

Vale Consultancy

CONSULTING CIVIL & STRUCTURAL ENGINEERS

STRUCTURAL CALCULATIONS

Rogerstone Library
Tregwilym Road
Newport
NP10 9EL

Prepared for: Horizon Civil Engineering
Project Ref: 23343

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DOCUMENT CONTROL

Project:	Rogerstone Library, Tregwilym Road, Newport, NP10 9EL
Client:	Horizon Civil Engineering
Vale Consultancy Ref:	23343

Issue	Prepared by	Approved by	Date	Status
01	Louis Morgan BEng (Hons)	Chris Danielsen BEng (Hons) CEng MIStructE Regional Director	27.11.2025	First issue

DESIGN STATEMENT

The design has been completed in accordance with British Standards BS6399, BS5628 (Masonry), BS5268 (Timber) & BS 5950 (Steel).

Information for this has been collated from survey/site visit and information provided by the client.

This design is for the steel walkway frame, and design of worst-case pad foundation.

The steel fabricator and contractor must check all site dimensions for the steel beams and posts prior to fabrication.

Contractor to check suitability of existing masonry for padstone and steel bearing.

Refer to our drawing 23343-V1(Structural General Arrangement) A1 for references.

Foundations designed for assumed 100KN/m² bearing pressure, to be confirmed prior to fabrication.

All dimensions, weights, member lengths, member tables, and any other relevant design information contained within this package is for analysis, and design purposes only, for submission to building control, and must not be used for pricing or fabrication purposes. All queries are to be directed to the engineer prior to tendering, pricing or fabrication. All structural members dimensions need to be taken accurately on site by the contractor prior to fabrication.

During any initial site visits performed by our Engineer, assumptions have to be made where structural elements may have been obscured by finishes. Opening up works should be undertaken prior to fabrication or construction of any structural members to confirm that the structural layout as indicated in our proposed sketches/detailed drawings is correct.

If there are any discrepancies, the Engineer MUST be informed immediately, and prior to proceeding with construction works on site.

CDM Comments:

- All temporary propping/support is to correspond to contractor's specification and details.

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	Section				Sheet no./rev.	
	Design loadings				3	
	Calc. by	Date	Chk'd by	Date	App'd by	Date
	LM	27/11/2025	CD	27/11/2025	CD	27/11/2025

Walkway Design Loadings

Steel design calculations have been completed in accordance with BS5950.

All dimensions stated in the following calculations are for design purposes only and not for use for fabrication or construction purposes. All dimensions must be checked by a competent contractor prior to fabrication or construction and any discrepancies found are to be reported to the design engineer.

Design Loadings

1. Walkway

Dead Loading:
Walkway Deck = 0.30 kN/m² Total Dead Loading

Imposed Loading:
BS 6399 : Part 1 : 1996 C3 = 3.00 kN/m² Total Live Loading

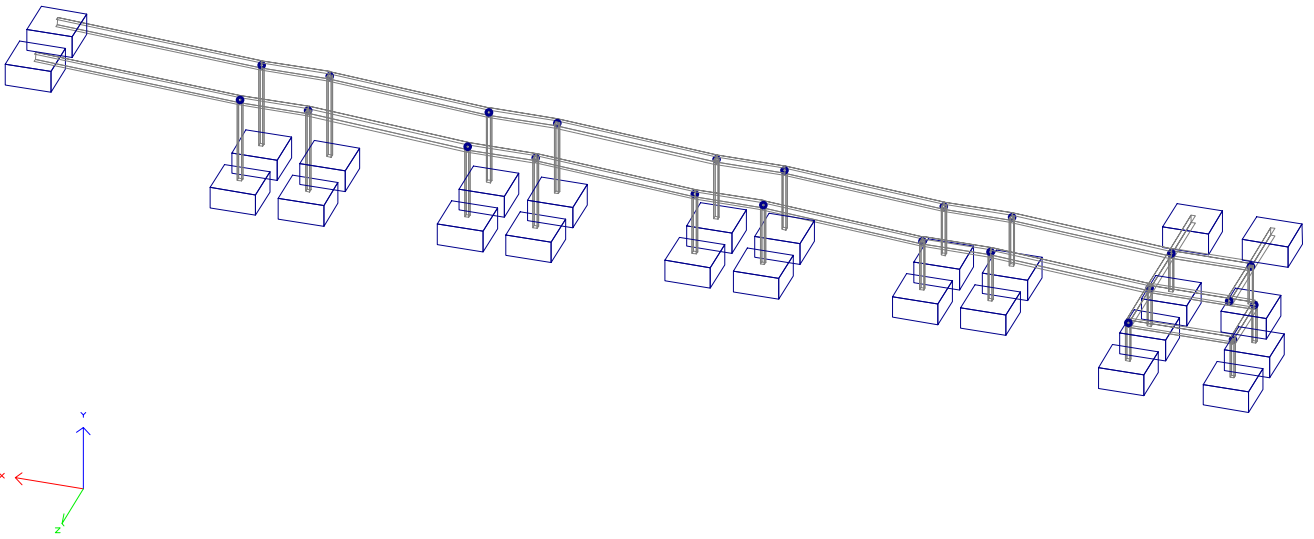


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Current View



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Design Code

Design code	Concrete code	Steel Code	Wind Code
BS	BS8110-Amd.3	BS5950:2000	BS 6399-2

Members

Mbr ref	Member type	Start joint	Start fixity	End joint	End fixity	Orient (°)	Directional behaviour	Length (m)	P-Delta behaviour	Slope (°)
1	90x90x5.0 SHS	33	Partial	51	Partial	0.0	Normal	1.940	Normal	90.0
2	90x90x5.0 SHS	32	Partial	50	Partial	0.0	Normal	1.940	Normal	90.0
3	90x90x5.0 SHS	31	Partial	49	Partial	0.0	Normal	1.940	Normal	90.0
4	90x90x5.0 SHS	30	Partial	48	Partial	0.0	Normal	1.940	Normal	90.0
5	90x90x5.0 SHS	29	Partial	47	Partial	0.0	Normal	1.680	Normal	90.0
6	90x90x5.0 SHS	28	Partial	46	Partial	0.0	Normal	1.680	Normal	90.0
7	90x90x5.0 SHS	27	Partial	45	Partial	0.0	Normal	1.680	Normal	90.0
8	90x90x5.0 SHS	26	Partial	44	Partial	0.0	Normal	1.680	Normal	90.0
9	90x90x5.0 SHS	25	Partial	43	Partial	0.0	Normal	1.420	Normal	90.0
10	90x90x5.0 SHS	24	Partial	42	Partial	0.0	Normal	1.420	Normal	90.0
11	90x90x5.0 SHS	23	Partial	41	Partial	0.0	Normal	1.420	Normal	90.0
12	90x90x5.0 SHS	22	Partial	40	Partial	0.0	Normal	1.420	Normal	90.0
13	90x90x5.0 SHS	21	Partial	39	Partial	0.0	Normal	1.160	Normal	90.0
14	90x90x5.0 SHS	20	Partial	38	Partial	0.0	Normal	1.160	Normal	90.0
15	90x90x5.0 SHS	3	Partial	13	Partial	0.0	Normal	0.900	Normal	90.0
16	90x90x5.0 SHS	9	Partial	17	Partial	0.0	Normal	0.900	Normal	90.0
19	180x90 UKPFC26	10	Partial	13	Partial	0.0	Normal	2.300	Normal	0.0
20	180x90 UKPFC26	13	Partial	14	Partial	0.0	Normal	1.500	Normal	0.0
21	180x90 UKPFC26	17	Partial	8	Partial	0.0	Normal	1.500	Normal	0.0
25	180x90 UKPFC26	53	Partial	51	Partial	0.0	Normal	4.508	Normal	-3.3
26	180x90 UKPFC26	51	Partial	49	Partial	0.0	Normal	1.500	Normal	0.0
27	180x90 UKPFC26	49	Partial	47	Partial	0.0	Normal	3.510	Normal	-4.2
28	180x90 UKPFC26	47	Partial	45	Partial	0.0	Normal	1.500	Normal	0.0
29	180x90 UKPFC26	45	Partial	43	Partial	0.0	Normal	3.510	Normal	-4.2
30	180x90 UKPFC26	43	Partial	41	Partial	0.0	Normal	1.500	Normal	0.0
31	180x90 UKPFC26	41	Partial	39	Partial	0.0	Normal	3.510	Normal	-4.2
32	180x90 UKPFC26	39	Partial	37	Partial	0.0	Normal	1.500	Normal	0.0
33	180x90 UKPFC26	37	Partial	14	Partial	0.0	Normal	3.510	Normal	-4.2
34	180x90 UKPFC26	14	Partial	17	Partial	0.0	Normal	1.500	Normal	0.0
35	180x90 UKPFC26	52	Partial	50	Partial	0.0	Normal	4.508	Normal	-3.3
36	180x90 UKPFC26	50	Partial	48	Partial	0.0	Normal	1.500	Normal	0.0
37	180x90 UKPFC26	48	Partial	46	Partial	0.0	Normal	3.510	Normal	-4.2
38	180x90 UKPFC26	46	Partial	44	Partial	0.0	Normal	1.500	Normal	0.0
39	180x90 UKPFC26	44	Partial	42	Partial	0.0	Normal	3.510	Normal	-4.2
40	180x90 UKPFC26	42	Partial	40	Partial	0.0	Normal	1.500	Normal	0.0
41	180x90 UKPFC26	40	Partial	38	Partial	0.0	Normal	3.510	Normal	-4.2
42	180x90 UKPFC26	38	Partial	36	Partial	0.0	Normal	1.500	Normal	0.0
43	180x90 UKPFC26	36	Partial	17	Partial	0.0	Normal	3.510	Normal	-4.2

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Members(continued)

<i>Mbr ref</i>	<i>Member type</i>	<i>Start joint</i>	<i>Start fixity</i>	<i>End joint</i>	<i>End fixity</i>	<i>Orient (°)</i>	<i>Directional behaviour</i>	<i>Length (m)</i>	<i>P-Delta behaviour</i>	<i>Slope (°)</i>
44	90x90x5.0 SHS	55	Partial	11	Partial	0.0	Normal	0.900	Normal	90.0
45	90x90x5.0 SHS	10	Partial	54	Partial	0.0	Normal	0.900	Normal	-90.0
46	90x90x5.0 SHS	19	Partial	37	Partial	0.0	Normal	1.160	Normal	90.0
47	90x90x5.0 SHS	18	Partial	36	Partial	0.0	Normal	1.160	Normal	90.0
49	180x90 UKPFC26	57	Partial	17	Partial	0.0	Normal	1.750	Normal	0.0
50	180x90 UKPFC26	57	Partial	5	Partial	0.0	Normal	1.500	Normal	0.0
51	90x90x5.0 SHS	58	Partial	57	Partial	0.0	Normal	0.900	Normal	90.0
52	90x90x5.0 SHS	56	Partial	14	Partial	0.0	Normal	0.900	Normal	90.0
53	180x90 UKPFC26	11	Fixed	12	Fixed	0.0	Normal	0.550	Normal	0.0
54	180x90 UKPFC26	12	Fixed	14	Fixed	0.0	Normal	1.750	Normal	0.0
55	180x90 UKPFC26	12	Fixed	57	Partial	0.0	Normal	1.500	Normal	0.0
56	180x90 UKPFC26	10	Fixed	11	Fixed	0.0	Normal	1.500	Normal	0.0

Joints

<i>Joint ref</i>	<i>X pos (m)</i>	<i>Y pos (m)</i>	<i>Z pos (m)</i>	<i>Joint ref</i>	<i>X pos (m)</i>	<i>Y pos (m)</i>	<i>Z pos (m)</i>	<i>Joint ref</i>	<i>X pos (m)</i>	<i>Y pos (m)</i>	<i>Z pos (m)</i>
3	3.500	0.000	4.500	5	1.750	0.900	0.000	8	3.500	0.900	0.000
9	3.500	0.000	1.500	10	1.200	0.900	4.500	11	1.200	0.900	3.000
12	1.750	0.900	3.000	13	3.500	0.900	4.500	14	3.500	0.900	3.000
17	3.500	0.900	1.500	18	7.000	0.000	1.500	19	7.000	0.000	3.000
20	8.500	0.000	1.500	21	8.500	0.000	3.000	22	12.000	0.000	1.500
23	12.000	0.000	3.000	24	13.500	0.000	1.500	25	13.500	0.000	3.000
26	17.000	0.000	1.500	27	17.000	0.000	3.000	28	18.500	0.000	1.500
29	18.500	0.000	3.000	30	22.000	0.000	1.500	31	22.000	0.000	3.000
32	23.500	0.000	1.500	33	23.500	0.000	3.000	36	7.000	1.160	1.500
37	7.000	1.160	3.000	38	8.500	1.160	1.500	39	8.500	1.160	3.000
40	12.000	1.420	1.500	41	12.000	1.420	3.000	42	13.500	1.420	1.500
43	13.500	1.420	3.000	44	17.000	1.680	1.500	45	17.000	1.680	3.000
46	18.500	1.680	1.500	47	18.500	1.680	3.000	48	22.000	1.940	1.500
49	22.000	1.940	3.000	50	23.500	1.940	1.500	51	23.500	1.940	3.000
52	28.000	2.200	1.500	53	28.000	2.200	3.000	54	1.200	0.000	4.500
55	1.200	0.000	3.000	56	3.500	0.000	3.000	57	1.750	0.900	1.500
58	1.750	0.000	1.500								

Member Partial end Fixities

Mem ref.	Start Fixity type	Values (local axes)			End Fixity type	Values (local axes)		
		x	y			x	y	
		normal	lateral	units		normal	lateral	units
1	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
2	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
3	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
4	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor



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Member Partial end Fixities (continued)

Mem ref.	Start Fixity type	Values (local axes)			End Fixity type	Values (local axes)		
		x normal	y lateral	units		x normal	y lateral	units
5	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
6	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
7	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
8	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
9	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
10	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
11	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
12	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
13	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
14	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
15	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
16	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
19	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
20	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
21	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
25	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
26	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
27	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
28	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
29	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
30	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
31	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
32	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
33	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
34	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
35	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
36	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
37	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
38	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
39	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
40	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
41	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
42	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
43	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
44	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
45	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
46	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
47	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
49	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
50	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
51	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor
52	Proportion of full fixity	0.05	0.05	factor	Proportion of full fixity	0.05	0.05	factor

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Member Partial end Fixities (continued)

Mem ref.	Start Fixity type	Values (local axes)			End Fixity type	Values (local axes)		
		x normal	y lateral	units		x normal	y lateral	units
55	Fixed				Proportion of full fixity	0.05	0.05	factor

Supports

Joint ref	Support type	X Trans. (kN/mm)	Y Trans. (kN/mm)	Z Trans. (kN/mm)	X Rot. (kNm/Rad)	Y Rot. (kNm/Rad)	Z Rot. (kNm/Rad)	Direction control
3	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
5	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
8	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
9	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
18	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
19	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
20	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
21	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
22	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
23	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
24	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
25	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
26	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
27	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
28	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
29	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
30	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
31	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
32	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
33	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
52	Pinned	Fixed	Fixed	Fixed	Free	Free	Free	Normal
53	Pinned	Fixed	Fixed	Fixed	Free	Free	Free	Normal
54	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
55	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
56	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal
58	Pinned Base	Fixed	Fixed	Fixed	Free	Fixed	Free	Normal

Sections

Reference	Area (cm²)	Ixx (cm4)	Iyy (cm4)	J (cm4)	Elements (mm)				
					No	Width	Height	Vert. off	Lat. off
305x165 UKB40	51.3	8503	764	14.7					
80x80x5.0 SHS	14.7	137	137	217					
180x75 UKPFC20	25.9	1370	146	7.34					
180x90 UKPFC26	33.2	1820	277	13.3					
90x90x5.0 SHS	16.7	200	200	316					

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Materials

Material reference	Elastic modulus (kN/mm ²)	Poisson ratio	Density (kN/m ³)	Thermal expansion (°Cx10-6)
UK-S275	205.00	0.30	77.00	12.00

Member Types

Reference	Shape	Material	Seg no	Start section	End section	Length (m)	Depth (mm)	Placing rule
90x90x5.0 SHS	SW Library	UK-S275	1	90x90x5.0 SHS				
180x90 UKPFC26	SW Library	UK-S275	1	180x90 UKPFC26				

Self Weights

Mem ref	Self weight (kN)	Mem ref	Self weight (kN)	Mem ref	Self weight (kN)	Mem ref	Self weight (kN)
1	0.249	2	0.249	3	0.249	4	0.249
5	0.216	6	0.216	7	0.216	8	0.216
9	0.183	10	0.183	11	0.183	12	0.183
13	0.149	14	0.149	15	0.116	16	0.116
19	0.588	20	0.383	21	0.383	25	1.152
26	0.383	27	0.897	28	0.383	29	0.897
30	0.383	31	0.897	32	0.383	33	0.897
34	0.383	35	1.152	36	0.383	37	0.897
38	0.383	39	0.897	40	0.383	41	0.897
42	0.383	43	0.897	44	0.116	45	0.116
46	0.149	47	0.149	49	0.447	50	0.383
51	0.116	52	0.116	53	0.141	54	0.447
55	0.383	56	0.383				

Total self weight for selected members : 20.357 kN

Member Loads

Load reference	Load type	Start pos'n (m)	Start intensity (kN) & (m)	End pos'n (m)	End intensity (kN) & (m)	Direction	Category
Loads on member 19 (Length 2.300m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Loads on member 20 (Length 1.500m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Loads on member 21 (Length 1.500m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Loads on member 25 (Length 4.508m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed

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Member Loads (continued)

Load reference	Load type	Start pos'n (m)	Start intensity (kN) & (m)	End pos'n (m)	End intensity (kN) & (m)	Direction	Category
<i>Loads on member 26 (Length 1.500m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 27 (Length 3.510m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 28 (Length 1.500m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 29 (Length 3.510m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 30 (Length 1.500m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 31 (Length 3.510m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 32 (Length 1.500m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 33 (Length 3.510m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 34 (Length 1.500m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 35 (Length 4.508m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 36 (Length 1.500m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 37 (Length 3.510m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 38 (Length 1.500m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 39 (Length 3.510m)</i>							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
<i>Loads on member 40 (Length 1.500m)</i>							

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Member Loads (continued)

Load reference	Load type	Start pos'n (m)	Start intensity (kN) & (m)	End pos'n (m)	End intensity (kN) & (m)	Direction	Category
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Loads on member 41 (Length 3.510m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Loads on member 42 (Length 1.500m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Loads on member 43 (Length 3.510m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Loads on member 49 (Length 1.750m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Loads on member 50 (Length 1.500m)							
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Loads on member 53 (Length 0.550m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Loads on member 54 (Length 1.750m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Loads on member 55 (Length 1.500m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed
Loads on member 56 (Length 1.500m)							
Dead 0.75m	UL		0.400			Vertical (-Y)	Dead
Live 0.75m	UL		2.250			Vertical (-Y)	Imposed

Load Combinations

Load Category			Partial Safety Factors				
No	Name	Type	Sub type	1	2	3	4
	Combination reference			ULS	SLS	Dead	Live
	Limit state			ULS	SLS	SLS	SLS
	Elastic analysis			Linear	Linear	Linear	Linear
	Plastic analysis			No	No	No	No
1	Self Weight	Permanent	Self weight	1.40	1.00	1.00	0.00
2	Dead	Permanent	Permanent	1.40	1.00	1.00	0.00
3	Imposed	Variable	Cat B: office	1.60	1.00	0.00	1.00

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Member Axial and Shear Effect Envelopes

Interval no	Interval pos. (m)	Maximum Axial (kN)	Maximum Shear (kN)		Minimum Axial (kN)	Minimum Shear (kN)	
			Normal	Lateral		Normal	Lateral
Member 1							
0	0.000	14.051	0.000	0.000	0.000	-0.011	0.000
1	0.485	13.963	0.000	0.000	0.000	-0.011	0.000
2	0.970	13.876	0.000	0.000	0.000	-0.011	0.000
3	1.455	13.789	0.000	0.000	0.000	-0.011	0.000
4	1.940	13.701	0.000	0.000	0.000	-0.011	0.000
Member 2							
0	0.000	14.052	0.000	0.000	0.000	-0.011	0.000
1	0.485	13.965	0.000	0.000	0.000	-0.011	0.000
2	0.970	13.878	0.000	0.000	0.000	-0.011	0.000
3	1.455	13.790	0.000	0.000	0.000	-0.011	0.000
4	1.940	13.703	0.000	0.000	0.000	-0.011	0.000
Member 3							
0	0.000	11.567	0.006	0.000	0.000	0.000	0.000
1	0.485	11.480	0.006	0.000	0.000	0.000	0.000
2	0.970	11.392	0.006	0.000	0.000	0.000	0.000
3	1.455	11.305	0.006	0.000	0.000	0.000	0.000
4	1.940	11.218	0.006	0.000	0.000	0.000	0.000
Member 4							
0	0.000	11.565	0.006	0.000	0.000	0.000	0.000
1	0.485	11.478	0.006	0.000	0.000	0.000	0.000
2	0.970	11.390	0.006	0.000	0.000	0.000	0.000
3	1.455	11.303	0.006	0.000	0.000	0.000	0.000
4	1.940	11.216	0.006	0.000	0.000	0.000	0.000
Member 5							
0	0.000	11.600	0.000	0.000	0.000	-0.007	0.000
1	0.420	11.524	0.000	0.000	0.000	-0.007	0.000
2	0.840	11.449	0.000	0.000	0.000	-0.007	0.000
3	1.260	11.373	0.000	0.000	0.000	-0.007	0.000
4	1.680	11.297	0.000	0.000	0.000	-0.007	0.000
Member 6							
0	0.000	11.602	0.000	0.000	0.000	-0.007	0.000
1	0.420	11.526	0.000	0.000	0.000	-0.007	0.000
2	0.840	11.451	0.000	0.000	0.000	-0.007	0.000
3	1.260	11.375	0.000	0.000	0.000	-0.007	0.000
4	1.680	11.299	0.000	0.000	0.000	-0.007	0.000
Member 7							
0	0.000	11.598	0.007	0.000	0.000	0.000	0.000
1	0.420	11.522	0.007	0.000	0.000	0.000	0.000
2	0.840	11.447	0.007	0.000	0.000	0.000	0.000
3	1.260	11.371	0.007	0.000	0.000	0.000	0.000
4	1.680	11.295	0.007	0.000	0.000	0.000	0.000
Member 8							

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Member Axial and Shear Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum Axial (kN)	Maximum Shear (kN)		Minimum Axial (kN)	Minimum Shear (kN)	
			Normal	Lateral		Normal	Lateral
0	0.000	11.596	0.007	0.000	0.000	0.000	0.000
1	0.420	11.520	0.007	0.000	0.000	0.000	0.000
2	0.840	11.445	0.007	0.000	0.000	0.000	0.000
3	1.260	11.369	0.007	0.000	0.000	0.000	0.000
4	1.680	11.293	0.007	0.000	0.000	0.000	0.000
Member 9							
0	0.000	11.553	0.000	0.000	0.000	-0.010	0.000
1	0.355	11.489	0.000	0.000	0.000	-0.010	0.000
2	0.710	11.425	0.000	0.000	0.000	-0.010	0.000
3	1.065	11.361	0.000	0.000	0.000	-0.010	0.000
4	1.420	11.298	0.000	0.000	0.000	-0.010	0.000
Member 10							
0	0.000	11.555	0.000	0.000	0.000	-0.010	0.000
1	0.355	11.491	0.000	0.000	0.000	-0.010	0.000
2	0.710	11.427	0.000	0.000	0.000	-0.010	0.000
3	1.065	11.364	0.000	0.000	0.000	-0.010	0.000
4	1.420	11.300	0.000	0.000	0.000	-0.010	0.000
Member 11							
0	0.000	11.551	0.010	0.000	0.000	0.000	0.000
1	0.355	11.487	0.010	0.000	0.000	0.000	0.000
2	0.710	11.423	0.010	0.000	0.000	0.000	0.000
3	1.065	11.359	0.010	0.000	0.000	0.000	0.000
4	1.420	11.295	0.010	0.000	0.000	0.000	0.000
Member 12							
0	0.000	11.549	0.010	0.000	0.000	0.000	0.000
1	0.355	11.485	0.010	0.000	0.000	0.000	0.000
2	0.710	11.421	0.010	0.000	0.000	0.000	0.000
3	1.065	11.357	0.010	0.000	0.000	0.000	0.000
4	1.420	11.293	0.010	0.000	0.000	0.000	0.000
Member 13							
0	0.000	11.507	0.000	0.000	0.000	-0.015	0.000
1	0.290	11.455	0.000	0.000	0.000	-0.015	0.000
2	0.580	11.403	0.000	0.000	0.000	-0.015	0.000
3	0.870	11.350	0.000	0.000	0.000	-0.015	0.000
4	1.160	11.298	0.000	0.000	0.000	-0.015	0.000
Member 14							
0	0.000	11.508	0.000	0.000	0.000	-0.015	0.000
1	0.290	11.456	0.000	0.000	0.000	-0.015	0.000
2	0.580	11.404	0.000	0.000	0.000	-0.015	0.000
3	0.870	11.352	0.000	0.000	0.000	-0.015	0.000
4	1.160	11.299	0.000	0.000	0.000	-0.015	0.000
Member 15							
0	0.000	8.725	0.025	0.000	0.000	0.000	-0.008

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Member Axial and Shear Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum Axial (kN)	Maximum Shear (kN)		Minimum Axial (kN)	Minimum Shear (kN)	
			Normal	Lateral		Normal	Lateral
1	0.225	8.685	0.025	0.000	0.000	0.000	-0.008
2	0.450	8.644	0.025	0.000	0.000	0.000	-0.008
3	0.675	8.604	0.025	0.000	0.000	0.000	-0.008
4	0.900	8.563	0.025	0.000	0.000	0.000	-0.008
Member 16							
0	0.000	18.912	0.000	0.001	0.000	-0.023	0.000
1	0.225	18.871	0.000	0.001	0.000	-0.023	0.000
2	0.450	18.831	0.000	0.001	0.000	-0.023	0.000
3	0.675	18.790	0.000	0.001	0.000	-0.023	0.000
4	0.900	18.750	0.000	0.001	0.000	-0.023	0.000
Member 19							
0	0.000	0.025	5.195	0.000	0.000	0.000	0.000
1	0.575	0.025	2.597	0.000	0.000	0.000	0.000
2	1.150	0.025	0.000	0.000	0.000	0.000	0.000
3	1.725	0.025	0.000	0.000	0.000	-2.598	0.000
4	2.300	0.025	0.000	0.000	0.000	-5.196	0.000
Member 20							
0	0.000	0.008	3.367	0.000	0.000	0.000	0.000
1	0.375	0.008	1.673	0.000	0.000	0.000	0.000
2	0.750	0.008	0.000	0.000	0.000	-0.021	0.000
3	1.125	0.008	0.000	0.000	0.000	-1.715	0.000
4	1.500	0.008	0.000	0.000	0.000	-3.410	0.000
Member 21							
0	0.000	0.007	3.414	0.000	0.000	0.000	0.000
1	0.375	0.007	1.720	0.000	0.000	0.000	0.000
2	0.750	0.007	0.026	0.000	0.000	0.000	0.000
3	1.125	0.007	0.000	0.000	0.000	-1.668	0.000
4	1.500	0.007	0.000	0.000	0.000	-3.362	0.000
Member 25							
0	0.000	0.000	10.082	0.000	-0.571	0.000	0.000
1	1.127	0.000	5.007	0.000	-0.278	0.000	0.000
2	2.254	0.015	0.000	0.000	0.000	-0.068	0.000
3	3.381	0.308	0.000	0.000	0.000	-5.142	0.000
4	4.508	0.602	0.000	0.000	0.000	-10.217	0.000
Member 26							
0	0.000	0.001	3.466	0.000	0.000	0.000	0.000
1	0.375	0.001	1.772	0.000	0.000	0.000	0.000
2	0.750	0.001	0.078	0.000	0.000	0.000	0.000
3	1.125	0.001	0.000	0.000	0.000	-1.616	0.000
4	1.500	0.001	0.000	0.000	0.000	-3.310	0.000
Member 27							
0	0.000	0.000	7.886	0.000	-0.580	0.000	0.000
1	0.877	0.000	3.943	0.000	-0.287	0.000	0.000

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Member Axial and Shear Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum Axial (kN)	Maximum Shear (kN)		Minimum Axial (kN)	Minimum Shear (kN)	
			Normal	Lateral		Normal	Lateral
2	1.755	0.006	0.000	0.000	0.000	0.000	0.000
3	2.632	0.299	0.000	0.000	0.000	-3.943	0.000
4	3.510	0.592	0.000	0.000	0.000	-7.887	0.000
Member 28							
0	0.000	0.000	3.389	0.000	-0.001	0.000	0.000
1	0.375	0.000	1.695	0.000	-0.001	0.000	0.000
2	0.750	0.000	0.000	0.000	-0.001	0.000	0.000
3	1.125	0.000	0.000	0.000	-0.001	-1.694	0.000
4	1.500	0.000	0.000	0.000	-0.001	-3.388	0.000
Member 29							
0	0.000	0.000	7.886	0.000	-0.580	0.000	0.000
1	0.877	0.000	3.943	0.000	-0.287	0.000	0.000
2	1.755	0.006	0.000	0.000	0.000	0.000	0.000
3	2.632	0.299	0.000	0.000	0.000	-3.943	0.000
4	3.510	0.592	0.000	0.000	0.000	-7.887	0.000
Member 30							
0	0.000	0.000	3.389	0.000	-0.004	0.000	0.000
1	0.375	0.000	1.695	0.000	-0.004	0.000	0.000
2	0.750	0.000	0.000	0.000	-0.004	0.000	0.000
3	1.125	0.000	0.000	0.000	-0.004	-1.694	0.000
4	1.500	0.000	0.000	0.000	-0.004	-3.388	0.000
Member 31							
0	0.000	0.000	7.886	0.000	-0.580	0.000	0.000
1	0.877	0.000	3.943	0.000	-0.287	0.000	0.000
2	1.755	0.006	0.000	0.000	0.000	0.000	0.000
3	2.632	0.299	0.000	0.000	0.000	-3.944	0.000
4	3.510	0.592	0.000	0.000	0.000	-7.887	0.000
Member 32							
0	0.000	0.000	3.389	0.000	-0.009	0.000	0.000
1	0.375	0.000	1.695	0.000	-0.009	0.000	0.000
2	0.750	0.000	0.001	0.000	-0.009	0.000	0.000
3	1.125	0.000	0.000	0.000	-0.009	-1.693	0.000
4	1.500	0.000	0.000	0.000	-0.009	-3.388	0.000
Member 33							
0	0.000	0.000	7.850	0.000	-0.577	0.000	0.000
1	0.877	0.000	3.906	0.000	-0.284	0.000	0.000
2	1.755	0.009	0.000	0.000	0.000	-0.037	0.000
3	2.632	0.302	0.000	0.000	0.000	-3.980	0.000
4	3.510	0.595	0.000	0.000	0.000	-7.923	0.000
Member 34							
0	0.000	0.008	3.389	0.000	0.000	0.000	0.000
1	0.375	0.008	1.695	0.000	0.000	0.000	0.000
2	0.750	0.008	0.001	0.000	0.000	0.000	0.000

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Member Axial and Shear Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum Axial (kN)	Maximum Shear (kN)		Minimum Axial (kN)	Minimum Shear (kN)	
			Normal	Lateral		Normal	Lateral
3	1.125	0.008	0.000	0.000	0.000	-1.694	0.000
4	1.500	0.008	0.000	0.000	0.000	-3.388	0.000
Member 35							
0	0.000	0.000	10.082	0.000	-0.543	0.000	0.000
1	1.127	0.000	5.007	0.000	-0.250	0.000	0.000
2	2.254	0.043	0.000	0.000	0.000	-0.068	0.000
3	3.381	0.336	0.000	0.000	0.000	-5.142	0.000
4	4.508	0.630	0.000	0.000	0.000	-10.217	0.000
Member 36							
0	0.000	0.028	3.466	0.000	0.000	0.000	0.000
1	0.375	0.028	1.772	0.000	0.000	0.000	0.000
2	0.750	0.028	0.078	0.000	0.000	0.000	0.000
3	1.125	0.028	0.000	0.000	0.000	-1.616	0.000
4	1.500	0.028	0.000	0.000	0.000	-3.310	0.000
Member 37							
0	0.000	0.000	7.886	0.000	-0.552	0.000	0.000
1	0.877	0.000	3.943	0.000	-0.259	0.000	0.000
2	1.755	0.034	0.000	0.000	0.000	0.000	0.000
3	2.632	0.327	0.000	0.000	0.000	-3.943	0.000
4	3.510	0.620	0.000	0.000	0.000	-7.887	0.000
Member 38							
0	0.000	0.027	3.389	0.000	0.000	0.000	0.000
1	0.375	0.027	1.695	0.000	0.000	0.000	0.000
2	0.750	0.027	0.000	0.000	0.000	0.000	0.000
3	1.125	0.027	0.000	0.000	0.000	-1.694	0.000
4	1.500	0.027	0.000	0.000	0.000	-3.388	0.000
Member 39							
0	0.000	0.000	7.886	0.000	-0.552	0.000	0.000
1	0.877	0.000	3.943	0.000	-0.259	0.000	0.000
2	1.755	0.034	0.000	0.000	0.000	0.000	0.000
3	2.632	0.327	0.000	0.000	0.000	-3.943	0.000
4	3.510	0.620	0.000	0.000	0.000	-7.887	0.000
Member 40							
0	0.000	0.024	3.389	0.000	0.000	0.000	0.000
1	0.375	0.024	1.695	0.000	0.000	0.000	0.000
2	0.750	0.024	0.000	0.000	0.000	0.000	0.000
3	1.125	0.024	0.000	0.000	0.000	-1.694	0.000
4	1.500	0.024	0.000	0.000	0.000	-3.388	0.000
Member 41							
0	0.000	0.000	7.886	0.000	-0.552	0.000	0.000
1	0.877	0.000	3.943	0.000	-0.259	0.000	0.000
2	1.755	0.034	0.000	0.000	0.000	0.000	0.000
3	2.632	0.327	0.000	0.000	0.000	-3.944	0.000

 Vale Consultancy CONSULTING CIVIL & STRUCTURAL ENGINEERS	Rogerstone Library Tregwilym Road Newport NP10 9EL	Job No	23343
		Job Ref	Walkway
		Designed By	LM
		Checked By	CD
		Date	23.11.2025
		Revision No	1.0
		Calc No	1.0
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Member Axial and Shear Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum Axial (kN)	Maximum Shear (kN)		Minimum Axial (kN)	Minimum Shear (kN)	
			Normal	Lateral		Normal	Lateral
4	3.510	0.620	0.000	0.000	0.000	-7.887	0.000
Member 42							
0	0.000	0.019	3.389	0.000	0.000	0.000	0.000
1	0.375	0.019	1.694	0.000	0.000	0.000	0.000
2	0.750	0.019	0.000	0.000	0.000	0.000	0.000
3	1.125	0.019	0.000	0.000	0.000	-1.694	0.000
4	1.500	0.019	0.000	0.000	0.000	-3.388	0.000
Member 43							
0	0.000	0.000	7.886	0.000	-0.551	0.000	0.000
1	0.877	0.000	3.942	0.000	-0.259	0.000	0.000
2	1.755	0.034	0.000	0.000	0.000	-0.001	0.000
3	2.632	0.327	0.000	0.000	0.000	-3.944	0.000
4	3.510	0.620	0.000	0.000	0.000	-7.887	0.000
Member 44							
0	0.000	11.152	0.000	0.008	0.000	-0.043	0.000
1	0.225	11.111	0.000	0.008	0.000	-0.043	0.000
2	0.450	11.071	0.000	0.008	0.000	-0.043	0.000
3	0.675	11.030	0.000	0.008	0.000	-0.043	0.000
4	0.900	10.990	0.000	0.008	0.000	-0.043	0.000
Member 45							
0	0.000	8.583	0.000	0.009	0.000	-0.025	0.000
1	0.225	8.624	0.000	0.009	0.000	-0.025	0.000
2	0.450	8.664	0.000	0.009	0.000	-0.025	0.000
3	0.675	8.705	0.000	0.009	0.000	-0.025	0.000
4	0.900	8.745	0.000	0.009	0.000	-0.025	0.000
Member 46							
0	0.000	11.467	0.015	0.000	0.000	0.000	0.000
1	0.290	11.415	0.015	0.000	0.000	0.000	0.000
2	0.580	11.363	0.015	0.000	0.000	0.000	0.000
3	0.870	11.311	0.015	0.000	0.000	0.000	0.000
4	1.160	11.258	0.015	0.000	0.000	0.000	0.000
Member 47							
0	0.000	11.502	0.015	0.000	0.000	0.000	0.000
1	0.290	11.450	0.015	0.000	0.000	0.000	0.000
2	0.580	11.397	0.015	0.000	0.000	0.000	0.000
3	0.870	11.345	0.015	0.000	0.000	0.000	0.000
4	1.160	11.293	0.015	0.000	0.000	0.000	0.000
Member 49							
0	0.000	0.011	3.870	0.000	0.000	0.000	0.000
1	0.438	0.011	1.893	0.000	0.000	0.000	0.000
2	0.875	0.011	0.000	0.000	0.000	-0.083	0.000
3	1.313	0.011	0.000	0.000	0.000	-2.060	0.000
4	1.750	0.011	0.000	0.000	0.000	-4.036	0.000

 Vale Consultancy CONSULTING CIVIL & STRUCTURAL ENGINEERS	Rogerstone Library Tregwilym Road Newport NP10 9EL	Job No	23343
		Job Ref	Walkway
		Designed By	LM
		Checked By	CD
		Date	23.11.2025
		Revision No	1.0
		Calc No	1.0
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Member Axial and Shear Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum Axial (kN)	Maximum Shear (kN)		Minimum Axial (kN)	Minimum Shear (kN)	
			Normal	Lateral		Normal	Lateral
Member 50							
0	0.000	0.000	3.436	0.000	-0.006	0.000	0.000
1	0.375	0.000	1.742	0.000	-0.006	0.000	0.000
2	0.750	0.000	0.048	0.000	-0.006	0.000	0.000
3	1.125	0.000	0.000	0.000	-0.006	-1.646	0.000
4	1.500	0.000	0.000	0.000	-0.006	-3.341	0.000
Member 51							
0	0.000	10.909	0.000	0.007	0.000	-0.012	0.000
1	0.225	10.868	0.000	0.007	0.000	-0.012	0.000
2	0.450	10.828	0.000	0.007	0.000	-0.012	0.000
3	0.675	10.787	0.000	0.007	0.000	-0.012	0.000
4	0.900	10.747	0.000	0.007	0.000	-0.012	0.000
Member 52							
0	0.000	21.033	0.036	0.000	0.000	0.000	0.000
1	0.225	20.992	0.036	0.000	0.000	0.000	0.000
2	0.450	20.951	0.036	0.000	0.000	0.000	0.000
3	0.675	20.911	0.036	0.000	0.000	0.000	0.000
4	0.900	20.870	0.036	0.000	0.000	0.000	0.000
Member 53							
0	0.000	0.043	7.601	0.000	0.000	0.000	0.000
1	0.138	0.043	6.980	0.000	0.000	0.000	0.000
2	0.275	0.043	6.358	0.000	0.000	0.000	0.000
3	0.412	0.043	5.737	0.000	0.000	0.000	0.000
4	0.550	0.043	5.116	0.000	0.000	0.000	0.000
Member 54							
0	0.000	0.043	1.780	0.000	0.000	0.000	0.000
1	0.438	0.043	0.000	0.000	0.000	-0.197	0.000
2	0.875	0.043	0.000	0.000	0.000	-2.173	0.000
3	1.313	0.043	0.000	0.000	0.000	-4.150	0.000
4	1.750	0.043	0.000	0.000	0.000	-6.127	0.000
Member 55							
0	0.000	0.001	3.336	0.000	0.000	0.000	0.000
1	0.375	0.001	1.642	0.000	0.000	0.000	0.000
2	0.750	0.001	0.000	0.000	0.000	-0.052	0.000
3	1.125	0.001	0.000	0.000	0.000	-1.746	0.000
4	1.500	0.001	0.000	0.000	0.000	-3.441	0.000
Member 56							
0	0.000	0.009	3.388	0.000	0.000	0.000	0.000
1	0.375	0.009	1.694	0.000	0.000	0.000	0.000
2	0.750	0.009	0.000	0.000	0.000	0.000	0.000
3	1.125	0.009	0.000	0.000	0.000	-1.695	0.000
4	1.500	0.009	0.000	0.000	0.000	-3.389	0.000

 Vale Consultancy CONSULTING CIVIL & STRUCTURAL ENGINEERS	Rogerstone Library Tregwilym Road Newport NP10 9EL	Job No	23343
		Job Ref	Walkway
		Designed By	LM
		Checked By	CD
		Date	23.11.2025
		Revision No	1.0
		Calc No	1.0
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Member Moment Effect Envelopes

Interval no	Interval pos. (m)	Maximum (kNm)			Minimum (kNm)		
		Torsion	Normal	Lateral	Torsion	Normal	Lateral
Member 1							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.485	0.000	0.000	0.000	0.000	-0.005	0.000
2	0.970	0.000	0.000	0.000	0.000	-0.010	0.000
3	1.455	0.000	0.000	0.000	0.000	-0.016	0.000
4	1.940	0.000	0.000	0.000	0.000	-0.021	0.000
Member 2							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.485	0.000	0.000	0.000	0.000	-0.005	0.000
2	0.970	0.000	0.000	0.000	0.000	-0.010	0.000
3	1.455	0.000	0.000	0.000	0.000	-0.016	0.000
4	1.940	0.000	0.000	0.000	0.000	-0.021	0.000
Member 3							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.485	0.000	0.003	0.000	0.000	0.000	0.000
2	0.970	0.000	0.005	0.000	0.000	0.000	0.000
3	1.455	0.000	0.008	0.000	0.000	0.000	0.000
4	1.940	0.000	0.011	0.000	0.000	0.000	0.000
Member 4							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.485	0.000	0.003	0.000	0.000	0.000	0.000
2	0.970	0.000	0.005	0.000	0.000	0.000	0.000
3	1.455	0.000	0.008	0.000	0.000	0.000	0.000
4	1.940	0.000	0.011	0.000	0.000	0.000	0.000
Member 5							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.420	0.000	0.000	0.000	0.000	-0.003	0.000
2	0.840	0.000	0.000	0.000	0.000	-0.006	0.000
3	1.260	0.000	0.000	0.000	0.000	-0.009	0.000
4	1.680	0.000	0.000	0.000	0.000	-0.012	0.000
Member 6							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.420	0.000	0.000	0.000	0.000	-0.003	0.000
2	0.840	0.000	0.000	0.000	0.000	-0.006	0.000
3	1.260	0.000	0.000	0.000	0.000	-0.009	0.000
4	1.680	0.000	0.000	0.000	0.000	-0.012	0.000
Member 7							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.420	0.000	0.003	0.000	0.000	0.000	0.000
2	0.840	0.000	0.006	0.000	0.000	0.000	0.000
3	1.260	0.000	0.009	0.000	0.000	0.000	0.000
4	1.680	0.000	0.012	0.000	0.000	0.000	0.000
Member 8							

 Vale Consultancy CONSULTING CIVIL & STRUCTURAL ENGINEERS	Rogerstone Library Tregwilym Road Newport NP10 9EL	Job No	23343
		Job Ref	Walkway
		Designed By	LM
		Checked By	CD
		Date	23.11.2025
		Revision No	1.0
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Member Moment Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum (kNm)			Minimum (kNm)		
		Torsion	Normal	Lateral	Torsion	Normal	Lateral
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.420	0.000	0.003	0.000	0.000	0.000	0.000
2	0.840	0.000	0.006	0.000	0.000	0.000	0.000
3	1.260	0.000	0.009	0.000	0.000	0.000	0.000
4	1.680	0.000	0.012	0.000	0.000	0.000	0.000
Member 9							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.355	0.000	0.000	0.000	0.000	-0.004	0.000
2	0.710	0.000	0.000	0.000	0.000	-0.007	0.000
3	1.065	0.000	0.000	0.000	0.000	-0.011	0.000
4	1.420	0.000	0.000	0.000	0.000	-0.014	0.000
Member 10							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.355	0.000	0.000	0.000	0.000	-0.004	0.000
2	0.710	0.000	0.000	0.000	0.000	-0.007	0.000
3	1.065	0.000	0.000	0.000	0.000	-0.011	0.000
4	1.420	0.000	0.000	0.000	0.000	-0.014	0.000
Member 11							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.355	0.000	0.004	0.000	0.000	0.000	0.000
2	0.710	0.000	0.007	0.000	0.000	0.000	0.000
3	1.065	0.000	0.011	0.000	0.000	0.000	0.000
4	1.420	0.000	0.014	0.000	0.000	0.000	0.000
Member 12							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.355	0.000	0.004	0.000	0.000	0.000	0.000
2	0.710	0.000	0.007	0.000	0.000	0.000	0.000
3	1.065	0.000	0.011	0.000	0.000	0.000	0.000
4	1.420	0.000	0.014	0.000	0.000	0.000	0.000
Member 13							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.290	0.000	0.000	0.000	0.000	-0.004	0.000
2	0.580	0.000	0.000	0.000	0.000	-0.009	0.000
3	0.870	0.000	0.000	0.000	0.000	-0.013	0.000
4	1.160	0.000	0.000	0.000	0.000	-0.017	0.000
Member 14							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.290	0.000	0.000	0.000	0.000	-0.004	0.000
2	0.580	0.000	0.000	0.000	0.000	-0.009	0.000
3	0.870	0.000	0.000	0.000	0.000	-0.013	0.000
4	1.160	0.000	0.000	0.000	0.000	-0.017	0.000
Member 15							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000



Rogerstone Library
Tregwilym Road
Newport
NP10 9EL

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Job Ref Walkway
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Member Moment Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum (kNm)			Minimum (kNm)		
		Torsion	Normal	Lateral	Torsion	Normal	Lateral
1	0.225	0.000	0.006	0.000	0.000	0.000	-0.002
2	0.450	0.000	0.011	0.000	0.000	0.000	-0.004
3	0.675	0.000	0.017	0.000	0.000	0.000	-0.006
4	0.900	0.000	0.023	0.000	0.000	0.000	-0.007
Member 16							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.225	0.000	0.000	0.000	0.000	-0.005	0.000
2	0.450	0.000	0.000	0.000	0.000	-0.010	0.000
3	0.675	0.000	0.000	0.001	0.000	-0.015	0.000
4	0.900	0.000	0.000	0.001	0.000	-0.021	0.000
Member 19							
0	0.000	0.000	0.000	0.000	0.000	-0.020	0.000
1	0.575	0.000	2.220	0.000	0.000	0.000	0.000
2	1.150	0.000	2.967	0.000	0.000	0.000	0.000
3	1.725	0.000	2.220	0.000	0.000	0.000	0.000
4	2.300	0.000	0.000	0.000	0.000	-0.021	0.000
Member 20							
0	0.000	0.000	0.000	0.000	-0.002	-0.007	0.000
1	0.375	0.000	0.938	0.000	-0.002	0.000	0.000
2	0.750	0.000	1.247	0.000	-0.002	0.000	0.000
3	1.125	0.000	0.922	0.000	-0.002	0.000	0.000
4	1.500	0.000	0.000	0.000	-0.002	-0.039	0.000
Member 21							
0	0.000	0.000	0.000	0.000	0.000	-0.039	0.000
1	0.375	0.000	0.924	0.000	0.000	0.000	0.000
2	0.750	0.000	1.251	0.000	0.000	0.000	0.000
3	1.125	0.000	0.943	0.000	0.000	0.000	0.000
4	1.500	0.000	0.000	0.000	0.000	0.000	0.000
Member 25							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	1.127	0.000	8.502	0.000	0.000	0.000	0.000
2	2.254	0.000	11.285	0.000	0.000	0.000	0.000
3	3.381	0.000	8.350	0.000	0.000	0.000	0.000
4	4.508	0.000	0.000	0.000	0.000	-0.304	0.000
Member 26							
0	0.000	0.000	0.000	0.000	0.000	-0.284	0.000
1	0.375	0.000	0.699	0.000	0.000	0.000	0.000
2	0.750	0.000	1.046	0.000	0.000	0.000	0.000
3	1.125	0.000	0.757	0.000	0.000	0.000	0.000
4	1.500	0.000	0.000	0.000	0.000	-0.167	0.000
Member 27							
0	0.000	0.000	0.000	0.000	0.000	-0.177	0.000
1	0.877	0.000	5.012	0.000	0.000	0.000	0.000

 Vale Consultancy CONSULTING CIVIL & STRUCTURAL ENGINEERS	Rogerstone Library Tregwilym Road Newport NP10 9EL	Job No	23343
		Job Ref	Walkway
		Designed By	LM
		Checked By	CD
		Date	23.11.2025
		Revision No	1.0
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Member Moment Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum (kNm)			Minimum (kNm)		
		Torsion	Normal	Lateral	Torsion	Normal	Lateral
2	1.755	0.000	6.742	0.000	0.000	0.000	0.000
3	2.632	0.000	5.012	0.000	0.000	0.000	0.000
4	3.510	0.000	0.000	0.000	0.000	-0.178	0.000
Member 28							
0	0.000	0.000	0.000	0.000	0.000	-0.166	0.000
1	0.375	0.000	0.787	0.000	0.000	0.000	0.000
2	0.750	0.000	1.105	0.000	0.000	0.000	0.000
3	1.125	0.000	0.787	0.000	0.000	0.000	0.000
4	1.500	0.000	0.000	0.000	0.000	-0.165	0.000
Member 29							
0	0.000	0.000	0.000	0.000	0.000	-0.178	0.000
1	0.877	0.000	5.012	0.000	0.000	0.000	0.000
2	1.755	0.000	6.741	0.000	0.000	0.000	0.000
3	2.632	0.000	5.011	0.000	0.000	0.000	0.000
4	3.510	0.000	0.000	0.000	0.000	-0.179	0.000
Member 30							
0	0.000	0.000	0.000	0.000	0.000	-0.164	0.000
1	0.375	0.000	0.789	0.000	0.000	0.000	0.000
2	0.750	0.000	1.106	0.000	0.000	0.000	0.000
3	1.125	0.000	0.789	0.000	0.000	0.000	0.000
4	1.500	0.000	0.000	0.000	0.000	-0.164	0.000
Member 31							
0	0.000	0.000	0.000	0.000	0.000	-0.178	0.000
1	0.877	0.000	5.011	0.000	0.000	0.000	0.000
2	1.755	0.000	6.741	0.000	0.000	0.000	0.000
3	2.632	0.000	5.010	0.000	0.000	0.000	0.000
4	3.510	0.000	0.000	0.000	0.000	-0.180	0.000
Member 32							
0	0.000	0.000	0.000	0.000	0.000	-0.162	0.000
1	0.375	0.000	0.791	0.000	0.000	0.000	0.000
2	0.750	0.000	1.109	0.000	0.000	0.000	0.000
3	1.125	0.000	0.792	0.000	0.000	0.000	0.000
4	1.500	0.000	0.000	0.000	0.000	-0.161	0.000
Member 33							
0	0.000	0.000	0.000	0.000	0.000	-0.178	0.000
1	0.877	0.000	4.979	0.000	0.000	0.000	0.000
2	1.755	0.000	6.677	0.000	0.000	0.000	0.000
3	2.632	0.000	4.915	0.000	0.000	0.000	0.000
4	3.510	0.000	0.000	0.000	0.000	-0.307	0.000
Member 34							
0	0.000	0.008	0.000	0.000	0.000	-0.040	0.000
1	0.375	0.008	0.913	0.000	0.000	0.000	0.000
2	0.750	0.008	1.231	0.000	0.000	0.000	0.000

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Member Moment Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum (kNm)			Minimum (kNm)		
		Torsion	Normal	Lateral	Torsion	Normal	Lateral
3	1.125	0.008	0.914	0.000	0.000	0.000	0.000
4	1.500	0.008	0.000	0.000	0.000	-0.039	0.000
Member 35							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	1.127	0.000	8.502	0.000	0.000	0.000	0.000
2	2.254	0.000	11.285	0.000	0.000	0.000	0.000
3	3.381	0.000	8.350	0.000	0.000	0.000	0.000
4	4.508	0.000	0.000	0.000	0.000	-0.304	0.000
Member 36							
0	0.000	0.000	0.000	0.000	0.000	-0.284	0.000
1	0.375	0.000	0.699	0.000	0.000	0.000	0.000
2	0.750	0.000	1.046	0.000	0.000	0.000	0.000
3	1.125	0.000	0.757	0.000	0.000	0.000	0.000
4	1.500	0.000	0.000	0.000	0.000	-0.167	0.000
Member 37							
0	0.000	0.000	0.000	0.000	0.000	-0.177	0.000
1	0.877	0.000	5.012	0.000	0.000	0.000	0.000
2	1.755	0.000	6.742	0.000	0.000	0.000	0.000
3	2.632	0.000	5.012	0.000	0.000	0.000	0.000
4	3.510	0.000	0.000	0.000	0.000	-0.178	0.000
Member 38							
0	0.000	0.000	0.000	0.000	0.000	-0.166	0.000
1	0.375	0.000	0.787	0.000	0.000	0.000	0.000
2	0.750	0.000	1.105	0.000	0.000	0.000	0.000
3	1.125	0.000	0.787	0.000	0.000	0.000	0.000
4	1.500	0.000	0.000	0.000	0.000	-0.165	0.000
Member 39							
0	0.000	0.000	0.000	0.000	0.000	-0.178	0.000
1	0.877	0.000	5.012	0.000	0.000	0.000	0.000
2	1.755	0.000	6.741	0.000	0.000	0.000	0.000
3	2.632	0.000	5.011	0.000	0.000	0.000	0.000
4	3.510	0.000	0.000	0.000	0.000	-0.179	0.000
Member 40							
0	0.000	0.000	0.000	0.000	0.000	-0.164	0.000
1	0.375	0.000	0.789	0.000	0.000	0.000	0.000
2	0.750	0.000	1.106	0.000	0.000	0.000	0.000
3	1.125	0.000	0.789	0.000	0.000	0.000	0.000
4	1.500	0.000	0.000	0.000	0.000	-0.164	0.000
Member 41							
0	0.000	0.000	0.000	0.000	0.000	-0.178	0.000
1	0.877	0.000	5.011	0.000	0.000	0.000	0.000
2	1.755	0.000	6.741	0.000	0.000	0.000	0.000
3	2.632	0.000	5.010	0.000	0.000	0.000	0.000

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Member Moment Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum (kNm)			Minimum (kNm)		
		Torsion	Normal	Lateral	Torsion	Normal	Lateral
4	3.510	0.000	0.000	0.000	0.000	-0.180	0.000
Member 42							
0	0.000	0.000	0.000	0.000	0.000	-0.162	0.000
1	0.375	0.000	0.791	0.000	0.000	0.000	0.000
2	0.750	0.000	1.108	0.000	0.000	0.000	0.000
3	1.125	0.000	0.791	0.000	0.000	0.000	0.000
4	1.500	0.000	0.000	0.000	0.000	-0.162	0.000
Member 43							
0	0.000	0.000	0.000	0.000	0.000	-0.180	0.000
1	0.877	0.000	5.009	0.000	0.000	0.000	0.000
2	1.755	0.000	6.738	0.000	0.000	0.000	0.000
3	2.632	0.000	5.008	0.000	0.000	0.000	0.000
4	3.510	0.000	0.000	0.000	0.000	-0.182	0.000
Member 44							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.225	0.000	0.000	0.002	0.000	-0.010	0.000
2	0.450	0.000	0.000	0.004	0.000	-0.019	0.000
3	0.675	0.000	0.000	0.006	0.000	-0.029	0.000
4	0.900	0.000	0.000	0.008	0.000	-0.038	0.000
Member 45							
0	0.000	0.000	0.023	0.000	0.000	0.000	-0.008
1	0.225	0.000	0.017	0.000	0.000	0.000	-0.006
2	0.450	0.000	0.011	0.000	0.000	0.000	-0.004
3	0.675	0.000	0.006	0.000	0.000	0.000	-0.002
4	0.900	0.000	0.000	0.000	0.000	0.000	0.000
Member 46							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.290	0.000	0.004	0.000	0.000	0.000	0.000
2	0.580	0.000	0.009	0.000	0.000	0.000	0.000
3	0.870	0.000	0.013	0.000	0.000	0.000	0.000
4	1.160	0.000	0.017	0.000	0.000	0.000	0.000
Member 47							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.290	0.000	0.004	0.000	0.000	0.000	0.000
2	0.580	0.000	0.009	0.000	0.000	0.000	0.000
3	0.870	0.000	0.013	0.000	0.000	0.000	0.000
4	1.160	0.000	0.017	0.000	0.000	0.000	0.000
Member 49							
0	0.000	0.000	0.000	0.000	-0.001	-0.008	0.000
1	0.438	0.000	1.253	0.000	-0.001	0.000	0.000
2	0.875	0.000	1.649	0.000	-0.001	0.000	0.000
3	1.313	0.000	1.180	0.000	-0.001	0.000	0.000
4	1.750	0.000	0.000	0.000	-0.001	-0.154	0.000

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Member Moment Effect Envelopes (continued)

Interval no	Interval pos. (m)	Maximum (kNm)			Minimum (kNm)		
		Torsion	Normal	Lateral	Torsion	Normal	Lateral
Member 50							
0	0.000	0.000	0.000	0.000	0.000	-0.072	0.000
1	0.375	0.000	0.899	0.000	0.000	0.000	0.000
2	0.750	0.000	1.235	0.000	0.000	0.000	0.000
3	1.125	0.000	0.935	0.000	0.000	0.000	0.000
4	1.500	0.000	0.000	0.000	0.000	0.000	0.000
Member 51							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.225	0.000	0.000	0.002	0.000	-0.003	0.000
2	0.450	0.000	0.000	0.003	0.000	-0.005	0.000
3	0.675	0.000	0.000	0.005	0.000	-0.008	0.000
4	0.900	0.000	0.000	0.006	0.000	-0.011	0.000
Member 52							
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.225	0.000	0.008	0.000	0.000	0.000	0.000
2	0.450	0.000	0.016	0.000	0.000	0.000	0.000
3	0.675	0.000	0.025	0.000	0.000	0.000	0.000
4	0.900	0.000	0.033	0.000	0.000	0.000	0.000
Member 53							
0	0.000	0.000	0.000	0.000	-0.001	-0.041	0.000
1	0.138	0.000	0.962	0.000	-0.001	0.000	0.000
2	0.275	0.000	1.879	0.000	-0.001	0.000	0.000
3	0.412	0.000	2.710	0.000	-0.001	0.000	0.000
4	0.550	0.000	3.456	0.000	-0.001	0.000	0.000
Member 54							
0	0.000	0.000	3.454	0.000	-0.001	0.000	0.000
1	0.438	0.000	3.800	0.000	-0.001	0.000	0.000
2	0.875	0.000	3.282	0.000	-0.001	0.000	0.000
3	1.313	0.000	1.898	0.000	-0.001	0.000	0.000
4	1.750	0.000	0.000	0.000	-0.001	-0.350	0.000
Member 55							
0	0.000	0.000	0.000	0.000	-0.002	0.000	0.000
1	0.375	0.000	0.933	0.000	-0.002	0.000	0.000
2	0.750	0.000	1.231	0.000	-0.002	0.000	0.000
3	1.125	0.000	0.894	0.000	-0.002	0.000	0.000
4	1.500	0.000	0.000	0.000	-0.002	-0.079	0.000
Member 56							
0	0.000	0.002	0.000	0.000	0.000	-0.008	0.000
1	0.375	0.002	0.945	0.000	0.000	0.000	0.000
2	0.750	0.002	1.262	0.000	0.000	0.000	0.000
3	1.125	0.002	0.944	0.000	0.000	0.000	0.000
4	1.500	0.002	0.000	0.000	0.000	-0.009	0.000

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Summation Check for Combination ULS

Analysis Type : Linear elastic

Loads	Load summation (kN)			Moment summation (kNm)		
	Px	Py	Pz	Mx	My	Mz
Member loads	0.00	-296.20	0.00	692.41	0.00	-3734.92
Joint loads	0.00	0.00	0.00	0.00	0.00	0.00
Total loads	0.00	-296.20	0.00	692.41	0.00	-3734.92
Reactions	0.00	296.20	0.00	-692.41	0.00	3734.92
Summations	0.00	0.00	0.00	0.00	0.00	0.00

Summation Check for Combination SLS

Analysis Type : Linear elastic

Loads	Load summation (kN)			Moment summation (kNm)		
	Px	Py	Pz	Mx	My	Mz
Member loads	0.00	-190.88	0.00	446.25	0.00	-2407.46
Joint loads	0.00	0.00	0.00	0.00	0.00	0.00
Total loads	0.00	-190.88	0.00	446.25	0.00	-2407.46
Reactions	0.00	190.88	0.00	-446.25	0.00	2407.46
Summations	0.00	0.00	0.00	0.00	0.00	0.00

Error Log

Analysis Warnings:
* 2 Load errors corrected.

Elastic Critical Load Analysis

No.	Combination Reference	Elastic Critical Load Factor	Critical joint	Critical degree of freedom	No.	Combination Reference	Elastic Critical Load Factor	Critical joint	Critical degree of freedom
1	ULS	N/A	N/A		2	SLS	N/A	N/A	

Design Results Summary

Group reference	Design object			Comments	Design status
	Reference	Type	Code		
Frame	244	SW Design	BS5950:2000		Passed
	245	SW Design	BS5950:2000		Passed
	246	SW Design	BS5950:2000		Passed
	247	SW Design	BS5950:2000		Passed
	248	SW Design	BS5950:2000		Passed
	249	SW Design	BS5950:2000		Passed
	250	SW Design	BS5950:2000		Passed
	251	SW Design	BS5950:2000		Passed
	252	SW Design	BS5950:2000		Passed
	253	SW Design	BS5950:2000		Passed
	254	SW Design	BS5950:2000		Passed
	255	SW Design	BS5950:2000		Passed

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Design Results Summary (continued)

Group reference	Design object			Comments	Design status
	Reference	Type	Code		
	256	SW Design	BS5950:2000		Passed
	257	SW Design	BS5950:2000		Passed
	258	SW Design	BS5950:2000		Passed
	259	SW Design	BS5950:2000		Passed
	260	SW Design	BS5950:2000		Passed
	261	SW Design	BS5950:2000		Passed
	262	SW Design	BS5950:2000		Passed
	263	SW Design	BS5950:2000		Passed
	264	SW Design	BS5950:2000		Passed
	265	SW Design	BS5950:2000		Passed
	266	SW Design	BS5950:2000		Passed
	267	SW Design	BS5950:2000		Passed
	268	SW Design	BS5950:2000		Passed
	269	SW Design	BS5950:2000		Passed
	270	SW Design	BS5950:2000		Passed
	271	SW Design	BS5950:2000		Passed
	272	SW Design	BS5950:2000		Passed
	273	SW Design	BS5950:2000		Passed
	274	SW Design	BS5950:2000		Passed
	275	SW Design	BS5950:2000		Passed
	276	SW Design	BS5950:2000		Passed
	277	SW Design	BS5950:2000		Passed
	278	SW Design	BS5950:2000		Passed
	279	SW Design	BS5950:2000		Passed
	280	SW Design	BS5950:2000		Passed
	281	SW Design	BS5950:2000		Passed
	282	SW Design	BS5950:2000		Passed
	283	SW Design	BS5950:2000		Passed
	284	SW Design	BS5950:2000		Passed
	285	SW Design	BS5950:2000		Passed
	286	SW Design	BS5950:2000		Passed
	287	SW Design	BS5950:2000		Passed
	288	SW Design	BS5950:2000		Passed
	289	SW Design	BS5950:2000		Passed
	290	SW Design	BS5950:2000		Passed
	291	SW Design	BS5950:2000		Passed
	292	SW Design	BS5950:2000		Passed
	293	SW Design	BS5950:2000		Passed

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	Tregwilym Road	Job Ref	Walkway
	Newport	Designed By	LM
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Steelwork Design Results

Design object ref	Memb ref	Design parameter	Analysis section	Design section	Utilisation factors				Design status
					Local capacity	Lateral buckling	Torsion	Deflection	
Group Reference - Frame									
244	1	defaults	90x90x5.0 SHS	180x90UKP FC26	0.031	0.035	n / a	0.001	Passed
245	2	defaults	90x90x5.0 SHS		0.031	0.035	n / a	0.001	Passed
246	3	defaults	90x90x5.0 SHS		0.025	0.029	n / a	0.000	Passed
247	4	defaults	90x90x5.0 SHS		0.025	0.029	n / a	0.000	Passed
248	5	defaults	90x90x5.0 SHS		0.025	0.028	n / a	0.000	Passed
249	6	defaults	90x90x5.0 SHS		0.025	0.028	n / a	0.001	Passed
250	7	defaults	90x90x5.0 SHS		0.025	0.028	n / a	0.000	Passed
251	8	defaults	90x90x5.0 SHS		0.025	0.028	n / a	0.001	Passed
252	9	defaults	90x90x5.0 SHS		0.025	0.027	n / a	0.000	Passed
253	10	defaults	90x90x5.0 SHS		0.025	0.027	n / a	0.001	Passed
254	11	defaults	90x90x5.0 SHS		0.025	0.027	n / a	0.000	Passed
255	12	defaults	90x90x5.0 SHS		0.025	0.027	n / a	0.001	Passed
256	13	defaults	90x90x5.0 SHS		0.025	0.027	n / a	0.000	Passed
257	14	defaults	90x90x5.0 SHS		0.025	0.027	n / a	0.001	Passed
258	15	defaults	90x90x5.0 SHS		0.019	0.021	n / a	0.001	Passed
259	16	defaults	90x90x5.0 SHS		0.041	0.043	n / a	0.001	Passed
260	19	defaults	180x90 UKPFC26		0.047	0.054	n / a	0.024	Passed
261	20	defaults	180x90 UKPFC26		0.020	0.021	n / a	0.007	Passed
262	21	defaults	180x90 UKPFC26		0.020	0.021	n / a	0.007	Passed
263	25	defaults	180x90 UKPFC26		0.177	0.302	n / a	0.182	Passed
264	26	defaults	180x90 UKPFC26		0.018	0.018	n / a	0.005	Passed
265	27	defaults	180x90 UKPFC26		0.106	0.154	n / a	0.085	Passed
266	28	defaults	180x90 UKPFC26		0.018	0.019	n / a	0.006	Passed
267	29	a3dmax-5442	180x90 UKPFC26		0.106	0.116	0.002	0.085	Passed
268	30	defaults	180x90 UKPFC26		0.018	0.019	n / a	0.006	Passed
269	31	defaults	180x90 UKPFC26		0.106	0.154	n / a	0.085	Passed
270	32	defaults	180x90 UKPFC26		0.018	0.019	n / a	0.006	Passed
271	33	defaults	180x90 UKPFC26		0.105	0.152	n / a	0.084	Passed
272	34	defaults	180x90 UKPFC26		0.019	0.021	n / a	0.007	Passed
273	35	defaults	180x90 UKPFC26		0.177	0.302	n / a	0.182	Passed
274	36	defaults	180x90 UKPFC26		0.018	0.018	n / a	0.005	Passed

 Vale Consultancy CONSULTING CIVIL & STRUCTURAL ENGINEERS	Rogerstone Library	Job No	23343
	Tregwilym Road	Job Ref	Walkway
	Newport	Designed By	LM
	NP10 9EL	Checked By	CD
		Date	23.11.2025
		Revision No	1.0
		Calc No	1.0
		Page No	29

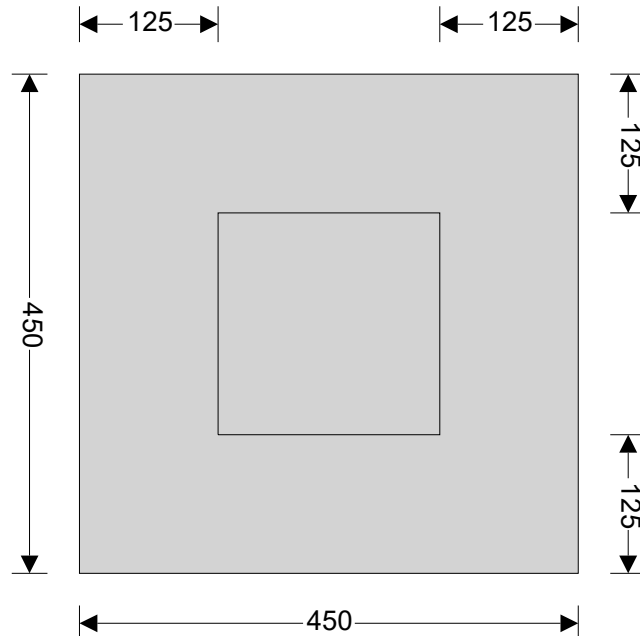
A3D MAX Version 4.62 (Build 1122) Copyright © 2024 Computer and Design Services Ltd. (Analysis No. 12)

Steelwork Design Results (continued)

Desig object ref	Memb ref	Design parameter	Analysis section	Design section	Utilisation factors				Design status
					Local capacity	Lateral buckling	Torsion	Deflection	
275	37	defaults	180x90 UKPFC26		0.106	0.154	n / a	0.085	Passed
276	38	defaults	180x90 UKPFC26		0.018	0.019	n / a	0.006	Passed
277	39	defaults	180x90 UKPFC26		0.106	0.154	n / a	0.085	Passed
278	40	defaults	180x90 UKPFC26		0.018	0.019	n / a	0.006	Passed
279	41	defaults	180x90 UKPFC26		0.106	0.154	n / a	0.085	Passed
280	42	defaults	180x90 UKPFC26		0.018	0.019	n / a	0.006	Passed
281	43	defaults	180x90 UKPFC26		0.106	0.154	n / a	0.084	Passed
282	44	defaults	90x90x5.0 SHS		0.024	0.027	n / a	0.001	Passed
283	45	defaults	90x90x5.0 SHS		0.019	0.021	n / a	0.001	Passed
284	46	defaults	90x90x5.0 SHS		0.025	0.027	n / a	0.000	Passed
285	47	defaults	90x90x5.0 SHS		0.025	0.027	n / a	0.001	Passed
286	49	defaults	180x90 UKPFC26		0.026	0.028	n / a	0.010	Passed
287	50	defaults	180x90 UKPFC26		0.019	0.021	n / a	0.007	Passed
288	51	defaults	90x90x5.0 SHS		0.024	0.025	n / a	0.001	Passed
289	52	defaults	90x90x5.0 SHS		0.046	0.048	n / a	0.001	Passed
290	53	defaults	180x90 UKPFC26		0.054	0.039	n / a	0.095	Passed
291	54	defaults	180x90 UKPFC26		0.060	0.059	n / a	0.028	Passed
292	55	defaults	180x90 UKPFC26		0.019	0.021	n / a	0.035	Passed
293	56	defaults	180x90 UKPFC26		0.020	0.022	n / a	0.007	Passed

PAD FOOTING ANALYSIS AND DESIGN (BS8110-1:1997)

Tedds calculation version 2.0.07



Pad footing details

Length of pad footing	$L = 450 \text{ mm}$
Width of pad footing	$B = 450 \text{ mm}$
Area of pad footing	$A = L \times B = 0.203 \text{ m}^2$
Depth of pad footing	$h = 300 \text{ mm}$
Depth of soil over pad footing	$h_{\text{soil}} = 300 \text{ mm}$
Density of concrete	$\rho_{\text{conc}} = 23.6 \text{ kN/m}^3$

Column details

Column base length	$l_A = 200 \text{ mm}$
Column base width	$b_A = 200 \text{ mm}$
Column eccentricity in x	$e_{PxA} = 0 \text{ mm}$
Column eccentricity in y	$e_{PyA} = 0 \text{ mm}$

Soil details

Density of soil	$\rho_{\text{soil}} = 20.0 \text{ kN/m}^3$
Design shear strength	$\phi' = 25.0 \text{ deg}$
Design base friction	$\delta = 19.3 \text{ deg}$
Allowable bearing pressure	$P_{\text{bearing}} = 100 \text{ kN/m}^2$

Axial loading on column

Dead axial load on column	$P_{GA} = 3.2 \text{ kN}$
Imposed axial load on column	$P_{QA} = 10.4 \text{ kN}$
Wind axial load on column	$P_{WA} = 0.0 \text{ kN}$
Total axial load on column	$P_A = 13.6 \text{ kN}$

Foundation loads

Dead surcharge load	$F_{G\text{sur}} = 0.000 \text{ kN/m}^2$
---------------------	--

Imposed surcharge load

$$F_{Qsur} = 0.000 \text{ kN/m}^2$$

Pad footing self weight

$$F_{swt} = h \times \rho_{conc} = 7.080 \text{ kN/m}^2$$

Soil self weight

$$F_{soil} = h_{soil} \times \rho_{soil} = 6.000 \text{ kN/m}^2$$

Total foundation load

$$F = A \times (F_{Gsur} + F_{Qsur} + F_{swt} + F_{soil}) = 2.6 \text{ kN}$$

Calculate pad base reaction

Total base reaction

$$T = F + P_A = 16.2 \text{ kN}$$

Eccentricity of base reaction in x

$$e_{Tx} = (P_A \times e_{Px} + M_{xA} + H_{xA} \times h) / T = 0 \text{ mm}$$

Eccentricity of base reaction in y

$$e_{Ty} = (P_A \times e_{Py} + M_{yA} + H_{yA} \times h) / T = 0 \text{ mm}$$

Check pad base reaction eccentricity

$$\text{abs}(e_{Tx}) / L + \text{abs}(e_{Ty}) / B = 0.000$$

Base reaction acts within middle third of base

Calculate pad base pressures

$$q_1 = T / A - 6 \times T \times e_{Tx} / (L \times A) - 6 \times T \times e_{Ty} / (B \times A) = 80.240 \text{ kN/m}^2$$

$$q_2 = T / A - 6 \times T \times e_{Tx} / (L \times A) + 6 \times T \times e_{Ty} / (B \times A) = 80.240 \text{ kN/m}^2$$

$$q_3 = T / A + 6 \times T \times e_{Tx} / (L \times A) - 6 \times T \times e_{Ty} / (B \times A) = 80.240 \text{ kN/m}^2$$

$$q_4 = T / A + 6 \times T \times e_{Tx} / (L \times A) + 6 \times T \times e_{Ty} / (B \times A) = 80.240 \text{ kN/m}^2$$

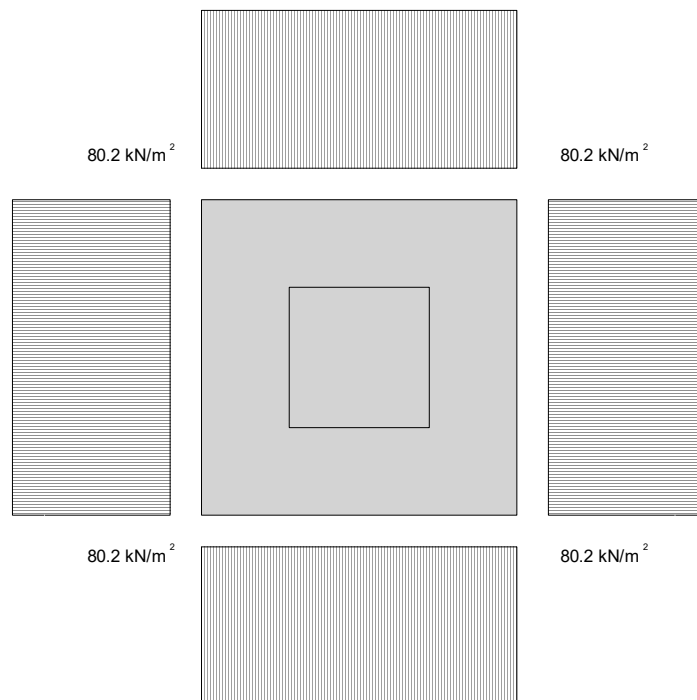
Minimum base pressure

$$q_{min} = \min(q_1, q_2, q_3, q_4) = 80.240 \text{ kN/m}^2$$

Maximum base pressure

$$q_{max} = \max(q_1, q_2, q_3, q_4) = 80.240 \text{ kN/m}^2$$

PASS - Maximum base pressure is less than allowable bearing pressure



Material details

Characteristic strength of concrete

$$f_{cu} = 30 \text{ N/mm}^2$$

Calculate pad lengths in x direction

Left hand length

$$L_L = L / 2 + e_{Px} = 225 \text{ mm}$$

Right hand length

$$L_R = L / 2 - e_{Px} = 225 \text{ mm}$$

Project Rogerstone Library, Tregwilym Road, Newport, NP10 9EL				Job no. 23343	
Calcs for Worst case pad (Centralised post)				Start page no./Revision 32	
Calcs by LM	Calcs date 26/11/2025	Checked by CD	Checked date 26/11/2025	Approved by CD	Approved date 26/11/2025

Calculate rate of change of base pressure in x direction

Length of base reaction $L_x = L = 450 \text{ mm}$
Rate of change of base pressure $C_x = [(q_1 + q_2) - (q_3 + q_4)] / (2 \times L_x) = 0.000 \text{ kN/m}^2/\text{m}$

Calculate pad lengths in y direction

Top length $L_T = B / 2 - e_{PyA} = 225 \text{ mm}$
Bottom length $L_B = B / 2 + e_{PyA} = 225 \text{ mm}$

Calculate rate of change of base pressure in y direction

Length of base reaction $L_y = B = 450 \text{ mm}$
Rate of change of base pressure $C_y = [(q_1 + q_3) - (q_2 + q_4)] / (2 \times L_y) = 0.000 \text{ kN/m}^2/\text{m}$

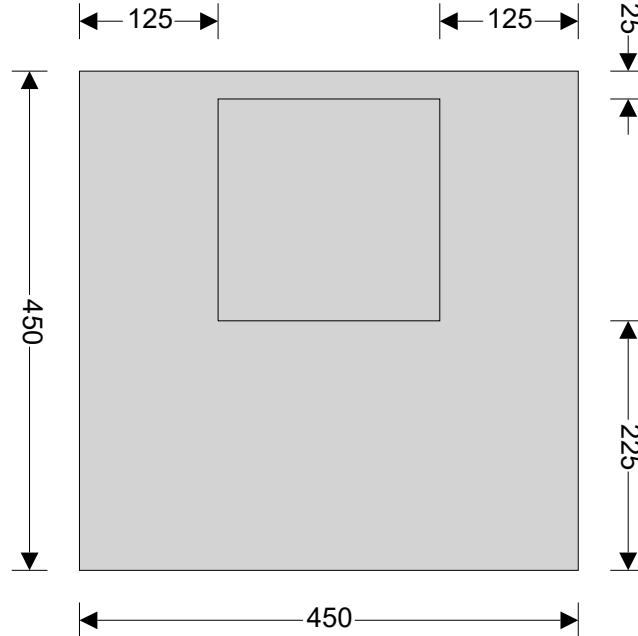
Calculate minimum depth of unreinforced pad footing

Average pressure to left of pad footing $q_L = (q_1 + q_2) / 2 - C_x \times (L_L - l_A / 2) / 2 = 80.240 \text{ kN/m}^2$
Minimum depth to left of pad footing $h_{Lmin} = (L_L - l_A / 2) \times \max(0.15 \times [(q_L / 1 \text{ kN/m}^2)^2 / (f_{cu} / 1 \text{ N/mm}^2)]^{1/4}, 1) = 125 \text{ mm}$
Average pressure to right of pad footing $q_R = (q_3 + q_4) / 2 - C_x \times (L_R - l_A / 2) / 2 = 80.240 \text{ kN/m}^2$
Minimum depth to right of pad footing $h_{Rmin} = (L_R - l_A / 2) \times \max(0.15 \times [(q_R / 1 \text{ kN/m}^2)^2 / (f_{cu} / 1 \text{ N/mm}^2)]^{1/4}, 1) = 125 \text{ mm}$
Average pressure to top of pad footing $q_T = (q_2 + q_4) / 2 - C_y \times (L_T - b_A / 2) / 2 = 80.240 \text{ kN/m}^2$
Minimum depth to top of pad footing $h_{Tmin} = (L_T - b_A / 2) \times \max(0.15 \times [(q_T / 1 \text{ kN/m}^2)^2 / (f_{cu} / 1 \text{ N/mm}^2)]^{1/4}, 1) = 125 \text{ mm}$
Average pressure to bottom of pad footing $q_B = (q_1 + q_3) / 2 - C_y \times (L_B - b_A / 2) / 2 = 80.240 \text{ kN/m}^2$
Minimum depth to bottom of pad footing $h_{Bmin} = (L_B - b_A / 2) \times \max(0.15 \times [(q_B / 1 \text{ kN/m}^2)^2 / (f_{cu} / 1 \text{ N/mm}^2)]^{1/4}, 1) = 125 \text{ mm}$
Minimum depth of unreinforced pad footing $h_{min} = \max(h_{Lmin}, h_{Rmin}, h_{Tmin}, h_{Bmin}, 300 \text{ mm}) = 300 \text{ mm}$

PASS - Unreinforced pad footing depth is greater than minimum

PAD FOOTING ANALYSIS AND DESIGN (BS8110-1:1997)

Tedds calculation version 2.0.07



Pad footing details

Length of pad footing	$L = 450$ mm
Width of pad footing	$B = 450$ mm
Area of pad footing	$A = L \times B = 0.203$ m ²
Depth of pad footing	$h = 300$ mm
Depth of soil over pad footing	$h_{\text{soil}} = 300$ mm
Density of concrete	$\rho_{\text{conc}} = 23.6$ kN/m ³

Column details

Column base length	$l_A = 200$ mm
Column base width	$b_A = 200$ mm
Column eccentricity in x	$e_{PxA} = 0$ mm
Column eccentricity in y	$e_{PyA} = 100$ mm

Soil details

Density of soil	$\rho_{\text{soil}} = 20.0$ kN/m ³
Design shear strength	$\phi' = 25.0$ deg
Design base friction	$\delta = 19.3$ deg
Allowable bearing pressure	$P_{\text{bearing}} = 100$ kN/m ²

Axial loading on column

Dead axial load on column	$P_{GA} = 1.8$ kN
Imposed axial load on column	$P_{QA} = 5.6$ kN
Wind axial load on column	$P_{WA} = 0.0$ kN
Total axial load on column	$P_A = 7.4$ kN

Foundation loads

Dead surcharge load	$F_{G\text{sur}} = 0.000$ kN/m ²
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Imposed surcharge load

$$F_{Qsur} = 0.000 \text{ kN/m}^2$$

Pad footing self weight

$$F_{swt} = h \times \rho_{conc} = 7.080 \text{ kN/m}^2$$

Soil self weight

$$F_{soil} = h_{soil} \times \rho_{soil} = 6.000 \text{ kN/m}^2$$

Total foundation load

$$F = A \times (F_{Gsur} + F_{Qsur} + F_{swt} + F_{soil}) = 2.6 \text{ kN}$$

Calculate pad base reaction

Total base reaction

$$T = F + P_A = 10.0 \text{ kN}$$

Eccentricity of base reaction in x

$$e_{Tx} = (P_A \times e_{Px} + M_{xA} + H_{xA} \times h) / T = 0 \text{ mm}$$

Eccentricity of base reaction in y

$$e_{Ty} = (P_A \times e_{Py} + M_{yA} + H_{yA} \times h) / T = 74 \text{ mm}$$

Check pad base reaction eccentricity

$$\text{abs}(e_{Tx}) / L + \text{abs}(e_{Ty}) / B = 0.164$$

Base reaction acts within middle third of base

Calculate pad base pressures

$$q_1 = T / A - 6 \times T \times e_{Tx} / (L \times A) - 6 \times T \times e_{Ty} / (B \times A) = 0.899 \text{ kN/m}^2$$

$$q_2 = T / A - 6 \times T \times e_{Tx} / (L \times A) + 6 \times T \times e_{Ty} / (B \times A) = 98.347 \text{ kN/m}^2$$

$$q_3 = T / A + 6 \times T \times e_{Tx} / (L \times A) - 6 \times T \times e_{Ty} / (B \times A) = 0.899 \text{ kN/m}^2$$

$$q_4 = T / A + 6 \times T \times e_{Tx} / (L \times A) + 6 \times T \times e_{Ty} / (B \times A) = 98.347 \text{ kN/m}^2$$

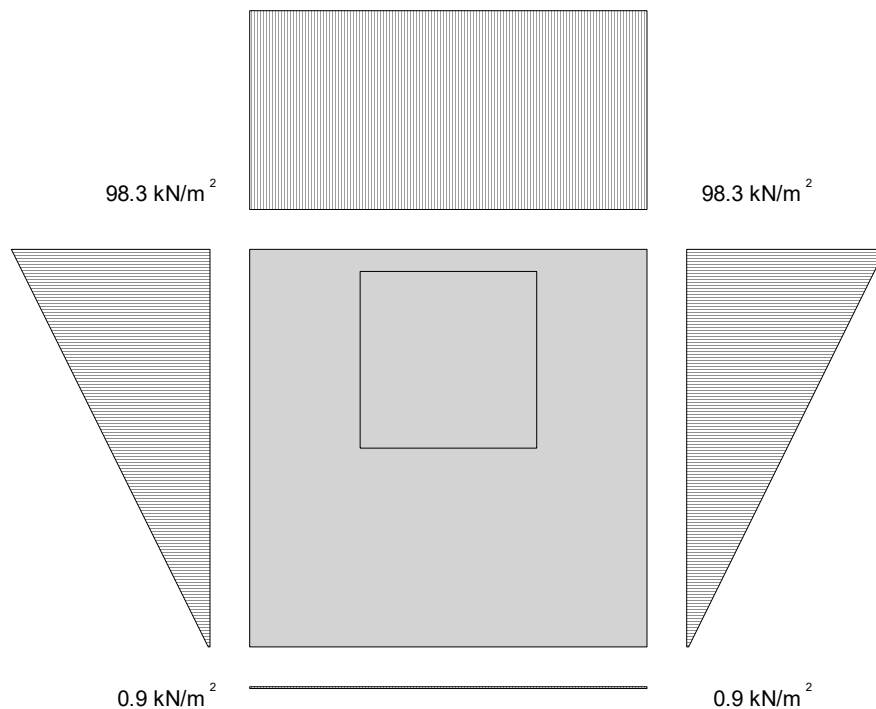
Minimum base pressure

$$q_{min} = \min(q_1, q_2, q_3, q_4) = 0.899 \text{ kN/m}^2$$

Maximum base pressure

$$q_{max} = \max(q_1, q_2, q_3, q_4) = 98.347 \text{ kN/m}^2$$

PASS - Maximum base pressure is less than allowable bearing pressure



Material details

Characteristic strength of concrete

$$f_{cu} = 30 \text{ N/mm}^2$$

Calculate pad lengths in x direction

Left hand length

$$L_L = L / 2 + e_{Px} = 225 \text{ mm}$$

Right hand length

$$L_R = L / 2 - e_{Px} = 225 \text{ mm}$$

Project Rogerstone Library, Tregwilym Road, Newport, NP10 9EL				Job no. 23343	
Calcs for Worst case pad (Eccentric post)				Start page no./Revision 35	
Calcs by LM	Calcs date 26/11/2025	Checked by CD	Checked date 26/11/2025	Approved by CD	Approved date 26/11/2025

Calculate rate of change of base pressure in x direction

Length of base reaction $L_x = L = 450 \text{ mm}$
Rate of change of base pressure $C_x = [(q_1 + q_2) - (q_3 + q_4)] / (2 \times L_x) = 0.000 \text{ kN/m}^2/\text{m}$

Calculate pad lengths in y direction

Top length $L_T = B / 2 - e_{PyA} = 125 \text{ mm}$
Bottom length $L_B = B / 2 + e_{PyA} = 325 \text{ mm}$

Calculate rate of change of base pressure in y direction

Length of base reaction $L_y = B = 450 \text{ mm}$
Rate of change of base pressure $C_y = [(q_1 + q_3) - (q_2 + q_4)] / (2 \times L_y) = -216.552 \text{ kN/m}^2/\text{m}$

Calculate minimum depth of unreinforced pad footing

Average pressure to left of pad footing $q_L = (q_1 + q_2) / 2 - C_x \times (L_L - l_A / 2) / 2 = 49.623 \text{ kN/m}^2$
Minimum depth to left of pad footing $h_{Lmin} = (L_L - l_A / 2) \times \max(0.15 \times [(q_L / 1 \text{ kN/m}^2)^2 / (f_{cu} / 1 \text{ N/mm}^2)]^{1/4}, 1) = 125 \text{ mm}$
Average pressure to right of pad footing $q_R = (q_3 + q_4) / 2 - C_x \times (L_R - l_A / 2) / 2 = 49.623 \text{ kN/m}^2$
Minimum depth to right of pad footing $h_{Rmin} = (L_R - l_A / 2) \times \max(0.15 \times [(q_R / 1 \text{ kN/m}^2)^2 / (f_{cu} / 1 \text{ N/mm}^2)]^{1/4}, 1) = 125 \text{ mm}$
Average pressure to top of pad footing $q_T = (q_2 + q_4) / 2 - C_y \times (L_T - b_A / 2) / 2 = 122.710 \text{ kN/m}^2$
Minimum depth to top of pad footing $h_{Tmin} = (L_T - b_A / 2) \times \max(0.15 \times [(q_T / 1 \text{ kN/m}^2)^2 / (f_{cu} / 1 \text{ N/mm}^2)]^{1/4}, 1) = 225 \text{ mm}$
Average pressure to bottom of pad footing $q_B = (q_1 + q_3) / 2 - C_y \times (L_B - b_A / 2) / 2 = 3.606 \text{ kN/m}^2$
Minimum depth to bottom of pad footing $h_{Bmin} = (L_B - b_A / 2) \times \max(0.15 \times [(q_B / 1 \text{ kN/m}^2)^2 / (f_{cu} / 1 \text{ N/mm}^2)]^{1/4}, 1) = 25 \text{ mm}$
Minimum depth of unreinforced pad footing $h_{min} = \max(h_{Lmin}, h_{Rmin}, h_{Tmin}, h_{Bmin}, 300 \text{ mm}) = 300 \text{ mm}$

PASS - Unreinforced pad footing depth is greater than minimum