

Revision B: Supporting Calculations



BDS | SCAFFOLD
DESIGN
SPECIALISTS

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Date: 23/11/2023		
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Date: 23/11/2023	Project: Rylands Building, Manchester	Drawing Ref: BDS - 10313 - 01 to 05
Checked By: Mike Brown	Drawing Title: External Independent Access Scaffold with Stair Access Scaffold to Bridgewater Place	Revision: B 23/11/2023
Date: 23/11/2023		Pages: All

Components & Material Properties

Items listed below are for information purposes only, & are not necessarily used in this design.

All tubes used in this design are based on type 4, unless otherwise stated.

All couplers used in this design are based on class "B", unless otherwise stated.

NASC TG20:21 - Page 119 - Table 5.9Steel Tube (Type 4)

Area	=	5.57cm ²
Wall Thickness	=	4mm
Self Weight	=	4.37kg/m (0.043kN/m)
Diameter	=	48.3mm
Radius of Gyration	=	1.57cm
Plastic Modulus	=	7.87cm ³
Design Strength	=	235N/mm ²
Modulus of Elasticity	=	210000N/mm ²
Moment of Inertia	=	13.8cm ⁴
Moment Capacity	=	1.12kNm
Shear Capacity	=	29.1kN

NASC TG20:21 - Page 121 - Table 5.10

<u>Effective Length (L_E)</u>	<u>Slenderness ratio - λ</u>	<u>Safe axial load -P_c</u>
1.0m	63.50	58.60kN
1.1m	70.00	55.25kN
1.2m	76.50	51.90kN
1.3m	82.70	48.60kN
1.4m	88.90	45.30kN
1.5m	95.30	42.25kN
1.6m	101.70	39.20kN
1.7m	108.05	36.45kN
1.8m	114.40	33.70kN
1.9m	120.75	31.40kN
2.0m	127.10	29.10kN
2.1m	133.45	27.20kN
2.2m	139.80	25.30kN
2.3m	146.15	23.65kN
2.4m	152.50	22.00kN
2.5m	158.85	20.65kN
2.6m	165.20	19.30kN
2.7m	171.55	18.20kN
2.8m	177.90	17.10kN
2.9m	184.25	16.15kN
3.0m	190.60	15.20kN
3.1m	196.95	14.40kN
3.2m	203.30	13.60kN
3.3m	209.65	12.90kN
3.4m	216.00	12.20kN

<u>Effective Length (L_E)</u>	<u>Slenderness ratio - λ</u>	<u>Safe axial load - P_c</u>
3.5m	222.35	11.60kN
3.6m	228.70	11.00kN
3.7m	235.05	10.50kN
3.8m	241.40	10.00kN
3.9m	247.75	9.55kN
4.0m	254.10	9.10kN

NASC TG20:21 - Page 129 - Table 5.14

Effective lengths, L_E of standards in ledger braced tied independent scaffolds with 2m lifts with effective façade bracing

Vertical intervals betv Bay lengths

lines of ties	1.2m	1.5m	1.8m	2.0m	2.1m	2.4m	2.7m
2m with 2m 1st lift	2.5	2.5	2.5	2.5	2.55	2.75	2.9
2m with 2.7m 1st lift	2.7	2.7	2.7	2.7	2.7	2.9	3
4m	3.2	3.2	3.2	3.2	3.2	3.2	3.2
6m	4	4	4	4	4	4	4

NASC TG20:21 - Page 166 - Table C1

Aluminium Tube

Area	=	6.15cm ²
Wall Thickness	=	4.47mm
Self Weight	=	1.65kg/m
Diameter	=	48.3mm
Radius of Gyration	=	1.56cm
Plastic Modulus	=	8.61cm ³
Design Strength	=	255N/mm ²
Modulus of Elasticity	=	70000N/mm ²
Moment of Inertia	=	14.9cm ⁴
Moment Capacity	=	1.33kNm

NASC TG20:21 - Page 167 - Table C.2

<u>Effective Length (L_E)</u>	<u>Slenderness ratio - λ</u>	<u>Safe axial load - P_c</u>
1.0m	64.2	48.90kN
1.2m	77	36.60kN
1.4m	89.9	27.90kN
1.6m	102.7	21.80kN
1.8m	115.5	17.50kN
2.0m	128.4	14.40kN
2.2m	141.2	12.00kN
2.4m	154	10.10kN
2.6m	166.9	8.70kN
2.8m	179.7	7.50kN

NASC TG20:21 - Page 135 - Table 5.15**Couplers**

Right Angle Coupler (Double) Class "A"	SWL =	6.10kN	Slip
Right Angle Coupler (Double) Class "B"	SWL =	9.10kN	Slip
Band & plate (Double) coupler	SWL =	6.10kN	Slip
Right Angle Coupler (Double) Self Weight	SW =	1.25kg	
Swivel Coupler Class "A"	SWL =	6.10kN	Slip
Swivel Coupler Class "B"	SWL =	9.10kN	Slip
Swivel Coupler Self Weight	SW =	1.33kg	
Sleeve Coupler Class "A"	SWL =	3.60kN	Tension
Adjustable Screw Jack (200mm extension)	SWL =	35.00kN	Compression
Girder Coupler (must be used in pairs)	SWL =	10.00kN	"X" Axis
	SWL =	30.00kN	"Y" Axis
	SWL =	12.50kN	"Z" Axis
Girder Coupler Self Weight (each)	SW =	1.50kg	

Timber Scaffold Boards

Self Weight	=	25kg/m ²
Width	=	225mm
Thickness	=	38mm
Section Modulus	=	47.5cm ³
Moment Capacity	=	0.48kNm

300mm Ladder Beams* (Steel) Laced at 1m c/c

Self Weight	=	0.30kN	(laced & braced)
Moment Capacity	=	10.40kNm	
Shear Capacity	=	18.00kN	

*For further information refer to manufacturer

RMD Superslim Soldiers

Moment Capacity	=	38.0kNm
Shear Capacity	=	75.0kN

*For further information refer to manufacturer

450mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	0.14kN	(laced & braced)
Moment Capacity	=	15.70kNm	
Shear Capacity	=	13.90kN	

*For further information refer to manufacturer

750mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	0.28kN	(laced & braced)
Moment Capacity	=	42.90kNm	
Shear Capacity	=	45.50kN	

*For further information refer to manufacturer

1300mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	Varies TBC	(laced & braced)
Moment Capacity	=	98.52kNm	
Shear Capacity	=	44.25kN	

*For further information refer to manufacturer

1500mm Apollo Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	Varies TBC (laced & braced)
Moment Capacity	=	255.00kNm
Shear Capacity	=	60.00kN

*For further information refer to manufacturer

1300mm Asterix Beams* (Aluminium)

Self Weight	=	Varies TBC (laced & braced)
Moment Capacity	=	102.20kNm Laced at 1m c/c
Moment Capacity	=	77.70kNm Laced at 1.5m c/c
Shear Capacity	=	42.10kN (Top & Bottom chords connected)
Shear Capacity	=	32.60kN (Bottom chord connected)

*For further information refer to manufacturer

450mm Layher Beams* (Aluminium) Laced at 1m c/c

Self Weight	=	0.14kN (laced & braced)
Moment Capacity	=	13.94kNm
Shear Capacity	=	12.32kN

*For further information refer to manufacturer

450mm Layher Beams* (Aluminium) Laced at 1.5m c/c

Self Weight	=	0.14kN (laced & braced)
Moment Capacity	=	8.06kNm
Shear Capacity	=	12.32kN

*For further information refer to manufacturer

450mm Layher Beams* (Aluminium) Laced at 2m c/c

Self Weight	=	0.14kN (laced & braced)
Moment Capacity	=	5.14kNm
Shear Capacity	=	12.32kN

*For further information refer to manufacturer

780mm Dessa Beams* (Aluminium) Laced at 1m c/c. (6no. bolts 3 each side of spigot)

Self Weight	=	0.28kN (laced & braced)
Moment Capacity	=	38.84kNm
Shear Capacity	=	23.71kN

*For further information refer to manufacturer

Relevant Design Standards/guidance (only a selection of the below standards are applicable for this design)

BS EN 39	:2001	Specification for steel scaffold tube.
BS EN 74-1	:2005	Couplers, spigot pins & baseplates for use in falsework & scaffolds.
BS EN 12811-1	:2003	Temporary works equipment: Scaffolds - Performance requirements & general design.☐
BS EN 12812-1	:2008	Falsework: Performance requirements & general design.
BS EN 1139-1-2	:1990	Metal scaffolding - part 1: Tubes - Specification for aluminium tube.
BS EN 1139-2-2	:2009	Metal scaffolding - part 2: Couplers - Specification for aluminium couplers.
BS EN 1991-1-1	:2002	Eurocode 1: Actions on structures - Densities, self-weight & imposed loads.
BS EN 1991-1-3	:2003	Eurocode 1: Actions on structures - Snow loads.
BS EN 1991-1-4	:2005	Eurocode 1: Actions on structures - Wind loads.
BS EN 1991-2	:2003	Eurocode 1: Actions on structures - Part2: Traffic load and bridges
BS EN 13374	:2013	Temporary edge protection systems - Product specification, test methods.
BS 5975	:2019	Code of practise for temporary work procedures & the p design of false work.
BS 2482	:2009	Specification for timber scaffold boards.
TG3:19		Erection, use & dismantling of temporary rubbish chutes on scaffold.
TG4:19		Anchorage systems.
TG9:18		Guide to the design & construction of temporary roofs & buildings.
TG12:17		Tying down of scaffold boards.
TG13:16		Non-standard boarded platforms.
TG16:21		Anchoring to the ground.
TG20:21		Technical guidance on the use of BS EN 12811-1.
SG4:15		Preventing falls in scaffolding.
SG5:18		Overhead power sources.
SG25:20		Access & egress from scaffolds.
SG27:09		Temporary edge protection on open steelwork.
SG28:17		Safe system of work for scaffolding associated with timber frame building construction.
SG29:17		Internal edge protection on scaffold platforms.
SG32:17		Provision of extended & telescopic transoms & board brackets.
SG34:17		Guidance on protection of the public

Job Description: External Independent Access Scaffold with
Stair Access Scaffold to Bridgewater Place

Safe Working Loads:

Independent with 1no. Lift at:	2 kN/m ²
Independent with 1no. Lift at:	1 kN/m ²
Mansard Access (Phase 1) with 1no. Lift at:	1.5 kN/m ²
Mansard Access (Phase 2) with 1no. Lift at:	0.75 kN/m ²
All inside boards at:	0.75 kN/m ²
Bolt on Stair Tower with 1no. Lift at:	1.5 kN/m ²

Item: Independent

Max Bay Length:	2.50m
Max Bay Width:	1.00m (3 decks)
Max Transom Centres:	N/A
Max Standard Load:	Refer to DWG's

Item: Mansard Access

Max Bay Length:	2.50m
Max Bay Width:	2.00m (6 decks)
Max Transom Centres:	N/A
Max Standard Load:	Refer to DWG's

Item: Birdcage

Max Bay Length:	N/A
Max Bay Width:	N/A
Max Transom Centres:	N/A
Max Standard Load:	N/A

Item: Buttress

Max Bay Length:	N/A
Max Bay Width:	N/A
Max Transom Centres:	N/A
Max Standard Load:	N/A

Item: Ties (Tension)

Max Tie Load:	8.42kN
Preliminary Test:	16.84kN
Proof Test:	10.53kN

Item: Ties (Shear)

Max Tie Load:	N/A
Preliminary Test:	N/A
Proof Test:	N/A

Additional Comments (if required)

- System scaffold to be built in accordance with manufacturers guidelines & recommendations

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size	2.50m	0.70m							
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam						kN/m		0	2.50m
Transom								1	0.35m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.88
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.25m
Façade Bracing								0	3.15m
Plan Bracing								0	2.50m
Fittings								2	N/A
Live Loads Applied								15	
								14	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.46kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	9.67kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.98kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	10.65kN

No. Support Stds/Puncheons	1						
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result		
10.65kN	2.0m	26.10kN	0.4m	32.50kN	PASSES		
					PASSES		

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load: N/A
GBP: N/A

Additional Comments If Required

INSIDE STANDARD			#1	Allowance For Double Width:		N/A			
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								0	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								1	0.56
Toe Boards								0	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								0	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied				Total Number of Lifts:				15	
				Number of Boarded Lifts:				14	
(SWL) 100%			2.00kN /m²	Total Dead Load Per Lift:				0.23kN	
(SWL) 50%			1.00kN /m²	Total Dead Load				7.59kN	
(SWL) Inside bds			0.75kN /m²						
Maximum No. Lifts at 100%			1	Total Live Load:				4.59kN	
Maximum No. Lifts at 50%			1						
No. Lifts with inside bds loaded			2	Total Load Combined:				12.18kN	
No. Support Stds/Puncheons			1						
Axial Load		Buckling Length		Allowable	Length of Thread		Allowable	Result	
12.18kN		2.0m		26.10kN	0.4m		32.50kN	PASSES	
								PASSES	
Ground Bearing Pressure (GBP)									
				Sole Pad Arrangements					
				Pad Width (m)	Pad Length (m)		Pad Area (sqm)		
Typical Arrangement			y	0.225	0.450		0.10125		
Increased Arrangement				0.450	0.450		0.2025		
Tredda Plate				0.210	0.210		0.0441		
Other							0		
Imposed Load:		12.18 kN							
GBP:		120.33 kN/m²							

Additional Comments If Required

INSIDE STANDARD			#2	Allowance For Double Width: N/A					
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	0.30m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.15m
Guardrails								0	2.50m
Decked (Main Platform)								1	0.38
Decked (Inside Decks)								1	0.56
Toe Boards								0	2.50m
Ledger Bracing								1	2.05m
Façade Bracing								1	3.15m
Plan Bracing								0	2.30m
Fittings								2	N/A
Live Loads Applied					Total Number of Lifts:			4	
					Number of Boarded Lifts:			0	
(SWL) 100%			2.00kN /m²	Total Dead Load Per Lift:					0.42kN
(SWL) 50%			1.00kN /m²	Total Dead Load					1.82kN
(SWL) Inside bds			0.75kN /m²						
Maximum No. Lifts at 100%			0	Total Live Load:					0.00kN
Maximum No. Lifts at 50%			0						
No. Lifts with inside bds loaded			0	Total Load Combined:					1.82kN
No. Support Stds/Puncheons			2						
Axial Load		Buckling Length		Allowable	Length of Thread		Allowable	Result	
13.24kN		2.0m		26.10kN					
					0.4m		32.50kN	PASSES	
Ground Bearing Pressure (GBP)									
				Sole Pad Arrangements					
				Pad Width (m)	Pad Length (m)		Pad Area (sqm)		
Typical Arrangement			y	0.225	0.450		0.10125		
Increased Arrangement				0.450	0.450		0.2025		
Tredda Plate				0.210	0.210		0.0441		
Other							0		
Imposed Load:		13.24 kN							
GBP:		130.77 kN/m²							
Total Inside Load									
Load	+	Load	+	Load	+	Load	=	Total Load	
10.65kN	+	12.18kN	+	1.82kN	+	1.82kN	=	26.48kN	

OUTSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size	2.50m	1.00m		
Standards (lift height)			1	2.00m
Ledgers			1	2.50m
Beam		kN/m	0	2.50m
Transom			1	0.50m
Guardrails			2	2.50m
Decked (Main Platform)			1	1.25
Decked (Inside Decks)			0	0.00
Toe Boards			1	2.50m
Ledger Bracing			0	2.40m
Façade Bracing			1	3.15m
Plan Bracing			0	2.65m
Fittings			2	N/A
Live Loads Applied			Total Number of Lifts:	15
			Number of Boarded Lifts:	14

(SWL) 100%	2.00kN /m ²	Total Dead Load Per Lift:	0.60kN
(SWL) 50%	1.00kN /m ²	Total Dead Load	13.03kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.75kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	16.78kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
16.78kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	N/A	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load: N/A
GBP: N/A

Additional Comments If Required

Consider Imposed Load From Cantilever

Coupler Capacities

Coupler Type Used - Class A: 6.1kN
Coupler Type Used - Class B: **Y** 9.1kN
Node loads in accordance with TG20:21, 5.9.2

No. of Primary Connections: **2**
No. of Supplementary Connections: **2**
Strength of Connection: **30.40kN**

Consider Load Through Spur/Pull back

Load / Sin (°degrees)
16.78kN / **63** = **18.83kN** < 30.40kN **PASSES**

Consider Axial Load Capacities

Axial Load	Effective Length (Le)	Safe Axial Load (Pc)	Slenderness Ratio (λ)	Slenderness Max (λ)	Result
18.83kN	2.4 m	22.00kN	152.5	271	PASSES

Loads Imposed on to Ground

Support	Reaction	Additional Leg/Loads	Additional Leg/Loads	Total Load
1	16.78kN	+	26.48kN	= 43.26kN

No. Support Stds/Punches **2**

Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
21.63kN	2.0m	26.10kN	0.4m	32.50kN	PASSES

Ground Bearing Pressure (GBP)

	Pad Width (m)	Sole Pad Arrangements		Pad Area (sqm)
		Pad Length (m)		
Typical Arrangement	0.225	0.450		0.10125
Increased Arrangement	0.450	0.450		0.2025
Treda Plate	0.210	0.210		0.0441
Other	y 0.675	0.900		0.6075

Imposed Load: **43.26** kN
GBP: **71.21** kN/m²

Additional Comments If Required

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size	2.08m	0.70m							
Standards (lift height)								1	2.00m
Ledgers								1	2.08m
Beam						kN/m		0	2.08m
Transom								1	0.35m
Guardrails								2	2.08m
Decked (Main Platform)								1	0.73
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.08m
Ledger Bracing								0	2.25m
Façade Bracing								0	2.94m
Plan Bracing								0	2.29m
Fittings								2	N/A
Live Loads Applied								13	
								12	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.40kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	7.26kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.82kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	8.08kN

No. Support Stds/Puncheons	1						
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result		
8.08kN	2.0m	26.10kN	0.4m	32.50kN	PASSES		
					PASSES		

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

INSIDE STANDARD		#1	Allowance For Double Width:		N/A	
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)		
Toe Board DL	0.027kN/m					
Bracing DL	0.044kN/m					
Bay Size			2.08m	1.00m		
Standards (lift height)					1	2.00m
Ledgers					1	2.08m
Beam				kN/m	0	2.08m
Transom					1	0.50m
Guardrails					0	2.08m
Decked (Main Platform)					1	1.04
Decked (Inside Decks)					1	0.47
Toe Boards					0	2.08m
Ledger Bracing					0	2.40m
Façade Bracing					0	2.94m
Plan Bracing					0	2.44m
Fittings					2	N/A
Live Loads Applied				Total Number of Lifts:	13	
				Number of Boarded Lifts:	12	
(SWL) 100%	2.00kN /m ²			Total Dead Load Per Lift:		0.22kN
(SWL) 50%	1.00kN /m ²			Total Dead Load		5.77kN
(SWL) Inside bds	0.75kN /m ²					
Maximum No. Lifts at 100%	1			Total Live Load:		3.82kN
Maximum No. Lifts at 50%	1					
No. Lifts with inside bds loaded	2			Total Load Combined:		9.60kN
No. Support Stds/Puncheons		1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result	
9.60kN	2.0m	26.10kN	0.4m	32.50kN	PASSES	
Ground Bearing Pressure (GBP)						
			Sole Pad Arrangements			
			Pad Width (m)	Pad Length (m)	Pad Area (sqm)	
Typical Arrangement		y	0.225	0.450	0.10125	
Increased Arrangement			0.450	0.450	0.2025	
Tredda Plate			0.210	0.210	0.0441	
Other					0	
Imposed Load:		9.60 kN				
GBP:		94.78 kN/m ²				

Additional Comments If Required

INSIDE STANDARD		#2	Allowance For Double Width: N/A						
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.08m	0.30m		
Standards (lift height)								1	2.00m
Ledgers								1	2.08m
Beam							kN/m	0	2.08m
Transom								1	0.15m
Guardrails								0	2.08m
Decked (Main Platform)								1	0.31
Decked (Inside Decks)								1	0.47
Toe Boards								0	2.08m
Ledger Bracing								1	2.05m
Façade Bracing								1	2.94m
Plan Bracing								0	2.09m
Fittings								2	N/A
Live Loads Applied				Total Number of Lifts:				4	
				Number of Boarded Lifts:				0	
(SWL) 100%			2.00kN /m²	Total Dead Load Per Lift:					0.40kN
(SWL) 50%			1.00kN /m²	Total Dead Load					1.71kN
(SWL) Inside bds			0.75kN /m²						
Maximum No. Lifts at 100%			0	Total Live Load:					0.00kN
Maximum No. Lifts at 50%			0						
No. Lifts with inside bds loaded			0	Total Load Combined:					1.71kN
No. Support Stds/Puncheons			2						
Axial Load	Buckling Length		Allowable	Length of Thread		Allowable	Result		
10.55kN	2.0m		26.10kN	0.4m		32.50kN	PASSES		
PASSES									
Ground Bearing Pressure (GBP)									
				Sole Pad Arrangements					
			Pad Width (m)	Pad Length (m)		Pad Area (sqm)			
Typical Arrangement			y	0.225	0.450		0.10125		
Increased Arrangement				0.450	0.450		0.2025		
Tredda Plate				0.210	0.210		0.0441		
Other							0		
Imposed Load:		10.55 kN							
GBP:		104.16 kN/m²							
Total Inside Load									
Load	+	Load	+	Load	+	Load	=	Total Load	
8.08kN	+	9.60kN	+	1.71kN	+	1.71kN	=	21.09kN	

OUTSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

	2.08m	1.00m
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Standards (lift height)		1	2.00m
Ledgers		1	2.08m
Beam	kN/m	0	2.08m
Transom		1	0.50m
Guardrails		2	2.08m
Decked (Main Platform)		1	1.04
Decked (Inside Decks)		0	0.00
Toe Boards		1	2.08m
Ledger Bracing		0	2.40m
Façade Bracing		1	2.94m
Plan Bracing		0	2.44m
Fittings		2	N/A

Live Loads Applied

Total Number of Lifts:	13
Number of Boarded Lifts:	12

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.54kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	9.86kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	1.17kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	11.03kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
11.03kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

INSIDE PUNCHEON		#1	Allowance For Double Width:		N/A				
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	0.70m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.35m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.88
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.25m
Façade Bracing								0	3.15m
Plan Bracing								0	2.50m
Fittings								2	N/A
Live Loads Applied				Total Number of Lifts:				13	
				Number of Boarded Lifts:				12	
(SWL) 100%		0.75kN /m²	Total Dead Load Per Lift:						0.46kN
(SWL) 50%		0.38kN /m²	Total Dead Load						8.35kN
(SWL) Inside bds		0.75kN /m²	Total Live Load:						0.98kN
Maximum No. Lifts at 100%		1	Total Load Combined:						9.33kN
Maximum No. Lifts at 50%		1							
No. Lifts with inside bds loaded		2							
No. Support Stds/Puncheons		1							
Axial Load	Buckling Length	Allowable	Length of Thread		Allowable	Result			
9.33kN	2.0m	26.10kN	0.4m		22.50kN	PASSES			
PASSES									
Ground Bearing Pressure (GBP)									
			Sole Pad Arrangements						
			Pad Width (m)	Pad Length (m)	Pad Area (sqm)				
Typical Arrangement		N/A	0.225	0.450	0.10125				
Increased Arrangement			0.450	0.450	0.2025				
Tredda Plate			0.210	0.210	0.0441				
Other					0				
Imposed Load:		N/A							
GBP:		N/A							

Additional Comments If Required

INSIDE STANDARD		#2	Allowance For Double Width:		N/A				
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								0	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								1	0.56
Toe Boards								0	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								0	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied				Total Number of Lifts:				13	
				Number of Boarded Lifts:				12	
(SWL) 100%			2.00kN /m²	Total Dead Load Per Lift:					0.23kN
(SWL) 50%			1.00kN /m²	Total Dead Load					6.56kN
(SWL) Inside bds			0.75kN /m²	Total Live Load:					4.59kN
Maximum No. Lifts at 100%			1	Total Load Combined:					11.15kN
Maximum No. Lifts at 50%			1						
No. Lifts with inside bds loaded			2						
No. Support Stds/Puncheons			1						
Axial Load		Buckling Length	Allowable	Length of Thread		Allowable	Result		
11.15kN		2.0m	26.10kN	0.4m		32.50kN	PASSES		
Ground Bearing Pressure (GBP)									
				Sole Pad Arrangements					
			Pad Width (m)	Pad Length (m)		Pad Area (sqm)			
Typical Arrangement			y	0.225		0.450		0.10125	
Increased Arrangement				0.450		0.450		0.2025	
Tredda Plate				0.210		0.210		0.0441	
Other								0	
Imposed Load:		11.15 kN							
GBP:		110.12 kN/m²							
Total Inside Puncheon Load									
Load		+	Load		=	Total Load			
9.33kN		+	11.15kN		=	20.48kN			

OUTSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size	2.50m	1.00m							
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam						kN/m		0	2.50m
Transom								1	0.50m
Guardrails								2	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								1	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied								13	
								12	

(SWL) 100%	2.00kN /m ²	Total Dead Load Per Lift:	0.60kN
(SWL) 50%	1.00kN /m ²	Total Dead Load	11.25kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.75kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	15.00kN

No. Support Stds/Puncheons	1								
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result				
15.00kN	2.0m	26.10kN	0.4m	32.50kN	PASSES				
					PASSES				

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	N/A	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load: N/A
GBP: N/A

Additional Comments If Required

Consider Inside Pull Back

Load / no. Pull Backs = Load Per Pull Back
20.48kN / 3 = 6.83kN

Load < Allowable Load Result
6.83kN < 10.60kN **PASSES**

Loads Imposed on to Ground

Support Reaction + Additional Leg/Loads + Additional Leg/Loads = Total Load
1 20.48kN + 21.09kN + = **41.58kN**

Consider Outside Pull Back

Load / no. Pull Backs = Load Per Pull Back
15.00kN / 2 = 7.50kN

Load < Allowable Load Result
7.50kN < 10.60kN **PASSES**

Loads Imposed on to Ground

Support Reaction + Additional Leg/Loads + Additional Leg/Loads = Total Load
1 15.00kN + 11.03kN + = **26.03kN**

TABLE 1 – Capacity of Vertical Diagonal Brace							
Bay Length (m)	α (°)	Loading by Tension			Loading by Compression		
		All. Nv (kN)	All. Q (kN)	All. V (kN)	All. Nv (kN)	All. Q (kN)	All. V (kN)
Bay Height H = 2.0m							
3.0	35.1	+16.30	13.3	9.4	-5.12	4.2	2.9
2.5	40.5		12.4	10.6	-6.17	4.7	4.0
2.0	47.3		11.1	12.0	-7.62	5.2	5.6
1.5	56.1		9.1	13.5	-9.59	5.4	8.0
1.0	67.1		6.3	15.0	-12.32	4.8	11.4
0.7	74.8		4.3	15.8	-13.81	3.6	13.3

Consider Imposed Load From Cantilever

Coupler Capacities

Coupler Type Used - Class A:		6.1kN	No. of Primary Connections:	1
Coupler Type Used - Class B:	Y	9.1kN	No. of Supplementary Connections:	1
Node loads in accordance with TG20:21, 5.9.2			Strength of Connection:	15.20kN
Load	/	No. Pull Backs		
26.03kN	/	2	=	13.02kN

Consider Load Through Spur/Pull back

Load	/	Sin (°degrees)		
13.02kN	/	63	=	14.61kN
			<	15.20kN
				PASSES

Consider Axial Load Capacities

Axial Load	Effective Length (Le)	Safe Axial Load (Pc)	Slenderness Ratio (λ)	Slenderness Max (λ)	Result
14.61kN	2.4 m	22.00kN	152.5	271	PASSES

Loads Imposed on to Ground

Support	Reaction		Additional Leg/Loads		Additional Leg/Loads		Total Load
1	26.03kN	+	41.58kN	+		=	67.61kN

No. Support Stds/Punches	4				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
16.90kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement		0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Treda Plate		0.210	0.210	0.0441
Other	y	1.000	0.900	0.9

Imposed Load:	67.61 kN
GBP:	75.12 kN/m ²

Additional Comments If Required

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size	2.50m	0.70m							
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam						kN/m		0	2.50m
Transom								1	0.35m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.88
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.25m
Façade Bracing								0	3.15m
Plan Bracing								0	2.50m
Fittings								2	N/A
Live Loads Applied								9	
								9	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.46kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	5.92kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.98kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	6.90kN

No. Support Stds/Puncneons	1						
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result		
6.90kN	2.0m	26.10kN	0.4m	32.50kN	PASSES		
					PASSES		

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

INSIDE STANDARD		#1	Allowance For Double Width: N/A						
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								0	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								1	0.56
Toe Boards								0	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								0	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied				Total Number of Lifts:				13	
				Number of Boarded Lifts:				12	
(SWL) 100%		2.00kN /m²	Total Dead Load Per Lift:						0.23kN
(SWL) 50%		1.00kN /m²	Total Dead Load						6.56kN
(SWL) Inside bds		0.75kN /m²	Total Live Load:						4.59kN
Maximum No. Lifts at 100%		1	Total Load Combined:						11.15kN
Maximum No. Lifts at 50%		1							
No. Lifts with inside bds loaded		2							
No. Support Stds/Puncheons		1							
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result				
11.15kN	2.0m	26.10kN	0.4m	32.50kN	PASSES				
									PASSES
Ground Bearing Pressure (GBP)									
			Sole Pad Arrangements						
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)					
Typical Arrangement		y	0.225	0.450	0.10125				
Increased Arrangement			0.450	0.450	0.2025				
Tredda Plate			0.210	0.210	0.0441				
Other					0				
Imposed Load:		11.15 kN							
GBP:		110.12 kN/m²							

Additional Comments If Required

Consider Imposed Load From Adjacent Bay

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)	
0.5	*	2.5	*	(	1.5	+	0.25	)	+	0.45	
										=	2.64kN

Load	*	No. Lifts	=	Result
2.64kN	*	1	=	2.64kN

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)	
0.5	*	2.5	*	(	1.5	+	0.25	)	+	0.45	
										=	2.64kN

Load	*	No. Lifts	=	Result
2.64kN	*	1	=	2.64kN

Load	+	Load	+	Load	=	Result
11.15kN	+	2.64kN	+	2.64kN	=	16.43kN

No. Support Stds/Puncheons		1					
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result		
16.43kN	2.0m	26.10kN	0.4m	32.50kN	PASSES	PASSES	

INSIDE STANDARD			#2	Allowance For Double Width:		N/A				
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area	
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)						
Toe Board DL	0.027kN/m									
Bracing DL	0.044kN/m									
Bay Size						2.50m	0.30m			
Standards (lift height)								1	2.00m	
Ledgers								1	2.50m	
Beam								kN/m	0	2.50m
Transom								1	0.15m	
Guardrails								0	2.50m	
Decked (Main Platform)								1	0.38	
Decked (Inside Decks)								1	0.56	
Toe Boards								0	2.50m	
Ledger Bracing								1	2.05m	
Façade Bracing								1	3.15m	
Plan Bracing								0	2.30m	
Fittings								2	N/A	
Live Loads Applied					Total Number of Lifts:			4		
					Number of Boarded Lifts:			0		
(SWL) 100%			2.00kN /m²	Total Dead Load Per Lift:					0.42kN	
(SWL) 50%			1.00kN /m²	Total Dead Load					1.82kN	
(SWL) Inside bds			0.75kN /m²							
Maximum No. Lifts at 100%			0	Total Live Load:					0.00kN	
Maximum No. Lifts at 50%			0							
No. Lifts with inside bds loaded			0	Total Load Combined:					1.82kN	
No. Support Stds/Puncheons			2							
Axial Load		Buckling Length		Allowable	Length of Thread		Allowable	Result		
26.98kN		2.0m		26.10kN	0.4m		32.50kN	FAILS		
								PASSES		
Ground Bearing Pressure (GBP)										
				Sole Pad Arrangements						
				Pad Width (m)	Pad Length (m)		Pad Area (sqm)			
Typical Arrangement			y	0.225	0.450		0.10125			
Increased Arrangement				0.450	0.450		0.2025			
Tredda Plate				0.210	0.210		0.0441			
Other							0			
Imposed Load:		26.98 kN								
GBP:		266.45 kN/m²								
Total Inside Load										
Load	+	Load	+	Load	+	Load	=	Total Load		
6.90kN	+	16.43kN	+	1.82kN	+	1.82kN	=	26.98kN		

Please see below For Failed Standard Analyses

OUTSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size	2.50m	1.00m							
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam						kN/m		0	2.50m
Transom								1	0.50m
Guardrails								2	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								1	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied								13	
								12	

(SWL) 100%	2.00kN /m ²	Total Dead Load Per Lift:	0.60kN
(SWL) 50%	1.00kN /m ²	Total Dead Load	11.25kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.75kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	15.00kN

No. Support Stds/Puncheons	1						
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result		
15.00kN	2.0m	26.10kN	0.4m	32.50kN	PASSES		
					PASSES		

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	N/A	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load: N/A
GBP: N/A

Additional Comments If Required

Consider Imposed Load From Cantilever

Coupler Capacities

Coupler Type Used - Class A:		6.1kN	No. of Primary Connections:	1
Coupler Type Used - Class B:	Y	9.1kN	No. of Supplementary Connections:	1
Node loads in accordance with TG20:21, 5.9.2			Strength of Connection:	15.20kN
Load	/	No. Pull Backs		
15.00kN	/	2	=	7.50kN

Consider Load Through Spur/Pull back

Load	/	Sin (°degrees)		
7.50kN	/	63	=	8.42kN
			<	15.20kN
				PASSES

Consider Axial Load Capacities

Axial Load	Effective Length (Le)	Safe Axial Load (Pc)	Slenderness Ratio (λ)	Slenderness Max (λ)	Result
8.42kN	2.4 m	22.00kN	152.5	271	PASSES

Loads Imposed on to Ground

Support	Reaction	+	Additional Leg/Loads	+	Additional Leg/Loads	=	Total Load
1	15.00kN	+	26.98kN	+		=	41.98kN

No. Support Stds/Punches	2				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
20.99kN	2.0m	26.10kN	0.5m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement		0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Treda Plate		0.210	0.210	0.0441
Other	y	0.675	0.900	0.6075

Imposed Load:	41.98 kN
GBP:	69.10 kN/m ²

Additional Comments If Required

Roof Founded (Phase 1)

INSIDE STANDARD

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

2.50m 2.00m

Standards (lift height)		1	2.00m
Ledgers		1	2.50m
Beam	kN/m	0	2.50m
Transom		1	1.00m
Guardrails		2	2.50m
Decked (Main Platform)		1	2.50
Decked (Inside Decks)		0	0.00
Toe Boards		1	2.50m
Ledger Bracing		0	2.90m
Façade Bracing		0	3.15m
Plan Bracing		0	3.15m
Fittings		2	N/A
Live Loads Applied			
	Total Number of Lifts:	1	
	Number of Boarded Lifts:	1	

(SWL) 100%	1.50kN /m ²	Total Dead Load Per Lift:	0.48kN
(SWL) 50%	0.75kN /m ²	Total Dead Load	1.05kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.75kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	4.80kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
4.80kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load: 4.80 kN
GBP: FALSE kN/m²

Additional Comments If Required

Roof Founded (Phase 1)

CENTRE STANDARD

Allowance For Double Width: **YES**

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size 2.50m 2.00m

Standards (lift height)	1	2.00m
Ledgers	1	2.50m
Beam	0	2.50m
Transom	1	2.00m
Guardrails	1	2.50m
Decked (Main Platform)	1	5.00
Decked (Inside Decks)	0	0.00
Toe Boards	1	2.50m
Ledger Bracing	0	2.90m
Façade Bracing	0	3.15m
Plan Bracing	0	3.15m
Fittings	2	N/A
Live Loads Applied	Total Number of Lifts:	2
	Number of Boarded Lifts:	1

(SWL) 100%	1.50kN /m ²	Total Dead Load Per Lift:	0.43kN
(SWL) 50%	0.75kN /m ²	Total Dead Load	2.01kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	7.50kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	9.51kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
9.51kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load: 9.51 kN
GBP: **FALSE** kN/m²

Additional Comments If Required

Roof Founded (Phase 1)

CENTRE PUNCHEON

Allowance For Double Width: YES

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size 2.50m 1.50m

Standards (lift height)	1	2.00m
Ledgers	1	2.50m
Beam	0	2.50m
Transom	1	1.50m
Guardrails	1	2.50m
Decked (Main Platform)	1	3.75
Decked (Inside Decks)	0	0.00
Toe Boards	1	2.50m
Ledger Bracing	0	2.65m
Façade Bracing	0	3.15m
Plan Bracing	0	2.90m
Fittings	2	N/A
Live Loads Applied	Total Number of Lifts:	3
	Number of Boarded Lifts:	1.5

(SWL) 100%	1.50kN /m ²	Total Dead Load Per Lift:	0.41kN
(SWL) 50%	0.75kN /m ²	Total Dead Load	2.53kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	5.63kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	8.15kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
8.15kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load: N/A
GBP: N/A

Additional Comments If Required

Roof Founded (Phase 1)

CENTRE STANDARD

Allowance For Double Width: YES

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size 2.50m 1.00m

Standards (lift height)	1	2.00m
Ledgers	1	2.50m
Beam	0	2.50m
Transom	1	1.00m
Guardrails	0	2.50m
Decked (Main Platform)	1	2.50
Decked (Inside Decks)	0	0.00
Toe Boards	0	2.50m
Ledger Bracing	0	2.40m
Façade Bracing	0	3.15m
Plan Bracing	0	2.65m
Fittings	2	N/A
Live Loads Applied	Total Number of Lifts:	3
	Number of Boarded Lifts:	2

(SWL) 100%	1.50kN /m ²	Total Dead Load Per Lift:	0.25kN
(SWL) 50%	0.75kN /m ²	Total Dead Load	1.89kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.75kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	5.64kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
5.64kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load: 5.64 kN
GBP: FALSE kN/m²

Additional Comments If Required

Roof Founded (Phase 1)

Consider Pull Back

$$\begin{array}{rclcl} \text{Load} & / & \text{no. Pull Backs} & = & \text{Load Per Pull Back} \\ 8.15\text{kN} & / & 2 & = & 4.08\text{kN} \end{array}$$

$$\begin{array}{rclcl} \text{Load} & < & \text{Allowable Load} & & \text{Result} \\ 4.08\text{kN} & < & 15.00\text{kN} & & \text{PASSES} \end{array}$$

Loads Imposed on to Ground

$$\begin{array}{rclclclcl} \text{Support} & \text{Reaction} & & \text{Additional Leg/Loads} & & \text{Additional Leg/Loads} & & \text{Total Load} \\ 1 & 8.15\text{kN} & + & 5.64\text{kN} & + & & = & 13.79\text{kN} \end{array}$$

TABLE 1 – Capacity of Vertical Diagonal Brace							
Bay Length (m)	α (°)	Loading by Tension			Loading by Compression		
		All. N _v (kN)	All. Q (kN)	All. V (kN)	All. N _v (kN)	All. Q (kN)	All. V (kN)
Bay Height H = 2.0m							
3.0	35.1	+16.30	13.3	9.4	-5.12	4.2	2.9
2.5	40.5		12.4	10.6	-6.17	4.7	4.0
2.0	47.3		11.1	12.0	-7.62	5.2	5.6
1.5	56.1		9.1	13.5	-9.59	5.4	8.0
1.0	67.1		6.3	15.0	-12.32	4.8	11.4
0.7	74.8		4.3	15.8	-13.81	3.6	13.3

No. Support Stds/Puncheons 1

$$\begin{array}{rclclclcl} \text{Axial Load} & \text{Buckling Length} & & \text{Allowable} & \text{Length of Thread} & & \text{Allowable} & \text{Result} \\ 13.79\text{kN} & 2.0\text{m} & & 26.10\text{kN} & 0.4\text{m} & & 32.50\text{kN} & \text{PASSES} \end{array}$$

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	y	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

$$\begin{array}{rcl} \text{Imposed Load:} & 13.79 & \text{kN} \\ \text{GBP:} & 136.21 & \text{kN/m}^2 \end{array}$$

Roof Founded (Phase 2)

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size 2.50m 2.00m

Standards (lift height)		1	2.00m
Ledgers		1	2.50m
Beam	kN/m	0	2.50m
Transom		1	1.00m
Guardrails		2	2.50m
Decked (Main Platform)		1	2.50
Decked (Inside Decks)		0	0.00
Toe Boards		1	2.50m
Ledger Bracing		0	2.90m
Façade Bracing		0	3.15m
Plan Bracing		0	3.15m
Fittings		2	N/A
Live Loads Applied		2	
	Total Number of Lifts:	2	
	Number of Boarded Lifts:	1	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.48kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	1.53kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	1.88kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	3.41kN

No. Support Stds/Puncneons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
3.41kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load: N/A
GBP: N/A

Additional Comments If Required

Roof Founded (Phase 2)

CENTRE PUNCHEON

Allowance For Double Width: YES

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

2.50m 2.00m

Standards (lift height)	1	2.00m
Ledgers	1	2.50m
Beam	0	2.50m
Transom	1	2.00m
Guardrails	1	2.50m
Decked (Main Platform)	1	5.00
Decked (Inside Decks)	0	0.00
Toe Boards	1	2.50m
Ledger Bracing	0	2.90m
Façade Bracing	0	3.15m
Plan Bracing	0	3.15m
Fittings	2	N/A
Live Loads Applied	Total Number of Lifts:	2.5
	Number of Boarded Lifts:	1.5

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.43kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	2.80kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.75kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	6.55kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
6.55kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load:	N/A
GBP:	N/A

Total Pull Back Load

Load	+	Load	=	Total
3.41kN	+	6.55kN	=	9.95kN

Roof Founded (Phase 2)

CENTRE STANDARD

Allowance For Double Width: YES

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size 2.50m 1.00m

Standards (lift height)	1	2.00m
Ledgers	1	2.50m
Beam	0	2.50m
Transom	1	1.00m
Guardrails	0	2.50m
Decked (Main Platform)	1	2.50
Decked (Inside Decks)	0	0.00
Toe Boards	0	2.50m
Ledger Bracing	0	2.40m
Façade Bracing	0	3.15m
Plan Bracing	0	2.65m
Fittings	2	N/A
Live Loads Applied	Total Number of Lifts:	3
	Number of Boarded Lifts:	2

(SWL) 100%	1.50kN /m ²	Total Dead Load Per Lift:	0.25kN
(SWL) 50%	0.75kN /m ²	Total Dead Load	1.89kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.75kN
Maximum No. Lifts at 50%	0		
No. Lifts with inside bds loaded	1	Total Load Combined:	5.64kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
5.64kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load: 5.64 kN
GBP: 55.67 kN/m²

Additional Comments If Required

Roof Founded (Phase 2)

Consider Pull Back

Load	/	no. Pull Backs	=	Load Per Pull Back
9.95kN	/	1	=	9.95kN

Load	<	Allowable Load	Result
9.95kN	<	15.00kN	PASSES

Loads Imposed on to Ground

Support	Reaction		Additional Leg/Loads		Additional Leg/Loads	=	Total Load
1	9.95kN	+	5.64kN	+		=	15.59kN

TABLE 1 – Capacity of Vertical Diagonal Brace							
Bay Length (m)	α (°)	Loading by Tension			Loading by Compression		
		All. Nv (kN)	All. Q (kN)	All. V (kN)	All. Nv (kN)	All. Q (kN)	All. V (kN)
Bay Height H = 2.0m							
3.0	35.1	+16.30	13.3	9.4	-5.12	4.2	2.9
2.5	40.5		12.4	10.6	-6.17	4.7	4.0
2.0	47.3		11.1	12.0	-7.62	5.2	5.6
1.5	56.1		9.1	13.5	-9.59	5.4	8.0
1.0	67.1		6.3	15.0	-12.32	4.8	11.4
0.7	74.8		4.3	15.8	-13.81	3.6	13.3

No. Support Stds/Puncheons **1**

Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
15.59kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	y	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other				0

Imposed Load: **15.59 kN**
 GBP: **153.96 kN/m²**

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size	2.50m	0.70m							
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam						kN/m		0	2.50m
Transom								1	0.35m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.88
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.25m
Façade Bracing								0	3.15m
Plan Bracing								0	2.50m
Fittings								2	N/A
Live Loads Applied								10	
								10	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.46kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	6.58kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.98kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	7.56kN

No. Support Stds/Puncheons	1						
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result		
7.56kN	2.0m	26.10kN	0.4m	32.50kN	PASSES		
					PASSES		

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load: N/A
GBP: N/A

Additional Comments If Required

INSIDE STANDARD			#1	Allowance For Double Width:		N/A			
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								0	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								1	0.56
Toe Boards								0	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								0	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied				Total Number of Lifts:				14	
				Number of Boarded Lifts:				13.5	
(SWL) 100%			2.00kN /m²	Total Dead Load Per Lift:				0.23kN	
(SWL) 50%			1.00kN /m²	Total Dead Load				7.22kN	
(SWL) Inside bds			0.75kN /m²	Total Live Load:				4.59kN	
Maximum No. Lifts at 100%			1	Total Load Combined:				11.81kN	
Maximum No. Lifts at 50%			1						
No. Lifts with inside bds loaded			2						
No. Support Stds/Puncheons			1						
Axial Load	Buckling Length			Allowable	Length of Thread		Allowable	Result	
11.81kN	2.0m			26.10kN	0.4m		32.50kN	PASSES	
Ground Bearing Pressure (GBP)									
				Sole Pad Arrangements					
				Pad Width (m)	Pad Length (m)		Pad Area (sqm)		
Typical Arrangement			y	0.225	0.450		0.10125		
Increased Arrangement				0.450	0.450		0.2025		
Tredda Plate				0.210	0.210		0.0441		
Other							0		
Imposed Load:		11.81 kN							
GBP:		116.65 kN/m²							

Additional Comments If Required

Consider Imposed Load From Adjacent Bay

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)	
0.5	*	2.5	*	(	1.5	+	0.25	)	+	0.45	
										=	2.64kN

Load	*	No. Lifts	=	Result
2.64kN	*	1	=	2.64kN

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)	
0.5	*	2.5	*	(	0	+	0.25	)	+	0.45	
										=	0.76kN

Load	*	No. Lifts	=	Result
0.76kN	*	1	=	0.76kN

Load	+	Load	+	Load	+	Load	=	Result
7.56kN	+	11.81kN	+	2.64kN	+	0.76kN	=	22.77kN

No. Support Stds/Puncheons		1					
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result		
22.77kN	2.0m	26.10kN	0.4m	32.50kN	PASSES	PASSES	

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	y	0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other		0.450	0.675	0.30375

Imposed Load:	22.77 kN
GBP:	74.97 kN/m ²

OUTSIDE STANDARD

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

	2.50m	1.00m		
Standards (lift height)			1	2.00m
Ledgers			1	2.50m
Beam		kN/m	0	2.50m
Transom			1	0.50m
Guardrails			2	2.50m
Decked (Main Platform)			1	1.25
Decked (Inside Decks)			0	0.00
Toe Boards			1	2.50m
Ledger Bracing			0	2.40m
Façade Bracing			1	3.15m
Plan Bracing			0	2.65m
Fittings			2	N/A

Live Loads Applied

Total Number of Lifts: 14
Number of Boarded Lifts: 13.5

(SWL) 100%	2.00kN /m ²	Total Dead Load Per Lift:	0.60kN
(SWL) 50%	1.00kN /m ²	Total Dead Load	12.28kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.75kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	16.03kN

No. Support Stds/Puncheons

Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
16.03kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.450	0.675	0.30375

Imposed Load: 16.03 kN
GBP: 52.78 kN/m²

Additional Comments If Required

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size	2.50m	0.70m							
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam						kN/m		0	2.50m
Transom								1	0.35m
Guardrails								2	2.50m
Decked (Main Platform)								1	0.88
Decked (Inside Decks)								0	0.00
Toe Boards								1	2.50m
Ledger Bracing								0	2.25m
Façade Bracing								0	3.15m
Plan Bracing								0	2.50m
Fittings								2	N/A
Live Loads Applied									
								Total Number of Lifts:	10
								Number of Boarded Lifts:	10

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.46kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	6.58kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.98kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	7.56kN

No. Support Stds/Puncheons	1								
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result				
7.56kN	2.0m	26.10kN	0.4m	32.50kN	PASSES				
					PASSES				

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load: N/A
GBP: N/A

Additional Comments If Required

INSIDE STANDARD			#1	Allowance For Double Width:		N/A			
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						2.50m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	2.50m
Beam							kN/m	0	2.50m
Transom								1	0.50m
Guardrails								0	2.50m
Decked (Main Platform)								1	1.25
Decked (Inside Decks)								1	0.56
Toe Boards								0	2.50m
Ledger Bracing								0	2.40m
Façade Bracing								0	3.15m
Plan Bracing								0	2.65m
Fittings								2	N/A
Live Loads Applied				Total Number of Lifts:				13	
				Number of Boarded Lifts:				13	
(SWL) 100%		2.00kN /m²		Total Dead Load Per Lift:				0.23kN	
(SWL) 50%		1.00kN /m²		Total Dead Load				6.84kN	
(SWL) Inside bds		0.75kN /m²							
Maximum No. Lifts at 100%		1		Total Live Load:				4.59kN	
Maximum No. Lifts at 50%		1							
No. Lifts with inside bds loaded		2		Total Load Combined:				11.44kN	
No. Support Stds/Puncheons		1							
Axial Load	Buckling Length		Allowable	Length of Thread		Allowable	Result		
11.44kN	2.0m		26.10kN	0.4m		32.50kN	PASSES		
Ground Bearing Pressure (GBP)									
				Sole Pad Arrangements					
			Pad Width (m)	Pad Length (m)		Pad Area (sqm)			
Typical Arrangement			y	0.225	0.450		0.10125		
Increased Arrangement				0.450	0.450		0.2025		
Tredda Plate				0.210	0.210		0.0441		
Other							0		
Imposed Load:		11.44	kN						
GBP:		112.96	kN/m²						

Additional Comments If Required

Consider Imposed Load From Adjacent Bay

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)	
0.5	*	2.5	*	(	1.5	+	0.25	)	+	0.45	
										=	2.64kN

Load	*	No. Lifts	=	Result
2.64kN	*	1	=	2.64kN

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)	
0.5	*	2.5	*	(	0	+	0.25	)	+	0.45	
										=	0.76kN

Load	*	No. Lifts	=	Result
0.76kN	*	1	=	0.76kN

Load	+	Load	+	Load	+	Load	=	Result
7.56kN	+	11.44kN	+	2.64kN	+	0.76kN	=	22.40kN

No. Support Stds/Puncheons		1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result	
22.40kN	2.0m	26.10kN	0.4m	32.50kN	PASSES	
					PASSES	

OUTSIDE STANDARD

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

2.50m 1.00m

Standards (lift height)		1	2.00m
Ledgers		1	2.50m
Beam	kN/m	0	2.50m
Transom		1	0.50m
Guardrails		2	2.50m
Decked (Main Platform)		1	1.25
Decked (Inside Decks)		0	0.00
Toe Boards		1	2.50m
Ledger Bracing		0	2.40m
Façade Bracing		1	3.15m
Plan Bracing		0	2.65m
Fittings		2	N/A
Live Loads Applied			
	Total Number of Lifts:	13	
	Number of Boarded Lifts:	13	

(SWL) 100%	2.00kN /m ²	Total Dead Load Per Lift:	0.60kN
(SWL) 50%	1.00kN /m ²	Total Dead Load	11.54kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.75kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	15.29kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
15.29kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

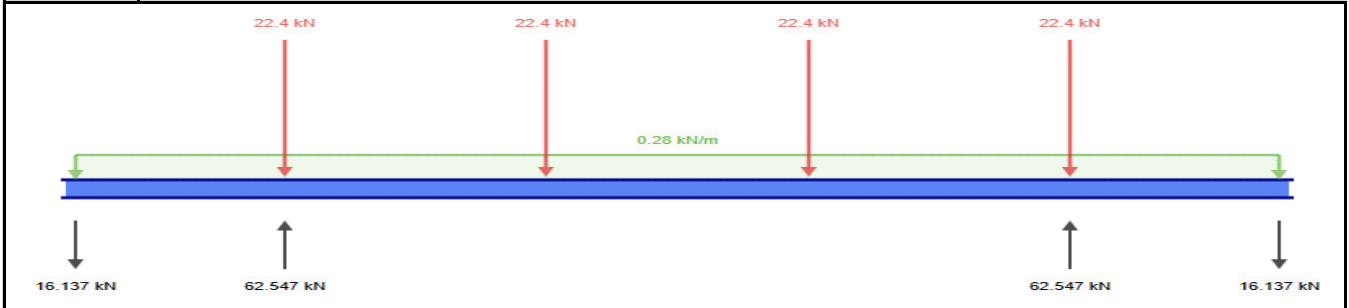
	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.450	0.675	0.30375

Imposed Load:	15.29 kN
GBP:	50.33 kN/m ²

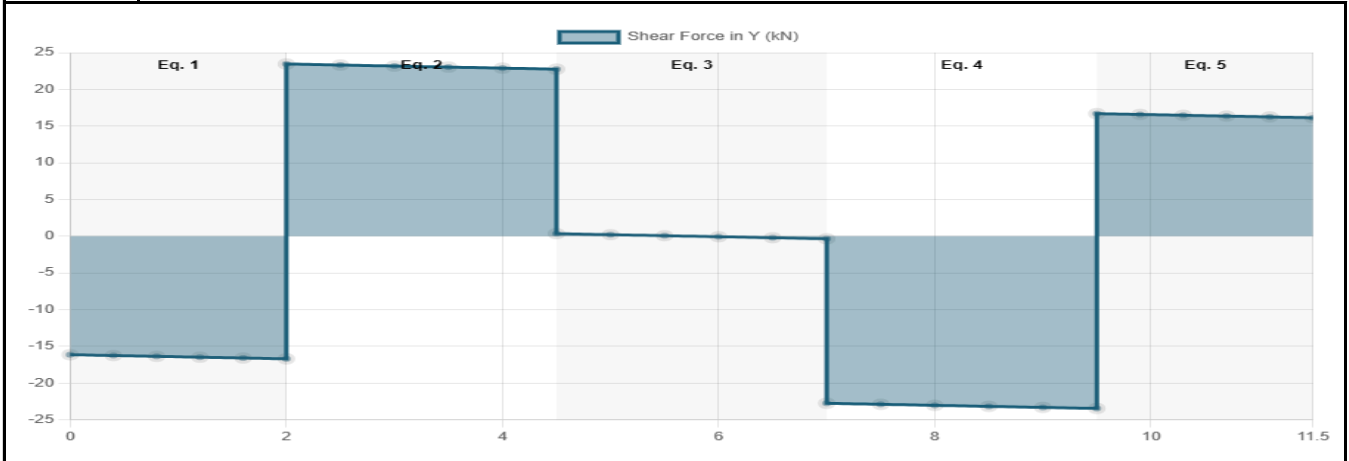
Additional Comments If Required

Item:		Loadings and Reactions on 750mm Apollo				Beams -		Inside Beam				
Point Loads		Location		Point Loads		Location		Point Loads		Location		
22.40kN		@	2.00m	22.40kN		@	4.50m	22.40kN		@	7.00m	
22.40kN		@	9.50m									
Beam C/C (m)			SWL (kN/m²)		Boards Sw (kN/m²)			Beam Sw (kN/m)			UDL kN/m	
0.5			0		0			0.28			0.28	

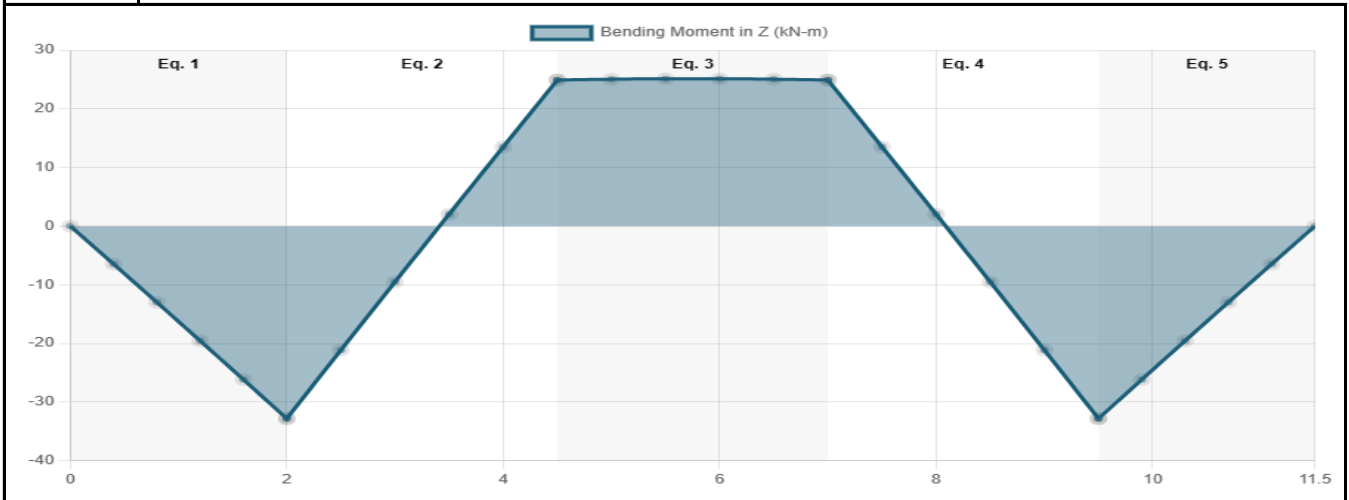
Reaction



Shear



BM



Coupler Capacities

Coupler Type Used - Class A: 6.1kN
Coupler Type Used - Class B: **Y** 9.1kN
Node loads in accordance with TG20:21, 5.9.2

No. of Primary Connections: **4**
No. of Supplementary Connections: **4**
Strength of Connection: **60.80kN**

Maximum Reactions

Support	Reaction	Node	Result
1	-16.14kN	60.80kN	PASSES
2	62.55kN	Load Applied to Pull Back	
3	62.55kN	Load Applied to Pull Back	
4	-16.14kN	60.80kN	PASSES

Maximum Shear

Max Shear	Allowable	Result
23.45kN <	45.50 kN	PASSES

Maximum BM

Max BM	Allowable	Result
32.83kN <	42.90 kNm	PASSES

Loads Imposed on to Ground

Support	Reaction		Additional Leg/Loads		Additional Leg/Loads		Total Load
1	-16.14kN	+	62.55kN	+	22.77kN	=	69.18kN
2	62.55kN	+		+		=	62.55kN
3	62.55kN	+		+		=	62.55kN
4	-16.14kN	+	62.55kN	+	22.77kN	=	69.18kN

No. Support Stds/Puncheons **2**

Axial Load	Effective Length (L _E)	Safe Axial Load (P _c)	Result
34.59kN	1.0 m	60.00kN	PASSES
34.59kN	1.0 m	60.00kN	PASSES

Ground Bearing Pressure (GBP)

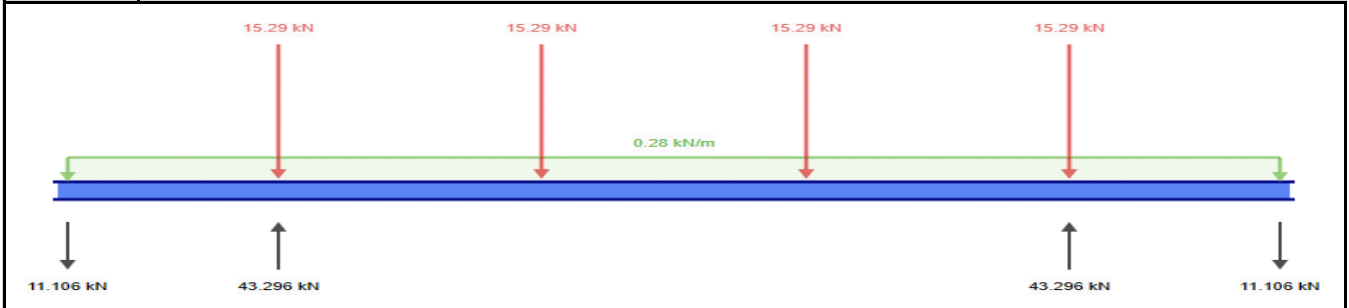
	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other y	1.000	1.000	1

Imposed Load: **69.18** kN
GBP: **69.18** kN/m²

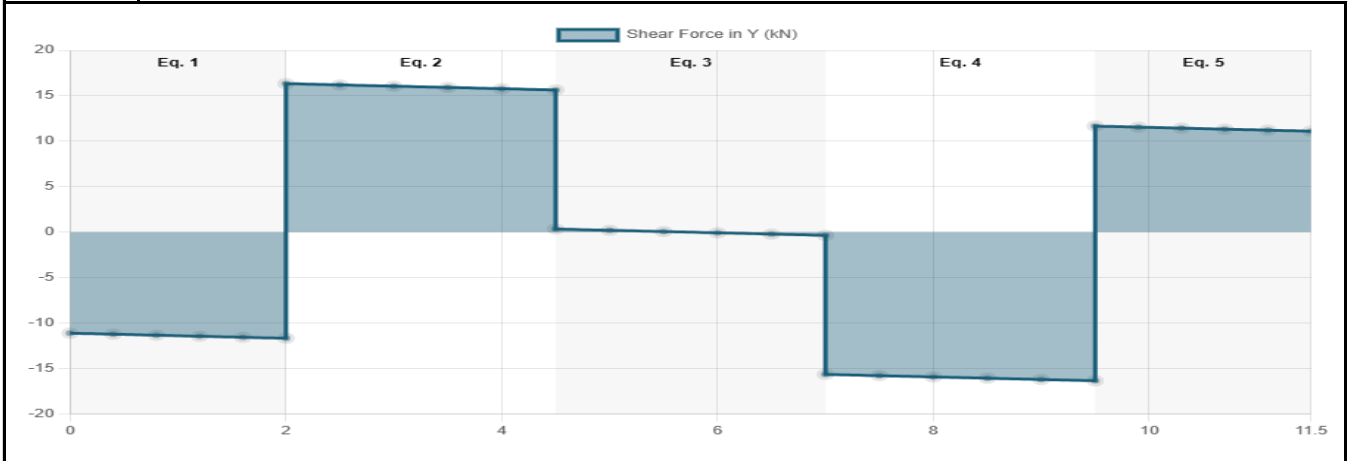
Additional Comments If Required

<u>Item:</u>		<u>Loadings and Reactions on</u>		<u>750mm Apollo</u>		Beams -		<u>Inside Beam</u>	
Point Loads		Location		Point Loads		Location		Point Loads	
Location		Point Loads		Location		Point Loads		Location	
15.29kN	@	2.00m	15.29kN	@	4.50m	15.29kN	@	7.00m	
15.29kN	@	9.50m							
Beam C/C (m)		SWL (kN/m²)		Boards Sw (kN/m²)		Beam Sw (kN/m)		UDL kN/m	
0.5		0		0		0.28		0.28	

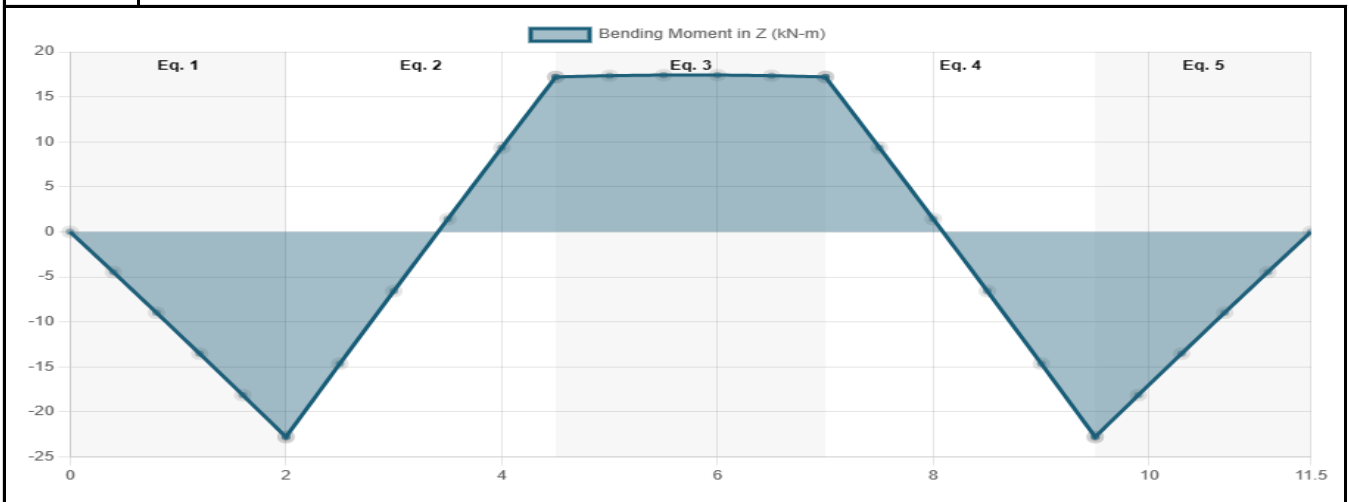
Reaction



Shear



BM



Coupler Capacities

Coupler Type Used - Class A: 6.1kN
Coupler Type Used - Class B: **Y** 9.1kN
Node loads in accordance with TG20:21, 5.9.2

No. of Primary Connections: **4**
No. of Supplementary Connections: **4**
Strength of Connection: **60.80kN**

Maximum Reactions

Support	Reaction	Node	Result
1	-11.11kN	60.80kN	PASSES
2	43.30kN	Load Applied to Pull Back	
3	43.30kN	Load Applied to Pull Back	
4	-11.11kN	60.80kN	PASSES

Maximum Shear

Max Shear	Allowable	Result
16.34kN <	45.50 kN	PASSES

Maximum BM

Max BM	Allowable	Result
22.77kN <	42.90 kNm	PASSES

Loads Imposed on to Ground

Support	Reaction		Additional Leg/Loads		Additional Leg/Loads		Total Load
1	-11.11kN	+	43.30kN	+	16.03kN	=	48.22kN
2	43.30kN	+		+		=	43.30kN
3	43.30kN	+		+		=	43.30kN
4	-11.11kN	+	43.30kN	+	16.03kN	=	48.22kN

No. Support Stds/Puncheons **2**

Axial Load	Effective Length (L _E)	Safe Axial Load (P _c)	Result
24.11kN	1.0 m	60.00kN	PASSES
24.11kN	1.0 m	60.00kN	PASSES

Ground Bearing Pressure (GBP)

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other y	0.900	0.900	0.81

Imposed Load: 48.22 kN
GBP: **59.53** kN/m²

Additional Comments If Required

Consider Inside Pull Back

Load / no. Pull Backs = Load Per Pull Back
62.55kN / 6 = 10.43kN

Load < Allowable Load Result
10.43kN < 10.60kN **PASSES**

Consider Outside Pull Back

Load / no. Pull Backs = Load Per Pull Back
43.30kN / 5 = 8.66kN

Load < Allowable Load Result
8.66kN < 10.60kN **PASSES**

TABLE 1 – Capacity of Vertical Diagonal Brace							
Bay Length (m)	α (°)	Loading by Tension			Loading by Compression		
		All. Nv (kN)	All. Q (kN)	All. V (kN)	All. Nv (kN)	All. Q (kN)	All. V (kN)
Bay Height H = 2.0m							
3.0	35.1	+16.30	13.3	9.4	-5.12	4.2	2.9
2.5	40.5		12.4	10.6	-6.17	4.7	4.0
2.0	47.3		11.1	12.0	-7.62	5.2	5.6
1.5	56.1		9.1	13.5	-9.59	5.4	8.0
1.0	67.1		6.3	15.0	-12.32	4.8	11.4
0.7	74.8		4.3	15.8	-13.81	3.6	13.3

INSIDE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size	1.75m	0.70m		
Standards (lift height)			1	2.00m
Ledgers			1	1.75m
Beam		kN/m	0	1.75m
Transom			1	0.35m
Guardrails			2	1.75m
Decked (Main Platform)			1	0.61
Decked (Inside Decks)			0	0.00
Toe Boards			1	1.75m
Ledger Bracing			0	2.25m
Façade Bracing			0	2.78m
Plan Bracing			0	2.13m
Fittings			2	N/A
Live Loads Applied			8	
		Total Number of Lifts:	8	
		Number of Boarded Lifts:	8	

(SWL) 100%	0.75kN /m ²	Total Dead Load Per Lift:	0.36kN
(SWL) 50%	0.38kN /m ²	Total Dead Load	4.02kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	0.69kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	4.71kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
4.71kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

Sole Pad Arrangements

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load:	N/A
GBP:	N/A

Additional Comments If Required

INSIDE STANDARD

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

1.75m 1.00m

Standards (lift height)		1	2.00m
Ledgers		1	1.75m
Beam	kN/m	0	1.75m
Transom		1	0.50m
Guardrails		0	1.75m
Decked (Main Platform)		1	0.88
Decked (Inside Decks)		1	0.39
Toe Boards		0	1.75m
Ledger Bracing		0	2.40m
Façade Bracing		0	2.78m
Plan Bracing		0	2.28m
Fittings		2	N/A
Live Loads Applied			
	Total Number of Lifts:	15	
	Number of Boarded Lifts:	14	

(SWL) 100%	2.00kN /m ²	Total Dead Load Per Lift:	0.20kN
(SWL) 50%	1.00kN /m ²	Total Dead Load	5.97kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.22kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	9.19kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
9.19kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)**Sole Pad Arrangements**

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other			0

Imposed Load:	9.19 kN
GBP:	90.74 kN/m ²

Additional Comments If Required

Consider Imposed Load From Adjacent Bay

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)		
0.5	*	1.75	*	(	1.5	+	0.25	)	+	0.45		
											=	1.98kN

Load	*	No. Lifts	=	Result
1.98kN	*	1	=	1.98kN

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)		
0.5	*	1.75	*	(	0	+	0.25	)	+	0.45		
											=	0.67kN

Load	*	No. Lifts	=	Result
0.67kN	*	5	=	3.34kN

Load	+	Load	+	Load	+	Load	=	Result
4.71kN	+	9.19kN	+	1.98kN	+	3.34kN	=	19.22kN

No. Support Stds/Puncheons		1						
Axial Load	Buckling Length		Allowable	Length of Thread		Allowable	Result	
19.22kN	2.0m		26.10kN	0.4m		32.50kN	PASSES	PASSES

CENTRE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

1.75m 1.50m

Standards (lift height)		1	2.00m
Ledgers		1	1.75m
Beam	kN/m	0	1.75m
Transom		1	0.75m
Guardrails		0	1.75m
Decked (Main Platform)		1	1.31
Decked (Inside Decks)		0	0.00
Toe Boards		0	1.75m
Ledger Bracing		0	2.65m
Façade Bracing		1	2.78m
Plan Bracing		0	2.53m
Fittings		2	N/A
Live Loads Applied			
	Total Number of Lifts:	6	
	Number of Boarded Lifts:	6	

(SWL) 100%	1.50kN /m ²	Total Dead Load Per Lift:	0.33kN
(SWL) 50%	0.75kN /m ²	Total Dead Load	3.82kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	2.95kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	6.77kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
6.77kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)**Sole Pad Arrangements**

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.450	0.675	0.30375

Imposed Load: N/A
 GBP: N/A

Additional Comments If Required

Consider Imposed Load From Adjacent Bay

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)		
1	*	1.75	*	(	1.5	+	0.25	)	+	0.45		
											=	3.51kN

Load	*	No. Lifts	=	Result
3.51kN	*	1	=	3.51kN

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)		
1	*	1.75	*	(	0	+	0.25	)	+	0.45		
											=	0.89kN

Load	*	No. Lifts	=	Result
0.89kN	*	1	=	0.89kN

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)		
1	*	0.5	*	(	0	+	0.25	)	+	0.45		
											=	0.58kN

Load	*	No. Lifts	=	Result
0.58kN	*	3	=	1.73kN

Load	+	Load	+	Load	+	Load	=	Result
6.77kN	+	3.51kN	+	0.89kN	+	1.73kN	=	12.90kN

No. Support Stds/Puncheons 1

Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
12.90kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

CENTRE PUNCHEON		#1	Allowance For Double Width: YES						
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						1.75m	2.00m		
Standards (lift height)								1	2.00m
Ledgers								1	1.75m
Beam							kN/m	0	1.75m
Transom								1	2.00m
Guardrails								0	1.75m
Decked (Main Platform)								1	3.50
Decked (Inside Decks)								0	0.00
Toe Boards								0	1.75m
Ledger Bracing								0	2.90m
Façade Bracing								1	2.78m
Plan Bracing								0	2.78m
Fittings								2	N/A
Live Loads Applied				Total Number of Lifts:				2	
				Number of Boarded Lifts:				1	
(SWL) 100%		1.50kN /m²	Total Dead Load Per Lift:						0.38kN
(SWL) 50%		0.75kN /m²	Total Dead Load						1.56kN
(SWL) Inside bds		0.75kN /m²							
Maximum No. Lifts at 100%		1	Total Live Load:						7.88kN
Maximum No. Lifts at 50%		1							
No. Lifts with inside bds loaded		2	Total Load Combined:						9.43kN
No. Support Stds/Puncheons		1							
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result				
9.43kN	2.0m	26.10kN							PASSES
			0.4m	32.50kN	PASSES				
Ground Bearing Pressure (GBP)									
				Sole Pad Arrangements					
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)					
Typical Arrangement		0.225	0.450	0.10125					
Increased Arrangement		0.450	0.450	0.2025					
Tredda Plate		0.210	0.210	0.0441					
Other		y	0.450	0.30375					
Imposed Load:		N/A							
GBP:		N/A							

Additional Comments If Required

CENTRE PUNCHEON

#2

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

2.00m 1.00m

Standards (lift height)		1	2.00m
Ledgers		1	2.00m
Beam	kN/m	0	2.00m
Transom		1	0.50m
Guardrails		2	2.00m
Decked (Main Platform)		1	1.00
Decked (Inside Decks)		0	0.00
Toe Boards		1	2.00m
Ledger Bracing		0	2.40m
Façade Bracing		1	2.90m
Plan Bracing		0	2.40m
Fittings		2	N/A
Live Loads Applied			
	Total Number of Lifts:	3.5	
	Number of Boarded Lifts:	3.5	

(SWL) 100%	1.50kN /m ²	Total Dead Load Per Lift:	0.53kN
(SWL) 50%	0.75kN /m ²	Total Dead Load	2.65kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	2.25kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	4.90kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
12.08kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)

		Sole Pad Arrangements		
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement		0.225	0.450	0.10125
Increased Arrangement		0.450	0.450	0.2025
Tredda Plate		0.210	0.210	0.0441
Other	y	0.450	0.675	0.30375

Imposed Load: N/A
 GBP: N/A

Total Puncheon Load

Load	+	Load	=	Total
9.43kN	+	2.65kN	=	12.08kN

CENTRE PUNCHEON		#1	Allowance For Double Width: YES						
Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length	Width (m)	Quantity	Length
Standard DL	0.047kN/m	(kN/m2) (kN/m)	0.056	(kN)		(m)			(or) Area
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								
Bay Size						1.75m	1.00m		
Standards (lift height)								1	2.00m
Ledgers								1	1.75m
Beam							kN/m	0	1.75m
Transom								1	1.00m
Guardrails								0	1.75m
Decked (Main Platform)								1	1.75
Decked (Inside Decks)								0	0.00
Toe Boards								0	1.75m
Ledger Bracing								0	2.40m
Façade Bracing								1	2.78m
Plan Bracing								0	2.28m
Fittings								2	N/A
Live Loads Applied				Total Number of Lifts:				2	
				Number of Boarded Lifts:				1	
(SWL) 100%		1.50kN /m²	Total Dead Load Per Lift:						0.34kN
(SWL) 50%		0.75kN /m²	Total Dead Load						1.09kN
(SWL) Inside bds		0.75kN /m²							
Maximum No. Lifts at 100%		1	Total Live Load:						3.94kN
Maximum No. Lifts at 50%		1							
No. Lifts with inside bds loaded		2	Total Load Combined:						5.03kN
No. Support Stds/Puncheons		1							
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result				
5.03kN	2.0m	26.10kN							PASSES
			0.4m	32.50kN	PASSES				
Ground Bearing Pressure (GBP)									
Sole Pad Arrangements									
		Pad Width (m)	Pad Length (m)	Pad Area (sqm)					
Typical Arrangement		0.225	0.450	0.10125					
Increased Arrangement		0.450	0.450	0.2025					
Tredda Plate		0.210	0.210	0.0441					
Other		y	0.450	0.675		0.30375			
Imposed Load:		N/A							
GBP:		N/A							

Additional Comments If Required

CENTRE PUNCHEON

#2

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

2.00m 1.00m

Standards (lift height)		1	2.00m
Ledgers		1	2.00m
Beam	kN/m	0	2.00m
Transom		1	0.50m
Guardrails		2	2.00m
Decked (Main Platform)		1	1.00
Decked (Inside Decks)		0	0.00
Toe Boards		1	2.00m
Ledger Bracing		0	2.40m
Façade Bracing		1	2.90m
Plan Bracing		0	2.40m
Fittings		2	N/A
Live Loads Applied		4	
	Total Number of Lifts:	4	
	Number of Boarded Lifts:	4	

(SWL) 100%	1.50kN /m ²	Total Dead Load Per Lift:	0.53kN
(SWL) 50%	0.75kN /m ²	Total Dead Load	3.02kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	2.25kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	5.27kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
5.27kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)**Sole Pad Arrangements**

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.450	0.675	0.30375

Imposed Load: N/A
 GBP: N/A

Total Puncheon Load

Load	+	Load	=	Total
5.03kN	+	3.02kN	=	8.05kN

CENTRE PUNCHEON

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

2.00m 1.00m

Standards (lift height)		1	2.00m
Ledgers		1	2.00m
Beam	kN/m	0	2.00m
Transom		1	0.50m
Guardrails		1	2.00m
Decked (Main Platform)		1	1.00
Decked (Inside Decks)		0	0.00
Toe Boards		0.5	2.00m
Ledger Bracing		0	2.40m
Façade Bracing		1	2.90m
Plan Bracing		0	2.40m
Fittings		2	N/A
Live Loads Applied		4	
	Total Number of Lifts:	2.5	
	Number of Boarded Lifts:		

(SWL) 100%	1.50kN /m ²	Total Dead Load Per Lift:	0.43kN
(SWL) 50%	0.75kN /m ²	Total Dead Load	2.31kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	2.25kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	4.56kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
4.56kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)**Sole Pad Arrangements**

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.450	0.675	0.30375

Imposed Load: N/A
 GBP: N/A

Additional Comments If Required

Consider Imposed Load From Adjacent Bay

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)		
1.25	*	2	*	(	1.5	+	0.25	)	+	0.45		
											=	4.83kN

Load	*	No. Lifts	=	Result
4.83kN	*	1	=	4.83kN

Bay Width (m)	*	Bay Length (m)	*	(	SWL (kN/m ²)	+	Bds DL (kN/m ²)	)	+	Tube Dead Load(kN)		
1.25	*	2	*	(	0	+		)	+	0.45		
											=	1.13kN

Load	*	No. Lifts	=	Result
1.13kN	*	2	=	2.25kN

Load	+	Load	+	Load	=	Result
4.56kN	+	4.83kN	+	2.25kN	=	11.63kN

No. Support Stds/Puncheons		1					
Axial Load	Buckling Length		Allowable	Length of Thread		Allowable	Result
11.63kN	2.0m		26.10kN	0.4m		32.50kN	PASSES
							PASSES

CENTRE STANDARD

Allowance For Double Width: YES

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

1.75m 2.00m

Standards (lift height)	1	2.00m
Ledgers	1	1.75m
Beam	0	1.75m
Transom	1	2.00m
Guardrails	1	1.75m
Decked (Main Platform)	1	3.50
Decked (Inside Decks)	0	0.00
Toe Boards	0.5	1.75m
Ledger Bracing	0	2.90m
Façade Bracing	1	2.78m
Plan Bracing	0	2.78m
Fittings	2	N/A
Live Loads Applied	Total Number of Lifts:	2.5
	Number of Boarded Lifts:	1

(SWL) 100%	1.50kN /m ²	Total Dead Load Per Lift:	0.46kN
(SWL) 50%	0.75kN /m ²	Total Dead Load	1.95kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	7.88kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	9.82kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
9.82kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

Ground Bearing Pressure (GBP)**Sole Pad Arrangements**

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.450	0.675	0.30375

Imposed Load:	9.82 kN
GBP:	32.34 kN/m ²

Additional Comments If Required

CENTRE STANDARD

Allowance For Double Width: N/A

Tube DL	0.033kN/m	Decks DL	0.23	Fittings	0.018	Length (m)	Width (m)	Quantity	Length (or) Area
Standard DL	0.047kN/m	(kN/m ²) (kN/m)	0.056	(kN)					
Toe Board DL	0.027kN/m								
Bracing DL	0.044kN/m								

Bay Size

1.75m 2.00m

Standards (lift height)		1	2.00m
Ledgers		1	1.75m
Beam	kN/m	0	1.75m
Transom		1	1.00m
Guardrails		1	1.75m
Decked (Main Platform)		1	1.75
Decked (Inside Decks)		0	0.00
Toe Boards		0.5	1.75m
Ledger Bracing		0	2.90m
Façade Bracing		1	2.78m
Plan Bracing		0	2.78m
Fittings		2	N/A
Live Loads Applied			
	Total Number of Lifts:	2	
	Number of Boarded Lifts:	1	

(SWL) 100%	1.50kN /m ²	Total Dead Load Per Lift:	0.42kN
(SWL) 50%	0.75kN /m ²	Total Dead Load	1.25kN
(SWL) Inside bds	0.75kN /m ²		
Maximum No. Lifts at 100%	1	Total Live Load:	3.94kN
Maximum No. Lifts at 50%	1		
No. Lifts with inside bds loaded	2	Total Load Combined:	5.19kN

No. Support Stds/Puncheons	1				
Axial Load	Buckling Length	Allowable	Length of Thread	Allowable	Result
5.19kN	2.0m	26.10kN	0.4m	32.50kN	PASSES
					PASSES

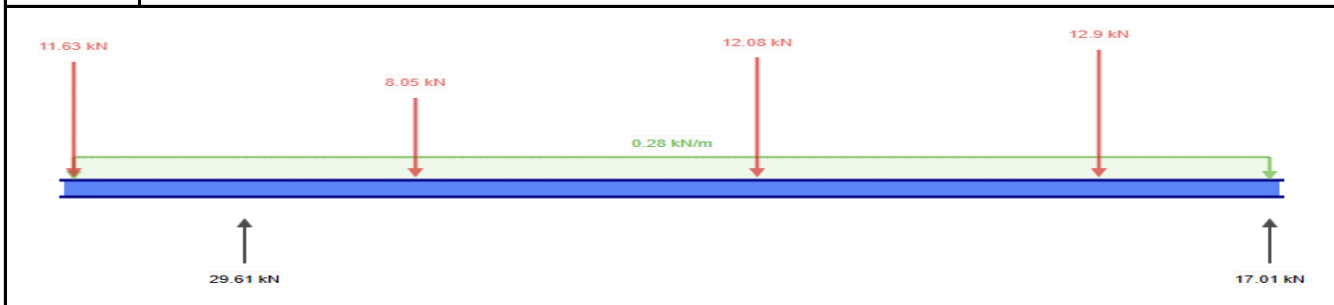
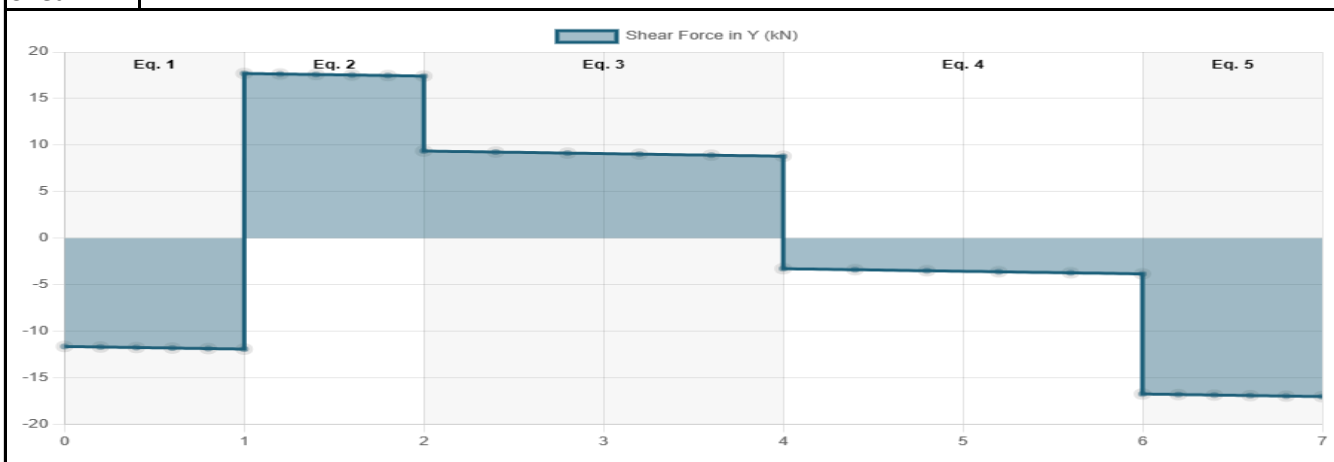
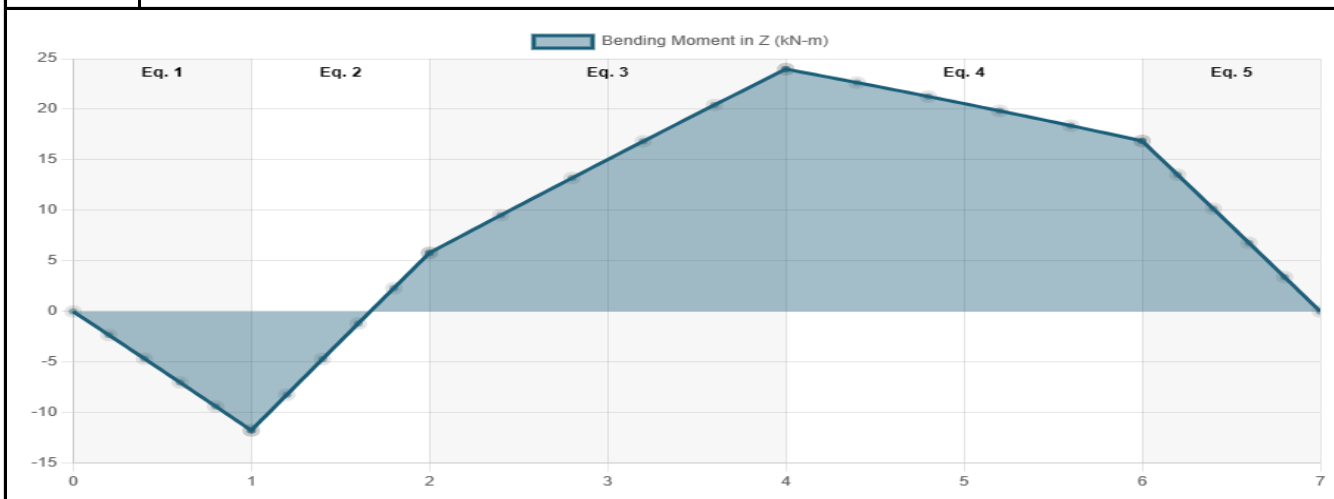
Ground Bearing Pressure (GBP)**Sole Pad Arrangements**

	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.450	0.675	0.30375

Imposed Load:	5.19 kN
GBP:	17.08 kN/m ²

Additional Comments If Required

Item:		Loadings and Reactions on 750mm Apollo				Beams -		Outside Beam	
Point Loads		Location	Point Loads		Location	Point Loads		Location	
11.63kN	@	0.00m	8.05kN	@	2.00m	12.08kN	@	4.00m	
12.90kN	@	6.00m							
Beam C/C (m)		SWL (kN/m²)		Boards Sw (kN/m²)		Beam Sw (kN/m)		UDL kN/m	
1.75		0		0		0.28		0.28	

Reaction**Shear****BM**

Coupler Capacities

Coupler Type Used - Class A: 6.1kN
 Coupler Type Used - Class B: **Y** 9.1kN
 Node loads in accordance with TG20:21, 5.9.2

No. of Primary Connections: **2**
 No. of Supplementary Connections: **2**
 Strength of Connection: **30.40kN**

Maximum Reactions

Support	Reaction	Node	Result
1	29.61kN	30.40kN	PASSES
2	17.01kN	30.40kN	PASSES

Maximum Shear

Max Shear	Allowable	Result
17.70kN <	45.50 kN	PASSES

Maximum BM

Max BM	Allowable	Result
23.97kN <	42.90 kNm	PASSES

Loads Imposed on to Ground

Support	Reaction		Additional Leg/Loads		Additional Leg/Loads	=	Total Load
1	29.61kN	+		+		=	29.61kN
2	17.01kN	+	19.22kN	+		=	36.23kN

No. Support Stds/Puncheons **2**

Axial Load	Effective Length (L _E)	Safe Axial Load (P _c)	Result
14.81kN	2.0 m	26.10kN	PASSES
18.12kN	2.0 m	26.10kN	PASSES

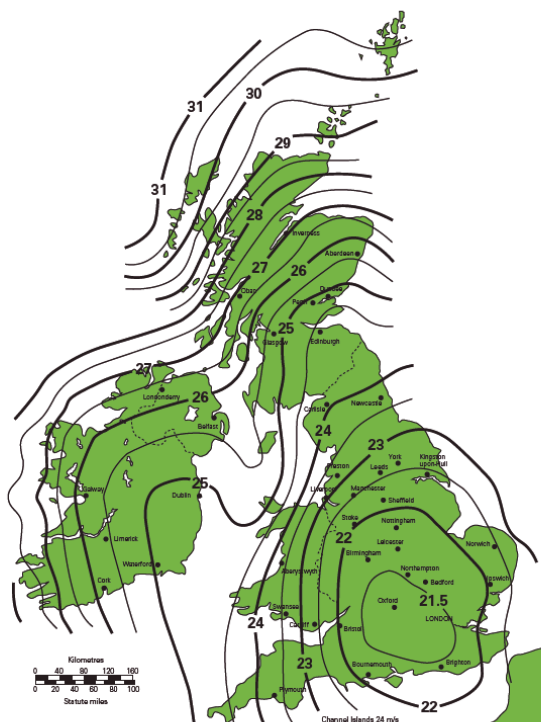
Ground Bearing Pressure (GBP)

Sole Pad Arrangements			
	Pad Width (m)	Pad Length (m)	Pad Area (sqm)
Typical Arrangement	0.225	0.450	0.10125
Increased Arrangement	0.450	0.450	0.2025
Tredda Plate	0.210	0.210	0.0441
Other	0.900	0.675	0.6075

Imposed Load: 36.23 kN
 GBP: **59.65** kN/m²

Additional Comments If Required

Consider Wind Loads On Scaffold

Figure E.1 – Wind speed, V_{map} (m/s)Table E1: Combined exposure factor, C_c

Height $Z - h_{eff}$ (m)	Site in country or adjacent to sea				Site in town, more than 2 km from the edge of the town		
	Closest distance to the shoreline (km)				Distance to shoreline (km)		
	≤ 0.1	2	10	≥ 100	≥ 2	10	≥ 100
≤ 2	1.90	1.60	1.50	1.40	1.07	1.01	0.94
3	2.15	1.84	1.73	1.62	1.32	1.25	1.17
4	2.31	2.03	1.90	1.78	1.54	1.44	1.35
5	2.43	2.18	2.05	1.90	1.72	1.62	1.50
10	2.82	2.65	2.50	2.32	2.33	2.20	2.04
15	3.07	3.02	2.85	2.67	2.81	2.65	2.48
20	3.20	3.05	2.98	2.78	2.90	2.83	2.64
30	3.42	3.43	3.27	3.04	3.40	3.24	3.01
50	3.68	3.68	3.62	3.39	3.68	3.62	3.39
100	3.98	3.98	3.98	3.80	3.98	3.98	3.80

Notes: (1) Interpolation may be used in this table
(2) Based on Figure NA.7 and Figure NA.8 in the NA to BS EN 1991-1-4

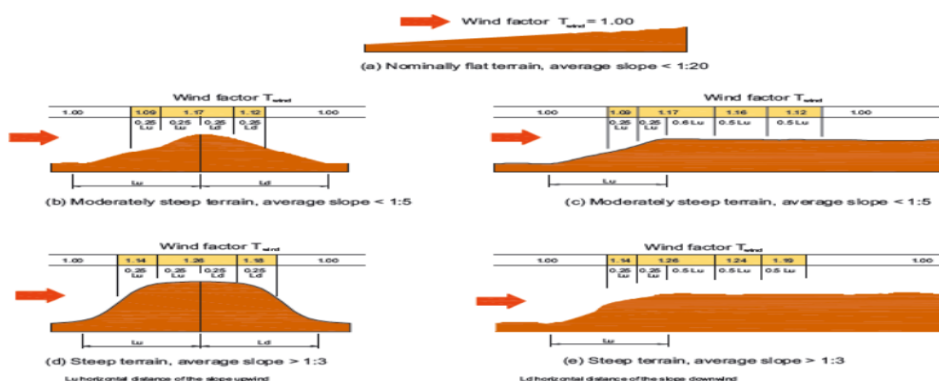
Figure E.2 – Topography factor, T_{wind} 

Figure E.3 – Displacement height

Table NA.1 Directional factor c_{dir}

Direction	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°
c_{dir}	0,78	0,73	0,73	0,74	0,73	0,80	0,85	0,93	1,00	0,99	0,91	0,82

NOTE 1 Interpolation may be used within Table NA.1.

NOTE 2 The directions are defined by angles from due North in a clockwise direction.

NOTE 3 Where the wind loading on a building is assessed only for orthogonal load cases, the maximum value of the factor for the directions that lie $\pm 45^\circ$ either side of the normal to the face of the building is to be used.

NOTE 4 Conservatively, c_{dir} may be taken as 1,0 for all directions.

Consider Wind Loads On Scaffold (Typical Tie)**TG20:21 - 5.15. 1.3 Scaffolds Clad With Sheeting****Windward**

$$F_c = q_p * C_{fT} * H_c * L_c * K_s \text{ kN}$$

q_p	*	C_{fT}	*	H_c	*	L_c	*	K_s	Result
0.67kN/m ²	*	1.3	*	2.0m	*	5.0m	*	1.35	=
									11.76kN
Max Tie Load (windward):		11.76kN				<	18.20kN		PASSES

Coupler Capacities

Coupler Type Used - Class A: 6.1kN

No. of Primary Connections: 2

Coupler Type Used - Class B: Y 9.1kN

No. of Supplementary Connections: 0

Node loads in accordance with TG20:21, 5.9.2

Strength of Connection: 18.20kN

Leeward

$$F_{tc} = q_p * C_s * C_{fT} * H_c * L_c * K_s \text{ kN}$$

q_p	*	C_s	*	C_{fT}	*	H_c	*	L_c	*
0.67kN/m ²	*	0.25	*	1.3	*	2.0m	*	5.0m	*
K_s	=	Result							
1.35	=	2.94kN							

Max Tie Load (leeward): 2.94kN Therefore Use 3.5kN < 9.10kN **PASSES**

Preliminary Load Test: 7.00kN

Proof Test Load: 4.40kN

Coupler Capacities

Coupler Type Used - Class A: 6.1kN

No. of Primary Connections: 1

Coupler Type Used - Class B: Y 9.1kN

No. of Supplementary Connections: 0

Node loads in accordance with TG20:21, 5.9.2

Strength of Connection: 9.10kN

Consider Load Through Bracing

Load	/	Sin (°degrees)					
2.94kN	/	32	=	5.55kN	<	9.10kN	PASSES

12mm ADI SCE Restraint Eye & 100mm Nylon Insert**Technical Data Sheet****Temporary Works Loads**

Product Designation	: SCE restraint eye
Type	: Eye type screw with 12mm diameter shaft & 23 or 50mm id
Material	: Carbon Steel Bar
Finish	: Bright Zinc Plated (Thickness 5~7 Microns)

**SAFETY FACTORS:**

Temporary works requires a safety factor of 2

Technical Data Sheet

Product Designation	: NP14 xxx
Type	: Nylon Plug (Rimmed or Rimless)
Material	: PA6 Polyamide (Nylon)
Finish	: Grey (RAL 7035)
Load Class	: Light duty fixing

NP14 is a nylon fixing, normally used in conjunction with the SCE restraint eye or a 12mm diameter screw in a variety of base materials. The short (75mm) version comes with or without rim as required. There are longer lengths available, 100/ 135 & 160mm long designed for render faced or insulated surfaces.

Substrate	Mean Ultimate TENSILE Action kN	
	75mm plug	100mm plug
Concrete C10/15	12	18
Concrete C20/25	15	24
Solid Brick	12	18
Granite	15	24
Hollow Brick	9	15

Wind Loads- as TG20, TG9:18 Appendix E, EN 12811 and NA to BS EN 1991-1-4:2005

(Appendix E to be used with scaffolds < 100m high with no significant topo or < 50m with significant topo)

Distance from Shoreline	>10	in km	Cc	2.83	Table E 1 (combination)
Significant Topography	n	y or n	Vb.map	22.5	Fig E 1 App E
Altitude above sea-A	43	in m	Cdir	1	Table NA.1 page 4
Cprob-do not use twif<1	1		Cseason	1	Table NA.2 page 6
			Twind	1	Fig E 3

1) Peak Wind Pressure $Q_p = 0.613 \cdot C_c \cdot S_{wind}^2$ Appendix E

2) $S_{wind} = T_{wind} \cdot V_{map} \cdot (1 + 0.001 \cdot A) \cdot C_{prob} \cdot C_{dir} \cdot C_{season}$ Appendix E

3) $S_{wind} = 23.47$

4) $Q_p = 0.96 \text{ kN/m}^2 \cdot 0.70 \text{ tw factor} = 0.67 \text{ kN/m}^2$

Wind Load Per Tie

	(Cpe for sheeting-Cpe*1, for debris netting Cpe*0.5, for unsheeted Cpe*0.26)		
Ae-Max Area acting on 1 tie =	2.50	in m ²	1
Qp=	0.67	kN/m ²	
Cpe +ve=	1.2		Ind-TG20 page 150, sign-7.4.3 EN 1991, net cpe 2 walls-NA4
Cpe -ve	0.8		

1) Load = $Q_p \cdot A_e \cdot C_{pe} \cdot C_f$

2) Therefore max push in= 2.01 kN

3) Therefore max pull out= 1.34 kN

Wind Load Per Tie

	(Cpe for sheeting-Cpe*1, for debris netting Cpe*0.5, for unsheeted Cpe*0.26)		
Ae-Max Area acting on 1 tie =	2.50	in m ²	0.26
Qp=	0.77	kN/m ²	
Cpe +ve=	1.2		Ind-TG20 page 150, sign-7.4.3 EN 1991, net cpe 2 walls-NA4
Cpe -ve	0.8		

1) Load = $Q_p \cdot A_e \cdot C_{pe} \cdot C_f$

2) Therefore max push in= 0.60 kN

3) Therefore max pull out= 0.40 kN

Max Tie Load (Windward): 2.01kN

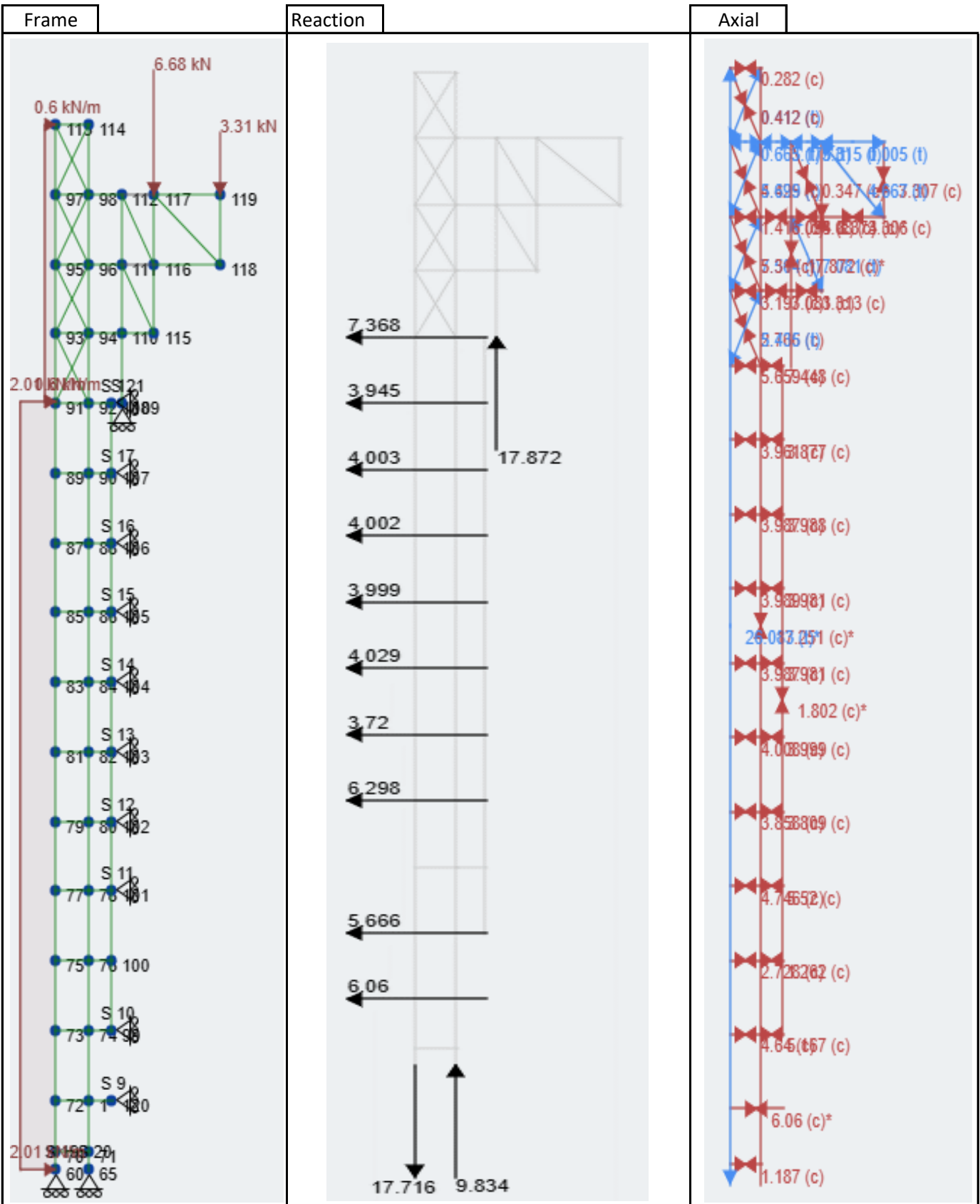
Max Tie Load (Windward): 0.60kN

Max Tie Load (Windward): 1.34kN

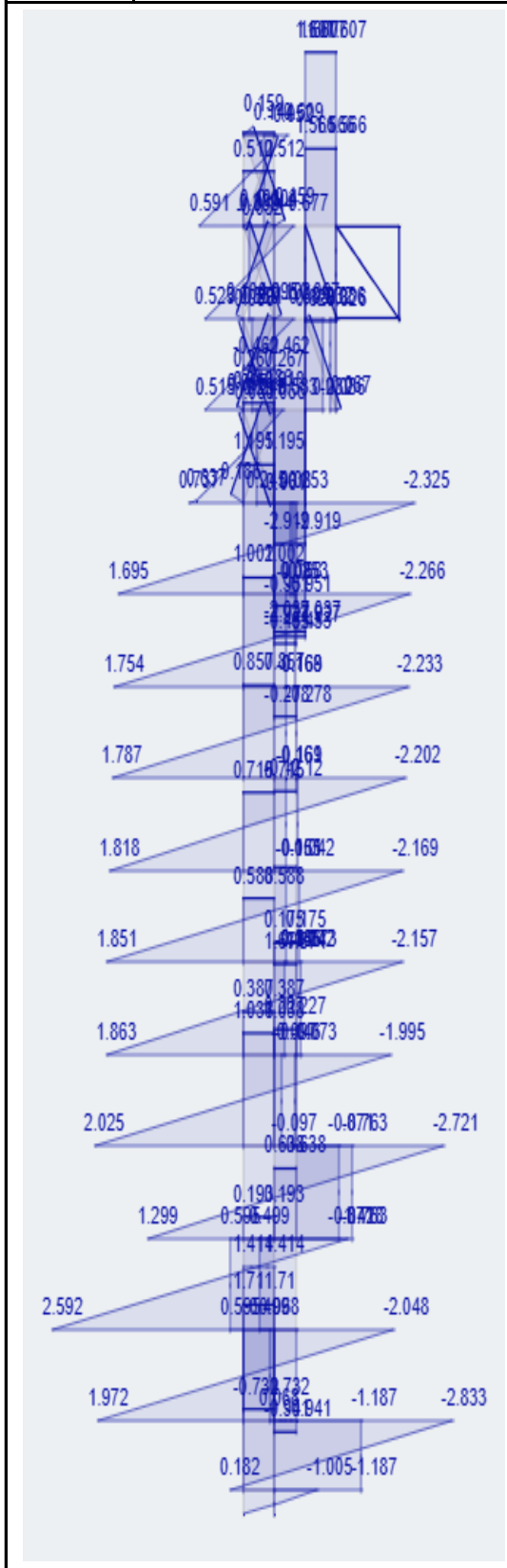
Max Tie Load (Windward): 0.40kN

Windward

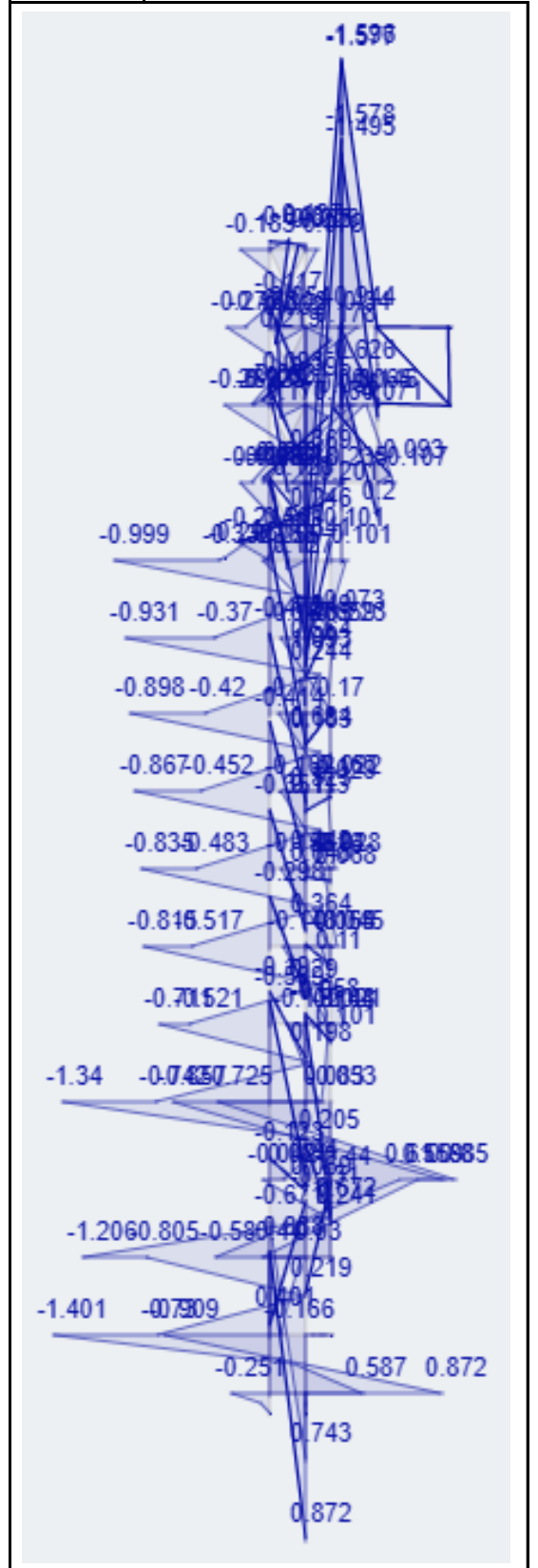
Load	@	Node	Wind UDL	2.01kN/m	(Clad)
3.31kN	@	119	Wind UDL	0.60kN/m	(Un-Clad)
6.68kN	@	117			



Shear



BM



Maximum Reactions Windward Load (High Level)

Support	Reaction	Node	Result
Max	7.37kN	18.20kN	PASSES

Maximum Reactions Windward Load (Low Level)

Load	*	no. Frames	=	Total	
6.30kN	*	2	=	12.60kN	
Support		Reaction		Node	Result
Max		12.60kN		18.20kN	PASSES

Maximum Shear

Max Shear
2.93kN

Maximum BM

Max BM
1.60kN

Maximum Axial

Max Axial
26.08kN

Consider Sleeve Capacity

Total Load	<	Capacity	Result
26.08kN	<	30.90kN	PASSES

3.6kN (Sleeve Capacity) + (9.1kN * 3) (Swivel Capacity) = **30.9kN**

Triple Splice Required to all Outside standards at Mansard Location

Consider Scaffold Uplift

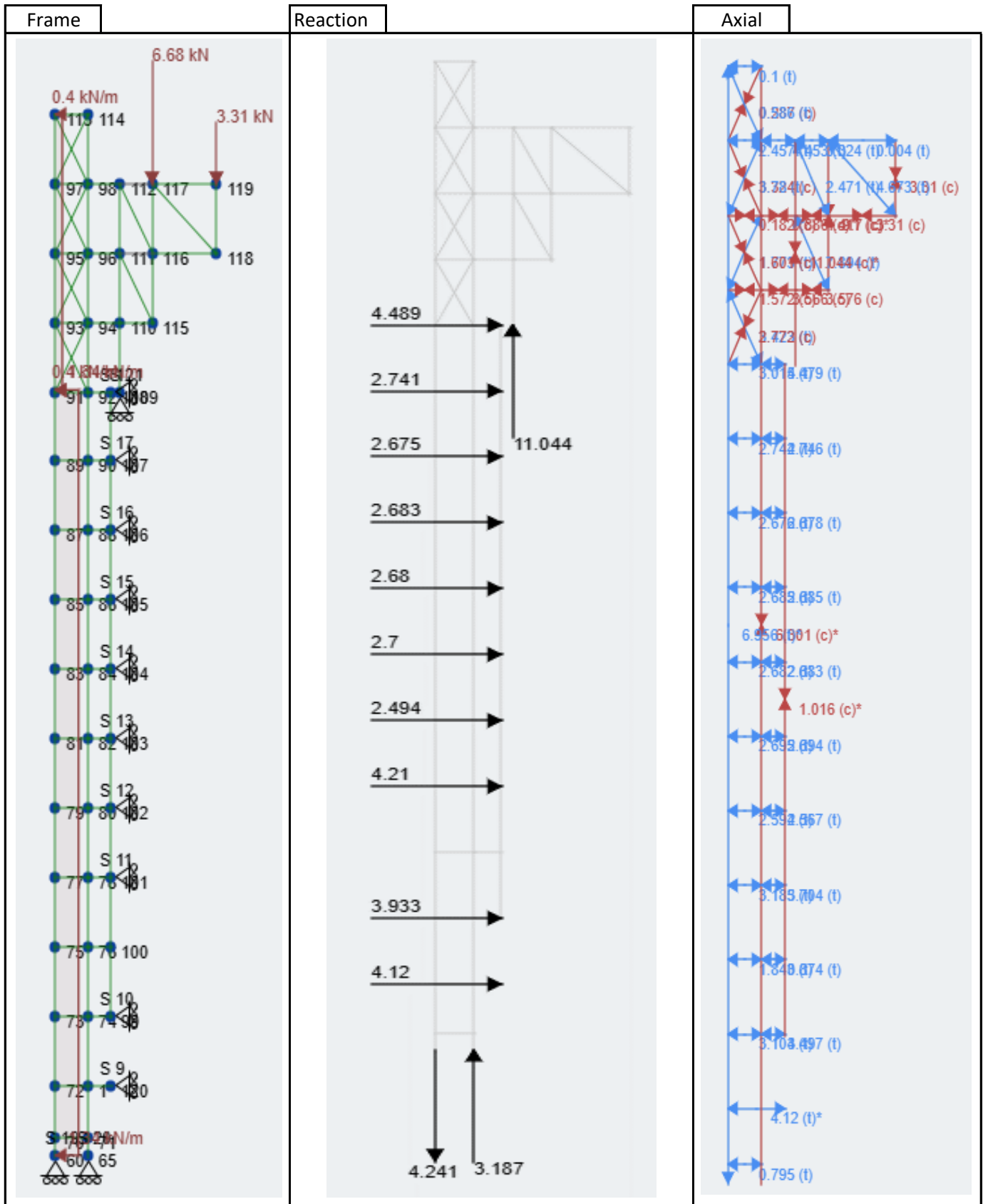
Load	+	Load	=	Total		
9.83kN	+	-17.72kN	=	-7.89kN		
Load	+	Load	+	Load	=	Total
-7.89kN	+	7.22kN	+	12.28kN	=	11.61kN

Positive Figure Calculated Therefore no Further Calculations Required

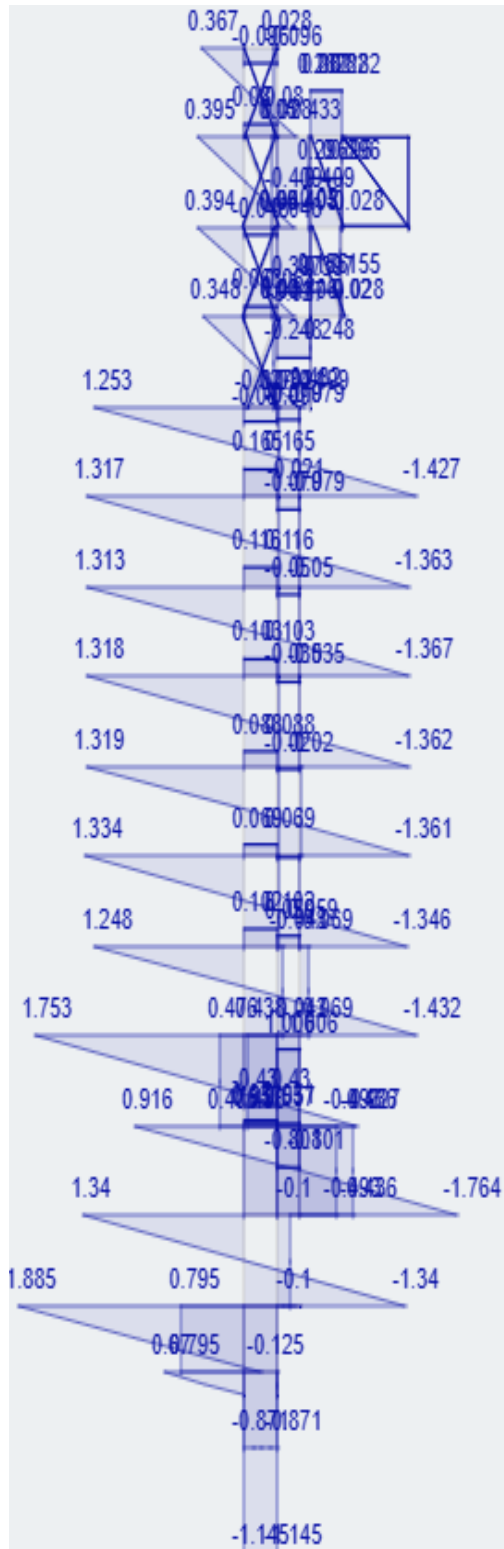
Additional Comments If Required

Windward

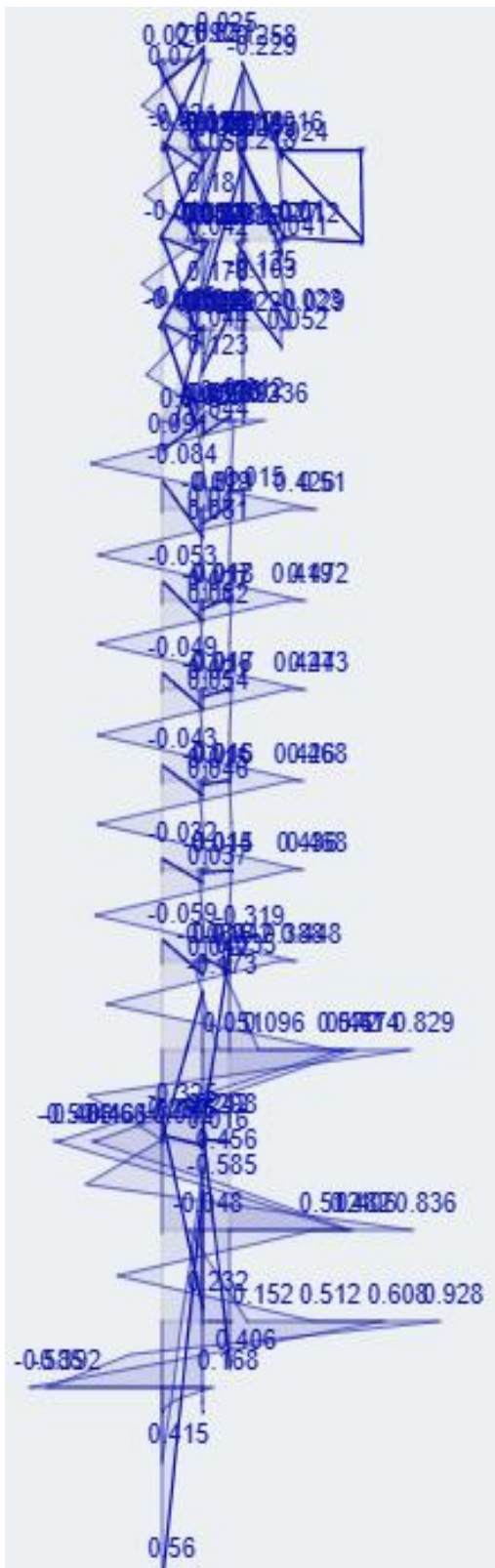
Load	@	Node	Wind UDL	1.34kN/m	(Clad)
3.31kN	@	119	Wind UDL	0.40kN/m	(Un-Clad)
6.68kN	@	117			



Shear



BM



Maximum Reactions Leeward Load (High Level)

Support	Reaction	Node	Result
Max	4.49kN	9.10kN	PASSES

Maximum Reactions Leeward Load (Low Level)

Load	*	no. Frames	=	Total	
4.21kN	*	2	=	8.42kN	
Support		Reaction		Node	Result
Max		8.42kN		9.10kN	PASSES

Preliminary Load Test: 16.84kN

Proof Test Load: 10.53kN

Maximum Shear

Max Shear
1.89kN

Maximum BM

Max BM
0.93kN

Maximum Axial

Max Axial
6.96kN

Consider Sleeve Capacity

Total Load	<	Capacity	Result
6.96kN	<	30.90kN	PASSES

3.6kN (Sleeve Capacity) + (9.1kN * 3) (Swivel Capacity) = **30.9kN**

Triple Splice Required to all Outside standards at Mansard Location

Consider Scaffold Uplift

Load	+	Load	=	Total
3.19kN	+	-4.24kN	=	-1.05kN

Load	+	Load	+	Load	=	Total
-1.05kN	+	7.22kN	+	12.28kN	=	18.45kN

Positive Figure Calculated Therefore no Further Calculations Required

Additional Comments If Required

TABLE 2 – Capacity of Standards					
Buckling Length (m)	1.0	1.5	2.0	2.5	3.0
Allowable Compression Load (kN)	60.0	39.5	26.1	18.0	13.1
Allowable Tension Load (kN)	54.0*				

Standard Capacity: 26.1kN > **23.21kN** therefore **Passes**

TABLE 3 – Capacity of Base Jacks / Swivel Base Jacks / U-Heads						
Length of Thread Visible (m)	0.1	0.2	0.3	0.4	0.5	0.6
Allowable Compression Load* (kN)	60.0	50.0	40.0	32.5	22.5	15.0

Screw Jack Capacity: 32.5kN > **23.21kN** therefore **Passes**

TABLE 7 – Capacity of Decks					
Type	Steel, 0.30m Wide	Steel, 0.20m Wide	Aluminium, 0.30m Wide	Aluminium, 0.60m Wide	Aluminium / Timber, 0.60m Wide
Length (m)	kN/m ²	kN/m ²	kN/m ²	kN/m ²	kN/m ²
3.0	6.0	6.0	3.0	2.0	2.0
2.5	6.0	6.0	3.0	4.5	4.5
2.0	6.0	6.0	3.0	-	4.5
1.5	6.0	6.0	-	-	4.5
1.3	6.0	6.0	-	-	-
1.0	6.0	6.0	-	-	-
0.7	6.0	6.0	-	-	-

Deck Capacity: 6kN/m² > **2kN/m²** therefore **Passes**

TABLE 9 – Capacity of Console Hop-Up Brackets			
Type	Uniformly Distributed Load	Point Load to Outer Wedge Head	Centre Point Load
	kN	kN	kN
0.22m Coupler	7.2	3.6	7.2
0.4m Lite	7.7	3.4	3.4
0.4m Reinforced	11.2	5.5	10.6
0.7m Reinforced	8.1	3.6	8.3
1.0m Reinforced	8.3	8.3	6.6

UDL (Independent)

$$2.5\text{m} * (0.75\text{kN/m}^2 + 0.5\text{kN/m}^2) + 0.45\text{kN/m} = \mathbf{2.95\text{kN/m}}$$

Transom Capacity: 8.1kN/m > **2.95kN/m** therefore **Passes**

TABLE 4 – Capacity of Single Transoms and Ledgers; Tubular Support

Transom Length (m)	allow. q (kN/m)	Deck Length (m)	allow. p ⁺ central transom (kN/m ²)	allow. p ⁺ perimeter transom (kN/m ²)	allow. P (kN)
0.7	24.4	3.0	7.9	16.0	7.4
		2.5	9.5	19.3	
		2.0	12.0	24.2	
		1.5	16.0	32.3	
1.0	13.5	3.0	4.3	8.8	6.1
		2.5	5.2	10.6	
		2.0	6.5	13.3	
		1.5	8.8	17.8	

UDL (Independent)

$$2.5\text{m} * (2\text{kN/m}^2 + 0.5\text{kN/m}^2) + 0.45\text{kN/m} = \mathbf{6.7\text{kN/m}}$$

Transom Capacity: 13.5kN/m > **6.7kN/m** therefore **Passes**

TABLE 5 – Capacity of Reinforced Transoms and Double Ledgers; Tubular Support (continued)

Transom Length (m)	allow. q (kN/m)	Deck Length (m)	allow. p ⁺ central transom (kN/m ²)	allow. p ⁺ perimeter transom (kN/m ²)	allow. P (kN)
1.5 (Transom)	12.8	3.0	4.0	8.3	1 x 9.2
		2.5	4.9	10.0	
		2.0	6.2	12.6	
		1.5	8.3	16.8	
1.5 (Ledger)	24.7	3.0	8.0	16.2	1 x 15.3 2 x 15.1
		2.5	9.7	19.5	
		2.0	12.1	24.5	
		1.5	16.2	32.7	
2.0 (Ledger)	14.0	3.0	4.4	9.1	1 x 11.3 2 x 8.7
		2.5	5.4	11.0	
		2.0	6.8	13.8	
		1.5	9.1	18.4	
2.5 (Ledger)	8.4	3.0	2.6	5.4	1 x 8.1 2 x 6.6
		2.5	3.1	6.5	
		2.0	4.0	8.2	
		1.5	5.4	11.0	
3.0 (Ledger)	4.6	3.0	1.3	2.9	1 x 7.2 2 x 5.4
		2.5	1.6	3.5	
		2.0	2.1	4.4	
		1.5	2.9	5.9	

UDL (Independent)

$$2.5\text{m} * (2\text{kN/m}^2 + 0.25\text{kN/m}^2) + 0.45\text{kN/m} = \mathbf{6.7\text{kN/m}}$$

Transom Capacity: 14kN/m > **6.7kN/m** therefore **Passes**

Project:	Rylands Building, Manchester
Drawing Number:	BDS - 10313 - 01 to 05
Item:	External Independent Access Scaffold with
Revision (if applicable):	B 23/11/2023
Category of Check (1, 2, or 3):	2

Description of Temporary Works:

External Independent Access Scaffold with
Stair Access Scaffold to Bridgewater Place

I certify for and on behalf of BDS Ltd, that in my opinion, the erection proposals and proposed temporary works details, specified in the schedule attached hereto relating to the construction of the above contract, are satisfactory for the proper discharge of responsibilities for the safe temporary works design elements of the works, and for their safe execution and removal (if applicable) in accordance with the drawings and specification, and without detriment to the related permanent Works.

Schedule of Drawings and Other Documents:

10313 - 01	Plan A-A	Plan B-B	
10313 - 02	Plan C-C		
10313 - 03	Elevation D-D		
10313 - 04	Section E-E	Section F-F	Section G-G
10313 - 05	Section F-F (Phase 1)	Section F-F (Phase 2)	

Supporting Calculations: Page 1 to 76

Check Certificate: Page 77 of Calculations Document

Drawn By: Adam McCann
Company: Buckley Design Solutions

Signature:



Drawing Status:
CONSTRUCTION

Calculations By: Jonny Hollingworth
Company: Buckley Design Solutions

Signature:



Checked By: Mike Brown
Company: Buckley Design Solutions

Signature:



Date:
23/11/2023