



Title: Drainage Strategy Technical Note
Date: 24th November 2023
Author: Rob Lowe
Reference: 23245-JUBB-XX-XX-RP-C-001
Revision: P2

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, Eastleigh, 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.
- 3.1.3 The existing surface water network onsite consists of a network of surface water sewers. These sewers discharge to a stream which runs along the northern boundary of the site. The watercourse flows through a Site of Important for Nature Conservation (SINC). The SINC is characterised by remnants of ancient woodland. Due to the sensitivity of the watercourse, it has been decided it is best to connect into the onsite network and utilise the existing outfall rather than constructing a new outfall.

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.

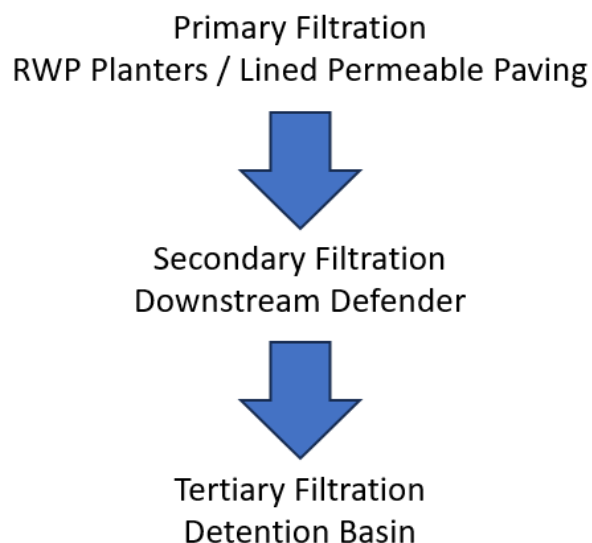
3.3 Strategy

- 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, as stated within paragraph 3.1.3 it has been decided to utilise the existing network so as to not harm the sensitive watercourse. The connection point is located c130m from the outfall so the use of existing sewers is minimal.
- 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 As part of the drainage strategy, lined permeable paving is proposed to be used as a collection method of surface water. This will provide both source control cleansing and a closed collection method which will prevent wildlife from entering the drainage system. The permeable paving is proposed to be lined to prevent inundation of groundwater.
- 3.3.5 The development will then require 809m³ of attenuation. The attenuation will be provided via a planted detention basin. A copy of the calculations used to size the attenuation is included within Appendix A.
- 3.3.6 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 lined 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 detention basin 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 lined 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.
- 3.4.8 A copy of the specification for the downstream defender is included within the appendices of this document.
- 3.4.9 The figure below details the SuDS treatment train that will provide the three levels of filtration.



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

Lined 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

Downstream Defender

Regular Maintenance	Frequency
Manhole Open cover to inspect level of silt and oil present, where required remove the excess silt and oil.	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

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

Charcroft - Unit 10:	Date: 23/11/2023		
	Designed by: AH	Checked by: KG	Approved By: RL
Report Details: Type: Junctions Storm Phase: Phase	JUBB:		



Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)
MH1	Manhole	1074.241	670.875	20.640	1.340
MH2	Manhole	1107.421	706.284	19.850	1.350
MH3	Manhole	1136.435	682.070	19.850	1.750
MH4	Manhole	1149.053	671.764	19.900	2.006
MH5	Manhole	1091.113	613.078	20.100	1.100
MH6	Manhole	1104.424	601.172	20.200	1.400
MH7	Manhole	1116.404	603.341	20.500	2.019
MH11	Manhole	1126.068	615.254	20.390	2.161
MH12	Manhole	1136.885	627.819	20.400	2.282
MH13	Manhole	1148.638	641.469	20.200	2.172
MH14	Manhole	1162.185	657.204	19.800	1.841
MH8	Manhole	1155.201	553.379	20.240	1.240
MH9	Manhole	1145.644	562.286	20.250	1.410
MH10	Manhole	1115.713	590.862	20.200	1.636
MH15	Manhole	1167.823	648.468	20.000	1.700
MH16	Manhole	1155.985	680.528	19.800	1.943
Manhole	Manhole	1208.706	711.296	19.800	2.300

Name	Invert Level (m)	Chamber Shape	Diameter (m)	Manhole Locked
MH1	19.300	Circular	1.200	☐
MH2	18.500	Circular	1.200	☐
MH3	18.100	Circular	1.200	☐
MH4	17.894	Circular	1.200	☐
MH5	19.000	Circular	1.200	☐
MH6	18.800	Circular	1.200	☐
MH7	18.481	Circular	1.200	☐
MH11	18.229	Circular	1.200	☐
MH12	18.118	Circular	1.200	☐
MH13	18.028	Circular	1.200	☐
MH14	17.959	Circular	1.200	☐
MH8	19.000	Circular	1.200	☐
MH9	18.840	Circular	1.200	☐
MH10	18.564	Circular	1.200	☐
MH15	18.300	Circular	1.200	☐
MH16	17.857	Circular	1.200	☐
Manhole	17.500	Circular	1.200	☐

Charcroft - Unit 10:	Date: 23/11/2023		
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Report Details: Type: Junctions Storm Phase: Phase	JUBB:		



Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
MH1	Inlet	Catchment Area	(None)	No Restriction
MH2	Inlet	P1.000	(None)	No Restriction
	Inlet (1)	Catchment Area (4)	(None)	No Restriction
	Inlet (2)	Catchment Area (15)	(None)	No Restriction
MH3	Inlet	P1.001	(None)	No Restriction
	Inlet (2)	Catchment Area (16)	(None)	No Restriction
MH4	Inlet	P1.002	(None)	No Restriction
	Inlet (1)	P2.006	(None)	No Restriction
	Inlet (3)	Catchment Area (17)	(None)	No Restriction
MH5	Inlet	Catchment Area (1)	(None)	No Restriction
MH6	Inlet	P2.000	(None)	No Restriction
	Inlet (1)	Catchment Area (7)	(None)	No Restriction
MH7	Inlet	P2.001	(None)	No Restriction
	Inlet (1)	P3.002	(None)	No Restriction
MH11	Inlet	P2.002	(None)	No Restriction
	Inlet (1)	Catchment Area (9)	(None)	No Restriction
	Inlet (3)	Catchment Area (11)	(None)	No Restriction
MH12	Inlet	P2.003	(None)	No Restriction
	Inlet (1)	Catchment Area (5)	(None)	No Restriction
MH13	Inlet (2)	Catchment Area (12)	(None)	No Restriction
	Inlet	P2.004	(None)	No Restriction
MH14	Inlet (1)	Catchment Area (13)	(None)	No Restriction
	Inlet	P2.005	(None)	No Restriction
	Inlet (1)	P4.000	(None)	No Restriction
	Inlet (2)	Catchment Area (6)	(None)	No Restriction
MH8	Inlet (3)	Catchment Area (14)	(None)	No Restriction
	Inlet	Catchment Area (2)	(None)	No Restriction
MH9	Inlet	P3.000	(None)	No Restriction
	Inlet (1)	Catchment Area (8)	(None)	No Restriction
MH10	Inlet	P3.001	(None)	No Restriction
	Inlet (1)	Catchment Area (10)	(None)	No Restriction
MH15	Inlet	Catchment Area (3)	(None)	No Restriction
MH16	Inlet	P1.003	(None)	No Restriction
Manhole	Inlet	OUTFLOW	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
MH1	Outlet	P1.000	Free Discharge
MH2	Outlet	P1.001	Free Discharge
MH3	Outlet	P1.002	Free Discharge
MH4	Outlet	P1.003	Free Discharge
MH5	Outlet	P2.000	Free Discharge
MH6	Outlet	P2.001	Free Discharge
MH7	Outlet	P2.002	Free Discharge
MH11	Outlet	P2.003	Free Discharge
MH12	Outlet	P2.004	Free Discharge
MH13	Outlet	P2.005	Free Discharge
MH14	Outlet	P2.006	Free Discharge
MH8	Outlet	P3.000	Free Discharge
MH9	Outlet	P3.001	Free Discharge
MH10	Outlet	P3.002	Free Discharge
MH15	Outlet	P4.000	Free Discharge
MH16	Outlet	Pipe	Free Discharge

Charcroft - Unit 10:	Date: 23/11/2023		
	Designed by: AH	Checked by: KG	Approved By: RL
Report Details: Type: Stormwater Controls Storm Phase: Phase	JUBB:		



Pond

Type : Pond

Dimensions

Exceedence Level (m)	19.450
Depth (m)	1.650
Base Level (m)	17.800
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:x)	3.476
Total Volume (m³)	809.085

Depth (m)	Area (m²)	Volume (m³)
0.000	285.00	0.000
1.000	530.00	401.217
1.600	715.00	773.335

Inlets

Inlet

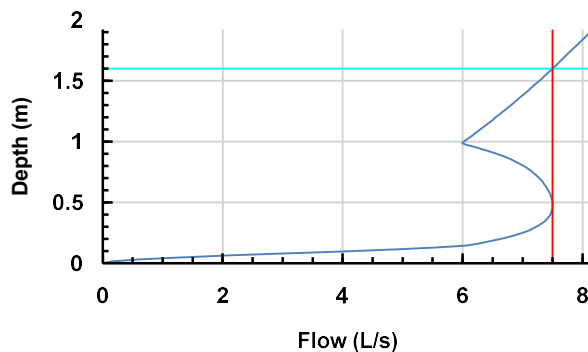
Inlet Type	Point Inflow
Incoming Item(s)	Pipe
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	OUTFLOW
Outlet Type	Hydro-Brake®
Invert Level (m)	17.800
Design Depth (m)	1.600
Design Flow (L/s)	7.5
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☒

Unit Reference SHE-0119-7500-1600-7500



Charcroft - Unit 10:	Date: 23/11/2023			
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Report Details: Type: Stormwater Controls Storm Phase: Phase	JUBB:			

Advanced

Perimeter	Circular
Length (m)	42.640
Friction Scheme	Manning's n
n	0.2

Charcroft - Unit 10:	Date: 23/11/2023		
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Report Details: Type: Connections Storm Phase: Phase	JUBB:		



Name	From	To	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)
P1.000	MH1	MH2	48.525	Pipe	97.050		0.6	225
P1.001	MH2	MH3	37.791	Pipe	151.163		0.6	300
P1.002	MH3	MH4	16.292	Pipe	162.924		0.6	450
P2.000	MH5	MH6	17.859	Pipe	100.000		0.6	375
P2.001	MH6	MH7	12.175	Pipe	60.874		0.6	375
P2.002	MH7	MH11	15.340	Pipe	150.000		0.6	450
P2.003	MH11	MH12	16.580	Pipe	150.000		0.6	450
P2.004	MH12	MH13	18.013	Pipe	200.000		0.6	450
P2.005	MH13	MH14	20.763	Pipe	300.000		0.6	450
P2.006	MH14	MH4	19.607	Pipe	300.000		0.6	450
P3.000	MH8	MH9	13.064	Pipe	150.000		0.6	300
P3.001	MH9	MH10	41.382	Pipe	150.000		0.6	375
P3.002	MH10	MH7	12.497	Pipe	150.000		0.6	375
P4.000	MH15	MH14	10.398	Pipe	103.977		0.6	450
P1.003	MH4	MH16	11.174	Pipe	300.000		0.6	450
Pipe	MH16	Pond	30.243	Pipe	530.584		0.6	450
OUTFLOW	Pond	Manhole	30.802	Pipe	102.673		0.6	300

Name	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Flow Restriction (L/s)
P1.000	20.640	19.300	19.850	18.800	
P1.001	19.850	18.500	19.850	18.250	
P1.002	19.850	18.100	19.900	18.000	
P2.000	20.100	19.000	20.200	18.821	
P2.001	20.200	18.800	20.500	18.600	
P2.002	20.500	18.481	20.390	18.379	
P2.003	20.390	18.229	20.400	18.118	
P2.004	20.400	18.118	20.200	18.028	
P2.005	20.200	18.028	19.800	17.959	
P2.006	19.800	17.959	19.900	17.894	
P3.000	20.240	19.000	20.250	18.913	
P3.001	20.250	18.840	20.200	18.564	
P3.002	20.200	18.564	20.500	18.481	
P4.000	20.000	18.300	19.800	18.200	
P1.003	19.900	17.894	19.800	17.857	
Pipe	19.800	17.857	19.800	17.800	
OUTFLOW	19.800	17.800	19.800	17.500	7.6

Charcroft - Unit 10:	Date: 23/11/2023		
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Report Details: Type: Inflow Summary Storm Phase: Phase	JUBB:		



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	MH1		Time of Concentration	0.087	100	0	100	0.087
Catchment Area (1)	MH5		Time of Concentration	0.124	100	0	100	0.124
Catchment Area (2)	MH8		Time of Concentration	0.076	100	0	100	0.076
Catchment Area (3)	MH15		Time of Concentration	0.158	100	0	100	0.158
Catchment Area (4)	MH2		Time of Concentration	0.067	100	0	100	0.067
Catchment Area (5)	MH12		Time of Concentration	0.077	100	0	100	0.077
Catchment Area (6)	MH14		Time of Concentration	0.061	100	0	100	0.061
Catchment Area (7)	MH6		Time of Concentration	0.036	100	0	100	0.036
Catchment Area (8)	MH9		Time of Concentration	0.086	100	0	100	0.086
Catchment Area (9)	MH11		Time of Concentration	0.052	100	0	100	0.052
Catchment Area (10)	MH10		Time of Concentration	0.055	100	0	100	0.055
Catchment Area (11)	MH11		Time of Concentration	0.020	100	0	100	0.020
Catchment Area (12)	MH12		Time of Concentration	0.021	100	0	100	0.021
Catchment Area (13)	MH13		Time of Concentration	0.023	100	0	100	0.023
Catchment Area (14)	MH14		Time of Concentration	0.023	100	0	100	0.023
Catchment Area (15)	MH2		Time of Concentration	0.045	100	0	100	0.045
Catchment Area (16)	MH3		Time of Concentration	0.031	100	0	100	0.031
Catchment Area (17)	MH4		Time of Concentration	0.029	100	0	100	0.029
TOTAL		0.0		1.071				1.071

Charcroft - Unit 10:	Date: 23/11/2023		
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Report Details: Type: Network Design Criteria Storm Phase: Phase	JUBB:		



Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

FSR

Type: FSR

Return Period (years)	100.0
Region	England and Wales
M5-60 (mm)	19.7
Ratio R	0.350

Pipe Options

Lock Slope Options	None
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:x)	500.00
Max. Slope (1:x)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Pipe Size Library

Default

Add. Increment (mm)	75
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Diameter (mm)	Min. Slope (1:x)	Max. Slope (1:x)
100	0.00	0.00
150	0.00	0.00

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Manhole Options

Apply Offset	☐
Synchronise Manhole Invert Levels	☒

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.200	0.000
375	1.350	0.000
500	1.500	0.000
750	1.800	0.000

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.900
Width (m)	0.000

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.000	1.050	0.000
1.500	1.200	0.000

Access

Depth (m)	Ladder Protrusion (mm)
0.000	130
3.000	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

Charcroft - Unit 10:	Date: 23/11/2023			
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Report Details: Type: Outfall Details Storm Phase: Phase	JUBB:			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Manhole	Free Discharge		

Charcroft - Unit 10:	Date: 23/11/2023			
	Designed by: AH	Checked by: KG	Approved By: RL	
	Report Title: Rainfall Analysis Criteria			
JUBB:				

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Reduced
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☒
Rainfall Depth (mm)	1.0
Run Time (mins)	1440

Rainfall

FSR	Type: FSR
-----	-----------

Region	England and Wales
M5-60 (mm)	19.7
Ratio R	0.350
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	40

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Charcroft - Unit 10:	Date: 23/11/2023		
	Designed by: AH	Checked by: KG	Approved By: RL
Report Details: Type: Inflows Summary Storm Phase: Phase	JUBB:		



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow (m³)
Catchment Area	FSR: 100 years: +40 %: 15 mins: Winter	0.09	50.9	23.767
Catchment Area (1)	FSR: 100 years: +40 %: 15 mins: Winter	0.12	72.3	33.745
Catchment Area (2)	FSR: 100 years: +40 %: 15 mins: Winter	0.08	44.5	20.769
Catchment Area (3)	FSR: 100 years: +40 %: 15 mins: Winter	0.16	92.4	43.129
Catchment Area (4)	FSR: 100 years: +40 %: 15 mins: Winter	0.07	39.2	18.300
Catchment Area (5)	FSR: 100 years: +40 %: 15 mins: Winter	0.08	45.0	20.985
Catchment Area (6)	FSR: 100 years: +40 %: 15 mins: Winter	0.06	35.6	16.595
Catchment Area (7)	FSR: 100 years: +40 %: 15 mins: Winter	0.04	21.1	9.846
Catchment Area (8)	FSR: 100 years: +40 %: 15 mins: Winter	0.09	50.0	23.323
Catchment Area (9)	FSR: 100 years: +40 %: 15 mins: Winter	0.05	30.6	14.284
Catchment Area (10)	FSR: 100 years: +40 %: 15 mins: Winter	0.05	31.9	14.900
Catchment Area (11)	FSR: 100 years: +40 %: 15 mins: Winter	0.02	11.6	5.405
Catchment Area (12)	FSR: 100 years: +40 %: 15 mins: Winter	0.02	12.3	5.723
Catchment Area (13)	FSR: 100 years: +40 %: 15 mins: Winter	0.02	13.2	6.176
Catchment Area (14)	FSR: 100 years: +40 %: 15 mins: Winter	0.02	13.4	6.245
Catchment Area (15)	FSR: 100 years: +40 %: 15 mins: Winter	0.04	26.1	12.196
Catchment Area (16)	FSR: 100 years: +40 %: 15 mins: Winter	0.03	17.9	8.349
Catchment Area (17)	FSR: 100 years: +40 %: 15 mins: Winter	0.03	17.2	8.024

Charcroft - Unit 10:	Date: 23/11/2023		
	Designed by: AH	Checked by: KG	Approved By: RL
Report Details: Type: Junctions Summary Storm Phase: Phase	JUBB:		



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
MH1	FSR: 100 years: +40 %: 15 mins: Winter	20.64 0	19.30 0	19.891	0.591	50.9	0.669	0.000	38.6	23.229	Surcharged
MH2	FSR: 100 years: +40 %: 15 mins: Winter	19.85 0	18.50 0	19.603	1.103	104.0	1.248	0.000	90.2	53.355	Flood Risk
MH3	FSR: 100 years: +40 %: 15 mins: Winter	19.85 0	18.10 0	19.323	1.223	108.1	1.383	0.000	95.7	60.206	Surcharged
MH4	FSR: 100 years: +40 %: 15 mins: Winter	19.90 0	17.89 4	19.295	1.402	430.6	1.585	0.000	419.0	277.633	Surcharged
MH5	FSR: 100 years: +40 %: 15 mins: Winter	20.10 0	19.00 0	20.002	1.002	72.3	1.133	0.000	58.7	33.779	Flood Risk
MH6	FSR: 100 years: +40 %: 15 mins: Winter	20.20 0	18.80 0	19.972	1.172	79.8	1.326	0.000	65.8	43.814	Flood Risk
MH7	FSR: 100 years: +40 %: 15 mins: Winter	20.50 0	18.48 1	19.944	1.463	145.7	1.655	0.000	157.8	102.514	Surcharged
MH11	FSR: 100 years: +40 %: 15 mins: Winter	20.39 0	18.22 9	19.896	1.667	173.0	1.886	0.000	193.7	122.536	Surcharged
MH12	FSR: 100 years: +40 %: 15 mins: Winter	20.40 0	18.11 8	19.827	1.709	216.3	1.933	0.000	226.4	147.715	Surcharged
MH13	FSR: 100 years: +40 %: 15 mins: Winter	20.20 0	18.02 8	19.714	1.686	230.1	1.907	0.000	239.9	151.170	Surcharged
MH14	FSR: 100 years: +40 %: 15 mins: Winter	19.80 0	17.95 9	19.588	1.629	331.2	1.842	0.000	317.7	213.239	Flood Risk
MH8	FSR: 100 years: +40 %: 15 mins: Winter	20.24 0	19.00 0	20.045	1.045	44.5	1.182	0.000	29.3	20.665	Flood Risk
MH9	FSR: 100 years: +40 %: 15 mins: Winter	20.25 0	18.84 0	20.031	1.191	79.2	1.347	0.000	63.3	44.399	Flood Risk
MH10	FSR: 100 years: +40 %: 15 mins: Winter	20.20 0	18.56 4	19.977	1.413	95.2	1.598	0.000	80.7	59.212	Flood Risk
MH15	FSR: 100 years: +40 %: 15 mins: Winter	20.00 0	18.30 0	19.604	1.304	92.4	1.475	0.000	80.1	42.697	Surcharged
MH16	FSR: 100 years: +40 %: 480 mins: Winter	19.80 0	17.85 7	19.232	1.376	72.2	1.556	0.000	72.1	834.225	Surcharged
Manhole	FSR: 100 years: +40 %: 30 mins: Winter	19.80 0	17.50 0	17.553	0.053	7.5	0.000	0.000	7.5	19.395	OK

Charcroft - Unit 10:	Date: 23/11/2023		
	Designed by: AH	Checked by: KG	Approved By: RL
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	JUBB:		



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Pond	FSR: 100 years: +40 %: 480 mins: Winter	19.233	19.232	1.433	1.432	72.1	658.185	0.000	0.000	7.5	357.666	19	OK

Charcroft - Unit 10:	Date: 23/11/2023		
	Designed by: AH	Checked by: KG	Approved By: RL
Report Details: Type: Connections Summary Storm Phase: Phase	JUBB:		



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
P1.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH1	MH2	20.6	19.891	0.225	23.229	1.1	0.73	38.6	Surcharged
P1.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH2	MH3	19.9	19.603	0.300	53.281	1.3	1	90.2	Flood Risk
P1.002	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	MH3	MH4	19.9	19.133	0.450	53.639	0.7	0.39	97.7	Surcharged
P2.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH5	MH6	20.1	20.002	0.375	33.367	1.1	0.29	58.7	Flood Risk
P2.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH6	MH7	20.2	19.972	0.375	43.402	1.4	0.26	65.8	Flood Risk
P2.002	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH7	MH11	20.5	19.944	0.450	102.145	1.2	0.6	157.8	Surcharged
P2.003	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH11	MH12	20.4	19.896	0.450	121.171	1.2	0.73	193.7	Surcharged
P2.004	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH12	MH13	20.4	19.827	0.450	145.065	1.4	0.99	226.4	Surcharged
P2.005	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH13	MH14	20.2	19.714	0.450	147.588	1.5	1.29	239.9	Surcharged
P2.006	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH14	MH4	19.8	19.588	0.450	208.481	2.0	1.71	317.7	Flood Risk
P3.000	FSR: 100 years: +40 %: 15 mins: Summer	Pipe	MH8	MH9	20.2	19.788	0.300	18.493	0.8	0.32	29.3	Surcharged

Charcroft - Unit 10:				Date: 23/11/2023								
Report Details: Type: Connections Summary Storm Phase: Phase				Designed by:	Checked by:	Approved By:						
				AH	KG	RL						
				JUBB:								

P3.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH9	MH10	20.3	20.031	0.375	44.372	0.9	0.39	63.3	Flood Risk
P3.002	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH10	MH7	20.2	19.977	0.375	59.212	0.8	0.49	80.7	Flood Risk
P4.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH15	MH14	20.0	19.604	0.450	42.429	1.1	0.25	80.1	Surcharged
P1.003	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH4	MH16	19.9	19.295	0.450	271.704	2.6	2.25	419.0	Surcharged
Pipe	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	MH16	Pond	19.8	18.938	0.450	267.066	2.6	2.94	409.7	Surcharged
OUTFLOW	FSR: 100 years: +40 %: 30 mins: Winter	Pipe	Pond	Manhole	19.8	18.700	0.053	19.395	0.9	0.07	7.5	Surcharged

Charcroft - Unit 10:	Date: 23/11/2023		
	Designed by: AH	Checked by: KG	Approved By: RL
Report Details: Type: Phase Management Storm Phase: Phase	JUBB:		





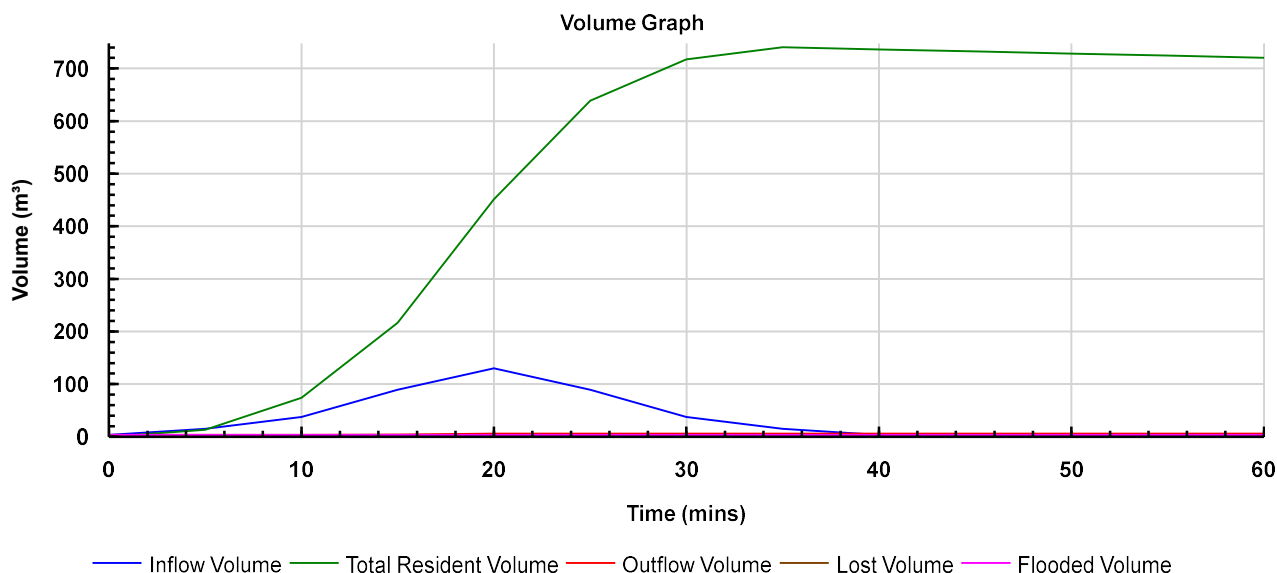
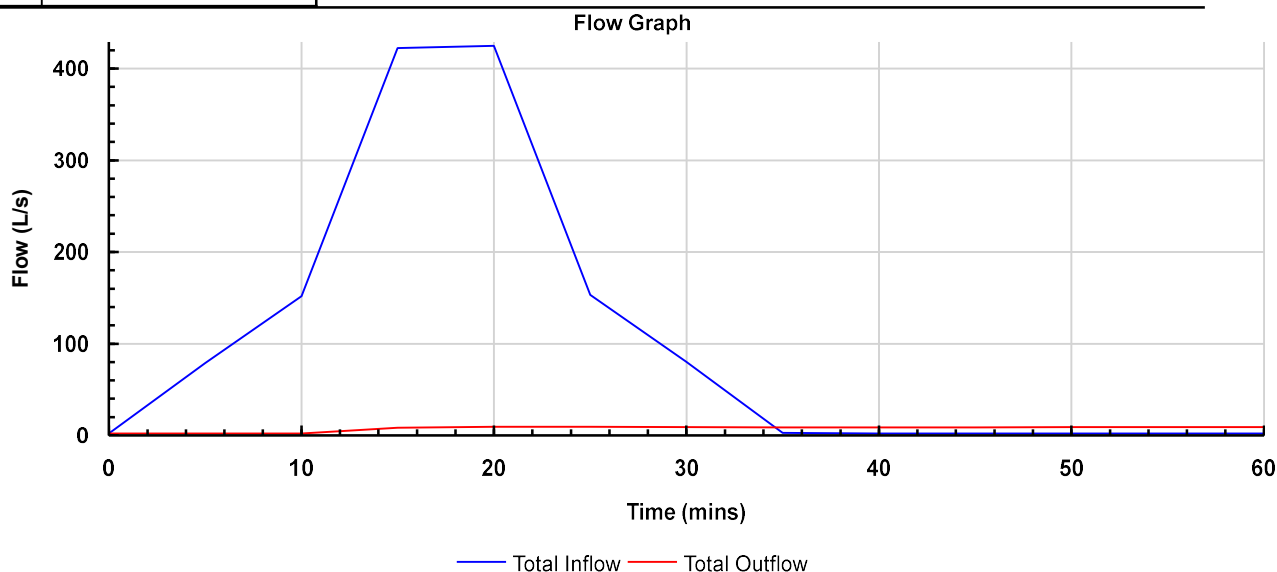
Phase

FSR: 100 years: Increase Rainfall (%): +40: 30 mins: Winter

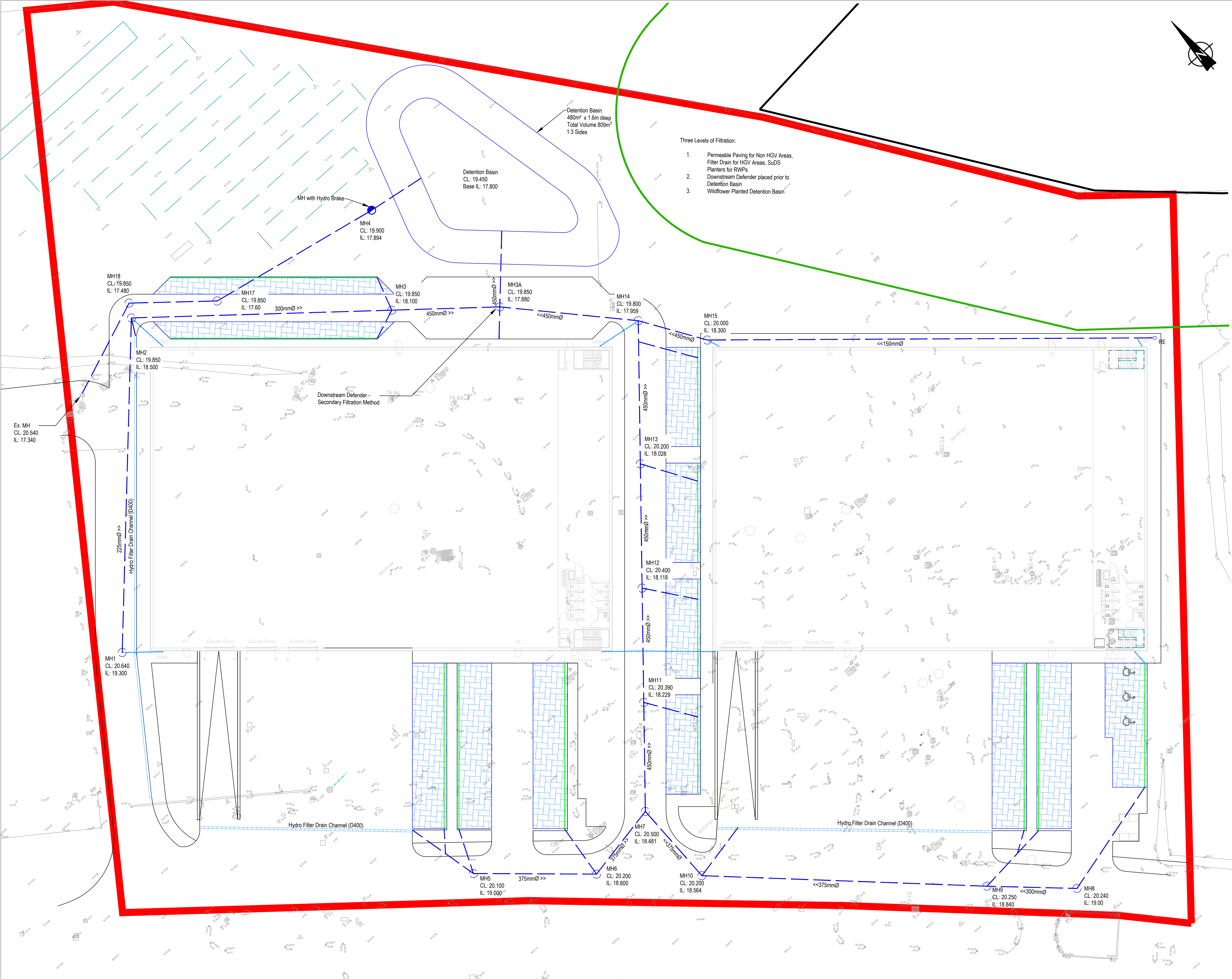
Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
Manhole			7.5	19.395
TOTAL	424.6	391.940	7.5	19.395

Graphs



Appendix B: Site Wide Surface Water Strategy Drawing



- 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
- RE
- Rodding eye
- Permeable paving
- Hydrobrake
- Perforated pipe

- Three Levels of Filtration:
1. Permeable Paving for Non HGV Areas, Filter Drain for HGV Areas, SUDS Planters for RWPs
 2. Downstream Defender placed prior to Detention Basin
 3. Wildflower Planted Detention Basin

P3	23.11.23	Updated following planning comments	AH	RL
P2	22.08.23	Preliminary Issue	AH	RL
P1	30.06.23	Preliminary issue	AH	RL

Rev Date Description By Apvd

PROJECT:
CHALCROFT BUISNESS PARK
UNIT 10

TITLE:
DRAINAGE ARRANGEMENT
OPTION 1

CLIENT:
FIPWEL

SCALE@A1:
1:250

PROJECT REF:
23245
DRAWING No: JUB_XX_XX_DR_C_500
REV: P3

Revision Referencing
P = Preliminary A = Approval T = Tender C = Construction

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

023 8063 1432

boyleandsummers.co.uk

Boyle & Summers

Appendix D: Downstream Defender Specification

DOWNSTREAM DEFENDER® SELECT DESIGN SUMMARY



PROJECT INFORMATION

Reference	23245
Site	Chalcroft Unit 10
Designer	Rob Lowe
Date	23/11/2023 11:00

DESIGN INPUTS

Sizing Method	Betterment
Catchment Area (m²)	8937

DESIGN OUTPUTS

Product	HYDRO INTERNATIONAL DOWNSTREAM DEFENDER® SELECT
Separator Type	Vortex
Unit Reference	DDC18-100-C-450

PRODUCT CONFIGURATION

Material	Concrete
Sediment Protection	No
Oil Retention	No
Floatables storage / Oil treatment	No
Hydro-Logic® Flow Monitoring	No
Hydro-Logic® Sediment Level Monitoring	No

UNIT WEIGHTS AND DIMENSIONS

(A) Unit Size (m)	1.80
(B) Inlet Pipe Size (mm)	450
(D) Outlet Pipe Size (mm)	450
(F) Height of Chamber (m)	4.09

PERFORMANCE AND HYDRAULICS

Treatment Flow Rate (l/s)	69
Hydraulic Capacity Flow Rate (l/s)	217
Typical Operating Headloss (mm)	230
Maximum Headloss (mm)	500

STORAGE

(E) Min. Sediment Storage Capacity (m³)	1.02
--	------

