

Rainwater Drainage Calculations

Radcliffe Hub - Civic Hub Building

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RADHUB-HAN-V4-XX-CA-M-0003 Issue 01

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1.0 Rainwater Flow Rates & Roof Areas

RAINWATER FLOW RATES & ROOF AREAS

Project Roof Areas

Roof Zone	Description	Roof Area
		(m2)
1	1st Floor Roof - NW Corner	629
2	1st Floor Roof - NE Corner	463
3	1st Floor Roof - SW Corner	550
4	2nd Floor Roof	882

BS Calculation Method

Calculate Total Rainwater Flow Rate

The rate of flow of rainwater to be drained away from a roof under steady state conditions shall be calculated from the following equation:

Q = r x A x C

Where;

- Q
- is the flow rate of water (l/s)
- r
- is the rainfall intensity (l/s/m2)
- A
- is the effective roof area (m2)
- C
- is a runoff coefficient (taken as 1.0 unless national and local regulations and practice state otherwise)

Roof Zone 1: 1st Floor Roof - NW Corner

Details	Units	Value
Rainfall Intensity	(l/s/m2)	0.05
Safety Margin	(%)	10%
Rainfall Intensity 'R'		0.055
Roof Area	(m2)	629
Wall 1 (Part of office west wall)		
Wall Length	(m)	6
Wall Height	(m)	4.7
Wall Surface Area	(m2)	28.2
50% of Surface Area	(m2)	14.1
Effective Roof Area 'A'	(m2)	643.1
Runoff Coefficient 'C'		1.0
Rainwater Flow Rate 'Q'	(l/s)	35.37

Roof Zone 1 Sub Zones - Roof Outlet Numbers & Sizes

Details	Units	1-1	1-2	1-3	1-4	1-5
Roof Zone Area	(m2)	129.5	129.5	129.5	129.5	111.0
Wall Zone Area	(m2)	0.0	0.0	0.0	0.0	28.2
Effective Roof Zone Area	(m2)	129.5	129.5	129.5	129.5	125.1
Roof Zone Flow Rate	(l/s)	7.12	7.12	7.12	7.12	6.88
Outlet Size	(mmØ)	100	100	100	100	100
Outlet Type	(mmØ)	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B
Head of Water	(mm)	35	35	35	35	35
Max Flow Rate	(l/s)	7.5	7.5	7.5	7.5	7.5
CHECK		PASS	PASS	PASS	PASS	PASS
Total Flow Rate	(l/s)	35.37				

Roof Zone 2: 1st Floor Roof - NE Corner

Details	Units	Value
Rainfall Intensity	(l/s/m2)	0.05
Safety Margin	(%)	10%
Rainfall Intensity 'R'		0.055
Roof Area	(m2)	463
Wall 2 (Office North wall)		
Wall Length	(m)	42.2
Wall Height	(m)	4.7
Wall Surface Area	(m2)	198.34
50% of Surface Area	(m2)	99.17
Effective Roof Area 'A'	(m2)	562.17
Runoff Coefficient 'C'		1.0
Rainwater Flow Rate 'Q'	(l/s)	30.92

Roof Zone 2 Sub Zones - Roof Outlet Numbers & Sizes

Details	Units	2-1	2-2	2-3	2-4	2-5
Roof Zone Area	(m2)	98	98	98	81	88
Wall Zone Area	(m2)	31.6	31.6	31.6	67.2	36.2
Effective Roof Zone Area	(m2)	113.8	113.8	113.8	114.6	106.1
Roof Zone Flow Rate	(l/s)	6.26	6.26	6.26	6.30	5.84
Outlet Size	(mmØ)	100	100	100	100	100
Outlet Type	(mmØ)	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B
Head of Water	(mm)	35	35	35	35	35
Max Flow Rate	(l/s)	7.5	7.5	7.5	7.5	7.5
CHECK		PASS	PASS	PASS	PASS	PASS
Total Flow Rate	(l/s)	30.92				

Roof Zone 3 - 1st Floor Roof - South West Corner

Details	Units	Value
Rainfall Intensity	(l/s/m2)	0.05
Safety Margin	(%)	10%
Rainfall Intensity 'R'		0.055
Roof Area	(m2)	550
Wall 3 (Part of office west wall)		
Wall Length	(m)	20.5
Wall Height	(m)	4.7
Wall Surface Area	(m2)	96.35
50% of Surface Area	(m2)	48.18
Effective Roof Area 'A'	(m2)	598.18
Runoff Coefficient 'C'		1.0
Rainwater Flow Rate 'Q'	(l/s)	32.90

Roof Zone 3 - Roof Outlet Numbers & Sizes

Details	Units	3-1	3-2	3-3	3-4	3-5	3.6
Roof Zone Area	(m2)	90.0	101.0	101.0	86.0	86.0	86.0
Wall Zone Area	(m2)	0.0	0.0	47.0	0.0	0.0	49.4
Effective Roof Zone Area	(m2)	90.0	101.0	124.5	86.0	86.0	110.7
Roof Zone Flow Rate	(l/s)	4.95	5.56	6.85	4.73	4.73	6.09
Outlet Size	(mmØ)	100	100	100	100	100	100
Outlet Type	(mmØ)	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B
Head of Water	(mm)	35	35	35	35	35	35
Max Flow Rate	(l/s)	7.5	7.5	7.5	7.5	7.5	7.5
CHECK		PASS	PASS	PASS	PASS	PASS	PASS
Total Flow Rate	(l/s)	32.90					

Roof Zone 4 - 2nd Floor Roof - Office Area Roof

Details	Units	Value
Rainfall Intensity	(l/s/m2)	0.05
Safety Margin	(%)	10%
Rainfall Intensity 'R'		0.055
Roof Area	(m2)	882
Walls		
Wall Length	(m)	0
Wall Height	(m)	0
Wall Surface Area	(m2)	0
50% of Surface Area	(m2)	0
Effective Roof Area 'A'	(m2)	882
Runoff Coefficient 'C'		1.0
Rainwater Flow Rate 'Q'	(l/s)	48.51

Roof Zone 4 - Roof Outlet Numbers & Sizes

Details	Units	4-1	4-2	4-3	4-4	4-5	4-6	4-7	4-8
Roof Zone Area	(m2)	103	103	103	134.5	103	103	98	133
Wall Zone Area	(m2)	0	0	0	0	0	0	0	0
Effective Roof Zone Area	(m2)	103.0	103.0	103.0	134.5	103.0	103.0	98.0	133.0
Roof Zone Flow Rate	(l/s)	5.67	5.67	5.67	7.40	5.67	5.67	5.39	7.32
Outlet Size	(mmØ)	100	100	100	100	100	100	100	100
Outlet Type	(mmØ)	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B	WADE TYPE B
Head of Water	(mm)	35	35	35	35	35	35	35	35
Max Flow Rate	(l/s)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
CHECK		PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Total Flow Rate	(l/s)	48.43							

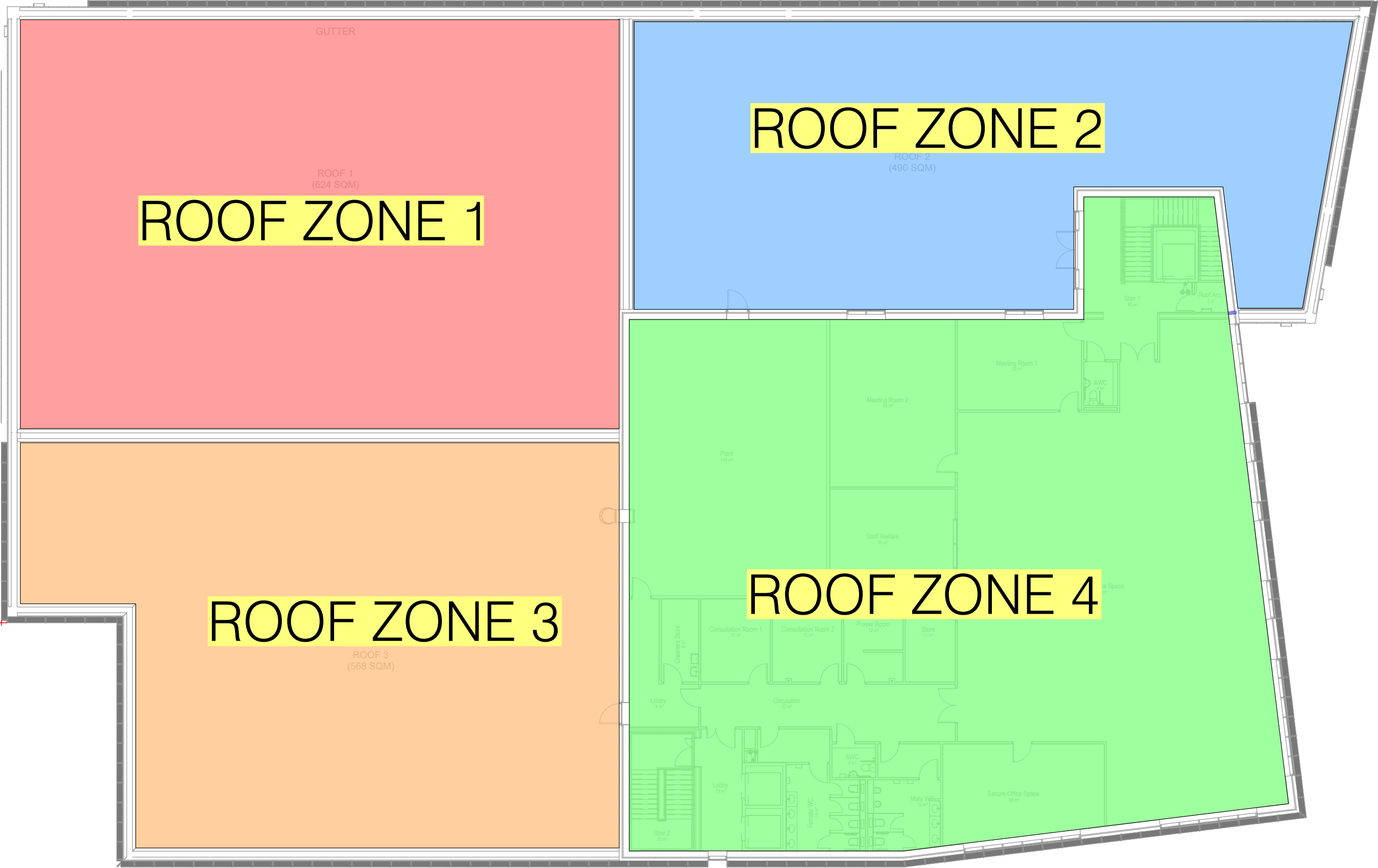


2.0 Rainwater Stacks

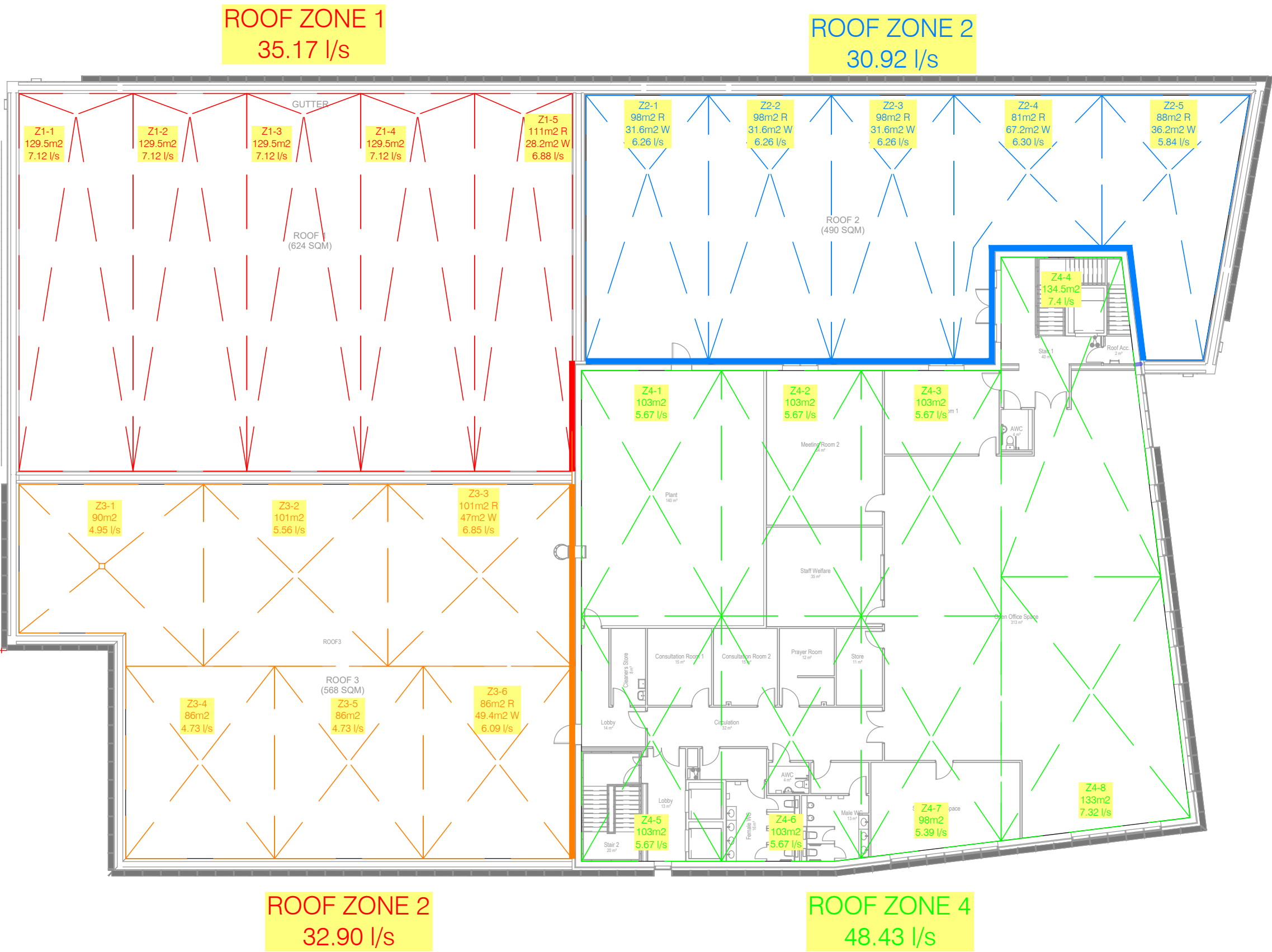
RAINWATER STACKS

Ref	Roof Zones Served	Roof Zone Flow Rate	Total Flow Rate	Size	Flow Rate (f = 0.33)
		(l/s)	(l/s)	(mm)	(l/s)
RW01	1-1	7.12	35.36	200Ø	68.00
	1-2	7.12			
	1-3	7.12			
	1-4	7.12			
	1-5	6.88			
RW02	2-1	6.26	18.78	150Ø	31.60
	2-2	6.26			
	2-3	6.26			
RW03	3-1	4.95	19.97	150Ø	31.60
	3-2	5.56			
	3-4	4.73			
	3-5	4.73			
RW04	3-3	6.85	12.94	150Ø	31.60
	3-6	6.09			
RW05	4-5	5.67	24.05	150Ø	31.60
	4-6	5.67			
	4-7	5.39			
	4-8	7.32			
RW06	4-1	5.67	21.41	150Ø	31.60
	4-2	5.67			
	4-3	5.67			
	4-4	4.40			
RW07	2-4	6.30	12.14	150Ø	31.60
	2-5	5.84			
			144.65		

3.0 Roof Zones



4.0 Roof Sub Zones



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