Proposed Load Testing for Mega Anchor Products

Introduction:
A selection of mega anchor products will be load tested to determine different loading capacities with different length piles. This will include mainly Down Load & Upload capacities. The data will be considered in calculations for general building and construction and solar structures. Mega Anchor products will be subject to multiple load tests under controlled conditions. The tests will also test tensile strength of Mega Anchor products and fixings.
Maximum Load test will not exceed 90KN Download & 45KN upload. All anchors will be installed as per design compliance drawing S2 for 30KN support.
All test will be filmed.

Testing Plan:
Test Date: 12/04/2014
Test Location:
Travers Lane, Heathcote, Victoria, Australia

Tests will be carried out on Mega Anchor products as described below.
MA1# Heavy Duty Mega Anchor
MA15# Heavy Duty Mega Anchor Flat Top

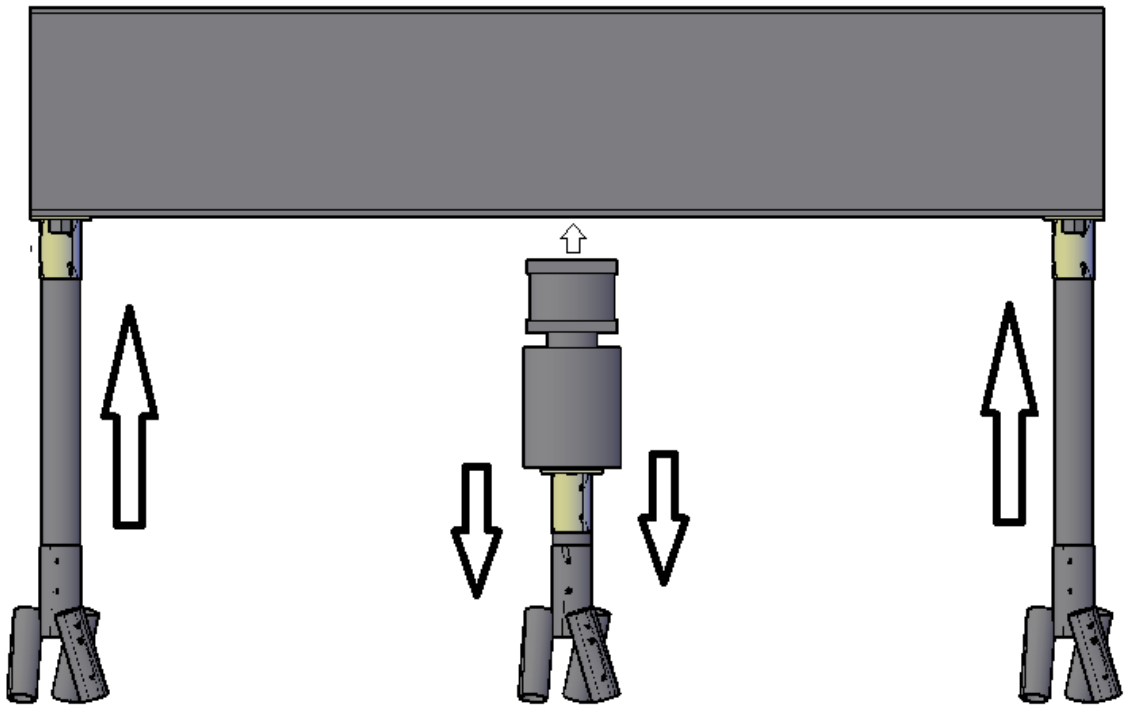
Each test will consist of 3 anchors being installed in close proximity of each other. The anchors will be installed in a straight line, multiple tests will be conducted on anchors installed with different pile depths. A bearer will span the 3 anchors with a 20t hydraulic Jack and 20t load cell placed between the centre anchor and the bearer the anchors on the end will be attached directly to the bearer.

Test Plan Details:

Items Required:

Item	QTY
MA1# Heavy Duty Mega Anchor	6
MA15# Heavy Duty Flat Top	9
Risers 50NB Gal Pipe	9
900mm Piles 32NB Pipe 2mm Gal	9
1200mm Piles 32NB Pipe 2mm Gal	9
1500mm Pipe 32NB Pipe 2mm Gal	9
Tek screws 14g class 4 20x22	300
Bolts nuts & 4mm washes M14	4
Bearer / Beam 350mm I Beam	1
20t (tonne) Hydraulic Jack	1
20t (tonne) Load Cell	1
Load Cell Display	1
Video Camera	1
Still Camera	1
Mega Anchor Standard Installation Tool Set	1

Testing Diagram:



1st Test MA1# MA15# 900MM Piles

3 MA1# Heavy Duty Mega Anchors will be installed. The 3 anchors will be installed in a line. The hydraulic jack and load cell will be placed on the middle Anchor and the other 2 MA1# anchors fitted with the MA15# Flat Top will attach directly to the bearer. The 2 MA1# anchors on the outside of the beam will be tested for uplift and the centre anchor will be tested for down force. The Anchors will have a set pile depth of 900mm with the piles penetrating 750mm into the ground. It has been calculated that the 2 outer anchors will share the uplift force making the uplift force approximately half the download force applied to the middle anchor.

Items Required:
3 x MA1#
3 x MA15#
1 x 20t Hydraulic Jack
1 x 20t Load Cell + Display
9 x 900mm piles
Screws & Bolts

2nd Test MA1# MA15# 1200MM Piles

3 MA1# Heavy Duty Mega Anchors will be installed. The 3 anchors will be installed in a line. The hydraulic jack and load cell will be placed on the middle Anchor and the other 2 MA1# anchors fitted with the MA15# Flat Top will attach directly to the bearer. The 2 MA1# anchors on the outside of the beam will be tested for uplift and the centre anchor will be tested for down force. The Anchors will have a set pile depth of 1200mm with the piles penetrating 1050mm into the ground. It has been calculated that the 2 outer anchors will share the uplift force making the uplift force approximately half the download force applied to the middle anchor.

Items Required:
3 x MA1#
3 x MA15#
1 x 20t Hydraulic Jack
1 x 20t Load Cell + Display
9 x 1200mm piles
Screws & Bolts

3rd Test MA1# MA15# 1500MM Piles

3 MA1# Heavy Duty Mega Anchors will be installed. The 3 anchors will be installed in a line. The hydraulic jack and load cell will be placed on the middle Anchor and the other 2 MA1# anchors fitted with the MA15# Flat Top will attach directly to the bearer. The 2 MA1# anchors on the outside of the beam will be tested for uplift and the centre anchor will be tested for down force. The Anchors will have a set pile depth of 1500mm with the piles penetrating 1350mm into the ground. It has been calculated that the 2 outer anchors will share the uplift force making the uplift force approximately half the download force applied to the middle anchor.

Items Required:
3 x MA1#
3 x MA15#
1 x 20t Hydraulic Jack
1 x 20t Load Cell + Display
9 x 1500mm piles
Screws & Bolts

Test Results

1st Test

Load Direction	Uplift	Download	Uplift	
Anchor	MA1#	MA1#	MA1#	Max Load Applied
Pile Length	900	900	900	3000KG
Pile Ground Penetration	750	750	750	
Down Load Applied	NA	3000KG	NA	
Up Load Applied	1500KG	NA	1500KG	
Point Of failure Load	1500KG	None	1500KG	
Type Of failure	Lifting	NA	Lifting	
Damage to Product	None	None	None	

Pile Log

Anchor No	Pile 1	Pile 2	Pile 3	Practical Refusal
1	750	750	750	N
2 (Centre Anchor)	750	750	750	N
3	750	750	750	N

Conclusion

The test results indicate that 900mm piles that penetrate 750mm can withstand an upload force of approximately 1500KG before the anchor starts to lift. No damage was sustained to the anchor, fixings or any attachments. This test also indicates that although the anchor piles were not installed to practical refusal they were still able to withstand down load forces up to 3000KG.


Anchor Test Setup 900mm Piles


Beam Bolted To MA15# Flat Top


Centre Anchor
900mm piles


Anchor Test 900mm Piles 2000KG Load

Mega Anchor Product Testing

2nd Test

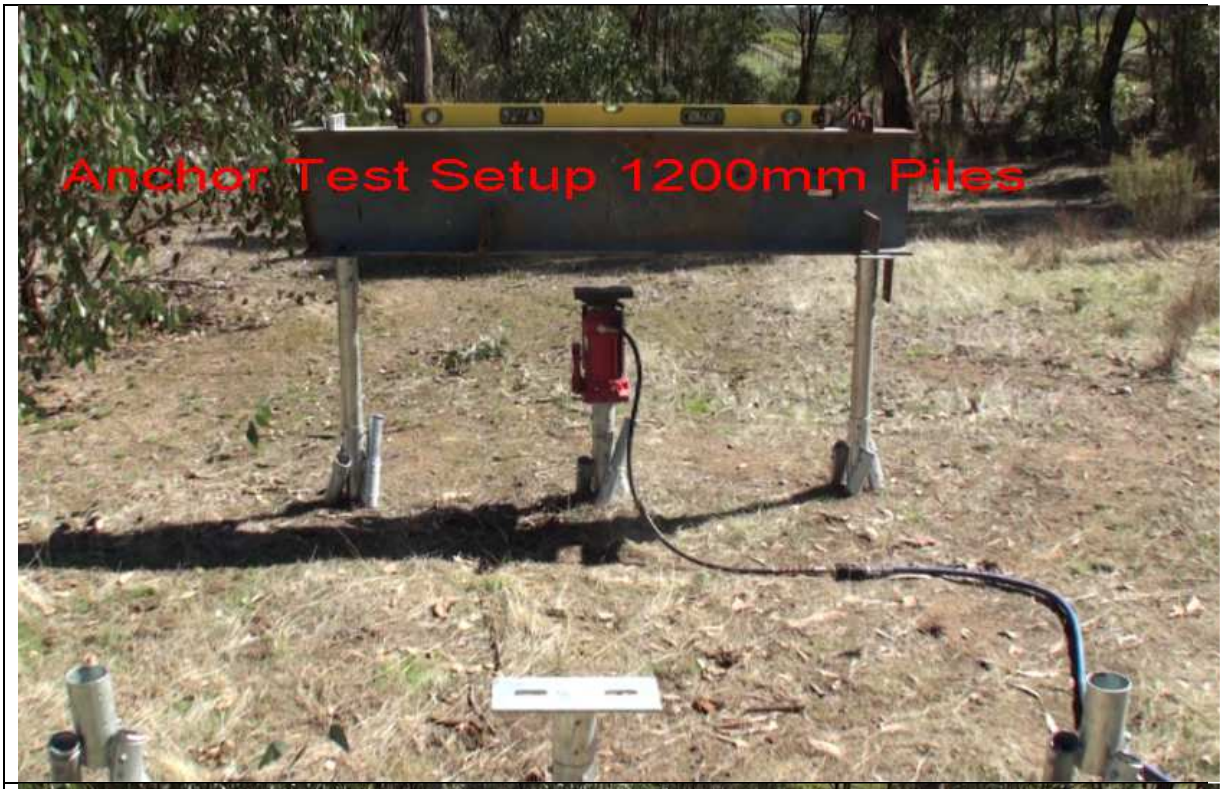
Load Direction	Uplift	Download	Uplift	
Anchor	MA1#	MA1#	MA1#	Max Load Applied
Pile Length	1200	1200	1200	4700
Pile Ground Penetration	1050	1050	1050	
Down Load Applied	NA	4700KG	NA	
Up Load Applied	2350	NA	2350	
Point Of failure Load	None	None	2000KG	
Type Of failure	None	None	Lifting	
Damage to Product	None	None	None	

Pile Log

Anchor No	Pile 1	Pile 2	Pile 3	Practical Refusal
1	1050	1050	950	Y
2	1050	1050	1050 /N	Y/N
3	1050	1050	950	Y

Notes

The test results indicate that 1200mm piles that penetrate 1050mm can withstand an upload force of approximately 2350KG before the anchor starts to lift. No damage was sustained to the anchor, fixings or any attachments.
This test also indicates that anchor piles installed to practical refusal were able to exceed the design load of the Mega Anchor and withstand down forces up to 4700KG without failure.


Anchor Test Setup 1200mm Piles


Anchor Test 1200mm Piles 4000KG Load

Mega Anchor Product Testing

3rd Test

Load Direction	Uplift	Download	Uplift	
Anchor	MA1#	MA1#	MA1#	Max Load Applied
Pile Length	1500	1200	1500	8000KG
Pile Ground Penetration	1350	1050	1350	
Down Load Applied	NA	8000KG	NA	
Up Load Applied	4000 KG	NA	4000 KG	
Point Of failure Load	Between 3500KG – 4000KG	5500KG 7600KG	Between 3500KG – 4000KG	
Type Of failure	MA15# Flat Top Connection Welds Failure	Push down Into Ground At 5500KG Riser Tek Screw Sheer At 7600KG	MA15 Flat Top Connection Welds Failure	
Damage to Product	Flat Top	No	Flat Top	

Pile Log

Anchor No	Pile 1	Pile 2	Pile 3	Practical Refusal
1	1180	1350	1300	Y
2	1050	1050	950	Y
3	1350	1350	1350	Y

Notes

The test results indicate that 1500mm piles that penetrate 1350mm can withstand an upload force in excess of 4000KG however it was observed that the MA15# flat top was the first component to fail in this test with the flat top connection welds breaking when the load applied exceeded 3500KG. There was some deflection in the centre anchor at loads between 5000KG & 8000KG but no physical breaks or destructive damage to the anchor. The centre anchor was installed with 1200mm piles. At the higher end of the load testing, the fixings on the anchor gave way between 7000KG & 8000KG. This test also indicates that anchor piles installed to practical Refusal were able to exceed the design load of the Mega Anchor and withstand down forces up to 5500KG without failure and loads up 7000KG before Tek screw sheer.

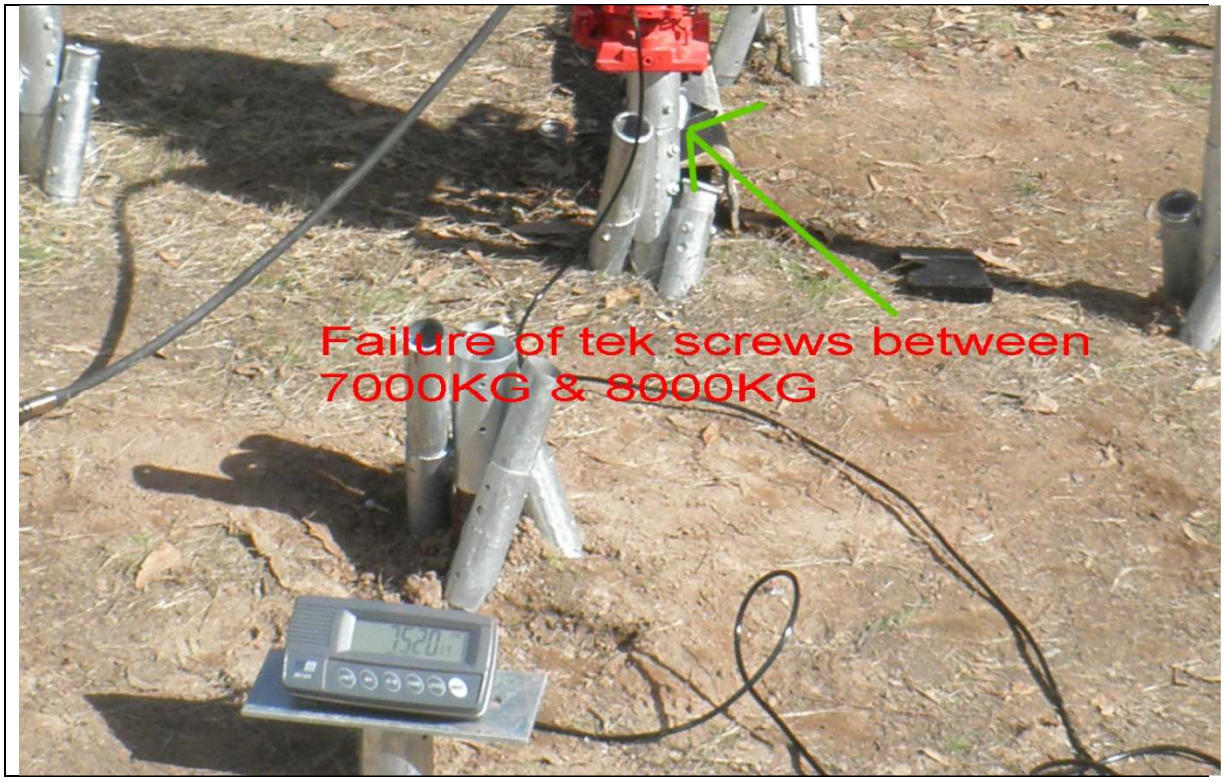

Anchor Test Setup 1500mm Piles
With 1200 piles In Centre Anchor


4000KG Load


6000 KG Load
6040


Flat Top Failure
7500 KG


Failure of flat top between 7000KG & 8000KG


Failure of tek screws between
7000KG & 8000KG

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PH / FAX: +613 9438 1612 Email: - megaanchor@gmail.com Website: - www.mega-anchor.com

Mega Anchor Pile Test

A pile test was conducted to determine the depth of the piles for the Mega Anchor foundation system. A pile was driven to practical refusal on the specified site in the location where the building will be situated. The test details are outlined below.

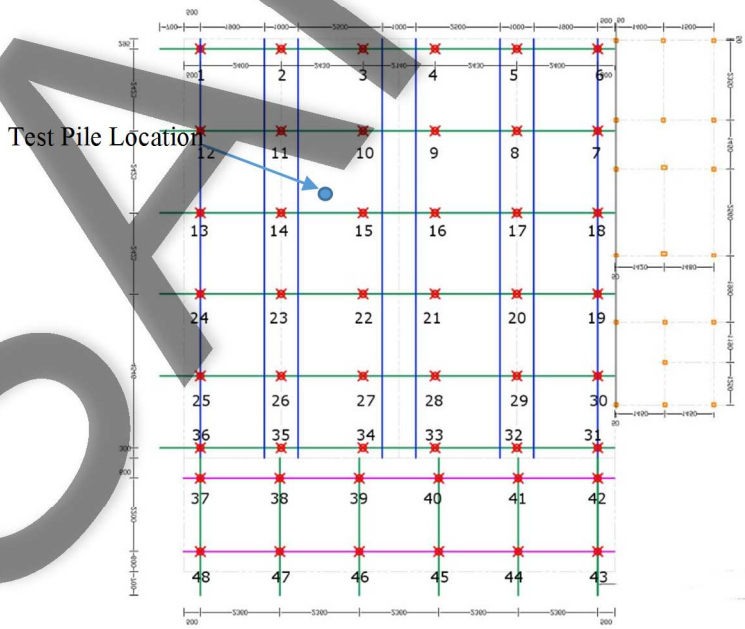
Site Address:	Test Pile	Date 13.10.2015
Johnson Rd, Claymore, NSW	32 NB Galvanized Pipe 2mm Wall thickness	

Practical Refusal for Mega Anchor Pile Test
Pile Driver: 45 Joules @ 1300BPM
Pile penetration: 5mm / 10 seconds

Test Pile: 1
This test pile was driven to practical refusal on site in the location outlined in figure 1, Test pile location. The test pile reached practical refusal at 910mm

Test Pile Material	Test Pile Length	Pile Penetration	Driver	Recommended Pile depth
32 NB Galvanized Pipe 2mm Wall Thickness	2000mm	910mm	45 Joule Demolition Hammer	1100mm

Figure 1:



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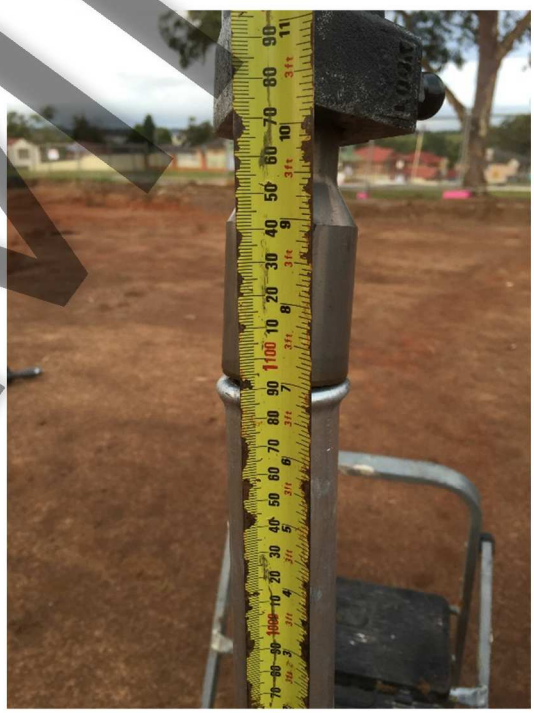

CERTIFICATE NUMBER NP F9206

A Noble & Son Ltd.

A.B.N. 18 007 513 395

TESTED LIFTING GEAR & MINING EQUIPMENT SPECIALISTS

WESTERN AUSTRALIAN DIVISION

50 Kewdale Road Welshpool WA 6106 P.O. Box 355, Welshpool DC WA 6986 Telephone: (08) 9358 5266 Facsimile: (08) 9451 3866
Email: perthsales@nobles.com.au Website: www.nobles.com.au

CERTIFICATE OF TENSILE TEST AND EXAMINATION

QUANTITY	DISTINGUISHING MARKS	DESCRIPTION	LOAD APPLIED	WORK LOAD LIMIT
1	NPF9206	PULL TO FAILURE TEST WAS COMPLETED ON A MEGA ANCHOR ANCHOR FAILED AT 8.05T ANCHOR WAS INSTALLED IN A SAND/CLAY BASE TEST LOCATION: ON SITE/VIVASH LOAD CELL#: 97823	78.9 kN	N/A

"Where A. Noble & Son Ltd carry out proof tests on goods which are not their manufacture they are not responsible for the final integrity of the product if a proof test and careful visual inspection by a competent person does not identify any short-comings in design or manufacture."

The Goods covered by this certificate have been examined and tested in accordance with the specified requirements.

DATE OF TEST: 23/03/2011

TEST SPECIFICATION: WT029

OUR REFERENCE: 789076

CUSTOMER ORDER No.: PCN0027/500283

A LOAD OF **AS SPECIFIED** WAS APPLIED
WHICH REPRESENTS ..... THE W.L.L.

AFTER REMOVAL OF THE LOAD, EACH ITEM WAS EXAMINED BY A COMPETENT OFFICER AND FOUND TO BE FREE FROM PERMANENT SET, FLAW OR OTHER VISUAL DEFECT, AND COMPLIES WITH THE REQUIREMENTS OF THE TEST.

TO: **PINDAN CONTRACTING PTY LTD**
UNIT 8/1 LONGFELLOW CT
BELMONT WA 6104

NATA Accredited Laboratory
Number: 1836

This Laboratory is accredited by the National Association of Testing Authorities, Australia. The test(s) reported herein have been performed in accordance with its terms of accreditation. This document shall not be reproduced except in full.

Approved NATA Signatory MURRAY TOZER

Date - 8 APR 2011

CERTIFICATE NUMBER NP F9207

A Noble & Son Ltd.

A.B.N. 18 007 513 395

TESTED LIFTING GEAR & MINING EQUIPMENT SPECIALISTS

WESTERN AUSTRALIAN DIVISION

50 Kewdale Road Welshpool WA 6106 P.O. Box 355, Welshpool DC WA 6986 Telephone: (08) 9358 5266 Facsimile: (08) 9451 3866
Email: perthsales@nobles.com.au Website: www.nobles.com.au

CERTIFICATE OF TENSILE TEST AND EXAMINATION

QUANTITY	DISTINGUISHING MARKS	DESCRIPTION	LOAD APPLIED	WORK LOAD LIMIT
1	NPF9207	PROOF LOAD TEST CARRIED OUT ON CUSTOMERS OWN MEGA ANCHOR TO CUSTOMERS NOMINATED LOAD 68.67 kN IN ACCORDANCE WITH NOBLES INTERNAL NON DESTRUCTIVE TEST PROCEDURE. NO DRAWINGS/MATERIAL CERTIFICATES OR WELDERS QUALIFICATION SITED. MANUFACTURED BY: PINDAN THE EQUIPMENT SHOWED NO DELITERIOUS EFFECTS AT THE TIME OF LOAD TEST TEST LOCATION: NOBLES PERTH LOAD CELL#: 97823 "Where A. Noble & Son Ltd carry out proof tests on goods which are not their manufacture they are not responsible for the final integrity of the product if a proof test and careful visual inspection by a competent person does not identify any short-cominge in design or manufacture." The Goods covered by this certificate have been examined and tested in accordance with the specified requirements.	68.67 kN	N/A

DATE OF TEST: 23/03/2011

TEST SPECIFICATION: WT029

OUR REFERENCE: 789076

CUSTOMER ORDER No.: PCN0027/500263

A LOAD OF **AS SPECIFIED** WAS APPLIED
WHICH REPRESENTS THE W.L.L.

AFTER REMOVAL OF THE LOAD, EACH ITEM WAS EXAMINED BY A COMPETENT OFFICER AND FOUND TO BE FREE FROM PERMANENT SET, FLAW OR OTHER VISUAL DEFECT, AND COMPLIES WITH THE REQUIREMENTS OF THE TEST.

TO: **PINDAN CONTRACTING PTY LTD**
UNIT 8/1 LONGFELLOW CT
BELMONT WA 6104

NATA Accredited Laboratory Number: 1836

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Approved NATA Signatory MURRAY TOZER

Date - 8 APR 2011

STRUCterre
consulting engineers

STRUCTURAL COMPUTATIONS

PROPOSED RESIDENCE: **No. 4 Waratah Way,**
Cockatoo

CLIENT: **Mega Building Industries Pty Ltd**
PO Box 475
Diamond Creek, VIC 3089

JOB No: 92481

REFERENCES

- B.C.A. Building Code of Australia
- AS/NZS 1170.0- 2002 Structural Design Actions: General Principles
- AS/NZS 1170.1- 2002 Structural Design Actions: Permanent, Imposed and other actions
- AS/NZS 1170.2- 2011 Structural Design Actions: Wind Actions
- AS1720.1 - 2010 Timber Structures: Design Methods
- AS3600 - 2009 Concrete Structures Code
- AS4100 - 1998 Steel Structures
- AS3700 - 2011 Masonry Structures
- AS1684.2 & .4 - 2010 Residential timber-framed Construction
- AS2870 - 2011 Residential Slabs and Footings

Nadir Yonan

Structerre Consulting Engineers

STRUCTURAL WORKS

Consulting Engineers
1/321 Whitehorse Rd BALWYN Vic 3103
Phone : 03 9888 4588 Fax : 03 9888 4511
email : works@knox.hotkey.net.au

Engineer :
Reference : 92481

Mark : B1 Floor bearers

Try 100x50x2 C350LO Rect Hollow Sections for length = 1900 1900
Top Restraints calculated with a left offset = 0, left spacing = 600, interna; spacing = 600, right spacing = 600, right offset = 0
Bottom Restraints at

Section Properties

CSA = 574 mm² Zyy = 10.3x10³ mm³
Ixx = 0.75x10⁶ mm⁴ Fy = 350 MPa
Zxx = 15.0x10³ mm³ E = 200000 MPa
Iyy = 0.26x10⁶ mm⁴

GRAVITY/VERTICAL LOADS

UDL List (kPa)	DL	RLL	FLL
UDL1 : Default UDL 1 =	0.37	0.25	0
USER : User Defined UDL =	0.70	-	-
UDL2 : Default UDL 2 =	0.4	0	1.5

Applied Loads

LC	TYPE	MAGNITUDE	LOCATION
A	U	SW	
A	U	4.8*[UDL1]	
A	U	3.2*[USER]	
A	U	1.5*[UDL2]	

COMBINATION FACTORS

	DL	DL+RLL	DL+FLL
DL x	1.35	1.20	1.20
LL x	-	1.50 (1.00)	1.50 (1.00)

Note : LC that can be applied to other members are in bold
Values in () are the serviceability combination factors

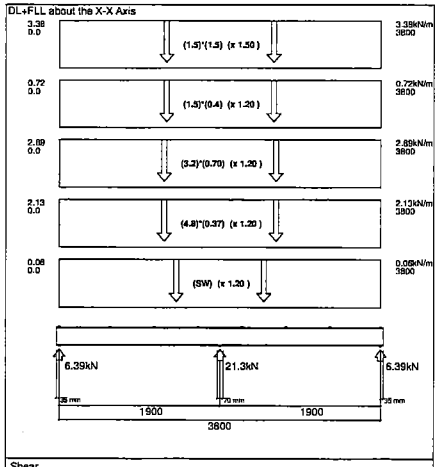
X-Axis Actions/Results
Critical Combination for Strength is DL+FLL

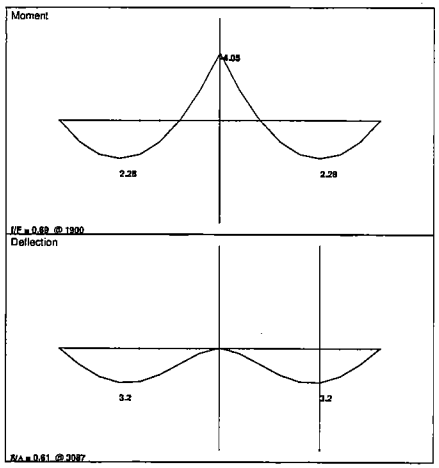
LIMIT STATE DESIGN

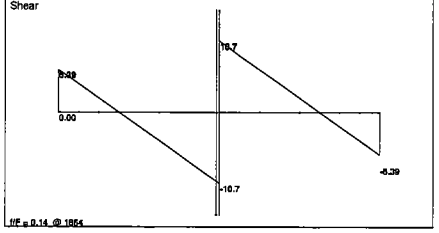
	DL	DL+RLL	DL+FLL
Max Internal Actions			
Axial (kN) (-ve = comp)	0.00	0.00	**0.00**
Shear (kN)	7.47	8.78	**10.7**
-Moment (kN.m)	-2.84	-3.34	**-4.05**
+Moment (kN.m)	1.60	1.88	**2.28**
f/F max	0.49 [m]	0.57 [m]	**0.69 [m]**
Deflection (mm)	2.2 [2]	2.7 [2]	**3.2 [2]**
Deflection Ratio L/d	878 [2]	698 [2]	**592 [2]**
Reactions			
R1 (kN) (LH Reaction)	4.48	5.27	**6.39**
R2 (kN)	14.9	17.6	**21.3**
R3 (kN) (RH Reaction)	4.48	5.27	**6.39**

ADOPT : 100x50x2 C350LO Rect Hollow Sections for B1

NOTES
Continuous over 2 spans.







Engineer :
Reference : 92481

Mark : B1_BALCONY Floor bearers

Try 100x50x2 C350LO Rect Hollow Sections for length = 1900 1900
Top Restraint at 3800 mm c/c, Bottom Restraint at 3800 mm c/c

Section Properties

CSA = 574 mm² Zyy = 10.3x10³ mm³
Ixx = 0.75x10⁶ mm⁴ Fy = 350 MPa
Zxx = 15.0x10³ mm³ E = 200000 MPa
Iyy = 0.26x10⁶ mm⁴

GRAVITY/VERTICAL LOADS

UDL List (kPa)	DL	RLL	FLL
UDL1 : Default UDL 1 =	0.37	0.25	0
USER : User Defined UDL =	0.7	-	-
UDL2 : Default UDL 2 =	0.4	0	1.5

Applied Loads

LC	TYPE	MAGNITUDE	LOCATION
A	U	SW 'Self Weight	
A	U	4.8*[UDL1]	
A	U	3.2*[USER]	
A	U	1.5*[UDL2]	
A	U	1.2*[USER]	

COMBINATION FACTORS

	DL	DL+RLL	DL+FLL
DL x	1.35	1.20	1.20
LL x	-	1.50 (1.00)	1.50 (1.00)

Note : LC that can be applied to other members are in bold
Values in () are the serviceability combination factors

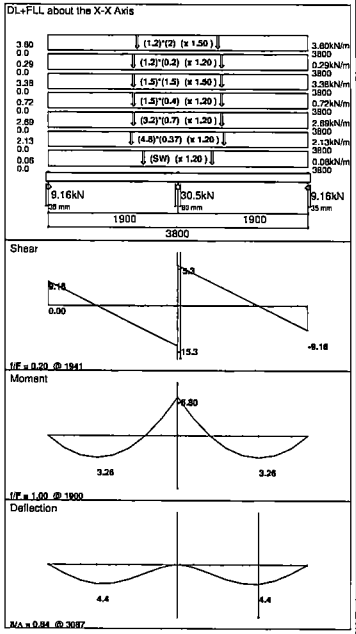
X-Axis Actions/Results
Critical Combination for Strength is DL+FLL

LIMIT STATE DESIGN

	DL	DL+RLL	DL+FLL
Max Internal Actions			
Axial (kN) (-ve = comp)	0.00	0.00	**0.00**
Shear (kN)	7.86	9.12	**15.3**
-Moment (kN.m)	-2.99	-3.47	**-5.80**
+Moment (kN.m)	1.68	1.95	**3.26**
f/F max	0.51 [m]	0.59 [m]	**1.00 [m]**
Deflection (mm)	2.3 [2]	2.8 [2]	**4.4 [2]**
Deflection Ratio L/d	835 [2]	671 [2]	**429 [2]**
Reactions			
R1 (kN) (LH Reaction)	4.72	5.47	**9.16**
R2 (kN)	15.7	18.2	**30.5**
R3 (kN) (RH Reaction)	4.72	5.47	**9.16**

ADOPT : 100x50x2 C350LO Rect Hollow Sections for B1_BALCONY

NOTES
Continuous over 2 spans.



Mark : B1_TG_TRUSS Floor bearers

Try 100x50x2 C350LO Rect Hollow Sections for length = 1900 1900
Top Restraint at 3800 mm c/c, Bottom Restraint at 3800 mm c/c

Section Properties

CSA = 574 mm² Zyy = 10.3x10³ mm³
Ixx = 0.75x10⁶ mm⁴ Fy = 350 MPa
Zxx = 15.0x10³ mm³ E = 200000 MPa
Iyy = 0.26x10⁶ mm⁴

GRAVITY/VERTICAL LOADS

UDL List (kPa)	DL	RLL	FLL
UDL1 : Default UDL 1 =	0.37	0.25	0
USER : User Defined UDL =	0.7	-	-
UDL2 : Default UDL 2 =	0.4	0	1.5

Applied Loads

LC	TYPE	MAGNITUDE	LOCATION
A	U	SW 'Self Weight	
A	U	{0.6 1.7 4.8 4.8}*[UDL1]	0 2400 2400
A	P	1.5*4.3*[UDL1]	2400
A	U	3.2*[USER]	
A	U	1.5*[UDL2]	

COMBINATION FACTORS

	DL	DL+RLL	DL+FLL
DL x	1.35	1.20	1.20
LL x	-	1.50 (1.00)	1.50 (1.00)

Note : LC that can be applied to other members are in bold
Values in () are the serviceability combination factors

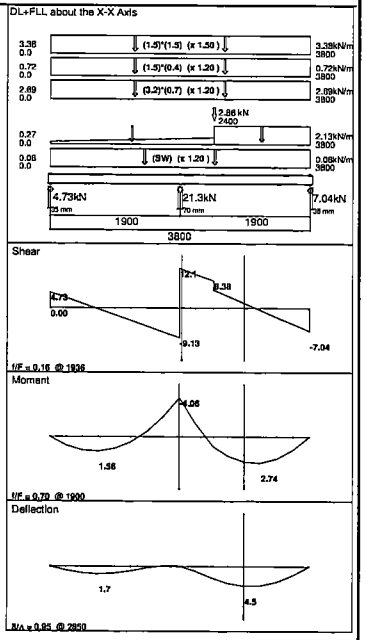
X-Axis Actions/Results
Critical Combination for Strength is DL+FLL

LIMIT STATE DESIGN

	DL	DL+RLL	DL+FLL
Max Internal Actions			
Axial (kN) (-ve = comp)	0.00	0.00	**0.00**
Shear (kN)	9.16	11.5	**12.1**
-Moment (kN.m)	-2.86	-3.37	**-4.05**
+Moment (kN.m)	2.12	2.61	**2.74**
f/F max	0.49 [m]	0.58 [m]	**0.70 [m]**
Deflection (mm)	3.5 [2]	5.0 [2]	**4.5 [2]**
Deflection Ratio L/d	542 [2]	381 [2]	**420 [2]**
Reactions			
R1 (kN) (LH Reaction)	2.62	2.21	**4.73**
R2 (kN)	14.9	17.5	**21.3**
R3 (kN) (RH Reaction)	5.22	6.47	**7.04**

ADOPT : 100x50x2 C350LO Rect Hollow Sections for B1_TG_TRUSS

NOTES
Continuous over 2 spans.



STRUCTURAL WORKS

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email : works@knox.hotkey.net.au

Mark : BB1 Balcony Beam

Try 100x50x2 C350LO Rect Hollow Sections for length = 2300 2300
Top Restraints calculated with a left offset = 0, left spacing = 600, interna; spacing = 600, right spacing = 600, right offset = 0
Bottom Restraints at

Section Properties

CSA = 574 mm² Zyy = 10.3x10³ mm³
Ixx = 0.75x10⁶ mm⁴ Fy = 350 MPa
Zxx = 15.0x10³ mm³ E = 200000 MPa
Iyy = 0.26x10⁶ mm⁴

GRAVITY/VERTICAL LOADS

Applied Loads

LC	TYPE	MAGNITUDE	LOCATION
A	U	SW	
A	P	R>2BJ	0 600 1200 1800 2400 3000 3600 4200 4600

COMBINATION FACTORS

	DL	DL+FLL
DL x	1.35	1.20
LL x	-	1.50 (1.00)

Note : LC that can be applied to other members are in bold
Values in () are the serviceability combination factors

X-Axis Actions/Results

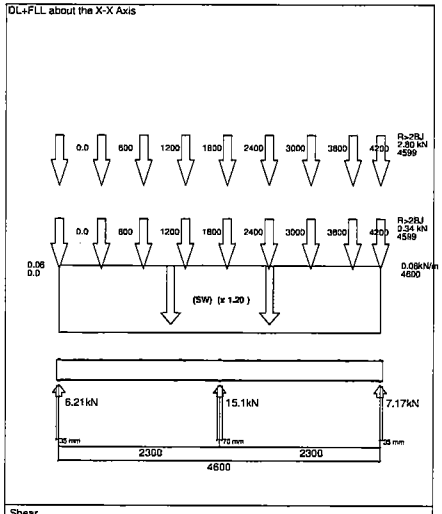
Critical Combination for Strength is DL+FLL

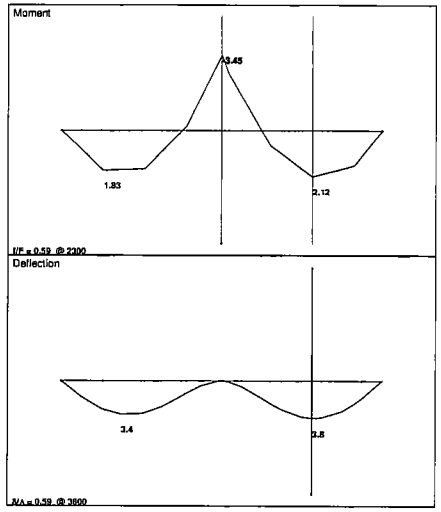
LIMIT STATE DESIGN

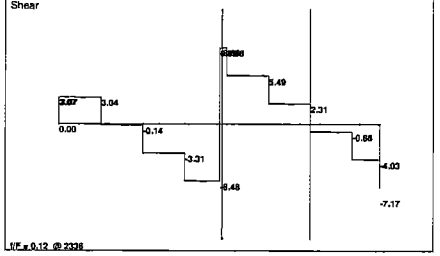
	DL	DL+FLL
Max Internal Actions		
Axial (kN) (-ve = comp)	0.00	0.00
Shear (kN)	1.12	8.66
-Moment (kN.m)	-0.45	-3.45
+Moment (kN.m)	0.27	2.12
f/F max	0.08 [m]	0.59 [m]
Deflection (mm)	0.5 [2]	3.8 [2]
Deflection Ratio L/d	4309 [2]	607 [2]
Reactions		
R1 (kN) (LH Reaction)	0.80	6.21
R2 (kN)	1.98	15.1
R3 (kN) (RH Reaction)	0.91	7.17

ADOPT : 100x50x2 C350LO Rect Hollow Sections for BB1

NOTES
Continuous over 2 spans.







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STRUCTURAL WORKS

Consulting Engineers
1/321 Whitehorse Rd BALWYN Vic 3103
Phone : 03 9888 4588 Fax : 03 9888 4511
email : works@knox.hotkey.net.au

Mark : BJ Balcony Joists

Try 100x50x2 C350LO Rect Hollow Sections for length = 2550 -700
Top Restraint at 3250 mm c/c, Bottom Restraint at 3250 mm c/c

Section Properties

CSA = 574 mm² Zyy = 10.3x10³ mm³
Ixx = 0.75x10⁶ mm⁴ Fy = 350 MPa
Zxx = 15.0x10³ mm³ E = 200000 MPa
Iyy = 0.26x10⁶ mm⁴

GRAVITY/VERTICAL LOADS

UDL List (kPa)

	DL	RLL	FLL
USER : User Defined UDL =	0.2	-	2

Applied Loads

LC	TYPE	MAGNITUDE	LOCATION
A	U	SW 'Self Weight	
A	U	0.45*[USER]	

COMBINATION FACTORS

	DL	DL+FLL
DL x	1.35	1.20
LL x	-	1.50 (1.00)

Note : LC that can be applied to other members are in bold
Values in () are the serviceability combination factors

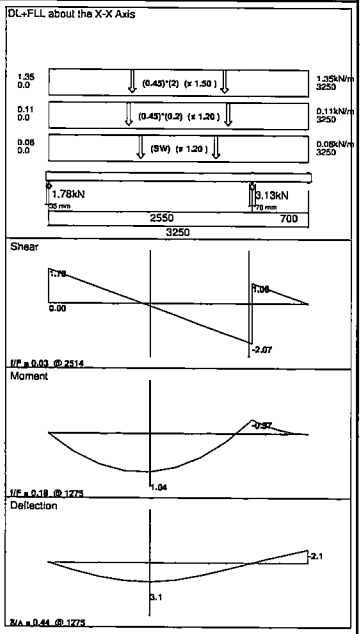
X-Axis Actions/Results

Critical Combination for Strength is DL+FLL

LIMIT STATE DESIGN

	DL	DL+FLL
Max Internal Actions		
Axial (kN) (-ve = comp)	0.00	0.00
Shear (kN)	-0.25	-2.07
-Moment (kN.m)	-0.04	-0.37
+Moment (kN.m)	0.13	1.04
f/F max	0.02 [m]	0.18 [m]
Deflection (mm)	0.4 [1]	3.1 [1]
Deflection Ratio L/d	6240 [1]	819 [1]
Cant. Deflection (mm)	-0.3 [2]	-2.1 [2]
Reactions		
R1 (kN) (LH Reaction)	0.22	1.78
R2 (kN) (RH Reaction)	0.38	3.13

ADOPT : 100x50x2 C350LO Rect Hollow Sections for BJ



Mark : FJ Floor Joists

Try 100x50x2 C350LO Rect Hollow Sections for length = 2950
Top Restraint at 2950 mm c/c, Bottom Restraint at 2950 mm c/c

Section Properties

CSA = 574 mm² Zyy = 10.3x10³ mm³
Ixx = 0.75x10⁶ mm⁴ Fy = 350 MPa
Zxx = 15.0x10³ mm³ E = 200000 MPa
Iyy = 0.26x10⁶ mm⁴

GRAVITY/VERTICAL LOADS

UDL List (kPa)

	DL	RLL	FLL
UDL2 : Default UDL 2 =	0.4	0	1.5

Applied Loads

LC	TYPE	MAGNITUDE	LOCATION
A	U	SW	
A	U	0.45*[UDL2]	

COMBINATION FACTORS

	DL	DL+FLL
DL x	1.35	1.20
LL x	-	1.50 (1.00)

Note : LC that can be applied to other members are in bold
Values in () are the serviceability combination factors

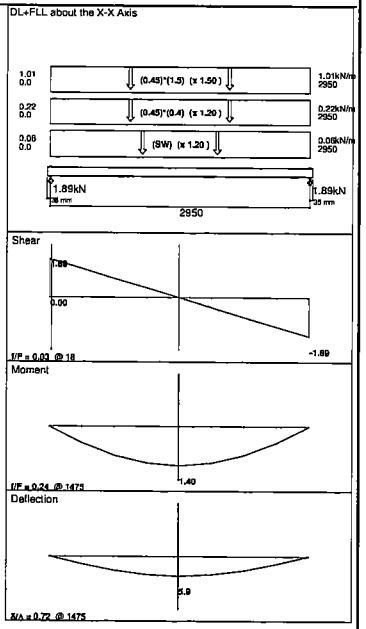
X-Axis Actions/Results

Critical Combination for Strength is DL+FLL

LIMIT STATE DESIGN

	DL	DL+FLL
Max Internal Actions		
Axial (kN) (-ve = comp)	0.00	0.00
Shear (kN)	0.45	1.89
-Moment (kN.m)	0.00	0.00
+Moment (kN.m)	0.33	1.40
f/F max	0.06 [m]	0.24 [m]
Deflection (mm)	1.5	5.9
Deflection Ratio L/d	1986	498
Reactions		
R1 (kN) (LH Reaction)	0.45	1.89
R2 (kN) (RH Reaction)	0.45	1.89

ADOPT : 100x50x2 C350LO Rect Hollow Sections for FJ



STRUCterre
consulting engineers

sheet:	5
date:	29.10.2015
job no:	92481
design:	N.Y.

hs = 1.8 m

as per clause 2.3.2 (B) (2) & G4.3 & G5.3 in AS2870-2011

The geotechnical design strength should be based on base resistance plus side friction or adhesion where effective. No side adhesion or friction should be assumed to exist to a depth of 0.75Hs for down loads. For uplift load due to soil swelling, side friction or adhesion should be assumed to be effective.

thus ignore top 0.75hs = 1.35 m

Soil Bearing Capacity 250 kPa

SKIN FRICTION 50 kPa

Loads

Load DL 12.3 kN

Load LL 14 kN

Total Load 19.3 kN

Pad area 0.10 x 0.10 = 0.01 m^2

Pad capacity = 2.50 kN

Stump Check

Try 50NB 60.3 x 2.3 mm C350

Ultimate Design Load 26.3 kN

Lef ≤ 2.5 m

e 30 mm

M* 0.789 kN.m

ϕMs 2.44 kN.m

ϕNc 44.8 kN

ϕMbx 1.0 kN.m > 0.8 kN.m Thus OK

Mega Anchor Capacity

Number of Piles 3

Try 30NB 42.4 x 4 mm C250

End bearing capacity = 1.1 kN

Design Load - Pad capacity = 15.7 kN

Total suface area per meter 0.3996 m^2/m

Pile capacity 19.98 kN/m

pile length required 0.8 m

min. depth of 3 piles 2.1 m

Adopt 2.1m Deep Mega-Anchors (3No. 30NB Gal. piles) founded below ground level

Note: Pile founding depth is 0.8m minimum into natural silty clay as noted on soil report and 2.1m minimum below ground level whichever is deeper or to Penetration Resistance on to natural rock. Anchors should be proof loaded and tested during construction to ensure that design loads are being achieved. Consideration should be given to corrosion protection of anchors, particularly where permanent or long-term anchors are proposed.

MEGA ANCHOR PILE LOG

Job Details		Installer Details	
Job:	Sample Job	Company Name:	Mega Building Industries P/L
Address:	Johnson Rd, Claymore, NSW	Site Supervisor:	Tom Builder
Installation Date:	13/10/2015	Installers Address	Sample St, Melbourne
Signature:		Contact Ph:	03 9999 9999
Date:			

Pile Driver Details:

Driver, Make/Model	Bosch GSH 16-30
Joules	45
BPM	1300
Weight	17 KG
Tool Holder	30mm

Pile Log:

ANCHOR NO:	Pile Length	Pile 1	Pile 2	Pile 3	To Practical Refusal Y/N
1	1100	1000	1000	1000	Y
2	1100	1100	1000	1000	Y
3	1100	1050	950	950	Y
4	1100	1000	900	900	Y
5	1100	1100	1100	900	Y
6	1100	1050	950	800	Y
7	1100	1050	1050	1050	Y
8	1100	800	850	850	Y
9	1100	950	950	1050	Y
10	1100	1100	950	1000	Y
11	1100	1050	1050	1050	Y
12	1100	1050	1050	1050	Y
13	1100	1100	1100	1100	Y
14	1100	1050	1050	1050	Y
15	1100	1100	1050	600	Y
16	1100	1100	1100	1100	Y
17	1100	1100	900	1000	Y
18	1100	1100	1100	1100	Y
19	1100	950	950	950	Y
20	1100	1100	1100	950	Y
21	1100	1100	1100	1100	Y
22	1100	1100	1100	1100	Y
23	1100	1100	1100	1100	Y
24	1100	1100	1100	1100	Y
25	1100	1100	1100	1100	Y
26	1100	1100	1100	1100	Y
27	1100	1100	1100	1100	Y
28	1100	1100	1100	1100	Y
29	1100	1100	1100	1100	Y

ANCHOR NO:	Pile Length	Pile 1	Pile 2	Pile 3	To Practical Refusal Y/N
30	1100	1100	1100	1100	Y
31	1100	1100	1100	1100	Y
32	1100	1100	1100	1100	Y
33	1100	1100	1100	1100	Y
34	1100	1100	1100	1100	Y
35	1100	1100	1100	1100	Y
36	1100	1100	1100	1100	Y
37	1100	1100	1100	1100	Y
38	1100	1100	1100	1100	Y
39	1100	1100	1100	1100	Y
40	1100	1100	1100	1100	Y
41	1100	1100	1100	1100	Y
42	1100	1100	1100	1100	Y
43	1100	1100	1100	1100	Y
44	1100	1100	1100	1100	Y
45	1100	1100	950	1000	Y
46	1100	1100	1100	1100	Y
47	1100	1100	1100	1100	Y
48	1100	1100	1100	1100	Y

Notes:

Mega Anchor Stump Layout: