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SURFACE WATER DRAINAGE PLAN (Scale 1:100)

Full Site Area Including externals and new building = 386m<sup>2</sup>  
 Impermeable Roof Areas Only To Surface Water Drainage System  
 Total Impermeable Roof Area = 100m<sup>2</sup>  
 Total Permeable externals = 286m<sup>2</sup>

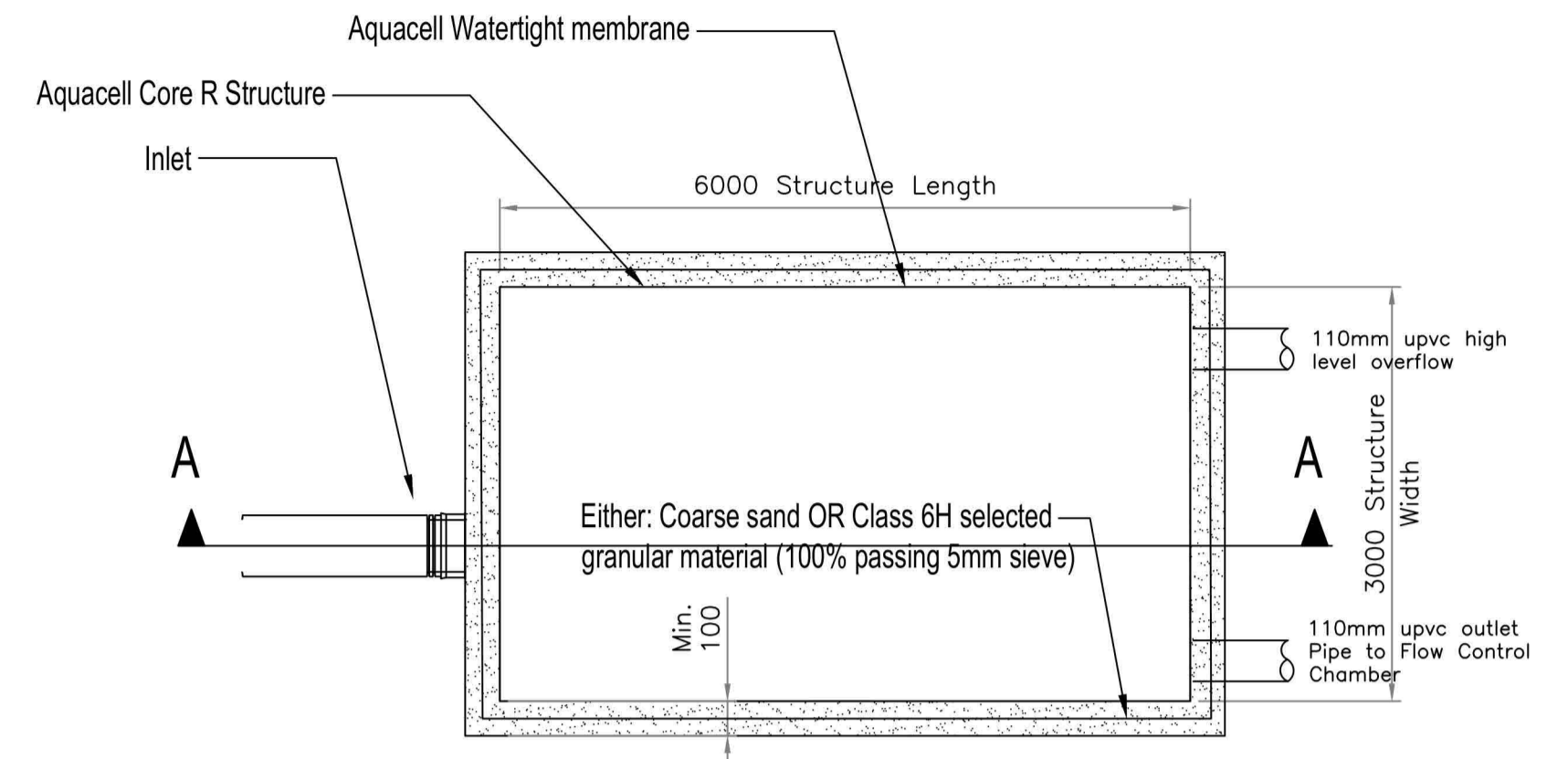
**Attenuation Details**  
 Total Attenuation volume required for roof drainage to 1 in 200 year event = 3.9m<sup>3</sup>  
 Adopt 1No. attenuation zone formed with 1.0x0.5x0.4m Aquacell Core-R crates with 95% free volume for 0.19m<sup>3</sup> volume. Tank to be located 500mm from buildings possible.  
 1 Crates deep = 0.4m (0.25m effective)  
 6 Crates wide = 6m  
 6 Crates long = 3m  
 Total volume = 6x3x0.25x0.95% = 4.3m<sup>3</sup> formed with 36 crates (Above calculation allows for 150mm zone to top of crates as redundant due to overflow pipe requirement)  
 Max vehicle loading above crates not to exceed 9 tonnes  
 Note size may be altered, deepened etc for fewer crates if invert levels permit to main sewer

Note: Location of Underground surface water lines to suit downpipe locations. Locations to be confirmed on site. Pop up setting out to be as per Architectural drawings. All junctions to be swept radius bends  
 IC denotes Inspection Chamber  
 MH denotes Manhole  
 RE denotes Rodding Eye  
 RWP denotes Rain Water Pipe

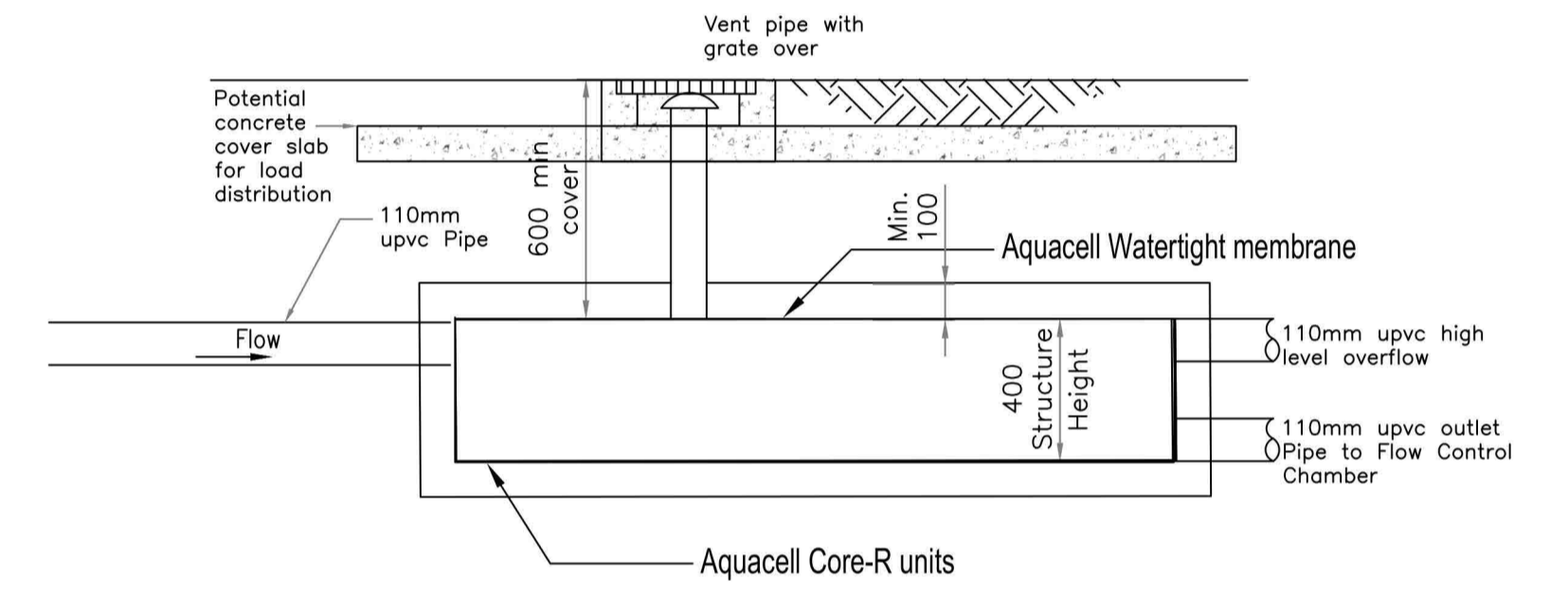
Denotes DN100 UPVC solid Surface Water Drainage @ 1:60 fall minimum unless otherwise noted  
 All ACO drains to have integral silt traps prior to discharge to main surface water drainage.  
 All Rain Water Downpipe, POP-UP locations and ACO drains to suit architects plans  
 Any existing field drains or old rubble drains encountered during foundation excavations to be intercepted and diverted. Any old rubble drains below foundation formation levels to be excavated and backfilled with type 1 granular sub-base material to clause 803 of the specification for highway works. Sub-base material to be laid and compacted in layers not exceeding 110mm to clause 802 of this specification.  
 Crates at 650mm cover depth suitable for Stonee vehicle loading. Note cover depth may need to be shallower with concrete slab over to suit falls to existing disconnecting manhole

**NEW DRAINAGE SPECIFICATION**

New drainage to be laid in 150mm dia. reinforced structured polypropylene pipework (Hepworth plastidrain) with flexible joints to BS EN 13476-1:2018. All pipework to be bedded and jointed as manufacturer's instructions/details.  
 Cover to pipes is defined as depth from finished ground level to the top surface of the pipe barrel.  
 All pipes must be laid true to a minimum 1 in 80 gradient unless noted otherwise (exact levels to be established on site).  
 Drainage with cover of less than 600mm in driveways or within 1000mm of foundations to have concrete surround as detailed. Concrete surrounds shall be discontinuous at every pipe joint and shall be separated by 20mm thick fibreboard or equivalent. Board to be full width and height of concrete surround.  
 All drainage works to be tested before and after backfilling to the satisfaction of building control, as appropriate.  
 New inspection chambers to be 500mm dia. polypropylene inspection chambers (or equivalent)  
 Handhole access points to be fitted to base of new soil stacks and 'pop-up' locations to allow rodding and inspection, as required.  
 All new rodding eyes to have concrete surround/neck support.



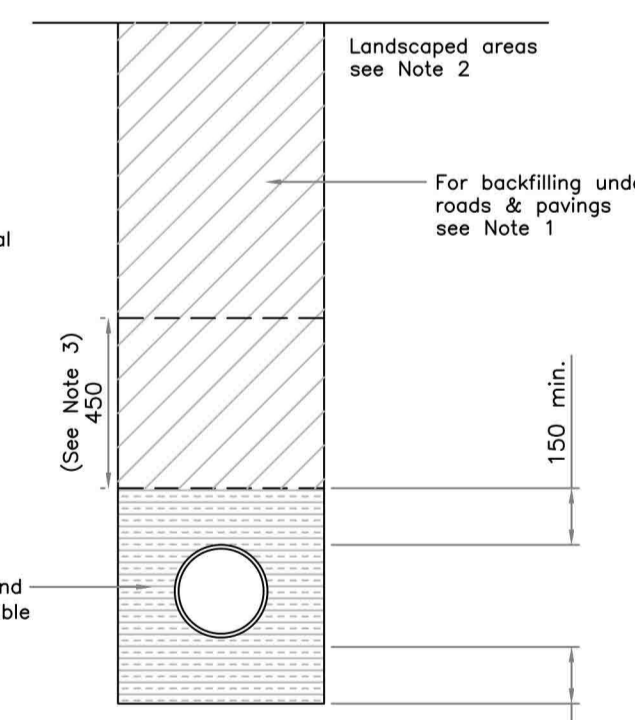
TYPICAL ATTENUATION TANK PLAN



SECTION A-A

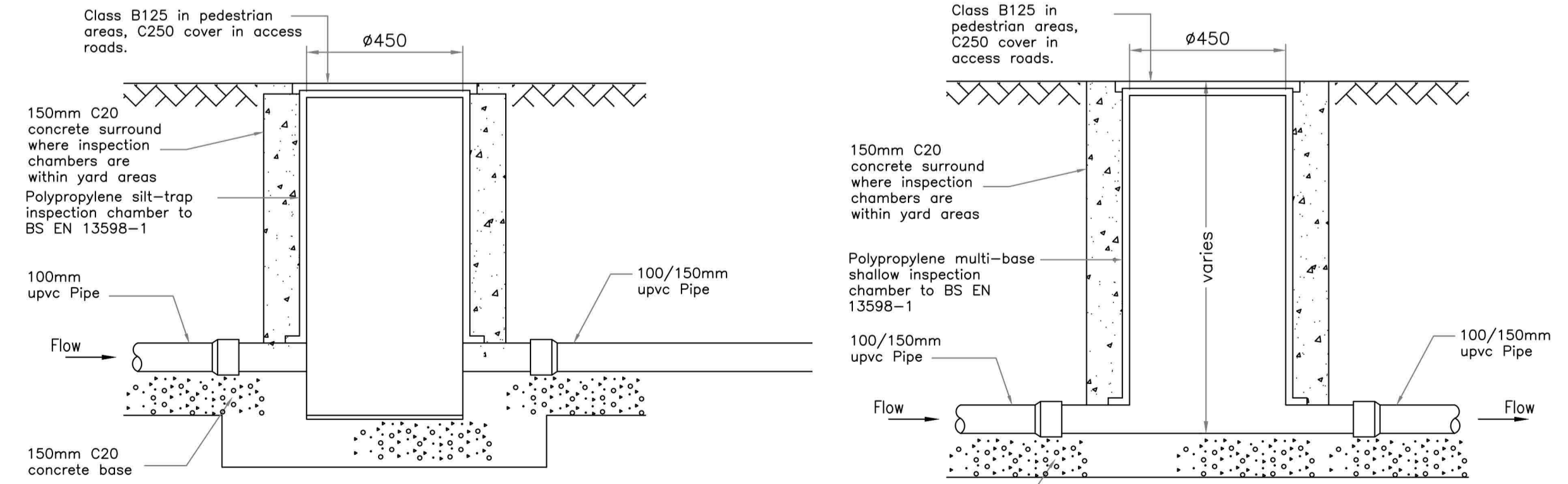
**Pipe Bedding Notes**

- Backfilling under roads and pavings: Backfill from top of granular bedding up to formation level with Granular Sub-base Material Type 1 to Highways Agency specification for Highway Works 1998 Clause 803, laid and compacted in 150mm layers.
- Backfilling under landscaped areas: Backfill from top of granular bedding up to underside of top soil with selected Class 1B fill whether selected from locally excavated material or imported, shall consist of uniform readily compactible material, free from vegetable matter, building rubbish and frozen material, or materials susceptible to spontaneous combustion, and excluding clay of liquid limit greater than 80 and/or plastic limit greater than 55 and materials of excessively high moisture content. Clay lumps and stones retained on 75mm and 37.5mm sieves respectively shall be excluded from the fill material. Laid and compacted in layers not exceeding 300mm.
- Do not use heavy compactors before there is 600mm of material over pipe.



Pipe Nominal Bore (DN)	Maximum Particle Size (mm)	Class of Bedding	Suitable Materials	
			Imported granular materials (Note a)	Maximum CF value for as-dug granular material (Note b)
100	10	S	10mm nominal single size.	0.15
		B		0.30 (Note c)
		F		0.15
		N	Course medium or fine sand	
150 to 500	20	S	14 to 5mm graded or 20mm to 5mm graded.	0.15
		B		0.30 (Note c)
		F		0.15
		N	All in aggregate or course medium or fine sand.	

Concrete encasement to shallow pipes in roads



Typical Silt Trap Inspection Chamber Detail Scale 1:20

Typical Inspection Chamber Detail

15.4.24	A	Updated	DK
DATE	No.	REVISION	DRN.
CLIENT, PROJECT & TITLE			
MR P. THOMPSON			
PROPOSED DWELLINGS AT 1 DOUGLAS CRESCENT, BONNYRIGG, EH19 2DG			
UNDERGROUND DRAINAGE PLAN, DETAILS AND SPECIFICATION			
STATUS			
PLANNING			
TURNBULL KYLE LTD CONSULTING CIVIL ENGINEERS 10 Oliver Place Hawick TD9 9BG			
Tel. 01450 371177			
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CHECKED BY	D.K.	SCALE	AS NOTED @ A1
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