Pittwater

Form 11

LOCAL

P.O. Box 3190
NARELLAN DC NSW 2567
P: (02) 4655 5811
F: (02) 4655 2411
E: info@localgroup.com.au
ABN: 30 735 366 565

COUNCIL COPY

Construction Certificate

and Determination
issued under the Environmental Planning and Assessment Act, 1979 Sections 109C(1)(b) and 81A(2)

Certificate Number: 5001192

Address: LOT: 1
DP: 546543
HNO.:32
THE SERPENTINE
BILGOLA 2107

Development Consent: 0784/06

Description of Work: DWELLING

Date of Consent: 10 August, 2007

Building Classification: 1a

This Construction Certificate has been determined as **APPROVED** in accordance with the procedures outlined in Clause 142 of the Environmental Planning and Assessment Regulation 2000. In making this determination I certify that the work if completed in accordance with the plans and specifications referred to in this Certificate will comply with the requirements of the Environmental Planning and Assessment Regulation, 2000 as referred to in Section 81A(5) of the Environmental Planning and Assessment Act, 1979 (as amended).

Plans/s

ARCHITECTURAL PLANS PREPARED BY TURNER & ASSOCIATES, JOB NO, 06205, DRAWING NO. A102 AND A401 ISSUE D, DRAWING NO. A103 ISSUE H, DRAWING NO. A104 ISSUE G, DRAWING NO. A105, A205 AND A207 ISSUE E, DRAWING NO A203, A204 AND A402 ISSUE C, DRAWING NO. A206 ISSUE F, DRAWING NO. A254, A256, A304 AND A311 ISSUE A, DRAWING NO. A255 AND A308 ISSUE B,

Specification/s

ARCHITECTURAL SPECIFICATIONS, PREPARED BY TURNER AND ASSOCIATES, ISSUE A, DATED 17/9/07

Other Documents

APPLICATION FORM
OWNERS CONSENT
BASIX CERTIFICATE NO. 20C-06-0257-TRO -218483-0
DILAPIDATION REPORT
ENGINEERS PLANS PREPARED BY ROBERT BIRD GROUP, JOB NO. 06533, DATED 15/10/07
CONTOUR SURVEY PREPARED BY GARY EDWARDS PTY LTD
CERTIFICATE OF DESIGN, STORMWATER DRAINAGE PREPARED BY GREENARROW HYDRAULICS, DATED 7/11/07
STORMWATER DRAINAGE PLAN, PREPARED BY GREENARROW HYDRAULIC, DATED DEC 06, SHEET 1 OF 1.
TRAFFIC MANAGEMENT PLAN PREPARED BY LYLE MARSHALL PTY LTD, DATED 27/8/07
TREE PROTECTION MEASURES, PREPARED BY URBAN FORESTRY, DATED 22/8/07
WASTE MANAGEMENT PLAN, PREPARED BY CABE, DATED 21/8/07

Fire Safety Schedule

Paul Gearin
Accredited Certifier
Building Professionals Board
BPB0132

SCANNED
28 NOV 2007
PITTWATER COUNCIL

21 November, 2007
Date of Determination

Rec: 228980 $30 23/11/07.

LOCAL
P.O. Box 3190
NARELLAN DC NSW 2567
P: (02) 4655 5811
F: (02) 4655 2411
E: info@localgroup.com.au
ABN: 30 735 366 565

Australian Bureau of Statistics

OUR REFERENCE **5001192**

THE AREAS

The Site (m^2): 763
Existing Building (m^2):
The Proposal (m^2):

THE EXISTING

Location:
LOT: 1
DP: 546543
HNO.:32
THE SERPENTINE
BILGOLA 2107

Use: Dwelling
No. of Existing Dwellings: 0

THE PROPOSAL

Location:
LOT: 1
DP: 546543
HNO.:32
THE SERPENTINE
BILGOLA 2107

Use: Residential - Dwelling
Dual Occupancy: No
No. of Proposed Dwellings: 1
No. of Storeys: 3

THE MATERIALS

Walls: Full Brick
Floors: Concrete
Frame: Timber
Roof: Other

LOCAL

APPLICATION FORM

☑ Principal Certifying Authority ☐ Construction Certificate ☐ Compliance Certificate
☐ Complying Development Certificate
☐ Occupation Certificate

THE APPLICATION

DATE OF APPLICATION: 2/8/07.

LAND TO BE DEVELOPED

Lot No.:	1	**Deposited Plan:**	546543
House No.:	32	**Street Name**	THE SERPENTINE
Suburb:	BILGOLA	**Post Code:**	2107
Area (m²):	763	**Section/Folio:**	21306 (5)

THE DEVELOPMENT

Proposed Building Work:	Residential ☑ Commercial ☐ Industrial ☐
Description of Development:	NEW RESIDENCE
Value of Work:	$1,500,000
Type of work:	House

CONSENTS

Consent Authority:	PITTWATER COUNCIL		
Development Consent No.:	N0784/06	**Date of Issue:**	
Builder or Owner/Builder Name:	CABE DEVELOPMENTS PTY LTD		
Licence No.:	126790C		

THE APPLICANT

Surname:	QUATTROMANI
First Name:	LOUIS
Street:	SUITE 202, 29-31 SOLENT CIRCUIT
Suburb:	BAULKHAM HILLS 2153
Contact No's.:	02 8818 3630 / 0414 622 033

THE OWNER/S

	Owner 1	Owner 2	Owner 3	Owner 4
First Name:	CABEZ INVESTMENTS			
Surname:	PTY LTD			
Street:	202, 29-31 Solent Cct			
Address:	BAULKHAM HILLS.			
Contact No.:	(02) 8818 3600			

23464

LETTER OF CONSENT

OWNERS CONSENT

I/we the owners of the subject property hereby give consent for the lodgement all relevant applications (i.e. for Construction Certificate/s, Complying Development Certificate/s, Occupation Certificate/s, Compliance Certificate/s) and associated documentation to Local Certification Services Unit Trust for consideration.

I/we also declare that all documentation presented as part of an application for a Construction Certificate has remained unaltered from that issued with any Development Consent or that any changes have been documented and Local Certification Services Unit Trust have been advised accordingly.

In the event that the nominated Principal Certifying Authority resigns form his employment position with Local Certification Services Unit Trust my signature provided below will also serve as the authorisation for the transfer of the role and responsibilities of the Principal Certifying Authority from the nominated person to Mr Craig Hardy.

PRINCIPAL CERTIFYING AUTHORITY

With reference to this proposed development I/we the owners of the subject property hereby advise of our decision to appoint ☐ Andrew Dean ☐ Callan Blackwell ☐ Craig Hardy ☐ Danial Powell ☐ Michael Shanahan ☑ Paul Gearin ☐ Trent McCurley ☐ Paul Morgan ☐ to fulfil the role of Principal Certifying Authority (PCA) as outlined in the Environmental Planning and Assessment Act, 1979 (as amended).

I/we understand that this engagement shall be subject to the Terms and Conditions outlined in this application and the associated Schedule and I/we further understand that he will carry out all mandatory inspections required by the Act during the course of construction along with any others that he deems to be necessary and referred to the abovementioned Agreement.

I/we also advise that I/we are aware of the conditions attached to any Development Consent (i.e. Local Development Consent or Complying Development Consent) and are aware of our responsibilities in relation to those conditions.

SIGNATURES

APPLICANT

Signed: _____

Name *(Please Print)*: LOUIS QUATTROMANI **Date:** 2/8/07

OWNER/S

Signed: _____

Name *(Please Print)*: LOU ZIVANOVIC **Date:** 2/8/07

Signed: _____

Name *(Please Print)*: _____ **Date:** _____

Signed: _____

Name *(Please Print)*: _____ **Date:** _____

Signed: _____

Name *(Please Print)*: _____ **Date:** _____

LONG SERVICE
BUILDING & CONSTRUCTION

Building and Construction Industry
Long Service Payments Corporation
Ground Floor
cnr Donnison & Baker Streets
Gosford NSW 2250
Locked Bag 3000
Central Coast MC NSW 2252
Tel: 13 14 41
Fax: (02) 9287 5685
Email: info@lspc.nsw.gov.au
www.lspc.nsw.gov.au
ABN 93 646 090 808

RECEIVED
23 AUG 2007
BY:.....

22 August 2007

CABE DEVELOPMENTS PTY LTD
PO BOX 6924
BAULKHAM HILLS BC NSW 2153

Levy Receipt

Receipt No: 00053717

Received from: (Name of person or organisation paying for levy)

CABE DEVELOPMENTS PTY LTD

the amount of

$6,300.00

Payment details:

Cheque	000459	$6,300.00	CABE DEVELOPMENTS P/L

being payment for Long Service Levy as detailed below

Levy Payment Form number	0289992
Council/Department/Authority	PITTWATER COUNCIL
C.C. Number	5001192
Work address	32 THE SERPENTINE BILGOLA NSW 2107
Estimated value of work	$1,800,000.00
Levy payable (No exemption)	**$6,300.00**
Total levy paid	**$6,300.00**

Signed: (Signature of authorised person)

Date 22/8/07

62296

Residential Construction Warranty

vero
construction and engineering

Certificate of Insurance

Cabe Developments Pty Ltd
Suite 202/29-31 Solent Circuit
BAULKHAM HILLS NEW SOUTH WALES 2153

Form 1
Section 92
Home Building Act 1989

Builder's Copy

Issue Date: 10/09/2007
Certificate No: RCW73391403
Broker Reference No: 26986

CERTIFICATE IN RESPECT OF INSURANCE

Contract Of Insurance Complies With: Section 92
Of The: Home Building Act 1989

Issued By: Vero Insurance Limited
ABN 48 005 297 807

Building Contract Details

Contract Date: August 27, 2007
Declared Building Contract Value: $1,800,000.00
(Refer policy for indemnity limit)

Carried Out By: Cabe Developments Pty Ltd
ABN: 32073291960
Licence No: 126790C
For: Cabez Investments Pty Ltd

In Respect Of: Single Dwelling
At: House No. 32
The Serpentine
BILGOLA NEW SOUTH WALES 2107

Permit Authority: Pittwater Council

Subject to the Act and the Home Building Regulation 2004 and the conditions of the insurance contract, cover will be provided to a beneficiary described in the contract and successors in the title to the beneficiary. Please note when the Insurer has issued this certificate, the Insurer is not entitled to refuse to pay a claim, or to cancel the insurance contract, on the grounds that the premium was not paid. This certificate is to be read in conjunction with the policy wording.

N PN9FP2J227BP Printed 10/09/2007

Signed for and on behalf of the insurer:



Insurer: Vero Insurance Limited ABN 48 005 297 80

insurancebrokers of nsw

Insurance Brokers of NSW Pty
ACN 091 769
ABN 54 091 769
AFS Licence Number 239

As per your request, the policy described below has been endorsed in accordance with your instructions. Should the alterations described herin not reflect the amendments requested, please contact our office.

TAX INVOICE

This document will be a tax invoice for GST when you make payment

Invoice Date: 12/09/2007
Invoice No: 27033
Our Reference: CABEDEV

Should you have any queries in relation to this account, please contact your Account Manager
Jim Tasses

Cabe Developments Pty Ltd
Norwest Business Park
Suite 202, 29-31 Solent Circuit
BAULKHAM HILLS NSW 2153

Class of Policy: Construction Insurance
Insurer: The Hollard Insurance Company Pty Ltd - Mecon
LEVEL 4 259 GEORGE STREET SYDNEY NSW 2000
ABN: 78 090 584 473
The Insured: Cabe Developments Pty Ltd

ENDORSEMENT
Policy No: CWAP000120
Period of Cover:
From **31/08/2007**
to **30/11/2007** at 4:00 pm

Details: See attached schedule for a description of the risk(s) insured

YOUR DUTY OF DISCLOSURE
Please read important notice overleaf.

Direct Credit option:
St George Bank Ltd
Acct Name: Insurance Brokers of NSW P/L

BSB No: 332084
Acct No: 551748541
Please use reference:
CABEDEV 27033

Clients who are not fully satisfied with our service should contact our customer relations.complaints officer. Insurance Brokers of NSW Pty Ltd also subscribe to the Insurance Brokers Disputes Limite (IBD), a free customerservice and the General Insurance Brokers Code of Practice. Further information is available from this office, or contact t IBD on 1300 780 808.

This policy does not include Workers Compensatio Insurance. Workers Compensation is Compulsory f Employers.

Your Premium:

Premium	U'writer Levy	Fire Levy	GST	Stamp Duty	Broker Fee
$10,676.00	$0.00	$1,702.89	$170.29	$1,129.43	$0.00

TOTAL DUE **$13,678.61**

REMITTANCE ADVICE

Please mail this portion with your cheque made payable to:

insurancebrokers of nsw
P O Box 9279
HARRIS PARK NSW 2150

Our Ref: CABEDEV ENDORSEMENT
Invoice No: **27033**
Due Date: 31/08/2007
Policy No: CWAP000120
Acct Man: Jim Tasses
In accordance with standard business practices, receipts will not be issued unless requested.

AMOUNT DUE **$13,678.61**

Turner & Associates

32 The Serpentine, Bilgola

BASIX ASSESSMENT

Report No. 20C-06-0257-TRP-218483-0

Vipac Engineers & Scientists Ltd

Sydney, NSW

30th November 2006





DOCUMENT CONTROL

32 The Serpentine, Bilgola

BASIX ASSESSMENT

REPORT NO:
20C-06-0257-TRP-218483-0

LIBRARY CODE:
A 65

PREPARED FOR:
Turner & Associates
Level 1
586 Crown Street
Surry Hills NSW 2010
Contact: Dan Szwaj
Phone: +61 2 9690 2855
Fax : +61 2 9690 2411

PREPARED BY:
Vipac Engineers & Scientists Ltd
2 Sirius Road
LANE COVE NSW 2066
AUSTRALIA
Email: sydney@vipac.com.au
Phone: (02) 9422 4222
Fax : (02) 9420 5911

AUTHOR:
Henky Mantophani — Date: 30th November 2006
Project Engineer

REVIEWED BY:
Neihad Al-Khalidy — Date: 30th November 2006
Senior Engineer

APPROVED BY:
Peter Matthews — Date: 30th November 2006
Operational Manager - NSW

REVISION HISTORY:

Revision No.	Date Issued	Reason/Comments
0	30th November 2006	Initial Issue

DISTRIBUTION:

Copy No. 2		Location
1		Project
2	**Uncontrolled Copy**	Client, (PDF Format)

KEYWORDS: 32 The Serpentine, Bilgola , BASIX

NOTE: This is a controlled document within the document control system. If revised, it must be marked SUPERSEDED and returned to the Vipac QA Representative.

EXECUTIVE SUMMARY

VIPAC Engineers & Scientists Ltd. has been commissioned by Mr & Mrs Stanisich to assess the interaction of the proposed 32 The Serpentine, Bilgola development with the local environment in terms of BASIX compliance.

The residential dwelling has been assessed in terms of their passive energy design using the Nationwide House Energy Rating scheme (NatHERS). It has also been assessed in terms of their ability to conserve water and also to minimise energy consumption via appliances and hot water etc. With the recommendations contained within this report we find that the proposed development is able to achieve a BASIX certificate (achieving Water target of 40% and Energy target of 40%). For further details, please refer to the BASIX Certificate No. 110440S provided for this DA submission.

While every endeavour has been made to provide a realistic energy rating for the proposed development, we note that the energy calculating process using computer program simulation is not 100% accurate.

The energy efficiency of any building is determined not only by the design but also by the energy consumption requirements and practices of the occupants. Actual energy consumption will not be known until a building is occupied and operational.

TABLE OF CONTENTS

1. INTRODUCTION 5

2. WATER 5

3. THERMAL COMFORT 6

3.1. NATHERS MODELLING ASSUMPTIONS 6

3.2. NATHERS RESULTS (THERMAL COMFORT) 7

4. ENERGY 8

5. SUMMARY 9

ARCHITECTURAL DRAWINGS 9

ABSA CERTIFICATES 10

ABSA SPECIFICATION BLOCK 11

LIST OF FIGURES AND TABLES

TABLE 1: CONSTRUCTION MATERIALS - BASE CASE (NATHERS MODEL) 6

TABLE 2: NATHERS ENERGY CONSUMPTION RESULTS AND ADDITIONAL TREATMENTS 7

TABLE 3: AREA SCHEDULE 7

1. INTRODUCTION

BASIX is a web-based planning tool designed to assess the potential performance of new homes with respect to a range of sustainability issues including Landscape, Stormwater, Water, Thermal Comfort and Energy. BASIX aims to reduce the environmental impact of these features of new residential housing and therefore will produce homes that are more comfortable and cheaper to run than most existing homes.

BASIX focuses on reducing Water and Energy use. Landscape, Stormwater and Thermal Comfort indices are also included in the assessment as information relating to these attributes impacts on water consumption and greenhouse gas emissions. From 1st July 2006, BASIX has set targets so that each new residential development will use 40% less drinking-quality water and produce less greenhouse gas emissions than average NSW homes of the same type (target varies over Zones and building types, please refer to: http://www.basix.nsw.gov.au/information/common/pdf/alts_adds_req/energy_fact_sheet.pdf).

NatHERS is Australian designed software used for assessing the thermal performance of residential units and houses in New South Wales and can be used to assess the thermal comfort of dwellings under the BASIX scheme if the deemed to comply method is not suitable. NatHERS computer simulation of residential developments forms part of the Nationwide House Energy Rating Scheme, and is used to assess the potential of a residential development to have low energy requirements once operational. Heating and cooling loads for the development have been determined using NatHERS software.

2. WATER

The proposed development has achieved the BASIX Water target of 40%. For details of the requirements necessary to achieve the 40% target, please refer to the BASIX Certificate No. 110440S provided for this DA submission.

Below is the summary of the requirements:

- 335m^2 of the 390m^2 landscaped areas must be of indigenous/low water use species.
- 3 Star (water rating) showerheads, toilets and taps.
- 6000L rainwater tank, collecting from 123m^2 roof. The water collected must be used for landscape irrigation and toilet flushing.
- Install an on-demand hot water recirculation system.
- Maximum outdoor pool size is 25kL and maximum outdoor spa size is 1.8kL.
- Outdoor pool and spa covers must be installed.

3. THERMAL COMFORT

3.1. NATHERS MODELLING ASSUMPTIONS

NatHERS calculates the transient hourly heat gains and losses for each space inside a building taking into account the building's thermal storage, typical residential operational schedules and hourly weather data.

The "base-case" modelled materials of construction for the development are described in Table 1. Building geometry and orientation were modelled according to supplied drawings.

Table 1: Construction Materials - Base Case (NATHERS Model)

Element	Material	Detail
External walls	Cavity Brick Double Concrete Metal Deck	As per drawings
	Insulation	
	Medium colour	0.475 – 0.7 absorptance
Internal walls	Brick Plastered	
Windows	Single glass Clear	with Open Weave Curtain (NatHERS default)
Ceilings	Plasterboard	
Roof	Concrete	Medium colour (0.475 – 0.7 absorptance)
Floors	Concrete	Tiles covering

3.2. NATHERS RESULTS (THERMAL COMFORT)

Energy summary report for the residential dwelling is summarized in Table 2 below. The Additional Treatment listed in Table 2 below need to be implemented to the dwelling to achieve the heating and cooling loads required by BASIX.

Table 2: NatHERS Energy Consumption Results and Additional Treatments

Heating Load (MJ/m^2)	Cooling Load (MJ/m^2)	Additional Treatment
74.2	44.9	➢ R2.5 External Wall Insulation to the metal cladding walls. ➢ R1.5 External Wall Insulation to the Cavity Brick and Concrete walls. ➢ R4.0 Roof/Ceiling Insulation to exposed roof areas. ➢ Skylight must use Double-glazing clear (50% shaded). ➢ All glazing use Double glazing clear with timber frame, except: ➢ Ground level north glazing, Lower Ground level north glazing and Bed 1, 2 and Library south glazing (Bed 3 and Bed 1 ensuite south glazing must use Double glazing clear with timber frame) use single glass Low-E with timber frame. ➢ East and West Street Level and Upper Street Level glazing use Double glazing toned with timber frame

Table 3: Area Schedule

Sub-floor	Conditioned Area (m^2)	Unconditioned Area (m^2)	Wall Area (m^2)	Window Area (m^2)	Skylight (m^2)	ABSA Certificate Number
Enclosed	373.0	6.0	281.3	168.7	9.5	70174136

4. ENERGY

The proposed development has achieved the BASIX Energy target of 40%. For details of the requirements necessary to achieve the 40% target, please refer to the BASIX Certificate No. 110440S provided for this DA submission.

Below is the summary of the requirements:

- Solar (gas boosted) Hot Water System (21-25 RECs).
- 1-phase (EER 2.5 - 3.0) air-conditioning system for living room and all bedrooms for heating and cooling and must be Day/Night Zoned.
- Bathrooms, kitchen and laundry exhaust system use individual fan, ducted to façade or roof, with manual on/off switch.
- 3 of the living/dining/lounge/family rooms, all bedrooms & studies, kitchen, laundry, bathrooms/toilets and hallways will be primarily lit (minimum 80% of light fittings) by compact fluorescent, fluorescent, or LED lamps, with dedicated fluorescent or LED fitting.
- Solar (only) pool heating, with timer controlled pump.
- Solar (gas boosted) spa heating, with timer controlled pump.
- Gas cook-top and electric oven.
- Well-ventilated fridge space.
- Indoor and outdoor clothes lines.

5. SUMMARY

The proposed 32 The Serpentine, Bilgola development has been assessed in terms of its passive energy design (thermal comfort) using the Nationwide House Energy Rating scheme (NatHERS). The proposed development has also been assessed in terms of its ability to conserve water and also to minimise energy consumption via appliances and hot water etc. With the recommendations contained within this report we find that the proposed development is able to achieve a BASIX certificate (achieving Water target of 40% and Energy target of 40%). For further details, please refer to the ABSA Certificate No. 70174136 and BASIX Certificate No. 110440S provided for this DA submission.

While every endeavour has been made to provide a realistic energy rating for the proposed development, we note that the energy calculating process using computer program simulation is not 100% accurate.

The energy efficiency of any building is determined not only by the design but also by the energy consumption requirements and practices of the occupants. Actual energy consumption will not be known until a building is occupied and operational.

ARCHITECTURAL DRAWINGS

The environmental assessment carried out in this Report was based on the following architectural drawings prepared by Turner + Associates Architects.

Drawing Schedule:			
D400	Cover, Drawing Schedule	NTS	revision C
D401	Site Context Plan	1:500 @ A1	revision E
D402	Site Analysis Plan	1:200 @ A1	revision B
D403	Site Plan / Roof Plan	1:100 @ A1	revision C
D404	Street Level Plan	1:100 @ A1	revision C
D405	Upper Ground Level Plan	1:100 @ A1	revision C
D406	Ground Level Plan	1:100 @ A1	revision C
D407	Lower Ground Level Plan	1:100 @ A1	revision C
D420	North Elevation	1:100 @ A1	revision D
D421	East Elevation	1:100 @ A1	revision C
D422	South Elevation	1:100 @ A1	revision D
D423	West Elevation	1:100 @ A1	revision C
D430	Section A-A	1:100 @ A1	revision C
D431	Section B-B	1:100 @ A1	revision E

This Report Has Been Prepared

For

Turner & Associates

by

VIPAC ENGINEERS & SCIENTISTS Ltd

ABSA CERTIFICATES

Assessor Certificate

Single Dwelling

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

Issued in accordance with the requirements of
BASIX THERMAL COMFORT - Simulation Method

ABSA

Assessor

Name: Henky Mantophani Company: Vipac Engineers and Scientists Ltd Assr #: 20241

Address: 2 Sirius Road LANE COVE LANE COVE NSW 2066

Phone: (02) 9422 4222 Fax: (02) 9420 5911 Email: henkym@vipac.com.au

Declaration of Interest: None

Client

Name: Dan Szwaj Company: Turner + Associates Architects

Address: 586 Crown Street SURRY HILLS NSW 2010

Phone: 02 9690 2855 Fax: 02 9690 2411 Email:

Project

Address: 32 The Serpentine BILGOLA NSW 2107

Lot / DP: 1 / 546543 LGA: Pittwater Council

Applicant:

Assessment

Date: 30/11/2006 Job ID: 20C-06-02 Filename: house3.zip Run # 1

Software: NatHERS Version: 2.32B Climate Zone: 17

Referenced documents

All details, upon which this Assessment has been based, are included in the project documentation which has been stamped and signed by the Assessor issuing this Certificate, as detailed below:

Thermal Performance Specification / Commitments attached and affixed to drawings, page: 1

Drawings: DA00-DA07, DA20-DA23, DA30-DA32

Specifications: Only specifications, detailed on Drawings identified above, have been referenced

ABSA Assessor Certificate Assessor # 20241 Certificate # 70174136 Issued: 30-Nov-06

THERMAL COMFORT - Simulation Method

The details must be entered into your BASIX Assessment

Area calculations (M2)

Net Conditioned Floor Area 373 Net Unconditioned Floor Area 6

Concessions / Ventilation Bonus

Eligible Concessions: None

The dwelling has the required shading to qualify for BASIX cross ventilation bonus: N/A

Predicted annual energy loads

Heating:	74
Cooling: (sensible + latent)	45
Total:	119

ABSA Assessor stamp

20241 70174136

30-11-06

ABSA Inc. Level 11 Elizabeth Towers 418A Elizabeth St Surry Hills NSW 2010
phone: 1300 760 012 fax: (02) 9281 9514 email: support@absa.net.au www.absa.net.au

ABSA SPECIFICATION BLOCK

ABSA Assessor Certificate Assessor # 20241 Certificate # 70174136 Issued: 30-Nov-06

Thermal Performance Specifications - BASIX THERMAL COMFORT - Simulation Method

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

Windows *Product ID*	*Glass*	*Frame*	*U value*	*SHGC*	*Area M2*	*Detail*
	Double clear	Timber	2.82	0.659		All except below
	Double toned	Timber	2.8	0.486		East&West St Level&Upper St Le
Low E glass	Custom single	Timber	3.07	0.492		Gmd/LvlNorth,LowerGmdNorth,Be

Skylights *Product ID*	*Glass*	*Frame*	*U value*	*SHGC*	*Area M2*
	DG Clear 50% shaded				

Window and skylight U and SHGC values, if specified, are according to ANAC 2005. Alternate products or specifications may be used if their U value is lower, and the SHGC value is less than 10% higher or lower, than the U and SHGC values of the product specified above.

External walls	*Construction*	*Insulation*	*Colour - Solar absorptancy*	*Detail*
Cavity Brick	R1.5		Medium - SA 0.475 - 0.7	As per plans
Concrete Block 90+90	R1.5		Medium - SA 0.475 - 0.7	As per plans
Metal Cladding	R2.5		Medium - SA 0.475 - 0.7	As per plans

Internal walls	*Construction*	*Insulation*	*Detail*
Brick plastered	None		

Floors	*Construction*	*Insulation*	*Covering*	*Detail*
Concrete	None		Ceramic Tile	

Ceilings	*Construction*	*Insulation*	*Detail*
Plasterboard	R4.0		Exposed roof areas only
Concrete	None		Between Floors

Roof	*Construction*	*Insulation*	*Colour - Solar absorptancy*	*Detail*
Tiled Concrete 100mm	None		Medium - SA 0.475 - 0.7	

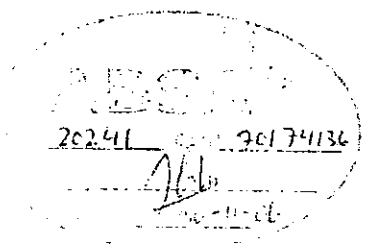
Window cover	*Internal (curtains)*	*External (awnings, shutters, etc)*
Open Weave		None

Fixed shading	*Eaves (width - inc. gutters, height above windows)*	*Verandahs, Pergolas (type, description)*
0 0	As per plans	As per plans

Overshadowing	*Overshadowing structures*	*Overshadowing trees*

Orientation, Exposure, Ventilation and Infiltration	
Orientation of nominal north elevation	15
Terrain category	Suburban
Roof ventilation:	Standard
Cross ventilation:	Standard
Subfloor ventilation:	none
Living area open to entry:	Yes
Living areas separated by doors:	No
Stair open to heated areas:	Yes
Weather seals to windows and doors:	Yes
Exhaust fans without dampers:	No
Ventilated skylights:	No
Open fireplace or unflued gas heater:	No
Vented downlights:	No
Wall and ceiling vents:	No

ABSA Assessor stamp



32 THE SERPENTINE> BILGOLA

EARLY WORKS CONSTRUCTION ISSUE

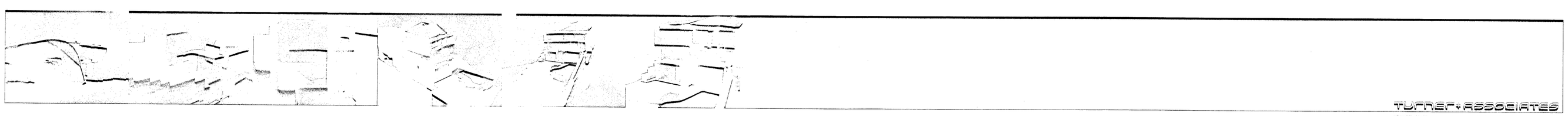
November 2007

ARCHITECTURAL DRAWINGS

Following drawings to be read in conjunction with specification, schedules and consultant documentation

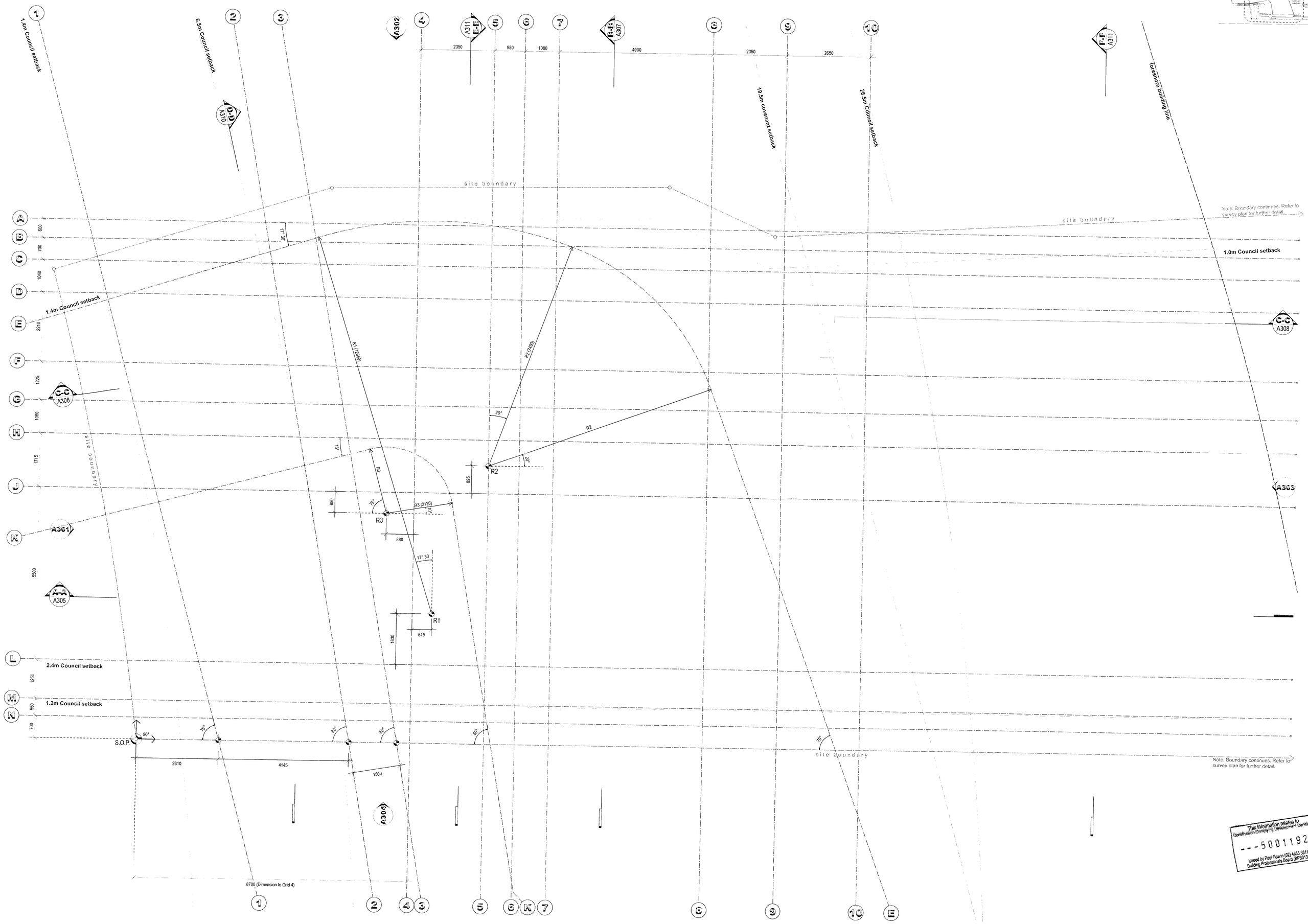
No.	Drawing Title	Scale		Revision
A100				
SITE WORKS				
A101	Not Issued	-	-	-
A102	Grid Setout Plan	1:100	@ (B1)	D
A103	Piling / Retention Wall Set Out Plan	1:50	@ (B1)	H
A104	Capping Beam Setout Plan	1:50	@ (B1)	G
A105	Modified Ground Level Diagram	1:50	@ (B1)	E
A200				
GENERAL ARRANGEMENT PLANS				
PLANS				
A201	Site Plan	1:100	@ (B1)	not issued
A202	Roof Plan	1:50	@ (B1)	not issued
A203	Street Level Plan	1:50	@ (B1)	not issued
A204	Upper Ground Level Plan	1:50	@ (B1)	not issued
A205	Ground Level Plan	1:50	@ (B1)	not issued
A206	Lower Ground Level Plan	1:50	@ (B1)	not issued
A207	Driveway Plan & Subfloor Plan	1:50	@ (B1)	E
SETOUT DIAGRAMS				
A221	Structure_Roof Plan	1:50	@ (B1)	not issued
A222	Metal Cladding_Setout Plan	1:50	@ (B1)	not issued
A223	Stone Rod Diagram	1:50	@ (B1)	not issued
CONCRETE PROFILES				
A251	Concrete Profile_Street Level Plan	1:50	@ (B1)	not issued
A252	Concrete Profile_Upper Ground Level Plan	1:50	@ (B1)	not issued
A253	Concrete Profile_Ground Level Plan	1:50	@ (B1)	not issued
A254	Concrete Profile_Lower Ground Level Plan	1:50	@ (B1)	not issued
A255	Concrete Profile_Driveway & Subfloor Plans	1:50	@ (B1)	B
REFLECTED CEILING PLANS (RCP				
A276	RCP_Street Level Plan	1:50	@ (B1)	not issued
A277	RCP_Upper Ground Level Plan	1:50	@ (B1)	not issued
A278	RCP_Ground Level Plan	1:50	@ (B1)	not issued
A279	RCP_Lower Ground Level Plan	1:50	@ (B1)	not issued
A300				
ELEVATIONS & SECTIONS				
ELEVATIONS				
A301	North Elevation	1:50	@ (B1)	not issued
A302	East Elevation	1:50	@ (B1)	not issued
A303	South Elevation	1:50	@ (B1)	not issued
A304	West Elevation	1:50	@ (B1)	not issued
SECTIONS				
A305	Section A-A (Northern Extent of Site)	1:50	@ (B1)	not issued
A306	Section A-A (Southern Extent of Site)	1:50	@ (B1)	not issued
A307	Section B-B	1:50	@ (B1)	not issued
A308	Section C-C	1:50	@ (B1)	not issued
A309	Section D-D	1:50	@ (B1)	not issued
A310	Section E-E	1:50	@ (B1)	not issued
A311	Section F-F	1:50	@ (B1)	not issued
A312	Section G-G	1:50	@ (B1)	not issued
A400				
LIFTS, STAIRS & RAMPS				
A401	Driveway Section 1 & Section 2	1:50	@ (B1)	D
A402	Ramp - East Elevation & Wall Elevation	1:50	@ (B1)	C
A403	Stair 02	1:20	@ (B1)	not issued
A404	Stair 03	1:20	@ (B1)	not issued
A405	Stair 04	1:20	@ (B1)	not issued
A406	Stair 05	1:20	@ (B1)	not issued
A407	Stair 06	1:20	@ (B1)	not issued
A408	Stair 07	1:20	@ (B1)	not issued
A409	Stair 08	1:20	@ (B1)	not issued
A500				
JOINERY & WET AREAS				
A501	Joinery_SL_Garage Storage & Store Rm [J01,J02]	1:20	@ (B1)	not issued
A502	Wet Area_UL_BTH1 [J03]	1:20	@ (B1)	not issued
A503	Wet Area_UL_BTH2 [J04]	1:20	@ (B1)	not issued
A504	Joinery_UL_B3 [J05]	1:20	@ (B1)	not issued
A505	Joinery_UL_B2 [J06]	1:20	@ (B1)	not issued
A506	Joinery_UL_B1/WIR [J07,J08(1)]	1:20	@ (B1)	not issued
A507	Joinery_UL_B1/WIR [J08(2),J09]	1:20	@ (B1)	not issued
A508	Wet Area_UL_EnB1 [J10]	1:20	@ (B1)	not issued
A509	Joinery_GL_Cellar & B4 [J11,J14]	1:20	@ (B1)	not issued
A510	Joinery_GL_EnB4 [J12, J13]	1:20	@ (B1)	not issued
A511	Wet Area_GL_WC01 [J15]	1:20	@ (B1)	not issued
A512	Joinery_GL_Kitchen [J16, J17]_1	1:20	@ (B1)	not issued
A513	Joinery_GL_Kitchen [J16, J17]_2	1:20	@ (B1)	not issued
A514	Joinery_GL_Living Room [J18]	1:20	@ (B1)	not issued
A515	Joinery_GL_BBQ [J19]	1:20	@ (B1)	not issued
A516	Wet Area_LG_LY01 [J20]	1:20	@ (B1)	not issued
A517	Joinery_LG_Media Bar [J21]_1	1:20	@ (B1)	not issued
A518	Joinery_LG_Media Bar [J21]_2	1:20	@ (B1)	not issued
A519	Joinery_LG_Media [J22]	1:20	@ (B1)	not issued
A520	Joinery_LG_Media [J23]	1:20	@ (B1)	not issued
A521	Wet Area_LG_WC02 [J24]	1:20	@ (B1)	not issued
A522	Joinery_LG_Rumpus Room [J25]	1:20	@ (B1)	not issued
A523	Joinery_LG_Kitchen Storage/B5 [J26]_1	1:20	@ (B1)	not issued
A524	Joinery_LG_Kitchen Storage/B5 [J26]_2	1:20	@ (B1)	not issued
A525	Wet Area_LG_EnB5 [J27]	1:20	@ (B1)	not issued
A526	Joinery_LG_B5 Window [J28]	1:20	@ (B1)	not issued
A527	Wet Area_LG_WC03 [J29]	1:20	@ (B1)	not issued
A528	Joinery_LG_LY02/Entry [J30,J31]	1:20	@ (B1)	not issued
A600				
WINDOWS, DOORS, BALUSTRADES				
A601	Windows + External Screens Schedule 1 of 2	1:50	@ (B1)	not issued
A602	Windows + External Screens Schedule 2 of 2	1:50	@ (B1)	not issued
A603	Door Schedule	1:50	@ (B1)	not issued
A604	Balustrade & Handrail Schedule	1:50	@ (B1)	not issued
A700				
CONSTRUCTION DETAILS				
tbc	Garage Door & Portico details	1:2, 1:10	@ (B1)	not issued
tbc	Driveway details	1:2, 1:10	@ (B1)	not issued
tbc	Metal Cladding Roof details	1:2, 1:10	@ (B1)	not issued
tbc	Metal Cladding Wall details	1:2, 1:10	@ (B1)	not issued
tbc	Timber Cladding details	1:2, 1:10	@ (B1)	not issued
tbc	Off-form Concrete details	1:2, 1:10	@ (B1)	not issued
tbc	Stonework details	1:2, 1:10	@ (B1)	not issued
tbc	Wall details	1:2, 1:10	@ (B1)	not issued
tbc	Window & Glazed Door details	1:2, 1:10	@ (B1)	not issued
tbc	Skylight details	1:2, 1:10	@ (B1)	not issued
tbc	Pool details	1:2, 1:10	@ (B1)	not issued
tbc	Handrail & Balustrade details	1:2, 1:10	@ (B1)	not issued
tbc	North Courtyard Fireplace details	1:2, 1:10	@ (B1)	not issued
tbc	External Timber Screen details	1:2, 1:10	@ (B1)	not issued
ARCHITECTURAL SCHEDULES				
1.00	External Finishes	-	@ (A3)	not issued
2.00	Internal Finishes	-	@ (A3)	not issued
3.00	Fixtures & fittings	-	@ (A3)	not issued
4.00	Doors	-	@ (A3)	not issued
5.00	Windows & External Screens	-	@ (A3)	not issued
6.00	Balustrades & Handrails	-	@ (A3)	not issued
7.00	Joinery	-	@ (A3)	not issued
8.00	Lighting	-	@ (A3)	not issued

This documentation pertains to Construction/Complying Development Certificate
--- 5001192
Issued by Pearl Beach (02) 4459 3311
Building Professionals Board (BPB0132)



TURNER + ASSOCIATES
NOMINATED ARCHITECT Nicholas Turner 6655

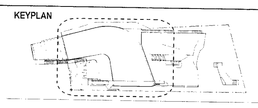
SCANNED
24 JAN 2008



01 Grid Set Out Plan

Note: Unless noted otherwise grid setout established parallel/ perpendicular to western boundary.

KEYPLAN



NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. ARCHITECT TO BE NOTIFIED OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

S.O.P. Site Setout Point (refer to Survey Drawing prepared by Gary Edwards & Associates for further details)

Setout Point as dimensioned

No	Date	Appr	Revision Notes
D	16.11.07	DS	Construction Issue - Early Works
C	24.09.07	DS	Tender Issue - Early Works
B	23.08.07	DS	Client Approval
A	10.08.07	DS	Client Review

PROJECT ARCHITECTS
TURNER + ASSOCIATES
LEVEL 9/566 CROWN STREET SURRY HILLS NSW 2010
T 02 9360 2855 F 02 9360 2411 E rbutler@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 6895

CLIENT
CASE Developments Pty Ltd
PO Box 6024
Baulkham Hills BC, NSW 2153
Eric Zammit
T 02 8818 3600 M 0414 480 222 E lou@tobeinvestments.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Norwest Business Park > Suite 202. 25-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Monk T 02 8818 3620 M 0415 441 774 E mark@tobe.com.au
Laura Quattromani T 02 8818 3630 M 0414 662 033 E laura@tobe.com.au

BUILDER
CASE Developments Pty Ltd
Norwest Business Park > Suite 202. 25-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Monk T 02 8818 3620 M 0415 441 774 E mark@tobe.com.au
Laura Quattromani T 02 8818 3630 M 0414 662 033 E laura@tobe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Suite 1, 19 Orion Road
Sydney NSW 2000
Stephen Gillett, Tony Kaye
T 02 9241 8811 M 0417 103 828 E stephen.gillett@rbd.robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 403 Forest Road
Bexley NSW 2207
Adrian Mills
T 02 9311 8611 M 0410 507 244 E admin@greenarrow.net.au

PCA
Local Management Services
PO Box 3150
Hamilton DC, NSW 2567
Paul Gream
T 02 4055 5811 M 0423 508 808 E vanessa@localgroup.com.au

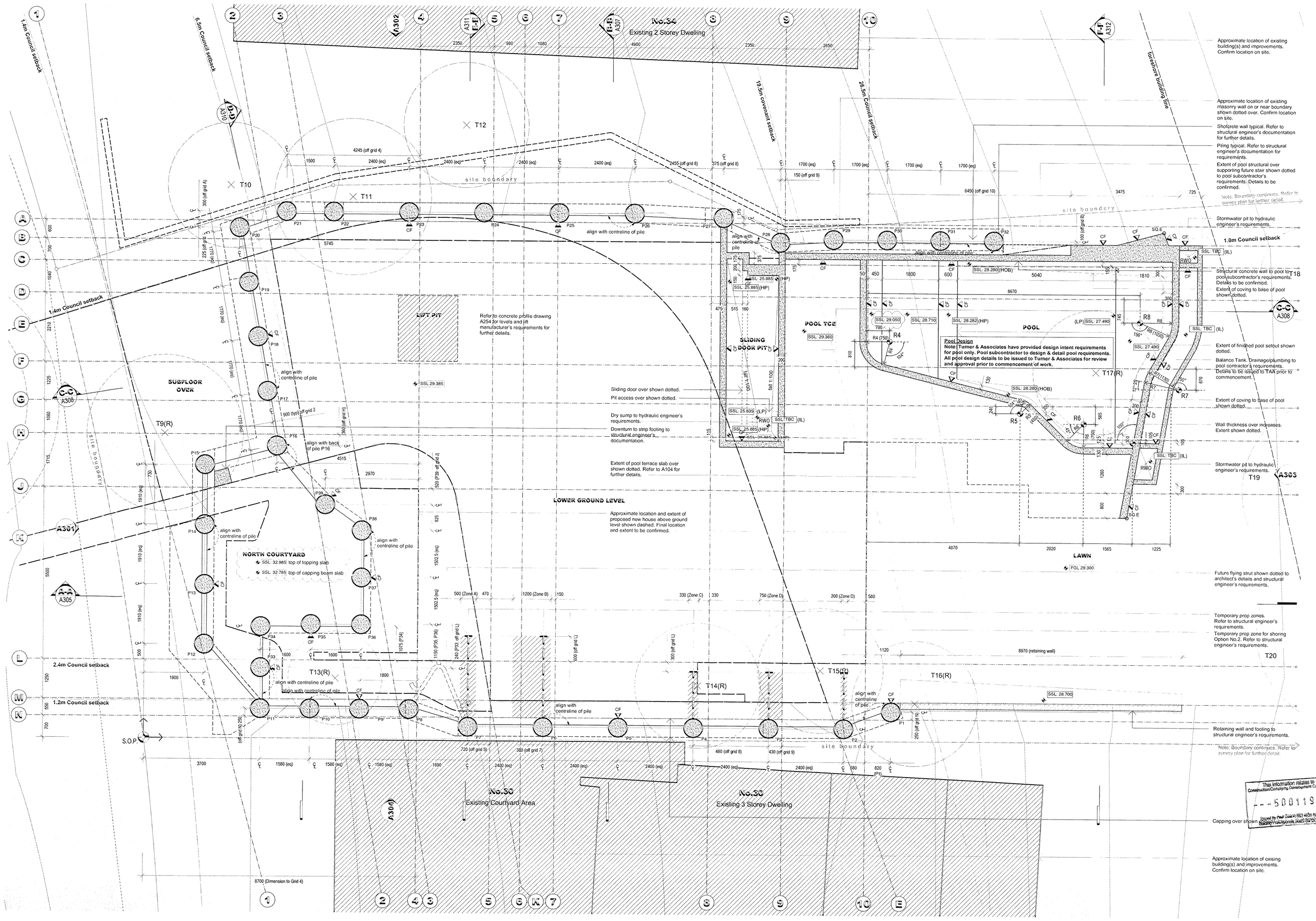
LANDSCAPE ARCHITECT
Selena Hamae Design
PO Box 549
Avalon Beach, NSW 2107
Selena Hamae
T 02 9973 2247 M 0403 041 167 E selena@tech2u.com.au

PROJECT
Bilgola Residence
30 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Grid Set Out Plan

PRINT DATE	16.11.07	NORTH
DATE COMMENCED	31.07.07	
DRAWN	AR	
CHECKED	AM	
SCALE @ B1	1:50	
@ A3	1:100	
STATUS	For Construction	JOB NO. 06025
		DWG NO. A102 D

This information relates to Construction/Occupation Certificate
---5001192
Issued by Paul Gream (02) 4055 5811
Building Professionals Board BSP5001343



01 - **Piling / Retention Wall Set Out Plan**

Note: Refer to architectural drawing A104 for capping beam details.

NOTES:

1. Refer to DA Conditions of Approval and CC Approval requirements prior to commencement of work. 2. Refer to structural requirements prepared by Robert Bird Group for further details. 3. Refer to gootechnical requirements prepared by Jeffrey & Katauskas for further details. 4. Refer to arborist report prepared by Urban Forestry Management for further details. 5. Refer to hydraulic & stormwater requirements prepared by Green Arrow for further details. 6. Refer to civil requirements (documentation pending).

NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. THE OWNER + ASSOCIATES OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

(EX)	Existing
FFL	Finished Floor Level
FGL	Finished Ground Level
S.O.P.	Site Setout Point (refer to Survey Drawing prepared by Gary Edwards & Associates for further details)
SSL	Structural Slab Level
P1, 2..	Pile No.1, 2, etc. for location reference ONLY. [Refer to structural engineer's documentation for pile type and structural requirements]
WS	Water stop detail
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No.1, 2 etc. , to be retained, trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No.1, 2 (R) etc. , to be removed, trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL 25.550(EX)	Existing Relative Spot Level [To Australian Height Datum]
RL 25.550	Proposed Relative Spot Level, shown boxed [To Australian Height Datum]
FFL	Finished Floor Level, shown boxed [To Australian Height Datum]
SSL	Structural Slab Level, shown boxed [To Australian Height Datum]
FCL	Finished Ceiling Level, shown boxed [To Australian Height Datum]
100↑	Set down in structure. Refer to drawing for change in level.
SQ E	Square edge
T E	Tooled edge
CF	Critical face of wall

NOTES

Zone A,B...etc Zone for temporary propping. Refer to structural engineer's documentation for further details

No	Date	Appr	Revison Notes
H	18.11.07	DS	Clarification of North Courtyard Levels + Pool Levels
G	16.11.07	DS	Construction Issue - Early Works
F	01.11.07	-	Final Client Review
E	16.10.07	-	Client Review
D	24.08.07	DS	Tender Issue - Early Works

PROJECT ARCHITECTS
TURNER + ASSOCIATES
LEVEL 1/166 CROWN STREET SURRY HILLS NSW 2010
T 02 9360 2855 F 02 9360 2411 E dtcrews@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 6935

CLIENT
CABE Developments Pty Ltd
PO Box 6024
Baulkham Hills BC NSW 2153
Lou Zuravec
T 02 8818 3600 M 0414 488 222 E lou@crabenvestments.com.au

PROJECT MANAGER
CABE Developments Pty Ltd
Norwest Business Park + Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Monk T 02 8818 3620 M 0418 441 774 E mark@cabe.com.au
Louis Quattromani T 02 8818 3620 M 0414 662 033 E louis@cabe.com.au

BUILDER
CABE Developments Pty Ltd
Norwest Business Park + Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Monk T 02 8818 3620 M 0418 441 774 E mark@cabe.com.au
Louis Quattromani T 02 8818 3620 M 0414 662 033 E louis@cabe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 5, 7 Castlereagh St
Sydney, NSW 2000
Stephen Gilpin / Chris Kwan
T 02 9221 0811 M 0417 103 828 E stephen.gilpin@rpd.robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 405 Forest Road
Bexley NSW 2207
Michael Green
T 02 9221 0611 M 0410 507 244 E admin@greenarrow.net.au

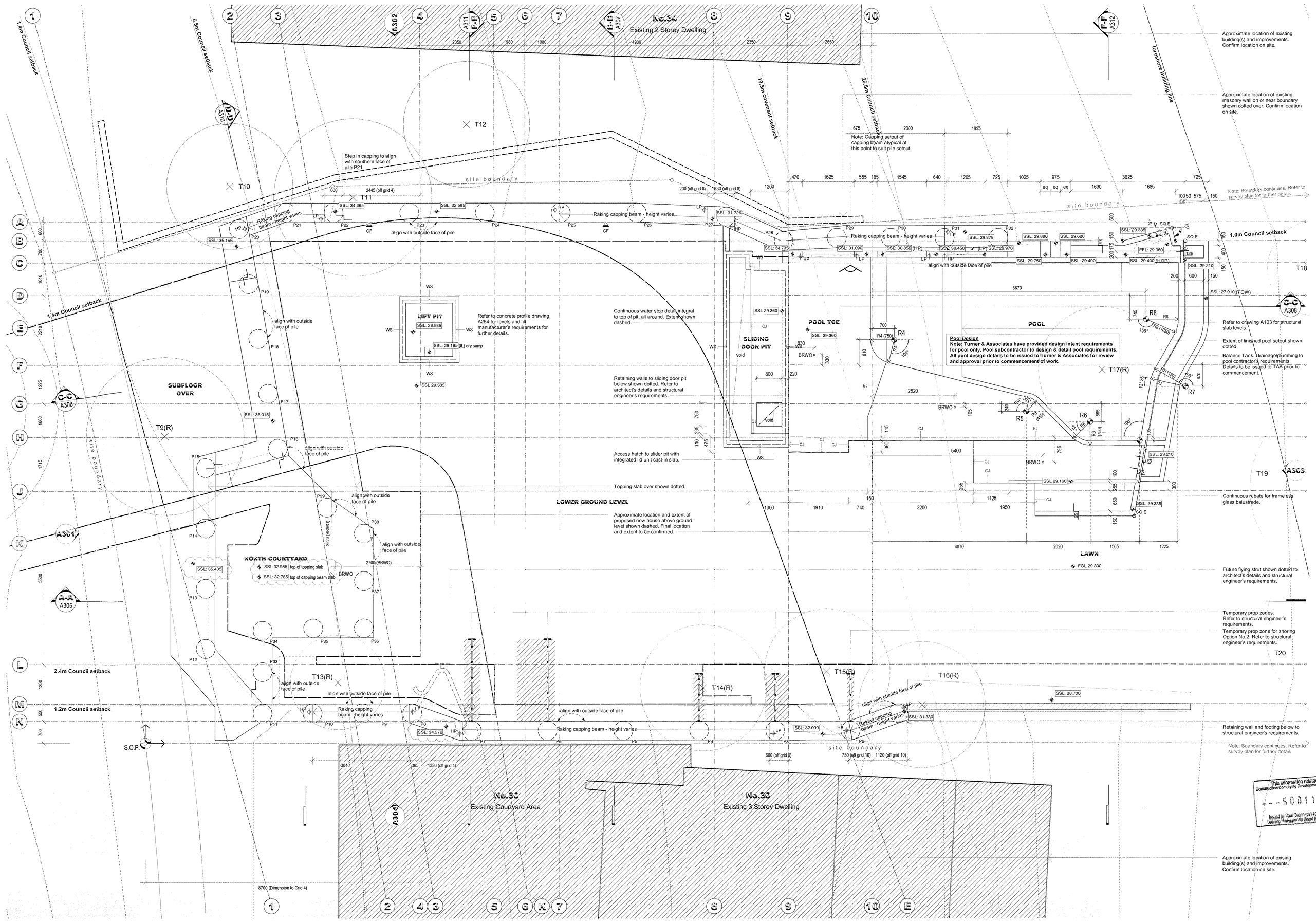
PCA
Lovell Management Services
PO Box 3700
Baulkham Hills NSW 2567
Fred Fawaz
T 02 4655 5811 M 0423 568 808 E vanessa@lovellgroup.com.au

LANDSCAPE ARCHITECT
Selena Hannan Design
PO Box 3
Avalon Beach NSW 2107
Selena Hannan
T 02 9972 2247 M 0403 041 187 E selena@tech2u.com.au

PROJECT
Bilgola Residence
32 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Piling / Retention Wall Set Out Plan

PRINT DATE	18.11.07	NORTH
DATE COMMENCED	31.07.07	
DRAWN	AR	
CHECKED	AR	
SCALE @ B1	1:50	
@ A3	NTS	
STATUS	For Construction	JOB NO. 06025
		DWG NO. A103 H



01 Capping Beam Set Out Plan

Note: Refer to architectural drawing A103 for piling details

NOTES:

1. Refer to DA Conditions of Approval and CC Approval requirements prior to commencement of work. 2. Refer to structural requirements prepared by Robert Bird Group for further details. 3. Refer to geotechnical requirements prepared by Jeffrey & Katauskas for further details. 4. Refer to arborist report prepared by Urban Forestry Management for further details. 5. Refer to hydraulic & stormwater requirements prepared by Green Arrow for further details.
6. Refer to civil requirements (documentation pending).

NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. INFORM TURNER + ASSOCIATES OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION

LEGEND (Refer to Specification & Schedules for further information)

BRWO	Balcony Rainwater Outlet
(EX)	Existing
FFL	Finished Floor Level
FGL	Finished Ground Level
HP	High Point
LP	Low Point
S.O.P.	Site Setout Point [refer to Survey Drawing prepared by Gary Edwards & Associates for further details]
SSL	Structural Slab Level
WS	Water stop
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No.1, 2 etc... to be retained, trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No.1, 2 (R) etc... to be removed, trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL 25.550(EX)	Existing Relative Spot Level [To Australian Height Datum]
RL 25.550	Proposed Relative Spot Level: shown boxed [To Australian Height Datum]
FFL	Finished Floor Level, shown boxed [To Australian Height Datum]
SSL	Structural Slab Level, shown boxed [To Australian Height Datum]
FCL	Finished Ceiling Level, shown boxed [To Australian Height Datum]
100	Set down in structure. Refer to drawing for change in level
SQ E	Square edge
T E	Tooled edge
CF	Critical face of wall
	Point of direction change

No	Date	Appr	Revision Notes
G	18.11.07	DS	Clarification of North Courtyard Levels + Pool Levels
F	16.11.07	DS	Construction Issue - Early Works
E	01.11.07	-	Final Client Review
D	16.10.07	-	Client Review
C	24.08.07	DS	Tender Issue - Early Works

PROJECT ARCHITECTS
Turner + Associates
LEVEL 1/ 586 CROWN STREET, SURRY HILLS NSW 2010
T 02 9360 2002 F 02 9360 2411 E dulow@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 6926

CLIENT
CASE Developments Pty Ltd
PO Box 6924
Baulkham Hills BC NSW 2153
Cris Zivkovic
T 02 8818 3600 M 0414 488 222 E tru@tobeinvestments.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Norwest Business Park + Suite 202, 29-31 Solent Cct
Baulkham Hills NSW 2153
Mark Mark T 02 8818 3620 M 0418 443 774 E mark@tobe.com.au
Louis Quattromani T 02 8818 3630 M 0414 652 033 E louis@tobe.com.au

BUILDER
CASE Developments Pty Ltd
Norwest Business Park + Suite 202, 29-31 Solent Cct
Baulkham Hills NSW 2153
Mark Mark T 02 8818 3620 M 0418 443 774 E mark@tobe.com.au
Louis Quattromani T 02 8818 3630 M 0414 652 033 E louis@tobe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 1, 456 Kent Street
Sydney NSW 2000
Stephen Gillett Tony Kean
T 02 9221 0611 M 0417 553 828 E stephen.gillett@rbd.robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 459 Forest Road
Bexley NSW 2207
Michael Green
T 02 9221 0611 M 0410 507 244 E admin@greenarrow.net.au

BCA
Fleet Management Services
PO Box 3135
Rankton DC NSW 2567
Paul Gearin
T 02 4655 5811 M 0423 568 808 E vanessa@localgroup.com.au

LANDSCAPE ARCHITECT
Selena Hannan Design
PO Box 549
Avalon Beach NSW 2107
Selena Hannan
T 02 9972 3267 M 0403 041 187 E selena@hs2u.com.au

PROJECT
Bilgola Residence
32 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Capping Beam Set Out Plan

PRINT DATE	18.11.07
DATE COMENCED	31.07.07
DRAWN	BJ, AR
CHECKED	AR
SCALE @ B1	1:50
@ A3	NTS
STATUS	For Construction
JOB NO.	06025
DRG NO.	A104 G

NORTH



01 Modified Ground Level Diagram

Note: Refer to architectural drawing A103 for piling details.
Refer to architectural drawing A104 for capping beam details.

NOTES:

1. Refer to DA Conditions of Approval and CC Approval requirements prior to commencement of work. 2. Refer to structural requirements prepared by Robert Bird Group for further details. 3. Refer to geotechnical requirements prepared by Jeffrey & Katauskas for further details. 4. Refer to arborist report prepared by Urban Forestry Management for further details. 5. Refer to hydraulic & stormwater requirements prepared by Green Arrow for further details.
6. Refer to civil requirements (documentation pending).

NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. FIGURED DIMENSIONS TAKE PREFERENCE TO SCALED DIMENSIONS. VERIFICATION BEFORE PROCEEDING WITH WORK. DIMENSIONS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND *(Refer to Specification & Schedules for further information)*

(EX)	Existing
FFL	Finished Floor Level
FGL	Finished Ground Level
S.O.P.	Site Setout Point (refer to Survey Drawing prepared by Gary Edwards & Associates for further details)
SSL	Structural Slab Level
P1, 2...	Pile No.1, 2 .etc. for location reference ONLY. [Refer to structural engineer's documentation for pile type and structural requirements.]
WS	Water stop detail
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No.1, 2 etc... to be retained. trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No.1, 2 (R) etc... to be removed. trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL: 25.550(EX)	Existing Relative Spot Level [To Australian Height Datum]
RL: 25.550	Proposed Relative Spot Level. shown boxed [To Australian Height Datum]
FFL	Finished Floor Level. shown boxed [To Australian Height Datum]
SSL	Structural Slab Level. shown boxed [To Australian Height Datum]
FCL	Finished Ceiling Level. shown boxed [To Australian Height Datum]
100↓	Set down in structure. Refer to drawing for change in level.
SQ E	Square edge
T E	Tooled edge
CF	Critical face of wall

SCHEDULE OF AREAS *(Pending Civil Engineer's review and approval)*

Area A: Subfloor under Garage & Driveway
- A1: Subfloor SSL-350 (250 + 100)
- A2: Subfloor SSL-1000 (900 + 100)

Area B: North Courtyard
- B1: Courtyard SSL-305 (200 + 100)
- B2: Courtyard SSL-TBC (200 + 50 + Crane Pad depth)

Area C: Lower Ground Level
- C1: Lower Ground SSL-270 (120 + 50 + 100)
- C2: Lower Ground SSL-500 (400 + 100)
- C3: Lower Ground SSL-1300 (Lift Pit depth [800] & Lift Pad depth [400] + 100)
- C4: Finished Lower Ground - 4000 (100 + Slider Pit depth + 200)

Area D: Pool Terrace
- D1: Pool Terrace SSL-300 (200 + 100)

Area E: Pool & Balance Tank
- E1: Pool Terrace SSL-600 (100 + 500 + 200 + 100)
- E2: Pool Terrace SSL-1400 (100 + 1000 + 200 + 100)
- E3: Pool Terrace SSL-2200 (100 + 1800 + 200 + 100)
- E4: Pool Terrace SSL-TBC (100 + invert level of balance tank + 200 + 100)
- E5: Pool Terrace SSL-1300 (100 + 1200)

Area F: Lawn/ Garden
- F1: Finished Ground Level-600 (600mm to 600max)
- F2: Finished Ground Level-600 (600mm to 600max)
- F3: Finished Ground Level-600 (600mm to 600max)

Note: Modified ground level graded to fall

Area G: Western Retaining Wall
- G1: Finished Ground Level - 600 - depth of retaining wall footing

Area H: Capping Beam
- H1: Depth of Capping Beam
- H2: As above
- H3: As above
- H4: As above
- H5: As above
- H6: As above

Area J: Driveway Crossover
- J1: To be confirmed

E	16.11.07	DS	Information Only
D	01.11.07	-	Final Client Review
C	16.10.07	-	Client Review
B	24.08.07	DS	Information for Tender
A	23.08.07	DS	Client Approval
No	Date	Appr	Revision Notes

PROJECT ARCHITECTS

TURNER & ASSOCIATES

LEVEL 1/ 186 CROWN STREET, BURRY HILLS NSW 2010
T 02 9360 2850 F 02 9360 2411 E: dsuss@turnerassociates.com.au

NOMINATED ARCHITECT: Nicholas Turner: 6085

CLIENT
CASE Developments Pty Ltd
Level 5, 3 Gladeswagh St
Baulkham Hills BC NSW 2153
Lou Zvirkovic
T 02 8818 3600 M 0414 488 222 E lou@colbeinvestments.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Norwest Business Park 1- Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Hunt T 02 8818 3600 M 0419 441 774 E: markh@colbe.com.au
Louis Quattromani T 02 8818 3600 M 0414 662 033 E: lkuoq@colbe.com.au

BUILDER
CASE Developments Pty Ltd
Norwest Business Park 1- Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Hunt T 02 8818 3600 M 0419 441 774 E: markh@colbe.com.au
Louis Quattromani T 02 8818 3600 M 0414 662 033 E: lkuoq@colbe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 5, 3 Gladeswagh St
Baulkham Hills, NSW
Stephen Gillett, Tom Kean
T 02 9221 6611 M 0417 103 826 E: stephen.gillett@rbirdbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1 409 Victoria Road
Rowley NSW 2207
Michael Green
T 02 9221 6611 M 0410 507 244 E: admin@greenarrow.net.au

PCA
Local Management Services
PO Box 370
Paddington, NSW 2567
David Gordon
T 02 4605 5811 M 0423 558 808 E: vanessa@localgroup.com.au

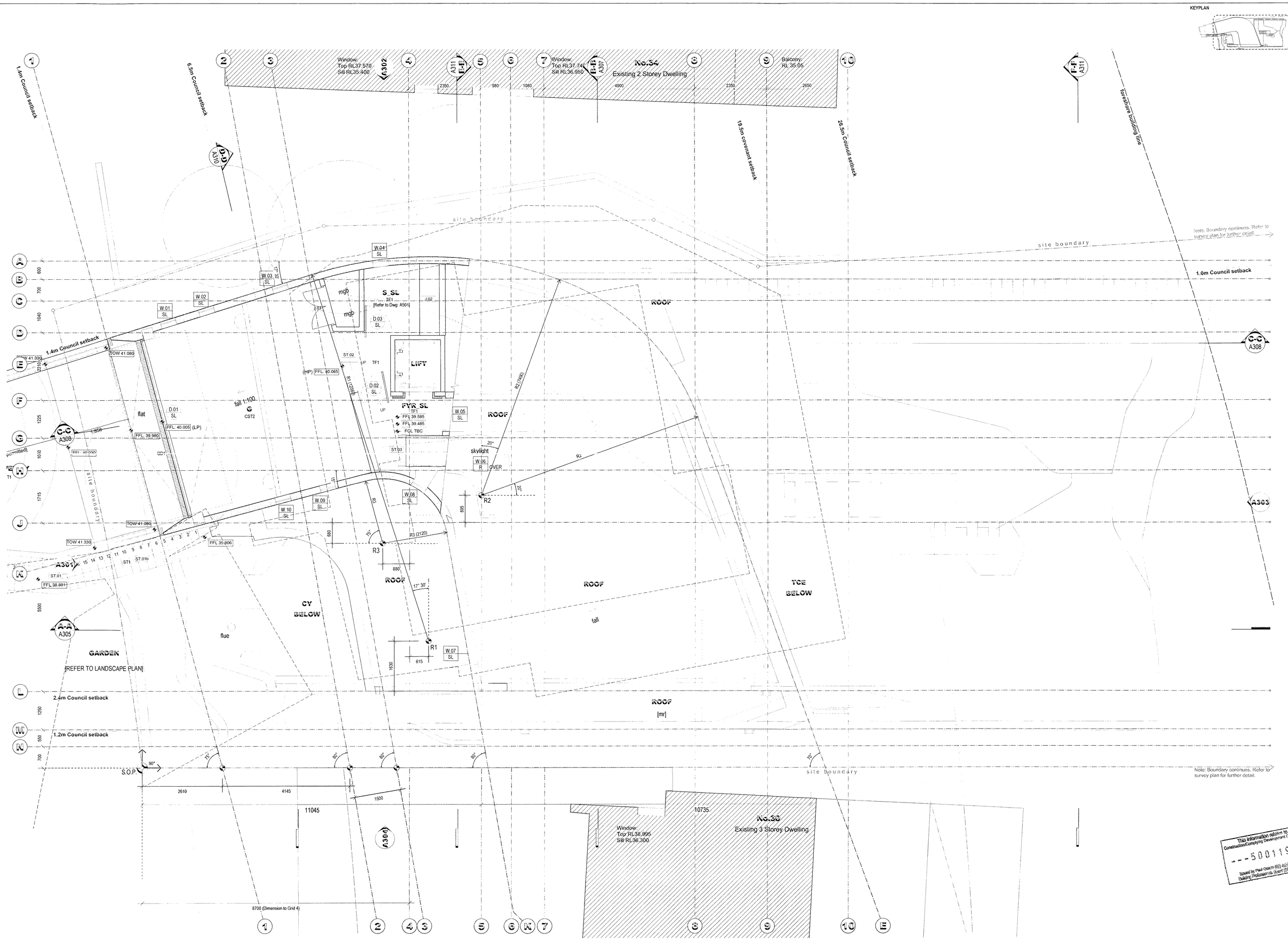
LANDSCAPE ARCHITECT
Selena Hannan Design
PO Box 545
Avalon Beach, NSW 2107
Selena Hannan
T 02 9973 3247 M 0403 041 187 E: selena@tech2u.com.au

PROJECT
Bilgola Residence
32 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Modified Ground Level Diagram

PRINT DATE	05.11.07
DATE COMMENCED	17.08.07
DRAWN	AR /MJ
CHECKED	AR
SCALE @ B1	1:50
@ A3	NTS
STATUS	For Information Only
JOB NO.	06025
DWG NO.	A105 E

NORTH



01 Street Level Plan

Note: Refer to Concrete Profile drawings for further information

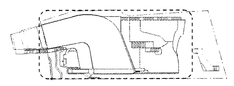
NOTES:

1. Refer to DA Conditions of Approval and CC Approval requirements prior to commencement of work.
2. Refer to structural requirements prepared by Robert Bird Group for further details.
3. Refer to geotechnical requirements prepared by Jeffrey & Katauskas for further details.
4. Refer to arborist report prepared by Urban Forestry Management for further details.
5. Refer to hydraulic & stormwater requirements prepared by Green Arrow for further details.
6. Refer to civil requirements (documentation pending).

MATERIALS & FINISHES

BTI, 2...	Balustrade; type 1, 2, etc.	CR1, 2...	Cement Render; type 1, 2, etc.	HR1, 2...	Handrail; type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2...	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2...	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2...	Metal Cladding; type 1, 2, etc.	TF1, 2...	Timber Flooring; type 1, 2, etc.	T1, 2...	Tile; type 1, 2, etc.
CEA1, 2...	Concrete Exposed Aggregate; type 1, 2, etc.	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2...	Suspended Ceiling; type 1, 2, etc.		
COF1, 2...	Concrete Off-Form Finish; type 1, 2, etc.	GSB1, 2...	Glass Splash Back; type 1, 2, etc.	PBMR	Plasterboard, Moisture Resistant	SKT1, 2...	Skirting; type 1, 2, etc.		
CPC1, 2...	Concrete, Pre-Cast; type 1, 2, etc.	GD1, 2...	Grated Drain; type 1, 2, etc.	PF1, 2...	Paint Finish; type 1, 2, etc.	STC, 2...	Stone Cladding; type 1, 2, etc.		

KEYPLAN



NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. INFORM TURNER + ASSOCIATES OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

B1, 2...	Bedroom 1, 2, etc.
BTH_1, 2...	Bathroom_1, 2, etc.
BY	Balcony
CY	Courtyard
CLR	Cellar
D	Dining
E_GL, LG...	Entry_Ground, Lower Ground, etc.
EGL	Existing Ground Level
EN_B1, B2...	Ensuite_Bedroom 1, 2, etc.
FCL	Finished Ceiling Level
fp	Fire Place
FW1, 2...	Floor waste 1, 2, etc
FYR_SL, UG...	Lift / Stair Foyer_Street, Upper Ground, etc)
G	Garage
GL	Ground Level
HT	Hot Tub / Spa
HWS	Hot Water System
	[refer to BASIX assessment for details)
K_GL, LG...	Kitchen_Ground, Lower Ground, etc.
L	Living
LG	Lower Ground
LY_01, 02...	Laundry 1, 2, etc.
mgb	Mobile Bin
[m+sb]	Membrane roof with stone ballast
P	Pantry
r	Robe
rf	refrigerator
S_01, 02...	Storage Room 1, 2, etc.
S_SL	Storeroom_Street Level
sd	Sliding Door
SFL	Subfloor Area
SHR	Shower Room
SL	Street Level
SNA	Sauna
ST	Study
TCE	Terrace
UG	Upper Ground
V	Void
WIR_B1, B2...	Walk in Robe_Bedroom 1, 2, etc.
wm/d	Washing Machine / Dryer
W2	Wall type. Refer to wall schedule.
CPC1	Finishes and material type. Refer to wall schedule.
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No.1, 2 etc... to be retained, trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Evisting Tree No.1, 2 (R) etc... to be removed, trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL 25.550(EX)	Existing Relative Spot Level [To Australian Height Datum]
RL 25.550	Proposed Relative Spot Level. shown boxed [To Australian Height Datum]
FFL	Finished Floor Level, shown boxed [To Australian Height Datum]
SSL	Structural Slab Level, shown boxed [To Australian Height Datum]
FSL	Finished Ceiling Level, shown boxed [To Australian Height Datum]
100	Set down in structure. Refer to drawing for change in level.
SQ.E	Square edge
T.E	Tooled edge
CF	Critical face of wall

No	Date	Appr	Revision Notes
C	18.11.07	DS	Client Review
B	16.10.07		Client Review
A	21.09.07	DS	Consultant Issue

PROJECT ARCHITECTS

TURNER + ASSOCIATES

LEVEL 1/166 CROWN STREET SURRY HILLS NSW 2010
T 02 9360 2850 F 02 9360 2411 E rbizzaro@turnerassociates.com.au

NOMINATED ARCHITECT Nicholas Turner 6935

CLIENT

CASE Developments Pty Ltd
PO Box 6524
Baulkham Hills BC NSW 2153
Lou Quattromani
T 02 8818 3020 M 0414 488 222 E lou@arabenwentworths.com.au

PROJECT MANAGER

CASE Developments Pty Ltd
Norwest Business Park + Suite 202, 20-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mons T 02 8818 3020 M 0410 441 774 E mark@cabe.com.au
Louis Quattromani T 02 8818 3030 M 0414 662 033 E louis@cabe.com.au

BUILDER

CASE Developments Pty Ltd
Norwest Business Park + Suite 202, 20-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mons T 02 8818 3020 M 0410 441 774 E mark@cabe.com.au
Louis Quattromani T 02 8818 3030 M 0414 662 033 E louis@cabe.com.au

STRUCTURAL ENGINEER

Robert Bird Group Pty Ltd
Level 1, 60 Carrington St
Sydney NSW 2000
Stephen Gillett, Tony Kozin
T 02 9221 6411 M 0417 193 628 E stephen.gillett@rpd-robertbird.com.au

HYDRAULIC ENGINEER

Green Arrow Consulting
Level 3, 405 Forest Road
Bexley NSW 2207
Michael Green
T 02 9221 5511 M 0410 507 244 E admin@greenarrow.net.au

PCA

Lend Management Services
PO Box 3135
Frenton DC NSW 2567
Paul Gavin
T 02 4655 5811 M 0423 568 806 E vanessa@localgroup.com.au

LANDSCAPE ARCHITECT

Selena Hannon Design
PO Box 545
Avalon Beach NSW 2107
Selena Hannon
T 02 9972 5247 M 0403 041 187 E selena@tech2u.com.au

PROJECT

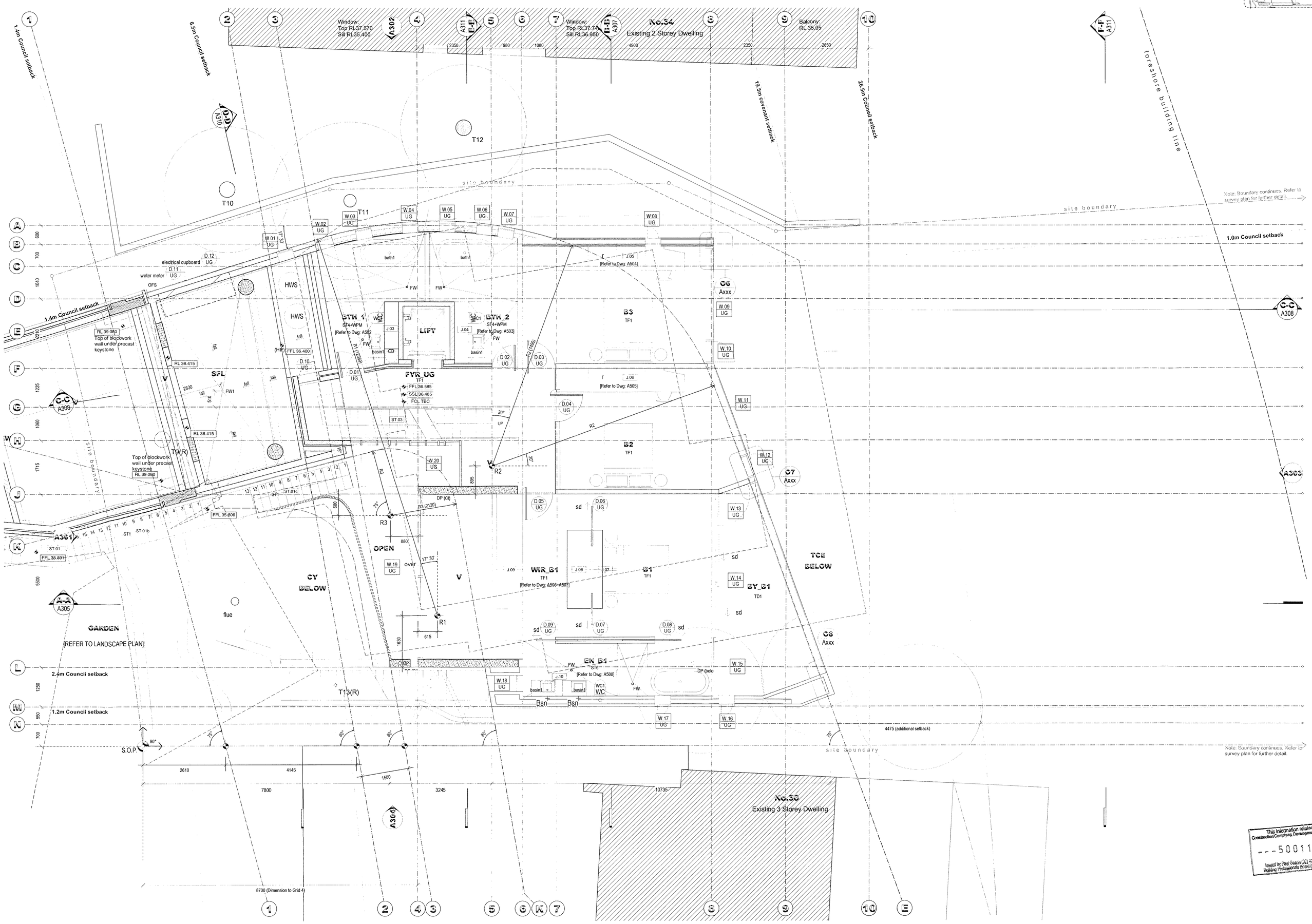
Bilgola Residence
30 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE

Street Level Plan

PRINT DATE	18.11.07	NORTH	
DATE COMMENCED	16.08.07		
DRAWN	AM, AR		
CHECKED	AR		
SCALE @ B1	1:50		
@ A3	1:100		
STATUS	JOB NO.	DWG NO.	
For Information Only	06025	A203	C

This information relative to Construction/Occupying Development Certificate
---5001192
Issued by Paul Gavin (BDC A655 3611 Building Professionals Board (BPB 00132)



01 Upper Ground Level Plan

Note: Refer to Concrete Profile drawings for further information

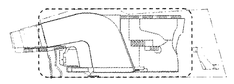
NOTES:

1. Refer to DA Conditions of Approval and CC Approval requirements prior to commencement of work.
2. Refer to structural requirements prepared by Robert Bird Group for further details.
3. Refer to gootechnical requirements prepared by Joffrey & Kataiuskas for further details.
4. Refer to arborist report prepared by Urban Forestry Management for further details.
5. Refer to hydraulic & stormwater requirements prepared by Green Arrow for further details.
6. Refer to civil requirements (documentation pending).

MATERIALS & FINISHES

BT1, 2...	Balustrade; type 1, 2, etc.	CR1, 2...	Cement Render; type 1, 2, etc.	HR1, 2...	Handrail: type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2...	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2...	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2...	Metal Cladding; type 1, 2, etc.	TF1, 2...	Timber Flooring; type 1, 2, etc.	T1, 2...	Tile; type 1, 2, etc.
CEA1, 2...	Concrete Exposed Aggregate; type 1, 2, etc.	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2...	Suspended Ceiling; type 1, 2, etc.		
COF1, 2...	Concrete Off-Form Finish; type 1, 2, etc.	GSB1, 2...	Glass Splash Back; type 1, 2, etc.	PBMR	Plasterboard, Moisture Resistant	SKT1, 2...	Skirting; type 1, 2, etc.		
CPC1, 2...	Concrete; Pre-Cast; type 1, 2, etc.	GD1, 2...	Grated Drain; type 1, 2, etc.	PF1, 2...	Paint Finish; type 1, 2, etc.	STC, 2...	Stone Cladding; type 1, 2, etc.		

KEYPLAN



NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. INFORM TURNER + ASSOCIATES OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

B1, 2...	Bedroom 1, 2, etc.
BTH, 1, 2...	Bathroom, 1, 2, etc.
BY	Balcony
CY	Courtyard
CLR	Cellar
D	Dining
E_GL, LG...	Entry_Ground, Lower Ground, etc.
EGL	Existing Ground Level
EN_B1, B2...	Ensuite_Bedroom 1, 2, etc.
FCL	Finished Ceiling Level
fp	Fire Place
FW1, 2...	Floor waste 1, 2, etc.
FYR_SL, LG...	Lift / Stair Foyer_Street, Upper Ground, etc)
G	Garage
GL	Ground Level
HT	Hot Tub / Spa
HWS	Hot Water System
	[refer to BASIX assessment for details)
K_GL, LG...	Kitchen_Ground, Lower Ground, etc
L	Living
LG	Lower Ground
LY_01, 02...	Laundry 1, 2, etc.
mgb	Mobile Bin
[m+rB]	Membrane roof with stone ballast
p	Pantry
r	Robe
rf	refrigerator
S_01, 02...	Storage Room 1, 2, etc.
S_SL	Storeroom_Street Level
sd	Sliding Door
SPL	Subfloor Area
SHR	Shower Room
SL	Street Level
SNA	Sauna
ST	Study
TCE	Terrace
UG	Upper Ground
V	Void
WIR_B1, B2...	Walk in Robe_Bedroom 1, 2, etc.
wm/d	Washing Machine / Dryer
W2	Wall type. Refer to wall schedule.
CPC1	Finishes and material type. Refer to wall schedule.
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No 1, 2 etc... to be retained, trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No 1, 2 (R) etc... to be removed, trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL. 25.550(EX)	Existing Relative Spot Level [To Australian Height Datum]
RL. 25.550	Proposed Relative Spot Level, shown boxed [To Australian Height Datum]
FFL	Finished Floor Level, shown boxed [To Australian Height Datum]
SSL	Structural Slab Level, shown boxed [To Australian Height Datum]
FCL	Finished Ceiling Level, shown boxed [To Australian Height Datum]
150	Set down in structure. Refer to drawing for change in level.
SQ E	Square edge
T E	Tooled edge
CF	Critical face of wall

No	Date	Appr	Revision Notes
C	18.11.07	DS	Client Reveiew
B	16.10.07		Client Reveiew
A	21.09.07	DS	Consultant Issue

PROJECT ARCHITECTS
TURNER + ASSOCIATES
LEVEL 1/186 CROWN STREET SURRY HILLS NSW 2010
T 02 9360 2555 F 02 9360 2411 E dtczwag@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 6926

CLIENT
CASE Developments Pty Ltd
PO Box 8924
Lavington Plaza DC, NSW 2153
Lou Zuccarini
T 02 8818 3600 M 0414 488 222 E lou@caborneestments.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Norwest Business Park + Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mons T 02 8818 3620 M 0415 441 774 E mark@cabe.com.au
Liam Quattromani T 02 8818 3630 M 0414 662 033 E liccris@cabe.com.au

BUILDER
CASE Developments Pty Ltd
Norwest Business Park + Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mons T 02 8818 3620 M 0415 441 774 E mark@cabe.com.au
Liam Quattromani T 02 8818 3630 M 0414 662 033 E liccris@cabe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 3, 9 Castlereagh St
Sydney NSW 2000
Stephen Gillett, Ian Kean
T 02 9221 6611 M 0417 103 828 E stephen.gillett@rbd-robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 409 Forest Road
Hurstville NSW 2207
Michael Dow
T 02 9221 6611 M 0410 537 244 E admin@greenarrow.net.au

PCA
Local Management Services
PO Box 3100
Hamilton DC, NSW 2567
Paul Gosse
T 02 4050 5811 M 0423 568 806 E vanessa@localgroup.com.au

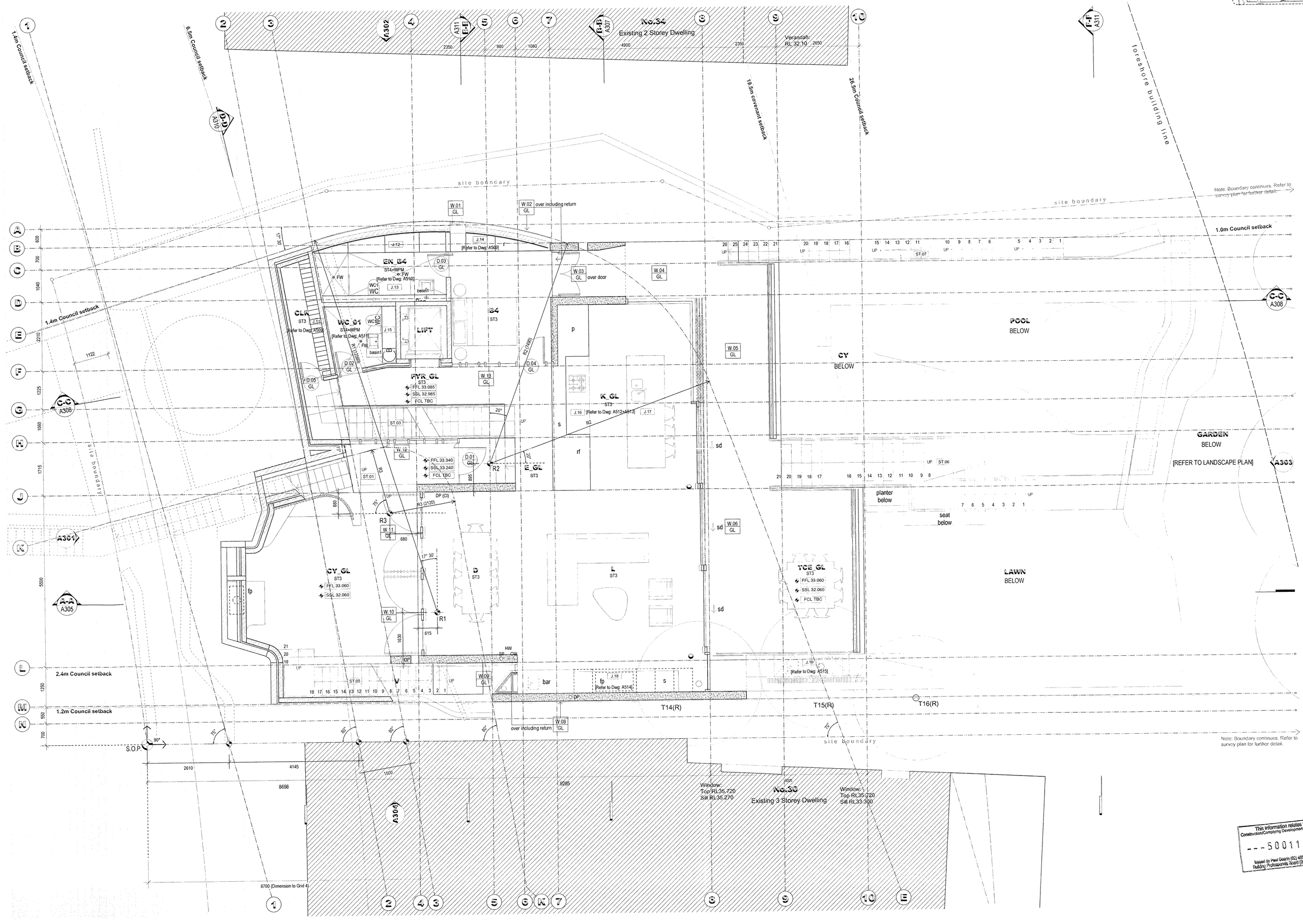
LANDSCAPE ARCHITECT
Selena Hannan Design
PO Box 3100
Avalon Beach, NSW 2107
Selena Hannan
T 02 9973 3247 M 0403 041 167 E selena@tech2u.com.au

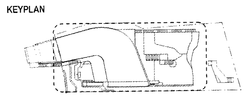
PROJECT
Bilgola Residence
32 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Upper Ground Level Plan

PRINT DATE	18.11.07	NORTH
DATE COMMENCED	16.08.07	
DRAWN	AM, AR	
CHECKED	AR	
SCALE @ B1	1:50	
@ A3	NTS	
STATUS	For Information Only	JOB NO. 06025
		DWG NO. A204 C

This information relates to Construction/Complying Development Certificate
---5001192
Issued by Paul Gosse on (02) 4055 5411
Building Professionals Board (BPB0132)





NOTES
THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. INFORM TURNER + ASSOCIATES OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

B1, 2..	Bedroom 1, 2, etc.
BTH_1, 2..	Bathroom_1, 2, etc.
BY	Balcony
CY	Courtyard
CLR	Cellar
D	Dining
E_GL, LG..	Entry_Ground, Lower Ground, etc.
EGL	Existing Ground Level
EN_B1, B2..	Ensuite_Bedroom 1, 2, etc.
FCL	Finished Ceiling Level
fp	Fire Place
FW1, 2..	Floor waste 1, 2, etc.
FYR_SL, UG..	Lift / Stair Foyer_Street, Upper Ground, etc.)
G	Garage
GL	Ground Level
HT	Hot Tub / Spa
HWS	Hot Water System (refer to BASIX assessment for details)
K_GL, LG..	Kitchen_Ground, Lower Ground, etc.
L	Living
LG	Lower Ground
LY_01, 02..	Laundry 1, 2, etc.
mgb	Mobile Bin
[m+sb]	Membrane roof with stone ballast
p	Pantry
r	Robe
rf	refrigerator
S_01, 02..	Storage Room 1, 2, etc.
S_SL	Storeroom_Street Level
sd	Sliding Door
SFL	Subfloor Area
SHR	Shower Room
SL	Street Level
SNA	Sauna
ST	Study
TCE	Terrace
UG	Upper Ground
V	Void
WIR_B1, B2..	Walk in Robe_Bedroom 1, 2, etc.
wm/d	Washing Machine / Dryer
W2	Wall type. Refer to wall schedule.
CPC1	Finishes and material type. Refer to wall schedule.
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No.1, 2 etc... to be retained, trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No.1, 2 (R) etc... to be removed, trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL: 25.550(EX)	Existing Relative Spot Level [To Australian Height Datum]
RL: 25.550	Proposed Relative Spot Level, shown boxed [To Australian Height Datum]
FFL	Finished Floor Level, shown boxed [To Australian Height Datum]
SSL	Structural Slab Level, shown boxed [To Australian Height Datum]
FCL	Finished Ceiling Level, shown boxed [To Australian Height Datum]
100	Set down in structure. Refer to drawing for change in level.
SQ E	Square edge
T E	Tooled edge
CF	Critical face of wall

No	Date	Appr	Revison Notes
E	18.11.07	DS	Client Review
D	12.11.07		Client Review
C	30.10.07		Consultant Issue
B	16.10.07		Client Review
A	21.09.07	DS	Consultant Issue

PROJECT ARCHITECTS
TURNER + ASSOCIATES
LEVEL 1/166 CROWN STREET SURRY HILLS NSW 2010
T 02 9360 2855 F 02 9630 2411 E dpowis@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 6695

CLIENT
CABE Developments Pty Ltd
PO Box 6924
Baulkham Hills BC, NSW 2153
Lou Quattroman
T 02 8818 3630 M 0414 488 222 E lou@cabeinvestments.com.au

PROJECT MANAGER
CABE Developments Pty Ltd
Norwest Business Park 1- Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Monk T 02 8818 3630 M 0415 841 774 E mark@cabe.com.au
Louis Quattroman T 02 8818 3630 M 0414 662 033 E louisq@cabe.com.au

BUILDER
CABE Developments Pty Ltd
Norwest Business Park 1- Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Monk T 02 8818 3630 M 0415 841 774 E mark@cabe.com.au
Louis Quattroman T 02 8818 3630 M 0414 662 033 E louisq@cabe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 1, 60 Carrington St
Sydney, NSW 2000
Stephen Gelatt, Tony Khan
T 02 9221 5511 M 0417 103 828 E stephen.gelatt@syd.robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 405 Forest Road
Bexley, NSW 2207
Michael Chan
T 02 9521 0811 M 0410 507 244 E admin@greenarrow.net.au

PCA
Local Management Services
PO Box 3700
Hamilton DC, NSW 2567
Paul Green
T 02 4055 5811 M 0423 508 808 E vanessa@localgroup.com.au

LANDSCAPE ARCHITECT
Sylvana Hannan Design
PO Box 549
Avalon Beach, NSW 2107
Sylvana Hannan
T 02 9973 2247 M 0403 041 187 E sylana@tech2u.com.au

PROJECT
Bilgola Residence
32 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Ground Level Plan

PRINT DATE	18.11.07
DATA COMMENCED	16.09.07
DRAWN	RM/ DS
CHECKED	DS
SCALE @ B1	1:50
@ A3	NTS
STATUS	For Information Only
JOB NO.	06025
DWG NO.	A205 E

NORTH

This information relates to Construction/Complying Development Certificate
---5001192
Issued to Paul Green (02) 4055 5011
Building Professionals Board (BPB) No.

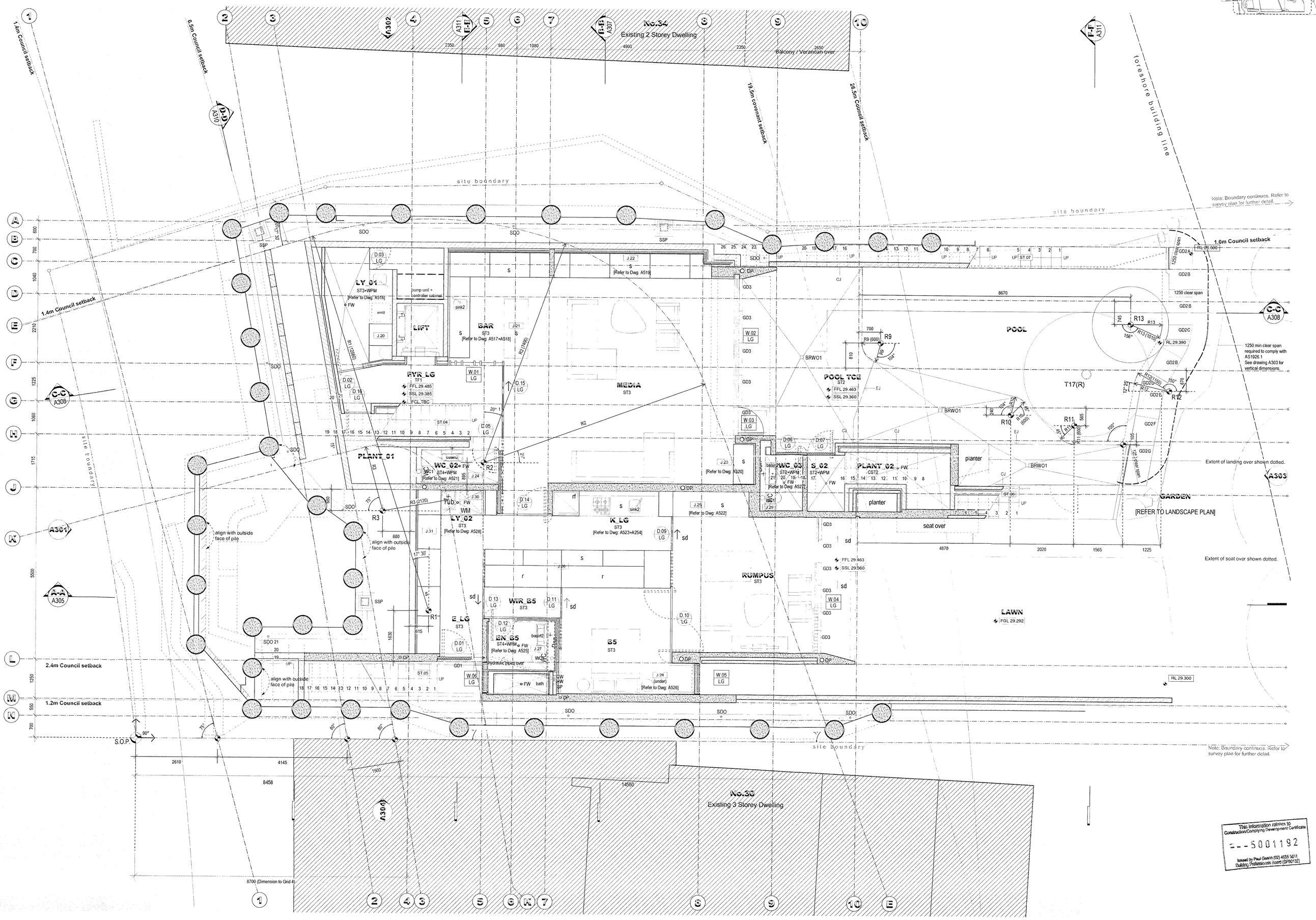
01 **Ground Level Plan**

Note: Refer to Concrete Profile drawings for further information

NOTES:
1. Refer to DA Conditions of Approval and CC Approval requirements prior to commencement of work. 2. Refer to structural requirements prepared by Robert Bird Group for further details. 3. Refer to geotechnical requirements prepared by Jeffrey & Katauskas for further details. 4. Refer to arbonist report prepared by Urban Forestry Management for further details. 5. Refor to hydraulic & stormwater requirements prepared by Green Arrow for further details. 6. Refer to civil requirements (documentation pending).

MATERIALS & FINISHES

BT1, 2...	Balustrade; type 1, 2, etc.	CR1, 2...	Cement Render; type 1, 2, etc.	HR1, 2...	Handrail; type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2...	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2..	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2...	Metal Cladding; type 1, 2, etc.	TF1, 2...	Timber Flooring; type 1, 2, etc.	T1, 2...	Tile; type 1, 2, etc.
CEA1, 2...	Concrete Exposed Aggregate; type 1, 2, etc.	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2...	Suspended Ceiling; type 1, 2, etc.		
COF1, 2...	Concrete Off-Form Finish; type 1, 2, etc.	GSB1, 2...	Glass Splash Back; type 1, 2, etc.	PBMR	Plasterboard, Moisture Resistant	SKT1, 2...	Skirting; type 1, 2, etc.		
CPC1, 2...	Concrete, Pre-Cast; type 1, 2, etc.	GD1, 2...	Grated Drain; type 1, 2, etc.	PF1, 2...	Paint Finish; type 1, 2, etc.	STC, 2...	Stone Cladding; type 1, 2, etc.		



01 Lower Ground Level Plan

Note: Refer to Concrete Profile drawings for further information

NOTES:

1. Refer to DA Conditions of Approval and CC Approval requirements prior to commencement of work. 2. Refer to structural requirements prepared by Robert Bird Group for further details. 3. Refer to geotechnical requirements prepared by Jeffrey & Katauskas for further details. 4. Refer to arborist report prepared by Urban Forestry Management for furthor details. 5. Refer to hydraulic & stormwater requirements prepared by Green Arrow for further details. 6. Refer to civil requirements (documentation pending).

MATERIALS & FINISHES

BTI, 2...	Balustrade; type 1, 2, etc.	CR1, 2...	Cement Render; type 1, 2, etc.	HR1, 2...	Handrail; type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2...	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2...	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2...	Metal Cladding; type 1, 2, etc.	TF1, 2...	Timber Flooring; type 1, 2, etc.	T1, 2...	Tile; type 1, 2, etc.
CEA1, 2...	Concrete Exposed Aggregate; type 1, 2, etc	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2...	Suspended Ceiling; type 1, 2, etc.		
COF1, 2...	Concrete Off-Form Finish; type 1, 2, etc.	GSB1, 2...	Glass Splash Back; type 1, 2, etc.	PBMR	Plasterboard. Moisture Resistant	SKT1, 2...	Skirting; type 1, 2, etc		
CPC1, 2...	Concrete, Pre-Cast; type 1, 2, etc.	GD1, 2...	Grated Drain; type 1, 2, etc.	PF1, 2...	Paint Finish; type 1, 2, etc.	STC, 2...	Stone Cladding; type 1, 2, etc.		

KEYPLAN

NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION** ALL DIMENSIONS AND LEVELS TO BE CHECKED ON SITE BEFORE COMMENCING ANY WORK OR SHOP DRAWINGS. INFORM TURNER + ASSOCIATES OF ANY DISCREPANCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION

LEGEND (Refer to Specification & Schedules for further information)

B1, 2...	Bedroom 1, 2, etc.
BTH, 1, 2...	Bathroom, 1, 2, etc.
BY	Balcony
CY	Courtyard
CLR	Cellar
D	Dining
E_GL, LG...	Entry_Ground, Lower Ground, etc.
EGL	Existing Ground Level
EN_B1, B2...	Ensuite_Bedroom 1, 2, etc.
FCL	Finished Ceiling Level
fp	Fire Place
FW1, 2...	Floor waste 1, 2, etc.
FYR_SL, UG...	Lift / Stair Foyer_Street, Upper Ground, etc.)
G	Garage
GL	Ground Level
HT	Hot Tub / Spa
HWS	Hot Water System (refer to BASIX assessment for details)
K_GL, LG...	Kitchen_Ground, Lower Ground, etc.
L	Living
LG	Lower Ground
LY_01, 02...	Laundry 1, 2, etc.
mgb	Mobile Bin
[m+sb]	Membrane roof with stone ballast
P	Pantry
r	Robe
rf	refrigerator
S_01, 02...	Storage Room 1, 2, etc.
S_SL	Storeroom_Street Level
sd	Sliding Door
SFL	Subfloor Area
SHR	Shower Room
SL	Street Level
SNA	Sauna
ST	Study
TCE	Terrace
UG	Upper Ground
V	Void
WIR_B1, B2..	Walk in Robe_Bedroom 1, 2, etc.
wm/d	Washing Machine / Dryer
WZ	Wall type. Refer to wall schedule.
CPC1	Finishes and material type. Refer to wall schedule.
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No.1, 2 etc.. to be retained. trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No.1, 2 (R) etc.. to be removed, trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL: 25.550/EX	[Existing Relative Spot Level [To Australian Height Datum]
RL: 25.550	Proposed Relative Spot Level, shown boxed [To Australian Height Datum]
FFL	Finished Floor Level, shown boxed [To Australian Height Datum]
SSL	Structural Slab Level, shown boxed [To Australian Height Datum]
FCL	Finished Ceiling Level, shown boxed [To Australian Height Datum]
100	Set down in structure. Refer to drawing for change in level.
SQ.E	Square edge
T.E	Tooled edge
CF	Critical face of wall

No	Date	Appr	Revision Notes
F	18.11.07	DS	Client Review
E	09.11.07		Client Review
D	05.11.07	-	Preliminary Pool Review
C	30.10.07		Consultant Issue
B	30.10.07		Client Review

PROJECT ARCHITECTS
TURNER & ASSOCIATES
LEVEL 1/ 566 CROWN STREET SURRY HILLS NSW 2010
T 02 9690 2855 F 02 9690 2411 E dlcheall@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 4689

CLIENT
CASE Developments Pty Ltd
PO Box 6024
Baulkham Hills BC, NSW 2153
Lou Zvukovic
T 02 8818 3600 M 0414 488 222 E lou@caberedments.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Norwest Business Park 1- Suite 202 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Monk T 02 8818 3620 M 0410 441 774 E mark@cabe.com.au
Lewis Quilthorpe T 02 8818 3626 M 0414 662 233 E lewis@cabe.com.au

BUILDER
CASE Developments Pty Ltd
Norwest Business Park 1- Suite 202 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Monk T 02 8818 3620 M 0410 441 774 E mark@cabe.com.au
Lewis Quilthorpe T 02 8818 3626 M 0414 662 233 E lewis@cabe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 5 /5 Castlereagh St
Sydney NSW 2000
Stephen Gillett / Kevin Keam
T 02 9221 6811 M 0417 103 826 E stephen.gillett@rbgnl-robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 409 Forest Road
Hurstville NSW 2220
Michael Chow
T 02 9221 6811 M 0410 507 244 E admin@greenarrow.net.au

PCA
Local Management Services
PO Box 3100
Noerdan DC, NSW 2567
Paul Cronin
T 02 4055 3611 M 0423 568 808 E vanessa@localgroup.com.au

LANDSCAPE ARCHITECT
Selena Ham en Design
PO Box 3100
Avalon Beach, NSW 2107
Selena Hamon
T 02 9973 3247 M 0433 041 187 E selena@tech2u.com.au

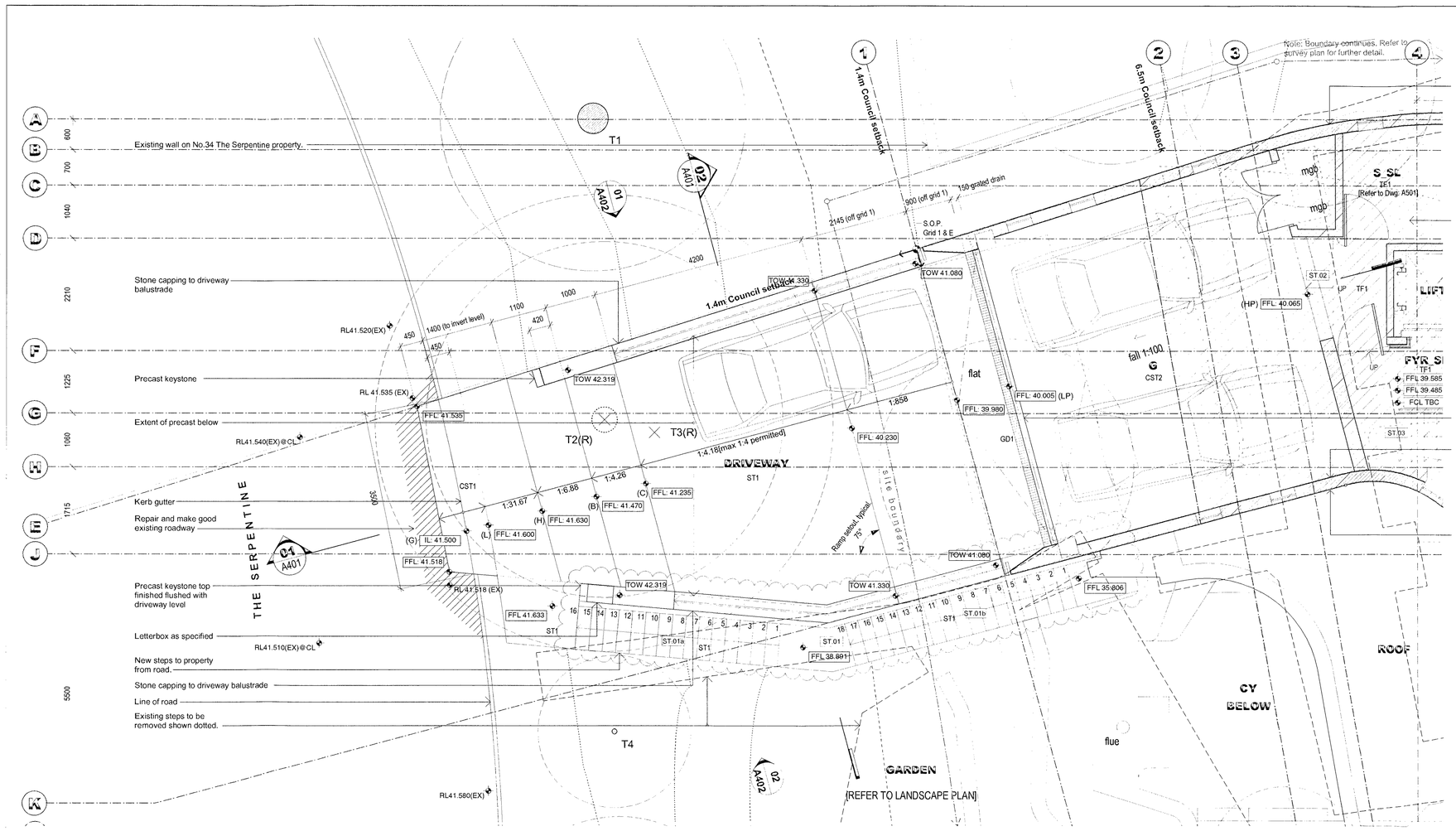
PROJECT
Bilgola Residence
20 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Lower Ground Level Plan

PRINT DATE	18.11.07
DATE COMMENCED	13.09.07
DRAWN	AM
CHECKED	DS
SCALE @ B1	1:50
@ A3	NTS

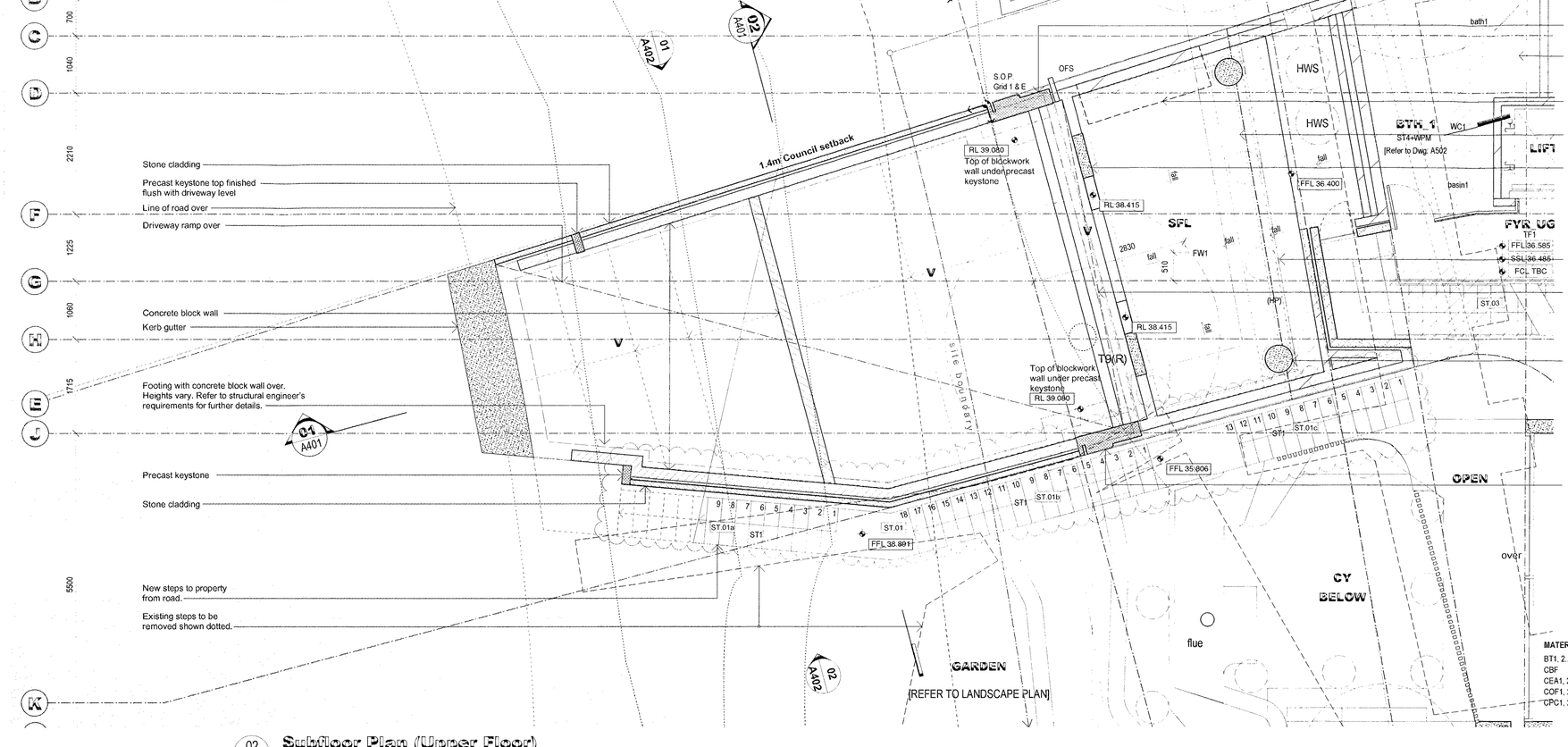
NORTH

STATUS For Information Only | JOB NO. 06025 | DWG NO. A206 | REV. F



01 Driveway Plan (Street Level)

Note: 1. Refer to Concrete Profile drawings for further information.
2. For ramp gradient coding i.e. (G), (L), (H)... etc refer to Pittwater Council Special Driveway Profile.



02 SubFloor Plan (Upper Floor)

Note: Refer to Concrete Profile drawings for further information.

KEYPLAN



NOTES

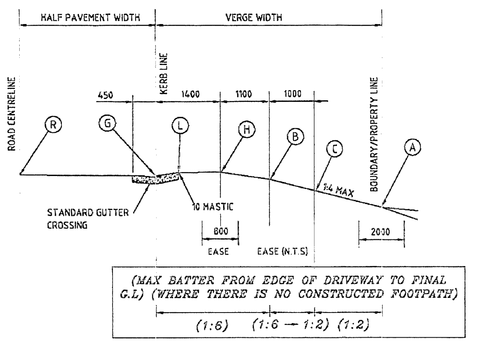
THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. INFORM TURNER + ASSOCIATES OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWING ARE NOT TO BE SCALED. USE FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

B1, 2...	Bedroom 1, 2, etc.
BTH_1, 2...	Bathroom_1, 2, etc.
BY	Balcony
CY	Courtyard
CLR	Cellar
D	Dining
E_GL, LG...	Entry_Ground, Lower Ground, etc.
EGL	Existing Ground Level
EN_B1, B2...	Ensuite_Bedroom 1, 2, etc.
FCL	Finished Ceiling Level
fp	Fire Place
FW1, 2...	Floor waste 1, 2, etc.
FYR_SL, UG...	Lift / Stair Foyer_Street, Upper Ground, etc.)
G	Garage
GL	Ground Level
HT	Hot Tub / Spa
HWS	Hot Water System
	(refer to BASIX assessment for details)
K_GL, LG...	Kitchen_Ground, Lower Ground, etc.
L	Living
LG	Lower Ground
LY_01, 02...	Laundry 1, 2, etc.
mgb	Mobile Bin
[m+nb]	Membrane roof with stone ballast
p	Pantry
r	Robe
rf	refrigerator
S_01, 02...	Storage Room 1, 2, etc.
S_SL	Storeroom_Street Level
sd	Sliding Door
SFL	Subfloor Area
SHR	Shower Room
SL	Street Level
SNA	Sauna
ST	Study
TCE	Terrace
UG	Upper Ground
V	Void
WR_B1, B2...	Walk in Robe_Bedroom 1, 2, etc.
wm/d	Washing Machine / Dryer
W2	Wall type. Refer to wall schedule.
CPC1	Finishes and material type. Refer to wall schedule.
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No.1, 2 etc... to be retained, trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No.1, 2 (R) etc... to be removed, trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL: 25.550(EX)	Existing Relative Spot Level [To Australian Height Datum]
RL: 25.550	Proposed Relative Spot Level, shown boxed [To Australian Height Datum]
FFL:	Finished Floor Level, shown boxed [To Australian Height Datum]
SSL:	Structural Slab Level, shown boxed [To Australian Height Datum]
FCL:	Finished Ceiling Level, shown boxed [To Australian Height Datum]
100	Set down in structure. Refer to drawing for change in level
SQ.E	Square edge
T.E	Tooled edge
CF	Critical face of wall

MAXIMUM LOW (M.L)

FOR USE ONLY FOR SINGLE DWELLINGS OR DUAL OCCUPANCIES



POINT	REMARKS	LEVELS
R	ROAD CENTRELINE	
G	INVERT OF GUTTER	
L	BACK OF LAYBACK	100 ABOVE "G"
H	1000 FROM BACK OF LAYBACK	136 ABOVE "G"
B	2500 FROM KERB LINE	30 BELOW "G"
C	3500 FROM KERB LINE	265 BELOW "G"
A	BOUNDARY	EASE REQUIRED AT GRADE CHANGE

NOTES
- To be read in conjunction with Pittwater 21 Development Controls.
- Only considered for issue by Council if kerb & gutter exists & approved by Council's Drainage Engineer.

PITTWATER COUNCIL | Special Driveway Profile | MAXIMUM LOW | PLAN No. PWC-DW08 | REV No. B | DATE 17/08/07

C:\ea File No\0 Current\Drawings - Current\Blocks & Standards\Standards\Driveways\ PWC-DW08LOW.dwg Plot Date: Plot Date 17 August, 2007 - 3:33 PM

C3 Pittwater Council - Driveway Profile (Maximum Low)

Note: Driveway levels based on Appendix 10 of Pittwater Council's DCP Volume 4 - Driveway Profiles.

No	Date	Appr	Revision Notes
E	18.11.07	DS	Construction Issue - Early Works
D	16.10.07	- -	Client Review
C	03.10.07	DS	Draft Council Submission
B	21.09.07	DS	Consultant Issue
A	11.09.07	DS	Consultant Issue

MATERIALS & FINISHES

BT1, 2...	Balustrade; type 1, 2, etc.	CR1, 2...	Cement Render; type 1, 2, etc.	HR1, 2...	Handrail; type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2...	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2...	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2...	Metal Cladding; type 1, 2, etc.	TF1, 2...	Timber Flooring; type 1, 2, etc.	T1, 2...	Tile; type 1, 2, etc.
CEA1, 2...	Concrete Exposed Aggregate; type 1, 2, etc	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2...	Suspended Ceiling; type 1, 2, etc.		
COF1, 2...	Concrete Off-Form Finish; type 1, 2, etc.	GSB1, 2...	Glass Splash Back. type 1, 2, etc.	PBMR	Plasterboard, Moisture Resistant	SKT1, 2...	Skirting; type 1, 2, etc.		
*CPC1, 2...	Concrete, Pre-Cast; type 1, 2, etc.	GD1, 2...	Grated Drain; type 1, 2, etc.	PF1, 2...	Paint Finish; type 1, 2, etc.	STC, 2...	Stone Cladding; type 1, 2, etc.		

This information relates to Construction/Complying Development Certificate
---5001192
Issued by Paul Dolan (02) 4055 5611
Building Professionals Board (BPB) 0120

PROJECT ARCHITECTS
TURNER & ASSOCIATES
LEVEL 1/166 CROWN STREET SURRY HILLS NSW 2010
T 02 9360 2955 F 02 9360 2411 E dtuzwa@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 6695

CLIENT
CASE Developments Pty Ltd
PO Box 6924
Baulkham Hills BC, NSW 2153
Lisa Lee
T 02 8818 3000 M 0414 488 222 E lisa@caseinvestments.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Suite 202, Level 2, Quadrant Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mirrki T 02 8818 3020 M 0419 441 774 E mark@cobe.com.au
Liwin Quathmann T 02 8818 3030 M 0414 662 033 E liuwa@cobe.com.au

BUILDER
CASE Developments Pty Ltd
Suite 202, Level 2, Quadrant Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mirrki T 02 8818 3020 M 0419 441 774 E mark@cobe.com.au
Liwin Quathmann T 02 8818 3030 M 0414 662 033 E liuwa@cobe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 5, 9 Castlereagh St
Sydney, NSW 2000
Stephen Gillatt, Tony Kwan
T 02 9221 6411 M 0417 103 628 E stephen.gillatt@sydrobertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 409 Forest Road
Hurstville, NSW 2207
Michael Green
T 02 9221 6611 M 0410 507 244 E admin@greenarrow.net.au

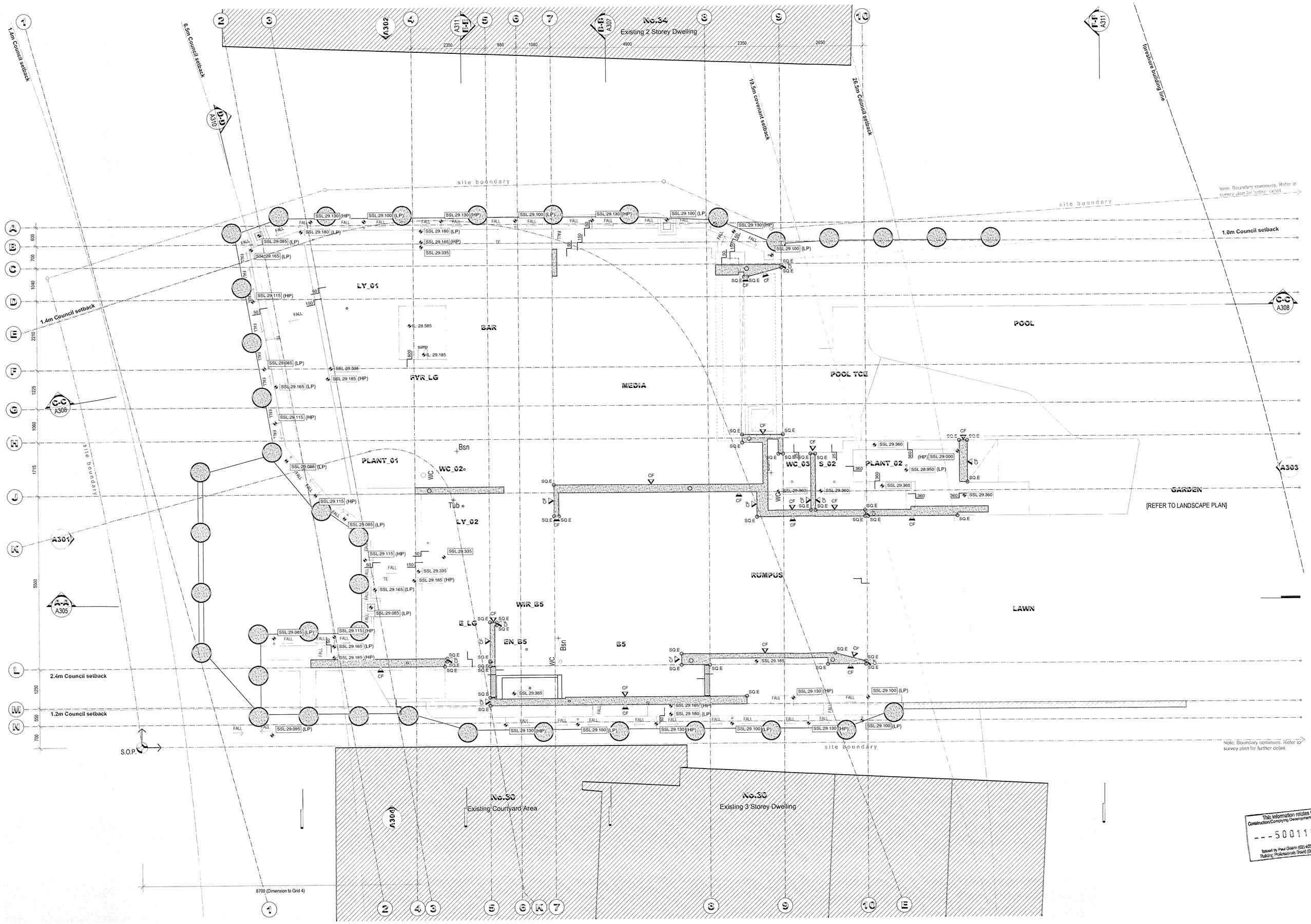
PCA
Lucid Management Services
PO Box 3100
Narellan DC, NSW 2567
Paul Goonn
T 02 4655 5611 M 0423 568 808 E vanessa@lucidgroup.com.au

LANDSCAPE ARCHITECT
Sabina Hamran Design
PO Box 345
Avalon Beach, NSW 2107
Sabina Hamran
T 02 9913 3357 M 0403 041 187 E sabina@tech2u.com.au

PROJECT
Bilgola Residence
37 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Driveway Plan & Subfloor Plan

PRINT DATE	18.11.07	NORTH
DATE COMMENCED	27.09.07	
DRAWN	AR	
CHECKED	AR	
SCALE @ B1	1:50	
@ A3	1:100	
STATUS	For Construction	JOB NO. 06025
		DWG NO. A207 E



01 Concrete Profile_Lower Ground Level Plan

Note: Refer to Elevations & Sections for further information on setout and size of Precast. Allow for service penetrations in Precast Walls and Floor slabs.

NOTES:

1. Refer to DA Conditions of Approval and CC Approval requirements prior to commencement of work.
2. Refer to structural requirements prepared by Robert Bird Group for further details.
3. Refer to geotechnical requirements prepared by Jeffrey & Katauskas for further details.
4. Refer to arborist report prepared by Urban Forestry Management for further details.
5. Refor to hydraulic & stormwater requirements prepared by Green Arrow for further details.
6. Refer to civil requirements (documentation pending).

MATERIALS & FINISHES

BT1, 2...	Balustrade; type 1, 2, etc.	CR1, 2...	Cement Render; type 1, 2 etc.	HR1, 2...	Handrail; type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2...	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2...	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2...	Metal Cladding; type 1, 2, etc.	TF1, 2...	Timber Flooring; type 1, 2, etc.	T1, 2...	Tile; type 1, 2, etc.
CEA1, 2...	Concrete Exposed Aggregate; type 1, 2, etc.	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2...	Suspended Ceiling; type 1, 2, etc.		
COF1, 2...	Concrete Off Form Finish; type 1, 2 etc.	GSB1, 2...	Glass Splash Back; type 1, 2, etc.	PBMR	Plasterboard, Moisture Resistant	SKT1, 2...	Skirting; type 1, 2, etc.		
CPC1, 2...	Concrete, Pre-Cast; type 1, 2, etc.	GD1, 2...	Grated Drain; type 1, 2, etc.	PFI, 2...	Paint Finish; type 1, 2, etc.	STC, 2...	Stone Cladding; type 1, 2, etc.		

NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. NOTIFY TURNER + ASSOCIATES OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND *(Refer to Specification & Schedules for further information)*

B1, 2...	Bedroom 1, 2, etc.
BTH, 1, 2...	Bathroom, 1, 2, etc
BY	Balcony
CY	Courtyard
CLR	Cellar
D	Dining
E_GL, LG...	Entry_Ground, Lower Ground, etc.
EGL	Existing Ground Level
EN, B1, B2...	Ensuite_Bedroom 1, 2, etc.
FCL	Finished Ceiling Level
fp	Fire Place
FW1, 2...	Floor waste 1, 2, etc.
FYR_SL, UG...	Lift / Stair Foyer_Street, Upper Ground, etc.)
G	Garage
GL	Ground Level
HT	Hot Tub / Spa
HWG	Hot Water System (refer to BASIX assessment for details)
K_GL, LG...	Kitchen_Ground, Lower Ground, etc.
L	Living
LG	Lower Ground
LY_01, 02...	Laundry 1, 2, etc.
mgb	Mobile Bin
[m+sb]	Membrane roof with stone ballast
P	Pantry
R	Robe
rf	refrigerator
S_01, 02...	Storage Room 1, 2, etc.
S_SL	Storeroom_Street Level
sd	Sliding Door
SFL	Subfloor Area
SHR	Shower Room
SL	Street Level
SNA	Sauna
ST	Study
TCE	Terrace
UG	Upper Ground
V	Void
WIR_B1, B2...	Walk in Robe_Bedroom 1, 2, etc.
wm/d	Washing Machine / Dryer
W2	Wall type: Refer to wall schedule
CPC1	Finishes and material type: Refer to wall schedule
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No.1, 2 etc... to be retained. trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No.1, 2 (R) etc... to be removed. trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL. 25.550(EX)	Existing Relative Spot Level [To Australian Height Datum]
RL. 25.550	Proposed Relative Spot Level. shown boxed [To Australian Height Datum]
FFL	Finished Floor Level. shown boxed [To Australian Height Datum]
SSL	Structural Slab Level. shown boxed [To Australian Height Datum]
FCL	Finished Ceiling Level. shown boxed [To Australian Height Datum]
100	Set down in structure. Refer to drawing for change in level.
SQ E	Square edge
T E	Tooled edge
CF	Critical face of wall

No.	Date	Issue	Description/Notes
3	18.11.07	DO	Client Issues

No.	Date	Appr.	Revision Notes

PROJECT ARCHITECTS
TURNER + ASSOCIATES
LEVEL 1/ 580 CROWN STREET SURRY HILLS NSW 2010
T 02 9360 2855 F 02 9360 2411 E dtunea@turnerassociatesint.com.au
NOMINATED ARCHITECT Nicholas Turner 6985

CLIENT
CASE Developments Pty Ltd
PO Box 6924
Baulkham Hills BC, NSW 2153
Lou Zoumboulis
T 02 8818 3620 M 0414 488 222 E lou@cobbenvestments.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Norwest Business Park – Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mark T 02 8818 3620 M 0419 441 774 E mark@cbde.com.au
Louis Quattromani T 02 8818 3620 M 0414 662 033 E louis@cbde.com.au

BUILDER
CASE Developments Pty Ltd
Norwest Business Park – Suite 202, 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mark T 02 8818 3620 M 0419 441 774 E mark@cbde.com.au
Louis Quattromani T 02 8818 3620 M 0414 662 033 E louis@cbde.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 5, 9 Castlereagh St
Sydney, NSW 2000
Stephen Cowd, Tony Kren
T 02 9221 6611 M 0417 103 829 E stephen.gibbitt@syd.robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 409 Forest Road
Bexley, NSW 2207
Mitchell Green
T 02 9021 0611 M 0410 507 244 E admin@greenarrow.net.au

PCA
Local Management Services
PO Box 1000
Nowra BC, NSW 2541
Paul Geoini
T 02 4535 5811 M 0423 568 809 E vanessa@localgroup.com.au

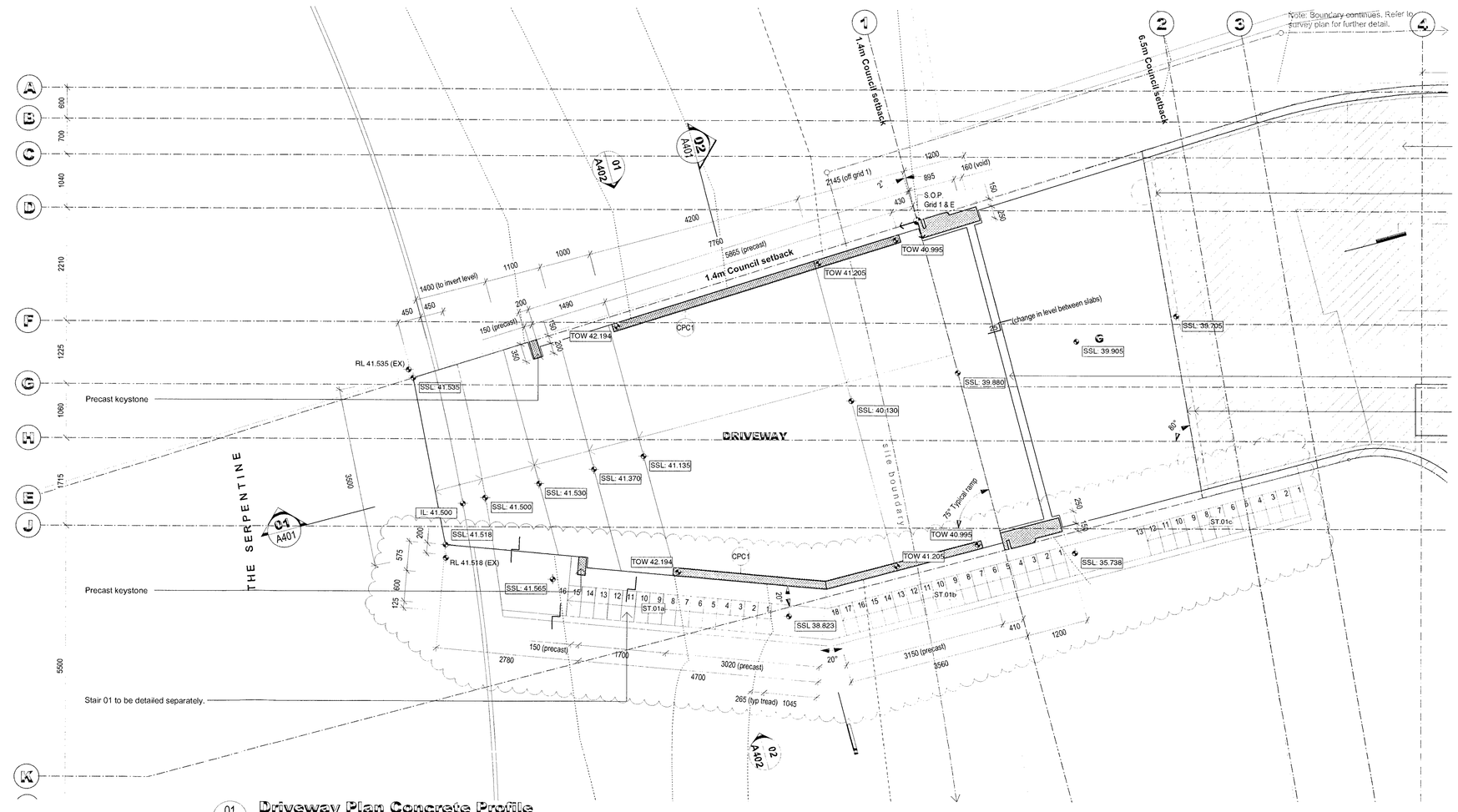
LANDSCAPE ARCHITECT
Selena Hannan Design
PO Box 545
Avalon Beach, NSW 2107
Selena Hannan
T 02 9918 3247 M 0403 041 187 E selena@tech2u.com.au

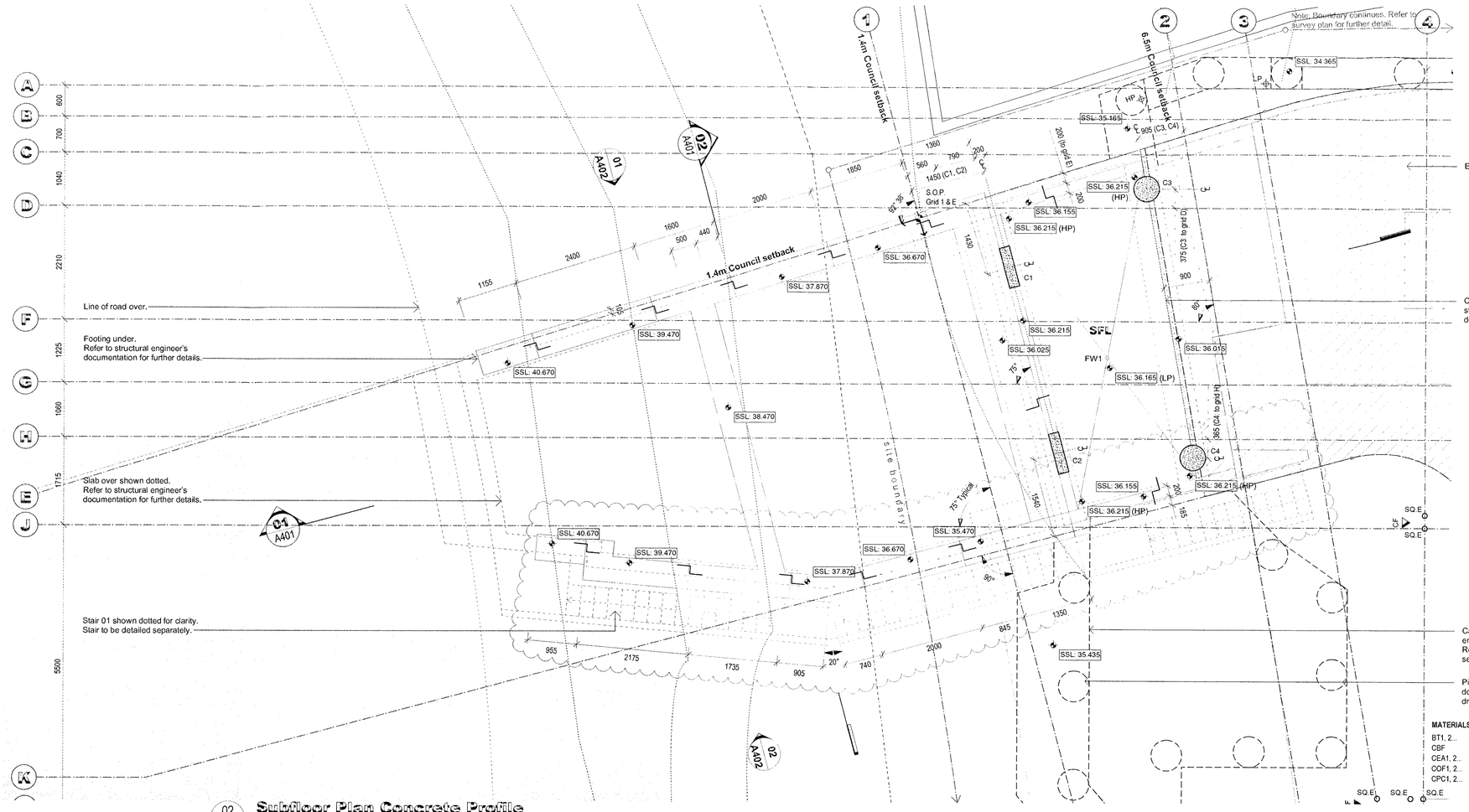
PROJECT
Bilgola Residence
32 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Concrete Profile_Lower Ground Level Plan

FIRST DATE	18.11.07	NORTH	
DATE COMMENCED	24.09.07		
DRAWN	AM		
CHECKED			
SCALE @ B1	1:50		
@ A3	NTS		
STATUS	For Information Only	JOB NO	06025
		DWG NO	A254 A

This information relates to Construction/Complying Development Certificate
---5001192
Issued by Paul Grimm (02) 4854 5011
Building Professionals Board (BPB0132)





KEYPLAN



NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. INFORM TURNER + ASSOCIATES OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

B1, 2..	Bedroom 1, 2, etc
BTH_1, 2..	Bathroom_1, 2, etc
BY	Balcony
CY	Courtyard
CLR	Cellar
D	Dining
E_GL, LG..	Entry_Ground, Lower Ground, etc.
EGL	Existing Ground Level
EN_B1, B2..	Ensuite_Bedroom 1, 2, etc.
FCL	Finished Ceiling Level
fp	Fire Place
FW1, 2..	Floor waste 1, 2, etc
FYR_SL, UG..	Lift / Stair Foyer_Street, Upper Ground, etc)
G	Garage
GL	Ground Level
HT	Hot Tub / Spa
HWS	Hot Water System (refer to BASIX assessment for details)
K_GL, LG..	Kitchen_Ground, Lower Ground, etc.
L	Living
LG	Lower Ground
LY_B1, 02..	Laundry 1, 2, etc.
mgb	Mobile Bin
[m+sb]	Membrane roof with stone ballast
p	Pantry
r	Robe
rf	refrigerator
S_01, 02..	Storage Room 1, 2, etc.
S_SL	Storeroom_Street Level
sd	Sliding Door
SFL	Subfloor Area
SHR	Shower Room
SL	Street Level
SNA	Sauna
ST	Study
TCE	Terrace
UG	Upper Ground
V	Void
WR_B1, B2..	Walk in Robe_Bedroom 1, 2, etc.
wmid	Washing Machine / Dryer
W2	Wall type. Refer to wall schedule.
CPC1	Finishes and material type. Refer to wall schedule.
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No 1, 2 etc.. to be retained, trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No 1, 2 (R) etc... to be removed. trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL: 25.550/(EX)	Existing Relative Spot Level [To Australian Height Datum]
RL: 25.550	Proposed Relative Spot Level, shown boxed [To Australian Height Datum]
FFL	Finished Floor Level, shown boxed [To Australian Height Datum]
SSL	Structural Slab Level, shown boxed [To Australian Height Datum]
FCL	Finished Ceiling Level, shown boxed [To Australian Height Datum]
100	Cut down in structure. Refer to drawing for change in level
SQ.E	Square edge
T.E	Tooled edge
CF	Critical face of wall

No	Date	Appr	Revison Notes
B	18.11.07	DS	Construction Issue - Early Works
A	03.10.07	DS	Client Preliminary Review

MATERIALS & FINISHES

BT1, 2..	Balustrade; type 1, 2, etc.	CR1, 2..	Cement Render; type 1, 2, etc.	HR1, 2..	Handrail; type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2..	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2..	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2..	Metal Cladding; type 1, 2, etc.	TF1, 2..	Timber Flooring; type 1, 2, etc.	T1, 2..	Tile; type 1, 2, etc.
CEA1, 2..	Concrete Exposed Aggregate; type 1, 2, etc.	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2..	Suspended Ceiling; type 1, 2, etc.		
COF1, 2..	Concrete Off-Form Finish; type 1, 2, etc.	GSB1, 2..	Glass Splash Back; type 1, 2, etc.	PBMR	Plasterboard; Moisture Resistant	SK1, 2..	Skirting; type 1, 2, etc.		
CPC1, 2..	Concrete, Pre-Cast; type 1, 2, etc.	GD1, 2..	Grated Drain; type 1, 2, etc.	PF1, 2..	Paint Finish; type 1, 2, etc.	STC, 2..	Stone Cladding; type 1, 2, etc.		

This information relates to Construction/Complying Development Certificate
---5001192
Issued by Paul Grech (02) 4025 5011
Dulwich Professional Health (02) 9810 3322

PROJECT ARCHITECTS
TURNER + ASSOCIATES
LEVEL 9 580 CROWN STREET SURRY HILLS NSW 2010
T 02 9690 2855 F 02 9690 2411 E dscaw@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 6095

CLIENT
CASE Developments Pty Ltd
Suite 202, 25-31 Silent Grove
Baulkham Hills BC, NSW 2153
Lou Zvorinos
T 02 8818 3630 M 0414 488 222 E lou@caberesidential.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Norwest Business Park 1 Suite 202, 25-31 Silent Grove
Baulkham Hills, NSW 2153
Mark Mohr T 02 8818 3630 M 0419 681 774 E mark@cabe.com.au
Louis Quattromani T 02 8818 3630 M 0414 662 033 E louisq@cabe.com.au

BUILDER
CASE Developments Pty Ltd
Norwest Business Park 1 Suite 202, 25-31 Silent Grove
Baulkham Hills, NSW 2153
Mark Mohr T 02 8818 3630 M 0419 681 774 E mark@cabe.com.au
Louis Quattromani T 02 8818 3630 M 0414 662 033 E louisq@cabe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 3, 3 Castlereagh St
Sydney, NSW 2000
Stephen Gillett, Tony Keen
T 02 9221 6611 M 0417 103 826 E stephen.gillett@syd.robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
PO Box 3126 Dural
Manly NSW 2257
Michael Green
T 02 9251 6611 M 0410 507 244 E admin@greenarrow.net.au

PCA
Local Management Services
PO Box 3126
Hamilton DC, NSW 2303
Ken Hooper
T 02 4955 5811 M 0423 568 808 E vanessa@localgroup.com.au

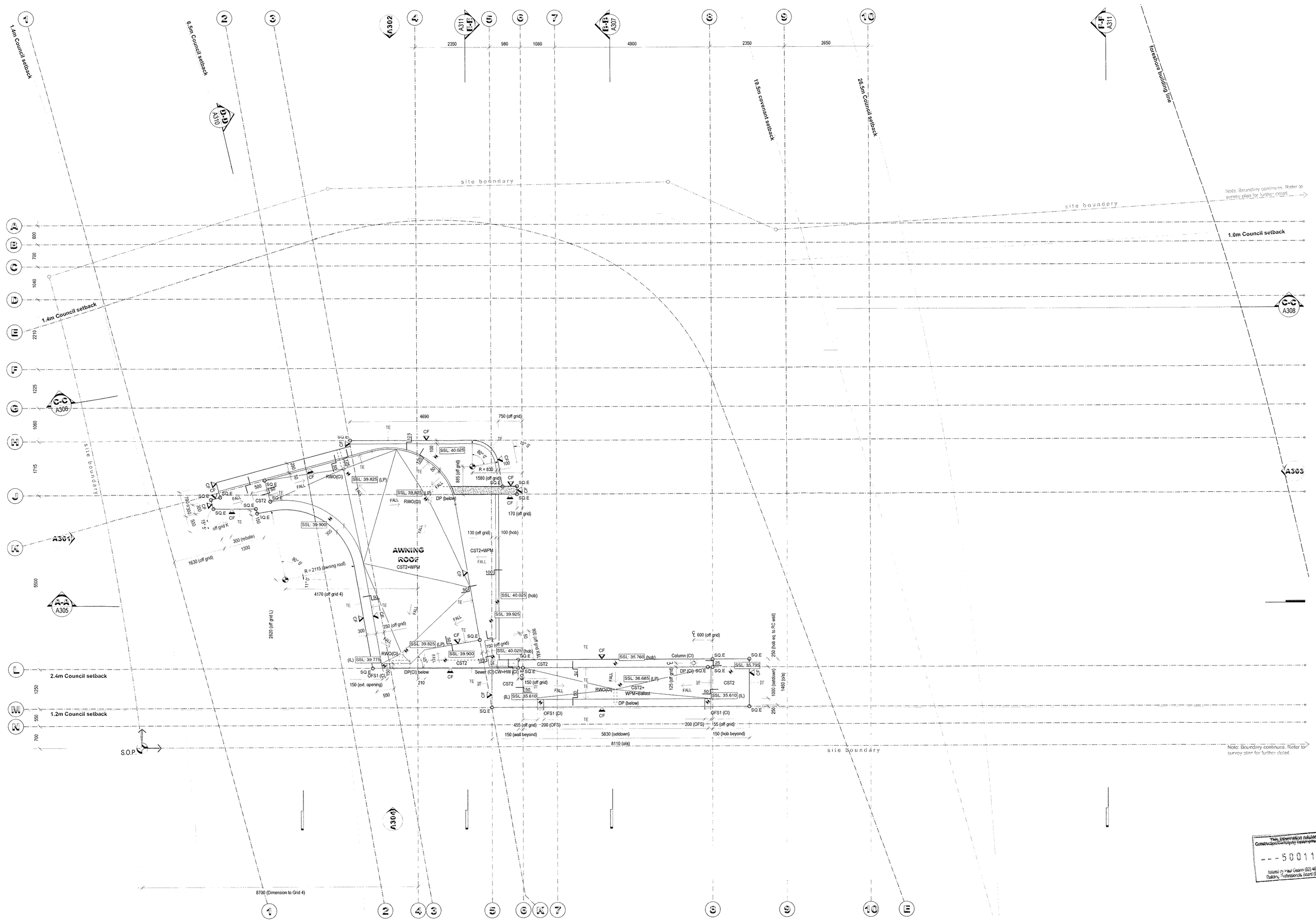
LANDSCAPE ARCHITECT
Selena Hannan Design
PO Box 548
Avalon Beach, NSW 2107
Selena Hannan
T 02 9973 3247 M 0403 041 187 E selena@tech2u.com.au

PROJECT
Bilgola Residence
32 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Driveway Plan & Subfloor Plan - Concrete Profiles

PRINT DATE	18.11.07
DATE COMMENCED	25.09.07
DRAWN	AR
CHECKED	AR
SCALE @ B1	1:50
@ A3	NTS
STATUS	For Construction
JOB NO.	06025
DWG NO.	A255 B

NORTH



01 Concrete Profile_Awning Roofs [Composite Drawing]

Note: Refer to drawings A251, A252, A253 for further information. Allow for service penetrations in walls and floor slabs.

MATERIALS & FINISHES

BT1, 2...	Balustrade; type 1, 2, etc.	CR1, 2...	Cement Render; type 1, 2, etc.	HR1, 2...	Handrail; type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2...	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2...	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2...	Metal Cladding; type 1, 2, etc.	TF1, 2...	Timber Flooring; type 1, 2, etc.	T1, 2...	Tile; type 1, 2, etc.
CEA1, 2...	Concrete Exposed Aggregate; type 1, 2, etc.	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2...	Suspended Ceiling; type 1, 2, etc.		
COF1, 2...	Concrete Off-Form Finish; type 1, 2, etc.	GSB1, 2...	Glass Splash Back; type 1, 2, etc.	PBMR	Plasterboard, Moisture Resistant	SKT1, 2...	Skirting; type 1, 2, etc.		
CPC1, 2...	Concrete, Pre-Cast; type 1, 2, etc.	GD1, 2...	Grated Drain; type 1, 2, etc.	PF1, 2...	Paint Finish; type 1, 2, etc.	STC, 2...	Stone Cladding; type 1, 2, etc.		

NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. INFORM TURNER + ASSOCIATES OF ANY DISCREPANCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

B1, 2...	Bedroom 1, 2, etc.
BTH_1, 2...	Bathroom_1, 2, etc.
BY	Balcony
CY	Courtyard
CUR	Cellar
D	Dining
E_GL, LG...	Entry_Ground, Lower Ground, etc.
EGL	Existing Ground Level
EN_B1, B2...	Ensuite_Bedroom 1, 2, etc.
FCL	Finished Ceiling Level
fp	Fire Place
FW1, 2...	Floor waste 1, 2, etc.
FYR_SL, UG...	Lift / Stair Foyer_Street, Upper Ground, etc.)
G	Garage
GL	Ground Level
HT	Hot Tub / Spa
HWS	Hot Water System (refer to BASIX assessment for details)
K_GL, LG...	Kitchen_Ground, Lower Ground, etc.
L	Living
LG	Lower Ground
LY_01, 02...	Laundry 1, 2, etc
mgb	Mobile Bin
[m+sb]	Membrane roof with stone ballast
p	Pantry
r	Robe
rf	refrigerator
S_01, 02...	Storage Room 1, 2, etc.
S_SL	Storeroom_Street Level
sd	Sliding Door
SFL	Subfloor Area
SHR	Shower Room
SL	Street Level
SNA	Sauna
ST	Study
TCE	Terrace
UG	Upper Ground
V	Void
WIR_B1, B2...	Walk in Robe_Bedroom 1, 2, etc.
wm/d	Washing Machine / Dryer
W2	Wall type. Refer to wall schedule.
CPC1	Finishes and material type. Refer to wall schedule.
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No.1, 2 etc... to be retained. trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No.1, 2 (R) etc... to be removed. trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL: 25.550(EX)	Existing Relative Spot Level [To Australian Height Datum]
RL: 25.550	Proposed Relative Spot Level, shown boxed [To Australian Height Datum]
FFL:	Finished Floor Level, shown boxed [To Australian Height Datum]
SSL:	Structural Slab Level, shown boxed [To Australian Height Datum]
FCL:	Finished Ceiling Level, shown boxed [To Australian Height Datum]
100↓	Set down in structure. Refer to drawing for change in level.
SQ E	Square edge
TE	Tooled edge
CF	Critical face of wall

No.	Date	App.	Revision/Notes
A	18.11.22	DG	Client Review

PROJECT ARCHITECTS
TURNER + ASSOCIATES
LEVEL 1/ 566 CROWN STREET, SURRY HILLS NSW 2010
T 02 9360 2855 F 02 9360 2411 E dtuner@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 6695

CLIENT
CASE Developments Pty Ltd
PO Box 8009
Baulkham Hills BC, NSW 2153
Lou Buttrose
T 02 8878 3600 M 0414 468 222 E lou@caseinvestments.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Norwest Business Park + Suite 202 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mure T 02 8818 3630 M 0419 461 774 E mark@cobe.com.au
Louis Quothroman T 02 8818 3630 M 0414 662 033 E louis@cobe.com.au

BUILDER
CASE Developments Pty Ltd
Norwest Business Park + Suite 202 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mure T 02 8818 3630 M 0419 461 774 E mark@cobe.com.au
Louis Quothroman T 02 8818 3630 M 0414 662 033 E louis@cobe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 7, 60 Carrington St
Sydney, NSW 2000
Stephen Gillett, Tony Kwan
T 02 9221 5211 M 0417 503 628 E stephen.gillett@syd.robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 403 Forest Road
Bexley, NSW 2207
Peter Chrisp
T 02 9221 9511 M 0419 507 244 E admin@greenarrow.net.au

PCA
Local Management Services
PO Box 3195
Hamilton DC, NSW 2567
Paul Gavan
T 02 4055 5411 M 0423 568 808 E vshessis@localgroup.com.au

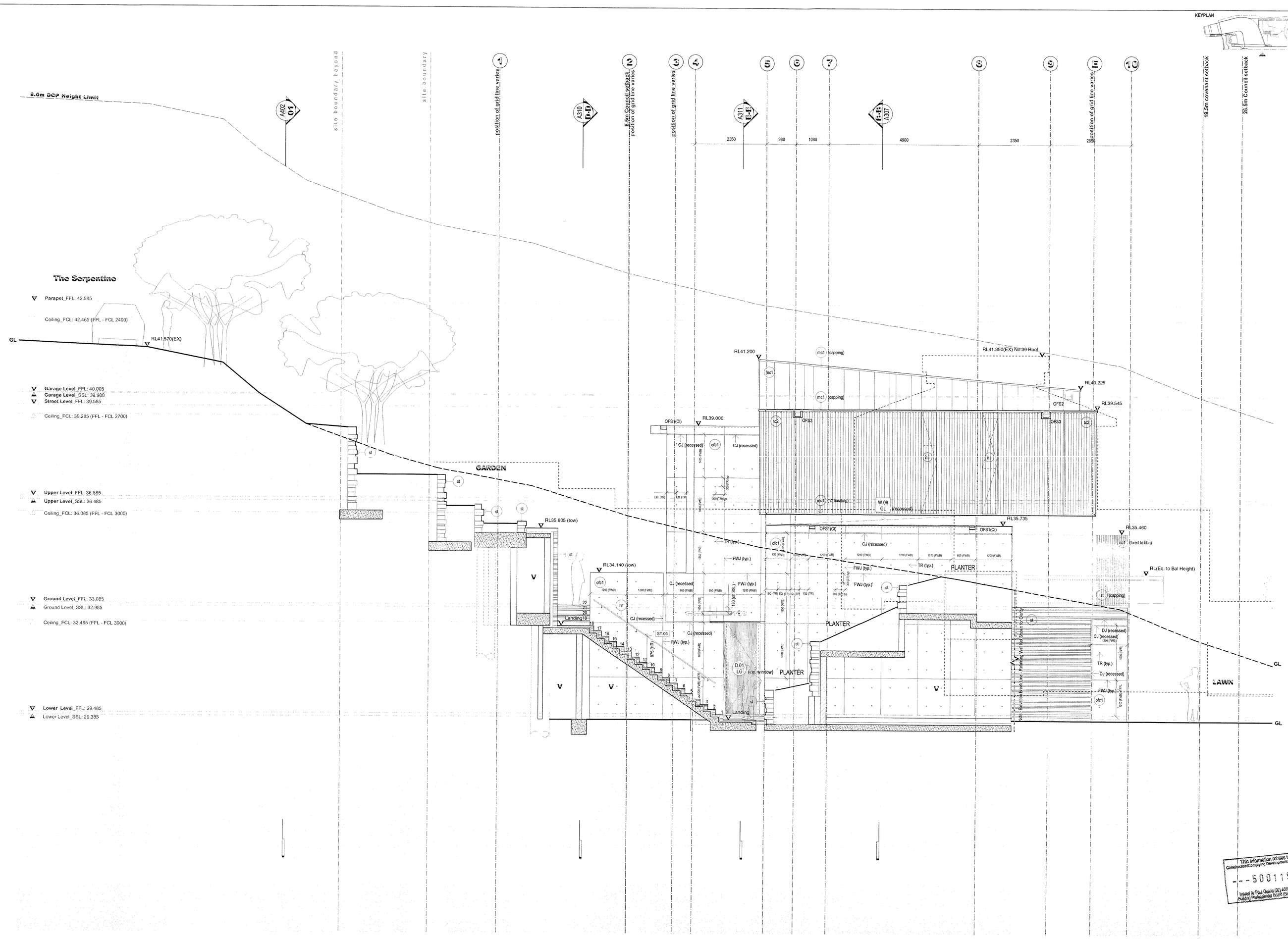
LANDSCAPE ARCHITECT
Selena Hessian Design
PO Box 549
Avalon Beach, NSW 2107
Selena Hessian
T 02 9972 2247 M 0403 041 157 E selena@tech2u.com.au

PROJECT
Bilgola Residence
2d The Serpentine, Bilgola, NSW 2107

This determination includes 50 Construction Certificate Endorsement Certificate
-- - 50011192
Issued by Peter Gibson (02) 4055 5411
Building Professionals Board (BPB0132)

DRAWING TITLE
Concrete Profile_Awning Roofs [Composite Drawing]

TYPIST DATE	18.11.22	NORTH
DATE COMMENCED	18.11.22	
DRAWN	AM, DS	
CHECKED		
SCALE @ A1	1:50	
@ A3	N/S	
STATUS	JOB NO.	DWG NO.
For Information Only	06025	A256 A



01 West Elevation

Scale 1:50

MATERIALS & FINISHES

BT1, 2...	Balustrade; type 1, 2, etc.	CR1, 2...	Cement Render; type 1, 2, etc.	HR1, 2...	Handrail; type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2...	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2...	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2...	Metal Cladding; type 1, 2, etc.	TF1, 2...	Timber Flooring; type 1, 2, etc.	TL1, 2...	Tile; type 1, 2, etc.
CEA1, 2...	Concrete Exposed Aggregate; type 1, 2, etc.	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2...	Suspended Ceiling; type 1, 2, etc.		
COF1, 2...	Concrete Off-Form Finish; type 1, 2, etc.	GSB1, 2...	Glass Splash Back; type 1, 2, etc.	PBMR	Plasterboard, Moisture Resistant	SKT1, 2...	Skirting; type 1, 2, etc.		
CPC1, 2...	Concrete, Pre-Cast; type 1, 2, etc.	GD1, 2...	Grated Drain; type 1, 2, etc.	PF1, 2...	Paint Finish; type 1, 2, etc.	STC, 2...	Stone Cladding; type 1, 2, etc.		

KEYPLAN

NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. INFORM TURNER + ASSOCIATES OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

No	Date	Appr	Revison Notes
A	18.11.07	DS	Client Review

PROJECT ARCHITECTS
TURNER & ASSOCIATES
LEVEL 1/ 66 CROWN STREET BURSH HILL NSW 2010
T 02 9600 2855 F 02 9600 2411 E dsuwa@turnerassociates.com.au
NOMINATED ARCHITECT: Nicholas Turner 6935

CLIENT
CADE Developments Pty Ltd
PO Box 6924
Baulkham Hills BC NSW 2153
Lou Zvirbinis
T 02 8818 3600 M 0414 488 222 E lou@robemwestments.com.au

PROJECT MANAGER
CADE Developments Pty Ltd
Norwest Business Park + Suite 202, 25-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mink T 02 8818 3620 M 0419 841 774 E mark@cade-com.au
Liam Quattromani T 02 8818 3630 M 0414 662 033 E lliuma@cade-com.au

BUILDER
CADE Developments Pty Ltd
Norwest Business Park + Suite 202, 25-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mink T 02 8818 3620 M 0419 841 774 E mark@cade-com.au
Liam Quattromani T 02 8818 3630 M 0414 662 033 E lliuma@cade-com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 5, 74 Castlereagh St
Sydney, NSW 2000
Stephen Gobell, Tony Kaye
T 02 9221 5611 M 0417 103 828 E stephen.gobell@byd.robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 409 Forest Road
Bexley NSW 2207
Michael Green
T 02 9221 5611 M 0410 507 244 E adrian@greenarrow.net.au

PCA
Local Management Services
PO Box 3067
Nowra DC, NSW 2967
Paul Geann
T 02 4455 5811 M 0423 568 808 E vanessa@localgroup.com.au

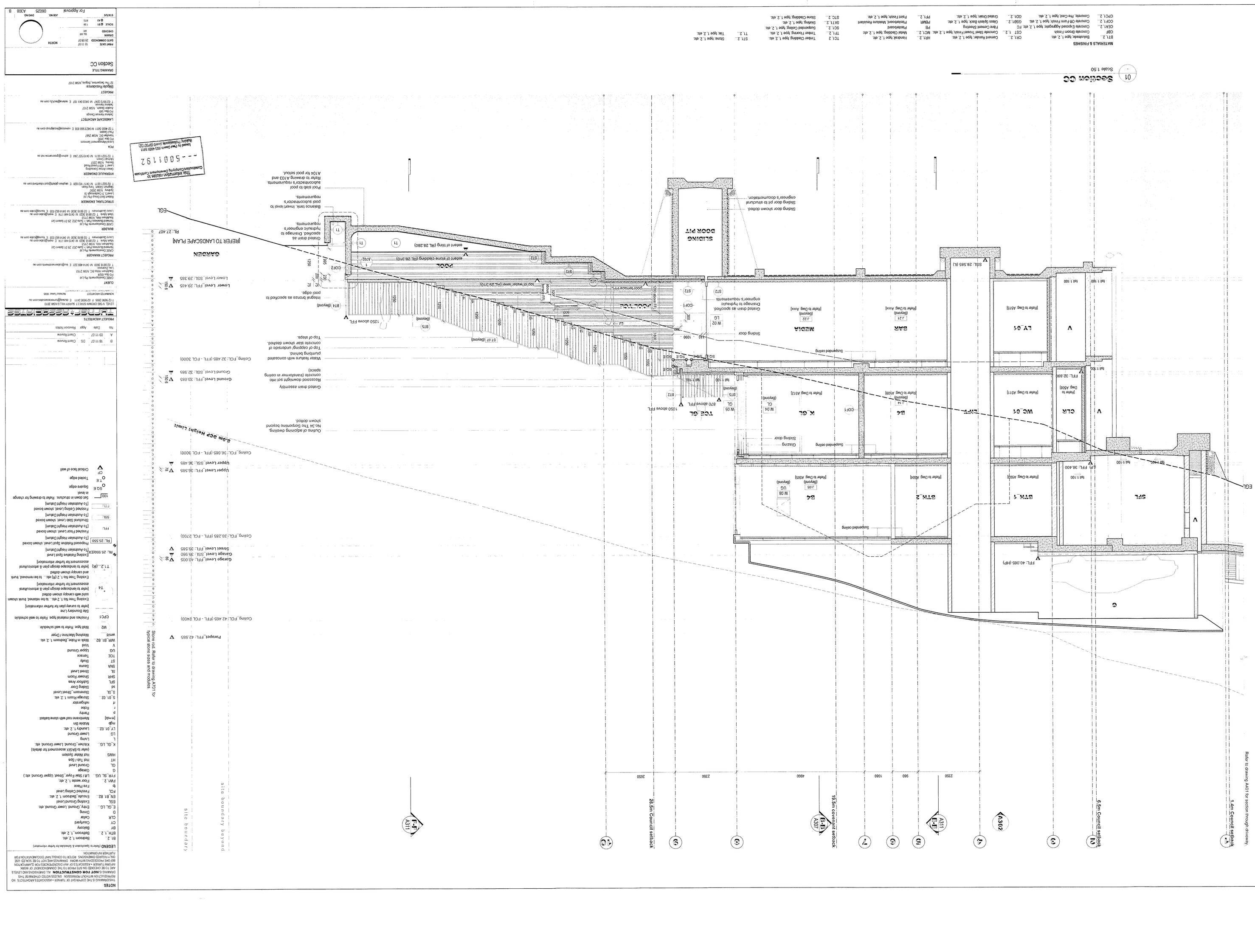
LANDSCAPE ARCHITECT
Selena Hannan Design
PO Box 340
Avalon Beach, NSW 2107
Selena Hannan
T 02 9973 3247 M 0403 841 187 E selena@tech2u.com.au

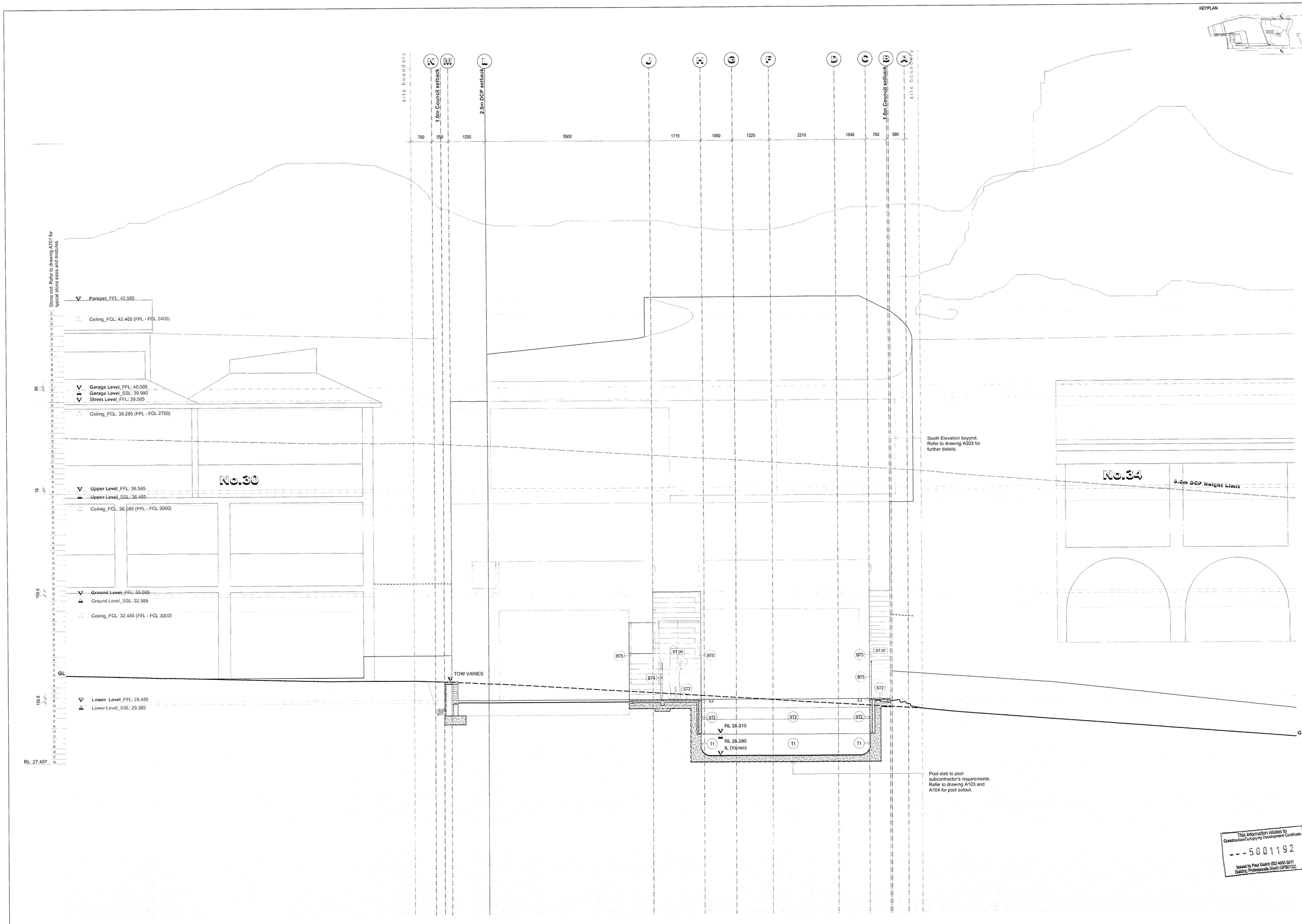
PROJECT
Bilgola Residence
32 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
West Elevation

PRINT DATE	18.11.07	NORTH	
DATE COMMENCED	15.10.07		
DRAWN	BG		
CHECKED	DS		
SCALE @ B1 / @ A3	1:50		
STATUS	PRELIMINARY	JOB NO. 06025	DWG NO. A304 A

This information relates to Construction/Complying Development Certificate
-- 5001192
Issued by Paul Geann (02) 4455 5811
Building Professionals Board (BPB0132)


Section CC
Scale 1:50
MATERIALS & FINISHES
BT1.2 Bluestone Type 1, 2, etc.
CB2 Concrete Broom Finish
CCF1.2 Concrete Off-Form Finish, Type 1, 2, etc
CCP1.2 Concrete Cast-in Pattern, Type 1, 2, etc
CEA1.2 Concrete Exposed Aggregate, Type 1, 2, etc
CF1.2 Concrete Finish, Type 1, 2, etc
CPC1.2 Concrete, Pre-cast, Type 1, 2, etc
CR1.2 Cement Render, Type 1, 2, etc
CS1 1.2 Concrete Steel Trowel Finish, Type 1, 2, etc
GB1.2 Glass Block, Type 1, 2, etc
GO1.2 Gabion Wall, Type 1, 2, etc
HR1.2 Handrail, Type 1, 2, etc
MC1.2 Metal Cladding, Type 1, 2, etc
PB4R Plasterboard, Moisture Resistant
PP1.2 Paint Finish, Type 1, 2, etc
PS Plasterboard
RG1.2 Rendered Brick, Type 1, 2, etc
SC1.2 Suspended Cladding, Type 1, 2, etc
SK1L.2 Skylight, Type 1, 2, etc
ST1.2 Timber Flooring, Type 1, 2, etc
TC1.2 Timber Cladding, Type 1, 2, etc
SS1.2 Stone, Type 1, 2, etc
T1.2 Tile, Type 1, 2, etc
SLIDING DOOR PIT
POOL
GARDEN
BELOW
GAR
MEDIA
LY_01
LV
WC_01
CLR
V
STW_2
STW_1
SFL
G
R_GL
TOC_GL
TOE_GL
RL. 28.585 (SL)
RL. 27.407
RL. 42.005 (HP)
Sliding door shown dotted.
Sliding door to structure opening to be demolished.
Extend drain as specified. Drainage to hydraulic engineer's requirements.
Extend drain as specified. Drainage to hydraulic engineer's requirements.
Balance tank. Invert level to pool subcontractor's requirements.
Pool slab to pool subcontractor's requirements. Refer to drawing A104 for pool setout.
Extent of stone cladding (RL 28.280)
Extent of stone cladding (RL 28.310)
Suspended ceiling
Glazing
Sliding door
Skylight
Refer to Dwg A501
Refer to Dwg A502
Refer to Dwg A503
Refer to Dwg A511
Refer to Dwg A512
Refer to Dwg A513
Refer to Dwg Axxx
Refer to Dwg Axxx
Refer to Dwg A504
Refer to Dwg A505
Refer to Dwg A506
Refer to Dwg A507
Refer to Dwg A508
Refer to Dwg A509
Refer to Dwg A510
Refer to Dwg A514
Refer to Dwg A515
Refer to Dwg A516
Refer to Dwg A517
Refer to Dwg A518
Refer to Dwg A519
Refer to Dwg A520
Refer to Dwg A521
Refer to Dwg A522
Refer to Dwg A523
Refer to Dwg

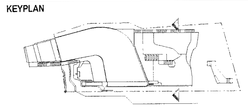


01 **Section FF**
Scale 1:50

MATERIALS & FINISHES

BT1, 2...	Balustrade; type 1, 2, etc.	CR1, 2...	Cement Render; type 1, 2, etc.	HR1, 2...	Handrail; type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2...	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2...	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2...	Metal Cladding; type 1, 2, etc.	TF1, 2...	Timber Flooring; type 1, 2, etc.	T1, 2...	Tile; type 1, 2, etc.
CEA1, 2...	Concrete Exposed Aggregate; type 1, 2, etc.	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2...	Suspended Ceiling; type 1, 2, etc.		
COF1, 2...	Concrete Off-Form Finish; type 1, 2, etc.	GSB1, 2...	Glass Splash Back; type 1, 2, etc.	PBMR	Plasterboard, Moisture Resistant	SKT1, 2...	Skirting; type 1, 2, etc.		
CPC1, 2...	Concrete, Pre-Cast; type 1, 2, etc.	GD1, 2...	Grated Drain; type 1, 2, etc.	PF1, 2...	Paint Finish; type 1, 2, etc.	STC, 2...	Stone Cladding; type 1, 2, etc.		

KEYPLAN



NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK OR THE PREPARATION OF SHOP DRAWINGS OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

B1, 2...	Bedroom 1, 2, etc.
BTH_1, 2..	Bathroom_1, 2, etc.
BY	Balcony
CY	Courtyard
CLR	Cellar
D	Dining
E_GL, LG...	Entry_Ground, Lower Ground, etc.
EGL	Existing Ground Level
EN_B1, B2...	Ensuite_Bedroom 1, 2, etc.
FCL	Finished Ceiling Level
fp	Fire Place
FW1, 2...	Floor waste 1, 2, etc.
FYR, SL, UG...	Lift / Stair Foyer_Street, Upper Ground, etc.)
G	Garage
GL	Ground Level
HT	Hot Tub / Spa
HWS	Hot Water System (refer to BASIX assessment for details)
K_GL, LG...	Kitchen_Ground, Lower Ground, etc.
L	Living
LG	Lower Ground
LY_01, 02...	Laundry 1, 2, etc.
mgb	Mobile Bin
[m+rf]	Membrane roof with stone ballast
P	Pantry
r	Robe
rf	refrigerator
S_01, 02...	Storage Room 1, 2, etc.
S_SL	Storeroom_Street Level
sd	Sliding Door
SFL	Subfloor Area
SHR	Shower Room
SL	Street Level
SNA	Sauna
ST	Study
TCE	Terrace
UG	Upper Ground
V	Void
WIR_B1, B2..	Walk in Robe_Bedroom 1, 2, etc.
wm/d	Washing Machine / Dryer
W2	Wall type. Refer to wall schedule.
CPC1	Finishes and material type. Refer to wall schedule.
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No.1, 2 etc... to be retained, trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No.1, 2 (R) etc... to be removed. trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL: 25.550/EX	Existing Relative Spot Level [To Australian Height Datum]
RL: 25.550	Proposed Relative Spot Level. shown boxed [To Australian Height Datum]
FFL	Finished Floor Level. shown boxed [To Australian Height Datum]
SSL	Structural Slab Level. shown boxed [To Australian Height Datum]
FCL	Finished Ceiling Level. shown boxed [To Australian Height Datum]
150	Set down in structure. Refer to drawing for change in level
SQ E	Square edge
T E	Tooled edge
CF	Critical face of wall

No	Date	App	Revision Notes
A	18 11 07	DS	Client Review

PROJECT ARCHITECTS
TURNER + ASSOCIATES
LEVEL 9/ 580 CROWN STREET SURRY HILLS NSW 2010
T 02 9690 2655 F 02 9690 2411 E dtcrea@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 6686

CLIENT
CASE Developments Pty Ltd
PO Box 6924
Baulkham Hills BC, NSW 2153
Lou Zivanovic
T 02 8818 3020 M 0414 488 222 E lou@cubeinvestments.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Norwest Business Park 1 Suite 202, 20-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mark T 02 8818 3020 M 0419 441 774 E mark@cbbe.com.au
Louis Quattromani T 02 8818 3020 M 0414 662 033 E louis@cbbe.com.au

BUILDER
CASE Developments Pty Ltd
Norwest Business Park 1 Suite 202, 20-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Mark T 02 8818 3020 M 0419 441 774 E mark@cbbe.com.au
Louis Quattromani T 02 8818 3020 M 0414 662 033 E louis@cbbe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 5, 9 Castlereagh St
Sydney, NSW 2000
Stephen Gillett, Tony Khan
T 02 9221 6611 M 0417 103 820 E stephen.gillett@syd-robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 405 Forest Road
Bexley, NSW 2207
Michael Green
T 02 9021 0511 M 0410 507 244 E admin@greenarrow.net.au

PCA
Local Management Services
PO Box 2567
Gerringer DC, NSW 2567
Paul Gavins
T 02 4655 5811 M 0423 568 808 E vanessa@localgroup.com.au

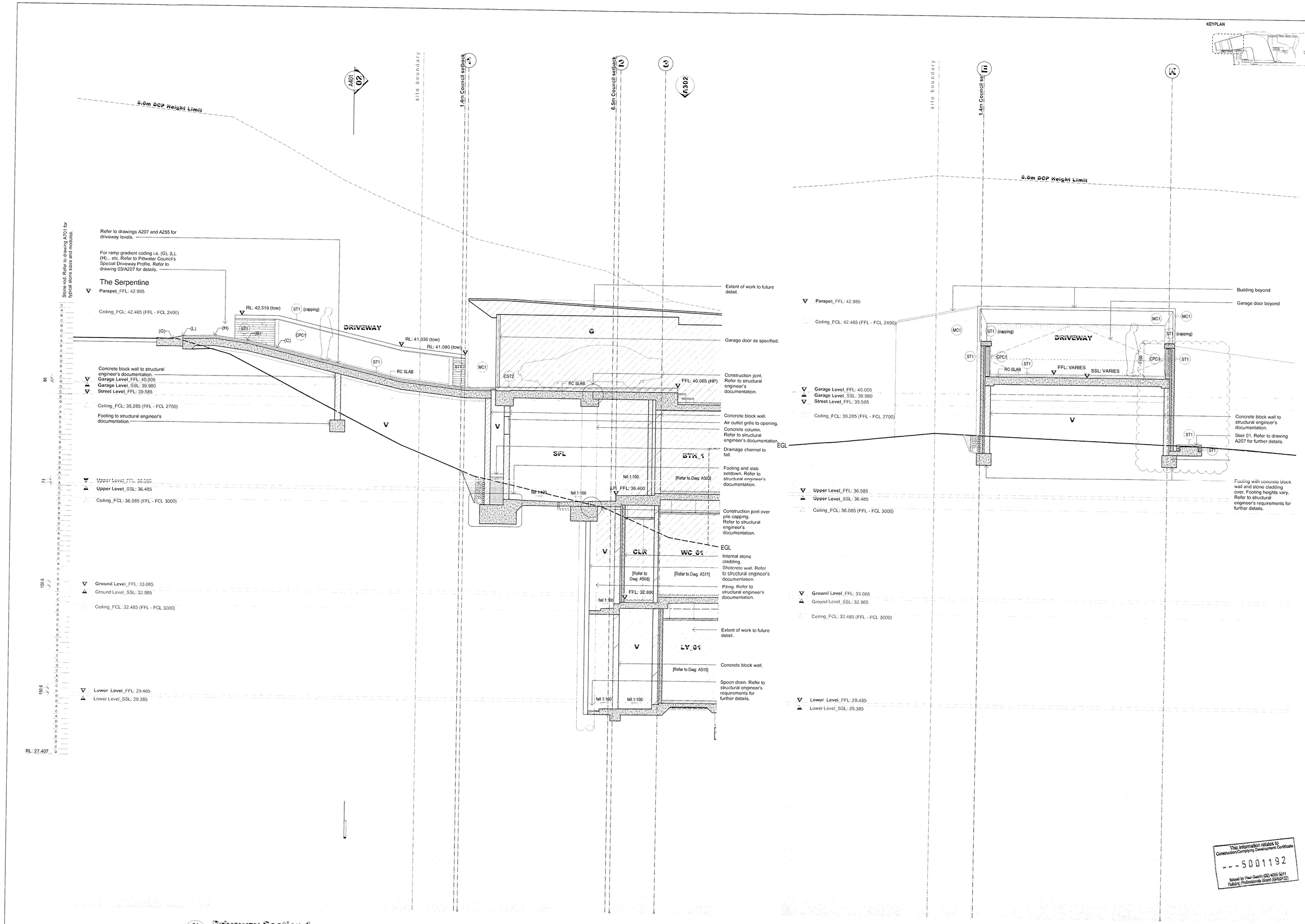
LANDSCAPE ARCHITECT
Selena Hannan Design
PO Box 345
Avalon Beach, NSW 2107
Selena Hannan
T 02 9972 3247 M 0403 041 187 E selena@tech2u.com.au

PROJECT
Bilgola Residence
32 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Section FF

PRINT DATE	18 11 07	NORTH	
DATE COMMENCED	15 10 07		
DRAWN	BG AB DS		
CHECKED			
SCALE @ A1	1:50		
@ A3	-		
STATUS	For Information Only	JOB NO.	DRG NO.
		06025	A311 A

This information relates to Construction/Complying Development Certificate
---5001192
Issued by Paul Gavins (02) 4655 5811
Building Professionals Board (BPB0132)



01 Driveway Section 1

Note: Refer to drawing 1/A207 for finished floor levels.

02 Driveway Section 2

MATERIALS & FINISHES

BT1, 2...	Balustrade; type 1, 2, etc.	CR1, 2...	Cement Render; type 1, 2, etc.	HR1, 2...	Handrail; type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2...	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2...	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2...	Metal Cladding; type 1, 2, etc.	TF1, 2...	Timber Flooring; type 1, 2, etc.	T1, 2...	Tile; type 1, 2, etc.
CEA1, 2...	Concrete Exposed Aggregate; type 1, 2, etc.	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2...	Suspended Ceiling; type 1, 2, etc.		
COF1, 2...	Concrete Off-Form Finish; type 1, 2, etc.	GSB1, 2...	Glass Splash Back; type 1, 2, etc.	PBMR	Plasterboard, Moisture Resistant	SKT1, 2...	Skirting; type 1, 2, etc.		
CPC1, 2...	Concrete, Pre-Cast; type 1, 2, etc.	GD1, 2...	Grated Drain; type 1, 2, etc.	PF1, 2...	Paint Finish; type 1, 2, etc.	STC, 2...	Stone Cladding; type 1, 2, etc.		

NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. INFORM TURNER + ASSOCIATES OF ANY DISCREPENCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

B1, 2...	Bedroom 1, 2, etc.
BTH_1, 2...	Bathroom_1, 2, etc.
BY	Balcony
CY	Courtyard
CLR	Cellar
D	Dining
E_GL, LG...	Entry_Ground, Lower Ground, etc.
EGL	Existing Ground Level
EN_B1, B2...	Ensuite_Bedroom 1, 2, etc.
FCL	Finished Ceiling Level
fp	Fire Place
FW1, 2...	Floor waste 1, 2, etc.
FYR_SL, UG...	Lift / Stair Foyer_Street, Upper Ground, etc.)
G	Garage
GL	Ground Level
HT	Hot Tub / Spa
HWS	Hot Water System (refer to BASIX assessment for details)
K_GL, LG...	Kitchen_Ground, Lower Ground, etc.
L	Living
LG	Lower Ground
LY_01, 02...	Laundry 1, 2, etc.
mgb	Mobile Bin
[m+lb]	Membrane roof with stone ballast
P	Pantry
r	Robe
rf	refrigerator
S_01, 02...	Storage Room 1, 2, etc.
S_SL	Storeroom_Street Level
sd	Sliding Door
SFL	Subfloor Area
SHR	Shower Room
SL	Street Level
SNA	Sauna
ST	Study
TCE	Terrace
UG	Upper Ground
V	Void
WR_B1, B2...	Walk in Robe_Bedroom 1, 2, etc.
wmid	Washing Machine / Dryer
W2	Wall type. Refer to wall schedule.
CPC1	Finishes and material type. Refer to wall schedule.
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No 1, 2 etc... to be retained, trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No 1, 2 (R) etc... to be removed, trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL: 25.550(EX)	Existing Relative Spot Level. [To Australian Height Datum]
RL: 25.550	Proposed Relative Spot Level. shown boxed [To Australian Height Datum]
FFL:	Finished Floor Level. shown boxed [To Australian Height Datum]
SSL:	Structural Slab Level. shown boxed [To Australian Height Datum]
FCL:	Finished Ceiling Level. shown boxed [To Australian Height Datum]
100	Set down in structure. Refer to drawing for change in level
SQ E	Square edge
T.E	Tooled edge
CF	Critical face of wall

No	Date	Appr	Revision Notes
D	18.11.07	DS	Construction Issue - Early Works
C	16.10.07		Client Review
B	03.10.07	DS	Draft Council Submission
A	11.09.07	DS	Consultant Issue

PROJECT ARCHITECTS
TURNER + ASSOCIATES
LEVEL 1/ 566 CROWN STREET SURRY HILLS NSW 2010
T 02 9699 2533 F 02 9699 2411 E dbowa@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 6506

CLIENT
CASE Developments Pty Ltd
PO Box 6504
Baulkham Hills BC, NSW 2153
Lou Zuccarini
T 02 8818 3000 M 0414 488 222 E lou@cobeinvestments.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Norwest Business Park + Suite 202, 29-31 Solent Crt
Mark More T 02 8818 3020 M 0410 441 774 E mark@cobe.com.au
Louis Quattromani T 02 8818 3030 M 0414 462 033 E louis@cobe.com.au

BUILDER
CASE Developments Pty Ltd
Norwest Business Park + Suite 202, 29-31 Solent Crt
Baulkham Hills, NSW 2153
Mark More T 02 8818 3020 M 0410 441 774 E mark@cobe.com.au
Louis Quattromani T 02 8818 3030 M 0414 462 033 E louis@cobe.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 5, 5 Castlereagh St
Sydney, NSW 2000
Stephen Gilchrist / Ben Keen
T 02 9221 6811 M 0417 103 828 E stephen.gilchrist@rbgd.robertbird.com.au

HYDRAULIC ENGINEER
Green Edge Consulting
Level 1, 1-3 Good Road
Bexley, NSW 2207
Michael Green
T 02 9221 6611 M 0410 527 244 E admin@greenarrow.net.au

PCA
Local Management Services
PO Box 3100
Rambler DC, NSW 2567
Paul Gibson
T 02 4626 5811 M 0423 568 806 E vanessa@localgroup.com.au

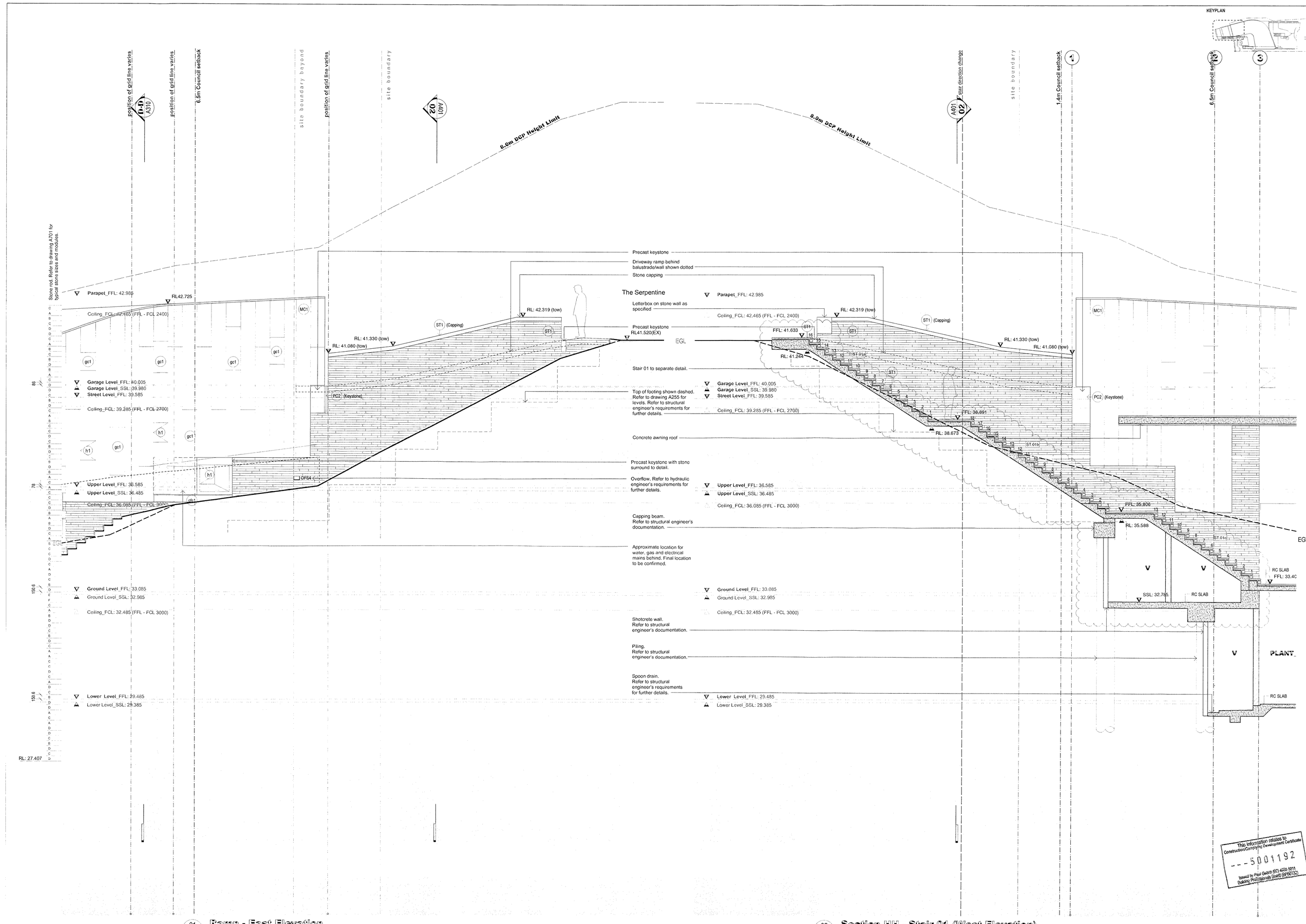
LANDSCAPE ARCHITECT
Selena Hannan Design
PO Box 3247
Avalon Beach, NSW 2107
Selena Hannan
T 02 9973 3247 M 0403 041 187 E selena@tech2u.com.au

PROJECT
Bilgola Residence
32 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Driveway Section 1 & Section 2

PRINT DATE	18.11.07	NORTH	
DATE COMMENCED	20.08.07		
DRAWN	AR		
CHECKED	AR		
SCALE @ B1	1:50		
@ A3	NTS		
STATUS	For Construction	JOB NO. 06025	DWG NO. A401 D

This information relates to Construction/Complying Development Certificate
---5001192
Issued by Paul Gavin (BDC 4055 5671 (Building Professionals Board (BPB)#1102)



01 Ramp - East Elevation

1:100

02 Section HH - Stair 01 (West Elevation)

Note: Refer to Driveway Section 01 [Dwg 01-A401]

1:100

MATERIALS & FINISHES

BT1, 2...	Balustrade; type 1, 2, etc.	CR1, 2...	Cement Render; type 1, 2, etc.	HR1, 2...	Handrail; type 1, 2, etc.	TC1, 2	Timber Cladding; type 1, 2, etc.	ST1, 2...	Stone; type 1, 2, etc.
CBF	Concrete Broom Finish	CST 1, 2...	Concrete Steel Trowel Finish; type 1, 2, etc.	MC1, 2...	Metal Cladding; type 1, 2, etc.	TF1, 2...	Timber Flooring; type 1, 2, etc.	T1, 2...	Tile; type 1, 2, etc.
CEA1, 2...	Concrete Exposed Aggregate; type 1, 2, etc.	FC	Fibre Cement Sheeting	PB	Plasterboard	SC1, 2...	Suspended Ceiling; type 1, 2, etc.		
COF1, 2...	Concrete Off-Form Finish; type 1, 2, etc.	GSB1, 2...	Glass Splash Back; type 1, 2, etc.	PBMR	Plasterboard, Moisture Resistant	SKT1, 2...	Skirting; type 1, 2, etc.		
CPC1, 2...	Concrete, Pre-Cast; type 1, 2, etc.	GD1, 2...	Grated Drain; type 1, 2, etc.	PF1, 2...	Paint Finish, type 1, 2, etc.	STC, 2...	Stone Cladding; type 1, 2, etc.		

NOTES

THIS DRAWING IS THE COPYRIGHT OF TURNER + ASSOCIATES ARCHITECTS. NO REPRODUCTION WITHOUT PERMISSION. UNLESS NOTED OTHERWISE THIS DRAWING IS **NOT FOR CONSTRUCTION**. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF WORK. INFORM TURNER + ASSOCIATES OF ANY DISCREPANCIES FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. DRAWINGS ARE NOT TO BE SCALED. USE ONLY FIGURED DIMENSIONS. REFER TO CONSULTANT DOCUMENTATION FOR FURTHER INFORMATION.

LEGEND (Refer to Specification & Schedules for further information)

B1, 2...	Bedroom 1, 2, etc.
BTH_1, 2...	Bathroom_1, 2, etc.
BY	Balcony
CY	Courtyard
CLR	Cellar
D	Dining
E_GL, LG...	Entry_Ground, Lower Ground, etc.
EGL	Existing Ground Level
EN_B1, B2...	Ensuite_Bedroom 1, 2, etc.
FCL	Finished Ceiling Level
fp	Fire Place
FW1, 2...	Floor waste 1, 2, etc.
FYR_SL, UG...	Lift / Stair Foyer_Street, Upper Ground, etc.)
G	Garage
GL	Ground Level
HT	Hot Tub / Spa
HWS	Hot Water System (refer to BASIX assessment for details)
K_GL, LG...	Kitchen_Ground, Lower Ground, etc.
L	Living
LG	Lower Ground
LY_01, 02...	Laundry 1, 2, etc.
mgb	Mobile Bin
[m+st]	Membrane roof with stone ballast
p	Pantry
r	Robe
rf	refrigerator
S_01, 02...	Storage Room 1, 2, etc.
S_SL	Storeroom_Street Level
sd	Sliding Door
SFL	Subfloor Area
SHR	Shower Room
SL	Street Level
SNA	Sauna
ST	Study
TCE	Terrace
UG	Upper Ground
V	Void
WR_B1, B2...	Walk in Robe_Bedroom 1, 2, etc.
wm/d	Washing Machine / Dryer
W2	Wall type. Refer to wall schedule.
CPC1	Finishes and material type. Refer to wall schedule.
	Site Boundary Line [refer to survey plan for further information]
T4	Existing Tree No.1, 2 etc... to be retained, trunk shown solid with canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
T1,2...(R)	Existing Tree No.1, 2 (R) etc... to be removed, trunk and canopy shown dotted [refer to landscape design plan & arboricultural assessment for further information]
RL: 25.550(EX)	Existing Relative Spot Level [To Australian Height Datum]
RL: 25.550	Proposed Relative Spot Level, shown boxed [To Australian Height Datum]
FFL:	Finished Floor Level, shown boxed [To Australian Height Datum]
SSL:	Structural Slab Level, shown boxed [To Australian Height Datum]
FCL:	Finished Ceiling Level, shown boxed [To Australian Height Datum]
100	Set down in structure. Refer to drawing for change in level
SQ E	Square edge
T E	Tooled edge
CF	Critical face of wall

No	Date	Appr	Revision Notes
C	18.11.07	DS	Construction Issue - Early Works
B	16.10.07		Client Review
A	03.10.07	DS	Draft Council Submission

PROJECT ARCHITECTS
Turner & Associates
LEVEL 1/ 566 CROWN STREET SURRY HILLS NSW 2010
T 02 9360 2855 F 02 9600 2411 E dsowa@turnerassociates.com.au
NOMINATED ARCHITECT Nicholas Turner 6935

CLIENT
CASE Developments Pty Ltd
PO Box 6024
Baulkham Hills BC NSW 2153
Cas Zoetewei
T 02 8818 3630 M 0414 488 220 E tcv@cobrainvestments.com.au

PROJECT MANAGER
CASE Developments Pty Ltd
Norwest Business Park > Suite 202. 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Work. T 02 8818 3620 M 0419 441 774 E mark@case.com.au
Louis Quathomaro T 02 8818 3630 M 0414 662 033 E louis@case.com.au

BUILDER
CASE Developments Pty Ltd
Norwest Business Park > Suite 202. 29-31 Solent Cct
Baulkham Hills, NSW 2153
Mark Work. T 02 8818 3620 M 0419 441 774 E mark@case.com.au
Louis Quathomaro T 02 8818 3630 M 0414 662 033 E louis@case.com.au

STRUCTURAL ENGINEER
Robert Bird Group Pty Ltd
Level 12, 99 Mount St
Sydney, NSW 2000
Stephen Gillett, Tony Kwan
T 02 9221 2811 M 0417 163 828 E stephen.gillett@rbgsd.robertbird.com.au

HYDRAULIC ENGINEER
Green Arrow Consulting
Level 1, 429 Forest Road
Bexley, NSW 2207
Michael Green
T 02 9021 0611 M 0410 507 244 E admin@greenarrow.net.au

PCA
Local Management Services
PO Box 3160
Hamilton DC NSW 2567
Paul Gavin
T 02 4055 5011 M 0423 568 808 E vanessa@localgroup.com.au

LANDSCAPE ARCHITECT
Sellers Harman Design
PO Box 540
Avalon Beach, NSW 2107
Selena Harman
T 02 9972 2247 M 0403 041 187 E selena@tnot3s.com.au

PROJECT
Bilgola Residence
32 The Serpentine, Bilgola, NSW 2107

DRAWING TITLE
Ramp - East Elevation & West Elevation

PRINT DATE	18.11.07	NORTH
DATE COMMENCED	10.09.07	
DRAWN	AR	
CHECKED	AR	
SCALE @ B1	1:100	
@ A3		
STATUS	For Construction	
JOB NO.	06025	
DWG NO.	A402	C

BASIX Certificate

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

Certificate number: 110440S

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 29/06/2006, published by the Department of Planning. This document is available at www.basix.nsw.gov.au

Director-General
Date of issue: Thursday, 30 November 2006

NSW GOVERNMENT
Department of Planning

Project address	
Project name	32 The Serpentine, Bilgola
Street address	32 The Serpentine None Bilgola 2107
Local Government Area	Pittwater Council
Plan type and plan number	Deposited Plan 546543
Lot no.	1
Section no.	
Project type	
Project type	separate dwelling house
No. of bedrooms	5
Site details	
Site area (m²)	763
Roof area (m²)	213
Conditioned floor area (m2)	368
Unconditioned floor area (m2)	6
Total area of garden and lawn (m2)	390
Assessor details and thermal loads	
Assessor number	20241
Certificate number	70174136
Cooling load (MJ/m².year)	45
Heating load (MJ/m².year)	74
Other	
none	n/a

Score

✓ Water: 40 (Target 40)
✓ Thermal comfort: pass (Target pass)
✓ Energy: 40 (Target 40)

Schedule of BASIX commitments

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

Water Commitments	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
Landscape			
The applicant must plant indigenous or low water use species of vegetation throughout 335 square metres of the site.	✓	✓	
Fixtures			
The applicant must install showerheads with a minimum rating of 3 star in all showers in the development.		✓	✓
The applicant must install a toilet flushing system with a minimum rating of 3 star in each toilet in the development.		✓	✓
The applicant must install taps with a minimum rating of 3 star in the kitchen in the development.		✓	
The applicant must install basin taps with a minimum rating of 3 star in each bathroom in the development.		✓	
The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the development.		✓	✓
Alternative water			
Rainwater tank			
The applicant must install a rainwater tank of at least 6000 litres on the site. This rainwater tank must meet, and be installed in accordance with, the requirements of all applicable regulatory authorities.	✓	✓	✓
The applicant must configure the rainwater tank to collect rain runoff from at least 123 square metres of the roof area of the development (excluding the area of the roof which drains to any stormwater tank or private dam).		✓	✓
The applicant must connect the rainwater tank to:			
• all toilets in the development		✓	✓
• at least one outdoor tap in the development (Note: NSWHealth does not recommend that rainwater be used for human consumption in areas with potable water supply.)		✓	✓
Swimming pool			
The swimming pool must not have a volume greater than 25 kilolitres.	✓	✓	

Water Commitments	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
The swimming pool must have a pool cover.		✓	
The swimming pool must be outdoors.	✓	✓	
Outdoor Spa			
The spa must not have a volume greater than 1.8 kilolitres.	✓	✓	
The spa must have a spa cover.		✓	

Thermal Comfort Commitments	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
Simulation Method			
The applicant must attach the certificate referred to under "Assessor Details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for an occupation certificate for the proposed development.			
The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX certificate, including the Cooling and Heating loads shown on the front page of this certificate.			
The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Assessor Certificate requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor to certify that this is the case. The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.			
The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✓	✓

Energy Commitments	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
Hot water			
The applicant must install the following hot water system in the development, or a system with a higher energy rating: solar (gas boosted) with a performance of 21 to 25 RECs or better	✓	✓	✓
Cooling system			
The applicant must install the following cooling system, or a system with a higher energy rating, in at least 1 living area: 1-phase airconditioning; Energy rating: EER 2.5 - 3.0		✓	✓
The applicant must install the following cooling system, or a system with a higher energy rating, in at least 1 bedroom: 1-phase airconditioning; Energy rating: EER 2.5 - 3.0		✓	✓
The cooling system must provide for day/night zoning between living areas and bedrooms.		✓	✓
Heating system			
The applicant must install the following heating system, or a system with a higher energy rating, in at least 1 living area: 1-phase airconditioning; Energy rating: EER 2.5 - 3.0		✓	✓
The applicant must install the following heating system, or a system with a higher energy rating, in at least 1 bedroom: 1-phase airconditioning; Energy rating: EER 2.5 - 3.0		✓	✓
The heating system must provide for day/night zoning between living areas and bedrooms.		✓	✓
Ventilation			
The applicant must install the following exhaust systems in the development:			
At least 1 Bathroom: individual fan, ducted to façade or roof; Operation control: manual switch on/off		✓	✓
Kitchen: individual fan, ducted to façade or roof; Operation control: manual switch on/off		✓	✓
Laundry: individual fan, ducted to façade or roof; Operation control: manual switch on/off		✓	✓
Artificial lighting			
The applicant must ensure that the "primary type of artificial lighting" is fluorescent or light emitting diode (LED) lighting in each of the following rooms, and where the word "dedicated" appears, the fittings for those lights must only be capable of accepting fluorescent or light emitting diode (LED) lamps:			
• at least 6 of the bedrooms / study; dedicated		✓	✓
• at least 3 of the living / dining rooms; dedicated		✓	✓

Energy Commitments	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
• the kitchen; dedicated		✓	✓
• all bathrooms/toilets; dedicated		✓	✓
• the laundry; dedicated		✓	✓
• all hallways; dedicated		✓	✓
Natural lighting			
The applicant must install a window and/or skylight in the kitchen of the dwelling for natural lighting.	✓	✓	✓
The applicant must install a window and/or skylight in 4 bathroom(s)/toilet(s) in the development for natural lighting.	✓	✓	✓
Swimming pool			
The applicant must install the following heating system for the swimming pool in the development (or alternatively must not install any heating system for the swimming pool): solar only		✓	
The applicant must install a timer for the swimming pool pump in the development.		✓	
Outdoor spa			
The applicant must install the following heating system for the spa in the development (or alternatively must not install any heating system for the spa): solar (gas boosted)		✓	
The applicant must install a timer for the spa pump in the development.		✓	
Other			
The applicant must install a gas cooktop & electric oven in the kitchen of the dwelling.		✓	
The applicant must construct each refrigerator space in the development so that it is "well ventilated", as defined in the BASIX definitions.		✓	
The applicant must install a fixed outdoor clothes drying line as part of the development.		✓	
The applicant must install a fixed indoor or sheltered clothes drying line as part of the development.		✓	

Legend

In these commitments, "applicant" means the person carrying out the development.

Commitments identified with a ✓ in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).

Commitments identified with a ✓ in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.

Commitments identified with a ✓ in the "Certifier check" column must be certified by a certifying authority as having been fulfilled, before a final occupation certificate(either interim or final) for the development may be issued.

CABE

21 August 2007

Paul Gearin
Local Management Services Pty Ltd
PO Box 3190
NARELLAN DC NSW 2567

P 02 4655 5811
F 02 4655 2411

Dear Paul

32 The Serpentine, Bilgola
Waste Management Plan

Waste Management during construction will be managed by local bins to each level of the building which will be craned on a daily basis (by site tower crane) to Cabes tipper truck and waste will be tipped at the local public tip _ 'Kimbricki' site.

It is envisaged that the tower crane will be erected at site establishment stage due the difficult site access. Upon removal of the tower crane, which is expected to be 6 to 8 weeks prior to completion the residual waste at this point will be managed by Reefway Waste skip bins.

Yours sincerely
CABE

LOUIS QUATTROMANI
Project Manager
D 02 8818 3630

Mr. Louis Quattromani
Project Manager - Cabe
Suite 202, 29-31 Solent Circuit
BAULKHAM HILLS NSW 2153

URBAN FORESTRY AUSTRALIA

TREE MANAGEMENT
CONSULTING ARBORICULTURISTS
HORTICULTURISTS
LANDSCAPE DESIGNERS

22 August 2007

Dear Mr. Quattromani

Inspection of Tree Protection Devices – 32 the Serpentine, Bilgola.

At your request, I met Mr. Grant Dowling on site today, to access the above secured site and inspect the protection devices provided to trees approved for retention.
The provision of tree protection is a requirement of your approved Development Application DA N0784/06.

I provide the following observations and comments:

Tree 1, in the adjoining property, is adequately protected by the 1.8 metre high chain fencing along the east side boundary. The root zone of the tree is protected by the existing neighbours driveway.

Trees 4 and 5 are protected by 1.8 metre sturdy chain fencing located adjacent to road.
There is no opportunity to extend the fenced area further north, as this would create a hazard to drivers and pedestrians. In accordance with the recommendations of the arboricultural assessment by Urban Forestry Australia - November 2006, the soil surface and tree roots are protected by a thick layer of coarse mulch,
The area to the south of the trees contains vegetation which is approved for removal. Until such time this occurs, it is not practical to place fencing in this area. It is unlikely the removal of this vegetation will impact on the two small trees approved for retention.

URBAN FORESTRY AUSTRALIA
www.urbanforestryaustralia.com.au
Consulting Arboriculturists

PO Box 151
Newport Beach NSW 2106
admin@urbanforestryaustralia.com.au

Telephone: (02) 9918 9833
Facsimile: (02) 9918 9844
Mobile: 0414 997 417

Trees 19 and 20 have appropriate 1.8 metre fencing encircling the two trees. The fencing is located at appropriate distances to protect the Primary Root Zone (PRZ) of both trees, and a thick layer of coarse mulch has been placed over the majority of the area enclosed by fencing. It is understood this fencing may need to be altered to enable deck construction near the stems of the trees. This would need to be subject to arboriculturist advice, prior to any changes made to the current fencing locations.

RECOMMENDATIONS

Trees 4 and 5 will require some trimming to clear the roadside where trucks are likely to park. This pruning is minor in extent, and is required to prevent tearing damage to branches should vehicles contact the trees.

It is also recommended the Oleander (Tree 7), growing on the side of the road, should be pruned to clear it of contact with trucks and machinery.

Any changes to fencing locations, pruning requirements, or works proposed inside the tree protection areas must be subject to advice from an arboriculturist, *prior* to making any changes which may affect the trees.

I am satisfied the protection devices afforded the trees on this site, are appropriate, and will protect the trees from significant construction impacts.

Further, I am appropriately experienced and qualified to provide this certification for the purposes of application for a Construction Certificate for this project.

Should you require further assistance with this matter, or require my liaison with Council officers, please do not hesitate to contact me.

Yours faithfully



MEMBER ISA

MEMBER OF INSTITUTE OF AUSTRALIAN CONSULTING ARBORICULTURISTS

Catriona Mackenzie MAIH MIACA MISAAC
Consulting arboriculturist, horticulturist and landscape designer.
Certificate of Horticulture *Honours*
Diploma of Horticulture (Arboriculture) *Distinction*
Associate Diploma of Applied Science (Landscape) *Distinction*

7 November, 2007

Our Ref: 206-47

greenarrow hydraulics

GreenArrow Hydraulics Pty Ltd
ABN 32 095 342 153
Level 1, 409 Forrest Road
PO Box 442
Bexley NSW 2207
Ph: (02) 9567 4466
Fax: (02) 9567 4462
Email: greenarrow@bigpond.com

Cabe Developments
Suit 202, 29-31 Solent Circuit
Baulkham Hills NSW 2153

Attention: Mr Louis Quattromani

Dear Sir,

CERTIFICATE OF DESIGN – STORMWATER DRAINAGE

SINGLE DWELLING –

32 THE SERPENTINE, BILGOLA

DEVELOPMENT APPLICATION N0: 0784/06

Pursuant to the provisions of Clause A2.2 of the Building Code of Australia, I hereby certify that the above design is in accordance with normal engineering practice and meets the requirements of the Building Code of Australia, the Environmental Planning and Assessment Regulation, relevant Australian Standards and relevant conditions of the Development Consent. In particular the design is in accordance with the following:

- *AS 3500 part 3.2*
- *Pittwater Council Stormwater Policy*
- *Da Condition No's: B2,3,5,5 & C4*

I am an appropriately qualified and competent person in this area and as such can certify that the design and performance of the design comply with the above and which are detailed on the following drawings.

- *H-01 – H-08 Rev.B*

Yours faithfully,

Michael Green Dip. Eng., AHSCA
Director

CABE

06 September

Mr Trevor Butt
Avalon Law
PO Box 73
AVALON NSW 2107

Faxed only

Dear Mr Butt

32 The Serpentine, Bilgola
Dilapidation Report

I refer to the attached letter dated 21 August, 2007.

We have sent to your client, Ms A Hodges, via registered mail (Receipt Confirmation enclosed), a letter regarding access to her property for an independent Dilapidation Consultant.

As you are aware, a Dilapidation Report is a council required report (please refer to attached, Item C3 on the DA consent and Item 7.2.4 on the Geotechnical Report), protecting all parties in relation to construction works on adjoining properties and public assets.

The report is to be prepared by Craig Nisbett of Sydney Building Reports who will carry out a site inspection usually taking approximately one hour, half an hour will be internal and half an hour external.

To date we have had no response in relation to the aforementioned. Please advise if your client is prepared to consent to the Dilapidation Consultant carrying out the inspection and submitting the report accordingly.

Yours sincerely
CABE

LOUIS QUATTROMANI
Project Manager
D 02 8818 3630

enc
copy David Beattie, David Beattie Pty Limited – F 02 9283 5995
Paul Gearin, Local Group Pty Limited – F 02 4655 2411
Craig Nisbett, Sydney Building Report – F 02 9651 2171
Mark Monk, CABE

PO Box 6924, Baulkham Hills BC NSW 2153
P 02 8818 3600 F 02 8818 3699
ABN 32 073 291 960
www.cabe.com.au

CABE

21 August 2007

Ms A Hodges
34 The Serpentine
BILGOLA NSW 2107

Registered Post only

Dear Ms Hodges

32 The Serpentine, Bilgola
Dilapidation Report for 34 The Serpentine, Bilgola

Firstly I wish to introduce myself, my name is Louis Quattromani and I am the Project Manager for the construction of the abovementioned property, which is due to commence shortly. Provided below are my direct phone numbers and I invite you to contact myself should you have any concerns or queries during the construction process.

We have been requested by Council to engage a Dilapidation Consultant to prepare Dilapidation Reports on both 30 and 34 The Serpentine, Bilgola as well as the Council-owned Road Reserve separating 32 The Serpentine and the roadway.

Preparation of the Dilapidation Report entails a Consultant conducting an inspection, both internally and externally, collecting photographic evidence and making notation of current conditions both structurally and aesthetically. A copy of this report is forwarded to the Home Owner and Council.

The object of this process is to allow protection of both parties in relation to any issues arising from the construction of 32 The Serpentine, Bilgola.

Please contact me direct on (02) 8818 3630 to organise a suitable time for the Consultant, Sydney Building Reports, to carry out the inspection. Generally, the inspection takes less than one hour.

Once again, please do not hesitate to contact me with any concerns or queries during the construction of 32 The Serpentine, Bilgola.

Yours sincerely
CABE

LOUIS QUATTROMANI
Project Manager
D 02 8818 3630

PO Box 6924, Baulkham Hills BC NSW 2153
P 02 8818 3600 F 02 8818 3699
ABN 32 073 291 960
www.cabe.com.au

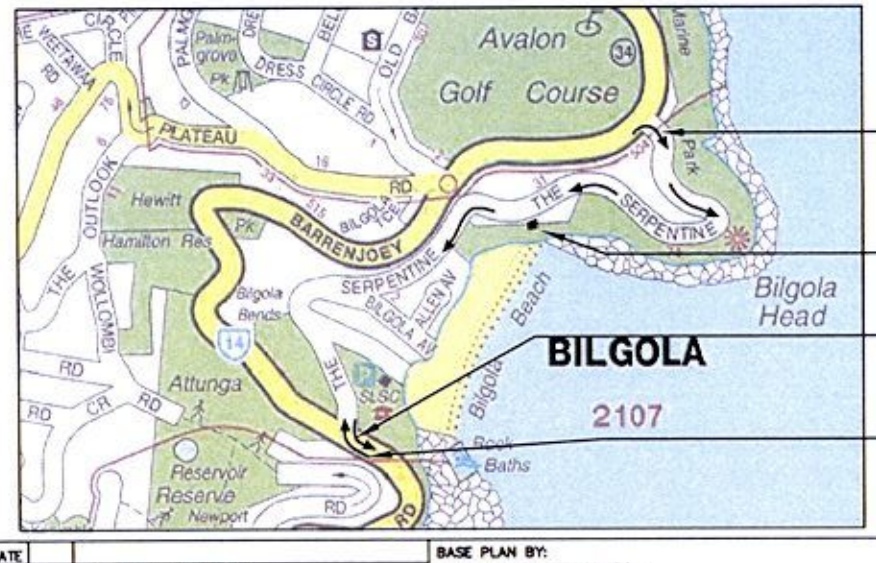
TABLE 1 – CONSTRUCTION PROGRAMME and DAILY TRAFFIC MOVEMENTS

Stage	Description Of Works	Time Period	Commencement Date
STAGE 1			
Stage 1	Erection of Site Shed withinn boundary and skips bins and crane. Temporary construction zone in the Serpentine on Eastern side outside site boundary.	10 weeks	8/10/07
STAGE 2			
Stage 2A	Driveway Crossing and Layback	1 week	
Stage 2 B	Driveway and Garage Floor Slab	11 weeks	
STAGE 3	Main Frame Construct and Concrete Pours	16 weeks	
STAGE 4	Finishing worK	40 weeks	

Daily Vehicular Movements
The hours of construction work will be 7:00am to 5:00pm Monday to Friday, 7:00am to 1:00pm Saturday.
The proposed number of daily truck and car movements for stages 1-4 are shown in table 2.

TABLE 2 – CONSTRUCTION PROGRAMME and DAILY TRAFFIC MOVEMENTS

Stage	Total Number of Daily Movements				Parking Notes
	CARS IN	CARS OUT	TRUCKS IN	TRUCKS OUT	
Stage 1	2	2	6-8	6-8(Trucks Loading)	No parking
Stage 2A	4	4	2	2	No Parking on site
Stage 2B	4	4	2	2	Loading in Driveway only
Stage 3	5	5	2	2	No Parking on site. Loading in Driveway only Boom pump on garage slab
Concrete pour days	4	4	6-8	6-8	Prtial road closure for trucks to clear cranes for 2-4 hours
Stage 4	7	8	1-2	1-2	Cars: Parked Tradesmen Trucks: Materials Delivery



VEHICULAR ROUTE DIAGRAM:
ACCESS TO SITE

GENERAL NOTES

SITE HOARDINGS ARE TO BE ERECTED AND INSTALLED IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT 2000.

TRAFFIC CONTROLLERS

REFER TO AS1742 .3 - 2003 CLAUSE 4.6.6
"ONLY COMPETENT PERSONS WHO POSSESS AN APPROPRIATE STATE CERTIFICATION SHALL BE APPOINTED AS TRAFFIC CONTROLLERS".
"TRAFFIC CONTROLLERS MUST WEAR HIGH VISIBILITY CLOTHING AT ALL TIMES".

SEQUENCE OF ERECTING SIGNS

BEFORE WORK COMMENCES, SIGNS AND DEVICES AT THE APPROACHES TO THE WORK AREA SHOULD BE ERECTED IN ACCORDANCE WITH AS1742.3 - 2002 SECTION 2.5.3, AS BELOW

a) SEE ADVANCED WARNING SIGNS.
b) ALL INTERMEDIATE ADVANCE AND POSITIONING SIGNS AND DEVICES IN ADVANCE OF TAPER OR WORK AREA.
c) ALL DELINEATING DEVICES REQUIRED TO FORM THE TAPER INCLUDING ILLUMINATED FLASHING ARROW SIGN AT THE END OF THE TAPER WHERE REQUIRED.
d) DELINEATION PAST THE WORK AREA.
e) ALL OTHER WARNING AND REGULATORY SIGNS.

PARKING NOTES:

- STAGE 1
  CONSTRUCTION VEHICLES TO PARK IN CONSTRUCTION ZONE OUTSIDE SITE FRONTAGE IN THE SERPENTINE AS SHOWN IN TCP 2 STAGE 1
- STAGE 2A
  CONSTRUCTION VEHICLES TO PARK IN CONSTRUCTION LANE
- STAGE 2B
  CONSTRUCTION VEHICLES TO PARK IN DRIVEWAY
- STAGE 3 & 4
  CONSTRUCTION VEHICLES TO PARK IN DRIVEWAY

This information relates to Construction/Complying Development Certificate
---5001192
Issued by Paul Gearin (02) 4655 5811
Building Professionals Board (BPB0132)

TRAFFIC NOTES

- ALL SIGNAGE AND SETOUT OF SIGNS IS TO COMPLY WITH REFER TO AS 1742.3-2002. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES
  PART 3: TRAFFIC CONTROL DEVICES FOR WORKS ON ROADS
- NO WORKS AT NIGHT
- ERECTION OF SIGNS:
  ALL SIGNS AND DEVICES SHALL BE ERECTED IN ACCORDANCE WITH Clause 2.5.3 of AS 1742.3-2002. A VEHICLE MOUNTED WARNING DEVICE IS TO PROTECT WORKERS ERECTING SIGNS.

No.	DATE		AMENDMENTS TO NOTES
A	27/9/7		

BASE PLAN BY:
TURNER & ASSOCIATES ARCHITECTS
PHONE: (02) 9660 2855 FAX: (02) 9660 2411

DATUM: A.H.D.

COPYRIGHT
THIS DRAWING IS THE PROPERTY OF LYLE MARSHALL AND ASSOCIATES P/L AND MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED & IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORISED USE OF THIS DRAWING IS PROHIBITED.

LYLE MARSHALL AND ASSOCIATES PTY. LTD.
CONSULTING ENGINEERS, TRANSPORTATION AND ENVIRONMENTAL PLANNERS
SUITE 8, 871 PACIFIC HIGHWAY, CHATSWOOD N.S.W 2067 PH:(02) 9419 8191 FAX:(02) 9419 8107
EMAIL: lylemarshall@ozemail.com.au

CLIENT: CABE
PO BOX 6924 BAULKHAM HILLS NSW 2153
PH: (02) 8818 3600 FAX: (02) 8818 3699

32 THE SERPENTINE RESDIENTIAL DEVELOPMENT
TRAFFIC MANAGEMENT PLAN
GENERAL NOTES AND LEGEND

SCALE	PASSED	DATE
1:200(A1), 1:500(A3)		AUGUST 2007

DESIGN	LMA
DRAWN	EMMC
CHECKED	GLM

SHEET No. 1A OF 6
DRAWING No. 1549-07

DETAIL 1
STAGE 1 TCP SIGNAGE
Scale: 1:200

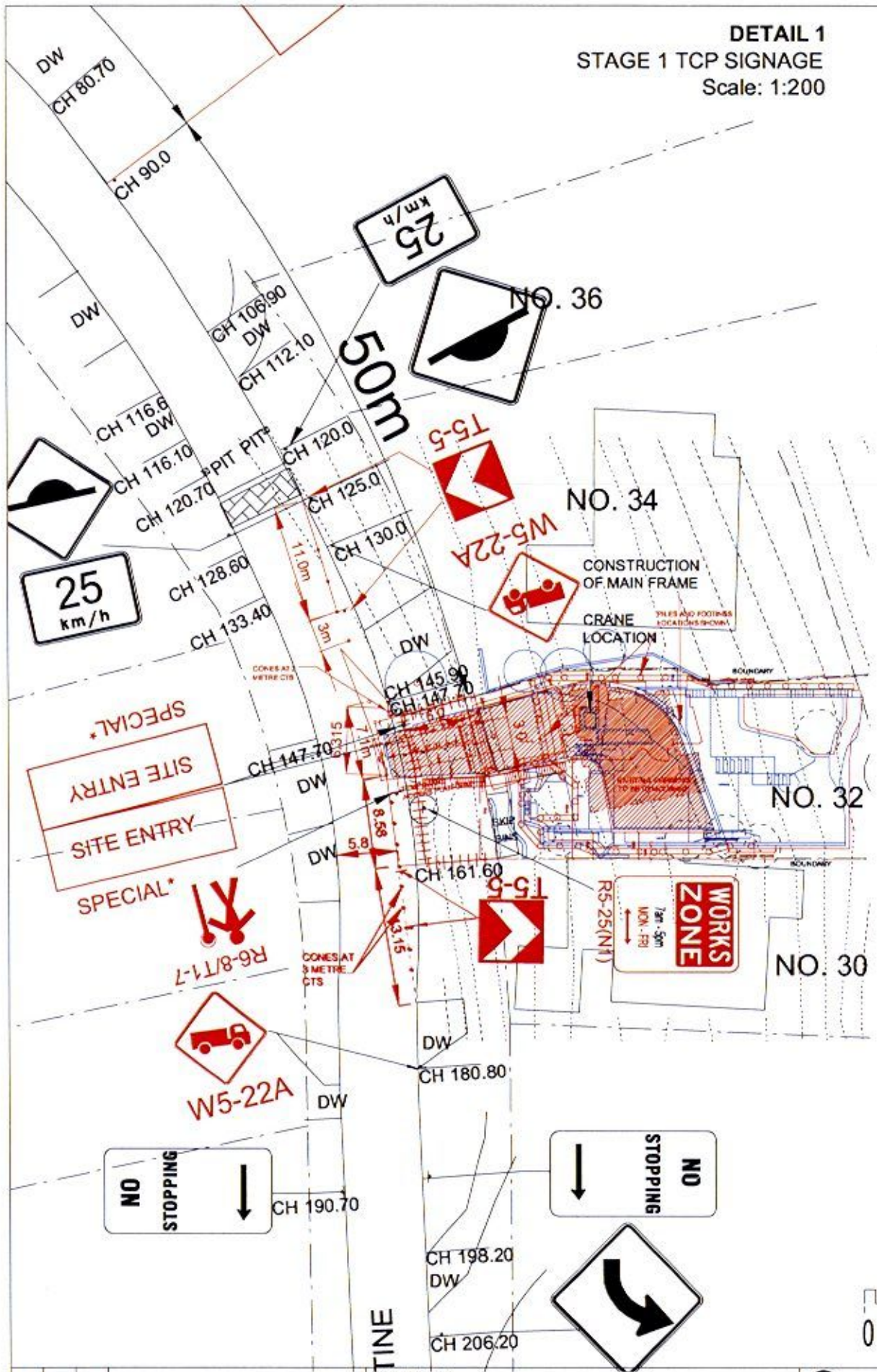
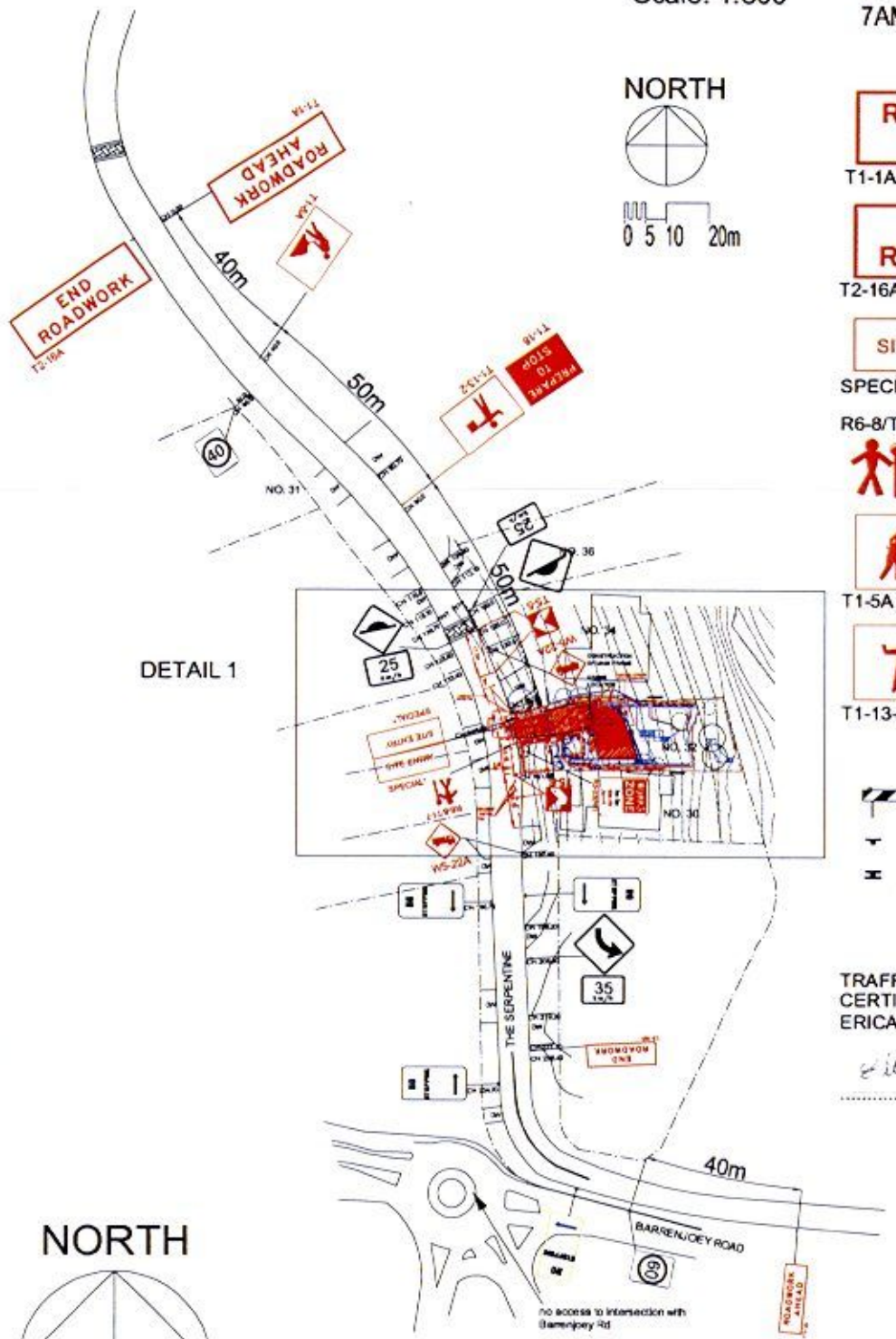


FIGURE 1
ADVANCED WARNING SIGN SETUP
Scale: 1:800



SIGNAGE LEGEND-TCP No 1 STAGE 1

TRAFFIC CONTROL PLAN BETWEEN
7AM TO 5PM

		QUANTITY
ROADWORK AHEAD	T1-1A	2
END ROADWORK	T2-16A	2
SITE ENTRY SPECIAL*	R6-8/T1-7	
	T1-5A	1
	T1-13-2	1

		QUANTITY
	W5-22A	2
WORKS ZONE 7am - 5pm MON - FRI	R5-25(N1)	1
	T5-5	5
PREPARE TO STOP	T1-18	1

BARRIER BOARD
SIGN - SINGLE SIDED
SIGN - DOUBLE SIDED
FLASHING AMBER LIGHTS
BARRIER BOARD POSITION
SEPARATION LINE
EDGE LINE
WORK AREA
CONES

TRAFFIC CONTROL AT WORKSITE
CERTIFCATE NO 2172014699
ERICA MARSHALL McCLELLAND

NORTH

0 5 10 20m

FOR GENERAL NOTES AND
CONSTRUCTION PROGRAM REFER TO
DRAWING No 1549-07-SHEET1

No.	DATE	APPD

BASE PLANS BY:
TURNER & ASSOCIATES ARCHITECTS
LEVEL 1 410 CROWN STREET SYDNEY NSW 2010
PHONE: (02) 9368 0000 FACSIMILE: (02) 9368 3088

DATUM:
A.H.D.

COPYRIGHT
THIS DRAWING IS THE PROPERTY OF LYLE MARSHALL AND ASSOCIATES P/L AND MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED & IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORISED USE OF THIS DRAWING IS PROHIBITED.

LYLE MARSHALL AND ASSOCIATES PTY. LTD.
CONSULTING ENGINEERS, TRANSPORTATION AND ENVIRONMENTAL PLANNERS
SUITE 8, 871 PACIFIC HIGHWAY, CHATSWOOD N.S.W 2067 PH (02) 9419 8191 FAX (02) 9419 8107
EMAIL: lylemarshall@ozemail.com.au

CLIENT: CABE
PO BOX 6924 BAULKHAM HILLS NSW 2153
PH: (02) 8818 3600 FAX: (02) 8818 3699

RESIDIENTIAL DEVELOPMENT 32 THE SERPENTINE BILGOLA
TRAFFIC MANAGEMENT CONTROLS PLAN
STAGE 1 DEMOLITION & EXCAVATION

SCALE	PASSED	DATE
AS SHOWN		AUGUST 2007

DESIGN	LMA	SHEET No.	DRAWING No.
DRAWN	EMMC	2A of 6	1549-1-07
CHECKED	GLM		

DETAIL 1
STAGE 1 TCP SIGNAGE
Scale: 1:200

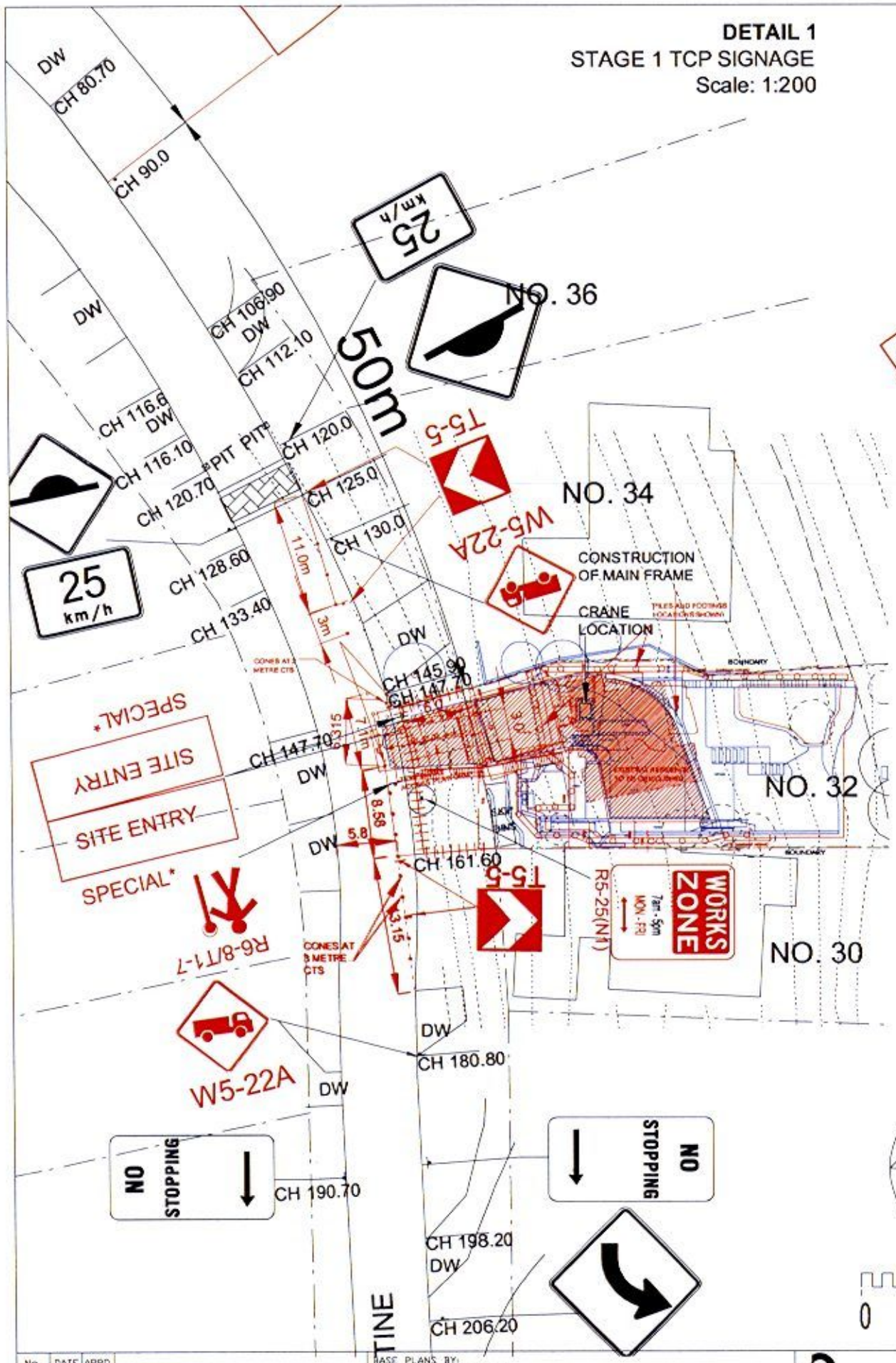
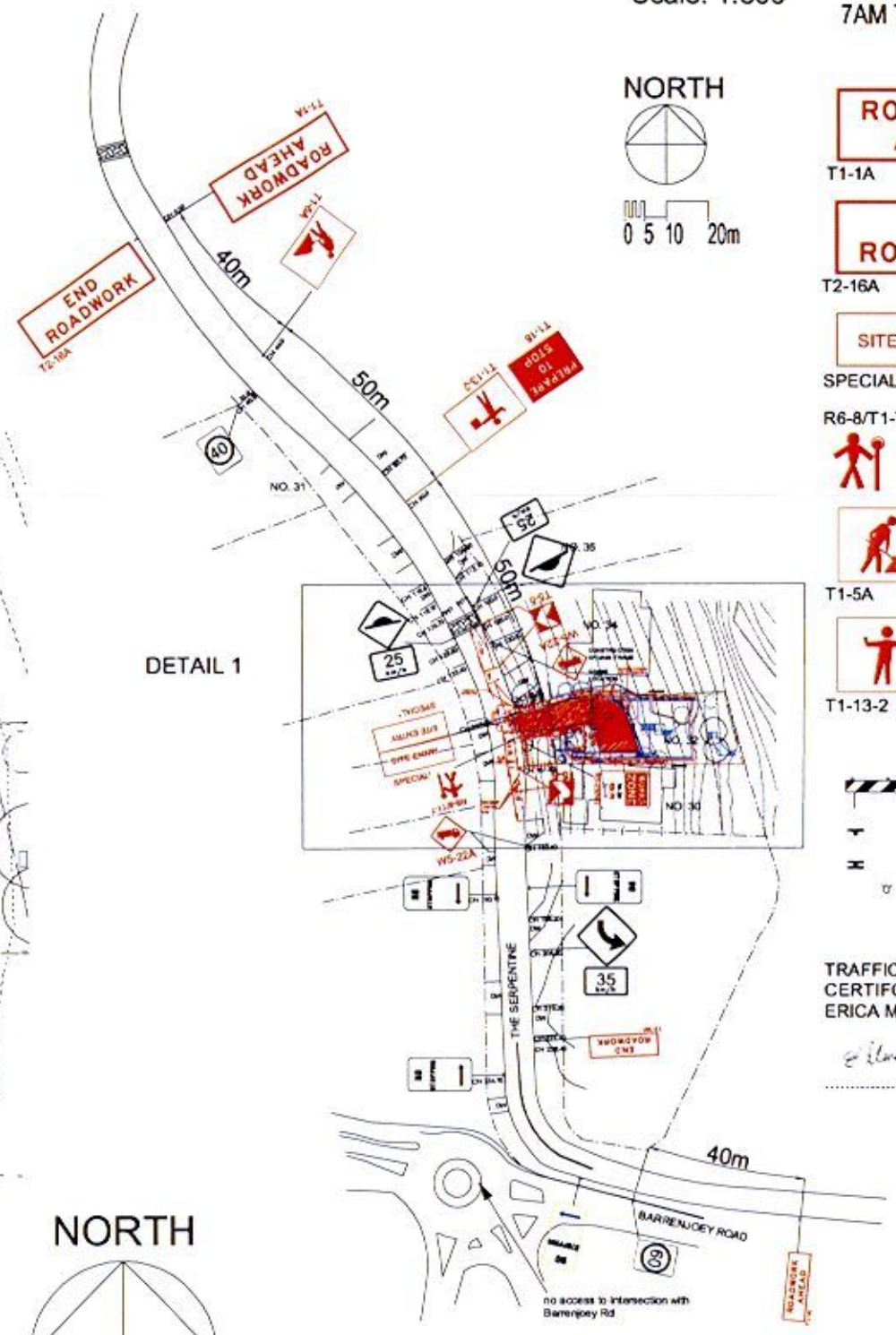


FIGURE 1
ADVANCED WARNING SIGN SETUP
Scale: 1:800



SIGNAGE LEGEND-TCP No 2 STAGE 2A

TRAFFIC CONTROL PLAN BETWEEN
7AM TO 5PM

	QUANTITY		QUANTITY
ROADWORK AHEAD T1-1A	2	W5-22A	2
END ROADWORK T2-16A	2	WORKS ZONE 7am - 5pm MON - FRI R5-25(N1)	1
SITE ENTRY SPECIAL*			
R6-8/T1-7	1	T5-5	5
T1-5A			
T1-13-2	1	PREPARE TO STOP T1-18	1

BARRIER BOARD
SIGN - SINGLE SIDED
SIGN - DOUBLE SIDED
FLASHING AMBER LIGHTS
BARRIER BOARD POSITION
SEPARATION LINE
EDGE LINE
WORK AREA
CONES

TRAFFIC CONTROL AT WORKSITE
CERTIFCATE NO 2172014699
ERICA MARSHALL McCLELLAND

NORTH

0 5 10 20m

FOR GENERAL NOTES AND CONSTRUCTION PROGRAM REFER TO DRAWING No 1549-07-SHEET1

No.	DATE	APPD

BASE PLANS BY:
TURNER & ASSOCIATES ARCHITECTS
LEVEL 1 4-10 CROWN STREET SYDNEY NSW 2010
PHONE: (02) 9358 3000 FACSIMILE: (02) 9358 3088

DATUM: A.H.D.

COPYRIGHT
THIS DRAWING IS THE PROPERTY OF LYLE MARSHALL AND ASSOCIATES P/L AND MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED & IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORISED USE OF THIS DRAWING IS PROHIBITED.

LYLE MARSHALL AND ASSOCIATES PTY. LTD.
CONSULTING ENGINEERS, TRANSPORTATION AND ENVIRONMENTAL PLANNERS
SUITE 8, 871 PACIFIC HIGHWAY, CHATSWOOD N.S.W 2067 PH:(02) 9419 8191 FAX (02) 9419 8107
EMAIL: lyemarshall@ozemail.com.au

CLIENT: CABE
PO BOX 6924 BAULKHAM HILLS NSW 2153
PH: (02) 8818 3600 FAX: (02) 8818 3699

SCALE	PASSED	DATE
AS SHOWN		SEPT 2007

RESDIENTIAL DEVELOPMENT 32 THE SERPENTINE BILGOLA
TRAFFIC MANAGEMENT CONTROLS PLAN
STAGE 2A CONSTRUCTION OF DRIVEWAY

DESIGN	LMA	SHEET No.	DRAWING No.
DRAWN	EMMC	3A OF 6	1549-1-07
CHECKED	GLM		

DETAIL 3
STAGE 2B TCP SIGNAGE
Scale: 1:200

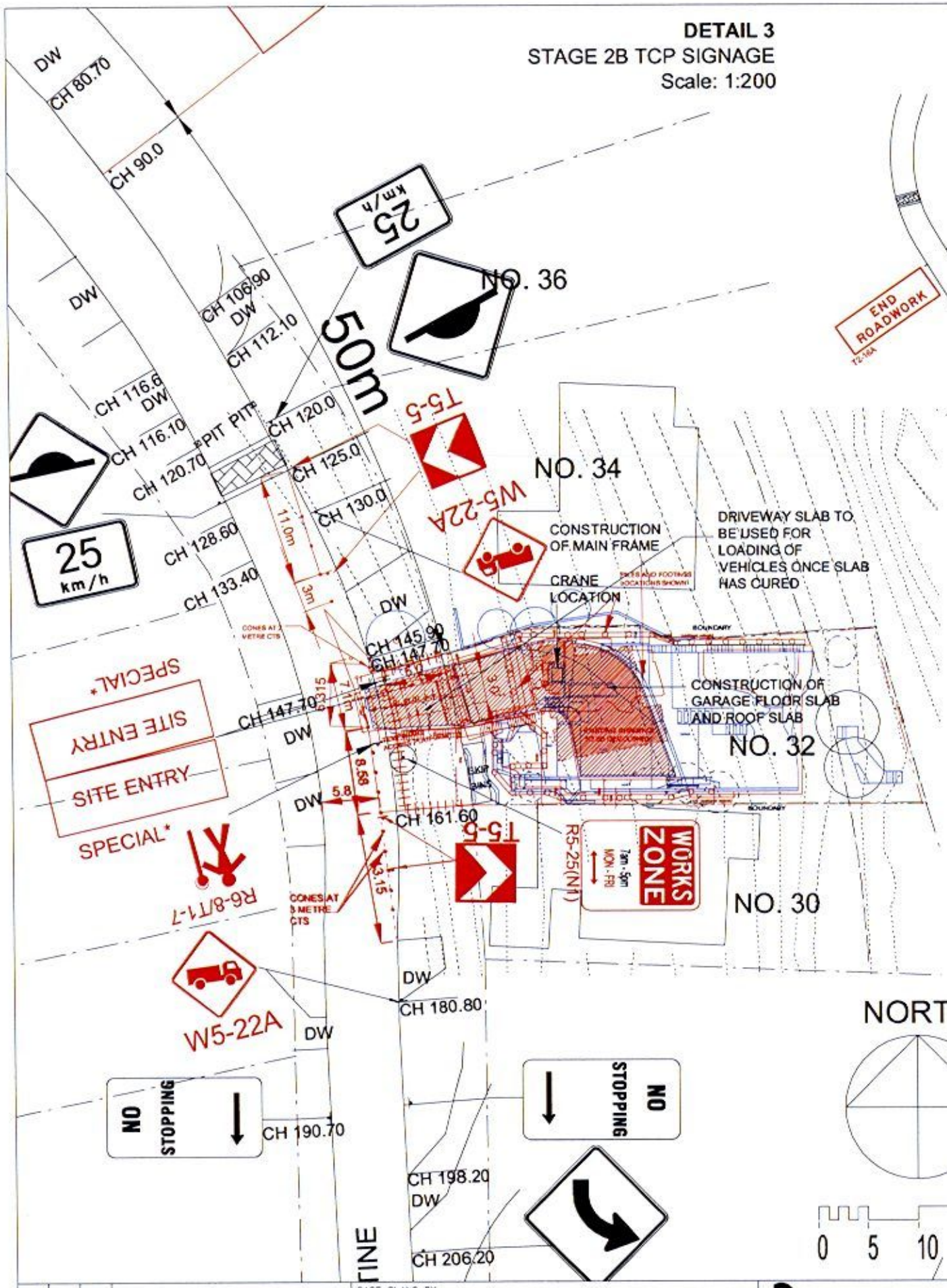
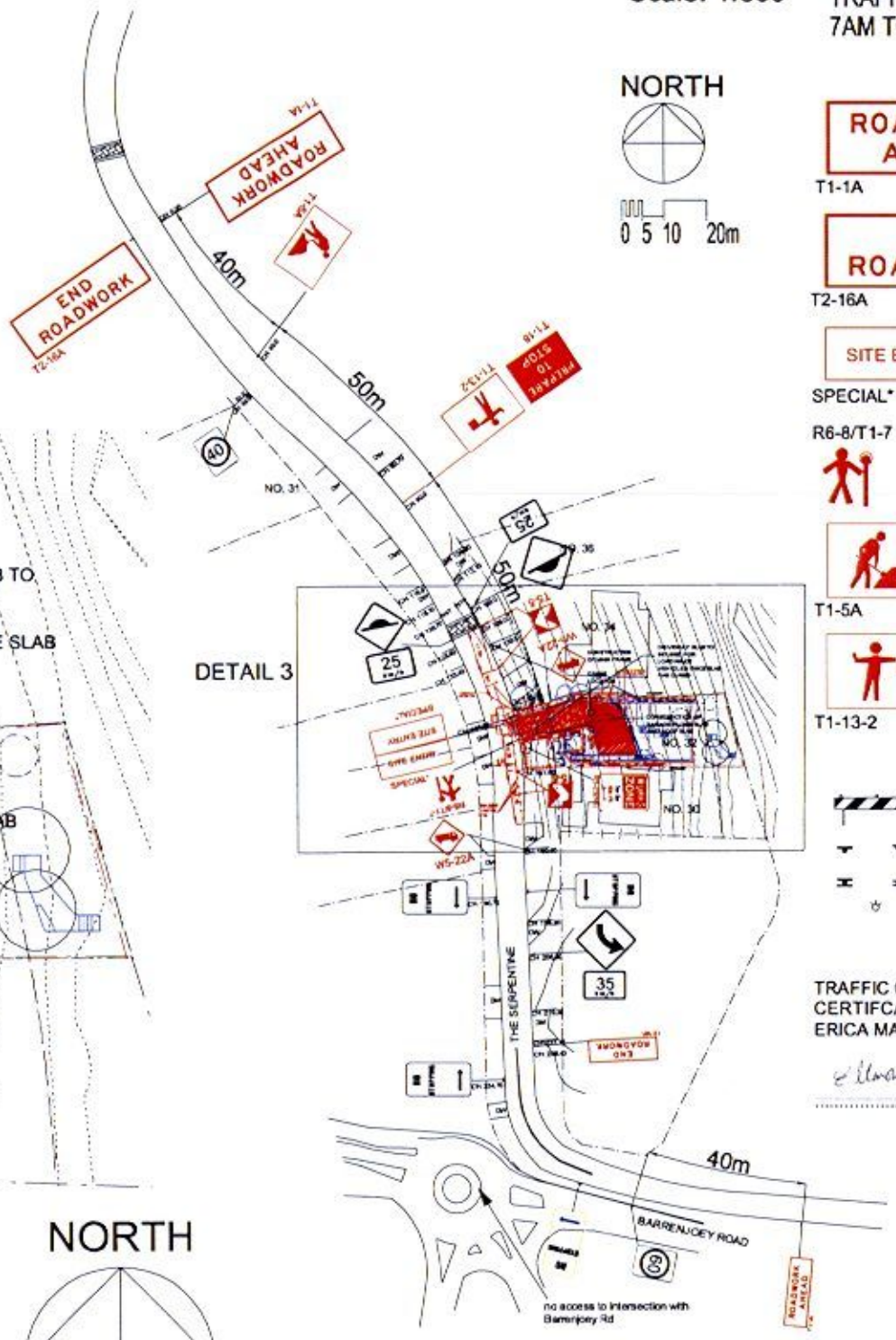


FIGURE 3
ADVANCED WARNING SIGN SETUP
Scale: 1:800



NORTH

0 5 10 20m

FOR GENERAL NOTES AND CONSTRUCTION PROGRAM REFER TO DRAWING No 1549-07-SHEET1

SIGNAGE LEGEND-TCP No 3 STAGE 2B

TRAFFIC CONTROL PLAN BETWEEN
7AM TO 5PM

		QUANTITY
ROADWORK AHEAD	T1-1A	2
END ROADWORK	T2-16A	2
SITE ENTRY	SPECIAL*	
	R6-8/T1-7	1
	T1-5A	1
	T1-13-2	1

		QUANTITY
	W5-22A	2
WORKS ZONE 7am - 5pm MON - FRI	R5-25(N1)	1
	T5-5	5
PREPARE TO STOP	T1-18	1

BARRIER BOARD
SIGN - SINGLE SIDED
SIGN - DOUBLE SIDED
FLASHING AMBER LIGHTS
BARRIER BOARD POSITION
SEPARATION LINE
EDGE LINE
WORK AREA
CONES

TRAFFIC CONTROL AT WORKSITE
CERTIFCATE NO 2172014699
ERICA MARSHALL McCLELLAND

E Marshall McClelland

No.	DATE	APP'D

BASE PLANS BY:
TURNER & ASSOCIATES ARCHITECTS
LEVEL 1 410 CROWN STREET SYDNEY NSW 2010
PHONE: (02) 9358 2000 FACSIMILE: (02) 9358 2088

DATUM
A.H.D.

COPYRIGHT
THIS DRAWING IS THE PROPERTY OF LYLE MARSHALL AND ASSOCIATES P/L AND MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED & IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION UNAUTHORISED USE OF THIS DRAWING IS PROHIBITED.

LYLE MARSHALL AND ASSOCIATES PTY. LTD.
CONSULTING ENGINEERS, TRANSPORTATION AND ENVIRONMENTAL PLANNERS
SUITE 8, 871 PACIFIC HIGHWAY, CHATSWOOD N.S.W 2067 PH (02) 9419 8191 FAX (02) 9419 8107
EMAIL: lylemarshall@ozemail.com.au

CLIENT: CABE
PO BOX 6924 BAULKHAM HILLS NSW 2153
PH: (02) 9838 3600 FAX: (02) 9838 3699

RESDIENTIAL DEVELOPMENT 32 THE SERPENTINE BILGOLA
TRAFFIC MANAGEMENT CONTROLS PLAN
STAGE 2B CONSTRUCTION GARAGE FLOOR SLAB

SCALE	PASSED	DATE
AS SHOWN		SEPT 2007

DESIGN	LMA	SHEET No.	DRAWING No.
DRAWN	EMMC	4A OF 6	1549-1-07
CHECKED	GLM		

DETAIL 3
STAGE 3 TCP SIGNAGE
Scale: 1:200

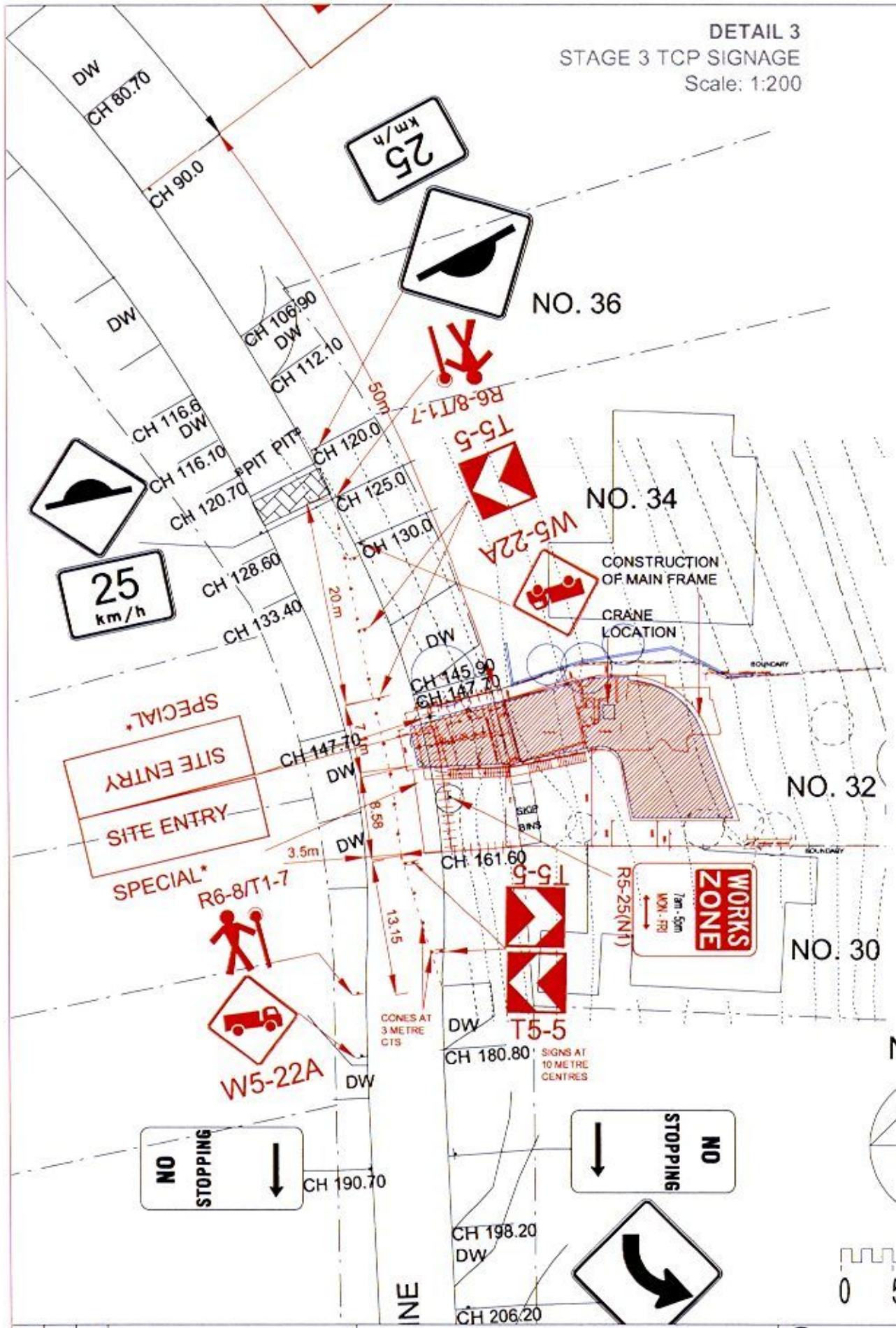
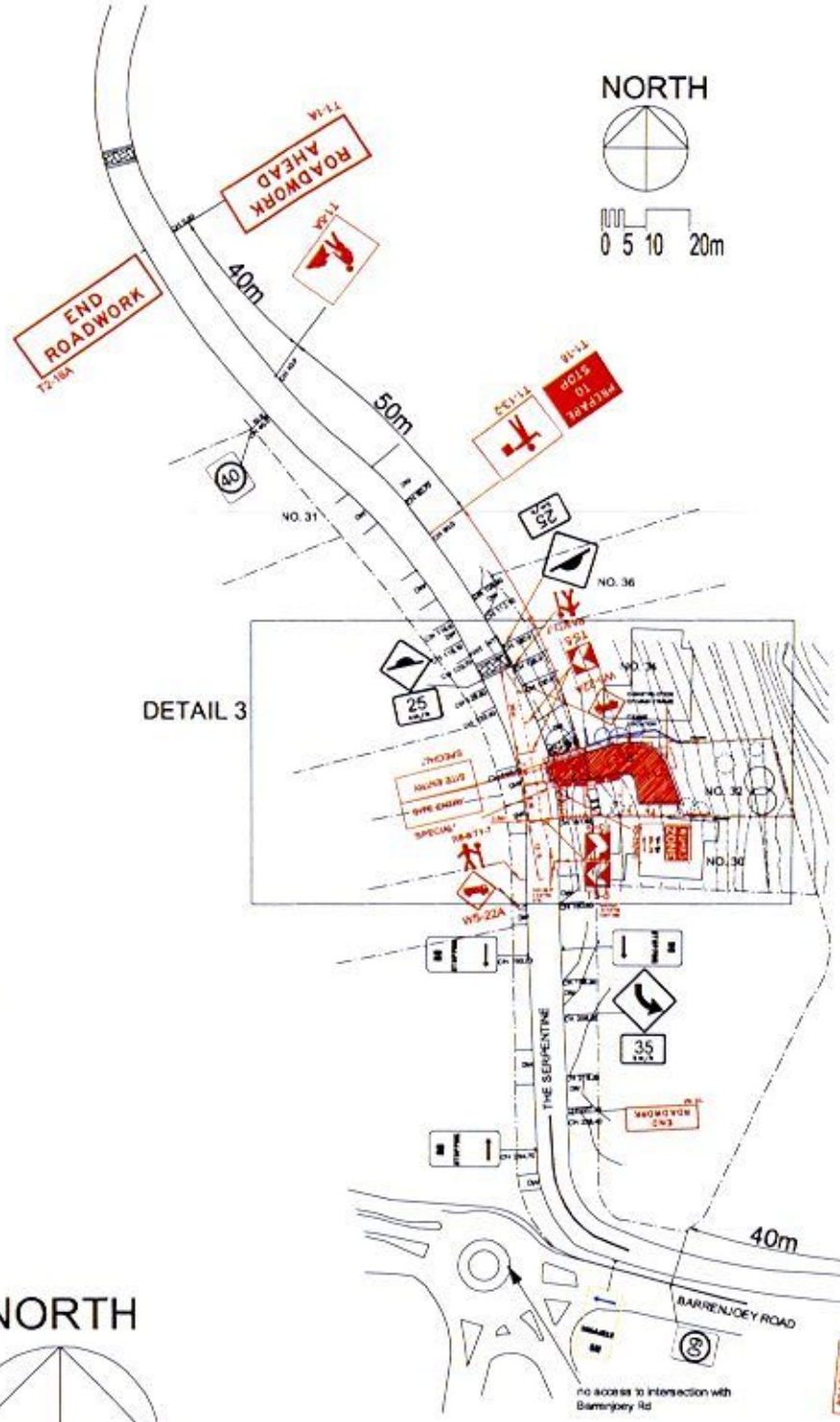


FIGURE 3
ADVANCED WARNING SIGN SETUP
Scale: 1:800



DETAIL 3

NORTH

0 5 10 20m

SIGNAGE LEGEND-TCP No 4 STAGE 3

TRAFFIC CONTROL PLAN BETWEEN
7AM TO 5PM

ROADWORK AHEAD T1-1A	2	W5-22A	2
END ROADWORK T2-16A	2	WORKS ZONE 7am - 5pm MON - FRI R5-25(N1)	1
SITE ENTRY SPECIAL*			
R6-8/T1-7	2	T5-5	7
T1-5A			
T1-13-2	1	PREPARE TO STOP T1-18	1

QUANTITY

QUANTITY

BARRIER BOARD
SIGN - SINGLE SIDED
SIGN - DOUBLE SIDED
FLASHING AMBER LIGHTS
BARRIER BOARD POSITION
SEPARATION LINE
EDGE LINE
WORK AREA
CONES

TRAFFIC CONTROL AT WORKSITE
CERTIFCATE NO 2172014699
ERICA MARSHALL McCLELLAND

NOTE:

THIS TCP IS SET UP FOR A PERIOD OF 2-4 HOURS TO REMOVE CRANES

FOR GENERAL NOTES AND CONSTRUCTION PROGRAM REFER TO DRAWING No 1549-07-SHEET1

No.	DATE	APP'D

BASE PLANS BY:
TURNER & ASSOCIATES ARCHITECTS
LEVEL 1 410 CROWN STREET SYDNEY NSW 2010
PHONE: (02) 8668 0000 FACSIMILE: (02) 9368 3086

DATUM: A.H.D.

COPYRIGHT
THIS DRAWING IS THE PROPERTY OF LYLE MARSHALL AND ASSOCIATES P/L AND MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED & IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORISED USE OF THIS DRAWING IS PROHIBITED.

LYLE MARSHALL AND ASSOCIATES PTY. LTD.
CONSULTING ENGINEERS, TRANSPORTATION AND ENVIRONMENTAL PLANNERS
SUITE 8, 871 PACIFIC HIGHWAY, CHATSWOOD N.S.W 2067 PH (02) 9419 8191 FAX (02) 9419 8107
EMAIL lylemarshall@ozemail.com.au

CLIENT: CABE
PO BOX 6924 BAULKHAM HILLS NSW 2153
PH: (02) 8818 3600 FAX: (02) 8818 3699

RESIDENTIAL DEVELOPMENT 32 THE SERPENTINE BILGOLA
TRAFFIC MANAGEMENT CONTROLS PLAN
STAGE 3 CONSTRUCTION GARAGE FLOOR SLAB - CRANE REMOVAL

SCALE	PASSED	DATE
AS SHOWN		SEPT 2007

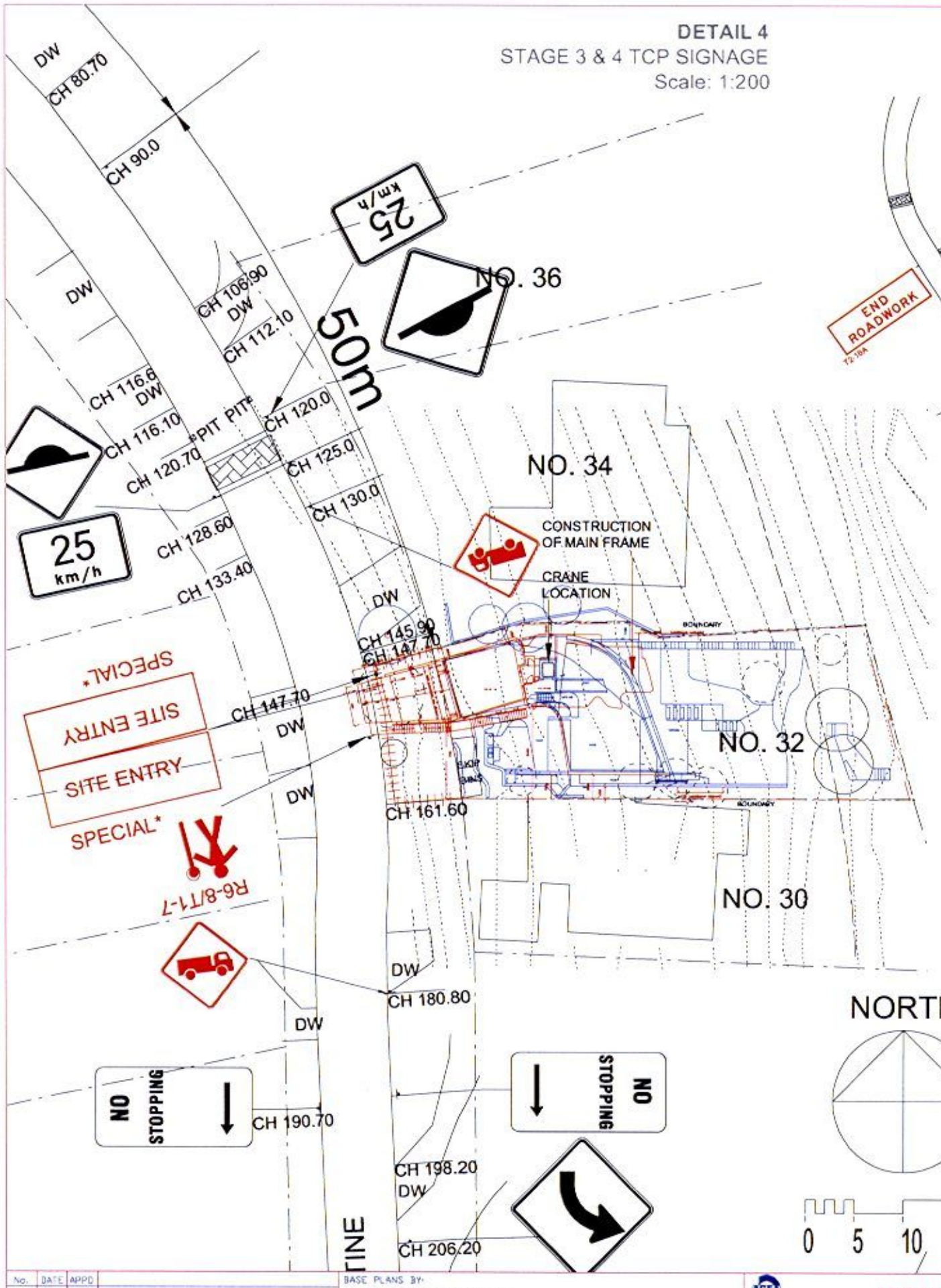
DESIGN	LMA	SHEET No.	DRAWING No.
DRAWN	EMMC	5A OF 6	1549-1-07
CHECKED	GLM		

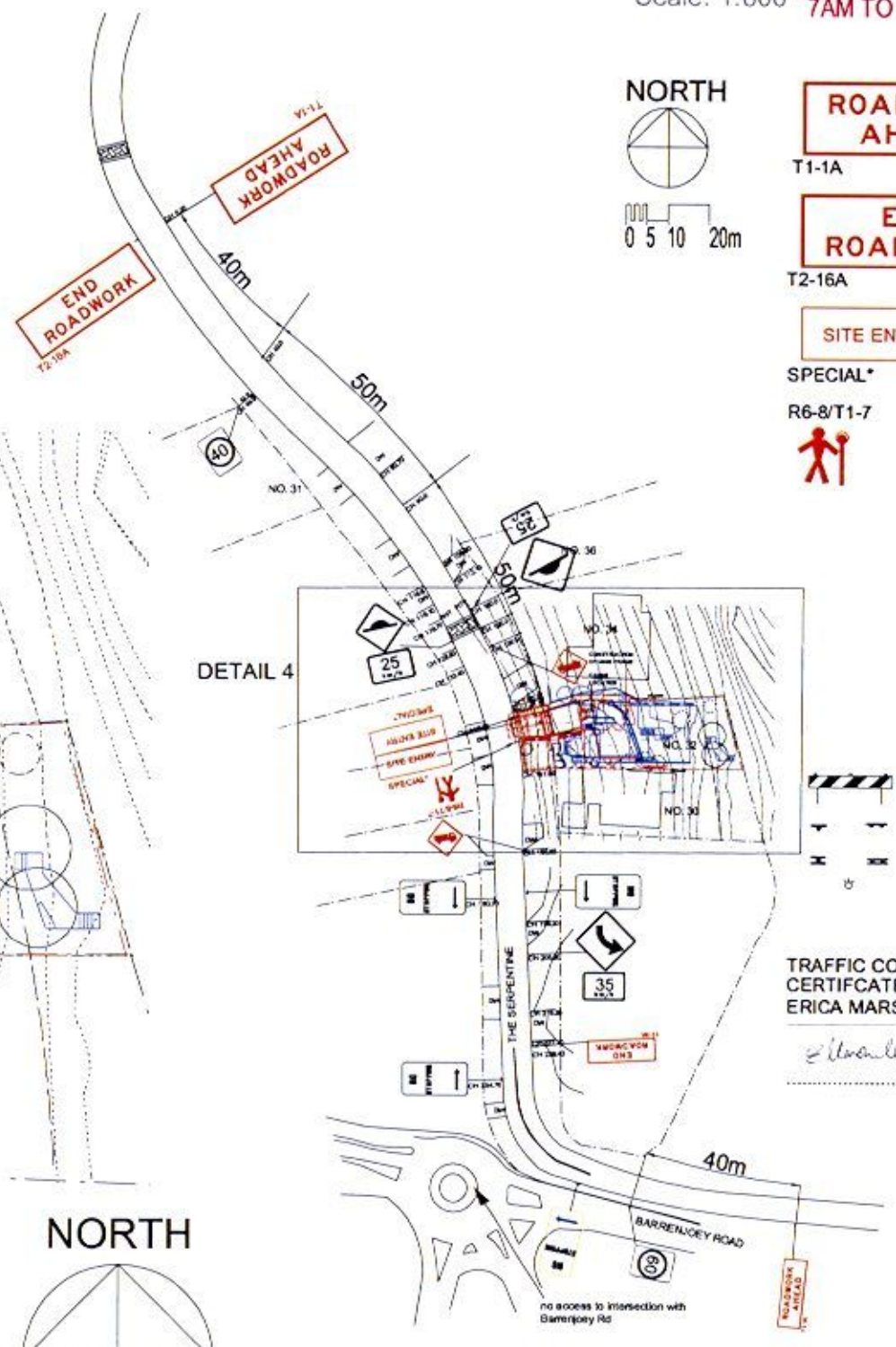
SIGNAGE LEGEND-TCP No 5 STAGE 3 & 4

TRAFFIC CONTROL PLAN BETWEEN
7AM TO 5PM

DETAIL 4
STAGE 3 & 4 TCP SIGNAGE
Scale: 1:200

FIGURE 4
ADVANCED WARNING SIGN SETUP
Scale: 1:800





NORTH

0 5 10 20m

	QUANTITY
ROADWORK AHEAD T1-1A	2
END ROADWORK T2-16A	2
SITE ENTRY SPECIAL* R6-8/T1-7	
W5-22A	2
WORKS ZONE 7am - 5pm MON - FRI R5-25(N1)	1

- BARRIER BOARD
- SIGN - SINGLE SIDED
- SIGN - DOUBLE SIDED
- FLASHING AMBER LIGHTS
- BARRIER BOARD POSITION
- SEPARATION LINE
- EDGE LINE
- WORK AREA
- CONES

TRAFFIC CONTROL AT WORKSITE
CERTIFCATE NO 2172014699
ERICA MARSHALL McCLELLAND

FOR GENERAL NOTES AND CONSTRUCTION PROGRAM REFER TO DRAWING No 1549-07-SHEET1

No.	DATE	APPD

BASE PLANS BY:
TURNER & ASSOCIATES ARCHITECTS
LEVEL 1 413 CROWN STREET SYDNEY NSW 2010
PHONE: (02) 9358 2000 FACSIMILE: (02) 9358 3088

DATUM: A.H.D.

COPYRIGHT
THIS DRAWING IS THE PROPERTY OF LYLE MARSHALL AND ASSOCIATES P/L AND MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED & IN ACCORDANCE WITH THE TERMS OF ENGAGEMENT FOR THAT COMMISSION. UNAUTHORISED USE OF THIS DRAWING IS PROHIBITED.

LYLE MARSHALL AND ASSOCIATES PTY. LTD.
CONSULTING ENGINEERS, TRANSPORTATION AND ENVIRONMENTAL PLANNERS
SUITE 8, 871 PACIFIC HIGHWAY, CHATSWOOD N.S.W 2067 PH (02) 9419 8191 FAX (02) 9419 8107
EMAIL: lylemarshall@ozemail.com.au

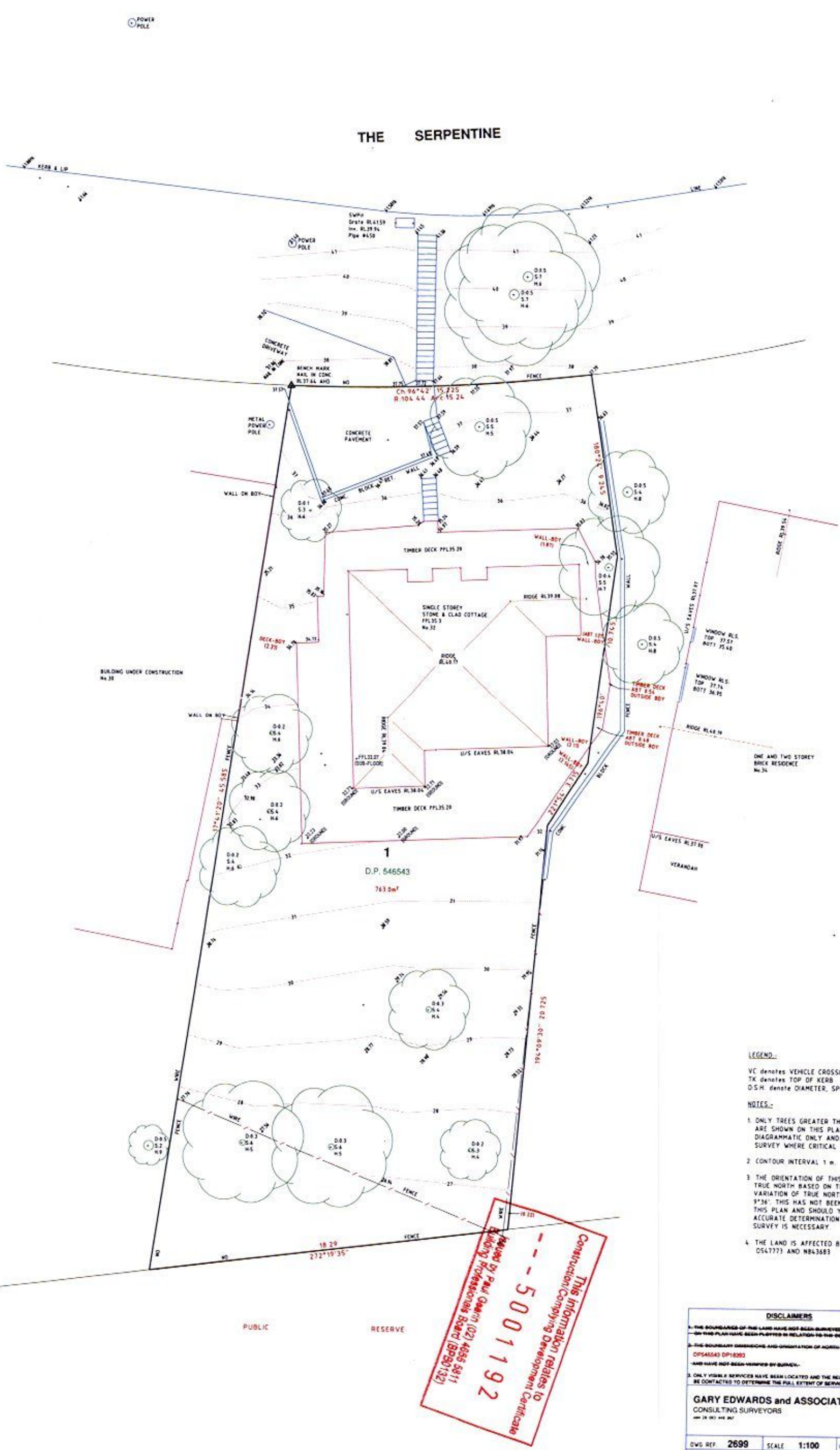
CLIENT: CABE
PO BOX 5924 BAULKHAM HILLS NSW 2153
PH: (02) 8818 3600 FAX: (02) 8818 3699

RESIDENTIAL DEVELOPMENT 32 THE SERPENTINE BILGOLA
TRAFFIC MANAGEMENT CONTROLS PLAN
STAGE 3 CONSTRUCTION OF MAIN FRAME & FINISHING WORKS

SCALE	PASSED	DATE
AS SHOWN		SEPT 2007

		SHEET No.	DRAWING No.
DESIGN	LMA	6A OF 6	1549-1-07
DRAWN	EMMC		
CHECKED	GLM		

THE SERPENTINE



APPROX TRUE NORTH 9°36'

MM BY DP546543

LEGEND:-

VC denotes VEHICLE CROSSING
TK denotes TOP OF KERB
D.S.H. denote DIAMETER, SPREAD and HEIGHT of TREE

NOTES:-

1. ONLY TREES GREATER THAN 3.5 METRES IN HEIGHT ARE SHOWN ON THIS PLAN AND THEIR POSITION IS DIAGRAMMATIC ONLY AND MAY REQUIRE ADDITIONAL SURVEY WHERE CRITICAL TO DESIGN.
2. CONTOUR INTERVAL 1 m.
3. THE ORIENTATION OF THIS PLAN IS APPROXIMATE TRUE NORTH BASED ON THE ASSUMPTION THAT THE VARIATION OF TRUE NORTH TO MAGNETIC NORTH IS 9°36'. THIS HAS NOT BEEN VERIFIED AS PART OF THIS PLAN AND SHOULD YOU REQUIRE A MORE ACCURATE DETERMINATION OF TRUE NORTH A FURTHER SURVEY IS NECESSARY.
4. THE LAND IS AFFECTED BY COVENANTS IN C746430, D547773 AND N843683

This information relates to Construction/Occupying Development Certificate
---5001192
Issued by Paul Goetz (02) 4956 5811
Building Professionals Board (BPB0137)

DISCLAIMERS

~~1. THE BOUNDARIES OF THE LAND HAVE NOT BEEN SURVEYED AND THE FEATURES SHOWN ON THIS PLAN HAVE BEEN PLOTTED IN RELATION TO THE OCCUPATIONS.~~

~~2. THE BOUNDARY DIMENSIONS AND ORIENTATION OF NORTH HAVE BEEN COMPILED FROM:~~
~~DP546543 DP16393~~
~~AND HAVE NOT BEEN VERIFIED BY SURVEY.~~

3. ONLY VISIBLE SERVICES HAVE BEEN LOCATED AND THE RELEVANT AUTHORITIES SHOULD BE CONTACTED TO DETERMINE THE FULL EXTENT OF SERVICES.

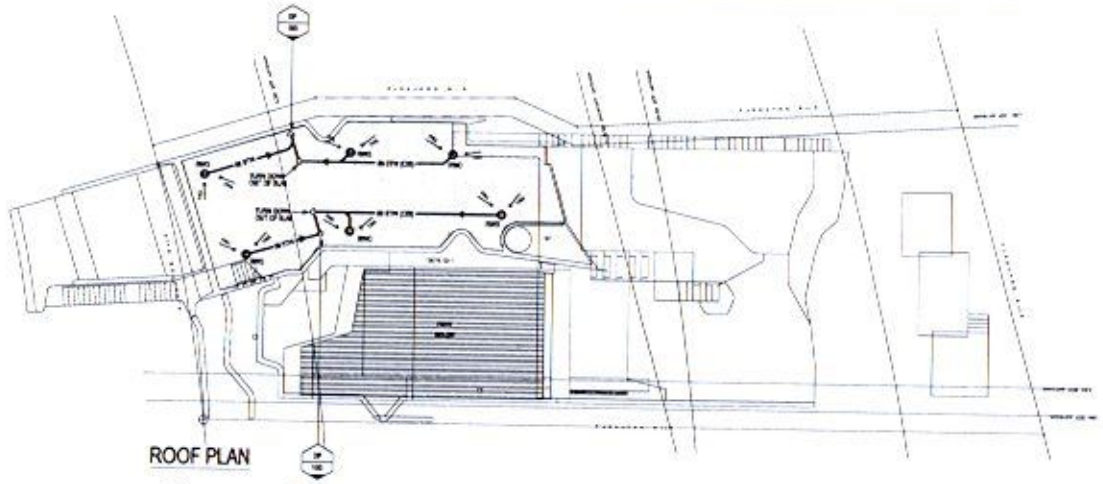
COPYRIGHT

GARY EDWARDS AND ASSOCIATES is the owner of the copyright subsisting in these drawings, plans, designs and specifications. They must not be used, reproduced or copied in whole or in part without prior written consent of GARY EDWARDS AND ASSOCIATES PTY LTD

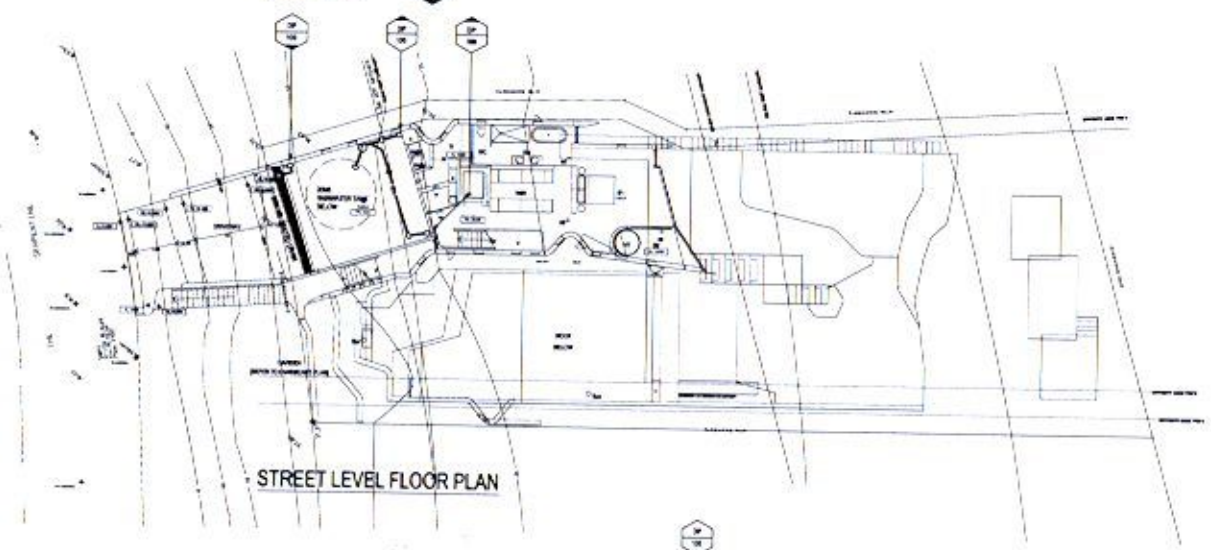
GARY EDWARDS and ASSOCIATES Pty Ltd
CONSULTING SURVEYORS
ABN 29 003 445 867

Tel. (02) 9630 7966
Fax (02) 9683 4666
3 Kiama Street
NORTHMEAD 2152
P.O.Box 2672
NORTH PARRAMATTA 1750
E-mail: Surveyor@SpatialData.com.au

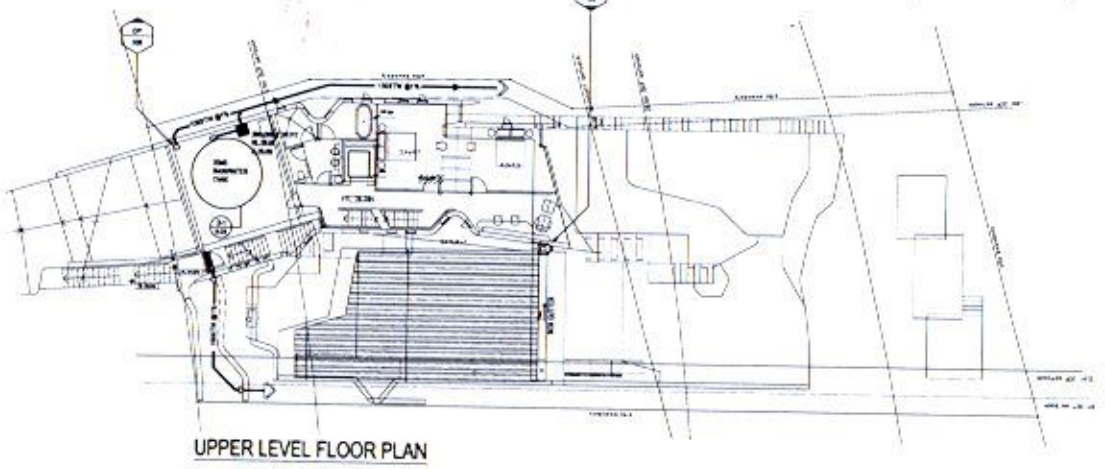
DWG REF. 2699	SCALE 1:100	CONTOUR AND BOUNDARY SURVEY	
DATUM AHD	DATE 10-3-2006	32 THE SERPENTINE	
BM PM 6898	DRAWN/CHECKED RM/GE	BILGOLA	
RL 47.412	SHEET 1 OF 1		



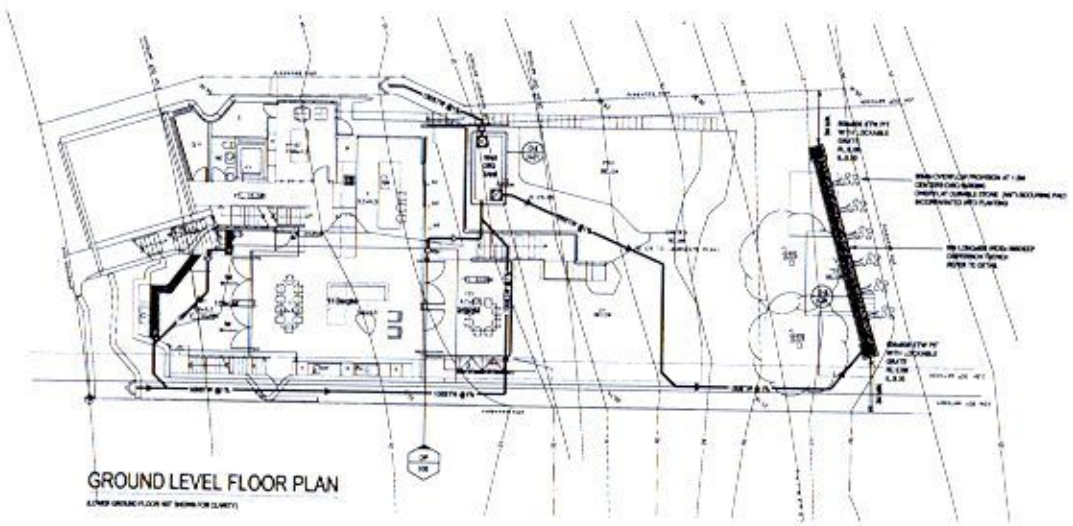
ROOF PLAN



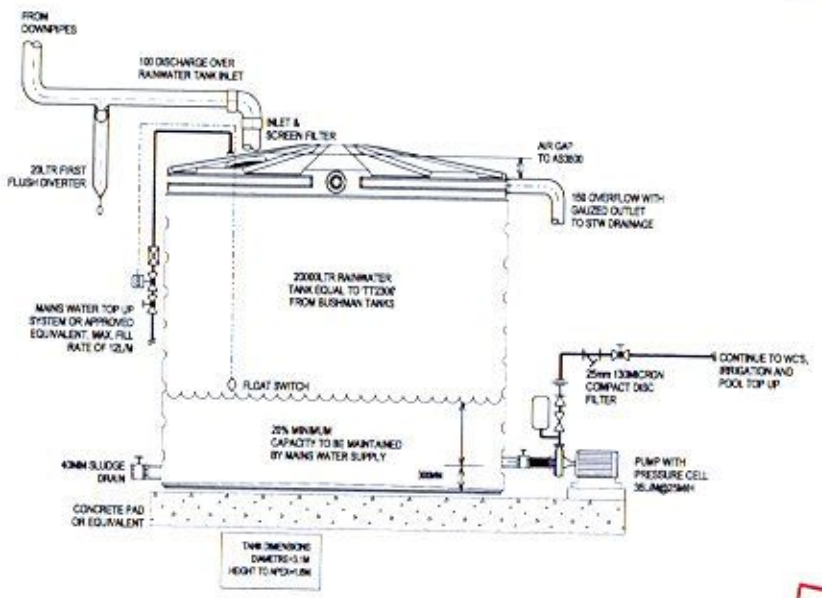
STREET LEVEL FLOOR PLAN



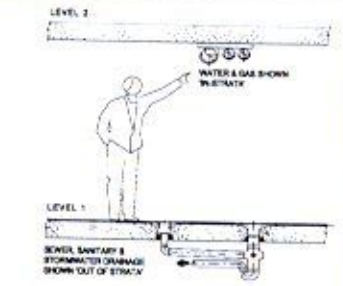
UPPER LEVEL FLOOR PLAN



GROUND LEVEL FLOOR PLAN



RAINWATER HARVESTING TANK
DETAIL 1



STRATA ZONES

NOTES:

1) ALL WORK SHALL COMPLY WITH AS3500 AND ALL OTHER RELEVANT AUSTRALIAN STANDARDS AND CODES OF PRACTICE

2) DO NOT SCALE FROM DRAWINGS, USE FIGURED DIMENSIONS FROM LATEST REVISION OF ARCHITECTURAL DRAWINGS

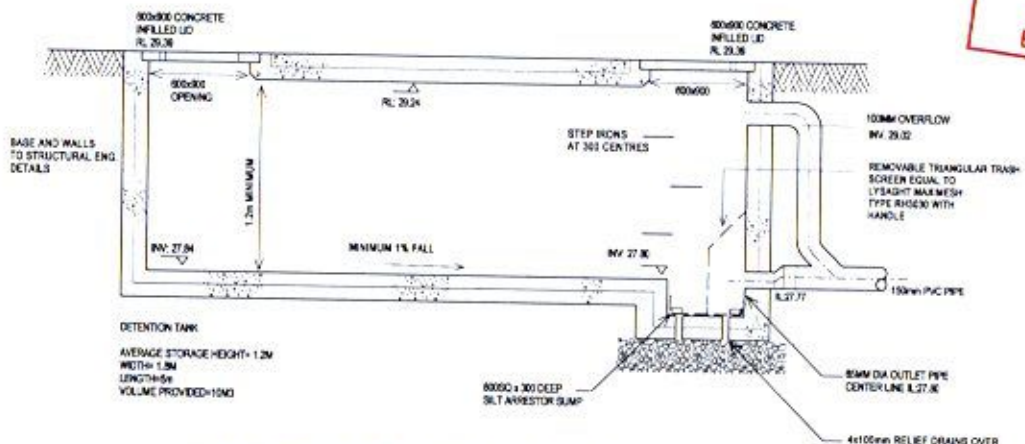
3) CONFIRM ALL SITE LEVELS AND EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORKS

4) ALL DRAINPIPES LOCATED IN AREAS DEEMED TO BE NOISE SENSITIVE BY THE CONSTRUCTION MANAGER SHALL BE ACOUSTIC INSULATED BY THE CONSTRUCTION MANAGER

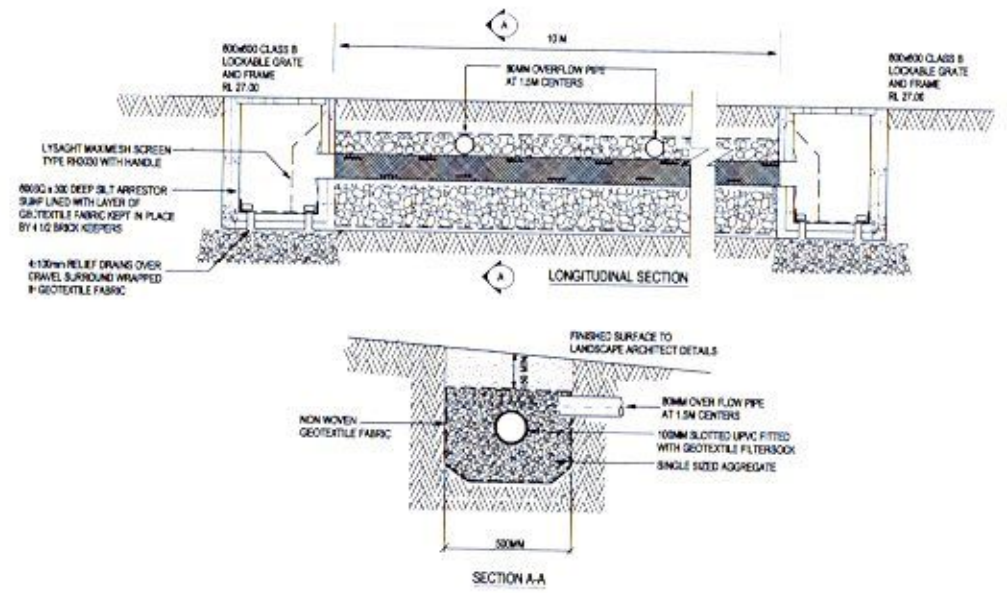
5) SUB-SOIL DRAINAGE SHALL BE CONSISTENT WITH THE STRUCTURAL ENGINEERS AND LAID TO SITE CONDITIONS UNDER SUPERVISION OF THE GEOTECH ENGINEER

6) LOWER GROUND FLOOR NOT SHOWN FOR CLARITY

This information relates to Construction/Complying Development Certificate
---5001192
Issued by Paul Gearin (02) 4655 5811
Building Professionals Board (BPB0132)



STORMWATER DETENTION TANK DETAIL 2



DISPERSION TRENCH DRAIN
DETAIL 3

REV.	ISSUE	DRN	ENG.	DATE
A	DEVELOPMENT APPLICATION	LD	MG	8.12.06

REFERENCED DRAWINGS:

DISCIPLINE:	ARCHITECTURAL
DWG NO:	DA06, 04, 05, 06, 07,
REVISION:	D
DATED:	05.12.06

APPROVAL:

'DEVELOPMENT APPLICATION'
NOT FOR CONSTRUCTION

CLIENT:

CABE DEVELOPMENTS

ARCHITECTS:

TURNER + ASSOCIATES

Level 1, 346 Crown Street
SURRY HILLS NSW 2010
T (02) 9360 2660 F (02) 9360 2411

HYDRAULIC CONSULTANT:

greenarrow hydraulics

GREENARROW HYDRAULICS Pty Ltd
Level 1, 420 Forest Rd
PO Box 442, Bexley NSW 2207
T (02)95674466 F (02)95674462
E-mail: admin@greenarrow.net.au

PROJECT:

RESIDENTIAL DEVELOPMENT
32 THE SERPENTINE
BILGOLA NSW

SHEET TITLE:

STORMWATER DRAINAGE

SCALE:	PROJECT No:	DRAWN:	CHECKED:
1:200	206-474	LD	MG
DRAWING NO:	REV:	DATE:	SHEET:
H-01	A	DEC.06	1/1

© Copyright GreenArrow Hydraulics Pty Ltd 2004-2006

BILGOLA HOUSE

32 THE SERPENTINE, BILGOLA, NEW SOUTH WALES

ROBERT BIRD GROUP

STRUCTURAL ENGINEERING DRAWINGS

GENERAL NOTES

1. THESE ENGINEERING DRAWINGS ARE TO BE READ IN CONJUNCTION WITH PROJECT SPECIFICATIONS AND OTHER CONSULTANTS DRAWINGS ON THE PROJECT.
2. THESE ENGINEERING DRAWINGS HAVE BEEN PREPARED FROM INFORMATION AVAILABLE AT THE TIME OF ISSUE. AS THIS INFORMATION MAY BE THE SUBJECT OF CHANGE PRIOR TO OR DURING CONSTRUCTION THE CONTRACTOR IS TO ADVISE THE ENGINEER WHERE DISCREPANCIES OCCUR.
3. THESE DRAWINGS SHALL NOT BE USED FOR FINAL SETOUT OF THE PROJECT UNLESS SPECIFICALLY STATED.
4. WHERE STRUCTURAL CERTIFICATION IS REQUIRED, INSPECTIONS ARE TO BE PERFORMED BY A DULY APPOINTED INSPECTOR FROM 'ROBERT BIRD GROUP'. THESE INSPECTIONS ARE TO BE PERFORMED IN ACCORDANCE WITH THE INSPECTION & TEST PLANS PREPARED BY 'ROBERT BIRD GROUP'. THE INSPECTOR IS TO BE GIVEN A MINIMUM OF 48 HOURS NOTICE THAT AN INSPECTION IS REQUIRED, OR PROVIDED WITH A CONSTRUCTION PROGRAM FOR THE WORKS.
5. PRIOR TO THE COMMENCEMENT OF WORKS THE CONTRACTOR IS TO IDENTIFY ALL EXISTING SERVICES. ANY DAMAGE TO EXISTING SERVICES IS TO BE RECTIFIED AT THE CONTRACTORS EXPENSE. SERVICES SHOWN ON 'ROBERT BIRD GROUP' DRAWINGS ARE INDICATIVE ONLY.
6. THE CONTRACTOR SHALL CHECK OR OBTAIN ALL DIMENSIONS RELEVANT TO SETTING OUT OF SITE WORKS, AND THE PROVISION OF ANY TEMPORARY BRACING, INCLUDING DESIGN, IN ACCORDANCE WITH THE SPECIFICATION.
7. DURING CONSTRUCTION THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STABILITY OF THE WORKS AND ENSURE NO PART IS OVERSTRESSED. THE DESIGN AND CERTIFICATION OF ALL FORMWORK AND BACKPROPPING IS TO BE THE RESPONSIBILITY OF THE CONTRACTOR. (REFER TO NOTES 8 & 9 FOR STRIPPING PROCEDURES FOR IN-SITU CONCRETE).
8. FORMWORK STRIPPING
   UNLESS SPECIFIED OTHERWISE IN THE PROJECT DOCUMENTATION, MINIMUM STRIPPING TIMES FOR IN-SITU CONCRETE FORMWORK SHALL COMPLY WITH SECTION 5.4.3 (TABLE 5.4.1) OF AS3610-'FORMWORK FOR CONCRETE'.
9. MULTISTOREY FORMWORK:
   UNLESS SPECIFIED OTHERWISE IN THE PROJECT DOCUMENTATION AND FORMWORK DOCUMENTATION APPROVED BY OUR OFFICE, THE MINIMUM NUMBER OF LEVELS OF SUPPORT TO BE IN PLACE DURING THE TIME OF EACH POUR ON A FLOOR SHALL BE IN ACCORDANCE WITH SECTION 5.4.4 (TABLE 5.4.3) OF AS3610-'FORMWORK FOR CONCRETE'.
10. WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT AUSTRALIAN STANDARDS AND BCA STATUTORY REQUIREMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT SUFFICIENT TOLERANCES ARE PROVIDED AND INTEGRATED THROUGHOUT ALL ELEMENTS OF THE WORKS.
12. ALL NON-LOAD BEARING ELEMENTS SHALL BE KEPT CLEAR OF THE STRUCTURE SOFFIT BY AN ALLOWANCE DETERMINED FROM SPAN/250 OR CANTILEVER/125 BUT NOT LESS THAN 20mm, UNLESS NOTED OTHERWISE ON THE DRAWINGS.
13. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
14. THE STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE ROBUSTNESS REQUIREMENTS OF AS1170
15. SUPERIMPOSED DEAD LOADS AND LIVE LOADS HAVE BEEN DETERMINED IN ACCORDANCE WITH AS1170 AND ARE SHOWN ON THE GENERAL ARRANGEMENT DRAWINGS.
16. WIND AND EARTHQUAKE LOADS HAVE BEEN DETERMINED IN ACCORDANCE WITH AS1170 BASED ON THE FOLLOWING DESIGN CRITERIA :-

BCA STRUCTURAL IMPORTANCE LEVEL	2		
WIND LOADS:		EARTH QUAKE LOADS:	
ANNUAL PROBABILITY OF EXCEEDANCE	1/500	ANNUAL PROBABILITY OF EXCEEDANCE	1/150
REGION	A2	PROBABILITY FACTOR Kp	0.45
TERRAIN CATEGORY	2	ACCELERATION COEFFICIENT	0.036
REGIONAL WIND SPEED V_R (m/s)	45	SITE FACTOR	1
SHIELDING M_s	1.0	RESPONSE FACTOR	N/A
TOPOGRAPHIC M_t	1.0	EARTHQUAKE DESIGN CATEGORY	A

17. THE GEOTECHNICAL ENGINEERING INVESTIGATION HAS BEEN PERFORMED BY JEFFERY AND KATAUSKAS, REPORT NO : 20908SL, DATE : 19.10.06 ⚠

LEGEND/ABBREVIATIONS

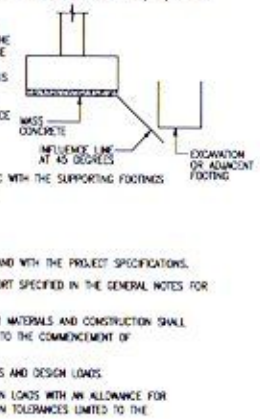
ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
HORIZ	HORIZONTAL	N/S	NEAR SIDE
VERT	VERTICAL	F/S	FAR SIDE
CONT	CONTINUALLY PLACED	B/S	BOTH SIDES
CRS	CENTRES	U/S	UNDER SIDE
B	BOTTOM FACE	L	LENGTH/LONG
T	TOP FACE	W	WIDTH/WIDE
T&B	TOP & BOTTOM	H	HEIGHT/HIGH
NF	NEAR FACE	D	DEPTH/DEEP
FF	FAR FACE	NOM	NOMINAL
EF	EACH FACE	REQ'D	REQUIRED
EW	EACH WAY	REINF	REINFORCEMENT
EQ	EQUAL	OPP	OPPOSITE
NSOP	NOT SHOWN ON PLAN	SIM	SIMILAR
NSOE	NOT SHOWN ON ELEVATION	GA	GENERAL ARRANGEMENT
UNO	UNLESS NOTED OTHERWISE	PT	POST TENSION
TYP	TYPICAL	DWG	DRAWINGS
CL	CENTRE LINE	NTS	NOT TO SCALE
PL	PLATE		

EARTHWORKS NOTES

1. REFER TO THE GEOTECHNICAL ENGINEERING REPORT SPECIFIED IN THE GENERAL NOTES.
2. STRIP SITE OF ALL TOPSOIL, VEGETATION AND DELETERIOUS MATTER TO A MINIMUM DEPTH OF 150mm.
3. PROOF ROLL SUBGRADE TO REVEAL SOFT SPOTS. SOFT SPOTS TO BE REMOVED AND BACKFILLED. ALL NATURAL SUBGRADE IS TO BE COMPACTED TO 98% STANDARD COMPACTION IN ACCORDANCE WITH AS1289 PRIOR TO PLACEMENT OF FILL MATERIAL.
4. MATERIAL WON FROM THE SITE TO BE INSPECTED BY THE GEOTECHNICAL ENGINEER FOR APPROVAL PRIOR TO USE AS FILL. ANY IMPORTED FILL TO HAVE A MINIMUM CBR VALUE OF 15%. ALL FILL TO BE COMPACTED TO 98% STANDARD COMPACTION IN 200mm MAXIMUM THICK LAYERS IN ACCORDANCE WITH AS1289.
5. TEST CERTIFICATES ON THE FILL MATERIAL SHALL BE SUPPLIED TO THE SUPERINTENDENT FOR APPROVAL PRIOR TO THE USE OF THE FILL MATERIAL.
6. CONTAMINATION OF THIS SITE WAS INVESTIGATED AS PART OF THE GEOTECHNICAL INVESTIGATION. REFER TO THE GEOTECHNICAL REPORT SPECIFIED IN THE GENERAL NOTES.
   or
   POSSIBLE CONTAMINATION OF THIS SITE HAS NOT BEEN INVESTIGATED. SUSPECT SOILS EXPOSED DURING EXCAVATION AND GROUND WORKS SHALL BE REPORTED TO THE SUPERINTENDENT.

FOUNDATION NOTES

1. REFER TO THE GEOTECHNICAL ENGINEERING REPORT SPECIFIED IN THE GENERAL NOTES FOR SITE SPECIFIC GEOTECHNICAL INFORMATION.
2. FOOTINGS TO BE FOUNDED ON MATERIAL HAVING AN ALLOWABLE BEARING CAPACITY OF [600] kPa. WHERE DIFFICULTY IN REACHING THE REQUIRED CAPACITY IS EXPERIENCED, 'ROBERT BIRD GROUP' IS TO BE CONTACTED TO REASSESS THE FOOTING DESIGN. ⚠
3. THE CONTRACTOR IS TO ENGAGE AND PAY A GEOTECHNICAL ENGINEER TO VERIFY THE BEARING CAPACITY OF THE FOUNDATIONS PRIOR TO PLACEMENT OF THE BLINDING LAYER.
4. ALL LOOSE MATERIAL AND WATER TO BE CLEANED OUT OF THE FOUNDATION. FORM WORK TO BE USED WHERE THE SIDES OF THE FOUNDATION ARE NOT STABLE.
5. A 50mm MINIMUM BLINDING LAYER SHOULD BE APPLIED TO THE BASE OF ALL FOUNDATIONS IMMEDIATELY AFTER VERIFICATION OF THE BEARING CAPACITY BY THE GEOTECHNICAL ENGINEER. WHERE THE FOLLOWING MATERIAL IS DEEPER THAN REQUIRED FOR THE FOOTING THE EXCAVATION IS TO BE BACKFILLED WITH A WEAK MIX CONCRETE (N10) TO THE UNDERSIDE OF THE FOOTING.
6. WHERE AN EXCAVATION IS REQUIRED OR EXISTS BELOW THE BASE OF A FOOTING THE SIDE OF THE EXCAVATION SHALL BE LOCATED AWAY FROM EDGE OF FOOTING BY THE SAME DISTANCE THAT THE EXCAVATION IS BELOW FOOTING BASE. WHERE THIS CANNOT BE ACHIEVED, 'ROBERT BIRD GROUP' SHALL BE CONTACTED FOR FURTHER DIRECTION. MASS CONCRETE IS TO EXTEND TO THE INFLUENCE LINE AS REQUIRED.



7. ALL WALLS AND COLUMNS SHALL BE CONCENTRIC WITH THE SUPPORTING FOOTINGS UNLESS NOTED OTHERWISE ON THE DRAWINGS.

PILING NOTES – DRIVEN PILES

1. PILES SHALL BE IN ACCORDANCE WITH AS2159 AND WITH THE PROJECT SPECIFICATIONS.
2. REFER TO THE GEOTECHNICAL ENGINEERING REPORT SPECIFIED IN THE GENERAL NOTES FOR SITE SPECIFIC GEOTECHNICAL INFORMATION.
3. DETAILS OF PILE DESIGN AND SPECIFICATION FOR MATERIALS AND CONSTRUCTION SHALL BE SUBMITTED TO 'ROBERT BIRD GROUP' PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
4. REFER TO THE FOOTING DRAWING FOR PILE SIZES AND DESIGN LOADS.
5. PILES SHALL BE DESIGNED TO CARRY THE DESIGN LOADS WITH AN ALLOWANCE FOR ECCENTRICITIES WHICH ARISE FROM CONSTRUCTION TOLERANCES LIMITED TO THE FOLLOWING:-
   TOLERANCES..... IN PLAN..... 50mm IN ANY DIRECTION
   TOLERANCES..... VERTICAL..... 1:250
   IF THESE TOLERANCES ARE EXCEEDED 'ROBERT BIRD GROUP' ARE TO BE CONTACTED IMMEDIATELY.
6. NOTIFY 'ROBERT BIRD GROUP' IMMEDIATELY OF ANY OBSTRUCTIONS ENCOUNTERED DURING PILING. FAILURE OF THE PILE TO REACH THE REQUIRED DEPTH OR ANY OTHER IRREGULARITIES.
7. STATIC LOAD TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS2159 ON PILE LOCATIONS AS AGREED WITH 'ROBERT BIRD GROUP' AND AS NOTED ON THE DRAWINGS.
8. THE HEAD OF EACH PILE SHALL BE TRIMMED TO THE REQUIRED CUT-OFF LEVEL.
9. PILE REINFORCEMENT SHALL REMAIN INTACT AFTER COMPLETION OF PILING, EXCAVATION AND TRIMMING OF PILES TO THE REQUIRED LEVEL. EACH VERTICAL REINFORCING BAR SHALL PROJECT A MINIMUM OF 40 BAR DIAMETERS INTO THE PILE CAP.
10. THE SEQUENCE OF WORK SHALL AVOID DAMAGE TO EXISTING ADJACENT STRUCTURES.
11. WHERE PILE DRIVING WORKS ARE TO BE CONDUCTED IN THE VICINITY OF EXISTING STRUCTURES, GEOTECHNICAL ADVICE MUST BE SOHT TO ENSURE THE PROPOSED WORKS DOES NOT CAUSE DAMAGE.
12. APPROPRIATE RECORDS SHALL BE TAKEN FOR EACH PILE AND SUBMITTED TO 'ROBERT BIRD GROUP'.

CONCRETE NOTES

GENERAL
1. CONCRETE WORK SHALL BE IN ACCORDANCE WITH AS3600 AND WITH THE PROJECT SPECIFICATIONS.
2. CONSTRUCTION JOINTS SHALL BE PROPERLY FORMED AND USED ONLY WHERE SHOWN ON 'ROBERT BIRD GROUP' DRAWINGS OR SPECIFICALLY APPROVED BY 'ROBERT BIRD GROUP'.
3. ALL THICKNESSES SHOWN ARE MINIMUM STRUCTURAL REQUIREMENTS, NO REDUCTION IN THICKNESS DUE TO FALLS OR TOPPING IS PERMITTED. REFER ARCHITECT DRAWINGS FOR ALL SLAB FALLS AND CONFIRMATION OF SLAB STEPS.
4. UNLESS A GROOVE LINE ALLOWANCE HAS BEEN NOTED ON THE DRAWINGS, NO GROOVE LINES ARE PERMITTED, EXCEPT AT SLAB LINES. ALL GROOVE LINES ARE TO BE SUBMITTED TO 'ROBERT BIRD GROUP' FOR APPROVAL.
5. THE FACE OF ALL CONCRETE AGAINST WHICH NEW CONCRETE IS TO BE CAST IS TO BE THOROUGHLY MECHANICALLY SCABBLED, FULLY EXPOSING THE AGGREGATE MATRIX.
6. NO PENETRATIONS GREATER THAN 150mm DIAMETER, OR EMBEDMENT OF PIPES GREATER THAN 40mm DIAMETER OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE SLABS FOR ALL OTHER CONCRETE MEMBERS NO PENETRATIONS, CHASES OR EMBEDMENTS SHALL BE MADE WITHOUT PRIOR APPROVAL BY 'ROBERT BIRD GROUP'.
7. CONDUITS GREATER THAN 25mm DIAMETER CAST INTO CONCRETE MEMBERS SHALL BE SPACED AT A MAXIMUM DISTANCE POSSIBLE AND UNDER NO CIRCUMSTANCES CLOSER THAN X CLEAR SPACING OF TWICE THE LARGER CONDUIT DIAMETER FROM ANY REINFORCEMENT OR ANY OTHER CONDUIT.

CONCRETE
1. THE CHARACTERISTIC COMPRESSIVE STRENGTH (f'c) AT 28 DAYS OF IN PLACE CONCRETE SHALL BE AS NOTED ON THE DRAWINGS.
2. MAXIMUM AGGREGATE SIZE....20mm
3. SLUMP.....80mm
4. ALL CONCRETE SHALL BE VIBRATED.
5. ALL CONCRETE SHALL BE CURED IN ACCORDANCE WITH THE SPECIFICATION
6. ALL CONCRETE SHALL BE SAMPLED AND TESTED IN ACCORDANCE WITH AS1379 AND THE PROJECT SPECIFICATION.
7. ALL FORM WORK SHALL COMPLY WITH AS3610

REINFORCEMENT
1. REINFORCEMENT IS TO BE MANUFACTURED IN ACCORDANCE WITH AS4671 AND SHALL BE FIXED AS SHOWN ON DRAWINGS.
2. MATERIAL IS INDICATED BY THE FOLLOWING SYMBOLS:-
   - Y DEFORMED BAR GRADE 400
   - N DEFORMED BAR GRADE 500 (NORMAL DUCTILITY)
   - R PLAIN ROUND BAR GRADE 250
   - W PLAIN WIRE GRADE 450
   - SL SQUARE FABRIC GRADE 500
   - RL RECTANGULAR FABRIC GRADE 500
3. THE BAR SIZE IS INDICATED BY A NUMBER AFTER THE SYMBOL, WHICH INDICATES THE BAR DIAMETER IN MILLIMETRES.
4. REINFORCEMENT SPACING NOMINATED ON DRAWINGS IS TO ASSIST SCHEDULER AND STEEL FIXER TO ASSESS TOTAL NUMBER OF BARS REQUIRED. WHERE BARS PLACED IN ACCORDANCE WITH SPACING NOMINATED FOUL WITH OTHER STRUCTURAL REQUIREMENTS, PREFERENCE IS TO BE GIVEN TO RELOCATING BARS BY LOCALLY ADJUSTING SPACING TO ENABLE ASSEMBLY OF REINFORCEMENT TO BE COMPLETED. ENGINEER IS TO BE CONTACTED IN THE EVENT THAT REINFORCEMENT IS NEEDED TO BE CUT ON SITE PRIOR TO CONTINUING.
5. LAP LENGTHS TO REINFORCEMENT BARS TO BE AS NOTED ON THE RELEVANT DRAWINGS.
6. WELDING OF REINFORCEMENT BARS IS NOT PERMITTED UNLESS APPROVED.
7. COVER SHALL BE AS NOTED ON THE RELEVANT DRAWINGS.
8. CONCRETE COVERS NOTED ARE MEASURED FROM THE FORM WORK OR GROUND FACE TO THE OUTERMOST REINFORCEMENT COMPONENT, i.e., IN COLUMNS AND BEAMS TO THE OUTSIDE OF TIES OR LIGATURES.
9. COVER TO BE MAINTAINED DURING POURING BY THE USE OF PLASTIC CHAIRS OR PLASTIC TIPPED METAL CHAIRS.
10. WHERE NO REINFORCEMENT IS SHOWN ON THE DRAWING AT RIGHT ANGLES TO THE MAIN REINFORCEMENT DISTRIBUTION REINFORCEMENT IS TO BE PROVIDED.

SLAB ON GROUND NOTES

1. SLAB ON GROUND TO BE POURED ON A LAYER OF POLYETHYLENE SHEETING 200µm THICK ON TOP OF 50mm OF BEDDING SAND. JOINTS TO BE TAPED.
2. REFER ARCHITECT FOR WATERPROOFING DETAILS.
3. REFER ARCHITECT FOR TERMITE PROTECTION.
4. REFER ARCHITECT FOR STEP AND FALLS IN SLABS.
5. FABRIC TO BE PLACED ON CHAIRS AT 800 x 800 CENTRES AND CHAIRS TO BE PLACED ON STEEL PANS.
6. LAP FABRIC REINFORCEMENT THUS:



7. WHERE BEDDING SAND IS REQUIRED UNDER SLAB, THIS SHALL BE COMPACTED SUFFICIENTLY TO SUPPORT REINFORCEMENT PLUS 100kg/CHAIR WITHOUT VERTICAL DISPLACEMENT EXCEEDING 5mm.

This information relates to Construction/Complying Development Certificate - - - 5001192
Issued by Paul Gearin (02) 4655 5811 Building Professionals Board (BPB0132)

REINFORCED CONCRETE MASONRY NOTES

1. ALL MASONRY SHALL COMPLY WITH AS3700 AND THE PROJECT SPECIFICATION.
2. CONCRETE MASONRY UNITS TO HAVE A MINIMUM CHARACTERISTIC UNCONFINED STRENGTH OF 15MPa IN ACCORDANCE WITH AS2733.
3. MASONRY UNITS TO BE BEDDED IN FRESHLY PREPARED MORTAR UNIFORMLY MIXED IN THE RATIO OF ONE (1) PART CEMENT, ONE (1) PART LIME AND SIX (6) PARTS SAND, CONFORMING TO AS2701 'BRICKIES LOAM' SHALL NOT BE USED.
4. GROUT SHALL HAVE A COMPRESSIVE STRENGTH (f'c) OF 20 MPa AT 28DAYS, A SLUMP OF 125mm IN A 150mm SLUMP CONE, A MAXIMUM AGGREGATE SIZE OF 10mm AND BE IN ACCORDANCE WITH AS3700.
5. DEFORMED BAR REINFORCEMENT SHALL CONFORM TO AS1302.
6. EXTREME CARE MUST BE TAKEN TO CORRECTLY POSITION STARTER BARS IN FOOTINGS IN ACCORDANCE WITH DETAILS.
7. REFER TO THE MASONRY DRAWINGS FOR DETAILS ON VERTICAL CONTROL JOINTS.
8. ALL WALL INTERSECTIONS SHALL BE FULLY BONDED OR TIED UNLESS NOTED OTHERWISE.
9. PROVIDE CLEAN-OUT OPENINGS TO ALL CORES FOR INSPECTION AND TYING OF REINFORCEMENT.
10. FACE SHELLS AND CROSS WEBS TO BE FULLY BEDDED.
11. ALL CORES TO BE CLEANED OUT AFTER EACH DAYS LAYING.
12. VERTICAL WALL REINFORCEMENT SHALL BE TIED TO STARTER BARS AND RESTRAINED AT TOP OF WALL IN ITS REQUIRED LOCATION IN ACCORDANCE WITH THE DETAILS SO AS NOT TO MOVE DURING GROUT FILLING OF THE WALL.
13. WET ALL CORES PRIOR TO POURING GROUT.
14. FULLY GROUT ALL CORES IN REINFORCED WALLS, UNLESS NOTED OTHERWISE.
15. GROUT TO BE THOROUGHLY COMPACTED TO ENSURE COMPLETE FILLING OF ALL CORES.
16. FILL CORES TO A MAXIMUM OF 3m IN HEIGHT FOR ANY ONE POUR. ALL GROUT POURS TO STOP 25mm BELOW TOP OF BLOCKS.
17. WALL SHALL BE PROPPED DURING BACKFILLING OPERATIONS.
18. UNLESS NOTED OR SHOWN OTHERWISE ON THE DRAWINGS THERE ARE TO BE NO CHASES OR RECESSES PERMITTED IN THE MASONRY WALLS WITHOUT THE PRIOR APPROVAL OF 'ROBERT BIRD GROUP'.
19. USE OF 'H' BLOCKS ARE PREFERRED FOR RETAINING WALL CONSTRUCTION.

MASONRY NOTES

1. ALL MASONRY SHALL COMPLY WITH AS3700 AND THE PROJECT SPECIFICATION.
2. CONCRETE MASONRY UNITS TO HAVE A MINIMUM CHARACTERISTIC UNCONFINED STRENGTH OF 15MPa IN ACCORDANCE WITH AS2733.
3. MASONRY TO BE BEDDED IN FRESHLY PREPARED MORTAR.
   (a) CONCRETE BLOCKS :-
   MORTAR MIX TO BE UNIFORMLY MIXED IN A RATIO OF ONE PART CEMENT, ONE PART LIME AND SIX PARTS SAND CONFORMING TO AS2701. 'BRICKIES LOAM' SHALL NOT BE USED.
   (b) CLAY BRICKS :-
   MORTAR MIX TO BE UNIFORMLY MIXED IN THE RATIO OF ONE PART CEMENT, THREE PARTS SAND AND ONE FOURTH PART LIME CONFORMING TO AS2701. 'BRICKIES LOAM' SHALL NOT BE USED.
4. GROUT SHALL HAVE A COMPRESSIVE STRENGTH (f'c) OF 20 MPa AT 28 DAYS, A SLUMP OF 125mm IN A 150mm SLUMP CONE, A MAXIMUM AGGREGATE SIZE OF 10mm AND BE IN ACCORDANCE WITH AS3700.
5. BEDDING OF MASONRY SHALL BE FULL FACE WITH CROSS JOINTS COMPLETELY FILLED. JOINT THICKNESS SHALL NOT EXCEED 12mm.
6. PROVIDE WALL TIES AT 600mm MAXIMUM CENTRES VERTICALLY AND HORIZONTALLY. REFER TO MASONRY DETAILS FOR WALL TIE SETOUT AT OPENINGS.
7. THE CAVITY SHALL NOT EXCEED 100mm AND SHALL NOT BE SMALLER THAN 40mm UNLESS NOTED OTHERWISE. KEEP CAVITY CLEAN AND CLEAR OF OBSTRUCTIONS.
8. RAKING OF JOINTS IS NOT PERMITTED WITHOUT PRIOR APPROVAL FROM 'ROBERT BIRD GROUP'.
9. ALL WALLS TO BE KEPT STABLE AT ALL STAGES OF CONSTRUCTION AND NOT BE OVER STRESSED AT ANY TIME.
10. UNLESS NOTED OR SHOWN OTHERWISE ON DRAWINGS THERE ARE TO BE NO CHASES OR RECESSES PERMITTED IN MASONRY WALLS WITHOUT THE PRIOR APPROVAL OF 'ROBERT BIRD GROUP'.

LAP CHARTS

FOOTING LAP CHART

SIZE	LAP LENGTH BTM U.N.O.	LAP LENGTH TOP U.N.O.
N12	400	500
N16	500	650
N20	650	800
N24	900	1100
N28	1200	1500
N32	1500	1850
N36	1800	2250

SLAB LAP CHART

SIZE	LAP LENGTH U.N.O.
N12	400
N16	500
N20	600
N24	850
N28	1100

WALL LAP CHART

SIZE	LAP LENGTH U.N.O.
N12	500
N16	650
N20	800
N24	1000
N28	1150
N32	1300
N36	1450

COLUMN LAP CHART

SIZE	LAP LENGTH U.N.O.
N12	500
N16	650
N20	800
N24	1000
N28	1150
N32	1300
N36	1450

BEAM LAP CHART

SIZE	LAP LENGTH BTM U.N.O.	LAP LENGTH TOP U.N.O.
N12	400	500
N16	500	650
N20	650	800
N24	900	1100
N28	1200	1500
N32	1500	1850
N36	1800	2250

The information shall be copyright except for the sole purpose of assisting the organisation named in this document in performing tasks associated with the nominated project. This drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of Robert Bird Group.

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No.	Revision Description	By	App.	Date
T1	ISSUE FOR TENDER	TJ	CS	26.09.07
T2	ISSUE FOR REVIEW WITH ADJOINING NEIGHBOUR	DD	CS	26.09.07
T3	ISSUE FOR TENDER	DP	CS	13.10.07

Structural & Civil Engineering Consultant
RobertBirdGroup
SYDNEY OFFICE: Robert Bird Group Pty Ltd, PO Box 808, Australia Square, Sydney NSW 1215, Level 5, 8 Castlereagh St, Sydney NSW
Ph. (02) 8248 0100 Fax. (02) 8248 0101
Perth Office: www.robertbird.com

Client: CABE Developments Pty Ltd

Title: GENERAL NOTES SHEET 1

Project: BILGOLA HOUSE 32 THE SERPENTINE, BILGOLA

FOR TENDER NOT FOR CONSTRUCTION

Date	Design	Checked
AUG 07	C.S	
Scale @ B1	Drawn	Approved
-	T.J	S.G
Job Number	Drawing Number	Revision
06533	SO-01	T3

ADJACENT 2 STOREY RESIDENCE

150 THICK TYPE 'A' SHOTCRETE INFILL WALL

150 THICK TYPE 'B' SHOTCRETE INFILL WALL

TEMPORARY PROP LOCATION

UC WALER NOT REQUIRED FOR SHORING OPTION 2 REFER TO DRAWING S1-03 FOR ELEVATION

TEMPORARY PROP REQUIRED FOR SHORING OPTION 2 REFER TO DRAWING S1-03 FOR ELEVATION

UC WALER

'RW1'

ADJACENT 3 STOREY RESIDENCE

FOOTING & SHORING PLAN

SCALE 1:50

- REFER TO DRAWINGS S1-05 AND S1-06 FOR SECTIONS AND DETAILS
- REFER TO DRAWING S1-10 FOR PILES AND SHORING WALL DETAILS
- REFER TO DRAWING S1-11 FOR CAPPING BEAM DETAILS

ANCHOR KEY

ALL TEMPORARY GROUND ANCHORS AND THEIR BEARING PLATES ARE TO BE DESIGNED BY THE ANCHORING SUBCONTRACTOR, SUBJECT TO ENGINEER'S APPROVAL.

ALL TEMPORARY GROUND ANCHORS WORKING LOADS ARE BASED ON AN ANGLE OF INCLINATION OF 45° BELOW HORIZONTAL

① - TEMPORARY GROUND ANCHOR (SWL = 45t) INSTALLED THROUGH BORED PILE

② - TEMPORARY GROUND ANCHOR (SWL = 75t) INSTALLED THROUGH BORED PILE

③ - TEMPORARY GROUND ANCHOR (SWL = 100t) INSTALLED THROUGH BORED PILE

④ - TEMPORARY GROUND ANCHORS FOR "PA" PILES MAY BE INSTALLED AT A MAXIMUM HORIZONTAL SKEW ANGLE OF 30° FROM DESIGN ALIGNMENT.

REINFORCEMENT RATES:	
ELEMENT	REINF. RATE
WALLS	100 kg/m³

NOTE:

CONCRETE TO SUB-GRADE WALLS AND THEIR FOOTINGS TO INCLUDE CALTITE OR APPROVED EQUIVALENT. DETAILS OF THE PROPOSED PRODUCT TO BE USED TO BE SUBMITTED TO ENGINEER FOR APPROVAL.

GENERAL ARRANGEMENT LEGEND:

- DENOTES INSITU CONCRETE ELEMENT OVER
- DENOTES LOAD BEARING ELEMENT UNDER
- DENOTES LOAD BEARING ELEMENT UNDER AND INSITU CONCRETE ELEMENT OVER
- DENOTES PRECAST ELEMENT OVER
- DENOTES BLOCKWORK AND THICKNESS REFER S3.00 SERIES DRAWINGS FOR SCHEDULE AND TYPICAL DETAILS
- DENOTES PENETRATION
- DENOTES SUMP
- DENOTES SLAB STEP
- DENOTES SLAB THICKNESS
- DENOTES WALL NUMBER & DIRECTION ELEVATION IS VIEWED
- DENOTES SAWN JOINT
- DENOTES TOOLED JOINT
- DENOTES KEYED JOINT
- DENOTES DOWELLED JOINT
- DENOTES CONSTRUCTION JOINT
- DENOTES EXPANSION JOINT

NOTE: REFER ARCHITECTS DRAWINGS FOR ALL STEPS AND FALLS IN SLABS.

CONCRETE NOTES:

-REFER NOTES ON COVER SHEET.
-MIN. CONC. STRENGTH AT 28 DAYS.

LOCATION	f'c
LIFT PIT & WALLS	50 MPa

-CONCRETE COVER

LOCATION	COVER
LIFT PIT & WALLS	35mm

The information shall be copyright except for the sole purpose of assisting the organisation named in this document in performing tasks associated with the nominated project. The drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of Robert Bird Group.

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No.	Revision Description	By	App.	Date
P1	ISSUE FOR COORDINATION	TJ	CS	18.06.07
P2	ISSUE FOR COORDINATION	TJ	CS	20.06.07
T1	ISSUE FOR TENDER	TJ	CS	24.06.07
T2	ISSUE FOR REVIEW WITH ADJOINING NEIGHBOUR	CD	CS	24.08.07
T3	ISSUE FOR INFORMATION	CP	TK	21.09.07
T4	ISSUE FOR INFORMATION	CP	TK	02.10.07
T5	ISSUE FOR TENDER	CP	TK	15.10.07

Structural & Civil Engineering Consultant
RobertBirdGroup

SYDNEY OFFICE:
Robert Bird Group Pty Ltd
PO Box 6746, Australia Square, Sydney NSW 1215
Level 5
9 Castlereagh St, Sydney NSW
Ph. (02) 8246 5300
Fax. (02) 8246 5301
Web Site: www.robertbird.com

Client: CABE Developments Pty Ltd

Title: FOOTING AND SHORING PLAN

Project: BILGOLA HOUSE
32 THE SERPENTINE, BILGOLA

FOR TENDER NOT FOR CONSTRUCTION

Date	Design	Checked
AUG 07	CS	
Scale @ B1	Drawn	Approved
1:50	TJ	S.C
Job Number	Drawing Number	Revision
06533	S1-01	T5

ADJACENT 2 STOREY RESIDENCE

CAPPING BEAM PLAN

SCALE 1:50

- REFER TO DRAWING S1-10 FOR PILES AND SHORING WALL DETAILS
- REFER TO DRAWING S1-11 FOR CAPPING BEAM DETAILS

NOTES:

REFER ARCHITECTURAL DRAWINGS FOR PROFILES

750 DEEP TYPE '5' CAPPING BEAM

750 DEEP TYPE '5' CAPPING BEAM

750 DEEP TYPE '5' CAPPING BEAM

400 DEEP TYPE '7' CAPPING BEAM

500 DEEP TYPE '3' CAPPING BEAM

2N24 DOWELS TO 500 MAX EMBEDMENT INTO PIER 800 INTO CAPPING BEAM HILTI HIT RE-500

400 DEEP TYPE '7' CAPPING BEAM

500 DEEP TYPE '3' CAPPING BEAM

2N20 TOP & BTM

1400 WIDE

500 DEEP TYPE '3' CAPPING BEAM

TEMPORARY CRANE BASE, SIZE AND DEPTH TO BE DETERMINED.

N12-300 CENTRAL

N24 DOWELS 500 EMBEDMENT INTO PIER WITH MECHANICAL COUPLERS TO SUIT

500 DEEP TYPE '2' CAPPING BEAM

N24's

CAPPING BEAM ADJACENT TO No. 30 RETAINING WALL ON BOUNDARY IS TO BE CONSTRUCTED IN SEGMENTS SO AS TO AVOID UNDERMINING THE WALL & FOOTINGS. APPROXIMATE EXTENT SHOWN. BUILDER TO CONFIRM FOOTING SIZE BY USE OF TEST PITS.

750 DEEP TYPE '1' CAPPING BEAM

750 DEEP TYPE '1' CAPPING BEAM

750 DEEP TYPE '1' CAPPING BEAM

1400 WIDE

GENERAL ARRANGEMENT LEGEND:

- DENOTES INSITU CONCRETE ELEMENT OVER
- DENOTES LOAD BEARING ELEMENT UNDER
- DENOTES LOAD BEARING ELEMENT UNDER AND INSITU CONCRETE ELEMENT OVER
- DENOTES PRECAST ELEMENT OVER
- RB1 / RB2 — DENOTES BLOCKWORK AND THICKNESS REFER S1.00 SERIES DRAWINGS FOR SCHEDULE AND TYPICAL DETAILS
- DENOTES PENETRATION
- DENOTES SUMP
- STEP — DENOTES SLAB STEP
- THK — DENOTES SLAB THICKNESS
- W? — DENOTES WALL NUMBER & DIRECTION ELEVATION IS VIEWED
- S.J. — DENOTES SAWN JOINT
- T.J. — DENOTES TOOLED JOINT
- K.J. — DENOTES KEYED JOINT
- D.J. — DENOTES DOWELLED JOINT
- C.J. — DENOTES CONSTRUCTION JOINT
- E.J. — DENOTES EXPANSION JOINT

NOTE: REFER ARCHITECTS DRAWINGS FOR ALL STEPS AND FALLS IN SLABS.

ADJACENT 3 STOREY RESIDENCE

CONCRETE NOTES:
- REFER NOTES ON COVER SHEET.
- MIN. CONC. STRENGTH AT 28 DAYS.

LOCATION	f'c
LOWER BERM SLAB	50 MPa

- CONCRETE COVER

LOCATION	COVER
LOWER BERM SLAB	35mm

The information shall be copyright except for the sole purpose of assisting the organisation named in this document in performing tasks associated with the nominated project. The drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of Robert Bird Group

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

Rev	Revision Description	By	App	Date
T1	ISSUE FOR TENDER	CO	CS	24.08.07
T2	ISSUE FOR REVIEW WITH ADJOINING NEIGHBOUR	CO	CS	06.09.07
T3	ISSUE FOR INFORMATION	CP	TK	21.09.07
T4	ISSUE FOR INFORMATION	CP	TK	02.10.07
T5	ISSUE FOR TENDER	CP	TK	15.10.07

Structural & Civil Engineering Consultant
RobertBirdGroup

Client: CABE Developments Pty Ltd

Project: BILGOLA HOUSE
32 THE SERPENTINE, BILGOLA

Title: CAPPING BEAM PLAN

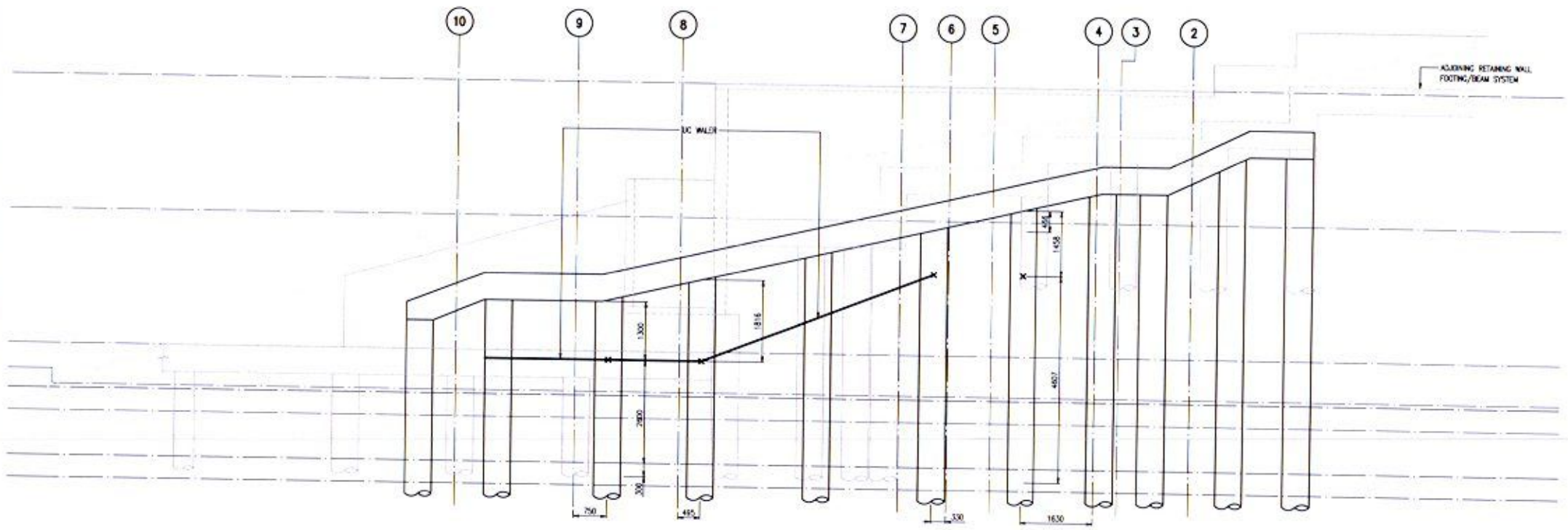
FOR TENDER NOT FOR CONSTRUCTION

Date	Design	Checked
AUG 07	C.S	
Scale @ B1	Drawn	Approved
1:50	T.J	S.G
Job Number	Drawing Number	Revision
06533	S1-02	T5

WESTERN ELEVATIONS
SCALE 1:50

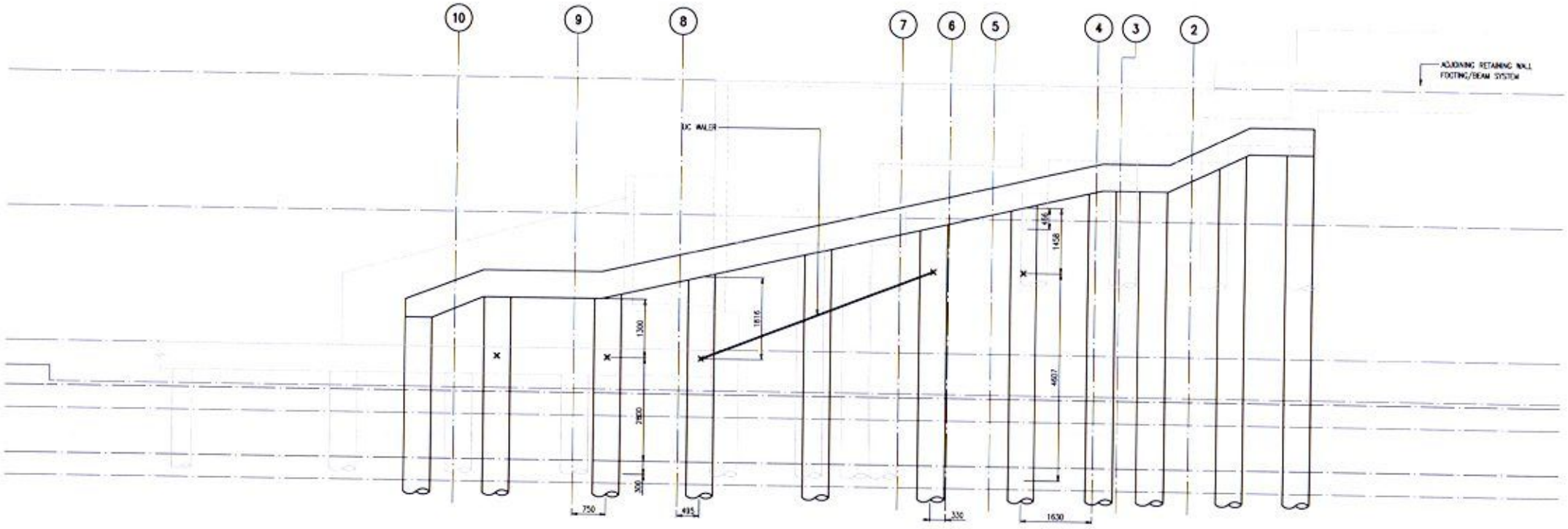
- REFER TO ARCH. DRAWINGS FOR SETOUT.

× - DENOTES TEMPORARY PROP LOCATION. REFER ARCHITECTURAL DRAWING FOR PROP SET-OUT.



WESTERN ELEVATION – SHORING OPTION 1
SCALE 1:50

NOTE: ADJOINING RETAINING WALL FOOTING/BEAM SYSTEM SHOWN INDICATIVE ONLY. EXACT LOCATION TO BE DETERMINED UPON EXCAVATION.



WESTERN ELEVATION – SHORING OPTION 2
SCALE 1:50

NOTE: ADJOINING RETAINING WALL FOOTING/BEAM SYSTEM SHOWN INDICATIVE ONLY. EXACT LOCATION TO BE DETERMINED UPON EXCAVATION.

This information shall be copyright except for the sole purpose of assisting the organisation named in this document in performing tasks associated with the nominated project. This drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of Robert Bird Group.

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS

REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No.	Revision Description	By	App.	Date
P1	ISSUE FOR INFORMATION	CP	TK	21.09.07
P2	ISSUE FOR INFORMATION	CP	TK	02.10.07
T1	ISSUE FOR TENDER	CP	TK	15.10.07

Structural & Civil Engineering Consultant

Sydney Office
Robert Bird Group Pty Ltd
PO Box 896, Australia Square
Sydney NSW 1215
Level 3
9 Castlereagh St, Sydney NSW
Ph. (02) 8246 3200
Fax. (02) 8246 3201
ACN 111 166 366
Web Site: www.robertbird.com

RobertBirdGroup

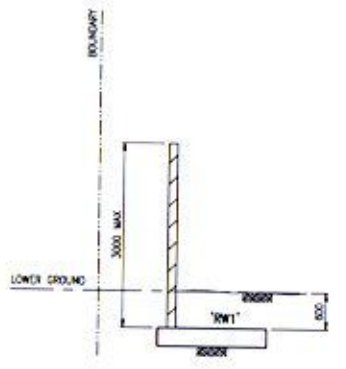
Client: CABE Developments Pty Ltd

Title: WESTERN ELEVATIONS

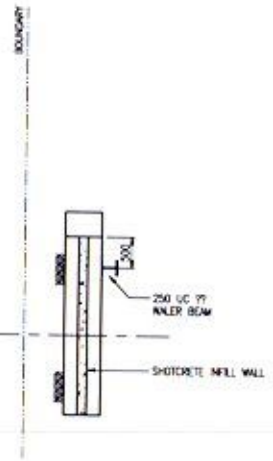
Project: BILGOLA HOUSE
32 THE SERPENTINE, BILGOLA

FOR TENDER NOT FOR CONSTRUCTION

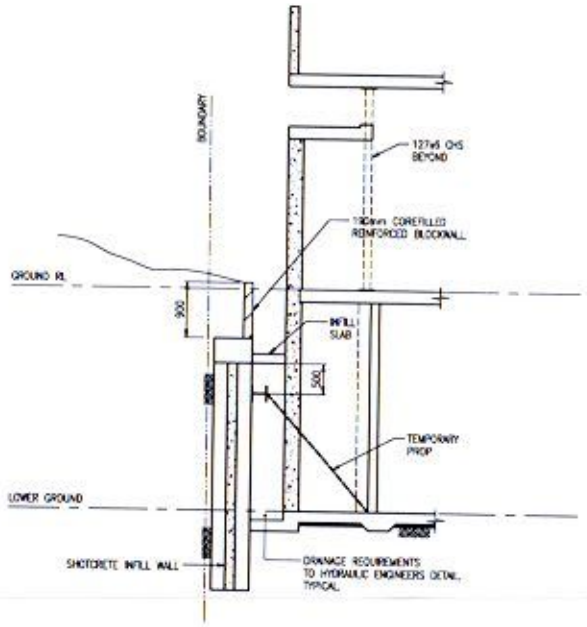
Date	Design	Checked
SEP 07	T.K.	
Scale @ A1	Drawn	Approved
1:50	C.P.	S.G.
Job Number	Drawing Number	Revision
06533	S1-03	T1



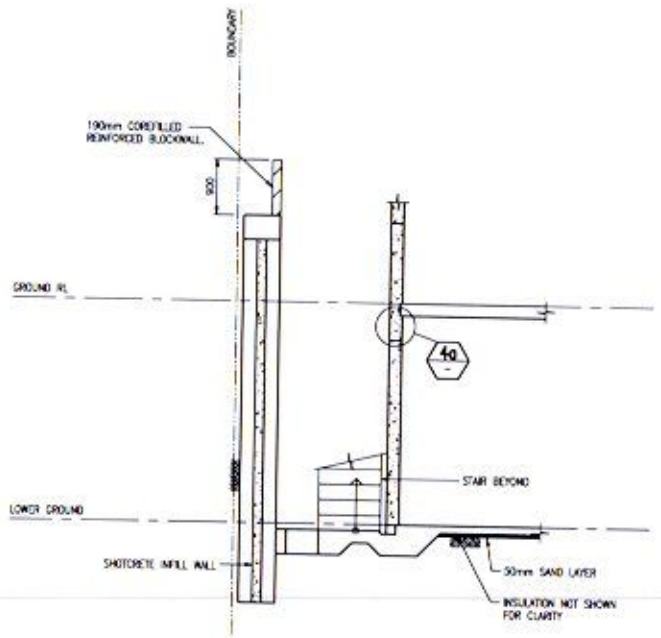
SECTION 1 / S1-01
SCALE 1:50



SECTION 2 / S1-01
SCALE 1:50



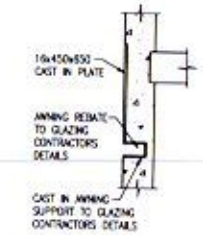
SECTION 3 / S1-01
SCALE 1:50



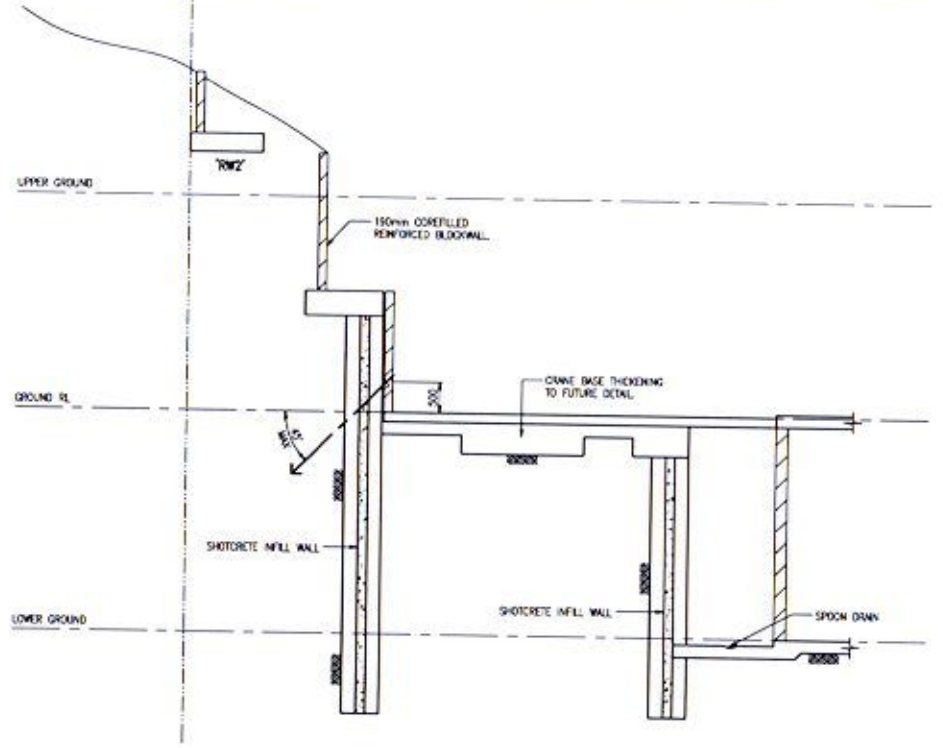
SECTION 4 / S1-01
SCALE 1:50

NOTES

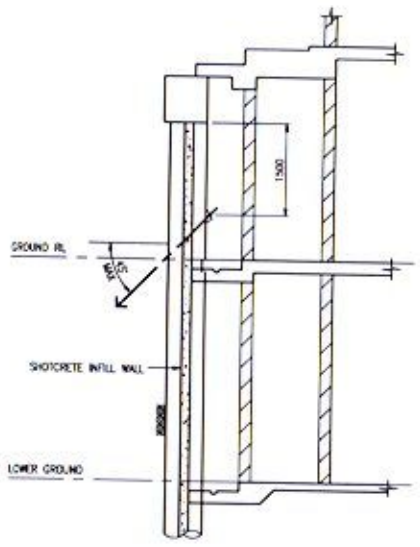
- REFER TO DRAWING S1-10 FOR PILES AND SHORING WALL DETAILS
- REFER TO DRAWING S1-11 FOR CAPPING BEAM DETAILS



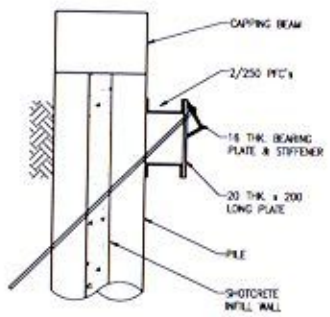
DETAIL 4a
SCALE 1:20



SECTION 5 / S1-01
SCALE 1:50



SECTION 6 / S1-01
SCALE 1:50



TYPICAL WALER BEAM
CONNECTION DETAIL
SCALE 1:20

The information shall be copyright except for the sole purpose of assisting the organisation named in this document in performing tasks associated with the nominated project. This drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of Robert Bird Group.

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No.	Revision Description	By	App.	Date
P1	ISSUE FOR COORDINATION	TJ	CS	20.08.07
T1	ISSUE FOR TENDER	TJ	CS	24.08.07
T2	ISSUE FOR REVIEW WITH ADJOINING NEIGHBOUR	CS	CS	06.09.07
T3	ISSUE FOR TENDER	CS	CS	15.10.07

Structural & Civil Engineering Consultant
RobertBirdGroup
SYDNEY OFFICE
Robert Bird Group Pty Ltd
PO Box 1535, Australia Square, Sydney NSW 1215
Level 5
9 Castlereagh St, Sydney NSW
Ph. (02) 9244 5500
Fax. (02) 9244 5501
ACN 139 181 361
Web Site: www.robertbird.com

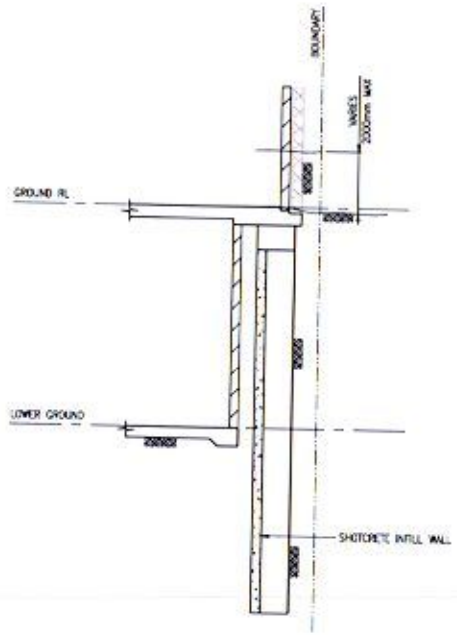
Client: CABE Developments Pty Ltd

Site: FOOTING AND SHORING SECTIONS - SHEET 1

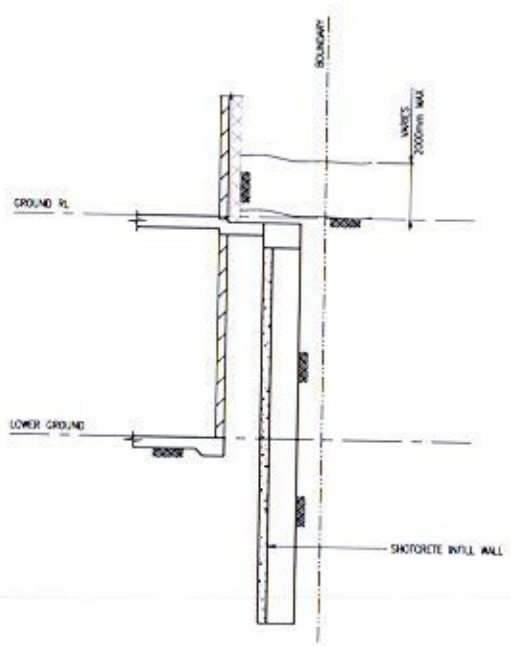
Project: BILGOLA HOUSE
32 THE SERPENTINE, BILGOLA

FOR TENDER NOT FOR CONSTRUCTION

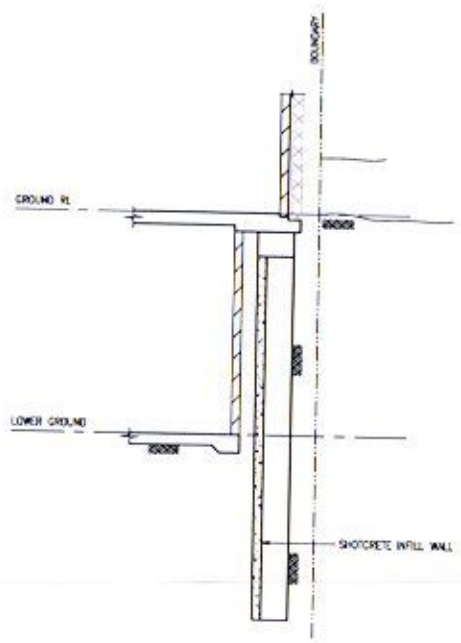
Date	Design	Checked
AUG 07	C.S	
Scale @ B1 1:50	Drawn T.J	Approved S.G
Job Number 06533	Drawing Number S1-05	Revision T3



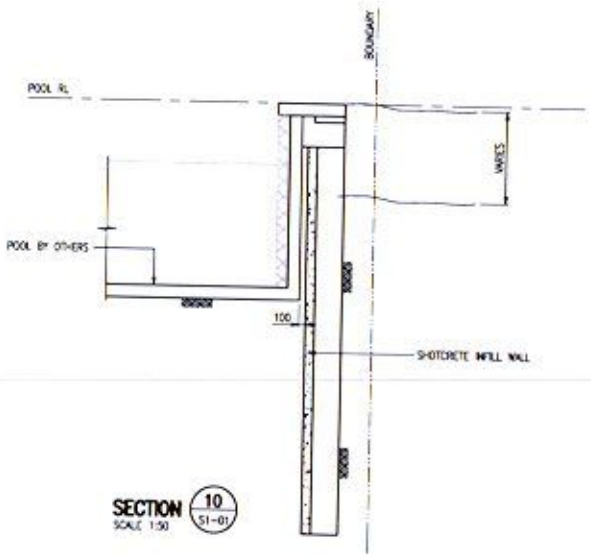
SECTION 7 / S1-01
SCALE 1:50



SECTION 8 / S1-01
SCALE 1:50



SECTION 9 / S1-01
SCALE 1:50



SECTION 10 / S1-01
SCALE 1:50

NOTES

- REFER TO DRAWING S1-10 FOR PILES AND SHORING WALL DETAILS
- REFER TO DRAWING S1-11 FOR CAPPING BEAM DETAILS

This information shall be copyright except for the sole purpose of assisting the organisation named in this document in performing tasks associated with the nominated project. The drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of Robert Bird Group.

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No	Revision Description	By	App	Date
P1	ISSUE FOR COORDINATION	TJ	CS	30.08.07
T1	ISSUE FOR TENDER	TJ	CS	24.09.07
T2	ISSUE FOR REVIEW WITH ADJOINING NEIGHBOUR	CD	CS	08.09.07
T3	ISSUE FOR TENDER	GP	CS	15.10.07

Structural & Civil Engineering Consultant
RobertBirdGroup

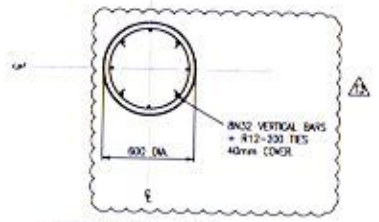
CABE Developments Pty Ltd

FOOTING AND SHORING SECTIONS – SHEET 2

BILGOLA HOUSE
32 THE SERPENTINE, BILGOLA

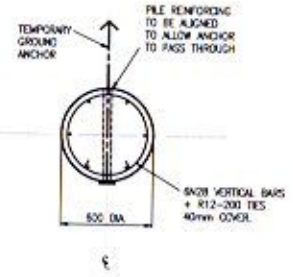
FOR TENDER NOT FOR CONSTRUCTION

Date	Design	Checked
AUG 07	C.S	
Scale @ B1	Drawn	Approved
1:50	T.J	S.G
Job Number	Drawing Number	Revision
06533	S1-06	T3



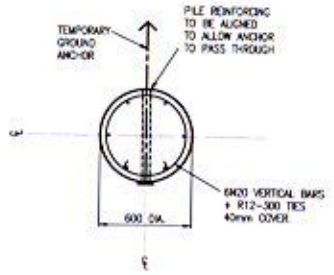
BORED PILE – 'PA'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



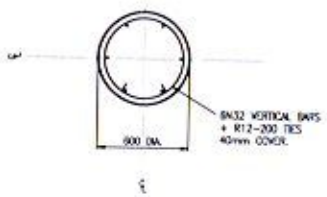
BORED PILE – 'PB'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



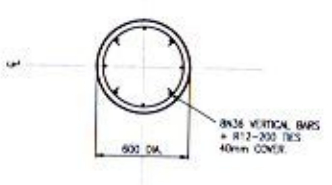
BORED PILE – 'PC'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



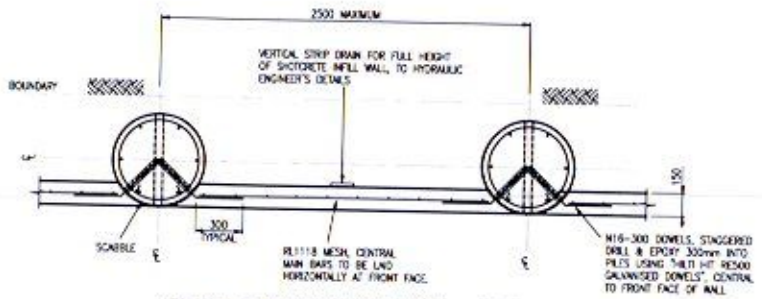
BORED PILE – 'PD'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS

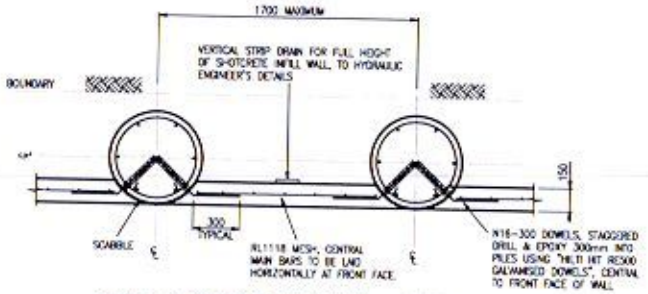


BORED PILE – 'PE'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS

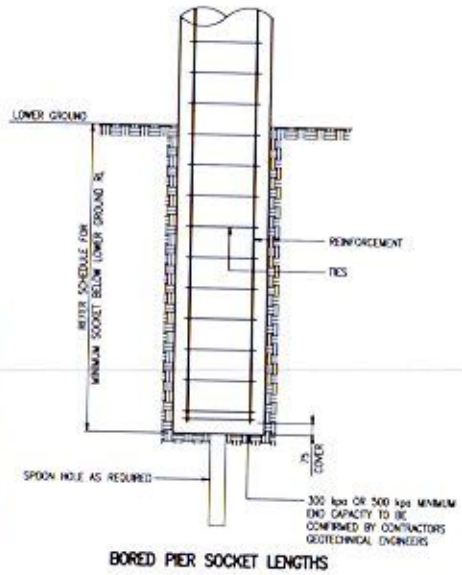


TYPICAL SHOTCRETE INFILL WALL – TYPE A
SCALE 1:20

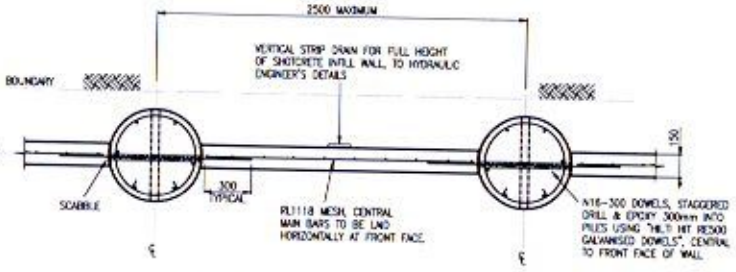


TYPICAL SHOTCRETE INFILL WALL – TYPE B
SCALE 1:20

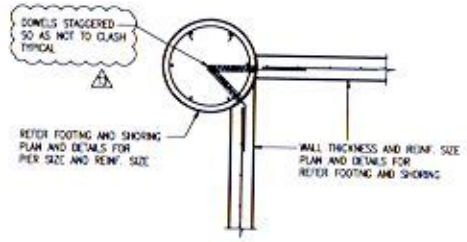
BORED PIER SCHEDULE			
PIER TYPE	PIER DIAMETER	BEARING CAPACITY	
		300 kpa	500 kpa
		SOCKET LENGTH	
P1	600	1300mm	1000mm
P2	600	1300mm	1000mm
P3	600	1300mm	1000mm
P4	600	1300mm	1000mm
P5	600	4000mm	3500mm



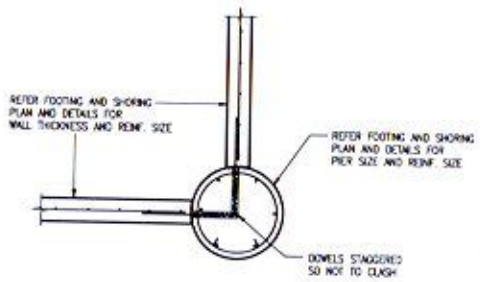
BORED PIER SOCKET LENGTHS



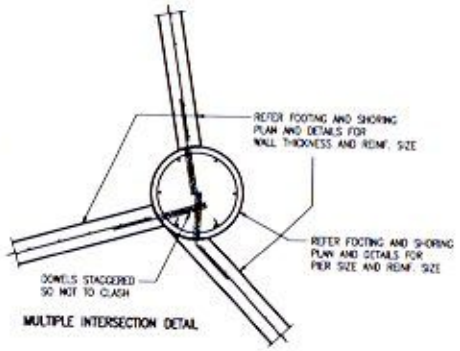
TYPICAL SHOTCRETE INFILL WALL – TYPE C
SCALE 1:20



90° CORNER DETAIL
SHOTCRETE WALL AT FRONT FACE
OF BORED PILE.

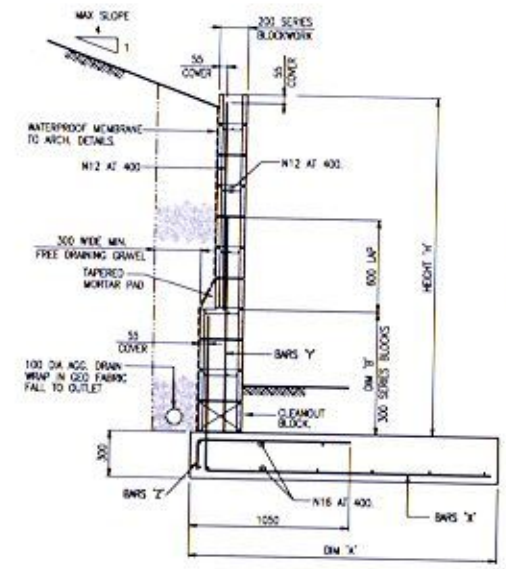


90° CORNER DETAIL
SHOTCRETE WALL AT FRONT FACE
OF BORED PILE.



MULTIPLE INTERSECTION DETAIL

TYPICAL SHOTCRETE INFILL INTERSECTION DETAILS
SCALE 1:20



RETAINING WALLS

WALL MARK	DIM 'H'	DIM 'A'	DIM 'B'	BARS 'X'	BARS 'Y'	BARS 'Z'
RW1	3000	2250	1200	N16-200	N16-200	N16-200
RW12	1000	900	-	N12-400	N12-400	N12-400

DESIGN LOADS:
8.0 kPa EQUIVALENT FLUID PRESSURE
21/kpm BACKFILL DENSITY
MAX 1:4 SLOPE BEHIND WALL

This information shall be copyright except for the sole purpose of executing the organisation named in this document in partnership, being associated with the nominated project. The drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of Robert Bird Group.

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No.	Revision Description	By.	App.	Date
P1	ISSUE FOR COORDINATION	TJ	CS	20.06.07
T1	ISSUE FOR TENDER	TJ	CS	06.09.07
T2	ISSUE FOR REVIEW WITH ADJOINING NEIGHBOUR	CD	CS	06.09.07
T3	ISSUE FOR TENDER	CP	CS	15.10.07

Structural & Civil Engineering Consultant:
RobertBirdGroup

SYDNEY OFFICE
Robert Bird Group Pty Ltd
PO Box 4086, Australia Square,
Sydney NSW 1215
Level 5
9 Castlereagh St, Sydney NSW
Ph. (02) 8248 3300
Fax (02) 8248 3311
Web Site: www.robertbird.com

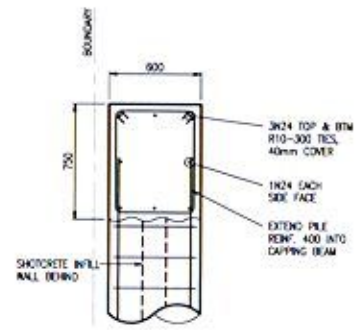
Client: CABE Developments Pty Ltd

Title: FOOTING AND SHORING DETAILS – SHEET 1

Project: BILGOLA HOUSE
32 THE SERPENTINE, BILGOLA

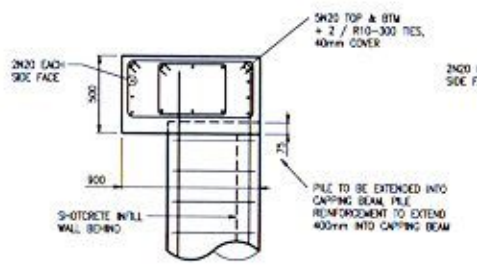
FOR TENDER NOT FOR CONSTRUCTION

Date	Design	Checked
AUG 07	C.S	
Scale @ B1	Drawn	Approved
1:20	T.J	S.G
Job Number	Drawing Number	Revision
06533	S1-10	T3



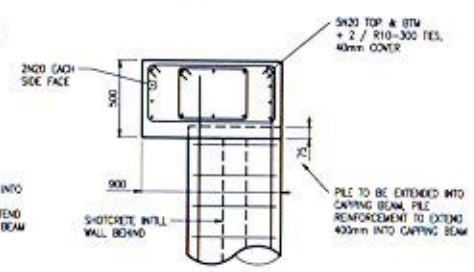
CAPPING BEAM – TYPE '1'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



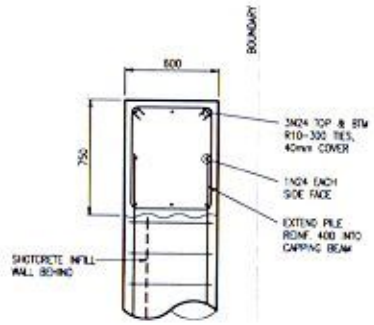
CAPPING BEAM – TYPE '2'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



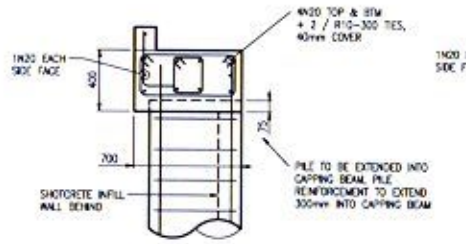
CAPPING BEAM – TYPE '3'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



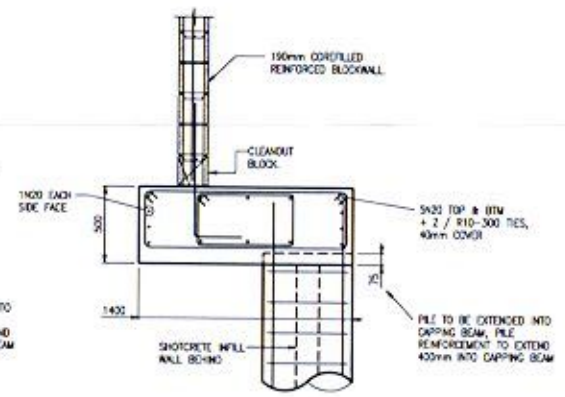
CAPPING BEAM – TYPE '5'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



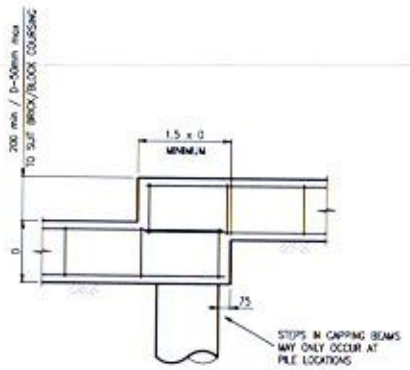
CAPPING BEAM – TYPE '7'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS

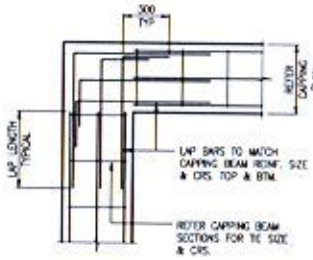


CAPPING BEAM – TYPE '8'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



PILE STEP DETAIL – ELEVATION
SCALE 1:20



CAPPING BEAM CORNER DETAIL
SCALE 1:20

This information shall be copyright except for the sole purpose of assisting the organisation named in the document in performing tasks associated with the nominated project. This drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of Robert Bird Group.

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS

REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No.	Revision Description	By	App	Date
T1	ISSUE FOR TENDER	TJ	CS	26.09.07
T2	ISSUE FOR REVIEW WITH ADJOINING NEIGHBOUR	CD	CS	26.09.07
T3	ISSUE FOR TENDER	CP	CS	15.10.07

Structural & Civil Engineering Consultant

RobertBirdGroup

SYDNEY OFFICE: Robert Bird Group Pty Ltd, PO Box 1696, Australia Square, Sydney NSW 1215, Level 5, 9 Castlereagh St, Sydney NSW, Ph. (02) 8248 5200, Fax. (02) 8248 5201, ACN 118 081 248, Web Site www.robertbird.com

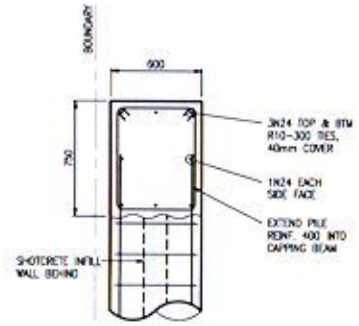
Client: CABE Developments Pty Ltd

Title: FOOTING AND SHORING DETAILS – SHEET 2

Project: BILGOLA HOUSE, 32 THE SERPENTINE, BILGOLA

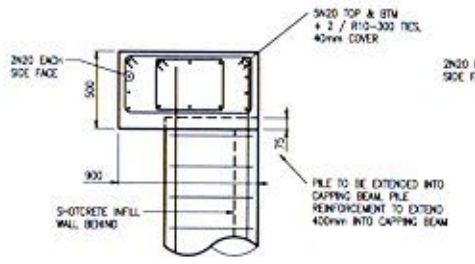
FOR TENDER NOT FOR CONSTRUCTION

Date	Design	Checked
AUG 07	C.S	
Scale @ A1	Drawn	Approved
1:20	T.J	S.G
Job Number	Drawing Number	Revision
06533	S1-11	T3



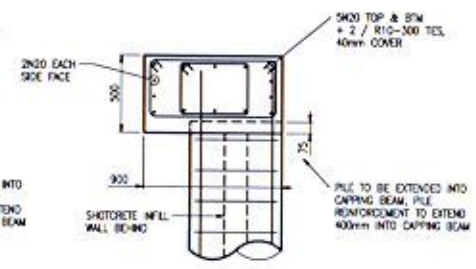
CAPPING BEAM – TYPE '1'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



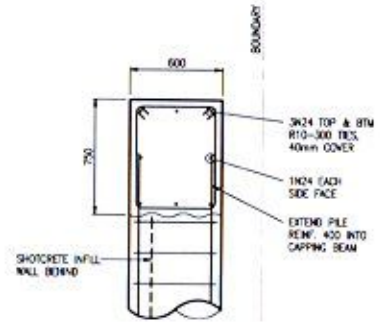
CAPPING BEAM – TYPE '2'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



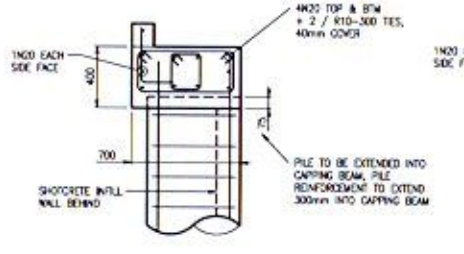
CAPPING BEAM – TYPE '3'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



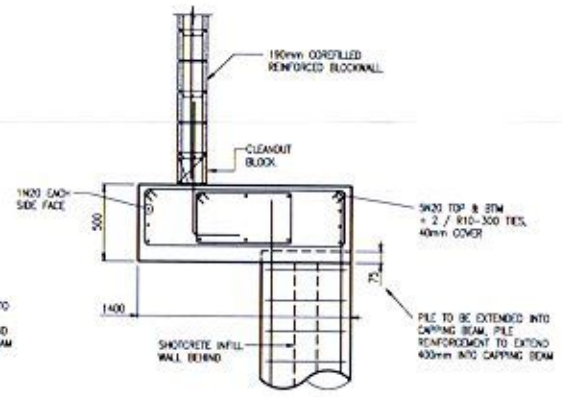
CAPPING BEAM – TYPE '5'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



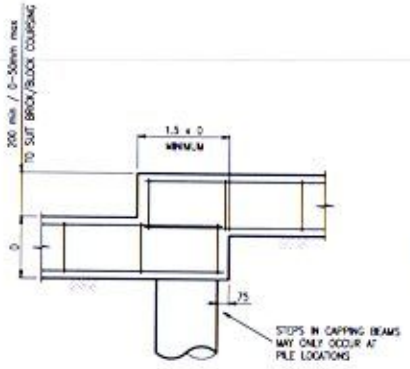
CAPPING BEAM – TYPE '7'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS

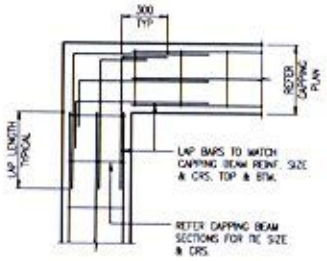


CAPPING BEAM – TYPE '8'
SCALE 1:20

CONCRETE STRENGTH F'c = 32 MPa AT 28 DAYS



PILE STEP DETAIL – ELEVATION
SCALE 1:20



CAPPING BEAM CORNER DETAIL
SCALE 1:20

This information shall be copyright except for the sole purposes of assisting the organisation named in this document in performing tasks associated with the nominated project. This drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of 'Robert Bird Group'

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No.	Revision Description	By	Acc.	Date
T1	ISSUE FOR TENDER	TJ	CS	06.09.07
T2	ISSUE FOR REVIEW WITH ADJOINING NEIGHBOUR	GD	CS	06.09.07
T3	ISSUE FOR TENDER	GP	CS	15.10.07

Structural & Civil Engineering Consultants
RobertBirdGroup

SYDNEY OFFICE:
Robert Bird Group Pty Ltd
PO Box 978, Australia Square,
Sydney NSW 1215
Level 5
9 Castlereagh St, Sydney NSW
Ph. (02) 8248 3200
Fax. (02) 8248 3201
Web Site: www.RobertBird.com

Client: CABE Developments Pty Ltd

Title: FOOTING AND SHORING DETAILS – SHEET 2

Project: BILGOLA HOUSE
32 THE SERPENTINE, BILGOLA

FOR TENDER NOT FOR CONSTRUCTION

Date	Design	Checked
AUG 07	C.S	
Scale @ B1	Drawn	Approved
1:20	T.J	S.G
Job Number	Drawing Number	Revision
06533	S1-11	T3

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

ADJACENT 2 STOREY RESIDENCE

LOWER GROUND LEVEL GENERAL ARRANGEMENT PLAN

SCALE 1:50

- REFER TO DRAWINGS S7-01 FOR SECTIONS AND DETAILS
- REFER TO DRAWING S1-10 FOR PILES AND SHORING WALL DETAILS
- REFER TO DRAWING S1-11 FOR CAPPING BEAM DETAILS

NOTES:

1. SLAB ON GROUND TO BE 120 THICK TYPICAL, U.N.O. ON PLAN.
2. SLAB ON GROUND TO BE REINFORCED WITH 1 LAYER OF SL82 FABRIC LNO 30mm FROM TOP.
3. ALL FOOTINGS ARE TO BEAR ON WEATHERED SANDSTONE WITH ALLOWABLE BEARING CAPACITY OF 600kPA.
4. ALL GROUND BEAMS TO BE 400 DEEP MIN. x 350 WIDE, U.N.O. ON PLAN.
5. FOR SLAB ON GROUND, $f'c$ = 50MPa.

REINFORCEMENT RATES U.N.O.:	
ELEMENT	REINF. RATE
SLABS	-
RC STAIRS	115 kg/m³
RC WALLS:	
- 140 THK	100 kg/m³
- 150 THK	100 kg/m³
- 200 THK	100 kg/m³
MASONRY WALLS:	
- 140 THK	50 kg/m³
- 190 THK	50 kg/m³

EXTERNAL SLAB ON GROUND AND POOL BY POOL CONSULTANT.

RC STAIR

1000 x 1000 THICKENING

100 x 50 x 6 RHS

150 THK CONC. WALL

100 DIA PIPE

250 THK CONC. WALL

200 THK CONC. WALL

1000 x 1000 THICKENING

150 THK CONC. WALL

250 THK CONC. WALL

100 DIA PIPE

500 D x 500 W STRIP FOOTINGS

250 THK CONC. WALL

150 THK MIN. CONC. WALL

100 DIA PIPE

250 THK CONC. WALL

'RW1'

STAIR LANDING

ADJACENT 3 STOREY RESIDENCE

GENERAL ARRANGEMENT LEGEND:

- DENOTES INSITU CONCRETE ELEMENT OVER
- DENOTES LOAD BEARING ELEMENT UNDER
- DENOTES LOAD BEARING ELEMENT UNDER AND INSITU CONCRETE ELEMENT OVER
- DENOTES PRECAST ELEMENT OVER
- DENOTES BLOCKWORK AND THICKNESS REFER S3.00 SERIES DRAWINGS FOR SCHEDULE AND TYPICAL DETAILS
- DENOTES PENETRATION
- DENOTES SUMP
- DENOTES SLAB STEP
- DENOTES SLAB THICKNESS
- DENOTES WALL NUMBER & DIRECTION ELEVATION IS VIEWED
- DENOTES SAWN JOINT
- DENOTES TOOLED JOINT
- DENOTES KEYED JOINT
- DENOTES DOWELLED JOINT
- DENOTES CONSTRUCTION JOINT
- DENOTES EXPANSION JOINT

NOTE: REFER ARCHITECTS DRAWINGS FOR ALL STEPS AND FALLS IN SLABS.

CONCRETE NOTES:
-REFER NOTES ON COVER SHEET.
-MIN. CONC. STRENGTH AT 28 DAYS.

LOCATION	$f'c$
SLAB ON GROUND	50 MPa
STAIRS	50 MPa
RC WALLS	50 MPa
MASONRY WALLS	50 MPa

-CONCRETE COVER

LOCATION	COVER
SLAB ON GROUND	35mm
STAIRS	35mm
RC WALLS	35mm
MASONRY WALLS	35mm

The information shall be copyright except for the sole purpose of assisting the organisation named in this document in performing trade associated with the nominated project. This drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of 'Robert Bird Group'

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No.	Revision Description	By	App.	Date
P1	ISSUE FOR INFORMATION	CP	TK	21.09.07
P2	ISSUE FOR INFORMATION	CP	TK	02.10.07
T1	ISSUE FOR TENDER	CP	TK	15.10.07

Structural & Civil Engineering Consultant
RobertBirdGroup

SYDNEY OFFICE:
Robert Bird Group Pty Ltd
PO Box 1038, Australia Square, Sydney NSW 1215
Level 8
9 Castlereagh St, Sydney NSW
PH. (02) 8246 5100
FAX. (02) 8246 5101

Client: CABE Developments Pty Ltd

Title: LOWER GROUND LEVEL GENERAL ARRANGEMENT PLAN

Project: BILGOLA HOUSE
32 THE SERPENTINE, BILGOLA

FOR TENDER NOT FOR CONSTRUCTION

Date	Design	Checked
SEP 07	T.K.	
Scale @ 'B'	Drawn	Approved
1:50	C.P.	S.G.
Job Number	Drawing Number	Revision
06533	S5-01	T1

ADJACENT 2 STOREY RESIDENCE

GROUND LEVEL GENERAL ARRANGEMENT PLAN

SCALE 1:50

- REFER TO DRAWINGS S8-02 FOR SECTIONS AND DETAILS
- REFER TO DRAWING S1-10 FOR PILES AND SHORING WALL DETAILS
- REFER TO DRAWING S1-11 FOR CAPPING BEAM DETAILS

NOTES:

REFER ARCHITECTURAL DRAWINGS FOR AWNING PROFILES.

REINFORCEMENT RATES U.N.O.:	
ELEMENT	REINF. RATE
SLABS:	
- 120 THK	-
- 150 THK	105 kg/m²
- 200 THK	155 kg/m²
RC STAIRS	115 kg/m²
RC WALLS:	
- 140 THK	100 kg/m²
- 150 THK	100 kg/m²
- 200 THK	100 kg/m²
MASONRY WALLS:	
- 140 THK	50 kg/m²
- 190 THK	50 kg/m²

GROUND FLOOR AWNING SLAB AT GRIDS A5 TO D8

SCALE 1:50

NOTE:
REINFORCEMENT RATE: 100 kg/m²

GROUND FLOOR RAISED INFILL SLAB AT GRIDS H4 TO J5

SCALE 1:50

NOTE:
REINFORCEMENT RATE: 100 kg/m²

GROUND FLOOR AWNING SLAB AT GRIDS L5 TO N7

SCALE 1:50

NOTE:
REINFORCEMENT RATE: 100 kg/m²

GENERAL ARRANGEMENT LEGEND:

- DENOTES INSITU CONCRETE ELEMENT OVER
- DENOTES LOAD BEARING ELEMENT UNDER
- DENOTES LOAD BEARING ELEMENT UNDER AND INSITU CONCRETE ELEMENT OVER
- DENOTES PRECAST ELEMENT OVER
- DENOTES BLOCKWORK AND THICKNESS REFER S3.00 SERIES DRAWINGS FOR SCHEDULE AND TYPICAL DETAILS
- DENOTES PENETRATION
- DENOTES SUMP
- DENOTES SLAB STEP
- DENOTES SLAB THICKNESS
- DENOTES WALL NUMBER & DIRECTION ELEVATION IS VIEWED
- DENOTES SAWN JOINT
- DENOTES TOOLED JOINT
- DENOTES KEYED JOINT
- DENOTES DOWELLED JOINT
- DENOTES CONSTRUCTION JOINT
- DENOTES EXPANSION JOINT

NOTE: REFER ARCHITECTS DRAWINGS FOR ALL STEPS AND FALLS IN SLABS.

CONCRETE NOTES:
-REFER NOTES ON COVER SHEET.
-MIN. CONC. STRENGTH AT 28 DAYS.

LOCATION	f'c
SLABS	50 MPa
STAIRS	50 MPa
RC WALLS	50 MPa
MASONRY WALLS	50 MPa

-CONCRETE COVER

LOCATION	COVER
SLABS	35mm
STAIRS	35mm
RC WALLS	35mm
MASONRY WALLS	35mm

This information shall be copyright except for the sole purpose of assisting the organisation named in this document in performing tasks associated with the nominated project. This drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of Robert Bird Group.

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS.
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No.	Revision Description	By	App.	Date
P1	ISSUE FOR INFORMATION	CP	TK	21.09.07
P2	ISSUE FOR INFORMATION	CP	TK	02.10.07
T1	ISSUE FOR TENDER	CP	TK	15.10.07

Structural & Civil Engineering Consultant
RobertBirdGroup

SYDNEY OFFICE:
Robert Bird Group Pty Ltd
PO Box 1036, Australia Square, Sydney NSW 1215
Level 6
9 Castlereagh St, Sydney NSW
Ph. (02) 8244 8200
Fax. (02) 8244 8201
Web Site: www.robertbird.com

Client: CABE Developments Pty Ltd

Title: GROUND LEVEL GENERAL ARRANGEMENT PLAN

Project: BILGOLA HOUSE
32 THE SERPENTINE, BILGOLA

FOR TENDER NOT FOR CONSTRUCTION

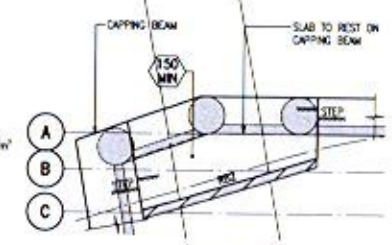
Date	Design	Checked
SEP. 07	T.K.	
Scale @ B1	Draw	Approved
1:50	C.P.	S.G.
Job Number	Drawing Number	Revision
06533	S5-02	T1

ADJACENT 2 STOREY RESIDENCE

INFILL SLAB AT GRIDS A2 TO C3

SCALE 1:50

NOTE:
REINFORCEMENT RATE: 100 kg/m³



REFER DRAWING S5-05 FOR CONTINUATION

SLAB TO PART PLAN FOR INFILL SLAB

150 THK 1000 HIGH

100 DIA PIPES

STEP

200

175

UPPER GROUND LEVEL GENERAL ARRANGEMENT PLAN

SCALE 1:50

- REFER TO DRAWINGS S8-02 FOR SECTIONS AND DETAILS
- REFER TO DRAWING S1-10 FOR PILES AND SHORING WALL DETAILS
- REFER TO DRAWING S1-11 FOR CAPPING BEAM DETAILS

NOTES:

REFER ARCHITECTURAL DRAWINGS FOR PROFILES.

REINFORCEMENT RATES U.N.O.:	
ELEMENT	REINF. RATE
SLABS	
- 120 THK	-
- 150 THK	105 kg/m³
- 175-200 THK	155 kg/m³
RC STAIRS	115 kg/m³
RC WALLS	
- 140 THK	100 kg/m³
- 150 THK	100 kg/m³
- 200 THK	100 kg/m³
MASONRY WALLS	
- 140 THK	50 kg/m³
- 190 THK	50 kg/m³

GENERAL ARRANGEMENT LEGEND:

- DENOTES INSITU CONCRETE ELEMENT OVER
- DENOTES LOAD BEARING ELEMENT UNDER
- DENOTES LOAD BEARING ELEMENT UNDER AND INSITU CONCRETE ELEMENT OVER
- DENOTES PRECAST ELEMENT OVER
- PB1 / PB2 — DENOTES BLOCKWORK AND THICKNESS REFER S3.00 SERIES DRAWINGS FOR SCHEDULE AND TYPICAL DETAILS
- DENOTES PENETRATION
- DENOTES SUMP
- STEP — DENOTES SLAB STEP
- THK — DENOTES SLAB THICKNESS
- W? — DENOTES WALL NUMBER & DIRECTION ELEVATION IS VIEWED
- S.J. — DENOTES SAWN JOINT
- T.J. — DENOTES TOOLED JOINT
- K.J. — DENOTES KEYED JOINT
- D.J. — DENOTES DOWELLED JOINT
- C.J. — DENOTES CONSTRUCTION JOINT
- E.J. — DENOTES EXPANSION JOINT

NOTE: REFER ARCHITECTS DRAWINGS FOR ALL STEPS AND FALLS IN SLABS.

ADJACENT 3 STOREY RESIDENCE

CONCRETE NOTES:
-REFER NOTES ON COVER SHEET.
-MIN. CONC. STRENGTH AT 28 DAYS.

LOCATION	f'c
SLABS	50 MPa
STAIRS	50 MPa
RC WALLS	50 MPa
MASONRY WALLS	50 MPa

-CONCRETE COVER

LOCATION	COVER
SLABS	35mm
STAIRS	35mm
RC WALLS	35mm
MASONRY WALLS	35mm

The information shall be copyright except for the sole purpose of assisting the organisation named in this document in performing tasks associated with the nominated project. This drawing and associated or derived information shall not be used for other purposes or transferred to others without written permission of Robert Bird Group.

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No.	Revision Description	By	App.	Date
P1	ISSUE FOR INFORMATION	CP	TK	21.06.07
P2	ISSUE FOR INFORMATION	CP	TK	22.10.07
T1	ISSUE FOR TENDER	CP	TK	15.10.07

Structural & Civil Engineering Consultant
RobertBirdGroup
SYDNEY OFFICE:
Robert Bird Group Pty Ltd
PO Box 1018, Australia Square, Sydney NSW 1215
Level 5
9 Castlereagh St, Sydney NSW
Ph. (02) 8248 3200
Fax. (02) 8248 3201
Web Site: www.robertbird.com

Client: CABE Developments Pty Ltd

Title: UPPER GROUND LEVEL GENERAL ARRANGEMENT PLAN

Project: BILGOLA HOUSE
32 THE SERPENTINE, BILGOLA

FOR TENDER NOT FOR CONSTRUCTION

Date	Design	Checked
SEP 07	T.K.	
Scale @ B1	Drawn	Approved
1:50	C.P.	S.G.
Job Number	Drawing Number	Revision
06533	S5-03	T1

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

ADJACENT 2 STOREY RESIDENCE

REFER DRAWING S5-05 FOR CONTINUATION

ADJACENT 3 STOREY RESIDENCE

STREET LEVEL GENERAL ARRANGEMENT PLAN

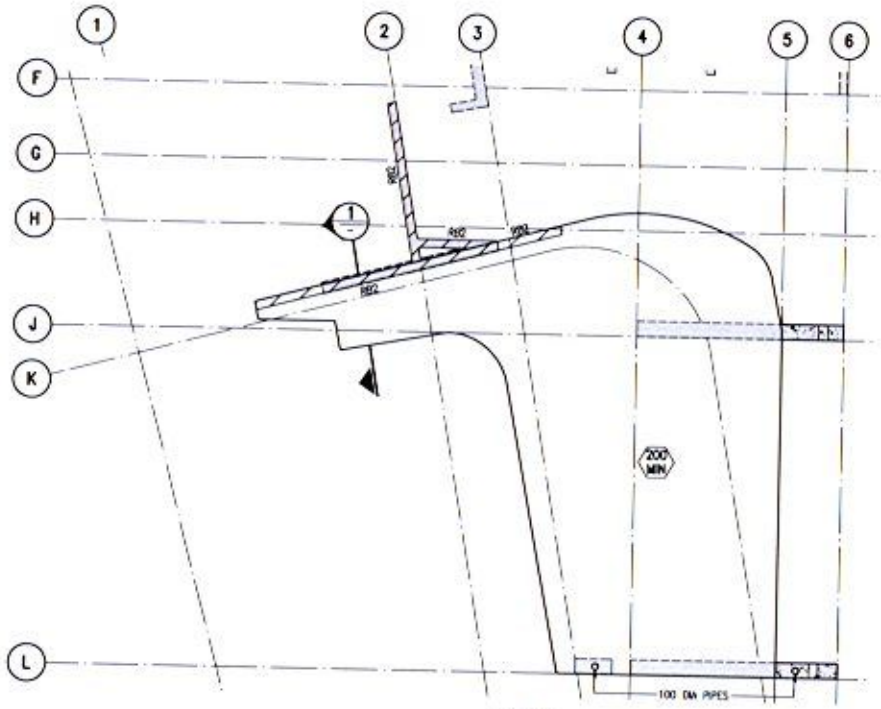
SCALE 1:50

- REFER TO DRAWINGS S8-02 FOR SECTIONS AND DETAILS
- REFER TO DRAWING S1-10 FOR PILES AND SHORING WALL DETAILS
- REFER TO DRAWING S1-11 FOR CAPPING BEAM DETAILS

NOTES:

REFER ARCHITECTURAL DRAWINGS FOR AWNING PROFILE

REINFORCEMENT RATES U.N.O.:	
ELEMENT	REINF. RATE
SLABS	
- 120 THK	-
- 150 THK	105 kg/m³
- 200 THK	155 kg/m³
RC STAIRS	115 kg/m³
RC WALLS	
- 140 THK	100 kg/m³
- 150 THK	100 kg/m³
- 200 THK	100 kg/m³
MASONRY WALLS	
- 140 THK	50 kg/m³
- 190 THK	50 kg/m³



AWNING GENERAL ARRANGEMENT PLAN

SCALE 1:50

NOTE:
REINFORCEMENT RATE: 100 kg/m³

GENERAL ARRANGEMENT LEGEND:

- DENOTES INSITU CONCRETE ELEMENT OVER
- DENOTES LOAD BEARING ELEMENT UNDER
- DENOTES LOAD BEARING ELEMENT UNDER AND INSITU CONCRETE ELEMENT OVER
- DENOTES PRECAST ELEMENT OVER
- DENOTES BLOCKWORK AND TYPE REFER S3.00 SERIES DRAWINGS FOR SCHEDULE AND TYPICAL DETAILS
- DENOTES PENETRATION
- DENOTES SLUMP
- DENOTES SLAB STEP
- DENOTES SLAB THICKNESS
- DENOTES WALL NUMBER & DIRECTION ELEVATION IS VIEWED
- DENOTES SAWN JOINT
- DENOTES TOOLED JOINT
- DENOTES KEYED JOINT
- DENOTES DOWELLED JOINT
- DENOTES CONSTRUCTION JOINT
- DENOTES EXPANSION JOINT

NOTE: REFER ARCHITECTS DRAWINGS FOR ALL STEPS AND FALLS IN SLABS.

CONCRETE NOTES:
-REFER NOTES ON COVER SHEET.
-MIN. CONC. STRENGTH AT 28 DAYS.

LOCATION	f'c
SLABS	50 MPa
STAIRS	50 MPa
RC WALLS	50 MPa
MASONRY WALLS	50 MPa

-CONCRETE COVER

LOCATION	COVER
SLABS	35mm
STAIRS	35mm
RC WALLS	35mm
MASONRY WALLS	35mm

This information shall be copyright except for the sole purpose of assisting the organisation named in this document in performing tasks associated with the nominated project. The drawing and association or derived information shall not be used for other purposes or transferred to others without written permission of Robert Bird Group.

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

Rev	Revision Description	By	App	Date
P1	ISSUE FOR INFORMATION	GP	TK	21.09.07
P2	ISSUE FOR INFORMATION	GP	TK	02.10.07
T1	ISSUE FOR TENDER	GP	TK	15.10.07

Structural & Civil Engineering Consultant:
RobertBirdGroup
3 STOREY SUITE 9
Robert Bird Group Pty Ltd
PO Box 6318, Australia Square,
Sydney NSW 1215
Level 5
9 Castlereagh St, Sydney NSW
Ph. (02) 8248 5200
Fax. (02) 8248 5201
www.robertbird.com

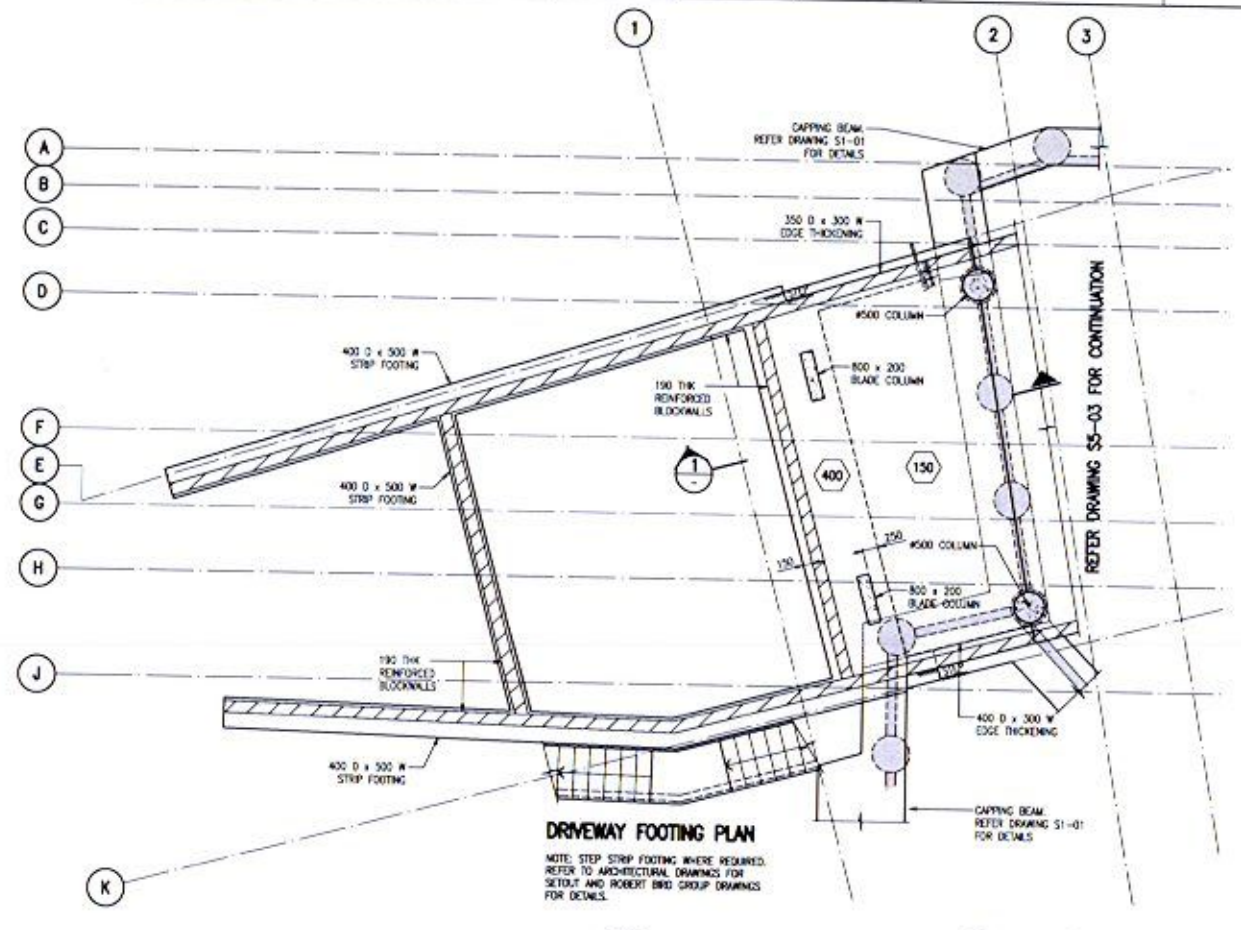
Client: CABE Developments Pty Ltd

Title: STREET LEVEL & AWNING GENERAL ARRANGEMENT PLANS

Project: BILGOLA HOUSE
32 THE SERPENTINE, BILGOLA

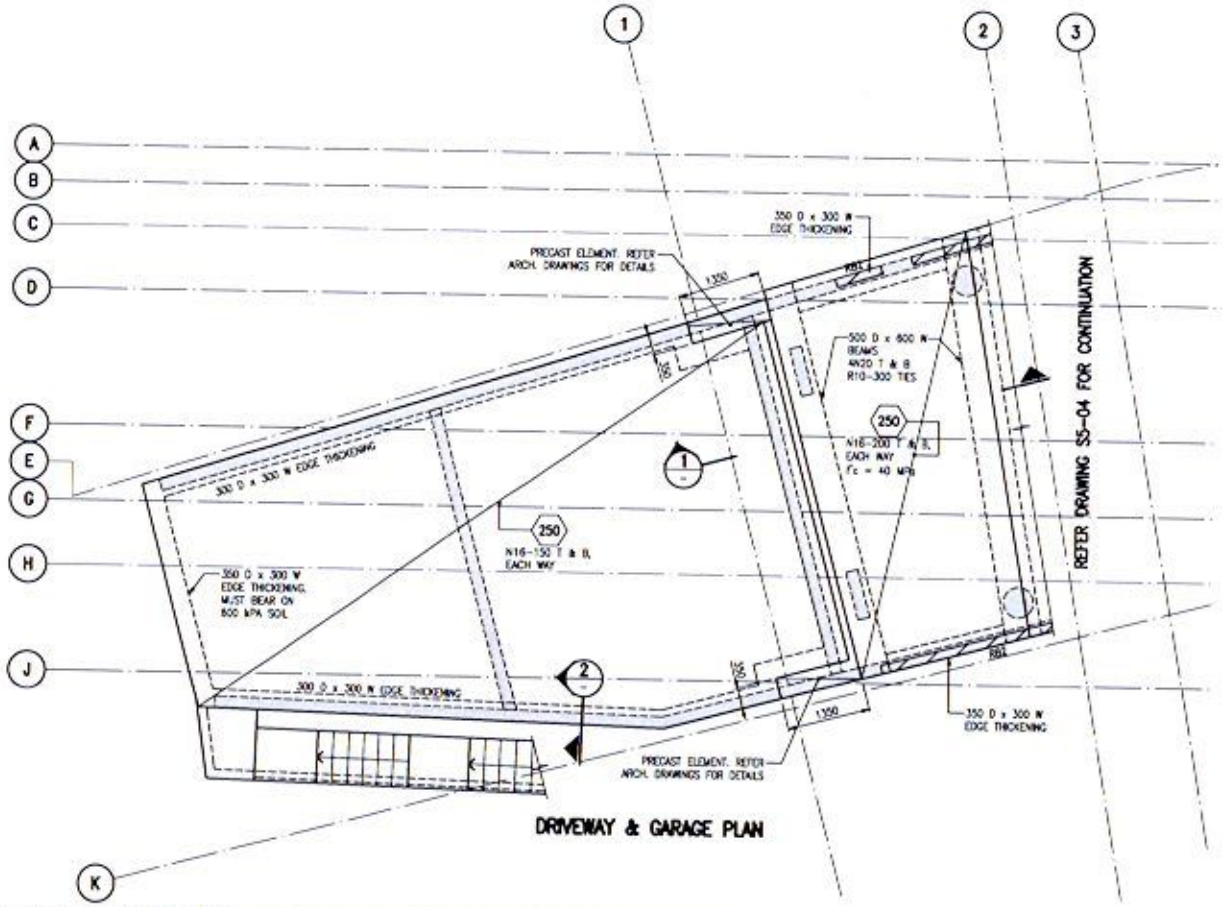
FOR TENDER NOT FOR CONSTRUCTION

Date	Design	Checked
SEP 07	T.K.	
Scale @ B1	Drawn	Approved
1:50	C.P.	S.G.
Job Number	Drawing Number	Revision
06533	S5-04	T1

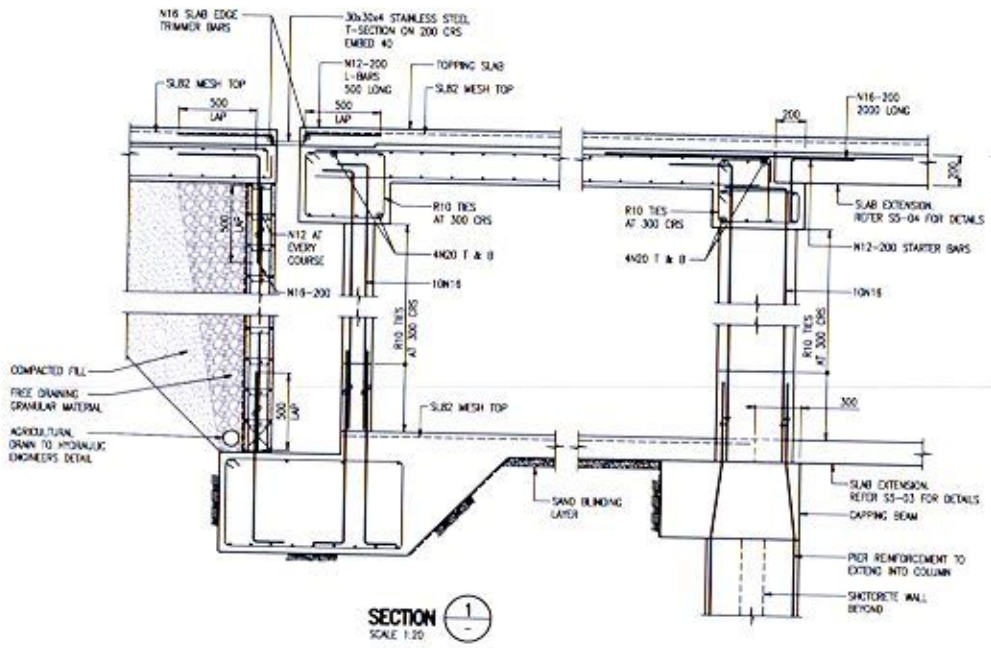


DRIVEWAY FOOTING PLAN

NOTE: STEP STRIP FOOTING WHERE REQUIRED. REFER TO ARCHITECTURAL DRAWINGS FOR SETOUT AND ROBERT BIRD GROUP DRAWINGS FOR DETAILS.



DRIVEWAY & GARAGE PLAN



SECTION (1)

SCALE 1:20

DRIVEWAY GENERAL ARRANGEMENT PLAN

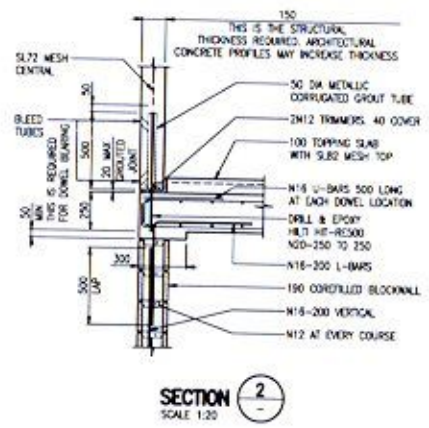
SCALE 1:50

- REFER TO DRAWING S1-10 FOR PILES AND SHORING WALL DETAILS
- REFER TO DRAWING S1-11 FOR CAPPING BEAM DETAILS

NOTES:

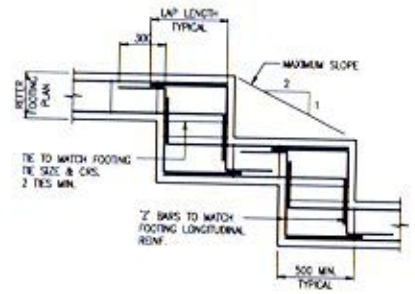
REFER ARCHITECTURAL DRAWINGS FOR PROFILES.

REINFORCEMENT RATES U.N.O.:	
ELEMENT	REINF. RATE
SLABS:	
- 120 THK	-
- 150 THK	105 kg/m³
- 200 THK	155 kg/m³
RC STAIRS	115 kg/m³
RC WALLS	
- 140 THK	100 kg/m³
- 150 THK	100 kg/m³
- 200 THK	100 kg/m³
MASONRY WALLS	
- 140 THK	50 kg/m³
- 190 THK	50 kg/m³



SECTION (2)

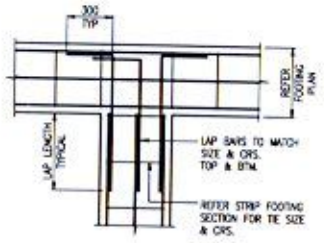
SCALE 1:20



FOOTING STEP FOR ABRUPT SLOPES

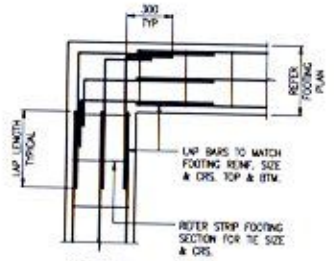
SCALE 1:20

STEP FOOTING TO SUIT COURSING.



STRIP FOOTING T-INTERSECTION DETAIL

SCALE 1:20



90 DEGREES STRIP FOOTING CORNER DETAIL

SCALE 1:20

GENERAL ARRANGEMENT LEGEND:

- DENOTES INSITU CONCRETE ELEMENT OVER
- DENOTES LOAD BEARING ELEMENT UNDER
- DENOTES LOAD BEARING ELEMENT UNDER AND INSITU CONCRETE ELEMENT OVER
- DENOTES PRECAST ELEMENT OVER
- PB1 / PB2 — DENOTES BLOCKWORK AND THICKNESS REFER S3.00 SERIES DRAWINGS FOR SCHEDULE AND TYPICAL DETAILS
- DENOTES PENETRATION
- DENOTES SUMP
- STEP — DENOTES SLAB STEP
- THK — DENOTES SLAB THICKNESS
- W? — DENOTES WALL NUMBER & DIRECTION ELEVATION IS VIEWED
- DENOTES SAWN JOINT
- DENOTES TOOLED JOINT
- DENOTES KEYED JOINT
- DENOTES DOWELLED JOINT
- DENOTES CONSTRUCTION JOINT
- DENOTES EXPANSION JOINT

NOTE: REFER ARCHITECTS DRAWINGS FOR ALL STEPS AND FALLS IN SLABS.

CONCRETE NOTES:

-REFER NOTES ON COVER SHEET.
-MIN. CONC. STRENGTH AT 28 DAYS.

LOCATION	f'c
SLAB ON GROUND	50 MPa
SUSPENDED SLAB	50 MPa
TOPPING SLAB	50 MPa
FOOTINGS	50 MPa
COLUMNS	50 MPa

-CONCRETE COVER

LOCATION	COVER
SLAB ON GROUND	35mm
SUSPENDED SLAB	35mm
TOPPING SLAB	35mm
FOOTINGS	35mm
COLUMNS	35mm

This information shall be copyright except for the sole purpose of executing the construction named in this document in performing tasks associated with the nominated project. This drawing and associated or derived information shall not be used for other purposes or disclosed to others without written permission of Robert Bird Group.

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER COVER SHEET FOR NOTES UNLESS NOTED OTHERWISE

No.	Revision Description	By	App.	Date
P1	ISSUE FOR INFORMATION	CP	TK	21.09.07
P2	ISSUE FOR INFORMATION	CP	TK	02.10.07
T1	ISSUE FOR TENDER	CP	TK	15.10.07

Structural & Civil Engineering Consultant
RobertBirdGroup
SYDNEY OFFICE
Robert Bird Group Pty Ltd
PO Box 6196, Australia Square
Sydney NSW 1215
Level 5
8 Castlereagh St, Sydney NSW
PH. (02) 8248 3200
Fax. (02) 8248 3201
Web Site: www.robertbird.com

Client: CABE Developments Pty Ltd

Title: DRIVEWAY GENERAL ARRANGEMENT PLAN
Project: BILGOLA HOUSE 32 THE SERPENTINE, BILGOLA

FOR TENDER NOT FOR CONSTRUCTION

Date	Design	Checked
SEP 07	T.K.	
Scale @ A1	Drawn	Approved
1:50 U.N.O.	C.P.	S.G.
Job Number	Drawing Number	Revision
06533	S5-05	T1

This information relates to
Construction/Complying Development Certificate
---5001192
Issued by Paul Geann (02) 4655 5611
Building Professionals Board (BPB0132)

ARCHITECTS

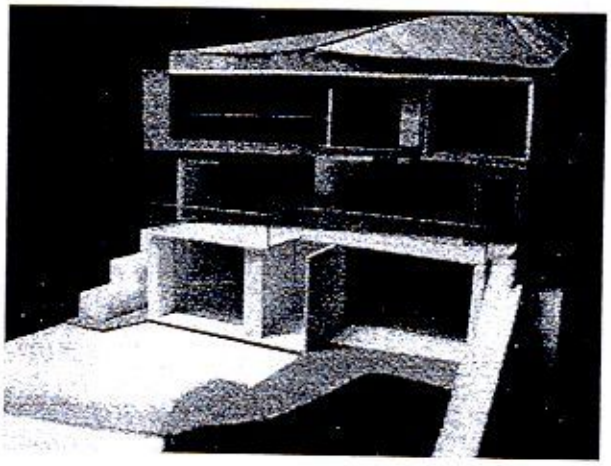
TURNER + ASSOCIATES

L1 510 CROWN STREET SURRY HILLS
T +61 2 8668 0000 F +61 2 8668 0088

ARCHITECTURAL SPECIFICATION
CONSTRUCTION CERTIFICATE SUBMISSION

32_The Serpentine

New House
32 The Serpentine,
Bilgola NSW



A	Client Review & Comment	17.09.07
ISSUE		**DATE**

Prepared on behalf of CABE Developments Pty Ltd

INDEX

SPECIFICATION

GENERAL

Preliminaries	(revision A)
General Requirements	(revision A)
Adhesives, Sealants & Fasteners	(revision A)
Termite Management	(revision A)
Timber Finishes & Treatments	(revision A)

STRUCTURE

Concrete (combined)	(revision A)
Brick and Block Construction	(revision A)
Stone Masonry	(revision A)
Structural Steel	(revision A)
Light Steel Framing	(revision A)
Structural Timber	(revision A)
Light Timber Framing	(revision A)

ENCLOSURE

Waterproofing	(revision A)
Cladding (combined)	(revision A)
Windows and Glazed Doors	(revision A)
Glazing	(revision A)
Glass Components	(revision A)
Insulation and Sarking	(revision A)

INTERIOR

Lining	(revision A)
Waterproofing (Wet Areas)	(revision A)

MECHANICAL

Mechanical Design	(revision A)

HYDRAULIC

Refer to Hydraulic Engineer's Documentation	-

ELECTRICAL

Electrical Design	(revision A)

Property	Tolerance criteria: Permitted deviation (mm)
Generally: Flatness[1] in 2000 mm	3
Features[2]: Verticality in 2000 mm	2
Features: Horizontality in 2000 mm	2
1. Flatness: Measured under a straightedge laid in any direction on a plane surface.	
2. Features: Conspicuous horizontal or vertical lines including external corners, parapets, reveals, heads, sills.	

2 PRODUCTS

2.1 TIMBER

Structural timber

Natural durability ratings to AS 5604 Table A1 (minimum): Durability class 2, or preservative treated timber of equivalent durability.

Structural timber grading standards

Hardwood: To AS 2082.

Softwood: To AS 2858.

Mechanical stress grading: To AS/NZS 1748.

Machine proof-grading: To AS 3519.

Identification

Method: Identify timber using branding, certification or both.

Branding: Brand structural timber, under the authority of a recognised product certification program applicable to the product. Locate the brand mark on faces or edges which will be concealed in the works. Include the following data for timbers, not covered by branding provisions of Australian standards or regulations for which branding is required.

- Stress grade.
- Method of grading.
- 'Seasoned' or 's'.
- The certification mark of the product certification program.
- The applicable standard.

Recognised product certification programs:

- Pine framing: Plantation Timber Certification.
- Finger jointed structural timber: Plantation Timber Certification.

Certification:

Inspection: If neither branding nor certification is adopted, have an independent inspecting authority inspect the timber.

Facias and barge boards

Hardwood: To AS 2796.3.

Seasoned cypress pine: To AS 1810.

Softwood: To AS 4785.3.

Preservation treatment Hazard Class to AS 1604.1: H3 A..

2.2 SHEET PRODUCTS

Structural plywood

Standard: To AS/NZS 2269.

Bond: Type A.

Veneer quality to visible surfaces: C (minimum).

Identification:

- Method: Identify plywood using branding, certification or both.
- Branding: Brand structural plywood, under the authority of a recognised product certification program applicable to the product. Locate the brand mark on faces or edges which will be concealed in the works. Include the following data:

0131b PRELIMINARIES

1 GENERAL

1.1 GENERAL

Interpretation

General: The words 'principal', and 'contract administrator' have the same meaning, respectively, as 'owner' and 'architect', unless the context requires otherwise.

Cross reference: The clause **Interpretation**, in the *General requirements* worksection, also applies.

1.2 THE SITE

Site restrictions

Comply with Council requirements.

Protection of persons and property

Temporary works: Provide and maintain required barricades, guards, fencing, shoring, temporary roadways, footpaths, signs, lighting, watching and traffic flagging.

Accessways, services: Do not obstruct or damage roadways and footpaths, drains and watercourses and other existing services in use on or adjacent to the site. Determine the location of such services.

Property: Do not interfere with or damage property which is to remain on or adjacent to the site, including adjoining property encroaching onto the site, and trees.

Rectification

Accessways, services: Rectify immediately any obstruction or damage to roadways and footpaths, drains and watercourses and other existing services in use on or adjacent to the site. Provide temporary services whilst repairs are carried out.

Property: Rectify immediately any interference or damage to property which is to remain on or adjacent to the site, including adjoining property encroaching onto the site, and trees.

Existing services

General: Attend to existing services as follows:

- If the service is to be continued, repair, divert or relocate as required. If the service crosses the line of a required trench, or will lose support when the trench is excavated, provide permanent support for the existing service.
- If the service is to be abandoned, cut and seal or disconnect, and make safe.

Proposals: Submit proposals for action to be taken with respect to existing services before starting this work. Minimise the number and duration of interruptions.

- Purpose of submission: For review.

Adjoining property

Notice: At least 10 working days before commencing work, submit to owners and occupants of adjoining property written notice of intention to commence work and an outline description of the type and extent of work.

Revealed encroachments: If the works reveal unknown encroachments of adjoining property on to the site or of existing site structures on to adjoining property, immediately seek instructions.

Records:

- Inspect the properties with the architect and owners and occupants of the properties, before commencement of work.
- Make detailed records of conditions existing within the properties, especially structural defects and other damage or defacement.
- Arrange for at least 2 copies of each record, including drawings, written descriptions, and photographs, to be endorsed by the owners and occupants, or their representatives, as evidence of conditions existing before commencement of work.

Endorsed copies: Submit one endorsed copy of each record. Keep the other endorsed copy on site.

- Purpose of submission: Information only.

1.3 CONSTRUCTION PLANT

Access
Comply with Council requirements.

Parking
Owner's existing parking areas: Use only designated parking areas.

Use of existing services
General: Existing services may be used as temporary services for the performance of the contract subject to conditions.

Protective clothing
Safety helmets: Make available safety helmets for the use of visitors.
- Standard: To AS/NZS 1801, Type 1.
- StandardsMark: Required.

Project signboards
General: Provide project-specific signboards and the following:
- Locate where directed.
- Maintain in good condition for duration of the work.
- Obtain permission for removal.
- Remove on completion.

Project signboard description
Comply with Council requirements.

1.4 BUILDING THE WORKS

Surveys
Refer to Survey information prepared by Gary Edwards & Associates.

Survey marks
Definition: The term 'survey mark' means a survey peg, bench mark, reference mark, signal, alignment, level mark or any other mark used or intended to be used for the purpose of setting out, checking or measuring the work.

Care of survey marks: Preserve and maintain the owner's survey marks in their true positions.

Rectification: If the owner's survey marks are disturbed or obliterated, immediately give notice and rectify the disturbance or obliteration.

Safety
Accidents: Promptly notify the architect of the occurrence of the following:
- Accidents involving death or personal injury.
- Accidents involving loss of time.
- Incidents with accident potential such as equipment failure, slides and cave-ins.

Accident reports: Submit reports of accidents.
- Purpose of submission: Information only.

Contractor's representative
General: Must be accessible, and fluent in English and technical terminology.

Subcontracting
General: Submit a complete list of proposed subcontractors and suppliers.

1.5 COMPLETION OF THE WORKS

Final cleaning
General: Before practical completion, clean throughout, including interior and exterior surfaces exposed to view. Vacuum carpeted and soft surfaces. Clean debris from the site, roofs, gutters, downpipes and drainage systems. Remove waste and surplus materials.

Samples: Remove non-incorporated samples, prototypes and sample panels.

Reinstatement
General: Before practical completion, clean and repair damage caused by installation or use of temporary work and restore existing facilities used during construction to original condition.

Adjoining property
Evaluation: At practical completion, inspect the properties with the architect and owners and occupants of the properties, recording any damage that has occurred since the pre-commencement inspection.

Pest eradication

General: Employ suitably qualified pest exterminators. At practical completion submit a certificate stating that completed works are free of pest types.

Removal of plant

General: Within 10 working days after practical completion, remove temporary works and construction plant no longer required. Remove the balance before the end of the defects liability period.

1.6 MISCELLANEOUS

Contractor and owner to observe confidentiality

Publicity: Do not issue information concerning the project for publication in the media without prior written approval of the owner. Refer to the owner enquiries from the media concerning the project.

Compliance with the law

Requirements of authorities: The owner, before entering into the contract, has given the notices, paid the fees, and obtained the permits, approvals and other authorisations.

Prior applications and approvals schedule

Prior notices given and applications made
Pittwater Council Notice to Applicant of Determination of a Development Application Consent No.N0784/06

Authority conditions schedule

Authority
Conditions of Approval detailed in Pittwater Council Notice to Applicant of Determination of a Development Application Consent No.N0784/06

0171b GENERAL REQUIREMENTS

1 GENERAL

1.1 PRECEDENCE

Precedence

General: Requirements of subsequent worksections of the specification override conflicting requirements in this worksection.

1.2 REFERENCED DOCUMENTS

Contractual relationships

General: Responsibilities and duties of the principal, contractor and contract administrator are not altered by requirements in the documents referenced in this specification.

Current editions

General: Use referenced documents which are the editions, with amendments, current 3 months before commencement of construction, except where other editions or amendments are required by statutory authorities.

1.3 INTERPRETATION

Abbreviations

General: For the purposes of this worksection the abbreviations given below apply.

- AS: Australian Standard.
- BCA: Building Code of Australia.
- NATA: National Association of Testing Authorities.
- NZS: New Zealand Standard.
- SSL: Scientific Services Laboratory.

Definitions

General: For the purposes of this worksection the definitions given below apply.

- Attendance: 'Attendance', 'provide attendance' and similar expressions mean 'give assistance for examination and testing'.
- Contract administrator: 'Contract administrator' has the same meaning as 'architect' or 'superintendent' and is the person appointed by the 'owner' or 'principal' under the contract.
- Design life: The period of time for which it as assumed, in the design, that an asset will be able to perform its intended purpose with only anticipated maintenance but no major repair or replacement being necessary.
- Documented: 'Documented', 'as documented' and similar terms mean contained in the contract documents.
- Economic life: The period of time from the acquisition of an asset to when the asset, while still physically capable of fulfilling its function and with only anticipated maintenance, ceases to be the lowest cost alternative for satisfying that function.
- Geotechnical site investigation: The process of evaluating the geotechnical characteristics of the site in the context of existing or proposed construction.
- Give notice: 'Give notice', 'submit', 'advise', 'inform' and similar expressions mean 'give notice (submit, advise, inform) in writing to the contract administrator'.
- IP: 'IP', 'IP code', 'IP rating' and similar expression have the same meaning as 'IP Code' in AS 60529.
- Maintenance period: Synonymous with 'Defects liability period'.
- Obtain: 'Obtain', 'seek' and similar expressions mean 'obtain (seek) in writing from the contract administrator'.
- Metallic-coated steel: Includes zinc-coated steel, zinc/iron alloy-coated steel, and aluminium/zinc-coated steel.
- Pipe: Includes pipe and tube.
- Principal: 'Principal' has the same meaning as 'owner', 'client' and 'proprietor' and is the party to whom the Contractor is legally bound to construct the works.
- Professional engineer: A person who is listed on the National Professional Engineers Register (NPER) in the relevant discipline at the relevant time.
- Proprietary: 'Proprietary' mean identifiable by naming manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
- Provide: 'Provide' and similar expressions mean 'supply and install'. Installation shall include development of the design beyond that documented.

- Registered testing authority:
  - An organisation registered by the National Association of Testing Authorities (NATA) to test in the relevant field; or
  - An organisation outside Australia registered by an authority recognised by NATA through a mutual recognition agreement; or
  - An organisation recognised as being a Registered Testing Authority under legislation at the time the test was undertaken.
- Required: Means required by the contract documents, the local council or statutory authorities.
- If required: A conditional specification term for work which may be shown on the drawings or be a legislative requirement.
- Samples: Includes samples, prototypes and sample panels.
- Supply: 'Supply', 'furnish' and similar expressions mean 'supply only'.
- Tests:
  - Pre-completion tests: Tests carried out before completion tests.
    - * Type tests: Tests carried out on an item identical with a production item, before delivery to the site.
    - * Production tests: Tests carried out on a purchased item, before delivery to the site.
    - * Site tests: Tests carried out on site.
  - Completion tests: Tests carried out on completed installations or systems before the date for practical completion, to demonstrate that the installation or system, including components, controls and equipment, operates correctly, safely and efficiently, and meets performance and other requirements. The superintendent may direct that completion tests be carried out after the date for practical completion.
- Tolerance: The permitted difference between the upper limit and the lower limit of dimension, value or quantity.
- Verification: Provision of evidence or proof that a performance requirement has been met or a default exists.

1.4 CONTRACT DOCUMENTS

Services diagrammatic layouts

General: Layouts of service lines, plant and equipment shown on the drawings are diagrammatic only, except where figured dimensions are provided or calculable.

Before commencing work:

- Obtain measurements and other necessary information.
- Coordinate the design and installation in conjunction with all trades.

Levels

General: Spot levels take precedence over contour lines and ground profile lines.

1.5 PERFORMANCE

General

General: If required, provide structures, installations and components as follows:

- Fixed access ways: To AS 1657.
- Structural design actions: To AS/NZS 1170.0

1.6 NOTICE

Inspection

Concealment: If notice of inspection is required in respect of parts of the works that are to be concealed, advise when the inspection can be made before concealment.

Submissions

Program: Allow in the construction program for at least the following times for response to submissions:

Proposed products schedules: If major products are not specified as proprietary items, submit a schedule of those proposed for use within 3 weeks of site possession.

Tests

General: Give notice of the time and place of nominated tests.

Attendance

General: Provide attendance for inspection of tests.

1.7 SUBMISSIONS

Authorities

Authorities' approvals: If required, submit documents showing approval by the authorities whose requirements apply to the work.

Correspondence: Submit copies of correspondence and notes of meetings with authorities.

Errors

General: If a submission contains errors, make a new or amended submission as appropriate, indicating changes made since the previous submission.

Identification

General: Identify the project, contractor, subcontractor or supplier, manufacturer, applicable product, model number and options, as appropriate and include pertinent contract document references. Include service connection requirements and product certification. Identify proposals for non-compliance with project requirements, and characteristics which may be detrimental to successful performance of the completed work.

Substitution

Performance: Equal or greater to that specified.

Alternatives: If alternatives to the documented products, methods or systems are proposed, submit sufficient information to permit evaluation of the proposed alternatives including the following:

- Samples.
- Essential technical information, in English.
- Reasons for the proposed substitutions.
- Statement of the extent of revisions to the contract documents.
- Statement of the extent of revisions to the construction program.
- Statement of cost implications including costs outside the contract.
- Statement of consequent alterations to other parts of the works.

Evidence: If the documented products or systems are unavailable within the time constraints of the construction programme submit evidence, from the supplier.

Criteria: If the substitution covers unavailability or is for any other reason, submit evidence that the substitution:

- Is of nett enhanced value to the Proprietor.
- Is consistent with the contract documents and is as effectual as the identified proprietary item.

Samples

Submission: Submit nominated samples.

Incorporation of samples: If it is intended to incorporate samples into the works, submit proposals. Incorporate samples in the works which have been endorsed for incorporation. Do not incorporate other samples.

Retention of samples: Keep endorsed samples in good condition on site, until practical completion.

Shop drawings

General: If required, submit dimensioned drawings showing details of the fabrication and installation of services and equipment, including relationship to building structure and other services, cable type and size, and marking details.

Diagrammatic layouts: Coordinate work shown diagrammatically in the contract documents, and submit dimensioned set-out drawings.

2 PRODUCTS

2.1 TESTS

Notice

Notice: Give notice of time and place of nominated tests.

Attendance

General: Provide attendance on tests where nominated in worksections.

Testing authorities

General: Except for site tests, have tests carried out by a Registered testing authority and submit test reports.

- Reports: Submit copies of test reports, including certificates for type tests, showing the observations and results of tests and conformance or non-conformance with requirements.
- Site tests: Use instruments calibrated by authorities accredited by a Registered testing authority.

2.2 MATERIALS AND COMPONENTS

Consistency

General: For the whole quantity of each material or product use the same manufacturer or source and provide consistent type, size, quality and appearance.

Corrosion resistance

General: Conform to the following corrosivity category with regard to worksection corrosion resistance tables.

Corrosivity category:

Corrosivity category:	High

Situation

The following classification of situation applies to tables in the worksection corrosion resistance tables.

- Internal:
  - building fabric protected from salt and moisture by vapour barriers, sarking, sheathing and building wraps.
- External:
  - includes external leaf and air spaces behind external leaf brickwork or blockwork walls.

Galvanizing

Severe conditions: Galvanize mild steel components (including fasteners) to AS 1214 or AS/NZS 4680 as appropriate, if:

- Exposed to weather.
- Embedded in masonry.
- Exposed to or in air spaces behind external leaf of masonry walls.
- In contact with chemically treated timber, other than CCA.

2.3 PROPRIETARY ITEMS

Manufacturers' or suppliers' recommendations

Proprietary items: Provide, including select, if no selection is given, and transport, deliver, store, handle, protect, finish, adjust, prepare for use, and provide manufactured items in accordance with the current written recommendations and instructions of the manufacturer or supplier.

Proprietary systems/assemblies: Assemble, install or fix to substrate in accordance with the current written recommendations and instructions of the manufacturer or supplier.

Project modifications: Advise of activities that supplement, or are contrary to, manufacturer's or suppliers' written recommendations and instructions.

Product certification: If products must comply with product certification schemes, provide them in accordance with the certification requirements.

Identified proprietary items

Implication: Identification of a proprietary item does not necessarily imply exclusive preference for the item so identified, but indicates the necessary properties of the item.

3 EXECUTION

3.1 WALL CHASING

Holes and chases

General: If holes and chases are required in masonry walls, provide proposals to demonstrate that the structural integrity of the wall is maintained. Do not chase walls nominated as fire rated or acoustic. Parallel chases or recesses on opposite faces of a wall shall not be closer than 600 mm to each other.

Chasing of blockwork: Only in core-filled hollow blocks or in solid blocks which are not designated as structural.

3.2 FIXING

General

Suitability: If equipment and services are not suitable for fixing to non-structural building elements, fix directly to structure and trim around penetrations in non-structural elements.

Fasteners

Use proprietary fasteners capable or transmitting the loads imposed, and sufficient to ensure the rigidity of the assembly.

3.3 COMPLETION

Warranties

General: Name the Principal as warrantee. Register with manufacturers as necessary. Retain copies delivered with components and equipment.

Commencement: Commence warranty periods at practical completion or at acceptance of installation, if acceptance is not concurrent with practical completion.

Approval of installer: If installation is not by manufacturer, and product warranty is conditional on the manufacturer's approval of the installer, submit the manufacturer's written approval of the installing firm.

3.4 OPERATION AND MAINTENANCE MANUALS

General

General: Submit operation and maintenance manuals for installations.

0181 ADHESIVES, SEALANTS AND FASTENERS

1 GENERAL

1.1 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of joints and penetrations prepared for the application of sealants.

1.2 PERFORMANCE

Adhesives and sealants

General: Provide adhesives and sealants capable of transmitting imposed loads, sufficient to ensure the rigidity of the assembly, or integrity of the joint and which will not cause discolouration of finished surfaces.

Compatibility: Do not use sealants or adhesives that are incompatible with the products to which they are applied.

Movement: Where an adhered or sealed joint may be subject to movement, select a system accredited to accommodate the projected movement under the conditions of service.

Refurbishment: Use sealants that can be safely removed and prepared for refurbishment.

Fasteners

Provide fasteners accredited for the particular use, capable of transmitting imposed loads and maintaining the rigidity of the assembly.

2 PRODUCTS

2.1 ADHESIVES

Standards

Mastic adhesive: To AS 2329.

Polymer emulsion adhesive for timber: To AS 2754.2, not inferior to Type 3.

High strength adhesive tape

General description: A foam of cross linked polyethylene or closed cell acrylic coated both sides with a high performance acrylic adhesive system, encased in release liners of paper or polyester.

Product classification: Ensure product suitability for the following substrates:

- Firm high strength foam tapes for high energy surfaces including most bare metals such as stainless steel and aluminium.
- Conformable high strength foam for medium energy surfaces including many plastics and paints, and bare metals.
- Conformable high strength foam for lower energy surfaces including many plastics, most paints and powder coatings, and bare metals.

Thickness: Select the tape to ensure a mismatch between surfaces does not exceed half the tape thickness under the applied lamination pressure.

2.2 SEALANTS

Standards

General: To ISO 11600.

External masonry joints

General: Provide sealant and bond breaking backing materials compatible with each other and the substrate and which are non-staining to masonry. Do not use bituminous materials with absorbent masonry units.

Bond breaking backing:

- Bond breaking materials: To be non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: To be closed-cell or impregnated, not water-absorbing.

Fire rated control joints

General: Provide sealant materials that maintain the nominated fire resistant rating.

- Fire stopping: To AS 4072.1.

Pointing and bedding

General: Provide sealants for fast moving joints in light weight building elements that are compatible with the contact materials.

Bond breaking backing:

- Bond breaking materials: To be non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: To be closed-cell or impregnated, not water-absorbing.

Floor movement joints

General: Provide trafficable sealants for that are compatible with the contact materials.

Bond breaking backing:

- Bond breaking materials: To be non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: To be closed-cell or impregnated, not water-absorbing.

2.3 FASTENERS

General

Masonry anchors: Proprietary expansion or chemical type.

Plain washers: To AS 1237.1.

- Provide washers to the heads and nuts of bolts, and the nuts of coach bolts.

Plugs: To be proprietary purpose-made plastic.

Powder-actuated fasteners: To AS/NZS 1873.4.

Stainless steel Fasteners: To ASTM A240/240M.

Steel nails: To AS 2334.

- Length: At least 2.5 x the thickness of the member being secured, and at least 4 x the thickness if the member is plywood or building board < 10 mm thick.

Unified hexagon bolts, screws and nuts: To AS/NZS 2465.

Fasteners in CCA treated timber: Epoxy coated or stainless steel.

Bolts

Coach bolts: To AS/NZS 1390.

Hexagon bolts Grades A and B: To AS 1110.1.

Hexagon bolts Grade C: To AS 1111.1.

Corrosion resistance

Corrosivity category: To the *General requirements* worksection.

Steel products: Conform to the **Corrosion resistance table** or provide proprietary products with metallic and/or organic coatings of equivalent corrosion resistance.

Corrosion resistance table – high corrosivity category

Situation	Self drilling screws to AS 3566.2 Class	Threaded fasteners and anchors		Powder actuated fasteners	
		Material	Minimum local metallic coating thickness (µm)	Material grade	Minimum local metallic coating thickness (µm)
Internal	3	Electroplated zinc or Hot-dip galvanized	30	Stainless steel 316	
External	Stainless steel 316	Stainless steel 316		Stainless steel 316	

Finishes

Electroplating:

- Metric thread: To AS 1897.
- Imperial thread: To AS 4397.

Galvanizing:

- Threaded fasteners: To AS 1214.
- Other fasteners: To AS/NZS 4680.

Mild steel fasteners: Galvanize if:

- Embedded in masonry.

- In external timbers.
- In contact with chemically treated timber, other than CCA treated timber.

Epoxy coated:

- CCA Treated timber.

Nuts

Hexagon chamfered thin nuts Grades A and B: To AS 1112.4.

Hexagon nuts Grade C: To AS 1112.3.

Hexagon nuts Style 1 Grades A and B: To AS 1112.1.

Hexagon nuts Style 2 Grades A and B: To AS 1112.2.

Screws

Coach screws: To AS/NZS 1393.

Hexagon screws Grades A and B: To AS 1110.2.

Hexagon screws: Grade C To AS 1111.2.

Hexagon socket screws: To AS 1420 and AS/NZS 1421.

Machine screws: To AS/NZS 1427.

Self-drilling screws: To AS 3566.1 and AS 3566.2.

Self-tapping screws:

- Crossed recessed countersunk (flat – common head style): To AS/NZS 4407.
- Crossed recessed pan: To AS/NZS 4406.
- Crossed recessed raised countersunk (oval): To AS/NZS 4408.
- Hexagon: To AS/NZS 4402.
- Hexagon flange: To AS/NZS 4410.
- Hexagon washer: To AS/NZS 4409.
- Slotted countersunk (flat – common head style): To AS/NZS 4404.
- Slotted pan: To AS/NZS 4403.
- Slotted raised countersunk (oval – common head style): To AS/NZS 4405.

Blind rivets

Description: Expanding end type with snap mandril.

Type: Closed end for external application, open end for internal application.

End material:

- Aluminium base alloy for metallic coated or colourbond coated steel.
- Stainless steel for stainless steel sheet.
- Copper for copper sheet.

Size:

- For sheet metal to sheet metal: 3 mm.
- For sheet metal to supports, brackets and rolled steel angles: 4.8 mm.

Performance

Loads: Provide fasteners capable of transmitting the loads imposed, and sufficient to ensure the rigidity of the assembly.

3 EXECUTION

3.1 ADHESIVES

Preparation

Substrates: Ensure substrates are:

- Clean and free of any deposit or finish which may impair adhesion.
- If framed or discontinuous, support members are in full lengths without splicing.
- If solid or continuous, excessive projections are removed.
- If previously painted, cracked or flaking paint is removed and the surface lightly sanded.

Contact adhesive

Precautions: Do not use if:

- A substrate is polystyrene foam.
- A PVC substrate may allow plasticiser migration.

- The adhesive solvent can discolour the finished surface.
- Dispersal of the adhesive solvent is impaired.

Two way method: Immediately after application press firmly to transfer adhesive and then pull both surfaces apart. Allow to tack off and then reposition and press firmly together. Tap areas in contact with a hammer and padded block.

One way method: Immediately after application bring substrates together and maintain maximum surface contact for 24 hours by clamps, nails or screws as appropriate. If highly stressed employ permanent mechanical fasteners.

High strength adhesive tape

Preparation:

- Non-porous surfaces: Clean with surface cleaning solvents such as isopropyl alcohol / water, wash down and allow to dry.
- Porous surfaces: Prime the surface with a contact adhesive compatible with the tape adhesive system.

Follow the recommendations of the manufacturer for application to the following: Copper, brass, plasticized vinyl and hydrophilic surfaces such as glass and ceramics in a high humidity environment.

Applied lamination pressure: Ensure the tape experiences 100 kPa.

Application temperature: Generally above 10° C, consult the manufacturer.

Completion: Do not apply loads to the assembly for 72 hours at 21° C.

3.2 SEALANT JOINTING

Preparation for jointing

Cleaning: Cut flush joint surface protrusions and make good. Mechanically clean joint surfaces free of any deposit or finish which may impair adhesion of the sealant. Immediately before jointing remove loose particles from the joint, using oil-free compressed air.

Bond breaking: Install bond breaking backing material.

Taping: Protect the surface on each side of the joint using 50 mm wide masking tape or equivalent means. On completion of pointing remove the tape and remove any stains or marks from the surface.

Primer: Apply the recommended primer to the surfaces in contact with sealant materials.

Sealant joint proportions

General weatherproofing joints (width:depth):

- 1:1 for joint widths < 12 mm.
- 2:1 for joint widths > 12 mm.

Sealant application

General: Apply the sealant to dry joint surfaces using a pneumatic applicator gun. Ensure the sealant completely fills the joint to the required depth; that it is in good contact with the full depth of the sides and that there is no air trapped in the joint. Do not apply the sealant outside the recommended working time for the material or the primer.

Weather conditions

Two pack polyurethanes: Do not apply the sealant if ambient conditions are outside the following:

- Temperature: < 5°C or > 40°C.
- Humidity: To the manufacturer's recommendations.

Joint finish

General: Force the sealant into the joint and finish with a smooth, slightly concave surface using a tool designed for the purpose.

Protection

General: Protect the joint from inclement weather during the setting or curing period of the material.

0183b METALS AND PREFINISHES

1 GENERAL

1.1 CROSS REFERENCES

General

General: Conform to the General requirements worksection.

2 PRODUCTS

2.1 METALS

Coated steel

Electrogalvanizing ferrous hollow and open sections: To AS 4750.

Hot dip galvanizing (zinc):

- Ferrous open sections by an in-line process: To AS/NZS 4791.
- Ferrous hollow sections by a continuous or specialised process: To AS/NZS 4792.

Metallic-coated sheet: To AS 1397.

- Thickness: Metal thicknesses specified are base metal thicknesses.

Steel wire: To AS/NZS 4534.

Stainless steel

Bars: To ASTM A276.

Plate, sheet and strip: To ASTM A240/A240M.

Welded pipe (round): To AS 1769.

Welded pipe (square): To ASTM A554.

3 EXECUTION

3.1 GENERAL

Metal separation

Incompatible sheet metals: provide separation by one of the following:

- Apply an anti-corrosion low moisture transmission coating such as zinc or barium chromate primer of aluminium pigmented bituminous paint to contact surfaces.
- Insert a concealed separation layer such as polyethylene film, adhesive tape, or bituminous felt.

Incompatible fixings: Do not use.

Incompatible service pipes: Install lagging or grommets. Do not use absorbent, fibrous of paper products.

Brazing

General: Ensure brazed joints have sufficient lap to provide a mechanically sound joint.

Butt joints: Do not use butt jointing for joints subject to loads. If butt joints are used, do not rely on the filler metal fillet only.

Filler metal: To AS/NZS 1167.1.

Finishing

Visible joints: Finish visible joints made by welding, brazing or soldering using methods appropriate to the class of work (including grinding or buffing) before further treatment such as painting, galvanizing or electroplating. Ensure self-finished metals are without surface colour variations after jointing.

Preparation

General: Before applying decorative or protective prefinishes to metal components, complete welding, cutting, drilling and other fabrication, and prepare the surface using a suitable method.

Standard: To AS 1627.

Priming steel surfaces: If site painting is specified to otherwise uncoated mild steel or similar surfaces:

- Prime after fabrication and before delivery to the works.

- After installation, repair damaged priming and complete the coverage to unprimed surfaces.

Welding

Aluminium: To AS 1665.

Stainless steel: To AS/NZS 1554.6.

Steel: To AS/NZS 1554.1.

3.2 ELECTROPLATING

Electroplated coatings

Chromium on metals: To AS 1192.

Nickel on metals: To AS 1192.

Service condition number: At least 2.

Zinc on iron or steel: To AS 1789.

3.3 ANODISING

Anodising

Standard: To AS 1231.

Thickness grade:

- Indoor applications: At least AA10.
- Outdoor applications: AA15 to AA20.

3.4 POWDER COATING

Standards

Architectural applications to aluminium and aluminium alloy substrates: AS 3715.

Architectural applications to substrates other than aluminium: AS 4506.

Preparation

General: Use chemical pretreatments. If recommended, provide conversion coatings.

Aluminium: Pretreat to AS 3715 Appendix G.

Galvanized steel: Clean by immersing in a suitable alkaline or acidic solution, apply a zinc phosphate chemical conversion coating, rinse and degas.

Unprotected steel: Remove rust to the recommendations of AS 1627.4 to grade Sa 2½ of AS 1627.9. Clean by immersing in trichloroethylene or an alkaline solution, and apply a coat of iron phosphate.

Thermoset polyester powder coating

Internal and external use: AS/NZS 4506.

Finish: Full gloss.

Thermoset fluoropolymer coating

Description: Factory applied spray coatings on aluminium products, including PVF_2 and PFTE coatings.

3.5 PREPAINTING

Air-drying enamel

Application: Spray or brush.

Finish: Full gloss.

General use:

- Primer: Two-pack epoxy primer to AS/NZS 3750.13.
- Top coats: 2 coats to AS 3730.6.

Oil resistant use:

- Primer: Two-pack epoxy primer to AS/NZS 3750.13.
- Top coats: 2 coats to AS 4025.1.

Equipment paint system

Description: Brush or spray application using paint as follows:

- Full gloss enamel finish coats, oil and petrol resistant: AS 4025.1, two coats.
- Prime coat to metal surfaces generally: AS 4089 or AS 4025.4.
- Prime coat to zinc-coated steel: AS 3730.15.
- Undercoat: AS 4025.2.

Prepainted metal products
Standard: To AS/NZS 2728.

Product type as noted in AS 2728: Not lower than the type appropriate to the field of application.

Stoving enamel
Application: Spray or dip.

Two-pack liquid coating
Application: Spray.

Finish: Full gloss.

Primer: Two pack epoxy primer to AS/NZS 3750.13.

Topcoat:

- Internal use: Proprietary polyurethane or epoxy acrylic system.
- External use: Proprietary polyurethane system.

3.6 COMPLETION

Damage
General: If prefinishes are damaged, including damage caused by unauthorised site cutting or drilling, remove and replace the damaged item.

Repair
General: If a repair is required to metallic coated sheet or electrogalvanized on inline galvanized steel products, clean the affected area and apply a two-pack organic primer to AS/NZS 3750.9.

0184 TERMITE MANAGEMENT

1 GENERAL

1.1 AIMS

Responsibilities
Provide termite management materials and systems.
Selections: As documented.

1.2 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

1.3 STANDARD

General
Termite barriers: To AS 3660.1.

1.4 INSPECTION

Notice
Inspection: Give sufficient notice so that inspection may be made of the completed termite barriers.

1.5 TESTS

Chemical soil barriers – reticulation systems
Type testing: To AS 3660.1 Appendix E.

1.6 SUBMISSIONS

Tests
Submit a Registered testing authority laboratory analysis certificate of chemical soil barrier type testing to Appendix E.

2 PRODUCTS

2.1 NON-CHEMICAL BARRIERS

Concrete slab barrier
Standard: To AS 3660.1 Section 4.

Termite cap and strip shields
Standard: To AS 3660.1 Section 5.

Woven stainless steel mesh barriers
Standard: To AS 3660.1 Section 6.

Graded stone particles barriers
Standard: To AS 3660.1 Section 7.

3 EXECUTION

3.1 NON-CHEMICAL BARRIERS

Concrete slab barrier
Standard: To AS 3660.1 Section 4.

Termite cap and strip shields
Standard: To AS 3660.1 Section 5.

Woven stainless steel mesh barriers
Standard: To AS 3660.1 Section 6.

Graded stone particles barriers
Standard: To AS 3660.1 Section 7.

3.2 COMPLETION

Termite barrier notice
Provide a durable notice permanently fixed in a prominent location to BCA B1.4 (i) (ii) or clause 3.1.3.2(b) and AS 3660.1 Appendix A.

Waste materials
Progressively cleaning: Ensure that no waste materials which could attract termites remain on the site.

Warranty
Terms: 10 years.

Completion inspection
At the end of the defects liability period, inspect the termite control systems and submit a report on their efficacy and status.

0185 TIMBER FINISHES AND TREATMENT

1 GENERAL

1.1 CROSS REFERENCES

General

General: Conform to the *General requirements* worksection.

1.2 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given below apply.

- Plywood: To AS/NZS 4491.
- 'Standard trade common names': To AS/NZS 1148.
- Groups of timbers: Terms employed for that purpose in relevant Australian standards.

1.3 SUBMISSIONS

Materials

Rainforest species: Submit source certification.

Pressure preservative treatment: For timber required to be pressure treated, submit a certificate or other satisfactory evidence showing that the timber has been treated.

2 PRODUCTS

2.1 TIMBER

Durability

General: Provide timbers having natural durability appropriate to the conditions of use, or preservative-treated timber of equivalent durability.

Natural durability class of heartwood: To AS 5604.

Minimum requirements:

- Class 1: Timbers in contact with ground.
- Class 2: Timbers above ground, not in continuous contact with moisture, well ventilated, protected from moisture but exposed to the weather.
- Class 3: Timbers above ground, not in continuous contact with moisture, well ventilated, protected with a finish, and well maintained.
- Class 4: Timbers fully protected from moisture, indoors, above ground, and well ventilated.

Lyctus susceptible timbers

General: Do not provide timbers containing Lyctus susceptible sapwood.

Preservative treatment

Glued laminated timber products: To AS/NZS 1604.5.

- Hazard classification: To Table A1.

Laminated veneer lumber (LVL): To AS/NZS 1604.4.

- Hazard classification. To Table A1.

Plywood: To AS/NZS 1604.3.

- Hazard classification: To Table A1.

Reconstituted wood-based products: To AS/NZS 1604.2.

- Hazard classification: To Table A1.

Sawn and round timber: To AS 1604.1.

- Hazard classification: To Table D1.

Moisture content

Tolerance: Make milled and dressed products from timbers seasoned as follows:

- To within 3% of the equilibrium moisture content appropriate to the timber and its intended conditions of use.

- To 10 – 15% moisture content.
- With no more than 3% difference between any 2 pieces in any one group.

Test: To AS/NZS 1080.1.

Protection: Protect timber and timber products stored on site from moisture and weather. For milled, prefinished, prefabricated and similar elements which are protected in the final structure, provide temporary weather protection until the permanent covering is in place.

Finished sizes

General: Provide milled timbers with actual dimensions which are at least the stated dimensions, except for dimensions qualified by a term such as 'nominal' or 'out of' to which industry standards for finished sizes apply.

Unseasoned timber

General: If unseasoned timber is used, or if variations in moisture are likely, allow for shrinkage, swelling and differential movement.

Surface finish

Hardwood: To AS 2796.1 Table B1.

Softwood: To AS 4785.1 Table B1.

3 EXECUTION

3.1 WORKMANSHIP

Ploughing

General: Back plough boards liable to warp (e.g. if exposed externally on one face). Make the width, depth and distribution of ploughs appropriate to the dimensions of the board and degree of exposure.

Painting

Edges: Chamfer edges of work to receive paint or similar coatings.

Priming: For woodwork to be painted, prime hidden surfaces before assembly.

0310b CONCRETE – COMBINED

1 GENERAL

1.1 AIMS

Responsibilities

General: Provide cast concrete that:

Has finishes to formed and unformed surfaces which are:

- Appropriate to the importance (visual or physical) of the concrete elements.
- Compatible with following trades and finishes.

Precast concrete: Provide elements that are:

- Undamaged by handling and installation.
- Independently designed and documented.
- Independently certified by a professional engineer for the design and the erected components.

Selections: As documented.

Design

Formwork: The design of the formwork is the contractor's responsibility.

1.2 CROSS REFERENCES

General requirements

General: Conform to the *General requirements* worksection.

1.3 STANDARDS

General

Formwork design and construction, formed surfaces: To AS 3610.

Steel decking including sheet connectors: To AS 2327.1.

Specification and supply of concrete: To AS 1379.

Concrete materials and construction: To AS 3600.

Concrete structures for retaining liquids: To AS 3735.

Methods and equipment

Precast elements: Comply with the recommendations of CIA Z48.

1.4 INTERPRETATIONS

Definitions

General: For the purposes of this worksection the definitions given below apply.

- Concrete class:
  - Normal: Concrete which is specified primarily by a standard compressive strength grade and otherwise in accordance with AS 1379 clause 1.6.3.
  - Special: Concrete which is specified to have certain properties or characteristics different from, or additional to, those of normal-class concrete and otherwise in accordance with AS 1379 clause 1.6.4.
- Early age: A mean compressive strength at 7 days exceeding the values shown in AS 1379 Table 2.
- Green concrete: Concrete which has set but not appreciably hardened.
- Precast units: Concrete elements manufactured in other than their final position including elements manufactured on site.
- Ambient temperature: The air temperature at the time of mixing and placing of concrete, and the predicted or likely air temperature at any time during the 48 hours following a concrete pour.
- Weather:
  - Cold: Ambient shade temperature < 10°C.
  - Hot: Ambient shade temperature > 32°C.

1.5 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Base or subgrade before covering.
- Membrane or film underlay installed on the base.
- Completed formwork, and reinforcement, cores, fixings and embedded items fixed in place.
- Surfaces or elements to be concealed in the final work before covering.
- Commencement of concrete placing.

For precast concrete:

- Panel edge details, and penetrations.
- Connection materials and inserts in place.
- Evaluation of surface finish.

1.6 TOLERANCES

Surface quality

Formed surfaces: Confirm conformance with the surface finish requirements of AS 3610 for the surface class nominated in the **Formed surface finishes schedule**.

Flatness

Unformed surfaces: Confirm conformance with the **Flatness tolerance classes table** for the class of finish nominated using a straight edge placed anywhere on the surface in any direction.

Flatness tolerance class table

Class	Measurement	Maximum deviation (mm)
A	3 m straight edge	3
B	3 m straight edge	6
C	600 mm straight edge	6

1.7 SHRINKAGE SENSITIVE STRUCTURES

Concrete performance

Drying shrinkage (maximum including tolerances): 650 μm for concrete up to and including strength grade 32; 700 μm for higher strength grades.

- Duration of air drying: 56 days

1.8 SUBMISSIONS

Design documentation

Certification: Submit certification by a qualified structural engineer experienced in formwork design verifying conformance of the design.

Precast:

- Veneered fabrication: If veneered fabrication is proposed submit proposals.
- Contractor design: Provide independent verification by a professional engineer of compliance of the design with project criteria.
- Shop drawings: Submit shop drawings of units showing the proposed details for their design, manufacture, assembly, transport and installation, including the following:
  - Project title and manufacturer's name.
  - Shape or profile drawings (submit these before fabrication of moulds and tooling).
  - Calculations showing method of complying with nominated performance requirements.
  - Concrete mix and type of cement if special-class concrete.
  - Veneer details, if applicable.
  - Formwork type.
  - Locations, sizes, details, materials and stress grades of tendons and reinforcement.
  - Locations, sizes, details, materials, corrosion protection and grades of cast-in ferrules, locating plates, bolts, anchors, lifting devices.
  - Details of all joints.
  - Jack clearances, procedures, stressing sequence, initial tensioning forces gauge pressure, and tendon elongation.
  - Surface finish class and surface treatment, if applicable.
  - Curing and protection methods.
  - Marking plan.

- Equipment and methods for handling, transport and installation, including lifting inserts and pick-up points.
- Calculated maximum loadings on lifting and bracing inserts and attachments.
- Evidence of load capacity of lifting and bracing inserts and attachments in the form of test reports or calculations.
- Specification of plugs for sealing recesses for cast-in fixings.

- Lifting:
  - Early lifting: If it is proposed to lift the units by their designated lifting points before 28 day strength has been achieved, submit evidence to demonstrate that the unit has adequate strength to carry its own weight without damage or residual cracking or deflection on removal of the lifting device.
  - Attachments for handling purposes: If it is proposed to locate lifting attachments, holes and other temporary fixings for handling purposes on visible faces of units, submit proposals.
  - Lifting units: If it is proposed to lift or support units at other than specified points, submit proposals.

Execution – documentation

Certification: Submit certification by a qualified structural engineer experienced in formwork design and construction for verifying conformance of the completed formwork.

Reshoring: If reshoring is intended, submit proposals.

Product proposals

Curing compounds: If it is proposed to use a liquid membrane-forming curing compound submit the following information:

- Certified test results for water retention to AS 3799 Appendix B.
- Evidence of compatibility with concrete, and with applied finishes including toppings and render, if any, including methods of obtaining the required adhesion.
- For visually important surfaces, evidence that an acceptable final surface colour will be obtained.

Void formers: Submit test certificates to confirm that the formers comply with the following requirements under laboratory conditions, when placed on damp sand and loaded with a mass of wet concrete equal to at least the mass of the beams or slabs they are required to support:

- Deflection during placing and compaction of the concrete is less than the span of the beam or slab divided by 1000.
- Additional deflection between initial set and 7 days does not exceed span/400.
- Collapse and loss of load carrying capacity will occur not more than 48 hours after flooding with water, creating a void at least 60% of the original depth of the void former.

Cores, fixings and embedded items: If the locations of these items are not shown or are shown diagrammatically, submit shop drawings showing the proposed locations, clearances and cover. Indicate proposed repositioning of reinforcement.

Pre-mixed supply

Delivery docket: For each batch, submit a docket listing the information required by AS 1379, and the following information:

- For special class performance concrete, specified performance and type of cement binder.
- For special class prescription concrete, details of mix, additives, and type of cement binder.
- Method of placement and climate conditions during pour.
- Name of concrete delivery supervisor.
- Project assessment carried out each day.
- The amount of water, if any, added at the site.
- The concrete element or part of the works for which the concrete was ordered, and where it was placed.
- The total amount of water added at the plant and the maximum amount permitted to be added at the site.

Subcontractors: Submit names and contact details of proposed pre-mixed concrete suppliers, and alternative source of supply in the event of breakdown of pre-mixed or site mixed supply.

2 PRODUCTS

2.1 POLYMERIC FILM UNDERLAY

Standard

Vapour barriers and damp-proofing membranes: To AS 2870.

Location

General: Under slabs on ground including integral ground beams and footings, provide a vapour barrier or, in areas prone to rising damp or salt attack, a damp-proofing membrane.

Installation
General: Lay over the base, lap joints at least 200 mm and seal the laps and penetrations with waterproof adhesive tape. Face the laps away from the direction of concrete pour. Take the underlay up vertical faces past the damp proof course where applicable, and tape fix at the top. Patch or seal punctures or tears before pouring concrete. Cut back as required after concrete has gained strength and forms have been removed.

Base preparation
General: According to base type, as follows:

- Concrete working base: Remove projections above the plane surface, and loose material.
- Graded prepared subgrade: Blind with sufficient sand to create a smooth surface free from hard projections. Wet the sand just before laying the underlay.

2.2 FORMWORK

Form linings and facings
Compatibility: To be compatible with finishes to be applied to concrete.

Lost formwork
General: Not to contain timber or chlorides and not to impair the structural performance of the concrete members.

Release agents
Compatibility: To be compatible with finishes to be applied to the concrete.

Void formers
Material: To be cardboard or fibreboard, collapsible on absorption of moisture.

2.3 STEEL DECKING

General
Material: Hot-dipped zinc-coated sheet steel to AS 1397, minimum G500-Z200.

2.4 REINFORCEMENT

Fibre reinforcement
Reference: CIA CPN35.

Protective coating
General: For concrete elements containing protective coated reinforcement, provide the same coating type to all that element's reinforcement and embedded ferrous metal items, including tie wires, stools, spacers, stirrups, plates and ferrules, and protect other embedded metals with a suitable coating.

Epoxy coating: To be high build, high solids chemically resistant coating.

- Thickness: 200 µm minimum.

Galvanizing: To AS/NZS 4680:

- Sequence: If fabrication is to occur after galvanizing, submit proposals for galvanizing repair and coating of cut ends.
- Zinc-coating (minimum): 600 g/m^2.

Steel reinforcement
Standard: To AS/NZS 4671.

- Ductility grade: Class N.

Surface condition: Free of loose mill scale, rust, oil, grease, mud or other material which would reduce the bond between the reinforcement and concrete.

Tie wire
General: To be annealed steel 1.25 mm diameter (minimum).

External and corrosive applications: Galvanized.

2.5 CONCRETE

Standard
General: To AS 3600.

2.6 PRECAST UNITS

Marking
Identification: Identify units by marks which are as follows:

- Remain legible until after the unit has been fixed in place.
- Are not visible in the completed structure.
- Show the date of casting.
- Show the correct orientation of the unit.

- On other than units manufactured as a standard product, indicate the locations within the structure in accordance with the marking plan.

Structural performance requirements
Additional: Comply with Structural Engineer's requirements.

Tolerances
Fixings and embedded items in precast units: To AS 3610 and AS 3850, as applicable.

Lifting and bracing inserts
Capacity: To AS 3850 clauses 2.4.2 and 2.4.3.

Attachments
Sealing: Recess lifting attachments such as ferrules, or other types of cast-in fixings, and provide plugs for sealing.

Welding of connections
Standard: To AS/NZS 1554.3.

Veneered construction
Method: Use a method which ensures that delamination of the veneer will not occur.

Cover to reinforcement: Excludes applied finish or finishing layer that has thermal or chemical properties different from, and/or lesser water penetration resistance than, the main body of concrete in the unit. Provide clear cover from interface between layers as follows:

3 EXECUTION

3.1 FORMWORK

General
General: Conform to the **Formed surfaces schedule**.

Preparation
Cleaning: Before placing concrete, remove free water, dust, debris and stains from the forms and the formed space.

Corners
Work above ground: Chamfer at re-entrant angles, and fillet at corners.

- Face of bevel 25 mm.

Embedments
General: Fix embedments through formwork to prevent movement, or loss of slurry or concrete, during concrete placement.

Openings
General: In vertical forms provide form openings or removable panels for inspection and cleaning, at the base of columns, walls and deep beams.

Access: For thin walls and columns, provide access hatches for placing concrete.

Release agents
Application: Before placing reinforcement, apply a release agent to form linings and facings.

Steel decking
Fixing: If sheeting cannot be fixed to structural steel supports with puddle welds, or with welded shear studs in composite construction, provide details

Steel linings
Rust: Clean off any rust and apply rust inhibiting agent prior to reuse.

Visually important surfaces
General: For concrete of surface finish classes 1, 2 or 3, set out the formwork to give a regular arrangement of panels, joints, bolt holes, and similar visible elements in the formed surface.

Void formers
Use: Cast designated suspended ground floor slabs and beams on void formers.

Protection: Keep void formers dry until use, place them on a firm level surface and place reinforcement and concrete with minimum delay.

3.2 REINFORCEMENT

Tolerances
Fabrication and fixing: To AS 3600.

Dowels
Fixing: If a dowel has an unpainted half, embed this in the concrete placed first.

Tolerances:

- Alignment: 2 mm in 300 mm.
- Location: ± half the diameter of the dowel.

Grade: 250 N.

Supports

General: Provide proprietary concrete, metal or plastic supports to reinforcement in the form of chairs, spacers, stools, hangers and ties, as follows:

- To be adequate to withstand construction and traffic loads.
- With a protective coating if they are ferrous metal extending to the surface of the concrete, or are used with galvanized or zinc-coated reinforcement.

Minimum spacing:

- Bars: ≤ 60 diameters.
- Fabric: ≤ 800 mm.

Supports over membranes: Prevent damage to waterproofing membranes or vapour barriers. If appropriate, place a metal or plastic plate under each support.

Projecting reinforcement

General: If 'starter' or other bars project beyond reinforcement mats or cages, through formwork or from cast concrete, provide a plastic protective cap to each bar until it is incorporated into subsequent work.

Tying

General: Secure the reinforcement against displacement by tying at intersections with either wire ties, or clips. Bend the ends of wire ties away from nearby faces of forms so that the ties do not project into the concrete cover.

Beams: Tie stirrups to bars in each corner of each stirrup. Fix other longitudinal bars to stirrups at 1 m maximum intervals.

Columns: Secure longitudinal column reinforcement to all ties at every intersection.

Mats: For bar reinforcement in the form of a mat, secure each bar at alternate intersections

Tolerances: To AS 3600 Section 19.

Welding

General: If welding of reinforcement is proposed, provide details.

3.3 CEMENT

Bagged cement

Standard: To AS 3972.

- Age: Less than 6 months old.
- Storage: Store cement bags under cover and above ground.

Chemical admixtures

Contents: Free of chlorides, fluorides and nitrates.

3.4 CONCRETE

General

General: Provide concrete in conformance with the **Properties table – performance** in the Selections.

Elapsed delivery time

General: Ensure that the elapsed time between the wetting of the mix and the discharge of the mix at the site is in conformance with the **Elapsed delivery time table**. Do not discharge at ambient temperature below 10°C or above 30°C.

Elapsed delivery time table

Concrete temperature at time of discharge (°C)	Maximum elapsed time (hours)
10 – 24	2.00
24 – 27	1.50
27 – 30	1.00
30 – 32	0.75

Pre- mixed supply

Addition of water: If water is to be added, comply with AS 1379 Section 4.2.3.

Transport: Mode must prevent segregation, loss of material and contamination of the environment, and must not adversely affect placing or compaction.

Site mixed supply

Emergencies: If mixing by hand is carried out, provide details.

Plant: Mix concrete in a plant located on the construction site.

3.5 CORES, FIXINGS AND EMBEDDED ITEMS

Adjoining elements

General: For adjoining elements to be fixed to or supported on the concrete, provide for the required fixings. If required, provide for temporary support of adjoining elements during construction of the concrete.

Corrosion: If in external or exposed locations, galvanize anchor bolts and embedded fixings, or propose alternative materials such as stainless steel.

Position: Fix cores and embedded items to prevent movement during concrete placing. In locating cores, fixings and embedded items, reposition but do not cut reinforcement, and maintain cover to reinforcement.

Isolation: Isolate embedded items so that water cannot track to concrete providing minimum cocver to reinforcement.

3.6 CONCRETE PLACING AND COMPACTION

Compaction

Methods: Use immersion and screed vibrators accompanied by hand methods as appropriate to remove entrapped air and to fully compact the mix.

Vibrators: Do not allow vibrators to come into contact with set concrete, reinforcement or items including pipes and conduits embedded in concrete. Do not use vibrators to move concrete along the forms. Avoid over-vibration that may cause segregation.

Placing

General: Use placing methods which avoid segregation and loss of concrete, and which minimise plastic settlement. Maintain a generally vertical and plastic concrete edge during placement.

Layers: Place concrete in layers ≤ 300 mm thick, such that each succeeding layer is compacted before previous layer has taken initial set. Compact into previous layer.

Placing records

General: Keep on site and make available for inspection a log book recording each placement of concrete, including the following:

- Date.
- Specified grade and source of concrete.
- Slump measurements.
- The portion of work.
- Volume placed.

Rain

General: During placement and prior to setting, do not expose concrete to rain.

Protection: Protect surface from damage by covering until hardened.

Time between adjacent placements

General: Conform to the **Minimum time delay schedule**.

Vertical elements

General: In vertical elements, limit the free fall of concrete to 1500 mm per 100 mm element thickness, up to a maximum free fall of 3000 mm, using enclosed vertical chutes or access hatches in forms.

3.7 CONCRETE PLACING IN COLD WEATHER

Cement

General: Do not use high alumina cement.

Placing

Concrete: Maintain the temperature of the freshly mixed concrete at ≥ 5°C.

Formwork and reinforcement: Before and during placing maintain temperature at ≥ 5°C.

Severe weather

General: If severe weather conditions are predicted, use high early strength cement.

Temperature control

General: Heat the concrete materials, other than cement, to the minimum temperature necessary to ensure that the temperature of the placed concrete is within the limits specified.

Admixtures: Do not use calcium chloride, salts, chemicals or other material in the mix to lower the freezing point of the concrete.

Frozen materials: Do not allow frozen materials or materials containing ice to enter the mixer, and keep free of frost and ice any forms, materials, and equipment coming in contact with the concrete.

Maximum temperature of water: 60°C when it is placed in the mixer.

Plastic concrete: Prevent plastic concrete from freezing, without using salts or chemicals.

3.8 CONCRETE PLACING IN HOT WEATHER

Handling
General: Prevent premature stiffening of the fresh mix and reduce water absorption and evaporation losses.

Placing
Formwork and reinforcement: Before and during placing maintain temperature at ≤ 35°C.

Severe weather
General: If ambient shade temperature > 38°C, do not mix concrete.

Temperature control
General: Select one or more of the following methods of maintaining the specified temperature of the placed concrete:

- Cool the concrete using liquid nitrogen injection before placing.
- Cover the container in which the concrete is transported to the forms.
- Spray the coarse aggregate using cold water prior to mixing.
- Use chilled mixing water.

Hot weather placing table

Concrete element	Temperature limit
Normal concrete in footings, beams, columns, walls and slabs	35°C
Concrete in sections ≥ 1 m in all dimensions except for concrete of strength 40 MPa or greater, in sections exceeding 600 mm in thickness	27°C

Evaporation control
Barriers: Erect barriers to protect freshly placed concrete from drying winds.

3.9 CONCRETE CURING

General
Curing: Cure continuously from completion of finishing until the total cumulative number of days or fractions of days, during which the air temperature in contact with the concrete is above 10°C, is at least the following, unless accelerated curing is adopted:

- Fully enclosed internal surfaces/Early age concrete: 3 days.
- Other concrete surfaces: 7 days.

End of curing period: Prevent rapid drying out at the end of the curing period.

Protection: Maintain at a reasonably constant temperature with minimum moisture loss, during the curing period.

Cold weather curing
General: Maintain concrete temperature between 10 – 20°C for curing period.

Curing compounds
Standard: To AS 3799.

Application: Provide a uniform continuous flexible coating without visible breaks or pinholes, which remains unbroken at least for the required curing period after application.

Substrates: Do not use wax-based or chlorinated rubber-based curing compounds on surfaces forming substrates to applied finishes, concrete toppings and cement-based render.

Self levelling toppings: If used also as curing compounds, confirm compliance with AS 3799.

Visually important surfaces: Apply curing compounds to produce uniform colour on adjacent surfaces.

Hot weather curing
Curing compounds: If it is proposed to use curing compounds, provide details.

Protection: Select a protection method as applicable.

- If the concrete temperature exceeds 25°C or if not protected against drying winds, protect the concrete using a fog spray application of aliphatic alcohol evaporation retardant.
- If ambient shade temperature is > 35°C, protect from wind and sun using an evaporative retarder until curing is commenced.
- Immediately after finishing, either cover exposed surfaces using an impervious membrane or hessian kept wet until curing begins, or apply a curing compound.

Water curing
General: If water is used, pond or continuously sprinkle in such a way as to not cause damage to the concrete surface, for the required curing period.

3.10 JOINTS

Construction joints
Location: Do not relocate or eliminate construction joints, or make construction joints not shown on the drawings. If emergency construction joints are made necessary by unforeseen interruptions to the concrete pour, submit a report on the action taken.

Finish: Butt join the surfaces of adjoining pours. In visually important surfaces make the joint straight and true, and free from blemishes impermissible for its surface finish class.

Preparation: Roughen and clean the hardened concrete joint surface. Remove loose or soft material, free water, foreign matter and laitance. Dampen the surface just before placing the fresh concrete and coat with a neat cement slurry.

Slip joints
Requirement: If concrete slabs are supported on masonry, provide proprietary slip joints.

3.11 FORMED SURFACES

Damage: Do not damage concrete works through premature removal of formwork.

Curing
General: If forms are stripped when concrete is at an age less than the minimum curing period, commence curing exposed faces as soon as the stripping is completed.

Evaluation of formed surfaces
General: If evaluation of formed surface tolerance or colour is required, complete the evaluation before surface treatment.

Finishing methods
General: If soffits of concrete elements or faces of concrete columns are to have a finish other than off the form, provide details of proposed procedures.

Blasted finishes:

- Abrasive: Blast the cured surface using hard, sharp graded abrasive particles until the coarse aggregate is in uniform relief.
- Light abrasive: Blast the cured surface using hard, sharp graded abrasive particles to provide a uniform matt finish without exposing the coarse aggregate.

Bush hammered finish: Remove the minimum matrix using bush hammering to expose the coarse aggregate, recessing the matrix no deeper than half the aggregate size, to give a uniform texture.

Exposed aggregate finish: Remove the vertical face forms while the concrete is green. Wet the surface and scrub using stiff fibre or wire brushes, using clean water freely, until the surface film of mortar is mechanically removed, and the aggregate uniformly exposed. Do not use acid etching. Rinse the surface with clean water.

Floated finishes:

- Sand floated finish: Remove the vertical face forms while the concrete is green. Wet the surface and rub using a wood float. Rub fine sand into the surface until a uniform colour and texture are produced.
- Grout floated finish: Remove the forms while the concrete is green. Dampen the surface and spread a slurry, using hessian pads or sponge rubber floats. Remove surplus slurry and work until a uniform colour and texture are produced.

Smooth rubbed finish: Remove the vertical face forms while the concrete is green. Wet the surface and rub using a carborundum or similar abrasive brick until a uniform colour and texture are produced.

Surface repairs
Surface repair method: If surface repairs are required, submit proposals.

3.12 UNFORMED SURFACES

General
General: Strike off, screed and level slab surfaces to finished levels.

Surface repairs
Surface repair method: If surface repairs are required, submit proposals.

Finishing methods – primary finish
Machine float finish:

- After levelling, consolidate the surface using a machine float.
- Cut and fill and refloat immediately to a uniform, smooth, granular texture.
- Hand float in locations inaccessible to the machine float.

Steel trowel finish: After machine floating finish as follows:

- Use power or handsteel trowels to produce a smooth surface relatively free from defects.
- When the surface has hardened sufficiently, retrowel to produce the final consolidated finish free of trowel marks and uniform in texture and appearance.

Burnished finish: Continue steel trowelling until the concrete surface attains a polished or glossy appearance, uniform in texture, appearance and free of trowel marks and defects.

Wood float finish: After machine floating use wood or plastic hand floats to produce the final consolidated finish free of float marks and uniform in texture and appearance.

Broom finish: After machine floating and steel trowelling draw a broom or hessian belt across the surface to produce a coarse even-textured transverse-scored surface.

Scored or scratch finish: After screeding, give the surface a coarse scored texture using a stiff brush or rake drawn across the surface before final set.

Sponge finish: After machine floating and steel trowelling, obtain an even textured sand finish by wiping the surface using a damp sponge.

Finishing methods – supplementary finish

Abrasive blast: After steel trowelling, abrasive blast the cured surface to provide texture or to form patterns without exposing the coarse aggregate using hard, sharp graded abrasive particles.

Coloured applied finish: To a machine float finished surface, apply a proprietary liquid or dry shake material in accordance with the manufacturer's written requirements and trowel to achieve the required appearance.

Stamped and coloured faux paved or cobblestone finish: A complete proprietary finishing system.

Exposed aggregate: After steel trowelling, grind the cured surface of the concrete to expose the coarse aggregate.

3.13 PRECAST UNITS

Handling

Lifting: Lift or support units only at designated or other approved points. Use handling methods which do not overstress, warp or damage the units.

Attachments

Remove temporary attachments after erection. Seal or otherwise make good residual recesses.

Installation

Fixing: Fix the units securely and accurately in their final positions.

Ancillaries: Provide components and materials, including fasteners, braces, shims, jointing strips, sealant, flashings, grout and mortar, necessary for the installation of the units.

Protection

General: Protect the units against staining, discolouration and other damage until they are installed in their final location.

3.14 COMPLETION

Formwork removal

Extent: Remove formwork, other than steel reinforcement decking, including formwork in concealed locations, but excepting lost formwork.

Timing: Do not disturb forms until concrete is hardened enough to withstand formwork movements and removal without damage.

Stripping:

- General: To AS 3600 where it is more stringent than AS 3610.

Loading

General: Do not erect masonry walls or other brittle elements on beams and slabs while they are still supported by formwork.

Unencased reinforcement

General: If 'starter bars' and other items project from cast concrete for future additions and are exposed to the weather, provide details of protection.

Protection

Protection: Protect the concrete from damage due to construction load overstresses, physical and thermal shocks, and excessive vibrations, particularly during the curing period.

Surface protection: Protect finished concrete surfaces and applied finishes from damage.

0331b BRICK AND BLOCK CONSTRUCTION

1 GENERAL

1.1 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

1.2 STANDARD

General
Materials and construction: To AS 3700.

1.3 INSPECTION

Notice
Inspection: Give sufficient notice so that inspection may be made of the following:
- Unit type, colour and texture.
- Bottoms of cavities, after cleaning out.
- Bottoms of core holes, before grouting.
- Reinforcement type and diameter.
- Positioning of reinforcing before grouting.
- Control joints, ready for insertion of joint filler.
- Damp-proof courses, in position.
- Flashings, in position.
- Lintels, in position.
- Structural steelwork, including bolts and shelf angles, in position.

1.4 TOLERANCES

Masonry construction
Conformance: Conform to AS 3700 Table 11.1.

2 PRODUCTS

2.1 MATERIALS

Bricks and blocks
Standard: To AS/NZS 4455.
Minimum age of clay bricks: 7 days.

Mortar materials
Admixtures:
- Admixtures: To AS 3700 clause 10.4.2.4.

Lime: To AS 1672.1.
Portland cement: To AS 3972.
- Type: GP.

Proportions: Conform to the **Mortar mix table**.
Sand: To be fine aggregate with low clay content and free from efflorescing salts, selected for colour and grading.
Water: To be clean and free from any deleterious matter.
White cement: To have iron salts content ≤ 1%.
Pigment: To BS EN 12878, and as follows:
- Quantity: Less than 10% of the mass of cement in the mix.

For light colours: Use off-white cement in the mix.

Mortar mix table

Mortar class to AS 3700	Cement, lime, sand ratios (by volume)			Water thickener
	Clay	Concrete	Calcium silicate	
Masonry cement				
M3	1:0:4	1:0:4	n/a	No
M4	1:0:3	n/a	n/a	No
Portland cement				
M2	1:2:9	n/a	n/a	No
M3	1:1:6	1:1:6	n/a	Optional
	1:0:5	1:0:5	1:0:5	Yes
M4	1:0.5:4.5	1:0.5:4.5	n/a	Optional
	1:0:4	1:0:4	1:0:4	Yes

2.2 COMPONENTS

Steel lintels

Angles and flats: To AS/NZS 3679.1.

Cold formed proprietary lintels: Designed to AS/NZS 4600.

Corrosion protection: To AS/NZS 2699.3.

Galvanizing: Do not cut after galvanizing.

Wall ties

Standard: To AS/NZS 2699.1.

Corrosive resistance and durability: In conformance with the **Corrosion resistance and durability table**.

Strength classification:

- Masonry veneer: Light duty.
- Normal cavity construction and at abutments: Medium duty.
- Cavities > 60 and < 200 mm wide: Heavy duty.

Corrosion resistance and durability

Compliance: Conform to the **Corrosion resistance and durability table(s)**, or provide proprietary products with metallic and/or organic coatings of equivalent corrosion resistance and as follows:

- Built-in products: Below damp proof course to be stainless steel 316 or engineered polymer.
- Bricks and blocks: Below damp-proof course, and in external leaves in the High corrosivity category, use 'Exposure' category to AS/NZS 4456.10: 1997 Appendix A (Salt attack resistance categories).
- Mortar: Below damp-proof course use mortar grade M4 to the **Mortar mix table**.

Corrosion resistance and durability table – High corrosivity category

Situation	Steel lintels	Wall ties, connectors and other structural steel accessories above damp proof course	Minimum cement content (mortar grade) above damp proof course
Internal	Galvanize after fabrication 470 g/m^2	- Galvanize after fabrication 470 g/m^2	M2
External	- Stainless 316 - Galvanize after fabrication 600 g/m^2 plus organic coating	- Stainless 316 - Engineered polymer	M4

Connectors and accessories

Standard: To AS/NZS 2699.2.

Flexible masonry ties: If accommodation of movement is required at control joints and where masonry abuts structural elements such as column faces and slab soffits, provide details.

Flashings and damp-proof courses
Standard: To AS/NZS 2904.

3 EXECUTION

3.1 GENERAL

Mortar mixing
General: Measure volumes accurately to achieve the specified proportions. Machine mix for at least six minutes.

Protection from contamination
General: Protect masonry materials and components from ground moisture and contamination.

Bond
Type: Stretcher bond.

Building in
Embedded items: Build in wall ties and accessories as the construction proceeds. If it is not practicable to obtain the required embedment wholly in the mortar joint in hollow unit brickwork or blockwork, fill appropriate cores with grout or mortar.

Steel door frames: Fill the backs of jambs and heads solid with mortar as the work proceeds.

Clearance for timber frame shrinkage
General: In timber frame brick veneer construction, leave clearances between window frames and brick sill and between roof frames and the brick veneer as follows:

- Additional clearance: Accommodate additional shrinkage of unseasoned floor timbers.
- Single storey frames and ground floor windows (not for slab on ground): 10 mm.
- Two storey frames and upper floor windows: 20 mm.

Construction at different rates or times
Monolithic structural action: If two or more adjoining sections of masonry, including intersecting walls, are constructed at different rates or times, rake back or tie the intersections between those sections so that monolithic structural action is obtained in the completed work.

Joining to existing
General: If jointing to existing work is required, provide a straight joint. Do not tooth new masonry into existing work.

Joints
Solid and cored units: Lay on a full bed of mortar. Fill perpends solid. Cut mortar flush.

Face-shell bed hollow units: Fill perpends solid. Cut mortar flush.

Finish:

- Externally: Tool to give a dense water-shedding finish.
- Internally: If wall is to be plastered, do not rake more than 10 mm to give a key.
- Thickness: 10 mm.

Cutting: Set out masonry with joints of uniform width and the minimum of cutting of masonry units.

Monolithic structural action
General: Provide brick or block header units, except in stretcher bond facework, to AS 3700 clause 4.11.2.

Spacing: 600 mm maximum.

Location:

- At engaged piers.
- At engagement of diaphragms with the leaves in diaphragm walls.
- At intersections of flanges with shear walls.
- At intersections with supporting walls and buttresses.
- Between leaves in solid masonry construction.

Rate of construction
Regulate the rate of construction to eliminate joint deformation, slumping or instability.

Rods
Set out: Construct masonry to the following rods:

- 75 mm high units: 7 courses to 600 mm.
- 90 mm high units: 6 courses to 600 mm.

- 190 mm high units: 3 courses to 600 mm.

Weather protection
General: Keep the top surface of brickwork and blockwork covered to prevent the entry of rainwater.

Temporary support
General: If the final stability of the brickwork or blockwork is dependent on (structural) elements to be constructed after the brickwork or blockwork, provide proposals for temporary support or bracing.

3.2 FACEWORK

Cleaning
General: Clean progressively as the work proceeds to remove mortar smears, stains and discolouration. Do not use an acid solution. Do not erode joints if using pressure spraying.

Colour mixing
Distribution: In facework, distribute the colour range of units evenly to prevent colour concentrations and 'banding'.

Commencement
General: Commence at least 1 full course for blockwork, or 2 full courses for brickwork, below adjacent finished level.

Double face walls
Selection: Select face units for uniform width and double-face qualities in single-leaf masonry with facework both sides.

Preferred face: Before starting, obtain a ruling as to which is the preferred wall face, and favour that face should a compromise be unavoidable.

Perpends
General: If it is proposed to use other than vertically aligned perpends in alternate courses, provide details.

Sills and thresholds
General: Solidly bed sills and thresholds and lay them so that the top surfaces drain away from the building.

Set out: Set out so that no unit is cut smaller than three quarters full width.

3.3 SUBFLOOR WORK

Access openings
General: In internal walls, leave door width openings beneath doorways to give access to underfloor areas.

Air vent locations
General: Provide air vents to give adequate cross ventilation to the space under ground floors.

Cavity walls: Provide matching vents in the internal leaves located as near as practicable to the vents in the external leaves.

Location: Below damp-proof course to internal and external walls.

Air vent types
Blockwork:

- Concrete framed: Bronze wire mesh in concrete frame 390 x 190 mm.
- Vent blocks: Purpose-made vent blocks.

Brickwork:

- Concrete framed: Bronze wire mesh in concrete frames, 470 x 160 mm.
- Cut brick: 2 cut bricks laid vertically and evenly spaced in a 230 mm wide x 2 course high opening, backed with bronze wire mesh built in.
- Terra cotta: Perforated, 230 x 160 mm.

Underpinning
Requirement: Install underpinning while maintaining the building undamaged.

Grouting: Pack dry mix M4 mortar between underpinning and existing structure at the completion of each panel of underpinning.

3.4 CAVITY WORK

Cavity clearance
General: Keep cavities clear at all times.

Cavity fill
General: Fill the cavity to 1 course above adjacent finished (ground) level with mortar. Fall the top surface towards the outer leaf.

Cavity width

General: Provide minimum cavity widths in conformance with the following:

- Masonry walls: 50 mm.
- Masonry veneer walls: 40 mm between the masonry leaf and the load bearing frame and 25 mm minimum between the masonry leaf and sheet bracing.

Openings

Care: Do not close the cavity at the jambs of external openings.

Wall ties connectors and accessories

Protection: Install to prevent water passing across the cavity.

3.5 DAMP-PROOF COURSES

Location

General: Provide damp-proof courses as follows:

- At timber floors: In the first course below the level of the underside of ground floor timbers in internal walls and inner leaves of cavity walls.
- Cavity walls built off slabs on ground: In the bottom course of the outer leaf, continuous horizontally across the cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 1 course above.
- Masonry veneer construction: In the bottom course of the outer leaf, continuous horizontally across the cavity. Fasten to the inner frame 75 mm above floor level.
- Walls adjoining infill floor slabs on membranes: In the course above the underside of the slab in internal walls and inner leaves of cavity walls. Project 40 mm and dress down over the membrane turned up against the wall.

Height: Not less than:

- 150 mm above the adjacent finished ground level.
- 75 mm above the finished paved or concrete area.
- 50 mm above the finished paved or concreted area and protected from the direct effect of the weather.

Installation

General: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding 2 courses per step for brickwork and 1 course per step for blockwork. Sandwich damp-proof courses between mortar.

- Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses and waterproof membranes.

3.6 FLASHINGS

Location

General: Provide flashings and weatherings as follows:

- Floors: Full width of outer leaf immediately above slab or shelf angle, continuous across cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 2 courses above for brick and 1 course above for block. Where the slab supports the outer skin and is not rebated, bed the flashing in a suitable sealant.
- Under sills: 30 mm into the outer leaf bed joint 1 course below the sill, extending up across the cavity and under the sill in the inner leaf or the frame. Extend at least 150 mm beyond the reveals or each side of the opening..
- Over lintels to openings: Full width of outer leaf immediately above the lintel, continuous across cavity, turned 30 mm into the inner leaf 2 courses above above for brick and 1 course above for block or turned up against the inner frame and fasten to it. Extend at least 150 mm beyond the lintels. Extend at least 50 mm beyond the lintels.
- At abutments with structural frames or supports: Vertical flash in the cavity using 150 mm wide material, wedged and grouted into a groove in the frame opposite the cavity.
- At jambs: Full height flash extending 75 mm beyond the closure into the cavity, interleaved with the sill and head flashing at each end. Fix to jambs.
- At roof abutments with cavity walls: Cavity flash immediately above the roof and over-flash the roof apron flashing.

Installation

General: Sandwich flashings between mortar except on lintels or shelf angles. Bed flashings, sills and copings in one operation to maximise adhesion.

Pointing: Point up joints around flashings, filling voids.

Weepholes

Location: Provide weepholes to external leaves of cavity walls in the course immediately above flashings, and cavity fill, and at the bottoms of unfilled cavities.

Form: Open perpends.
Maximum spacing: 1200 mm.

3.7 WALL TIES

Classification
Durability Classification to AS/NZS 2699.1
Conformance; Provide ties in conformance with the **Wall ties category table**.

Wall ties category table

Classification to AS/NZS 2699.1	Service conditions
Medium duty	Normal cavity construction
Medium duty	Tie bonding at abutments
Heavy duty	Cavities > 60 mm wide

Corrosion protection: To BCA Table 3.3.3.1.

Location
Provide wall ties spacing in conformance with AS 3700 clause 4.10 *Wall ties* or BCA Figure 3.3.3.1 as follows:
- Not more than 600 mm in each direction.
- Adjacent to vertical lateral supports.
- Adjacent to control joints.
- Around openings.

Installation
Embedment: At least 50 mm into mortar ensuring that mortar cover is 15 mm minimum to the outside face of the mortar.

3.8 CONTROL OF MOVEMENT

Joints
General: Provide joints as follows:
- Contraction joints for concrete and calcium silicate masonry:
  - Maximum length of continuous wall: 6 m.
  - Minimum width of control joint: 10 mm.
- Expansion joints for clay brickwork:
  - Maximum length of continuous wall: 6 m.
  - Maximum vertical spacing: 8 m.
  - Width of control joint: ≥ 10 mm ≤ 20 mm.
  - Width of horizontal joint: ≥15 mm ≤ 20 mm.

3.9 MASONRY DUCT RISERS

Location
General: Build a one-piece corrosion resistant metal tray to the masonry duct risers at roof level.

Installation
General: Cut an opening for the riser. Turn tray edges up 25 mm around the opening 13 mm clear of the walls. Externally turn the tray up 100 mm under the stepped flashing and down 100 mm over the apron flashing. Lap and solder joints.

Weepholes
General: Provide 2 weepholes through the masonry duct riser walls on opposite sides immediately above the tray.

3.10 BRICK BED JOINT REINFORCEMENT

Location
General: Locate as follows:
- In 2 bed joints below and above head and sill flashings to openings.
- In 2 bed joints below and above openings.
- In third bed joint above bottom of wall.
- In second bed joint below top of wall.

Maximum vertical intervals: 500 mm.

Installation

General: Lap 450 mm at splices. Fold and bend at corners so that the longitudinal wires are continuous. Stop 50 mm short of control joints.

- In brickwork: Extend 450 mm beyond each side of openings.

Reinforcement

Material: Galvanized welded wire mesh.

Width: Equal to the width of the leaf, less 15 mm cover from each exposed surface of the mortar joint.

3.11 REINFORCED AND GROUTED BLOCKWORK

Cleaning core holes

General: Provide purpose-made cleanout blocks or machine cut a cleaning hole at the base of each grouted core.

Location: Locate on the side of the wall which is to be rendered or otherwise concealed.

Cleaning: Rod cores to dislodge mortar fins protruding from the blocks and mortar droppings from reinforcement. Remove through the clean-out blocks.

Grouting

Commencement: Do not commence until grout spaces have been cleaned out and the mortar joints have attained sufficient strength to resist blow-outs.

Height of lift: Limit the height of individual lifts in any pour to ensure that the grout can be thoroughly compacted to fill all voids and ensure bond between grout and masonry.

Compaction: Compact by vibration or by rodding.

Topping up: On the completion of the last lift, top up the grout after 10 min to 30 min, and vibrate or rod to mix with the previous pour.

3.12 LINTELS

Location

General: Provide 1 lintel to each wall leaf in conformance with Structural Engineers requirements.

Installation

General: Do not cut on site. Keep lintels 10 mm clear of heads of frames.

Steel lintels: Pack mortar between any vertical component and supported masonry units. For angles install the long leg vertical.

Minimum bearing each end:

- Span ≤ 1000 mm: 100 mm.
- Span > 1000 mm: 150 mm.
- Span > 3000 mm: 200 mm.

Propping: To prevent deflection or excessive rotation, temporarily prop lintels until the masonry reaches its required strength.

Protection

Steel lintels: Steel lintels shall be hot dip galvanized (after fabrication).

0332b STONE MASONRY

1 GENERAL

1.1 AIMS

Responsibilities
General: Provide stone masonry elements as follows:

- Of uniform quality within any grade.
- Selected for the optimum matching of visual properties such as colour and pattern.
- Sound and free from defects liable to affect its strength, appearance and durability under the intended conditions of use.

1.2 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

1.3 STANDARD

General
Masonry: To AS 3700.

1.4 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Lintels in position.
- Proposed stone source (quarry, storage yard).
- Proposed mason's yard.
- Materials stored at the yard or on site.
- The prepared stone sample range.
- Stone in worked condition at the mason's yard.
- Stone laid out before fixing.
- Substrate prepared to receive the specified stonework.
- Items to be built-in located in their correct positions, including damp-proof course, flashings, bolts, cramps, brackets, structural metalwork and rainwater goods.
- Control joints ready for insertion of joint filler.

1.5 TOLERANCES

Dimension stone units
Maximum deviation from required dimensions:

- Loadbearing stone: ± 2 mm.
- Other stone: ± 10 mm.

Masonry construction
Conformance: Conform to AS 3700 Table 11.1.

2 PRODUCTS

2.1 NATURAL STONE

Stone types
Sandstone defects: Minor shale laminae or interbeds and minor concentrations of carbonaceous material (tea leaves) are acceptable in visible faces at ground level or in public areas. Neither defect is acceptable in carved or moulded work.

Granite: Igneous stone (e.g. granite) obtained from quarry stone extracted in blocks sufficiently large to suit the project requirements, and containing no more than a small degree of microcracking.

Stone selection

Grading: Select stone of the designated quality grade.

Matching: Within each grade, select stone for the optimum matching of visual properties such as colour and pattern.

2.2 MORTAR

Mortar materials

Cement type to AS 3972: GP.

White cement: Iron salts content ≤ 1%.

Lime: To AS 1672.1.

Sand: Fine aggregate with no clay content, free from efflorescing salts and selected for colour and grading.

- Crushed stone: Fine aggregate consisting partly or wholly of crushed stone, made from material of the same type as the stone facing.

Admixtures: Do not provide admixtures.

Pigment: To BS EN 12878, and as follows:

- Quantity: Less than 10% of the mass of cement in the mix.
- For light colours: Use off white cement in the mix.

Water

General: To be clean and free from any deleterious matter.

Mortar mix

Batching: Batch by weight and machine mix.

Mix compressive strength: ≤ compressive strength of the stone bedded on it.

Mix permeability: ≥ stone permeability.

Preparing lime putty:

- Using hydrated lime: Add lime to water in a clean container and stir to a thick creamy consistency. Leave undisturbed for at least 16 hours. Remove excess water and protect from drying out.
- Using quicklime: Run to putty as soon as possible after receipt of quicklime. Partly fill clean container with water, add lime to half the height of the water, then stir and hoe ensuring that no lime remains exposed above the water. Continue stirring and hoeing for at least 5 minutes after all reaction has ceased, then sieve into a maturing bin. Leave undisturbed for at least 14 days. Protect from drying out.

Proportions: Conform to the **Mortar mix table**.

Mortar mix table

Mortar class to AS 3700	Cement, lime, sand ratios (by volume)			Water thickener
	Clay	Concrete	Calcium silicate	
Masonry cement				
M3	1:0:4	1:0:4	n/a	No
M4	1:0:3	n/a	n/a	No
Portland cement				
M2	1:2:9	n/a	n/a	No
M3	1:1:6	1:1:6	n/a	Optional
	1:0:5	1:0:5	1:0:5	Yes
M4	1:0.5:4.5	1:0.5:4.5	n/a	Optional
	1:0:4	1:0:4	1:0:4	Yes

Sand stockpile

General: Before commencing stonework, stockpile sand for the whole of the works. Keep stockpiled sand dry.

2.3 COMPONENTS

Corrosion resistance and durability

Compliance: Conform to the **Corrosion resistance and durability tables**, or provide proprietary products with metallic and/or organic coatings of equivalent corrosion resistance:

- Built-in products: Below damp proof course to be stainless steel 316 or engineered polymer.
- Mortar: Below damp-proof course use mortar grade M4 to the **Mortar mix table.**

Corrosion resistance and durability table – High corrosivity category

Situation	Steel lintels	Wall ties, connectors and other structural steel accessories above damp proof course	Minimum cement content (mortar grade) above damp proof course
Internal	Galvanize after fabrication 470 g/m^2	- Galvanize after fabrication 470 g/m^2	M2
External	- Stainless 316 - Galvanize after fabrication 600 g/m^2 plus organic coating	- Stainless 316 - Engineered polymer	M4

Connectors and accessories

Standard: To AS/NZS 2699.2.

Flexible masonry ties: If accommodation of movement is required at control joints and where masonry abuts structural elements such as column faces and slab soffits, provide details.

Flashings and damp-proof courses

Standard: To AS/NZS 2904.

3 EXECUTION

3.1 GENERAL

Mortar mixing

General: Measure volumes accurately to achieve the specified proportions. Machine mix for at least six minutes.

Protection from contamination

General: Protect masonry materials and components from ground moisture and contamination.

Bond

Type: Stretcher bond.

Building in

Embedded items: Build in wall ties and accessories as the construction proceeds.

Steel door frames: Fill the backs of jambs and heads solid with mortar as the work proceeds.

Construction at different rates or times

Monolithic structural action: If two or more adjoining sections of masonry, including intersecting walls, are constructed at different rates or times, rake back or tie the intersections between those sections so that monolithic structural action is obtained in the completed work.

Joining to existing

General: If jointing to existing work is required, provide a straight joint. Do not tooth new masonry into existing work.

Joints

Finish:

- Externally: Tool to give a dense water-shedding finish.
- Internally: If wall is to be plastered, rake not more than 10 mm to give a key.
- Thickness: 10 mm.

Cutting: Set out joints of uniform width and minimise cutting.

Rate of construction

Regulate the rate of construction to eliminate joint deformation, slumping or instability.

Weather protection

General: Keep the top surface of stonework covered to prevent the entry of rainwater.

3.2 WORKMANSHIP GENERALLY

Storing

General: Store stone so that it is protected from the weather and atmospheric pollution, clear of the ground on its natural bed, on supports which do not locally overstress it, and in conditions suitable to promote good seasoning without staining, marking or damage.

Cutting

General: Perform the necessary cutting and shaping of stone to designated profiles including weathering, jointing, chasing, forming grooves and drilling for handling and fixing. Work the bed, face and back joints of the stone square and true.

Carving and moulding

General: Achieve a clean sharp finish.

3.3 LAYING UNITS

Bedding

General: Remove dust and foreign material from the bedding surfaces. If necessary adjust the moisture content of the stone units so that adverse effects, such as reduced bond, are kept within acceptable limits. Where possible, bed and joint the stone in one operation. Lay each stone on a full bed of mortar. Solidly fill and grout vertical joints, joggles and cramps as the work proceeds. Point up joints around flashings as necessary.

Natural bed

General: Lay loadbearing sedimentary stone or slate with its natural bed normal to the load (e.g. horizontal in walling, perpendicular to the line of thrust in arch voussoirs), except for the following:

- Overhanging projecting stones (cornices and string courses): Where edge bedding is required, lay each stone with its natural bed vertical and at right angles to the wall.
- Cladding panels: In non-loadbearing cladding panels, form each panel with its natural bed at right angles to the face.

Temporary support

General: Provide support as necessary to the stone while the mortar is curing, using bracing, joint spacers, or both.

Bracing and joint spacers: Non-damaging and non-staining softwood wedges or laths soaked in water. Do not allow metal pinch bars to bear directly on the stone.

Later construction: If the final stability of the stonework is dependent on (structural) elements to be constructed later, provide proposals for temporary support or bracing.

Raking and toothing

General: Raise advanced work no more than 1.5 m above the general level, and rake back. Do not tooth stonework for subsequent additions except where toothing is shown on the drawings.

Bonding

General: Bond the masonry so as to provide stability and monolithic structural action to the stonework assembly.

3.4 FIXINGS

Provision of fixings

General: If the necessary fixings for stonework are not otherwise provided as part of the structure provide suitable fixings sufficient to support and restrain each stone and effectively resist the loads from permanent, imposed, wind and earthquake actions to which it will be subjected in service.

Metals for fixings

General: Provide metal fixings that are:

- Corrosion resistant e.g. non-ferrous metal or stainless steel.
- Stamped for identification.
- Compatible with the materials with which they will be in contact or effectively insulated from electrochemical reaction with incompatible materials.

3.5 DAMP-PROOF COURSES

Material

Standard: To AS/NZS 2904.

Location

General: Provide damp-proof courses in the following locations, if applicable:

- Walls adjoining infill floor slabs on membranes: In the course above the underside of the slab in internal walls and inner leaves of cavity walls. Project 40 mm and dress down over the membrane turned up against the wall.

- Cavity walls built off slabs on ground: In the bottom course of the outer leaf, continuous horizontally across the cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 1 course above. Project 10 mm beyond the external slab edge and turn down at 45°.
- Masonry veneer construction: In the bottom course of the outer leaf, continuous horizontally across the cavity. Fasten to the inner frame 75 mm above floor level. Project 10 mm beyond the external slab edge and turn down at 45°.
- Internal walls built off slabs on ground: In the first course above floor level.
- At timber floors: In the first course below the level of the underside of ground floor timbers in internal walls and inner leaves of cavity walls.

Installation

General: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding 2 courses per step. Sandwich damp-proof courses between mortar.

Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses and waterproof membranes.

Location: At least 150 mm above adjacent finished ground level.

3.6 FLASHINGS AND WEATHERINGS

Material

Standard: To AS/NZS 2904.

Location

General: Provide flashings and weatherings in the following locations, if applicable:

- Under sills: 50 mm into the outer leaf bed joint 1 course below the sill, extending up across the cavity and under the sill.
- Over lintels to openings in cavity walls: Full width of the outer leaf immediately above the lintel, continuous across cavity, turned 50 mm into the inner leaf 2 courses above. Extend at least 50 mm beyond the lintels.
- At abutments with structural frames or supports: Vertical flashing in the cavity using 150 mm wide material, wedged and grouted into a groove in the frame opposite the cavity.
- At stiles where cavities are closed: Full height flashing extending 75 mm beyond the closure into the cavity, interleaved with sill and head flashings at each end. Fix to frame stiles.

Weepholes

Form: Open perpends stone course high, at least 8 mm wide.

Maximum spacing: 1000 mm.

Location: Provide weepholes to external leaves of cavity walls in the course immediately above flashings, damp-proof courses, lintels and supporting ledges.

3.7 WALL TIES

Wall ties

Durability classification to AS/NZS 2699.1.

Conformance; Provide ties in conformance with the **Wall ties category table**.

Wall ties category table

Classification to AS/NZS 2699.1	Service conditions
Medium duty	Normal cavity construction
Medium duty	Tie bonding at abutments
Heavy duty	Cavities > 60 mm wide

Corrosion protection: To BCA Table 3.3.3.1.

Location

Provide wall ties spacing in conformance with AS 3700 clause 4.10 *Wall ties* or BCA Figure 3.3.3.1 as follows:

- Not more than 600 mm in each direction.
- Adjacent to vertical lateral supports.
- Adjacent to control joints.
- Around openings.

3.8 JOINTING AND POINTING

General

General: Carry out jointing and pointing simultaneously to form a homogeneous bed.

Column and mullion joints
Method: Bed the joints in stone columns and mullions in mortar:

- Joggle the bed joints to prevent movement.
- Dowel the stones together with restraint fixings.
- Make column joints over a concealed lead pad with the centre cut out to allow for settlement.

3.9 CONTROL OF MOVEMENT

Joints
Requirement: Provide joints as follows:

- Maximum length of continuous wall: 6 m.
- Maximum vertical spacing: 8 m.
- Width of control joint: ≥ 10 mm ≤ 20 mm.
- Width of horizontal joint: ≥15 mm ≤ 20 mm.

3.10 SURFACE TREATMENTS

Abutting surfaces
General: Seal concealed faces of stone walling or facing panels where they abut brickwork or concrete.

Dissimilar stones
Isolation: Isolate contact surfaces of dissimilar types of stone with a membrane. Isolate sedimentary stonework from brickwork and other masonry to prevent salts movement.

3.11 COMPLETION

Maintenance manual
General: On completion submit a maintenance manual setting out a program for regular maintenance cycles at not more than five-year intervals. Include stonework cleaning, desalination, inspection and repair of joints and flashings, checking rainwater goods for blockages and breakdown, and detection of potential failures arising from movement or other causes. Include particulars of stone source, type of stone, and jointing materials.

Cleaning
Cleaning: Leave the stonework clean on completion.

0341b STRUCTURAL STEEL

1 GENERAL

1.1 CROSS-REFERENCES

General

General: Conform to the *General requirements* worksection.

1.2 STANDARDS

General

Materials, construction, fabrication and erection: To AS 4100.

Cold-formed steel: AS/NZS 4600.

1.3 ADJOINING ELEMENTS

General

Fixing: Provide for the fixing of adjoining building elements that are to be connected to or supported on the structural steel.

1.4 INSPECTION

Notice – on site

Inspection: Give notice so that inspection may be made of the following:

- Anchor bolts in position before casting in.
- Steelwork and column bases erected on site, before grouting, encasing, site painting or cladding.
- Tensioning of bolts in categories 8.8/TB and 8.8/TF.
- Reinforcement and formwork in place prior to any encasement.
- After any grouting, encasement, fire protection or site painting is completed.

1.5 SUBMISSIONS

Origin of steel

Requirement: If it is proposed to use steel not of Australian origin, submit documentation which demonstrates that the steel complies with Australian Standards.

Bolts

Compliance: Submit a manufacturer's compliance/test certificate from an accredited testing organization confirming compliance with AS/NZS 1252.

Independent certification: If bolts manufactured from outside Australia, provide a local NATA-accredited laboratory independent compliance certificate based on appropriate testing and verification.

Materials and components

Concrete or masonry anchors: If masonry anchors other than as shown on the drawings are required or proposed for the support or fixing of structural steel, submit evidence of the anchor capacity to carry the load.

Execution

Splicing: If splicing of structural members is intended, submit proposals.

Distortions: If a member is distorted during the galvanizing process, submit proposals for straightening.

2 PRODUCTS

2.1 STEEL TYPE AND GRADE

Material

Conformance: Steel members and sections shall conform to the **Steel grade (minimum) table.**

Steel grade (minimum) table

Type of steel	Grade
Universal beams and columns, parallel flange channels, large angles to AS/NZS 3679.1	300

Type of steel	Grade
Flat, small angles, taper flange beams and columns to AS/NZS 3679.1	250
Welded sections to AS/NZS 3679.2	300
Hot rolled plates, floor plates and slabs to AS/NZS 3678	250
Hollow sections to AS 1163: - Circular sections less than 165 mm nominal outside diameter - Sections other than the above	 C250/C350 C350/C450
Cold formed purlins and girts to AS 1397	G450 Z350

2.2 BOLTS

Bolts, nuts and washers
General: Hot-dip galvanized, corrosion-free, coated in oil and in serviceable condition.

3 EXECUTION

3.1 FABRICATION

General
Substitution: If substitution of members is proposed, provide details.

Beam camber
General: If beam members have a natural camber within the straightness tolerance, fabricate and erect them with the camber up.

Straightening
Care: If straightening or flattening members, do not damage.

Work exposed to view
Welds: Grind smooth but do not reduce the weld below its nominal size.

Shearing, flame cutting and chipping: Perform carefully and accurately.

Corners and edges: Grind fair those corners and edges which are sharp, marred, or roughened.

Site work
General: Other than work shown on the shop drawings as site work, do not fabricate, modify or weld structural steel on site.

Identification marks
General: Provide marks or other means of identifying each member compatible with the finish, for the setting out, location, erection and connection of the steelwork.

Monorail beams: Identify and mark rated capacity in accordance with AS 1418.18 clause 5.12.6.

Tolerances
Measurement: Tolerances are to be checked by measurement after fabrication when corrosion protection has been applied.

Conformance: To AS 4100 clause 14.4.

3.2 WELDING

General
Standard: To AS/NZS 1554.1.

Weld category
Weld categories not shown on the drawings: Category GP.

Weld type
Weld type not shown on the drawings: 6 mm continuous fillet weld made using E48XX electrodes or equivalent.

3.3 BOLTING

Connections
Connection type: For connections not shown on the drawings, provide 10 mm plates, 6 mm continuous fillet welds and 2 M20 bolts in 8.8/s bolting category.

Foundation bolts
General: Provide each foundation bolt with 2 nuts and 2 oversize washers and provide sufficient thread to permit the levelling nut and washer to be set below the base plate.

Lock nuts
General: Provide lock nuts for bolts in moving parts or parts subject to vibration and for vertical bolts in tension.

Tensioning of bolting categories 8.8/TB and 8.8/TF
Method: Use part-turn-of-nut or load indicating washers.

3.4 SURFACE PREPARATION AND TREATMENT

General
General: Conform to the *Steel – protective paint coatings* and/or *Steel – hot dip galvanized coatings* worksections as appropriate.

General: Structural steelwork not encased in concrete shall be coated.

Standards: To AS 1627 and AS/NZS 2312 Section 1.

Surface preparation: Class 1 blast.

Coating: Coat prepared steelwork as follows:

- Primer: Zinc phosphate primer.
- Thickness: 70 µm.
- Requirement: Verify and record thickness.
- Concrete encasing: Where members are part concrete encased extend the priming 25 mm into the surface to be encased.
- Inaccessible surfaces: Where surfaces will be in contact or near contact after fabrication or erection, apply the finish and allow it to dry before assembly.

Shop work: Apply the primer coat or protective system to the structural steel before delivery to the site.

Transport and handling: Do not damage the paintwork.

Site work: After erection, repair damage to the shop coating and apply coating omitted at site connections.

.

3.5 ERECTION

Temporary work
General: Provide all necessary temporary bracing or propping.

Temporary connections: If cleats not shown on shop drawings are required, submit details.

Foundation bolts
General: For each group of foundation bolts provide a template with setting out lines clearly marked for positioning the bolts when casting in.

Grouting at supports
Preparation: Before grouting steelwork to be supported by concrete, masonry and the like, set steelwork on packing or wedges.

Site welds
Completion: Weld only when correct alignment and preset or camber have been achieved.

Overhead welding: If overhead welding is required, submit proposals.

Handling
Care: Handle members or components without overstressing or deforming them.

Protection: Wrap or otherwise protect members or components to prevent damage to surface finishes during handling and erection.

3.6 REPAIRS

General
General: Repair finishes to ensure the full integrity of each phase and each coating.

3.7 COMPLETION

Temporary connections
General: Remove temporary cleats on completion and restore the surface.

0342 LIGHT STEEL FRAMING

1 GENERAL

1.1 AIMS

Responsibilities
General: Provide light steel floor, wall and roof framing that is:
- In conformance with the performance criteria documented.
- Integrated into the building.
- Suitable for the fixing to it of flooring, linings and cladding.
- Independently designed and documented.
- Independently certified by a professional engineer for the design and the erected framing.

1.2 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

1.3 STANDARDS

General
Design, materials and protection: To AS/NZS 4600.

Residential and low-rise steel framing: To NASH (National Association of Steel Housing) Standard.

1.4 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of steel framing erected on site before lining or cladding.

1.5 SUBMISSIONS

Design
General: Where the structural drawings define performance criteria, submit independent design, documentation and certification from a professional engineer.

Reactions: Provide location and magnitude of reactions to be accommodated by the support structure.

Floor and wall frame member sizes: Submit a schedule of proposed member sizes, certified as meeting stated project and AS/NZS 4600 requirements for span, spacings and loadings.

1.6 TOLERANCES

Walls
To NASH Standard, Appendix D.

1.7 CONSTRUCTION GENERALLY

Fabrication
Length: Cut members accurately to length so that they fit firmly against abutting members.

Service holes: Form holes by drilling or punching.

Bushes: Provide plastic bushes or grommets to site cut holes.

- Swarf: Remove swarf and other debris from cold-formed steel framing immediately.

Site work: Do not fabricate on site where welded connections are required.

Fastening
Type: Select from the following:
- Bolting.
- Self-drilling, self-tapping screws.
- Blind rivets.
- Proprietary clinching system.
- Structural adhesives.
- Welding.

Welding
Burning: Avoid procedures that result in greater than localised 'burning' of the sheets or framing members.

Prefabricated frames
General: Protect frames from damage or distortion during storage, transport and erection.

Metal separation
General: Install lagging to separate non-ferrous service pipes and accessories from the framing.

Unseasoned or CCA treated timber
General: Do not fix in contact with framing without fully painting the timber and/or the steel.

Earthing
Permanent earthing: Required.

Temporary earthing: Provide temporary earthing during erection until the permanent earthing is installed.

Protection
General: Coatings which have been damaged by welding or other causes shall be restored. Thoroughly clean affected areas to base metal and coat with zinc rich organic primer to APAS-2916.

Certification
General: For components for which independent design certification has been required, provide independent certification for the erected components confirming compliance with the design intent.

1.8 WALL FRAMING

Wall studs
General: Provide studs in single lengths without splices. Place a stud under, or within 40 mm from, each structural load point from roof or ceiling (except for openings). Provide multiple studs at points of concentrated load.

Maximum stud spacing: 600 mm.

Heads to openings
General: Provide lintels appropriate to load and span.

Additional support
General: Provide additional support in the form of noggings, trimmers and studs for support and fixing of lining, cladding, hardware, accessories, fixtures and fittings.

Vermin barriers
General: Provide vermin barriers as follows:

- Brick veneer barrier: Close nail 10 mm steel wire mesh to the underside of the bottom plate of external stud walls, extending across the cavity for building into brickwork.

Damp-proof course
General: Provide damp-proof courses under the bottom plate of stud walls built off slabs or masonry dwarf walls, as follows:

- External walls (not masonry veneer): Turn up at least 75 mm on the inside and tack. Project 10 mm beyond the external slab edge or dwarf wall and turn down at 45°.
- Walls of bathrooms, shower rooms and laundries: Turn up at least 150 mm on the 'wet' side and tack to studs.

Installation: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints.

Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses, sarkings and waterproof membranes.

Flashings
Location: Provide flashings to external openings sufficient to prevent the entry of moisture. Form trays at the ends of sill flashings.

Masonry veneer construction: Extend across cavities and build into brickwork.

1.9 ROOF FRAMING

Beam framing
General: Construct framing for 'flat' or pitched roofs where the ceiling follows the roof line, consisting of rafters or purlins supporting both ceiling and roof covering.

Antiponding
Requirement: Fix appropriate members to the tops of framing at the rear of fascias, to prevent sagging of and ponding on the sarking.

Additional support
Provide a frame member behind every joint in fibre cement or plasterboard sheeting or lining.

Battens
Requirement: Supply and fix battens suitable for span, spacing and roofing.

1.10 TRUSSES

Fabrication
Assembly: Factory assemble trusses.

Supports for in roof services
General: If walkways, mechanical plant or other services are to be supported within the roof space, provide support.

Water container and heater: Where a water container or heater is located in the roof space, provide a support platform to AS/NZS 3500.4 clause 5.5.

Marking
General: Permanently mark each truss to show:

- Project identification.
- Manufacturer.
- Tag or number.
- Location.
- Support points.

Installation
General: Fix to support structures, plumb to within H/200, where H is the height at the apex.

Support: Support trusses on bottom chord at two points only, unless designed for additional support.

Vertical movement: Over internal walls provide at least 10 mm vertical clearance and use bracing methods which allow for vertical movements.

Holding down and bracing: Provide details demonstrating equivalence with AS 1684 requirements.

Certification: Obtain certification from a professional engineer for the erected trusses.

1.11 ROOF TRIM

Fascia, valley gutter and barge boards
Requirement: Supply and fix fascia, valley gutter and barge boards in accordance with the manufacturer's requirements.

1.12 COMPLETION

Cleaning
General: On completion of framing remove debris from any gaps between members.

0381 STRUCTURAL TIMBER

1 GENERAL

1.1 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

Associated worksections
Associated worksections: Conform to the following:

- *Light timber framing.*

1.2 STANDARD

General
Design: To AS 1720.1.

1.3 INTERPRETATION

Definitions
General: For the purposes of this worksection the definitions given in AS 1720.1 apply.

1.4 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:

- Prefabricated items before priming or water-repellent treatment.
- Structural timberwork after erection but before it is covered.
- Unbranded timber in order to determine stress grade.
- On site preservative treated members before being concealed.
- Post holes/foundations before placing concrete.
- Bolts after final tightening.

1.5 SUBMISSIONS

Subcontractors
Timber portal frames: Submit name and contact details of proposed prefabricator.

Certification
Design: If design by the contractor is required, submit independent certification by a professional engineer of the design and documentation, and of the erected work for compliance with AS 1720.1 and project performance criteria.

Contractor design: For items designed by the contractor, submit independent certification of shop details by a professional engineer for compliance with AS 1720.1 and the project performance criteria.

Materials
Identification:

- Certification: Submit a supplier's certificate (which may be included on an invoice or delivery docket) verifying that the timber complies with the specification, including moisture content.
- Inspection: Submit the inspection authority's certificate verifying that the timber complies with the specification.

Moisture content: Submit evidence of moisture content.

Preservative treatment
Confirmation of preservative retention: Submit a test certificate from an independent testing authority confirming that the required retention has been achieved for every member.

Treatment record: Submit a certified copy of the charge sheet.

CCA treated timber: If proposed to be used, provide details.

2 PRODUCTS

2.1 TIMBER

Structural timber

Natural durability ratings to AS 5604 Table A1 (minimum): Durability class 2, or preservative treated timber of equivalent durability.

Timber grades

Conformance: Appearance grade if exposed to view in the finished work. Otherwise stud grade or lintel grade, as appropriate.

Structural timber grading standards

Hardwood: To AS 2082.

Softwood: To AS 2858.

Mechanical stress grading: To AS/NZS 1748.

Machine proof-grading: To AS 3519.

Identification

Method: Identify timber using branding, certification or both.

Branding: Brand structural timber, under the authority of a recognised product certification program applicable to the product. Locate the brand mark on faces or edges which will be concealed in the works. Include the following data:

- Stress grade.
- Method of grading.
- 'Seasoned' or 's'.
- The certification mark of the product certification program.
- The applicable standard.

Recognised product certification programs:

- Pine framing: Plantation Timber Certification.
- Hardwoods: Australian Timber Industry Certification (ATIC) Quality Scheme.
- Glued-laminated timber: Glued Laminated Timber Association of Australia (GLTAA) Product Certification System.
- Laminated veneer lumber: Plywood Association of Australia (PAA) Quality Control and Product Certification Scheme.
- Finger jointed structural timber: Plantation Timber Certification.

Certification:

- Timber to be certified in lieu of branding.

Inspection: If neither branding nor certification is adopted, have an independent inspecting authority inspect the timber.

Marine structural timber

Sawn timber: Minimum requirements:

- Hardwood: Species of durability class 2 and strength group S3.
- Softwood: Preservative treated radiata pine, slash pine, hoop pine or Caribbean pine.
- Grading: Structural Grade No.2 to AS 2082 or AS 2858, as appropriate.

Variations to grading standard:

- No loose gum and resin veins, unsound knots, shakes, or splits.
- Sapwood only if preservative treated.
- No gum or resin pockets on the upper surfaces of decking, kerbs or other horizontal members fully exposed to the weather.
- Hardwood may have sound heart in the central one third cross-section of members with a least dimension greater than 175 mm.
- Heartwood in softwoods limited to 20% of the cross section and 50% of the surface width.

Round timber: To AS 2209.

2.2 STRUCTURAL PLYWOOD

Standard

Standard: To AS/NZS 2269.

Bond
Bond: Type A.

Veneer
Veneer quality to visible surfaces: C (minimum).

Certification
General: Brand panels under the authority of a recognised certification program applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

Certification programs:

- Plywood and blockboard: Plywood Association of Australia (PAA) Quality Control and Product Certification Scheme.
- Wet processed fibreboard, dry processed fibreboard, particleboard and decorative overlay wood panels: Australian Wood Panels Association AWPA JAS-ANZ Scheme.

Plywood certified formaldehyde emission level to AS/NZS 2098.11

Wood panel certified formaldehyde emission level to AS/NZS 4266.16

2.3 GLUED-LAMINATED TIMBER

Standard
Glued-laminated structural timber: To AS/NZS 1328.1.

Joints
End joints: Scarf or finger joints generally.

- Timbers permitted to be stress grade reduced: Butt joints are permitted.

Camber
Orientation: Install cambered members with the camber up.

Protection from weather
Duration: Provide temporary protection for glued-laminated timber members until permanent covering is in place.

2.4 TIMBER PORTAL FRAMES

Gusset plate replacement
Cause: If more than 10% of nail heads penetrate the outer veneer of the gusset plate, replace the gusset plate.

Damp proofing
Protection: Where timber columns are placed in contact with concrete footings, provide a damp-proof membrane between the timber and the concrete.

Lifting
Care: Provide spreaders, strongbacks and bracing to ensure fabricated sections are lifted without racking or distress.

Purlins and girts
Shrinkage: When fitting unseasoned purlins and girts, make provision for transverse shrinkage.

2.5 LAMINATED VENEER LUMBER

General
Standard: To AS/NZS 4357.

2.6 FINGER JOINTED STRUCTURAL TIMBER

General
Standard: To AS 5068.

2.7 FASTENERS

Bolts
Thread: Provide thread length at least four times the bolt diameter.

Holes: Drill bolt holes 2 mm larger than the bolt diameter.

3 EXECUTION

3.1 STRUCTURAL TIMBER

General

Preservative treatment: If holes are drilled in treated timber, apply a saturation coating of preservative to the sides of the holes prior to inserting fixings.

Outdoor structures

Sealing: Seal the ends of members with wax emulsion or petroleum jelly immediately after sawing.

Anti splitting plates: Plate the ends of members 250 x 75 mm or larger with pressed or hammer-on galvanized nail plates equal to 50% of the cross-sectional area.

Bolt holes: Treat bolt holes with creosote or copper naphthenate emulsion before inserting the bolt.

Coating: After completion of fabrication, notching and machining, coat joints, holes and notches with a 6 mm layer of copper naphthenate emulsion.

Heart: Place the heart side of bracing members on the inside of joints. Place the heart side of other members on the downside wherever possible.

Bolts: Minimum size M20.

Washers: Minimum size 4 mm thick and 65 mm square or equivalent round area.

Bolt protection: Coat bolts with a bituminous coating before insertion in the bolt hole.

Recessed fixing: For fixings punched or sunk below the surface, fill the recess with a suitable wood filler or mastic.

Finishing: If a protective or decorative finish is required apply one coat of primer and one finishing coat all around before fixing.

3.2 COMPLETION

Tightening

Initial: Tighten bolts, screws and other fixings so that joints and anchorages are secure at practical completion.

Subsequent: If unseasoned timber is used, retighten after 6 months all bolts, screws and other fixings.

0382 LIGHT TIMBER FRAMING

1 GENERAL

1.1 AIMS

Responsibilities

General: Provide light timber floor, wall and roof framing as follows:

- In conformance with the performance criteria nominated.
- Integrated into the building.
- Suitable for the fixing to it of flooring, linings and cladding.
- Independently designed and documented.
- Independently certified by a professional engineer for the design and the erected framing.

1.2 CROSS REFERENCES

General

General: Conform to the *General requirements* worksection.

1.3 STANDARDS

General

Framing: To AS 1684 Parts 2, 3 or 4, as appropriate.

Design: To AS 1720.1.

1.4 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Prefabricated units before installation.
- Fabricated items before priming or water-repellent treatment.
- Bolts after final tightening.
- Timber work after erection but before it is covered.

1.5 SUBMISSIONS

Design

General: Where the structural drawings define performance criteria, submit independent design, documentation and certification from a professional engineer, including for the erected work.

Reactions: Provide location and magnitude of reactions to be accommodated by the support structure.

Floor and wall frame member sizes: Submit a schedule of proposed member sizes, certified as meeting stated project, AS 1684 and AS 1720.1 requirements for span, spacings and loadings.

Materials

Identification:

- Certification: Submit a supplier's certificate (which may be included on an invoice or delivery docket) verifying that the timber complies with the specification, including moisture content.
- Inspection: Submit the inspection authority's certificate verifying that the timber complies with the specification.

Moisture content: Submit records of moisture content.

Preservative treatment

CCA treated timber: If proposed to be used, provide details.

1.6 TOLERANCES

General

Walls: Conform to the **Walls tolerances table**.

Walls tolerances table

Property	Tolerance criteria: Permitted deviation (mm)
Generally: Verticality in 2000 mm	4

- Stress grade.
- Method of grading.
- The certification mark of the product certification program.
- The applicable standard.

- Recognised product certification programs:
  - Plywood: Plywood Association of Australia (PAA) Quality Control and Product Certification Scheme.
  - Blockboard: Plywood Association of Australia (PAA) Quality Control and Product Certification Scheme.
- Certification:
- Inspection: If neither branding nor certification is adopted, have an independent inspecting authority inspect the plywood.

Wet-processed fibreboard (including hardboard)
Standard: To AS/NZS 1859.4.

Hardboard bracing
Classification: General-purpose.

2.3 COMPONENTS

Nail plated joined beams
Standard: To AS 4446.

Type: Proprietary composite member made up by butt and horizontally joining timber with pressed in nail plates.

Mild steel post bases
Minimum dimensions:

- Stirrup: 75 mm wide x 6 mm thick.
- Dowel: 20 mm diameter heavy tube.

Location: To timber posts supported off concrete slabs or footings.

Finish: Galvanize after fabrication.

Fasteners
Installation: Do not split or otherwise damage the timber.

Coating: Before placing bolts in contact with CCA treated timber, coat the shank of the bolt in a grease or bituminous coating.

Damp-proof course
Material: To AS/NZS 2904.

Flashings
Material: To AS/NZS 2904.

2.4 FINGER JOINTED STRUCTURAL TIMBER

General
Standard: To AS 5068.

2.5 RECONSTITUTED STRUCTURAL TIMBER

General
Type: Proprietary reconstituted structural timber sawn from slabs manufactured from pinus radiata thinnings.

3 EXECUTION

3.1 GENERAL

Protection from weather
General: Provide temporary protection for members until permanent covering is in place.

3.2 WALL FRAMING

Additional support
General: Provide additional support in the form of noggings, trimmers and studs for fixing lining, cladding, hardware, accessories, fixtures and fittings as required.

Maximum spacing of noggings: 1350 mm centres.

Vermin barriers
General: Provide vermin barriers as follows:

- Brick veneer barrier: Close nail 10 mm steel wire mesh to the underside of the bottom plate of external stud walls, extending across the cavity for building into brickwork.

Damp-proof course

General: Provide damp-proof courses under the bottom plate of stud walls built off slabs or masonry dwarf walls, as follows:

- External walls (not masonry veneer): Turn up at least 75 mm on the inside and tack. Project 10 mm beyond the external slab edge or dwarf wall and turn down at 45°.
- Walls of bathrooms, shower rooms and laundries: Turn up at least 150 mm on the 'wet' side and tack to studs.

Installation: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints.

Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses, sarkings and waterproof membranes.

Flashings

Location: Provide flashings to external openings sufficient to prevent the entry of moisture. Form trays at the ends of sill flashings.

Masonry veneer construction: Extend across cavities and build into brickwork.

3.3 ROOF AND CEILING FRAMING

Wall plates

Fixing: Fix timber wall plates to masonry, with either straps or bolts.

Nailing plates

General: Where timber joists, rafters or purlins bear on or into steel members, provide 50 mm thick nailing plates bolted to the steel member at 500 mm maximum centres.

Beam framing

Ridge straps: Butt ends of rafters together at ridge, and strap each pair together with 900 mm long steel strap passing over the ridge, triple nailed to each rafter.

Additional support

General: Provide a frame member behind every joint in fibre cement sheeting or lining.

Anti-ponding boards

Standard: To AS/NZS 4200.2.

3.4 TRUSSES

Installation

Standard: To AS 4440.

Support: Support trusses on bottom chord at two points only, unless designed for additional support.

Plumb: Within H/200, where H is the height.

Vertical movement: Over internal walls provide at least 10 mm vertical clearance and use bracing methods which allow for vertical movements.

3.5 COMPLETION

Tightening

General: Tighten bolts, screws and other fixings so that joints and anchorages are secure at practical completion.

0411b WATERPROOFING – EXTERNAL AND TANKING

1 GENERAL

1.1 AIMS

Responsibilities
Conform to the **Selections**. Provide roof and deck waterproofing systems to substrates which are:

- Waterproof under five minutes duration rainfall of an intensity which has an average recurrence interval of 100 years.
- Graded to falls to dispose of stormwater without ponding above the depth of lapped seams.
- Able to accommodate anticipated building movements.
- Able to accommodate its own shrinkage over the warranty life of the roofing system.

1.2 CROSS REFERENCES

General
Conform to the *General requirements* worksection.

1.3 INTERPRETATIONS

Definitions
General: For the purposes of this worksection the definitions given below apply.

- Substrates: The surfaces on which membrane systems are laid.
- Bitumen: A viscous material from the distillation of crude oil comprising complex hydrocarbons, which is soluble in carbon disulphide, softens when it is heated, is waterproof and has good powers of adhesion. It is produced as a refined by-product of oil.
- SBS bitumen: Bitumen modified with Styrene Butadiene Styrene, a thermoplastic rubber, that undergoes a phase inversion at elevated temperature and converts to an elastomeric material.
- APP bitumen: Bitumen modified with Atactic Polypropylene Plastomeric.
- Bond breakers: Layers, which prevent membranes from bonding to the substrates.
- Membranes: Impervious barriers to liquid water which may be:
  - Liquid applied: Membranes applied in liquid or gel form and air cured to form a seamless film.
  - Sheet applied: Membranes applied in sheet form with joints lapped and bonded.
- Membrane systems: Combinations of membranes, flashings, drainage and accessories which form waterproof barriers and which may be:
  - Loose-laid.
  - Bonded to substrates fully or partially.
  - Fixed mechanically to substrates.
  - Protected either by ballast or an external insulation, also known as inverted membrane roof assembly (IRMA), or by both.
  - Trafficable, which may be for maintenance, pedestrians or vehicles.
- Seamless membranes: Membranes applied in liquid or gel form and air cured to form a seamless film.
- Slip sheets: Are used to isolate the membrane system from the supporting substrate or from the topping or mortar bedding above and are sometimes referred to as cleavage membranes and are similar to bond breakers. The most common material is polyethylene sheeting.

1.4 STANDARDS

Stormwater drainage
Standard: To AS/NZS 3500.3.

1.5 INSPECTION

Notice
Inspection: Give notice so that inspection may be made as follows:

- Substrate preparation completed.
- Secondary layers preparation completed.

- Before membranes are covered up or concealed.
- Underflashings complete prior to installation of overflashings.
- After flood testing.

1.6 SUBMISSIONS

Execution records

Placing records: Photographically record the application of membranes and information as follows:

- Date.
- Portion of work.
- Substrate preparation.
- Weather during application and curing.
- Protection provided from traffic and weather.

2 PRODUCTS

2.1 MEMBRANES

Membrane systems

To be proprietary membrane systems having one of the following certifying that the system is suitable for the intended external waterproofing, as follows:

- A current Australian Building Product and Systems Certification Scheme certificate issued by ABCB (Australian Building Codes Board).
- A current appraisal report issued by either CSIRO Building Products and Systems Appraisals.
- A current BRANZ Appraisal Certificate.

Membrane protection

Multi-layer modified bitumen system: Rigid closed cell extruded polystyrene foam boarding with shiplapped edges, adhered to the membrane with a solvent-free or low melt bitumen adhesive. Provide a maximum 6 mm gap at joints between boards.

3 EXECUTION

3.1 PREPARATION

General

Prepare substrates as follows:

- Fill all cracks in substrates wider than 1.5 mm with a filler compatible with the membrane system.
- Fill voids and hollows in concrete substrates with a concrete mix not stronger than the substrate.
- Remove projections.
- Remove all traces of a concrete curing compound if used.
- Remove deleterious and loose material.
- Leave the surface free of contaminates, clean and dust free.

Moisture content

Concrete substrates: Cure for > 21 days.

Moisture content: Verify that the moisture content of the substrate is compatible with the water vapour transmission rate of the membrane system by testing to AS/NZS 2455.1 Appendix B.

Test type: select from the following:

- Hygrometer test: Seal a hygrometer to the substrate for > 16 hours and measure the relative humidity of the air between the instrument and the slab.
- Electrical resistance test: Connect a resistance meter to the slab and read the moisture content.

Falls

Verify that falls in substrates are >1.5%.

Joints and fillets

Internal corners: Provide 45° fillets 50 x 50 mm.

External corners: Round or arris edges.

Movement control joints: Prepare all substrate joints to suit the membrane system.

Priming
If required, prime the substrates with compatible primers to ensure adhesion of membrane systems.

3.2 APPLICATION

Protection
General: Protect membrane from damage during installation and for the period after installation until the membrane achieves its service characteristics that resist damage.

Drains
General: Prevent moisture from tracking under the membranes at drainage locations.

Drains and cages: Provide grates or cages, to prevent blockage from debris. If the finished surface is above the level of the membrane provide a slotted extension piece to bring the grate up to the level of the finished surface.

Overflows: Turn the membranes into the overflow to prevent moisture from tracking behind the membrane.

Sheet joints
Bituminous sheet membranes:

- Side laps: 75 mm.
- End laps: 100 mm.
- Method: Heat welded.

Synthetic rubber membranes:

- Factory–vulcanized laps > 40 mm.
- Field side laps > 50 mm for side laps.
- Field end-laps > 100 mm for end laps.

PVC (Polyvinyl chloride) membranes:

- Factory welded laps > 30 mm.
- Field-welded laps:
  - If used over insulation boards > 100 mm.
  - Other instances > 75 mm overlaps.

Curing of liquid applied systems
General: To the manufacturers' instructions.

Movement control joints
General: Locate over movement control joints in the substructure.

Fillets and bond breakers: Provide of sufficient dimension to allow the membrane to accommodate the movement.

Bonded membranes: Carry movement joints in the substrate through to and into the surface finish.

Membrane terminations
Edge protection: Provide upturns above the maximum water level expected from the exposure conditions of rainfall intensity and wind.

- Height: > 150 mm.
- Anchoring: Secure sheet membranes along the top edge.
- Edge protection: Protect edges of the membrane.
- Waterproofing above terminations: Waterproof the structure above the termination to prevent moisture entry behind the membrane using cavity flashings, capping, waterproof membranes or waterproof coatings.

Horizontal terminations: Do not provide.

Membrane vertical penetrations
Pipes, ducts, and vents: Provide separate sleeves for all pipes, ducts, and vents and have them fixed to the substrate.

Membrane horizontal penetrations
Sleeves: Provide a flexible flange for all penetrations, bonded to the penetration and to the membrane.

Balcony membrane about doors and windows
Install membrane prior to the fixing of door or window frames.

Membrane upturn:

- Sheltered areas: 40 mm above the finished external floor surface or overflow level, whichever is the higher.
- Exposed areas: 150 mm upturn from the finished external floor level or overflow level, whichever is the higher.

Membrane around skylights and hatches
Install membranes to upstands prior to the installation of the skylight or hatch.

Overlaying finishes on membranes

Compatibility: If a membrane is to be overlayed with another system such as tiles, pavers, ballast, insulation, soil, and the like, provide an overlaying system that is compatible with and not cause damage to the membrane.

Bonded or partially bonded systems: If the topping or bedding mortar requires to be bonded to the membrane, provide sufficient movement joints in the topping or bedding mortar to reduce the movement over the membrane.

Double slip sheet: If the topping or bedding mortar is structurally sufficient not to require bonding to the substrate, lay a double slip sheet over the membrane to separate it from the topping or bedding mortar.

Paint coatings: If maintenance pathways are indicated by a paving paint, ensure compatibility with the membrane.

3.3 FLOOD TEST

General

Application: Perform a flood test prior to the installation of surface finishes.

Set-up:

- Measure for dryness the wall/floor junction of adjacent spaces to the slab soffit below using the electrical resistance test.
- Record the result for each area.
- Dam the access openings and seal drainage outlets to allow 50 mm water level but no higher than 25 mm below the weir level of the perimeter flashings.
- Provide temporary overflows of the same capacity as the roof outlets to maintain the flood level.
- Fill space with clean water and leave overnight.

Evaluation:

- Make a visual inspection of the wall/floor junction of adjacent spaces and of the slab soffit below for obvious water or moisture.
- Test the same areas for dryness using the moisture meter, and compare the results to the measurements taken prior to flooding.

Compliance:

- Evidence of water from the visual test: Failure.
- No visual evidence of water: Proceed with the moisture meter test.
- Increase in test results before and after flooding: Failure.

Records: Submit records of all flood tests.

3.4 COMPLETION

Protection

General: Keep traffic off membrane surfaces until bonding has set or for 24 hours after laying, whichever period is the longer.

Reinstatement: Repair or replace faulty or damaged work. If the work cannot be repaired satisfactorily, replace the whole area affected.

Warranty

Cross reference: *General requirements*.

0431b CLADDING – COMBINED

1 GENERAL

1.1 AIMS

Responsibilities
General: Provide lightweight external wall cladding and associated work which is as follows:
- Satisfies the product performance requirements.

1.2 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

1.3 PERFORMANCE CRITERIA

Location exposure severity
Exposure severity category: Very Severe

Corrosion resistance
Corrosivity category: Very High

1.4 INSPECTION

Notice
Inspection: Give sufficient notice so that the framing, sarking, vapour barrier and insulation may be inspected before they are covered up or concealed.

2 PRODUCTS

2.1 SHEET METAL CLADDING

General
Type: Provide a proprietary system of preformed sheet and purpose-made accessories.
Prepainted and organic film/metal laminate products: To AS/NZS 2728.
Design and installation: To AS 1562.1.

2.2 TIMBER WEATHERBOARDS

Timber
Hardwood: To AS 2796.1.
- Grade to AS 2796.2

2.3 COMPONENTS

Flashings
Standard: To AS/NZS 2904.

3 EXECUTION

3.1 TOLERANCES

Tolerances
Conform to the following to the **Tolerances table**:

Tolerances table

Property	Tolerance criteria: Permitted deviation (mm)
Spacing of supporting members	± 5 mm on the nominated support member spacing
Vertical or horizontal misalignment at the abutting ends of cladding	≤ 2 mm

3.2 CONSTRUCTION GENERALLY

Substrates or framing
Before fixing cladding check and, if necessary, adjust the alignment of substrates or framing.

Fixing
Nail to timber framing, screw to steel framing.

Accessories and trim
Provide accessories and trim necessary to complete the installation.

Fixing eaves and soffit lining
Nailing: 150 mm centres to bearers at maximum 450 mm centres.

Metal separation
Prevent direct contact between incompatible metals, and between green hardwood or chemically treated timber and aluminium or coated steel, by either:

- Applying an anti-corrosion, low moisture transmission coating to contact surfaces.
- Inserting a separation layer.

3.3 PROPRIETARY SYSTEMS OR PRODUCTS

3.4 SHEET METAL CLADDING

Accessories: Provide material with the same finish as roofing sheets.

Corner flashing
Finish off at corners with purpose-made folded flashing strips.

3.5 TIMBER WEATHERBOARD CLADDING

Preparation
Preservative treatment: For cladding with a natural or stained finish, prefinish the boards by dipping or brushing with water repellent preservative. Do not apply preservative if this is incompatible with a specified pigmented stain finish.

Cut surfaces: Treat freshly cut surfaces with water repellent before fixing.

Installation
Single lengths: Provide single lengths when installed vertically. Whenever possible provide single lengths of boards when installed horizontally.

Fixing at crossings:

- Seasoned milled weatherboards: 2 fixings.
- Unseasoned hardwood, sawn weatherboards, or secret nailed profiles: 1 fixing.

Nails:

- Hot dip galvanized to non-corrosive timbers.
- Silica bronze or stainless steel to corrosive timbers (including western red cedar or redwood).

Nailheads: Treat visible nailheads as follows:

- In stained or clear finishes: Drive flush.
- In opaque finishes: Punch below the surface and fill flush with putty after the surface has been primed.

Joints
Overlapping joints: Lap boards at least 30 mm.

End grain joints: Install boards so that butt joints are in compression.

Internal and external corners: Butt against a stop bead of thickness at least that of the cladding.

0451b WINDOWS AND GLAZED DOORS

1 GENERAL

1.1 AIMS

Responsibilities
Conform to the **Selections**.

Maintenance
Product design: Provide windows with sashes capable of being opened to satisfy the documented maintenance requirements.

1.2 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

1.3 STANDARDS

General
Selection and installation: To AS 2047.

Glazing
Glass type and thickness: To AS 1288, where no glass type or thickness is nominated.

Materials and installation: To AS 1288.

Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.

Terminology for work on glass: To AS/NZS 4668.

1.4 SUBMISSIONS

Certification
Certification: Submit an engineers' certificate confirming compliance with AS 2047.

Opacified glass
General: Submit a statement by the manufacturer certifying that the proposed method of opacifying the glass will not be detrimental to the glass or detract in any way from the glass product warranty.

2 PRODUCTS

2.1 GENERAL

Standards
Flashings: To AS/NZS 2904.

Aluminium extrusions: To AS/NZS 1866.

2.2 GLASS

Glass types and quality
Standard: To AS/NZS 4667.

Glazing plastics
General: Free from surface abrasions, and warranted by the manufacturer for 10 years against yellowing or other colour change, loss of strength and impact resistance, and general deterioration.

Safety glasses
Standard: To AS/NZS 2208.

StandardsMark: Required.

Type: Grade A when used in curtain walls.

Heat soaking: Required for toughened glass in curtain walls.

Ceramic coated glass
Heat strengthened or toughened glass with a coloured ceramic coating fused to and made an integral part of the surface: To ASTM C1048, Condition B.

Opacified glass
Glass with an opacifier permanently bonded to the inner face.

Unacceptable blemishes in heat-treated flat glass (including tinted and coated glass)
Standard: To AS/NZS 4667.

Insulating glass units (IGU's)
Selection and installation: To AS/NZS 4666.

2.3 GLAZING MATERIALS

General
Glazing materials (including putty, glazing compounds, sealants, gaskets, glazing tapes, spacing strips, spacing tapes, spacers, setting blocks and compression wedges): Appropriate for the conditions of application and the required performance.

Jointing materials
Provide recommended jointing and pointing materials which are compatible with each other and with the contact surfaces and non staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Priming
Apply the recommended primer to the surfaces in contact with sealant materials.

Movement joints
Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

Foamed materials (in compressible fillers and backing rods): Closed-cell or impregnated types which do not absorb water.

Bond breaking: Provide backing rods, and other back-up materials for sealants, which do not adhere to the sealant.

2.4 GLASS IDENTIFICATION

Safety glazing materials
Identify each piece or panel, to AS 1288.

Noise reducing glazed assemblies
Label each panel with a legible non-permanent mark, self-destroying when removed, stating and certifying the R_w rating, and identifying the testing authority. Remove when directed.

2.5 LOUVRE WINDOW ASSEMBLIES

General
Description: Provide louvre blades mounted in a metal surround frame or subframe and able to withstand the permissible-stress-design wind pressure for that location without failure or permanent distortion of members, and without blade flutter.

Adjustable louvres
Description: Provide louvre blades clipped into blade holders pivoted to stiles or coupling mullions, linked together in banks, each bank operated by an operating handle incorporating a latching device, or by a locking bar.

2.6 VENTILATING LOUVRE ASSEMBLIES

General
Description: Provide metal louvre blades mounted in a metal surround frame or subframe and able to withstand the permissible-stress-design wind pressure for that location without failure or permanent distortion of members, and without blade flutter.

Expansion joints
Provide for expansion and contraction in continuous sections (e.g. continuous louvres, interlocking mullions) at spacings not exceeding those recommended by the manufacturer, or 6 m, whichever is the lesser.

Fixed metal louvres
Provide metal louvre blades mounted in a metal surround frame or subframe, installed as for metal window installations.

Screens
Provide metallic coated steel wire or UPVC mesh screens behind louvres to prevent the entry of vermin, birds, rodents and wind blown leaves and papers.

2.7 INSECT SCREENS

Aluminium framed screens
Provide aluminium extruded or folded box frame sections with mesh fixing channel, mitred, staked and screwed at corners. Provide an extended frame section where necessary to adapt to window opening gear.

- Mesh: Bead the mesh into the frame channel with a continuous resilient gasket, so that the mesh is taut and without distortion.

Fixed screens
Provide fixed screens to the window frames with a clipping device which permits removal for cleaning.

Hinged screens
Hinge at the top to give access to opening sash.

Roll up screens
Provide a proprietary retractable insect screen comprising aluminium frame with baked enamel finish, fibreglass mesh beaded into the frame, and a retraction system including tension spring, nylon bearings, positive self-locking device, and plastic sealing strip at sill.

Sliding screens
Provide a matching aluminium head guide, sill runner, and frame stile sections for screens not part of the window frame.

- Hardware: Nylon slide runners and finger pull handle. Provide pile strip closers against sash where necessary to close gaps.

3 EXECUTION

3.1 GLASS PROCESSING

General
Processing: Perform required processes on glass, including cutting, obscuring, silvering and bending. Form necessary holes, including for fixings, equipment, access holes and speaking holes. Process exposed glass edges to a finish not inferior to ground arrised.

3.2 INSTALLATION

Glazing
General: Install the glass so that:

- Each piece is held firmly in place by permanent means which enable it to withstand the normal loadings and ambient conditions at its location without distortion or damage to glass and glazing materials.
- Building movements are not transferred to the glass.
- External glazing is watertight and airtight.

Temporary marking: Use a method which does not harm the glass. Remove marking on completion.

Toughened glass: Do not cut, work, or permanently mark after toughening. Use installation methods which prevent the glass making direct contact with metals or other non-resilient materials.

Heat absorbing glass: In locations exposed to direct sunlight, provide wheel cut edges free from damage or blemishes, with minimum feather.

Preglazing
Window assemblies and glazed doors: Supply inclusive of glazing, shop preglazed.

Site glazing
External timber framed glazing: Glaze with putty.

Windows and glazed doors
General: Install windows and glazed doors so that the frames:

- Are plumb, level, straight and true within acceptable building tolerances.
- Are fixed or anchored to the building structure in conformance with the wind action loading requirements.
- Will not carry any building loads, including loads caused by structural deflection or shortening.
- Allow for thermal movement.

Weatherproofing
Flashing and weatherings: Install flashings, weather bars, drips, storm moulds, caulking and pointing so that water is prevented from penetrating the building between the window frame and the building structure under the prevailing service conditions, including normal structural movement of the building.

Fixing
Fasteners and fastener spacing: Conform to the recommendations of the manufacturer.

Fasteners: Conceal fasteners.

Packing: Pack behind fixing points with durable full width packing.

Prepared masonry openings: If fixing of timber windows to prepared anchorages needs fastening from the frame face, sink the fastener heads below the surface and fill the sinking flush with a material compatible with the surface finish.

Joints
General: Make accurately fitted tight joints so that neither fasteners nor fixing devices such as pins, screws, adhesives and pressure indentations are visible on exposed surfaces.

Sealants: If priming is recommended, prime surfaces in contact with jointing materials.

Operation
General: Ensure moving parts operate freely and smoothly, without binding or sticking, at correct tensions or operating forces and are lubricated.

Protection
Removal: Remove temporary protection measures from the following:

- Contact mating surfaces before joining up.
- Exposed surfaces.

In situ touch up
Polyester or fluoropolymer coatings: Contact supplier for approval to apply touch up products otherwise replace damaged material.

Trim
General: Provide mouldings, architraves, reveal linings, and other internal trim using materials and finishes matching the window frames. Install to make neat and clean junctions between frames and the adjoining building surfaces.

3.3 COMPLETION

Trade clean
Method: Clean with soft clean cloths and clean water, finishing with a clean squeegee. Do not use abrasive or alkaline materials.

Extent: All frames and glass surfaces inside and out.

Maintenance manual
General: Submit the window and glazed door manufacturer's published instructions for operation, care and maintenance.

Warranty
Cross reference: *General requirements*.

4 PERFORMANCE

4.1 PERFORMANCE

Comply with NATHERS requirements.

0461b GLAZING

1 GENERAL

1.1 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

1.2 STANDARDS

Glazing
Glass type and thickness: To AS 1288, where no glass type or thickness is nominated.

Materials and installation: To AS 1288.

Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.

Terminology for work on glass: To AS/NZS 4668.

2 PRODUCTS

2.1 GLASS

Glass types and quality
Standard: To AS 1288 and AS/NZS 4667.

Glass and glazing materials
Glass and glazing materials generally: Free from defects which detract from appearance or interfere with performance under normal conditions of use.

Glazing plastics: Free from surface abrasions, and warranted by the manufacturer for 10 years against yellowing or other colour change, loss of strength and impact resistance, and general deterioration.

Safety glasses
Standard: To AS/NZS 2208.

StandardsMark: Required.

Type: Grade A when used in curtain walls.

Heat soaking: Required for toughened glass in curtain walls.

Insulating glass units (IGU's)
Selection and installation: To AS/NZS 4666.

2.2 GLAZING MATERIALS

General
Glazing materials (including putty, glazing compounds, sealants, gaskets, glazing tapes, spacing strips, spacing tapes, spacers, setting blocks and compression wedges): Appropriate for the conditions of application and the required performance.

Jointing materials
Compatability: Provide recommended jointing and pointing materials which are compatible with each other and with the contact surfaces and non staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Glazing tapes
Standards: To AAMA 800, Products coded 804.3, 806.3, 807.3, as applicable.

Elastomeric sealants
General: Provide elastomeric sealants in conformance with the **Elastomeric sealant schedule.**

Sealing compound (polyurethane, polysulphide, acrylic):

- Single component: Type II, Class A.
- Multi component: To ASTM C920.

Sealing compound (silicone):

- Single component: Class A.
- Multi component: To ASTM C920.

Sealing compound (butyl): To ASTM C1311.

Glazing compounds: To AAMA 802.3 (Types I or II), or 805.2, as applicable.

Narrow joint seam sealer: To AAMA 800, Products coded 803.3.

Exterior perimeter sealing compound: To AAMA 800.

Non drying sealant: To AAMA 800.

Expanded cellular glazing tape: To AAMA 800.

Very high bond pressure sensitive tapes: To ASTM D897, ASTM D1002, ASTM D3330M, ASTM D3652M, ASTM D3654M, and ASTM D3715M.

Pile weather strips

Standard: To AAMA 701/702.

Materials: Polypropylene or equivalent pile and backing, low friction silicone treated, ultra violet stabilised.

Finned type: A pile weather seal with a central polypropylene fin bonded into the centre of the backing rod and raised above the pile level.

Extruded gaskets and seals

Type: Non cellular (solid) elastopressive seals.

Material:

- Rubber products (neoprene, ethylene propylene diene monomer (EPDM) or silicone rubber): To BS 4255-1.
- Flexible polyvinyl chloride (PVC): To BS 2571, E type compounds, colour fastness grade B.

Priming

Compatibility: Apply the recommended primer to the surfaces in contact with sealant materials.

Movement joints

Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

Foamed materials (in compressible fillers and backing rods): Closed-cell or impregnated types which do not absorb water.

Bond breaking: Provide backing rods, and other back-up materials for sealants, which do not adhere to the sealant.

2.3 GLASS IDENTIFICATION

Safety glazing materials

Identification: Identify each piece or panel, to AS 1288.

3 EXECUTION

3.1 GLASS PROCESSING

General

Processing: Perform required processes on glass, including cutting, obscuring, silvering and bending. Form necessary holes, including for fixings, equipment, access holes and speaking holes. Process exposed glass edges to a finish not inferior to ground arrised.

3.2 INSTALLATION

Glazing

General: Install the glass so that:

- Each piece is held firmly in place by permanent means which enable it to withstand the normal loadings and ambient conditions at its location without distortion or damage to glass and glazing materials.
- Building movements are not transferred to the glass.
- External glazing is watertight and airtight.

Temporary marking: Use a method which does not harm the glass. Remove marking on completion.

Toughened glass: Do not cut, work, or permanently mark after toughening. Use installation methods which prevent the glass making direct contact with metals or other non-resilient materials.

Heat absorbing glass: In locations exposed to direct sunlight, provide wheel cut edges free from damage or blemishes, with minimum feather.

Preglazing

Window assemblies and glazed doors: Supply inclusive of glazing, shop preglazed.

Curtain walls: Supply inclusive of glazing, shop preglazed.

Site glazing

External timber framed glazing: Glaze with putty.

3.3 COMPLETION

Trade clean

Method: Clean with soft clean cloths and clean water, finishing with a clean squeegee. Do not use abrasive or alkaline materials.

Extent: All frames and glass surfaces inside and out.

Warranties

General: Submit a warranty, signed by the glazing subcontractor, undertaking to repair or replace glass and glazing materials which, within the warranty period, become defective or prove unsuitable for the specified application; provided that the manufacturers' recommendations for the maintenance of the material have been followed during the warranty period.

Glass manufacturer's warranty: An undertaking, conditional only on compliance with the manufacturer's recommendation for installation and maintenance, to supply replacement glass units to the site for replacement of defective units defined as follows:

- IGU units: Units in which the hermetic seal has failed as evidenced by intrusion of foreign matter, or internal condensation at temperature above 2°C.
- Coated glass units (including coated SIG units): Units in which the metallic coating shows evidence of manufacturing defects, including but not necessarily limited to cracking or peeling, as determined in accordance with ASTM C1048.

Toughened glass warranty: The manufacturer's warranty certifying that toughened glass supplied for use in curtain walls has been subjected to a heat soaking process which has converted at least 95% of the nickel sulphide content to the stable beta-phase.

Maintenance manual

Submit manufacturers' published recommendations for service use.

Cleaning

Replace damaged glass and leave the work clean, polished, free from defects, and in good condition.

4 PERFORMANCE

4.1 PERFORMANCE

Window and glazed door performance schedule:

Comply with NATHERS requirements.

0467 GLASS COMPONENTS

1 GENERAL

1.1 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

1.2 STANDARDS

Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.
Terminology for work on glass: To AS/NZS 4668.

1.3 INSPECTION

Notice
Inspection: Give notice so that the glass products may be inspected before they are installed.

1.4 SUBMISSIONS

Balustrade design
Certification: Submit a professional engineers' certificate confirming compliance with clause 3.6. of AS/NZS 1170.1.

Installation
Glass manufacturer's data: Submit statements from the manufacturers of the required glass types, certifying that the method of glazing, the selection of sealant systems, and conditions next to the glass comply with the following:

- Will not be detrimental to the long term structural performance, weathering capabilities and visual qualities of the glass.
- Will not cause delamination or other impairment to laminated glass during the service life of the curtain wall system.

2 PRODUCTS

2.1 GLASS

Glass and glazing materials
Glass and glazing materials generally: Free from defects which detract from appearance or interfere with performance under normal conditions of use.
Materials and installation: To AS 1288.
Quality requirements for cut-to-size and processed glass: To AS/NZS 4667.
Terminology for work on glass: To AS/NZS 4668.

Safety glasses
Standard: To AS/NZS 2208.
StandardsMark: Identify each piece or panel, to AS 1288.
Type: Grade A when used in curtain walls.

Glass tolerances
Size, squareness and flatness: To AS/NZS 2208.
Plate and sheet (i.e. not patterned):

- Roller wave: Maximum 0.15 mm.

2.2 GLAZING MATERIALS

General
Glazing materials (including putty, glazing compounds, sealants, gaskets, glazing tapes, spacing strips, spacing tapes, spacers, setting blocks and compression wedges): Appropriate for the conditions of application and the required performance.

Jointing materials

Provide recommended jointing and pointing materials which are compatible with each other and with the contact surfaces and non staining to finished surfaces. Do not provide bituminous materials on absorbent surfaces.

Glazing tapes

Standards: To AAMA 800, Products coded 804.3, 806.3, 807.3, as applicable.

Elastomeric sealants

Sealing compound (polyurethane, polysulphide, acrylic):

- Single component: Type II, Class A.
- Multi component: To ASTM C920.

Sealing compound (silicone):

- Single component: Class A.
- Multi component: To ASTM C920.

Sealing compound (butyl): To ASTM C1311.

Glazing compounds: To AAMA 802.3 (Types I or II), or 805.2, as applicable.

Narrow joint seam sealer: To AAMA 800, Products coded 803.3.

Exterior perimeter sealing compound: To AAMA 800.

Non drying sealant: To AAMA 800.

Expanded cellular glazing tape: To AAMA 800.

Very high bond pressure sensitive tapes: To ASTM D897, ASTM D1002, ASTM D3330M, ASTM D3652M, ASTM D3654M, and ASTM D3715M.

2.3 MIRRORS

Reflective surface

Type: Silver layer deposited on the glass or glazing plastic.

Protective coatings: Electrolytic copper coating at least 5 µm thick, and 2 coats of mirror backing and edge sealing paint having a total dry film thickness of at least 50 µm.

3 EXECUTION

3.1 GLASS PROCESSING

General

Processing: Perform required processes on glass, including cutting, obscuring, silvering and bending. Form necessary holes, including for fixings, equipment, access holes and speaking holes. Process exposed glass edges to a finish not inferior to ground arrised.

3.2 INSTALLATION

General

General: Install the glass so that:

- Each piece is held firmly in place by permanent means which enable it to withstand the normal loadings and ambient conditions at its location without distortion or damage to glass and glazing materials.
- Building movements are not transferred to the glass.

Temporary marking: Use a method which does not harm the glass. Remove marking on completion.

Toughened glass: Do not cut, work, or permanently mark after toughening. Use installation methods which prevent the glass making direct contact with metals or other non-resilient materials.

Frameless installations: Join the vertical edges of adjacent glass panels with silicone jointing compound.

3.3 FIXING MIRRORS

Backed mirrors

Backing: 9 mm waterproof plywood.

Adhesive fixing to backing: Non-acidic silicone adhesive at the rate recommended by the manufacturer.

Installation to backing: Clean the back of the glass panel and apply 'wallnuts' of adhesive together with double sided adhesive tape for temporary support, and affix directly to the backing.

Screw fixing

Mirror and backing: Fix direct to wall plugs with dome-headed chromium-plated screws in each corner and at 900 mm maximum centres around perimeter. Provide polyethylene sleeves and washers to prevent contact between screw and glass. Do not over-tension the screws.

Fixing backed and unbacked mirrors

Screw fixing: Fix direct to wall plugs with dome-headed chromium-plated screws in each corner and at 900 mm maximum centres around perimeter. Provide polyethylene sleeves and washers to prevent contact between screw and glass. Do not over-tension the screws.

Frame fixing: Proprietary aluminium frames to mirror perimeter, corners mitred. If unbacked, bed glass edges in a continuous resilient gasket. Attach the frame to the substrate with concealed screw fixings. Seal the frame to the substrate with paintable sealant which will not react with the mirror coating. Do not allow the sealant to contact the mirror back.

Bead fixing: Rebated timber beads to mirror perimeter, corners mitred. If unbacked, bed glass edges in a continuous resilient gasket. Screw fix the beads to the substrate.

Clip fixing: Fix direct to wall plugs with chromium-plated fixed clip and spring clip fixings at 900 mm maximum centres around perimeter. If unbacked, provide polyethylene or cork washers to prevent contact between clips and mirror back.

3.4 GLAZED SHOWER SCREENS

Water shedding

Provide an assembly which sheds water to the inside without retaining it on the frame surfaces. Seal the edge of the frame to adjoining surfaces with a resilient strip.

Sliding assemblies

Hanging: Hang the sliding sash on stainless steel or nylon sheaves on overhead channel track formed in the frame head, and fit nylon or equivalent bottom guides.

Hardware: Pull handles on both sides of sash, or of leading sash in multiple sash arrangements.

Fixing

Proprietary shower screens: To the manufacturer's recommendations.

3.5 GLASS BALUSTRADES

Standard

Glass balustrades: To AS 1288, Section 7.

3.6 COMPLETION

Trade clean

Method: Clean with soft clean cloths and clean water, finishing with a clean squeegee. Do not use abrasive or alkaline materials.

Extent: All frames and glass surfaces inside and out.

Warranty

Cross reference: *General requirements*.

0471 INSULATION AND SARKING MEMBRANES

1 GENERAL

1.1 AIMS

Responsibilities
General: Provide insulation and sarking membrane systems:
- Complete for their function.
- Conforming to the detail and location drawings.
- Firmly fixed in position.
- Maintain their performance for the life of the building.

1.2 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

1.3 STANDARDS

Installation of mineral wool insulation
Comply with the ICANZ Industry Code of Practice for the Safe Use of Glass Wool and Rock Wool Insulation.
Marking: Deliver mineral wool products to site in packaging labelled FBS-1 BIO-SOLUBLE INSULATION.

1.4 INTERPRETATION

Definitions
General: For the purposes of this worksection the definitions given below apply.
- Terminology: To AS/NZS 4859.1.
- Fire hazard properties: Means the average specific extinction area, critical radiant flux, Flammability index, Smoke-Developed Index, smoke growth rate index, smoke development rate or Spread-of-Flame Index of a material or assembly that indicate how they behave under specific fire test conditions.
- Sarking membrane: Flexible membrane material normally used for waterproofing, vapour proofing or thermal reflectance.
- FBS-1 Glass wool: Spun fibres of molten glass, utilizing up to 60% recycled waste glass, thermally bonded to form batts, blankets and sheets for thermal and acoustic insulation.
- FBS-1 Rock wool: Spun fibres of molten rock thermally bonded to form batts and blankets for thermal and acoustic insulation.
- Polyester insulation: Polyester fibres thermally bonded to form batts and blankets.
- Vapour barrier: A material or system that adequately impedes the transmission of water vapour under specified conditions.

1.5 SUBMISSIONS

Fire hazard properties
General: Submit evidence of conformance with the following:
- Fire hazard indices for all materials when tested in conformance with AS/NZS 1530.3, including, if the material has a reflective facing, scoring and blackening to AS/NZS 1530.3 clause A6:
  - Spread of flame index: 0.
  - Smoke developed index: ≤ 3.

Facing materials: Flammability index < 5 when tested in conformance with AS 1530.2.
Combustibility of insulation materials and facing: Not deemed combustible as determined by AS 1530.1.

Thermal properties
General: Submit evidence of conformance with AS/NZS 4859.1.

1.6 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the sarking, vapour barrier and insulation before they are covered up or concealed.

2 PRODUCTS

2.1 INSULATION MATERIALS

Fire hazard properties
General: Fire hazard indices for all materials when tested in conformance with AS/NZS 1530.3:

- Spread of flame index: 0.
- Smoke developed index: ≤ 3.
- Materials with reflective facing: Test to AS/NZS 1530.3 clause A6.

Facing materials: Flammability index < 5 when tested in conformance with AS 1530.2.

Combustibility of insulation materials and facing: Not deemed combustible as determined by AS 1530.1.

Bulk and reflective insulation
Cellulosic fibre (loose fill): To AS/NZS 4859.1 Section 5.

Mineral wool blankets and cut pieces: To AS/NZS 4859.1 Section 8.

Polyester: To AS/NZS 4859.1 Section 7.

Polyisocyanurate (rigid cellular sheets): To AS 1366.2.

Polystyrene (extruded rigid cellular sheets): To AS 1366.4.

Polystyrene (moulded rigid cellular sheets): To AS 1366.3.

Polyurethane (rigid cellular sheets): To AS 1366.1.

Polyurethane (sprayed): To ASTM D6694.

Reflective insulation: To AS/NZS 4859.1 Section 9.

Wet processed fibreboard (including softboard): To AS/NZS 1859.4.

Wool: To AS/NZS 4859.1 Section 6.

StandardsMark: Required.

Sarking membranes
Standard: To AS/NZS 4200.1.

Thermal performance: To AS/NZS 4859.1 Section 9.

Fasteners and supports
General: Metallic-coated steel.

Mesh support to roof insulation
Metallic-coated steel wire netting: To AS 2423 Section 4.

- Size: 45 mm mesh x 1 mm diameter.

Welded safety mesh: To AS/NZS 4389.

3 EXECUTION

3.1 GENERAL

Bulk insulation
Installation: To AS 3999 and BCA clause J1.2.

General: Ensure batts or blankets are firmly butted with no gaps except as follows:

- Access holes and vents: Do not obstruct.
- Light fittings and metal flues: Leave a 25 mm gap.

Sarking membrane
Standard: To AS/NZS 4200.2.

3.2 WALL INSULATION

Bulk installation
Batts: Friction fit between framing members. If support is not otherwise provided, staple nylon twine to the framing and stretch tight.

Wall sarking membrane
Application: Provide sarking behind cladding which does not provide a permanent weatherproof seal or may be subject to condensation forming on the internal face, including the following:

- Boards fixed vertically or diagonally.
- Boards or planks fixed in exposed locations where wind driven rain can penetrate the joints.

- Unpainted or unsealed cladding.
- Behind external cladding in bushfire prone areas to AS 3959.
- Masonry veneer.

Installation: Apply to the outer face of external stud walls from the bottom plate up, over the flashing. At the top, seal across the wall cavity. Overlap roll edges 150 mm. If the membrane is a vapour seal, seal all joints with pressure sensitive adhesive tape.

Fixing: Install as follows:

- To timber: Proprietary fixings or metallic-coated clouts or staples at 300 mm maximum centres.
- To steel: Tek screw with either 20 mm diameter washers or through hardboard strips.
- To plywood: Fix to plywood bracing panels with water based contact adhesive with a 50% adhesive cover.

3.3 ROOF INSULATION

Mesh support to roof insulation

Locations: Provide support to the following:

- Sarking, vapour barrier or reflective thermal insulation membranes laid over roof framing members which are spaced at more than 900 mm centres.
- Blanket type thermal insulation laid over roof framing members as sound insulation to metal roofing.

Installing wire netting: Lay over the roof framing providing sufficient slack or sag between members to suit the application.

Fixing wire netting: Staple to timber frame, wire to steel frame.

Installing welded safety mesh: To AS 4389.

Roof sarking locations

Location: Provide sarking under tile and shingle roofs.

Sarking membrane

Roof sarking:

- Installation to AS 2050.
- Location: Provide sarking under tile and shingle roofs.

Vapour barrier: Lay over the roof support frame with sufficient sag to allow the bulk insulation to achieve its full thickness. Overlap roll edges 150 mm and seal all joints with pressure sensitive adhesive tape.

Bulk insulation – metal roofs

Batts: Fit tightly between framing members.

Blanket for sound insulation: Install over the roof support frame, reflective thermal insulation (if any), and mesh support, so that the blanket is in continuous contact with the underside of the metal roofing sheets.

0511b LINING

1 GENERAL

1.1 AIMS

Responsibilities
General: Provide internal lining systems to the **Selections**.

1.2 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

1.3 INSPECTION

Notice
Inspection: Give sufficient notice so that inspection may be made of substrate or framing before installation of linings.

1.4 TOLERANCES

Surface
Flatness, twist, winding and bow: ≤ 1.5 mm deviation from a 1.5 m straightedge placed in any position.

2 PRODUCTS

2.1 MATERIALS AND COMPONENTS

Plasterboard
Standard: To AS/NZS 2588.

Fibre cement
Standard: To AS/NZS 2908.2.

Wall and ceiling linings: Type B category 2.

Minimum thickness: 4.5 mm.

Plywood and blockboard
Interior use: To AS/NZS 2270.

Exterior use: To AS/NZS 2271.

Visible surfaces with a clear finish: Veneer quality A.

Other visible surfaces: Veneer quality B.

Back/face veneer: Veneer quality C or D.

Bond: Type A.

Presealed plywood: Plywood pre-sealed both sides and edges with a machine applied sealer.

Wet processed fibreboard (including hardboard)
Standard: To AS/NZS 1859.4.

- Interior use generally: General purpose.
- Interior use heavy duty: Tempered (MR).
- Interior moisture area: Tempered (MR).
- Veneered hardboard: General purpose with a timber face veneer bonded to one side.

Wet processed fibreboard (including softboard): To AS/NZS 1859.4.

Dry-processed fibreboard (including medium density fibreboard)
Standard: To AS/NZS 1859.2.

Melamine overlaid medium density fibreboard: Medium density fibreboard (STD MDF) overlaid on both sides with low pressure melamine.

Decorative overlaid wood panels
Standard: To AS/NZS 1859.3.

Certification
General: Brand panels under the authority of a recognised certification program applicable to the product. Locate the brand on faces or edges which will be concealed in the works.

Certification programs:

- Plywood and blockboard: Plywood Association of Australia (PAA) Quality Control and Product Certification Scheme.
- Wet processed fibreboard, dry processed fibreboard, particleboard and decorative overlay wood panels: Australian Wood Panels Association AWPA JAS-ANZ Scheme.

Plywood certified formaldehyde emission level to AS 2098.11

Wood panel certified formaldehyde emission level to AS 4266.16

High pressure decorative laminate sheet
Standard: To AS/NZS 2924.1.

Coated steel
Standard: To AS 1397.

Fasteners
Steel nails: Hot dip galvanized.

Adhesives
For wallboards: Gunnable synthetic rubber/resin based mastic contact adhesive formulated for bonding flooring and wallboards to a variety of substrates.

Sealants
Fire rated sealant: Non-hardening sealant compatible with the materials to be sealed and having a fire rating equal to that of the partition it seals.

Acoustic sealant: Non-hardening sealant compatible with the materials to be sealed and having a specific gravity of not less than 1.5 gm/cubic centimetre and of 100% polyurethane mastic.

3 EXECUTION

3.1 CONSTRUCTION GENERALLY

Conditions
Do not commence lining work until such time as the building or zone in question is enclosed and weathertight and all wet trades have been completed.

Substrates or framing
General: Before fixing linings check and, if necessary, adjust the alignment of substrates or framing.

Battens
General: Fix at each crossing with structural framing members, or direct to solid walls or ceilings. Provide wall plugs in solid backgrounds.

Ceiling linings
General: Do not install until at least 14 days after the timber roof structure is fully loaded.

Accessories and trim
General: Provide accessories and trim necessary to complete the installation.

Adhesives
General: Provide adhesives of types appropriate to their purpose, and apply them so that they transmit the loads imposed, without causing discolouration of finished surfaces.

3.2 PLASTERBOARD LINING

Supports
General: Install timber battens or proprietary cold-formed galvanized steel furring channels as follows:

- Where framing member spacing exceeds the recommended spacing.
- Where direct fixing of the plasterboard is not possible due to the arrangement or alignment of the framing or substrate.
- Where the lining is the substrate for tiled finishes.

Transverse walls: Locate noggings as follows:

- At least 150 mm from the horizontal joint.
- Ensure that noggings do not protrude beyond the face of studs.

Installation
Gypsum plasterboard: To AS/NZS 2589.1.

Fibre reinforced gypsum plaster: To AS/NZS 2589.2.

Framed construction: Screw or nail or combine with adhesive.

Metal stud frames: Screw using galvanized self tapping screws, or retain using proprietary clamping straps and cover trims.

Masonry wall construction:

- Direct stick: To AS/NZS 2589.1 Appendix H.
- Fix to furring channels using screw or screw and adhesive to AS/NZS 2589.1 Section 7.

Ceilings: Fix using screw or screw and adhesive to ceiling furring members. Do not fix sheets to the bottom chords of trusses.

Wet areas: To AS 3740.

Multiple sheet layers

Application: Fire rated and acoustic rated walls.

Joints: Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before commencing succeeding layers. Stagger all sheet joints by minimum 200 mm.

Joints

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

Butt joints: Make joints over framing members or otherwise provide back blocking.

External corner joints: Make joints over metallic-coated steel corner beads.

Dry joints: Provide square edged sheet and finish with a UPVC joining section.

Control joints: Install purpose-made metallic-coated control joint beads at not more than 12 m centres in walls and ceilings and to coincide with structural movement joints.

Wet areas: Install additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Do not apply a topping coat after bedding perforated paper tape in bedding compound.

3.3 FIBRE CEMENT LINING

Supports

General: Install timber battens or proprietary cold-formed galvanized steel furring channels as follows:

- Where framing member spacing exceeds the recommended spacing.
- Where direct fixing of the fibre cement is not possible due to the arrangement or alignment of the framing or substrate.
- Where the lining is the substrate for tiled finishes.

Installation

General: Run sheets across the framing members. In flush jointed applications, stagger end joints in a brick pattern and locate them on framing members, away from the corners of large openings. Provide supports at edges and joints.

Timber framed construction: Nail only or combined with adhesive.

Steel framed construction: Screw only or combined with adhesive.

Wall framing: Do not fix to top and bottom plates or noggings.

- In tiled areas: Provide an extra row of noggings immediately above wall-to-floor flashings. Fix sheet at 150 mm centres to each stud and around the perimeter of the sheet.

Masonry wall construction:

- Fix using adhesive direct to masonry, but do not fix direct to masonry as a substrate for tiled finish.
- Fix to furring channels using screw or screw and adhesive.

Ceilings: Fix using screw or screw and adhesive to ceiling furring members. Do not fix sheets to the bottom chords of trusses.

Wet areas: To AS 3740.

Multiple sheet layers

Application: Fire rated and acoustic rated walls.

Joints: Fill and flush up all joints and fixings in each layer and caulk up perimeters and penetrations before commencing succeeding layers. Stagger all sheet joints by minimum 200 mm.

Joints

Flush joints: Provide recessed edge sheets and finish flush using perforated paper reinforcing tape.

- Movement joints in walls: Position a stud parallel to the joint on each side.
- Movement joints in ceilings and soffits: Provide movement joints to divide ceilings into bays not larger than 10.8 x 7.2 m and soffit linings into bays not larger than 4.2 x 4.2 m or 5.4 x 3.6 m. Provide framing parallel to the joint on each side. Do not fix the lining to abutting building surfaces.

External corner joints: Make joints over metallic-coated steel corner beads.

Dry joints: Provide square edged sheet and finish with a UPVC joining section.

Control joints: Provide purpose-made metallic-coated control joint beads at ≤ 7.2 m centres in walls and ceilings and to coincide with structural movement joints.

Wet areas: Provide additional supports, flashings, trim and sealants as required.

Joints in tiled areas: Bed perforated paper tape in bedding compound. Do not apply a topping coat.

- Movement joints: Space to suit joints required in tiling.
- Internal corners: Reinforce with metallic-coated steel angles. In corners subject to continuous moisture, flash over the angle and under the sheeting with continuous bitumen coated aluminium flashing.

3.4 CEILING ACCESS

General

Location: Provide personnel access ways to each separate ceiling space.

Material: Match adjacent ceiling.

Opening size: Maximise the space available within a 600 x 600 mm ceiling grid.

Types

Trimmed personnel access ways: Plain cover supported on all sides by timber trim fixed to underside of ceiling.

Flush personnel access ways: Cover fitted with rebated frame and set flush with the surrounding ceiling.

3.5 TRIM

General

General: Provide trim such as beads, mouldings and stops to make neat junctions between lining components, finishes and adjacent surfaces.

Timber trim

Hardwood: AS 2796.1.

Cypress pine: AS 1810.

Softwood: To AS 4785.1.

- Grade: To AS 4785.2.

0621 WATERPROOFING – WET AREAS

1 GENERAL

1.1 AIMS

Responsibilities
General: Provide wet area waterproofing systems which:
- Are graded to floor wastes to dispose of water without ponding.
- Prevent moisture entering the substrate or adjacent areas.

Selections: Conform to the **Selections**.

1.2 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.
Records: Document the extent of membrane protection for buildings to BCA 3.8.1.2.

1.3 STANDARDS

Wet areas
Standard: To AS 3740.

1.4 INTERPRETATIONS

Definitions
General: For the purposes of this worksection the definitions given below apply.
- Substrates: The surfaces on which tiles are bedded.
- Bond breaker: A system preventing the membrane bonding to the substrate, bedding or lining.
- Membranes: Impervious barriers to liquid water which may be:
  - Installed below floor finishes.
  - Installed behind the wall sheeting or render and termed *External.*
  - Installed to the face of the wall sheeting or render and termed *Internal.*
  - Liquid applied in liquid or gel form and air cured to form a seamless film.
  - Sheet in sheet form with joints lapped and sealed.
- Waterproof (WP): The property of a material that does not allow moisture to penetrate through it.
- Waterproofing systems: Combinations of membranes, flashings, drainage and accessories which form waterproof barriers and which may be:
  - Loose-laid.
  - Bonded to substrates.
- Water resistant (WR): The property of a material that restricts moisture movement and will not degrade under conditions of moisture.
- Wet area: An area within a building supplied with a floor waste.

1.5 INSPECTION

Notice
Inspection: Give notice so inspection may be made of the following:
- Substrate preparation completed.
- Secondary layers preparation completed.
- Before membranes are covered up or concealed.

1.6 SUBMISSIONS

Products documentation
General: Submit copies of product manufacturers:
- Product technical data sheets.
- Material safety data sheets (MSDS).

- Type tests certificates verifying conformance to AS/NZS 4858.

2 PRODUCTS

2.1 PRODUCTS

Membranes
Standard: To AS/NZS 4858.

Membrane systems
General: To be a proprietary membrane systems having one of the following stating that the system is suitable for the intended wet area waterproofing, as follows:

- A current Australian Building Product and Systems Certification Scheme certificate issued by ABCB (Australian Building Codes Board).
- A current appraisal report issued by either CSIRO Building Products and Systems Appraisals.
- A current BRANZ report.

Shower tray
General: Purpose-made jointless shower tray, with wall upstands at least 50 mm higher than the hob upstands. Set hob masonry on the inside of the tray hob upstands.

3 EXECUTION

3.1 PREPARATION

Substrates
General: Ensure substrates are as follows:

- Clean and free of any deposit or finish which may impair adhesion or location of tiles.
- If walls are plastered remove loose sand.
- If walls or floors are framed or discontinuous, support members are in full lengths without splicing.
- If floors are solid or continuous:
  - Excessive projections are removed.
  - Voids and hollows > 10 mm with abrupt edges are filled with a cement:sand mix not stronger than the substrate nor weaker than the bedding.
  - Depressions < 10 mm are filled with a latex modified cementitious product with feathering eliminated by scabbling the edges.
  - Cracks in substrates wider than 1.5 mm are filled with a filler compatible with the membrane system.

Absorbent substrates: If suction is excessive, control it by dampening but avoid over-wetting and do not apply mortar bedding to substrates showing surface moisture.

Dense concrete: If not sufficiently rough to provide a mechanical key, roughen by scabbling or the like to remove 3 mm of the surface and expose the aggregate; then apply a bonding treatment.

Moisture content
Concrete substrates: Cure for > 21 days.

Moisture content: Verify that the moisture content of the substrate is compatible with the water vapour transmission rate of the membrane system by testing to AS/NZS 2455.1 Appendix B.

Test type:

- Hygrometer test: Seal a hygrometer to the substrate for > 16 hours and measure the relative humidity of the air between the instrument and the slab.
- Electrical resistance test: Connect a resistance meter to the slab and read the moisture content.

Falls
Substrate: If the membrane is directly under the floor finish ensure the fall in the substrate conforms to the fall nominated for the finish.

Joints and fillets
Internal corners: Provide 45° fillets.

External corners: Round or arris edges.

Priming
General: If required, prime the substrates with compatible primers to ensure adhesion of membrane systems.

3.2 APPLICATION

Protection
General: Protect membrane from damage during installation and for the period after installation until the membrane achieves its service characteristics that resist damage.

Drains
Floor wastes: Turn membrane down onto the floor waste puddle flanges, and adhere.

Hobs
General: Extend membrane over the hob and into the room at least 50 mm. For hobless showers extend 1800 mm into the room.

Sheet joints
Bituminous sheet membranes:

- Side laps > 75 mm.
- End laps > 100 mm.

Synthetic rubber membranes:

- Factory-vulcanized laps > 40 mm.
- Field side laps > 50 mm for side laps.
- Field end-laps > 100 mm for end laps.

PVC membranes:

- Factory welded laps > 30 mm.
- Field–welded laps.
- If used over insulation boards > 100 mm.
- Other instances > 75 mm overlaps in other instances.

Curing of liquid applied systems
General: To the manufacturers instructions.

Curing: Allow membrane to fully cure before tiling.

Membrane terminations
Edge protection: Provide > 150 mm upturns.

Anchoring: Secure sheet membranes along the top edge.

Edge protection: Protect edges of the membrane.

Waterproofing above terminations: Waterproof the structure above the termination to prevent moisture entry behind the membrane using tiler's angle and finish overlaps.

Membrane vertical penetrations
Pipes, ducts, and vents: Provide separate sleeves for all pipes, ducts, and vents and have fixed to the substrate.

Membrane horizontal penetrations
Sleeves: Provide a flexible flange for all penetrations, bonded to the penetration and to the membrane.

Overlaying finishes on membranes
Compatibility: If a membrane is to be overlayed with another system such as tiles, pavers, provide an overlaying system that is compatible with and not cause damage to the membrane.

Bonded or partially bonded systems: If the topping or bedding mortar requires to be bonded to the membrane, provide sufficient movement joints in the topping or bedding mortar to reduce the movement over the membrane.

3.3 FLOOD TEST

General
Application: Perform a flood test prior to the installation of surface finishes.

Set-up:

- Measure for dryness the wall/floor junction of adjacent spaces the slab soffit below using the hygrometer test method.
- Record the result for each area.
- Dam the doorway(s) and seal floor wastes and drainage outlets to allow 50 mm water level.
- Fill space with clean water and leave overnight.

Evaluation:

- Make a visual inspection of the wall/floor junction of adjacent spaces and of the slab soffit below for obvious water or moisture.
- Test the same areas for dryness using the hygrometer test method, and compare the results to the measurements taken prior to flooding.

Compliance:

- Evidence of water from the visual test: Failure.
- No visual evidence of water: Proceed with the hygrometer test.
- Increase in test results before and after flooding: Failure.

Records:

- Submit records of all flood tests.

3.4 COMPLETION

Protection

General: Keep traffic off membrane surfaces until bonding has set or for 24 hours after laying, whichever period is the longer.

Reinstatement: Repair or replace faulty or damaged work. If the work cannot be repaired satisfactorily, replace the whole area affected.

Warranty

Cross reference: *General requirements.*

0702 MECHANICAL DESIGN AND INSTALL

1 GENERAL

1.1 AIMS

Responsibilities

General: Provide mechanical ventilation to bathrooms, WC's and Laundry areas where ventilation via operable window is not provided.

Design

Energy efficiency: Conform to the BCA and comply with NATHERS requirements.

1.2 CROSS REFERENCES

General

General: Conform to the *General requirements* worksection.

1.3 STANDARDS

General

Mechanical ventilation: To AS/NZS 1668.1 and AS 1668.2, as required by the Building Code of Australia.

2 PRODUCTS

2.1 FANS

General

Guards: Provide galvanized steel or bronze mesh guards.

Steel components: Corrosion protect by zinc plating or better.

Motors in air stream: Direct mount to impellers with minimum Class 155 insulation to IEC 60085. Provide terminal boxes external to fan casings and wired to fan motors.

Motor minimum degree of protection: IP55.

Bearings: Provide sealed for life or grease packed bearings.

Connections: Provide flexible duct connections at fan.

Roof mounted fans

Type: Centrifugal, mixed flow, axial flow aerofoil or propeller. Comply with the respective clauses above.

Housing: House fans in compact bases fitted with weathering skirts and manufactured from zinc-coated steel or UV stabilised plastic or composite.

Finish:

- Metallic-coated steel: UV stabilised powder coat to match roof colour.
- Other materials: Manufacturer's standard colour.

Vertical discharge fans: Provide weatherproof galvanized steel, plastic or aluminium backdraft dampers where the weather may enter when units are stopped.

Birdmesh: Where backdraft dampers are not fitted, provide birdmesh guards.

3 EXECUTION

3.1 DUCTWORK

Standard

Ductwork: To AS 4254.

Rigid duct

Material: Metallic-coated sheet steel to AS 1397, coating class G2/Z275.

Flexible duct

Material: Alumidised fabric clamped on formed metal helix with insulation blanket wrapped around duct and covered with an outer vapour barrier.

Installation: Install flexible duct as straight as possible with minimum number of bends. Maximise bend radius. Check for and rectify any crushed flexible duct..

Support: To AS 4254. Limit sag to < 40 mm/m.

Cleaning

Clean interior of ductwork progressively during installation.

Insulation and sealing: Notwithstanding the class of building, conform to BCA Specification J5.2.

0902 ELECTRICAL DESIGN AND INSTALL

1 GENERAL

1.1 AIMS

Responsibilities
General: Provide electrical systems as documented.

Qualification
General: Use only persons appropriately experienced and qualified to undertake the electrical design work on the systems documented.

Performance
General: Carry out verification tests and measurements to show compliance with the documentation.

1.2 CROSS REFERENCES

General
General: Conform to the *General requirements* worksection.

1.3 STANDARD

General
Electrical systems: To AS/NZS 3008.1.1 and SAA HB 301.

Telecommunications cabling: To AS/ACIF S008, AS/ACIF S009, AS/NZS 3080 and SAA HB 29.

Degrees of protection (IP code): To AS 60529.

EMC: To AS/NZS 61000.

2 EXECUTION

2.1 GENERAL

General
Arrangement: Arrange services so that services running together are parallel with each other and with adjacent building elements.

Fixing: If non-structural building elements are not suitable for fixing equipment and services to, fix directly to structure and trim around holes or penetrations in non-structural elements.

Installation: Install equipment and services plumb, fix securely and organise reticulated services neatly. Allow for movement in both structure and services.

Lifting: Provide heavy items of equipment with permanent fixtures for lifting as recommended by the manufacturer.

Suspended ground floors: Keep all parts of services under suspended ground floors > 150 mm clear of the ground surface. Make sure services do not impede access.

Submissions
Technical data: Submit documentation to fully describe the proposed installation.

Installation of accessories
General: Unless installed on purpose built ductwork. Install accessories in conformance with the **Installation of accessories table**.

Location: Final location of all outlets and equipment to be confirmed on site prior to installation.

Spacing from adjacent horizontal surface: ≥ 75 mm to the centre of accessory socket.

Default mounting heights to centre of accessory plate:

Outlets	300 mm
Switches and controls	1100 mm

Flush mounting: Provide flush mounted accessories except in plant rooms.

Common face plates: Mount adjacent flush mounted accessories under a common faceplate.

Restricted location: Do not install wall boxes across junctions of wall finishes.

Surface mounting: Proprietary mounting blocks.

Installation of accessories table

Wall construction	Installation and concealed cabling facilities
Rendered masonry partition	Flush wall box with conduit chased into wall
Double sided face brick partition	Vertically mounted flush wall box with conduit concealed in cut bricks
Face brick external cavity wall	Flush wall box with thermoplastic insulated cables in conduit run in cavity and tied against inner brick surface, or thermoplastic sheathed cables run in cavity
Stud partition	Flush plate secured to proprietary support bracket or wall box

Installation of ceiling mounted appliances

Connections: Appliances: Provide flush mounted outlets on the ceiling next to support brackets.

Mounting: Mount appliances independent of ceiling tiles and suspended ceiling material.

Connections: Fixed equipment: Provide concealed permanent connections.

Fixing: For equipment and appliances heavier than 30 kg provide support through the suspended ceiling to the building structure. Brace appliances that have excessive bending moments, are heavy or vibrate, to prevent horizontal movement.

Manuals

General: Conform to the **Operation and maintenance manuals** clause in *General requirements.*

Certification

General: Submit certification that the plant and equipment submitted meets all requirements and capacities of the contract documents except for departures that are identified in the submission.

2.2 LOW VOLTAGE POWER SYSTEMS

General

General: Provide a complete operational low voltage power system, comprising the following and as documented:

- Supply from network distributor.
- Metering.
- Consumers mains.
- Submains.
- Final subcircuits.

Submissions

Technical data: Submit documentation to fully describe the proposed installation. As a minimum provide:

- Single line diagram(s).
- Fault levels at switchboards.
- Maximum demand calculations.
- Cable and conductor cross sectional area and insulation type.
- Submain cable routes and support or enclosure method.
- Switchboard cupboard layouts including risers.
- Busduct systems including routes, dimensions and connection details.
- Certify compliance with AS/NZS 3000 clause 1.8, for electrical services.

Accessories

General: Provide the following and as documented:

- General power outlets.
- Isolating switches.
- Three phase outlets.

Wiring systems

Standard: To AS/NZS 3013.

Selection: Provide wiring systems appropriate to the installation conditions and the function of the load.

Thermal insulation: In walls filled with thermal insulation, install cables in PVC conduit.

Power cables

General: Copper cable generally, multi-stranded except for MIMS.

Minimum size:

- Lighting subcircuits: 1.5 mm^2.
- Power subcircuits: 2.5 mm^2.
- Submains: 6 mm^2.

Voltage drop: Install final subcircuit cables within the voltage drop parameters dictated by the route length and load.

Fault loop impedance: Provide final subcircuit cables selected to satisfy the requirements for automatic disconnection under short-circuit and earth fault/touch voltage conditions.

Dummy load tests

General: Where electrical tests are required and the actual load is not available, provide a dummy load equal to at least 75% of the design load.

2.3 SWITCHBOARDS

General

General: Provide proprietary switchboards to the following and as documented:

- Main switchboard.
- Distribution boards.

Rated short-circuit currents: Design for the maximum prospective symmetrical r.m.s. current values at rated operational voltage, at each assembly incoming supply terminal, excluding effects of current limiting devices.

Standards

Standard: To AS/NZS 3439.1 and AS/NZS 3439.3.

Statutory authority's equipment

General: Refer to network distributor service rules to determine their requirements. Install equipment supplied by the network distributor, and provide wiring to complete the installation.

Rated short-circuit currents

General: The rated fault capacity of the assembly enclosure, busbars and outgoing protective devices is equal to the fault level of the system at the assembly.

Busbars

General: Incorporate proprietary insulated busbar systems for the interconnection of isolators, circuit breakers and other circuit protective devices.

Earthing

General: Make provision for connection of communications systems CET at switchboard earth bar to AS/ACIF S009.

IP rating

General: IP52 minimum.
Weatherproof: IP56 minimum.

Supporting structure

General: Wall mounted for proprietary switchboards.

Ventilation

General: Required to maintain design operating temperatures at full load.

2.4 SWITCHBOARD COMPONENTS

Protective devices

General: Select and adjust protective devices to grade and coordinate for overcurrent, and earth faults.

Switch-isolator and combination fuse-switch units

Standard: To AS/NZS 60947.1 and AS/NZS 3947.3.

Rated current: To suit unit installed in enclosure.

Rated fault capacity: Provide units selected for short-circuit making capacity that is at least the fault level at assembly incoming terminals.

Breaking capacity: At least the rated full load current.

Rated duty: Uninterrupted in non-ventilated enclosure.

Operation: Independent manual operation including positive *'ON/OFF'* indicator.

Locking: Provide for padlocking in the *'OFF'* position.

Handles: Removable only when switch is in open position.

Fuse links: Isolated when switch contacts are open.

Moulded case and miniature circuit breakers

Moulded case breakers: To AS/NZS 60947.1, AS 2184 and AS 60947.2.

Miniature circuit breakers: To AS/NZS 60898.1 or AS 3111.

Trip type:

- Moulded case breakers: adjustable thermal, fixed magnetic.
- Miniature circuit breakers: Fixed thermal, fixed magnetic.

Current limiting: Moulded case breakers: required.

Fault capacity ≥ 10 kA: To AS 60947.2 and AS/NZS 60947.1.

Fault capacity < 10 kA, current rating < 100 A: Miniature overcurrent circuit breakers to AS/NZS 60898.1 or AS 3111

Mounting: Mount circuit breakers so that the *'ON/OFF'* and current rating indications are clearly visible with covers or escutcheons in position. Align operating toggles of each circuit breaker in the same plane.

Clip tray chassis: For miniature overcurrent circuit breakers provide clip tray assemblies capable of accepting single, double, or triple circuit breakers, and related busbars. Provide moulded clip-on pole fillers for unused portions.

Residual current devices

Integral type: Incorporate earth leakage in circuit breaker protection operation. To AS/NZS 61009.1.

Maximum tripping current: 30 mA.

Fuses with enclosed fuse links

Standards: To AS/NZS 60269.1, AS/NZS 60269.2.0 and AS/NZS 60269.2.1.

Fault level: Provide fuses suitable for the fault level at the assembly, and which discriminate with other protective equipment.

Let-through energy and peak cut-off current: To suit protected equipment.

Utilisation category: Distribution/general purpose: gG.

Fuse-holders: Mount fuse-holders so that fuse carriers may be withdrawn directly towards the operator and away from live parts. Provide fixed insulation which shrouds live metal when the fuse carrier is withdrawn.

Barriers: Provide barriers on both sides of each fuse link, preventing inadvertent electrical contact between phases by the insertion of screwdriver.

Fuse links: Enclosed, high rupturing capacity type mounted in a fuse carrier. If necessary for safe removal and insertion of the fuse carrier, provide extraction handles. Mount on clips within the spares cabinet.

Identification: Clearly indicate Australian manufacturer or distributor.

Contactors

Standard: To AS/NZS 60947.4.1.

Rated operational current: Full load current of the load controlled.

Minimum rating: 16 A.

Contacts life: 1 million operations at AC-3 or DC-3.

Mounting: Mount with sufficient clearance to allow full access for maintenance, removal and replacement of coils and contacts, without the need to disconnect wiring or remove other equipment.

Auxiliary contacts: Provide auxiliary contacts with at least one normally-open and one normally-closed separate contacts with rating of 6 A at 230 V a.c.

Interconnection: Do not connect contactors in series or parallel to achieve ratings.

2.5 LIGHTING

General

General: Provide a complete operational lighting system, tested and commissioned.

Interior lighting standard: To AS/NZS 1680 Parts 0, 2.4 and 2.5, and AS 1680 Parts 1, 2.1, 2.2, 2.3 and 3.

Exterior lighting standard: To AS/NZS 1158 Parts 0, 1.1, 1.3 and 3.1, and AS 1158 Parts 2 and 4.

Proprietary equipment: Provide only proprietary luminaires, fittings and accessories.

Modifications and refurbishing: Carry out to the original manufacturer's standards.

Minimum energy performance standards

General: To AS/NZS 4783.2 and AS/NZS 4782.2.

Comply with NATHERS report.

Lamps

Lamps: Provide all luminaires complete with lamps and accessories.

Verify operation: Install lamps in all luminaries and verify correct operation before completion

Standards:

- Fluorescent: To AS 4782.1.

- Incandescent: To AS 2325.
- Tungsten halogen: To IEC 60357.

Low voltage lamps: Provide lamps strictly in accordance with the luminaire manufacturer's recommendation.

Dichroic lamps: Provide dichroic lamps with integral reflector.

Lighting control system

General: Provide the following as documented:

- Lighting switches.
- Dimmers.
- Automatic control systems.

Documentation: Provide complete technical and operational documentation for the lighting control system.

Installation

Supports: Mount luminaires on proprietary supports by means of battens, trims, noggings, roses or packing material to suit location.

Completion

General: Verify the operation of all luminaires. Replace lamps which have been in service for a period > 20% of the lamp life as published by the lamp manufacturer.

2.6 TELECOMMUNICATION CABLING

General

General: Provide a complete operational telecommunications cabling system, tested and commissioned in accordance with AS/NZS 3080, AS/ACIF S009 and SAA HB 29. Provide accommodation for telecommunications cabling infrastructure complying with AS/NZS 3084 including the detailed requirements of Appendix ZA, ZB and ZC. Include the following as documented:

- Building distributor.
- Backbone cabling.
- Floor distributors.
- Consolidation points.
- Horizontal cabling.
- Telecommunications outlets.
- Fly leads.

System requirements

Application class to AS/NZS 3080 clause 6.3: E.

Balanced system to AS/NZS 3080 clause 7 (data): Category 6.

Balanced system to AS/NZS 3080 clause 7 (voice): Category 6.

Conformance: Certify the design and installation for conformance with AS/NZS 3080 in accordance with the detailed requirements of clause 4.

System warranty: Warrant the specified communications cabling performance for a minimum of 15 years.

Modular connector patch panels

Terminations: Terminate directly to the modular connector.

Patch cords: Terminate cord ends with appropriate registered jacks.

Optical fibre termination panels

Break out trays: Provide fibre optic cable break out trays at each group of fibre optic cable terminations.

Loom cables: Neatly loom cables and lay stripped cables into the break out tray.

Secure cables: Ensure that cables are secured by the sheath and that there is no stress on the fibre optic cores.

Patch cords

General: Provide terminated patch cords for 100% of the total incoming and outgoing ports used.

Records

Record book: Provide a record book at each cross connect.

Records in pencil: Complete the records in pencil for each termination and jumper, providing origin and destination and type of service.

Location: Secure log books in each distribution frame records holder.

Identification and labelling, and record documentation: To AS/NZS 3085.1.

Cable separation

Low voltage cables: Separate telecommunications cables not enclosed in conduits or ducts from low voltage services by at least 150 mm.

Electromagnetic interference (EMI): Provide clearance to minimise the effect of EMI where communications cables are installed parallel and adjacent to power cables carrying loads in excess of 200 A.

Installation

Crossover: Install cables neatly and without crossovers between cables.

Loom size: Loom cables into groups not exceeding 50 cables, and hold looms in place using reusable cable ties at least 20 mm wide. Do not exert compressive force on the cables when installing cable straps.

Fly leads

General: Provide fly leads to 50% of the outlets installed.

Earthing system

Communication earth system (CES): Provide a communications earth terminal (CET) associated with the local protective earth (PE) system adjacent to each electrical distribution board.

2.7 AUTOMATIC FIRE DETECTION

General

General: Provide a fully operational, system, tested and commissioned in accordance with the AS 1670 series and AS 7240.

General: Provide equipment listed in the ActivFire Register of Fire Protection Equipment.

Installation wiring

Conductor size: ≥ 1.5 mm^2 TPI 230 V rated, with red and white insulation.

Sheathing: Red.

Detectors

Point type smoke detectors: To AS 1603.2.

Installation

General: Install detectors so they can be easily inspected and tested in situ, and readily withdrawn for service.