JUPITER 32DD

(Modified)

TWIN MODEL

WELLINGTON WAR MEMORIAL

PUBLIC TOILETS

BUILDING CONSENT INFORMATION

Exeloo Ltd
26 Paramount Drive, Henderson
PO Box 33-256 Takapuna
Auckland, New Zealand.
Phone 64 - 9 - 838 8912
Fax 64 - 9 - 838 8913

EXELOO JUPITER 32DD TWIN TOILET UNITS

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OUTLINE SPECIFICATION

exeloo®

JUPITER
BASIC TWIN TOILET
MODEL: 32DD

NZ: Tel: 0800-393-566
Email: sales@exeloo.com

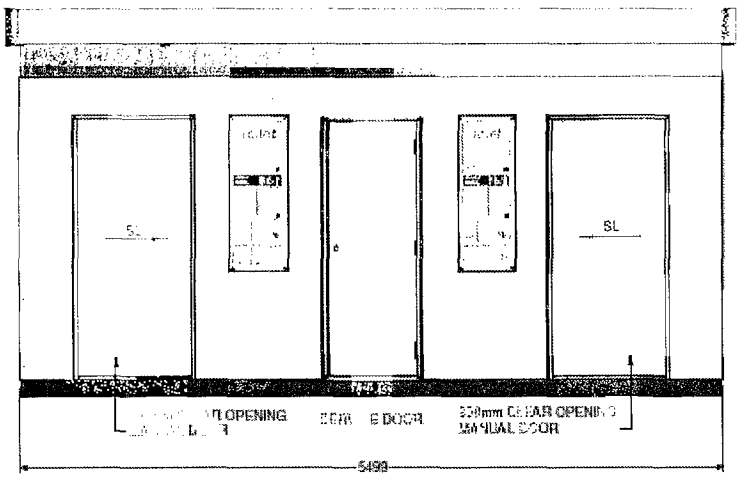
AUST: Tel: 1800-501-069
Email: sales@exeloo.com.au

This unit is designed to meet the needs of disabled users in New Zealand. It is not compliant in Australia.

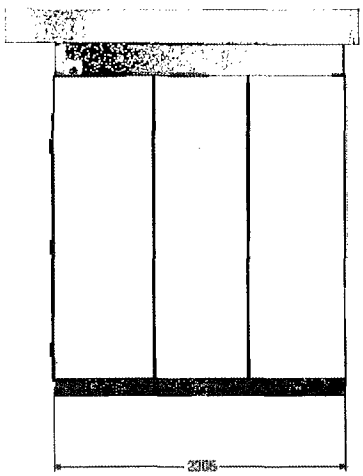
SPECIFICATION SHEET

STRUCTURE	FIXTURES	SPECIAL FEATURES
FRAME - Galvanised steel.	BASIN –Stainless Steel vandal resistant 3 in 1 Sensor hand basin with soap, water and hand dryer.	This system carries out the following functions: 1. Turnkey Lock and unlock. 2. Easy clean surfaces. 3. Vandal resistant exterior indicator surfaces. 4. Vandal resistant stainless steel Cavity Sliding doors with hydraulic closers for easy and safe use.
FLOOR - 120mm precast reinforced concrete.	TOILET PANS – Wall hung Stainless steel toilet pans with closed front toilet seats.	
ROOF – Color Steel ARX sheets with a facia	FLUSHING UNIT – Concealed mains pressure automatic flushing valves.	
CEILINGS - Nil.	LIGHTING – Surface mount proprietary fittings.	
DOORS - Stainless steel panel Cavity Sliding door Opening width – 800mm.	MIRRORS – 1200 x 400 mirror stainless steel.	
EXTERIOR WALL SURFACE – Compressed Cement fibre board with a metallic effect transfer	TOILET TISSUE DISPENSERS – Exeloo recessed stainless steel Twin Auto / Manual tissue dispenser.	
INTERIOR WALL LININGS - Flooring grade white ceramic 9mm jumbo tiles with moisture resistant epoxy grout.	HAND RAILS – 32mm stainless steel hand rails.	
VENTILATION –Stainless Steel louvers	EXTERNAL INFORMATION PANEL – Stainless steel panels with anodised aluminium signage in tactile and Braille.	
FLOOR SURFACE - Etched flooring grade ceramic tiles with moisture resistant grout.		

FRONT VIEW 1 : 30

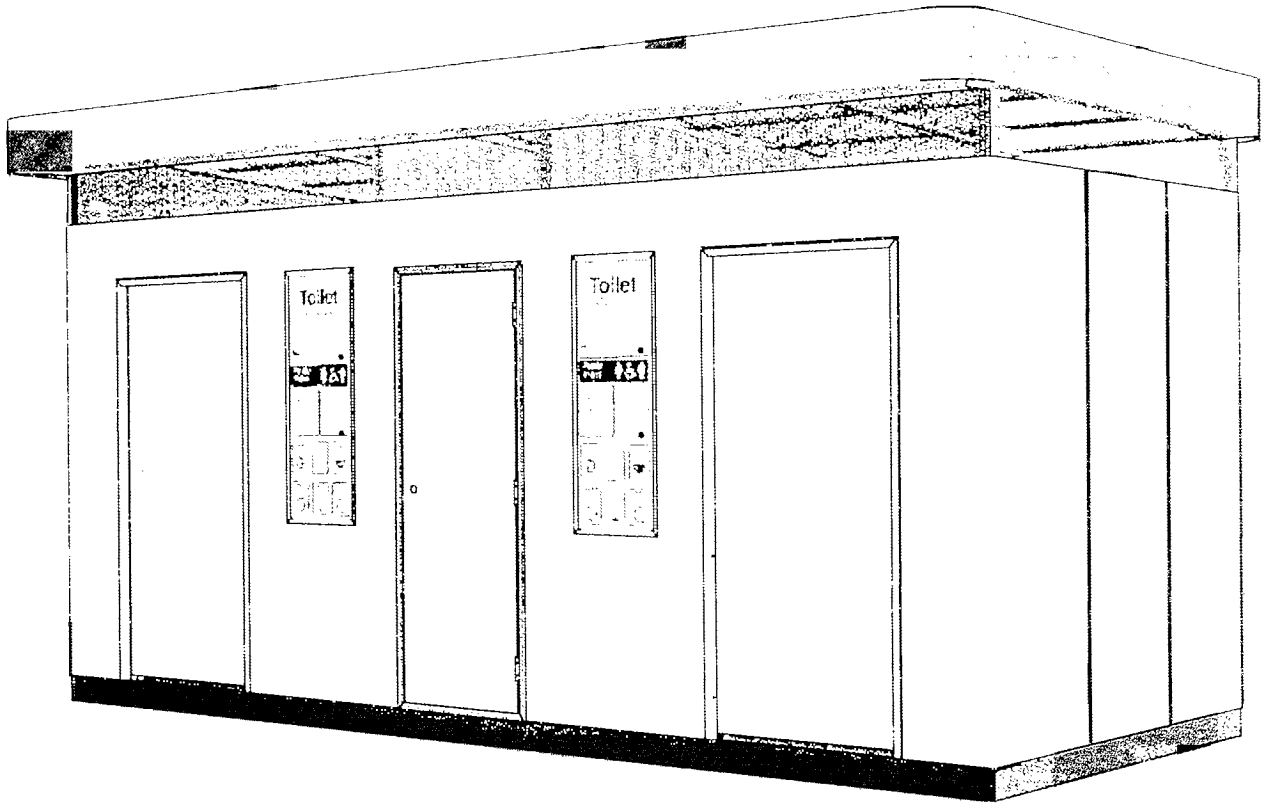


SIDE VIEW 1 : 30



DRAWINGS

PERSPECTIVE VIEW 1 : 25



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26 Paramount Dve
Henderson
Tel (09) 838-8912
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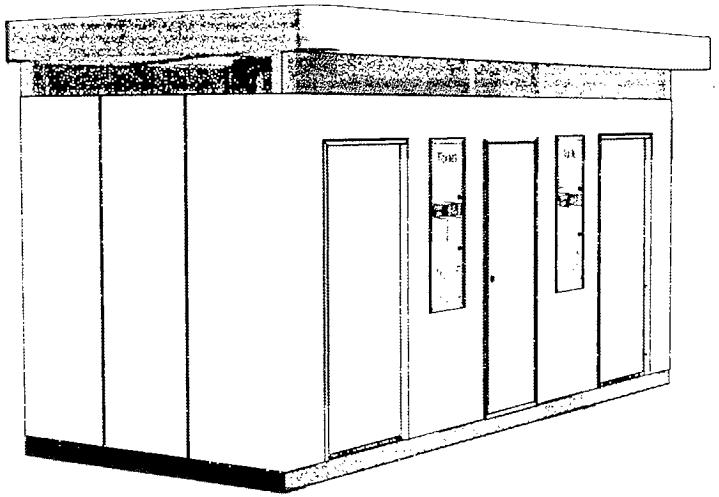
Auckland, New Zealand
Fax (09) 838-8913

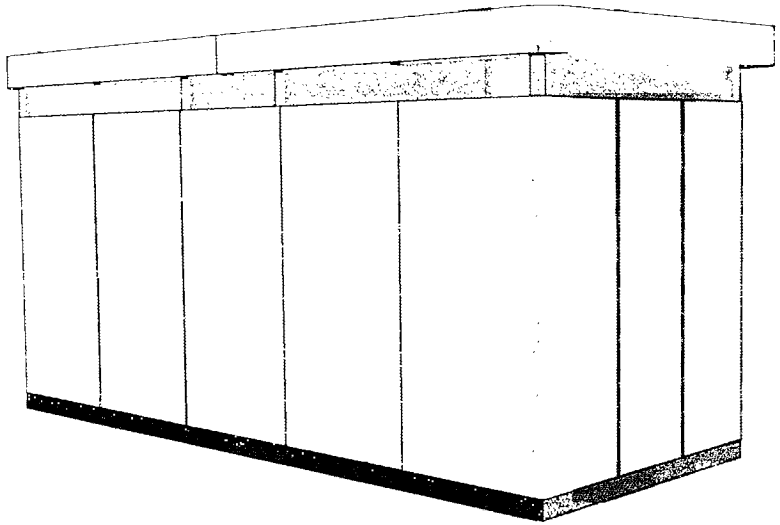
Description: JUPITER 52 SUPER TWIN ACCESSIBLE		Proj:		Units: mm	Rev. 1-A	Rev Date: 23/07/2013
		Tolerance: +/-0.5	Scale:	Checked by:	Approved by:	
Material:	Finish: REF	Drawn by: MKH	Creation Date: 17/10/2012	Sheet No. 1 / 6	Drawing No: ASJUP32DDNZL-1SMF	

DO NOT SCALE - IF IN DOUBT ASK | PROJECT: | SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE

FRONT PERSPECTIVE VIEW



REAR PERSPECTIVE VIEW



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Material:	Finish: REF	Drawn by: MKH	Creation Date: 17/10/2012	Sheet No. 6 / 6	Drawing No. ASJUP32DDNZL-1SMF

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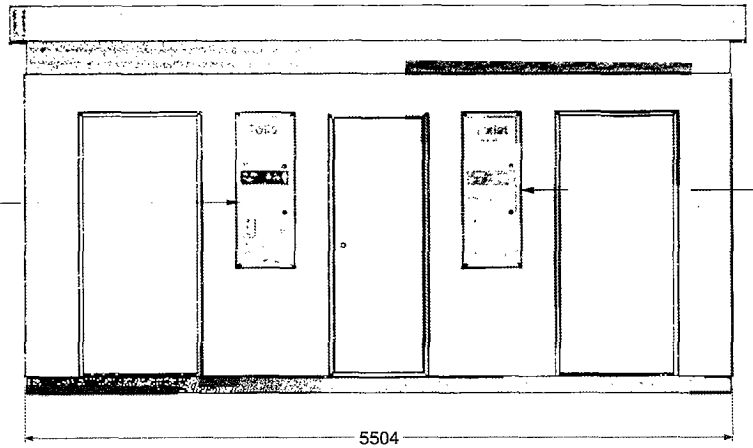
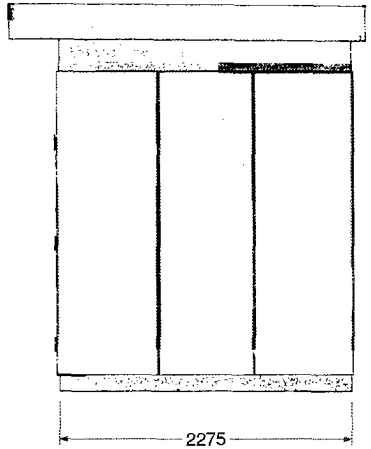
01 EXTERNAL ELEVATIONS

FRONT ELEVATION



R-H SIDE ELEVATION



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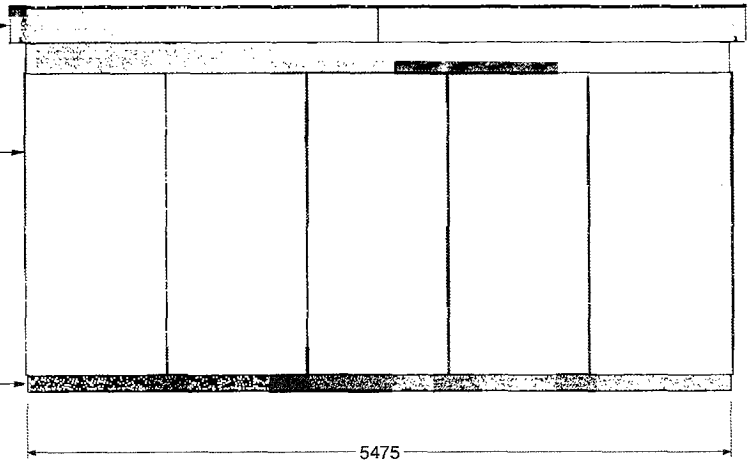
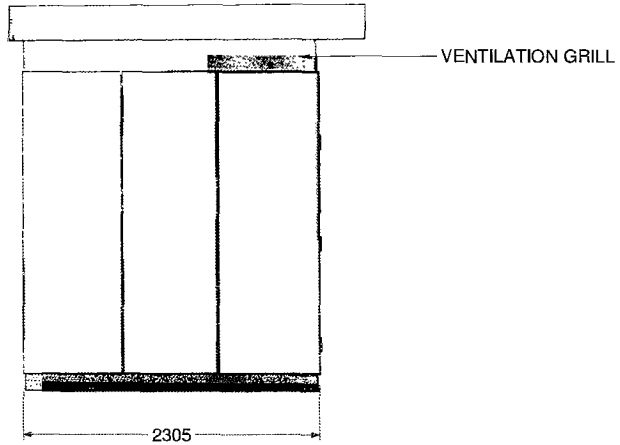


L-H SIDE ELEVATION



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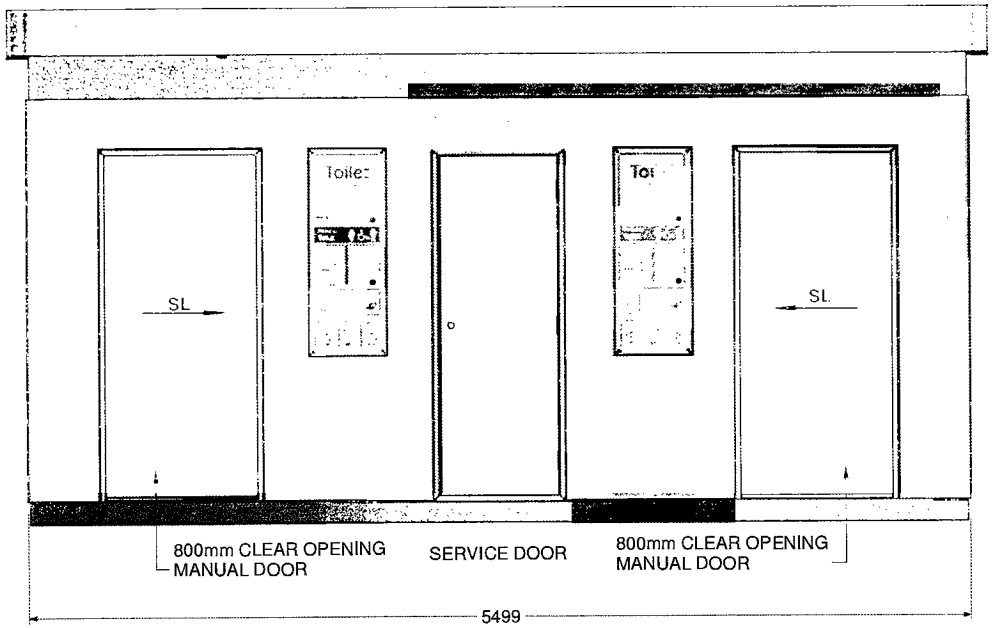

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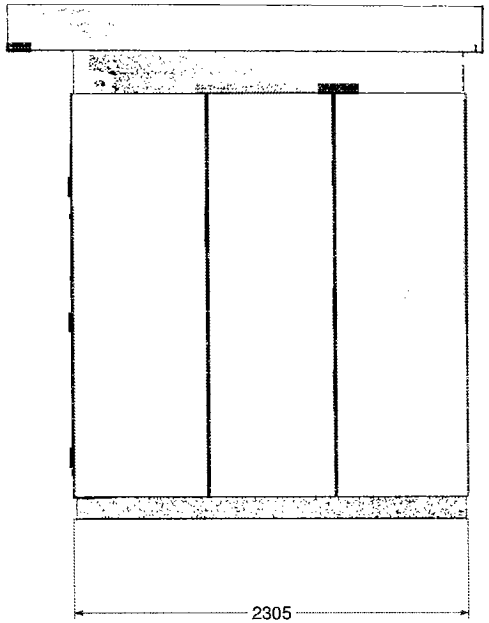

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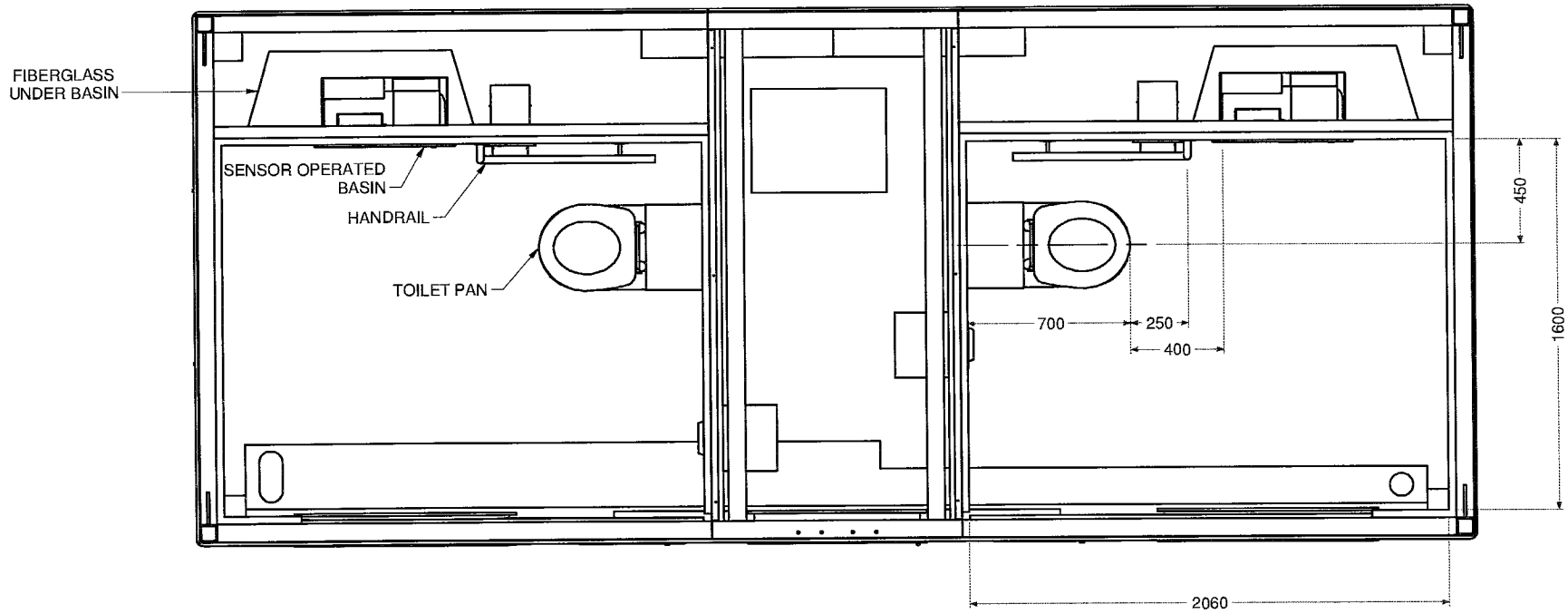
02 FLOOR PLAN

PLAN VIEW 1 : 20



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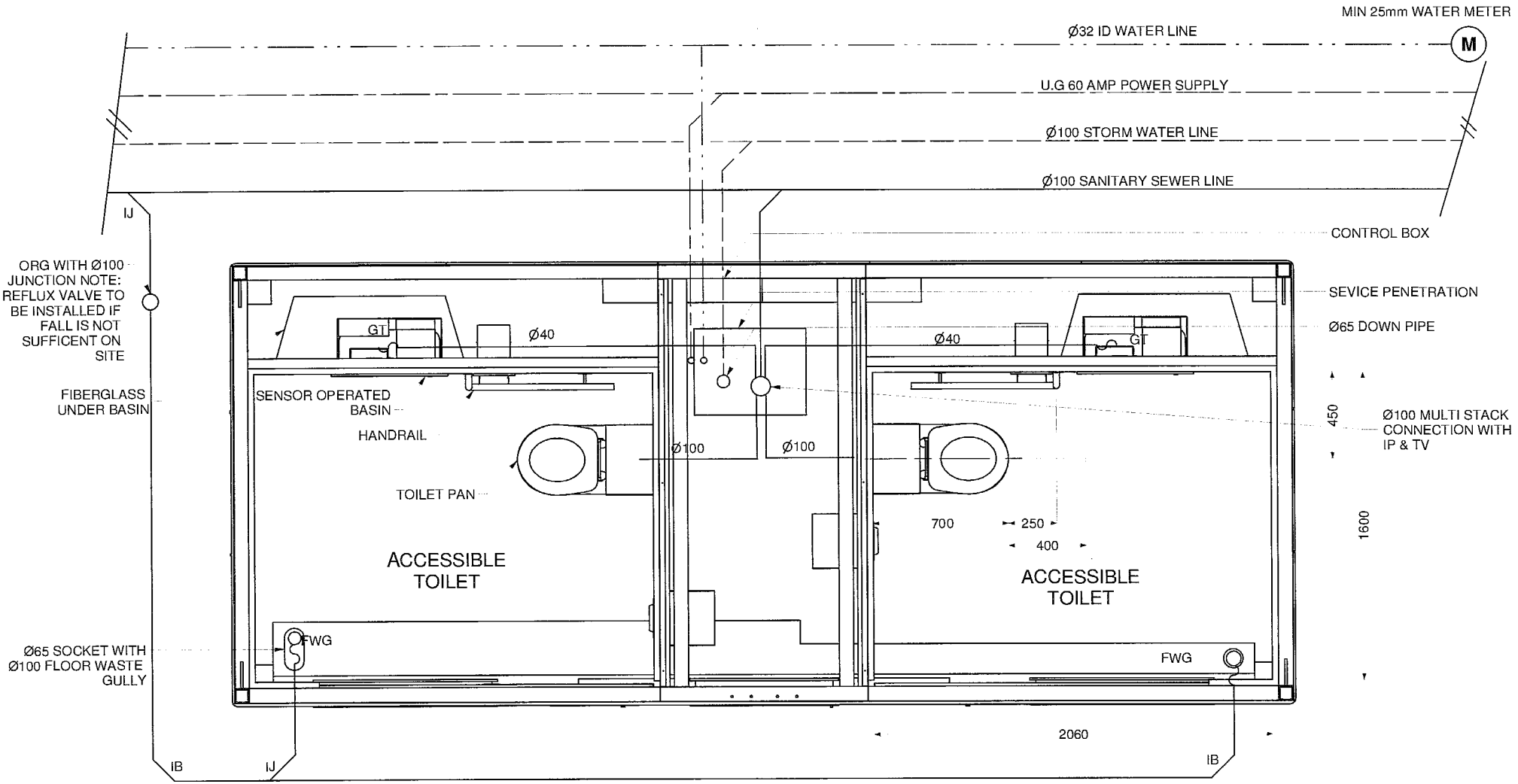
03 SERVICE PLAN

SERVICES SCHEMATIC 1 : 20



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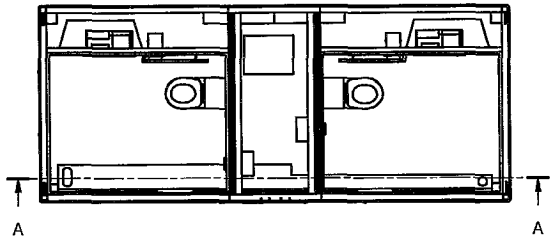
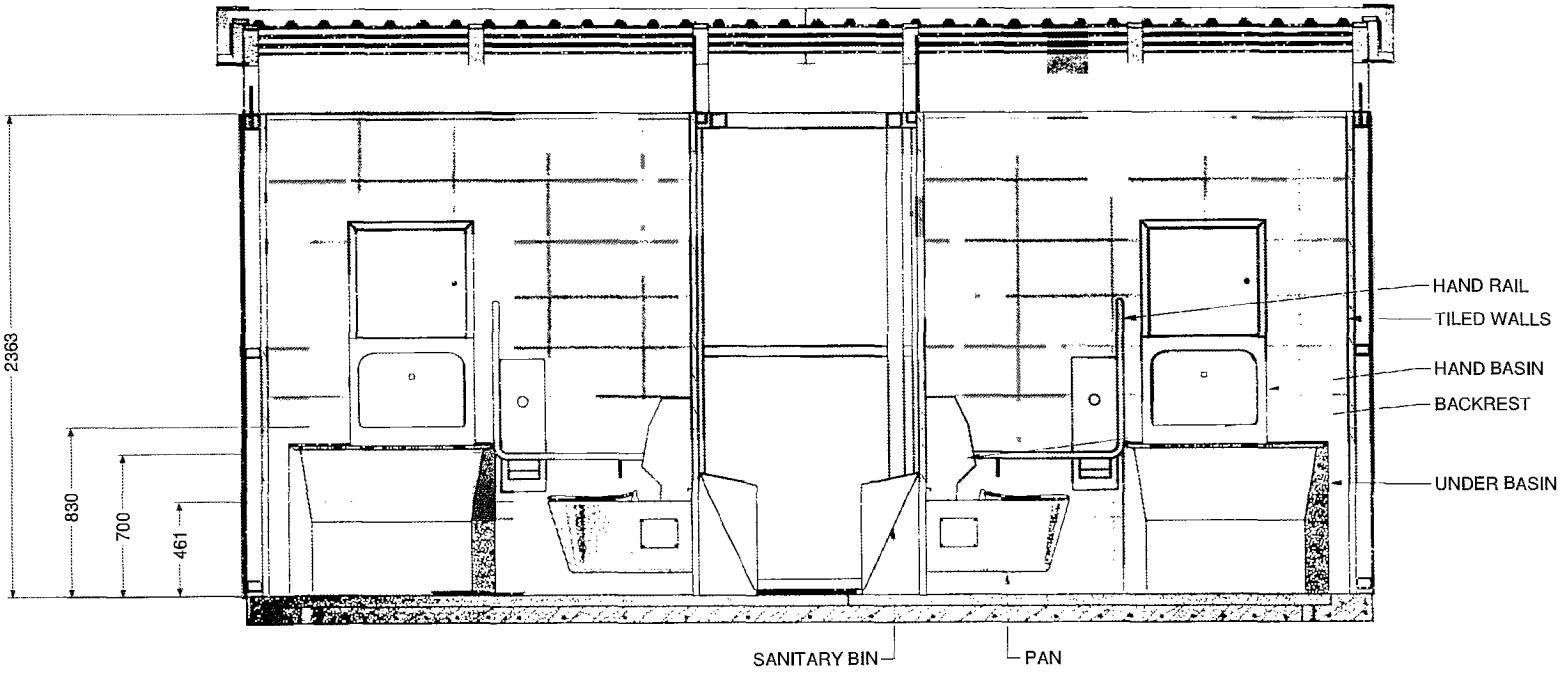
04 CROSS SECTIONAL VIEWS

PLAN VIEW



SECTION A-A 1 : 25



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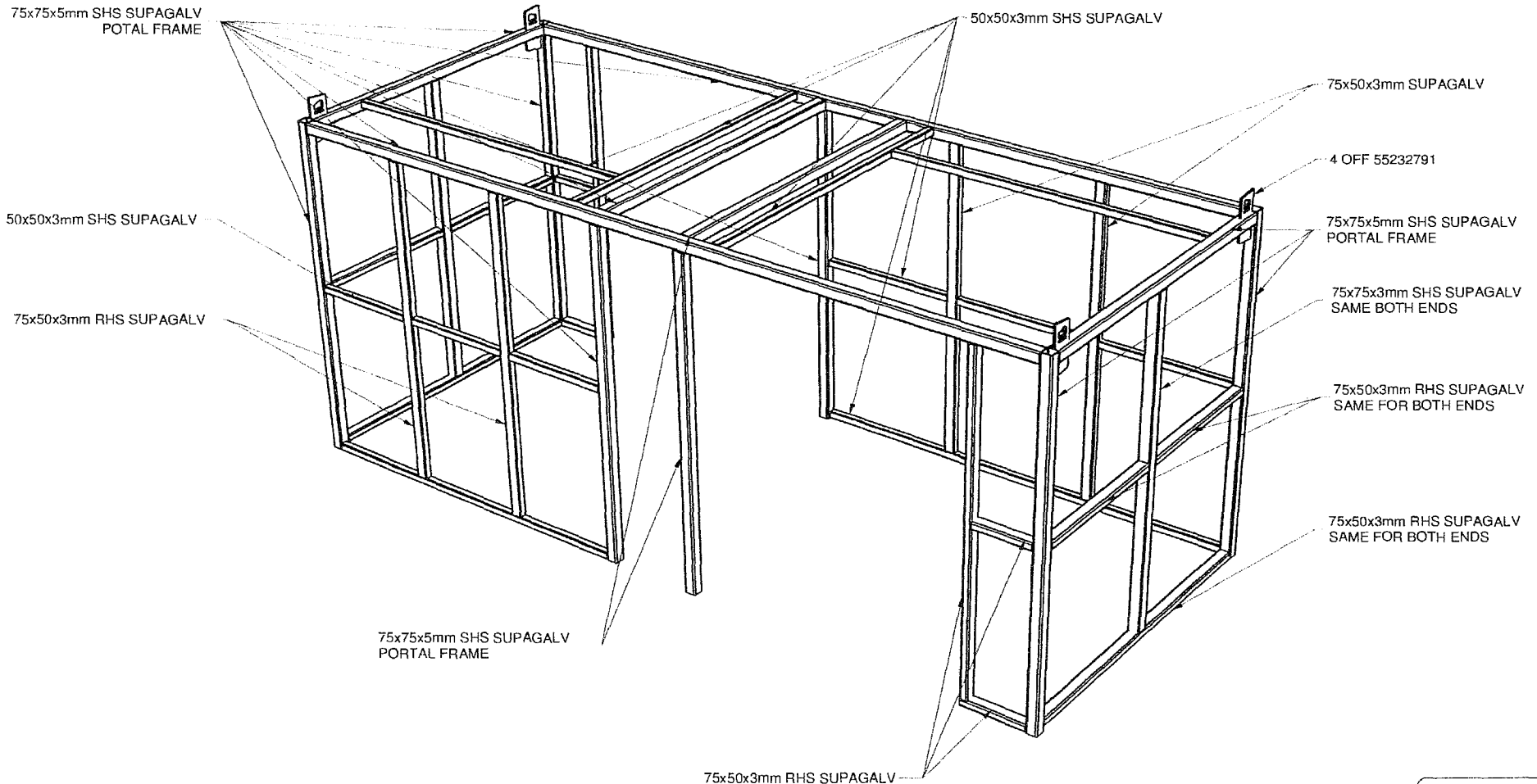
05 FRAME STRUCTURE

PERSPECTIVE VIEW



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Description: JUPITER 32 NZ FRAME ASSEMBLY		Proj:	Units: mm	Rev: 1-A
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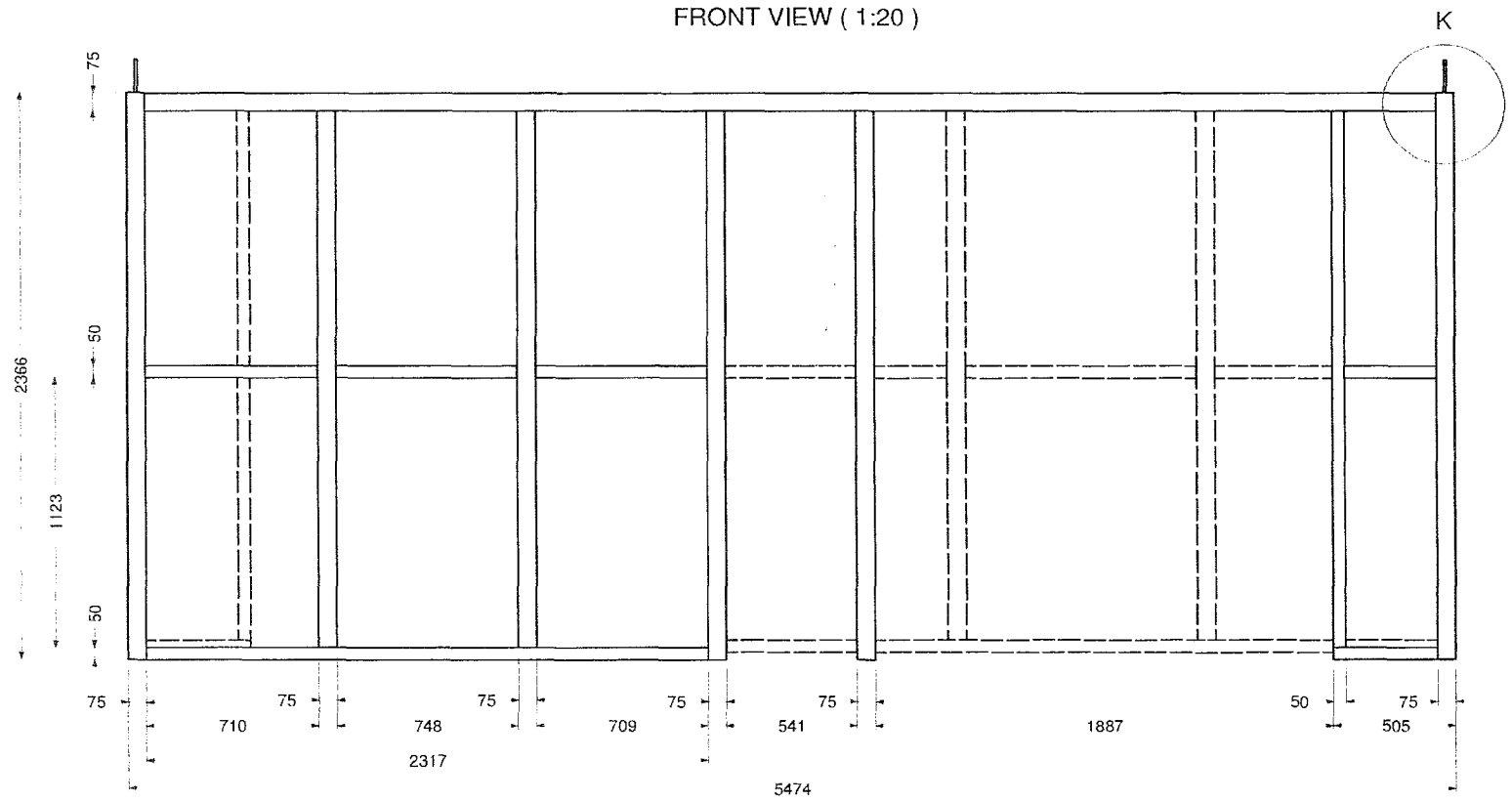
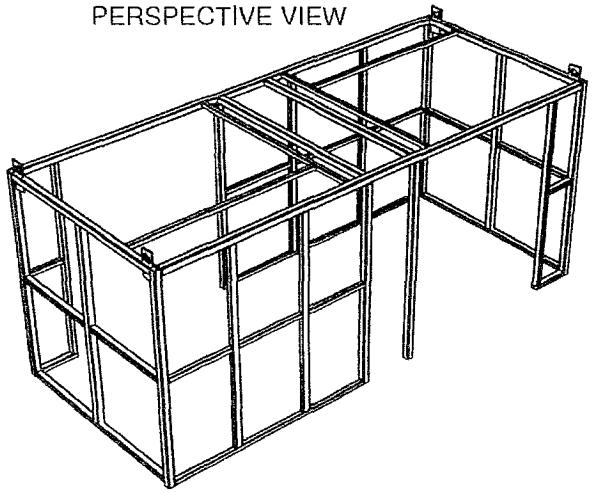
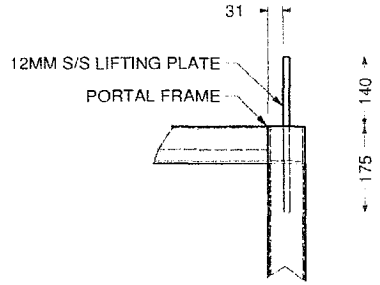
FRONT VIEW (1:20)



PERSPECTIVE VIEW



K (1 : 10)



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		Tolerance: +/-0.5	Scale: N.T.S.	Checked by:	Issue Date: 26/02/2013
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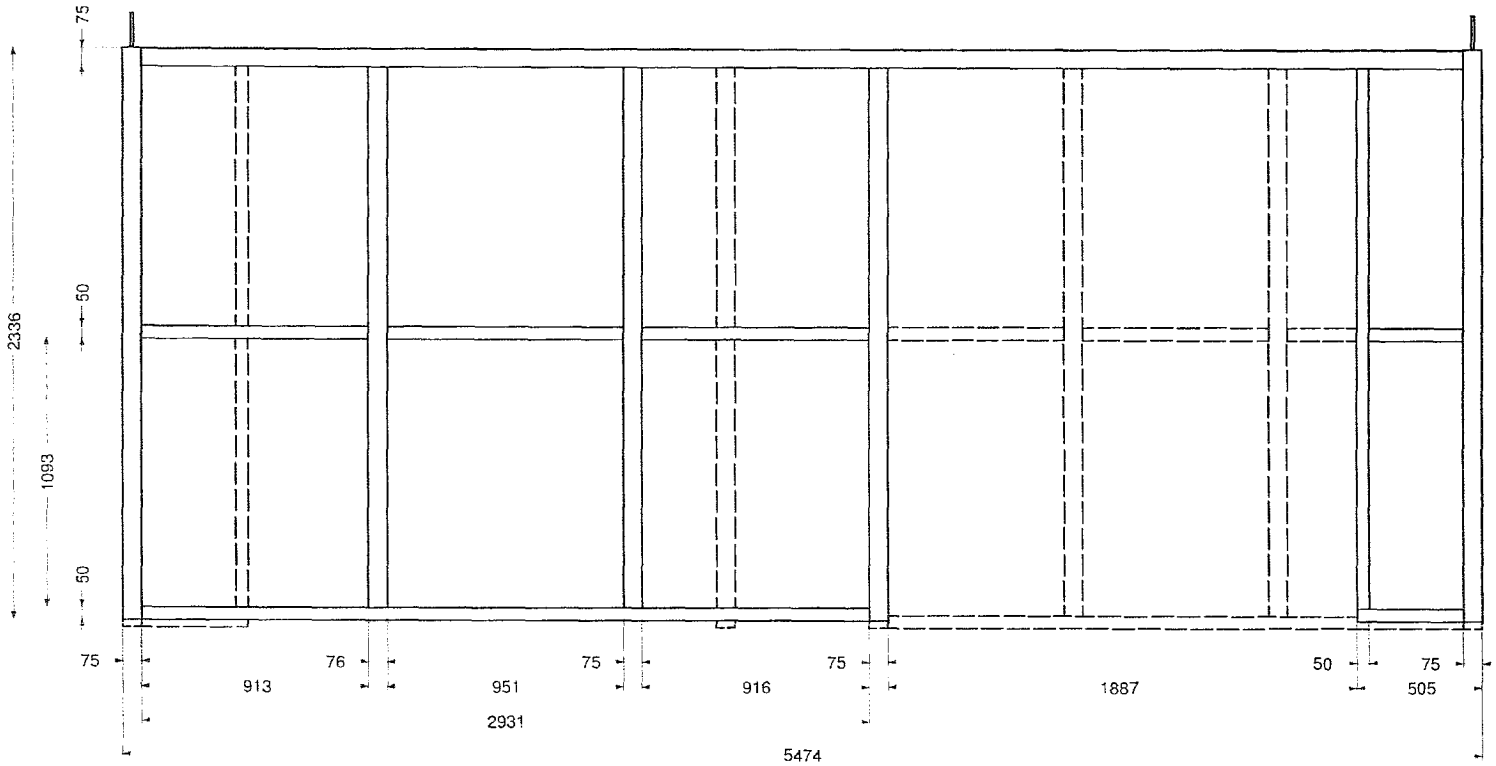
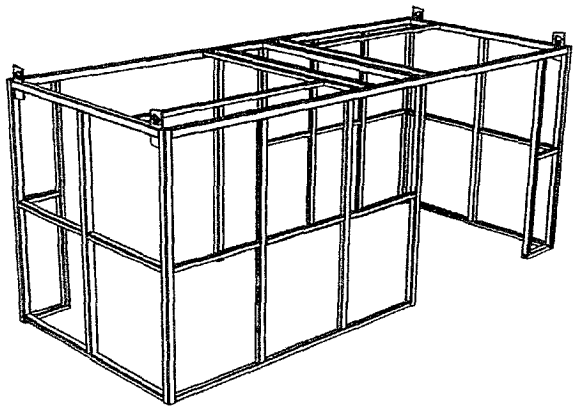
DO NOT SCALE - IF IN DOUBT ASK — PROJECT — SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE

REAR VIEW (1:20)



BACK PERSPECTIVE VIEW



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Description: JUPITER 32 NZ FRAME ASSEMBLY		Proj.	Units: mm	Rev: 1-A
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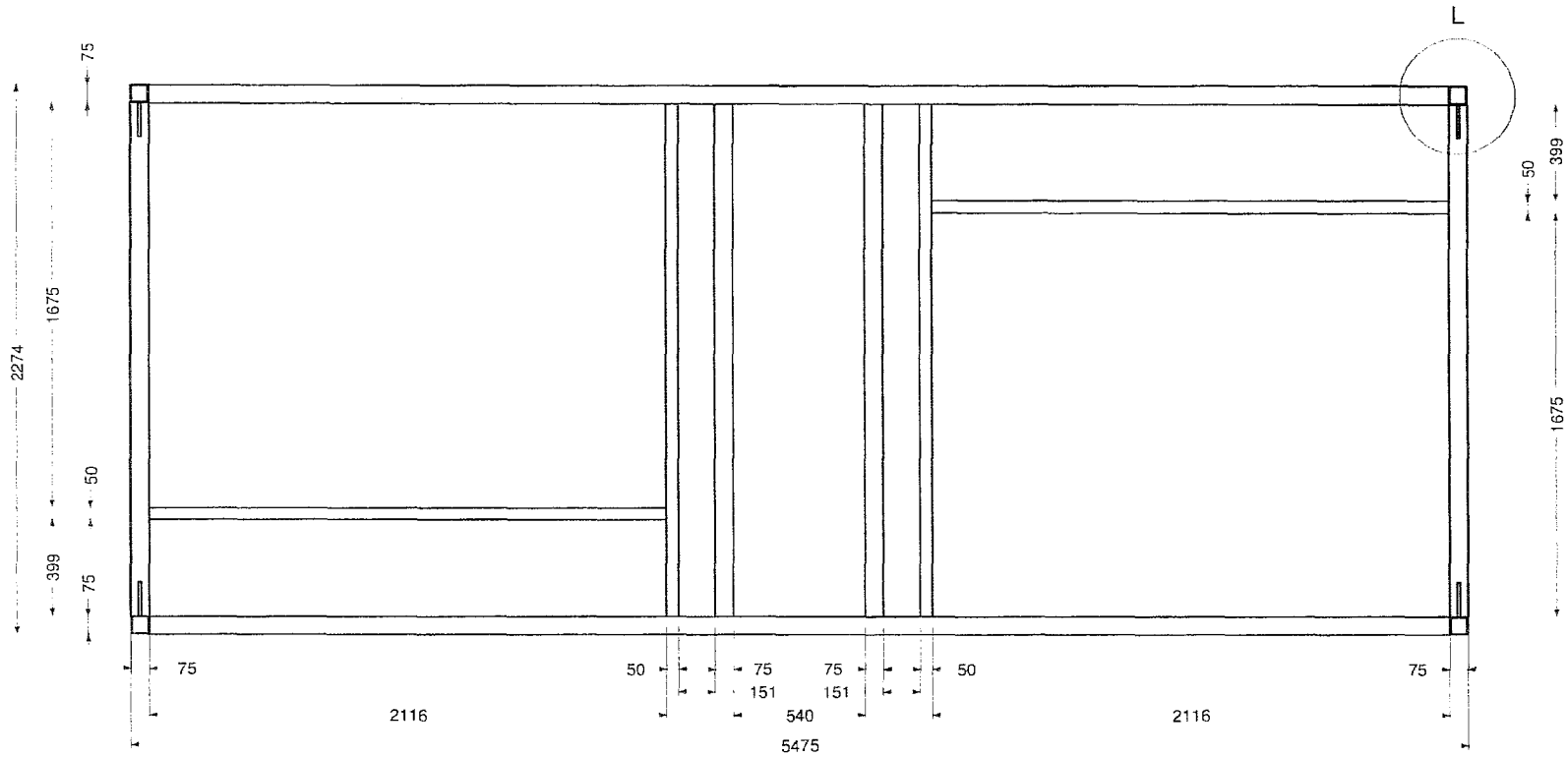
TOP VIEW (1:20)



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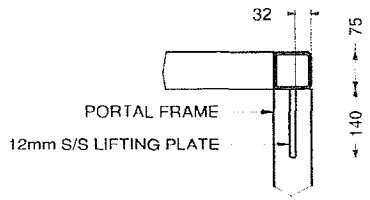

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Description: JUPITER 32 NZ FRAME ASSEMBLY		Units: mm	Rev: 1-A	
	Tolerance: +/-0.5	Scale: N.T.S.	Checked by:	Issue Date: 26/02/2013
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				Drawing No: ASJUP32DDNZ-2SMF-2

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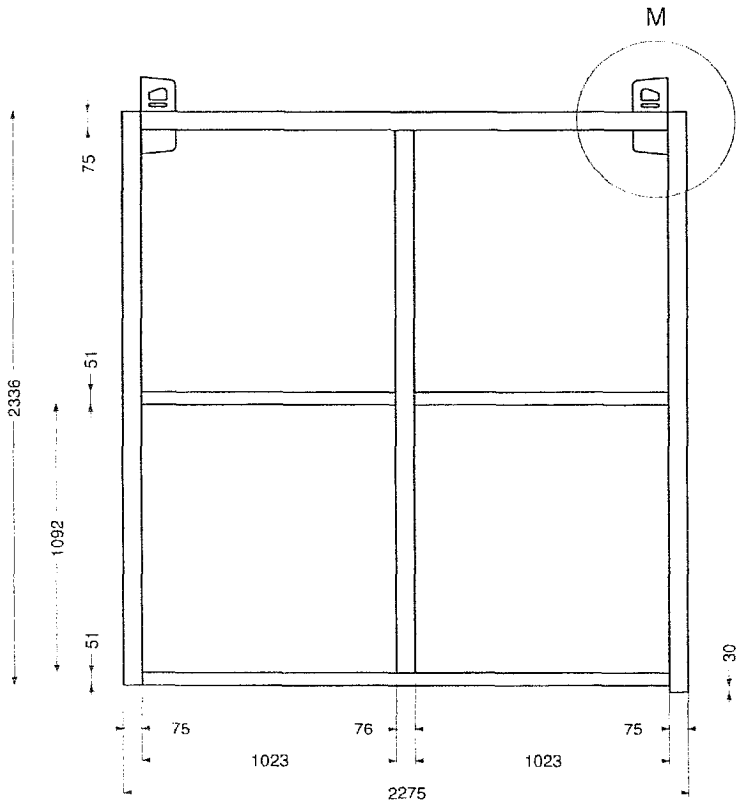
L-H SIDE VIEW (1:20)



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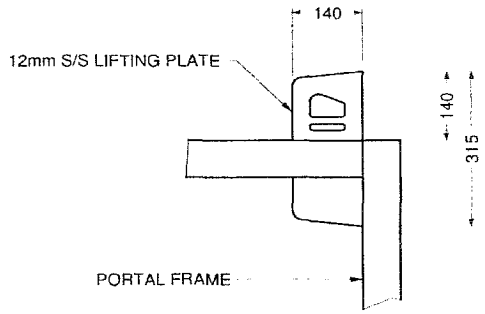

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Description: JUPITER 32 NZ FRAME ASSEMBLY			mm	1-A
		Tolerance: +/-0.5	Scale: N.T.S.	Date: 26/02/2013
Material:	Finish: REF	Drawn by: DCB	Approved by:	Sheet No: 4 / 5
				Drawing No: ASJUP32DDNZ-2SMF-2

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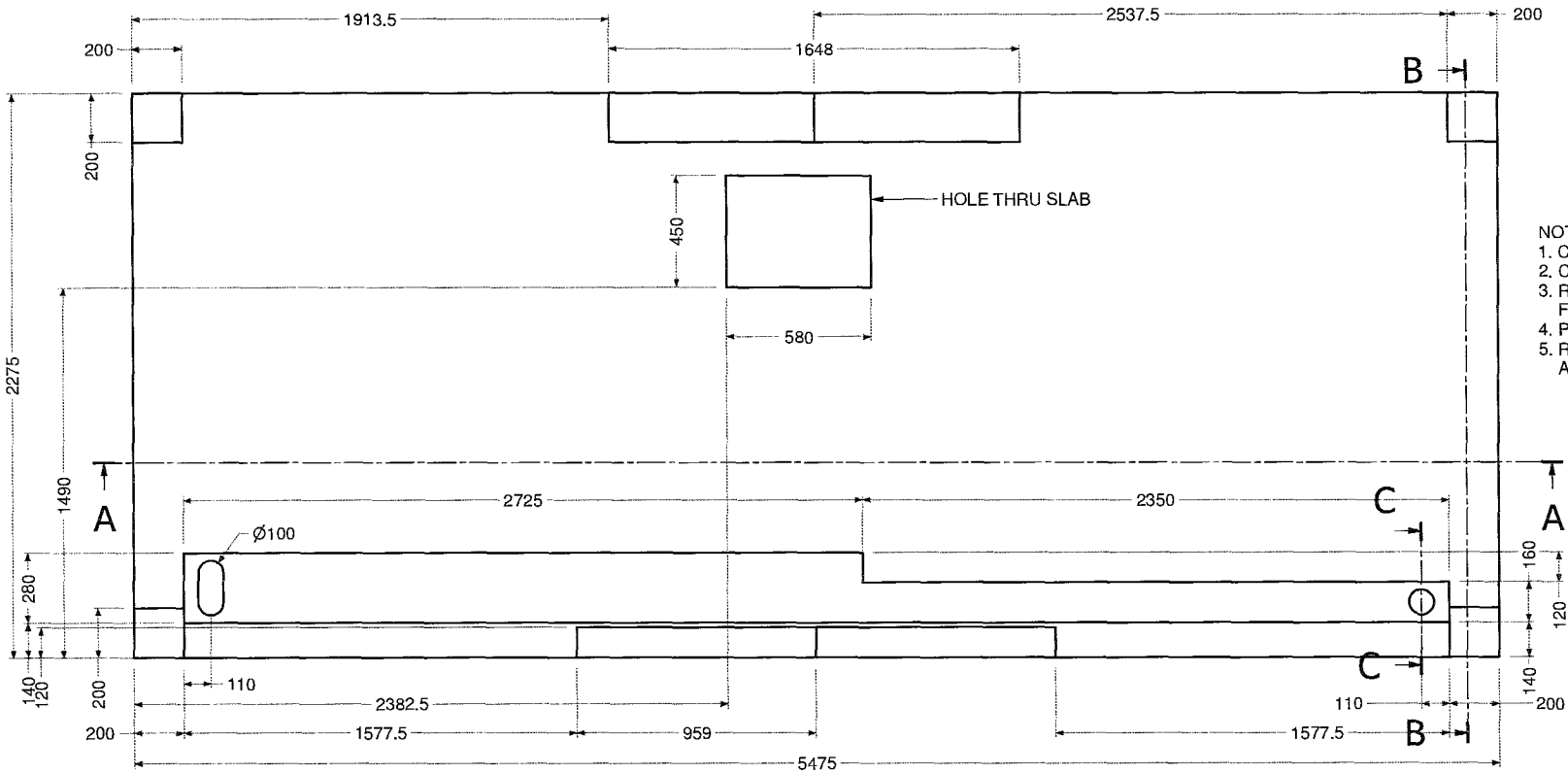
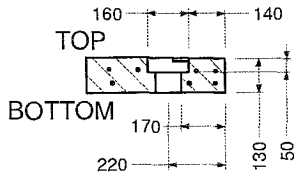
06 SLAB PLAN

MAIN VIEW 1:20 (A3)

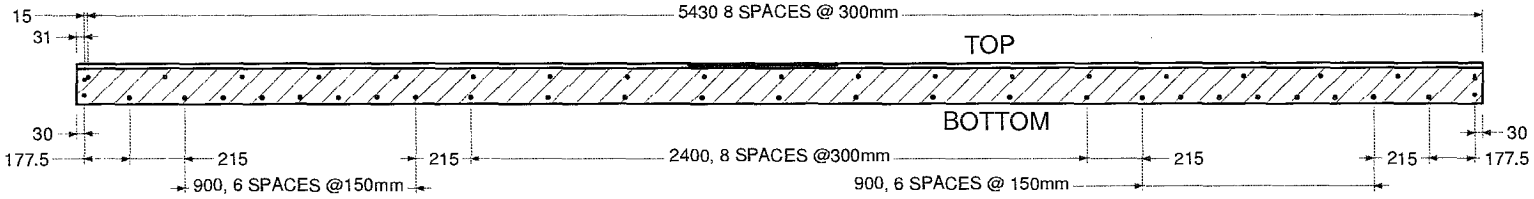


NOTES:
1. CONCRETE STRENGTH TO BE 40MPa
2. CONCRET COVER TO BE 30mm U.N.O
3. REFER TO NZ 3109:1997 TABLE 5.1 FOR PRECASTE TOLERANCES
4. PRODUCT CODE - WX
5. REINFORCING TO BE GRADE 430 AND HD10

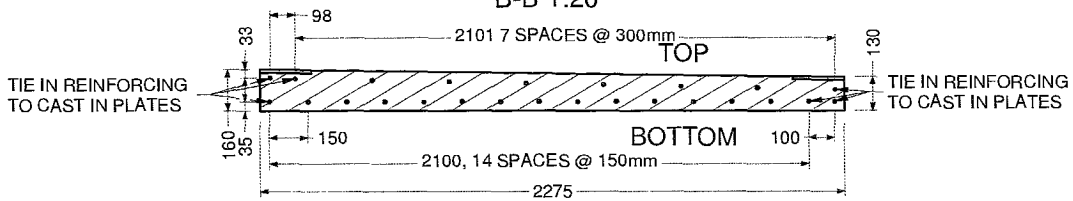
C-C



A-A 1:20



B-B 1:20



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CONSENT PACK
SHEET B1

Description: JUPITER SUPER TWIN/TRIPLE BASE FOR MODELS 22,23,32,33,42,43,52,53		Proj:	Units: mm	Rev. 1-D	
		Tolerance: +/-0.5	Scale:	Checked by:	Issue Date: 17/10/2013
Material:	Finish: REF	Drawn by: MKH	Approved by:	Sheet No. 1 / 3	Drawing No. AS-JUPITERSUPERSLAB

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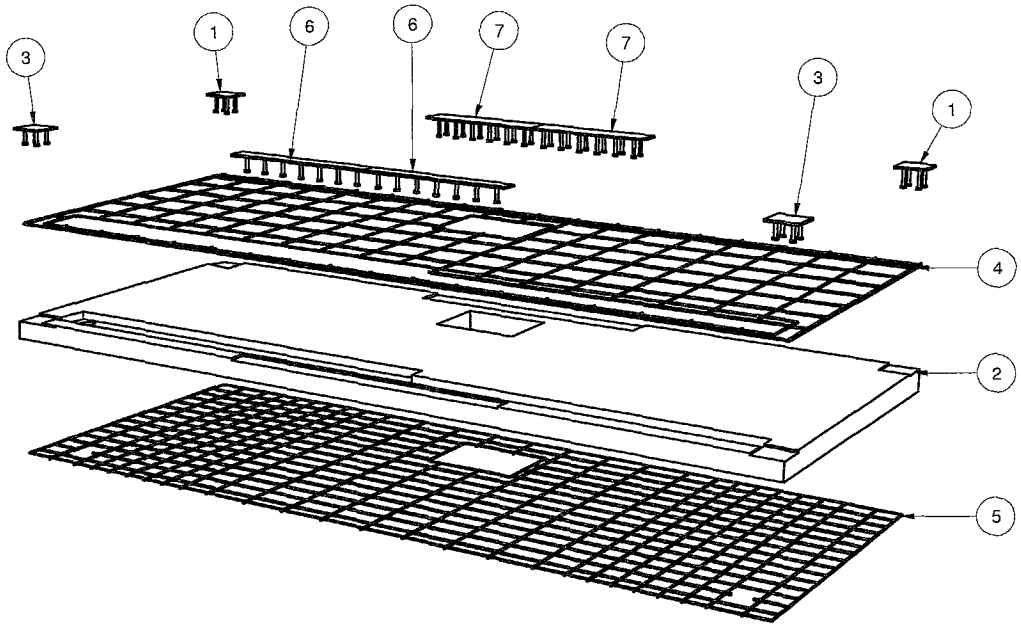
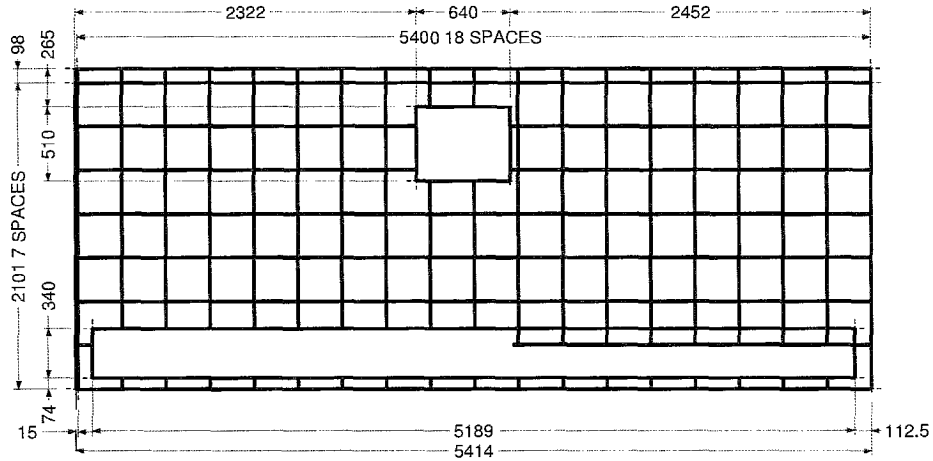
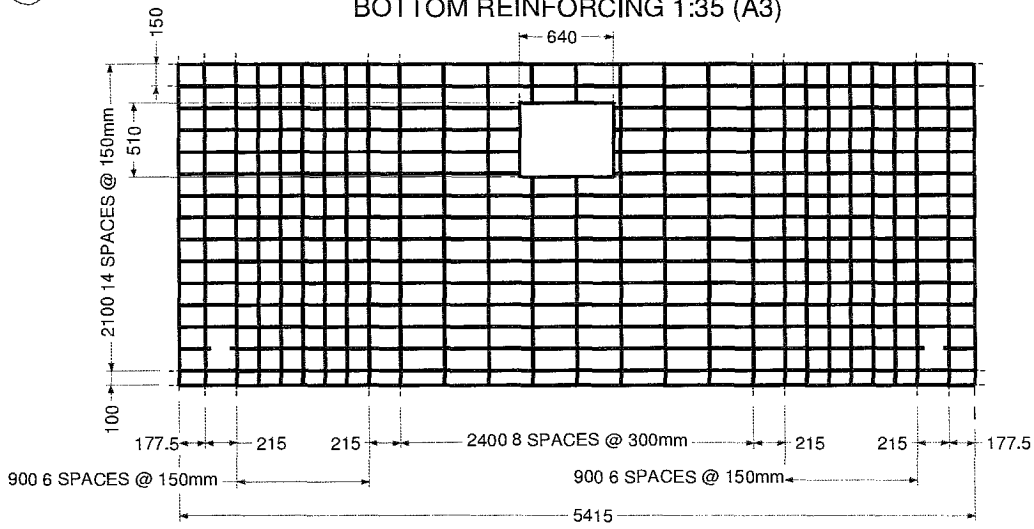
EXPLODED PERSPECTIVE VIEW



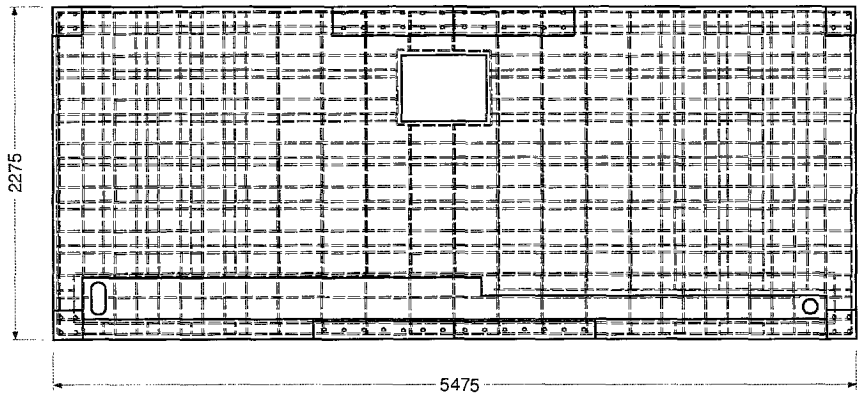
TOP REINFORCING 1:35 (A3)



BOTTOM REINFORCING 1:35 (A3)



REINFORCING HIDDEN VIEW 1:35 (A3)



Parts List

ITEM	PART NUMBER	DESCRIPTION	QTY
1	JUP 10025	CORNER REAR CASTING PLATE	2
2	JUP32 80002	JUPITER 32 CONCRETE FLOOR SLAB	1
3	JUP 10024	CORNER FRONT CASTING PLATE	2
4	JUP32 50012	JUPITER 32 TOP REINFORCING	1
5	JUP32 50022	JUPITER 32 BOTTOM REINFORCING	1
6	JUP 10022	FRONT CASTING PLATE	2
7	JUP 10023	REAR CASTING PLATE	2

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CONSENT PACK
SHEET B2

Description: JUPITER SUPER TWIN/TRIPLE BASE FOR MODELS 22,23,32,33,42,43,52,53

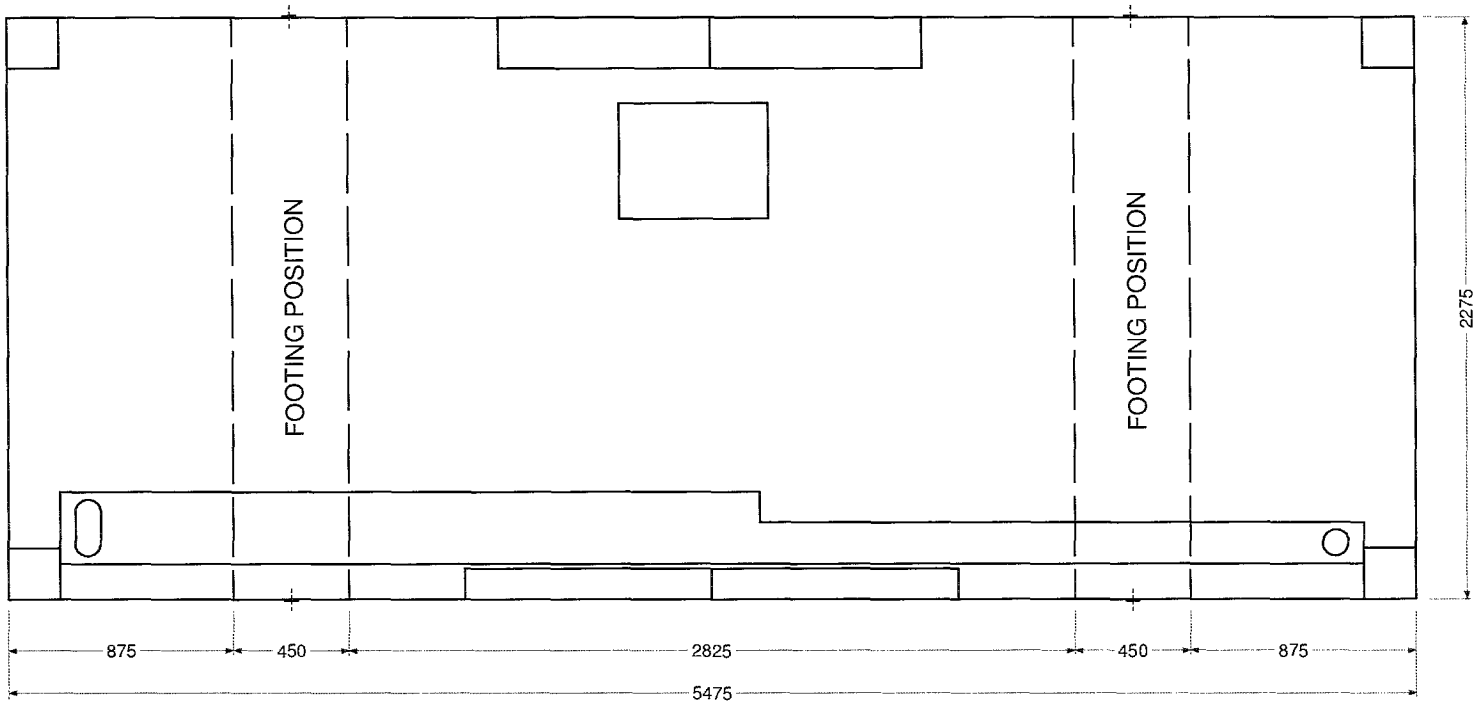
Proj | Units: mm | Rev: 1-D
Tolerance: +/-0.5 | Scale: | Checked by: | Issue Date: 17/10/2013
Material: | Finish: REF | Drawn by: MKH | Approved by: | Sheet No.: 2 / 3 | Drawing No.: AS-JUPITERSUPERSLAB

DO NOT SCALE - IF IN DOUBT ASK | PROJECT: | SPECIFICATION SUBJECT TO CHANGE WITHOUT NOTICE

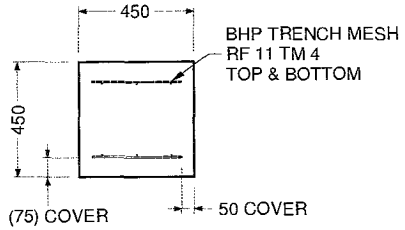
07 SLAB & FOUNDATION ASSEMBLY

NOTE:
SLAB SLOPES FROM 130mm (142 INC TILES) AT FRONT
TO 160mm (172mm INC TILES) AT REAR
FOOTING IS NOT PART OF THE BASE.

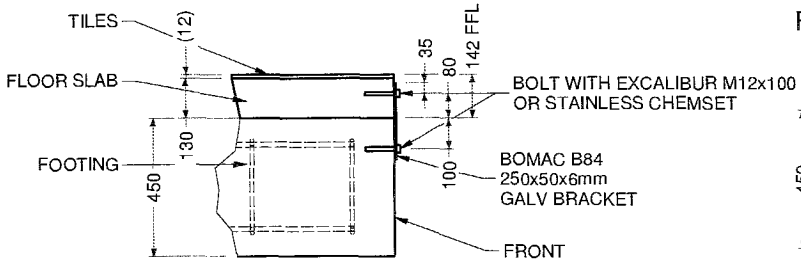
FOUNDATION DETAIL 1:20 (A3)



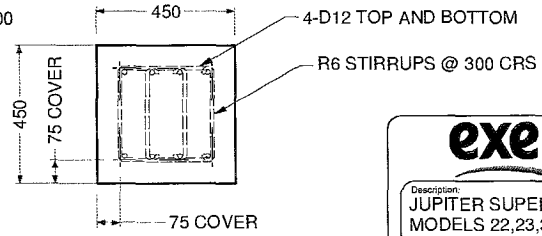
FOOTING DETAIL OPT 2



SIDE VIEW



FOOTING DETAIL OPT 1



FOUNDATION

1.GROUND CONDITIONS TO BE AT LEAST CAPABLE OF AN ALLOWABLE WORKING LOAD (DEAD AND LIVE) STRENGTH OF 100kpa
2.GROUND BEAM TO BE FILLED WITH 20 Mpa 28 DAY STRENGTH CONCRETE FOR 3 DAYS BEFORE PLACING EXELOO UNIT INTO POSITION

CONSENT PACK
SHEET B3

exeloo
26 Paramount Dve
Henderson
Tel (09) 838-8912
PO Box 33-256 Takapuna
Auckland, New Zealand
Fax (09) 838-8913

Description: JUPITER SUPER TWIN/TRIPLE BASE FOR MODELS 22,23,32,33,42,43,52,53		Proj		Units: mm	Rev: 1-D
		Tolerance: +/-0.5	Scale:	Checked by:	Issue Date: 17/10/2013
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STRUCTURAL

STRUCTURAL (ENGINEERS) CALCULATIONS JUPITER FRAME WITH SKILLION ROOF

ENGINEERING CALCULATIONS

MSC Consulting Group Ltd.
civil & structural engineers

FOR JUPITER MODELS: TWIN/TRIPLE UNITS WITH FLAT OR CURVED ROOF OPTIONS

FOR EXELOO LTD

Job No | 30207R
Date | July 2010

-ISSUED FOR BUILDING CONSENT-

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Sheet No.	1
Date	16/9/09
Ref.	30207
By	ZT

Jupiter Triple.

(note Jupiter triple sizing is identical to twin unit).

Ezeloo Jupiter Toilet Unit (revised)

For NZ and Aussi excluding C. D region :

Loads.

* Gravity loads.

Roof $G = 0.15$ kpa

$Q = 0.25$ kpa

Wall cladding. $G = 0.6$ kpa (including internal board & tiles)

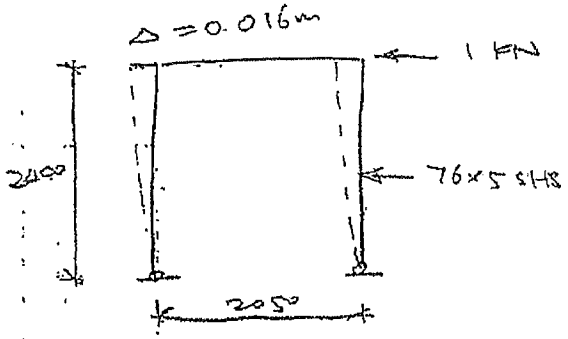
Floor 130~160 concrete slab 3.48 kpa

SDL 0.5 kpa

$G = 3.98$ kpa

$Q = 2$ kpa.

EQ actions

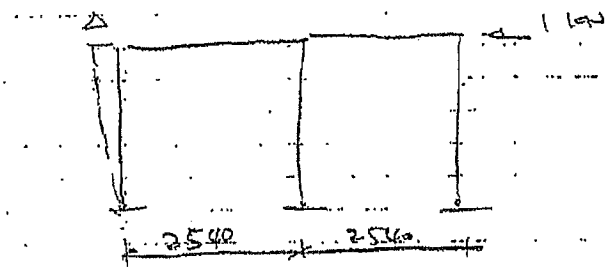


Portal frame under 1 kN lateral force

Displacement = 0.016 m

Stiffness $k = \frac{1000}{0.016} = 62500$ N/m

Along direction



$\Delta = 0.011$ m

$k = \frac{1000}{0.011} = 90743$ N/m

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Seismic mass $W_t = G + \psi_E Q$:

$= 0.15 \times 2.864 \times 5.786 + 0.6 \times 2.5 \times (2.15 + 5.08) + 0 = 13.28$ kN

Seismic mass per frame

across $m = \frac{13.28}{3} \times 100 = 442.67$ kg

along $m = \frac{13.28}{2} \times 100 = 664$ kg

$T = 2\pi\sqrt{\frac{m}{k}}$

across $T_{across} = 2\pi\sqrt{\frac{442.67}{62\,500}} = 0.53$ sec

along $T_{along} = 2\pi\sqrt{\frac{664}{91743}} = 0.53$ sec

$C(T) = C_h(T) Z R N$

Say soil class C, $T = 0.53$ sec

$C_h(T) = 1.922$

$Z = 0.13$ mostly

$= 0.6$ upper bound for Otira and Arthurs Pass

$= 0.4$ Wellington

$= 0.22$ Christchurch

$= 0.32$ Queenstown

$R_u = 1.0$ AEP = 1/500

$N = 1.0$

$C(T) = 1.922 \times 0.13 \times 1 \times 1 = 0.25$ Auckland

0.158 Otira, Arthurs Pass

0.769 Wellington

0.423 Christchurch

0.615 Queenstown

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$\mu = 1.25 \quad S_p = 1.3 - 0.3\mu = 0.925$

$k_\mu = (1.25-1)\frac{0.53}{0.7} + 1 = 1.189$

\# $C_d = \frac{C(T)\,S_p}{k_\mu} = \frac{0.25 \times 0.925}{1.189} = 0.194$ Auckland

0.897 Otira

0.598 Wellington

0.329 Christchurch

0.478 Queenstown

\# EQ lateral force

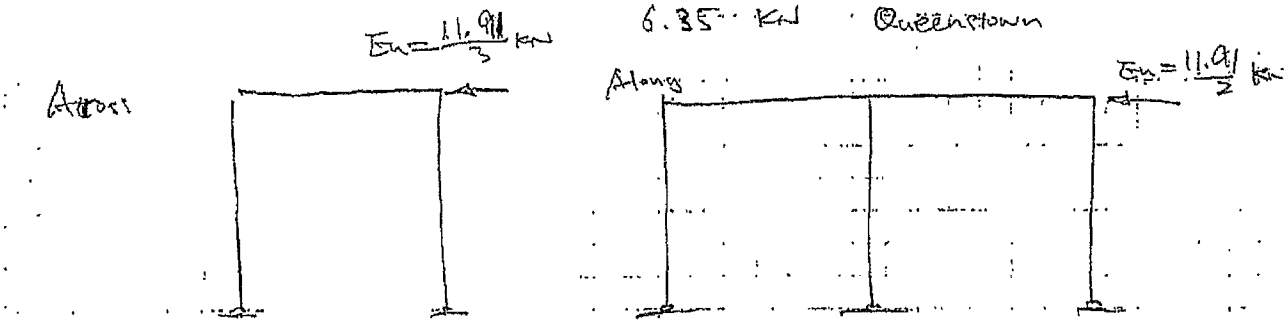
$E_u = 0.194 \times 13.28 = 2.58$ kN Auckland

11.91 kN Otira, Arthurs Pass ←

7.94 kN Wellington

4.37 kN Christchurch

6.35 kN Queenstown



$M^* = 4.95$ kNm $\quad M^* = 5.74$ kNm

$V^* = 3.7$ kN $\quad V^* = 2.34$ kN

$N^* = 5.6$ kN $\quad N^* = 3.92$ kN

SHS 75x5 OK ($\phi M_s = 10.6$ kNm).

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Wind Actions

Site wind speed $V_{sit,\beta} = V_R M_d M_{z,cat} M_s M_t$

ULS $V_{500} = 45$ m/s Region A

51 m/s " W

57 m/s " B

F_C 66 $= 69.3$ m/s " C. where $F_C = 1.05$

F_D 80 $= 88$ m/s " D. where $F_D = 1.1$

SLS $V_{25} = 37$ m/s Region A

43 m/s " W

39 m/s " B

F_C 47 $= 47$ m/s " C. where $F_C = 1.0$

F_D 53 $= 53$ m/s " D. where $F_D = 1.0$

$M_d = 1.0$ any direction

Region A, W, B

$M_{z,cat} = 0.99$ Category 1.

0.91 cat 2

0.83 cat 3

0.75 cat 4.

Region C and D:

0.9 cat 1, 2

0.8 cat 3, 4

$M_s = 1.0$

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$M_t = 1.0$ Say outside of Lee zone and below 500m sea level

* NZ wind speed (ULS)

Cate / Region	1	2	3	4
A	SLS only	40.95 m/sec	37.35 m/sec	33.75 m/sec
W		46.41 m/sec	42.33 m/sec	38.25 m/sec

* AUS wind speed (ULS)

Cate / Region	1	2	3	4
A	SLS only	40.95 m/sec	37.35 m/sec	33.75 m/sec
B		51.87 m/sec	47.31 m/sec	42.75 m/sec
C	SLS only	62.37 m/sec	55.44 m/sec	
D		79.2 m/sec	70.4 m/sec	

(To revised Jupiter unit, Region C and D not to be considered

Design Wind Pressure

$P = 0.5 \rho V^2 C_{fig} C_{dyn}$

$C_{dyn} = 1.0$

C_{fig} to be determined.

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* NZ Basic wind Pressure $P_b = 0.5 \rho V^2$ (kpa)

ULS

Cate / Region	2	3	4
A	1.0	0.837	0.683
W	1.29	1.08	0.877

* AUS basic wind pressure P_b (KPa)

ULS

Cate / Region	2	3	4
A	1.0	0.837	0.683
B	1.614	1.343	1.097
C	2.334	1.944	
D	3.763	2.973	

(Region C and D not to be considered for this Unit.)

Lee zone in NZ

Say all sites not to be in local topographic zone, ie not on hill, ridge and crest.

$M_h = 1.0$

then $M_t = M_{lee} = 1.35$

$V = 45 \times 0.91 \times 1.35 \times 1 = 55.28$ m/sec

$P_b = 1.833$ kpa ⟵ critical case

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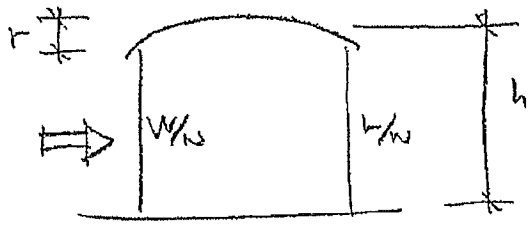
Curved roof



$r = 0.5$ m

$h = 2.5 + 0.5/2 = 2.75$ m

$h/r = 2.75/0.5 > 2$

not consider the roof as curved.

Across :

Windward $C_{p,e} = 0.7$

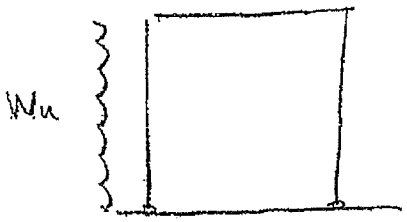
Leeward $C_{p,e} = -0.5$ for $d/b \leq 1$

Along :

Windward $C_{p,e} = 0.7$

Leeward $C_{p,e} = -0.3$ for $d/b = 5.08/2.1 = 2.3$

Wind forces on portal frames (across direction as critical)



$W_u = (0.7 + 0.5) \cdot P_{ws} \cdot \frac{b}{2}$, $b = 5.08$ m

$= 3.05 P_{ws}$

As NZ lee zone has the critical case with P_b

$= 1.833$ kPa

Using $W_u = 3.05 \times 1.833 = 5.59$ kN/m to design the frame.

Frame : $M^* = 8.15$ kNm

$V^* = 7.65$ kN

75x5 SHS grade C350.

$\phi M_s = 10.6$ kNm $> M^*$ ok

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Footing

* External pressure on roof

$h/d = 2.75/5.1 > 1$

$C_{p,e} = -1.3$ or -0.6

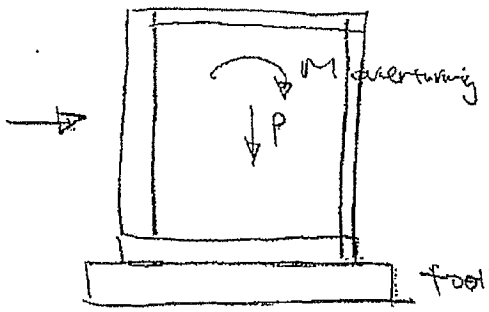
Critical upwards wind pressure of roof

Region A $P_{ULS} = -1.3 \times 1 = -1.3$ kpa

Lee Zone $P_{ULS} = -1.3 \times 1.833 = -2.38$ kpa

Region W $P_{ULS} = -1.3 \times 1.29 = -1.68$ kpa

Region B $P_{ULS} = -1.3 \times 1.614 = -2.1$ kpa



* Overturning moment.

Region A :

$M^*_o = (0.7+0.5) \times 1 \times 5.08 \times \frac{2.75^2}{2}$

$= 23.1$ KNm

Lee Zone :

$M^*_o = (0.7+0.5) \times 1.833 \times 5.08 \times \frac{2.75^2}{2}$

$= 42$ KNm

Region W :

$M^*_o = (0.7+0.5) \times 1.29 \times 5.08 \times \frac{2.75^2}{2} = 29.74$ KNm

Region B :

$M^*_o = (0.7+0.5) \times 1.614 \times 5.08 \times \frac{2.75^2}{2} = 37.2$ KNm

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Footing to be designed for Lee Zone that has the worst M^*_o.

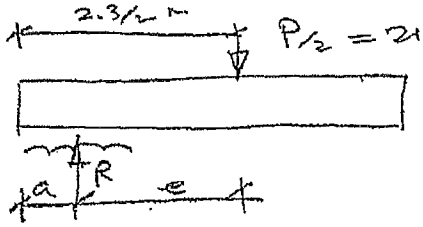
try 2 – 500 D x 600 W x 2300 L

$$P = 0.9 \times [0.15 \times 5.775 \times 2.75 + 3.98 \times 5.08 \times 2.15 + 0.6 \times 2.4 \times (2.15 + 5.08) + 0.5 \times 0.6 \times 24 \times 2.3 \times 2] - 2.38 \times 5.775 \times 2.75$$

(roof, floor, wall, footing)

$$= 0.9 \times [2.38 + 43.47 + 10.58 + 33.12] - 37.79$$

$$= 42.81 \text{ kN}$$

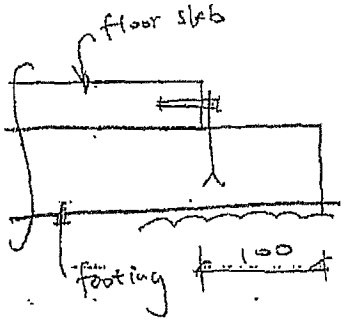


$$R = \frac{P}{2} = 21.4 \text{ kN}$$

$$e = \frac{M^*_o/2}{R} = \frac{21}{21.4} = 0.98 \text{ m}$$

$$a = 2.3/2 - 0.98 = 0.169 \text{ m}$$

$$\text{bearing} = \frac{42.81/0.9}{2 \times 0.169 \times 0.6 \times 2} = 117 \text{ kPa} < 150 \text{ kPa ok.}$$



$M^*_{footing} = 117 \text{ kPa} \times 0.6 \times 0.1^2/2$

$= 0.35 \text{ kNm}$

footing ok

require $A_{s\,min} = \rho_{min} \times 500 \times 600$

$= \frac{\sqrt{25}}{4 \times 500} \times 500 \times 600$

$= 750 \text{ mm}^2$

4 – HD16 — $A_s = 804 \text{ mm}^2$

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Holding down plate:

$T^* = \frac{42}{2} / 2.105 = 9.98$ kN

plate 5x50 $\phi T = 67.5$ kN OK.

CHemfast 1-M16 $\phi V_{ur} = 11.6$ kN OK

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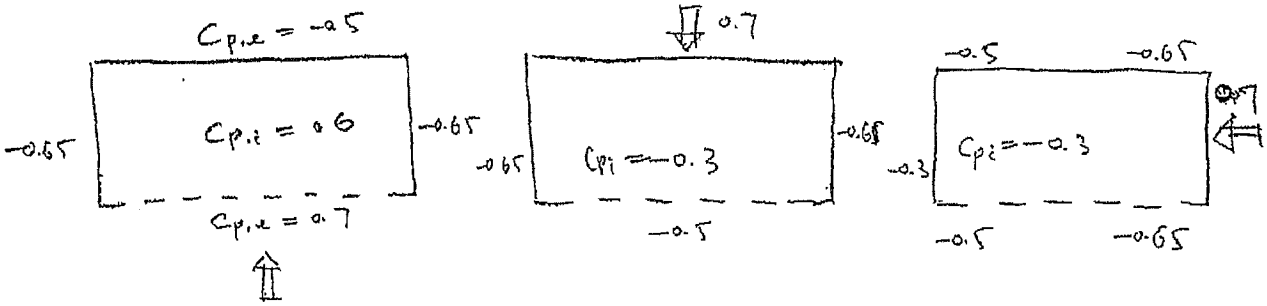
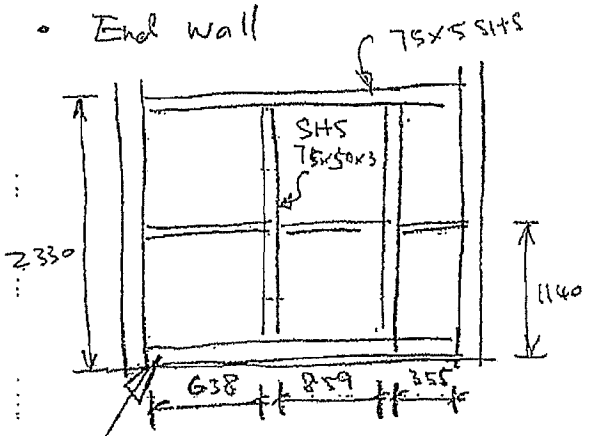
Internal wind Pressure

$C_{p,i} = 0.6$ or -0.3

Wall



End wall



($P_b = 1.893$ kpa Lee zone critical)

$P_{ULS} = (0.6 + 0.65) \times 1.893$

$= 2.29$ kpa

stud $W_u = 2.29 \times \frac{0.638 + 0.86}{2}$

$= 1.72$ kN/m

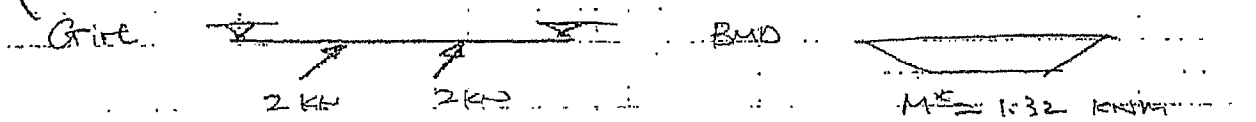
$M^*_{stud} = 1.72 \times 2.33^2/8 = 1.17$ kNm

$V^* = 1.72 \times 2.33 / 2 = 2.0$ kN

SHS 75x50x3 $\phi M_b = 6.38$ kNm OK

SHS 75x25x2 $\phi M_b = 2.52$ kNm ... OK

$L_e = 1.25$ m



SHS 75x25x2 $\phi M_b = 2.56$ kNm $L_e = 1.0$ m

$\therefore \phi M^* = 1.32$ kNm ... OK

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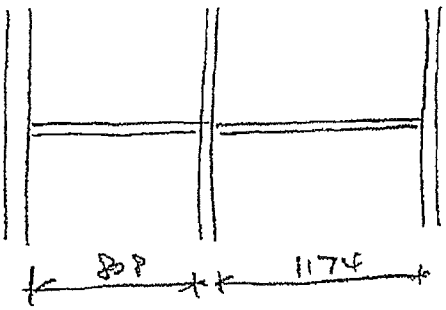
- Rear wall

$$P_{uls} = (0.6 + 0.5) \times 1.833 = 2.\ kpa$$



$$\text{Stud } W_u = 2. \times \frac{0.828 + 1.174}{2}$$

$$= 2\ KN/m$$

$$M^*_{end} = 2 \times 2.33^2/8 = 1.36\ KNm$$

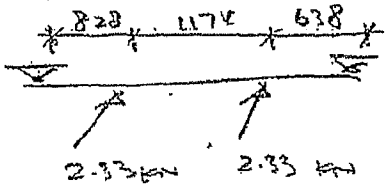
$$V^* = 2 \times 2.33/2 = 2.33\ KN$$

SHS 75X25X2 $\phi M_b = 2.52$ KNM $L_e = 1.75$ m

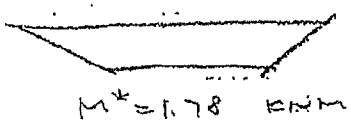
$> M^* = 1.36$ KNm OK.

SHS 50X3 $\phi M_s = 2.96$ KNM OK.

Base Girt



BMD



SHS 50X3 $\phi M_s = 2.96$ KNM OK.

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Roof — Curved Roof.
— Flat Roof option See P13A+B

Wind pressure

$P_{ults} = (1.3 + 0.6) \times 1.833 = -3.48$ kpa

$0.9G + W_u = 0.9 \times 0.15 - 3.48 = -3.35$ kpa ↑

- roof rafter SHS 50×3 @ 1050 CRS

UDL = $3.35 \times 1.05 = 3.51$ kN/m

$M^* = 2.75$ kNm $V^* = 4.14$ kN

SHS 50×3 $\phi M_s = 2.96$ kNm $> M^*$ ok.

- roof purlin SHS 50×25×2 @ 620 CRS

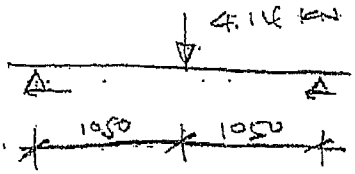
Span = 1050

UDL = $3.35 \times 0.62 = 2.08$ kN/m

$M^* = 2.08 \times 1.05^2/10 = 0.23$ kNm

$\phi M_{sy} = 0.824$ kNm $> M^*$ ok.

- Side purlin 75×50×3 SHS



$M^* = 4.14 \times 1.05/2 = 2.17$ kNm

$\phi M_{sy} = 5.17$ kNm

$> M^*$ ok.

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Sheet No.	13A
Date	1/7/10
Ref.	30207
By	RF

30207
Excl00 – Jupiter with Skillion Roof option.

Refer dwgs – Excl00 – Skillion Roof frame JUP09 1B – issued 30/6/10 1/2
(attached) Jupsk Roof Frame – " " 1B – " " 2/2

Check design of new flat skillion roof for worst case NZ wind only
– refer Previous calcs – MSC calcs – #30207.
– Jupiter Twin Standard Model 14 Toilet unit.
WIND PRESSURE CALCULATIONS – p6.

NZ ULS – Basic wind speed – $P_b = 0.5 \rho_{air} V^2$ (kPa).

Region \ CAT.	2	3	4
A	1.0	0.93	0.683
W	1.29	1.08	0.877.

Provide design of roof for worst case typical wind Pressure (NZ only)

→ NZ – Region W, cat (2) = 1.29kPa.

C_{fig} Internal pressure = 0.6. (Ref P11)
External suction = 1.3 . (Ref P8)

Roof Member design

Rafter span = 2.7m.
max tab width = 1.1m.

$w^* = \phi R_n + w_{DL}\uparrow = 0.9 \times 0.15 - (1.3 + 0.6) \times 1.29$
$= 0.135 - 2.45$
$= -2.32$ kPa uplift

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Sheet No.	38
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By	RP

$w_{OL} = -2.32 \times 1.2 = 2.55$ kN/m.

$M^* = 2.32$ kNm.

$Z_{req} = \frac{2.32}{0.9 \times 0.075} = 7.4 \times 10^{-3} m^3$

use 50+50+3 Duragal rafter → $Z_{xx} = 9.15 \times 10^{-3} m^3 > 7.4 \times 10^{-3}$ → Ok

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Sheet No.	1
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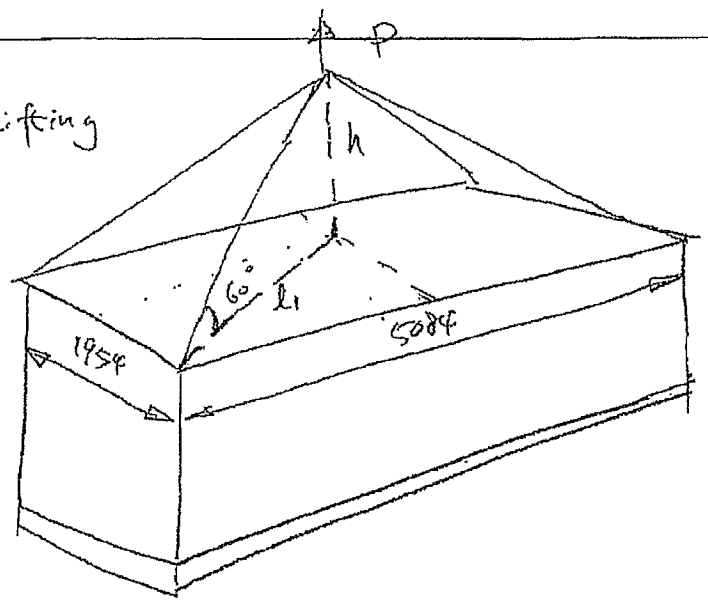
By	

Lifting

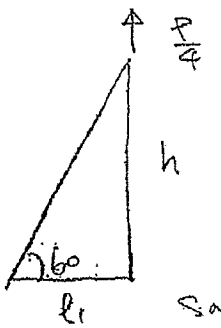


G = 0.15 × 5.775 × 2.75 + 3.98 × 5.08 × 2.15 + 0.61 × 2.75 × (2.15 + 5.08) × 2 = 70 kN

1.35 G = 95 kN

lifting Q = 1.35 G = 95 kN

P = 1.5 Q = 1.5 × 95 = 142 kN



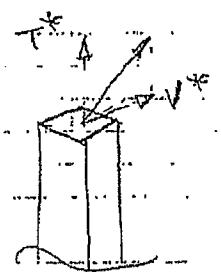
$l_1 = \sqrt{\left(\frac{1954}{2}\right)^2 + \left(\frac{5084}{2}\right)^2} = 2723$ mm

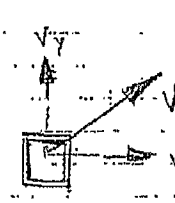
loads to be distributed to 4 chain evenly.

$\frac{P}{4} = 142/4 = 35.5$ kN

Say the chain at 60° angle min.

$h = l_1 \cdot \tan 60 = 2723 \times 1.732 = 4716$ mm





column design forces:

$T^* = 35.5$ kN

$V^* = 35.5 / \tan 60° = 20.5$ kN

$V_x = 20.5 \times \frac{5084/2}{2723} = 19.14$ kN

$V_y = 20.5 \times \frac{1954/2}{2723} = 7.36$ kN

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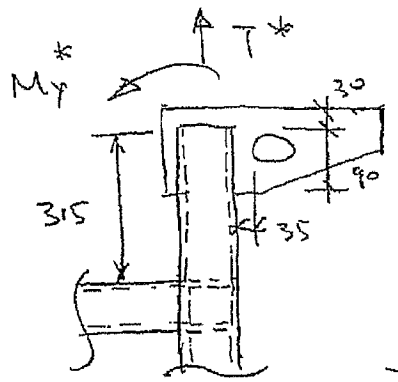
Sheet No.	15
Date	
Ref.	30707
By	



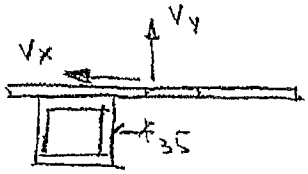
$M^*_{y-y} = 19.14 \times 0.315 = 6.03$ kNm

$M^*_{x-x} = 7.36 \times 0.315 = 2.32$ kNm

$T^* = 35.5$ kN

76x5 SHS ok for combined actions

(ref following MemDes printout)



12 plate $M^* = 7.36 \times 0.035 = 0.26$ kNm

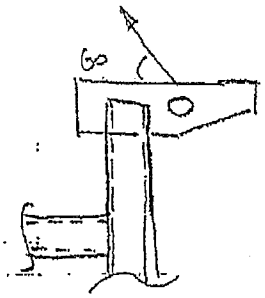
$\phi M_s = 0.9 \times 300 \times 12^2 \times 90 / 6$

$= 0.58$ kNm $> M^*$ ok.

$\phi V_n = 0.9 \times 0.6 \times 300 \times 12 \times 30 = 58.3$ kN

$> V^* = \sqrt{35.5^2 + 7.36^2} = 36.3$ kN OK

Loaded on 2 lifteyes only.



$\frac{P}{2} = 71$ kN

$V_{Horizontal} = 71 / \tan 60° = 41$ kN

Column $M^* = 41 \times 0.315 = 12.92$ kNm.

$T^* = 71$ kN

$V^* = 41$ kN

76x5 SHS ok for combined actions

(ref following Member printout)

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MemDes Calculations @ 14:44 on 14/09/2009 by zx

Project : 30207
Descriptn : Biaxial bending 76x5 SHS when lifting the unit

Section : 075x075x5.0 SHS Grade 450DG

Major Axis Bending

Design Action M^*_x = 6.0 kNm

User provided value for α_m = 1.00

α_s = 1.03

α_m α_s >= 1.0, => Segment Fully Restrained

$M_{bx} = M_{sx}$ = 15.12 kNm

Major axis capacity Ratio = M^*_x / ϕM_{bx}
= 0.44, ---- OK ----

Minor Axis Bending

Design Action M^*_y = 2.3 kNm

SHS Sectn => $M_{by} = M_{bx}$ = 15.12 kNm

Minor axis capacity ratio = M^*_y / ϕM_{by}
= 0.17, ---- OK ----

Shear Calculations (Unstiffened Web)

Design Action V^*_x = 19.1 kN

Nominal Shear Yield capacity V_w = 175.5 kN

α_v = 22.10 >= 1.0 => full web shear capacity

$V_u = V_w$ = 175.5 kN

Shear capacity ratio = V^*_x / ϕV_u
= 0.12, ---- OK ----

Axial Calculations

Design Action N_d = 35.5 kN [Tens], LeAxx = 0.31 m, LeAxy = 0.31 m

Tension capacity Ratio = N_d / ϕN_t
= 0.067, ---- OK ----

Combined Actions Checks

Clause 8.3.3/4 :

$M_{ry} = M_{sy}$ (1 - (N^*/ ϕN_s)) * 1.18, =< M_{sy} [Alt. Prov. OK]
= 15.1

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, Psi = 1.467

= $(M^*_x/ \phi M_{rx})^{Psi} + (M^*_y/ \phi M_{ry})^{Psi}$
= 0.378, ---- OK ----

Clause 8.4.5.2 :

Load / Capacity Ratio = $(M^*_x/ \phi /M_{lx})^{1.4} + (M^*_y/ \phi /M_{ry})^{1.4}$
= 0.404, ---- OK ----

========== SUMMARY ==========

**** U.L.S. Capacity Check Passed, Load Cap. Ratio = 0.44 ---- OK ----

MemDes Calculations @ 15:06 on 14/09/2009 by zx

Project : 30207
Descriptn : 76x5 SHS when load on 2 lifting eye

Section : 075x075x5.0 SHS Grade 450DG

Major Axis Bending

Design Action M^*_x = 12.9 kNm

User provided value for α_m = 1.00

α_s = 1.03

α_m α_s >= 1.0, => Segment Fully Restrained

$M_{bx} = M_{sx}$ = 15.12 kNm

Major axis capacity Ratio = M^*_x / ϕM_{bx}
= 0.95, --- OK ---

Shear Calculations (Unstiffened Web)

Design Action V^*_x = 41.0 kN

Nominal Shear Yield capacity V_w = 175.5 kN

α_v = 22.10 >= 1.0 => full web shear capacity

$V_u = V_w$ = 175.5 kN

Shear capacity ratio = V^*_x / ϕV_{vm}
= 0.38, ---- OK ----

Axial Calculations

Design Action N_d = 71.0 kN [Tens], LeAxx = 0.31 m, LeAxy = 0.31 m

Tension capacity Ratio = N_d / ϕN_t
= 0.134, ---- OK ----

Combined Actions Checks

Clause 8.3.3/4 :

$M_{ry} = M_{sy}$ (1 - (N^*/ ϕN_s)) * 1.18, =< M_{sy} [Alt. Prov. OK]
= 15.1

Load / Capacity Ratio = M^*_x / (0.9 M^r_x)
= 0.95, ---- OK ----

SUMMARY

**** U.L.S. Capacity Check Passed, Load Cap. Ratio = 0.95 ---- OK ----

Sheet No.	18
Date	
Ref.	3027
By	

Check horizontal SHS 76x5 as a strut.

$N^* = 41$ kN . $Le = 2116$ mm.

$\phi N_c = 313$ kN OK

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PRODUCER STATEMENT
PS1-DESIGN

32707

IPENZ ENGINEERS NEW ZEALAND | ARCHITECTS | ACENZ

Building Code Clause(s) B1

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance notes on the use of this form are printed on the reverse side)*

ISSUED BY: MSC Consulting Group Limited
(Design Firm)

TO: Exeloo Ltd
(Owner/Developer)

TO BE SUPPLIED TO: .....
(Building Consent Authority)

IN RESPECT OF: Jupiter Twin or Triple Toilet Unit
(Description of Building Work)

AT: Anywhere in New Zealand and Australia (except Cyclonic zone)
(Address)

..... **LOT** ..... **DP** ..... **SO** .....

We have been engaged by the owner/developer referred to above to provide structural engineering design
.....services in respect of the requirements of
(Extent of Engagement)
Clause(s) B1 and B2 (structure) ..... of the Building Code for
○ All or ◉ Part only (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:
☑ Compliance Documents issued by Department of Building & Housing B1 / VM1
(verification method : acceptable solution)
..... or
☐ Alternative solution as per the attached schedule .....

The proposed building work covered by this producer statement is described on the drawings titled.....
..... and numbered .....;
together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:

(i) Site verification of the following design assumptions good ground .....

(ii) All proprietary products meeting their performance specification requirements;

I **believe on reasonable grounds** the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code.

I, Anil Madhawan Krishnan .....am: ☑ CPEng 116708 .....#
(Name of Design Professional)
☐ Reg Arch .....#

I am a Member of: ☑ IPENZ ☐ NZIA and hold the following qualifications: BE(Hons) MIPENZ CPEng INTPE(NZ)

The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ

SIGNED BY Anil Madhawan Krishnan ..... ON BEHALF OF MSC Consulting Group Limited .....
(Design Firm)

Date 16/1/13 *(signature)* .....

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.