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JOB No.	SHEET No
MB-1622	**01**

DESIGNER	DATE	CHECKED
MB	**May ' 12**	

DRAWING REF.

CONTRACT
THE ENGINE HOUSE

PART OF STRUCTURE

STRUCTURAL DESIGN CALCULATIONS FOR DOOR SUPPORT FRAME

AT

THE ENGINE HOUSE
CHORLTON MILL
3 CAMBRIDGE STREET
MANCHESTER

Prepared by - Mark Brooker CEng MIStructE

Checked by -

Date - May 2012

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JOB No.	SHEET No
MB-1622	**02**

DESIGNER	DATE	CHECKED
MB	**May '12**	

DRAWING REF.

CONTRACT
THE ENGINE HOUSE

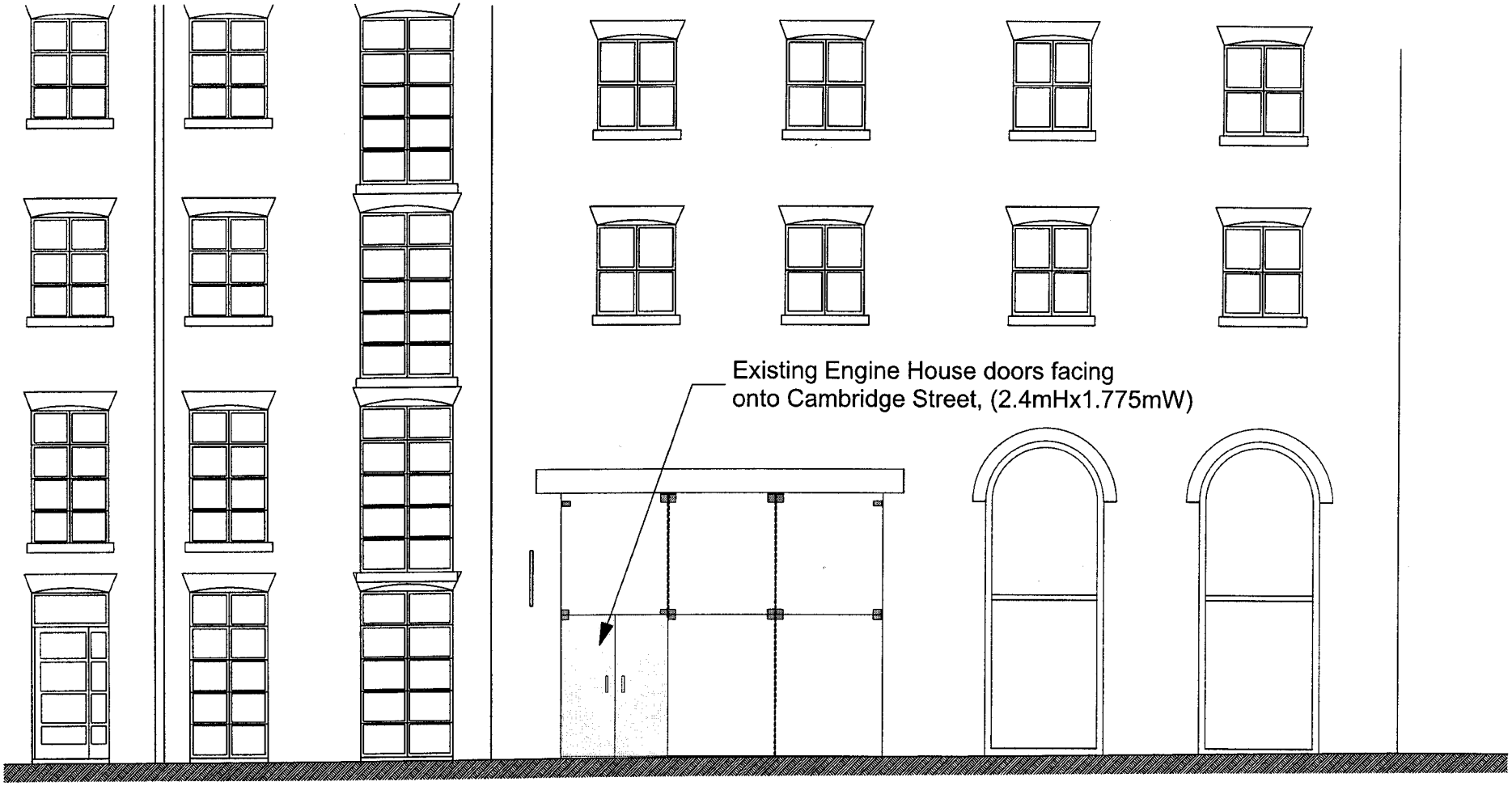
PART OF STRUCTURE

DOOR SUPPORT STRUCTURE

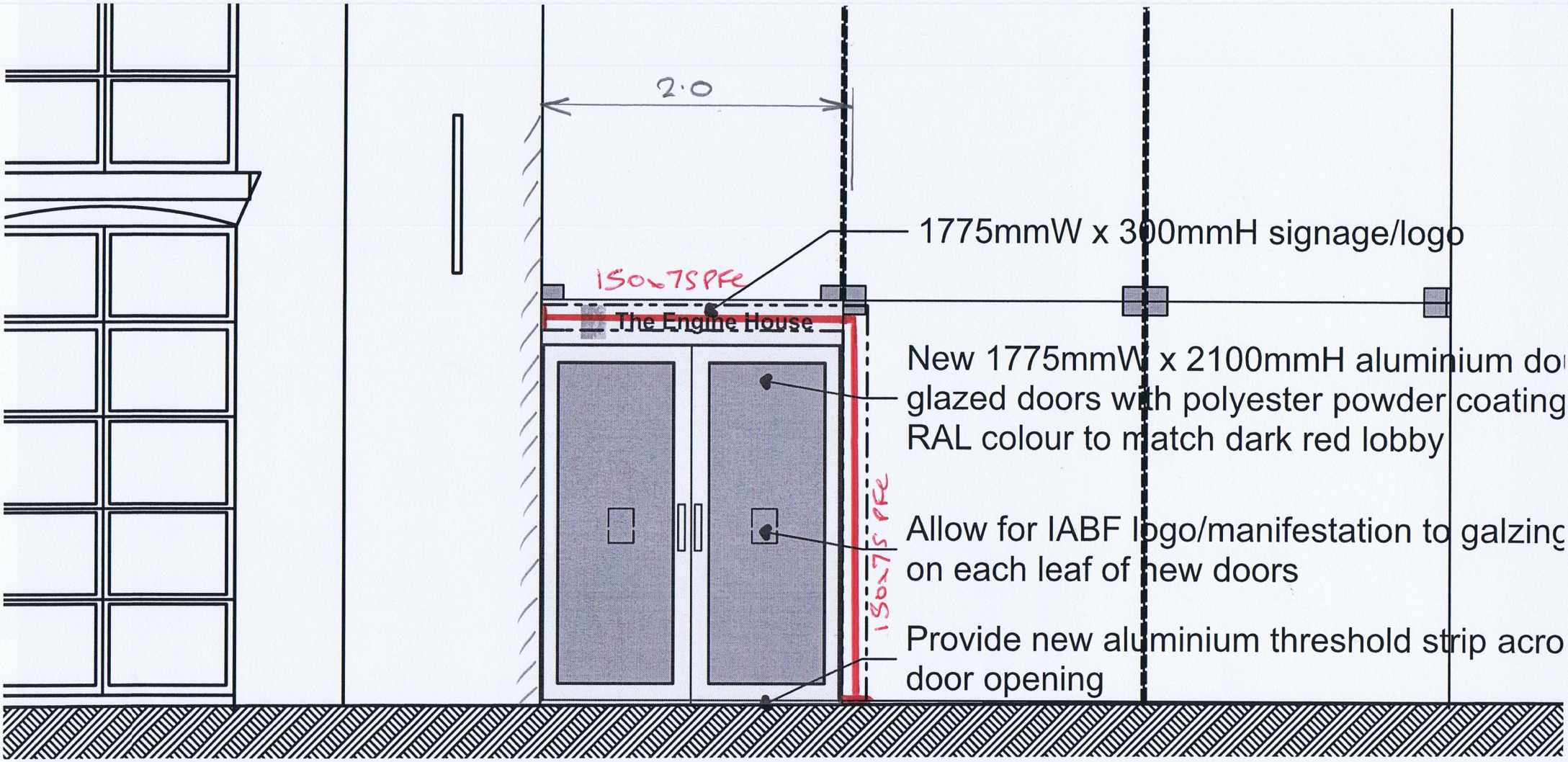
These structural design calculations have been produced to determine the size and arrangement of steelwork required to support / restrain a new door to be installed at The Engine Room, Chorlton Mill, Manchester.

The calculations are design using details provided on Mike MacPherson, Architects drawing P102-SK3 Rev A.

It should be noted that all dimensions and details shown within these calculations are to be checked on site by the Contractor prior to ordering / fabricating steelwork.

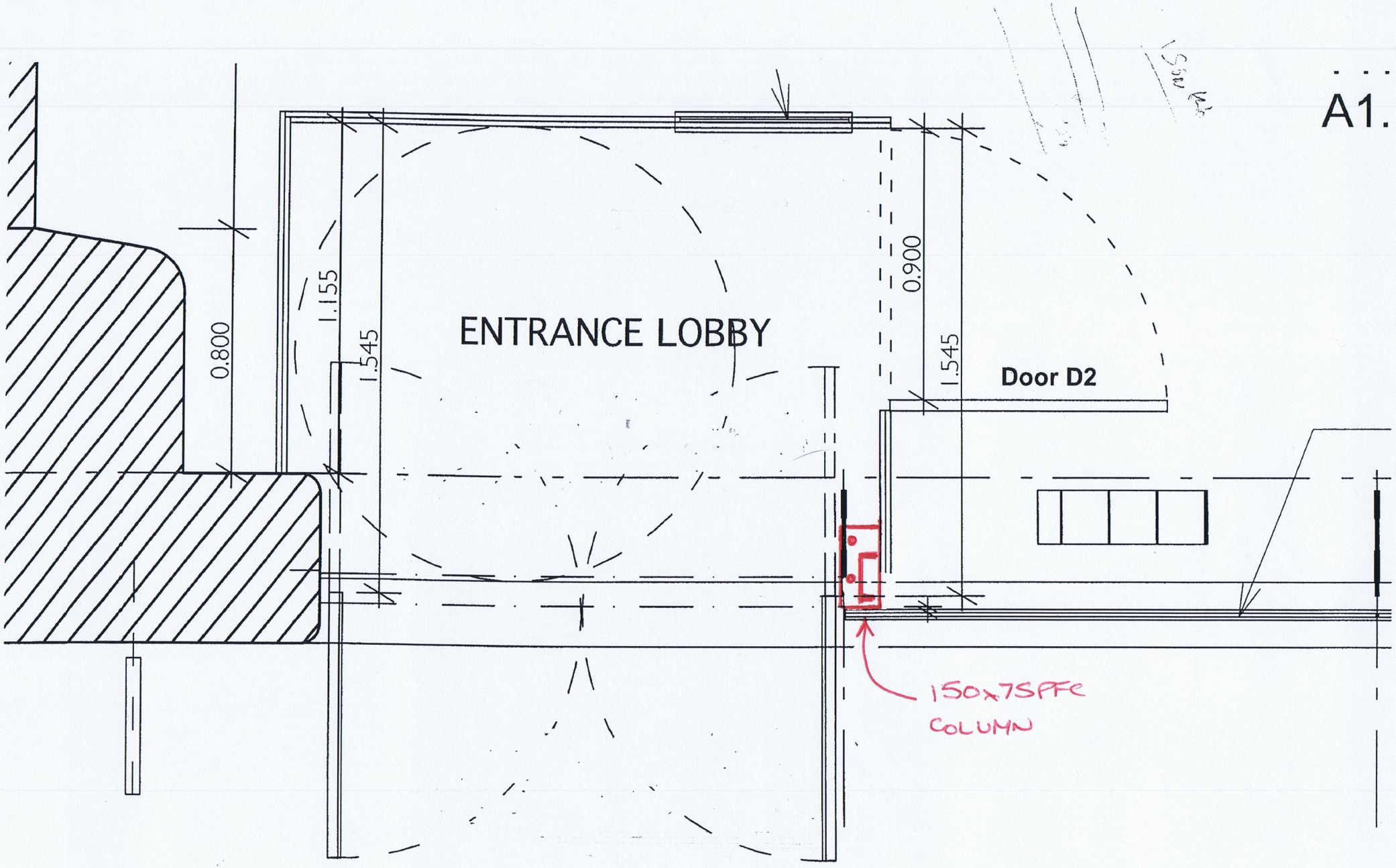


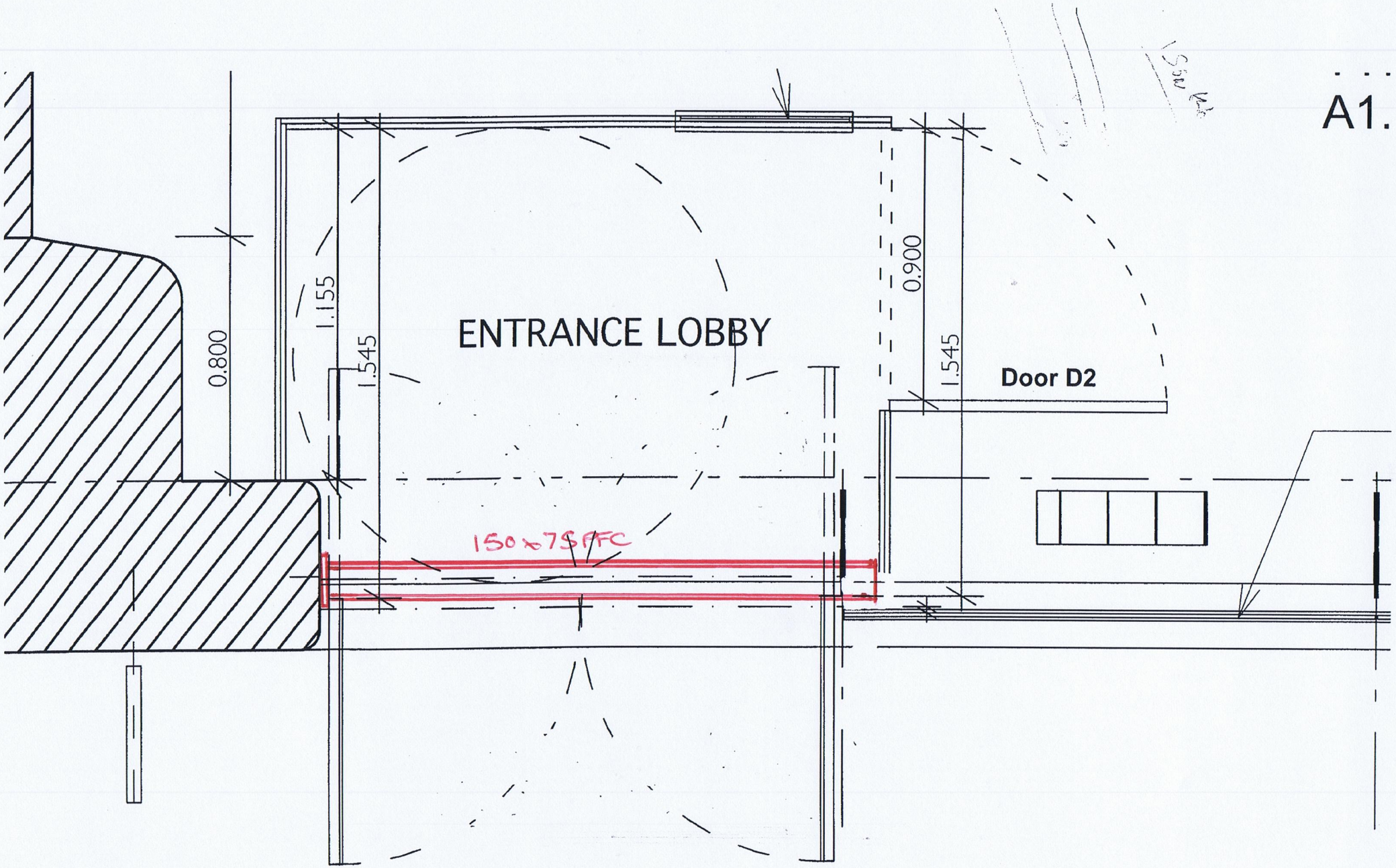
ELEVATION OF EXISTING ENTRANCE DOORS 1:100@A3



ELEVATION ON PROPOSED DOOR FRAME

04


A1.
ENTRANCE LOBBY
0.800
1.155
1.545
0.900
1.545
Door D2
150x75SFC
COLUMN
PROPOSED PLAN ON DOOR POST BASE


A1.
ENTRANCE LOBBY
0.800
1.155
1.545
0.900
1.545
Door D2
150x75 RFC
PROPOSED PLAN ON DOOR HEAD

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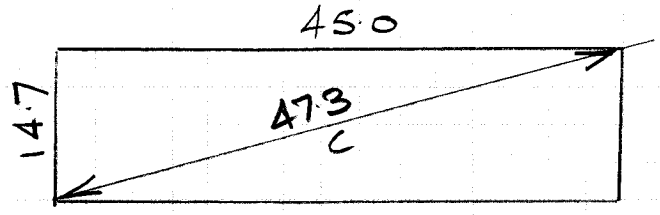
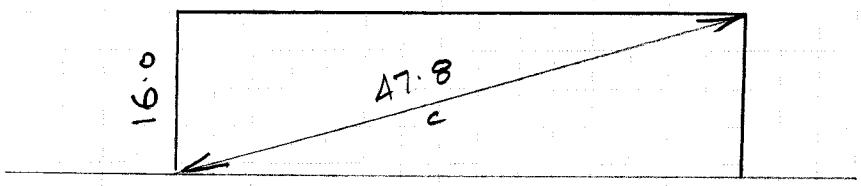
JOB No. MB-1622		SHEET No. 07 /	REV
DESIGNER M.B.	DATE May '12	CHECKED	
DRAWING REF.			
CONTRACT THE ENGINE ROOM	PART OF STRUCTURE		

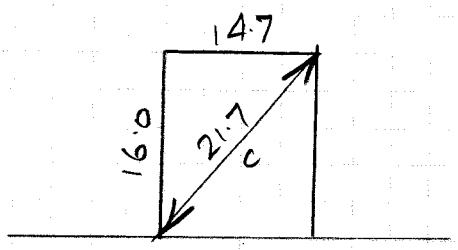
WIND LOADING ON BUILDING



PLAN



SIDE



FRONT

INTERNAL VOLUME = $(45.0 \times 14.7 \times 3.2) = 2117 m^3$

/ MetSPEC /®

DESIGN SUITE

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Sheet No. **of**
Job No. MB-1622
Designer MARK BROOKER
Date 09/05/2012
Registered Details:-

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Manchester, M32 8DN
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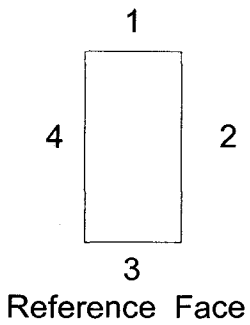
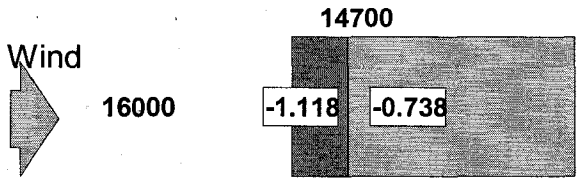
Wind Analysis to BS6399 - Wind Loads for Walls

DATA ENTRY:-	
Short Face 1 or 3	14.700 m
Long Face 2 or 4	45.000 m
Reference Face	Face 1 (Gable)
Reference Height	16.000 m
Gap Between Buildings	0.000 m



Reference Face



6400 8300

Suction(kN/m²) On Reference Face

Pressure (kN/m²) On Reference Face = +0.725
Pressure/Suction (kN/m²) On Opposite(Leeward) Face = -0.510

Note: The above loads are not applicable to parapets which must be designed separately.

NB: All dimensions are in millimetres and wind loads in kN/m²

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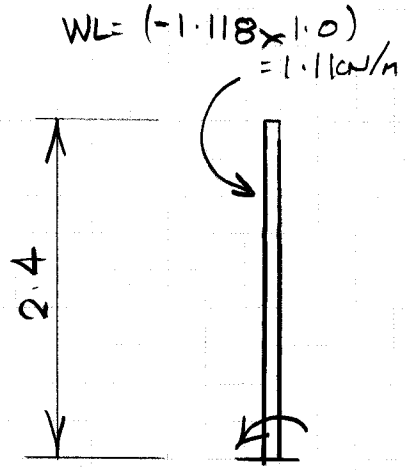
DESIGNER M.B.	DATE May '12	CHECKED
DRAWING REF.		
CONTRACT THE ENGINE ROOM	PART OF STRUCTURE	

WIND LOAD ON COLUMN - DOOR CLOSED WIND ON FACE OF BUILDING



$M_{CANT} = (1.4 \times 1.1) \times 2.4^2/2$

$= 5 kNm.$

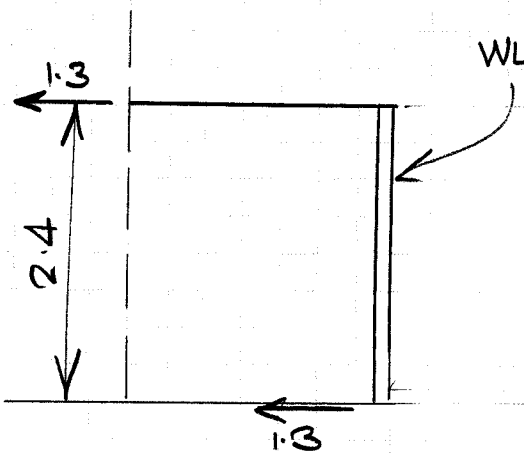
TRY 150x75 PFC Le: 2.4M

$M_b = 25 kNm.$

$\delta_{HEAD} = 0.9mm \quad (HT/2667)$

ADOPT 200x90 PFC

WIND LOAD ON COLUMN - DOOR OPEN



WL= (1.118x1.0) = 1.11kN/m

$M = (1.4 \times 1.1) \times 2.4^2/8$

$= 1.1 kNm.$

TRY 150x75 PFC

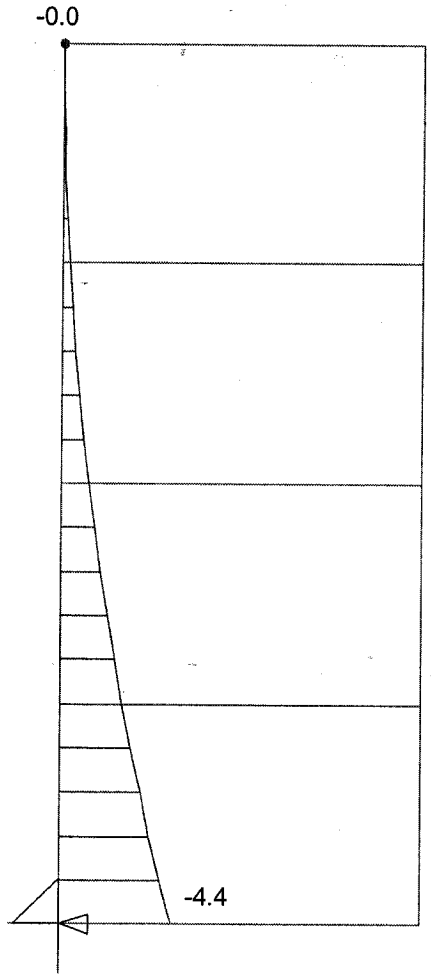
$P_y Z_y = 7.32 kNm.$

$\delta = \frac{5 \times 1.1 \times 2400^4}{384 \times 210 \times 10^3 \times 131 \times 10^4}$

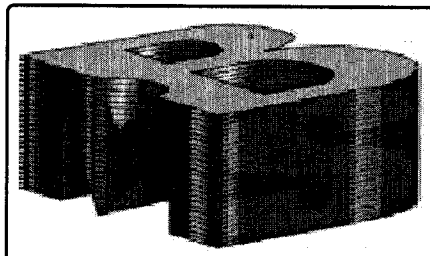
$= 1.7mm \quad (HT/1389)$

ADOPT 150x75 PFC

WIND BENDING MOMENT



WIND BENDING MOMENT



THE ENGINE ROOM
CHORLTON MILL
MANCHESTER

DOOR COLUMN DESIGN

Job No	MB-1622
Job Ref	COLUMN
Designed By	MB
Checked By	MB
Date	MAY 2012
Revision No	A
Calc No	1
Page No	1

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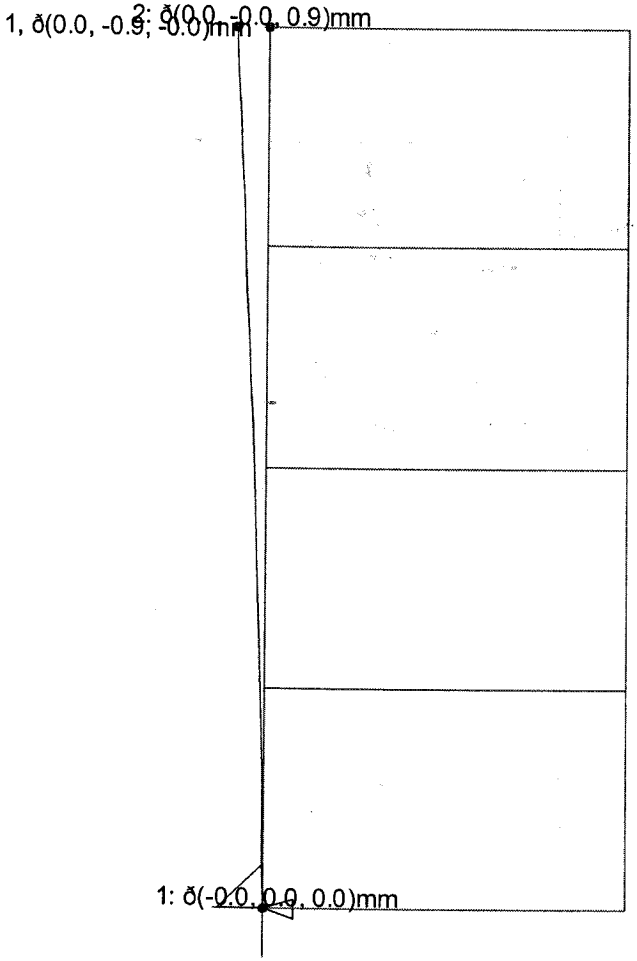
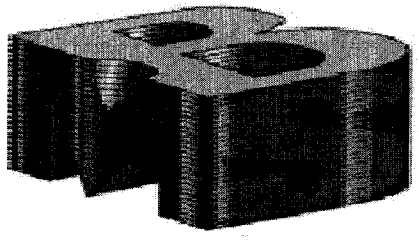
WIND LOAD DEFLECTION



WIND LOAD DEFLECTION



THE ENGINE ROOM
CHORLTON MILL
MANCHESTER

DOOR COLUMN DESIGN

Job No	MB-1622
Job Ref	COLUMN
Designed By	MB
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Calc No	1
Page No	2

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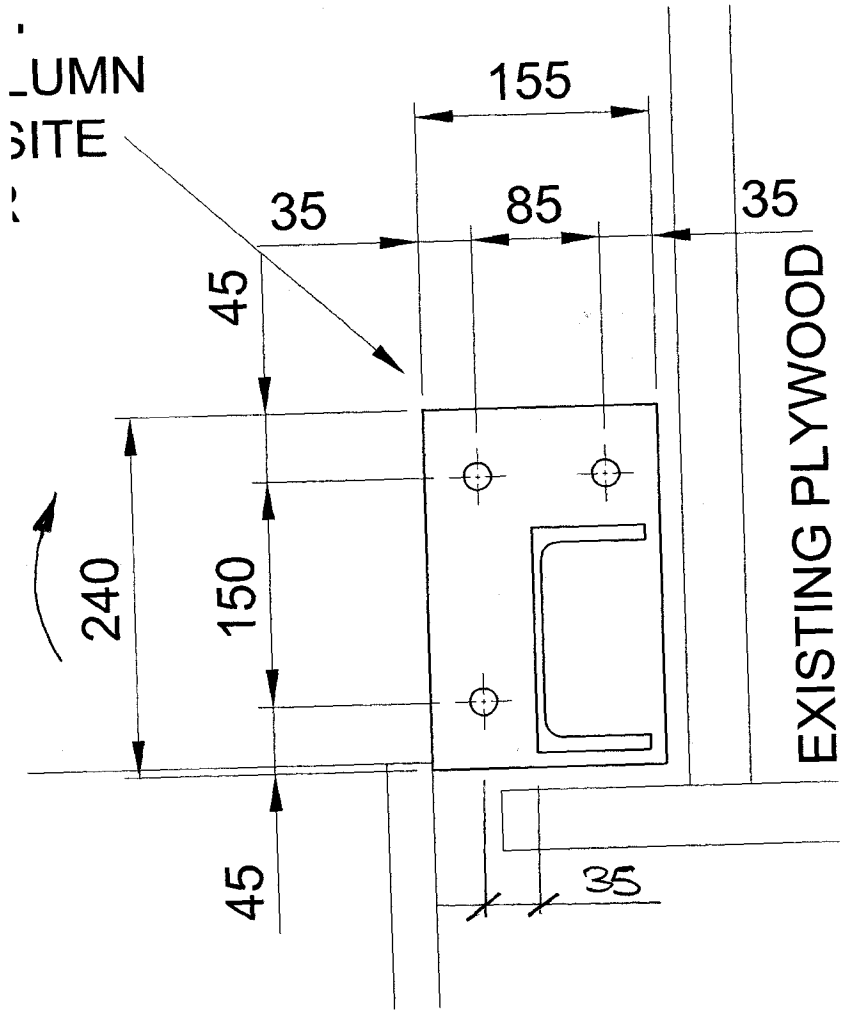
ULT MOMENT AT COLUMN BASE = 5KNm.

BOLT PULL OUT FORCE = $5/0.15 = 33$KN.

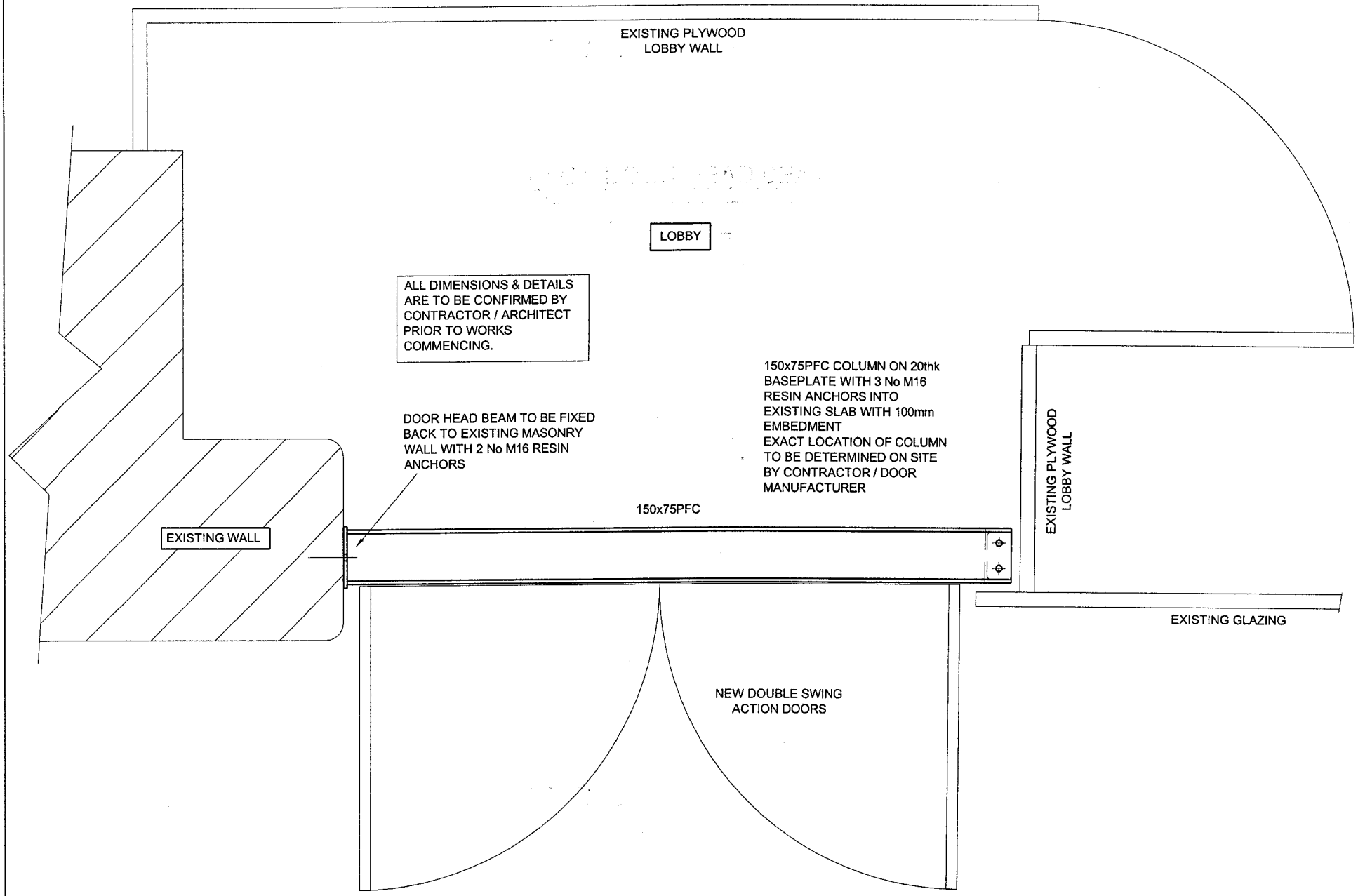
$M_{BOLT} = 33 \times 35 = 1155$KNmm.

TRY 20 THICK PLATE $Z = 150 \times 20^2/6 = 10000\ mm^3$.

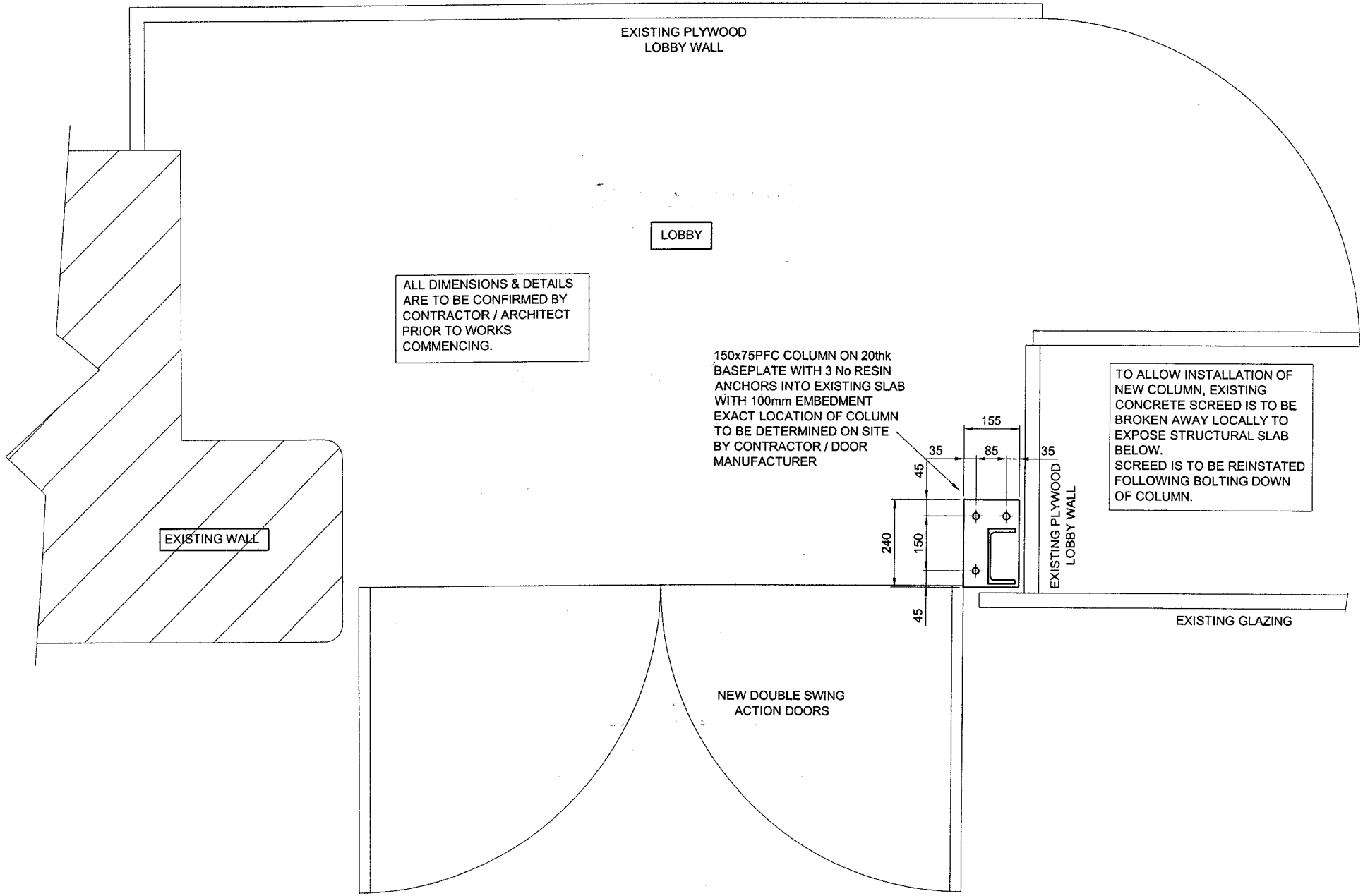
$\sigma = 1155 \times 10^3 / 10000 = 116 N/mm^2$.



ADOPT 20 THK BASEPLATE

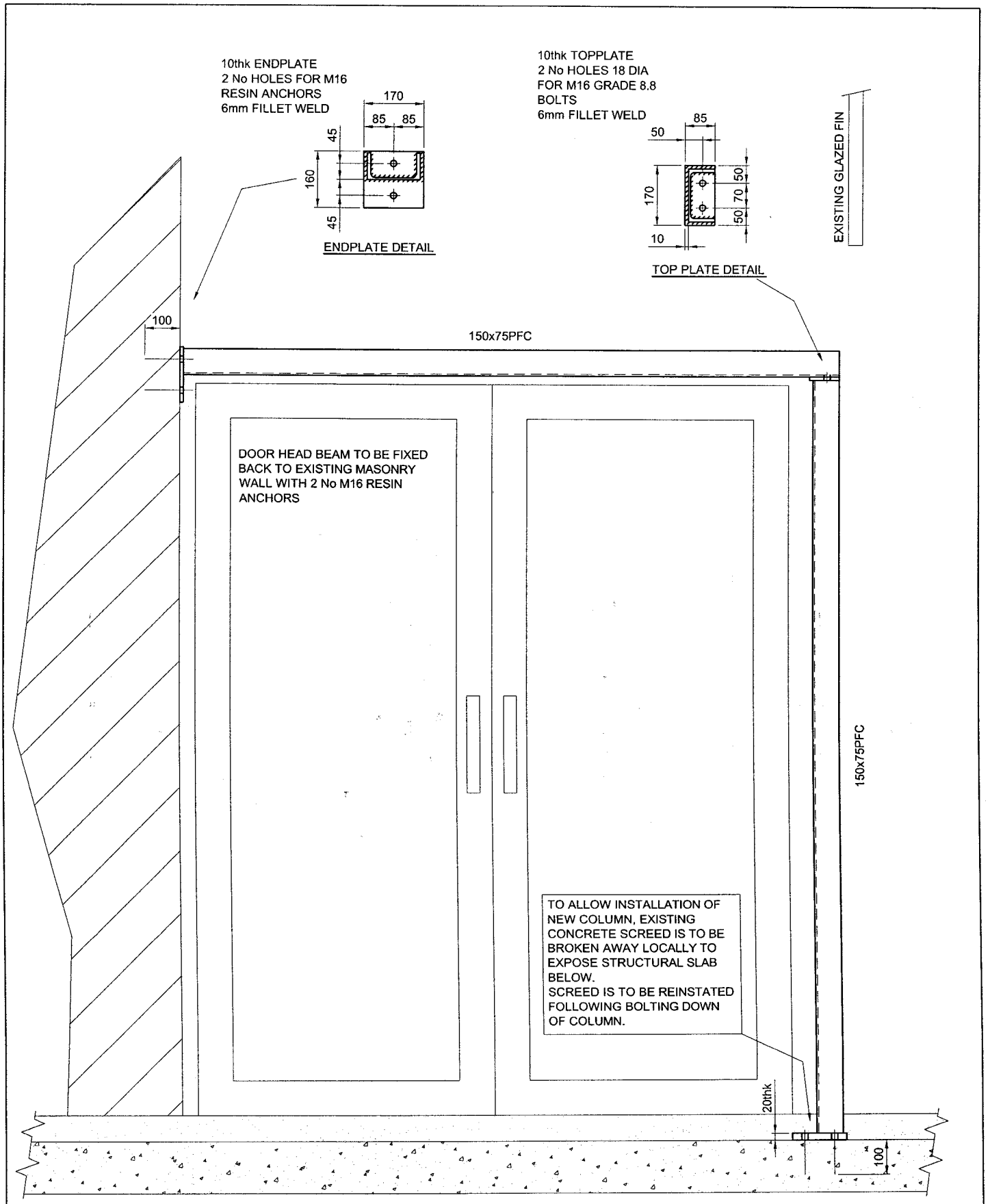


PLAN ON DOOR HEAD BEAM



GROUND FLOOR PLAN
SHOWING DOOR POST BASEPLATE

A1



ELEVATION ON DOOR SUPPORT FRAME