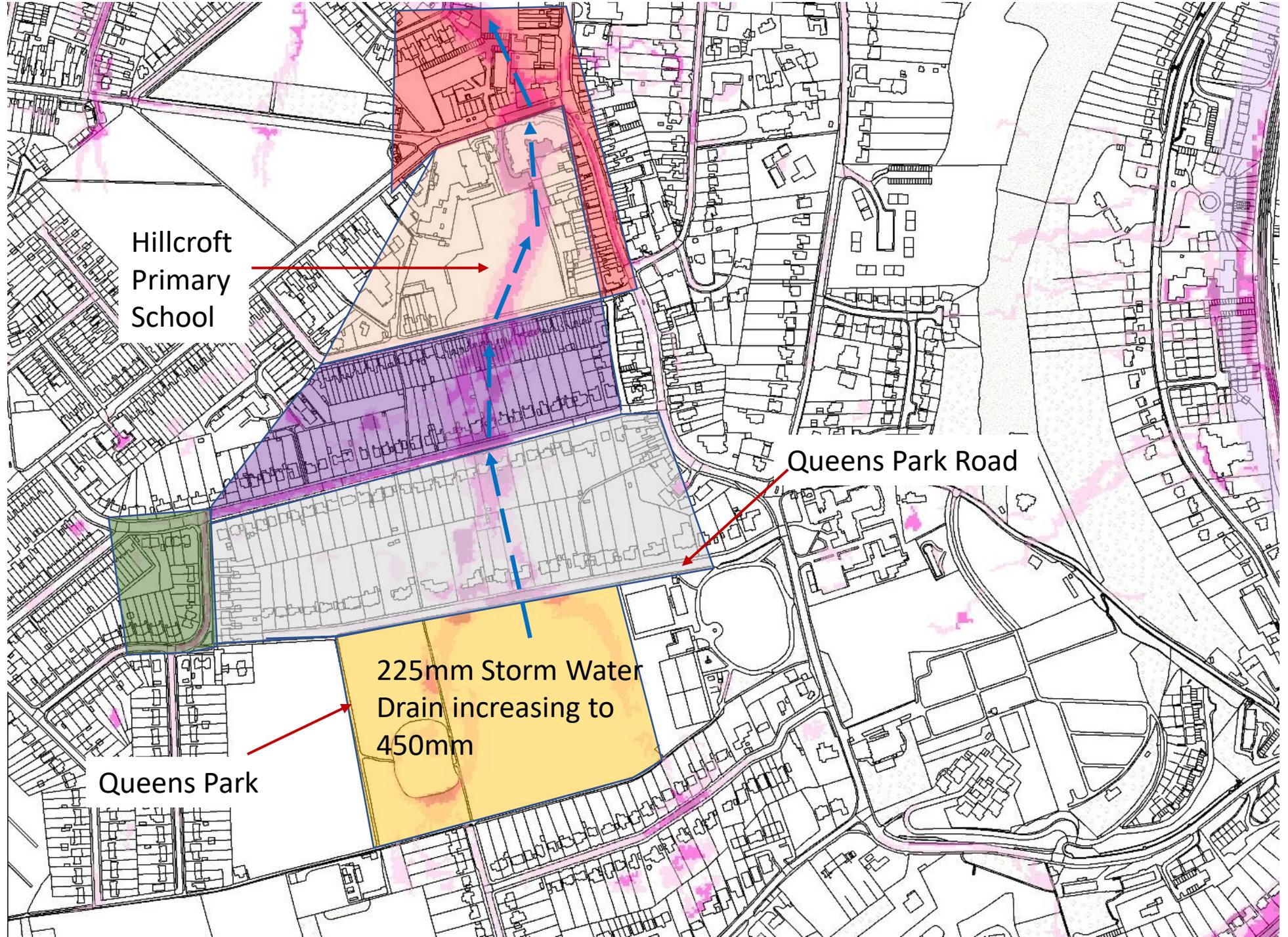


Rain Gardens in Caterham

Highways SuDS Only





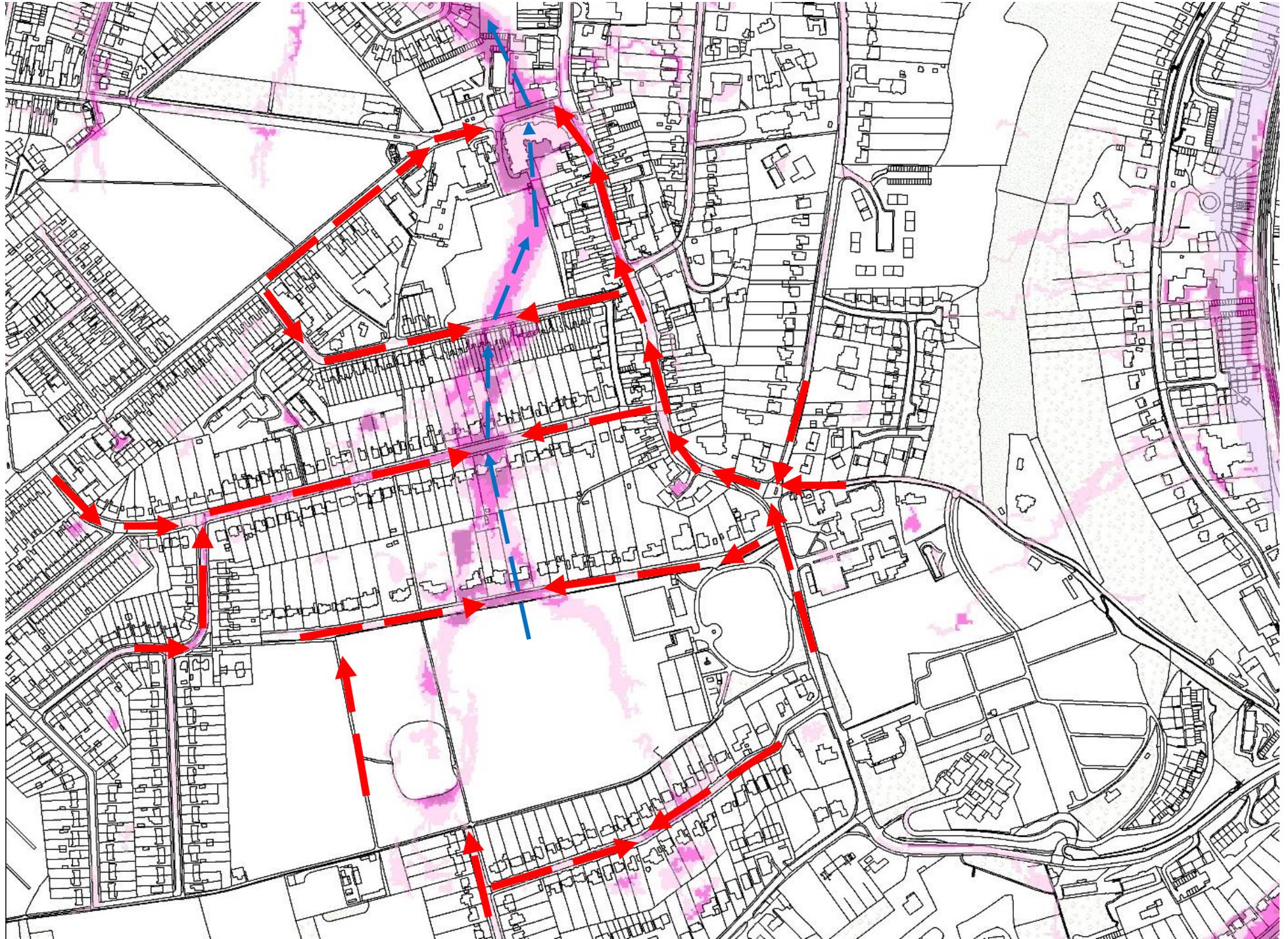
Hillcroft
Primary
School

Queens Park Road

225mm Storm Water
Drain increasing to
450mm

Queens Park

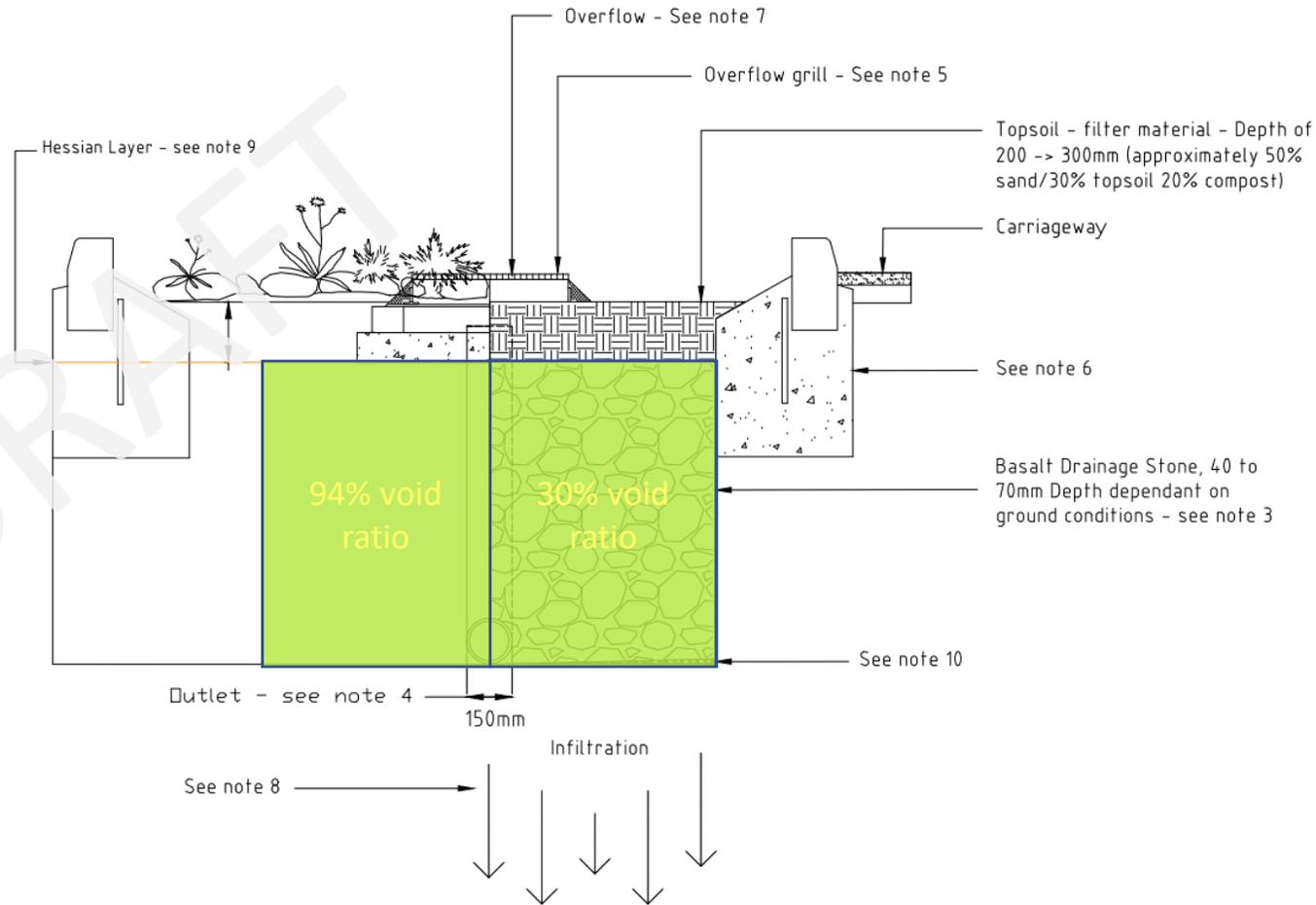




ENFIELD – Using gravel filter medium – approximately 30% void



HydroRock has more storage per 1m³ compared to Basalt Rock due to the void ratio and will take up to three times longer to fill up assuming the conditions are the same



Notes

- All dimensions are in millimeters
- 200 for wild flowers, increase to 300 for other planting schemes - if increased to 300 then an extra layer of engineering bricks will be required when constructing an overflow
- Storage can be increased from 30% to 90%+ if higher storage volumes are required by using alternative technology such as Crates or a Natural Aquifer for SuDS to replace Basalt stone.
- Outlet depth is restricted to the level of existing drainage system.
- Overflow to be set no less than 5mm below carriageway but may be increased up to 50mm.
- Refer to sd1000-348
- Refer to sd1000-368
- If there is sufficient infiltration then an overflow is not required
- Hessian layer to be used as it is biodegradable but gives enough time for planting layer to settle
- If overflow is required a gradient of no less than 1:40 is to be created with Type 1 infill

Rev.	Description

Drawn by	Date	Checked by	Date	Approved by	Date



Drawn by	Date	Checked by	Date	Approved by	Date

Drawing No.	Rev.
1000/349	-





Example area 2200m^2 – 1:30yr (50mm in 1 Hour) = 110m^3 of storage

Traditional gravel filter medium with approx. 30% void ratio = Rain Garden volume of 330m^3 required – 8 x Rain Gardens at 40m^3

Hydrorock filter medium with approx. 94% void ratio – Rain Garden volume of 120m^3 required – 3 x Rain Gardens at 40m^3

Queens Park Road, Caterham

Figures are all approximate

Solving Caterham's Flooding: Queens Park Road case study

Objective: use water gardens to buffer 120m³ of water in 1 hour and infiltrate 60m³ in 24 hours

Comparison below between gravel vs Hydrorock

<u>Water Garden Dimension</u>	<u>15.6m length x 2.4m width x 1.0m depth (37.5m³ unfilled void)</u>		<u>ASSUMPTIONS</u>	
	HYDROROCK	GRAVEL		
Water gardens needed to buffer 120m ³ / 1 hr	3	10	Water space in gravel	30%
Total Water Gardens Footprint	110m ²	375m ²	Water space in Hydrorock	94%
Total Volume of soil removed	145m ³	485m ³	Weight of soil m ³	1.3t
Total Weight of soil removed	145t	485t	Soil expansion factor	130%
Total Spoil loads (26t lorry)	6	19	Weight per spoil load	26t
Total Weight of infill	8.4t	630t	Gravel weight m ³	1.68t
Lorry loads for infill (26t lorry)	2 (Containers)	24	Hydrorock weight m ³	0.075t
End of life cleaning / treatment / disposal / recycling of 'hazardous waste'	8.4t (Recycled free by Rockwool)	630t (£100k)	Cost of cleaning gravel	£160 per t



Hydrorock Array buffering 40³ in 1 Hr / infiltrating 20m³ in 24 Hrs

- **Array Comprises: 78 BD440 Blocks** (2 Modules side-by-side of 39 Blocks each @ 3 Blocks wide X 13 Blocks long)
- **Array Dimensions: 15.6m Long x 2.4m Wide x 1.0m High / Footprint: 37m²**
- **Infiltration Surface Area: 55.4m²** (Bottom 37.4m² + Sides 15.6m² + Ends 2.4m²)
- **Filling Rate: 45.0³ / hr** (52 Blocks x 864 L / hr per Block)
- **Static Capacity: 34.3m³** (Storage capacity of Blocks - 78 Blocks x 440 L)
- **Infiltration Rate: 5.8m³ / hr** (104L / m² / hr x 55.4m²)
- **Dynamic Capacity: 40.1 m³** (Static Capacity 34.3m³ + infiltration during 1st hr of filling 5.8m³/hr)
- **Capability to infiltrate 50% of buffered volume within 24 hours: < 3 hrs** (17.1m³ ÷ 5.8m³ / hr) 100% < 6 hrs

[NB. Chalk soil infiltration K Value 2.5 = 104L / m² / hr]



