

NAPIER CITY COUNCIL

APPLICATION FOR BUILDING CONSENT &/OR PROJECT INFORMATION MEMORANDUM

Section 33 or section 45, Building Act 2004

CITY OF
NAPIER



THE OWNER		AGENT/CONTRACTOR	
Name of owner: CP & KA PRATT		(required if application is being made on behalf of the owner)	
Mailing address: 74 CHURCHILL DRIVE TARADALE NAPIER		Name of agent: _____	
Daytime phone: 06 8441 877 HM 06 834 2412 NK		Mailing address: _____	
Cell phone: _____		Daytime phone: _____	
Fax number: _____		Fax number: _____	
Email address: _____		Cell phone number: _____	
		BC NUMBER: BC060030	

THE BUILDING	
Street address of building:	74 CHURCHILL DRIVE ✓ TARADALE NAPIER
Legal description:	Lot 41 ✓ DP 17313 ✓ UP9: 102936 ✓
Valuation number:	1009015400 ✓
Building name:	Number of levels/storeys: _____
Level/unit number:	_____
Current, lawfully established use: [include number of occupants per level and per use if more than 1] _____	
Year first constructed: _____	

CERTIFICATE OF TITLE	
CT Number:	K1/381
The Certificate of Title is to be current within three months of application	
Certificate Provided: ☐	Certificate Not Required: ☐ Certificate to be obtained on my behalf: ☒

PROJECT	
New building ☐	Alteration ☒ Relocation ☐ Demolition ☐
Intended life: Indefinite but not less than 50 years: ☐	Or specified as: _____ years
Area of proposed building work:	ADDITION TO DECK 9.4 m²
Description of work:	ADDITION TO EXISTING DECKING
Intended use(s) (in detail): RECREATIONAL	
Estimated value (include GST): \$ 3000.00	
Do you intend to: Cross lease: ☐	Subdivide: ☐ Rental flats: ☐

APPLICATION

I request that you issue a: Building Consent: ☐ PIM: ☐ Building Consent and PIM: ☒

For the building work described in this application

Please note: 1) Work must not commence prior to the issue of the consent
2) Applications not finalised within one month of contact or issue of invoice may be cancelled.
3) A \$100 deposit is required on Application. Remaining fees are payable at time of uplifting the consent

Signature of Owner/Agent on behalf of and with the authority of the owner

16.1.06
Date

The information which you have provided in this application is placed on the building register which is available for public inspection at Council offices. As a useful service for the building community, the Council provides monthly lists of this information. Tradespeople and manufacturers often use the lists to offer products or services available at the time of construction. They also provide important analysis of market trends and indicators to industry. The information from the building register is required to be supplied by the Council under the Building Act and Local Government Official Information and Meetings Act.

NOTE: You are advised to contact the relevant Electric Power Company and Gas Company for any requirements that either utility may have for your intended project.

MAIN CONTRACTORS

Designer: _____

Builder: _____

Plumber: _____

Drainlayer: _____

Gasfitter: _____

Electrician: _____

Other: _____

PROJECT INFORMATION MEMORANDUM

The following matters are involved in the project:

- | | |
|--|--------------------------|
| Subdivision | ☐ |
| Alterations to land contours | ☐ |
| New or altered connections to public utilities | ☐ |
| New or altered locations and/or external dimensions of buildings | ☐ |
| New or altered access for vehicles | ☐ |
| Building work over or adjacent of any road or public place | ☐ |
| Disposal or stormwater and wastewater | ☐ |
| Building work over any existing drains or sewers or in close proximity to wells or water mains | ☐ |
| Other matters known to the applicant that may require authorisations from the territorial authority* | ☐ |

*Specify: _____

BUILDING CONSENT

The building work will comply with the building code as follows:

- | | |
|---|---|
| ☐ HB New Zealand Building Code Handbook | ☐ F7 Warning systems |
| ☒ B1 Structure | ☐ F8 Signs |
| ☒ B2 Durability | ☐ G1 Personal hygiene |
| ☐ C1 Outbreak of fire | ☐ G2 Laundering |
| ☐ C2 Means of escape | ☐ G3 Food preparation and prevention of contamination |
| ☐ C3 Spread of fire | ☐ G4 Ventilation |
| ☐ C4 Structural stability during the fire | ☐ G5 Interior environment |
| ☐ D1 Access routes | ☐ G6 Airborne and impact sound |
| ☐ D2 Mechanical installations for access | ☐ G7 Natural light |
| ☐ E1 Surface water | ☐ G8 Artificial light |
| ☐ E2 External moisture | ☐ G9 Electricity |

continued...

- | | |
|--|---|
| ☐ E3 Internal moisture | ☐ G10 Piped services |
| ☐ F1 Hazardous agents on site | ☐ G11 Gas as an energy source |
| ☐ F2 Hazardous building materials | ☐ G12 Water supplies |
| ☐ F3 Hazardous substances and processes | ☐ G13 Foul water |
| ☒ F4 Safety from falling | ☐ G14 Industrial liquid waste |
| ☐ F5 Construction and demolition hazards | ☐ G15 Solid waste |
| ☐ F6 Lighting for emergency | ☐ H1 Energy efficiency |

COMPLIANCE SCHEDULE

The following specified systems are being altered, added to, or removed in the course of the building work:

- | | |
|---|--|
| ☐ CS1 Automatic sprinkler systems | ☐ CS8/3 Escalators and moving walks |
| ☐ CS2 Automatic fire doors | ☐ CS9 Mechanical ventilation and air conditioning systems |
| ☐ CS3 Emergency warning systems | ☐ CS10 Other mechanical, electrical, hydraulic or electronic systems |
| ☐ CS4 Emergency lighting systems | ☐ CS11 Building maintenance units |
| ☐ CS5 Escape route pressurisation systems | ☐ CS12 Signs |
| ☐ CS6 Riser mains | ☐ CS13 Means of escape |
| ☐ CS7 Automatic backflow preventers | ☐ CS14 Safety barriers |
| ☐ CS8/1 Passenger carrying lifts | ☐ CS15 Access and facilities for people with disabilities |
| ☐ CS8/2 Service lifts | ☐ CS16 Fire hose reels |
| ☐ No specified systems in the building | |

[specified systems are defined in regulations]

BUILDING DETAILS CHECKLIST

- | | |
|---|-------------------------------------|
| a) Two copies of building plans and specifications, showing all necessary plans, elevations, cross sections and details. | ☒ |
| b) Two copies of the site plan showing dimensions of the proposed building from boundaries of the site and easements within the site. The preferred scale is 1:200. | ☒ |
| c) Two copies of subfloor bracing design and calculation. Detail all pile types and fixings. | ☐ |
| d) Two copies of wall bracing design and calculations. Detail fixing of wall bracing elements. | ☐ |
| e) Two copies of truss layout and one copy of the design certificate. | ☐ |
| f) Two copies of all fire and egress details, full specification of fire wall construction, fire doors and windows etc | ☐ |
| g) Two copies of engineering calculations and drawings. A design certificate could reduce processing time. | ☐ |
| h) One copy of any supervision advice, where supervision is necessary. A report will be required after the engineer has finished his supervision. | ☐ |
| i) Two copies of ground test details and reports. | ☒ |
| j) One copy of the report of the ground nature and any steps to be taken to prevent a danger to the building from such things as falling debris. | ☐ |

Note: Ground that does not have a ground bearing capacity of 100 kPa will require to have the foundations specifically designed

- | | |
|---|--------------------------|
| k) One copy of a drainage block plan. Show boundary lines and outline of the building at a 1:200 scale. | ☐ |
| l) Two copies of all plumbing, drainage and stormwater details. | ☐ |
| m) Two copies of electrical details where required by the Building Act. | ☐ |
| n) Two copies of all mechanical services details i.e. sprinkler systems, lifts, air conditioning systems etc. | ☐ |
| o) Levels to be shown to establish site drainage. | ☐ |
| p) Details of backflow prevention. | ☐ |
| q) One copy of all test results i.e. percolation tests. | ☐ |

FEES, CHARGES, DEPOSITS

OFFICE USE ONLY

APPLICATION RECEIPT NUMBER:

399858

Date:

16.1.06

FINAL RECEIPT NUMBER:

403413

Date:

15.2.06

FEE	AMOUNT
Administration	\$ 160.00
Plan Check	\$ 66.00
BRANZ Levy	\$
DBH Levy	\$
Inspections	\$ 110.00
Compliance Schedule	\$
Water Connection	\$
Water Meter & Box	\$
Bay View Water Capital Contribution	\$
Sewer Connection	\$
Stormwater Connection	\$
Vehicle Crossing Bond	\$ -
Street Damage Deposit	\$ -
Microfiche Charge	\$ 10.00
Dev Control Engineer	\$
Planning Check	\$ 33.00
Resource Consent Fee	\$
Financial Contribution Infill Housing	\$

FEE	AMOUNT
Reserves Contribution Commercial/ Industrial	\$
Financial Contribution Infill Non Standard	\$
Water Capital Contribution	\$
Sewer Capital Contribution	\$
Stormwater Capital Contribution	\$
Reserves Contribution Rural/Bay View	\$
Copy Title Fee	\$ 25.00
Peer Review	\$
Section 73 Certificate	\$
Backflow Preventer	\$
Water Disconnection	\$
Stormwater Disconnection	\$
Sewer Disconnection	\$
Services Engineer	\$ 68.00
Roading Engineer	\$ -
Development Contribution	\$
Well Sealing	\$

Total \$ 472.00

Less Deposit Paid \$ 100.00

TOTAL AMOUNT DUE \$ 372.00



COMPUTER FREEHOLD REGISTER UNDER LAND TRANSFER ACT 1952




R. W. Muir
Registrar-General
of Land

Search Copy

Identifier **HBK1/381**
Land Registration District **Hawkes Bay**
Date Issued 04 February 1983

Prior References

HBJ4/904

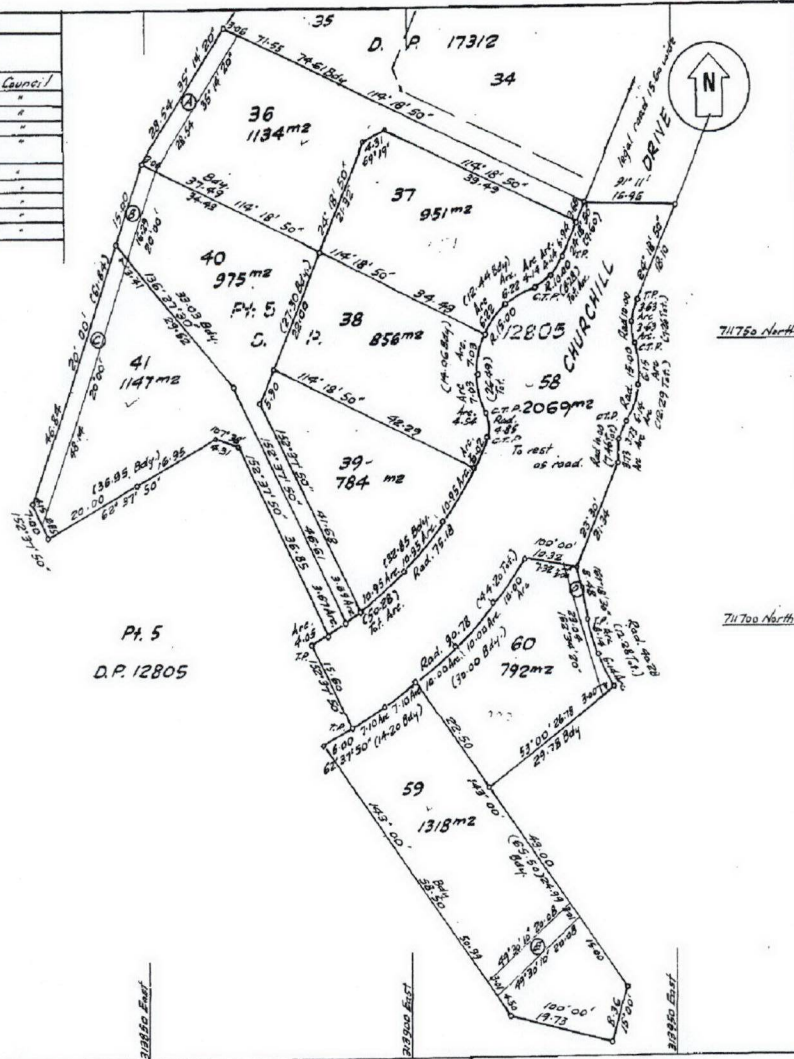
Estate Fee Simple
Area 1147 square metres more or less
Legal Description Lot 41 Deposited Plan 17313

Proprietors
Cayne Philip Pratt and Kathleen Ana Pratt

Interests

Subject to a right (in gross) to drain sewage and stormwater over part in favour of The Napier City Council created by Transfer 416592.11 - 4.2.1983 at 11.30 am
The easements created by Transfer 416592.11 are subject to Section 309 (1) (a) Local Government Act 1974
6399024.3 Mortgage to Westpac Banking Corporation - 28.4.2005 at 9:00 am

Memorandum of Easements			
Purpose	Letter	Servient Tenement	Grantee
Right to drain sewage	(A)	Pt Lot 36	Napier City Council
" " "	(B)	Pt Lot 40	" " "
" " "	(C)	Pt Lot 41	" " "
" " "	(D)	Pt Lot 60	" " "
" " "	(E)	Pt Lot 59	" " "
Right to drain stormwater	(F)	Pt Lot 36	" " "
" " "	(G)	Pt Lot 40	" " "
" " "	(H)	Pt Lot 41	" " "
" " "	(I)	Pt Lot 60	" " "
" " "	(J)	Pt Lot 59	" " "



This plan is concurrent with
D.P. 1731 and 1732

LAND DISTRICT	HAWKE'S BAY	PLAN OF LOTS 36-41 & 58-60
SURVEY BLK. & DIST. VII	HERETAUNGA	FORMERLY Pt. LOT 5 D.P. 12805
NZMS	SHEET NO. 163	

LOCAL AUTHORITY **NAPIER CITY**
DAGG AND THORN
Surveyed by _____
Scale 1:500 Date Oct. 1982

Pursuant to a resolution of the Napier City Council passed on the 22nd day of December 1982 approving under Section 305 of the Local Government Act, 1974 this plan of subdivision conditional upon the granting or reserving of the easements shown in the memorandum of easements endorsed hereon and certifying that the plan is in accordance with the requirements and provisions of the applicable district scheme the Common Seal of the Napier City Council has affixed hereto in the presence of:

Mayor

Town Clerk



Approved
By Common Seal of City of Napier
in witness whereof the Mayor
has hereunto set his hand and the
Town Clerk

Regd. Owner
Coordinates and in terms of
Cadastral Datum 1949
"A" Hawke's Bay 700,000 metres N
300,000 metres E

Total Area 1.0026 Ha.

Comprised in P.C.F. 14-90 45

I, Kenneth Frank Thorn, of Napier

Registered Surveyor and holder of an annual practicing certificate
do hereby certify that this plan has been made from surveys executed
by me or under my direction; that both plan and survey are correct
and have been made in accordance with the regulations under the
Surveyors Act 1906

Dated at Napier this 11th day
of October 1982 Signature K.F. Thorn

Field Book 1404 p. 6-17 Traverse Book 1404 p. 16-78

Reference Plans D.P. 12805

Examined by _____ Correct

Approved as to Survey _____

11/1/1983 _____ Chief Surveyor

Deposited this 11th day of February 1983

District Registrar

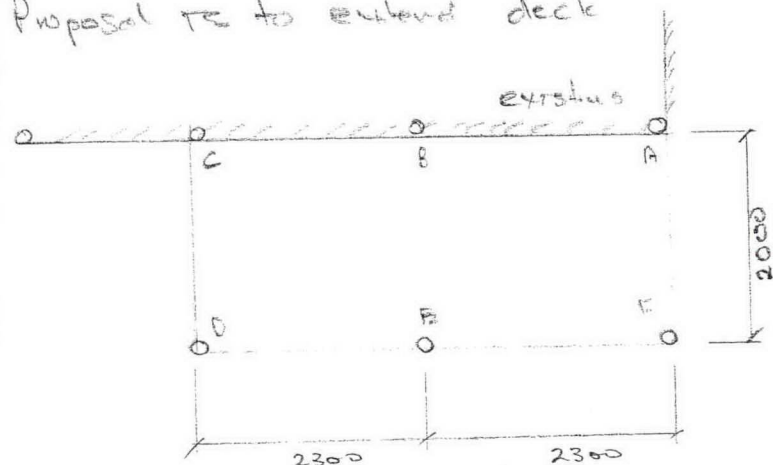
File _____
Received _____
Instructions _____

Sept 05

A CHURCHILL DRIVE : DECK

Refer to previous notes Nov. 2001

Proposal to extend deck

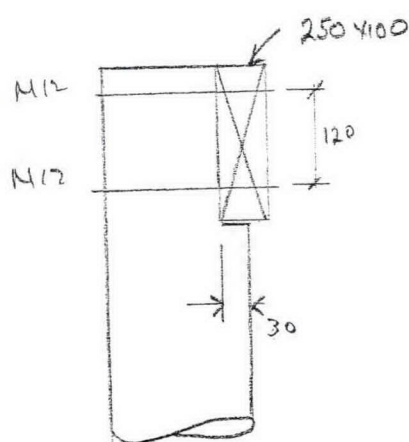
Deck: $G = 0.35 \text{ kPa}$ $\Phi = 2.0 \text{ kPa}$ JOISTS 150×50

at 400cc

- as prev.

Outer support Beam
(DEF)- existing = $194 \times 47 \text{ NO. 1 FR. GRADE}$ - remove this and/or repeat detail at
new outer support line

BEAM / Post at Point B



Support Beams ABC:

Max span 2300, $b_d = 2200$ $1.26 + 1.6 Q$ Max shear $V_x = 10.6 \text{ kN}$ / endover 2 spans = $2 \times 10.6 = 21.2 \text{ kN}$

For 250x100:

 $\Phi V_n = 42.9 \text{ kN}$ (Med) $\Phi M_n = 6.98 \text{ kNm}$ (" 1)Max $M_u = 5.27 \text{ kNm}$ - ok.

check sealing of nominal 30mm

$$q_{hb} = (21.2 \times 10^3) / (30 \times 175) = 4.0 \text{ MPa} < 8.9$$

Note
inner
existing
posts to
50mm.

INNER BEAM 250x100 NO. 1 FR.
TANALISED H3 - 2/M12 bolts
to poles

Page 122

Balustrade as previous -

DESIGN REPORT

Churchill drive
Beam ABClimit state
Timber_LimitGARY CLODE
10 Sept 2005

CHARACTERISTIC STRESSES

Youngs Modulus (E)	=	4.40E+03	mPa	Perm	K1	=	0.60
Char. Bending Stress (fb)	=	10.0	mPa	Med	K1	=	0.80
Char. Shear Stress (fs)	=	3.8	mPa	Brief	K1	=	1.00
Char. Axial Stress (fc)	=	15	mPa	Parl	K4	=	1.14
Char. Tens. Stress (ft)	=	4	mPa	Other		=	1.00

LOADS

Dead Load, G	=	0.35	kPa	UDL Dead	=	0.77	kN/m
Live Load, Q(P=perm, M=med, B=brief)	=	2.00	kPa	M UDL Live	=	4.40	kN/m
Wind Load (-ve) W	=	-0.70	kPa	UDL Wind	=	-1.54	kN/m
Point Load (@ aL, bL) P	=	1.80	kN	L For Pt Load DEAD or LIVE (D or L)			

Weight along beam (DEAD)	=	0	kN/m	" b min	=	0.5
Weight along beam (LIVE)	=	0	kN/m			
Axial Load (Tension -ve) N	=	0	kN	D Dead, Live, Wind, D, L, W		

BEAM DETAILS

Width (b)	=	94	mm	1.4(G)	=	1.24	kN
Depth (d)	=	247	mm	1.2(G) + 1.6(Q + P)	=	10.60	kN
Spacing (s)	=	2200	mm	1.2(G) + Qu + W + P	=	1.68	kN
Span (L)	=	2300	mm	0.9(G) + W	=	0.97	kN
Effect. Length (Lax)	=	2300	mm	DESIGN ϕ Vn	=	32.2	Perm
Effect. Length (Lay)	=	2300	mm		=	42.9	Med
(For tens edge restr Lay = t)					=	53.6	Brief

SECTION MODULUS	=	9.56E+05	mm ³	Slenderness Coeff		
MOMENT OF INERTIA	=	1.18E+08	mm ⁴	Bending S1	=	10.4
Effective length factor (K10)	=	1.00		Axial S2 =	=	9.3
B.M. Coefficient (C1)	=	0.1250		Axial S3 =	=	24.5
B.M. Coefficient (C2)	=	0.2500		M = C1 * W * L ²		
Deflection Coeff (C3)	=	0.0130		M = C2 * P * L		
Deflection Coeff (C4)	=	0.0208		D = C3 * W * L ⁴ /EI		
				D = C4 * P * L ³ /EI		

Bending Stability Factor (K8)	=	1.00		Creep Factor K2	=	2
LL COMB FACTOR ψ_{li}	=	0.40		Defln. Short ψ_s	=	0.7
STR REDUCT FACTOR ϕ	=	0.80		Defln. Long ψ_l	=	0.4

BENDING MOMENT (FACTORED)

				DESIGN STRENGTH ϕ Mn	Factored / Strength
1.4(G)	=	0.71	kNm OK	5.23	0.14
1.2(G) + 1.6(Q + P), for P=0	=	5.27	kNm OK	6.98	0.75
1.2(G) + 1.6(Q + P), for Q=0	=	2.27	kNm OK	8.72	0.26
1.2(G) + Qu + W + P	=	1.17	kNm OK	8.72	0.13
0.9(G) + W	=	-0.56	kNm OK	8.72	0.06

DEFLECTION

		Short	Long	WITH CREEP
1.0(G)	=	0.5	mm	1.1
1.0(G) + 1.0(Qs + Ps)	=	3.3	mm	2.1
1.0(G) + Qs + Ws + Ps	=	2.2	mm	2.9
1.0(G) + Ws	=	-0.5	mm	

MAXIMUM DEFLECTION

0.003 * L	=	6.9	mm	Dead	=	0.89
0.004 * L	=	9.2	mm	Live	=	5.96
0.006 * L	=	13.8	mm	Dead + Wind	=	-0.89

AXIAL

Design Axial Load N*c	=	0.00	kN	compression		
Nominal Strength ϕ Nncx	=	N/A	kN	K8 =	=	1.00
Nominal Strength ϕ Nncy	=	N/A	kN	K8 =	=	0.48
Nominal Strength ϕ Nnt	=	N/A	kN			

Combined bending about XX axis and axial compression

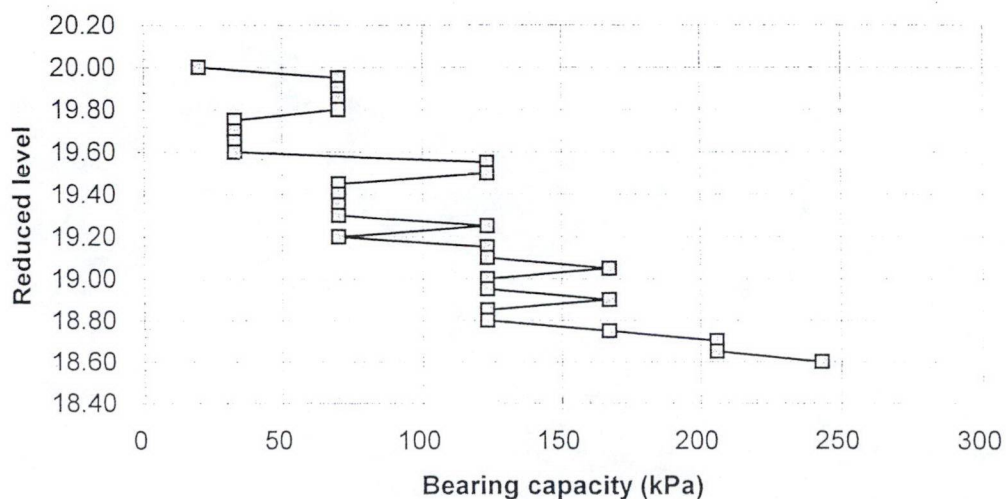
Bending Ratio =	0.75	Combined Ratios		
Compression Axial Ratio x =	N/A	Equation 3.23	=	0.75 OK
Compression Axial Ratio y =	N/A	Equation 3.24	=	0.57 OK
Tension Axial ratio =	N/A	Equation 3.25	=	0.75 OK

BEAM SIZE = 250 * 100 No 1 Framing Grade

TITLE : Lawrence: 74 Churchill Drive
 DESCRIPTION: BEARING CAPACITIES kPa

G CLODE
 03 November 2001

TEST No.	1.00					
DEPTH (m)	No OF BLOWS	REDUCED LEVEL	mm/BLOW	INDICATED BEARING CAPACITY	BLOWS PER 75mm	
0.00	0.00	20.00	0	20		
0.05	1.00	19.95	50	70		
0.10	1.00	19.90	50	70		
0.15	1.00	19.85	50	70	1.50	
0.20	1.00	19.80	50	70		
0.25	0.50	19.75	100	33		
0.30	0.50	19.70	100	33	1.00	
0.35	0.50	19.65	100	33		
0.40	0.50	19.60	100	33		
0.45	2.00	19.55	25	123	1.50	
0.50	2.00	19.50	25	123		
0.55	1.00	19.45	50	70		
0.60	1.00	19.40	50	70	2.00	
0.65	1.00	19.35	50	70		
0.70	1.00	19.30	50	70		
0.75	2.00	19.25	25	123	2.00	
0.80	1.00	19.20	50	70		
0.85	2.00	19.15	25	123		
0.90	2.00	19.10	25	123	2.50	
0.95	3.00	19.05	17	167		
1.00	2.00	19.00	25	123		
1.05	2.00	18.95	25	123	3.50	
1.10	3.00	18.90	17	167		
1.15	2.00	18.85	25	123		
1.20	2.00	18.80	25	123	3.50	
1.25	3.00	18.75	17	167		
1.30	4.00	18.70	13	206		
1.35	4.00	18.65	13	206	5.50	
1.40	5.00	18.60	10	243		



POLES: As previous, seismic critical.

G + Q_s + E

Line ABC total effective area = $1.2 \times 6.5 = 7.8 \text{ m}^2$

This now increased by $1.0 \times 4.6 = \frac{4.6 \text{ m}}{11.8 \text{ m}^2}$

$$C_{ph} = 0.5(RZL_u) = (0.5 \times (4 \times 1.2 \times 1)) = 0.6$$

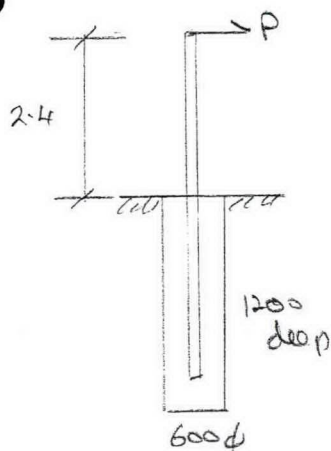
$$T_{ph} = 0.6 \times 11.8 \times (0.35 + 0.4 \times 2.0) = 8.1 \text{ kN}$$

This taken over at least 3 posts = $\frac{8.1}{3} = \underline{2.7 \text{ kN}}$

For Outer posts DEF

effective area = $4.6 \times 1.0 = 4.6$

$$\text{Load / pole} = \left(\frac{4.6}{11.8} \right) \times 2.7 = \underline{1.1 \text{ kN}}$$



For scale results, q_a increasing with depth

Refer plot

Footings 1200 deep $\times$ 600 dia

Note: deflⁿs at ultimate = 18.6 mm & o.k. but:

- M12 rod bracing permissible in row ABC if serviceability deflections unsatisfactory.

- Other poles same as previous.

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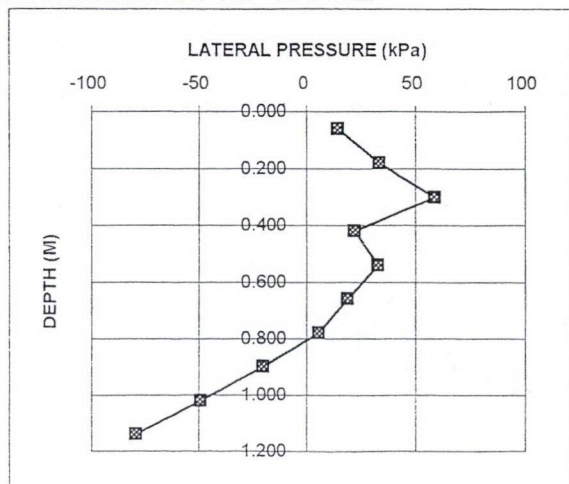
FLEXIBLE PILE (SUBGRADE REACTION METHOD)				G. CLODE	
Churchill Drive				10 Sept 2005	
BASIC HORIZONTAL FORCE	2.700 kN	LOAD FACTOR=	1.000		
HORIZONTAL FORCE (factored load)	2.700 kN		included		
HEIGHT TO TOP OF POLE	2.400 m				
HGT ABOVE GL TO FORCE	2.400 m	(as ratio of max.pressure)			
DEPTH BELOW GL TO BASE	1.200 m	DEPTH	RATIO		
BASE WIDTH	0.6 m	0.06	0.100		
NUMBER OF SPRINGS (n)	10.000	0.18	0.270		
SPRING SPACING (s)	0.120 m	0.3	0.570		
		0.42	0.270		
SOIL WEIGHT	18 kN/m3	0.54	0.570		
SOIL FRICTION ANGLE	15 Degrees	0.66	0.570		
SOIL COHESION	20 kPa	0.78	0.790		
CONSTANT	1.8153	0.9	1.000		
TERZAGHI FACTOR Nq	4.4	1.02	1.000		
TERZAGHI FACTOR Nc	12.9	1.14	1.000		
TERZAGHI FACTOR Ng	1.3				
STRENGTH REDUCTION	0.60	Depth limit on	N		
ULTIMATE BEARING Qu	375 kPa	Ks (Y or N)			
RELIABLE ULTIMATE (= Qu*St. red)	225 kPa	at a depth Z =	0.45 m		
ALLOWABLE BEARING Qa (service)	125 kPa	Safety factor =	3		

SPRING DEPTH	COEFF. SUBGR REACT	UNIT SPRING DISPLACE	UNIT SPRING FORCE	MOMENTS ABOUT BOT SPRING	FINAL SPRING FORCE	SOIL PRESS	BENDING MOMENTS
m	MN/m3	mm	kN		kN	kPa	kNm
0.060	3	1.000	0.237	0.256	1.03	14	6.6
0.180	9	0.840	0.554	0.531	2.41	33	6.8
0.300	20	0.680	0.972	0.817	4.24	59	6.8
0.420	10	0.521	0.362	0.260	1.58	22	6.2
0.540	21	0.361	0.543	0.326	2.36	33	5.4
0.660	21	0.201	0.310	0.149	1.35	19	4.3
0.780	30	0.041	0.090	0.032	0.39	5	3.1
0.900	39	-0.119	-0.337	-0.081	-1.47	-20	1.8
1.020	40	-0.278	-0.809	-0.097	-3.52	-49	0.7
1.140	41	-0.438	F10	0.000	-5.67	-79	0.0

1.922 2.194 2.70
-0.620 0.620 FORCE FOR UNIT DISPLACEMENT

F10= -1.302 Calc

TRIAL ROTATION mm/M = 1.332 0.000
SPRING DISPLACEMENT (TABLE) Y1= -0.438 Stop trial rotations when
F10/STIFFNESS=DISPLACEMENT Y2= -0.438 displacements Y1=Y2
GROUND LINE LATERAL DISPLACEMENT 4.7 mm
CENTRE ROTATION BELOW GL 0.811 m pile rotation= m/m
DISPLACEMENT AT HORIZONTAL FORCE 18.6 mm 5.80E-03
DISPLACEMENT AT TOP OF POLE 18.6 mm



RANGE OF LATERAL SUBGRADE REACTION

SOIL	Qa kPa	Ks MN/m3
Compact gravel	320	220 - 400
Loose gravel	160	20 - 80
Medium dense coarse sand	215	160 - 300
Medium sand		20 - 160
Fine sand or silty sand		40 - 100
Clay soft (Qu < 200 kPa)	70	2 - 20
Clay med. (200 < Qu < 400)	150	40 - 140
Clay stiff (Qu > 800)	300	60 - 220

(halve clay values if saturated)