APPENDIX G

TAYLOR WHALLEY SPYRA PLANNING STAGE
STRUCTURAL CALCULATIONS INCLUDING
MGF DESIGN SERVICES TEMPORARY PROPPING DETAILS,
SUMMARY OF SLOPE STABILITY ANALYSIS &
SUMMARY OF RETAINING WALL ANALYSIS

NO. 29 NEW END,

HAMPSTEAD,

LONDON, NW3 1JD

FOR KARWANA LTD

SCHEME DESIGN PLANNING STAGE STRUCTURAL CALCULATIONS

Job No: 8082

3 Dufferin Avenue,
Barbican, London, EC1Y 8PQ

T: 020 7253 2626
F: 020 7253 2767

E: tws@tws.uk.com
W: www.tws.uk.com

TABLE OF CONTENTS

3 Dufferin Avenue,
Barbican, London, EC1Y 8PQ

T: 020 7253 2626
F: 020 7253 2767

E: tws@tws.uk.com
W: www.tws.uk.com

1. INTRODUCTION

This document has been prepared to describe the desk studies carried out by Taylor Whalley Spyra Structural Engineers for the development proposal of 7 Storey building at 29 New End, London NW3.

Prior to the analysis and design stage several investigations has been carried out to get information about construction site, neighbouring buildings and ground conditions. A soil investigation report has been prepared by MRH Geotechnical Engineering based on their field works which will be referenced in this document. Analysis for ground stability and design of ground bearing structure has been carried out with specialist input of Geotechnical Consulting Group.

During our design we have benefitted from following computer software packages; STRAP V.11 for FE analysis, design of structural members, and CSC TEDDS V.12 for individual structural members analysis, design and WALLAP V.5.04 to model the behaviour of the retaining wall.

The extent of the project for construction of a raft foundation on level +109.0m includes the following;

1. Construction of contiguous/secant pile walls design of which is prepared by TWS and GCS Geotechnical Engineers.

2. Lateral and vertical propping at levels +118.5, +116.0 and +112.5 according to planned sequence. Design of propping has been prepared by specialist contractor MGF, and approved by TWS and GCG.

3. Excavation of the ground to level +109.0m according to the planned sequence, detail attached.

4. Construction of RC basement raft according to the planned phases. Raft has been designed considering both temporary and long term loads.

5. Construction of upper floor slabs in sequence with the removal of the struts. Propping will be kept in place until concrete reaches a safe strength.

6. During this process, monitoring will be carried by an independent subcontractor to ensure that movement on next door properties will be kept to minimal as design.

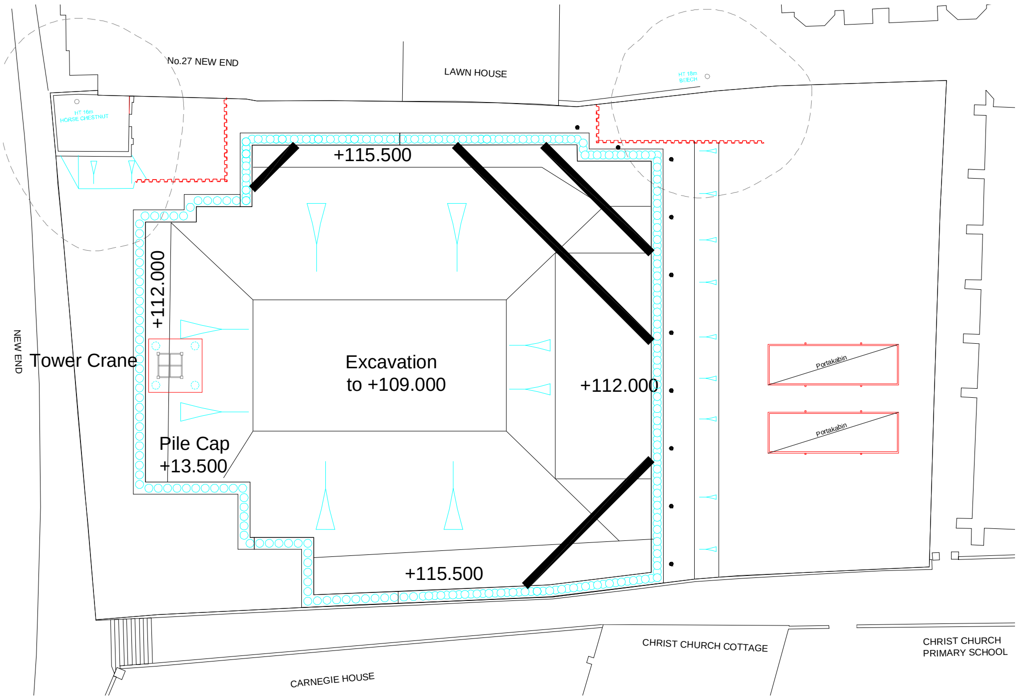
2. REFERENCES:

1. Ground Investigation Report by MRH Geotechnical (July 2010)
2. Summary of Preliminary Retaining Wall Analysis by GCG Geotechnical Engineers
3. Temporary works design by MGF
4. BS EN 1990 in conjunction with National Annex; Basis of Structural Design
5. BS EN 1991-1-1 in conjunction with National Annex; General Actions, Densities self weight and imposed load for buildings.
6. BS EN 1992-1 in conjunction with National Annex; Design of Concrete Structures
7. BS EN 1993-1 in conjunction with National Annex; Design of Steel Structures
8. BS 8110 Structural Use of Concrete
9. STRAP Users Manual
10. CSC TEDDS Users Manual
11. WALLAP Users Manual

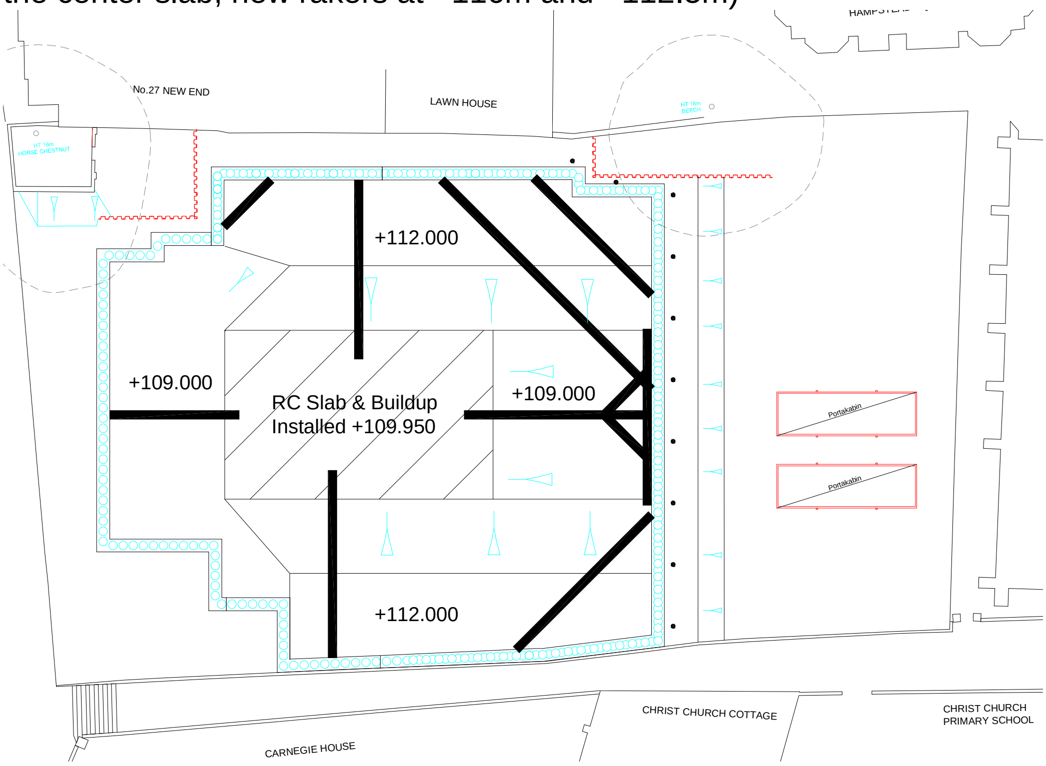
3. CONSTRUCTION STAGES IN BASEMENT MODEL'S CONCERN

Sequence numbering is according to Appendix G.

- Stage 4 (High and Mid Level Propping finished central Excavation to +109.0m final level)



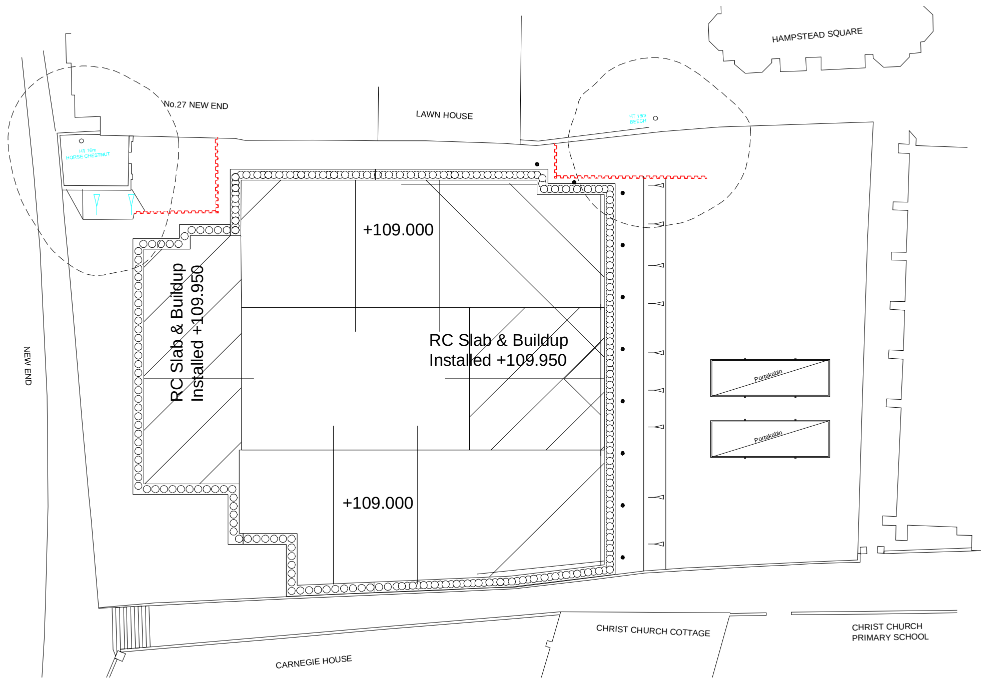
- Stage 5 (Excavation of North and south berms to +109m and East West to 112m level, casting the center slab, new rakers at +116m and +112.5m)



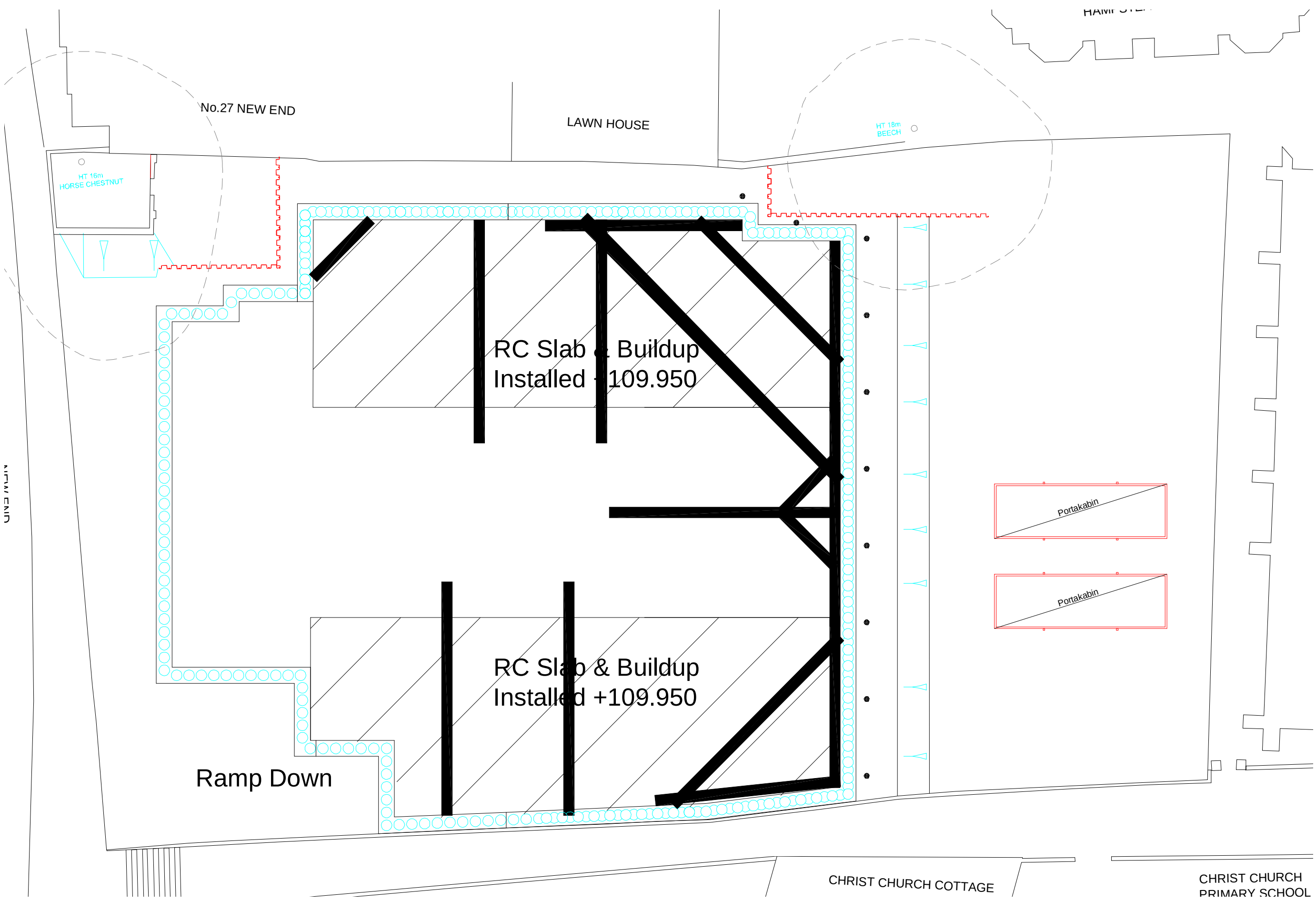
Job No	Description	Page:	4
8082	29 New End, London, NW3	Date:	March 2012
		By:	I. Tozluoglu
		Checked:	U. Mizrahi

taylor whalley spyra
tws

- Stage 6 (Excavation of the ground to final level +109m, new Struts at +112.5.)



- Stage 7 (Finalising the Basement Raft)



4. LOADING

4.1. Loads on the Basement Slab:

Dead Loads:

600thk Slab : 15kN/m²
Allowance for additional cover : 2kN/m²
Total : 17kN/m²

Imposed Loads:

Allowance for construction machinery working on the slab : 15kN/m²

4.2. Loading and Analysis Results Summary for Ground Bearing Pile Walls

New End – summary of wall analyses

	Wall displ., mm		Wall forces		TP loads, kN/m			Slab loads, kN/m		
	$\delta_{h,+118}$	$\delta_{h,max}$	M, kNm/m	V, kN/m	+118.5	+116.0	+112.5	+110.0	+113.5	+117.0
Lawn House	6	16	265	190	130	-	365	310	-	180
Tennis Ct	-	15	235	200	115	-	365	315	15	135
Garden	8	22	345	160	-	290	-	15	135	205
New End	-	10	70	65	-	-	60	115	20	-
	-	20	210	80	-	-	-	25	25	-

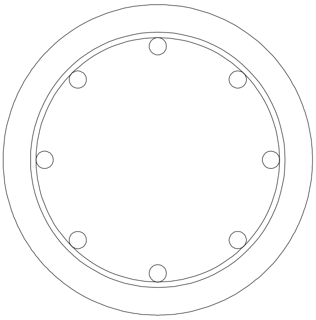
5. RC PILE WALL DESIGN

Loads for garden side used in this calculation.

Concrete Grade C40/50
Reinforcement steel fy: 460

Column result summary (kN,meter) (& = specified)

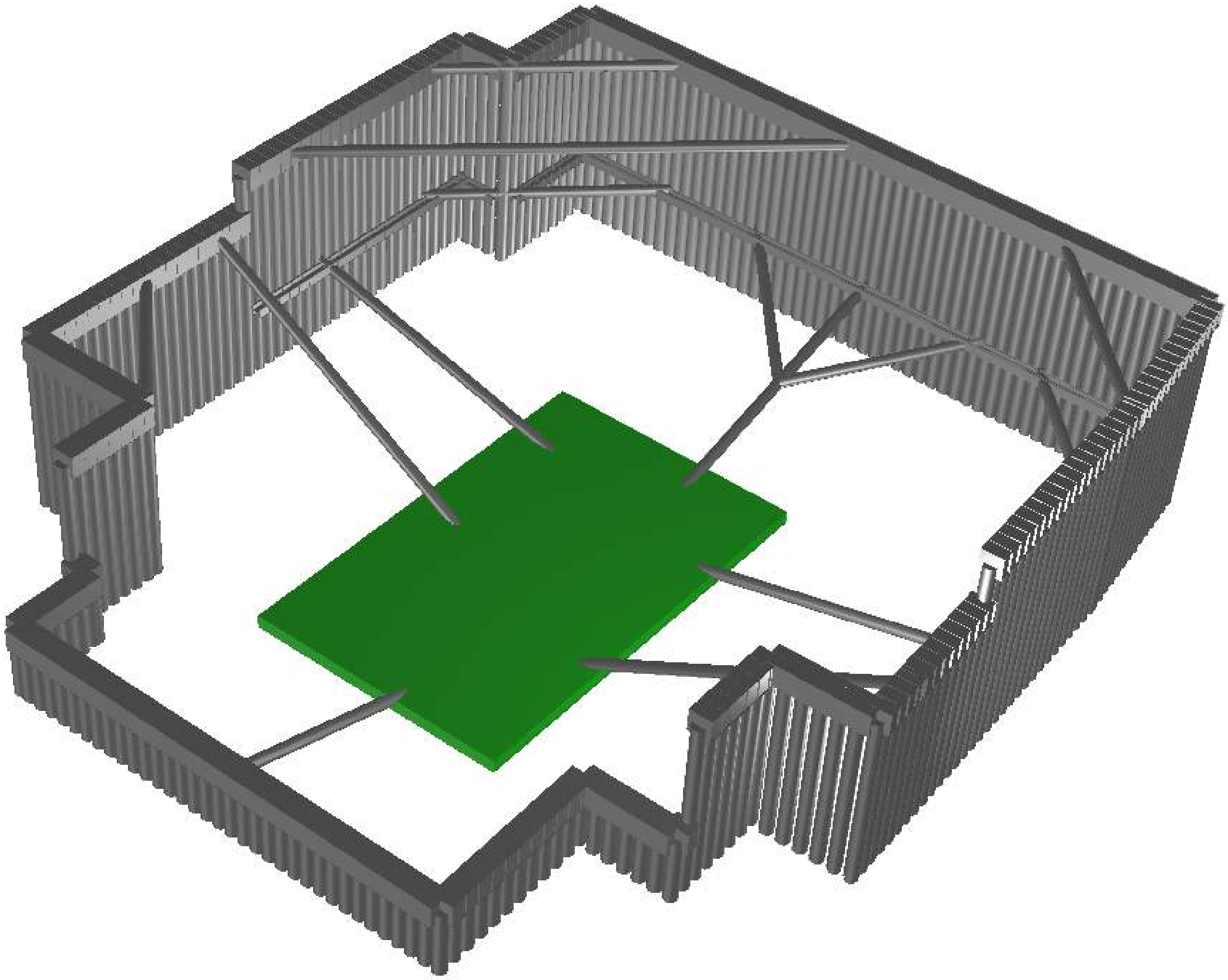
Mem.	Dir	Kl /h	Cl ss	Cm	Size B H	N	Mi	Mt	reinforcement Total	Each side	%	Cap.
COLUMN C2												
2	M3	10	sl	1	600	0.0	0.0	0.0	7ϕ25		1.22	1.00
	M2	10			600		321.3	321.3				



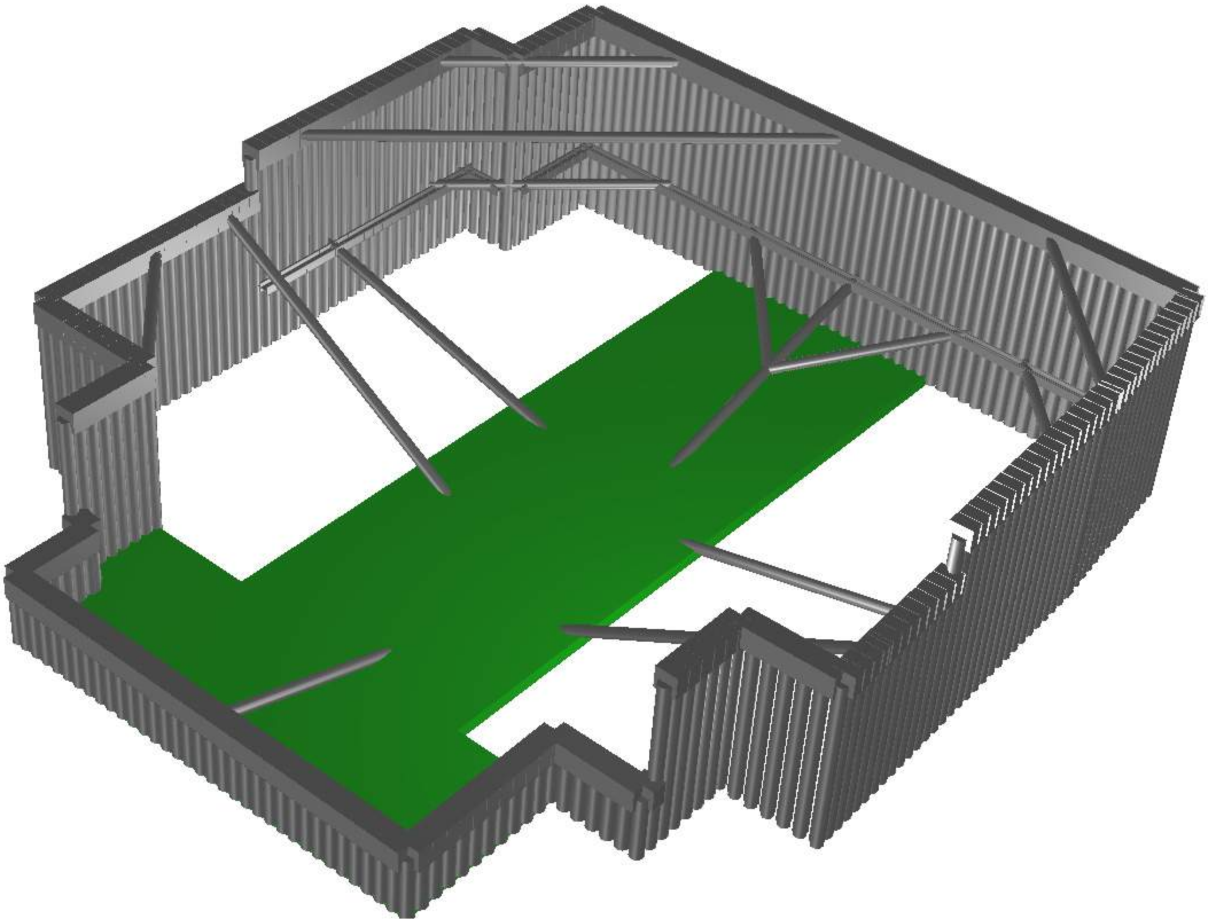
600dia. RC Pile
8T25 Vertical
T8@150 Transverse

6. STRUCTURAL DESIGN MODELS

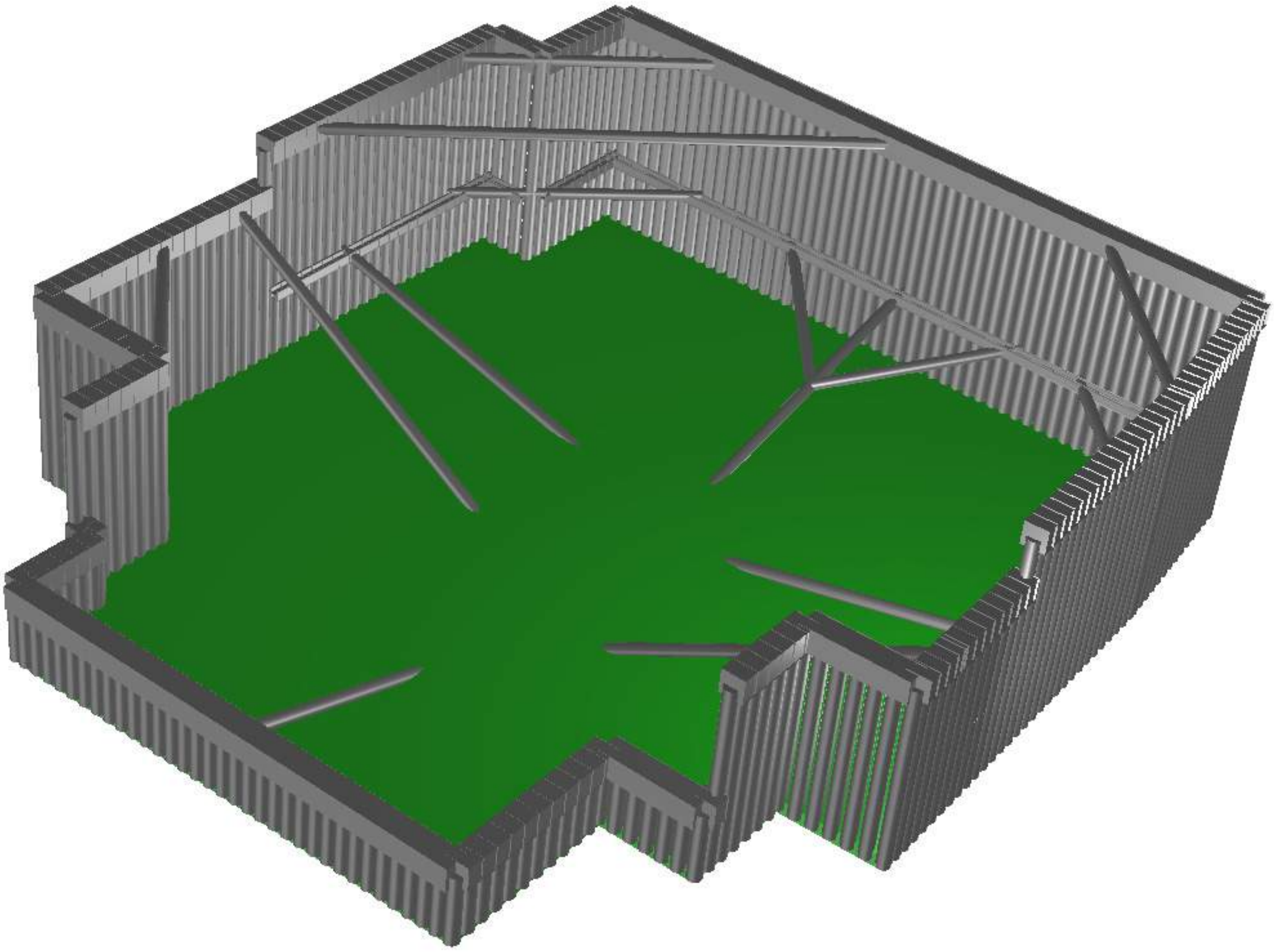
6.1. Model of Stage 5 Construction



6.2. Model of Stage 6 Construction



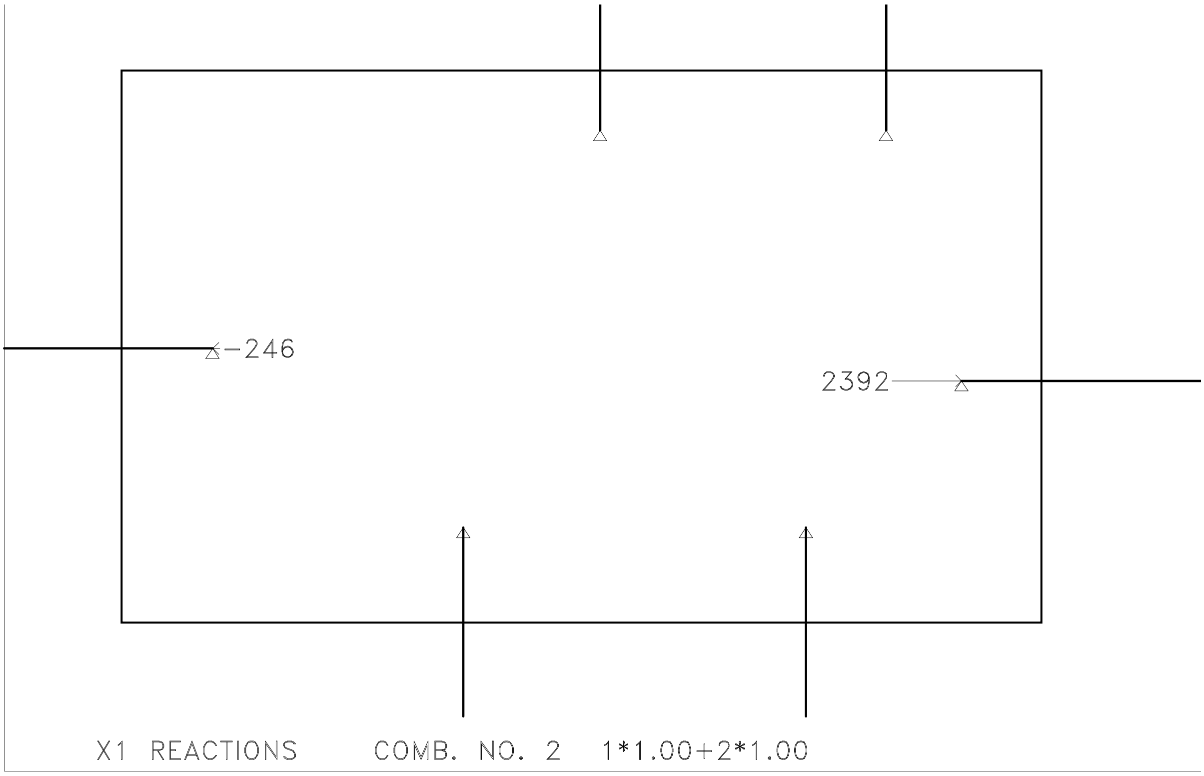
6.3. Model of Basement with Finished Slab



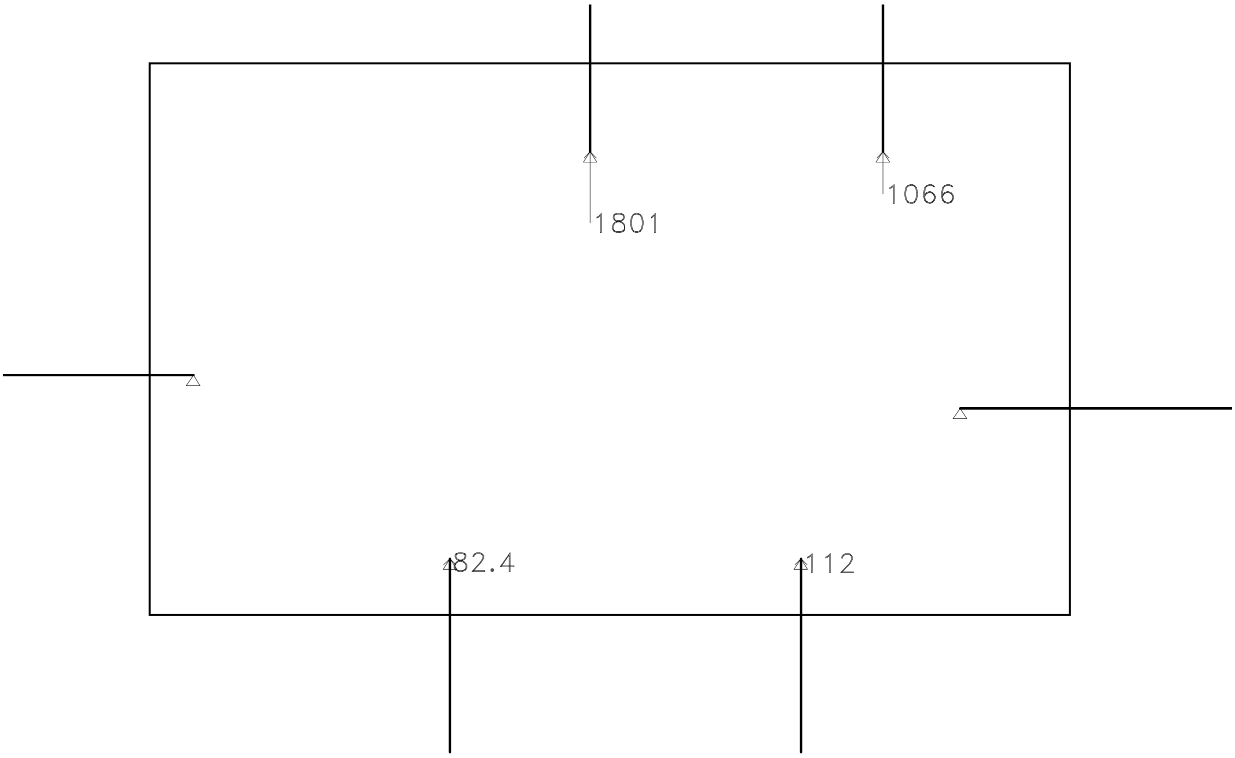
7. CHECKING MEMBERS AGAINS OUT OF BALANCE FORCES

7.1. Props Reaction Forces

X Direction

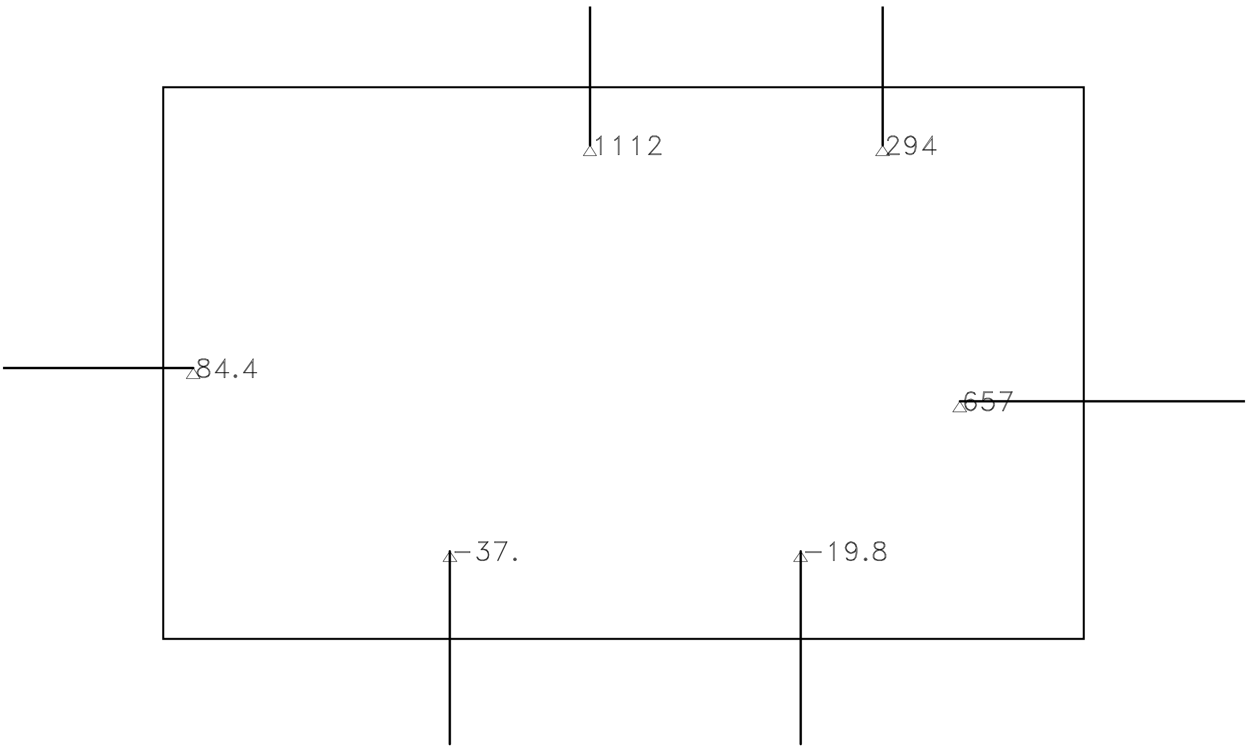


Y Direction



X2 REACTIONS COMB. NO. 2 1*1.00+2*1.00

Vertical Direction



X3 REACTIONS COMB. NO. 2 1*1.00+2*1.00

7.2 Displacement of the Stage Five Slab

Self Weight of the Slab : 11.7x18.6x0.6x25 = 3264kN

Sliding Forces : 3061kN

Total Base Sliding Resistance : 0.50 x (2090 + 3264) = 2677kN

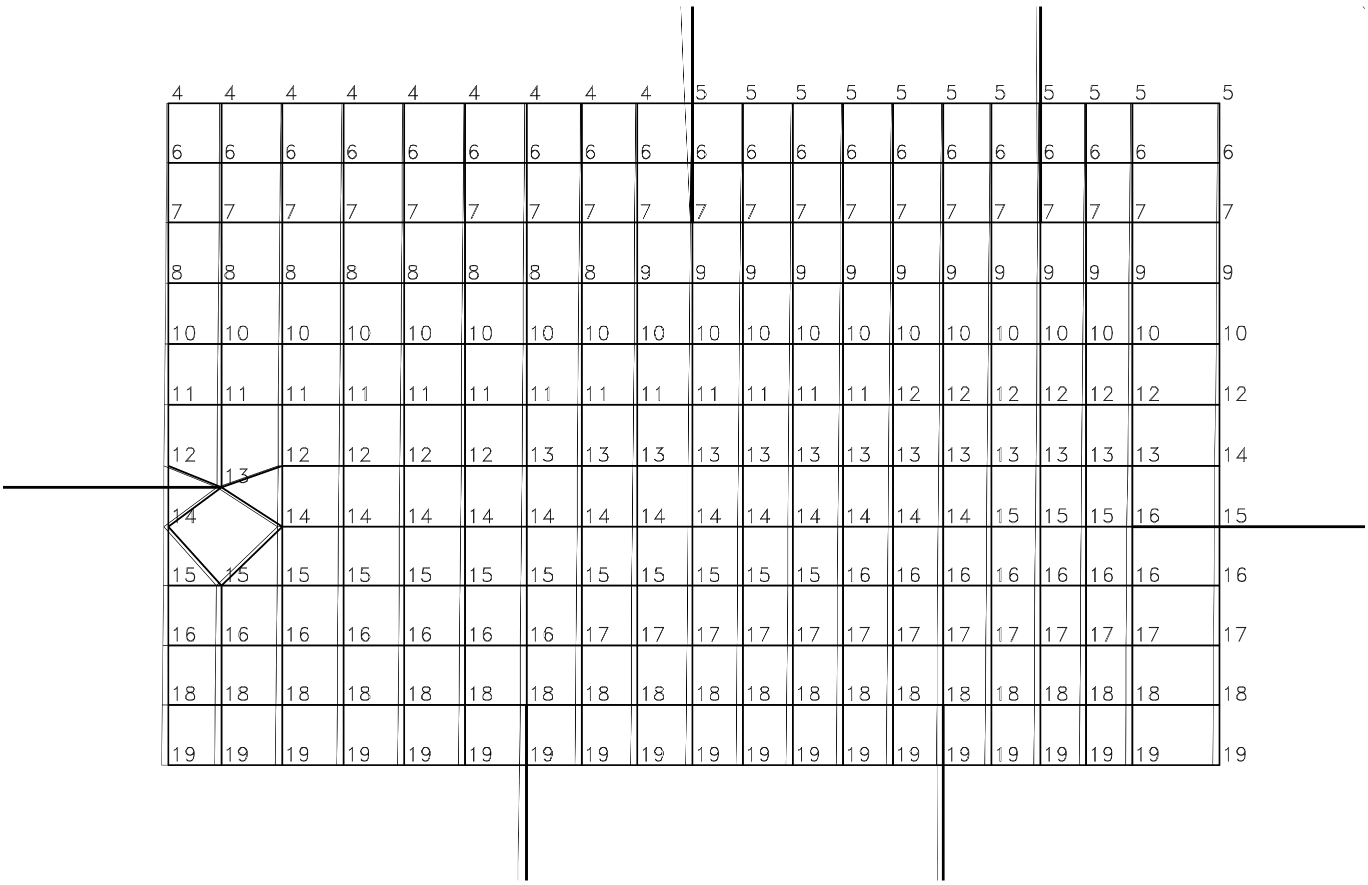
Spring coefficient for the area is 6000kN/m^3

Passive Soil Resistance is ignored

Friction is modelled with springs here for load distribution and accommodation of the props in sliding resistance.

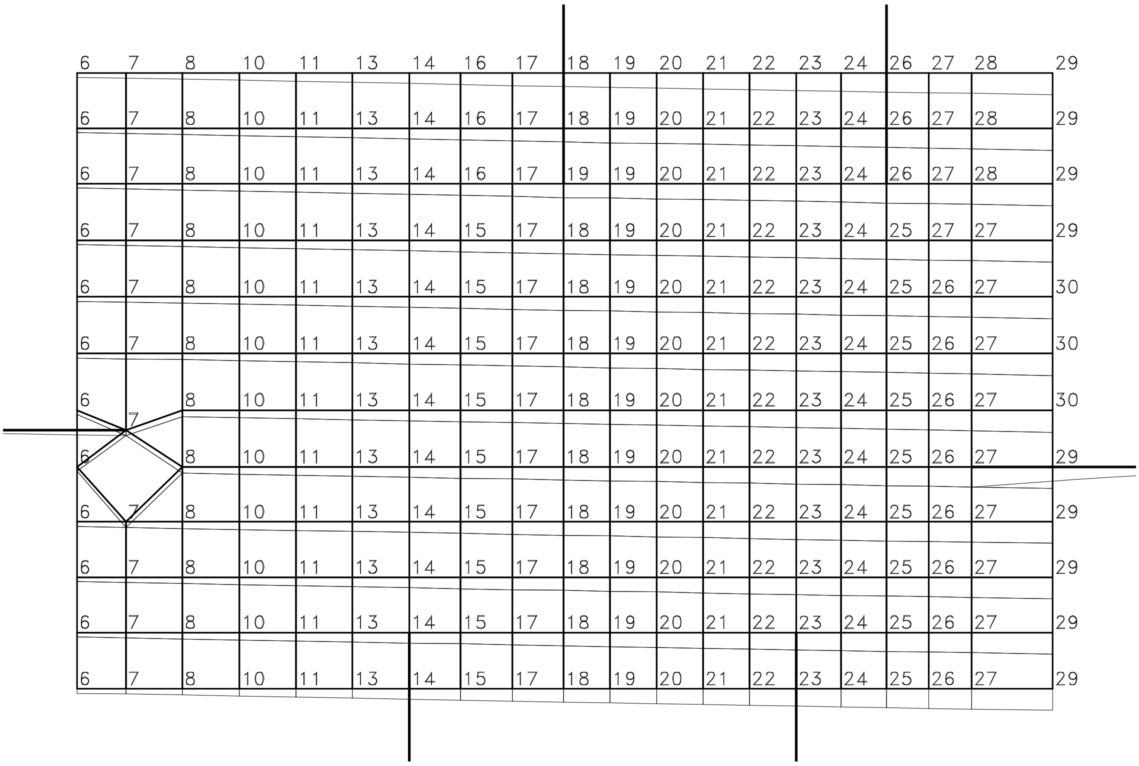
Displacement in X Direction

Values are mm x 10



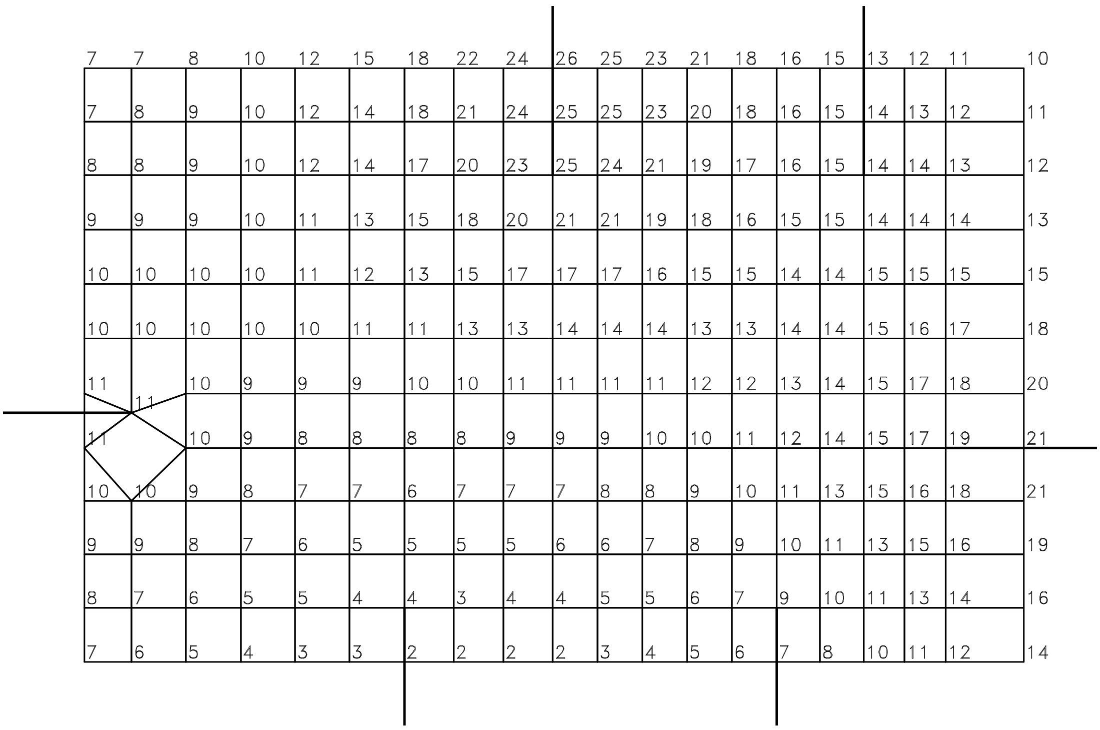
Displacement in Y Direction

Values are mm x 10

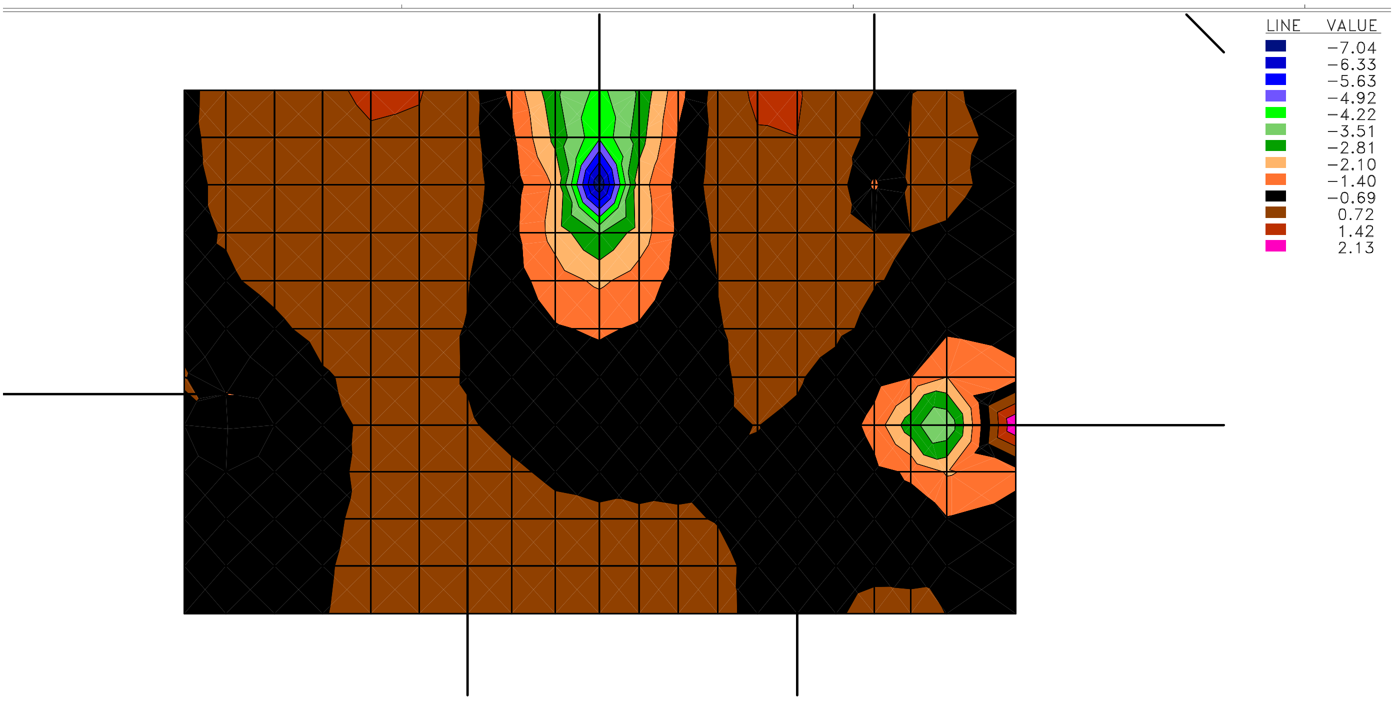


Displacement in Vertical Direction

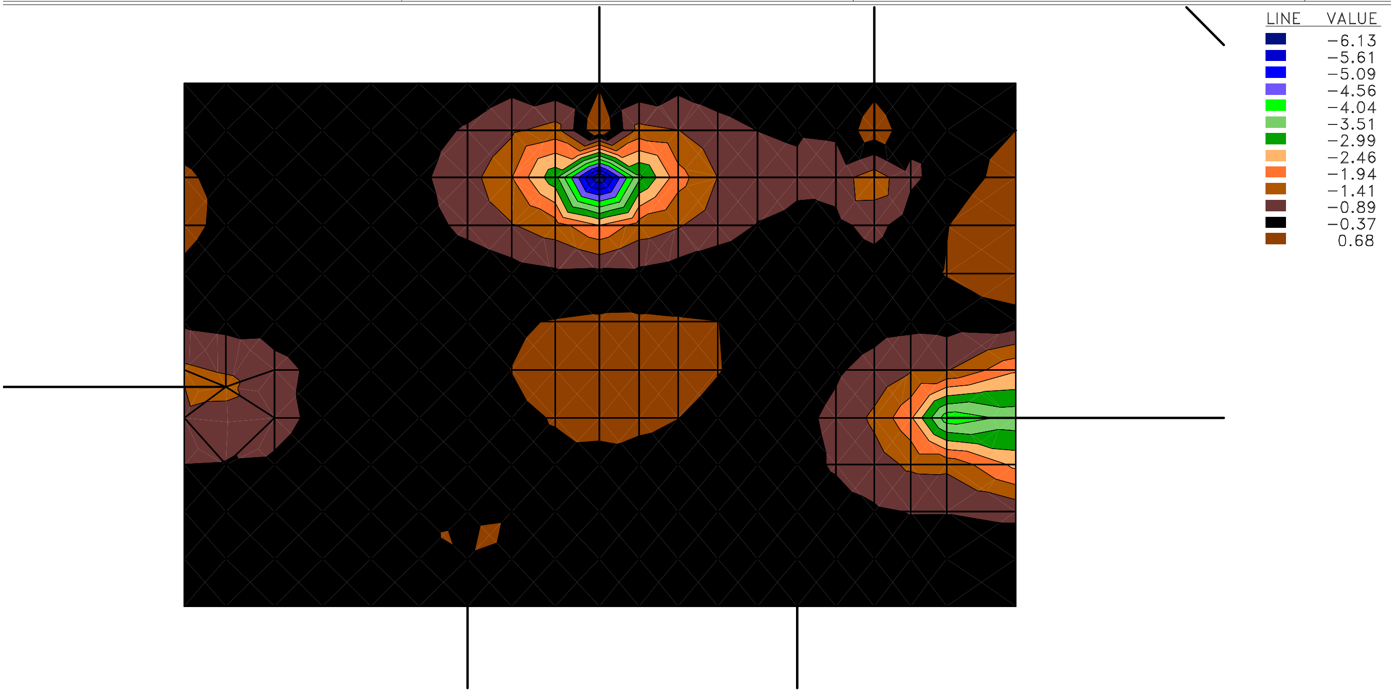
Values are mm x 10



7.3 Slab Stress Values for Stage 5



+SX CONTOUR LINES COMB. NO. 2 1*1.35+2*1.50+3*1.50

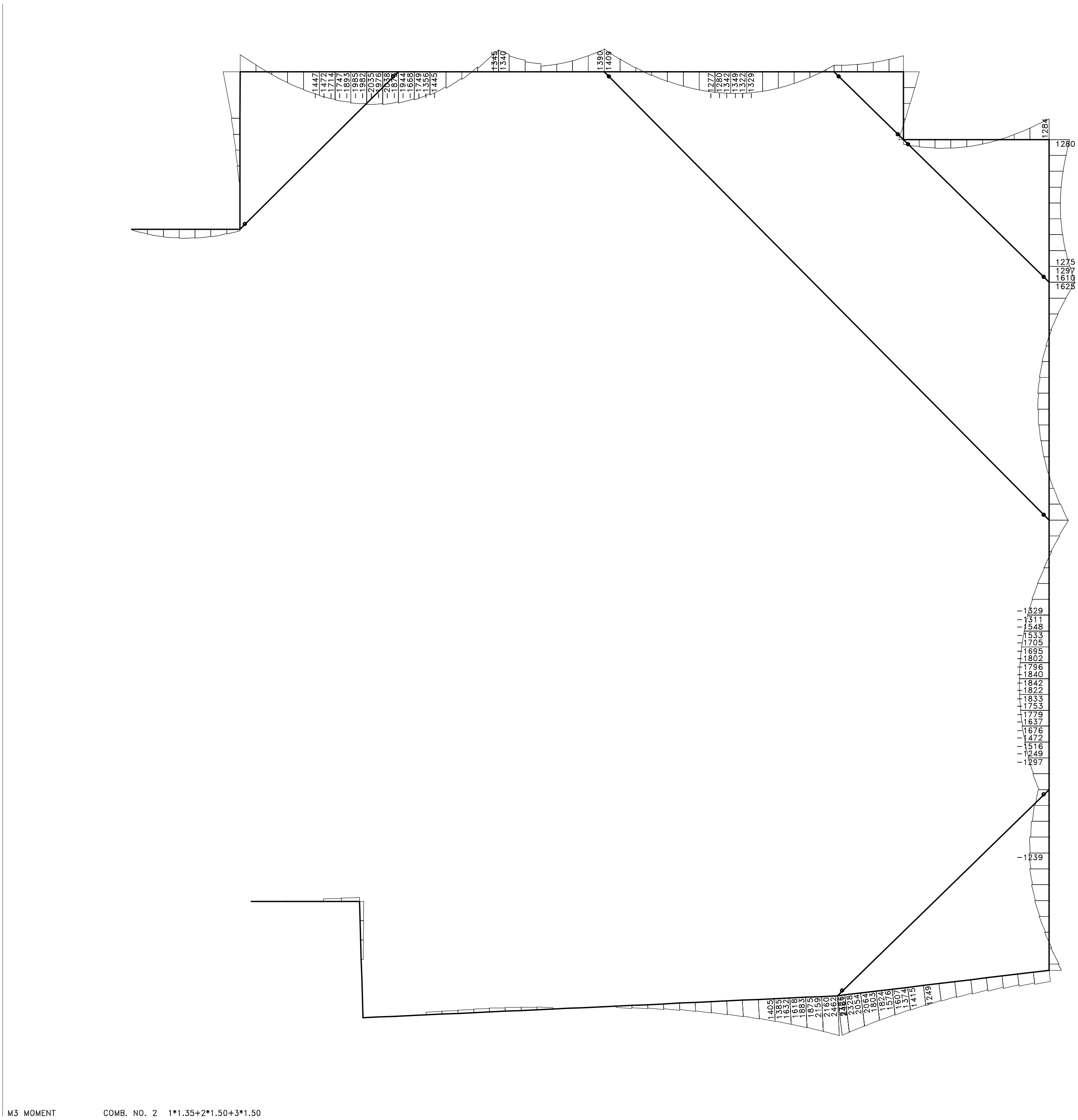


+SY CONTOUR LINES COMB. NO. 2 1*1.35+2*1.50+3*1.50

8. DESIGN of CAPPING BEAMS

8.1. Analysis Results

M3 Moment for Stage Five



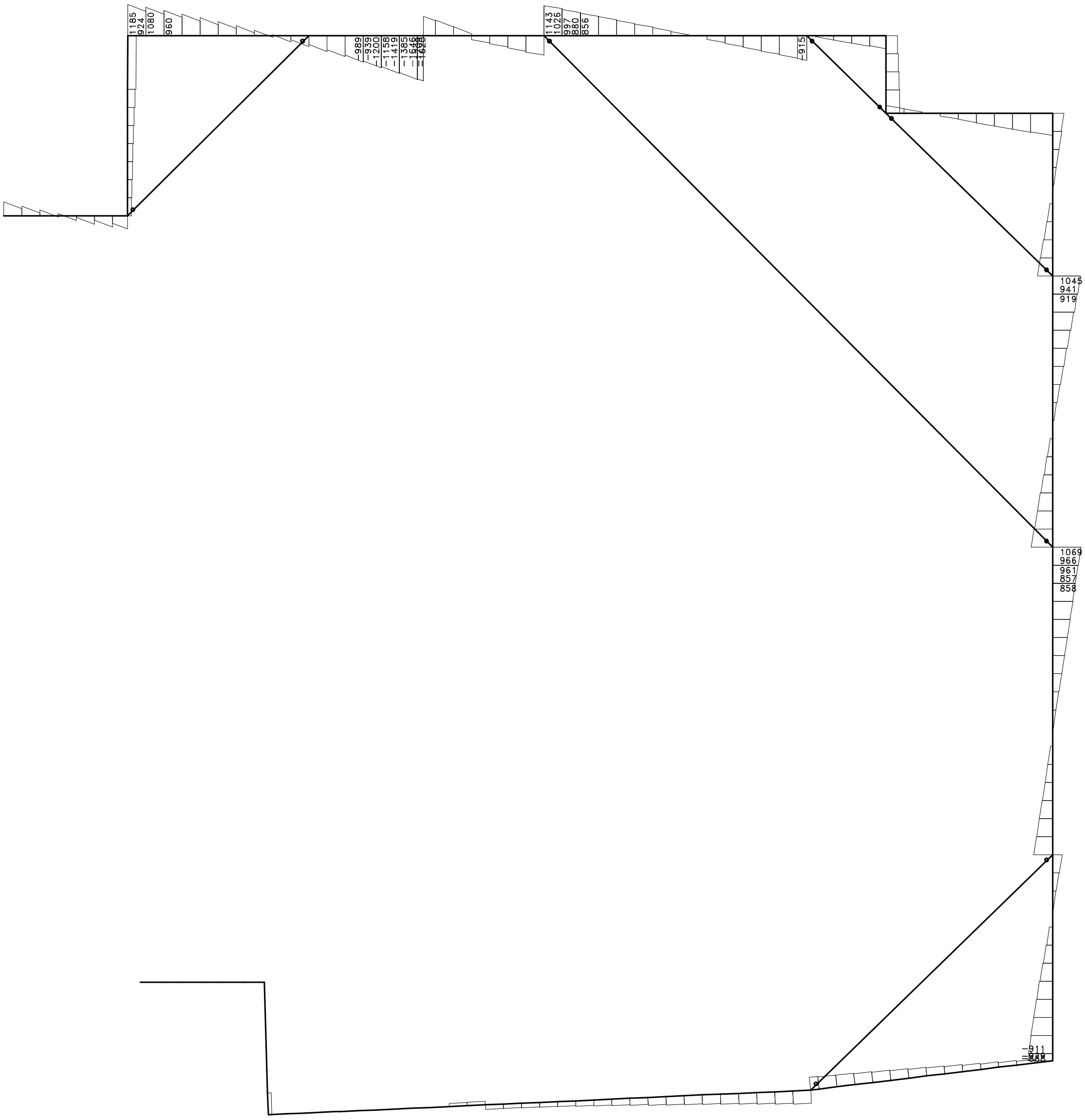
Maximum moment in this diagram is 2500kNm

3 Dufferin Avenue,
Barbican, London, EC1Y 8PQ

T: 020 7253 2626
F: 020 7253 2767

E: tws@tws.uk.com
W: www.tws.uk.com

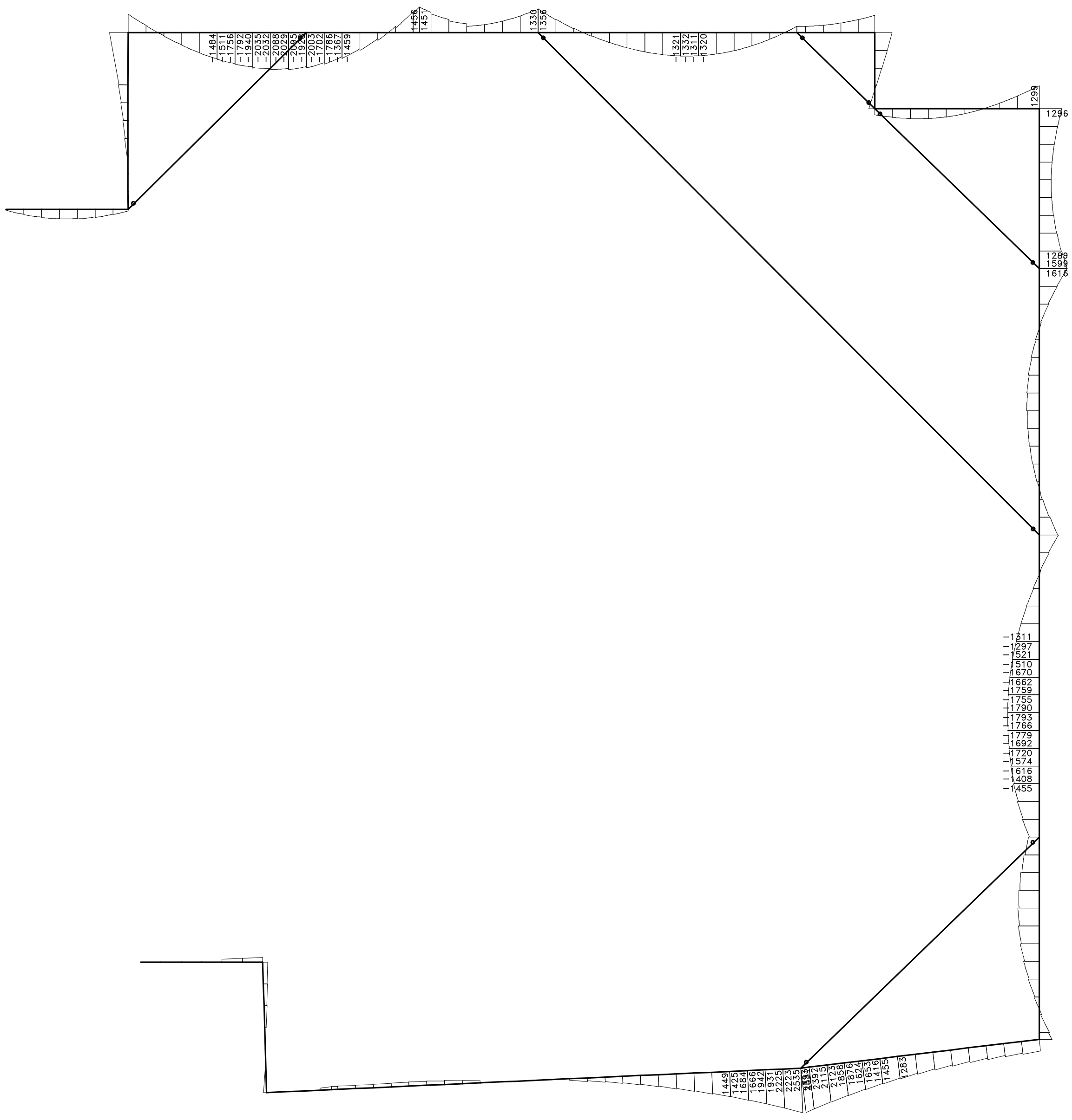
V2 Shear For Stage Five



Maximum Shear force in this diagram is 1700kN

Note that maximum moment and shears are from different areas.

M3 Moment for Final Stage



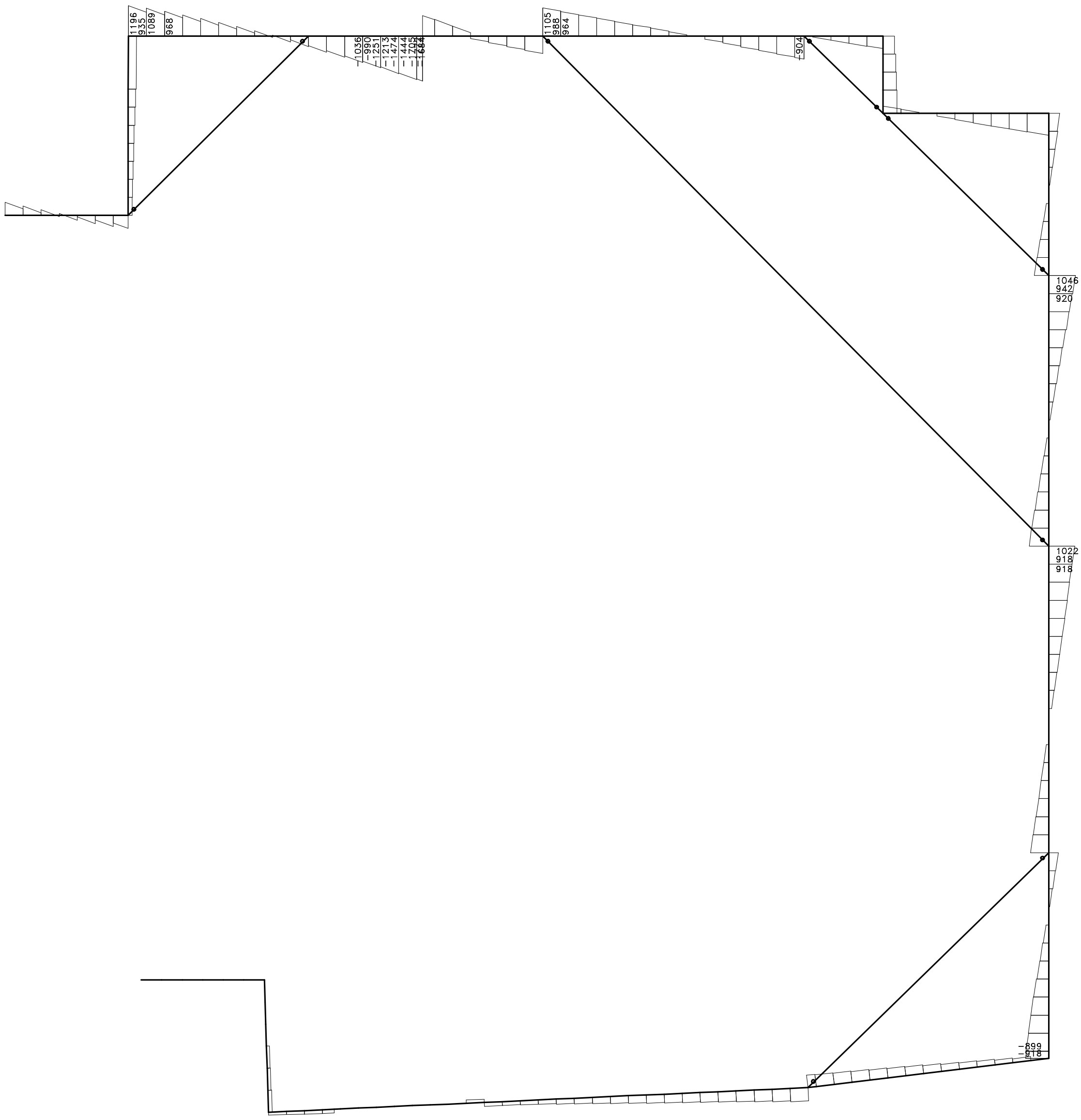
Maximum moment in this diagram is 2500kNm

Job No	Description	Page:	18
8082	**29 New End, London, NW3**	Date:	**March 2012**
		By:	**I. Tozluoglu**
		Checked:	**U. Mizrahi**

taylor whalley spyra

tws.

V2 Shear for Final Stage



Maximum Shear force in this diagram is 1800kN

Note that maximum moment and shears are from different areas.

8.2. Garden Side Capping Beam In 2m Distance Over the Supported Pile

RC BEAM DESIGN (EN1992-1)

In accordance with UK national annex

TEDDS calculation version 2.1.10

Rectangular section details

Section width; $b = \mathbf{1200}$ mm; Section depth; $h = \mathbf{1040}$ mm

Concrete details (Table 3.1 - Strength and deformation characteristics for concrete)

Concrete strength class; **C40/50**

Char.comp.cylinder strength; $f_{ck} = \mathbf{40}$ N/mm^2; Char.comp.cube strength; $f_{ck,cube} = \mathbf{50}$ N/mm^2

Mean comp.cylinder strength; $f_{cm} = \mathbf{48}$ N/mm^2; Mean axial tensile strength; $f_{ctm} = \mathbf{3.5}$ N/mm^2

Secant modulus of elasticity; $E_{cm} = \mathbf{35220}$ N/mm^2; Maximum aggregate size; $h_{agg} = \mathbf{20}$ mm

Partial factor for concrete; $\gamma_C = \mathbf{1.50}$; Comp.strength coefficient; $\alpha_{cc} = \mathbf{0.85}$

Design compressive strength; $f_{cd} = \mathbf{22.7}$ N/mm^2

Reinforcement details

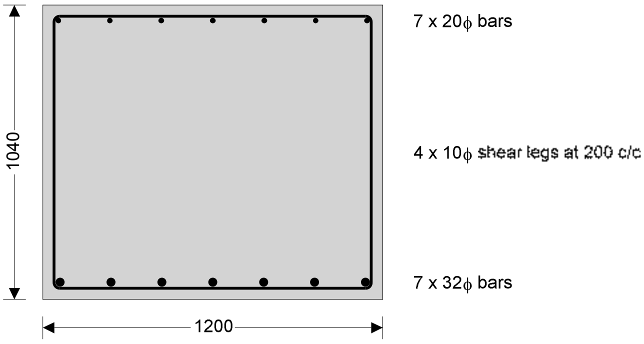
Characteristic yield strength; $f_{yk} = \mathbf{500}$ N/mm^2; Partial factor for reinforcment; $\gamma_S = \mathbf{1.15}$

Design yield strength; $f_{yd} = \mathbf{435}$ N/mm^2

Nominal cover to reinforcement

Nominal cover to top; $c_{nom\_t} = \mathbf{35}$ mm; Nominal cover to bottom; $c_{nom\_b} = \mathbf{35}$ mm

Nominal cover to sides; $c_{nom\_s} = \mathbf{35}$ mm



Rectangular section in flexure (Section 6.1) - - Positive midspan moment

Design bending moment; $M = \mathbf{2000}$ kNm; $K = \mathbf{0.043}$; $K' = \mathbf{0.207}$

K' > K - No compression reinforcement is required

Tens.reinforcement required; $A_{s,req} = \mathbf{4946}$ mm^2

Tens.reinforcement provided; 7 × 32ϕ bars; Tens.reinforcement provided; $A_{s,prov} = \mathbf{5630}$ mm^2

Min area of reinforcement; $A_{s,min} = \mathbf{2144}$ mm^2; Max area of reinforcement; $A_{s,max} = \mathbf{49920}$ mm^2

PASS - Area of reinforcement provided is greater than area of reinforcement required

Rectangular section in shear (Section 6.2)

Des.shear ; $V_{Ed} = \mathbf{300}$ kN

Shear reinforcement required; $A_{sv,req} = \mathbf{297}$ mm^2/m; Min shear reinforcement; $A_{sv,min} = \mathbf{1214}$ mm^2/m

Shear reinforcement provided; 4 × 10ϕ legs at 200 c/c; Shear reinforcement provided; $A_{sv,prov} = \mathbf{1571}$ mm^2/m

PASS - Area of shear reinforcement provided exceeds minimum required

Max longitudinal spacing; $s_{vl,max} = \mathbf{734}$ mm

PASS - Longitudinal spacing of shear reinforcement provided is less than maximum

Crack control (Section 7.3)

Adjusted max.bar diameter; $\phi_{mod} = \mathbf{9}$ mm; Max.adjusted bar diameter; $\phi_{max} = \mathbf{32}$ mm

Tension bar spacing; s_{bar} = **180** mm; Maximum tension bar spacing; s_{max} = **300** mm

Maximum crack width; w_k = **0.3** mm; Min.area of reinforcement; $A_{sc,min}$ = **4186** mm^2

PASS - Area of tension reinforcement provided exceeds minimum required for crack control

8.3. Garden Side Capping Beam at Span

RC BEAM DESIGN (EN1992-1)

In accordance with UK national annex

TEDDS calculation version 2.1.10

Rectangular section details

Section width; b = **1200** mm; Section depth; h = **1040** mm

Concrete details (Table 3.1 - Strength and deformation characteristics for concrete)

Concrete strength class; **C40/50**

Char.comp.cylinder strength; f_{ck} = **40** N/mm^2; Char.comp.cube strength; $f_{ck,cube}$ = **50** N/mm^2

Mean comp.cylinder strength; f_{cm} = **48** N/mm^2; Mean axial tensile strength; f_{ctm} = **3.5** N/mm^2

Secant modulus of elasticity; E_{cm} = **35220** N/mm^2; Maximum aggregate size; h_{agg} = **20** mm

Partial factor for concrete; γ_C = **1.50**; Comp.strength coefficient; α_{cc} = **0.85**

Design compressive strength; f_{cd} = **22.7** N/mm^2

Reinforcement details

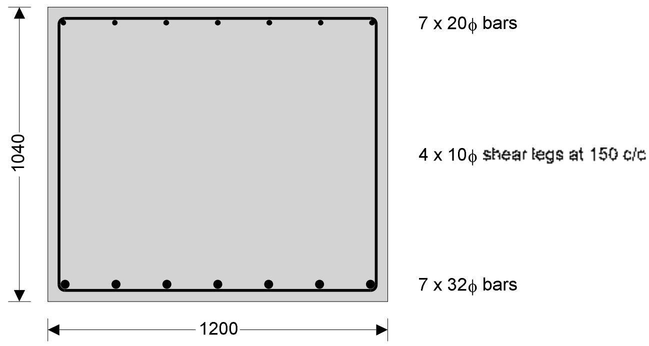
Characteristic yield strength; f_{yk} = **500** N/mm^2; Partial factor for reinforcment; γ_S = **1.15**

Design yield strength; f_{yd} = **435** N/mm^2

Nominal cover to reinforcement

Nominal cover to top; c_{nom_t} = **35** mm; Nominal cover to bottom; c_{nom_b} = **35** mm

Nominal cover to sides; c_{nom_s} = **35** mm



Rectangular section in flexure (Section 6.1) - - Positive midspan moment

Design bending moment; M = **1500** kNm; K = **0.033**; K' = **0.207**

K' > K - No compression reinforcement is required

Tens.reinforcement required; $A_{s,req}$ = **3709** mm^2

Tens.reinforcement provided; 7 × 32ϕ bars; Tens.reinforcement provided; $A_{s,prov}$ = **5630** mm^2

Min area of reinforcement; $A_{s,min}$ = **2144** mm^2; Max area of reinforcement; $A_{s,max}$ = **49920** mm^2

PASS - Area of reinforcement provided is greater than area of reinforcement required

Rectangular section in shear (Section 6.2)

Des.shear ; V_{Ed} = **1800** kN

Shear reinforcement required; $A_{sv,req}$ = **1780** mm^2/m; Min shear reinforcement; $A_{sv,min}$ = **1214** mm^2/m

Shear reinforcement provided; 4 × 10ϕ legs at 150 c/c; Shear reinforcement provided; $A_{sv,prov}$ = **2094** mm^2/m

PASS - Area of shear reinforcement provided exceeds minimum required

Max longitudinal spacing; $s_{vl,max}$ = **734** mm

PASS - Longitudinal spacing of shear reinforcement provided is less than maximum

Crack control (Section 7.3)

Adjusted max.bar diameter; ϕ_{mod} = **9** mm; Max.adjusted bar diameter; ϕ_{max} = **32** mm

Tension bar spacing; s_{bar} = **180** mm; Maximum tension bar spacing; s_{max} = **300** mm

Maximum crack width; w_k = **0.3** mm; Min.area of reinforcement; $A_{sc,min}$ = **4186** mm^2

PASS - Area of tension reinforcement provided exceeds minimum required for crack control

8.4. Tennis Court and Carnegie House Side Capping Beam

RC BEAM DESIGN (EN1992-1)

In accordance with UK national annex

TEDDS calculation version 2.1.10

Rectangular section details

Section width; b = **1200** mm; Section depth; h = **1040** mm

Concrete details (Table 3.1 - Strength and deformation characteristics for concrete)

Concrete strength class; **C40/50**

Char.comp.cylinder strength; f_{ck} = **40** N/mm^2; Char.comp.cube strength; $f_{ck,cube}$ = **50** N/mm^2

Mean comp.cylinder strength; f_{cm} = **48** N/mm^2; Mean axial tensile strength; f_{ctm} = **3.5** N/mm^2

Secant modulus of elasticity; E_{cm} = **35220** N/mm^2; Maximum aggregate size; h_{agg} = **20** mm

Partial factor for concrete; γ_C = **1.50**; Comp.strength coefficient; α_{cc} = **0.85**

Design compressive strength; f_{cd} = **22.7** N/mm^2

Reinforcement details

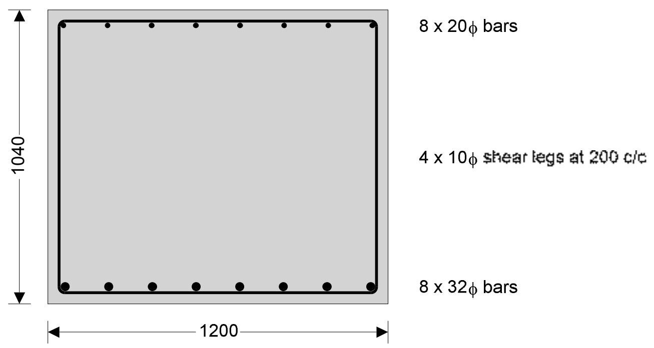
Characteristic yield strength; f_{yk} = **500** N/mm^2; Partial factor for reinforcment; γ_S = **1.15**

Design yield strength; f_{yd} = **435** N/mm^2

Nominal cover to reinforcement

Nominal cover to top; c_{nom_t} = **35** mm; Nominal cover to bottom; c_{nom_b} = **35** mm

Nominal cover to sides; c_{nom_s} = **35** mm



Rectangular section in flexure (Section 6.1) - - Positive midspan moment

Design bending moment; M = **2500** kNm; K = **0.054**; K' = **0.207**

K' > K - No compression reinforcement is required

Tens.reinforcement required; $A_{s,req}$ = **6186** mm^2

Tens.reinforcement provided; 8 × 32ϕ bars; Tens.reinforcement provided; $A_{s,prov}$ = **6434** mm^2

Min area of reinforcement; $A_{s,min}$ = **2144** mm^2; Max area of reinforcement; $A_{s,max}$ = **49920** mm^2

PASS - Area of reinforcement provided is greater than area of reinforcement required

Rectangular section in shear (Section 6.2)

Des.shear ; V_{Ed} = **520** kN

Shear reinforcement required; $A_{sv,req}$ = **515** mm^2/m; Min shear reinforcement; $A_{sv,min}$ = **1214** mm^2/m

Shear reinforcement provided; 4 × 10ϕ legs at 200 c/c; Shear reinforcement provided; $A_{sv,prov}$ = **1571** mm^2/m

PASS - Area of shear reinforcement provided exceeds minimum required

Max longitudinal spacing; $s_{vl,max}$ = **734** mm

PASS - Longitudinal spacing of shear reinforcement provided is less than maximum

Crack control (Section 7.3)

Adjusted max.bar diameter; ϕ_{mod} = **9** mm; Max.adjusted bar diameter; ϕ_{max} = **32** mm

Tension bar spacing; s_{bar} = **154** mm; Maximum tension bar spacing; s_{max} = **300** mm

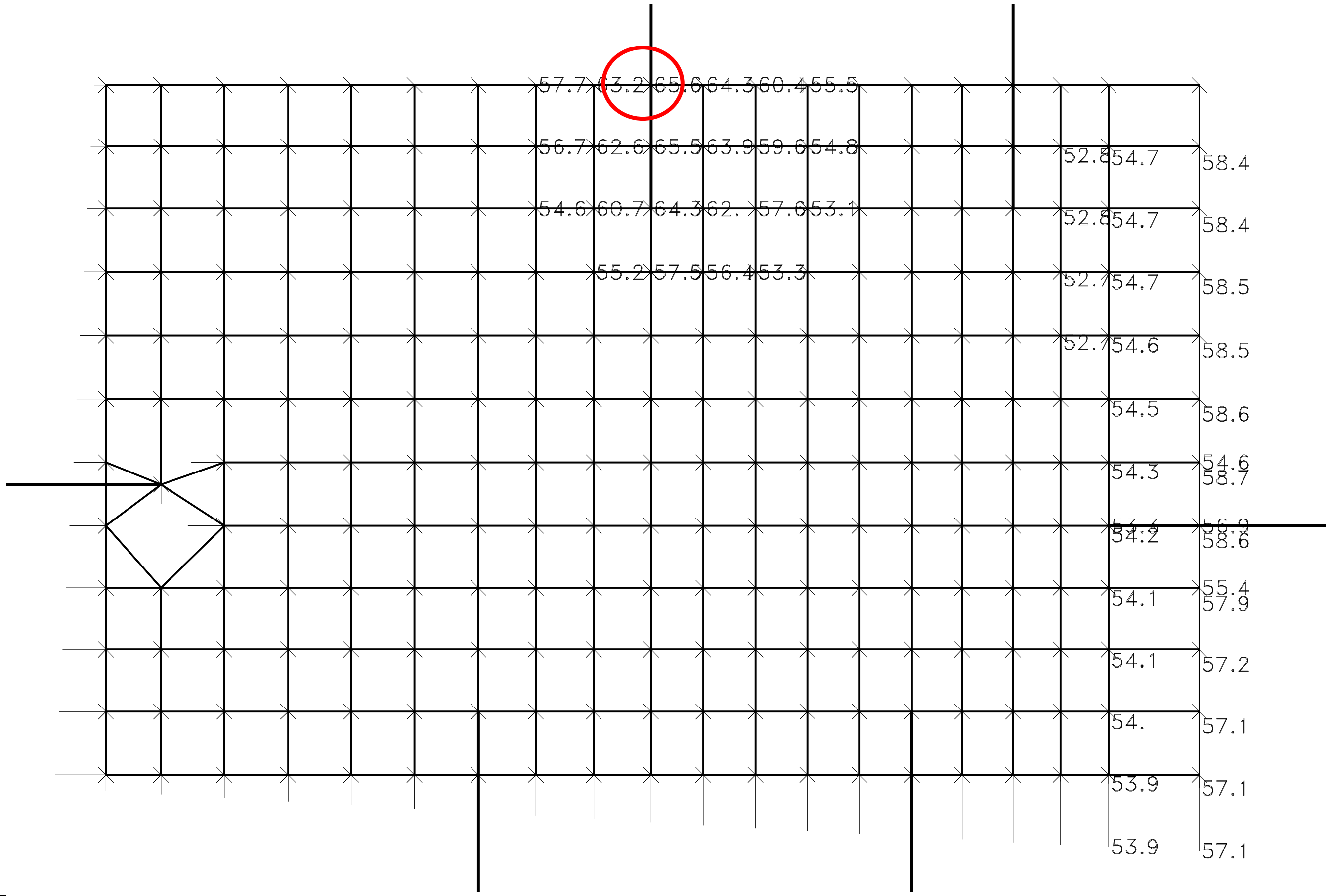
Maximum crack width; w_k = **0.3** mm; Min.area of reinforcement; $A_{sc,min}$ = **4180** mm^2

PASS - Area of tension reinforcement provided exceeds minimum required for crack control

Job No	Description	Page:	**23**
8082	**29 New End, London, NW3**	Date:	**March 2012**
		By:	**I. Tozluoglu**
		Checked:	**U. Mizrahi**

9. FOUNDATION SLAB

Maximum Ground Stress is 65.6kN/m^2 at stage six



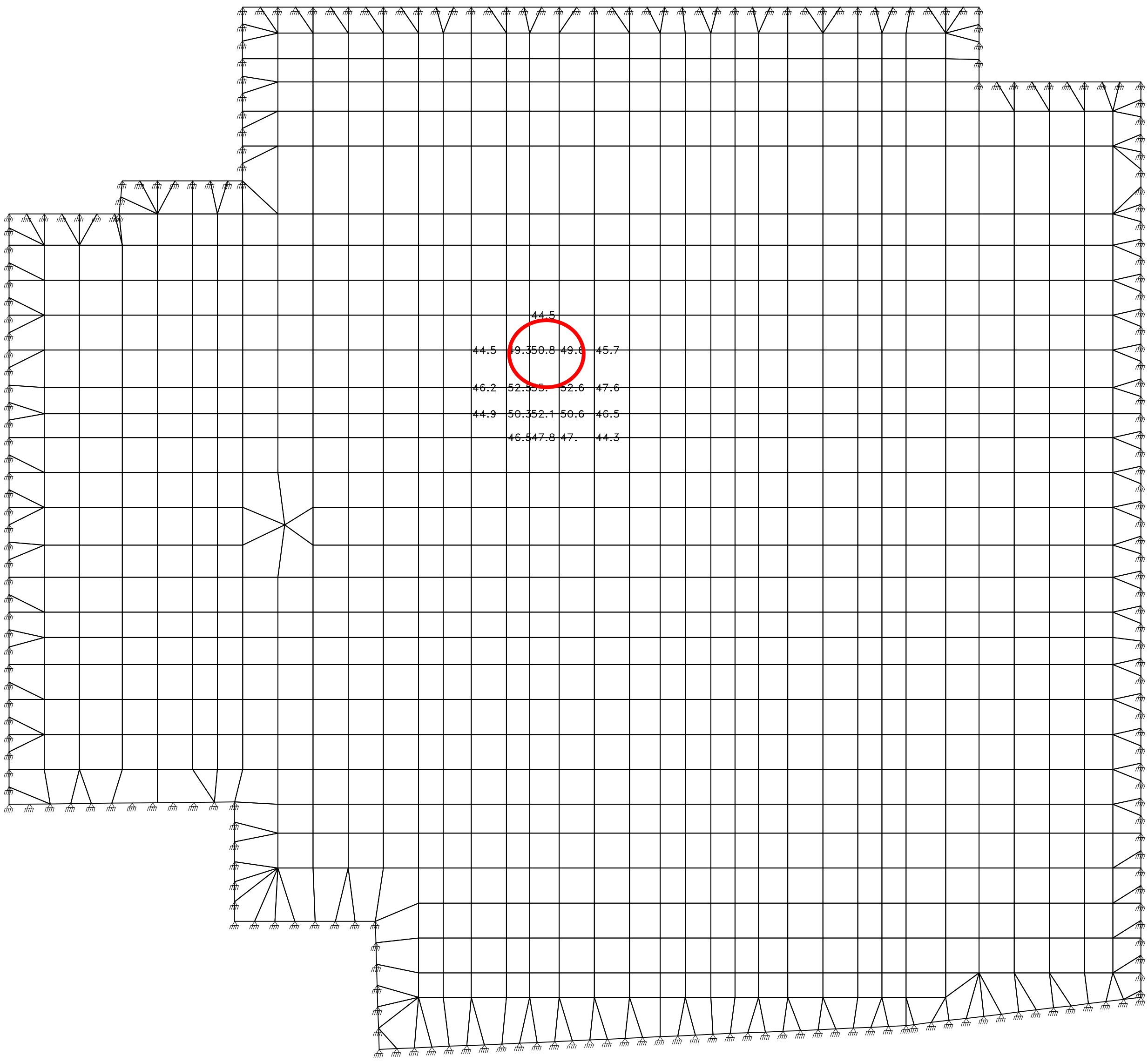
-

3 Dufferin Avenue,
Barbican, London, EC1Y 8PQ
T: 020 7253 2626
F: 020 7253 2767
E: tws@tws.uk.com
W: www.tws.uk.com

Job No	Description	Page:	**24**
8082	**29 New End, London, NW3**	Date:	**March 2012**
		By:	**I. Tozluoglu**
		Checked:	**U. Mizrahi**

taylor whalley spyra tws.

Maximum Ground Stress is 55kN/m^2 for the finished slab at temporary condition



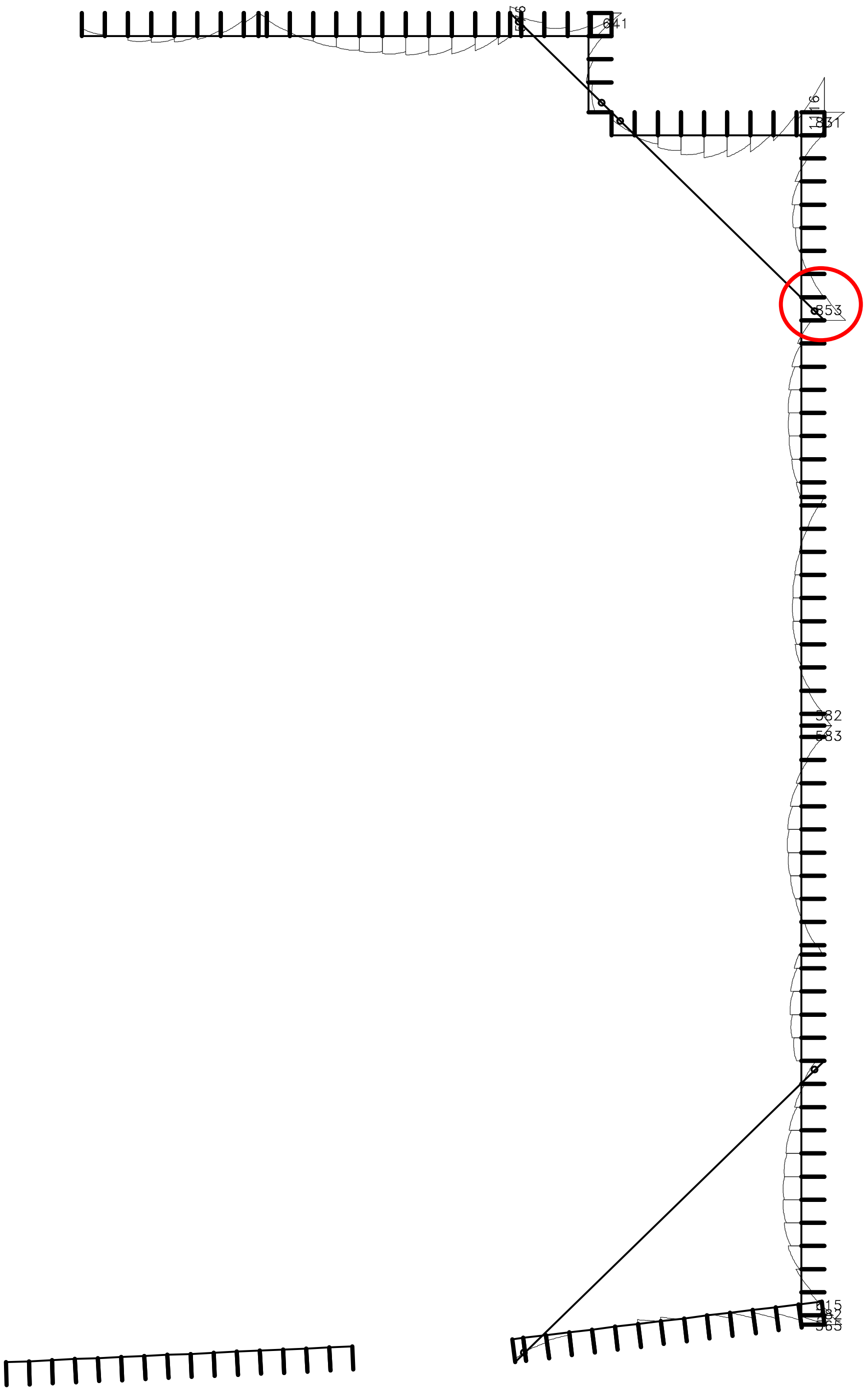
-

10. PROPPING SCHEME and DESIGN

10.1. Design Forces for Walers

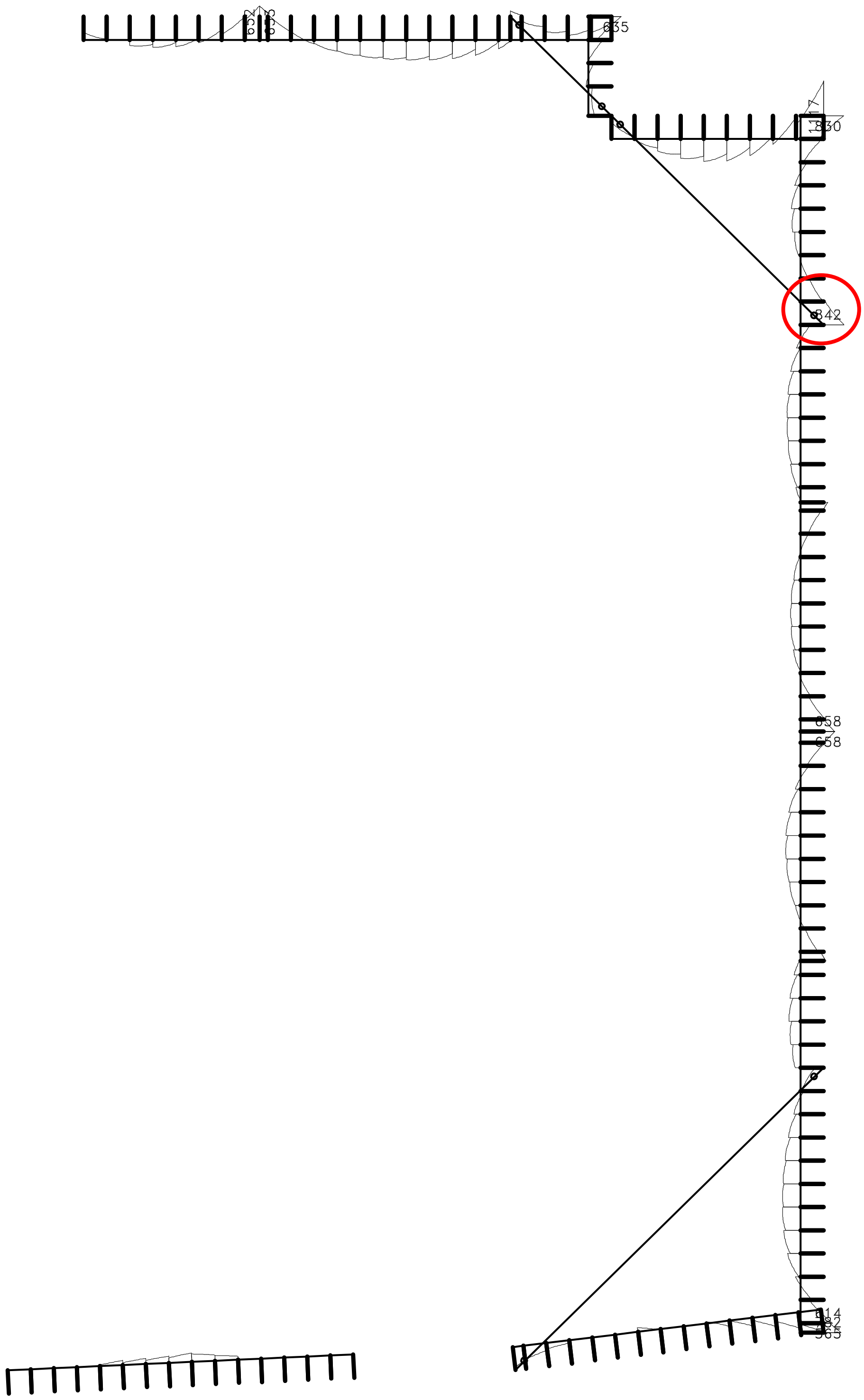
M3 Moment at stage 5

Maximum Moment 853kNm



M3 Moment at for Final Stage

Maximum Moment 842kNm

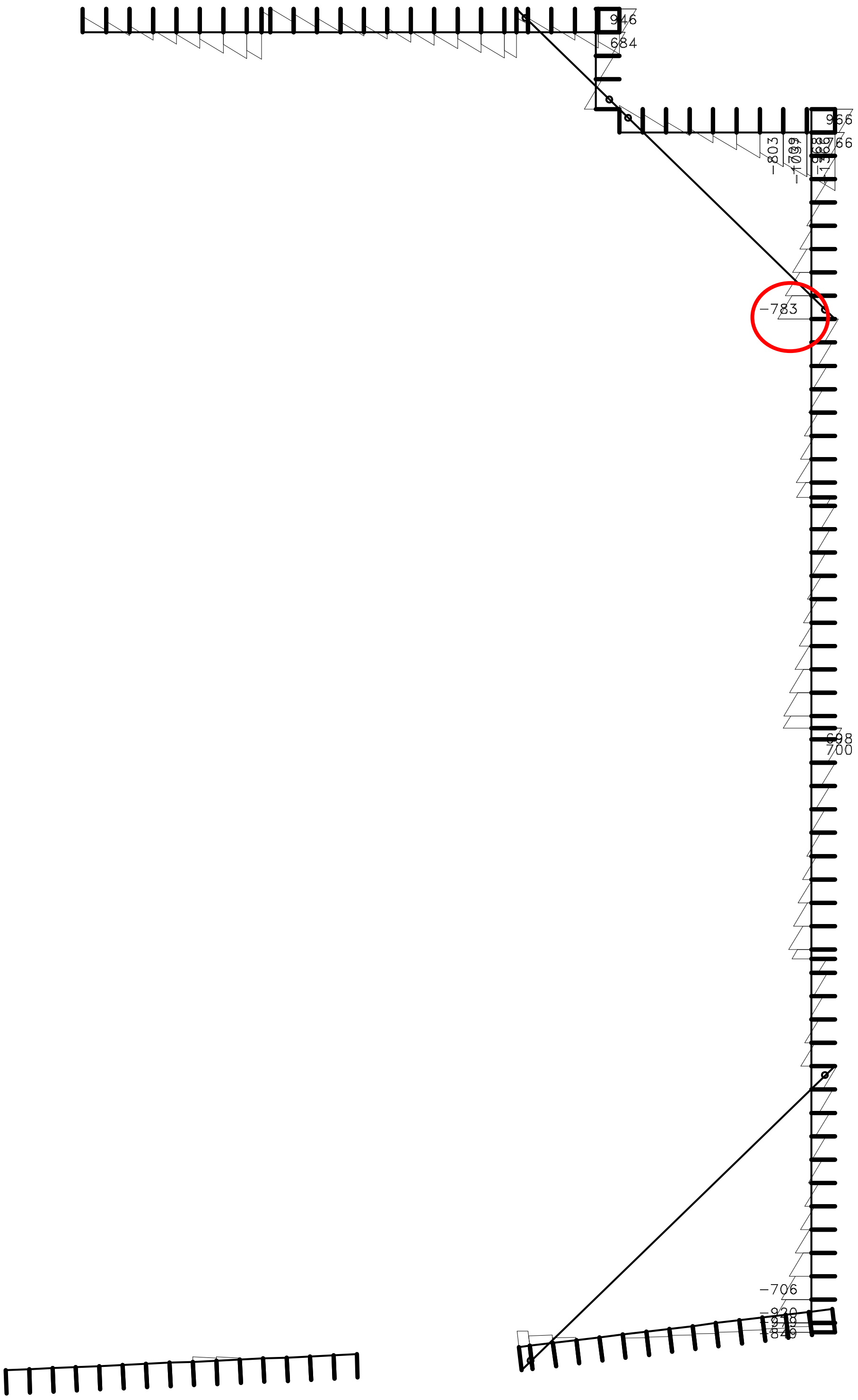


Job No	Description	Page:	27
8082	**29 New End, London, NW3**	Date:	**March 2012**
		By:	**I. Tozluoglu**
		Checked:	**U. Mizrahi**

taylor whalley spyra

V2 Shear at for Stage 5

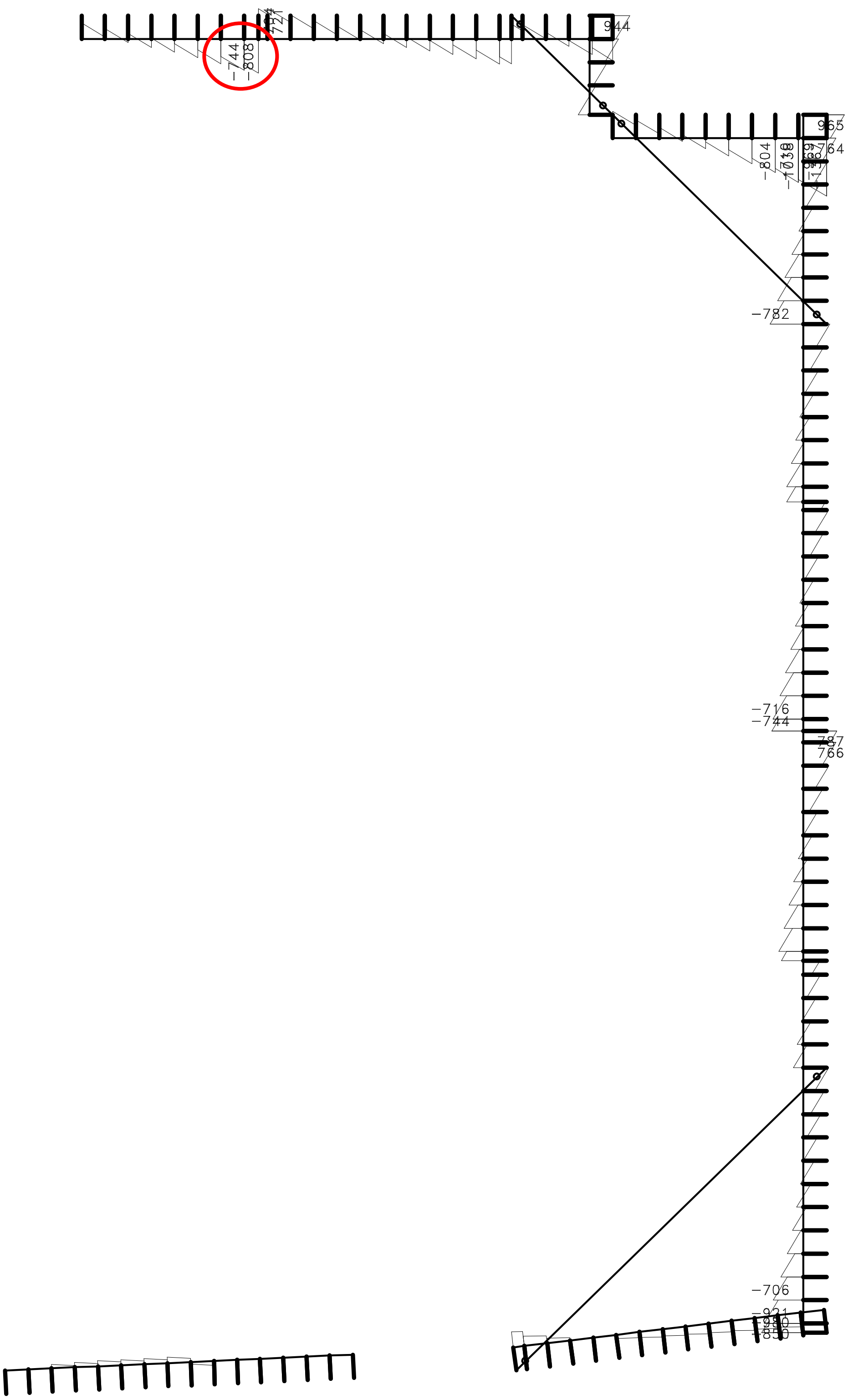
Maximum Shear 783kNm



Job No	Description	Page:	28
8082	29 New End, London, NW3	Date:	March 2012
		By:	I. Tozluoglu
		Checked:	U. Mizrahi

V2 Shear at for Stage 5

Maximum Shear 808kNm



3 Dufferin Avenue,
Barbican, London, EC1Y 8PQ

T: 020 7253 2626
F: 020 7253 2767

E: tws@tws.uk.com
W: www.tws.uk.com

10.2. Design of Waler Section

A detailed work will be carried out by MGF temporary propping specialists, design here is for preliminary scheme preparation purposes only.

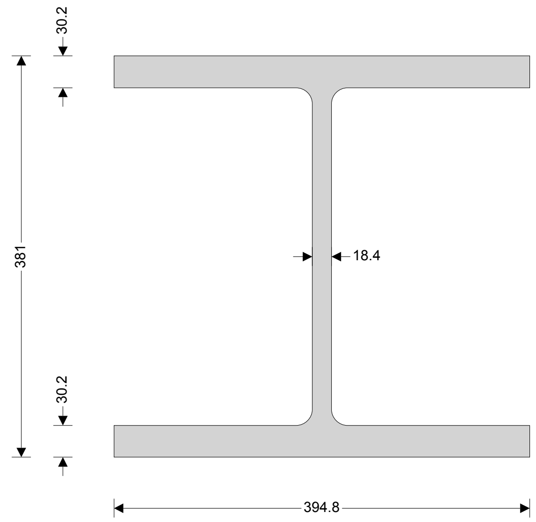
STEEL MEMBER DESIGN (EN1993-1-1:2005)

In accordance with EN1993-1-1:2005 incorporating Corrigenda February 2006 and April 2009 and the UK national annex

TEDDS calculation version 3.0.03

Section details

Section type; **UKC 356x406x235 (Corus Advance)**; Steel grade; **S275**



Section classification; **Class 1**

Check shear - Section 6.2.6

Design shear force; $V_{z,Ed}$ = **783** kN; Design shear resistance; $V_{c,z,Rd}$ = **1158.4** kN

PASS - Design shear resistance exceeds design shear force

Combined bending and shear - Section 6.2.8

Check bending moment - Section 6.2.5

Design bending moment; M_{Ed} = **853** kNm; Des.bending resist.moment; $M_{c,Rd}$ = **1088.1** kNm

Slenderness ratio for lateral torsional buckling

LTB slenderness ratio; $\bar{\lambda}_{LT}$ = **0.752**; Limiting slenderness ratio; $\bar{\lambda}_{LT,0}$ = **0.400**

$\bar{\lambda}_{LT} > \bar{\lambda}_{LT,0}$ - Lateral torsional buckling cannot be ignored

Design resistance for buckling - Section 6.3.2.1

Des.buckling resist.moment; $M_{b,Rd}$ = **917.4** kNm

PASS - Design buckling resistance moment exceeds design bending moment

MGF 406 Series Walers satisfies capacity requirements

MGF 406 Series Waler

The MGF 406 Waler System is the strongest modular waler system available in the UK. A 1250kN (double acting) hydraulic cylinder has been incorporated into the system which has a stroke of 800mm to accommodate construction tolerances and for the ease of installation. This system is fully compatible with the MGF 300 Series, 400 Series & 1000 Series Strut Systems. The 406 waler system can be articulated to support complex wall layouts e.g. hexagonal and octagonal frames.

Waler Properties

Steel Section	356x406x340 UC
Minimum Yield Strength, p_y	460 N/mm^2
Steel Grade	S460(N) EN10056
Unit Mass	340 kg/m
Gross Sectional Area, A_g	433 cm^2
Second Moment of Area, I_{xx}	122,500 cm^4
Plastic Modulus, S_{xx}	6999 cm^3
Moment Capacity, M_c	3009 kNm[1]

1 Member capacities calculated in accordance with BS 5950-1: 2000

Weights

1250kN Hydraulic Strut	1510 kg
0.5m Extension	344 kg
1m Extension	508 kg
2m Extension	868 kg
3m Extension	1228 kg
4m Extension	1588 kg
5m Extension	1949 kg
6m Extension	2309 kg
7m Extension	2659 kg
8m Extension	3028 kg
9m Extension	3388 kg
10m Extension	3749 kg

Hydraulic Properties

Specification	1250 kN Double Acting steel hydraulic cylinder
Working Load Capacity, P_{SLS}	1250 kN (CIRIA C580)
Working Pressure	400 Bar
Cylinder Stroke	800 mm
Seals and Fittings Rating	700 Bar

Connection Details

Waler Extension	
Arrangement	3-to-2 Lug
Minimum Yield Strength, p_y	355 N/mm^2
Lug Thickness	40mm thick
Pin	Φ 50mm EN19A(708M40)
Pin Shear Capacity, P_s	3581 kN
Bolts	6 No M30 (8.8)
Moment Capacity	2100 kNm

Connection Details

Waler Hydraulic	**(400SHS to 406UC)**
Steel Section (Outer)	400x400x16 SHS
Minimum Yield Strength, p_y	355 N/mm^2
Steel Grade	S355J2H
Plastic Modulus, S_{xx}	3484 cm^3
Moment Capacity, M_c	1235 kNm[1]
Weld	FPB

www.mgf.ltd.uk

10.3. Example Propping Members for the Temporary Works

MGF 1000 Series Struts

The MGF 1000 Series Hydraulic Strut has the largest capacity and is the most structurally efficient modular shoring system available in the UK. The system is capable of spanning up to 40m without any intermediate support and with the provision of adaptors ensures full compatibility with the MGF 406 Waler System and MGF 2500kN Modular Components. This system is primarily used to support RC capping beams as well as modular and bespoke steel / concrete waler systems.

Strut Properties

Steel Section	1067mm OD x15 mm thick
Minimum Yield Strength, p_y	448 N/mm^2
Steel Grade	API 5L X65
Unit Mass	360 kg/m
Gross Sectional Area, A_g	495.7 cm^2
Second Moment of Area, I_{xx}	685,941 cm^4
Moment Capacity, M_c	5762 kNm[1]
Compressive Axial Capacity, P_c	6487 kN[1,2]
Squash Load,	22217 kN[1]

1 Member capacities calculated in accordance with BS 5950-1: 2000
2 Effective Length = 20m

Weights

Swivel Plates Assembly	563 kg
2500kN Hydraulic Strut	1990 kg
Cone Adaptor	600 kg
4m Tube Extension	1612kg
5m Tube Extension	1972 kg
6m Tube Extension	2332 kg
7m Tube Extension	2692 kg
10m Tube Extension	3772 kg
Transition Plate	175 kg

Hydraulic Properties

Specification	2500 kN Double Acting steel hydraulic cylinder
Working Load Capacity, P_{SLS}	2500 kN (CIRIA C580)
Working Pressure	500 Bar
Cylinder Stroke	800 mm
Seals and Fittings Rating	700 Bar

Connection Details

Cone Adaptors

Flange Plate	850mm O/D, 670mm I/D
Thickness	30mm thick
Minimum Yield Strength, p_y	345 N/mm^2
Bolts	12 No M24 (8.8) 770mm PCD

Connection Details

Swivel Base Assembly

Flange Plate	520mm x 520mm x 40mm
Minimum Yield Strength, p_y	345 N/mm^2
Bolts	12 No M24 (8.8)
Pin	Ф 90mm EN24T(817M40)T
Pin Shear Capacity, P_s	15268 kN

MGF

www.mgf.ltd.uk

Job No	Description	Page:	32
8082	**29 New End, London, NW3**	Date:	**March 2012**
		By:	**I. Tozluoglu**
		Checked:	**U. Mizrahi**

taylor whalley spyra

MGF 1000 Series Struts

Connection Details

Strut Extension

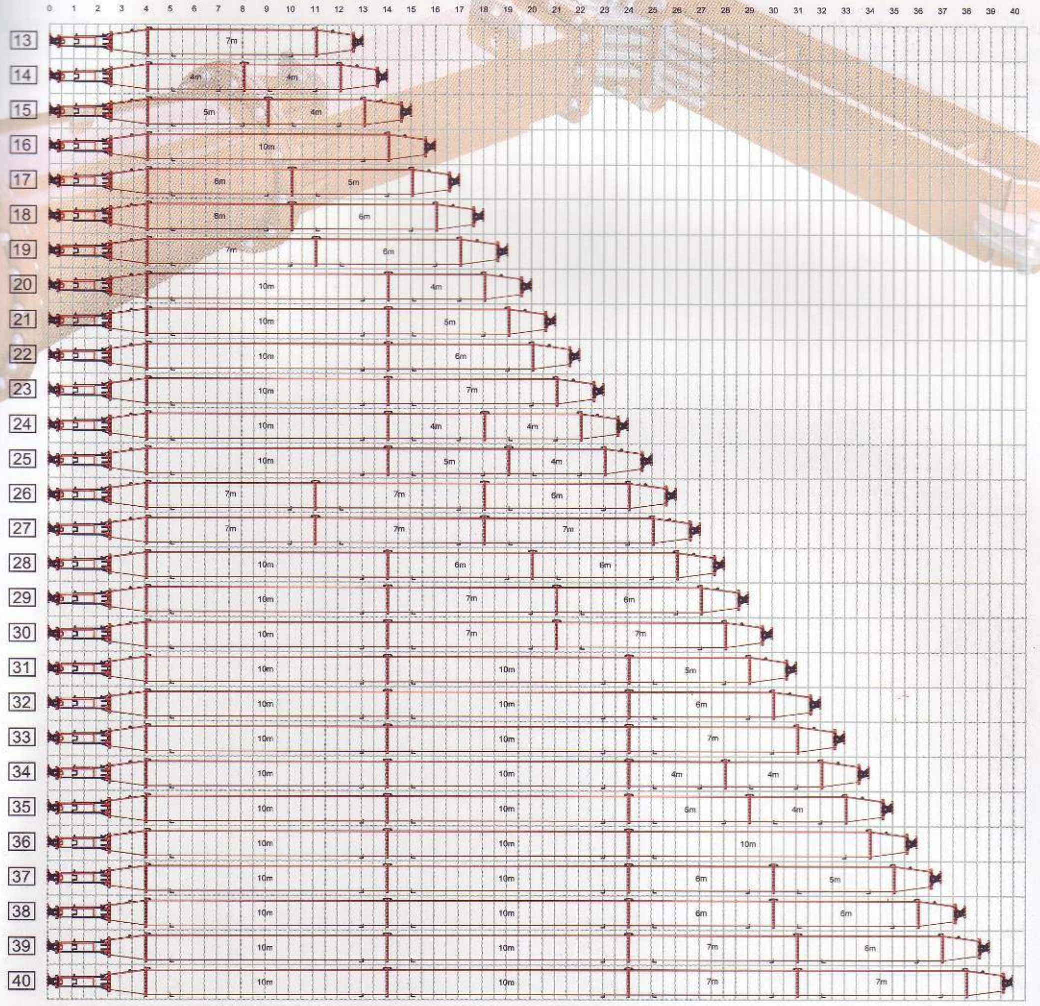
Flange Plate	1270mm O/D, 1070mm I/D
Thickness	30mm thick
Minimum Yield Strength, p_y	345 N/mm²
Bolts	24 No M24 (8.8) 1170mm PCD

Connection Details

Transition Plate

Flange Plate	850mm O/D, 670mm I/D
Thickness	40mm thick
Minimum Yield Strength, p_y	345 N/mm²
Bolts	12 No M24 (8.8) 770mm PCD

MGF 1000 SERIES STRUT EXTENSIONS



MGF 1000 Series can span up to 40m, the hydraulic power has a stroke of 800mm and when combined with short box extensions any length from 13m to 40m can be achieved

www.mgf.ltd.uk

MGF

3 Dufferin Avenue,
Barbican, London, EC1Y 8PQ

T: 020 7253 2626
F: 020 7253 2767

E: tws@tws.uk.com
W: www.tws.uk.com

MGF 400 Series Struts

The MGF 400 Series Hydraulic Strut System is capable of spanning up to 24m without any intermediate support and is fully compatible with the MGF 406 Waler System and MGF 1250kN and 2500kN Modular Components. This system is primarily used to support RC capping beams as well as modular and bespoke steel / concrete waler systems. This system can be used in both horizontal and raking applications to support excavations / structures.

Strut Properties

Steel Section	400x400x16 SHS
Minimum Yield Strength, p_y	355 N/mm^2
Steel Grade	S355J2H
Unit Mass	191 kg/m
Gross Sectional Area, A_g	243 cm^2
Second Moment of Area, I_{xx}	59,344 cm^4
Moment Capacity, M_c	1235 kNm[1]
Compressive Axial Capacity, P_c	2692 kN[1,2]
Squash Load,	8627 kN[1]

1 Member capacities calculated in accordance with BS 5950-1: 2000
2 Effective Length = 20m

Weights

Swivel Plates Assembly	563 kg
1250kN Hydraulic Strut	1071 kg
2500kN Hydraulic Strut	1990 kg
0.5m Extension	197 kg
1m Extension	313 kg
2m Extension	505 kg
3m Extension	699 kg
4m Extension	894 kg
5m Extension	1088 kg
6m Extension	1282 kg
7m Extension	1477 kg
8m Extension	1669 kg
9m Extension	1863 kg
10m Extension	2055 kg

Hydraulic Properties

MGF 1250kN Hydraulic Specification	1250 kN Double Acting steel hydraulic cylinder
MGF 2500kN Hydraulic Specification	2500 kN Double Acting steel hydraulic cylinder
MGF 1250kN Hydraulic Working Load Capacity, P_{SLS}	1250 kN (CIRIA C580)
MGF 2500kN Hydraulic Working Load Capacity, P_{SLS}	2500 kN (CIRIA C580)
MGF 1250kN Hydraulic Working Pressure	400 Bar
MGF 2500kN Hydraulic Working Pressure	500 Bar
Cylinder Stroke	800 mm
Seals and Fittings Rating	700 Bar

MGF www.mgf.ltd.uk

MGF 400 Series Struts

Connection Details

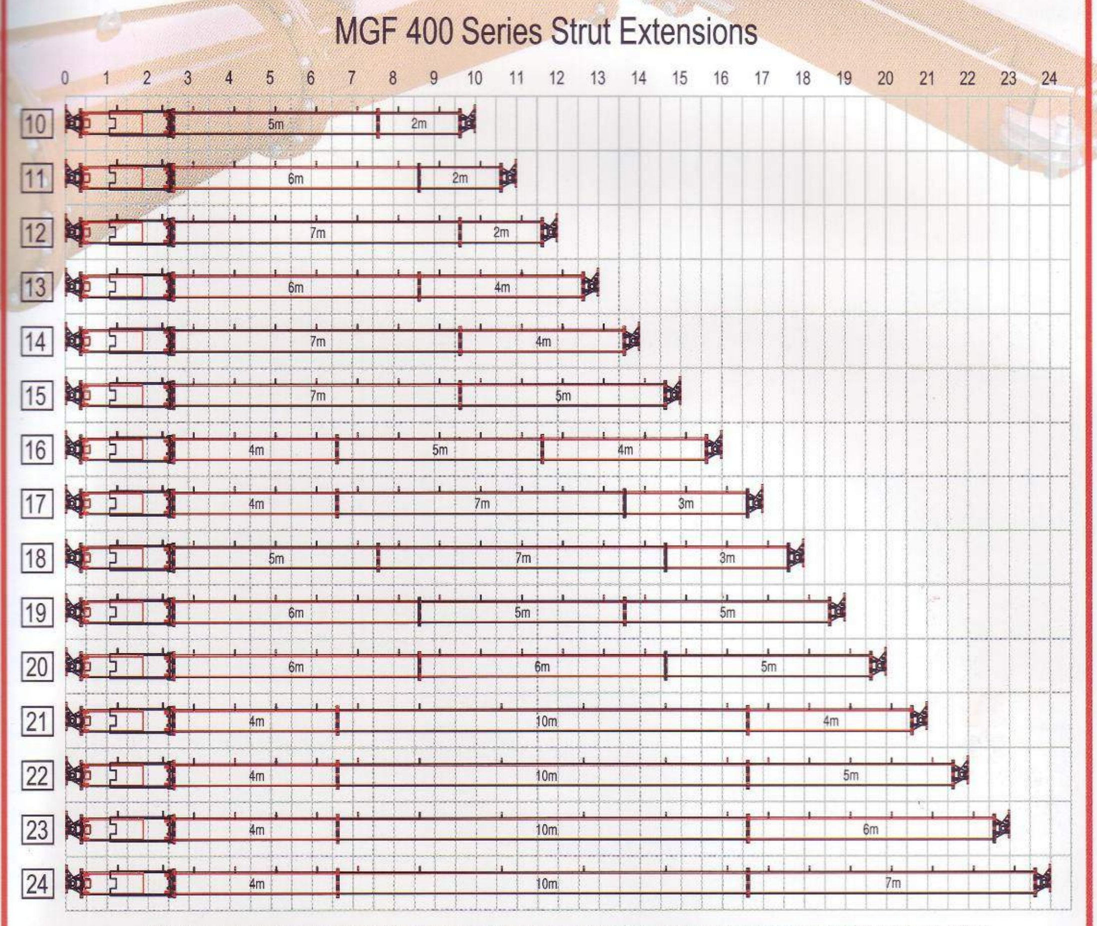
Hydraulic / Strut Extension

Flange Plate	520mm x 520mm x 30mm
Minimum Yield Strength, p_y	345 N/mm²
Bolts	12 No M24 (8.8)

Connection Details

Swivel Base Assembly

Flange Plate	520mm x 520mm x 40mm
Minimum Yield Strength, p_y	345 N/mm²
Bolts	12 No M24 (8.8)
Pin	Φ 90mm EN24T(817M40)T
Pin Shear Capacity, P_s	15268 kN



MGF 400 series hydraulic struts can span up to 24m, the power pack has a stroke of 800mm and when combined with short box extensions any length from 10m to 24m can be achieved.

www.mgf.ltd.uk

MGF