behaviour. If the volume and quality of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing is normally carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedure used are given on the individual report forms.

ENGINEERING REPORTS

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg a three storey building) the information and interpretation may not be relevant if the design proposal is changed (eg to a twenty storey building). If this happens, the company will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions – the potential for this will be partially dependent on borehole spacing and sampling frequency as well as investigation technique.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of persons or contractors responding to commercial pressures.

If these occur, the company will be pleased to assist with investigation or advice to resolve any problems occurring.

SITE ANOMALIES

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed that at some later stage, well after the event.

REPRODUCTION OF INFORMATION FOR CONTRACTUAL PURPOSES

Attention is drawn to the document "Guidelines for the Provision of Geotechnical Information in Tender Documents", published by the Institution of Engineers, Australia. Where information obtained from this investigation is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Copyright in all documents (such as drawings, borehole or test pit logs, reports and specifications) provided by the Company shall remain the property of Jeffery and Katauskas Pty Ltd. Subject to the payment of all fees due, the Client alone shall have a licence to use the documents provided for the sole purpose of completing the project to which they relate. License to use the documents may be revoked without notice if the Client is in breach of any objection to make a payment to us.

REVIEW OF DESIGN

Where major civil or structural developments are proposed or where only a limited investigation has been completed or where the geotechnical conditions/ constraints are quite complex, it is prudent to have a joint design review which involves a senior geotechnical engineer.

SITE INSPECTION

The company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related.

Requirements could range from:

- i) a site visit to confirm that conditions exposed are no worse than those interpreted, to
- ii) a visit to assist the contractor or other site personnel in identifying various soil/rock types such as appropriate footing or pier founding depths, or
- iii) full time engineering presence on site.

GRAPHIC LOG SYMBOLS FOR SOILS AND ROCKS

SOIL



FILL



TOPSOIL



CLAY (CL, CH)



SILT (ML, MH)



SAND (SP, SW)



GRAVEL (GP, GW)



SANDY CLAY (CL, CH)



SILTY CLAY (CL, CH)



CLAYEY SAND (SC)



SILTY SAND (SM)



GRAVELLY CLAY (CL, CH)



CLAYEY GRAVEL (GC)



SANDY SILT (ML)



PEAT AND ORGANIC SOILS

ROCK



CONGLOMERATE



SANDSTONE



SHALE



SILTSTONE, MUDSTONE,
CLAYSTONE



LIMESTONE



PHYLLITE, SCHIST



TUFF



GRANITE, GABBRO



DOLERITE, DIORITE



BASALT, ANDESITE



QUARTZITE

DEFECTS AND INCLUSIONS



CLAY SEAM



SHEARED OR CRUSHED
SEAM



BRECCIATED OR
SHATTERED SEAM/ZONE



IRONSTONE GRAVEL



ORGANIC MATERIAL

OTHER MATERIALS



CONCRETE



BITUMINOUS CONCRETE,
COAL



COLLUVIUM



UNIFIED SOIL CLASSIFICATION TABLE

Field Identification Procedures (Excluding particles larger than 75 µm and basing fractions on estimated weights)			Group Symbols	Typical Names	Information Required for Describing Soils	Use grain size curve in identifying the fractions as given under field identification	Laboratory Classification Criteria							
Gravels More than half of coarse fraction is larger than 4 mm sieve size	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes												
Coarse-grained soils More than half of material is larger than 75 µm sieve size (The 75 µm sieve size is about the smallest particle visible to naked eye)	Gravels with fines (appreciable amount of fines)	Predominantly one size or a range of sizes with some intermediate sizes missing	GW	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity; surface condition; and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses	Determine percentages of gravel and sand from grain size curve Depending on percentage of fines (fraction smaller than 75 µm sieve size) coarse grained soils are classified as follows: Less than 5% GW, GP, SW, SP More than 12% GM, GC, SM, SC 5% to 12% Borderline cases requiring use of dual symbols	$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_c = \frac{D_{30}^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for GP Atterberg limits below "A" line, or P_L less than 4 and 7 are borderline cases requiring use of dual symbols $C_u = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_c = \frac{D_{30}^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for SP Atterberg limits below "A" line or P_L less than 5 and 7 are borderline cases requiring use of dual symbols Atterberg limits below "A" line with P_L greater than 7							
	Sands More than half of coarse fraction is smaller than 4 mm sieve size	Clean sands (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes	SW	Well graded sands, gravelly sands, little or no fines			For undisturbed soils add information on stratification, degree of compactness, cementation, and moisture characteristics Example: Silty sand, gravelly; about 20% hard, angular gravel particles 12 mm maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (SM)						
		Sands with fines (appreciable amount of fines)	Predominantly one size or a range of sizes with some intermediate sizes missing	SP	Poorly graded sands, gravelly sands, little or no fines									
			Nonplastic fines (for identification procedures, see ML below)	Plastic fines (for identification procedures, see CL below)	SM			Silty sands, poorly graded sand-silt mixtures						
Fine-grained soils More than half of material is smaller than 75 µm sieve size (The 75 µm sieve size is about the smallest particle visible to naked eye)	Silt and clays Liquid limit less than 50	None to slight	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition; odour if any; local or geologic name; and other pertinent descriptive information, and symbol in parentheses	Use grain size curve in identifying the fractions as given under field identification								
		Quick to slow	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions Example: Clayey silt, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (ML)									
		Medium to high	OL	Organic silts and organic silts of low plasticity										
		Slight to medium	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts										
		High to very high	CH	Inorganic clays of high plasticity, fat clays										
	Silt and clays Liquid limit greater than 50	Medium to high	OH	Organic clays of medium to high plasticity										
		Readily identified by colour, odour, spongy feel and frequently by fibrous texture	PT	Peat and other highly organic soils										
		Highly Organic Soils	Silt and clays Liquid limit greater than 50	OH	Organic clays of medium to high plasticity				Use grain size curve in identifying the fractions as given under field identification					
											Silt and clays Liquid limit greater than 50	OH	Organic clays of medium to high plasticity	

NOTE: 1) Soils possessing characteristics of two groups are designated by combinations of group symbols (e.g. GW-GC, well graded gravel-sand mixture with clay fines).

2) Soils with liquid limits of the order of 35 to 50 may be visually classified as being of medium plasticity.

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LOG SYMBOLS

LOG COLUMN	SYMBOL	DEFINITION
Groundwater Record		Standing water level. Time delay following completion of drilling may be shown.
		Extent of borehole collapse shortly after drilling.
		Groundwater seepage into borehole or excavation noted during drilling or excavation.
Samples	ES	Soil sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'R' as noted below.
	N _c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60 degree solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25	Vane shear reading in kPa of Undrained Shear Strength.
	PID = 100	Photoionisation detector reading in ppm (Soil sample headspace test).
Moisture Condition (Cohesive Soils)	MC > PL	Moisture content estimated to be greater than plastic limit.
	MC = PL	Moisture content estimated to be approximately equal to plastic limit.
	MC < PL	Moisture content estimated to be less than plastic limit.
	(Cohesionless Soils)	
	D	DRY - runs freely through fingers.
	M	MOIST - does not run freely but no free water visible on soil surface.
Strength (Consistency) Cohesive Soils	W	WET - free water visible on soil surface.
	VS	VERY SOFT - Unconfined compressive strength less than 25kPa
	S	SOFT - Unconfined compressive strength 25-50kPa
	F	FIRM - Unconfined compressive strength 50-100kPa
	St	STIFF - Unconfined compressive strength 100-200kPa
	VSt	VERY STIFF - Unconfined compressive strength 200-400kPa
Density Index/ Relative Density (Cohesionless Soils)	H	HARD - Unconfined compressive strength greater than 400kPa
	()	Bracketed symbol indicates estimated consistency based on tactile examination or other tests.
		Density Index (I _p) Range (%) SPT 'N' Value Range (Blows/300mm)
	VL	Very Loose < 15 0-4
	L	Loose 15-35 4-10
	MD	Medium Dense 35-65 10-30
Hand Penetrometer Readings	D	Dense 65-85 30-50
	VD	Very Dense > 85 > 50
	()	Bracketed symbol indicates estimated density based on ease of drilling or other tests.
	300	Numbers indicate individual test results in kPa on representative undisturbed material unless noted otherwise.
	250	
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Tungsten carbide wing bit.
	T ₆₀	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.

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LOG SYMBOLS

ROCK MATERIAL WEATHERING CLASSIFICATION

TERM	SYMBOL	DEFINITION
Residual Soil	RS	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely weathered rock	XW	Rock is weathered to such an extent that it has "soil" properties, ie it either disintegrates or can be remoulded, in water.
Distinctly weathered rock	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Slightly weathered rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh rock	FR	Rock shows no sign of decomposition or staining.

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index (I_s 50) and refers to the strength of the rock substance in the direction normal to the bedding. The test procedure is described by the International Journal of Rock Mechanics, Mining, Science and Geomechanics. Abstract Volume 22, No 2, 1985.

TERM	SYMBOL	I_s (50) MPa	FIELD GUIDE
Extremely Low:	EL	0.03	Easily remoulded by hand to a material with soil properties.
Very Low:	VL	0.1	May be crumbled in the hand. Sandstone is "sugary" and friable.
Low:	L	0.3	A piece of core 150mm long x 50mm dia. may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.
Medium Strength:	M	1	A piece of core 150mm long x 50mm dia. can be broken by hand with difficulty. Readily scored with knife.
High:	H	3	A piece of core 150mm long x 50mm dia. core cannot be broken by hand, can be slightly scratched or scored with knife; rock rings under hammer.
Very High:	VH	10	A piece of core 150mm long x 50mm dia. may be broken with hand-held pick after more than one blow. Cannot be scratched with pen knife; rock rings under hammer.
Extremely High:	EH		A piece of core 150mm long x 50mm dia. is very difficult to break with hand-held hammer. Rings when struck with a hammer.

ABBREVIATIONS USED IN DEFECT DESCRIPTION

ABBREVIATION	DESCRIPTION	NOTES
Be	Bedding Plane Parting	Defect orientations measured relative to the normal to the long core axis (ie relative to horizontal for vertical holes)
CS	Clay Seam	
J	Joint	
P	Planar	
Un	Undulating	
S	Smooth	
R	Rough	
IS	Ironstained	
XWS	Extremely Weathered Seam	
Cr	Crushed Seam	
60t	Thickness of defect in millimetres	