

PLANNING
BUILDING
HERITAGE
LANDSCAPE
URBAN DESIGN

CITY
PLAN
SERVICES

4 August 2006

The General Manager
Customer Service
Pittwater Council
PO Box 882,
Unit 1, Vuko Place
Warriewood 2120

Dear Sir/Madam

Re: CONSTRUCTION CERTIFICATE NO 22374
1148-1152 BARRENJOEY RD, PALM BEACH

I refer to Construction Certificate 22375 dated 25 November 2003 for the Civil works associated with a subdivision at the subject property and enclose herewith revised Civil and Stormwater details and certification prepared by Northern Beaches Engineering.

Please be advised that these details replace the previously relied upon plans by Tierrey Consulting Engineers and are accepted subject to compliance with development consent condition B6 and excludes approval of works on public land.

Please do not hesitate to contact me should you required any further information.

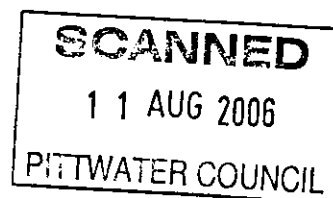
Yours Faithfully,



Brendan Bennett
Director

CC: Darren Leete – Raypond Developments

Encl: Civil & Stormwater drawings
Northern Beaches Engineering Certificate dated 26 July 2006



M:\Projects\CP2002\22-375\Le260802.doc

TELEPHONE 8270 3500
FACSIMILE 8270 3501

LEVEL 1 364 KENT STREET
SYDNEY NSW 2000

WWW.CITYPLAN.COM.AU
ABN 30 075 223 353



DIRECTORS

Stewart McGeehey Rick Wray Lucas Morley

Civil Works & Stormwater Design Certificate

Date: 26th July 2006
Client: Raypond P/L

Job No. 030963
Engineer: Rick Wray

Site: Cnr Palm Beach Road & Barrenjoey Road, Palm Beach

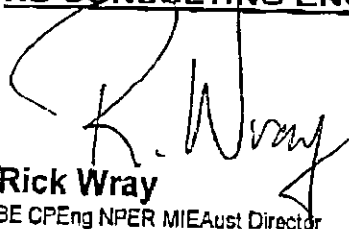
Rick Wray of NB Consulting Engineers P/L has designed a Stormwater Management System (on-site detention system) and Civil Works Plans for the above address (Job No 030963, Dwg No's S01C, C01E, C02C, C03B, C04A, C05B, C07E, C08F, C09G, C10D, C11E, C12C, C13, C14F, C15F, C16A, C17D, C18E, C19, C20C, C22B, C23C, C24D, C25C, C26A, C27).

I hereby certify that the design complies with Pittwater Councils conditions B19 and B20 of subdivision consent, and the following Australian Standards.

- BCA Clause 3.1.2 & AS/NZS 3500.3 – 2003.
- BCA Clauses 3.11.2, 3.11.3, 3.11.4.
- AS/NZS 1170.0 – 2002, AS/NZS 1170.1 – 2002.
- AS/NZS 1170.2 – 2002, AS1170.4 – 1993,
- AS 3600 – 2001, AS 3700 – 2001 & AS 2159 – 1995.

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

NB CONSULTING ENGINEERS P/L


Rick Wray
 BE CPEng NPER MIEAust Director
 Rego No. 803938

SCANNED
 11 AUG 2006
 PITTWAËR COUNCIL

\\NBSBS\COMPANY\ENG\NBC\2007\030963\Civil & Stormwater Design Certificate.doc

Northern Beaches Consulting Engineers Pty Ltd Structural, Civil & Stormwater Engineers ALN 078 121 616 ABN 24 078 121 616
 Suite 207, 30 Fischer Road Dee Why, NSW 2099 Tel 6994 7000 Fax 9934 7444 Email nb@nbconsulting.com.au

OBSERVATION POINT PROPOSED ACCESS ROAD

at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach
for: Raypond Development

Prepared By:

 **NORTHERN BEACHES**
Consulting Engineers P/L.

A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail : nb@nbconsulting.com.au

DRAWING SCHEDULE:

S01 - GENERAL NOTES
C01 - GENERAL ARRANGEMENT PLAN
C02 - BULK EARTHWORKS CROSS SECTIONS SHEET 1
C03 - BULK EARTHWORKS CROSS SECTIONS SHEET 2
C04 - BULK EARTHWORKS CROSS SECTIONS SHEET 3
C05 - BULK EARTHWORKS CROSS SECTIONS SHEET 4
C06 - NOT USED

C07 - RETAINING WALL DETAILS SHEET 1
C08 - RETAINING WALL DETAILS SHEET 2
C09 - RETAINING WALL DETAILS SHEET 3
C10 - RETAINING WALL DETAILS SHEET 4
C11 - RETAINING WALL DETAILS SHEET 5
C12 - SEDIMENT AND EROSION CONTROL PLAN
C13 - SEDIMENT AND EROSION CONTROL DETAILS
C14 - DRAINAGE PLAN
C15 - DRIVEWAY PLAN AND DETAILS
C16 - EXTERNAL ROADWORKS PLAN AND DETAILS
C17 - ON-SITE DETENTION TANK DT3
PLAN AND DRAINAGE DETAILS
C18 - UPPER DRIVEWAY SUSPENDED SLAB
PLANS AND DETAILS

C19 - DRIVEWAY ELEVATIONS SHEET 1
C20 - DRIVEWAY ELEVATIONS SHEET 2
C21 - NOT USED
C22 - RETAINING WALL DETAILS SHEET 6
C23 - ENTRY STAIR AND WALLS AT PALM
BEACH ROAD PLAN AND DETAILS
C24 - HGL LONGITUDINAL SECTIONS SHEET 1
C25 - HGL LONGITUDINAL SECTIONS SHEET 2
C26 - DRAINAGE DETAILS
C27 - RETAINING WALL DETAILS SHEET 7
C28 - RETAINING WALL DETAILS SHEET 8

SCANNED
11 AUG 2006
PITTWATER COUNCIL

CITY PLAN SERVICES
Construction Cert. No: Approved Date:
22375 04/01/06
Certifying Authority: Brendan Bennett
Licence/Contract No: PIA2004

030963
REV. D - 06.01.2005

GENERAL NOTES:

- GENERAL
G1. The drawings are to be read together with all Architects drawings and specifications.
G2. Dimensions shall not be obtained by scaling from the drawings. All setting out dimensions shall be verified and discrepancies shall be referred to the Engineer prior to commencement of work.

FOOTINGS

- F1. Footings to be constructed and back filled as soon as possible following excavation to avoid softening by rain or drying out by exposure.
F2. Footings must bear into undisturbed natural ground clear of organic material. Refer to details.
F3. If rock or variable bearing strata is encountered during excavation of the footings all footings/piers are to be excavated to similar material of greater bearing capacity.

CONCRETE

- C1. All workmanship and materials shall be in accordance with AS 3600.
C2. Concrete quality shall be as follows and shall be verified by tests.
C3. All concrete unless otherwise noted shall have a slump of 80mm at point of placement, a max. aggregate size of 20 mm.

Table with 4 columns: ELEMENT, INTERIOR, EXTERIOR, EXTERIOR CAST AGAINST GROUND. Rows include FOOTINGS, COLUMNS/PEDESTALS, SLABS/WALLS, BEAMS, and BLOCKWORK.

- C5. Sizes of concrete elements do not include thickness of applied finishes.
C6. All Construction Joints locations shall be approved by the Structural Engineer.
C7. Beam depths are written first and include slab thickness, if any.

SEDIMENT & EROSION CONTROL

- SE1. THE SEDIMENT & EROSION CONTROL MEASURES SHOWN ON THESE DRAWINGS ARE INDICATIVE ONLY AND ARE INTENDED AS A GUIDE TO THE BASIC MEASURES REQUIRED. THE CONTRACTOR IS TO PROVIDE ADDITIONAL MEASURES AS REQUIRED TO SUIT HIS STAGING, WORK METHODS & REQUIREMENTS OF COUNCIL.

REINFORCEMENT

- R1. All reinforcement specified is Grade D500 unless noted otherwise.
R2. Reinforcement is represented diagrammatically it is not necessarily shown in true projection.
R3. Top reinforcement is to be continuous over supports.

FORMWORK

- FW1. Formwork must be cleaned of all debris prior to casting of concrete.
FW2. Minimum stripping times for form work shall be as recommended in AS 1504 or as directed by the engineer.
FW3. The finished concrete shall be a dense homogeneous mass, completely filling the form work, thoroughly embedding the reinforcement and free of stone pockets.

BRICKWORK

- BR1. Brickwork is to be constructed to AS 3700.
BR2. Two layers of approved greased metal based slip material shall be used over all load bearing walls that support concrete slabs and placed on smooth brickwork or trowelled mortar finish.
BR3. No brickwork shall be constructed on suspended slabs until all propping has been removed from the underside of the slab and the concrete has the specified 28 day cylinder strength verified by tests.

BLOCKWORK

- BL1. Concrete blocks shall have a minimum compressive strength of 15 MPa and conform to AS 1500.
BL2. Where cores of hollow blocks are to be filled, properly compacted 20MPa concrete with 10 mm aggregate and 230 mm slump shall be used.
BL3. Location of actual starters is critical to suit block cores, allow 55 mm cover from the outside face of blockwork.

STEEL

- S1. All structural steelwork to be Grade 500 or greater.
S2. Material and workmanship shall comply with AS 1250 - 1981, SAA Steel Structures Code and the specification for Structural Steel.
S3. Rolled steel sections including steel plates shall comply with AS 3678 - 1990.
S4. Cold formed steel sections shall be Grade 450 Zinc coated in accordance with AS 1538-1988.

- a. Thoroughly cleaned wire brushing, followed by two coats of zinc phosphate primer equivalent to Dulux Luxoprim applied by hand using brushes to achieve a total dry film thickness of 70 microns.

EXTERNAL ELEMENTS - ELEMENTS WITHIN EITHER SKIN OF EXTERNAL CAVITY WALLS

- b. Preparation Blast clean to a minimum standard Class 2.5 in accordance with AS 1627 Part 4.
Primer 2-pack epoxy phosphate at dft 75 microns (Dulux Durepon P14).
Barrier Coat 2-pack epoxy miscous iron oxide, dft 100 microns.

TIMBER

- T1. All workmanship and materials to be in accordance with AS 1684 and AS 1720. All soft wood to be Grade F7 unless noted otherwise.
T2. All joints deeper than 150 to have blocking over support bearers and at a maximum 3000 centres.
T3. Roof trusses to be designed by the manufacturer to the relevant standards.

COMPACTED FILL

- CF1. Only to be used with approval Engineer 4 to be certified by a geotechnical Engineer.
CF2. Clear organic material and topsoil under proposed slabs/footings.
CF3. Filling shall be granular material compacted in not more than 200 mm layers to a minimum dry density ratio (AS 1289/E4.2 1982) of 98 percent standard.

INSPECTIONS BY ENGINEER

- 24 HOURS NOTICE IS REQUIRED BEFORE ANY SITE INSPECTION
1. Bearing strata of all footings prior to concrete pour.
2. Any reinforcement prior to concrete pour.

RETAINING WALLS

- RW1. ENSURE FREE DRAINING BACKFILL AND DRAINAGE IS IN PLACE BEHIND ALL RETAINING WALLS.

SHOTCRETE NOTES

- 1. PROVIDE SUPPORT TO EXISTING SERVICES AS REQUIRED. TO BE DETERMINED ON SITE.
2. SHOTCRETE CONCRETE TO BE IN ACCORDANCE WITH THE 'CONCRETE INSTITUTE OF AUSTRALIA' PUBLICATION 'RECOMMENDED PRACTICE - SPRAYED CONCRETE'.
3. SANDSTONE ROCK FACE TO BE INSPECTED BY GEOTECHNICAL ENGINEER TO CONFIRM STABILITY. IF UNFAVOURABLE ROCK MASS CONDITIONS ARE ENCOUNTERED, ROCK BOLTING MAY BE REQUIRED.

SITE PREPARATION, CLEARING AND GRUBBING

- S1. ALL WORK TO BE IN ACCORDANCE WITH LANDSCAPE SPECIFICATION
S2. DIVERTING WATER AND DEWATERING: THE CONTRACTOR SHALL TAKE ALL NECESSARY ACTION TO PREVENT ANY SURFACE OR SUBSOIL WATER FROM INTERFERING WITH THE PROGRESS OF THE WORKS.
S3. SEDIMENT AND EROSION CONTROL MEASURES SHALL BE CARRIED OUT FOR THE FULL DURATION OF THE WORKS BY THE CONTRACTOR.

EARTHWORKS

- E1. ALL WORK TO BE IN ACCORDANCE WITH THE SPECIFICATION.
E2. CUT TO LEVEL OF TOP OF SUBGRADE. PROOF ROLL ALL EXPOSED SUBGRADE AND REPLACE SOFT OR SPONGY AREAS AS PER FILL NOTES BELOW, COMPACT AS PER FILL.
E3. IN FILL AREAS- CUT AND REMOVE VEGETATION AND STRIP TOPSOIL -(AS PER SITE PREPARATION NOTES) PROOF ROLL EXPOSED SUBGRADE AND REPLACE SOFT OR SPONGY AREAS, AS DIRECTED BY THE GEOTECHNICAL ENGINEER OR SUPERINTENDENT. PLACE AND COMPACT NEW FILL.

GEOTECHNICAL

- GT1. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH GEOTECHNICAL INVESTIGATION REPORTS BY SHIRLEY CONSULTING ENGINEERS PREPARED 18 DECEMBER 2000, REF: RN2000/018 SHIRLEY CONSULTING ENGINEERS PREPARED 27 JULY 2002, REF: RN2002/0725

SURVEY

- SY1. THESE DRAWINGS BASED ON SURVEY PREPARED BY BOWDEN'S GROUP DRAWING No. 31784/01
SY2. ALL LEVELS ARE TO AUSTRALIAN HEIGHT DATUM (A.H.D.) UNO.
SY3. ALL LEVELS AND DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF WORK AND SUPERINTENDENT NOTIFIED OF ANY DISCREPANCIES.

EXISTING PAVEMENT

- EP1. CUT EXISTING PAVEMENT TO FORM NEAT EDGE FOR NEW WORK.
EP2. LEVELS OF NEW PAVEMENT TO MATCH EXISTING WHERE IT ABUTS.

EXCAVATION AND STORAGE

- ES1. EXCAVATIONS SHALL NOT BE LEFT OPEN OVERNIGHT. CONTRACTOR SHALL PROVIDE ADEQUATE BARRICADES, WARNING SIGNS, LAMPS ETC. AS REQUIRED FOR THE SAFETY OF THE PUBLIC.
ES2. LOCATION OF STORAGE OF CONSTRUCTION MATERIALS TO BE APPROVED BY THE SUPERINTENDENT.

DRAINAGE

- D1. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH AS3600.3.
D2. ALL PIPES NOMINATE 'u' PVC ' ON DRAINAGE PLAN SHALL BE STORMWATER u'PVC PIPES CLASS AND HAVE SOLVENT WELDED JOINTS IN ACCORDANCE WITH AS1264 AND INSTALLED IN ACCORDANCE WITH AS 2032
D3. ALL FITS TO HAVE CONCRETE BENCHING TO FACILITATE THE SMOOTH FLOW OF WATER THROUGH THE PIT.
D4. MINIMUM COVER TO PIPES SHALL BE 600mm UNDER TRAFFICABLE AREAS WITH NO CONCRETE SLAB OVER 450mm UNDER TRAFFICABLE AREA WITH CONCRETE SLAB OVER AND 300 ELSEWHERE U.N.O.

PAVEMENTS

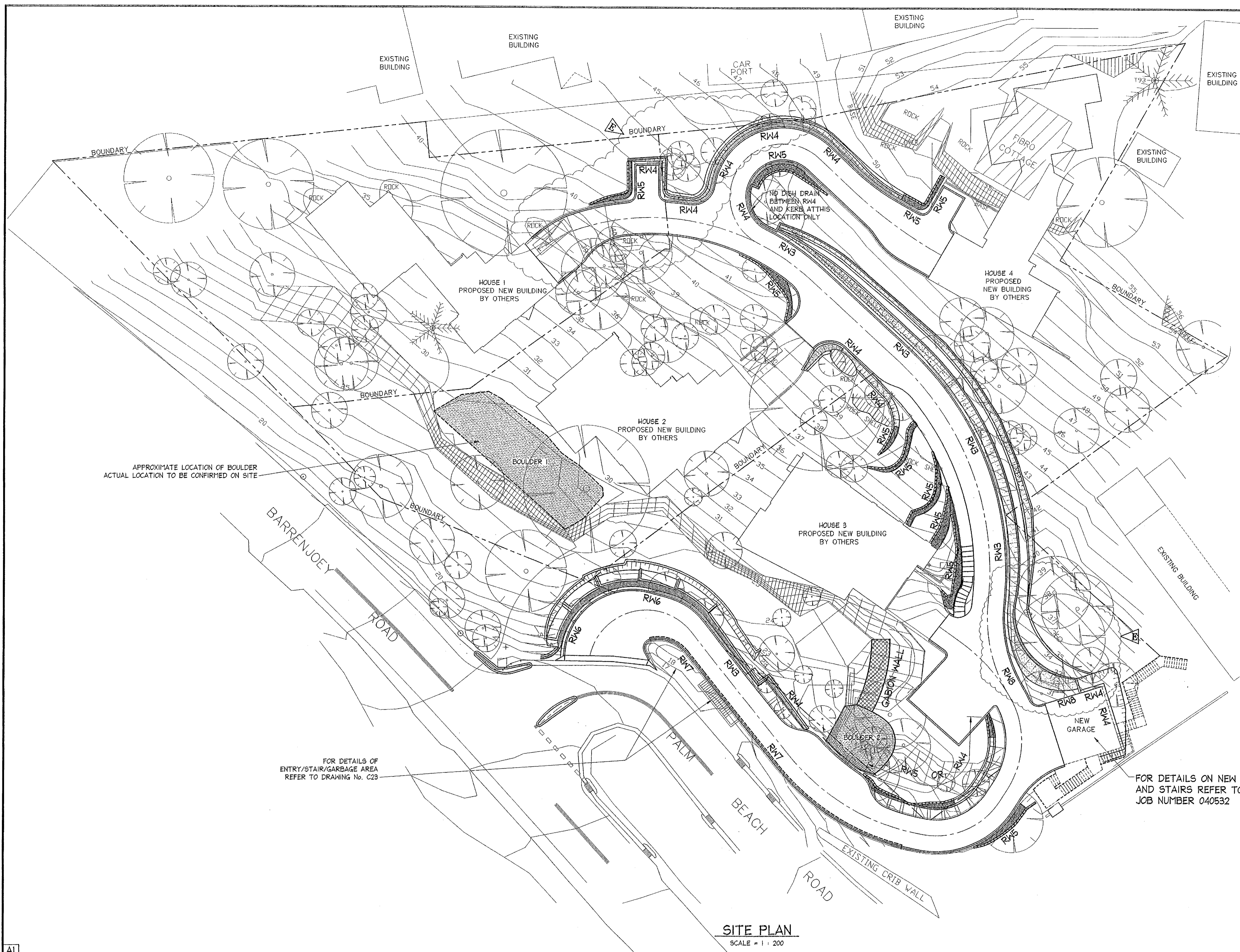
- P1. CONCRETE BASE ON GROUND
MINIMUM STRENGTH, f'cd = 32 MPa
OTHER CONCRETE PROPERTIES: REFER STRUCTURAL/CIVIL DRAWINGS
P2. GRANULAR SUB-PAVEMENT
BASE MATERIAL TO BE CRUSHED ROCK NOM. 20 MM MAXIMUM SIZE PARTICLES WITH THE FOLLOWING PROPERTIES.
PARTICLE SIZE GRADING:
SIEVE SIZE % PASSING
(75mm) NOM. 20mm

CITY PLAN SERVICES
City Plan Services logo and contact information including address and phone number.

SCANNED 11 AUG 2008
PITTWATER COUNCIL

ASSUMED FOUNDATION CLASSIFICATION FOR DESIGN PURPOSES - ASSUMED BEARING STRATA FOR DESIGN PURPOSES - VARIES

Table with columns for Date, Rev, Amendment, DOCUMENT CERTIFICATION, Northern Beaches Consulting Engineers P/L., Project: PROPOSED ACCESS ROAD, Drawing Title: GENERAL NOTES, Date: Oct. 2003, Design: R.G.W., Drawn: Paul R Bruce, Job No: 030963, Drawing No: 501, Rev: C.



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

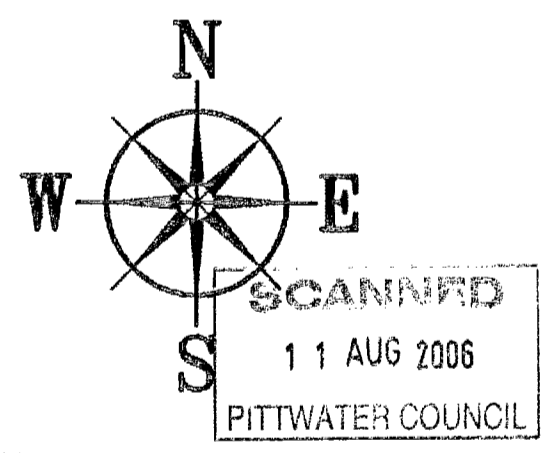
APPROXIMATE LOCATION OF BOULDER
ACTUAL LOCATION TO BE CONFIRMED ON SITE

FOR DETAILS OF ENTRY/STAIR/GARAGE AREA
REFER TO DRAWING No. C23

REFER TO BONDENS SETOUT
DRAWINGS FOR LEVELS
AND CHAINAGES

FOR DETAILS ON NEW GARAGE
AND STAIRS REFER TO
JOB NUMBER 040532


CITY PLAN SERVICES
Construction Cert. No: 27375 Approved Date: 6 APR 2005
Certifying Authority: Brendan Bennett
Drawing No: P173004



SITE PLAN
SCALE = 1 : 200

04.01.2005	E	PLAN ALTERED
21.10.2004	D	PLAN ALTERED AS INDICATED CHAINAGES REMOVED
17.09.2004	C	PLAN ALTERED
07.07.2004	B	ALTERED AT CLIENT REQUEST
25.05.2004	A	ALTERED AT CLIENT REQUEST
Date:	Rev:	Amendment:

DOCUMENT CERTIFICATION

Date: 31/05/05

 Rick G. Wray
 (Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
 I hold the following qualifications:
 BE(Civil), CPEng, MIEAust., NPER,
 Institute of Engineers Membership No. 803998
 I hereby state that this drawing is in compliance
 with the provisions of the Building Code of
 Australia and/or relevant Australian Industry
 Standards.

NB NORTHERN BEACHES
 Consulting Engineers P/L

A.C.N. 076 121 616 A.B.N. 24 076 121 616
 Suite 207, 30 FISHER ROAD
 DEE WHY N.S.W. 2099
 Ph: (02) 9894 7000 Fax: (02) 9894 7444
 e-mail: nb@nbconsulting.com.au

Project: **PROPOSED ACCESS ROAD**
 at: 1148-1152 Barrenjoey Road
 and 56 Palm Beach Road
 Palm Beach
 for: Raypond Development

Drawing Title:
**GENERAL
 ARRANGEMENT PLAN**

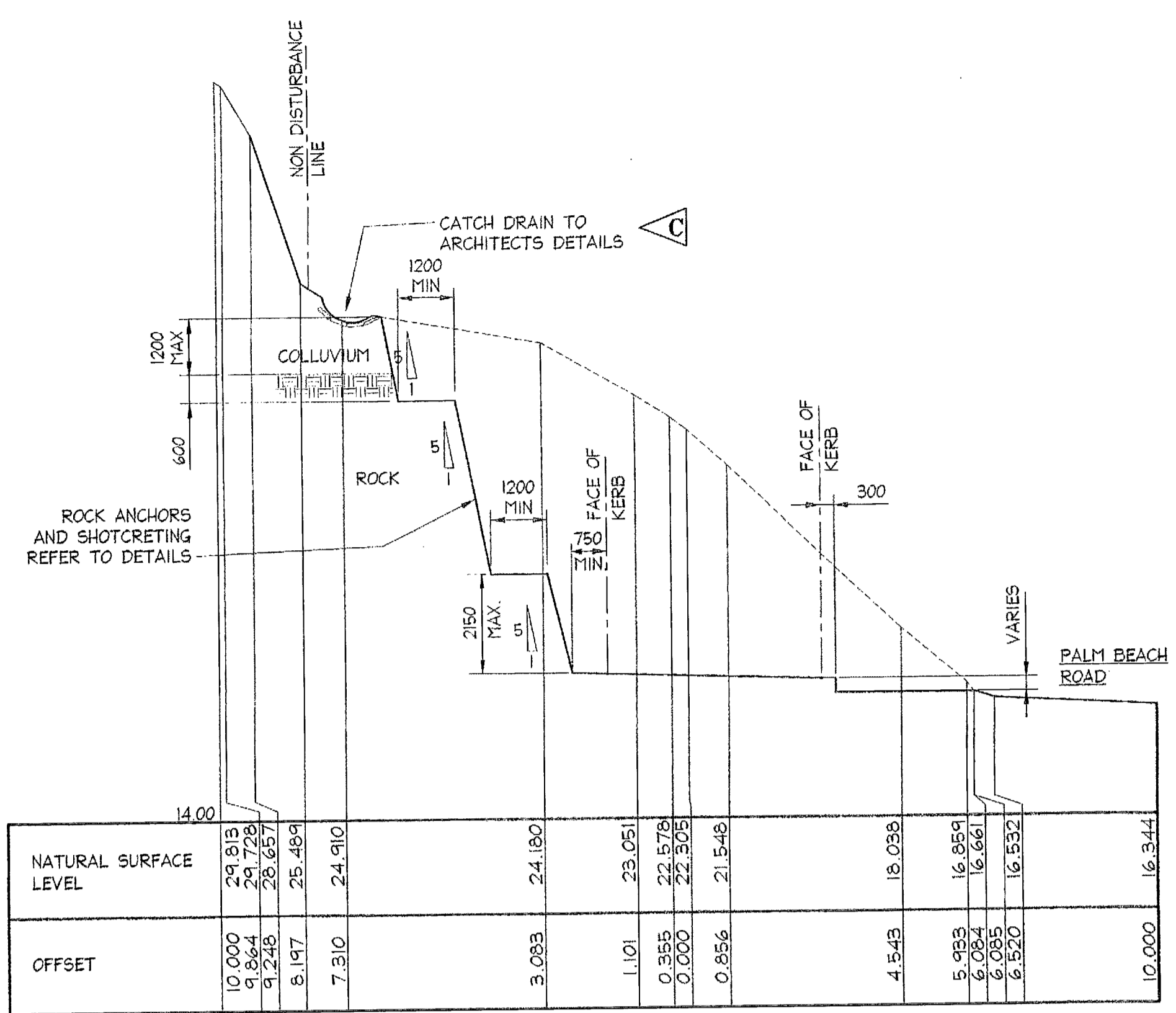
The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.

Date:	Design:	Drawn:	Checked:
Nov. 2003	R.G.W.	Paul R Bruce CPEng, MIEAust., NPER	
Job No:	Drawing No:	Rev:	
030963	C01	E	

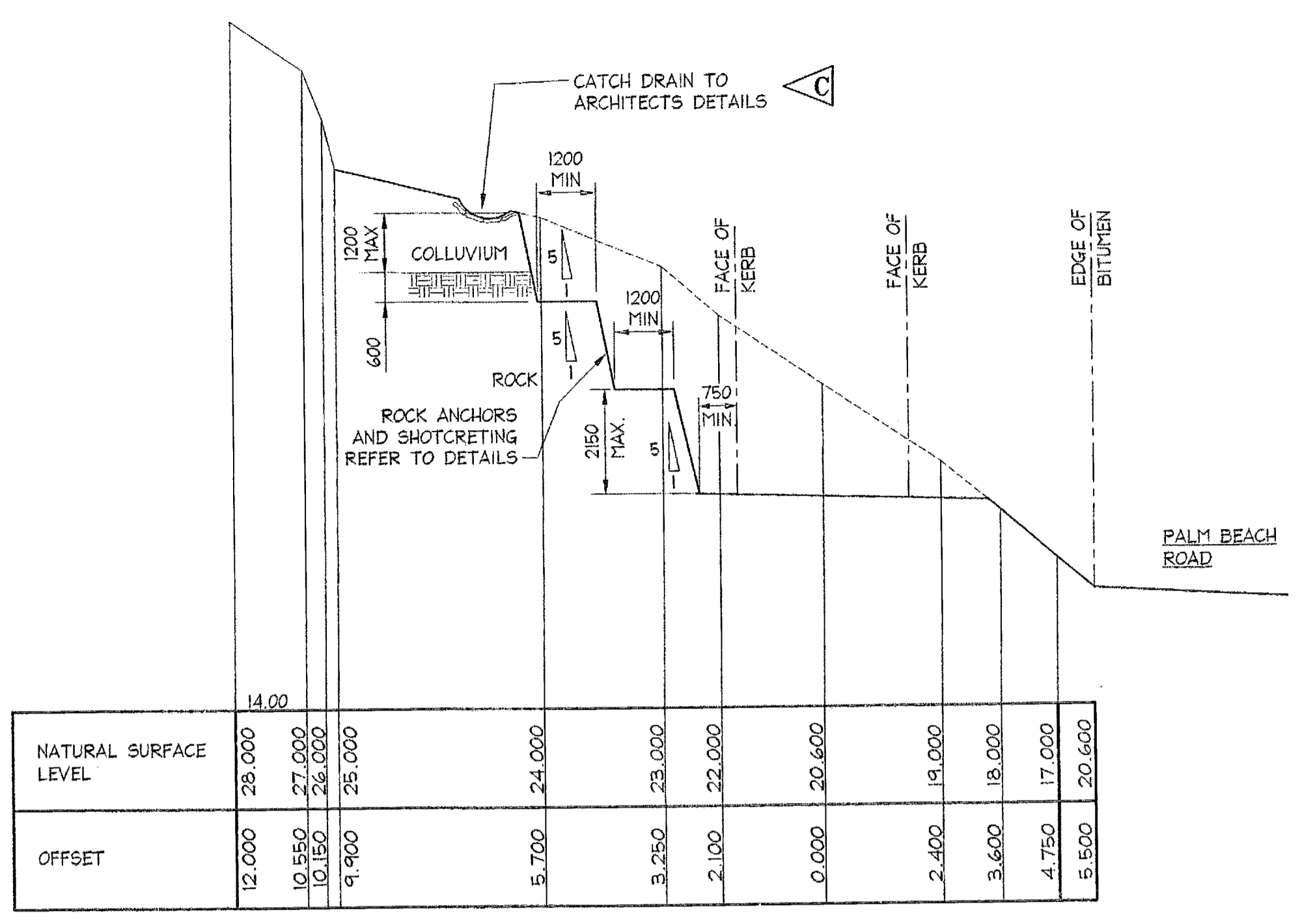
NOTES:

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

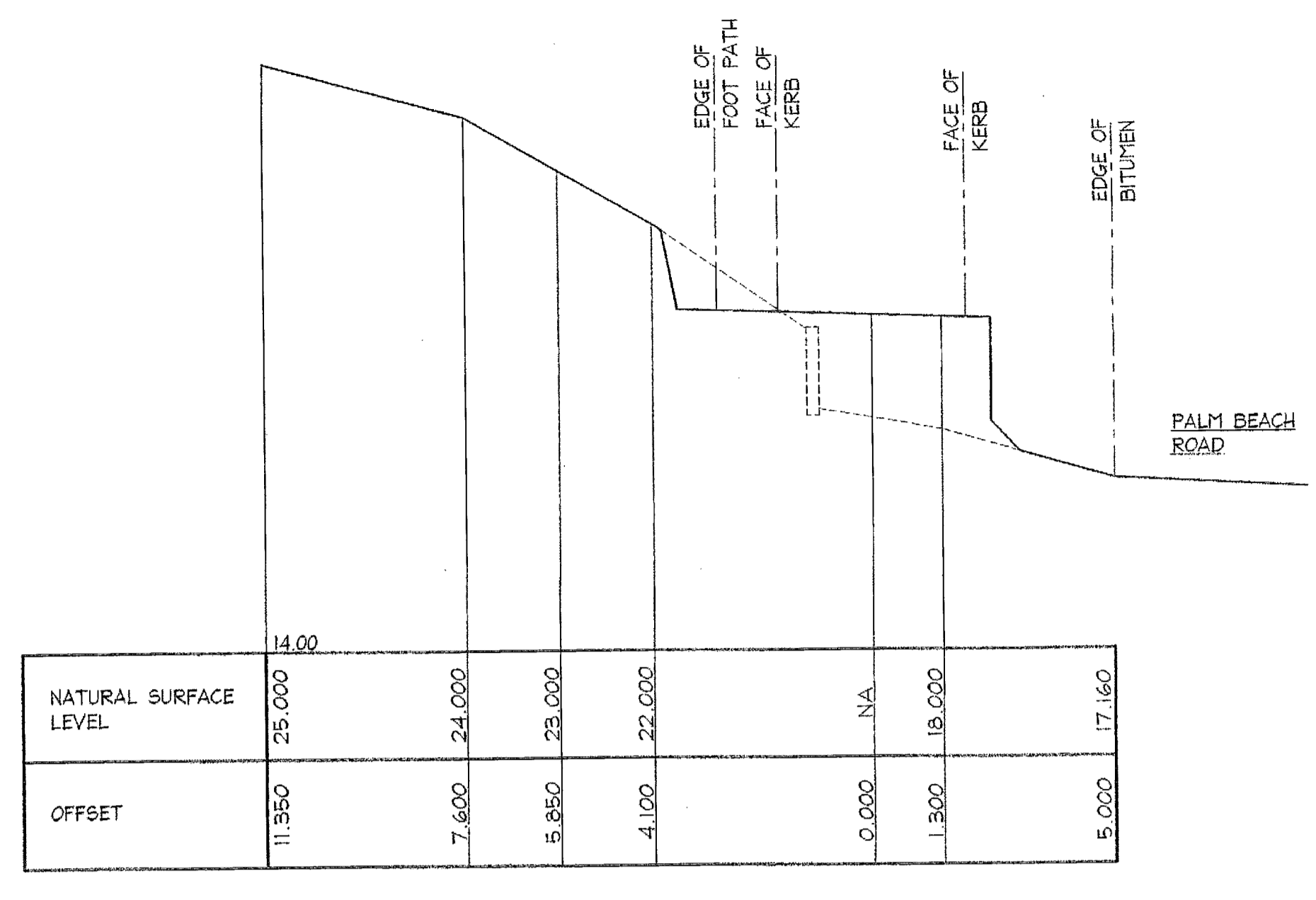
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SECTIONS ARE DERIVED FROM SURVEY, REFER TO ARCHITECTS DRAWINGS FOR PAVEMENT LEVELS AND SET OUT.



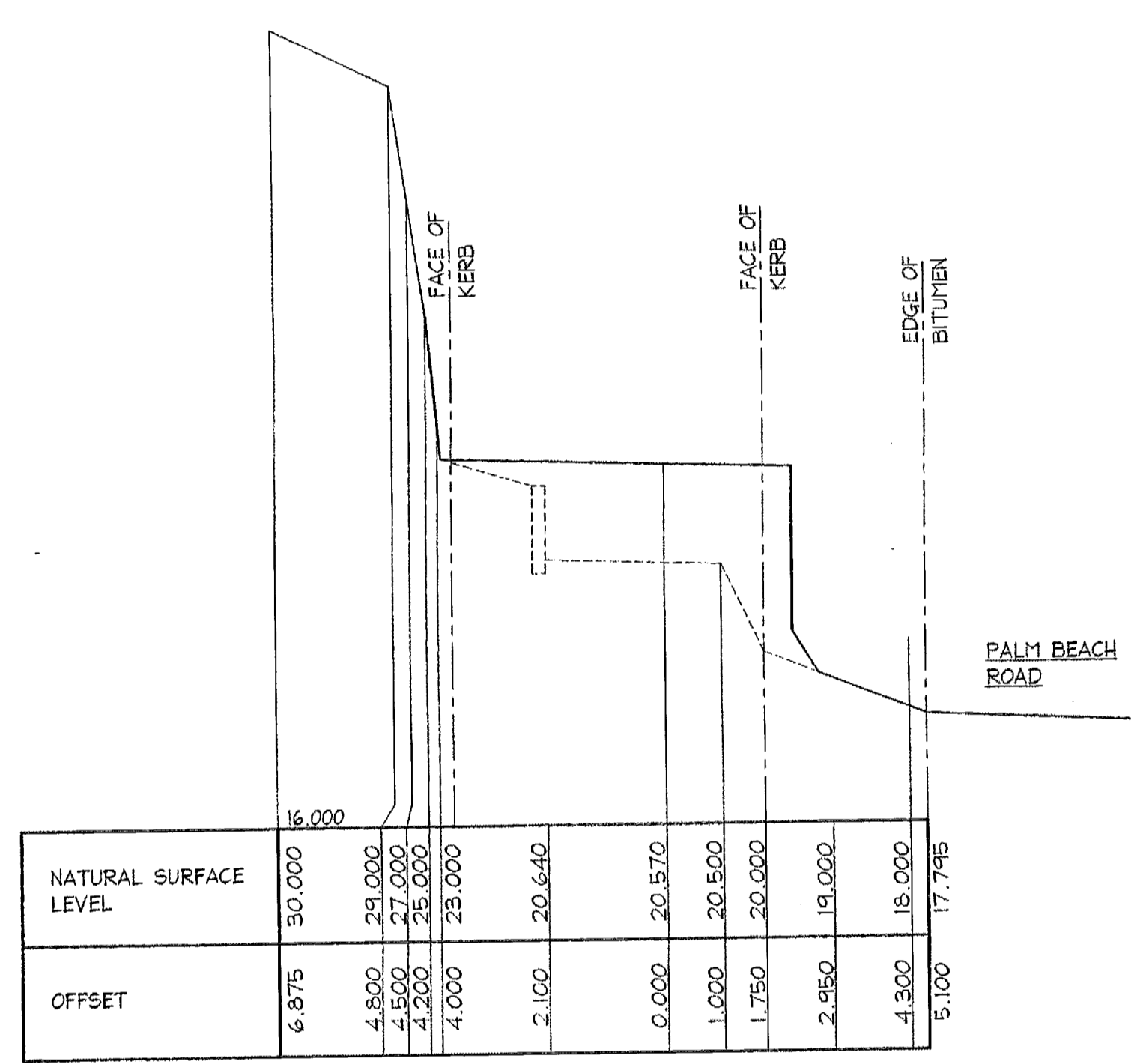
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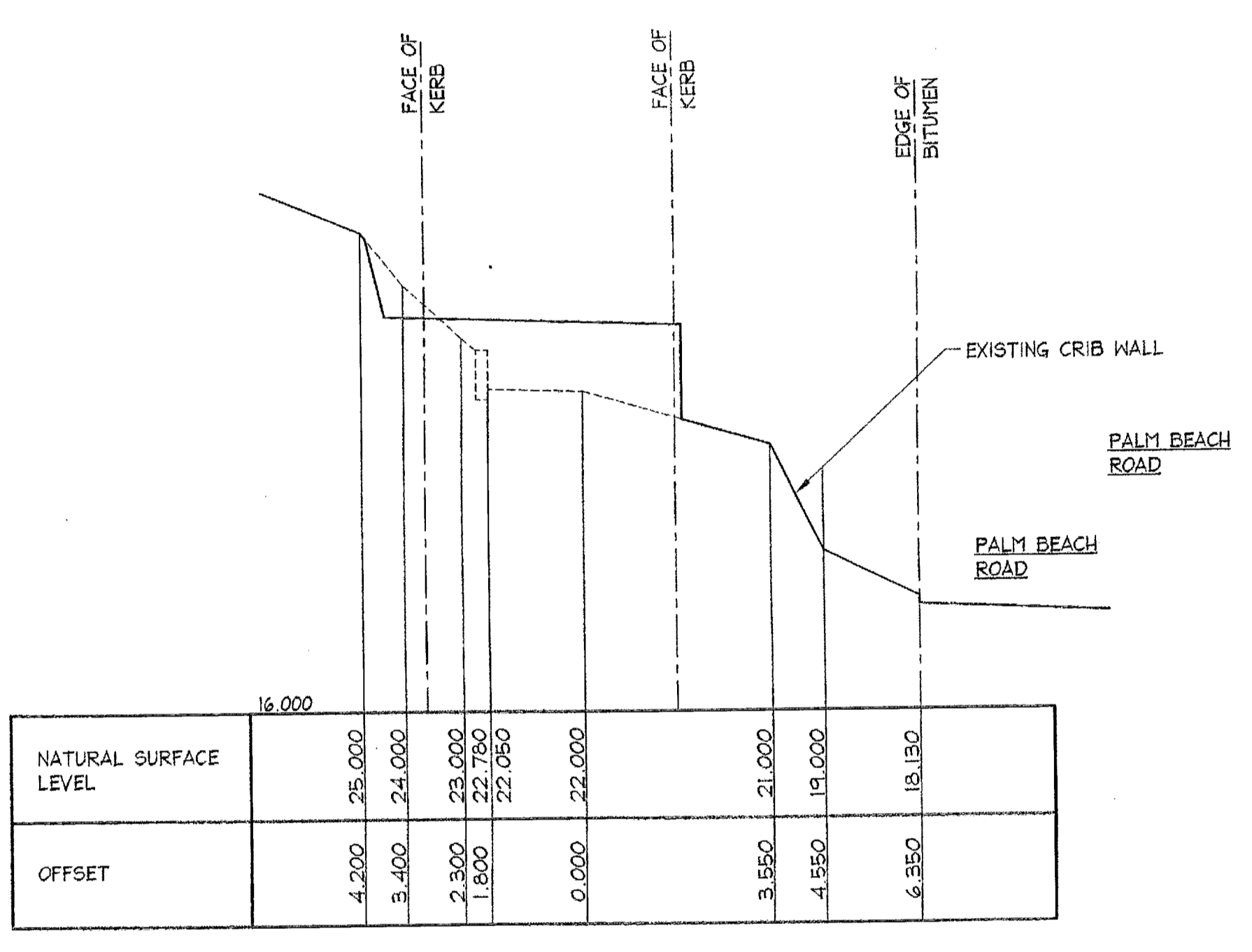
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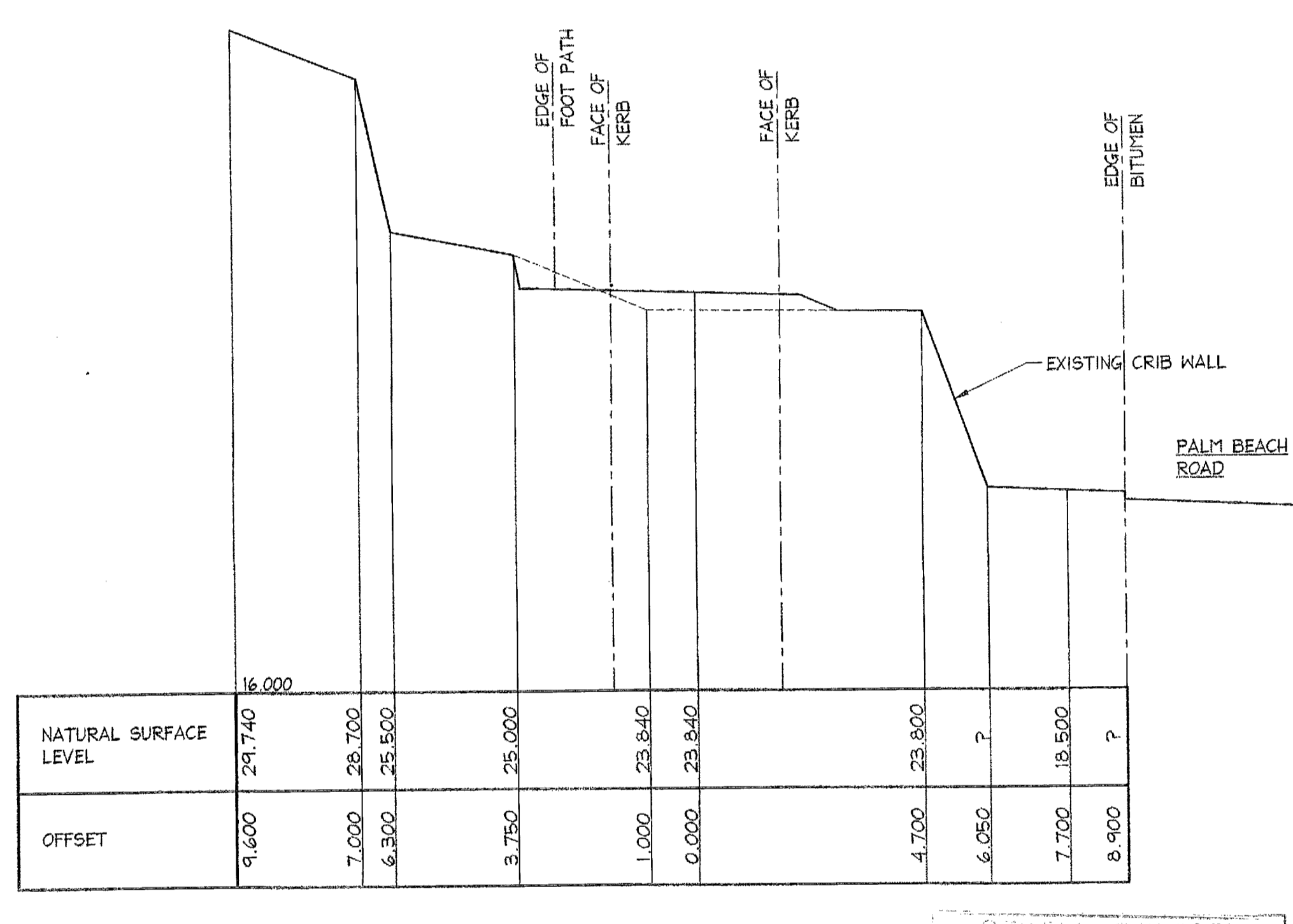
CH 27.200
SCALE = 1 : 100



CH 37.000
SCALE = 1 : 100



CH 42.000
SCALE = 1 : 100



CH 47.300
SCALE = 1 : 100

CITY PLAN SERVICES
Construction Cont. No.: Approved Date:
27375 04/06/2006
Certifying Authority: Brendan Bennett
11 AUG 2006
PITTSWATER COUNCIL

Date:	Rev:	Amendment:
29.10.2004	C	NOTE ALTERED
25.05.2004	B	DETAILS ALTERED
22.01.2004	A	SECTIONS CH 27.200 CH 42.000 CH 47.300 ALTERED

DOCUMENT CERTIFICATION
Date: Nov 04
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
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I hereby state that this drawing is in compliance
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Standards.

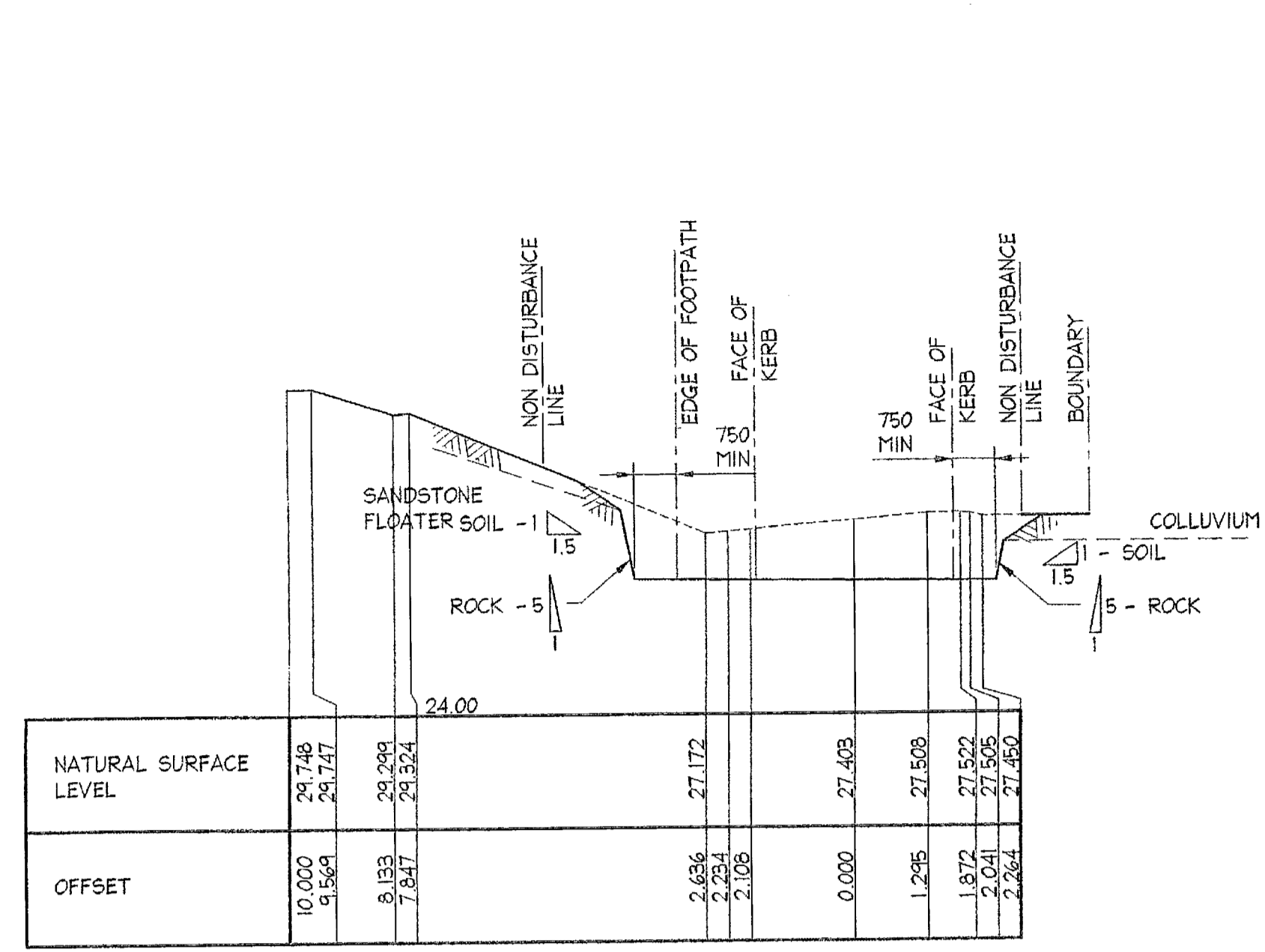
NORTHERN BEACHES
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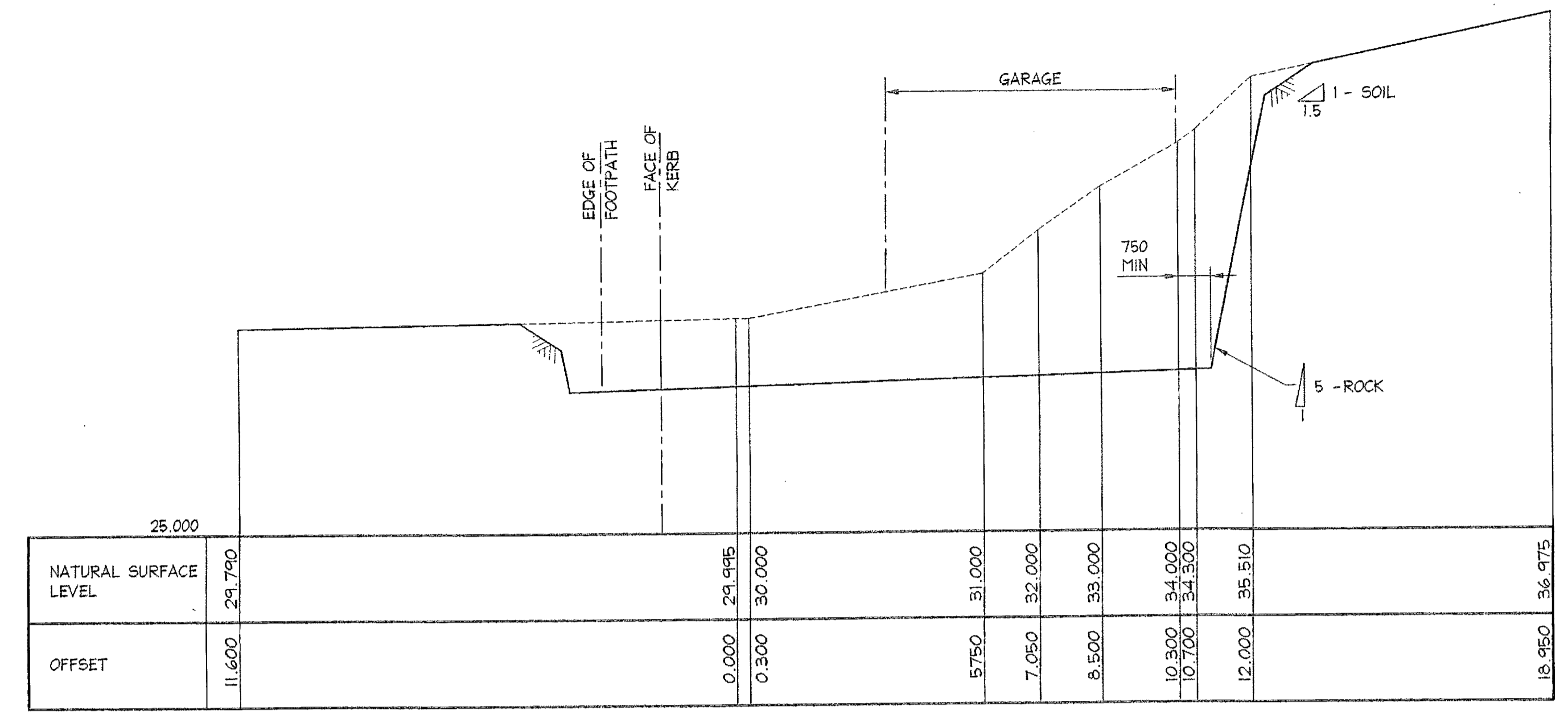
Drawing Title: **BULK EARTH WORKS**
CROSS SECTIONS
SHEET 1
The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.

Date:	Design:	Drawn:	Checked:
Oct. 2003	R.G.W.	Paul R Bruce CPREAust., MIEAust.	
Job No:	Drawing No:	Rev:	
030963	C02	C	

- NOTES:**
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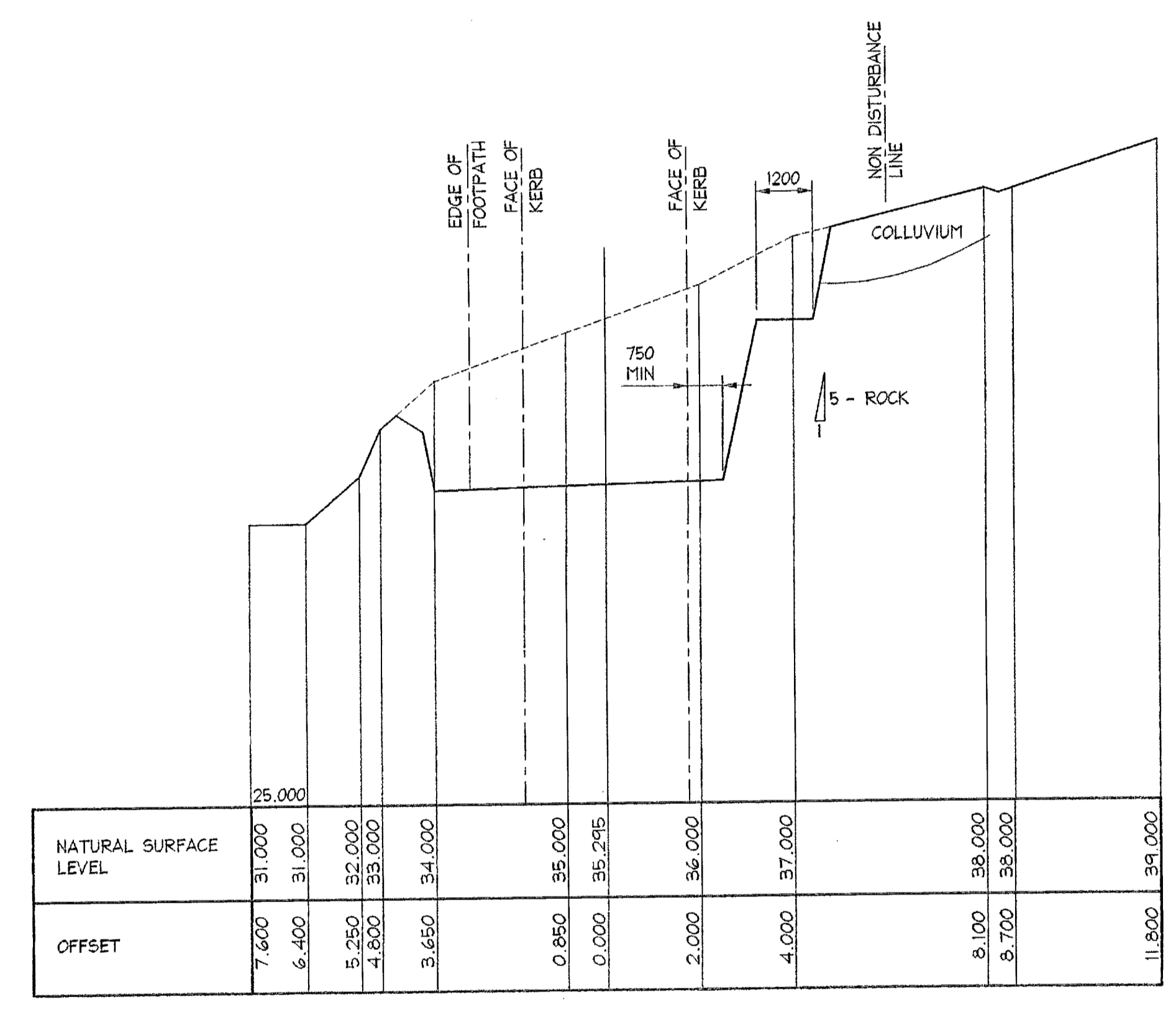


CH 57.300
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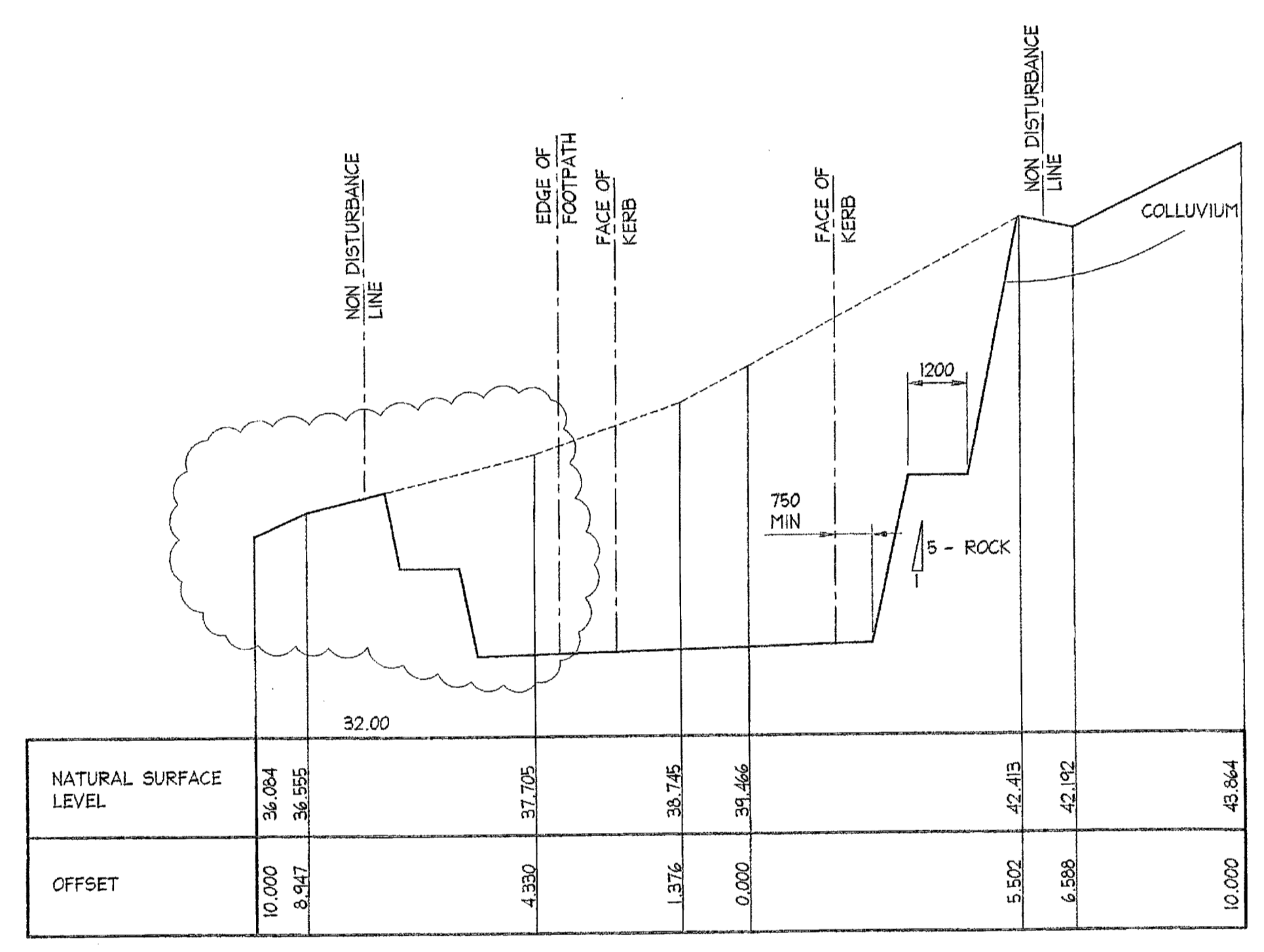


CH 67.800
SCALE = 1 : 100

NOTE:
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CH 83.200
SCALE = 1 : 100



CH 92.200
SCALE = 1 : 100

SCANNED
11 AUG 2006
PITTSWATER COUNCIL

CITY PLAN SERVICES
Construction Cert. No. Approved Date:
22375 04 AUG 2005
Certifying Authority: Brendan Bennett
Accreditation No: PIA0004

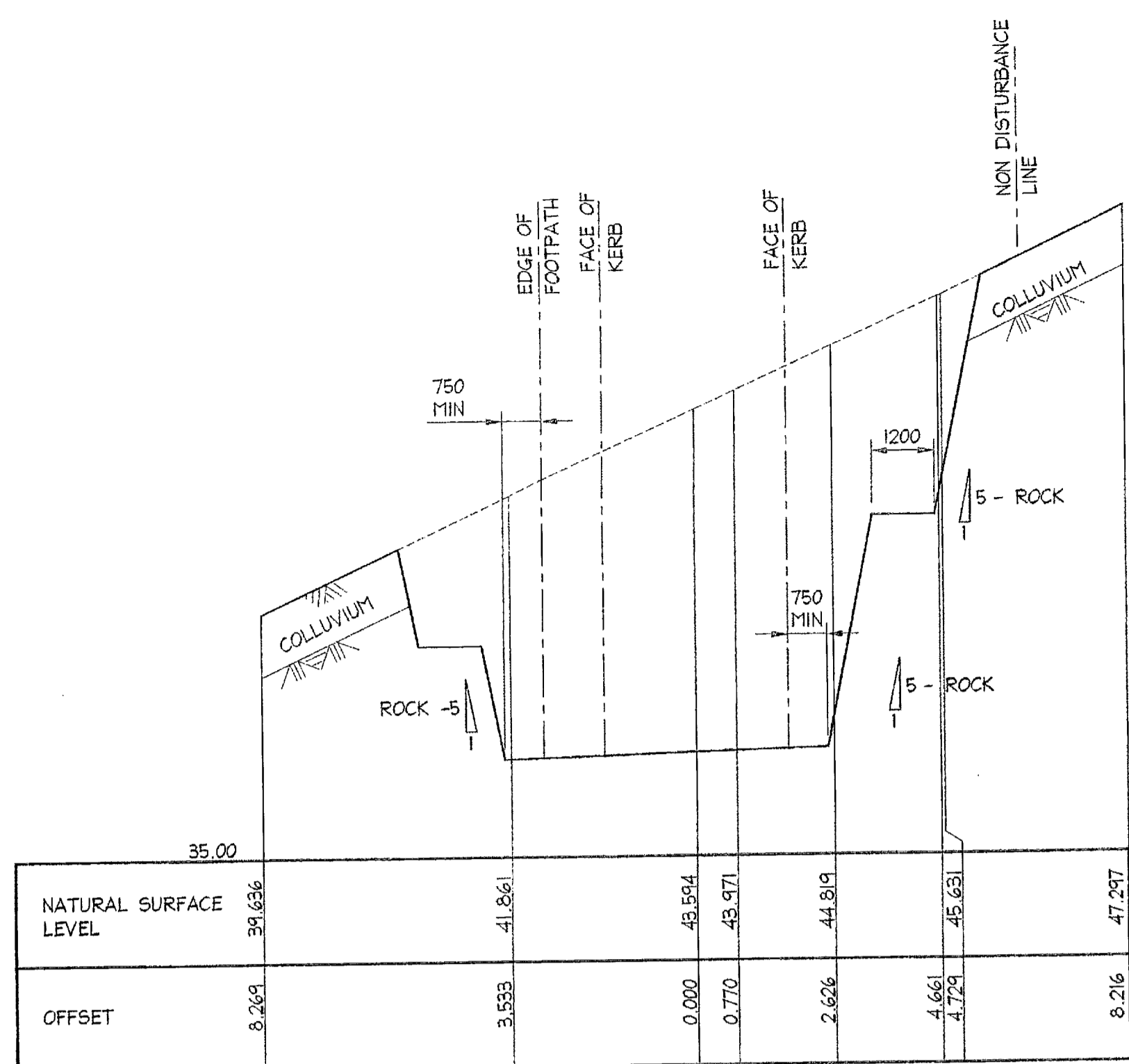
AI		DOCUMENT CERTIFICATION		I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust., NPER, Institute of Engineers Membership No. 803988 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.		NORTHERN BEACHES Consulting Engineers P/L. A.C.N. 078 121 616 A.B.N. 24 076 121 616 Suite 207, 30 FISHER ROAD DEE WHY N.S.W. 2099 Ph: (02) 9684 7000 Fax: (02) 9684 7444 e-mail: nb@nbconsulting.com.au		Project: PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development		Drawing Title: BULK EARTH WORKS CROSS SECTIONS SHEET 2 <small>The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.</small>		Date: Oct. 2003 Design: R.G.W. Drawn: Paul R Bruce <small>CPREng, MIEAust., NPER</small>		Job No: 030963 Drawing No: C03 Rev: B		Checked:	
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Date:	Rev:	Amendment:
25.05.2004	B	DETAILS ALTERED
22.01.2004	A	SECTIONS CH 67.800 CH 83.200 CH 92.200 ALTERED

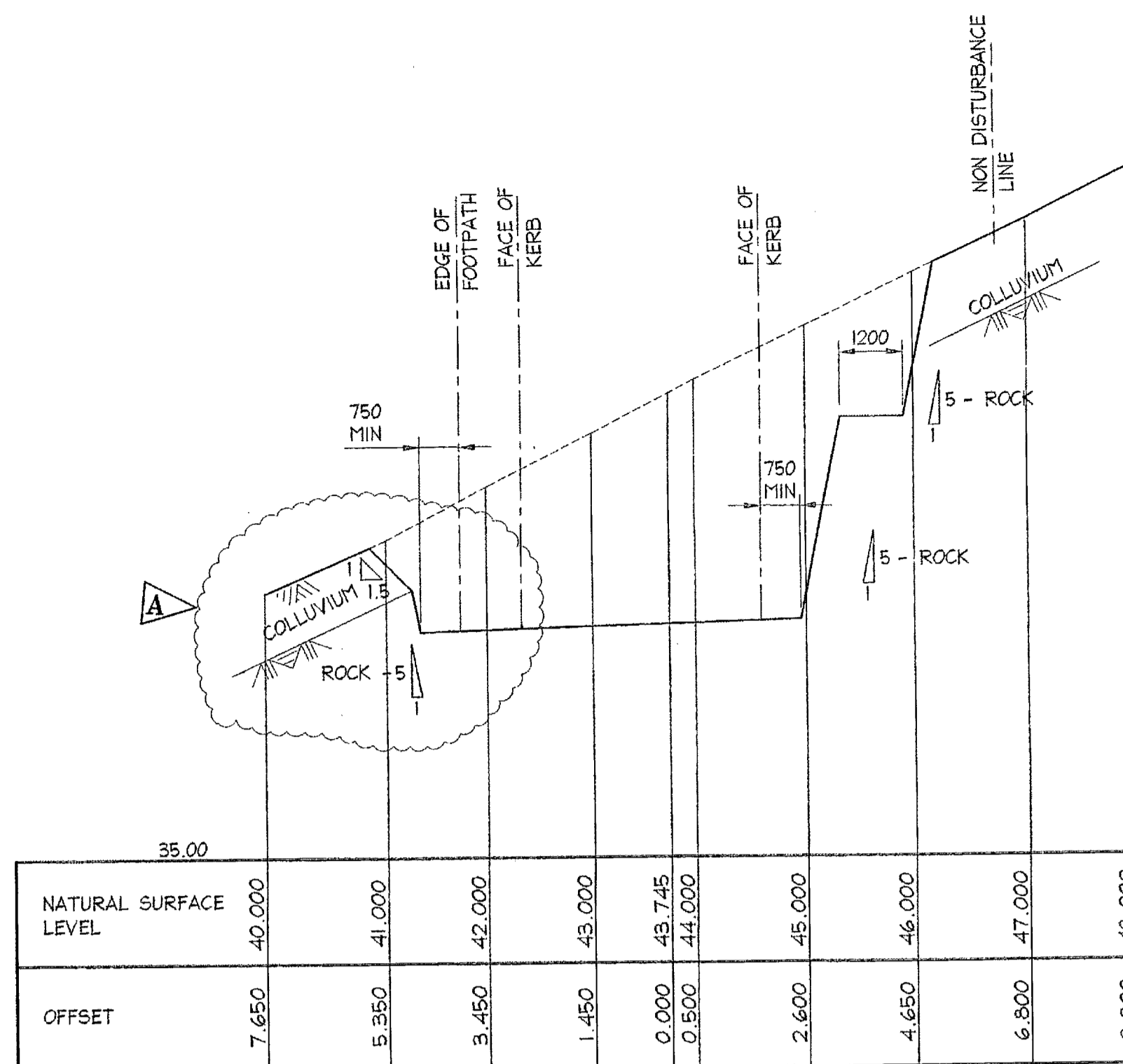
Date: *Nov 04*
 Rick G. Wray
 (Director Northern Beaches Consulting Engineers)

NOTE:
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PAVEMENT LEVELS AND SET OUT.

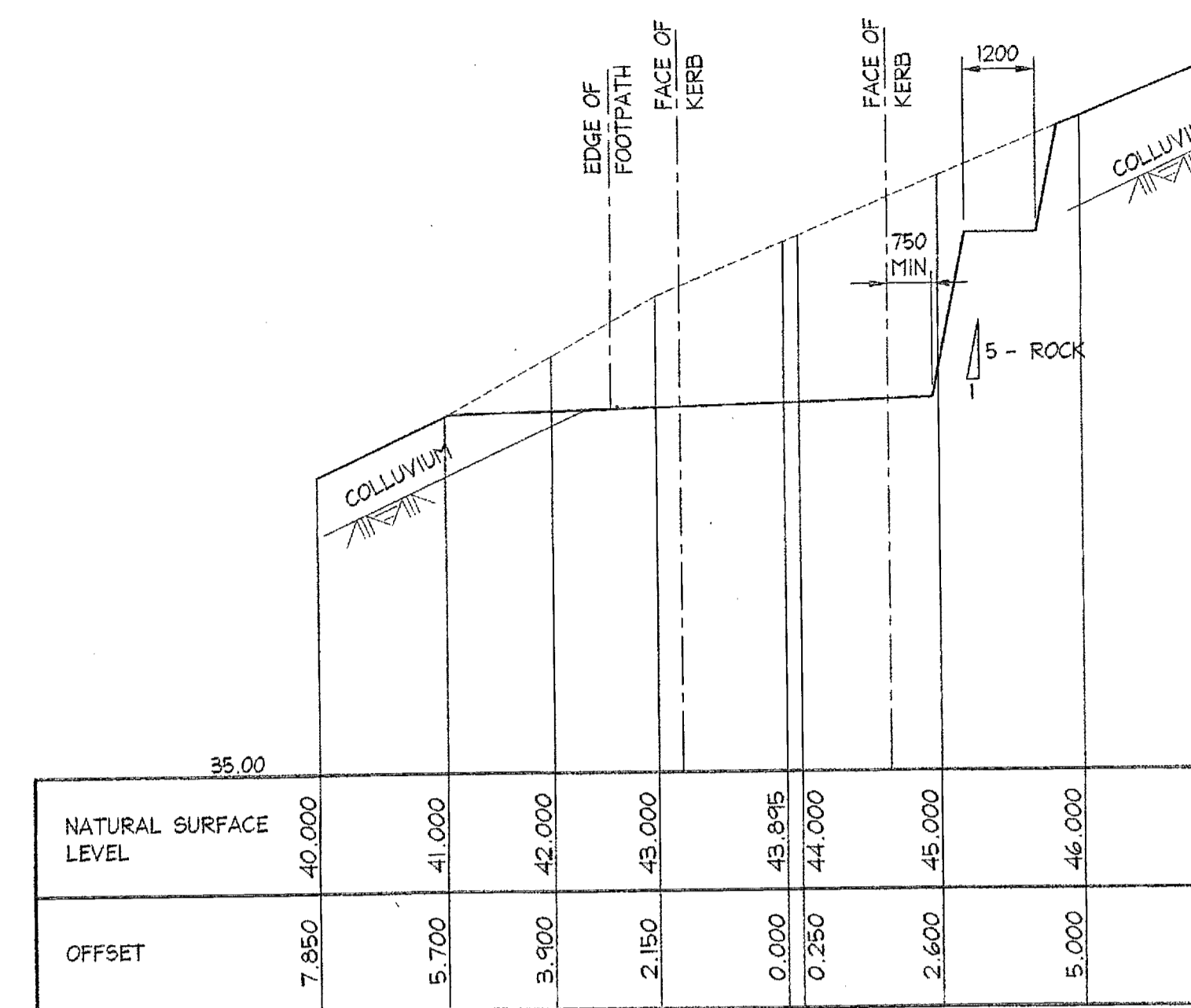
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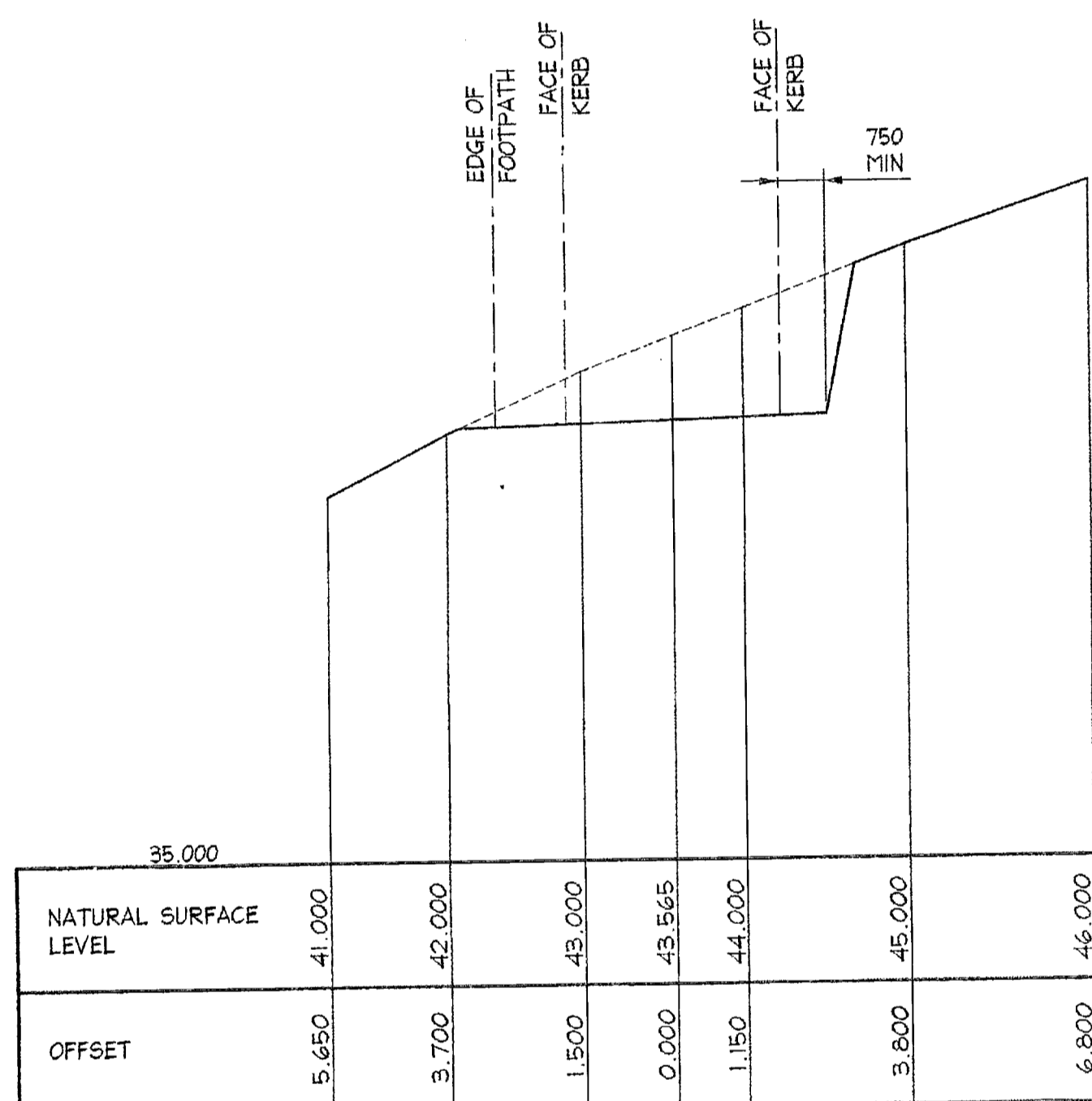
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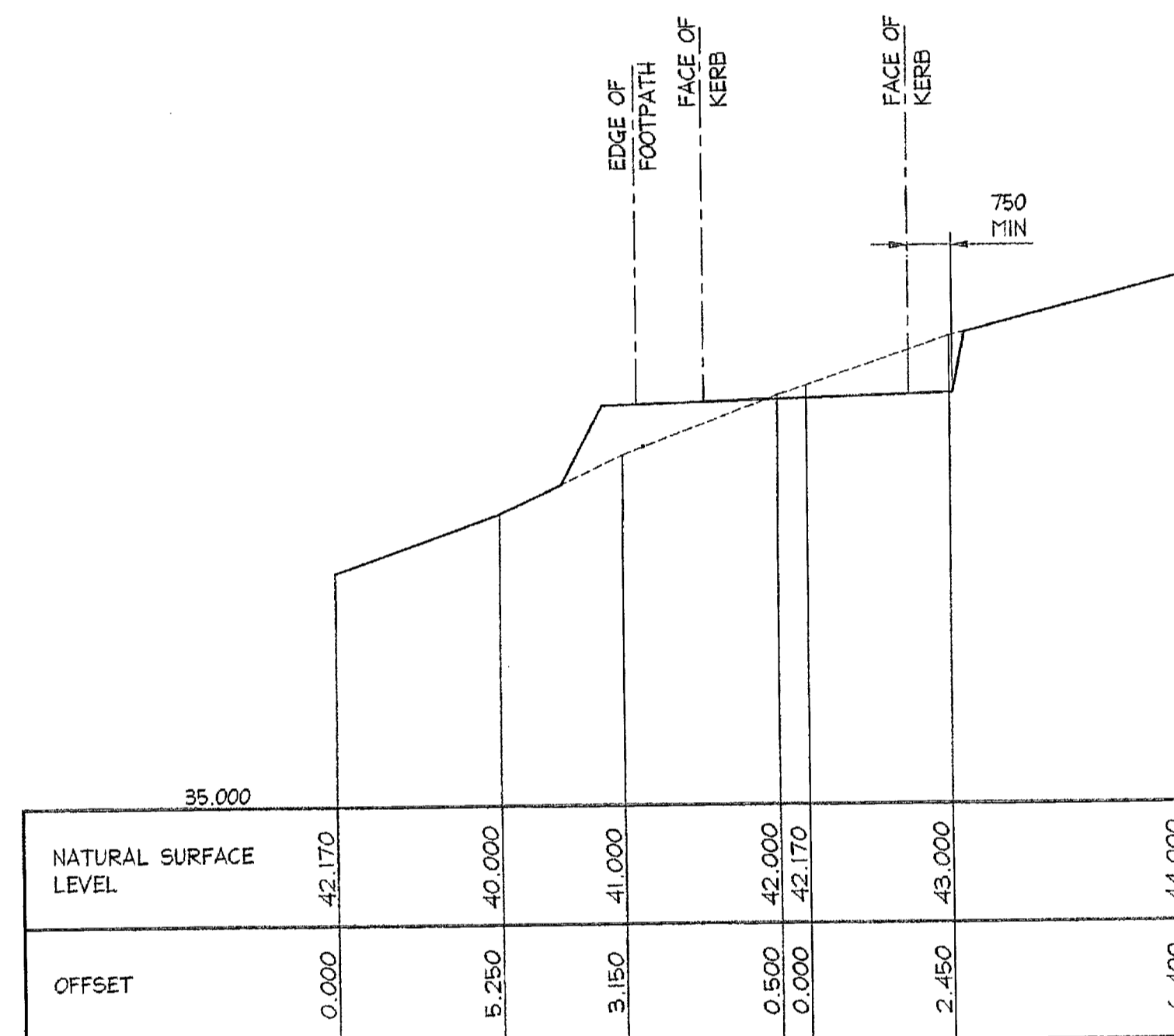
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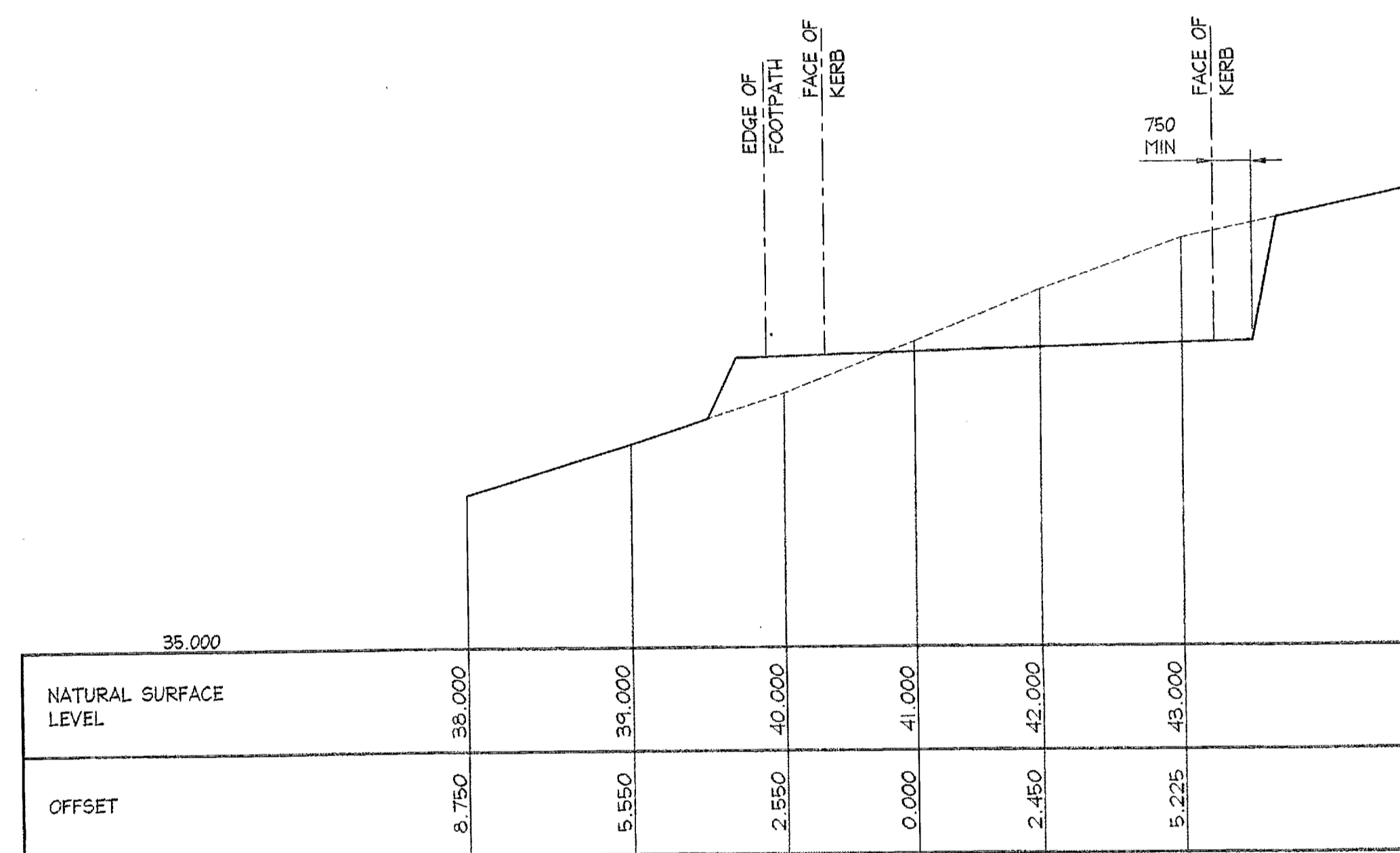
CH 127.600
SCALE = 1 : 100



CH 133.200
SCALE = 1 : 100



CH 141.900
SCALE = 1 : 100



CH 145.700
SCALE = 1 : 100

SCANNED
11 AUG 2006
PITTSWATER COUNCIL

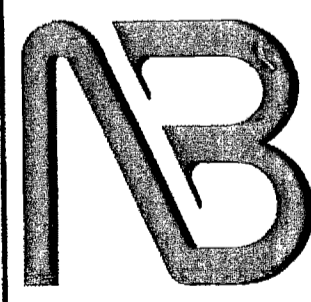
CITY PLAN SERVICES
Construction Cert. No: Approved Date:
22375 04 AUG 2006
Certifying Authority: Brendan Barnett
Production No: PIA2004

Date:	25.05.2004	Rev:	A	Amendment:	DETAILS ALTERED
-------	------------	------	---	------------	-----------------

DOCUMENT CERTIFICATION

Date: NOV 04
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPFR,
Institute of Engineers Membership No. 803438
I hereby state that this drawing is in compliance
with the provisions of the Building Code of
Australia and/or relevant Australian/Industry
Standards.



NORTHERN BEACHES
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DIE WIVY NSW 2089
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

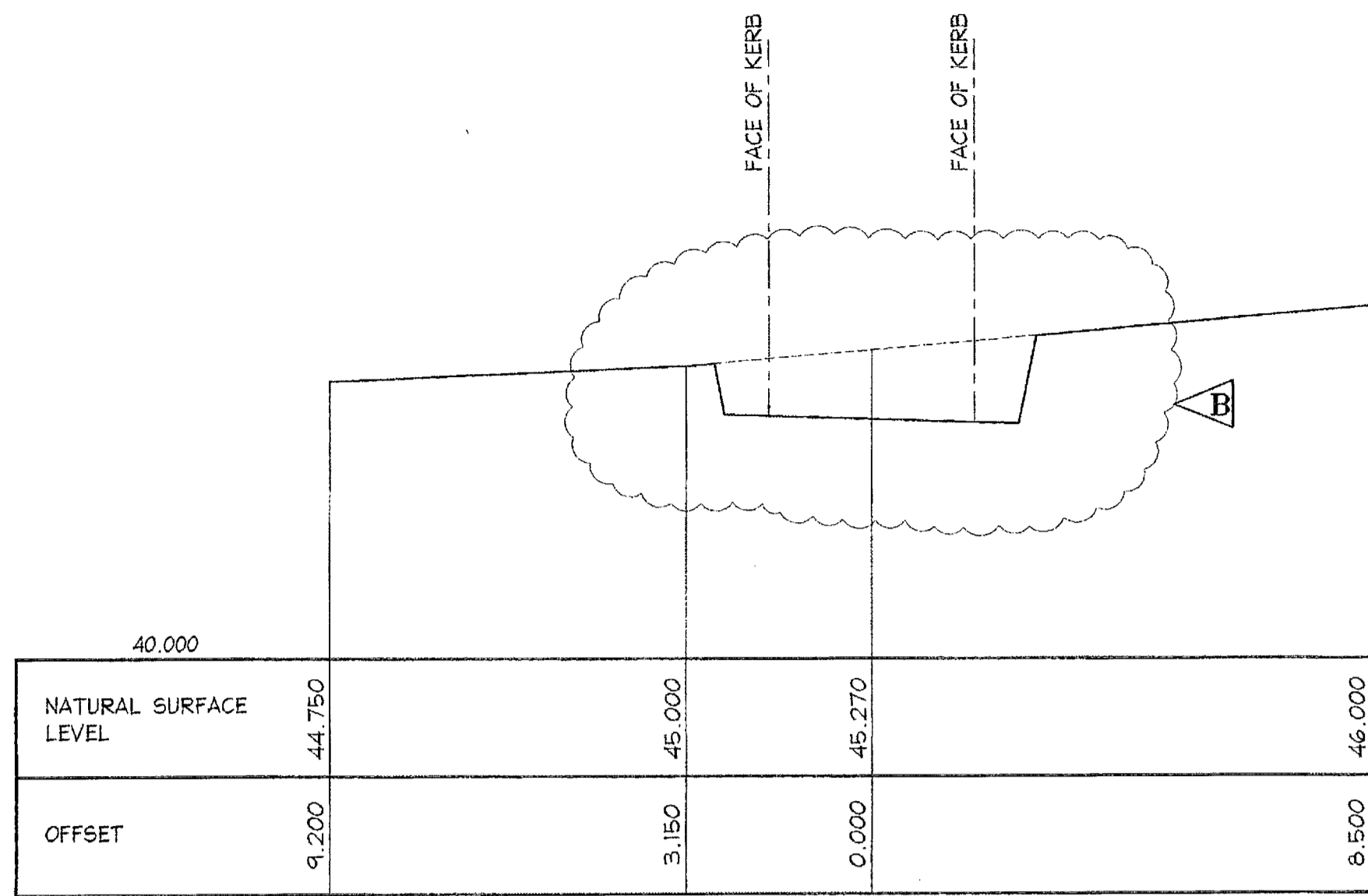
Project: PROPOSED ACCESS ROAD
at: 1148-1152 Barrenjoey Road
and 56 Palm Beach Road
Palm Beach
for: Raypond Development

Drawing Title:
BULK EARTH WORKS
CROSS SECTIONS
SHEET 3
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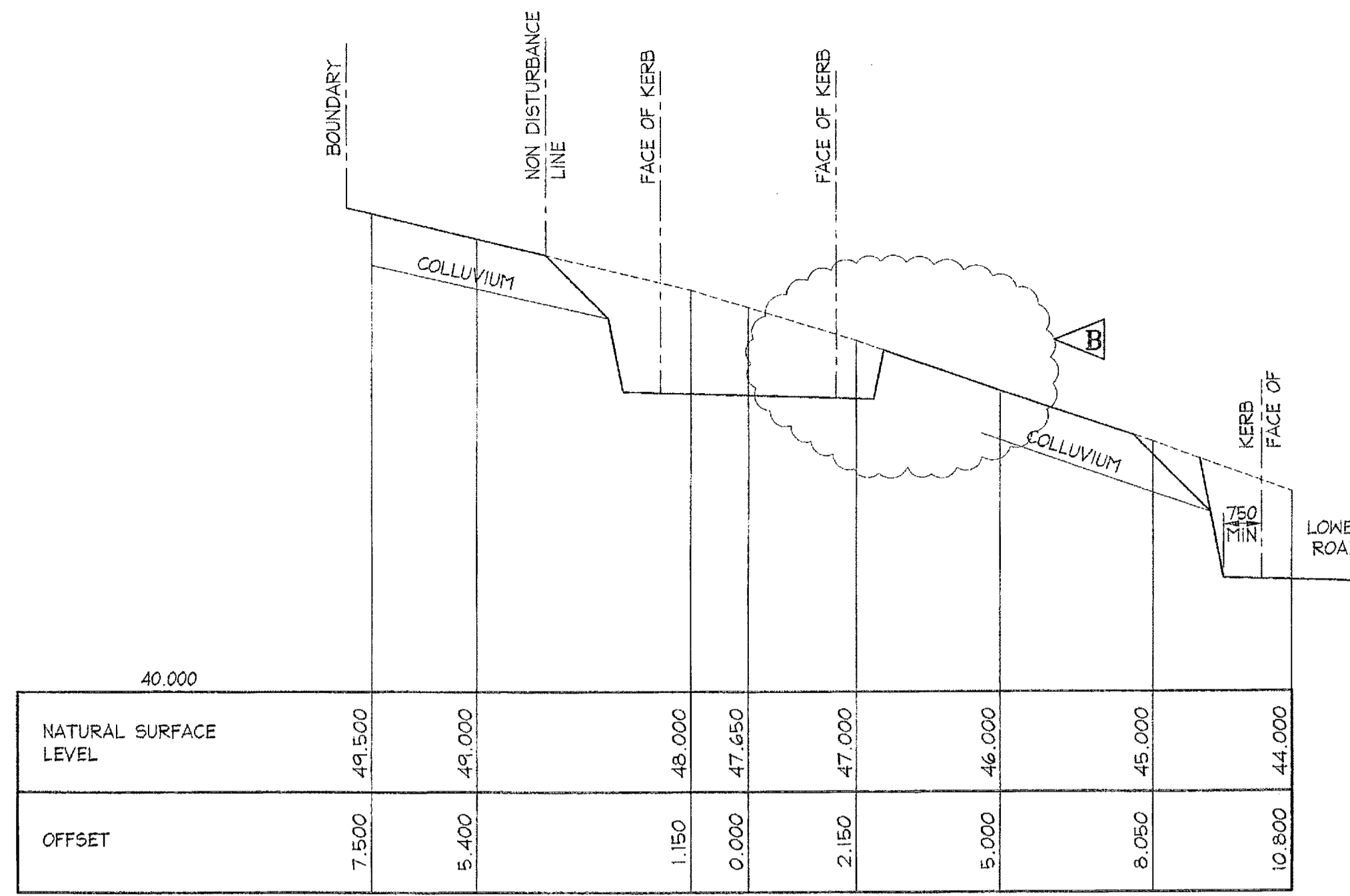
Date:	Oct. 2003	Design:	R.G.W.	Drawn:	Paul R Bruce CIVIL/ENGR	Checked:	
Job No:	030963	Drawing No:	C04	Rev:	A		

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

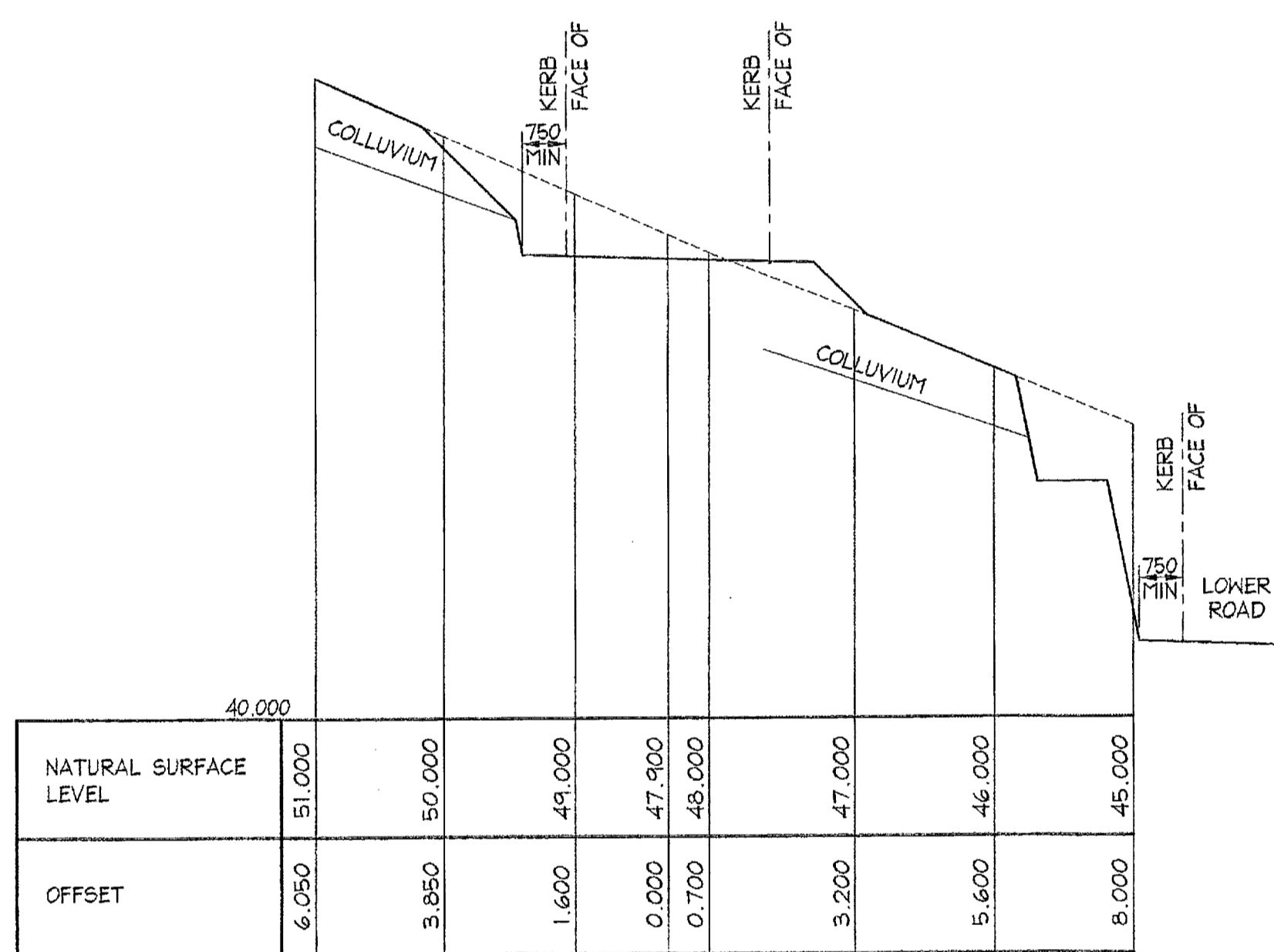
NOTE:
SECTIONS ARE DERIVED FROM SURVEY, REFER TO ARCHITECTS DRAWINGS FOR PAVEMENT LEVELS AND SET OUT.



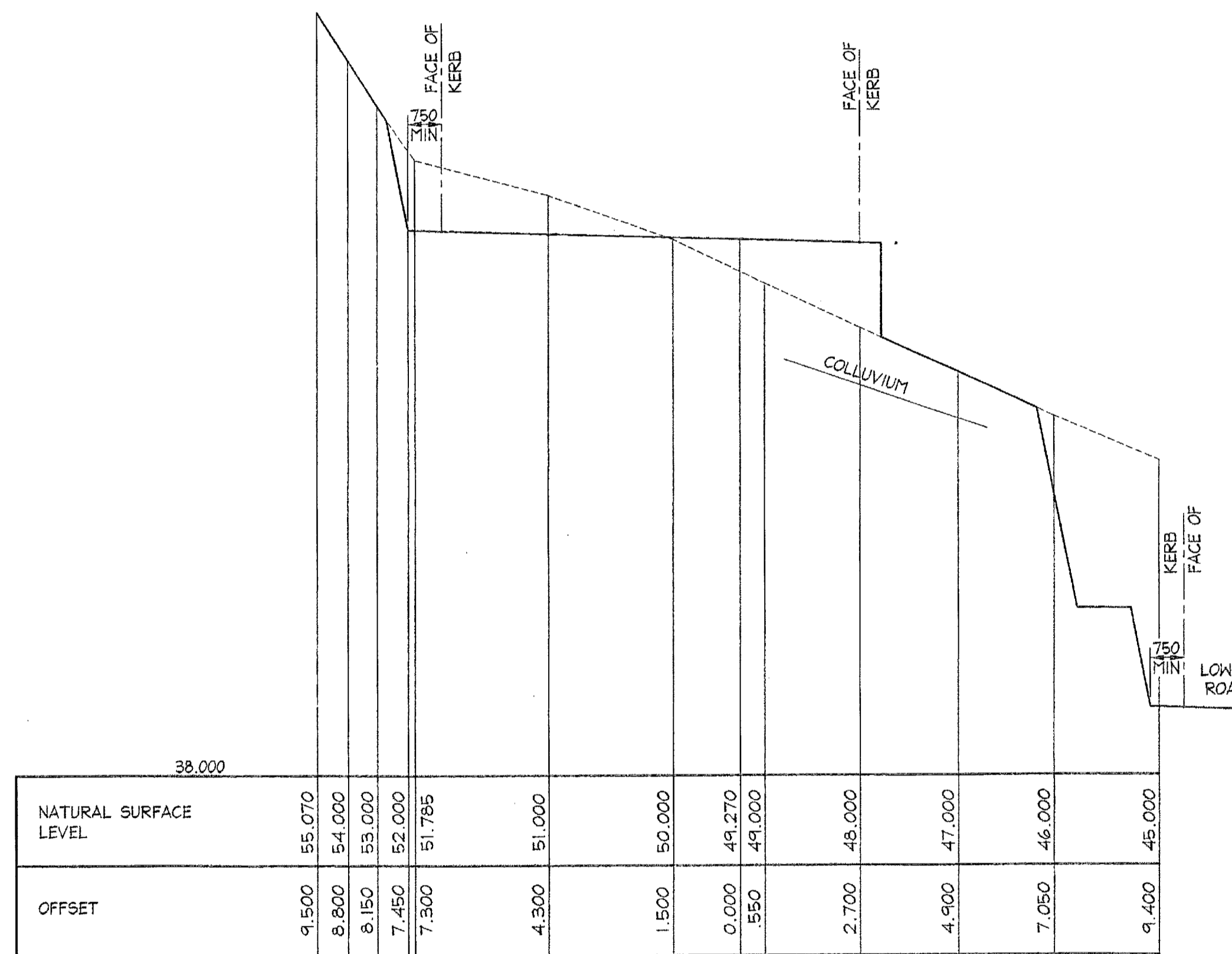
CH 142.755 - UPPER ROAD
SCALE = 1 : 100



CH 150.455 - UPPER ROAD
SCALE = 1 : 100



CH 158.541 - UPPER ROAD
SCALE = 1 : 100



CH 168.449 - UPPER ROAD
SCALE = 1 : 100

SCANNED
11 AUG 2006
PITTSWATER COUNCIL

CITY PLAN SERVICES
Construction Cert. No: Approved Draw:
22375 C.L.B.S. 768
Certifying Authority: Brendan Summitt
Approval No: PMS004

Date:	Rev:	Amendment:
25.05.2004	B	SECTIONS ALTERED
22.01.2004	A	SECTIONS CH 142.755 CH 150.455 ALTERED

DOCUMENT CERTIFICATION

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER,
Institute of Engineers Membership No. 803988

I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

Date: *April 06*
R. G. Wray
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

NORTHERN BEACHES
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e-mail: nb@nbconsulting.com.au

Project: **PROPOSED ACCESS ROAD**
at: 1148-1152 Barrenjoey Road
and 56 Palm Beach Road
Palm Beach
for: Raypond Development

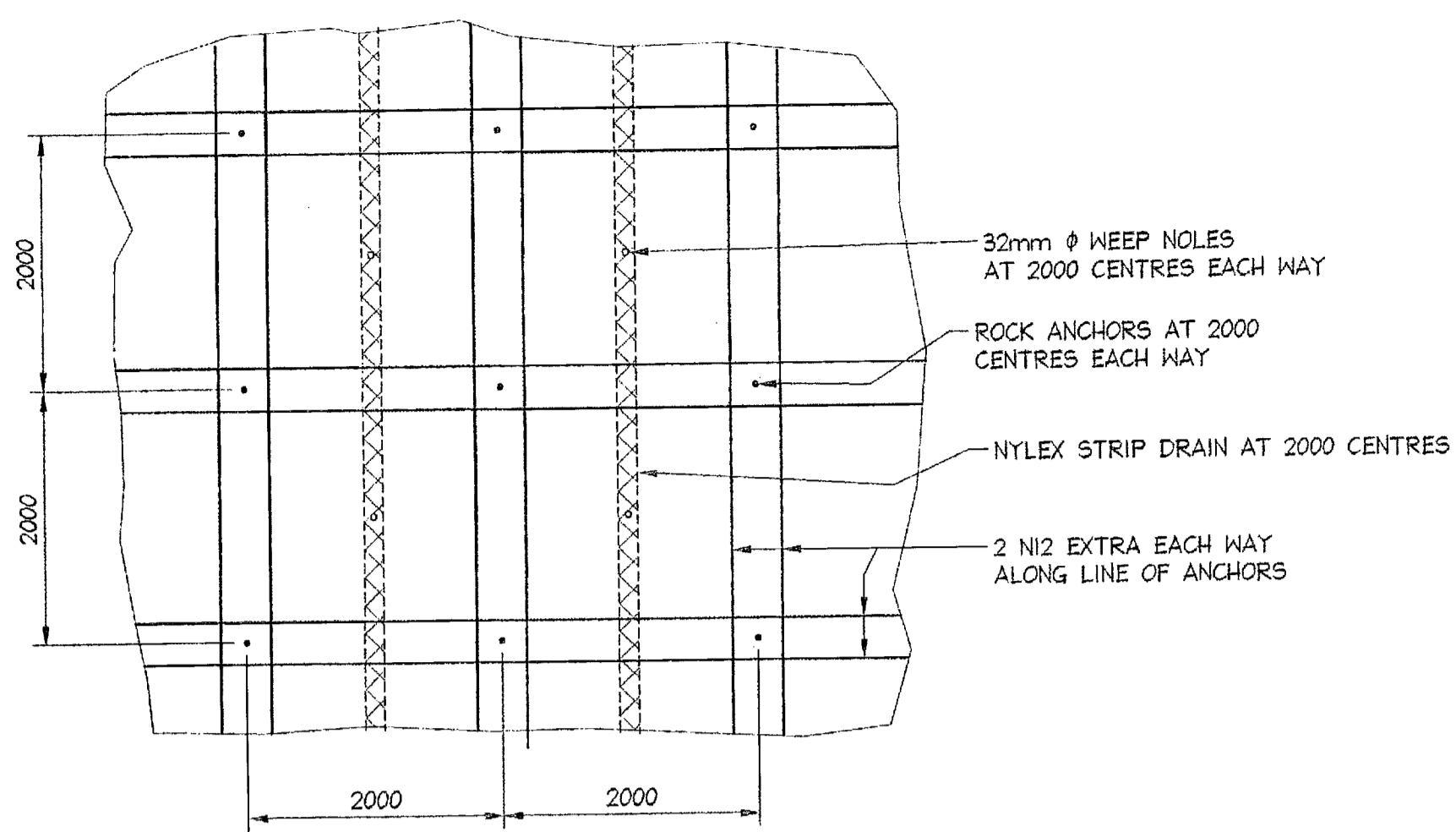
Drawing Title: **BULK EARTH WORKS**
CROSS SECTIONS
SHEET 4

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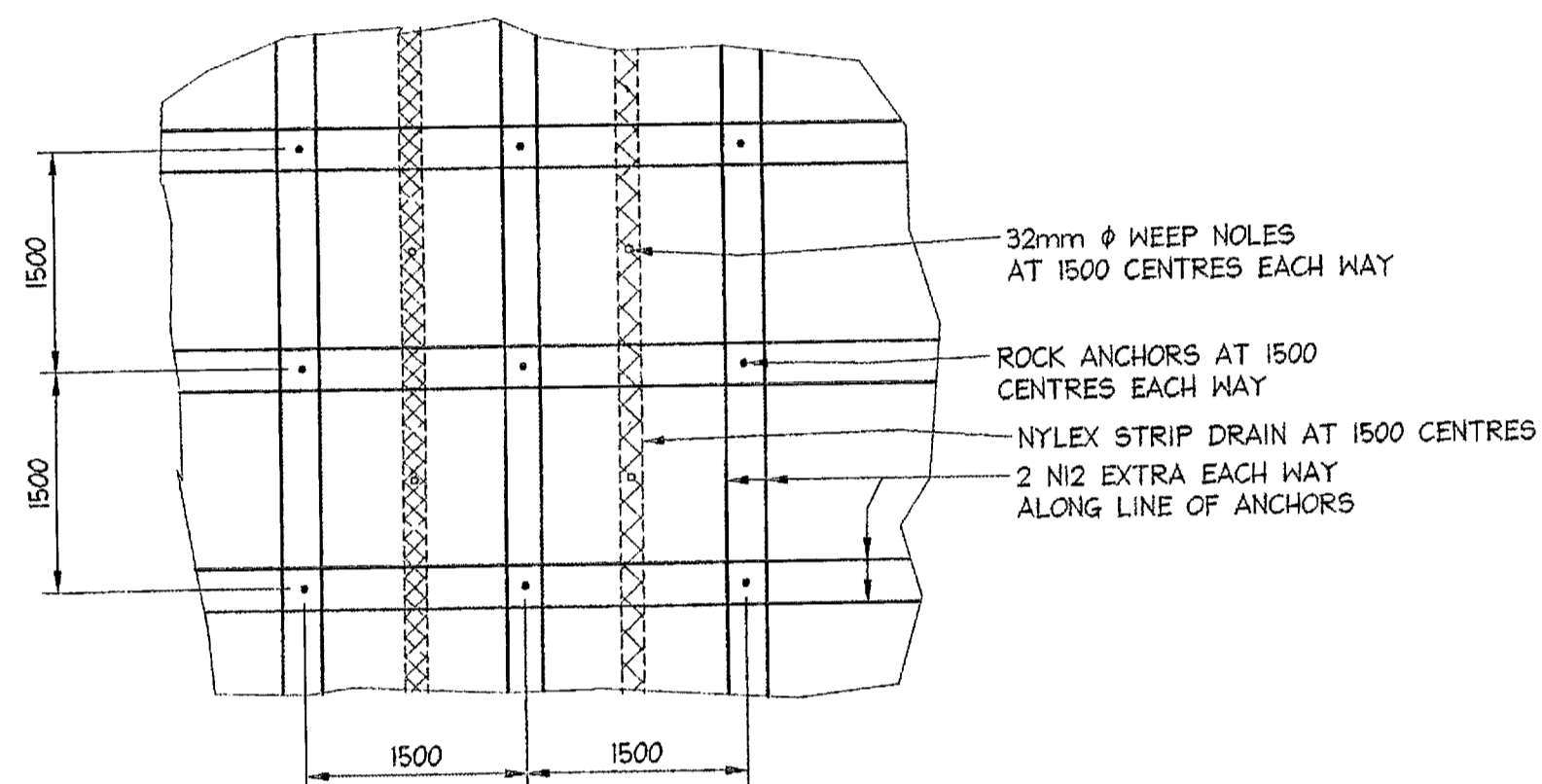
Date:	Design:	Drawn:	Checked:
Oct. 2003	R.G.W.	Paul R Bruce CPEng, MIEAust.	
Job No:	Drawing No:		Rev:
030963	C05		B

NOTES:

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



ANCHOR SETOUT ELEVATION TYPE A
SCALE = 1 : 50



ANCHOR SETOUT ELEVATION TYPE B
SCALE = 1 : 50

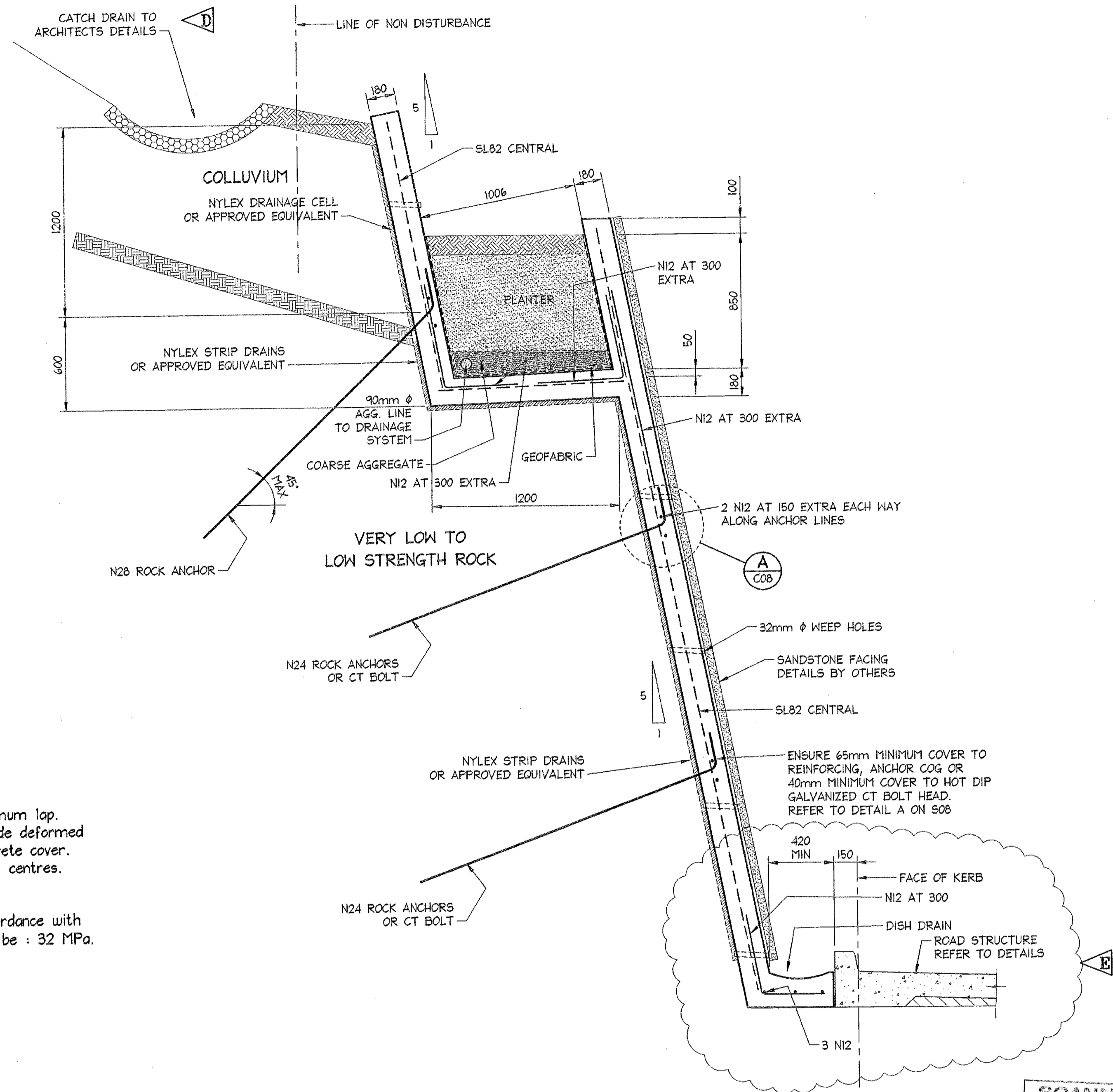
NOTE:
ANCHOR LENGTH, TYPE AND CENTRES TO BE SPECIFIED AND APPROVED ON SITE BY THE GEOTECHNICAL ENGINEER. REFER TO ANCHOR BOLTING SCHEDULE ON DRAWING No. C20 FOR ANCHOR LENGTH AND SPACING.

NOTE: ROCK ANCHORS
REFER TO 'SPECIFICATION FOR PERMANENT ROCK ANCHORS' BY DOUGLES PARTNERS.

NOTES: SPRAYED CONCRETE WALLS

REINFORCEMENT:
Allowance to be made for texture application.
Minimum cover to all reinforcement to be:
65 mm to exposed face.
50 mm to face cast against ground.
All welded fabric shall be lapped as follows: 300mm minimum lap.
Mild steel rods denoted N12 are 12mm diameter D500 Grade deformed bars with 450mm minimum lap and 65mm minimum concrete cover.
Reinforcement to be held in its correct position at 800mm centres.

CONCRETE:
All workmanship and materials shall be carried out in accordance with AS 3600. Concrete design strength (F_c) at 28 days to be : 32 MPa.



TYPICAL RETAINING WALL - TYPE RW2
SCALE = 1 : 20

SCANNED
11 AUG 2006
PITTSWATER COUNCIL

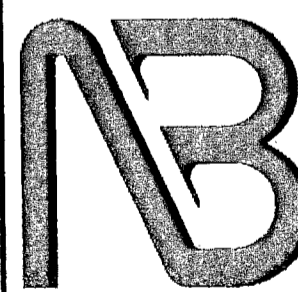
CIVIL PLANNING SERVICES
Construction Cert. No. Approved Emitter
22375 04 AUG 2006
Certifying Authority: Sherrin Burnett
Registration No: PWS004

Date	Rev	Amendment
17.12.2004	E	DETAIL ALTERED
29.10.2004	D	NOTE ALTERED
21.10.2004	C	RW1 DELETED DETAILS ALTERED
10.06.2004	B	DETAILS ALTERED NOTES ALTERED
22.01.2004	A	NOTES ALTERED DETAIL ADDED

DOCUMENT CERTIFICATION

Date: 5/ANOS
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER.
Institute of Engineers Membership No. 803938
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.

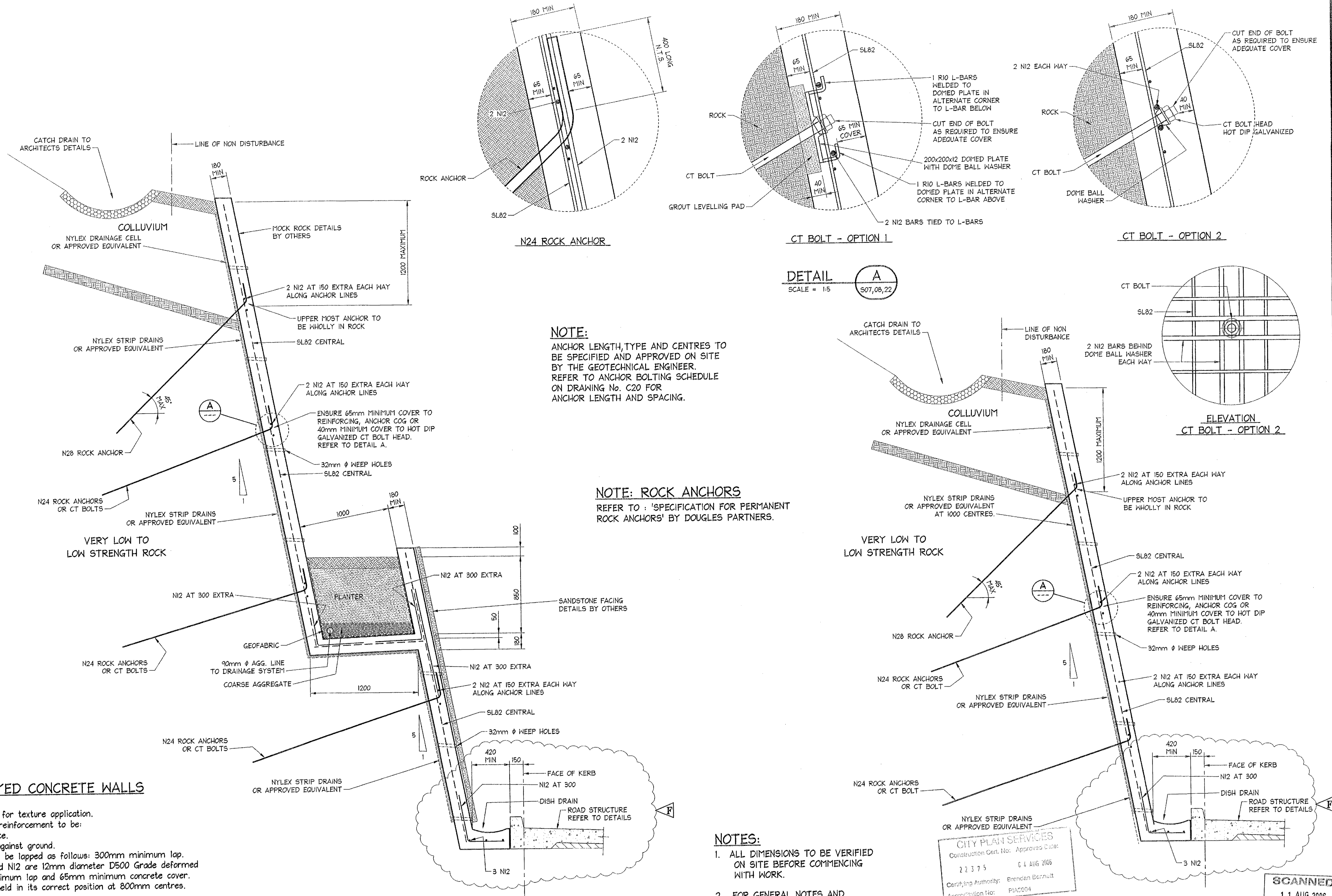


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DRE WHY N.S.W. 2099
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e-mail: nb@nbconsulting.com.au

Project: **PROPOSED ACCESS ROAD**
at: 1148-1152 Barrenjoey Road
and 56 Palm Beach Road
Palm Beach
for: Raypond Development

Drawing Title: **RETAINING WALL**
DETAILS SHEET 1
The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.

Date:	Design:	Drawn:	Checked:
Oct. 2003	R.G.W.	Paul R Bruce ONEAust., MIDAust.	
Job No:	Drawing No:	Rev:	
030963	C07	E	



NOTE:
ANCHOR LENGTH, TYPE AND CENTRES TO BE SPECIFIED AND APPROVED ON SITE BY THE GEOTECHNICAL ENGINEER. REFER TO ANCHOR BOLTING SCHEDULE ON DRAWING No. C20 FOR ANCHOR LENGTH AND SPACING.

NOTE: ROCK ANCHORS
REFER TO: 'SPECIFICATION FOR PERMANENT ROCK ANCHORS' BY DOUGLES PARTNERS.

NOTES: SPRAYED CONCRETE WALLS

REINFORCEMENT:
Allowance to be made for texture application.
Minimum cover to all reinforcement to be: 65 mm to exposed face.
50 mm to face cast against ground.
All welded fabric shall be lapped as follows: 300mm minimum lap.
Mild steel rods denoted N12 are 12mm diameter D500 Grade deformed bars with 450mm minimum lap and 65mm minimum concrete cover.
Reinforcement to be held in its correct position at 800mm centres.

CONCRETE:
All workmanship and materials shall be carried out in accordance with AS 3600. Concrete design strength (F_c) at 28 days to be: 32 MPa.

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

Date	Rev	Amendment
17.12.2004	F	DETAILS ALTERED
29.10.2004	E	NOT ALTERED DETAILS ALTERED
21.10.2004	D	DETAILS ALTERED
07.07.2004	C	DETAILS ALTERED
10.06.2004	B	DETAILS ALTERED NOTES ALTERED DETAIL ADDED

DOCUMENT CERTIFICATION

I am a qualified Structural/Civil Engineer. I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER, Institute of Engineers Membership No. 803938

I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.

Date: 3 JAN 05
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

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e-mail: nb@nbconsulting.com.au

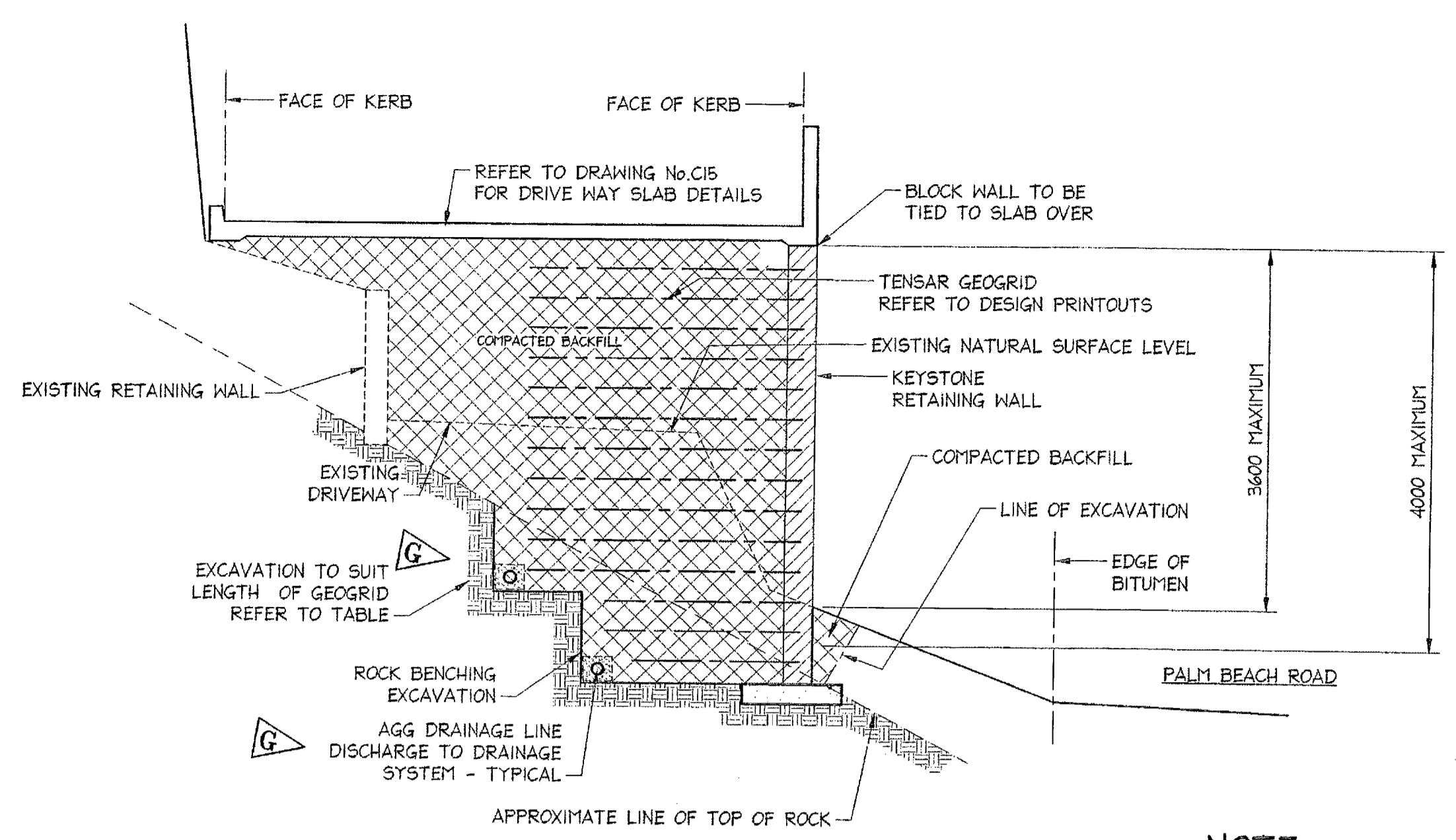
Project: **PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development**

Drawing Title: **RETAINING WALL DETAILS SHEET 2**

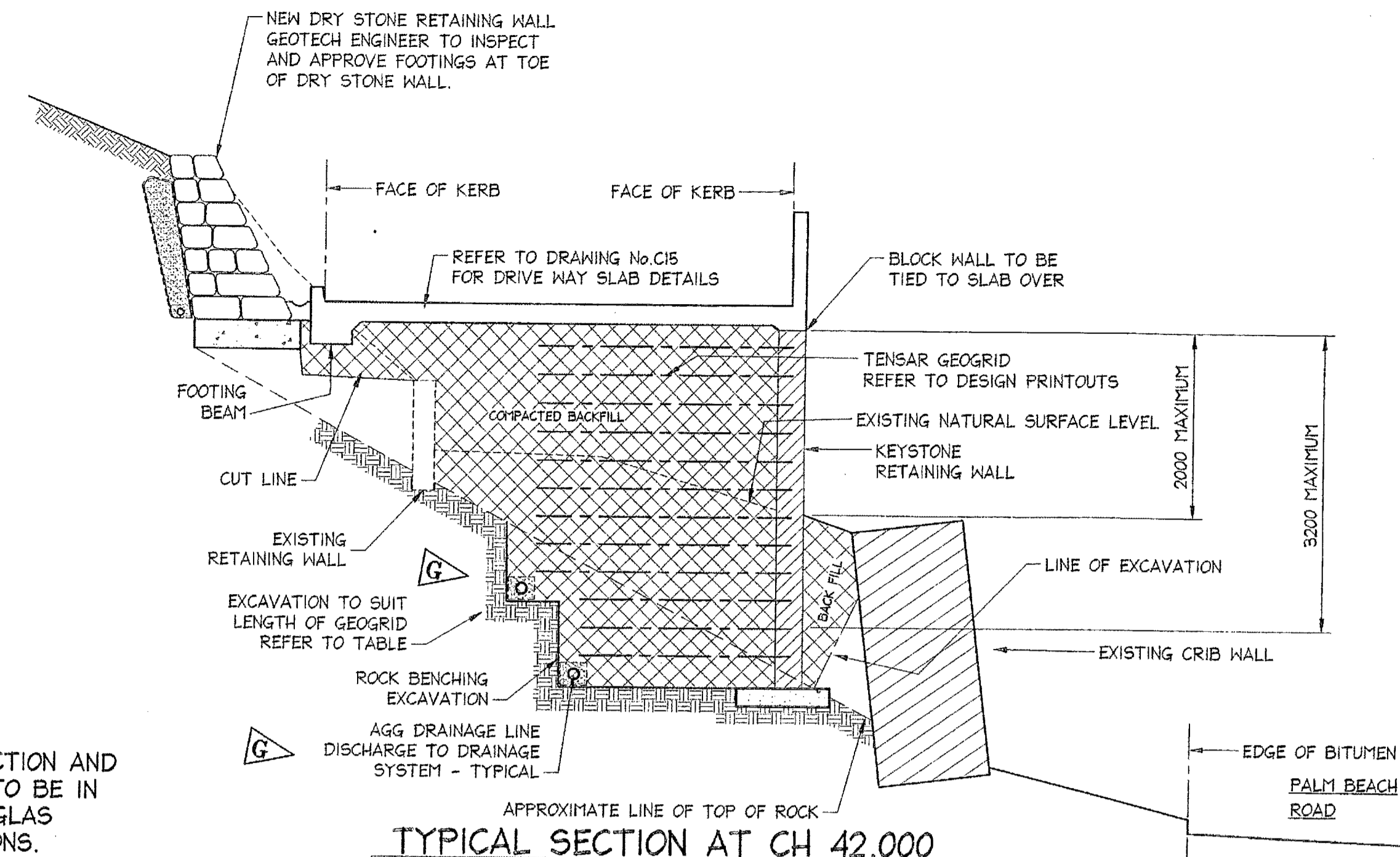
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Date:	Design:	Drawn:	Checked:
Oct. 2003	R.G.W.	Paul R Bruce CPEAust., MIEAust.	
Job No:	Drawing No:	Rev:	
030963	C08	F	

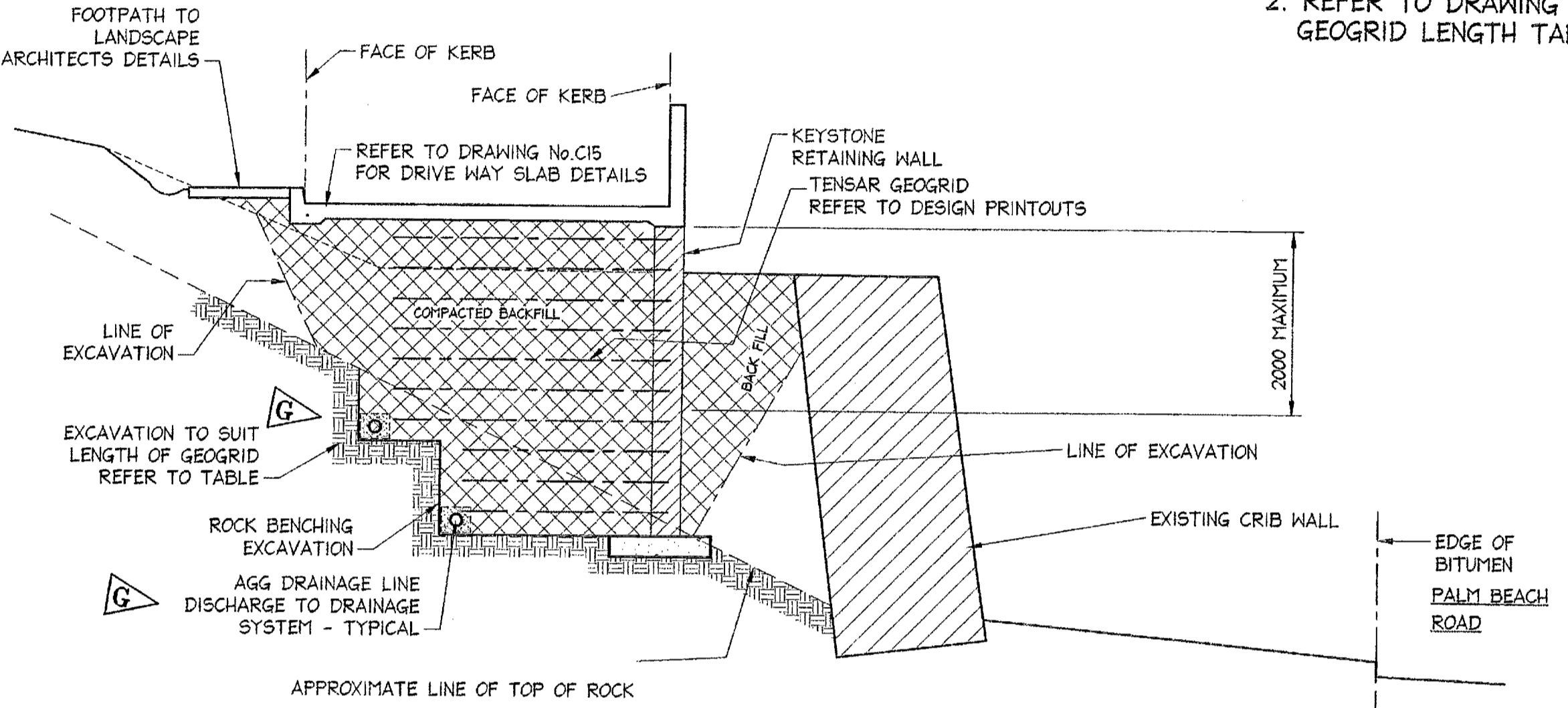
SCANNED
11 AUG 2006
PIT/WATER COUNCIL



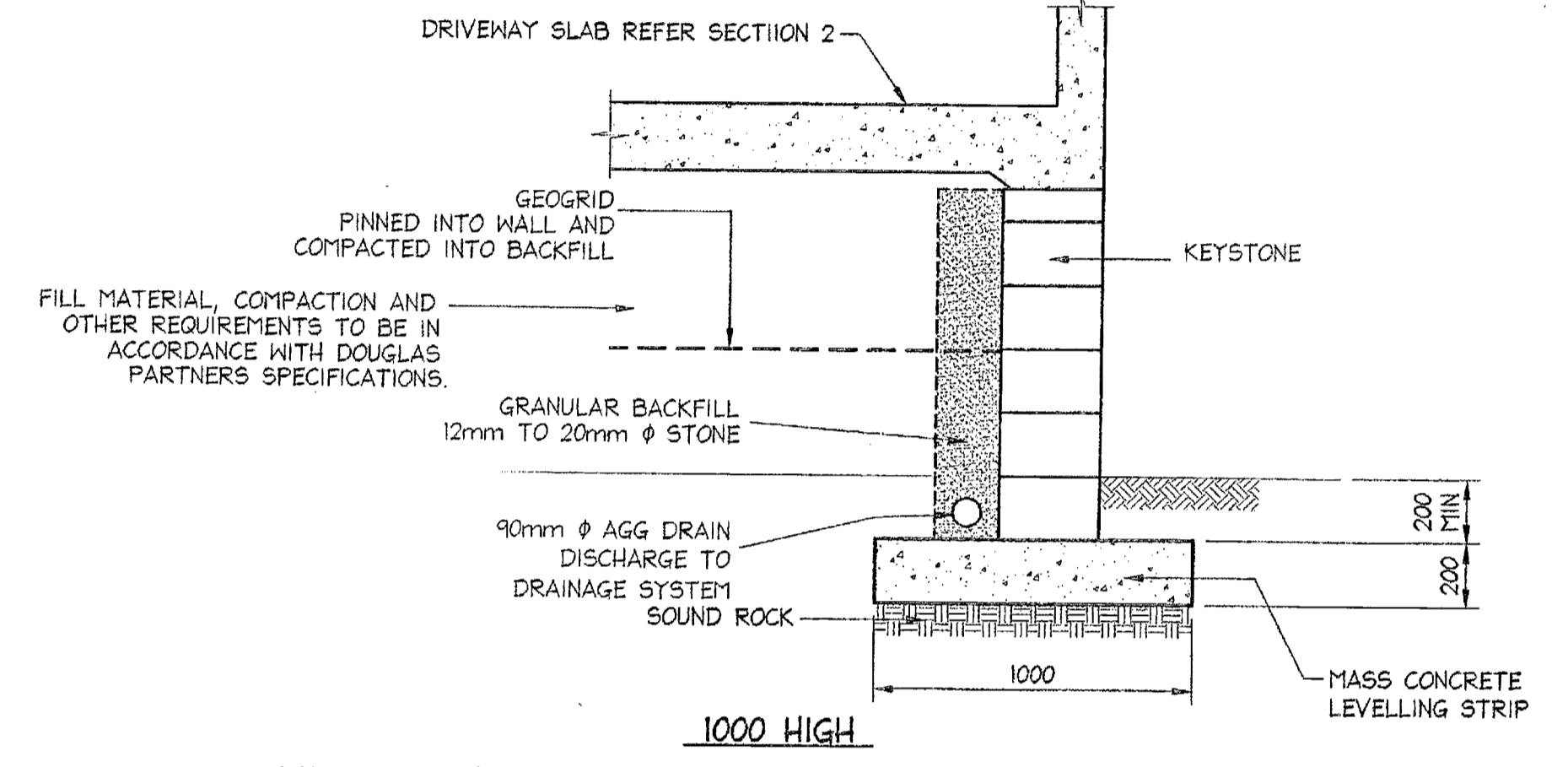
TYPICAL SECTION AT CH 37.000
SCALE = 1 : 50



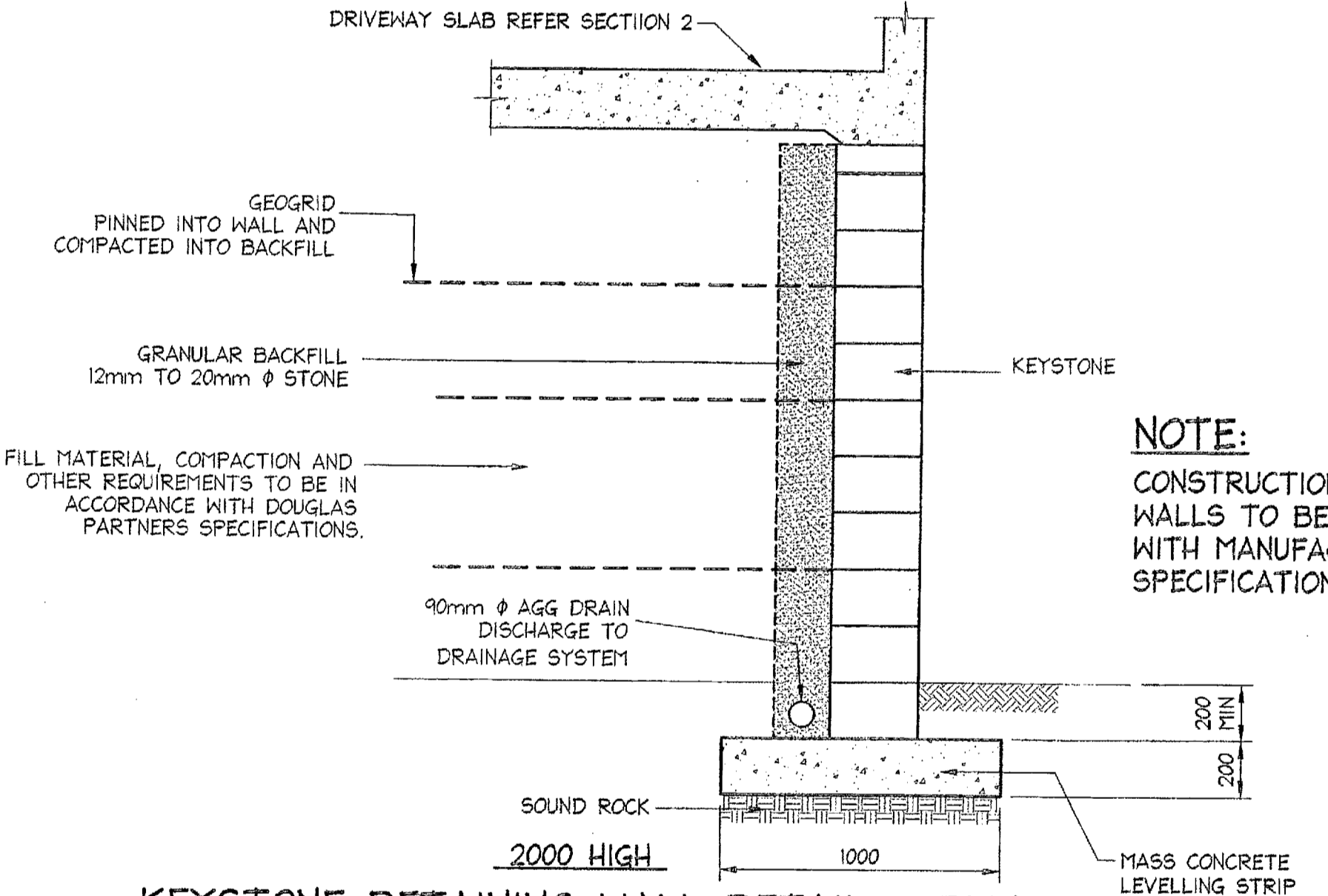
TYPICAL SECTION AT CH 42.000
SCALE = 1 : 50



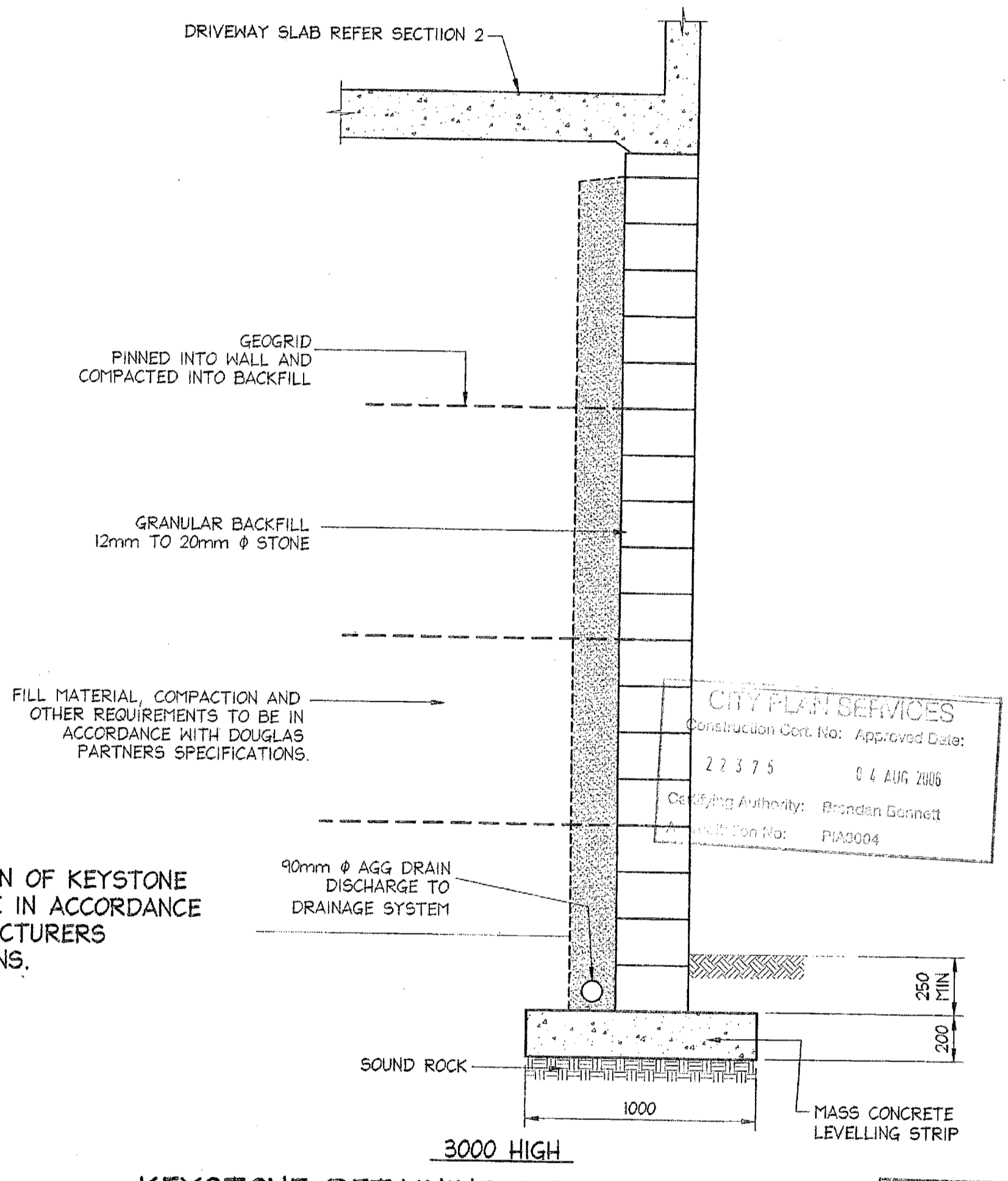
TYPICAL SECTION AT CH 47.300
SCALE = 1 : 50



KEYSTONE RETAINING WALL DETAIL - RW7
SCALE = 1 : 20



KEYSTONE RETAINING WALL DETAIL - RW7
SCALE = 1 : 20



KEYSTONE RETAINING WALL DETAIL - RW7
SCALE = 1 : 20

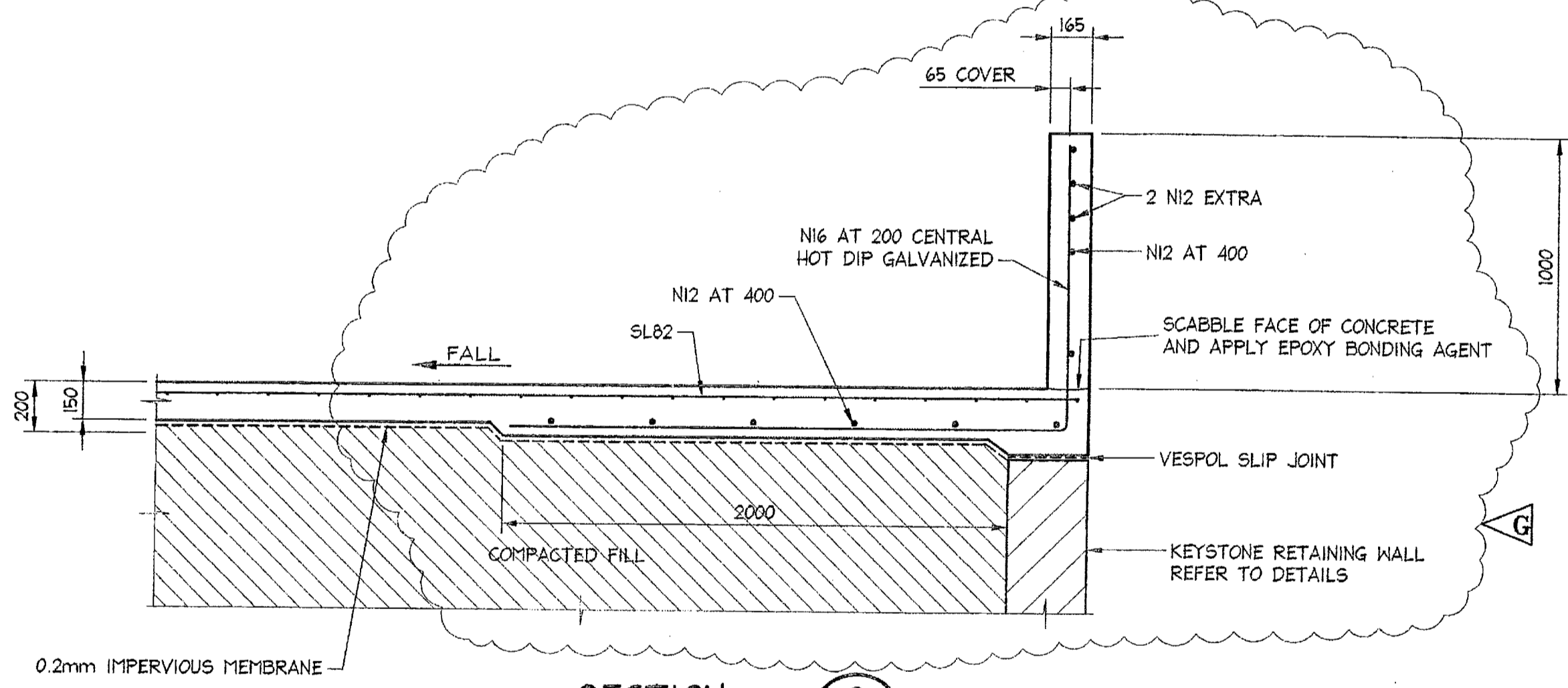
NOTES:
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: SOI.

NOTE:
IF BASE OF KEYSTONE WALL CLASHES WITH LINE OF EXISTING CRIB WALL
A - MOVE KEYSTONE WALL BACK TO SUIT
B - CANTILEVER DRIVEWAY SLAB OVER.
ENGINEER TO BE CONTACTED TO DETAIL CHANGES TO DRIVEWAY SLAB.

NOTE:
1. REFER TO SUPPLIERS SPECIFICATIONS FOR INSTALLATION REQUIREMENTS & DRAINAGE REQUIREMENTS
2. REFER TO DESIGN PRINTOUT 'KEYSTONE RETAINING WALL DESIGN' BY R. WRAY FOR:
H = 1.0 m TO H = 4.5m WALL HEIGHT
- LAYER LOCATIONS
- GEOGRID TYPE
- GEOGRID LENGTH
3. SURCHARGE TO SLAB = 7.5 kPa

NOTE:
1. FILL MATERIAL, COMPACTION AND OTHER REQUIREMENTS TO BE IN ACCORDANCE WITH DOUGLAS PARTNERS SPECIFICATIONS.
2. REFER TO DRAWING No. C27 FOR GEOGRID LENGTH TABLE

NOTE:
CONSTRUCTION OF KEYSTONE WALLS TO BE IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.



SECTION 2
SCALE = 1:20

Date	Rev.	Amendment
11.11.2004	G	DETAILS ALTERED
21.10.2004	F	DETAILS ALTERED NOTES ADDED
17.09.2004	E	DETAILS ALTERED NOTES ADDED
30.07.2004	D	DETAILS ALTERED NOTES ADDED
10.06.2004	C	DETAILS ALTERED

DOCUMENT CERTIFICATION
Date: 10/07/03
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer. I hold the following qualifications:
BE(Civil), CPEng, MIEAust, NPER, Institute of Engineers Membership No. 803938
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

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DEE WYH NSW, 2099
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e-mail: nb@nbconsulting.com.au

Project: PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development

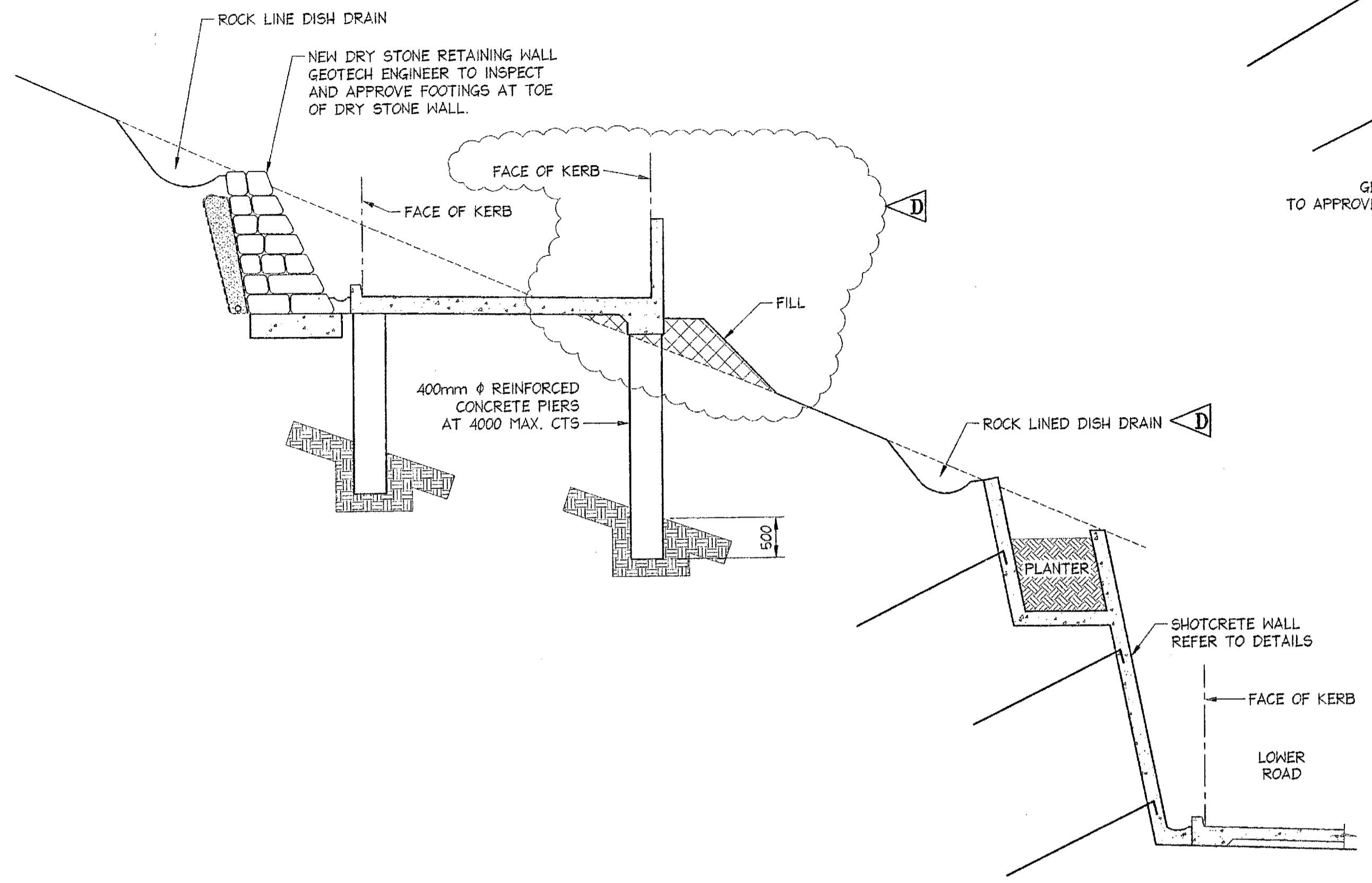
Drawing Title: RETAINING WALL DETAILS SHEET 3

Date	Design	Drawn	Checked
Oct. 2003	R.G.W.	Paul R Bruce	CPEng, MIEAust, NPER
Job No:	030963	Drawing No:	C09
Rev:			G

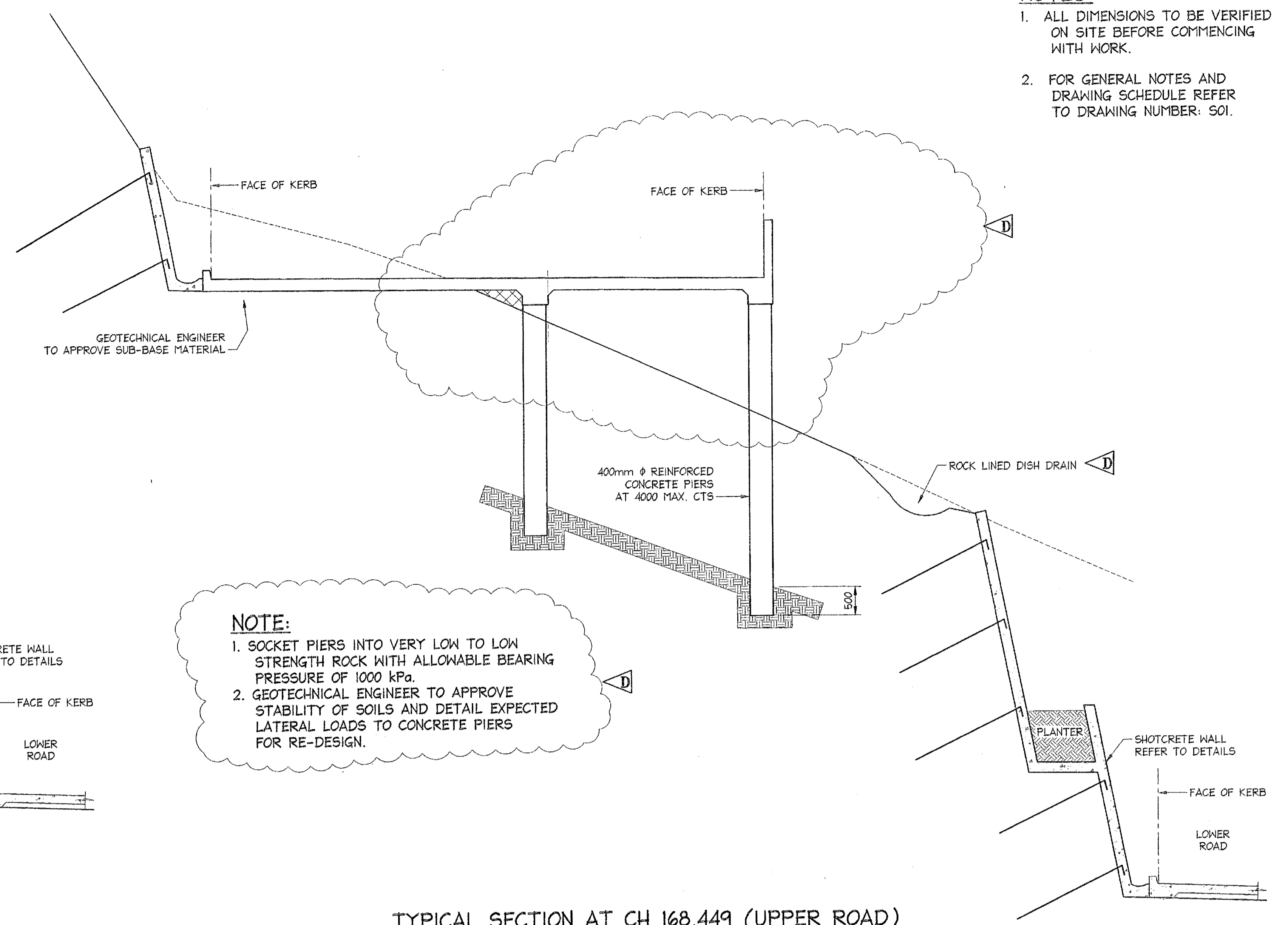
SCANNED 11 AUG 2003
PITTSWATER COUNCIL

C094

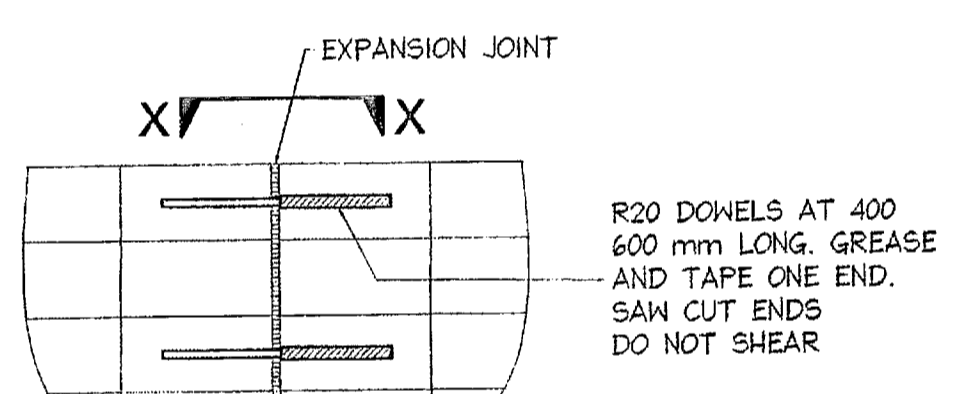
- NOTES:**
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
 2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: 501.



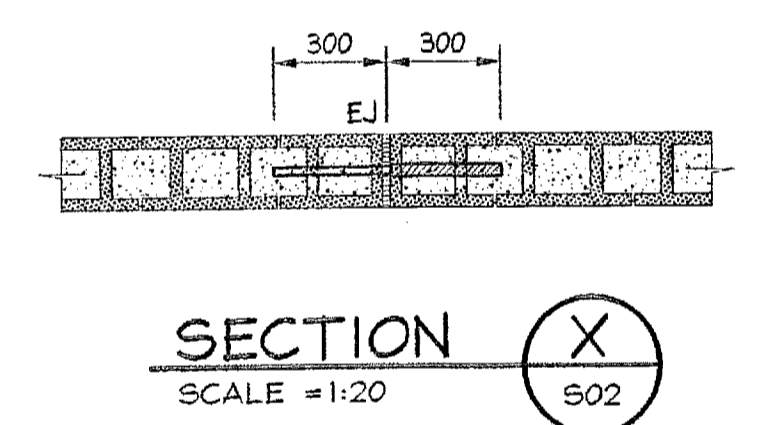
TYPICAL SECTION AT CH 158.541 (UPPER ROAD)
SCALE = 1 : 50



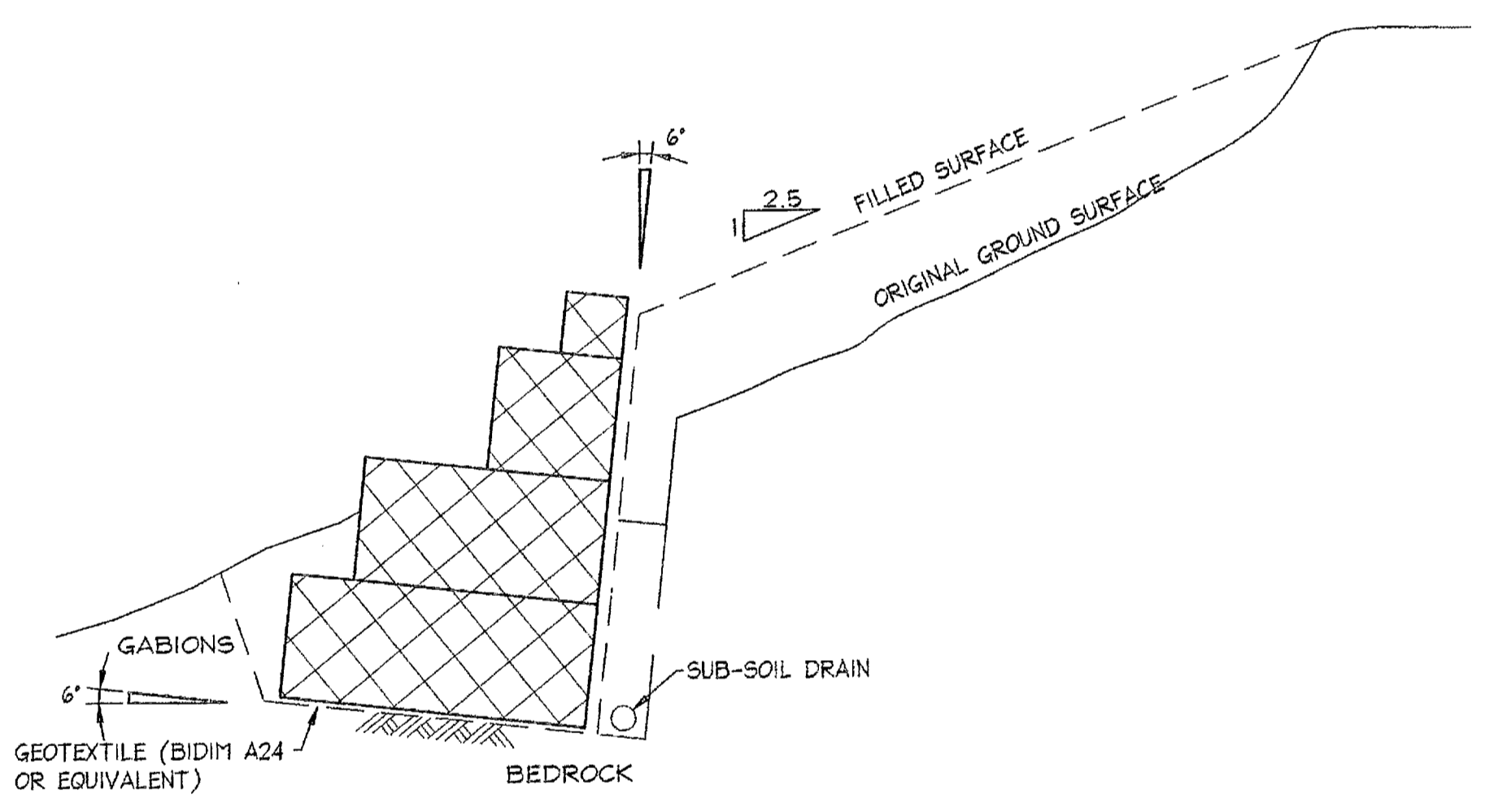
TYPICAL SECTION AT CH 168.449 (UPPER ROAD)
SCALE = 1 : 50



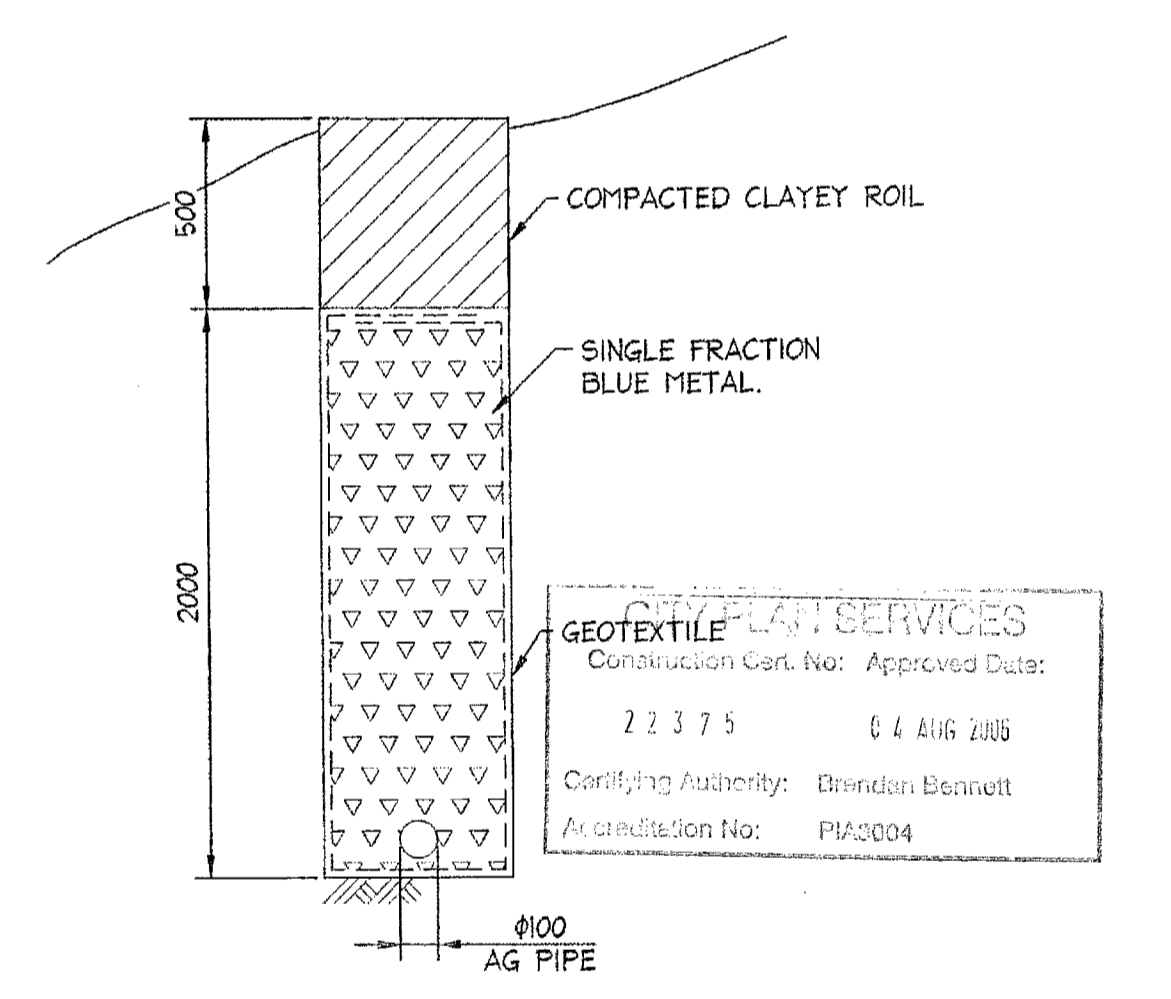
LOCATE JOINTS AT 8 m MAXIMUM CENTRES OR IN ACCORDANCE WITH AS 3700
TYPICAL EXPANSION JOINT DETAILS
SCALE = 1 : 20



SECTION X-X
SCALE = 1:20



REFER TO DETAILS BY DOUGLAS PARTNERS
GABION WALL
SCALE = 1 : 50



GABION WALL AND BOULDER 2 SUBSOIL DRAIN
SCALE = 1 : 20

11 AUG 2006
PITWATER COUNCIL

Date	Rev	Amendment
21.10.2004	D	DETAILS ALTERED
10.06.2004	C	DETAILS MOVED FROM C11
29.01.2004	B	DETAILS ALTERED
22.01.2004	A	DETAILS ALTERED AND ADDED

DOCUMENT CERTIFICATION

I am a qualified Structural/Civil Engineer. I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER, Institute of Engineers Membership No. 803938

I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.

Date: 11/08/06
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

NORTHERN BEACHES CONSULTING ENGINEERS P/L

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DEE WHY N.S.W. 2099
Ph: (02) 9884 7000 Fax: (02) 9884 7444
e-mail: nb@nbconsulting.com.au

Project: **PROPOSED ACCESS ROAD**
at: 1148-1152 Barrenjoey Road
and 56 Palm Beach Road
Palm Beach
for: Raypond Development

Drawing Title: **RETAINING WALL DETAILS SHEET 4**

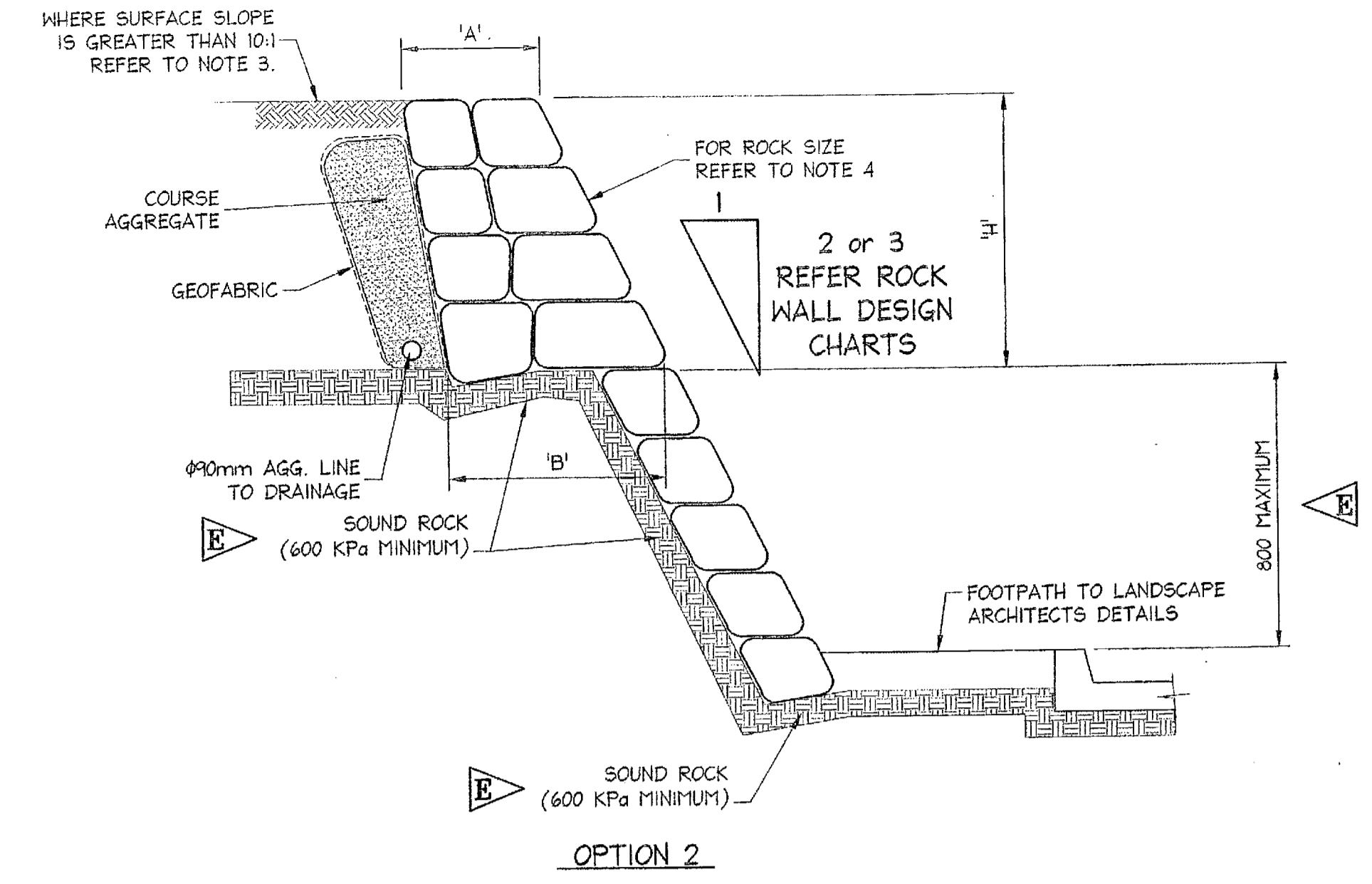
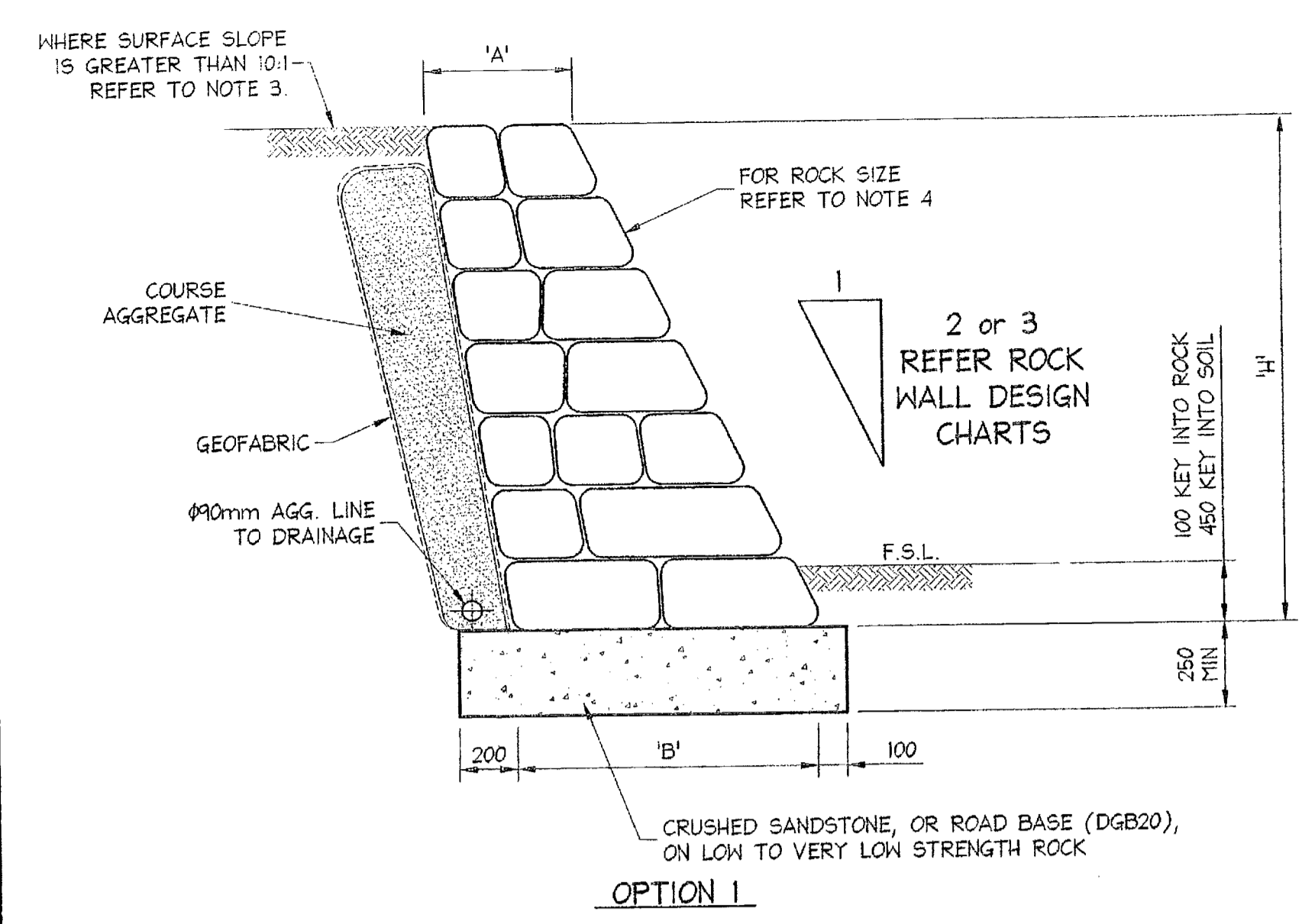
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Date	Design	Drawn	Checked
Oct. 2003	R.G.W.	Paul R Bruce C1EAsst., MDDAsst.	
Job No:	Drawing No:	Rev:	
030963	C10	D	

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

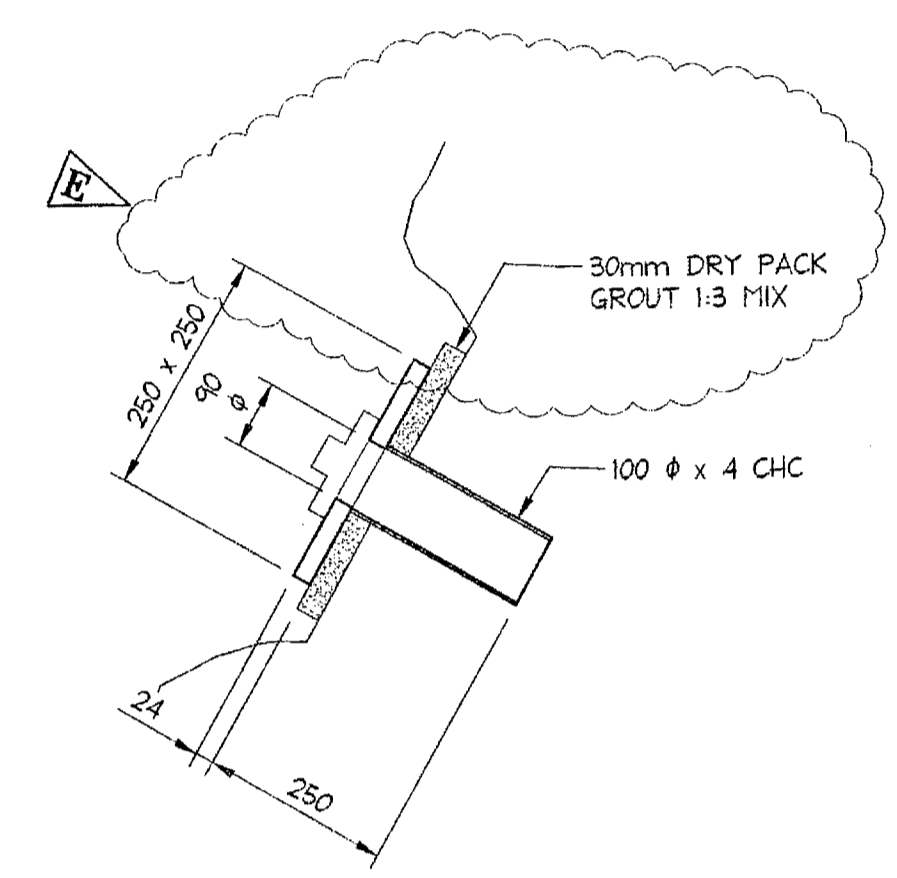
DRY STONE RETAINING WALL NOTES:

1. BACKFILL IS TO BE GRANULAR, FREE DRAINING AND COMPACTED.
2. FOUNDATION TO BE APPROVED FOR A SAFE BEARING CAPACITY OF 200 KPa PRIOR TO CONSTRUCTION.
3. WHERE THE SURFACE SLOPE OF RETAINED MATERIAL IS BETWEEN 10:1 AND 4:1 THE WALL BASE DIMENSION IS TO BE INCREASED BY 500mm.
4. ROCK IS TO BE SOUND DURABLE SANDSTONE OR OTHER APPROVED MATERIAL AND AT LEAST 0.5 SQUARE METRES PLAN AREA.
5. A CONTINUOUS 90mm DIA. SUBSOIL DRAIN IS TO BE INSTALLED AT THE REAR OF THE WALL WHERE THE WALL HEIGHT EXCEEDS 3000mm OR WHERE THE WALL FOUNDATION CONSISTS OF OTHER THAN ROCK.
6. ROCKS SHALL BE PLACED IN SUCH A MANNER THAT THEY ARE STABLE AND INTERLOCKING AND LAID ROUGHLY COURSED AND BEDDED ON THEIR BROADEST BASE.

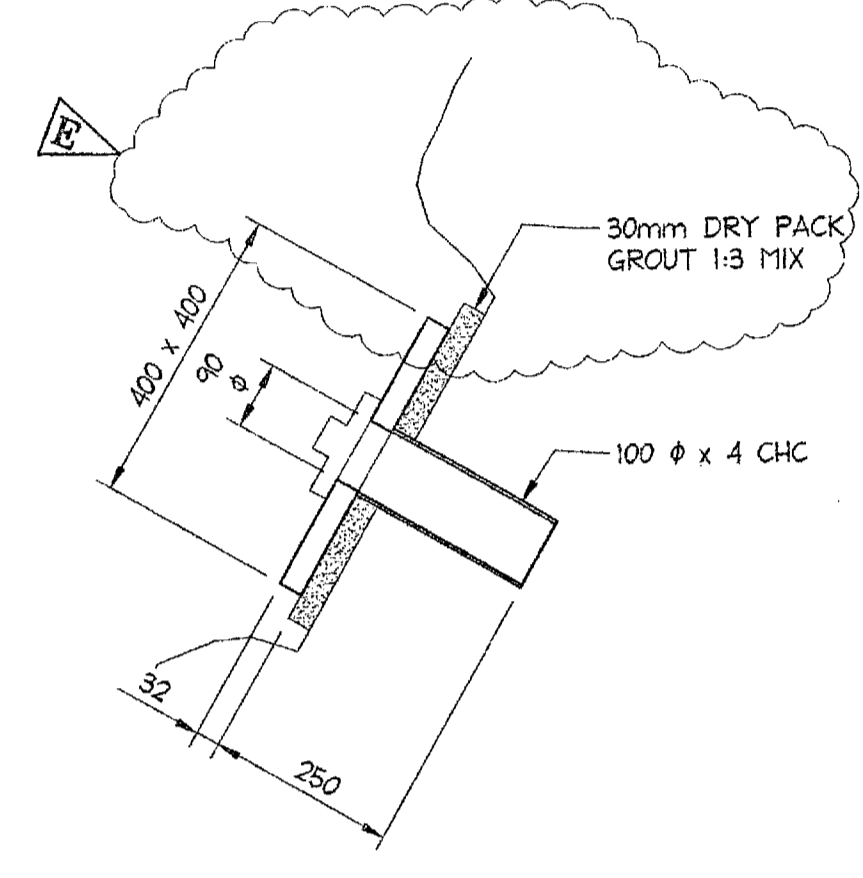


TYPICAL DRY STONE RETAINING WALL DETAIL - RW5

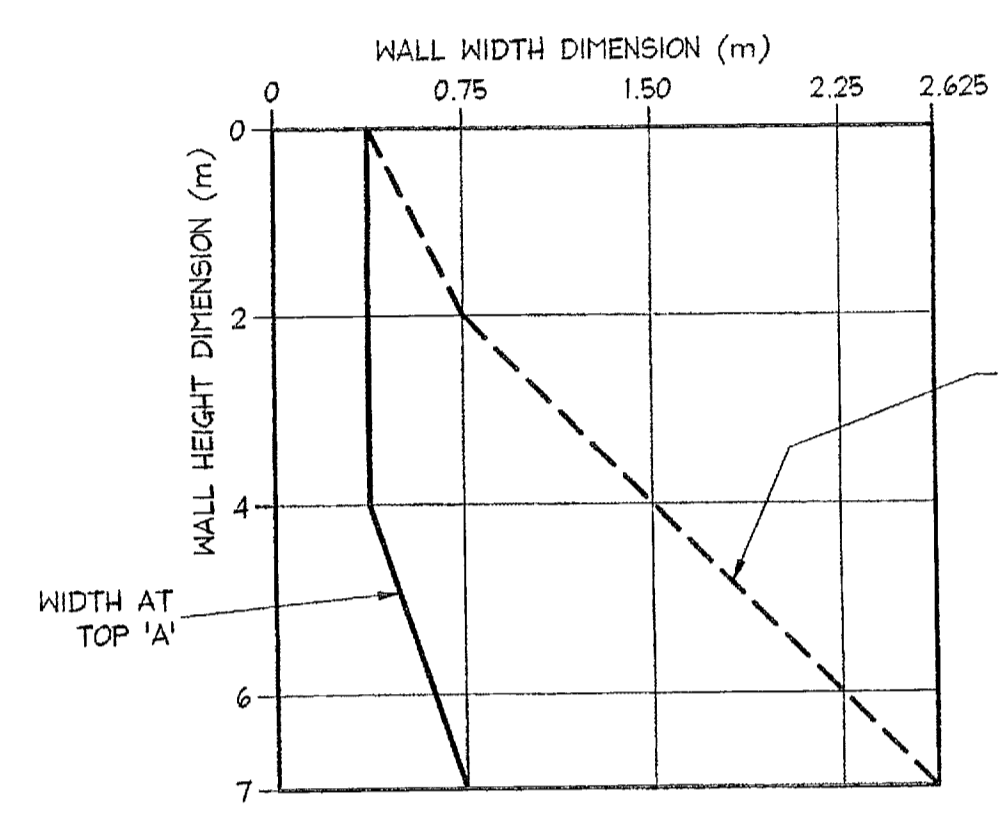
SCALE = 1 : 20



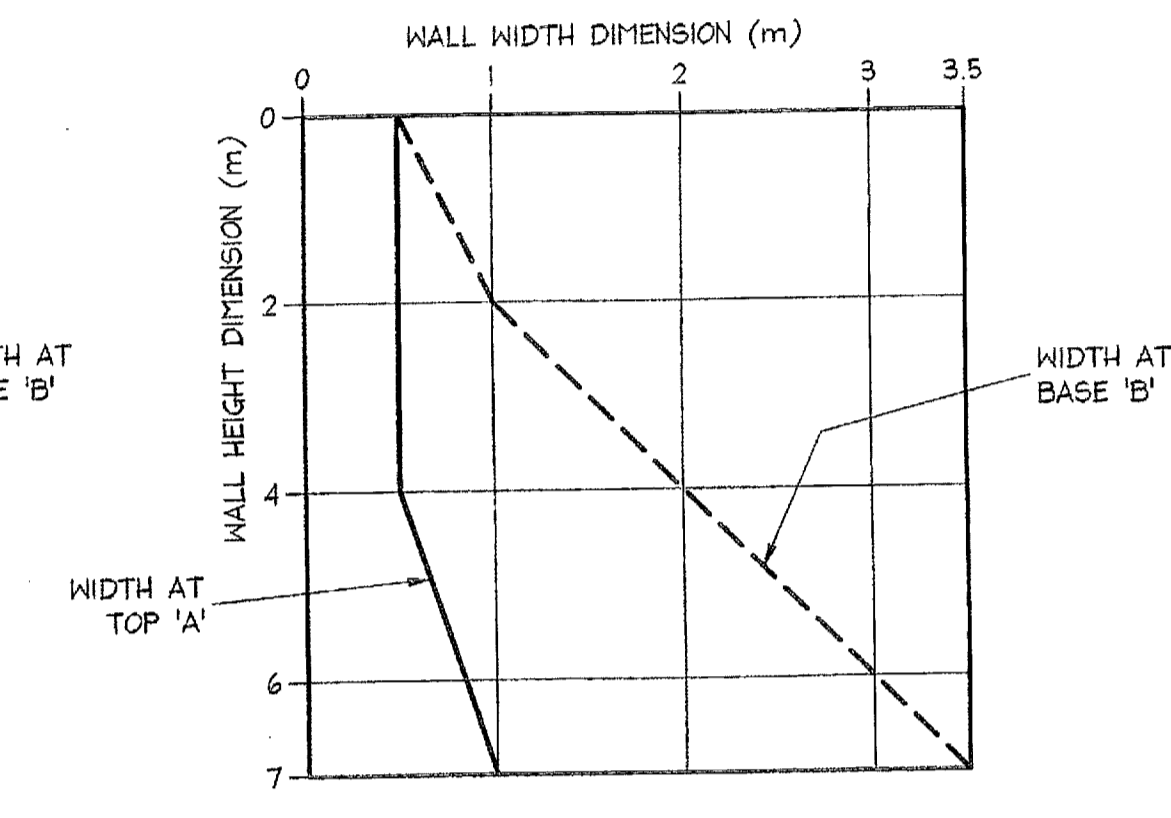
**BOULDER 1
PLATE AND HEAD DETAIL**
SCALE = 1 : 10



**BOULDER 2
PLATE AND HEAD DETAIL**
SCALE = 1 : 10



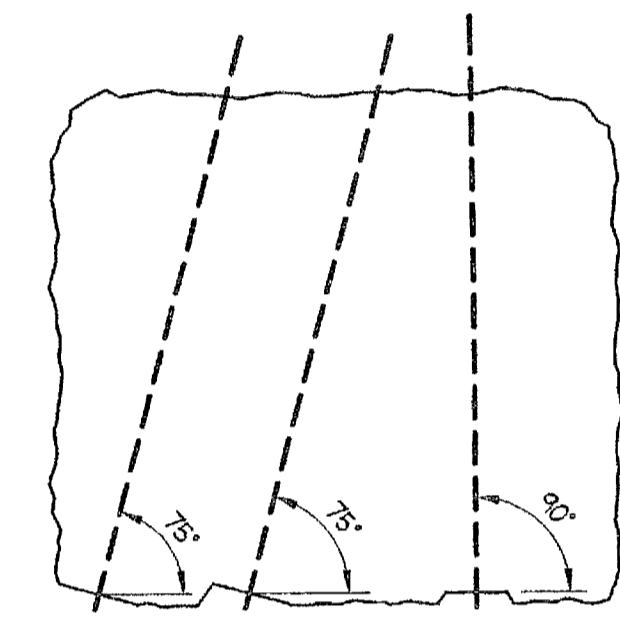
**ROCK WALL DESIGN CHART
FOR 1 : 2 WALL BATTER**



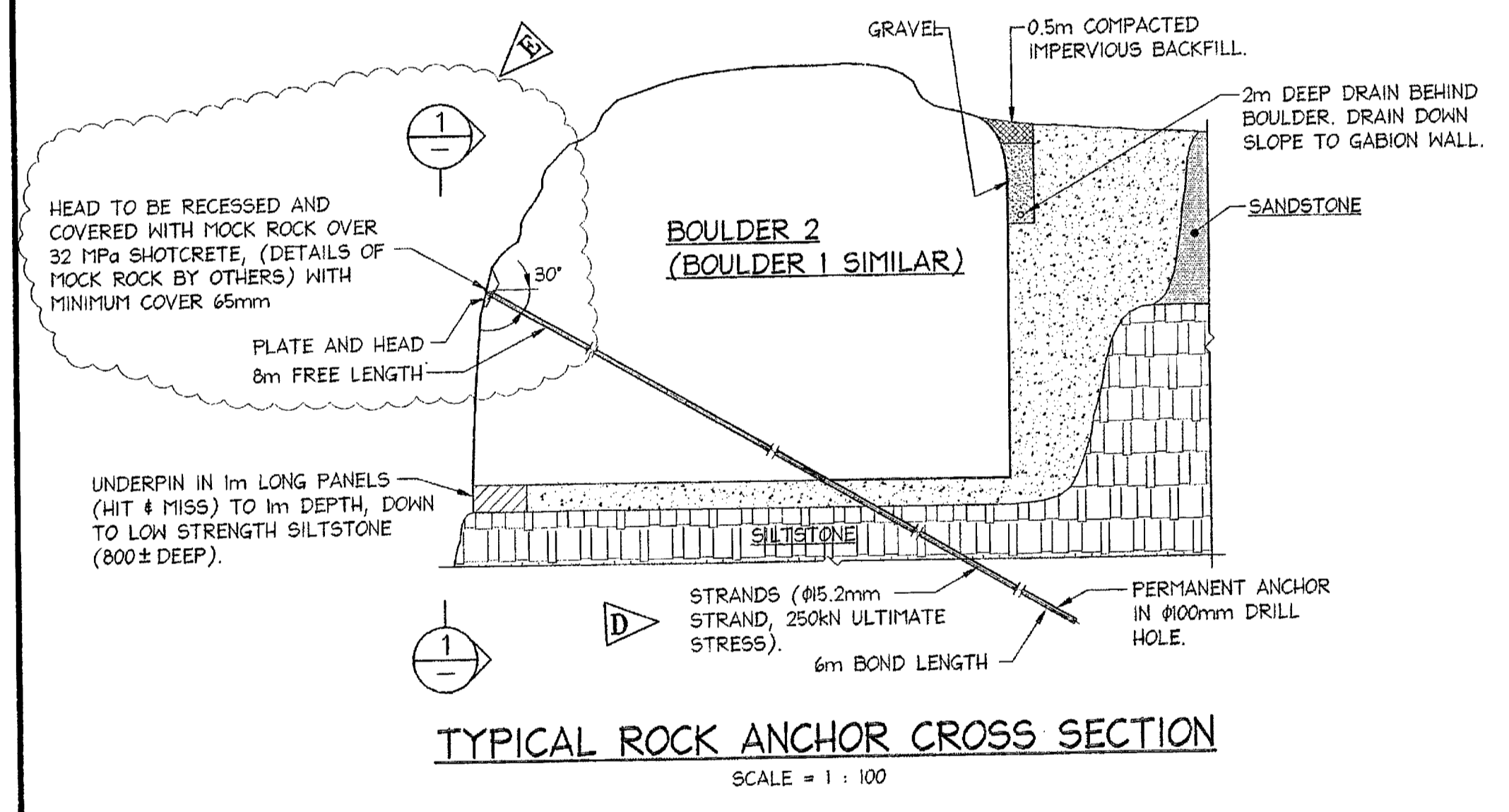
**ROCK WALL DESIGN CHART
FOR 1 : 3 WALL BATTER**

UNDERPINNING NOTES

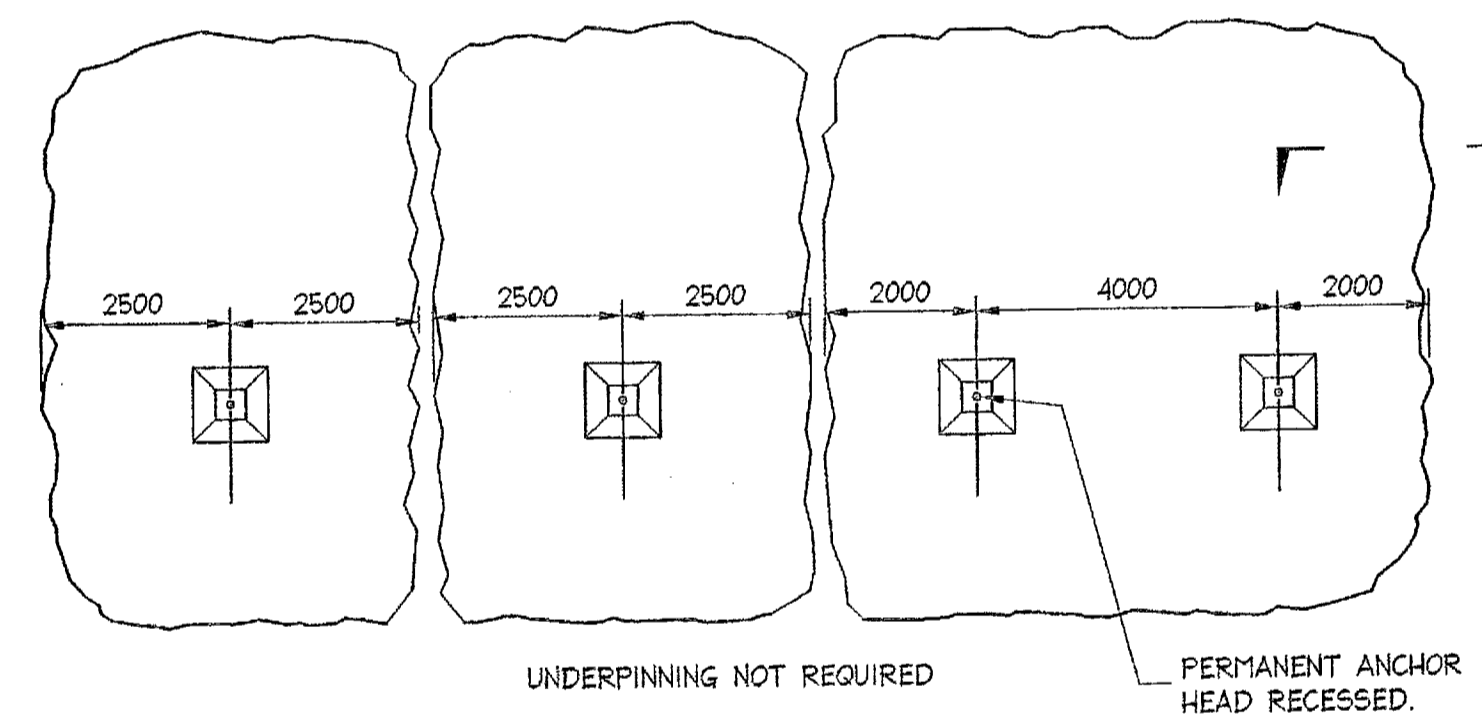
- Boulder 2 to be underpinned to level 800 mm below lowest point of boulder to a depth of 1000 mm.
Bulk excavation is to leave a 1.5 : 1, H : V embankment at the boulder.
Detailed excavation for the underpinning work is to be carried out in 1000 wide strips in sequence shown on Elevation. Complete all underpinning in the set before proceeding to excavate for the next 'letter' in the sequence. Use 20 MPa (min.) bricks laid in 1 : 0 : 3 cement mortar, or 20 MPa concrete, of width to 1000 wide, in 1000 long sections.
Backfill with mortar as the work proceeds.
Leave a 50 mm gap between the top of the underpinning & the underside of the existing footing. Fill void with moist 1 : 0 : 3 cement : sand non-shrink grout (Dry Pack Master Builders Underpinning Mortar) rammed firmly in place. Allow to cure for 24 hours before proceeding with excavation of adjacent sections.



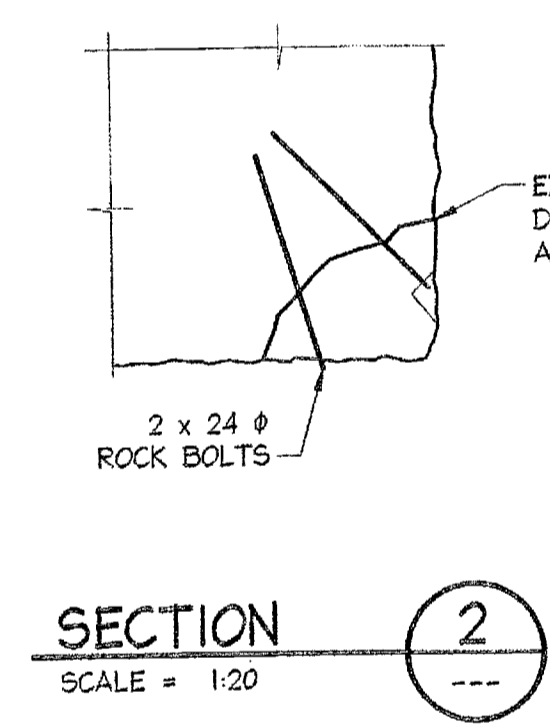
SECTION 3
SCALE = 1:20



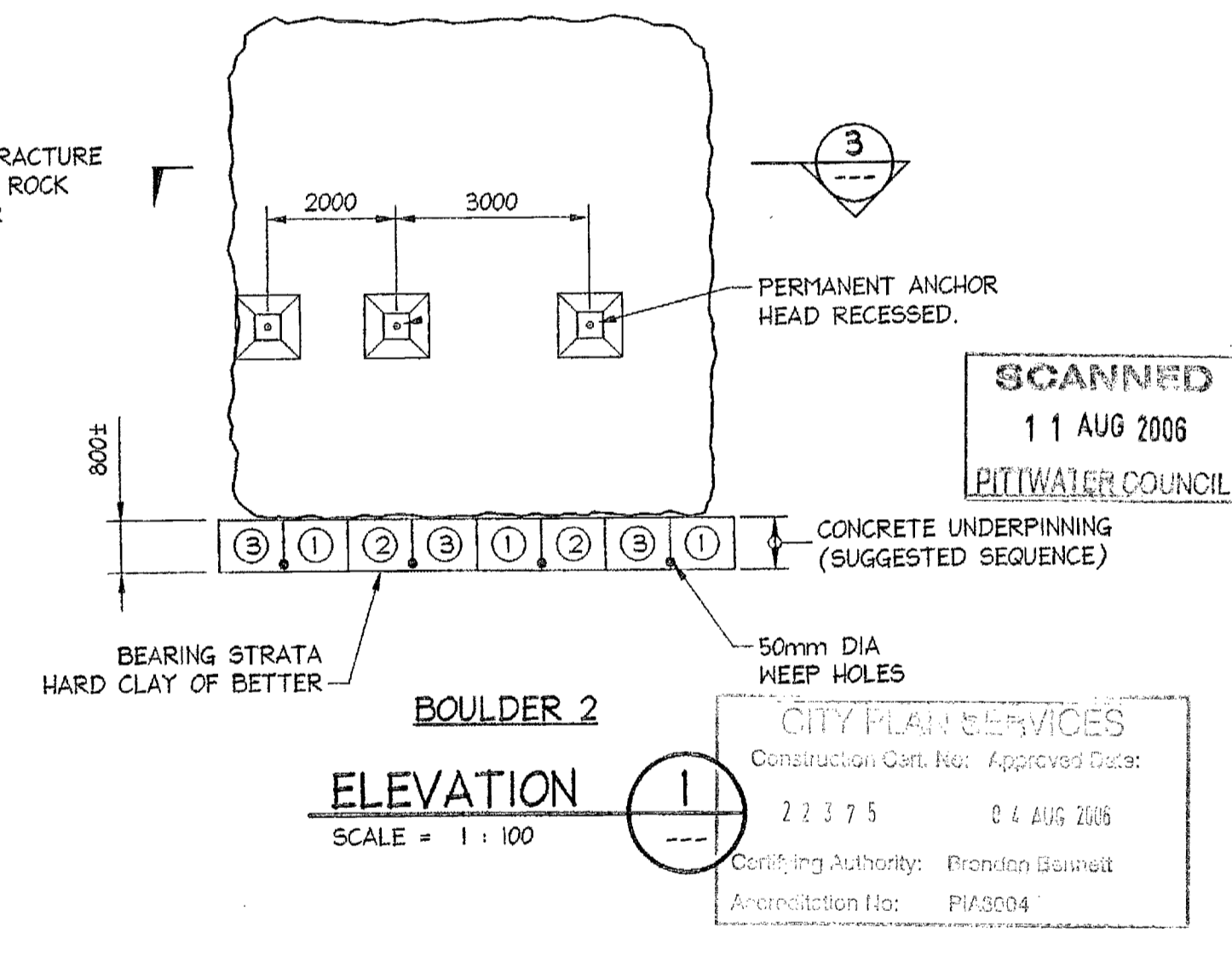
TYPICAL ROCK ANCHOR CROSS SECTION
SCALE = 1 : 100



**BOULDER 1
ELEVATION 1**
SCALE = 1 : 100



SECTION 2
SCALE = 1:20



**BOULDER 2
ELEVATION 1**
SCALE = 1 : 100

ROCK ANCHOR CAPACITY TABLE			
BOULDER NUMBER	ULTIMATE CAPACITY	TEST LOAD	LOCK OFF LOAD
1	250 kN	190 kN	120 kN
2	1000 kN	750 kN	290 kN

SCANNED
11 AUG 2006
PITWAIVER COUNCIL

CITY PLAN SERVICES
Construction Cert. No: Approved Date:
22275 04 AUG 2005
Certifying Authority: Transition Services
Amendment No: P/2004

Date	Rev.	Amendment
21.10.2004	E	DETAILS ALTERED
07.07.2004	D	DETAILS ALTERED
10.06.2004	C	DETAILS ALTERED AND ADDED
24.01.2004	B	NOTE ALTERED
22.01.2004	A	DETAILS ADDED

DOCUMENT CERTIFICATION
Date: Nov 04
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer. I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER, Institute of Engineers Membership No. 809488
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.

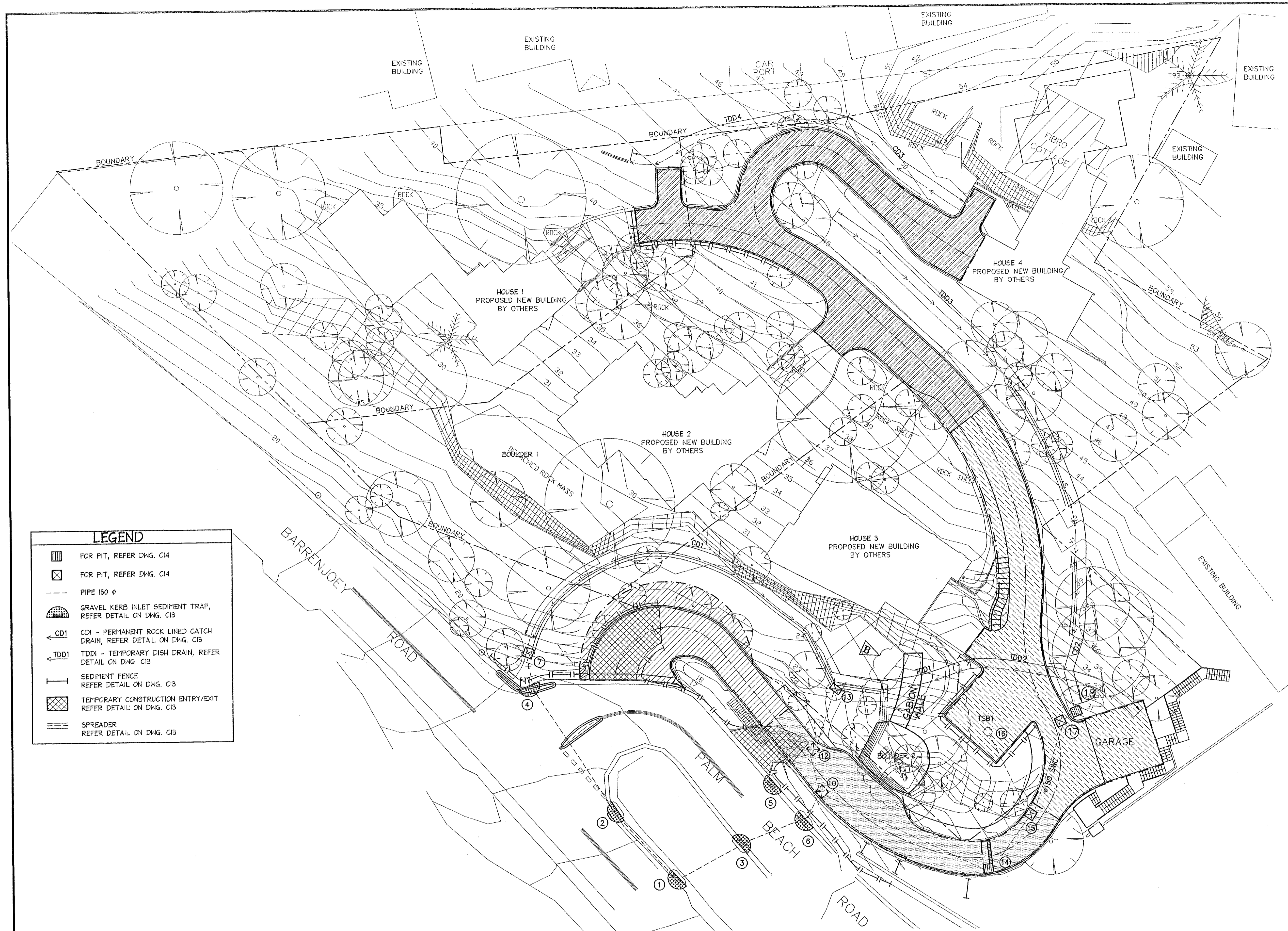
NORTHERN BEACHES Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 24 076 121 615
Suite 207, 30 FISHER ROAD
DEE WALLY NSW 2099
Ph: (02) 9684 7000 Fax: (02) 9684 7444
e-mail: nb@nbconsulting.com.au

Project: **PROPOSED ACCESS ROAD**
at: 1148-1152 Barrenjoey Road
and 56 Palm Beach Road
Palm Beach
for: Raypond Development

Drawing Title: **RETAINING WALL
DETAILS SHEET 5**
The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.

Date:	Design:	Drawn:	Checked:
Oct. 2003	R.G.W.	Paul R Bruce CPEAust., MIEAust.	
Job No:		Drawing No:	Rev.
030963		C11	E

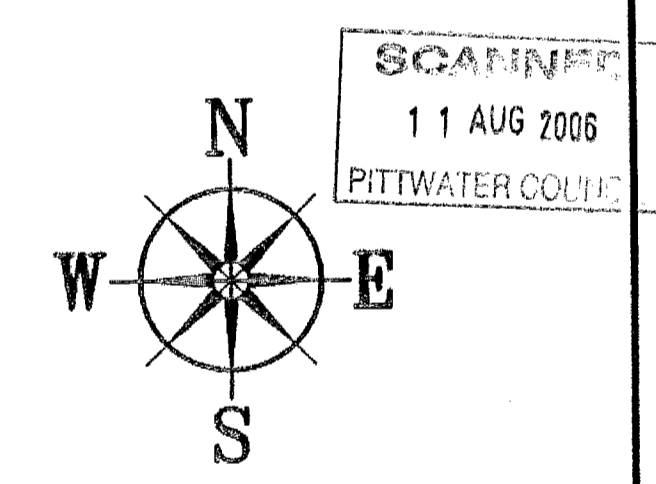
NOTES:
 1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
 2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: 501.



LEGEND

[Symbol]	FOR PIT, REFER DWG. C14
[Symbol]	FOR PIT, REFER DWG. C14
[Symbol]	PIPE 150 Ø
[Symbol]	GRAVEL KERB INLET SEDIMENT TRAP, REFER DETAIL ON DWG. C13
[Symbol]	CD1 - PERMANENT ROCK LINED CATCH DRAIN, REFER DETAIL ON DWG. C13
[Symbol]	TDD1 - TEMPORARY DISH DRAIN, REFER DETAIL ON DWG. C13
[Symbol]	SEDIMENT FENCE REFER DETAIL ON DWG. C13
[Symbol]	TEMPORARY CONSTRUCTION ENTRY/EXIT REFER DETAIL ON DWG. C13
[Symbol]	SPREADER REFER DETAIL ON DWG. C13

CITY PLAN SERVICES
 Construction Cert. No: Approved Under
 22375 C 4 AUG 2006
 Certifying Authority: Brendon Stewart
 Approval No: P140094



SEDIMENT AND EROSION CONTROL PLAN
 SCALE = 1 : 200

Date	Rev	Amendment
21.10.2004	C	STAGING CALLUP DELETED CHANGES DELETED
10.06.2004	B	PLAN ALTERED
29.01.2004	A	SCHEDULE DELETED

DOCUMENT CERTIFICATION

I am a qualified Structural/Civil Engineer. I hold the following qualifications:
 BE(Civil), CPEng, MIEAust., NPER, Institute of Engineers Membership No. 803498
 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

Date: 1st of August 2006
 Rick G. Wray (Director Northern Beaches Consulting Engineers)

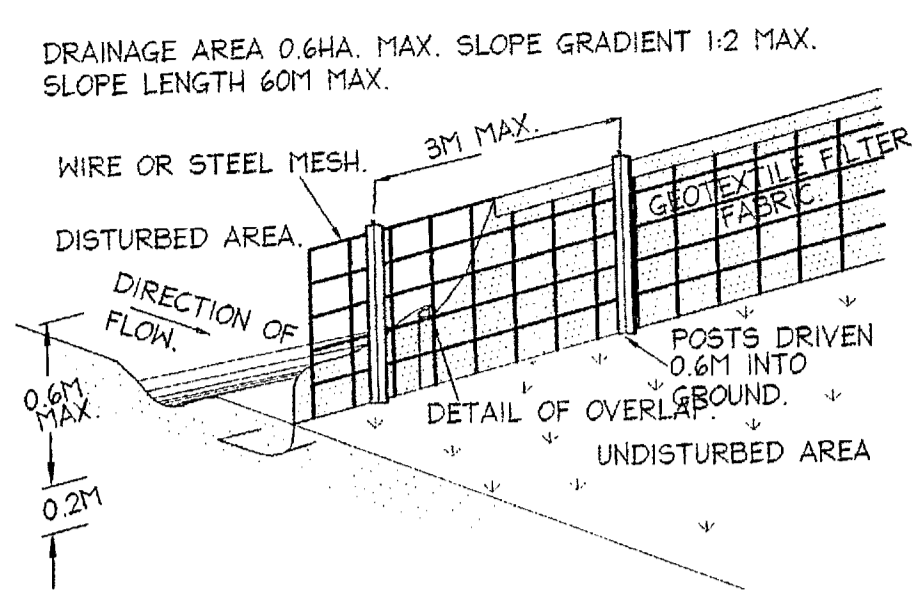
NB NORTHERN BEACHES Consulting Engineers P/L
 A.C.N. 078 121 616 A.B.N. 24 076 121 616
 Suite 207, 30 FISHER ROAD
 DEE WAY NSW 2099
 Ph: (02) 9884 7000 Fax: (02) 9884 7444
 e-mail: nb@nbconsulting.com.au

Project: **PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development**

Drawing Title: **SEDIMENT AND EROSION CONTROL PLAN**
 The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.

Date:	Design:	Drawn:	Checked:
Nov. 2003	R.G.W.	Paul R Bruce (MIEAust., NPD Aust.)	
Job No:	Drawing No:	Rev:	
030963	C12	C	

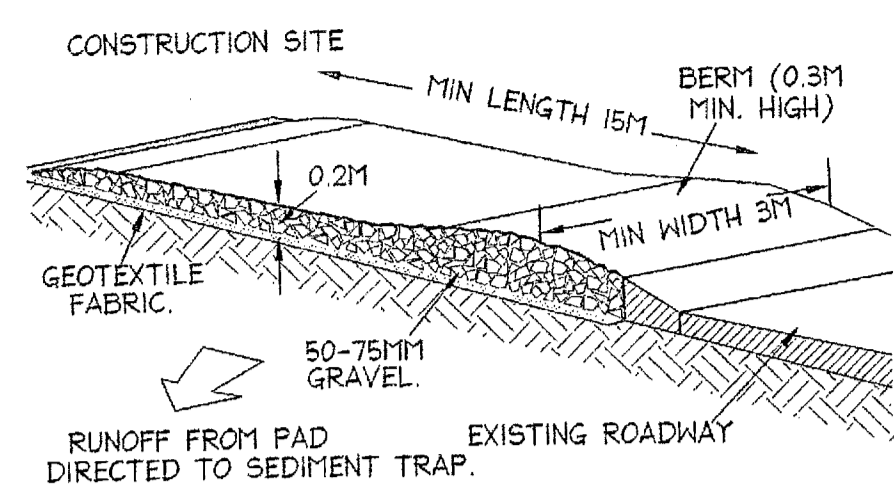
C12



SEDIMENT FENCE

CONSTRUCTION NOTES:

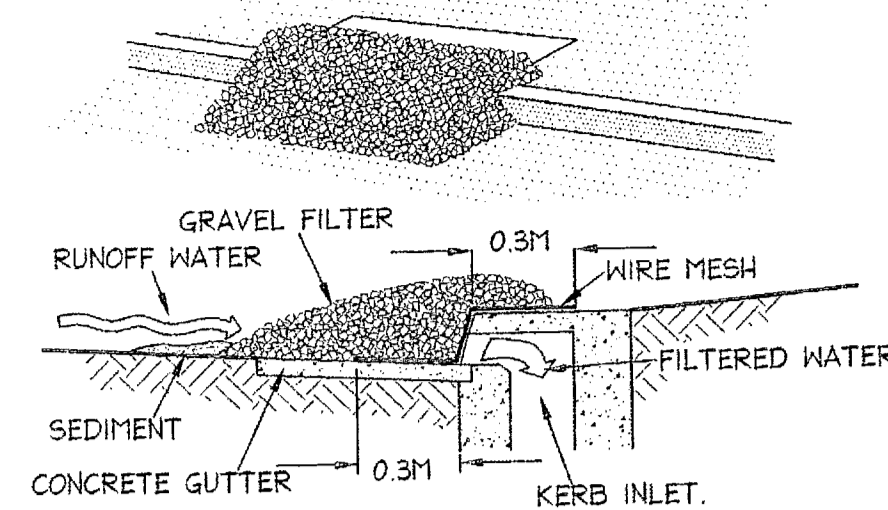
1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE.
2. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND, 3 METRES APART.
3. DIG A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. BACKFILL TRENCH OVER BASE OF FABRIC.
5. FIX SELF-SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
6. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.



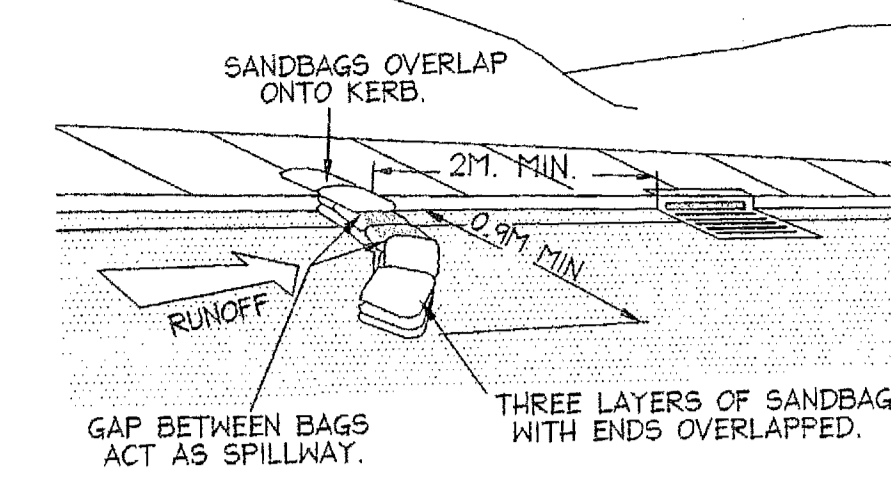
TYPICAL TEMPORARY CONSTRUCTION ENTRY/EXIT DETAIL

CONSTRUCTION NOTES:

1. STRIP TOPSOIL AND LEVEL SITE.
2. COMPACT SUBGRADE.
3. COVER AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
4. CONSTRUCT 200mm THICK PAD OVER GEOTEXTILE USING ROADBASE OR 30mm AGGREGATE. MINIMUM LENGTH IS METRES OR TO BUILDING ALIGNMENT. MINIMUM WIDTH 3 METRES.
5. CONSTRUCT HUMP IMMEDIATELY WITHIN BOUNDARY TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP.



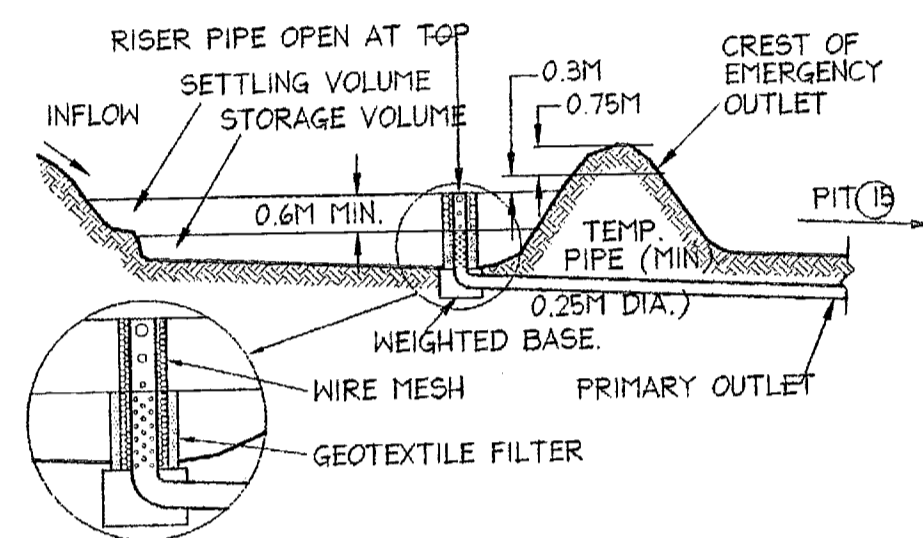
GRAVEL KERB INLET SEDIMENT TRAP



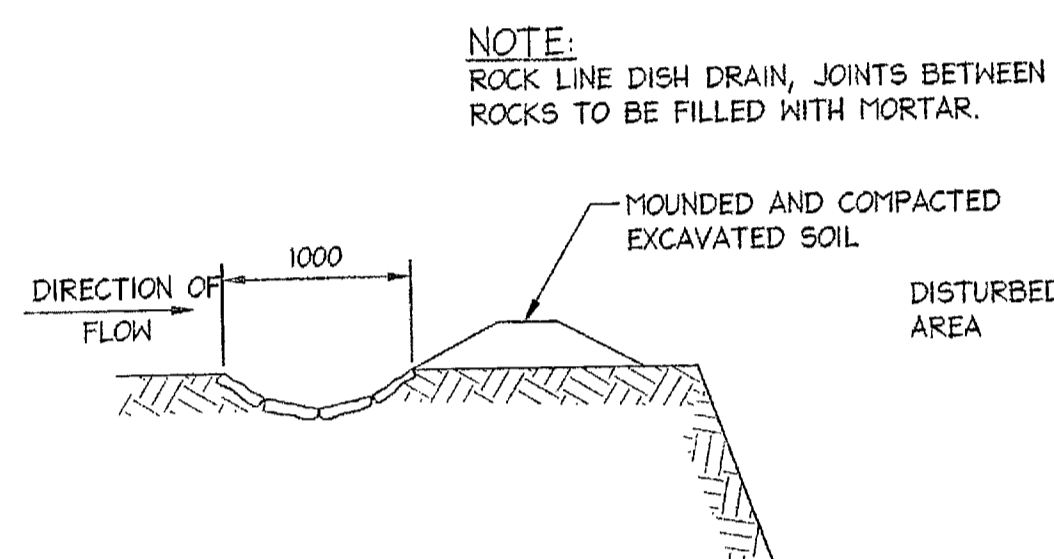
SANDBAG KERB INLET SEDIMENT TRAP

NOTES:

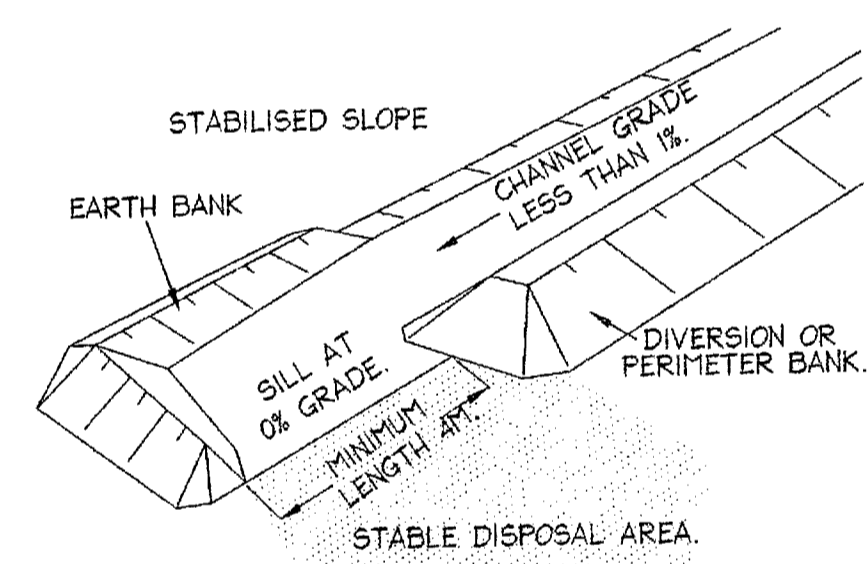
1. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WITH WORK.
2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: 501.



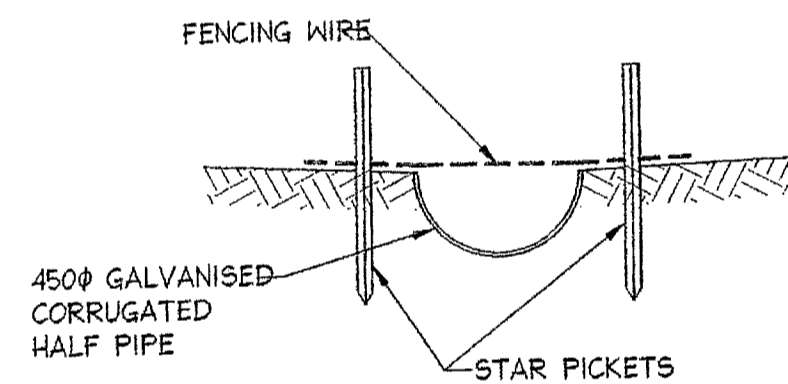
TYPICAL TEMPORARY SEDIMENT BASIN
DENOTED TSBI ON DWG. C12



CATCH DRAIN - ROCK LINED
DENOTED CD1, CD2 & CD3 ON DWG. C12



TYPICAL SPREADER DETAIL



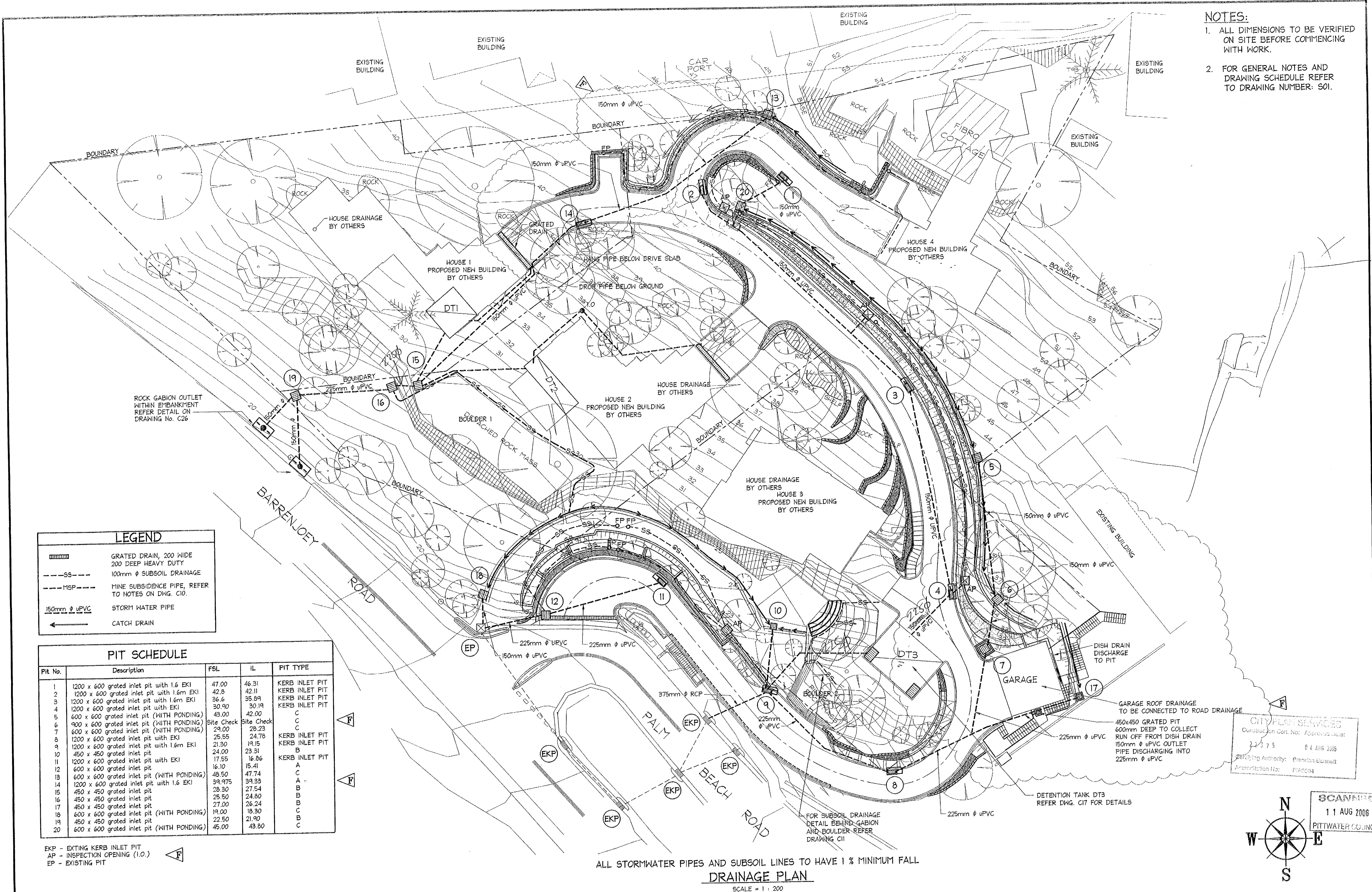
TEMPORARY DISH DRAIN
DENOTED TDD1, TDD2, TDD3 & TDD4 ON DWG. C12

SCANNED
11 AUG 2006
PITTSWATER COUNCIL

CITY PLAN SERVICES
General/Urban Cont. Plan Approval Date:
22.3.05 04 AUG 2005
Certifying Authority: Barbara Stewart
Approval/Plan No: P10004

AI	Date:	Rev:	Amendment:	DOCUMENT CERTIFICATION I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust, NPER. Institute of Engineers Membership No. 809498 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards. Date: 10/04/04 Rick G. Wray (Director Northern Beaches Consulting Engineers)	NORTHERN BEACHES Consulting Engineers P/L. A.C.N. 076 121 616 A.B.N. 24 076 121 616 Suite 207, 30 FISHER ROAD DEE WAY N.S.W. 2099 Ph: (02) 9984 7000 Fax: (02) 9984 7444 e-mail: nb@nbconsulting.com.au	Project: PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development	Drawing Title: SEDIMENT AND EROSION CONTROL DETAILS <small>The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.</small>	Date:	Design:	Drawn:	Checked:
								Nov. 2003	R.G.W.	Paul R Bruce CIVIL/ENGR, MIEAust, NPER	
								Job No:	Drawing No:	Rev:	
								030963	C13	-	

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



LEGEND

	GRATED DRAIN, 200 WIDE 200 DEEP HEAVY DUTY
	100mm ϕ SUBSOIL DRAINAGE
	MINE SUBSIDENCE PIPE, REFER TO NOTES ON DWG. C10.
	150mm ϕ uPVC STORM WATER PIPE
	CATCH DRAIN

PIT SCHEDULE

Pit No.	Description	FSL	IL	PIT TYPE
1	1200 x 600 grated inlet pit with 1.6 EKI	47.00	46.31	KERB INLET PIT
2	1200 x 600 grated inlet pit with 1.6m EKI	42.8	42.11	KERB INLET PIT
3	1200 x 600 grated inlet pit with 1.6m EKI	36.6	35.89	KERB INLET PIT
4	1200 x 600 grated inlet pit with EKI	30.90	30.19	KERB INLET PIT
5	600 x 600 grated inlet pit (WITH PONDING)	43.00	42.00	C
6	900 x 600 grated inlet pit (WITH PONDING)	Site Check	Site Check	C
7	600 x 600 grated inlet pit (WITH PONDING)	29.00	28.23	C
8	1200 x 600 grated inlet pit with EKI	25.55	24.78	KERB INLET PIT
9	1200 x 600 grated inlet pit with 1.6m EKI	21.30	19.15	KERB INLET PIT
10	450 x 450 grated inlet pit	24.00	23.31	B
11	1200 x 600 grated inlet pit with EKI	17.55	16.86	KERB INLET PIT
12	600 x 600 grated inlet pit	16.10	15.41	A
13	600 x 600 grated inlet pit (WITH PONDING)	48.50	47.74	C
14	1200 x 600 grated inlet pit with 1.6 EKI	39.975	39.33	A
15	450 x 450 grated inlet pit	28.30	27.54	B
16	450 x 450 grated inlet pit	25.50	24.80	B
17	450 x 450 grated inlet pit	27.00	26.24	B
18	600 x 600 grated inlet pit (WITH PONDING)	19.00	18.30	C
19	450 x 450 grated inlet pit	22.50	21.90	B
20	600 x 600 grated inlet pit (WITH PONDING)	45.00	43.80	C

EKP - EXISTING KERB INLET PIT
 AP - INSPECTION OPENING (I.O.)
 EP - EXISTING PIT

NOTE:
 1. FINISHED SURFACE LEVELS OF PITS TO BE CONFIRMED ON SITE

ALL STORMWATER PIPES AND SUBSOIL LINES TO HAVE 1% MINIMUM FALL
DRAINAGE PLAN
 SCALE = 1 : 200

CITY PLAN SERVICES
 Construction Dept. No: 2006020001
 23 7 5 0 4 016 2006
 Drafting Authority: Brendon Stewart
 Registration No: P140034

SCANPIT
 11 AUG 2006
 PITTWATER COUNCIL

Date	Rev	Amendment
06.01.2005	F	PLAN ALTERED
11.11.2004	E	PLAN ALTERED
21.10.2004	D	CHANGES TO PIT SCHEDULE PLAN ALTERED CHAINAGES DELETED
23.09.2004	C	CHANGES TO PIT SCHEDULE
09.09.2004	B	CHANGES DURING CONSTRUCTION

DOCUMENT CERTIFICATION

Date: 11/08/06
 Rick G. Wray
 (Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
 I hold the following qualifications:
 BE(Civil), CP(Eng), MIEAust., NPER.
 Institute of Engineers Membership No. 803938
 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.

NORTHERN BEACHES
 Consulting Engineers P/L

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 Suite 207, 30 FISHER ROAD
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 e-mail: nb@nbconsulting.com.au

Project: **PROPOSED ACCESS ROAD**
 at: 1148-1152 Barrenjoey Road
 and 56 Palm Beach Road
 Palm Beach
 for: Raypond Development

Drawing Title: **DRAINAGE PLAN**

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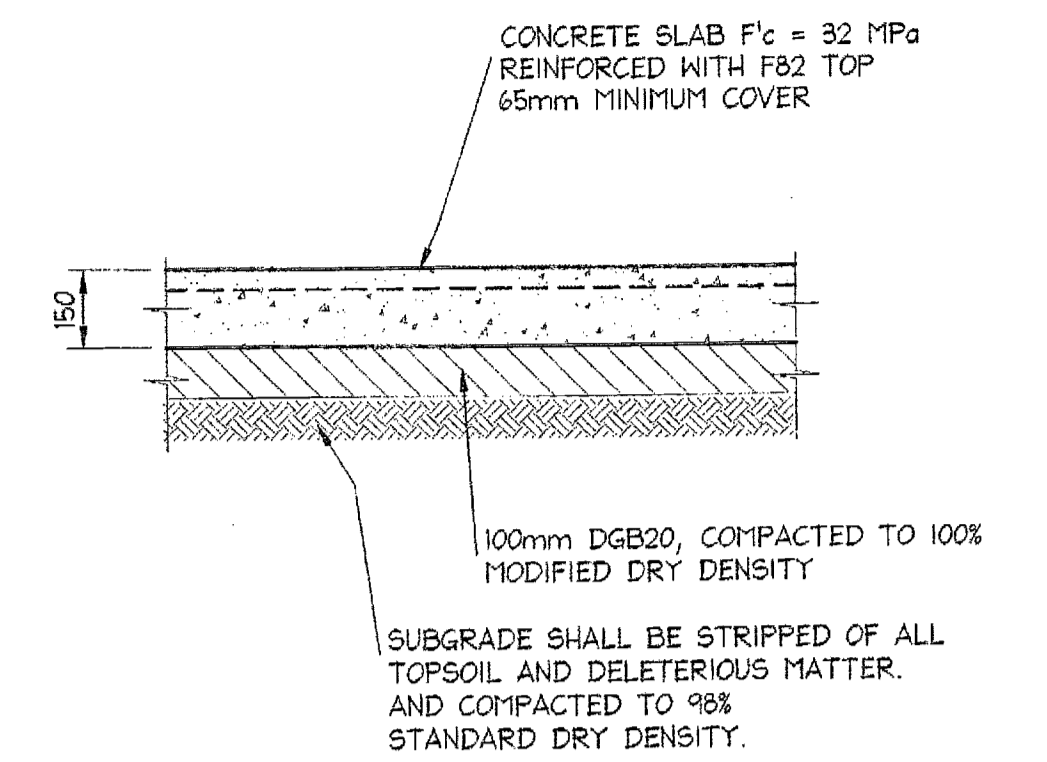
Date	Design	Drawn	Checked
Nov. 2003	R.G.W.	Paul R Bruce CP(Eng), MIEAust.	
Job No:	030963	Drawing No:	Rev:
		C14	F

CONCRETE PAVEMENT NOTES:

1. CLEAR ORGANIC MATERIAL AND TOPSOIL UNDER PROPOSED PAVEMENT.
2. IMPORTED SUB BASE MATERIAL TO UNDER SIDE OF CONCRETE PAVEMENTS SHALL BE D.G.B. 20, CONFORMING TO M.R. FORM No. 744 AND SHALL BE COMPACTED TO A DENSITY OF (MIN.) 100 % STANDARD MAXIMUM DRY DENSITY.
3. DURING CLEARING FOR PAVEMENT CUT OUT SOFT SPOTS AND FILL WITH APPROVED GRANULAR MATERIAL COMPACTED TO 98 % MODIFIED DRY DENSITY.
4. CONCRETE PAVEMENTS SHALL BE PLACED USING VIBRATORS AND SHALL BE CURED BY KEEPING WET USING WATER AND COVERED WITH PLASTIC OR HESSIAN OR APPROVED CURING COMPOUND FOR A MINIMUM OF SEVEN DAYS.
5. ALL LANDSCAPED AREAS SHALL BE COMPLETED IN ACCORDANCE WITH THE SITE LANDSCAPE PLANS.
6. ALL REINFORCEMENT SHALL BE PLACED ACCURATELY IN POSITION AND SECURELY FASTENED IN PLACE TO PREVENT DISPLACEMENT DURING THE PLACING OF THE CONCRETE. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PROTECTIVE COVER TO REINFORCEMENT SPECIFIED ON THE DRAWINGS IS OBTAINED.
7. ALL REINFORCEMENT SHALL BE SUPPORTED ON PLASTIC TIPPED WIRE CHAIRS, OR APPROVED PLASTIC CHAIRS AT 800mm MAXIMUM CENTRES BOTH WAYS. CHAIRS SHALL HAVE SUITABLE BEARING PLATES ARRANGED AND SECURED TO PREVENT SINKING INTO THE MATERIAL OR MEMBRANE BELOW.
8. CONCRETE SURFACES GENERALLY SHALL BE IN ACCORDANCE WITH ARCHITECTURAL SPECIFICATIONS.

NOTES:

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



TYPICAL PAVEMENT PREPARATION SLAB ON GRADE

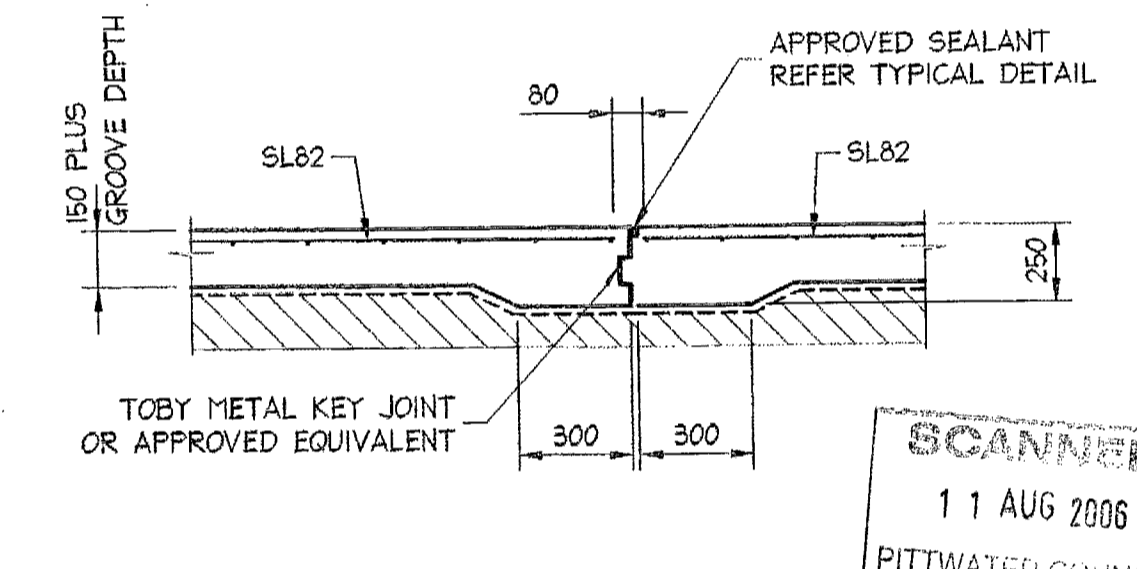
N.T.S.

NOTES:

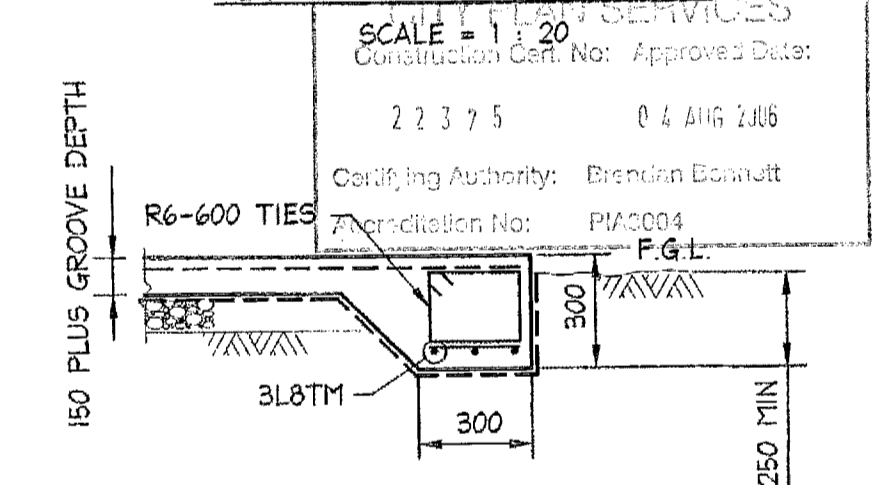
1. THE TIME OF SAWING SHALL BE VARIED, DEPENDING ON WEATHER CONDITIONS, AND SHALL BE SUCH TO PREVENT UNCONTROLLED CRACKING OF THE PAVEMENT.
2. SAWING OF THE JOINTS SHALL COMMENCE AS EARLY AS POSSIBLE AND TO BE COMMENSURATE WITH THE CONCRETE HAVING HARDENED SUFFICIENTLY TO PERMIT CUTTING WITHOUT EXCESSIVE CHIPPING, SPALLING OR TEARING.
3. ADEQUATE PROVISION SHALL BE MADE TO PERMIT SAWING OVERNIGHT IF REQUIRED.
4. THE APPROPRIATE TIME FOR SAWING IS BEST ASSESSED BY CASTING TEST PANELS ADJACENT TO THE WORKS AND CONDUCTING SAWING TRIALS.
5. AS A GENERAL GUIDE, THE JOINTS SHOULD BE SAWN WITHIN THE FOLLOWING PERIODS:

DAILY MAXIMUM TEMP (°C)	LATEST TIME FOR SAWING (HOURS)
<10	36
10-20	34
20-30	24
>30	12

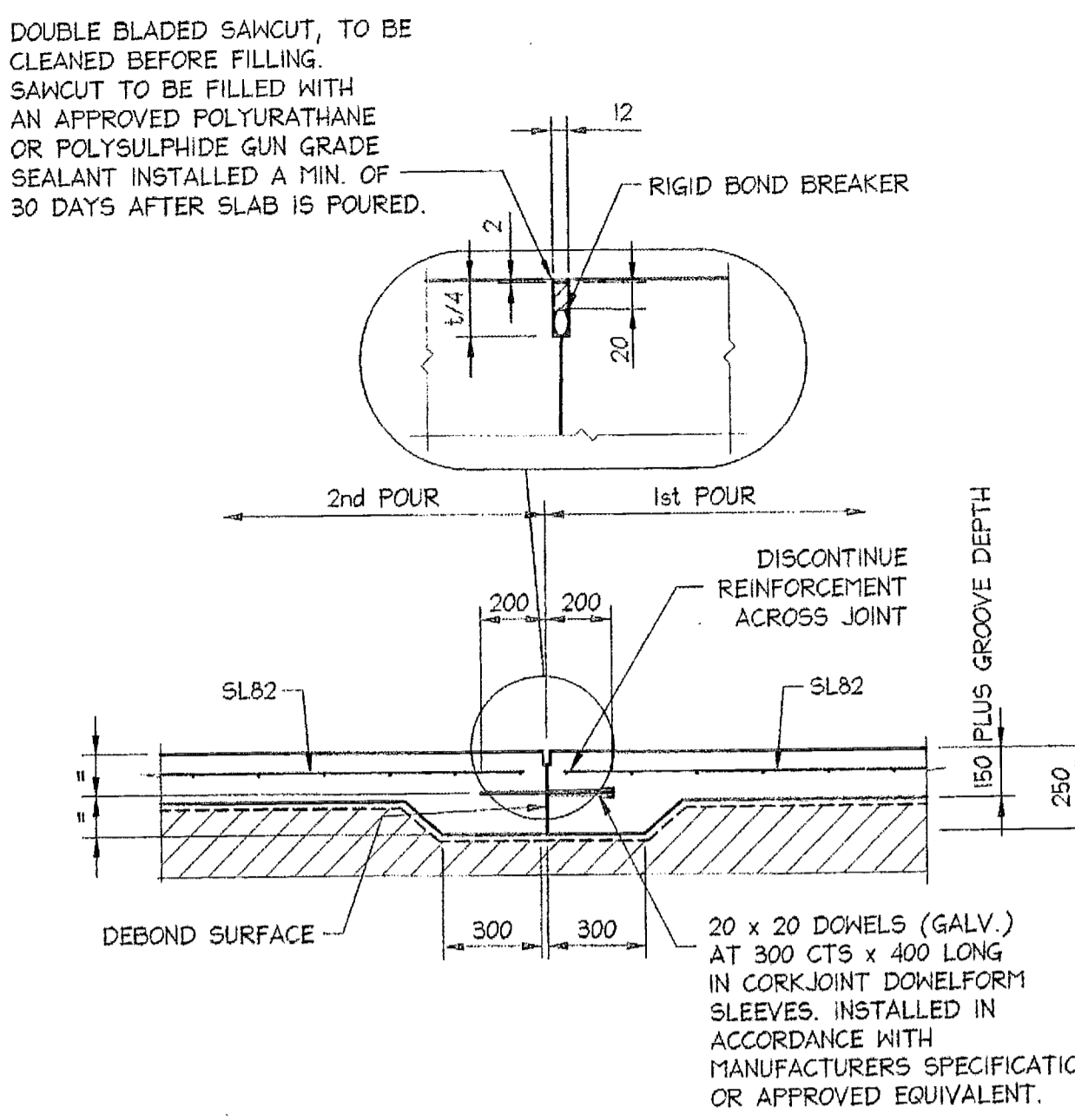
6. THE JOINTS SHALL BE SAWN IN THE SEQUENCE OF THE CONCRETE PLACEMENT



KEYED JOINT DETAIL DENOTED 'K.J.' ON PLAN

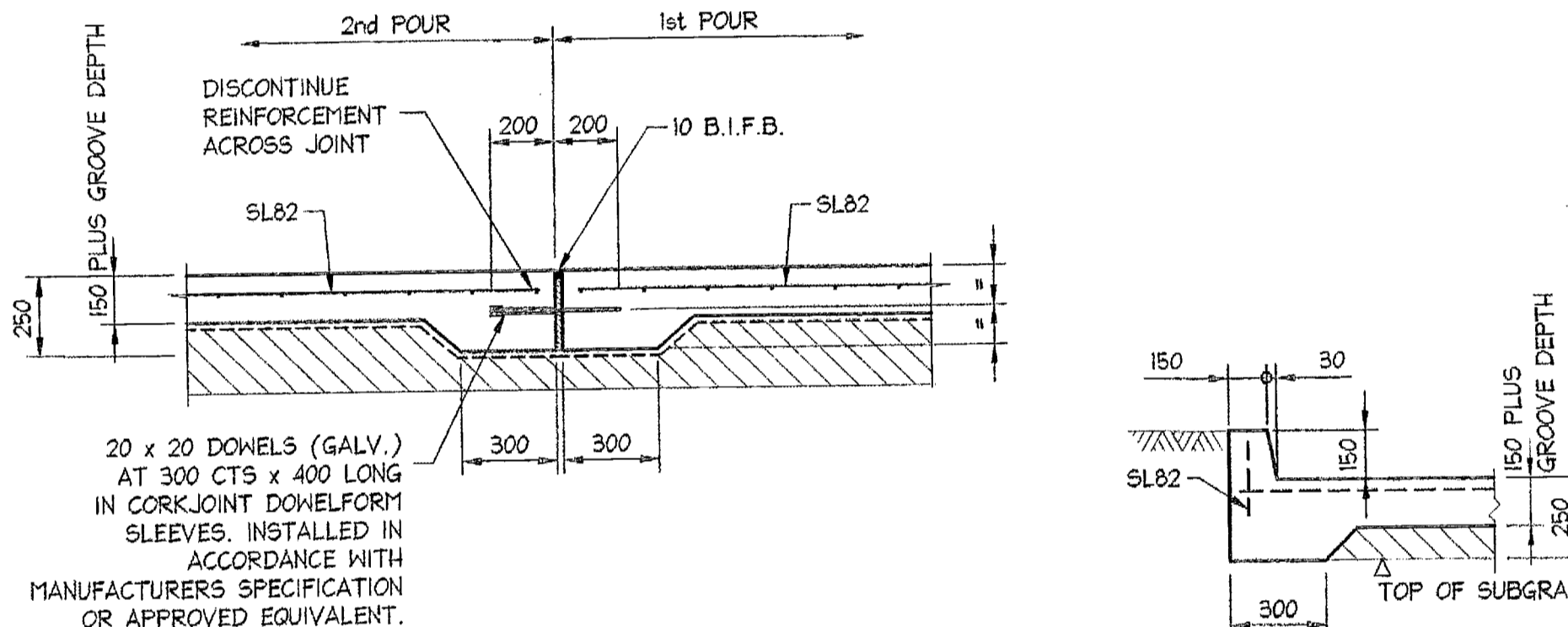


TYPICAL EDGE THICKENING DETAIL DENOTED 'ET' ON PLAN



TYPICAL DOWELLED JOINT DETAIL DENOTED 'D.J.' ON PLAN

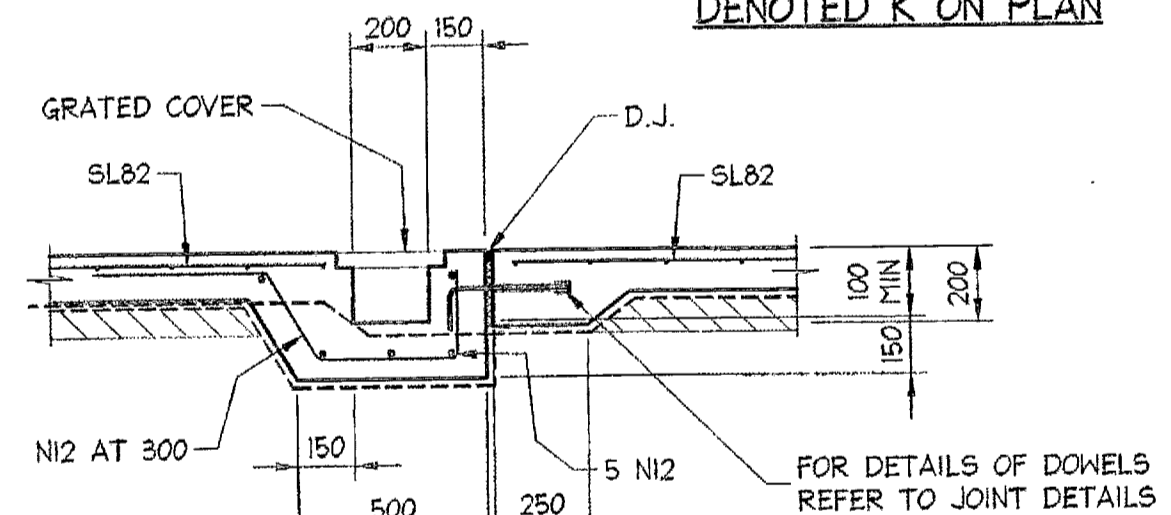
- NOTES:**
1. DOWELS SHALL BE ONE-PIECE BARS COMPLYING WITH AS 1902. THE ENDS SHALL BE CUT SQUARE AND FREE FROM BURRS. HOT DIPPED GALVANISED TO AS 4791.
 2. DOWELS TO BE INSTALLED TO THE FOLLOWING TOLERANCES:
HORIZONTAL VERTICAL LOCATION - HALF THE DIAMETER OF THE DOWEL
 3. DOWELS IN LONGITUDINAL JOINTS SHALL BE OMITTED WHEN THE CENTRE OF THE DOWEL WOULD OCCUR WITHIN 200mm (HORIZONTALLY) OF A TRANSVERSE JOINT.



TYPICAL EXPANSION JOINT DETAIL DENOTED 'EJ' ON PLAN

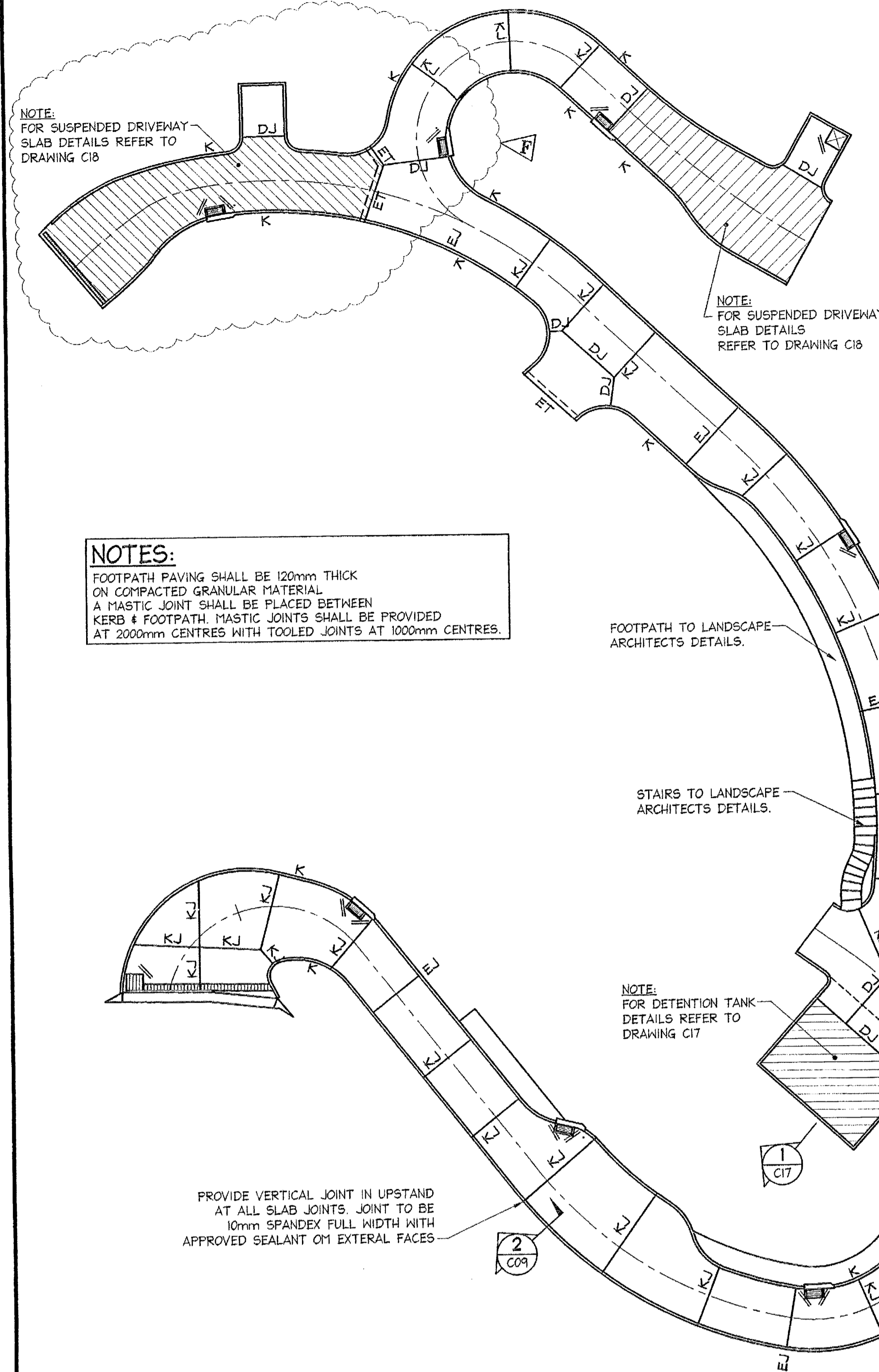
N.T.S.

KERB DETAIL DENOTED 'K' ON PLAN



TYPICAL DETAIL - GRATED DRAIN

SCALE = 1 : 20

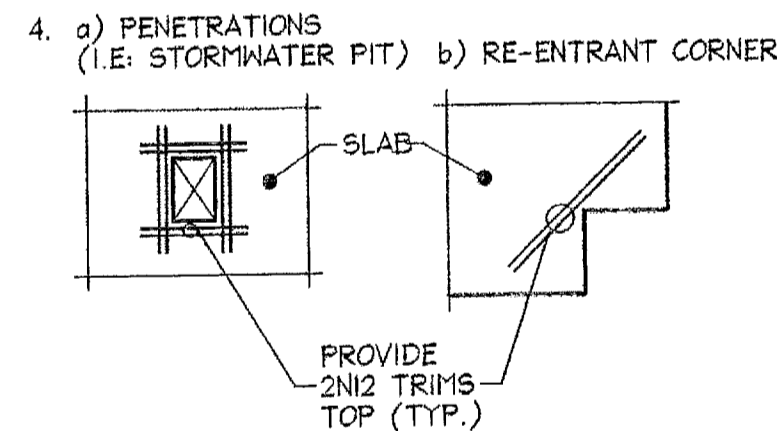


DRIVEWAY PLAN AND JOINT LAYOUT

SCALE = 1 : 200

SLAB ON GROUND NOTES

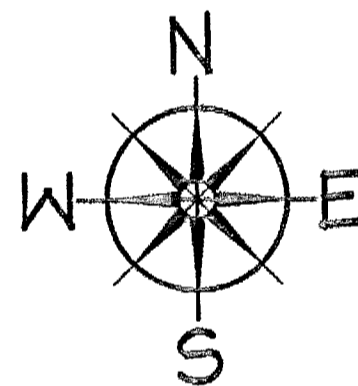
1. ALL DRIVEWAY SLABS ON GROUND TO 32 MPa CONCRETE
2. ALL DRIVEWAY SLABS ON GROUND TO BE 150 THICK PLUS GROOVE DEPTH REINFORCED WITH SL82, 65mm TOP COVER ON - 50 THICK SAND WHERE SUBGRADE IS ROCK. - 100 THICK GRANULAR SUBPAVEMENT WHERE SUBGRADE IS RESIDUAL SOIL. ALL REINFORCEMENT TO BE POSITIONED ON BAR CHAIRS WITH CORRECT COVER AND NOT TO BE WALKED IN
3. TYPICAL FABRIC LAP ;
4. ALL EXISTING FILL TO BE PROOF ROLLED.



5. ALL DRIVEWAY SLABS TO HAVE A TRANSVERSELY TYPED FINISH WITH AVERAGE GROOVE DEPTH OF 5mm. THE TRANSVERSE TYPED SHALL BE SKENEED UP TO 5' TO ALLOW ADEQUATE DRAINAGE TO KERB

SLAB ON GRADE
F_c at 28 Days = 32 MPa
COVER = 65mm Minimum

SUSPENDED SLABS
F_c at 28 Days = 40 MPa
COVER = 45mm Minimum



Date	Rev	Amendment
10.01.2005	F	PLAN ALTERED
29.10.2004	E	NOTE ADDED
21.10.2004	D	PLAN ALTERED
17.09.2004	C	PLAN ALTERED
29.07.2004	B	PLAN ALTERED TO SUIT CHANGES TO OSD TANK DT3

DOCUMENT CERTIFICATION

I am a qualified Structural/Civil Engineer. I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NPER, Institute of Engineers Membership No. 803938

I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.

Date: JAN 05' 2005
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

NORTHERN BEACHES Consulting Engineers P/L

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Ph: (02) 9994 7000 Fax: (02) 9994 7444
e-mail: nb@nbconsulting.com.au

Project: **PROPOSED ACCESS ROAD**
at: 1148-1152 Barrenjoey Road
and 56 Palm Beach Road
Palm Beach
for: Raypond Development

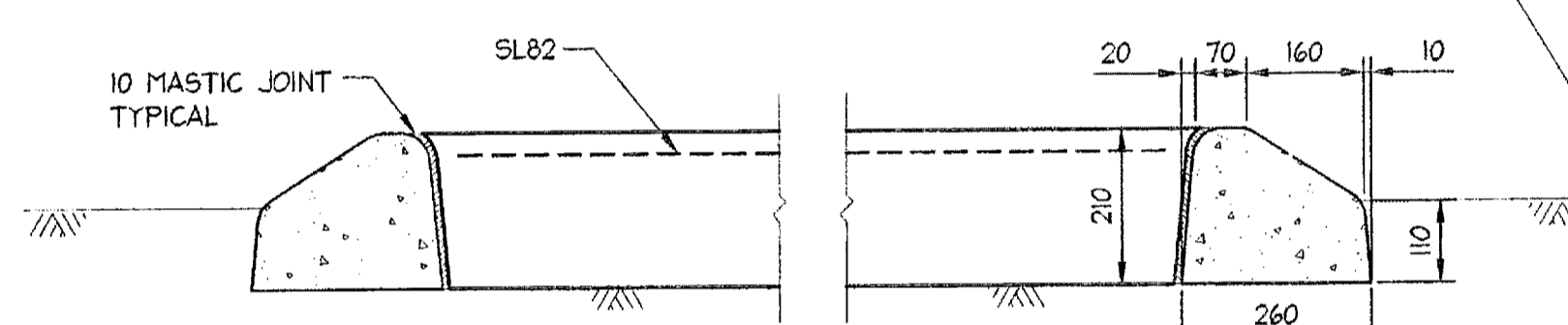
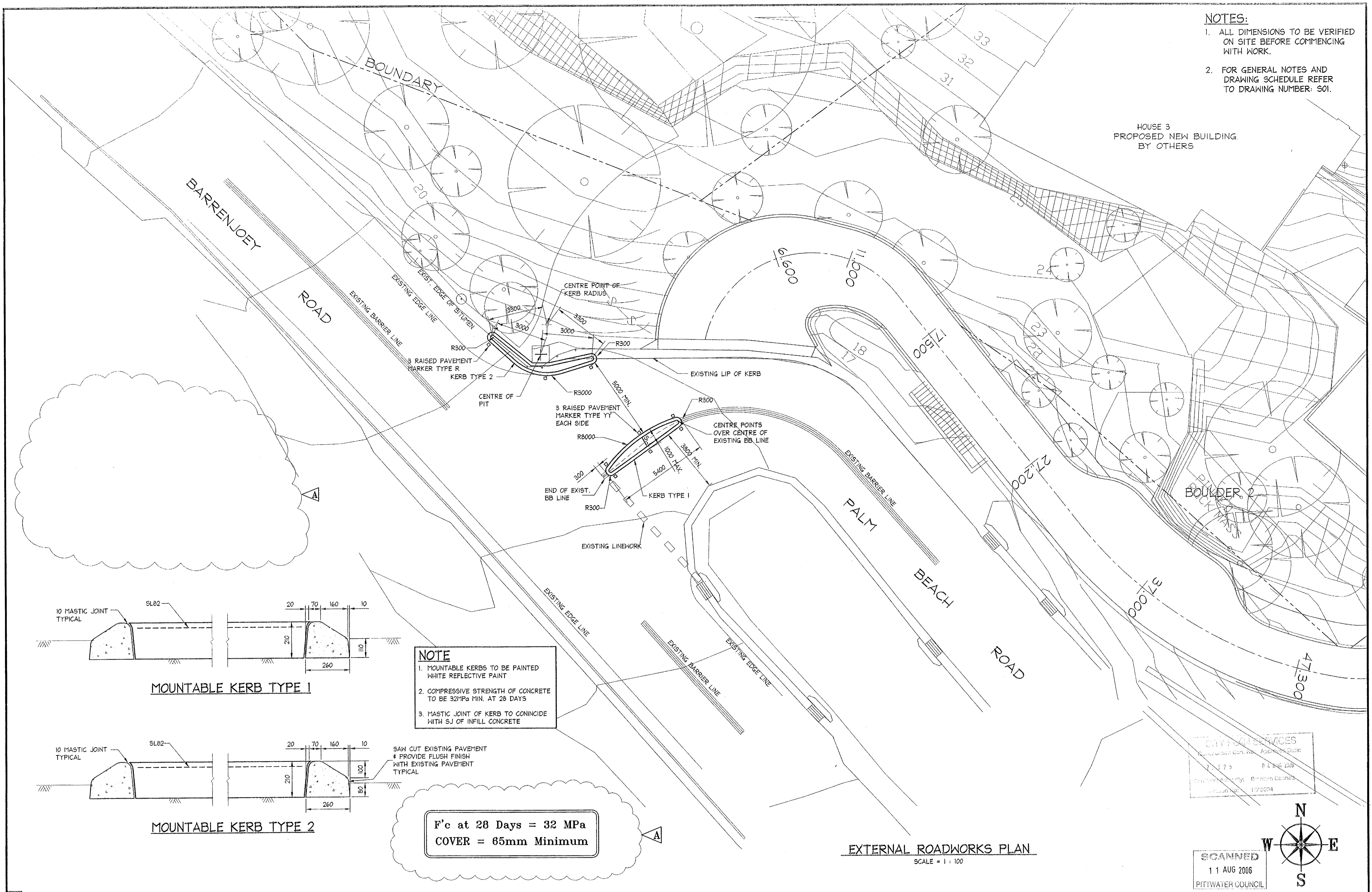
Drawing Title: **DRIVEWAY PLAN AND DETAILS**

Date: Nov. 2003
Design: R.G.W.
Drawn: Paul R Bruce
Checked: ORIEAust., MDDAust.

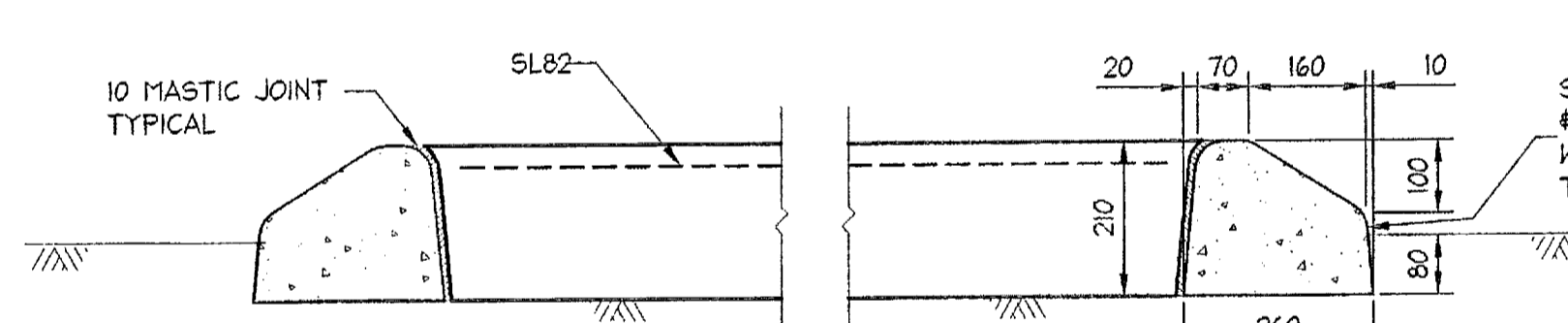
Job No: **030963**
Drawing No: **C15**
Rev: **F**

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

HOUSE 3
PROPOSED NEW BUILDING
BY OTHERS



MOUNTABLE KERB TYPE 1

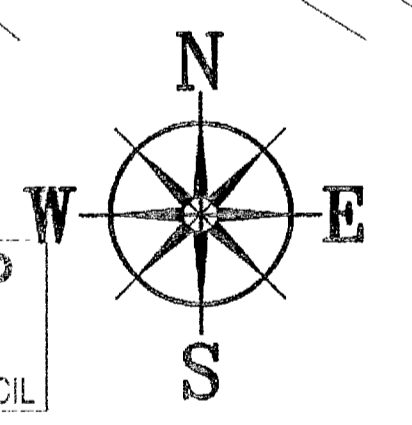


MOUNTABLE KERB TYPE 2

- NOTE**
1. MOUNTABLE KERBS TO BE PAINTED WHITE REFLECTIVE PAINT
 2. COMPRESSIVE STRENGTH OF CONCRETE TO BE 32MPa MIN. AT 28 DAYS
 3. MASTIC JOINT OF KERB TO COINCIDE WITH SJ OF INFILL CONCRETE

**F'c at 28 Days = 32 MPa
COVER = 65mm Minimum**

CITYLAND SERVICES
11775 RANGING DR
BIRMINGHAM
1522004



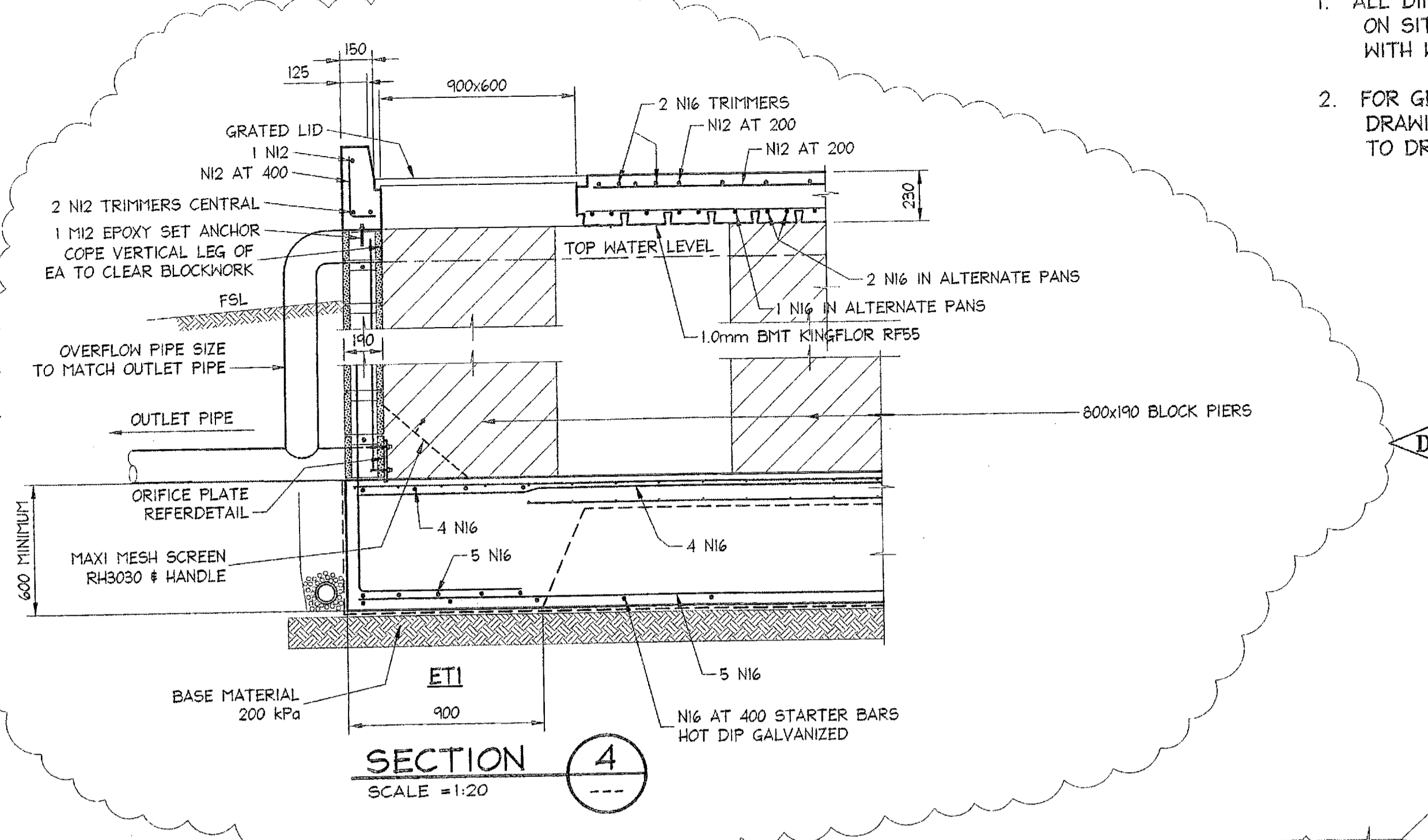
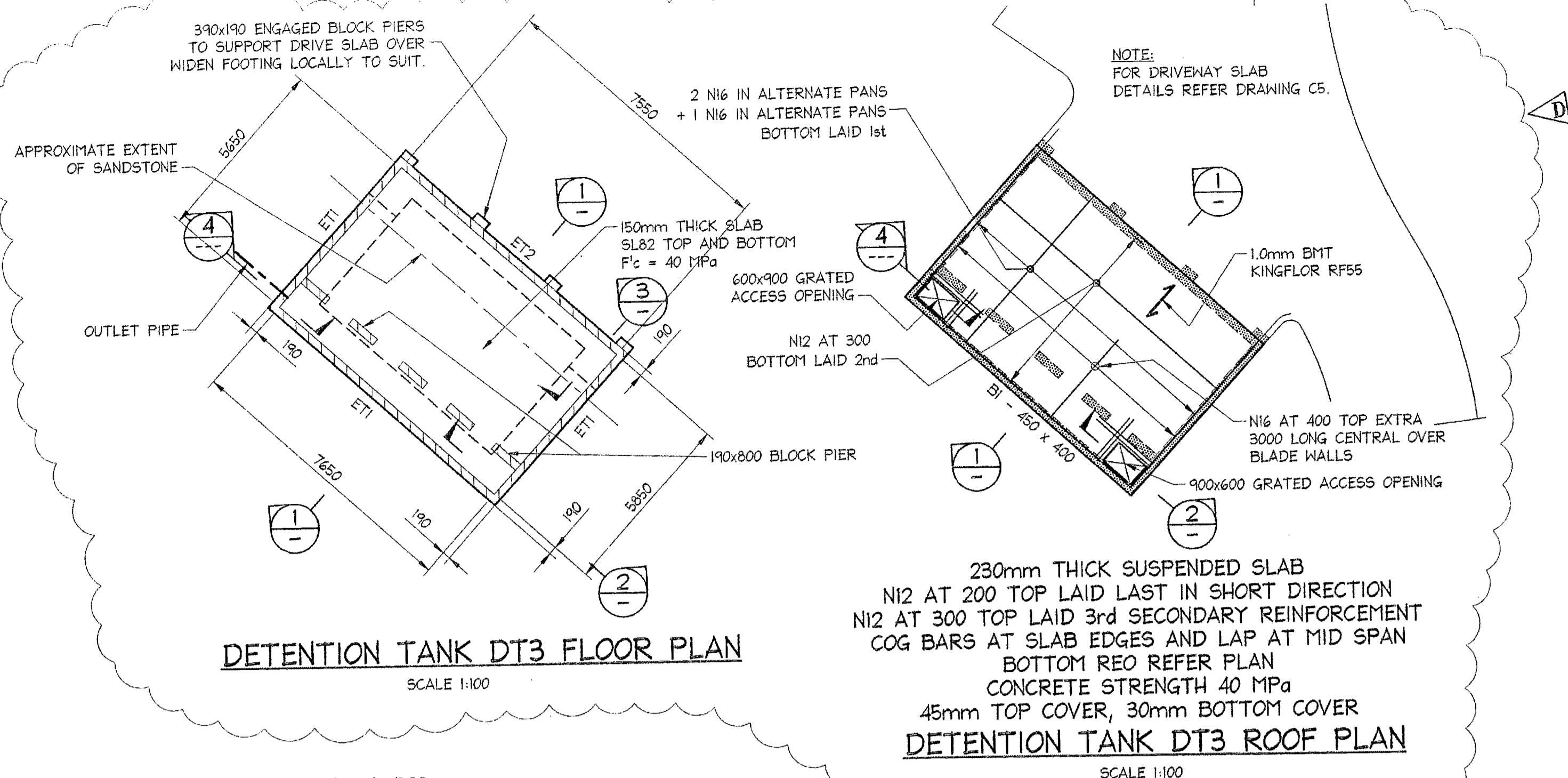
EXTERNAL ROADWORKS PLAN
SCALE = 1 : 100

SCANNED
11 AUG 2006
PITTSWATER COUNCIL

<p>DOCUMENT CERTIFICATION</p> <p>I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust., NPER, Institute of Engineers Membership No. 803938</p> <p>I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.</p> <p>Date: 10/04/04 Rick G. Wray (Director Northern Beaches Consulting Engineers)</p>		<p>NORTHERN BEACHES Consulting Engineers P/L</p> <p>A.C.N. 078 121 616 A.B.N. 24 078 121 616 Suite 207, 30 FISHER ROAD DSE WAY N.S.W. 2099 Ph: (02) 9984 7000 Fax: (02) 9984 7444 e-mail: nb@nbconsulting.com.au</p>	<p>Project: PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development</p>	<p>Drawing Title: EXTERNAL ROADWORKS PLAN AND DETAILS</p> <p>The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.</p>	<p>Date: Nov. 2003 Job No: 030963</p>	<p>Design: R.G.W.</p>	<p>Drawn: Paul R Bruce of MIEAust., NPEAust.</p>	<p>Checked: C16 A</p>
<p>24.05.2004 A DETAIL DELETED NOTE ADDED</p>	<p>Date: 11 AUG 2006</p>							

NOTES:

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

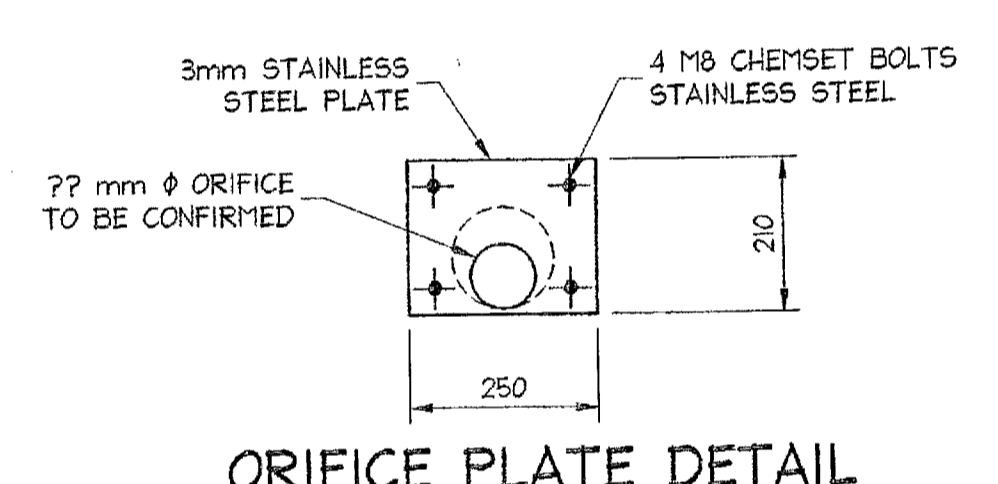
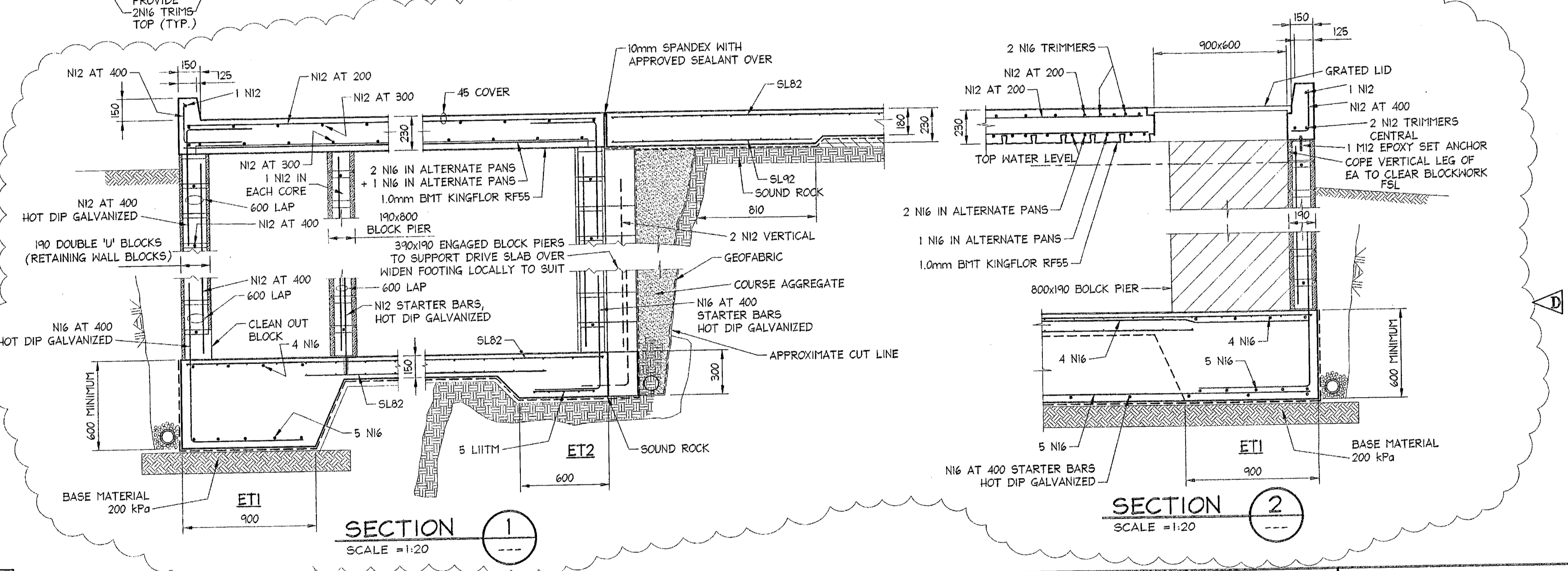
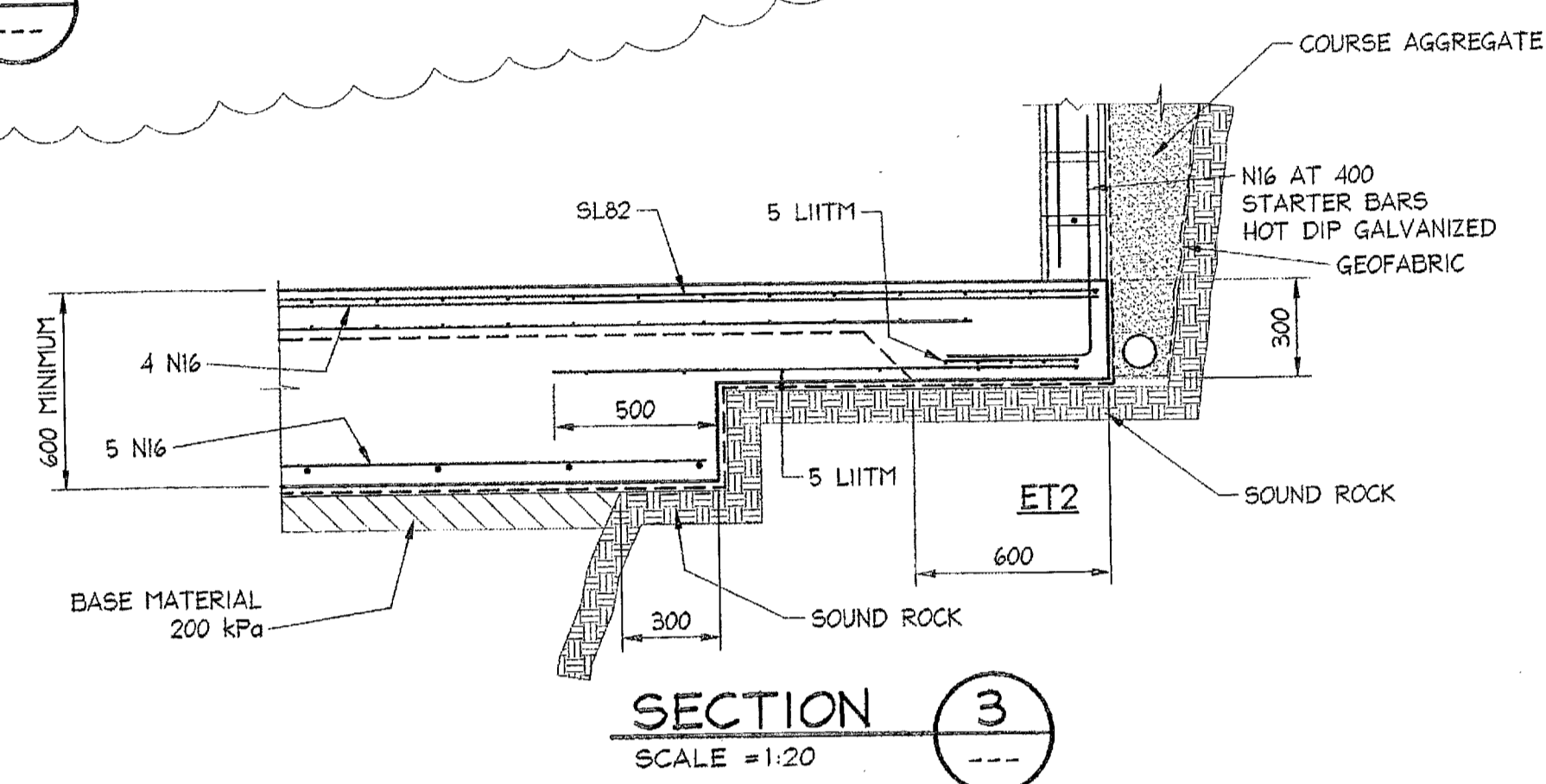


TANK BASE SLAB ON GROUND NOTES

1. ALL DRIVEWAY SLABS ON GROUND TO 32 MPa CONCRETE
2. ALL DRIVEWAY SLABS ON GROUND TO BE 180 THICK REINFORCED WITH SL82, 65mm TOP COVER ON - 50 THICK SAND WHERE SUBGRADE IS ROCK - 100 THICK GRANULAR SUBPAVEMENT WHERE SUBGRADE IS RESIDUAL SOIL
3. ALL REINFORCEMENT TO BE POSITIONED ON BAR CHAIRS WITH CORRECT COVER AND NOT TO BE WALKED IN
3. TYPICAL FABRIC LAP: 25 MIN
4. ALL SLABS TO BE POURED ON APPROVED VAPOUR BARRIER MEMBRANE (V.B.M.)
5. ALL EXISTING FILL TO BE PROOF ROLLED.
6. a) PENETRATIONS (I.E. STORMWATER PIT) b) RE-ENTRANT CORNER

SLAB NOTES

1. ALL SLABS TO BE 180 THICK U.O.
2. TYPICAL FABRIC LAP: 25 MIN
3. DEPTH OF SETDOWN TO BE MEASURED FROM TOP OF STRUCTURAL SLAB LEVEL.
4. PROVIDE SL72 TOP WHERE NO OTHER REINFORCEMENT SHOWN.
5. a) PENETRATIONS: PROVIDE 2N16 TRIMS TOP & BTM. (TYP.)



SCANNED
11 AUG 2006
PITTSWATER COUNCIL

ON-SITE SERVICES
Consulting Engineers Pty. Ltd. Approved 2005
21 775 011 216 785
Checking Authority: Brenton Davinett
Drawing No. 030963

Date	Rev	Amendment
21.10.2004	D	ALTERED DURING CONSTRUCTION
23.08.2004	C	ALTERED DURING CONSTRUCTION
29.07.2004	B	ALTERED DURING CONSTRUCTION TO SUIT GROUND CONDITIONS
10.06.2004	A	NOTES ALTERED

DOCUMENT CERTIFICATION

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Date: Nov 04
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

NORTHERN BEACHES Consulting Engineers P/L

A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 20 FISHER ROAD
DEE WAY N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

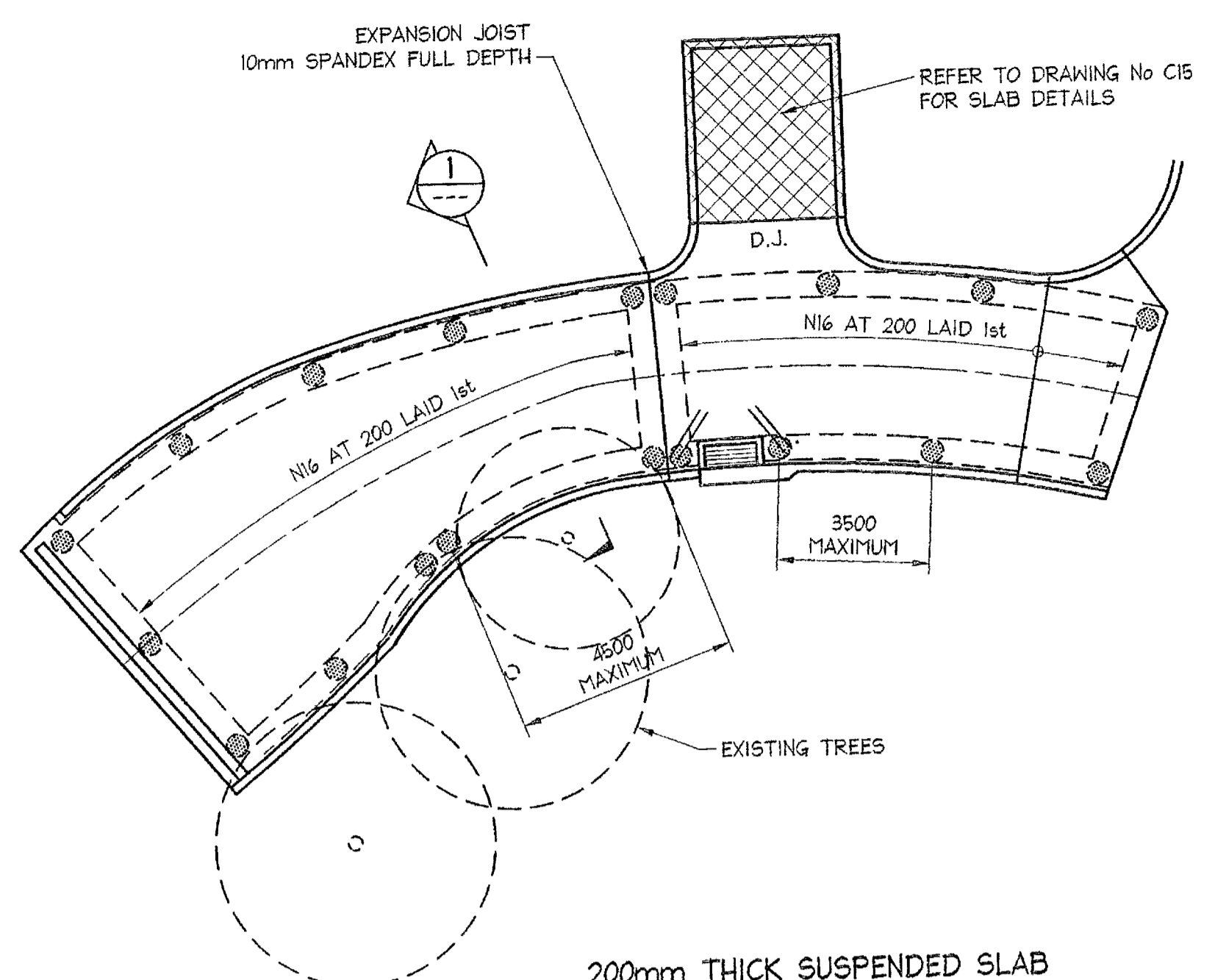
Project: **PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development**

Drawing Title: **ON-SITE DETENTION TANK DT3 PLAN AND DRAINAGE DETAILS**

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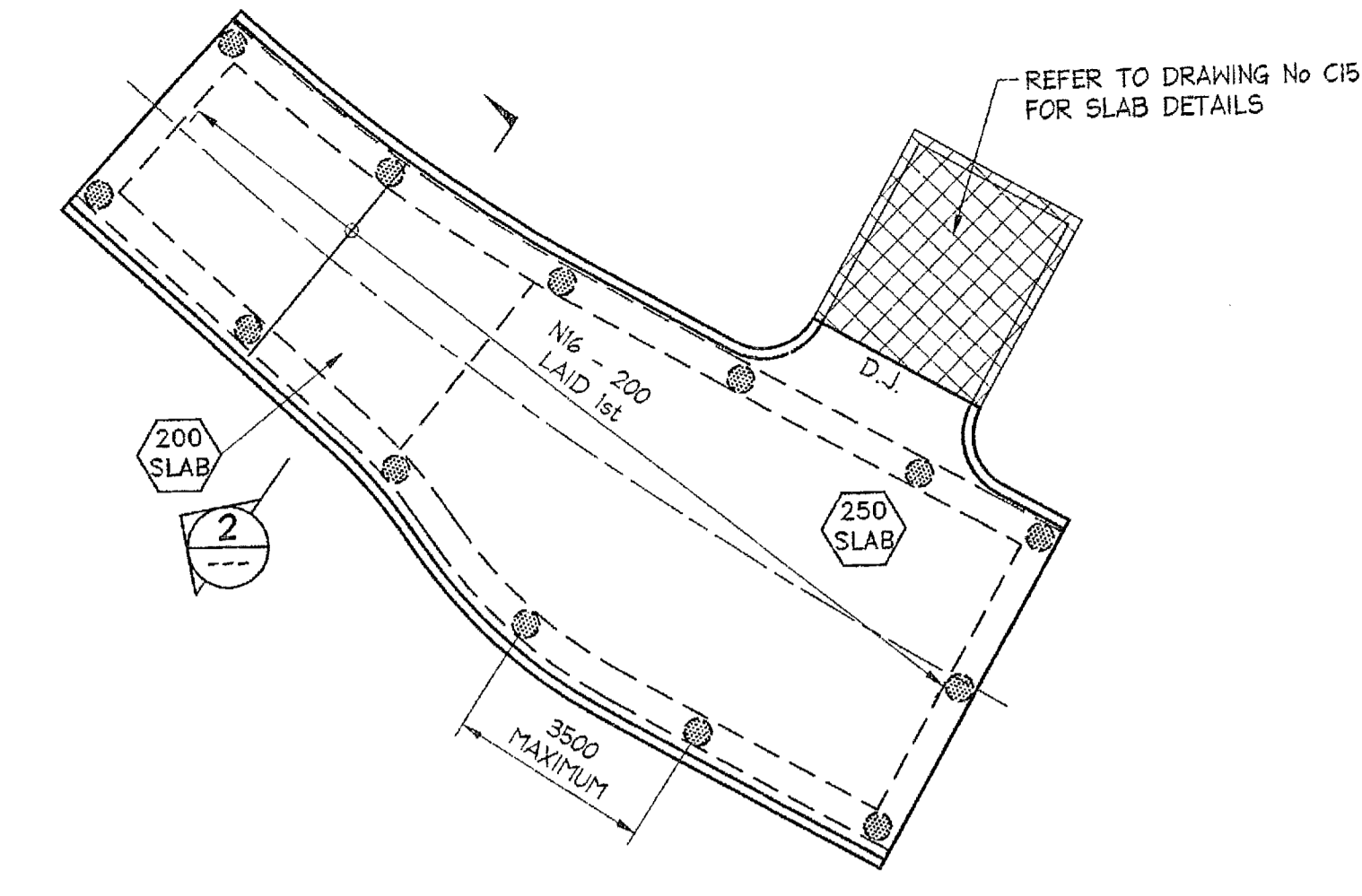
Date	Design	Drawn	Checked
Nov. 2003	R.G.W.	Paul R Bruce (MIEAust., MCEAust.)	
Job No:		Drawing No:	Rev:
		030963	C17 D

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



200mm THICK SUSPENDED SLAB
SL82 TOP, BOTTOM REO REFER PLAN
SECONDARY BOTTOM REINFORCEMENT TO BE N12 AT 200 LAID 2nd
CONCRETE STRENGTH 40 MPa
45mm TOP COVER, 45mm BOTTOM COVER

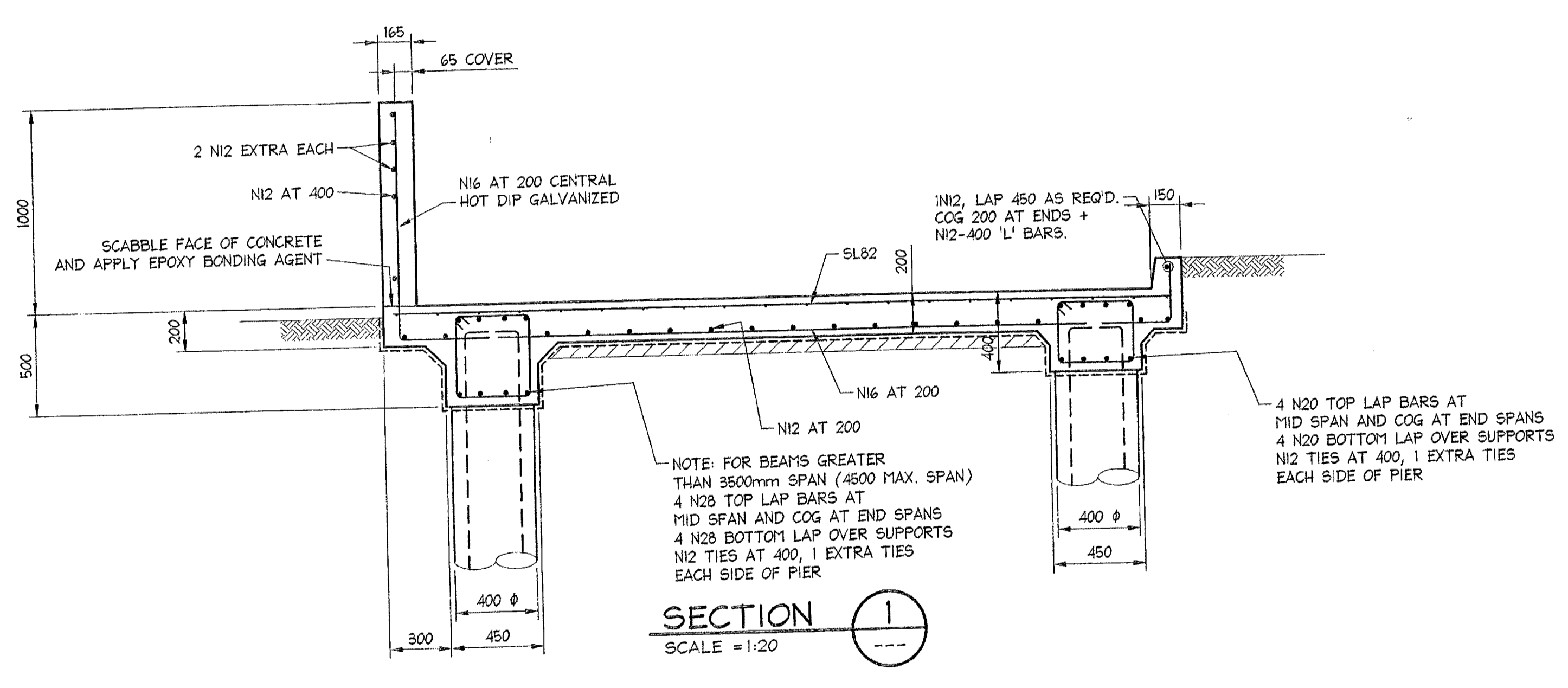
**SUSPENDED DRIVEWAY SLAB PLAN
TO HOUSE 1 - AND TOP AND
BOTTOM REINFORCEMENT**
SCALE 1:100



250mm THICK SUSPENDED SLAB UNO
SL82 TOP, BOTTOM REO REFER PLAN
SECONDARY BOTTOM REINFORCEMENT TO BE N12 AT 200 LAID 2nd
CONCRETE STRENGTH 40 MPa
45mm TOP COVER, 45mm BOTTOM COVER

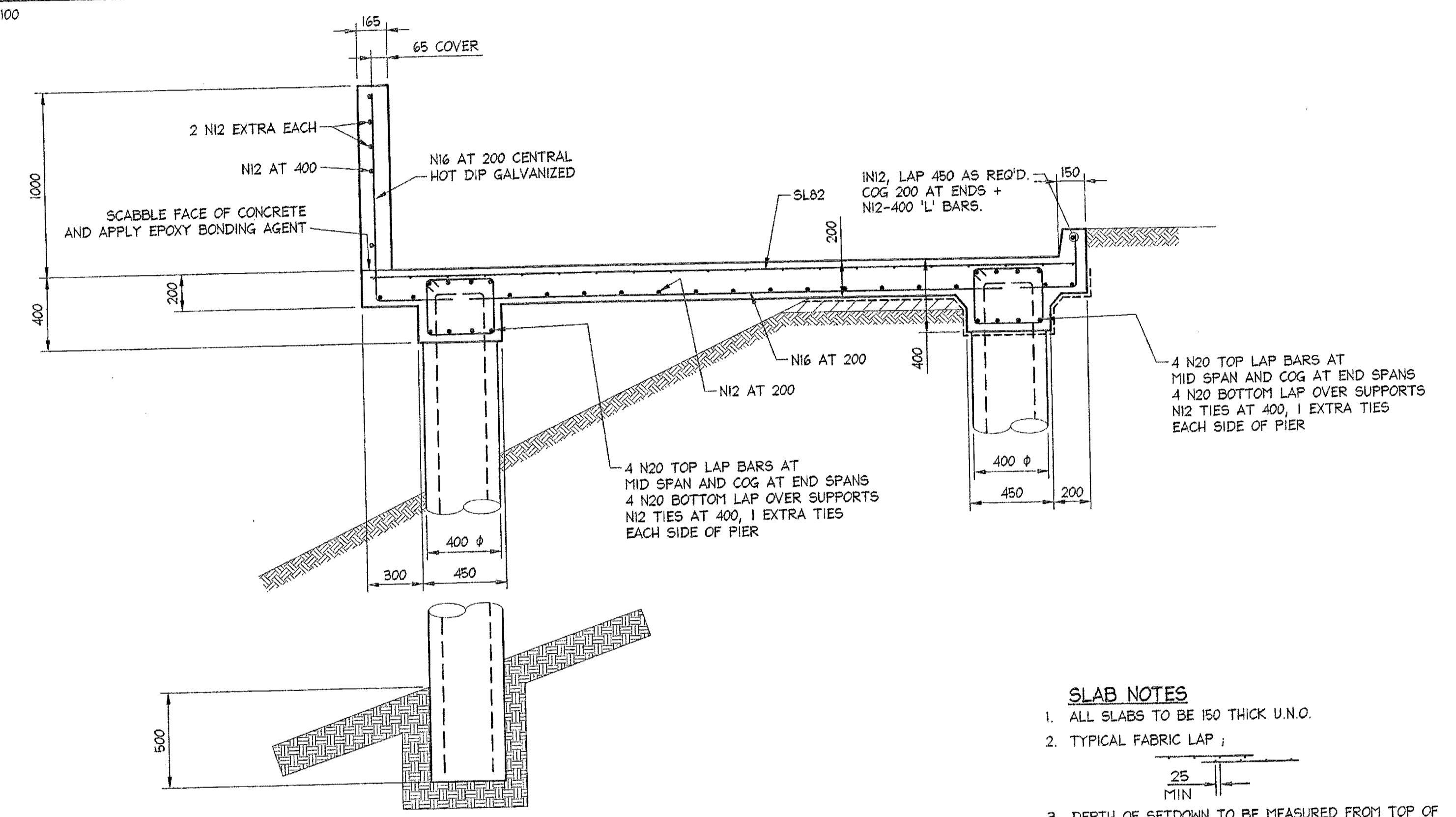
**SUSPENDED DRIVEWAY SLAB PLAN
TO HOUSE 4 - AND TOP AND
BOTTOM REINFORCEMENT**
SCALE 1:100

- TANK BASE SLAB ON GROUND NOTES**
1. ALL DRIVEWAY SLABS ON GROUND TO 32 MPa CONCRETE
 2. ALL DRIVEWAY SLABS ON GROUND TO BE 140 THICK REINFORCED WITH SL82, 65mm TOP COVER ON:-
- 50 THICK SAND WHERE SUBGRADE IS ROCK
- 100 THICK GRANULAR SUBPAVEMENT WHERE SUBGRADE IS RESIDUAL SOIL.
ALL REINFORCEMENT TO BE POSITIONED ON BAR CHAIRS WITH CORRECT COVER AND NOT TO BE WALKED IN
 3. TYPICAL FABRIC LAP:
 4. ALL SLABS TO BE POURED ON APPROVED VAPOUR BARRIER MEMBRANE (V.B.M.)
 5. ALL EXISTING FILL TO BE PROOF ROLLED.
 6. a) PENETRATIONS (I.E. STORAGE WATER PIT) b) RE-ENTRANT CORNER



SECTION 1
SCALE = 1:20

TYPICAL PIER SECTION
SCALE = 1:20



SECTION 2
SCALE = 1:20

- NOTE:**
1. SOCKET PIERS 500mm INTO VERY LOW TO LOW STRENGTH ROCK WITH ALLOWABLE BEARING PRESSURE OF 1000 kPa.
 2. GEOTECHNICAL ENGINEER TO APPROVE STABILITY OF SOILS AND DETAIL EXPECTED LATERAL LOADS TO CONCRETE PIERS FOR RE-DESIGN.

SLAB NOTES

1. ALL SLABS TO BE 150 THICK U.N.O.
2. TYPICAL FABRIC LAP:
3. DEPTH OF SETDOWN TO BE MEASURED FROM TOP OF STRUCTURAL SLAB LEVEL.
4. PROVIDE SL82 TOP WHERE NO OTHER REINFORCEMENT SHOWN.
5. a) PENETRATIONS

SCANNED
11 AUG 2008
PITWATER COUNCIL

CONSTRUCTION CODE NO: APPROVAL DATE:
22275 04 AUG 2008

Qualifying Authority: Dimensional Control
Approval No: P10004

Date	Rev.	Amendment
10.01.2005	E	PLAN CLARIFIED
11.11.2004	D	DETAILS ALTERED
21.10.2004	C	DETAILS AND PLAN ALTERED
10.06.2004	B	DETAILS ALTERED
29.01.2004	A	DETAILS ALTERED

DOCUMENT CERTIFICATION

Date: JAN 05
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPENG, MIEAust., NPER,
Institute of Engineers Membership No. 803938
I hereby state that this drawing is in compliance
with the provisions of the Building Code of
Australia and/or relevant Australian Industry
Standards.

**NORTHERN BEACHES
Consulting Engineers P/L**

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Suite 207, 30 FISHER ROAD
DEE WHarf NSW 2099
Ph: (02) 9964 7000 Fax: (02) 9964 7444
e-mail: nb@nbconsulting.com.au

Project: **PROPOSED ACCESS ROAD
at: 1148-1152 Barrenjoey Road
and 56 Palm Beach Road
Palm Beach
for: Raypond Development**

Drawing Title: **UPPER DRIVEWAY
SUSPENDED SLAB
PLANS AND DETAILS**

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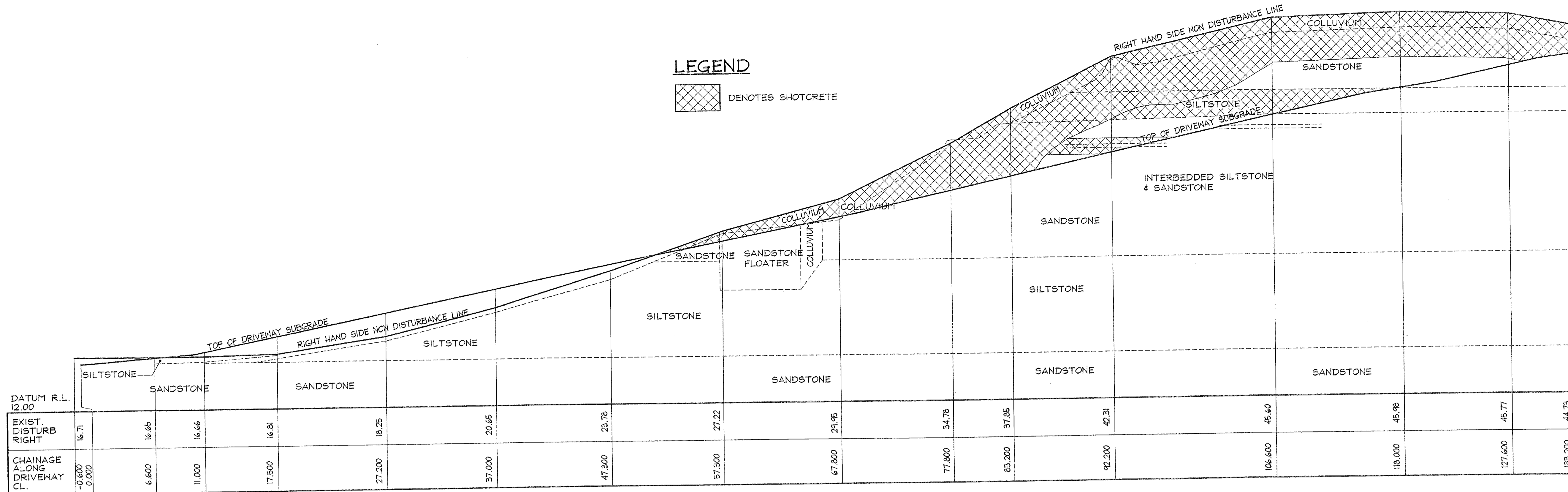
Date:	Design:	Drawn:	Checked:
Nov. 2003	R.G.W.	Paul R Bruce ONEAust., MIEAust.	
Job No:	Drawing No:	Rev:	
030963	C18	E	

NOTES:

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

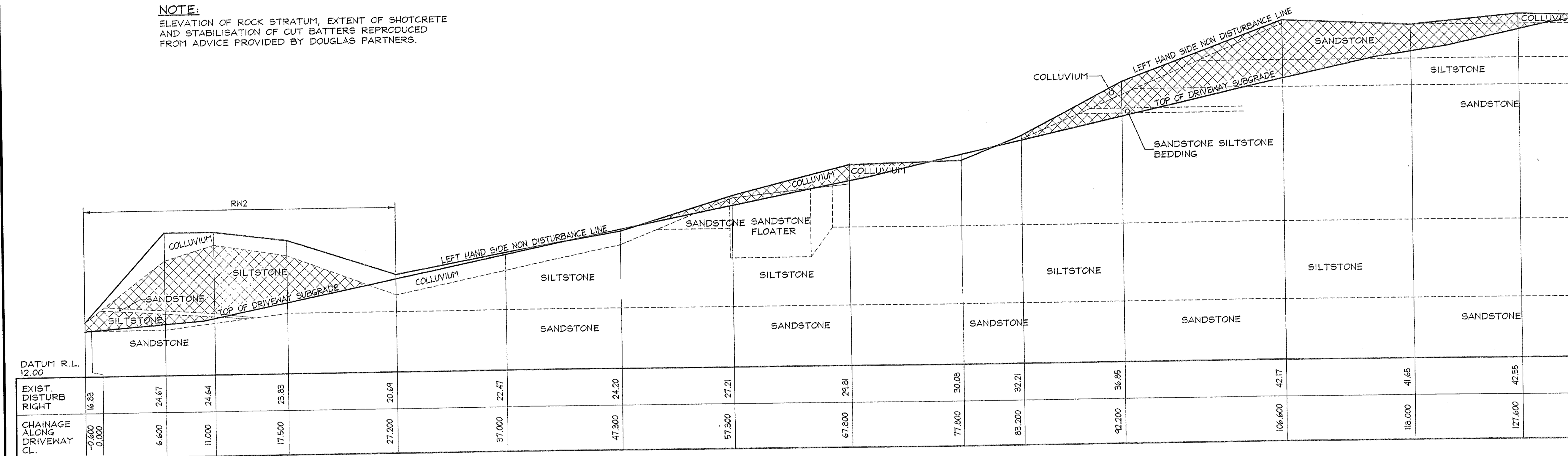
LEGEND

 DENOTES SHOTCRETE



**DRIVEWAY ELEVATION
RIGHT HAND SIDE VIEW**
SCALE 1:200

NOTE:
ELEVATION OF ROCK STRATUM, EXTENT OF SHOTCRETE AND STABILISATION OF CUT BATTERS REPRODUCED FROM ADVICE PROVIDED BY DOUGLAS PARTNERS.




**DRIVEWAY ELEVATION
LEFT HAND SIDE VIEW**
SCALE 1:200

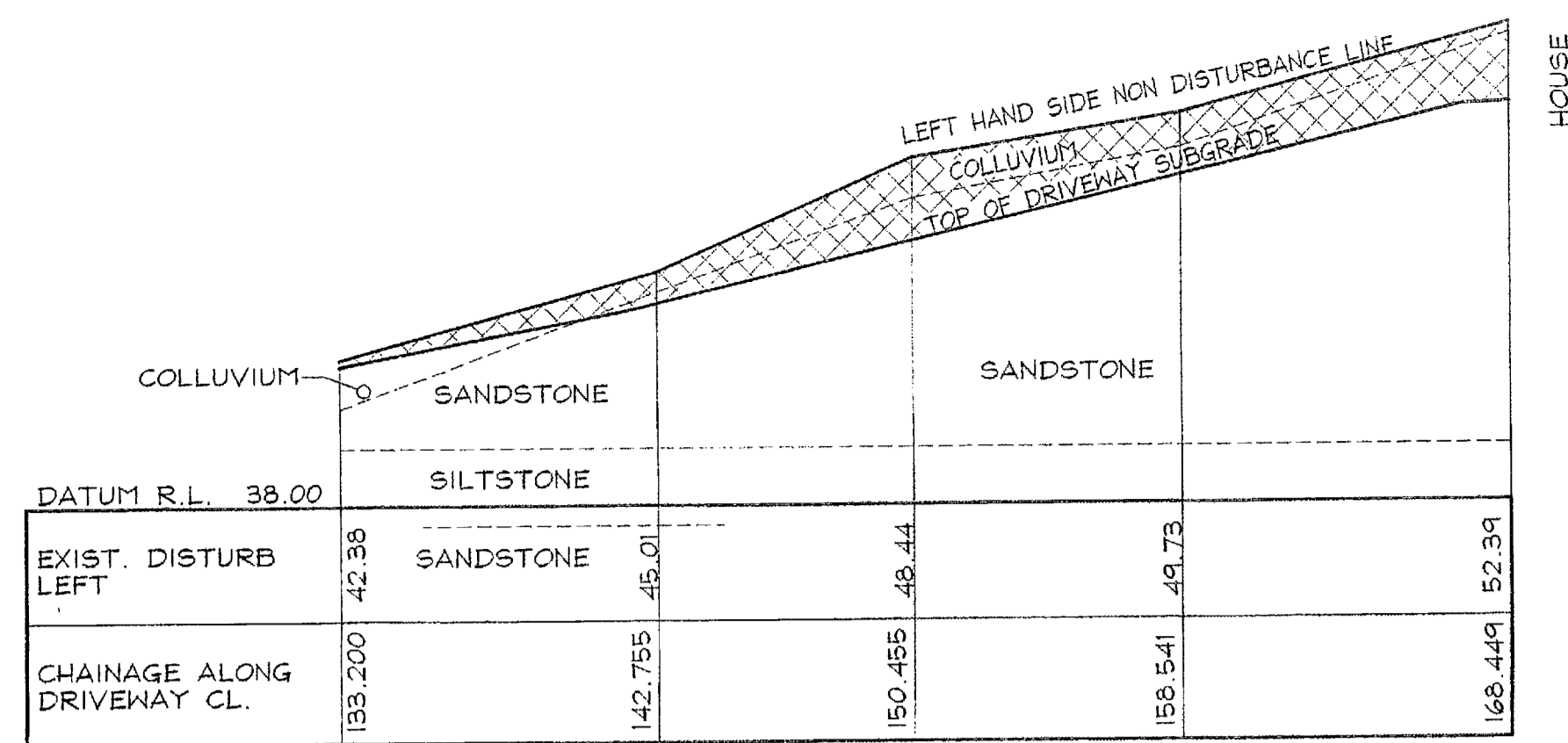
SCANNED
11 AUG 2008
PITTSWATER COUNCIL

CITY PLAN SERVICES
Consultation Cont. No: Approval Date:
22375 04 AUG 2008
Certifying Authority: Brenton Downall
Approval Cont. No: PIA0004

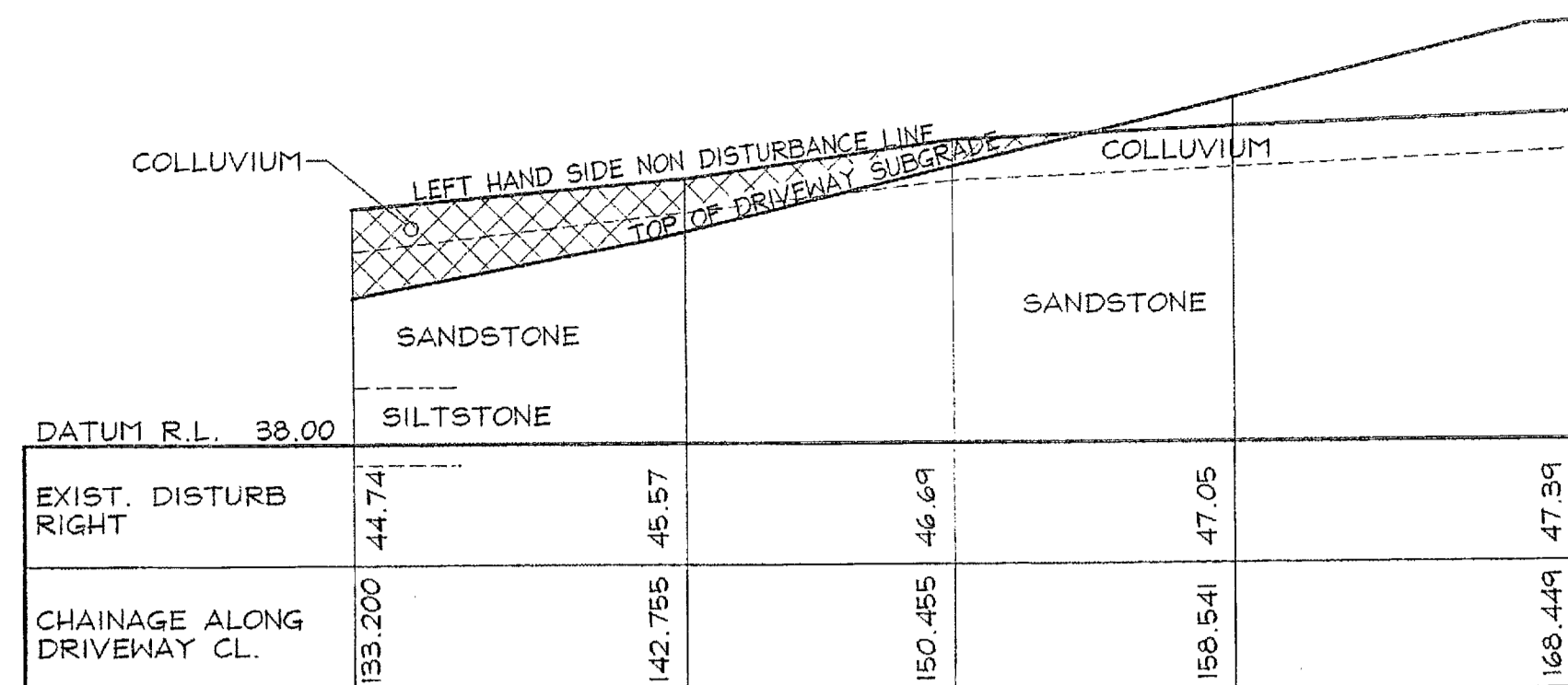
NOTE:
SECTIONS ARE DERIVED FROM SURVEY, REFER TO ARCHITECT'S DRAWINGS FOR PAVEMENT LEVELS AND SET OUT.

AI	DOCUMENT CERTIFICATION		<p>I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust., NPER, Institute of Engineers Membership No. 809938 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.</p>	 <p>NORTHERN BEACHES Consulting Engineers P/L. A.C.N. 075 121 616 A.B.N. 24 075 121 616 Suite 207, 30 FISHER ROAD DEE WY W NSW 2009 Ph: (02) 9584 7000 Fax: (02) 9584 7444 e-mail: nb@nbconsulting.com.au</p>	<p>Project: PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development</p>	<p>Drawing Title: DRIVEWAY ELEVATIONS SHEET 1</p>	Date: Nov. 2003	Design: R.G.W.	Drawn: Paul R Bruce 01EAust., MIEAust.	Checked:
	Date:	Rev:					Amendment:	Job No: 030963	Drawing No: C19	Rev: -

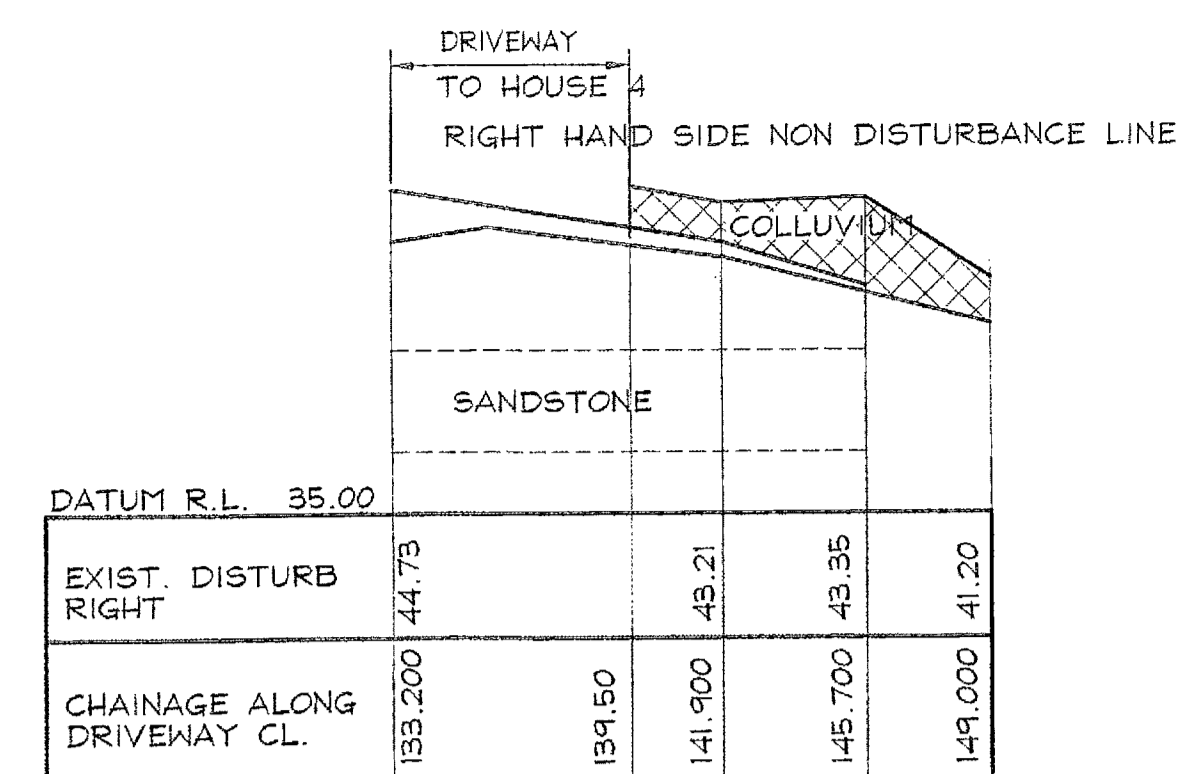
C19



**DRIVEWAY ELEVATION
LEFT HAND SIDE VIEW**
SCALE 1:200



**DRIVEWAY ELEVATION
RIGHT HAND SIDE VIEW**
SCALE 1:200



**LOWER DRIVEWAY ELEVATION
RIGHT HAND SIDE VIEW**
SCALE 1:200

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

LEGEND

DENOTES SHOTCRETE

DOWEL SCHEDULE		
MATERIAL	SLOPE HEIGHT (H)	BOLTING REQUIREMENTS
COLLUVIUM AND RESIDUAL SOIL	UP TO 1.5m	2.5m LONG GALV. N28 COGGED DOWEL SPACED AT 2.0m CENTRES HORIZONTAL & VERTICAL & DIPPING AT 45°. INSTALLED IN 75φ HOLE BLOWN CLEAN & FULLY GROUTED.
	1.5m TO 2.0m	3.0m LONG GALV. N28 COGGED DOWEL SPACED AT 2.0m CENTRES HORIZONTAL & VERTICAL & DIPPING AT 45°. INSTALLED IN 75φ HOLE BLOWN CLEAN & FULLY GROUTED.
SILTSTONE/SANDSTONE EXTREMELY WEATHERED, HIGHLY WEATHERED AND MODERATELY WEATHERED SILTSTONE	-	2.0m LONG GALV. N24 COGGED DOWEL SPACED AT 1.5m CENTRES BOTH HORIZONTALLY & VERTICALLY & DIPPING AT 10°. INSTALLED IN 75φ HOLES BLOWN CLEAN & FULLY GROUTED.
SILTSTONE SLIGHTLY WEATHERED FRESH	-	1.0m LONG GALV. N24 COGGED DOWEL SPACED AT 1.5m CENTRES BOTH HORIZONTALLY & VERTICALLY & DIPPING AT 10°. INSTALLED IN 75φ HOLES BLOWN CLEAN & FULLY GROUTED.
ANCHOR BOLTING SCHEDULE FOR BATTER IN ROCK		
MATERIAL	SLOPE HEIGHT (H)	BOLTING REQUIREMENTS
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	2.5m	2.5m LONG 24φ CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 2.0m CENTRES DIPPING AT 10°, INSTALLED IN 45φ HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	3.0m	2.5m LONG 24φ CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.5m CENTRES DIPPING AT 10°, INSTALLED IN 45φ HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	4.5m	3.0m LONG 24φ CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.5m CENTRES DIPPING AT 10°, INSTALLED IN 45φ HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	6.0m	3.0m LONG 24φ CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.5m CENTRES DIPPING AT 10°, INSTALLED IN 45φ HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.
SANDSTONE/SILTSTONE MEDIUM TO HIGH STRENGTH WITH 60° DAYLIGHTING JOINTS	9.0m	3.0m LONG 24φ CT BOLT (R24HT OR APPROVED EQUIVALENT) INSTALLED AT 1.5m CENTRES DIPPING AT 10°, INSTALLED IN 45φ HOLES, BLOWN CLEAN & FULLY GROUTED & TENSIONED TO 50kN.

NOTE:
ELEVATION OF ROCK STRATUM, EXTENT OF SHOTCRETE AND STABILISATION OF CUT BATTERS, REPRODUCED FROM ADVICE PROVIDED BY 'DOUGLAS PARTNERS'.

- CONSTRUCTION SEQUENCE FOR BATTER IN COLLUVIUM SOIL**
- 1) EXCAVATE COLLUVIUM AND PIN STRIP DRAINS.
 - 2) PLACE 60mm THICK 'SHOTCRETE'.
 - 3) INSTALL MESH AS DETAILED ON DRAWING No's C07 & C08.
 - 4) APPLY SECOND PASS OF 'SHOTCRETE' TO DEPTHS ON DRAWING No's C07 & C08.
- NOTE: MINIMUM 180 THICK OVER TEMPORARY SHOTCRETE

NOTE:
GALVANIZED CT BOLTS COMPLETE WITH MECHANICAL ANCHOR, DIMPLED SHEATH AND GALVANIZED BALL WASHER, NUT AND PLATES

SCANNED
11 AUG 2006
PITTSWATER COUNCIL

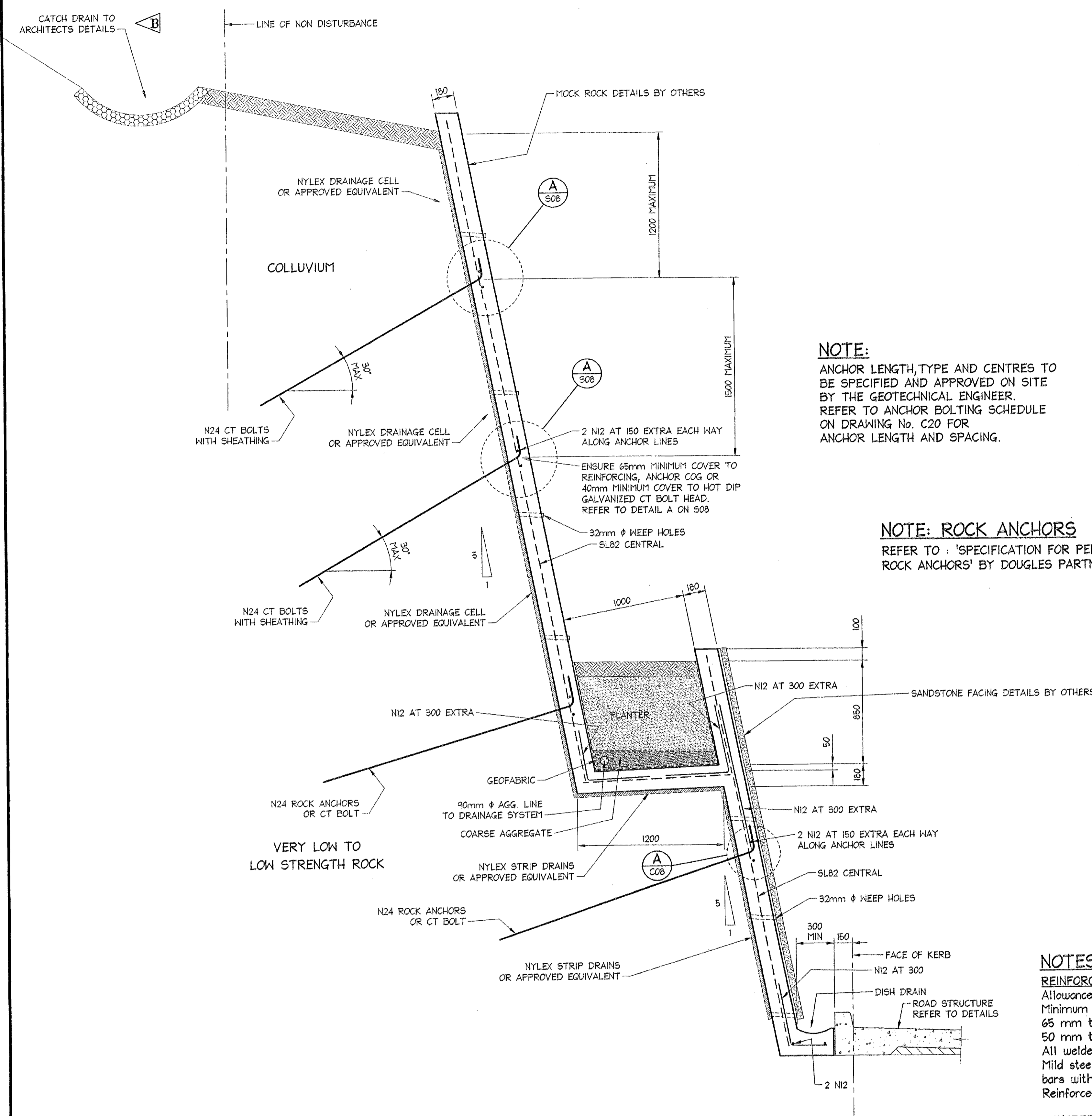
CITY PLAN SERVICES
Construction Cert. No.: A000112000
22275 84 404 715
Certifying Authority: Brisbane Council
Amendment No.: PA0004

NOTE:
SECTIONS ARE DERIVED FROM SURVEY, REFER TO ARCHITECTS DRAWINGS FOR PAVEMENT LEVELS AND SET OUT.

DOCUMENT CERTIFICATION I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust, NPER. Institute of Engineers Membership No. 809198 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards. Date: Nov 04 Rick G. Wray (Director Northern Beaches Consulting Engineers)			 NORTHERN BEACHES Consulting Engineers P/L. A.C.N. 078 121 816 A.B.N. 24 078 121 818 Suite 207, 30 FISHER ROAD DEE WHY NSW 2099 Ph: (02) 9584 7000 Fax: (02) 9584 7444 e-mail: nb@nbconsulting.com.au		Project: PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development		Drawing Title: DRIVEWAY ELEVATIONS SHEET 2 <small>The copyright of this drawing remains with Northern Beaches Consulting Engineers P/L.</small>		Date: Nov. 2003 Designer: R.G.W. Drawn: Paul R Bruce (CREAust, MIEAust)		Job No: 030963 Drawing No: C20 Rev: C											
<table border="1"> <tr><td>21.10.2004</td><td>C</td><td>SCHEDULE ALTERED</td></tr> <tr><td>07.07.2004</td><td>B</td><td>NOTE ADDED</td></tr> <tr><td>24.05.2004</td><td>A</td><td>NOTE ADDED</td></tr> <tr><td>Date:</td><td>Rev:</td><td>Amendment:</td></tr> </table>			21.10.2004	C	SCHEDULE ALTERED	07.07.2004	B	NOTE ADDED	24.05.2004	A	NOTE ADDED	Date:	Rev:	Amendment:								
21.10.2004	C	SCHEDULE ALTERED																				
07.07.2004	B	NOTE ADDED																				
24.05.2004	A	NOTE ADDED																				
Date:	Rev:	Amendment:																				

NOTES:

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2. FOR GENERAL NOTES AND DRAWING SCHEDULE REFER TO DRAWING NUMBER: 501.



NOTE:
ANCHOR LENGTH, TYPE AND CENTRES TO BE SPECIFIED AND APPROVED ON SITE BY THE GEOTECHNICAL ENGINEER. REFER TO ANCHOR BOLTING SCHEDULE ON DRAWING No. C20 FOR ANCHOR LENGTH AND SPACING.

NOTE: ROCK ANCHORS
REFER TO 'SPECIFICATION FOR PERMANENT ROCK ANCHORS' BY DOUGLES PARTNERS.

NOTES: SPRAYED CONCRETE WALLS
REINFORCEMENT:
Allowance to be made for texture application.
Minimum cover to all reinforcement to be:
65 mm to exposed face.
50 mm to face cast against ground.
All welded fabric shall be lapped as follows: 300mm minimum lap.
Mild steel rods denoted N12 are 12mm diameter D500 Grade deformed bars with 450mm minimum lap and 65mm minimum concrete cover.
Reinforcement to be held in its correct position at 800mm centres.
CONCRETE:
All workmanship and materials shall be carried out in accordance with AS 3600. Concrete design strength (F_c) at 28 days to be : 32 MPa.

TYPICAL RETAINING WALL - TYPE RW6
SCALE = 1 : 20

SCANNED
11 AUG 2006
PITTSWATER COUNCIL

CITY PLAN SERVICES
Construction Code No: Approved code
12375 04/04/05
City/ing Authority: Pittswater Council
Amendment No: PIA004

Date:	Rev:	Amendment:
29.10.2004	B	NOTE ALTERED
21.10.2004	A	DETAILS ALTERED

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Standards.
Date: Nov 04
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

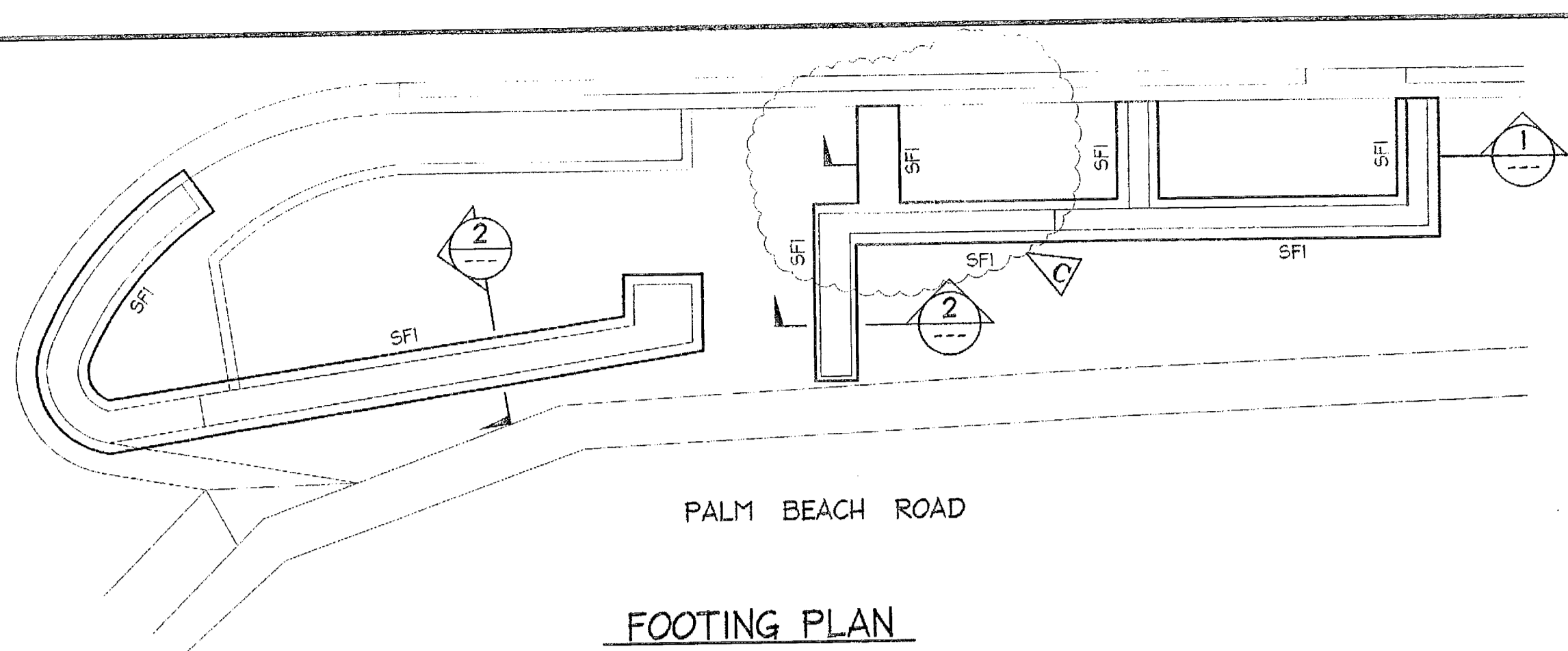
NB NORTHERN BEACHES
Consulting Engineers P/L.
A.C.N. 076 121 616 A.B.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEE WHY N.S.W. 2099
Ph: (02) 9584 7000 Fax: (02) 9584 7444
e-mail: nb@nbconsulting.com.au

Project: PROPOSED ACCESS ROAD
at: 1148-1152 Barrenjoey Road
and 56 Palm Beach Road
Palm Beach
for: Raypond Development

Drawing Title: RETAINING WALL
DETAILS SHEET 6
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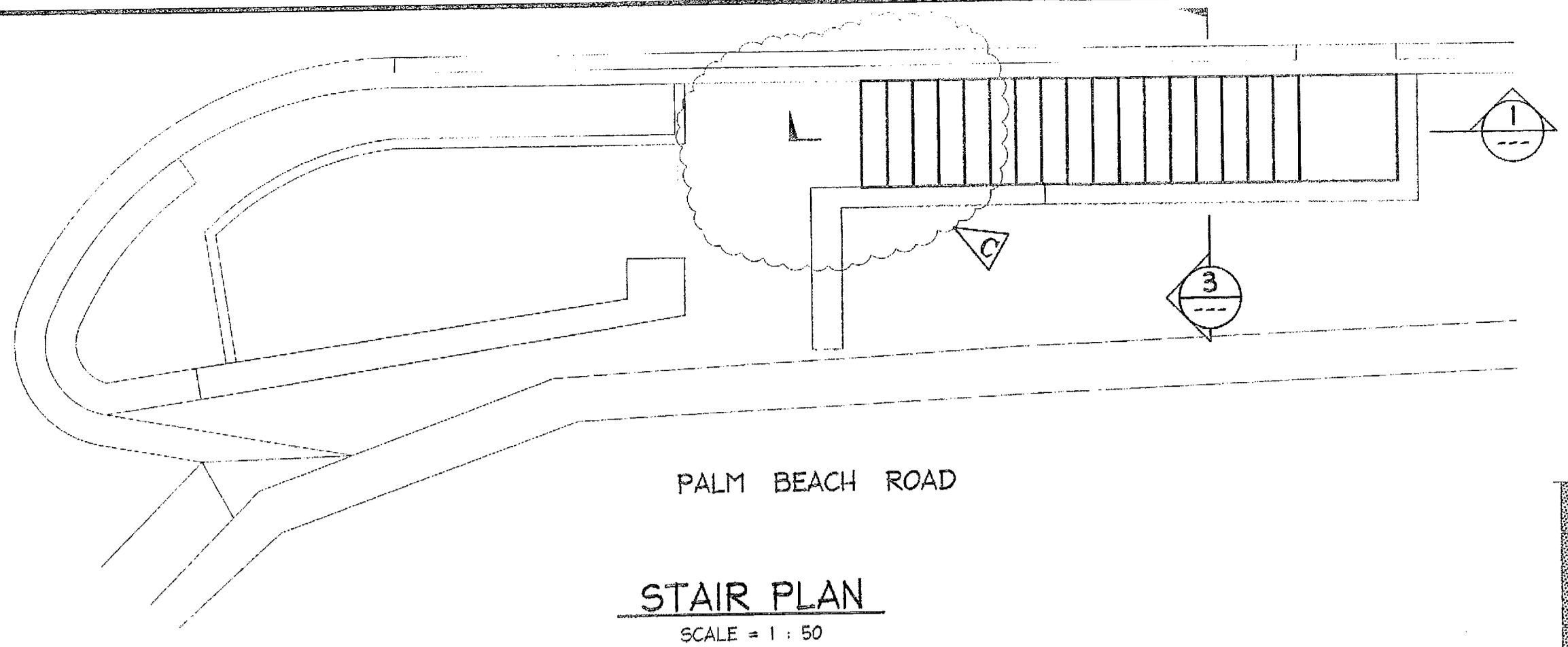
Date:	Design:	Drawn:	Checked:
Oct. 2003	R.G.W.	Paul R Bruce CPEAust., MIEAust.	
Job No:	Drawing No:	Rev:	
030963	C22	B	

4777



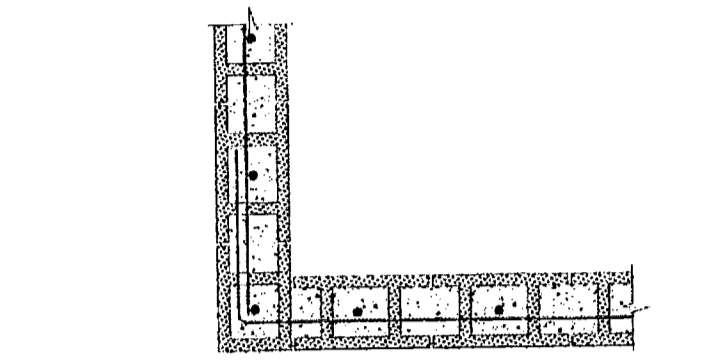
FOOTING PLAN
SCALE = 1 : 50

NOTE:
CONCRETE STRENGTH:
FOOTINGS:
F_c = 25 MPa, COVER = 65 mm

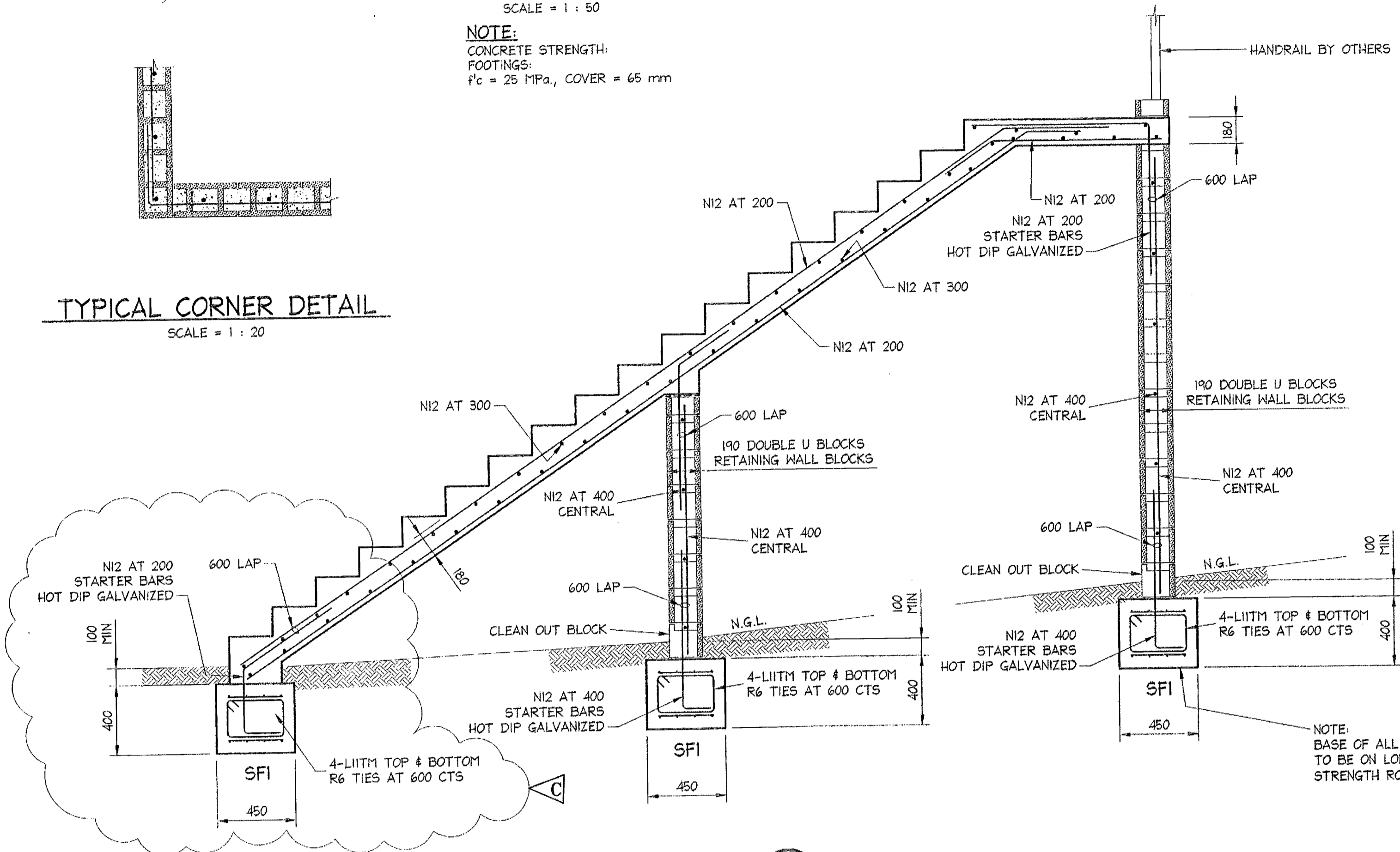


STAIR PLAN
SCALE = 1 : 50

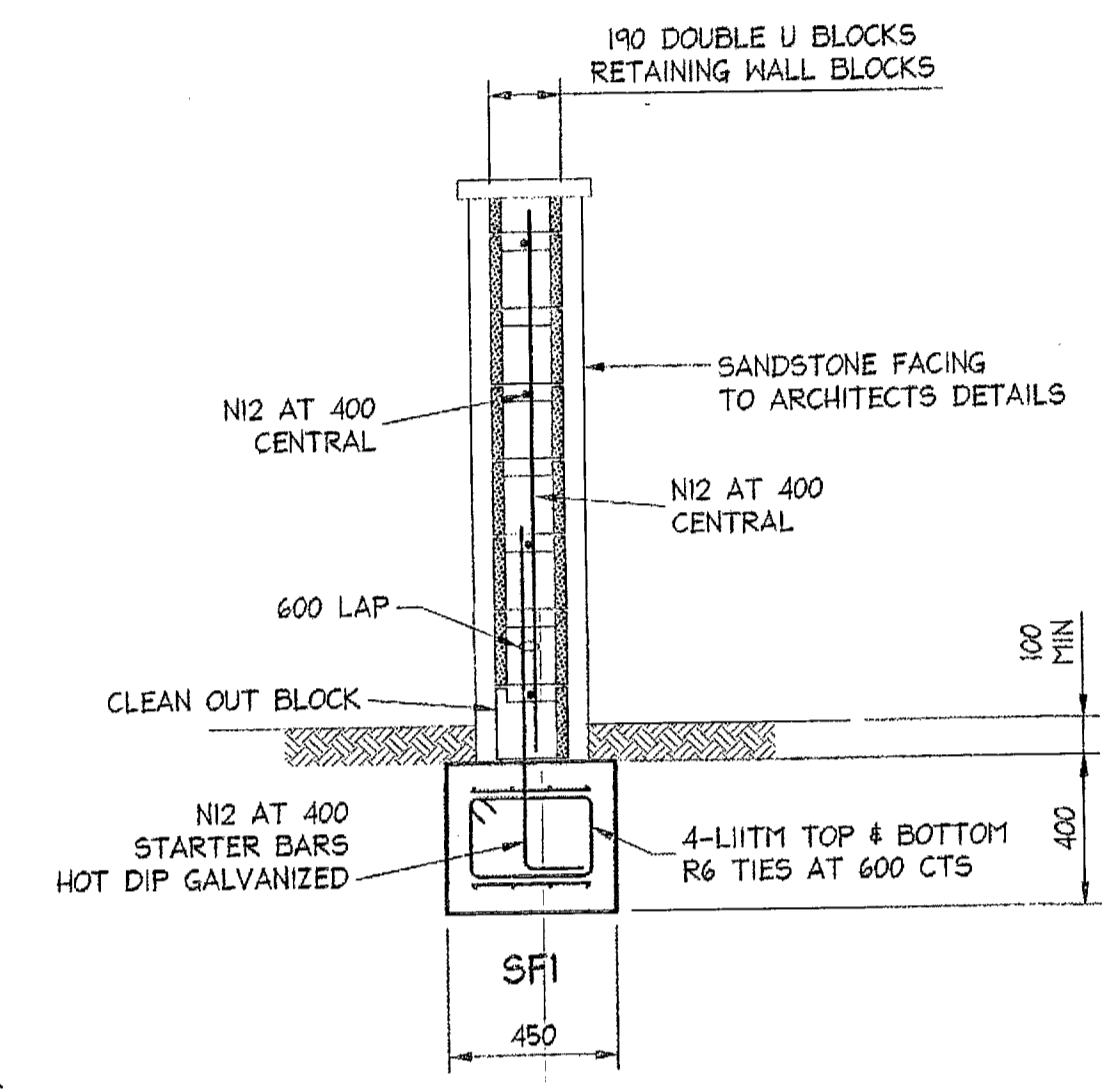
NOTE:
CONCRETE STRENGTH:
EXTERNAL SLABS:
F_c = 40 MPa, COVER = 45 mm



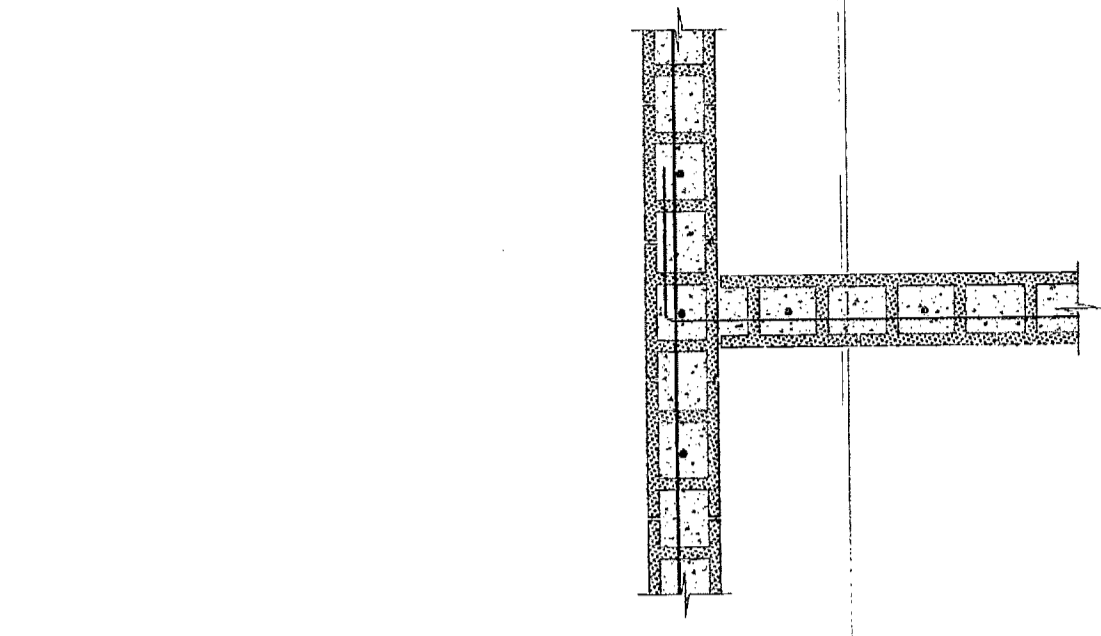
TYPICAL CORNER DETAIL
SCALE = 1 : 20



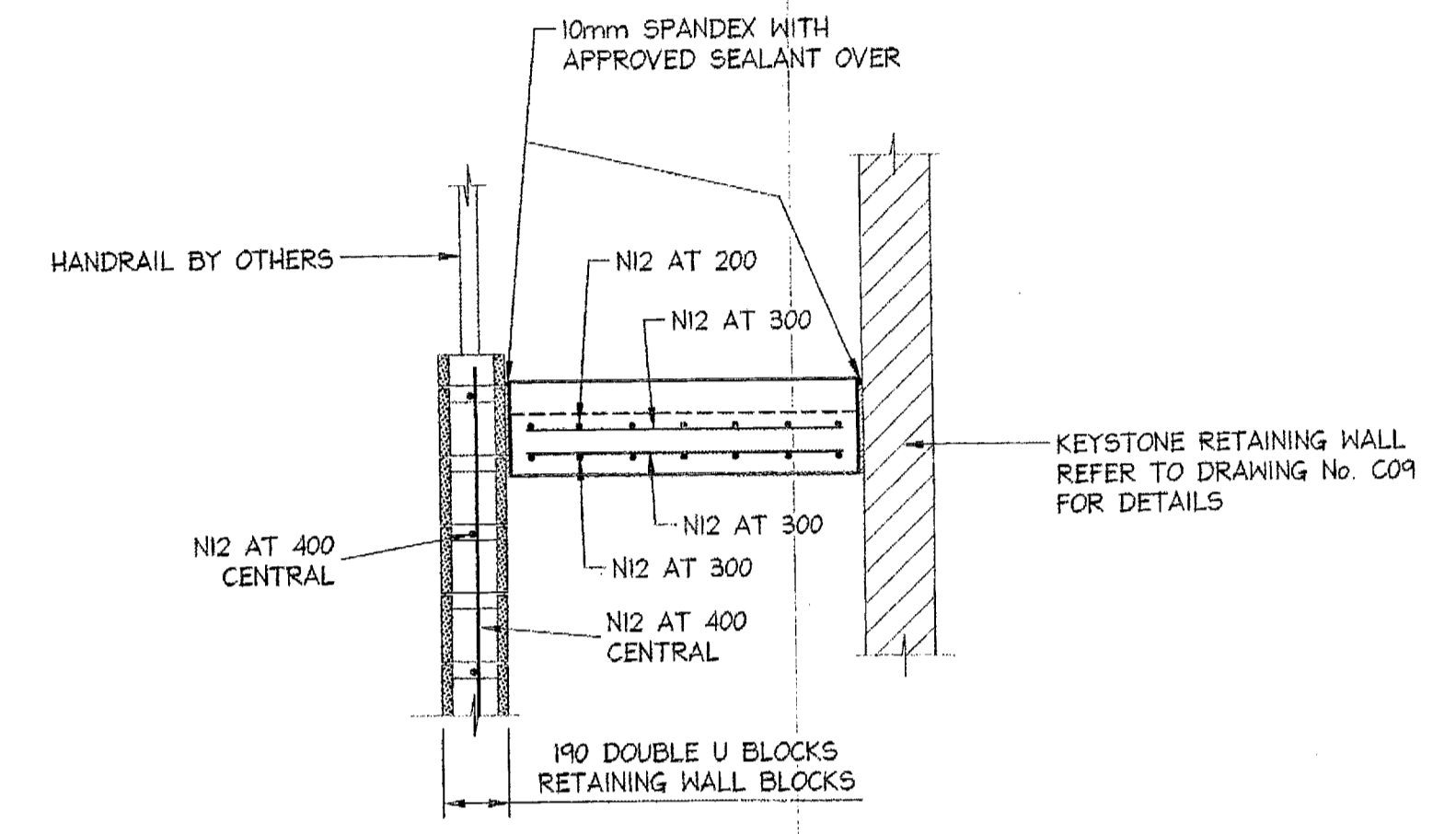
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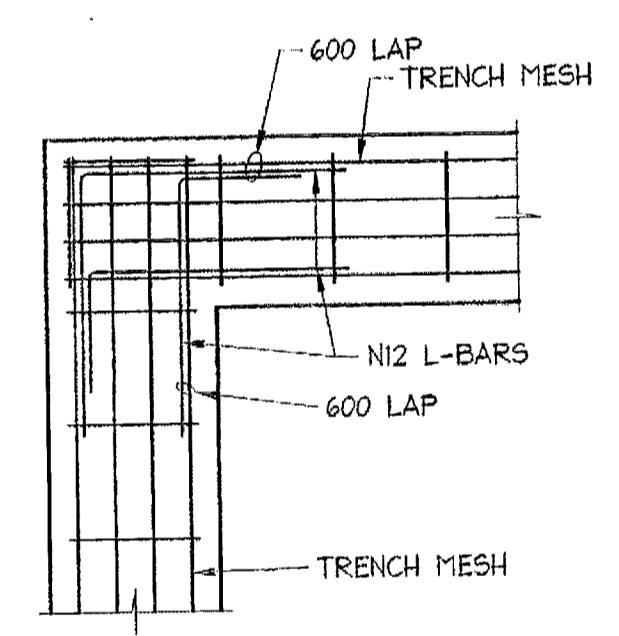
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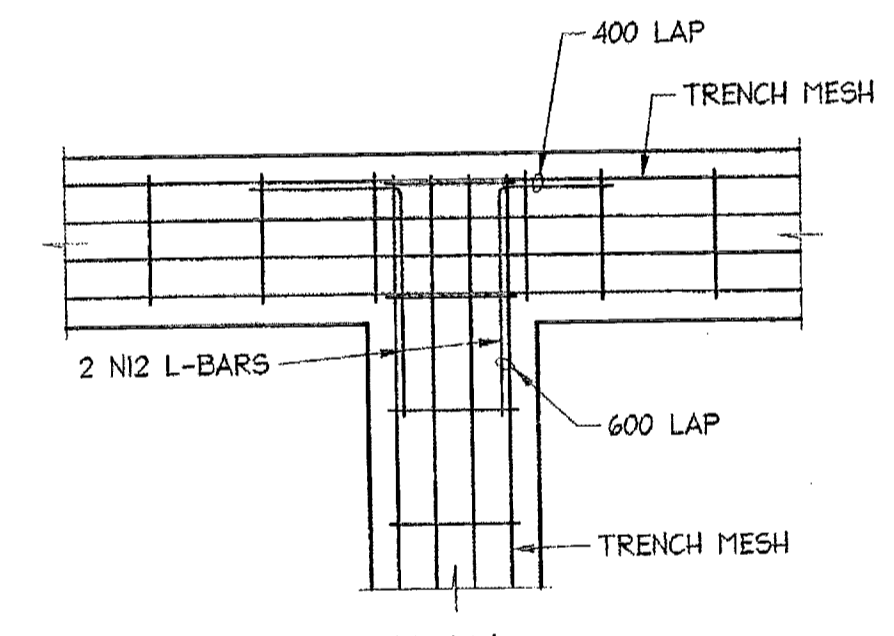
TYPICAL 'T' INTERSECTION
SCALE = 1 : 20



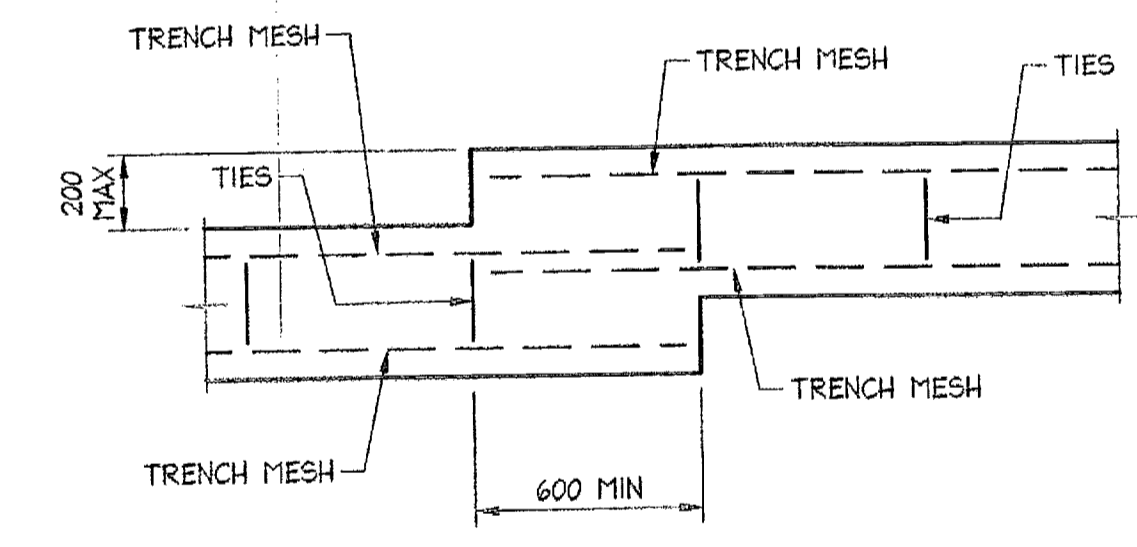
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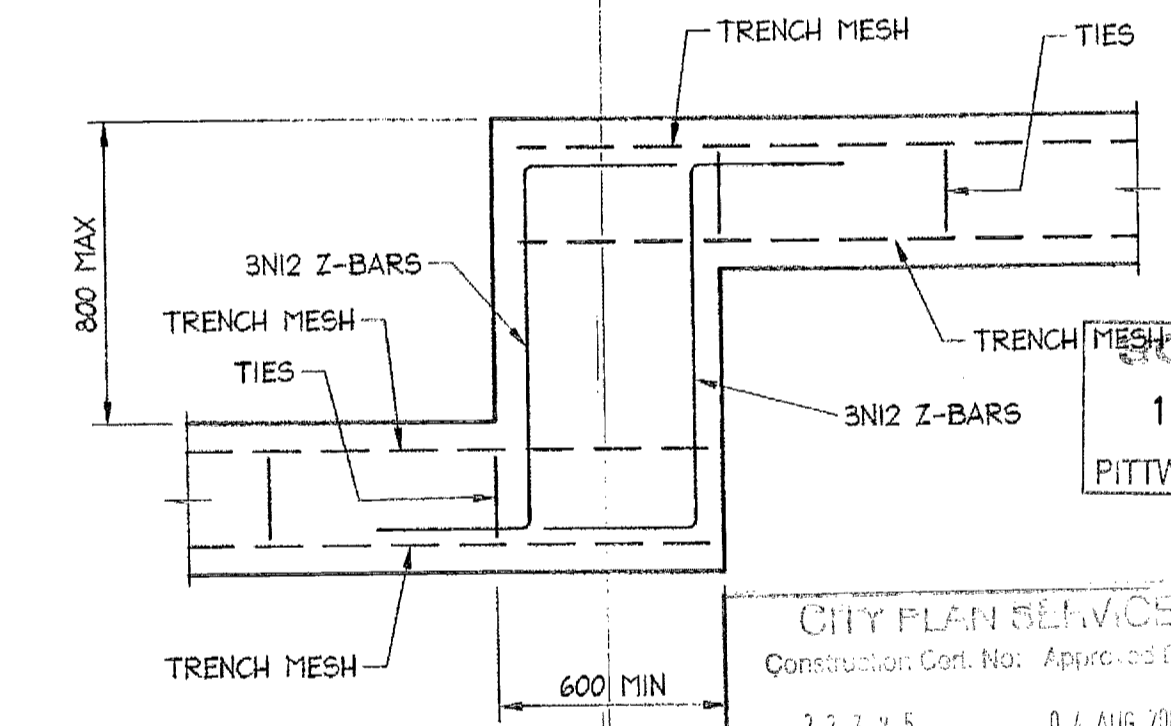
PLAN FOOTING CORNER
SCALE = 1 : 20



PLAN FOOTING 'T' JUNCTION
SCALE = 1 : 20



TYPICAL STEP FOOTING DETAILS
SCALE = 1 : 20



CITY PLAN SERVICES
Construction Cont. No.: Approved Plans:
22375 04 AUG 2005
Classifying Authority: Construction Branch
Accreditation No.: PAC004

11 AUG 2006
PITTSWATER COUNCIL

Date	Rev	Amendment
29.10.2004	C	DETAILS ALTERED
21.10.2004	B	DETAILS ALTERED AT CLIENT REQUEST
17.09.2004	A	DETAILS ALTERED AT CLIENT REQUEST

DOCUMENT CERTIFICATION

I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(Civil), CPEng, MIEAust., NFER,
Institute of Engineers Membership No. 803938

I hereby state that this drawing is in compliance
with the provisions of the Building Code of
Australia and/or relevant Australian Industry
Standards.

Date: Nov 04
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

NORTHERN BEACHES
Consulting Engineers P/L.

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DEE WHY N.S.W. 2089
Ph: (02) 9884 7000 Fax: (02) 9884 7444
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Project: **PROPOSED ACCESS ROAD**
at: 1148-1152 Barrenjoey Road
and 56 Palm Beach Road
Palm Beach
for: Raypond Development

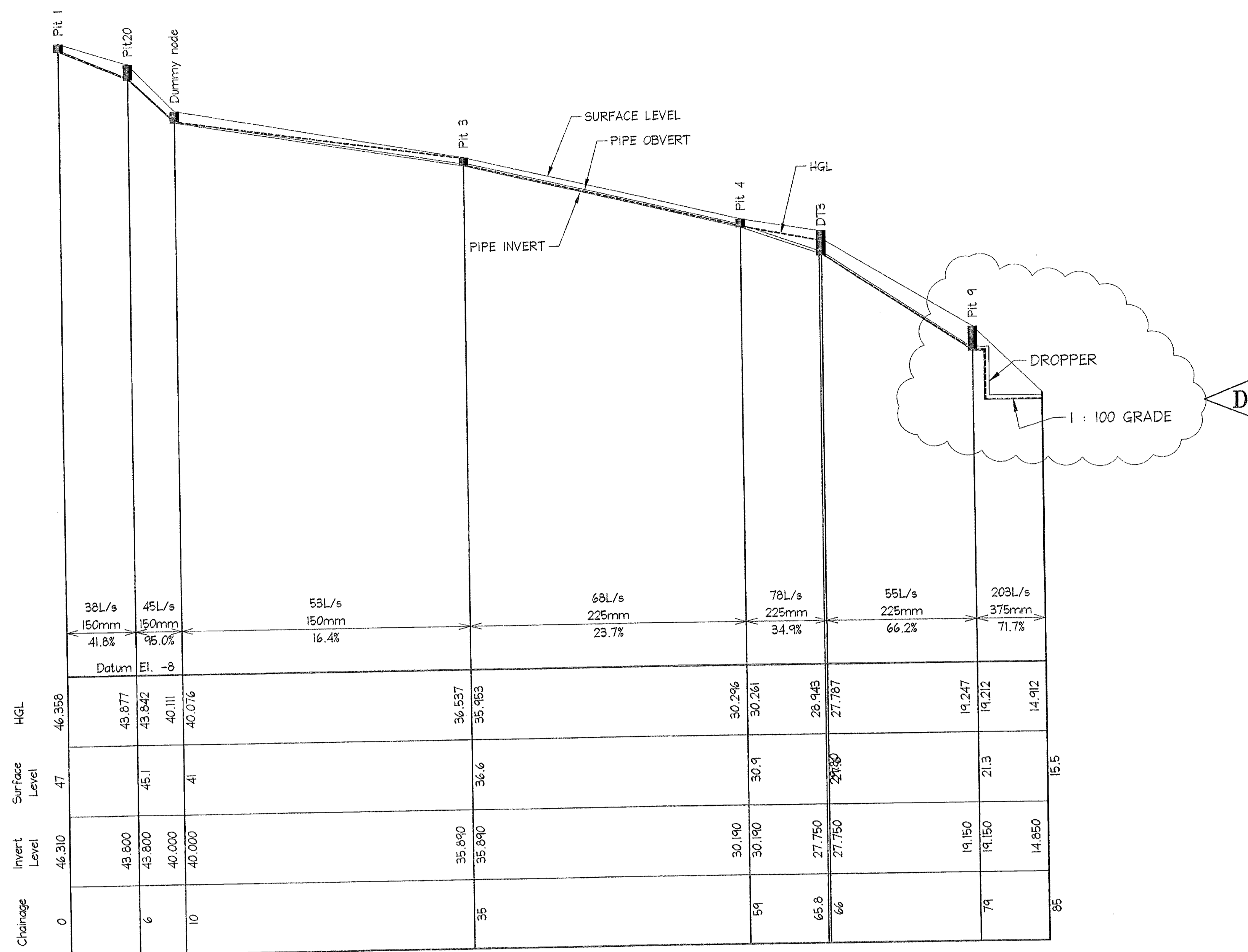
Drawing Title:
ENTRY STAIR AND WALLS
AT PALM BEACH ROAD
PLAN AND DETAILS

Date:	Design:	Drawn:	Checked:
July 2004	R.G.W.	Paul R Bruce CPA/EAsst.	
Job No:		Drawing No:	Rev:
030963		C23	C

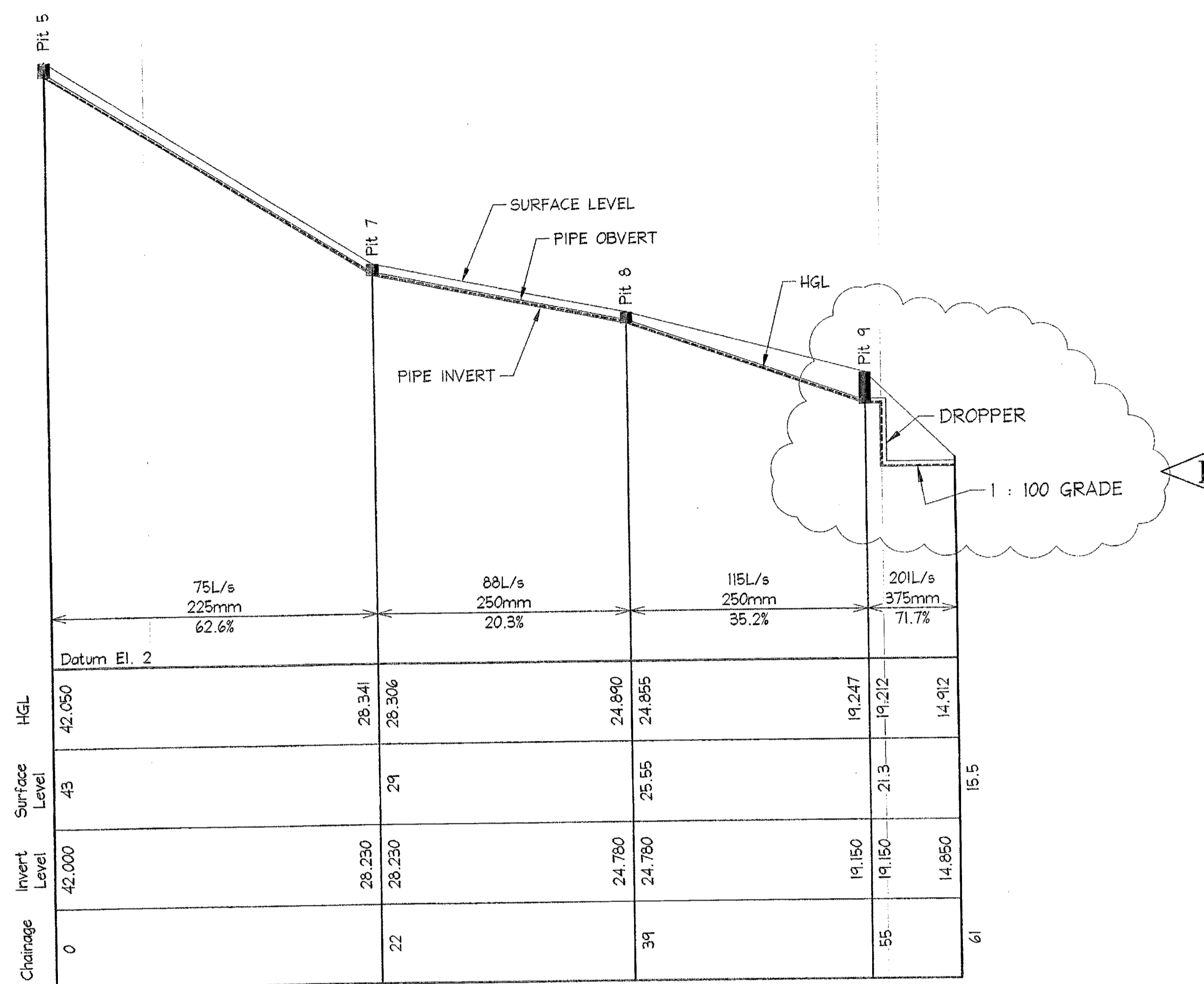
657

NOTES:

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



LONGITUDINAL ELEVATION LINE 1
SCALE = 1 : 250



LONGITUDINAL ELEVATION LINE 2
SCALE = 1 : 250

SCANNED
11 AUG 2006
PITTSWATER COUNCIL

CITY PLAN SERVICES
Construction Cost No: Approved Date:
22.3.75 04 AUG 2005
Cadastral Authority: Pittwater Council
Amendment No: 1/2005

Date	Rev.	Amendment
21.01.2005	D	HGL ELEVATIONS ALTERED
01.11.2004	C	HGL ELEVATIONS ALTERED
07.10.2004	B	HGL ELEVATIONS ALTERED
14-09-04	A	CHANGES DURING CONSTRUCTION

DOCUMENT CERTIFICATION

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Institute of Engineers Membership No. 803988

I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.

Date: _____
Rick G. Wray (Director Northern Beaches Consulting Engineers)

NORTHERN BEACHES
Consulting Engineers P/L

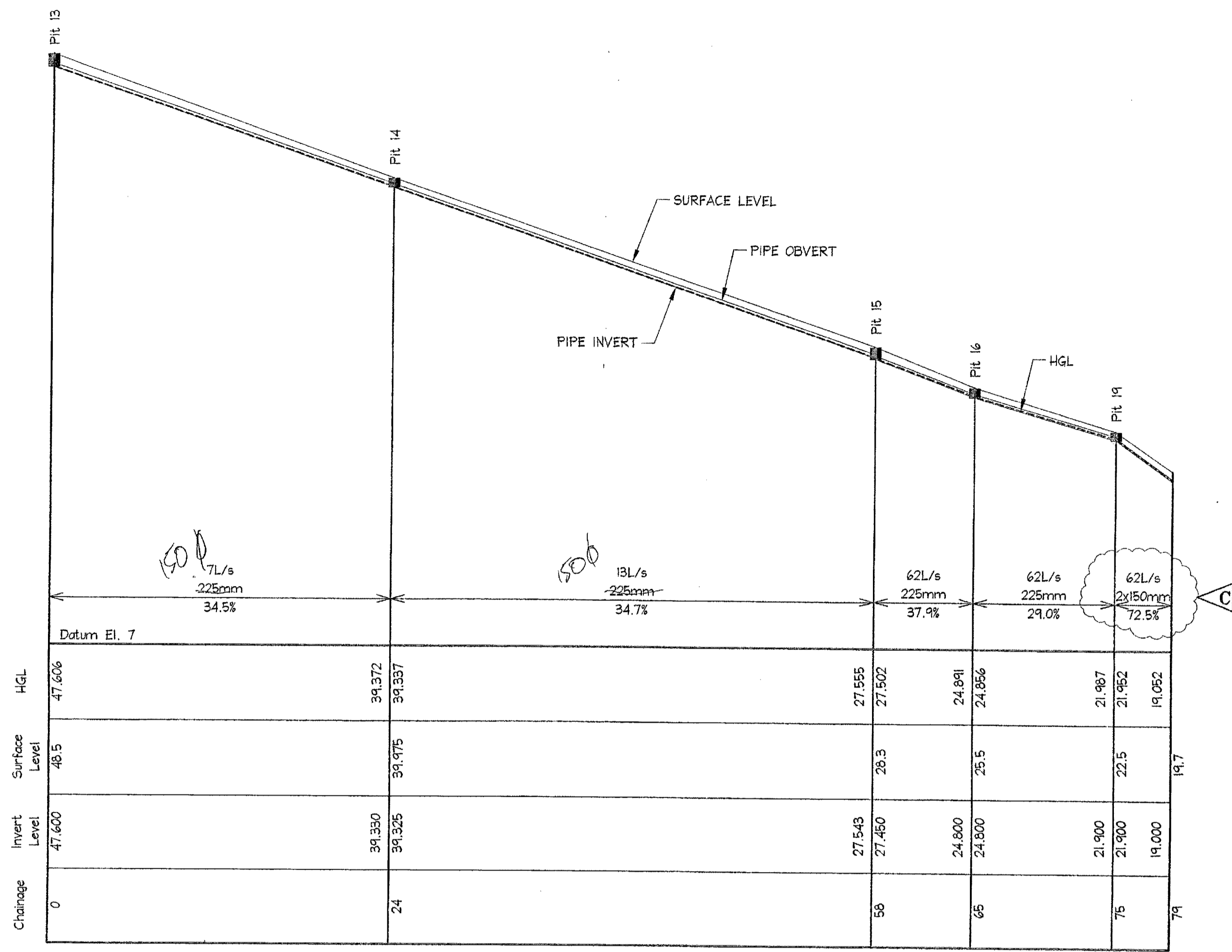
A.C.N. 076 121 518 A.B.N. 24 076 121 618
Suite 207, 30 FISHER ROAD
DEES BOROUGHS, N.S.W. 2099
Ph: (02) 9984 7000 Fax: (02) 9984 7444
e-mail: nb@nbconsulting.com.au

Project: **PROPOSED ACCESS ROAD**
at: 1148-1152 Barrenjoey Road
and 56 Palm Beach Road
Palm Beach
for: Raypond Development

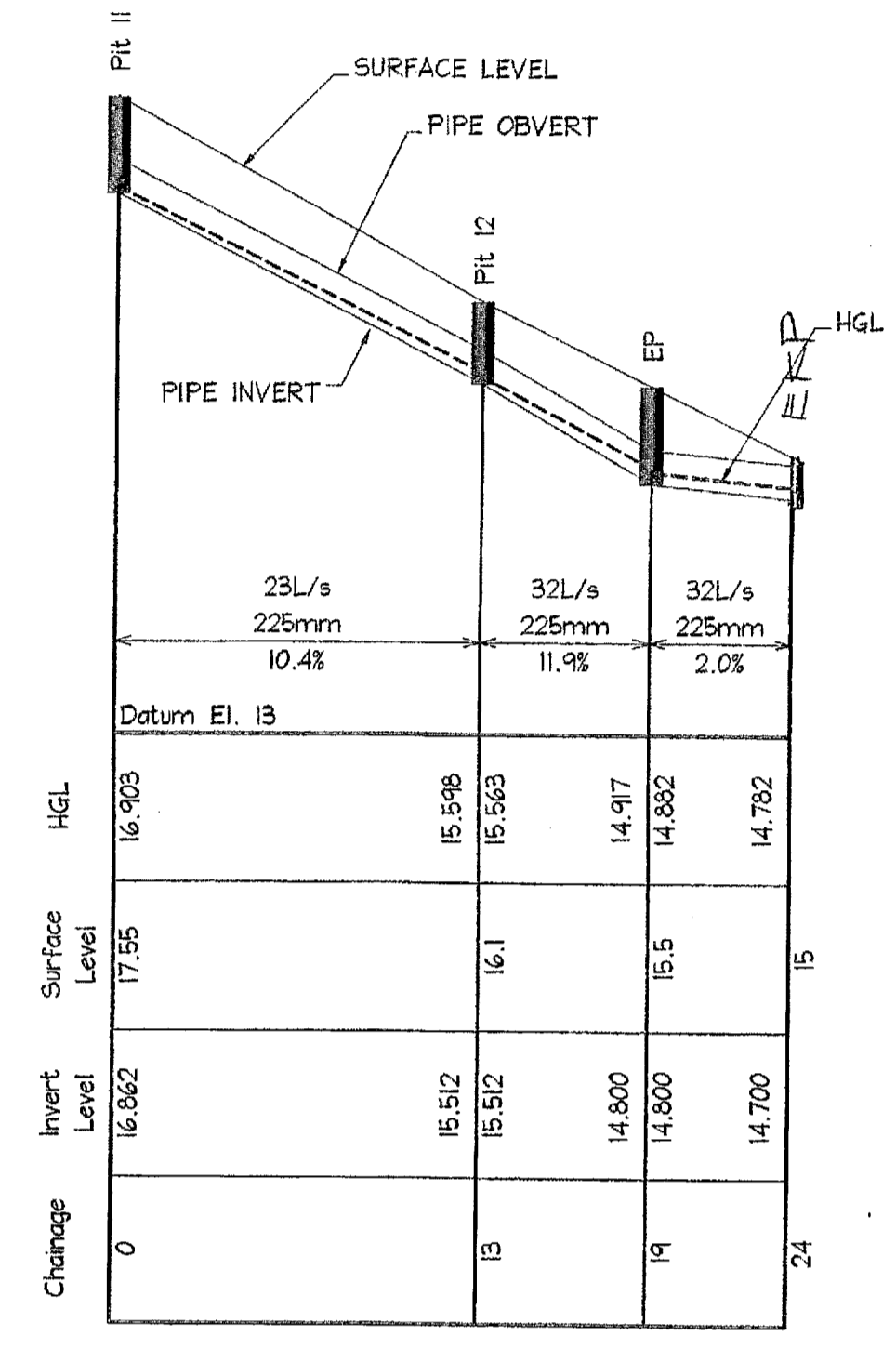
Drawing Title: **HGL**
LONGITUDINAL SECTIONS
SHEET 1

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Date:	Design:	Drawn:	Checked:
Aug 2004	M.P.	Paul R Bruce CP Eng, MIE Aust	
Job No:	Drawing No:	Rev:	
030963	C24	D	



LONGITUDINAL ELEVATION LINE 3
SCALE = 1 : 250



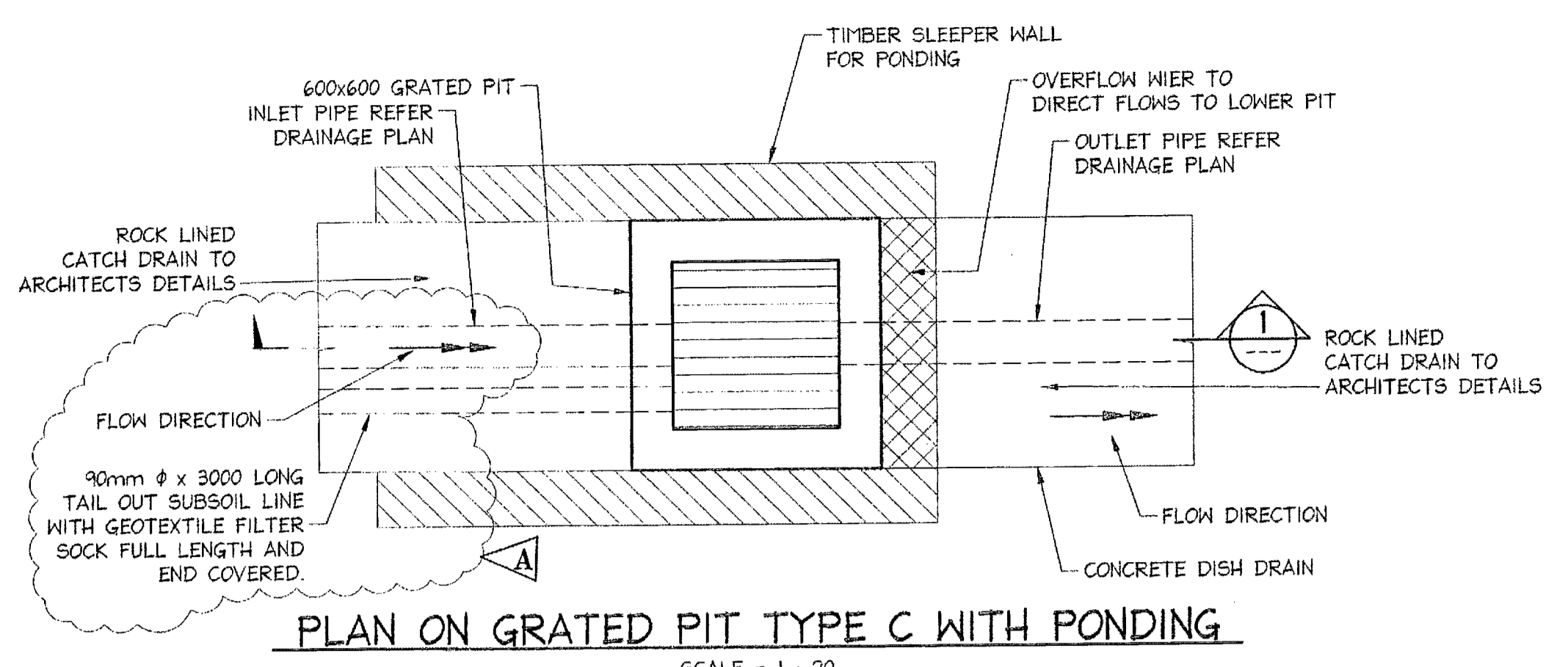
LONGITUDINAL ELEVATION LINE 4
SCALE = 1 : 250

SCANNED
11 AUG 2006
PITTSWATER COUNCIL

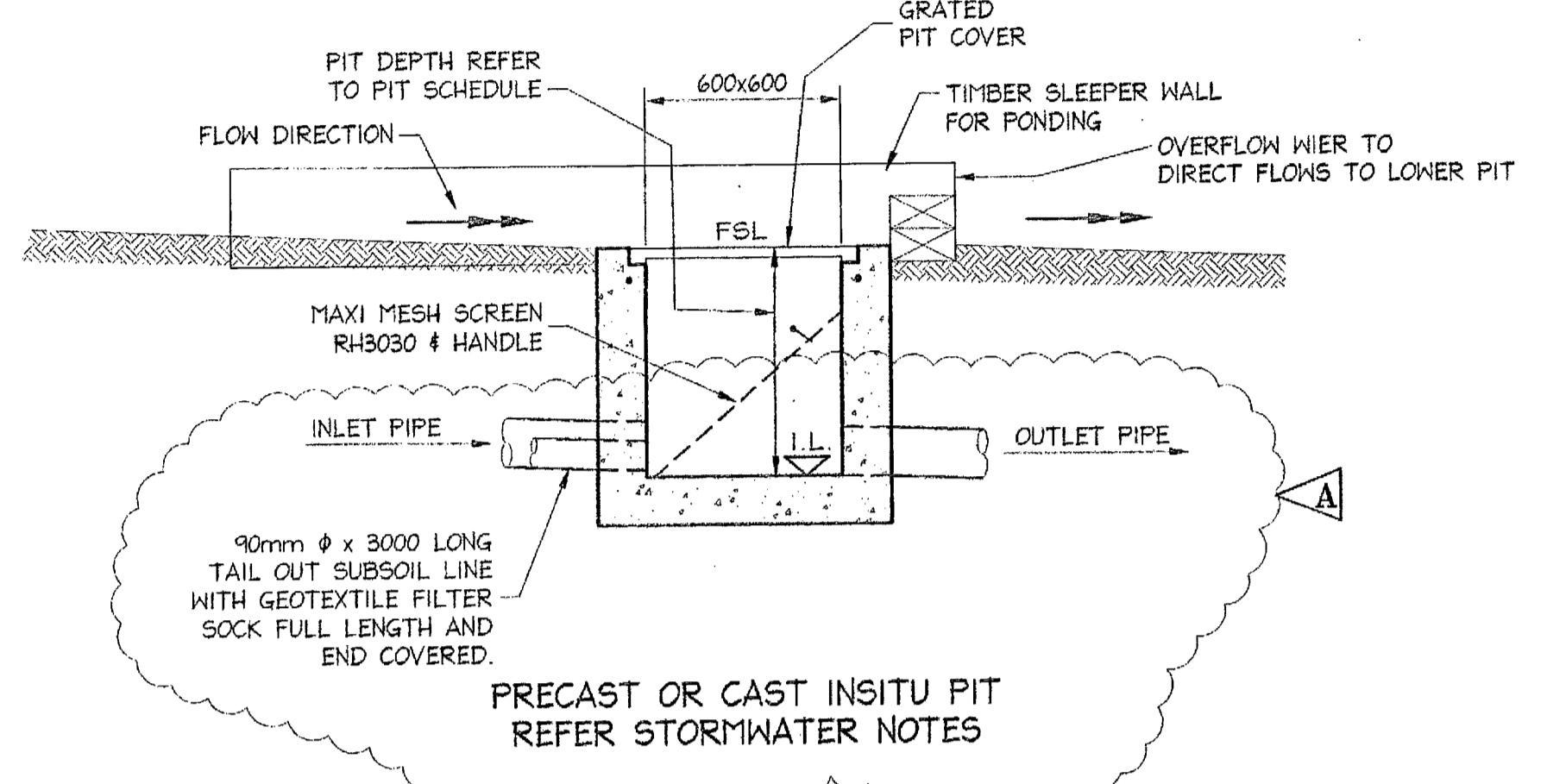
CITY PLAN SERVICES
Consultation Cont. No. Approved Cont.
27375 04 AUG 2006
Check/Sign Authority: Pittswater Council
Drawing No: FM2004

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01.11.2004	C	HGL ELEVATION ALTERED															
07.10.2004	B	HGL ELEVATIONS ALTERED															
14-09-04	A	CHANGES DURING CONSTRUCTION															

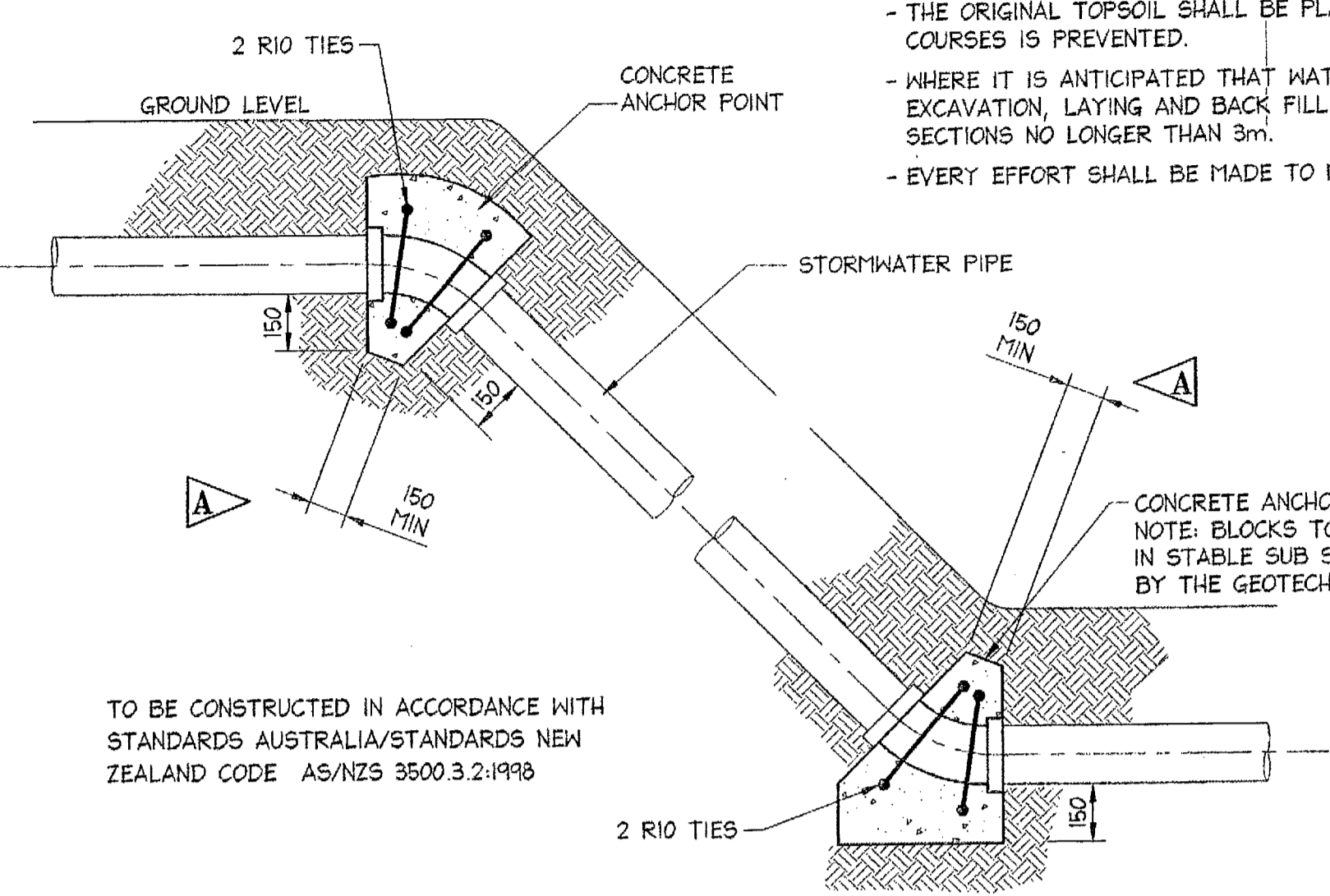
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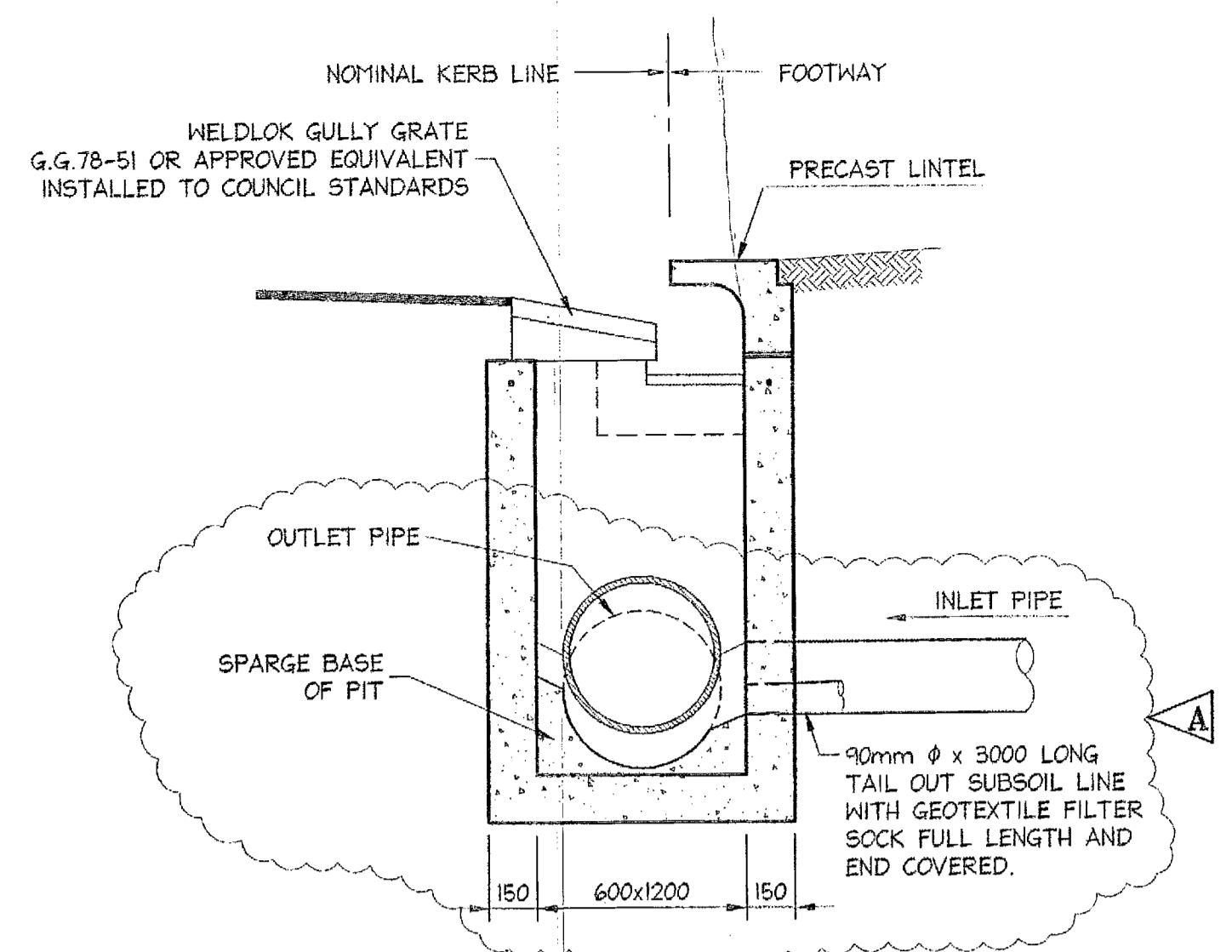
PLAN ON GRATED PIT TYPE C WITH PONDING
SCALE = 1 : 20



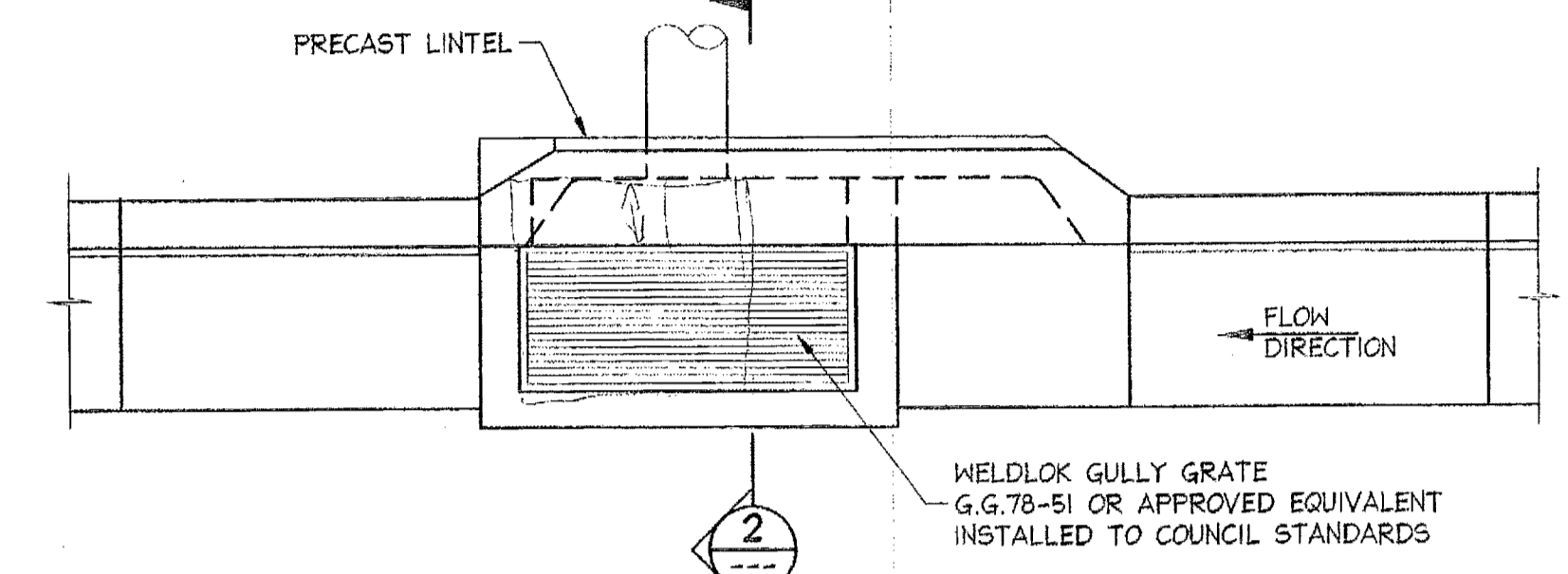
SECTION 1
SCALE = 1:20



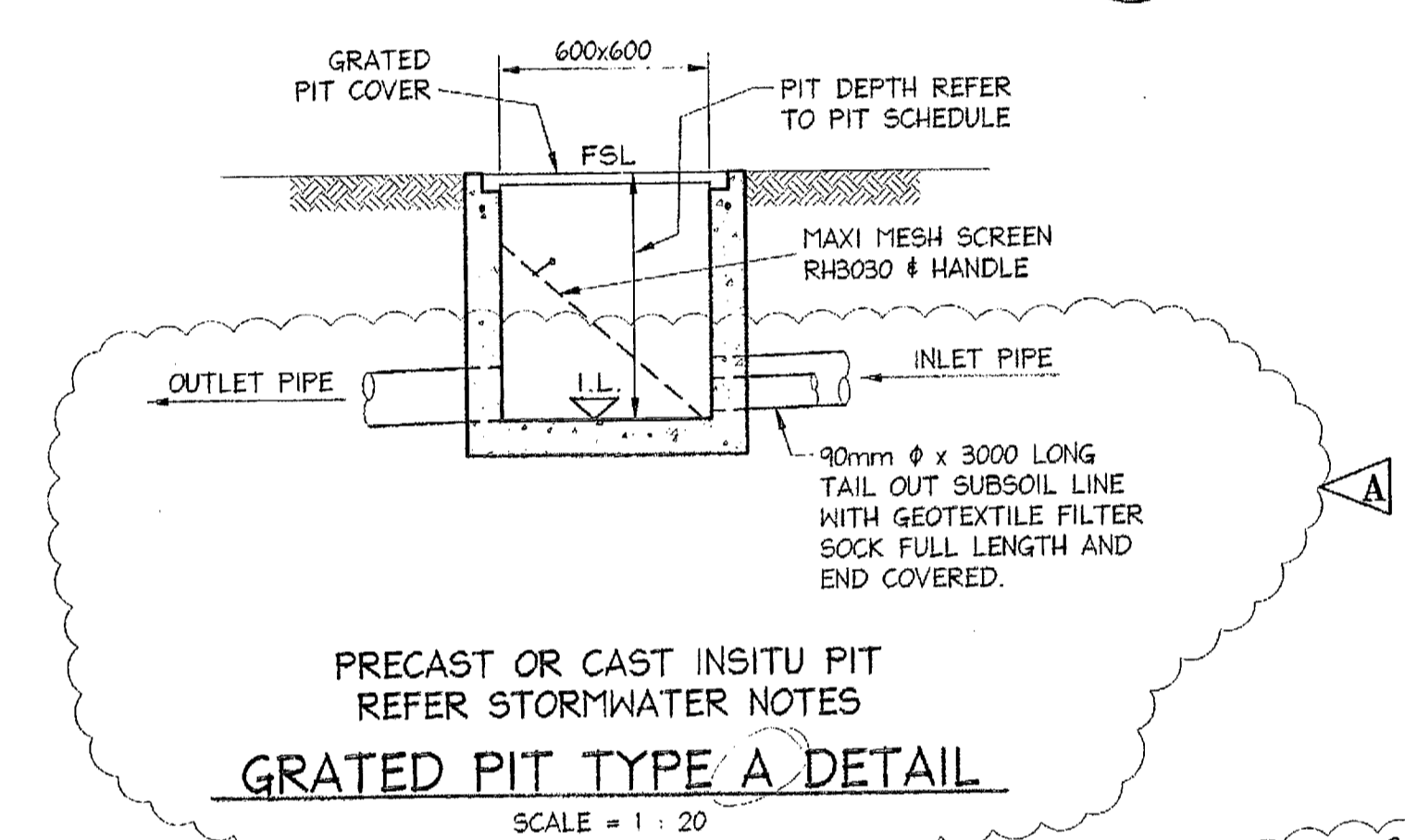
CONCRETE ANCHOR POINT DETAIL
FOR EARTH SLOPE GREATER THAN 1 V. TO 5 H.
SCALE = 1 : 20



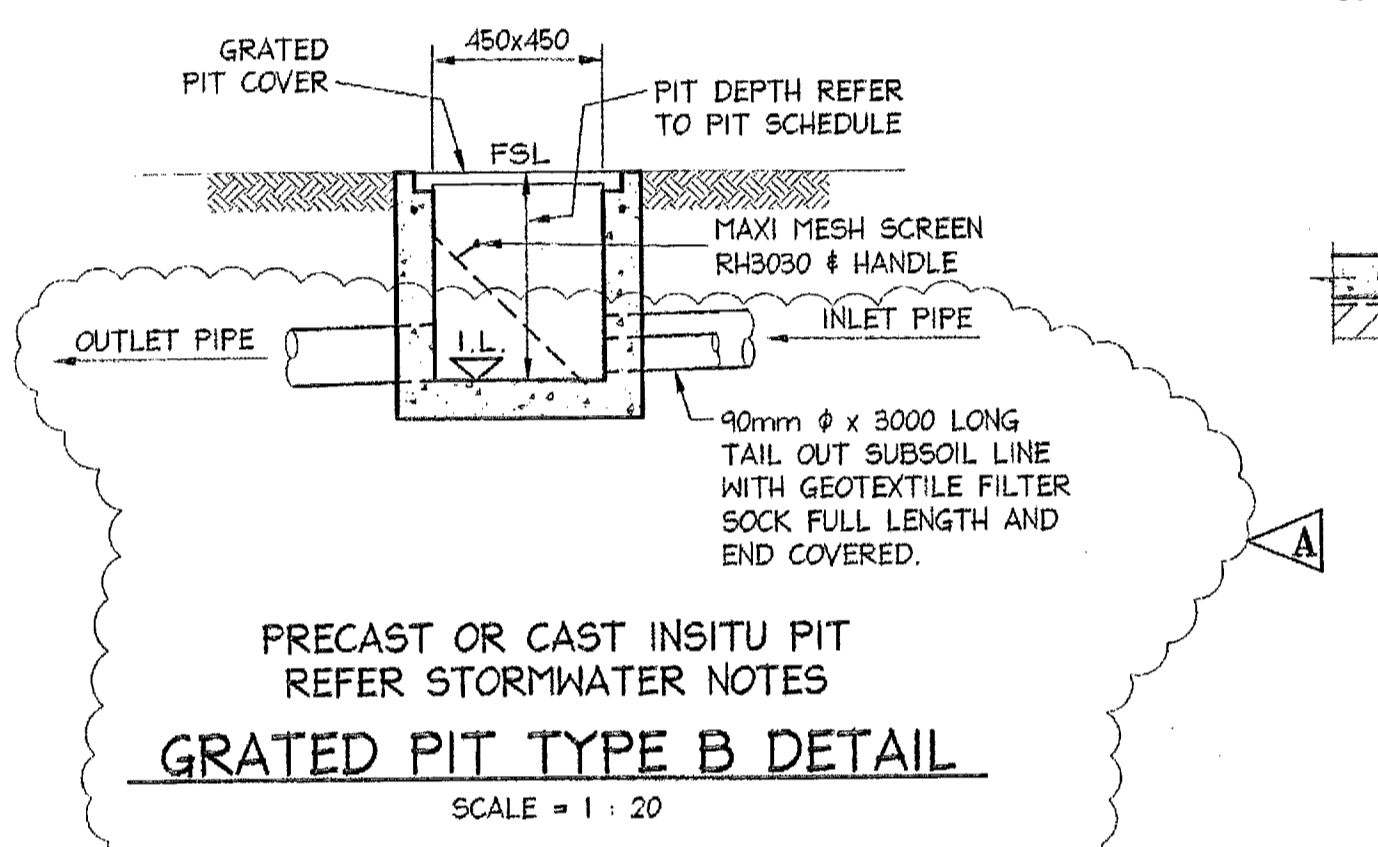
SECTION 2
SCALE = 1:20



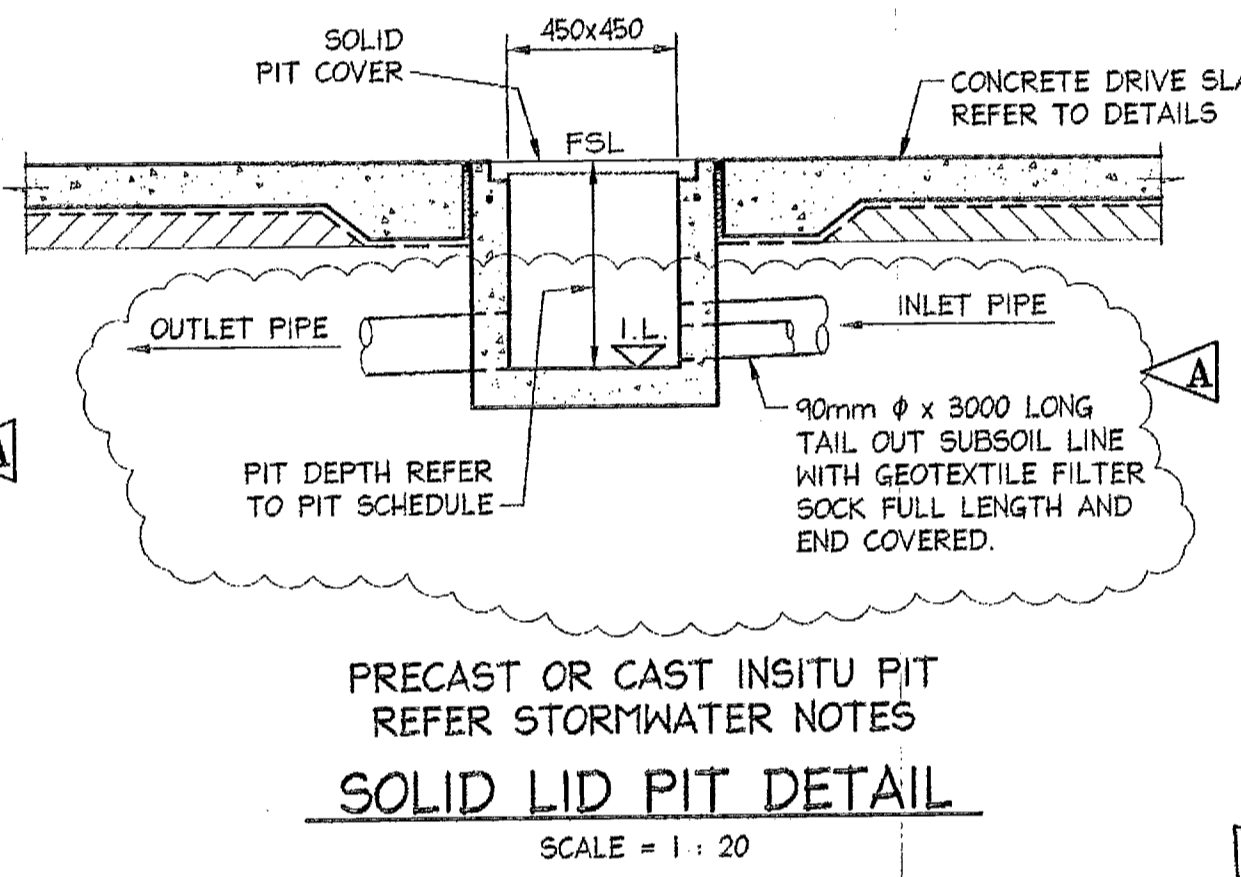
PRECAST OR CAST INSITU PIT, REFER STORMWATER NOTES
KERB INLET PIT PLAN
SCALE = 1 : 20



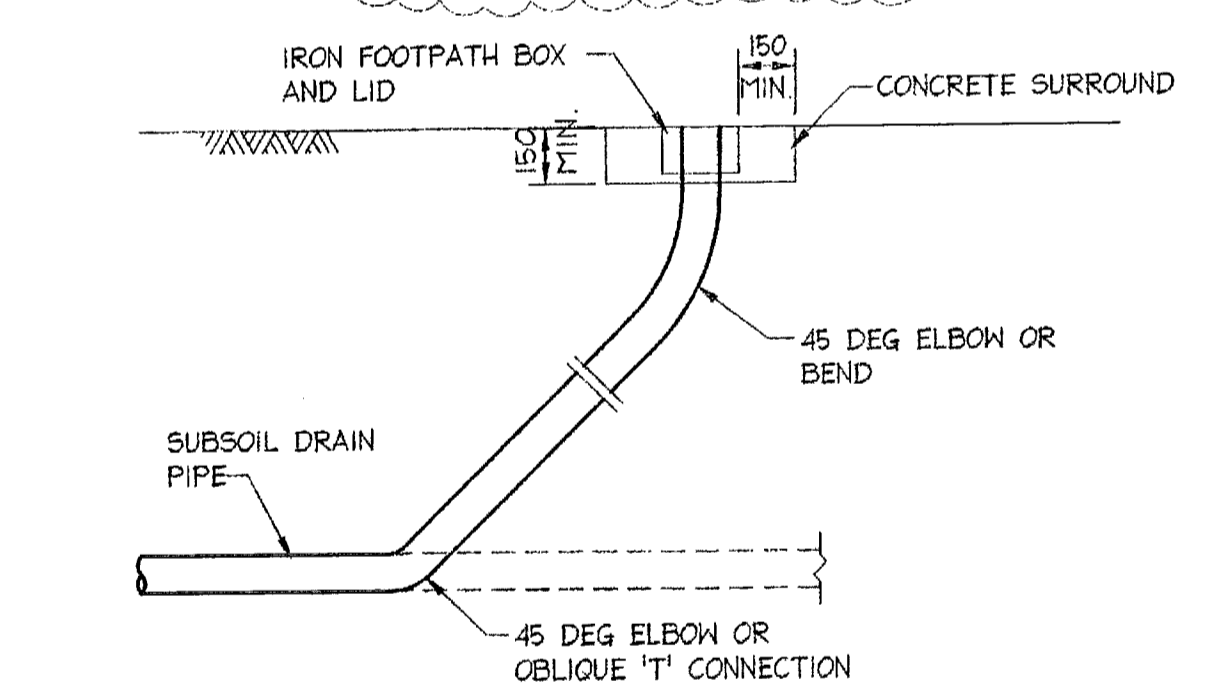
PRECAST OR CAST INSITU PIT REFER STORMWATER NOTES
GRATED PIT TYPE A DETAIL
SCALE = 1 : 20



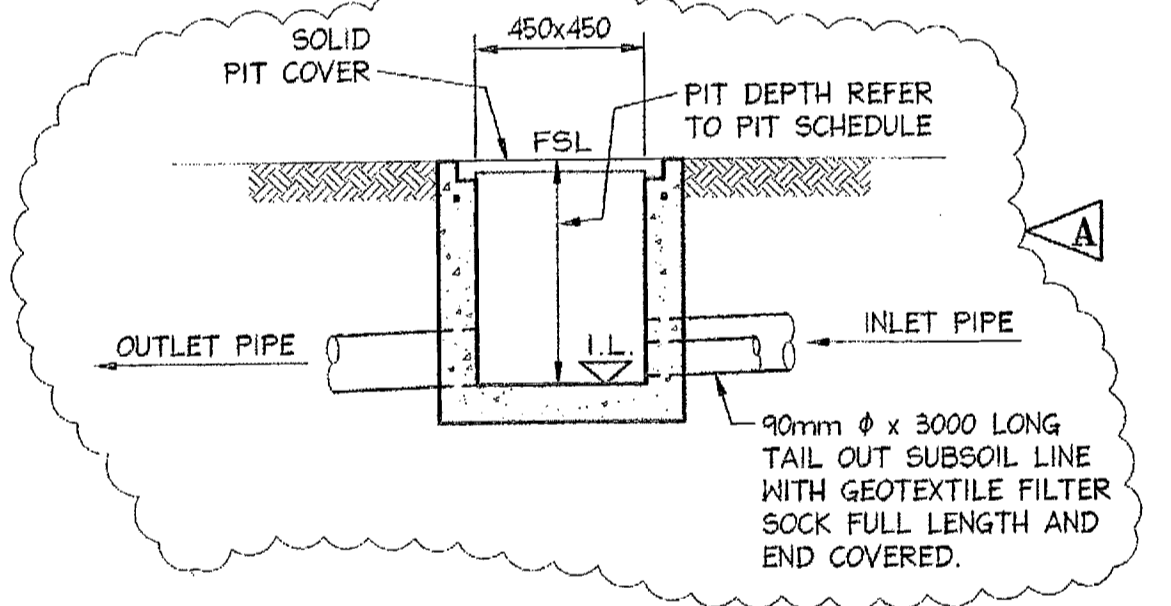
PRECAST OR CAST INSITU PIT REFER STORMWATER NOTES
GRATED PIT TYPE B DETAIL
SCALE = 1 : 20



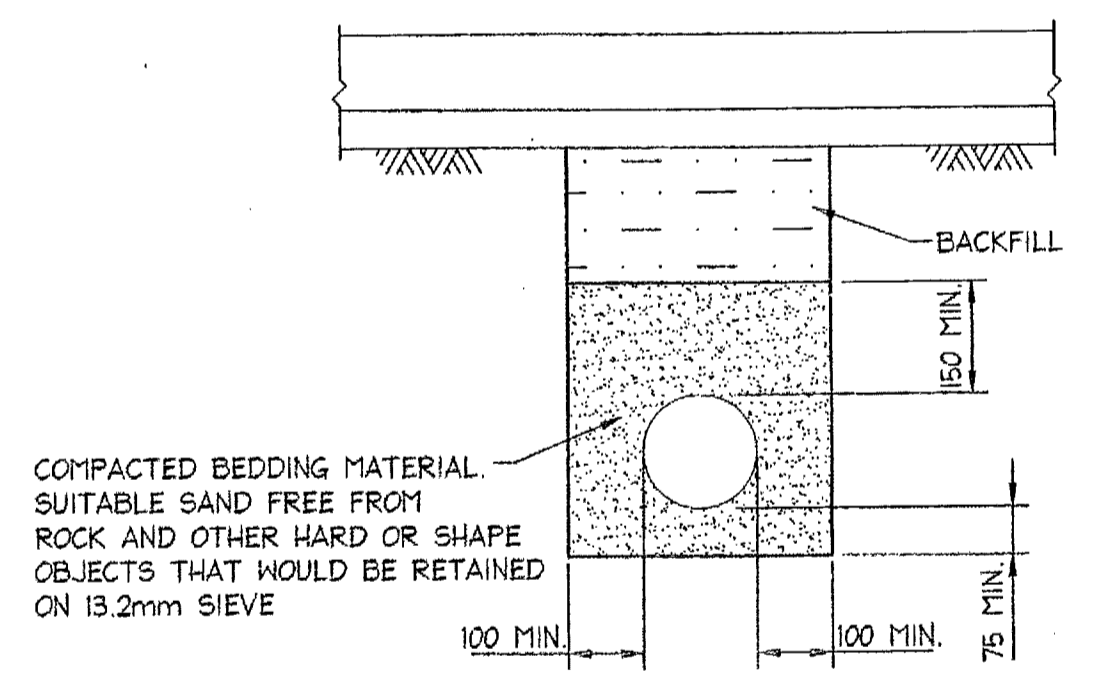
PRECAST OR CAST INSITU PIT REFER STORMWATER NOTES
SOLID LID PIT DETAIL
SCALE = 1 : 20



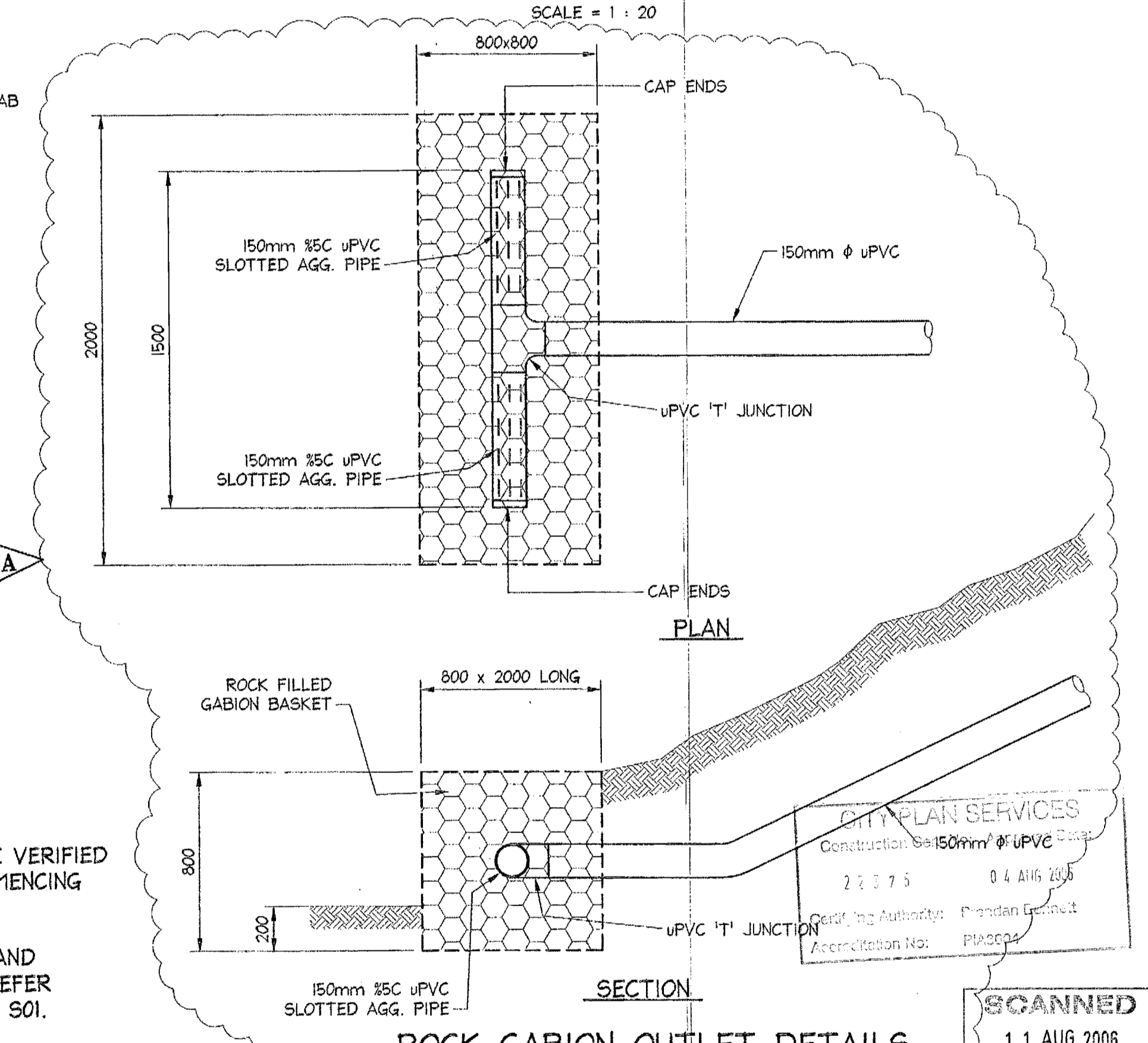
FLUSHING POINT DETAIL
SCALE 1:20
(DENOTED 'FP' ON PLAN).



PRECAST OR CAST INSITU PIT REFER STORMWATER NOTES
SUB SOIL LINE ACCESS PIT
(DENOTED 'AP' ON PLAN).
SCALE = 1 : 20



PIPE TRENCHING DETAIL
SCALE 1:20



ROCK GABION OUTLET DETAILS
SCALE = 1 : 20

NOTES:
THE INSTALLATION OF PIPE DRAINAGE BETWEEN PITS 14 - 15 - 16 - 19 SHALL BE AS FOLLOWS:
- DRAINS SHALL BE LAID IN SHALLOW TRENCHES EXCAVATED WITH THE MINIMUM GROUND DISTURBANCE, THE MINIMUM REMOVAL OF VEGETATION, AND SHALL HAVE A COVER OF ABOUT 300mm.
- HAND EXCAVATION METHODS SHALL BE EMPLOYED WHEREVER POSSIBLE AND THE USE OF EXCAVATION MACHINERY SHALL BE AVOIDED.
- DRAINS SHALL BE BEDDED DIRECTLY ON THE UNDISTURBED SOIL AT THE BASE OF THE TRENCH AND WHERE NECESSARY, SHALL BE SECURELY ANCHORED TO PREVENT THE HEIGHT OF THE PIPELINE BEING TRANSFERRED TO THE DOWNSTREAM PIPELINE.
- EXCAVATED MATERIAL SHALL BE USED FOR BACK FILLING AND BE THOROUGHLY COMPACTED BY HAND METHODS, TO ACHIEVE AS NEAR TO THE ORIGINAL SOIL DENSITY AS POSSIBLE.
- THE ORIGINAL TOPSOIL SHALL BE PLACED SO THAT THE FORMATION OF WATER COURSES IS PREVENTED.
- WHERE IT IS ANTICIPATED THAT WATER FROM ANY SOURCE MAY ENTER THE TRENCH EXCAVATION, LAYING AND BACK FILLING OF THE DRAIN SHALL BE CARRIED OUT IN SECTIONS NO LONGER THAN 3m.
- EVERY EFFORT SHALL BE MADE TO MINIMIZE THE TIME THAT THE TRENCHES ARE OPEN.

NOTE:
ALL GRATED AND SOLID PIT COVERS IN THE DRIVEWAY AND ROAD WORKS SHALL BE HEAVY DUTY.

TO BE CONSTRUCTED IN ACCORDANCE WITH STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND CODE AS/NZS 3500.3.2:1998

ANCHOR BLOCKS TO BE LOCATED AT THE BEND OR JUNCTION AT THE TOP AND BOTTOM OF THE INCLINED SITE STORMWATER DRAIN AND AT INTERVALS NOT EXCEEDING 3.0m

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

Date:	21.10.2004	Rev:	A	Amendment:	ALTERED AT CLIENTS REQUEST
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DOCUMENT CERTIFICATION
I am a qualified Structural/Civil Engineer.
I hold the following qualifications:
BE(CIVIL), CPENG, MIEAust, NFER,
Institute of Engineers' Membership No. 803988
I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian/Industry Standards.
Date: Nov 04
Rick G. Wray
(Director Northern Beaches Consulting Engineers)

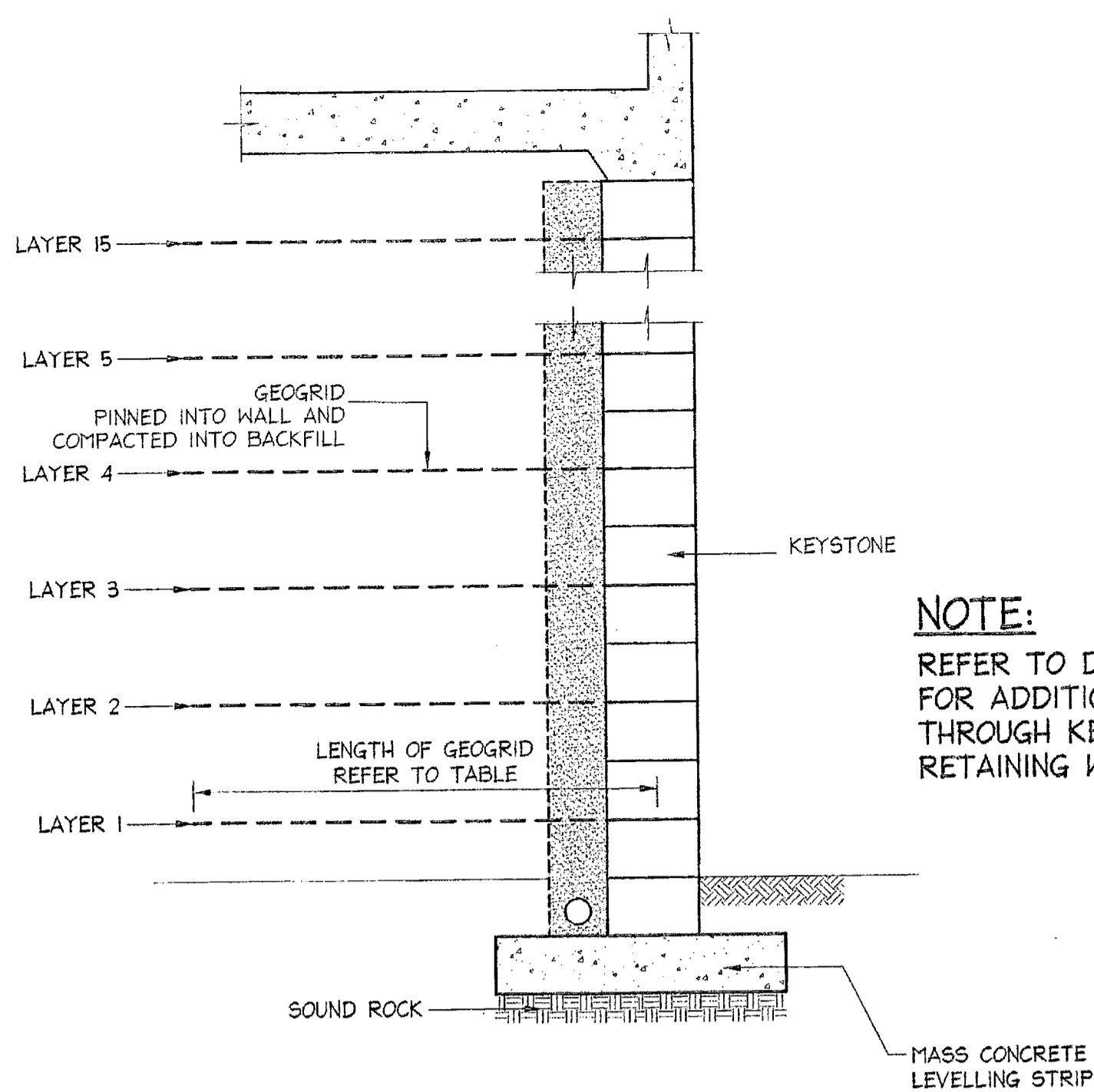
NORTHERN BEACHES Consulting Engineers P/L
A.C.N. 076 121 616 A.S.N. 24 076 121 616
Suite 207, 30 FISHER ROAD
DEESIDE NSW 2099
Ph: (02) 9884 7000 Fax: (02) 9884 7444
e-mail: nb@nbconsulting.com.au

Project: **PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development**

Drawing Title: **DRAINAGE DETAILS**
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Date:	Aug 2004	Design:	R.G.W.	Drawn:	Paul R Bruce	Checked:	ONEAust, NIDDAust.
Job No:	030963	Drawing No:	C26	Rev:	A	PITTWATER COUNCIL	

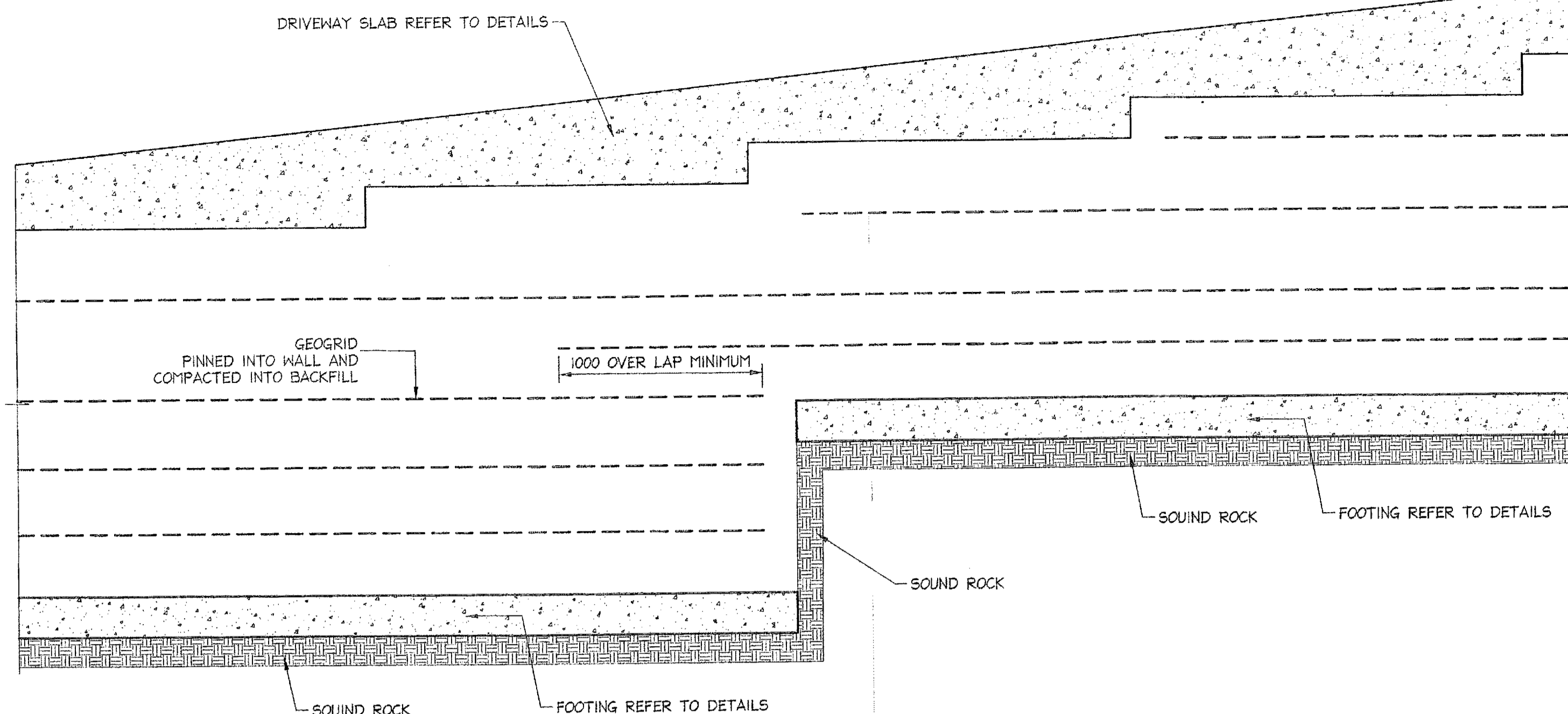
1107



TYPICAL KEYSTONE RETAINING SECTION

SCALE = 1 : 20

NOTE:
REFER TO DRAWING No. C09
FOR ADDITIONAL SECTIONS
THROUGH KEYSTONE
RETAINING WALLS



TYPICAL KEYSTONE RETAINING PART ELEVATION

SCALE = 1 : 20

GEOGRID TABLE - GX 35/35 - 7.5 kPa LIVE LOADING

WALL HEIGHT LAYER	1.5 m		2.5 m		3.5 m		4.5 m	
	HEIGHT	LENGTH	HEIGHT	LENGTH	HEIGHT	LENGTH	HEIGHT	LENGTH
1	0.2	1.2	0.2	1.7	0.2	2.2	0.2	2.9
2	0.6	1.2	0.4	1.7	0.4	2.2	0.4	2.9
3	1.2	2.0	0.8	1.7	0.6	2.2	0.6	2.9
4			1.2	1.7	0.8	2.2	0.8	2.9
5			1.6	1.8	1.0	2.2	1.0	2.9
6			2.2	2.6	1.4	2.2	1.2	2.9
7					1.8	2.2	1.4	2.9
8					2.2	2.2	1.6	2.9
9					2.6	2.4	1.8	2.9
10					3.2	3.2	2.0	2.9
11							2.4	2.9
12							2.8	2.9
13							3.2	2.9
14							3.6	3.0
15							4.2	3.8

GEOGRID TABLE - GX 50/30 - 7.5 kPa LIVE LOADING

WALL HEIGHT LAYER	1.5 m		2.5 m		3.5 m		4.5 m	
	HEIGHT	LENGTH	HEIGHT	LENGTH	HEIGHT	LENGTH	HEIGHT	LENGTH
1	0.6	1.6	0.2	1.7	0.2	2.2	0.2	2.8
2	1.2	2.0	0.4	1.7	0.8	2.2	0.6	2.8
3			1.0	1.7	1.4	2.2	1.0	2.8
4			1.6	1.9	2.0	2.2	1.4	2.8
5			2.2	2.6	2.6	2.5	1.8	2.8
6					3.2	3.2	2.4	2.8
7							3.0	2.8
8							3.6	3.1
9							4.2	3.8

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

PLANNED
1 AUG 2006
WATER COUNCIL

CITY PLAN SERVICES
Construction Cert. No. And. 01/03/03
2006 04 AUG 2006
Certifying Representative: [Signature]
Accreditation No.: PIAC004

AI	<p>DOCUMENT CERTIFICATION</p> <p>Date: 25/05/05 Rick G. Wray (Director Northern Beaches Consulting Engineers)</p>	<p>I am a qualified Structural/Civil Engineer. I hold the following qualifications: BE(Civil), CPEng, MIEAust., NPER, Institute of Engineers Membership No. 809188 I hereby state that this drawing is in compliance with the provisions of the Building Code of Australia and/or relevant Australian Industry Standards.</p>	<p>NORTHERN BEACHES Consulting Engineers P/L</p> <p>A.C.N. 078 121 818 A.B.N. 24 078 121 818 Suite 207, 30 FISHER ROAD DEE WYCH NSW 2009 Ph: (02) 9984 7000 Fax: (02) 9984 7444 e-mail: nb@nbconsulting.com.au</p>	<p>Project: PROPOSED ACCESS ROAD at: 1148-1152 Barrenjoey Road and 56 Palm Beach Road Palm Beach for: Raypond Development</p>	<p>Drawing Title: RETAINING WALL DETAILS SHEET 7</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Date:</td> <td>Design:</td> <td>Drawn:</td> <td>Checked:</td> </tr> <tr> <td>Oct. 2003</td> <td>R.G.W.</td> <td>Paul R Bruce CPEng, MIEAust., NPER</td> <td></td> </tr> <tr> <td>Job No:</td> <td>Drawing No:</td> <td>Rev:</td> <td></td> </tr> <tr> <td>030963</td> <td>C27</td> <td>-</td> <td></td> </tr> </table>	Date:	Design:	Drawn:	Checked:	Oct. 2003	R.G.W.	Paul R Bruce CPEng, MIEAust., NPER		Job No:	Drawing No:	Rev:		030963	C27	-	
Date:	Design:	Drawn:	Checked:																			
Oct. 2003	R.G.W.	Paul R Bruce CPEng, MIEAust., NPER																				
Job No:	Drawing No:	Rev:																				
030963	C27	-																				

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