



Project Preface

<i>Project name:</i>	Calculation package for the Retaining wall
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<i>Client name:</i>	Craig Morgan
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<u><i>Construction site address:</i></u> <i>Postcode:</i>	2 Melrose Houses Cardiff Road, Troedyrhiw,
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<i>Document prepared by:</i>	Marcin Krawucki BSc (Hons) GMICE ICE Membership: 92007313
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<i>Address:</i>	50 Quarry Row Merthyr Tydfil, CF47 8PS
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<i>Date of preparation:</i>	10-12-2024
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<i>Job reference number:</i>	AUX400
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<i>Revision:</i>	C01
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Project:	Calculation package for the Retaining wall		
Adress:	2 Melrose Houses Cardiff Road, Troedyrhiw,		
Job No.	AUX400	Sheet	1
Date:	10-12-2024	Rev.	C01

Design content

1 Introduction

1.1 Instructions

In accordance with instructions received from the client I have carried out a Structural calculations for the Retaining wall (Base only) at

**2 Melrose Houses
Cardiff Road, Troedyrhiw,**

2 Construction works

All the construction works must be done by experienced builder or contractor.

As there is no ground investigation I use the worst case $GBP=100\text{kN/m}^2$. The minimum reinforcement cover in the concrete base should be 40mm. The concrete for the Retaining wall is C40. Movement joints must be provided at a maximum of 6m space with a maximum 3m from a corner or change of direction, They must commence at concrete foundation level and continue through the coping courses. The backfill material must be granular type to relieve hydrostatic pressure. A min surcharge of 1.5KN/m^2 has been considered for soil.

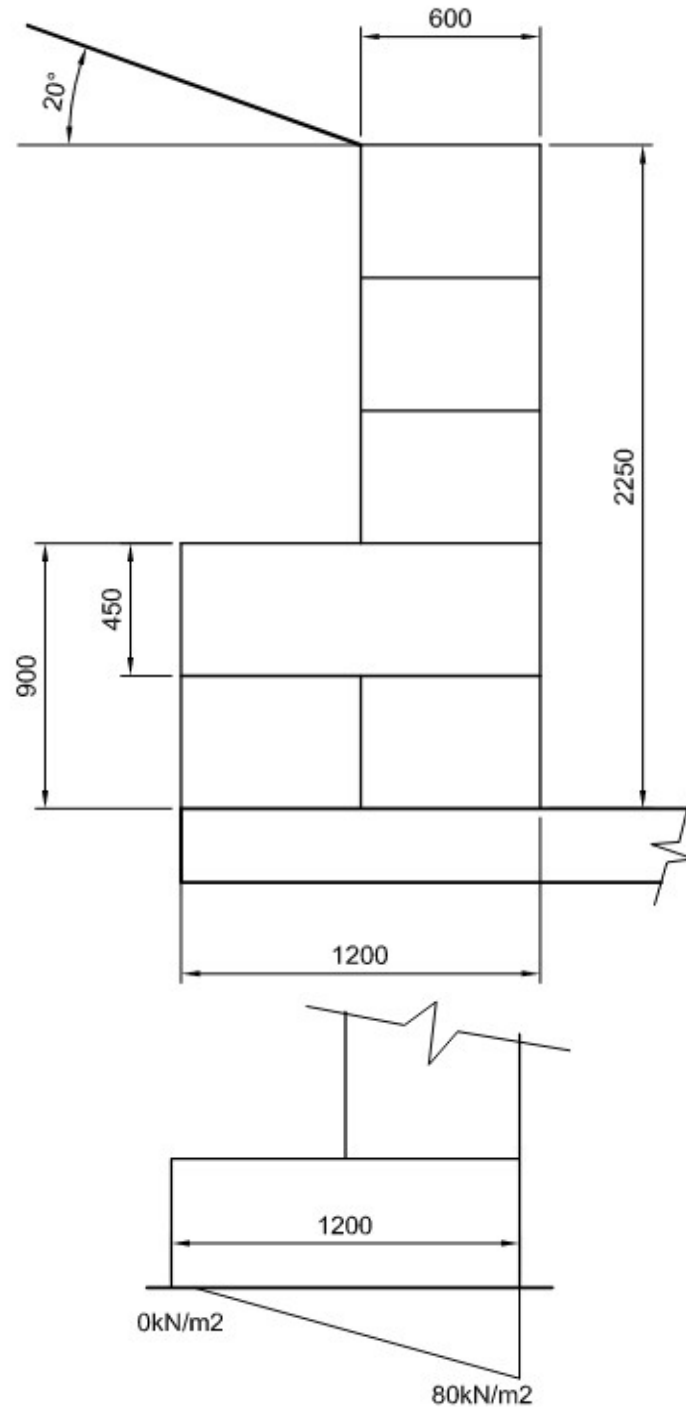
If the builder/contractor has any queries regarding the above-mentioned works during the installation installation process, please contact me.

Marcin Krawucki
BSc (Hons) GMICE
ICE Membership: 92007313



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Manufacturer Details



Bearing Pressure
Directly Beneath Wall

Retaining wall details (from manufacturer - Elite Precast Concrete)

Note: Density of soil is considered as 1800 KN/m³ instead of 1200 mentioned by manufacturer, however, the actual soil level is flat instead of angled and bearing pressure is 100 instead of 80

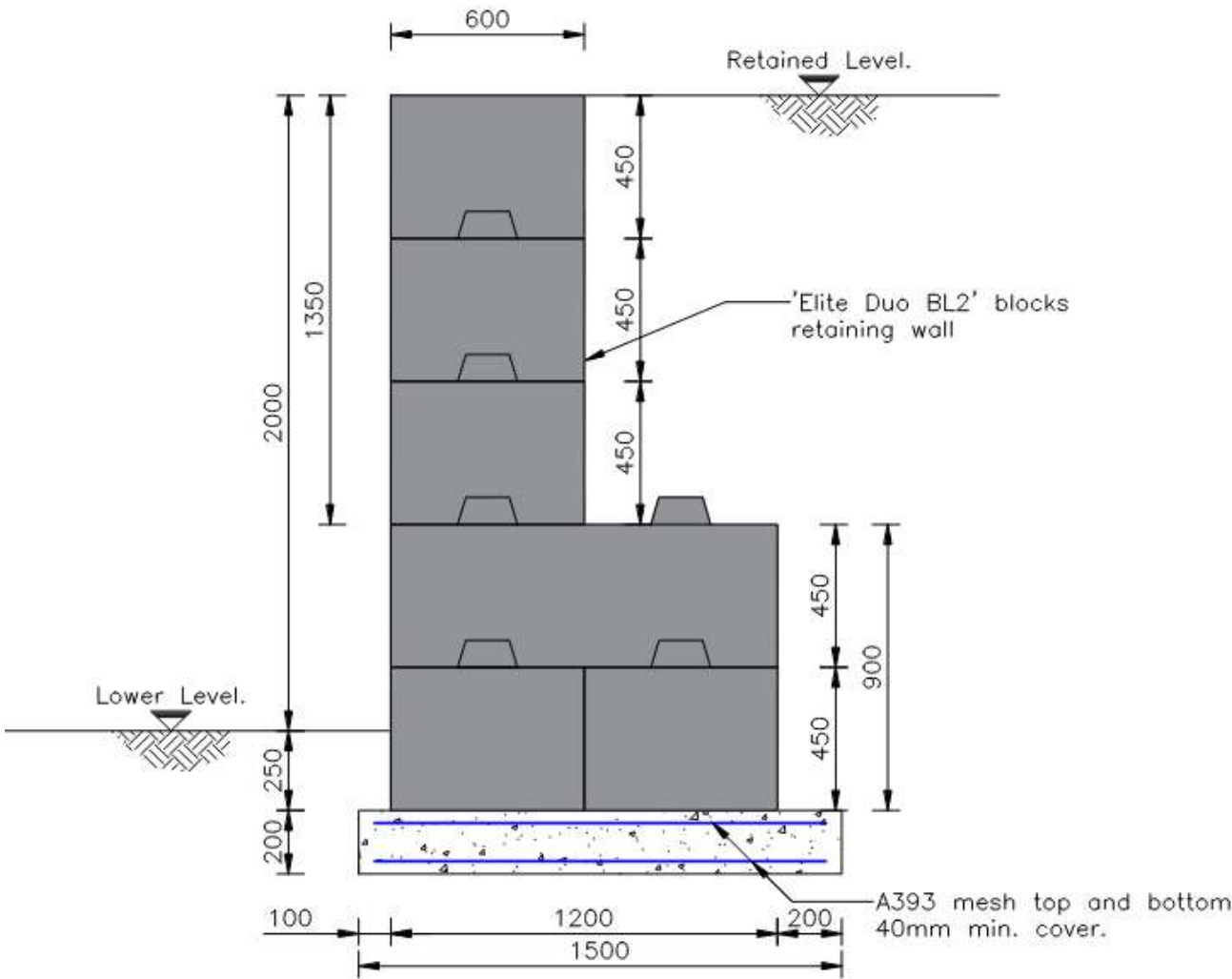


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Retaining wall Base Details



Retaining wall base details

Retaining wall Base Details

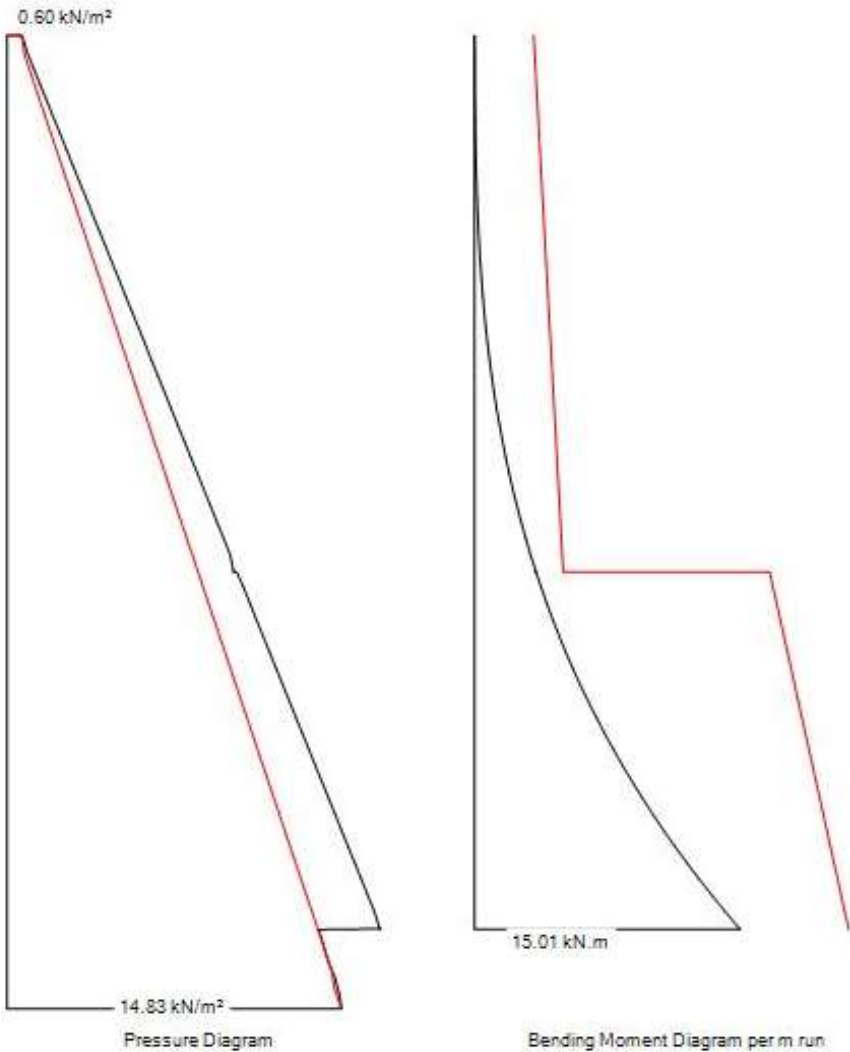


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Pressure and Moment on Wall



Pressure and Moment on Wall

_MasterSeries

Job ref :
 Sheet :
 Made By :
 Date :
 Checked :
 Approved :

Structural Design**Masonry Wall Details**

Partial Safety Factor (γ_{mc}/γ_{mf})	Units Category II, Execution Control Class 2	3/2.7	Table NA.1
Material	Concrete blocks, $\gamma=23 \text{ kN/m}^3$		
Units and Mortar Strength	5.2 N/mm ² , Mortar designation M12/(i)		
Blocks Ratio	Unit height=450, Least horizontal dimensions=600	0.75	
Compressive Strength (f_k)	Group 1	2.6 N/mm ²	Table NA.4

Wall Design (Inner Face Tension)

Critical Section	Critical @ 0 mm from base, Case 2		
Section Properties @ Base	$t=1200 \text{ mm}$, Area=12000 cm ² , Zb=240000 cm ³		
Flexural Strength f_{xk1}	$f_{xk1}=0.15$, $gd=0.036 \text{ N/mm}^2$, $f_{xk1}=f_{xk1}+0.9gd/\gamma_{mf}$	0.238 N/mm ²	Table NA.6
$M_r=f_{xk1} \cdot Z_b/\gamma_{mf}$	$0.238 \times 240000/2.7$	21.16 kN.m	

EN 1996-1-1:2005 6.3.4(1) Note 1 Advises against the use of the flexural strength f_{xk1} for unreinforced masonry used in earth retaining structures. No alternative values are provided.

Moment Capacity Check (M/Mr)	M 15.0 kN.m, Mr 21.2 kN.m	0.709	OK
Shear Capacity Check	F 19.3 kN, $f_{vk}=0.214 \text{ N/mm}^2$, Fvr 102.9 kN	0.19	OK

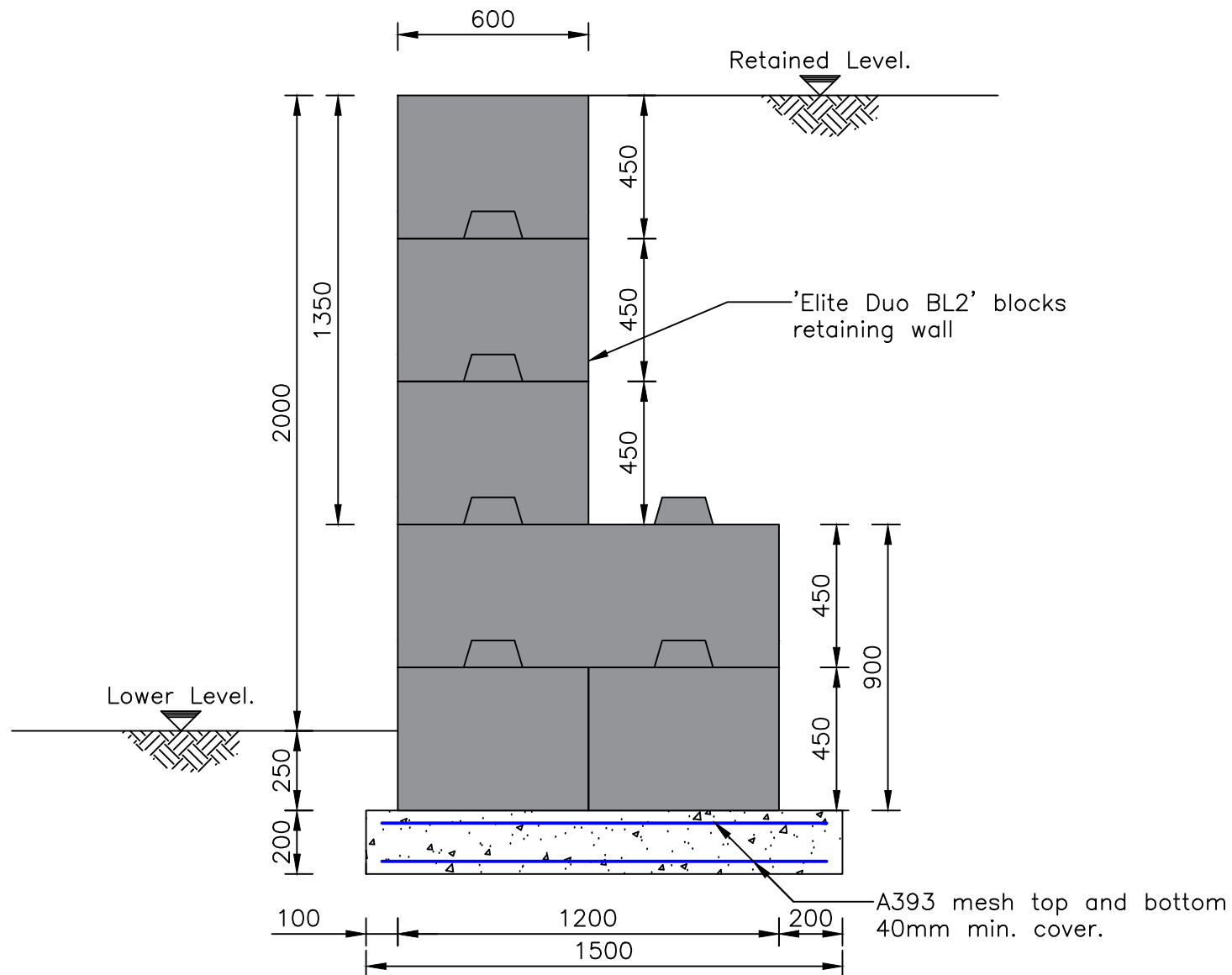
Base Top Steel Design

Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	OK
Compression Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	
Leverarm $z=fn(d,b,As,fy,Fcu)$	145 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 30 N/mm ²	138 mm	
$M_r=fn(\text{above}, As', d', x, x/d)$	393 mm ² , 55 mm, 14 mm, 0.10	23.5 kN.m	
Moment Capacity Check (M/Mr)	M 0.8 kN.m, Mr 23.5 kN.m	0.033	OK
Shear Capacity Check	F 7.4 kN, $vc=0.560 \text{ N/mm}^2$, Fvr 81.2 kN	0.09	OK

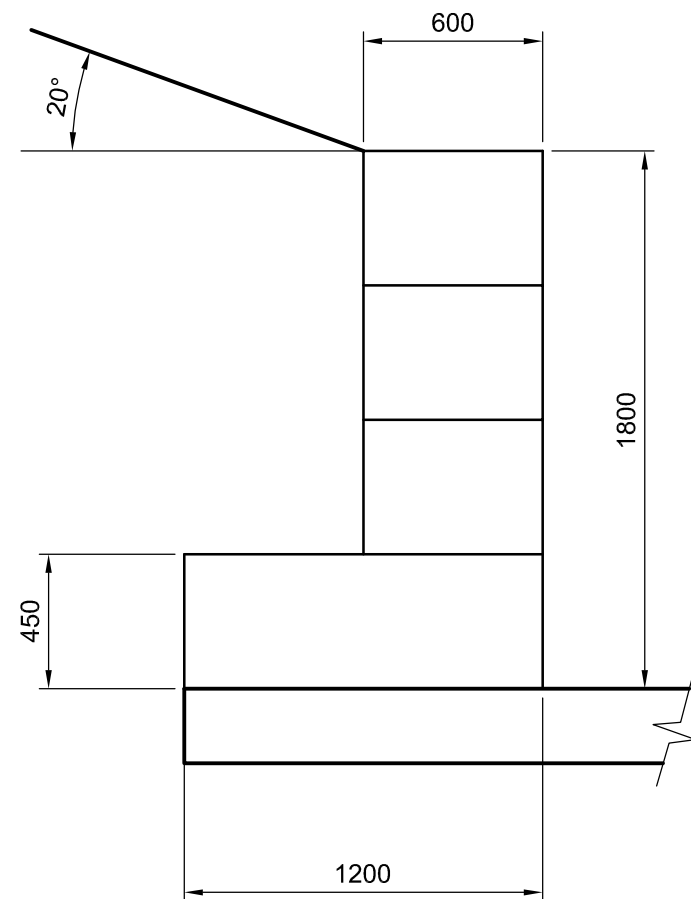
Base Bottom Steel Design

Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	OK
Compression Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	
Leverarm $z=fn(d,b,As,fy,Fcu)$	145 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 30 N/mm ²	138 mm	
$M_r=fn(\text{above}, As', d', x, x/d)$	393 mm ² , 55 mm, 14 mm, 0.10	23.5 kN.m	
Moment Capacity Check (M/Mr)	M 0.5 kN.m, Mr 23.5 kN.m	0.022	OK
Shear Capacity Check	F 10.5 kN, $vc=0.560 \text{ N/mm}^2$, Fvr 81.2 kN	0.13	OK

Note: Please note that the calculations provided above to be considered for the base of the retaining wall. Retaining wall to be assembled based on manufacturer's guidelines.

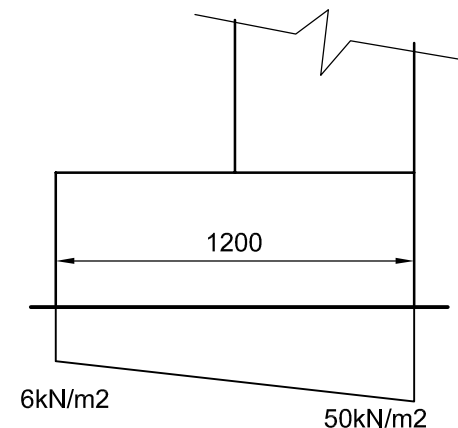


Retaining wall base details



Design Parameters
(1:25)

NOTE:-
The bearing pressure beneath the wall is shown below. **It is up to the client to ensure the ground and slab is adequate**, alternatively a foundation may be designed to suit allowable ground bearing pressures if required.



**Bearing Pressure
Directly Beneath Wall**

Bearing Pressures
(1:25)

Manufacturer (Elite Precast) Drawing

Retained Material:-
Sand
AoR = 30 degrees
Maximum Density
12 kN/m3 (1200 kgs/m3)

It is up to the client to advise if these parameters are not correct.

- NOTES:-
1. The contractor should take all necessary measurements on site.
 2. All dimensions shown on this drawing are approximate and for structural calculation purposes only.
 3. Dimensions on this drawing should not be used for fabrication purposes.
 4. Do not scale this drawing.
 5. This drawing should be read in conjunction with the calculations.

IMPORTANT NOTE
The existing slab and ground have not been investigated by CLP structures, the pressures exerted on the ground and slab are shown on this drawing, however **it is up to the client to satisfy himself that the existing ground and slab are adequate to support these loads.**

IMPORTANT NOTE
The wall has been designed to retain a specific material with a specific density and angle of repose. It is up to the client to ensure that the material retained on site does not exceed these designed parameters, failure to do so may result in the collapse of the wall.

Rev	Description	By	Date	Chk'd
	Purpose of Issue	Rev	Date	Auth

 CLP Structures STRUCTURAL ENGINEERING CONSULTANTS EMAIL: mail@CLP-Structures.co.uk TEL: 0117 3706357			
Client Elite Precast Concrete Ltd.			
Project Elite Duoblock Wall			
Title Wall Design Parameters and Limitations			
Original Scale As noted	Drawn CEL Date Aug 16	Rev – Checked	
Drawing Number		507–08	

1. Handling

Unit Volume / Weight

Unit Ref : **BL2**
Volume : **0.321 m³**
Weight : **750 kg**

- Weight is based on 2,350 kg/m³
- Lifting system is by means of a 170mm long spherical pin anchor rated at 2.5 tonnes with a safety factor of 3.
- Lifting is achieved by use of a 2.5t rated pin anchor ring clutch or combination ring clutch only and should comply with the Lifting Operation & Lifting Equipment Regulations 1998 (LOLER).

Lifting Pin Characteristics

Anchor Type : **T-025-0170**
Anchor Length : **170mm**
dia : **14mm**
Foot dia : **35mm**
Load Class : **2.5 tonnes**

IMPORTANT NOTE :

Prior to lifting older / pre-used blocks, check the lifting pin for wear / corrosion and check the block for cracks. If the block is cracked or the pin is worn, it could fail when lifting.

2. Concrete

- Characteristic 28 day cube strength = 50 N/mm² min.
- Concrete is Class A1 Fire Resistant in accordance with clause 4.3.4.4 of EN 13369

3. Manufacture

- Manufactured to : **BS EN 13369 : 2013**
- Tolerances to : **BS EN 13670 : 2009**

4. Physical & Chemical Properties

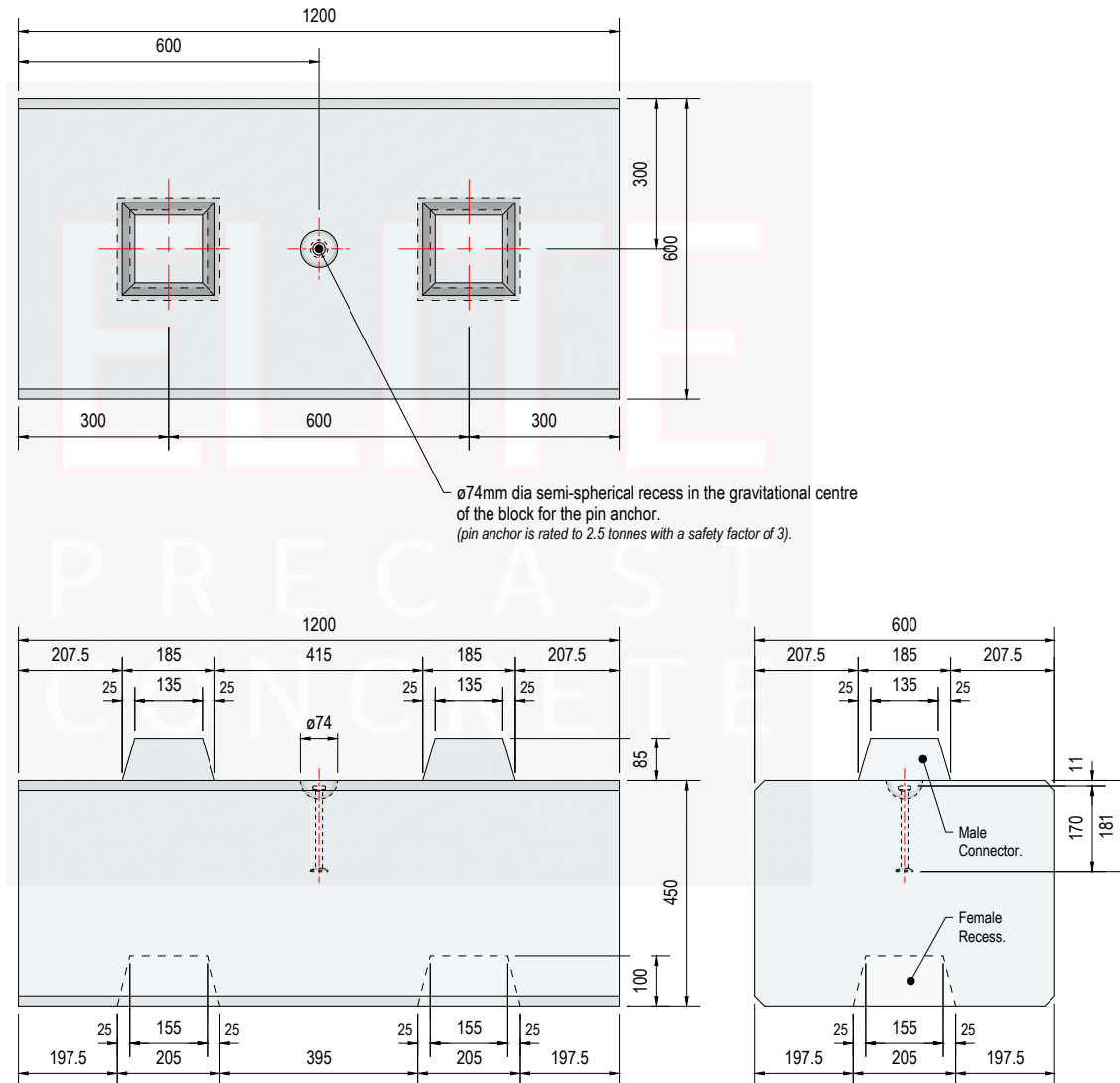
- Appearance : Grey in Colour
- Other Chemical Properties : Not Applicable

5. Design

- Design Life : **>100 years**

6. Manufacture Tolerances

- Length **±5mm**
- Width **±5mm**
- Height **±5mm**



					TITLE Duo™ Interlocking Concrete Block 1200mm x 600mm x 450mm (Male / Female Interlocks) Elite Product Code : BL2					ELITE PRECAST CONCRETE LTD HALESFIELD 9, TELFORD SHROPSHIRE TF7 4QW www.eliteprecast.co.uk											
B	18.01.23	Title block & notes updated.		CTC	RMD	 		DRN	CTC	CHKD	RMD	DATE	23-06-16	SIZE	A4	SCALE	1:15	DRG	EPC-DUO-002	REV	B
REV	DATE	REASON FOR ISSUE		DRN	APP																