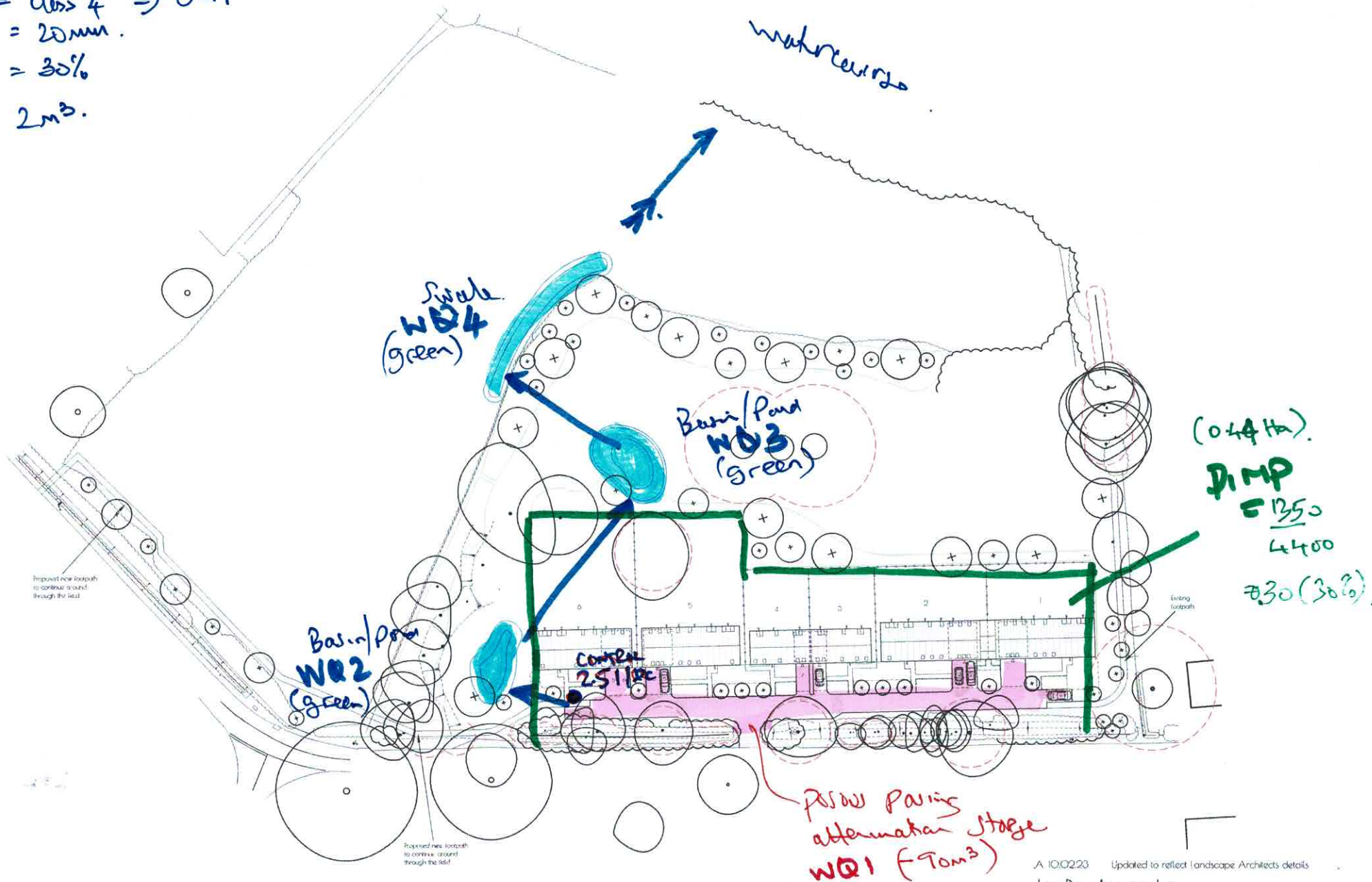


SITE
 SOIL = class 4 $\Rightarrow 0.47$.
 MS60 = 20mm.
 PWP = 30%
 $V_T = 2m^3$.

$$M5_{60} = 20 \text{ min.}$$
$$V_T = 2 \text{ m}^3.$$


$Q_{\text{out}} = 2.5 \text{ l/sec}$

A 10.02.23 Updated to reflect Landscape Architects details

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Project	Title
Land Off Knowle Lane (Replan)	Site Layout

Scale	Date	Drawn	Checked	Job No.	Drawing No.	Revision
1/8"=1'-0"	Jan '23	208	JD	10-121	SL01	A

scale 1:500

Note: All new planting is shown indicative Please refer to landscape architects drawings for details

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by: Andy Traves

Site name: Cockpit Farm

Site location: Horton Heath

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SUDS Manual C753 (Cirta, 2015) and the non-statutory standards for SUDS (Defra, 2015). It is not to be used for detailed design

of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude: 50.95565° N

Longitude: 1.291° W

Reference: 1766344261

Date: Apr 17 2023 13:58

Site characteristics		Methodology	
Total site area (ha):	0.75	esti	IH124
Significant public open space (ha):	0.48	Q _{BAR} estimation method:	Calculate from SPR and SAAR
Area positively drained (ha):	0.27	SPR estimation method:	Calculate from SOIL type
Impermeable area (ha):	0.135	Soil characteristics	Default
Percentage of drained area that is impermeable (%):	50		Edited
Impervious area drained via infiltration (ha):	0		4
Return period for infiltration system design (year):	10		0.47
Impervious area drained to rainwater harvesting (ha):	0	Hydrological characteristics	Default
Return period for rainwater harvesting system (year):	10		Edited
Compliance factor for rainwater harvesting system (%):	66	Rainfall 100 yrs 12 hrs:	--
Net site area for storage volume design (ha):	0.27	FEH / FSR conversion factor:	1.11
Net impermeable area for storage volume design (ha):	0.15	SAAR (mm):	800
Pervious area contribution to runoff (%):	30	M5-60 Rainfall Depth (mm):	20
* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q _{BAR} and other flow rates will have been reduced accordingly.		'r' Ratio M5-60/M5-2 day:	0.4
		Hydrological region:	7
		Growth curve factor ¹ year:	0.85
			0.85
Design criteria		Growth curve factor	1.62
Climate change allowance factor:	1.4	10 year:	
Urban creep allowance factor:	1.1	Growth curve factor 30 year:	2.3
Volume control approach	Flow control to max of 2 l/s/ha	Growth curve factor 100 years:	3.19
Interception rainfall depth (mm):	5 or Q _{bar}	Q _{BAR} for total site area (l/s):	4.23
Minimum flow rate (l/s):	2.5	Q _{BAR} for net site area (l/s):	1.52

Site discharge rates	Default	Edited	Estimated storage volumes		Default	Edited
1 in 1 year (l/s):	2.5	2.5	Attenuation storage 1/100 years (m³):		90	90
1 in 30 years (l/s):	2.5	2.5				
1 in 100 year (l/s):	2.5	2.5	Long term storage 1/100 years (m³):		0	0
		Total storage 1/100 years (m³):		90	90	

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksubs.com. The use of this tool is subject to the UK SUDS terms and conditions and licence agreement, which can both be found at <http://www.uksubs.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

<u>Site Ref</u>	Cockpit farm
<u>Catchment</u>	Total

TV Initial sizing of Treatment Storage volume:

Development area (A)	0.44	Ha	Taken from form ASV1
PIMP estimate	30	%	Percentage of impermeable surface
SPR	0.47		Taken from form ASV1
M _{s60} rainfall	20	mm	Appendix 1 Figure A2.1
M _{s60} rainfall (r)	0.4		Appendix 1 Figure A2.1
Treatment volume	2	m ³	(TV)

LTV Initial sizing of long term storage volume

Development area (A)	0.44	Ha	Taken from ASV1
PIMP estimate	30	%	Taken from TV
Impermeable area (AP)	0.13	Ha	
LTF	2.2	m ³ /Ha.mm	Fig A10.1/10.2
Rainfall depth (RD)	63	mm	Appendix 1 Fig A3.1
Long Term Vol (LTV)	18	m ³	

Practicalities of activating Long Term Storage

The practicalities of detailed design for this storage are not simple. Any element of reduction of runoff volume eg topographic management of indirect runoff, interception storage and rainwater harvesting, even partial infiltration when ground conditions are poor will help to minimise this volume. There are three basic approaches:

- 1) Provide for whole of LTV by infiltration. (many sites do not have appropriate soil characteristics for this)
- 2) System captures total flow (ie on line) then empties at a rate of less than 2 l/s/Ha using land drains or a throttle. (The problems with this are that a significant area comes into operation in all events. This results in a much greater area tha option (3). Due to the frequency of use it will tend to render the area unusable as a dual use public area and will restrict the type of planting that can be used in the storage area)
- 3) LTV system only activates above a storm size threshold (ie off line) which captures the required volume & discharges it at the required rate. In practice this means the attenuation system has a direct discharge at greenfield discharge rates. (The problems with this are that the design is complex. It is likely that the LTV storage may only operate of the order of once in 5 years. Whilst this may be acceptable for dual use as a football field etc if above ground storage in a parking area is mobilised depths would have to be limited. As use will be infrequent the drain down method must be robust. A simple throttle will rarely be effective as it would need to be impractically small for LTS on developments smaller than about 6Ha.)

Further detail is contained in chapter 7.2 and reference should be made to Fig 7.4 and Fig 7.5 for schematic illustration of the basic principles.