

Title: Drainage Strategy Technical Note
Date: 30th June 2023
Author: Rob Lowe
Reference: 23245-JUBB-XX-XX-RP-C-001
Revision: P1

1.0 Introduction

- 1.1.1 Jubb have prepared this Technical Note alongside the associated drawings and calculations to address the Drainage requirements for a reserved matters planning application in relation to the proposed redevelopment of Land at Unit 10 Chalcroft Business Park, Burnetts Lane, Easteligh, SO30 2PA.
- 1.1.2 The site is located within a wider existing industrial development called Chalcroft Business Park. The business park is located on the outskirts of the village of Hedge End. The property currently comprises a development of single storey units and light industrial buildings. There are existing concrete and tarmac hardstanding areas.
- 1.1.3 There are existing surface and foul water networks located within the development. These are currently used by the existing buildings within the industrial park to discharge their surface and foul water. The existing site currently discharges both surface and foul water (via a reed bed treatment system) to the adjoining stream.
- 1.1.4 It is proposed to demolish the existing development within the reserve matters application site and construct in its place 2no new industrial units with office space and associated car parking and HGV yard.

2.0 Foul Water Drainage

- 2.1.1 A new foul water drainage network will be required to service the proposed development. The proposed network will collect and convey foul water discharge from the development to a connection point on the existing foul water sewer located within the business park.
- 2.1.2 The proposed connection point to the foul sewer is located in the north western corner of the site. This connection is to be made via a new connection within an existing manhole.
- 2.1.3 The new foul sewerage network has been designed to accommodate the anticipated peak development flows without flooding.
- 2.1.4 Where the foul water pipes are located below permeable paving, the construction above the pipe will ensure the storage function of the permeable paving will not be impacted. This will also be the case for the utilities that need to be located below the permeable paving.

3.0 Surface Water Drainage

- 3.1.1 A new surface water drainage network will be required to service the proposed development to drain surface water runoff from the buildings, access road, car park and pedestrian hard standing areas.
- 3.1.2 The proposed connection point to the existing surface water sewer located in the north western corner of the site. These connections are to be made via a new connection within an existing manhole.

3.2 Geology

- 3.2.1 A ground investigation has yet to be undertaken on the site, but an intrusive survey is planned to be carried out. Records of previous ground investigations carried out within the business park are available. These cover an area immediately adjacent to the site. These investigations show the ground is made up of Mottled Sandy Clay overlain by sandy gravelly silt.

- 3.2.2 A review of BGS mapping has shown the site is underlain by a bedrock of Wittering Formation. This is a sand, silt clay mixture which is not generally known for its permeability. There are superficial deposits which could provide some permeability.
- 3.2.3 Due to the underlying impermeable bedrock, an infiltration method of discharge has been discounted at this point. Should it be deemed feasible following the ground investigation, the drainage design will be revisited.

3.3 Strategy

- 3.3.1 With the ground conditions appearing to be unfavourable to infiltration methods of surface water discharge, this method has been discounted. In line with the hierarchical SuDS approach, a watercourse discharge would be the next preferred option. Whilst the site is in close proximity to a watercourse with the stream being located alongside the business parks northern boundary, the proximity of onsite drainage is deemed preferred to discharge into.
- 3.3.2 The existing surface water network discharges to the stream via an existing headwall. Due to the sensitive nature of the surrounding site, a SINC is located 20m to the north of the site, it would not be suitable to construct a new discharge location within the SINC area.
- 3.3.3 To calculate the flow rates for this development, a greenfield runoff rate has been considered. This has been calculated as 7.34l/s. This rate will be used for all storms up to and including the 1 in 100 year storm + 40% climate change. A copy of the calculations used to calculate this figure are included within Appendix A of this technical note.
- 3.3.4 The development will then require 868m³ of attenuation. The majority of this will be provided via a planted detention basin. Additional storage will be provided by a below ground cellular storage attenuation tank. A copy of the calculations used to size the attenuation is included within Appendix A.
- 3.3.5 The drainage infrastructure will remain private and maintained by a management company post construction.

3.4 SuDS

- 3.4.1 As the site is over 1Ha, the surface water strategy will require three forms of filtration as per policy DM6 of the Eastleigh Borough Local Plan. This will be provided in the form of a source control filtration method, a secondary filtration method and a tertiary filtration method prior to discharge.
- 3.4.2 As the source control method of filtration, the site will be split into three catchments, Roof Areas. HGV areas and non HGV areas. For non HGV areas, levels of the roads will direct the surface water towards permeable paving. This will provide a water cleansing method at source. For HGV areas, a filter channel drain will be used in place of standard channel drains. This will provide a water cleansing method at source. For roof areas, the RWPs will pass through SuDS planters. All three methods will provide closed entries to the drainage network to prevent ingress from wildlife.
- 3.4.3 As a secondary method of filtration, a proprietary system such as a downstream defender will be utilised. These will be placed upstream of the cellular storage tank to prevent silt from entering it.
- 3.4.4 The final method of filtration will be provided by a detention basin. The basin will provide a tertiary treatment to ensure the water discharged will be clean. The detention basin will be planted with a wildflower grass mix to promote use by nearby flora and fauna.
- 3.4.5 New surface water drainage infrastructure will be implemented on site to adequately convey flows within the proposed system to prevent surface flooding. A copy of the Drainage Strategy drawing and calculations are included within the appendices of this report.

- 3.4.6 As per CIRIA Table 26.2 from the C753 SuDS Manual, the site has a medium pollution hazard level, with indices for TSS, Metals and Hydrocarbons of 0.7, 0.6, and 0.7 respectively. In line with CIRIA guidance, the secondary and tertiary treatment stages will only provide 50% of their normal impact. The primary stages will provide cleansing properties of 0.7, 0.6, & 0.7 for permeable paving and 0.4, 0.4, & 0.4 for the filter drain. The second stage treatment (downstream defender or similar) would normally provide mitigation of 0.5, 0.4, & 0.8 but with the 50% reduction these will be altered to 0.25, 0.2, & 0.4. The tertiary stage treatment method of a detention basin would normally provide 0.5, 0.5, & 0.6. These will be altered to be 0.25, 0.25, & 0.3. The cumulative scores show the drainage strategies provide suitable water cleansing.
- 3.4.7 The above measures will ensure the site complies with EBC Local Plan policies DM6, DM8, and DM10.

4.0 Maintenance and Management

- 4.1.1 To ensure that any proposed SuDS features operate effectively for its lifetime a detailed management plan for the operation and maintenance of the SuDS will be produced, prior to construction, based on Chapter 32 of Ciria C753.
- 4.1.2 It is anticipated that drainage for the building, carparking, landscaping, etc in private ownership will be managed and maintained privately by a management company.
- 4.1.3 The surface water and foul water drainage networks will not be offered to Southern Water for adoption. The onsite pipework and attenuation structures will be the responsibility of the site owners.
- 4.1.4 Proposed SuDS features such as permeable paving will remain private and will be maintained by a management company.
- 4.1.5 Details for the management and maintenance of any SuDS within the site will be agreed with the Local Authority prior to construction. A draft maintenance regime is detailed below, this will need to be confirmed once construction is complete.

General Requirements

Regular Maintenance	Frequency
Litter Collect all litter or other debris and remove from site at each site visit.	Monthly or when deemed necessary
Grass maintenance Amenity Grass – Mow all grass verges, paths and amenity grass at 35-50mm with 75mm max. All cuttings to remain in situ.	Monthly or when deemed necessary
Flood Routes Make visual inspection of proposed overland flow routes. Check that the route is not obstructed by rubbish, new features etc. Remove obstructions as necessary.	Monthly

Manholes

Regular Maintenance	Frequency
Silt Trap, Inspection chambers Remove cover and inspect ensuring water is flowing freely and that the existing route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn in which silt build up is more likely to occur.	Annually
Reactive Maintenance	Frequency
Replace gully grating and manhole if physical damage has occurred. If a blockage in the drainage system occurs rod the necessary region within the system to ensure the blockage is removed.	As required

Catch Pit

Regular Maintenance	Frequency
Silt Trap, Inspection chambers Open cover to inspect level of silt present, where required remove the excess silt.	Monthly within first year, annually thereafter
Reactive Maintenance	Frequency
If the level of silt is above the level of the pipes it may be necessary to mechanically extract the silt and jets the drains both upstream and downstream to ensure continued performance.	As required

Hydrobrake

Regular Maintenance	Frequency
Inspection Chamber Remove cover to inspect and note any high-water levels, re-inspect 24hrs later to evaluate reduction of water levels. Inspect ensuring that water is flowing appropriately through the flow control device and there are no obstructions to the flow of water immediately upstream or within the device. Remove debris and silt where necessary.	Monthly or following severe storms, within first year. Monthly for 3 months, then every 6 months.
Reactive Maintenance	Frequency
If a blockage within the hydrobrake unit occurs, it will need to be either jetted or replaced depending on the severity of the blockage.	As required

Permeable Paving

Regular Maintenance	Frequency
Surface Protection Remove litter and debris. Brush or suction sweep surface to remove silt build up and replace grit as required	Monthly Annually
Bedding Replacement Lift blocks and remove bedding material. Clean geotextile and replace bedding material with new silt-free granular material.	Every 10 years or as required
Reactive Maintenance	Frequency
Brush or suction sweep to remove any materials left on surface. Lift and re-bed blocks where movement has occurred. In case of settlement, full reconstruction and compaction of sub-base may be required. Sub-grade should be checked to washout of fines.	As required

Attenuation Tank

Regular Maintenance	Frequency
Remove cover and inspect ensuring water inflow is unobstructed and check for siltation and debris. Remove debris and silt. Undertake inspection after leaf fall in autumn in which silt build up is more likely to occur.	Annually
Review covers and surface for signs of settlement or structural degradation	Annually
Reactive Maintenance	Frequency
Replace inspection cover if physical damage has occurred. If siltation is impeding flow and reducing volume then the tank is to be flushed and cleared with a gully sucker or similar. Visual inspection or CCTV survey of the tank to be carried out where possible.	As required

5.0 Conclusions

- 5.1.1 It has been demonstrated through development of our proposed drainage strategy that the proposed development complies with the requirements of the planning authority.

Appendix A: Surface Water Calculations

Jubb Consulting Engineers Ltd (Bristol)							Page 1
St James's Court, Suite B			23245				
Ground Floor West, St James ...			Chalcroft Business Park				
Bristol, BS1 3LH			Unit 10				
Date 30/06/2023			Designed by AH				
File GREEN FIELD ATTENUATION...			Checked by RL				
Innovyze			Source Control 2020.1				
<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 1235 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	8.381	0.381	0.0	6.6	6.6	311.3	O K
30 min Summer	8.510	0.510	0.0	6.6	6.6	416.5	O K
60 min Summer	8.647	0.647	0.0	6.6	6.6	528.2	O K
120 min Summer	8.783	0.783	0.0	6.6	6.6	639.9	O K
180 min Summer	8.856	0.856	0.0	6.6	6.6	699.7	O K
240 min Summer	8.901	0.901	0.0	6.6	6.6	736.4	O K
360 min Summer	8.964	0.964	0.0	6.6	6.6	787.5	O K
480 min Summer	9.001	1.001	0.0	6.6	6.6	818.2	O K
600 min Summer	9.024	1.024	0.0	6.6	6.6	836.7	O K
720 min Summer	9.037	1.037	0.0	6.6	6.6	846.9	O K
960 min Summer	9.042	1.042	0.0	6.6	6.6	851.6	O K
1440 min Summer	9.016	1.016	0.0	6.6	6.6	830.5	O K
2160 min Summer	8.959	0.959	0.0	6.6	6.6	783.6	O K
2880 min Summer	8.901	0.901	0.0	6.6	6.6	735.9	O K
4320 min Summer	8.790	0.790	0.0	6.6	6.6	645.1	O K
5760 min Summer	8.688	0.688	0.0	6.6	6.6	562.1	O K
7200 min Summer	8.598	0.598	0.0	6.6	6.6	488.9	O K
8640 min Summer	8.520	0.520	0.0	6.6	6.6	424.8	O K
10080 min Summer	8.452	0.452	0.0	6.6	6.6	369.7	O K
15 min Winter	8.427	0.427	0.0	6.6	6.6	349.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
15 min Summer	130.405	0.0	296.9	26			
30 min Summer	87.611	0.0	397.3	41			
60 min Summer	56.129	0.0	536.5	70			
120 min Summer	34.675	0.0	662.6	130			
180 min Summer	25.749	0.0	737.1	188			
240 min Summer	20.687	0.0	788.2	248			
360 min Summer	15.234	0.0	866.2	366			
480 min Summer	12.237	0.0	920.3	486			
600 min Summer	10.316	0.0	958.0	604			
720 min Summer	8.967	0.0	980.2	724			
960 min Summer	7.182	0.0	981.9	962			
1440 min Summer	5.242	0.0	940.0	1288			
2160 min Summer	3.818	0.0	1330.5	1624			
2880 min Summer	3.045	0.0	1413.3	1988			
4320 min Summer	2.209	0.0	1530.3	2772			
5760 min Summer	1.757	0.0	1641.9	3536			
7200 min Summer	1.472	0.0	1718.5	4320			
8640 min Summer	1.274	0.0	1783.8	5024			
10080 min Summer	1.128	0.0	1838.4	5752			
15 min Winter	130.405	0.0	332.7	26			
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St James's Court, Suite B Ground Floor West, St James ... Bristol, BS1 3LH			23245 Chalcroft Business Park Unit 10				
Date 30/06/2023 File GREEN FIELD ATTENUATION...			Designed by AH Checked by RL				
Innovyze			Source Control 2020.1				
Summary of Results for 100 year Return Period (+40%)							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control E (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	8.572	0.572	0.0	6.6	6.6	467.5	O K
60 min Winter	8.727	0.727	0.0	6.6	6.6	593.7	O K
120 min Winter	8.883	0.883	0.0	6.6	6.6	721.2	O K
180 min Winter	8.968	0.968	0.0	6.6	6.6	791.1	O K
240 min Winter	9.022	1.022	0.0	6.6	6.6	835.0	O K
360 min Winter	9.097	1.097	0.0	6.6	6.6	895.9	O K
480 min Winter	9.141	1.141	0.0	6.6	6.6	932.2	O K
600 min Winter	9.169	1.169	0.0	6.6	6.6	954.9	O K
720 min Winter	9.186	1.186	0.0	6.6	6.6	968.7	O K
960 min Winter	9.199	1.199	0.0	6.6	6.6	979.5	O K
1440 min Winter	9.181	1.181	0.0	6.6	6.6	964.8	O K
2160 min Winter	9.114	1.114	0.0	6.6	6.6	910.4	O K
2880 min Winter	9.044	1.044	0.0	6.6	6.6	852.8	O K
4320 min Winter	8.867	0.867	0.0	6.6	6.6	708.1	O K
5760 min Winter	8.706	0.706	0.0	6.6	6.6	576.4	O K
7200 min Winter	8.569	0.569	0.0	6.6	6.6	465.0	O K
8640 min Winter	8.457	0.457	0.0	6.6	6.6	373.7	O K
10080 min Winter	8.368	0.368	0.0	6.5	6.5	300.9	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
30 min Winter	87.611	0.0	441.7	40			
60 min Winter	56.129	0.0	601.0	70			
120 min Winter	34.675	0.0	741.3	128			
180 min Winter	25.749	0.0	823.0	186			
240 min Winter	20.687	0.0	877.8	244			
360 min Winter	15.234	0.0	956.1	360			
480 min Winter	12.237	0.0	997.4	476			
600 min Winter	10.316	0.0	1006.2	592			
720 min Winter	8.967	0.0	1001.2	708			
960 min Winter	7.182	0.0	981.6	932			
1440 min Winter	5.242	0.0	934.7	1370			
2160 min Winter	3.818	0.0	1488.6	1732			
2880 min Winter	3.045	0.0	1579.0	2196			
4320 min Winter	2.209	0.0	1703.7	3032			
5760 min Winter	1.757	0.0	1839.1	3816			
7200 min Winter	1.472	0.0	1925.2	4608			
8640 min Winter	1.274	0.0	1998.7	5280			
10080 min Winter	1.128	0.0	2060.8	5952			
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St James's Court, Suite B Ground Floor West, St James ... Bristol, BS1 3LH	23245 Chalcroft Business Park Unit 10	
Date 30/06/2023 File GREEN FIELD ATTENUATION...	Designed by AH Checked by RL	
Innovyze	Source Control 2020.1	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.800	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.300

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To: (ha)	From: To: (ha)	From: To: (ha)			
0 4 0.500	4 8 0.400	8 12 0.400			

Jubb Consulting Engineers Ltd (Bristol)		Page 4
St James's Court, Suite B Ground Floor West, St James ... Bristol, BS1 3LH	23245 Chalcroft Business Park Unit 10	
Date 30/06/2023 File GREEN FIELD ATTENUATION...	Designed by AH Checked by RL	
Innovyze Source Control 2020.1		

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 8.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	860.0	0.0	1.201	0.0	0.0
1.200	860.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0111-7300-2000-7300
Design Head (m) 2.000
Design Flow (l/s) 7.3
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 111
Invert Level (m) 8.000
Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1200

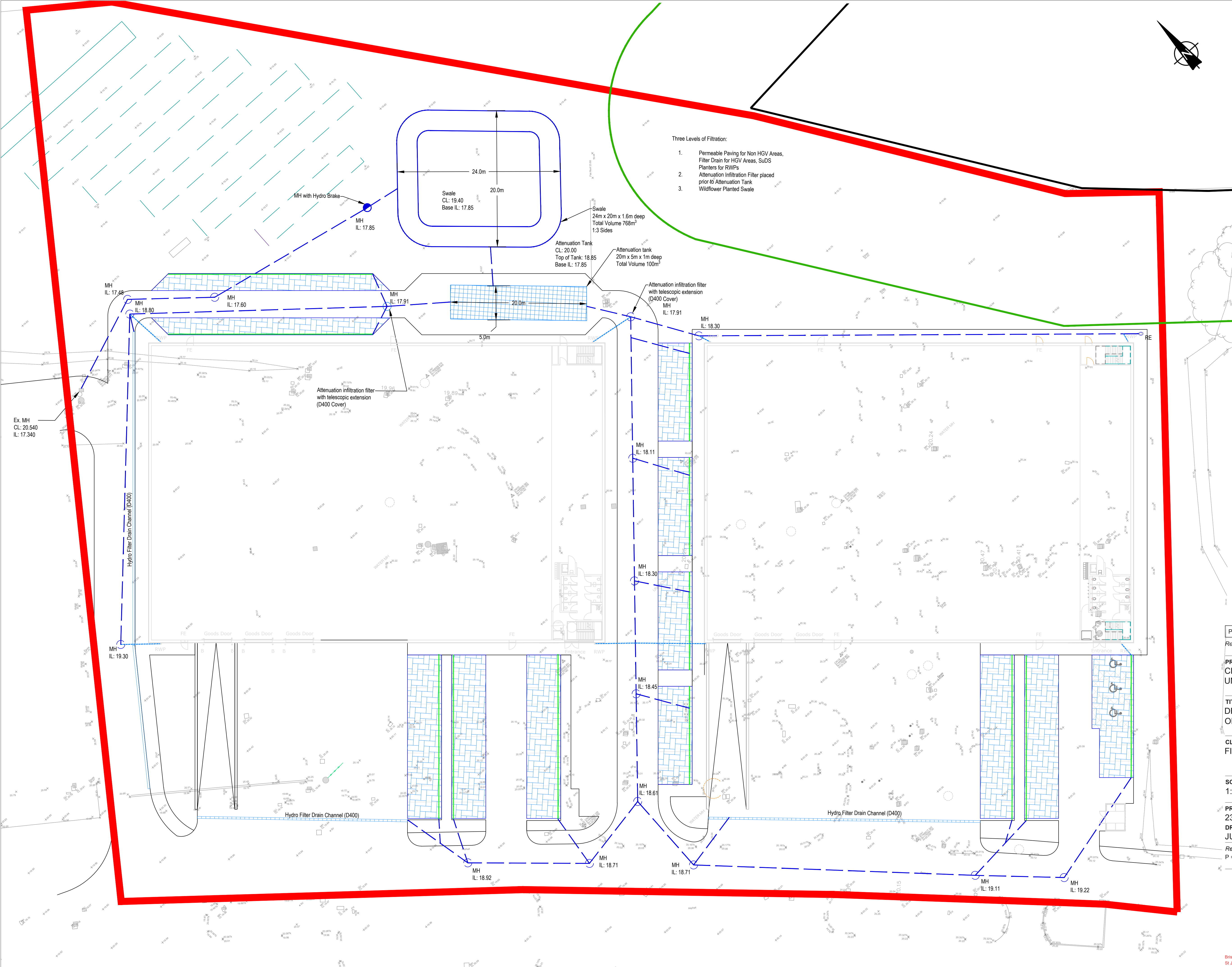
Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	7.3
Flush-Flo™	0.486	6.6
Kick-Flo®	0.996	5.3
Mean Flow over Head Range	-	6.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.9	1.200	5.7	3.000	8.8	7.000	13.2
0.200	5.8	1.400	6.2	3.500	9.5	7.500	13.6
0.300	6.4	1.600	6.6	4.000	10.1	8.000	14.1
0.400	6.6	1.800	6.9	4.500	10.7	8.500	14.5
0.500	6.6	2.000	7.3	5.000	11.2	9.000	14.9
0.600	6.6	2.200	7.6	5.500	11.8	9.500	15.3
0.800	6.2	2.400	7.9	6.000	12.3		
1.000	5.3	2.600	8.3	6.500	12.7		

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Appendix B: Site Wide Surface Water Strategy Drawing



- Three Levels of Filtration:
1. Permeable Paving for Non HGV Areas, Filter Drain for HGV Areas, SUDS Planters for RWPs
 2. Attenuation Infiltration Filter placed prior to Attenuation Tank
 3. Wildflower Planted Swale

- NOTES
1. Do not scale from this drawing.
 2. Location of existing utilities and drainage are indicative. Contractor to confirm location/depth of utilities on site before undertaking any construction activities.
 3. Attenuation is provided to accommodate the 1 in 100 year including 40% climate change allowance rainfall event.
 4. Proposed tanks are shown indicatively. The size, shape and position is subject to detail design.
 5. Onsite ground investigation works including infiltration testing in accordance with BRE365 guidance should be undertaken across the site to inform the drainage proposals.

- LEGEND
- 2250 @ 1:225
 - Proposed surface water sewer
 - Proposed channel drain
 - Proposed RWP Connection
 - Rodding eye
 - Permeable paving
 - Infiltration/Attenuation tank
 - Hydrobrake
 - Perforated pipe

P1	30.06.23	Preliminary issue	AH	RL
Rev	Date	Description	By	Apvd
PROJECT: CHALCROFT BUISNESS PARK UNIT 10				
TITLE: DRAINAGE ARRANGMENT OPTION 1				
CLIENT: FIPWEL				
SCALE@A1: 1:250				
PROJECT REF: 23245				
DRAWING No: JUB_XX_XX_DR_C_500			REV: P1	
Revision Referencing P = Preliminary A = Approval T = Tender C = Construction				

Jubb

Appendix C: Architects Layout



DRAFT



General Notes

This drawing is © Boyle & Summers and may not be reproduced, copied or altered in any way without written authority.

Other than for the purposes of planning, do not scale these drawings. Use written dimensions only. All dimensions to be checked on site prior to commencement of work.

Ordnance Survey Data

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Site and plot boundaries are shown indicatively only and subject to confirmation.

Key

- SITE BOUNDARY
- DEMOLITION LINES
- Maximum Northern build line
- SINC boundary
- 20 m SINC buffer
- REFUSE STORES
- COVERED CYCLE PARKING
- INTERNAL WALL MOUNTED CYCLE HOOKS
- GREEN LANDSCAPED AREAS
- GARDEN TABLE AND BENCH
- ELECTRIC CAR CHARGING STATION TO ENGINEER'S DETAIL
- CAR SHARING SPACES
- FIRE EXIT DOOR BOLLARDS - flat top, 100mm diameter, 0.9m high, root fixed, stainless steel grade 316
- GOODS DOOR BOLLARDS - flat top, 150mm diameter, 1.2m high, root fixed, stainless steel grade 316

Notes

Car parking: Total 103no. spaces including 6no. Disabled, 10no. EV spaces and 4no car share spaces.

Cycle storage: Total 46no. spaces provided via 20no. external stay hoops and 10no. internal wall mounted hooks.

Buildings 10 and 11 FFLs are shown indicatively and are subject to specialist design and confirmation.

Development Platform

Platform area: 13,173sqm.
Maximum Plot Ratio: up to 48.8%
Maximum Building Height (to haunch): 14m
Use Classes: E(g)(ii), E(g)(iii), B8

GEA & GIA area schedule

GEA Area schedule			GIA Area schedule		
GEA: Including mezzanine floors			GIA: Including party walls and mezzanine floors		
	sq m	sq ft		sq m	sq ft
BUILDING 10	3298	35499	BUILDING 10	3185	34283
BUILDING 11	3122	33605	BUILDING 11	3013	32432
TOTAL	6420	69104	TOTAL	6198	66715

A 24-05-23 Draft Issue. FN TB

Proposed Site Plan

CBP - BSL - D2 - XX - DR - A - 2101 - PL - A MAY 2023
22093: CHALCROFT 3 1:250 @ A1
CHALCROFT BUSINESS PARK Drawn JL
Client: FIPWEL Checked TB

Suite E, Ferry House
Canute Road
Southampton
Hampshire
SO14 3FJ
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boyleandsummers.co.uk

Boyle & Summers