



Havant & South Downs College
Havant, Hampshire

New Teaching Block
FRA & Drainage Strategy

Project Number: 21060

31 October 2023

Revision P01

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Date	31/10/23

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P01	Issued for Comment	31/10/2023

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1 INTRODUCTION

Marbas have been appointed to provide a Flood Risk Assessment (FRA) and Drainage Strategy (DS) for a new teaching block at Havant and South Downs College, Havant, Hampshire PO9 1QL.

This Flood Risk Assessment and Drainage Strategy is to be submitted as part of the planning application for the development of the site.

This Flood Risk Assessment & Drainage Strategy has been prepared in accordance with Communities & Local Government, National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG).

2 SITE DESCRIPTION

2.1 SITE LOCATION AND SURROUNDING AREA

The application site is located at British national Grid reference SU 71447 06877.

The site is located in Havant, 0.6km north west of Havant Centre, within a commercial and residential area, see figures 2.1.1 to 2.1.4.

The proposed site area is approximately 1513 m² in size and is in the south eastern area of the Havant & South Downs College grounds. The proposed work will consist of a three storey educational facility and a pathway running along the rear of the new building following the site edge. There are existing buildings north and west of the site boundary and there is a road and public foot path to the east and a 2 lane roundabout to the south of the site. There are currently no buildings on the proposed site area, as it is being used as additional parking space, however, there is currently a paved path running through the site from north to west connecting the current buildings and runs along to access the road & public footpath. The remainder of the site is grassed with 3 large trees and a hedge surrounding it.

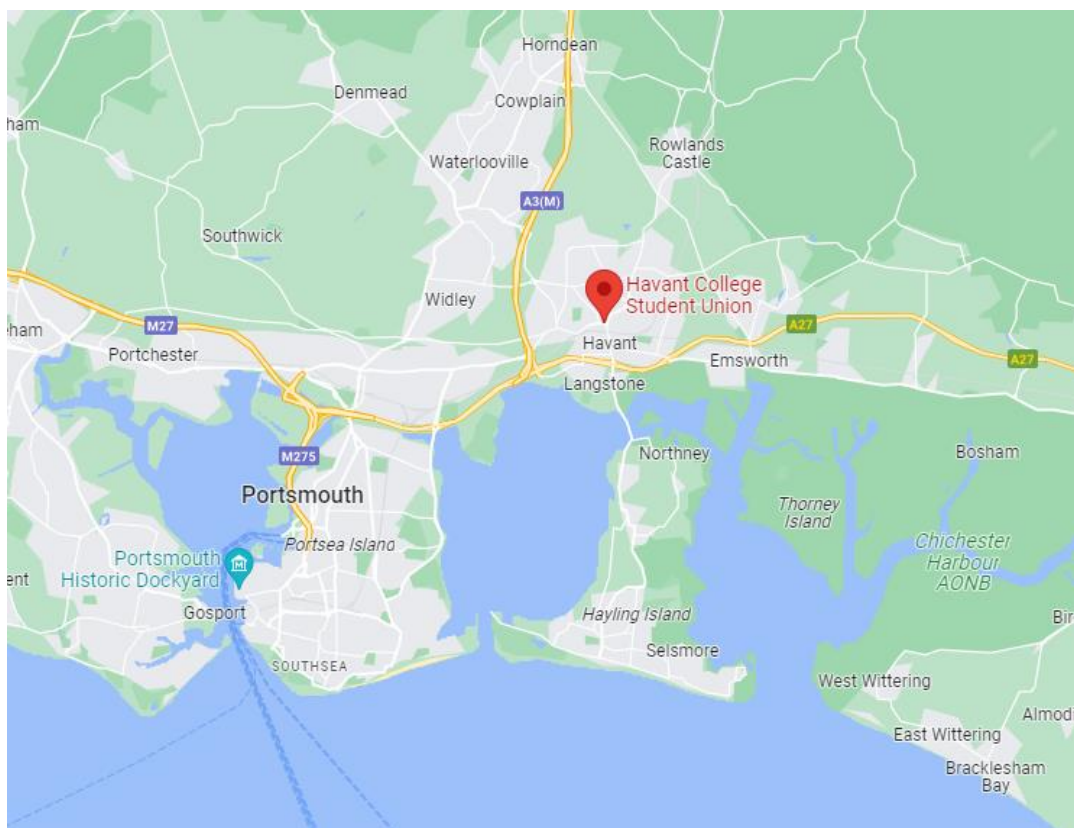


FIGURE 2.1.1 SITE LOCATION

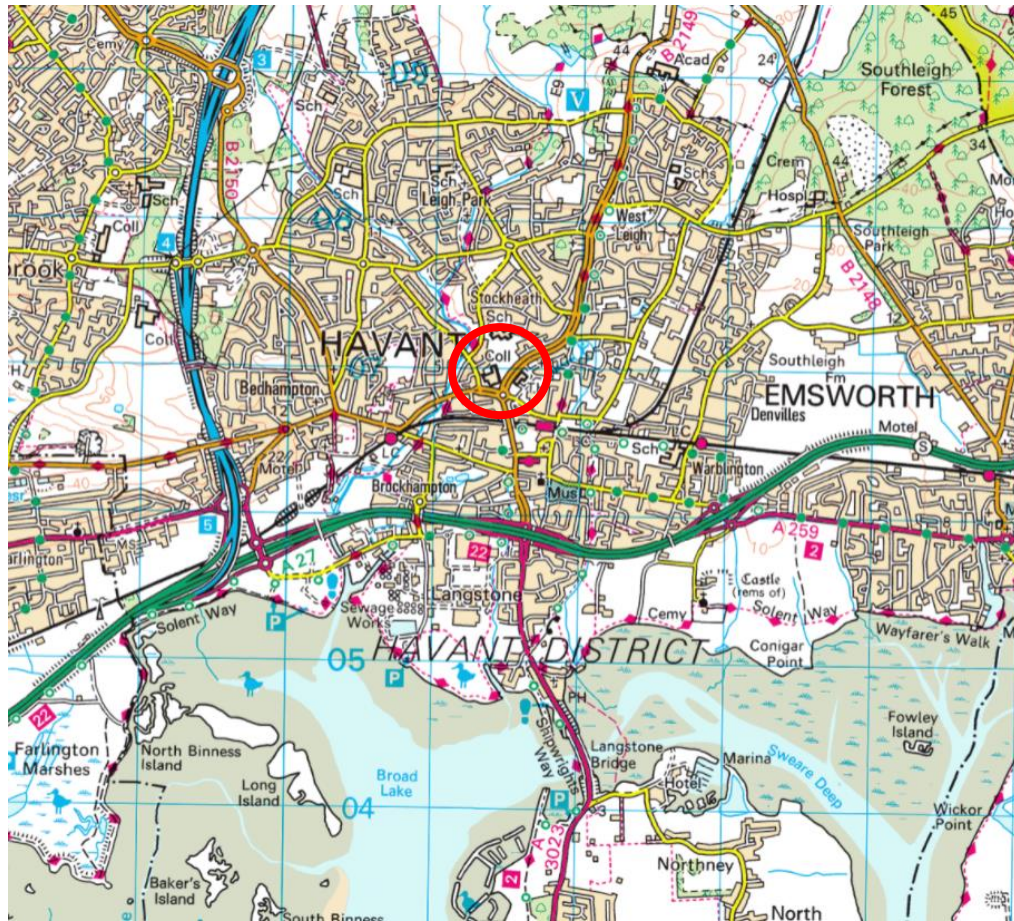


FIGURE 2.1.2 SITE LOCATION

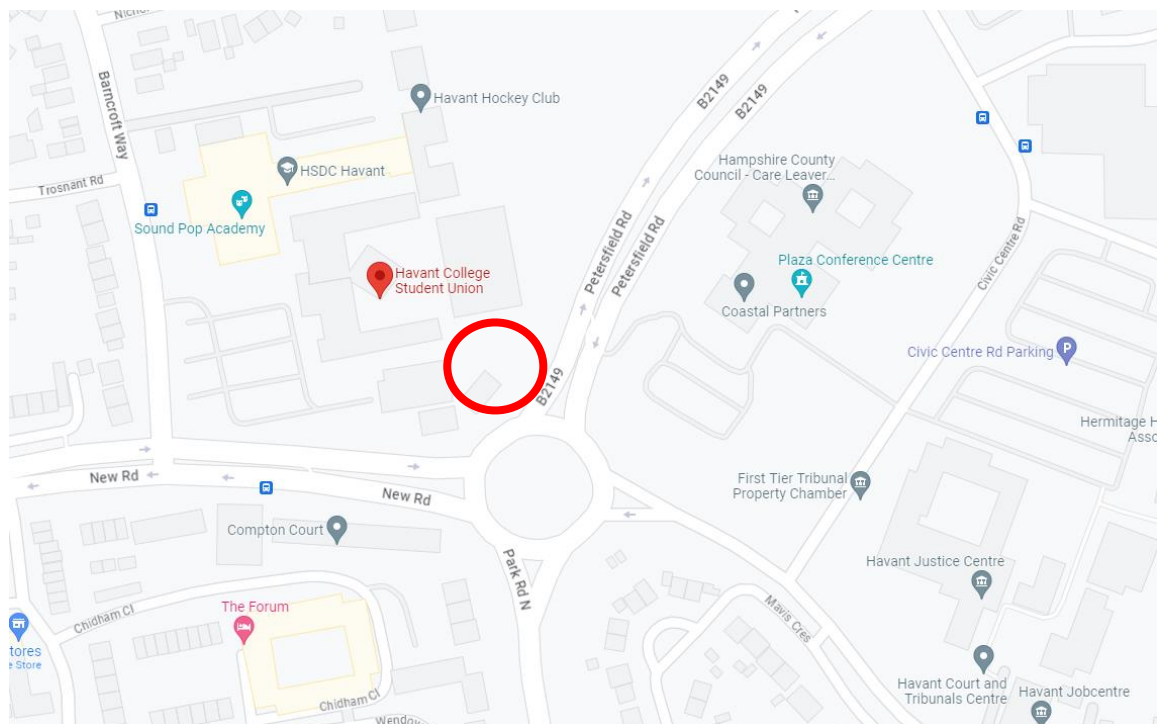


FIGURE 2.1.3 SITE LOCATION

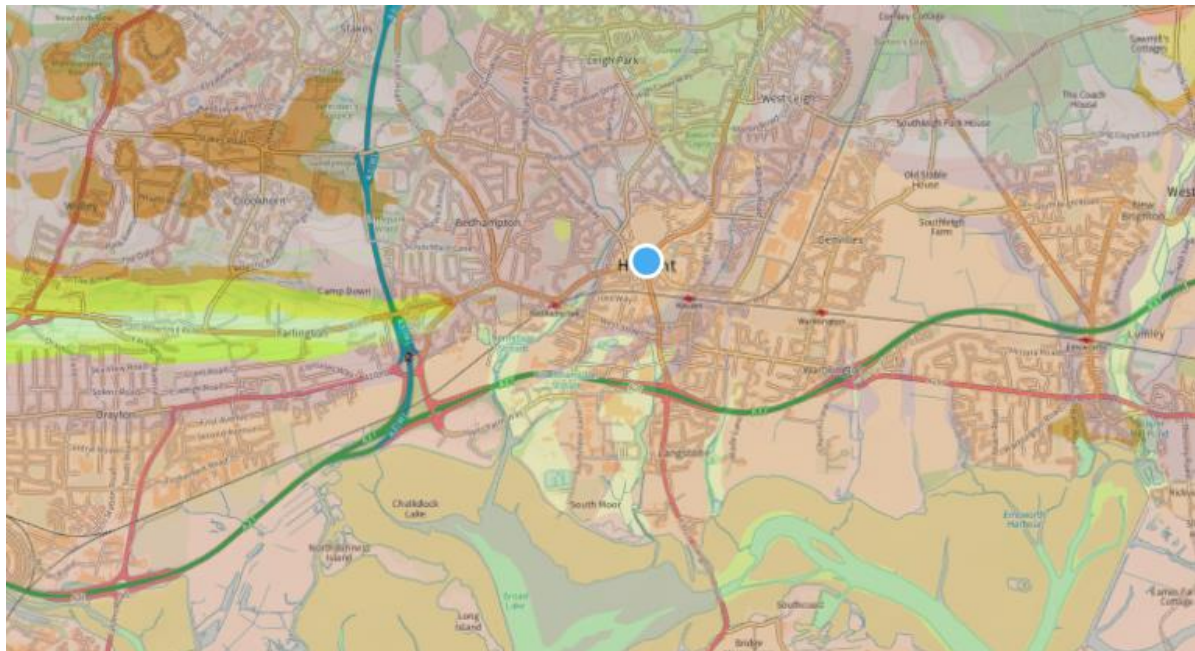


FIGURE 2.1.4 AERIAL IMAGE OF SITE LOCATION

2.2 GEOLOGY

British Geological Survey maps indicate that the substrata beneath the site is London Clay formation.

A ground investigation undertaken by Soils Ltd in September 2023 confirmed River Terrace deposits over London Clay with the London Clay being Circa 4m below ground level, refer to Appendix A.



Superficial deposits

River Terrace Deposits - Sand, silt and clay. Sedimentary superficial deposit formed between 2.588 million years ago and the present during the Quaternary period.

Bedrock geology

London Clay Formation - Clay, silt and sand. Sedimentary bedrock formed between 56 and 47.8 million years ago during the Palaeogene period.

FIGURE 2.2.1 British Geological Survey Map
(www.geologyviewer.bgs.ac.uk/)

2.3 TOPOGRAPHY

A topographical survey was produced for the site by Geotec Surveys Ltd in August 2023.

The survey shows that the site falls south west from the most north east point of the site, by the road access. The highest level on the site is 11.53m AOD at the north east road access path, this falls west to the site's lowest point at the entrance of the building west of the site (C Block) is 10.94m AOD. The most southerly point of the site by the college signage is 11.26m AOD, showing that the site also falls from here to the lowest point by C block entrance. Refer to the topographical survey within Appendix A.

3 STRATEGIC FLOOD RISK ASSESSMENT

Partnership for Urban South Hampshire appointed consultants Eastern Solent Coastal Partnership in February 2016 to undertake a Strategic Flood Risk Assessment (SFRA) of the district, to inform the preparation of the Core Strategy, to identify those parts of the district that are most at risk from flooding. The SFRA identified areas within the south of Hampshire & the IOW which maybe prone to possible flood risk from tidal, fluvial, pluvial, groundwater and sewer flooding. There was also an SFRA completed by Havant Borough Council internally in November 2018 to cover the Havant area only.

The SFRAs both indicate that the site location is within an area with no historical flooding issues. It is within a FZ1 Low probability site. The Flood Map – Tile B from the SFRA is attached as Appendix A.

4 POTENTIAL SOURCES OF EXTERNAL FLOODING

4.1. TIDAL

The site is located 2.2km north of the nearest coast line and is therefore not at any risk of tidal flooding.

4.2. FLUVIAL (RIVERS & SEA)

The EA produces floodplain maps for the UK, which show the areas at risk of fluvial and tidal flooding. The magnitudes of the flooding events considered are defined in terms of their return period. Generally, when determining the impact of any development within the floodplain of a fluvial reach, the design standard against which the EA will consider the feasibility of any scheme is typically the 1% annual probability flood (1 in 100 year return period flood) for sites within the floodplain, or the effects of a 1 in 100 year storm if outside the floodplain. The EA flood zone maps identify undefended floodplain, giving the horizontal extent of low (Zone 1), medium (Zone 2) and high risk flood zones (Zones 3a and 3b) depending on the severity of the flood event.

The Environment Agency's Risk of Flooding from Rivers & Sea Map (Figure 4.2) indicates that the site is located within Flood Zone 1 and therefore not at risk from Fluvial flooding.

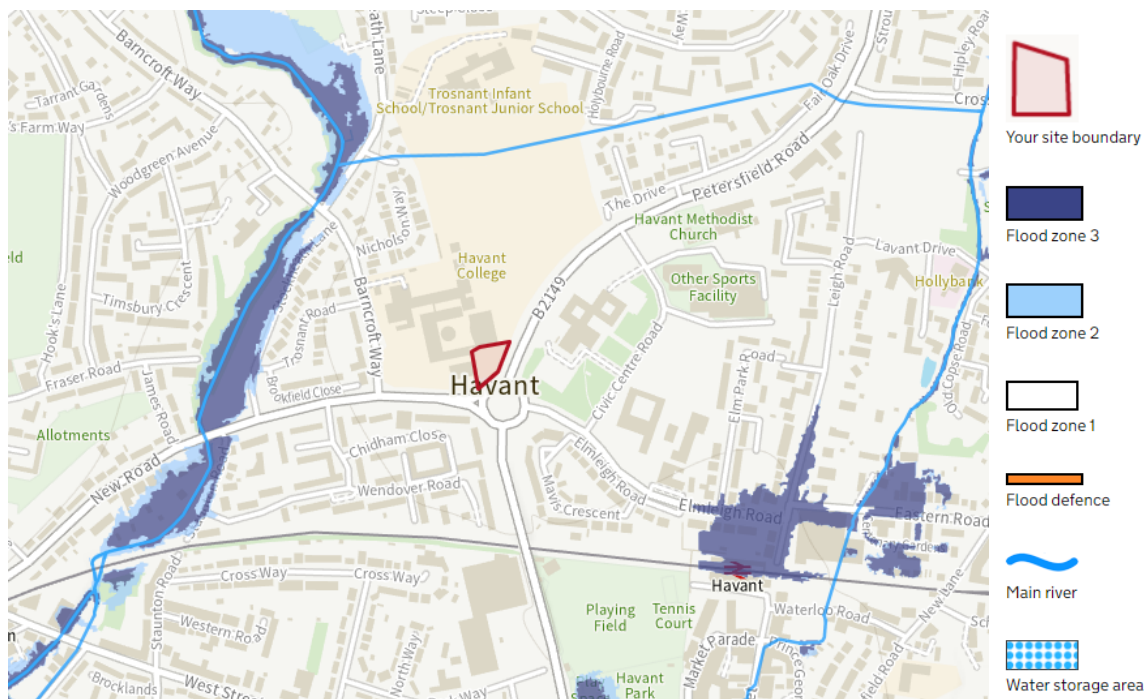


FIGURE 4.2 ENVIRONMENT AGENCY FLUVIAL FLOOD RISK MAP

4.3. PLUVIAL (SURFACE WATER)

The Environment Agency also produce maps which highlight the risk of flooding from surface water flows illustrating when the capacity of existing surface water drainage networks and channels are exceeded in extreme rainfall events.

The Environment Agency's risk of flooding from surface water map (below) shows that the site has a very low risk of pluvial flooding. There is a small amount of surface water on the road by the south end of the site but nothing within the college site area.

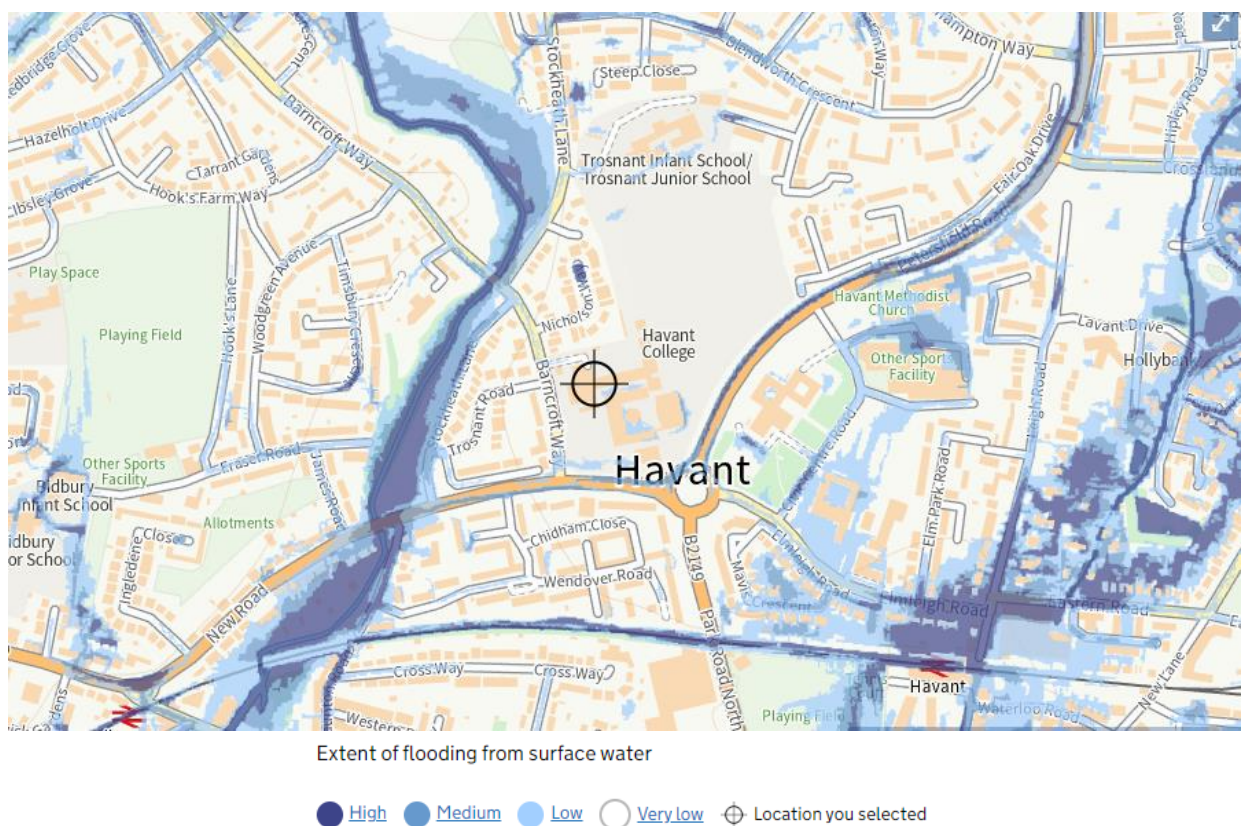


FIGURE 4.3 ENVIRONMENT AGENCY PLUVIAL FLOOD RISK MAP

4.4. FOUL/SURFACE WATER SEWERS

There is a surface water sewer running along the road south of the site, there have been no reported historic flood events relating to this sewer. (figure 4.4)

There are no foul water sewers within the vicinity of the site therefore there is no risk of flooding from this source.

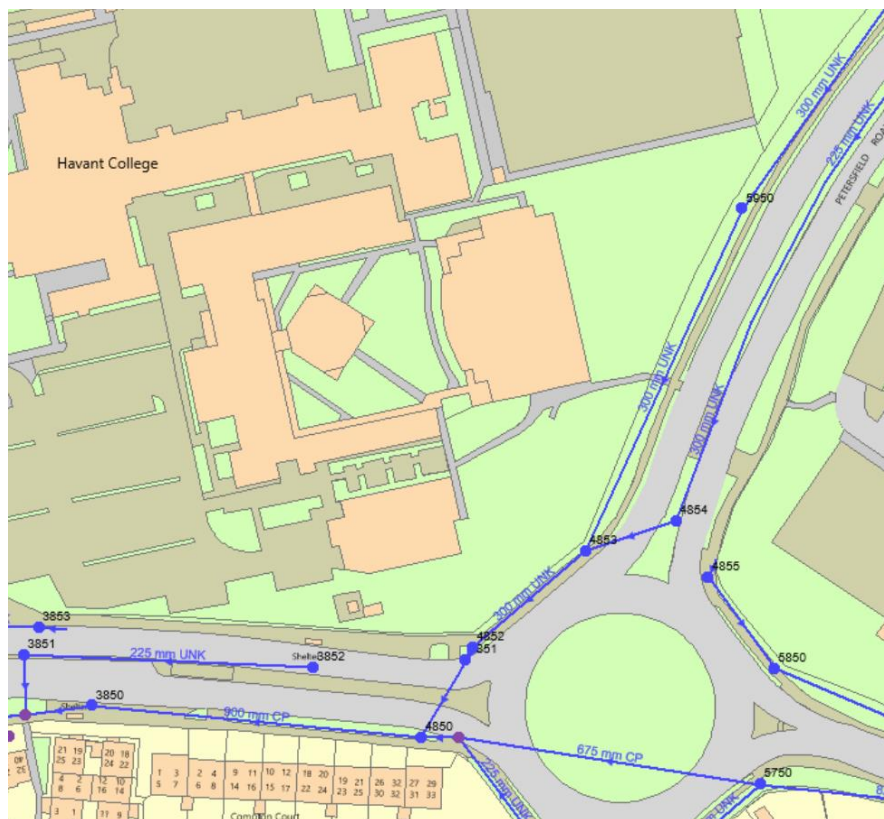


FIGURE 4.4 SOUTHERN WATER WASTEWATER PLAN

4.5. GROUND WATER

EA mapping confirms that the site is located within a ground water Source Protection Zone; Zone II – Subsurface Activity.

Zone 1: (Inner Protection Zone) - This zone is defined by a travel time of 50-days or less from any point within the zone at, or below, the water table. Additionally, the zone has as a minimum a 50-metre radius. It is based principally on biological decay criteria and is designed to protect against the transmission of toxic chemicals and water-borne disease.

During the ground investigation undertaken in September 2023, ground water was recorded within one of the boreholes at 3.8m below ground level, no other water strikes were recorded in the shallow boreholes, however water was struck at 12.5mbl.



FIGURE 4.5 SOURCE PROTECTION ZONE 3MAP

4.6. RESERVOIRS/CANALS AND OTHER ARTIFICIAL SOURCES

There are no Reservoirs, Canals or Artificial sources surrounding the site and therefore the site is not at risk of flooding from these sources.

5 DEVELOPMENT PROPOSALS

The proposed work on this site will consist of a three storey educational facility and a pathway running along the rear of the new building following the site edge.

There are currently no buildings on the proposed site area, there is only a paved path running through the site which will need to be removed and replaced with a new footpath that will connect all three buildings in the area.

Refer to Appendix B for site layout and floor plan layouts.

6 DRAINAGE STRATEGY

6.1 SUDS HIERARCHY OF SYSTEMS AND JUSTIFICATION OF USAGE

We have reviewed and taken into consideration the Environment Agency SuDS Hierarchy for SuDS systems which are noted below in order of preference:

1. Living Roofs
2. Basins and Ponds
3. Filter Strips and Swales
4. Infiltration Devices
5. Permeable Surfaces and Filter Drains
6. Tanked Systems

Below is the response to these systems identifying the most suitable system for the scheme.

1. Living and blue roofs impose a large load on the roof structure and require relatively flat roofs to insure water retention. It is not proposed to construct a blue roof for water retention due to the additional loading this would add to the proposed foundations.
2. The use of open basins and ponds will be unsuitable due to the compact nature of the site.
3. Filter strips and swales will be unsuitable due to the compact nature of the site.
4. Below ground Infiltration devices are feasible.
5. Permeable surfaces will be feasible.
6. A positive surface water storage tank systems with restricted connection to the surface water sewer is feasible as there are surface water sewers within the vicinity of the site.

6.2 PROPOSED SITE SURFACE WATER DRAINAGE STRATEGY

Historic drainage information has confirmed that the existing buildings surrounding the site discharge to soakaways. Soil infiltration testing undertaken in October 2023, 3m below ground level, has confirmed an infiltration rate of 1.20x10-m5, therefore surface water run-off from the new building and hard standing areas will be discharged to a soakaway.

The new building will require the removal of an existing soakaway and therefore the roof area that was connected to the existing soakaway will be connected to the new soakaway.

The soakaway will be designed for the 1:100+40% storm return period, refer to Appendix C for a drainage strategy layout and calculations.

A proprietary filter manhole designed to remove, heavy particles, silt, nutrients and dissolved materials, such as heavy metals, from the surface water as part of an integrated Sustainable Drainage Solution will be provide upstream of the soakaway.

6.3 FOUL WATER DRAINAGE

Due to the location and level of the existing foul water drainage, the foul water drainage from the new building will be discharge to a foul water pumping station, with duty and standby pumps and 24-hour storage.

The pumping station will discharge to the nearest foul water manhole.

6.4 FUTURE MAINTENANCE OF SYSTEM

Following construction, a maintenance document for the system will be provided to the owner of the site which will detail the constructed systems maintenance requirements.

It is the owners responsibility to maintain the system to prevent the increase in the risk of flood on and off site as a result of system failure.

The soakaway will be maintained in accordance with Table 13.1 from Ciria C753.

TABLE 13.1 Operation and maintenance requirements for soakaways		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

The proprietary treatment system and pumping chamber will be maintained in accordance with the manufactures recommendations.

Gullies, channel drains and manholes should be inspected annually to ensure that there is no build-up of silt.

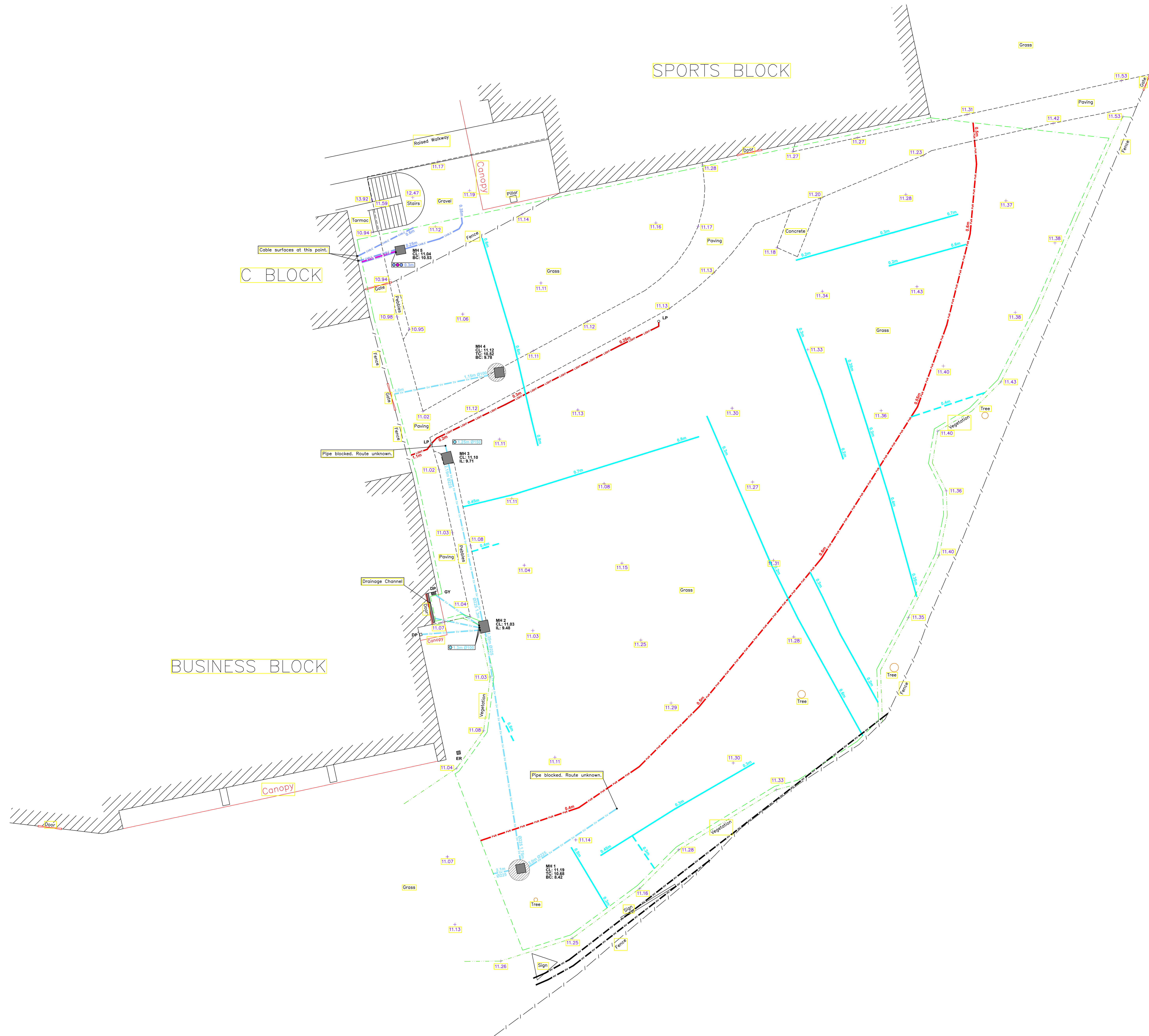
7 CONCLUSION

The site is located with Flood Zone 1 and is not at risk from any source of flooding.

Surface water drainage will be dealt with in a sustainable way by discharging runoff to soakaways designed to cater for the 1% AEP (1:100 year) storm with 40% additional storage to allow for climate change.

A maintenance document will be provided to the owner so that the system can be maintained to reduce the risk of blockages and system failure.

8 APPENDIX A



- LEGEND**
- Scan Area
 - Radio Frequency Scan Area
 - Previous Scan Area
 - Electricity Cable
 - Street Lighting
 - Power Carrying Feature
 - Telecommunication Cable
 - Cable Television Cable
 - Closed Circuit Television Cable
 - Alarm Cable
 - Telemetry Cable
 - Fibre Optic Cable
 - Energy Cable
 - Unknown Cable
 - Empty Duct
 - Foul Water Sewer
 - Surface Water Drain
 - Combined Sewer
 - Culvert
 - Water Pipe
 - Fire Main
 - Gas Pipe
 - Oil Pipe
 - Fuel Main
 - Steam Pipe
 - Vent Pipe
 - Unknown Pipe
 - Earth Strap
 - Metallic Feature
 - Detected Linear Feature
 - Possible Linear Feature
 - Taken from Statutory Information
 - Assumed
 - Anomalous Area
 - Area of Radio Frequency Disturbance
 - Area of Electrical Interference
 - Area of Reinforcing
 - Chamber
 - Unable to Survey

ABBREVIATIONS (where applicable)

AV	Air Valve	LP	Lamp Post
BB	Beltch Breach	MH	Manhole
BC	Bottom of Chamber	MHC	Marker
BH	Borehole	P	Post
BOL	Bollard	RE	Roofing Eye
BT	British Telecom Cover	RG	Rain Gully
CAB	Cabinet	RS	Road Sign
CATV	Cable Television Cover	SP	Sign Post
CCTV	Closed Circuit TV	ST	Stop Tap
CL	Cover Level	STN	Survey Station
DIA	Diameter	SV	Stitch Valve
DP	Down Pipe	T/C	Top of Chamber
EP	Electricity Pole	TCB	Telephone Call Box
ER	Earth Road	TL	Traffic Light
FH	Fire Hydrant	TP	Telegraph Pole
GY	Gully	U/L	Unable to Lift
IC	Inspection Cover	VP	Vent Pipe
IL	Invert Level	WM	Water Meter
IRS	Illuminated Road Sign	WO	Wash Out
JB	Junction Box		

NOTES

Depending on their individual suitability, a variety of detection methods were applied using all reasonable skill and care, in order to obtain the underground information needed to produce these survey results.

Variances in ground conditions, density of services and/or other external influences may affect the accuracy of the data recorded for this non-invasive survey. The detection and accuracy of any subsurface feature detected using non-invasive techniques is not guaranteed.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

Underground services shown on this drawing are illustrated by an individual service line. This does not necessarily represent number of cables and/or ducts.

Depths shown are to top of service or feature unless otherwise stated. Generally +/- 10% of the detected feature depth, in both the vertical and horizontal planes. All depths obtained both through direct measurement and non-invasive detection are as accurate as can be achieved at the time of survey.

Pipe sizes are shown only from visual inspection or taken from statutory records.

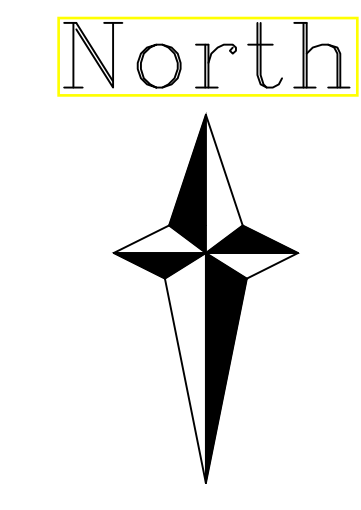
The definition of an anomalous area is an area where the radar data shows a substantial change in uniform data from its surrounding area. These areas could be voids, heavily saturated ground, buried tanks or other subsurface features.

Unless otherwise stated all coordinates and levels are related to OSGB36 datum by GPS.

IF IN DOUBT ASK

CONTROL COORDINATE SCHEDULE (OSGB36)

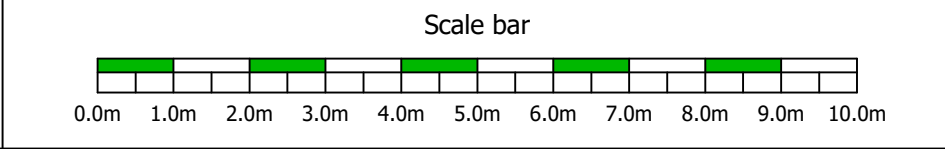
STATION	EASTING	NORTHING	HEIGHT
STN A	471375.294	106852.020	10.458
STN B	471333.311	106888.402	10.795



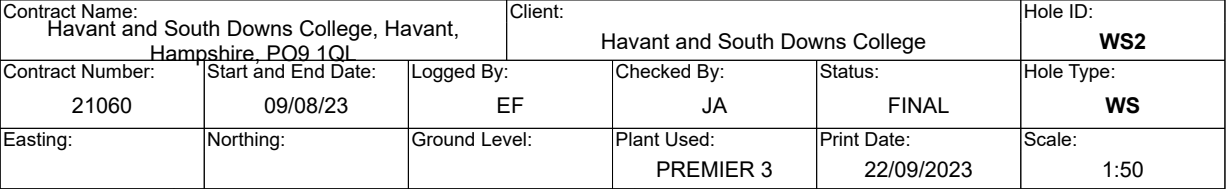
GEOTEC SURVEYS LIMITED
PO Box 99, Godalming, Surrey, GU7 2XT
TEL: 01428 686168 EMAIL: geotec@geotecsveys.com
FAX: 01428 686169 WEB: www.geotecsveys.com

Client:	Peter Marsh Consulting Limited Regency House St. Clement Street Winchester SO23 9DR	Site:	HSDC Havant New Road Havant Hampshire PO9 1QL
Project No:	2308006	Date:	August 2023
Sheet No:	1 of 1	Scale:	A0 Sheet @ 1:100
Drawn by:	SY	Approved by:	LH

Revision	Details	Initial	Date



	Contract Name: Havant and South Downs College, Havant, Hampshire, PO9 1QJ				Client: Havant and South Downs College				Hole ID: WS1					
	Contract Number: 21060		Start and End Date: 09/08/23		Logged By: EF		Checked By: JA		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREMIER 3		Print Date: 22/09/2023		Scale: 1:50			
Weather:				Termination:								Sheet 1 of 1		
Samples & In Situ Testing					Strata Details							Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.10	ES			0.20		Soft brown slightly clayey, slightly sandy, slightly gravelly SILT. Sand is fine to coarse. Gravel is subrounded fine to medium flint. Occasional rootlets. MADE GROUND Firm brown, becoming greyish brown with depth, slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse flint and concrete. Rare rootlets. MADE GROUND								
0.30	WAC			0.40										
0.60	ES			(0.70)		Firm brown mottled dark grey, slightly sandy, slightly gravelly CLAY. Sand is fine. Gravel is subangular fine to medium flint. Rare pyrite nodules. Rare rootlets. RIVER TERRACE DEPOSITS						1		
0.80	D			1.10										
1.20	D			(0.35)		Firm light brown mottled light grey, slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse flint. RIVER TERRACE DEPOSITS								
1.60	D			1.45 (0.30)										
1.90	D			1.75		Light brown, slightly clayey, slightly silty, very gravelly SAND. Sand is fine to coarse. Gravel is subangular fine to coarse flint. RIVER TERRACE DEPOSITS						2		
				2.00										
				(0.80)		Light brown and cream, very silty GRAVEL. Sand is fine to coarse. Gravel is subangular fine to coarse flint and chalk. RIVER TERRACE DEPOSITS								
				2.80										
2.80	D			(1.20)		Brown clayey GRAVEL. Gravel is Subangular fine to coarse flint. RIVER TERRACE DEPOSITS						3		
				4.00										
3.80	D					End of Borehole at 4.00m						4		
											5			
											6			
											7			
											8			
											9			
											10			
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Rootlets encountered to 1.40m bgl. Poor recovery 2.00-4.00m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
									3.80			20	3.80	
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														



Weather:	Termination:		Sheet 1 of 1
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Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:							
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)								
									Rootlets encountered to 1.00m bgl.							
Chiselling					Installation				Water Strikes							
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks		
												0	0.00	No ground water encountered		
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.																

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:						
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)							
										Rootlets encountered to 0.25m bgl. Dessicated rootlets encountered to 1.80m bgl.					
Chiselling					Installation				Water Strikes						
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks	
												0	0.00	No ground water encountered	
									Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.						

	Contract Name: Havant and South Downs College, Havant, Hampshire, PO9 1QJ				Client: Havant and South Downs College			Hole ID: WS4						
	Contract Number: 21060		Start and End Date: 09/08/23		Logged By: SAN		Checked By: JA		Status: FINAL		Hole Type: WS			
	Easting:		Northing:		Ground Level:		Plant Used: PREMIER 3		Print Date: 22/09/2023		Scale: 1:50			
Weather:				Termination:								Sheet 1 of 1		
Samples & In Situ Testing					Strata Details							Groundwater		
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description						Water Strike	Backfill/Installation	
0.10	WAC			0.08		Soft dark brown SILT with abundant roots and rootlets. MADE GROUND								
0.30	ES			0.25		Soft dark brown gravelly REWORKED SILT, Gravel is subangular fine to coarse consisting of quartz and flint. MADE GROUND								
0.50	ES			0.43		Firm brown slightly gravelly SILT. Gravel is subangular fine to medium flint. RIVER TERRACE DEPOSITS								
0.65	D			(0.56)		Brown silty GRAVEL. Gravel is subangular, fine to coarse flint. RIVER TERRACE DEPOSITS								
				1.05		Firm dark brown mottled orangey brown CLAY with rare desiccated rootlets. RIVER TERRACE DEPOSITS						1		
1.15	D			(0.75)		Firm orangish brown very gravelly CLAY. Gravel is subangular fine to coarse consisting of flint. RIVER TERRACE DEPOSITS								
1.65	D			1.80		Light brown and cream very silty GRAVEL. Sand is fine to coarse. Gravel is subangular fine to coarse of flint and subrounded fine to medium chalk. RIVER TERRACE DEPOSITS						2		
2.30	D													
2.80	D			(1.95)								3		
				3.75		Stiff greyish brown gravelly CLAY, becoming grey with depth. Gravel is subangular fine to medium of flint. LONDON CLAY FORMATION						4		
3.75	D			4.00		End of Borehole at 4.00m								
Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Rootlets encountered to 0.25m bgl. Dessicated rootlets encountered to 1.00m bgl.					
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
												0	0.00	No ground water encountered
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														

Soakaway Calculations

Soakaway Test No.	SA1 Test 1
Contract:	Havant and South Downs College
Contract No.	21159

Field Test

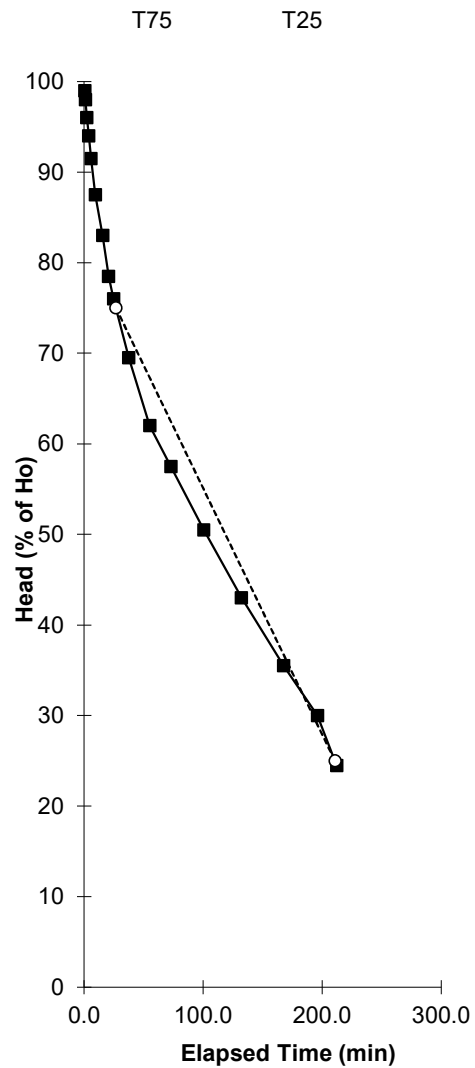
Trial Pit Log (include details of groundwater):
See trial Pit record

Depth of Pit	3.00 m
Width of Pit	0.60 m
Length of Pit	2.00 m
Depth of Pit Soaked	1.00 m
ap50	3.8 m2
Vp75-25	0.6 m3
t75-25	184.0 min
water used	1.2000 m3
f	1.430E-05 m/sec.

Field Data

Depth to	Elapsed	Head of	Head of
Water	Time	Water	Water
(m)	(min)	(% of Ho)	(m)
1	0	100	2
1.02	0.5	99	1.98
1.04	1.0	98	1.96
1.08	2.3	96	1.92
1.12	3.9	94	1.88
1.17	5.8	92	1.83
1.25	9.3	88	1.75
1.34	15.4	83	1.66
1.43	20.4	79	1.57
1.48	24.8	76	1.52
1.61	37.4	70	1.39
1.76	55.0	62	1.24
1.85	72.8	58	1.15
1.99	100.5	51	1.01
2.14	132.1	43	0.86
2.29	167.4	36	0.71
2.4	196.0	30	0.60
2.51	212.2	25	0.49

T75	26.696	75
T25	210.745	25
T75-25	184.049	Derived from Best Fit



Comments

SOILS LIMITED

**Newton House, Cross Road, Tadworth
Surrey, KT20 5SR**

Telephone: 01737 814 221

Facsimile: 01737 812 557

Soakaway Calculations

Soakaway Test No.	SA1 Test 2
Contract:	Havant and South Dowens College
Contract No.	21159

Field Test

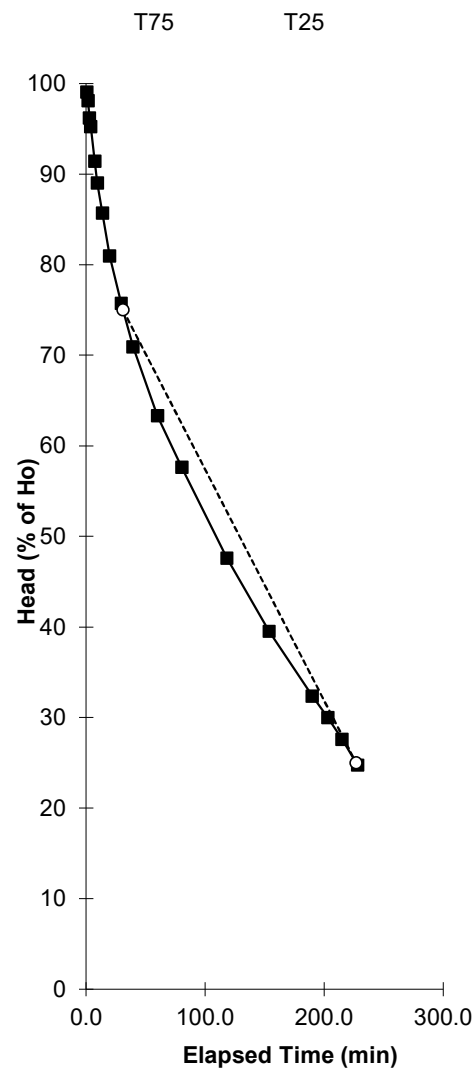
Trial Pit Log (include details of groundwater):
See trial Pit record

Depth of Pit	2.83 m
Width of Pit	0.60 m
Length of Pit	2.00 m
Depth of Pit Soaked	0.73 m
ap50	3.098 m2
Vp75-25	0.438 m3
t75-25	196.0 min
water used	0.8760 m3
f	1.203E-05 m/sec.

Field Data

Depth to Water	Elapsed Time	Head of Water	Head of Water
(m)	(min)	(% of Ho)	(m)
0.73	0	100	2.1
0.75	0.5	99	2.08
0.77	1.4	98	2.06
0.81	2.7	96	2.02
0.83	3.9	95	2.00
0.91	7.2	91	1.92
0.96	9.4	89	1.87
1.03	13.6	86	1.80
1.13	19.7	81	1.70
1.24	29.5	76	1.59
1.34	39.4	71	1.49
1.50	60.1	63	1.33
1.62	80.4	58	1.21
1.83	118.3	48	1.00
2	153.8	40	0.83
2.15	190.0	32	0.68
2.2	203.0	30	0.63
2.25	215.0	28	0.58
2.31	228.0	25	0.52

T75	30.966	75
T25	226.917	25
T75-25	195.951	Derived from Best Fit



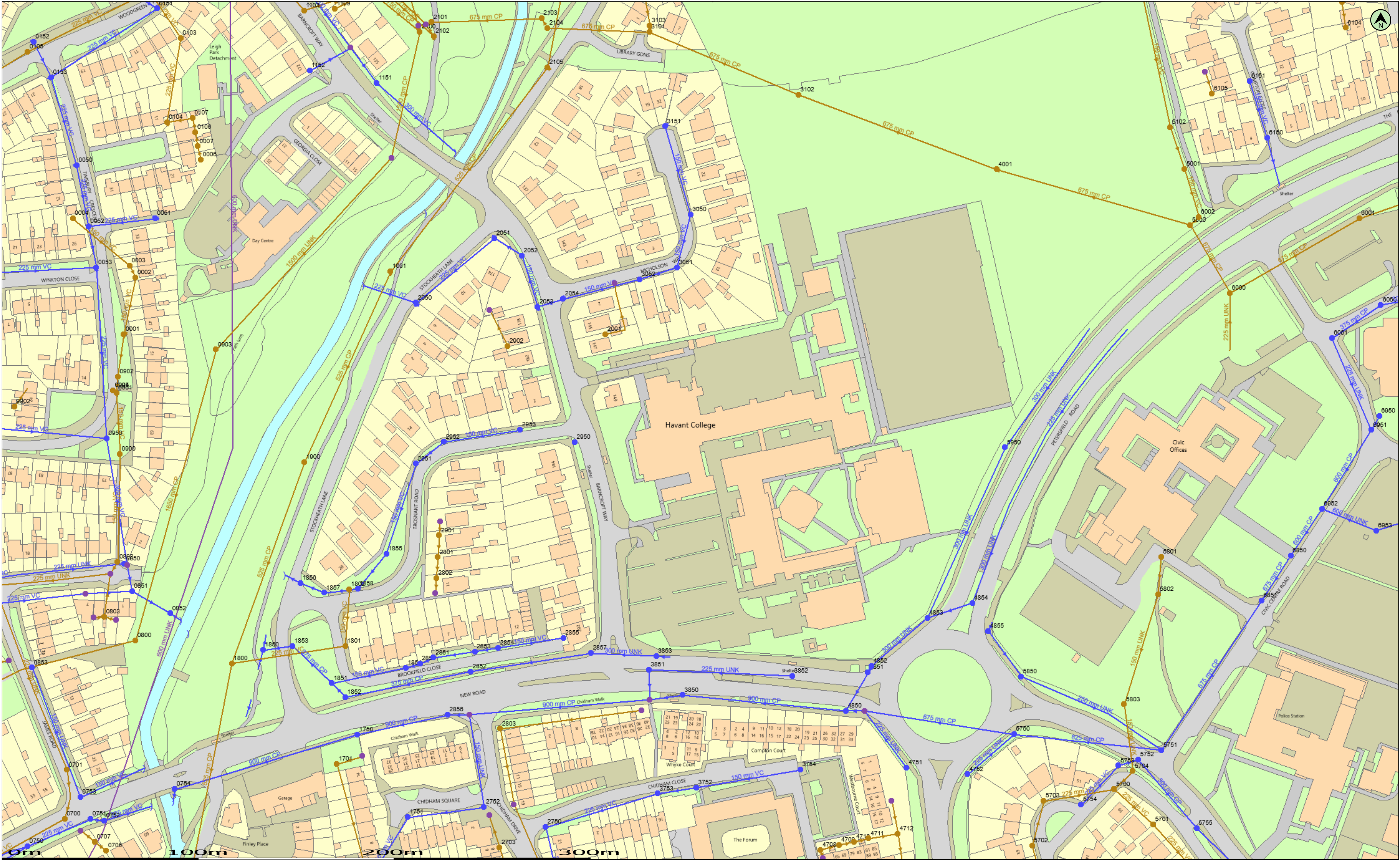
Comments

Data extrapolated after 153 minutes

SOILS LIMITED

**Newton House, Cross Road, Tadworth
Surrey, KT20 5SR**

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Facsimile: 01737 812 557



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The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2023 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

enquiries@baker-associatesltd.co.uk	
Havant College	



Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0001	F	10.87	9.00	
0002	F	11.03	9.35	
0003	F	11.25	10.13	
0004	F	12.10	0.00	
0006	F	0.00	0.00	
0007	F	0.00	0.00	
0103	F	11.84	0.00	
0104	F	11.92	0.00	
0105	F	13.50	11.48	
0106	F	0.00	0.00	
0107	F	0.00	0.00	
0700	F	7.90	6.37	
0701	F	8.20	0.00	
0706	F	0.00	0.00	
0707	F	0.00	0.00	
0800	F	7.72	0.00	
0802	F	8.20	7.06	
0803	F	0.00	0.00	
0900	F	10.21	8.10	
0901	F	10.26	8.58	
0902	F	10.34	8.71	
0903	F	9.11	2.71	
0904	F	0.00	0.00	
0905	F	0.00	0.00	
1001	F	7.61	4.70	
1103	F	10.17	8.10	
1109	F	0.00	0.00	
1701	F	0.00	0.00	
1800	F	6.68	0.00	
1801	F	8.55	6.86	
1802	F	8.69	7.61	
1900	F	7.24	4.49	
2001	F	0.00	0.00	
2100	F	9.79	0.00	
2101	F	9.70	4.17	
2102	F	9.79	3.85	
2103	F	7.70	4.30	
2104	F	7.80	5.47	
2105	F	8.29	4.91	
2703	F	0.00	0.00	
2801	F	0.00	0.00	
2802	F	0.00	0.00	
2803	F	0.00	0.00	
2901	F	0.00	0.00	
2902	F	0.00	0.00	
3101	F	11.24	6.06	
3102	F	12.68	6.96	
3103	F	0.00	0.00	
4001	F	13.44	7.19	
4708	F	0.00	0.00	
4709	F	0.00	0.00	
4710	F	0.00	0.00	
4711	F	0.00	0.00	
4712	F	0.00	0.00	
5000	F	13.13	0.00	
5001	F	13.46	11.57	
5102	F	13.85	11.80	
5700	F	10.78	0.00	
5701	F	10.52	9.28	
5702	F	10.92	9.60	
5703	F	10.96	9.57	
5704	F	10.78	0.00	
5801	F	11.19	10.54	
5802	F	11.10	9.97	
5803	F	10.64	9.47	
6000	F	12.62	7.48	
6001	F	12.87	8.85	
6002	F	13.41	8.53	
6103	F	0.00	0.00	
6104	F	0.00	0.00	
6105	F	0.00	0.00	
9902	F	0.00	0.00	
0050	S	12.03	9.20	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0051	S	11.11	9.24	
0052	S	11.72	8.92	
0053	S	11.39	0.00	
0151	S	12.20	10.00	
0152	S	13.50	9.85	
0153	S	13.01	9.60	
0750	S	8.15	7.03	
0751	S	7.67	6.67	
0752	S	7.47	6.20	
0753	S	7.83	6.81	
0754	S	7.23	5.76	
0850	S	8.31	7.38	
0851	S	8.46	0.00	
0852	S	6.81	5.11	
0853	S	9.29	8.38	
0950	S	10.31	7.82	
1151	S	9.63	6.49	
1152	S	0.00	0.00	
1750	S	8.57	6.53	
1751	S	8.98	0.00	
1850	S	7.45	6.37	
1851	S	8.79	7.22	
1852	S	8.73	7.96	
1853	S	7.80	6.92	
1854	S	9.05	8.01	
1855	S	9.78	8.76	
1856	S	7.18	6.63	
1857	S	8.05	7.01	
1858	S	8.78	7.32	
2050	S	7.47	6.53	
2051	S	8.34	7.08	
2052	S	9.15	7.53	
2053	S	9.85	0.00	
2054	S	10.11	9.27	
2750	S	10.21	8.54	
2752	S	0.00	0.00	
2850	S	9.10	8.11	
2851	S	9.32	0.00	
2852	S	9.73	8.73	
2853	S	9.73	8.44	
2854	S	9.80	8.54	
2855	S	10.06	8.92	
2856	S	9.11	6.80	
2857	S	10.14	9.01	
2950	S	11.21	0.00	
2951	S	10.33	9.32	
2952	S	10.60	9.62	
2953	S	10.98	10.34	
3050	S	11.87	10.61	
3051	S	12.09	10.46	
3052	S	11.88	10.29	
3151	S	11.70	10.83	
3752	S	10.97	9.49	
3753	S	10.83	9.13	
3754	S	10.93	10.03	
3850	S	10.27	7.02	
3851	S	10.43	8.58	
3852	S	10.75	9.61	
3853	S	10.42	0.00	
4751	S	11.55	10.25	
4752	S	11.54	10.01	
4850	S	10.96	7.36	
4851	S	10.99	0.00	
4852	S	11.17	0.00	
4853	S	11.29	10.64	
4854	S	11.62	0.00	
4855	S	11.34	10.54	
5750	S	11.11	0.00	
5751	S	10.95	0.00	
5752	S	10.78	9.78	
5753	S	10.85	9.95	
5754	S	10.82	10.14	
5755	S	10.65	9.61	

[illegible]

9 APPENDIX B



1 | Proposed Ground Floor Plan
1 : 100

NOTES:

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**AYRE
CHAMBERLAIN
GAUNT**

PROJECT
Havant Campus
HSDC, Havant, New Road Havant
PO9 1QL

DRAWING TITLE
Ground Floor Plan

REV.	DATE	DESCRIPTION
P1	31.08.23	First Issue. Draft Issue for information
P2	05.08.23	Issued for Information
P3	11.09.23	Issued for Information.
P4	15.09.23	Issue for Client Review
P5	29.09.23	Issued for Planning

DRWN BY	CHKD BY	APPD BY
ME	TH	DG

DRAWING NO.
project code - originator - volume - level - type - role - number
HVT-ACG-XX-00-DR-A-2000

STAGE	SUITABILITY
RIBA stage	code description
2	S2 Suitable for Information

10 APPENDIX C

DRAINAGE LEGEND

EXISTING FEATURES

- EXISTING SURFACE WATER DRAIN AND MANHOLE TO BE RETAINED
- EXISTING FOUL WATER DRAIN AND MANHOLE TO BE RETAINED
- EXISTING FOUL/SURFACE/COMBINED WATER DRAIN AND MANHOLE TO BE ABANDONED. CONTRACTOR TO CONFIRM THAT NO LIVE CONNECTIONS REMAIN. PIPES TO BE FULLY REMOVED.

PROPOSED FEATURES

- SURFACE WATER DRAIN
- RAINWATER PIPE - REFER TO PUBLIC HEALTH ENGINEERS/ARCHITECTS DRAWINGS FOR DETAILS

- YARD GULLY (TRAPPED)

- STORM WATER MANHOLE TYPE D
INTERNAL DIMENSIONS 450mm MINIMUM
DEPTH FROM COVER TO SOFFIT OF PIPE UP TO 3m
RESTRICT ACCESS TO Ø350 IF DEPTH FROM COVER TO SOFFIT OF PIPE IS LESS THAN 1m
(MAX PIPE DIAMETER 150mm 4500/4750)
(MAX PIPE DIAMETER 225mm 6002)

- STORM WATER FILTER MANHOLE

- STORM WATER SOAKAWAY / ATTENUATION TANK
GL = GROUND LEVEL
TOTL = TOP OF TANK LEVEL
BOTL = BOTTOM OF TANK LEVEL

- PIPE DETAIL: Ø, LENGTH, GRADIENT,

- MANHOLE REFERENCE:
COVER LEVEL,
INVERT LEVEL,
SUMP INVERT LEVEL,
MH TYPE,
CATCHPIT MANHOLE (IF REQUIRED),
COVER GRADE

- FOUL WATER DRAIN

- FOUL WATER RISING MAIN
ABOVE GROUND FOUL WATER CONNECTION - REFER TO PUBLIC HEALTH ENGINEERS/ARCHITECTS DRAWINGS FOR DETAILS

- FOUL WATER MANHOLE TYPE D
INTERNAL DIMENSIONS 450mm MINIMUM
DEPTH FROM COVER TO SOFFIT OF PIPE UP TO 3m
RESTRICT ACCESS TO Ø350 IF DEPTH FROM COVER TO SOFFIT OF PIPE IS LESS THAN 1m
(MAX PIPE DIAMETER 150mm)

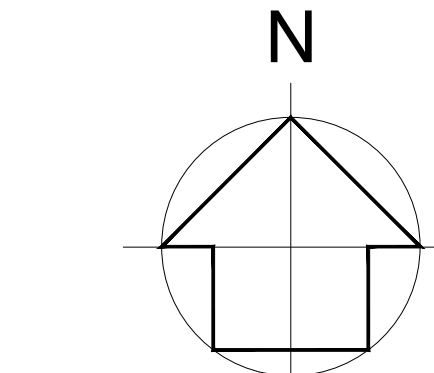
- FOUL WATER PUMP CHAMBER

- PIPE DETAIL: Ø, LENGTH, GRADIENT,

- MANHOLE REFERENCE:
COVER LEVEL,
INVERT LEVEL,
MH TYPE,
COVER GRADE

- PIPE DETAIL: Ø, LENGTH, GRADIENT,

↑ RISING MAIN TO CONNECT TO EXISTING MANHOLE. DOWNSTREAM DRAINAGE DISCHARGE LOCATION TBC.



INDICATIVE ONLY

NOTES:

- THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
- ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
- WHERE DRAINAGE RUNS PASS CLOSE TO BUILDINGS OR THEIR INVERT LEVELS ARE BELOW FOUNDATION LEVEL, THEN THE TRENCHES ARE TO BE BACK FILLED IN ACCORDANCE WITH THE STANDARD DETAIL PROVIDED.
- REFERENCE SHOULD BE MADE TO THE STRUCTURAL ENGINEERS DETAILS FOR ALL ASPECTS OF FOUNDATION DESIGN AND CONSTRUCTION.
- THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
- THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE. NO DIMENSIONS ARE TO BE SCALED FROM THESE DRAWINGS.
- IT IS THE CONTRACTORS/SUBCONTRACTORS RESPONSIBILITY TO ENSURE COMPLIANCE WITH THE CURRENT BUILDING REGULATIONS AND CODES OF PRACTICE.
- STUB CONNECTIONS TO ADAPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
- ALL DOWNPIPES ARE TO BE SEALED, IE CONNECTED DIRECTLY TO THE STORMWATER DRAIN. ACCESS POINTS TO BE PROVIDED 1m ABOVE GROUND LEVEL FOR EXTERNAL RWP'S AND 1m ABOVE FFL FOR INTERNAL RWP'S.
- UNLESS OTHERWISE NOTED OR SIMILAR APPROVED CHANNEL DRAINS TO BE ACO MULTI DRAIN WITH A15 GRATING IN PEDESTRIAN AREAS. SLOTTED CHANNEL TO BE USED FOR AREAS WITH FALLS <1:15 MESH GRATING TO BE USED WHERE FALLS >1:15.
- GULLY AND CHANNEL DRAIN POSITIONS ARE LIABLE TO AMENDMENT WHEN THE DESIGN LEVELS HAVE BEEN DETERMINED.
- MODULAR GEOCELLULAR STORAGE/STAKAWAY SYSTEM TO CONFORM TO CIRIA C783 THE SUDS MANUAL, C880 STRUCTURAL DESIGN OF MODULAR GEOCELLULAR DRAINAGE TANKS & C886 SITE HANDBOOK FOR THE CONSTRUCTION OF SUDS. THE MANUFACTURER SHOULD PROVIDE A COMPLETE SET OF INDEPENDENT TEST RESULTS FOR A PROPOSED SYSTEM INCLUDING, AS A MINIMUM, STRESS/STRAIN CURVES FOR VERTICAL AND LATERAL COMPRESSION, AND CREEP TESTS UNDER SUSTAINED LONG-TERM LOADS. A BBA CERTIFICATE IS NOT INDEPENDENT TEST DATA.
- IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. GENERALLY SUB SOIL DRAINS AFFECTED ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER DRAINAGE SYSTEM. PIPE DIAMETERS AND GRADIENTS ARE TO BE MAINTAINED.
- BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SPURS TO WHICH CONNECTIONS ARE PROPOSED. ADDITIONAL SPUR/MANHOLE CONNECTIONS ARE TO BE AGREED WITH THE RELEVANT ADOPTING AUTHORITY. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
- ROAD REINSTATEMENTS ARE TO BE TO THE HIGHWAY AUTHORITY APPROVAL.
- NO PRIVATE AREAS ARE TO DRAIN ONTO ADAPTABLE AREAS AND VICE VERSA.

DRAINAGE NOTES

- ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, AND/OR SITUATED UNDER HIGHWAY TO BE VITRIFIED CLAY TO BS EN 296 & BS55 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916 & BS5911 PART 1, OR THERMOPLASTIC STRUCTURED WALL SEWER PIPES TO WIS 4-35-01 (CLASS B) AND BE CAPABLE OF WITHSTANDING 4000 PSI JETTING PRESSURE. PRIVATE PIPES MAY BE VC OR PLASTIC.
- ADOPTABLE HIGHWAY WORKS ARE TO BE IN ACCORDANCE WITH LOCAL AUTHORITY DESIGN GUIDANCE.
- ANY WORKS ASSOCIATED WITH THE HIGHWAY/EXTERNAL WORKS INCLUDING HIGHWAY DRAINAGE, SHALL BE IN ACCORDANCE WITH THE HIGHWAYS AGENCY MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, VOL 1 (MCHW), UNLESS OTHERWISE SPECIFIED.
- FOR CONSTRUCTION DETAILS REFER TO THE RELEVANT MARBAS DRAWING NUMBERS LISTED ON THE DRAWING ISSUE SHEET.
- ALL ADOPTABLE DRAINAGE WORKS TO BE CONSTRUCTED AS DETAILED IN "THE CODE" FOR ADOPTION DESIGN AND CONSTRUCTION GUIDANCE AND THE LOCAL WATER AUTHORITY'S LOCAL PRACTICE NOTE.
- ALL ADOPTABLE SEWERS WITH LESS THAN 120m OF COVER WHEN LAID BENEATH THE ROADS, OR 0.90m OF COVER IN OTHER AREAS, SHALL HAVE CONCRETE PROTECTION IN ACCORDANCE WITH EITHER OF THE DETAILS SHOWN ON THE STANDARD DRAWING PROVIDED.
- ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT, THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER. IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
- COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
- ROAD GULLY PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS. ALL OTHER UN-REFERENCED PIPES ARE ASSUMED TO BE 100mm DIA.
 - FW MIN GRADIENT - 1 IN 40 (100 DIA) NO WC'S CONNECTED
 - FW MIN GRADIENT - 1 IN 80 (100 DIA) MIN 1 WC CONNECTED
 - FW MIN GRADIENT - 1 IN 150 (150 DIA) MIN 5 WC'S CONNECTED
 - SW MIN GRADIENT - 1 IN 100 (100 DIA)
 - SW MIN GRADIENT - 1 IN 150 (150 DIA)
- ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
- IN ORDER TO MAINTAIN THE SATISFACTORY FUNCTIONING OF SURFACE WATER SEWERS, ALL ROAD AND YARD GULLIES ARE TO BE "TRAPPED".
- ALL NON ADOPTABLE LATERALS BENEATH THE HIGHWAY SHALL BE BACK FILLED WITH A TYPE 1 GRANULAR MATERIAL AS CL 803 (MCHW) APPROVED BY THE ENGINEER.
- ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
- WHERE DRAINS PASS THROUGH FOUNDATIONS OR CONNECT TO MANHOLES, A FLEXIBLE PIPE JOINT SHOULD BE PROVIDED TO FORM A ROCKER PIPE IN ACCORDANCE WITH THE STANDARD DETAIL PROVIDED.
- SHALLOW PRIVATE DRAINS MAY REQUIRE PROTECTION USING CLASS 'Z' CONCRETE SURROUND OR PAVING SLABS BRIDGING THE TRENCH SUBJECT TO THE NHBG INSPECTORS REQUIREMENTS.

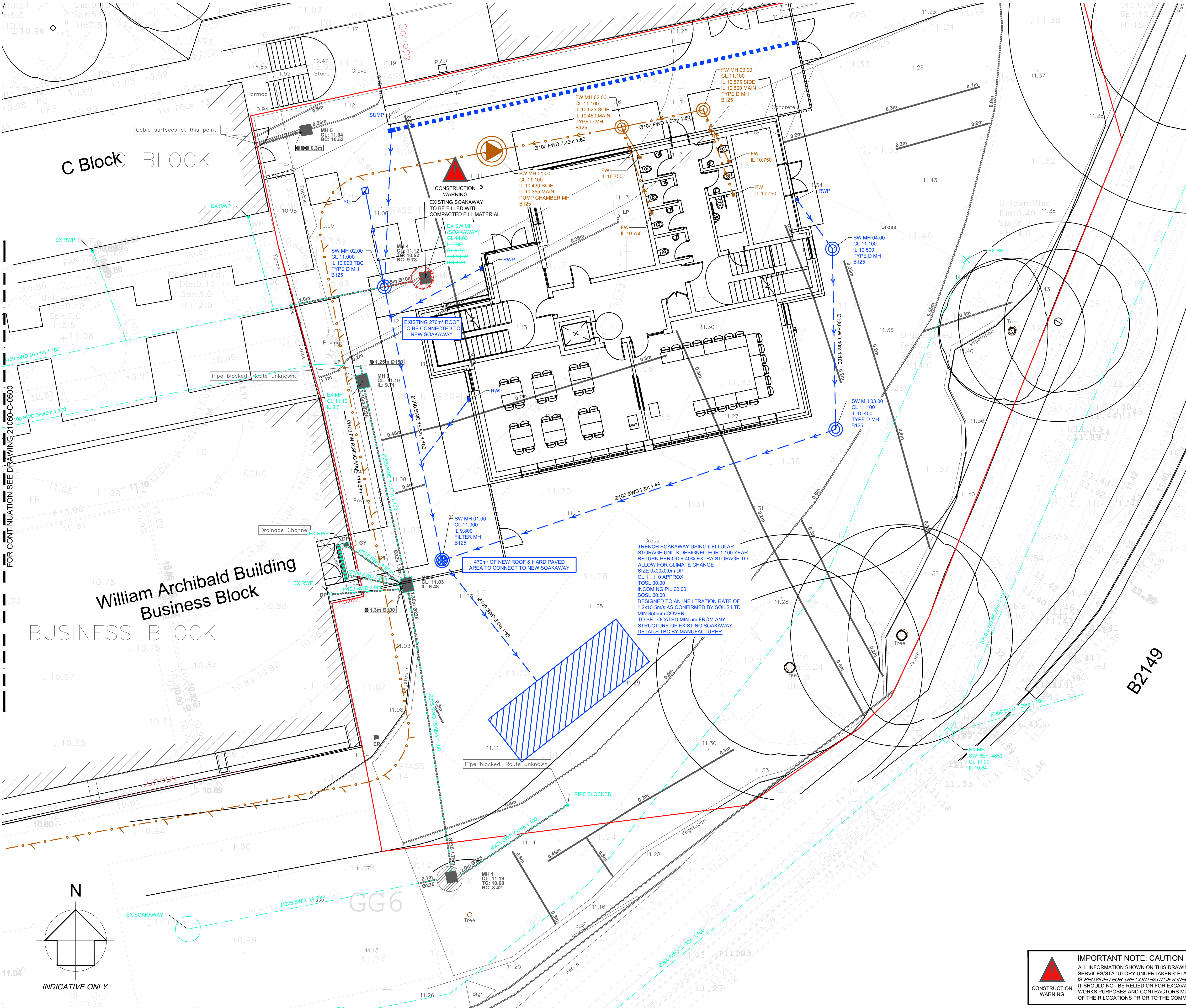
PO1	31/10/23	SPB	FIRST ISSUE
REV	DATE	BY	DESCRIPTION

DRAWING STATUS	PRELIMINARY
CUSTOMER	HAVANT & SOUTHDOWNS COLLEGE
PROJECT	NEW TEACHING BLOCK
DRAWING TITLE	PROPOSED BELOW GROUND DRAINAGE SHEET 1 OF 2

DRAWING No.	21060-C-0500	REV	PO1
SCALE	1:100	DATE	31/10/23
DRAWN	SB	CHECKED	SF
SHT.	A1		
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IMPORTANT NOTE: CAUTION
ALL INFORMATION SHOWN ON THIS DRAWING FOR UNDERGROUND SERVICES/STATUTORY UNDERTAKERS' PLANT IS APPROXIMATE AND IS PROVIDED FOR THE CONTRACTORS INFORMATION ONLY. IT SHOULD NOT BE RELIED ON FOR EXCAVATION OR ANY OTHER WORKS PURPOSES AND CONTRACTORS MUST SATISFY THEMSELVES OF THEIR LOCATIONS PRIOR TO THE COMMENCEMENT OF WORKS.

CONSTRUCTION WARNING



NOTES:

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- ALL ADOPTABLE SEWERS WITH LESS THAN 120m OF COVER WHEN LAID BENEATH THE ROADS, OR 0.90m OF COVER IN OTHER AREAS, SHALL HAVE CONCRETE PROTECTION IN ACCORDANCE WITH EITHER OF THE DETAILS SHOWN ON THE STANDARD DRAWING PROVIDED.
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- COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
- ROAD GULLY PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS. ALL OTHER UN-REFERENCED PIPES ARE ASSUMED TO BE 100mm DIA.
 - FW MIN GRADIENT - 1 IN 40 (100 DIA) NO WC'S CONNECTED
 - FW MIN GRADIENT - 1 IN 80 (100 DIA) MIN 1 WC CONNECTED
 - FW MIN GRADIENT - 1 IN 150 (150 DIA) MIN 5 WC'S CONNECTED
 - SW MIN GRADIENT - 1 IN 100 (100 DIA)
 - SW MIN GRADIENT - 1 IN 150 (150 DIA)
- ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
- IN ORDER TO MAINTAIN THE SATISFACTORY FUNCTIONING OF SURFACE WATER SEWERS, ALL ROAD AND YARD GULLIES ARE TO BE "TRAPPED".
- ALL NON ADOPTABLE LATERALS BENEATH THE HIGHWAY SHALL BE BACK FILLED WITH A TYPE 1 GRANULAR MATERIAL AS CL 803 (MCHW) APPROVED BY THE ENGINEER.
- ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
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- THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
- THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE. NO DIMENSIONS ARE TO BE SCALED FROM THESE DRAWINGS.
- IT IS THE CONTRACTORS/SUBCONTRACTORS RESPONSIBILITY TO ENSURE COMPLIANCE WITH THE CURRENT BUILDING REGULATIONS AND CODES OF PRACTICE.
- STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
- ALL DOWNPIPES ARE TO BE SEALED, IE CONNECTED DIRECTLY TO THE STORMWATER DRAIN. ACCESS POINTS TO BE PROVIDED 1m ABOVE FFL FOR EXTERNAL RWP'S AND 1m ABOVE FFL FOR INTERNAL RWP'S.
- UNLESS OTHERWISE NOTED OR SIMILAR APPROVED CHANNEL DRAINS TO BE ACCO MULTI DRAIN WITH A15 GRATING IN PEDESTRIAN AREAS, C250 CAR PARKS AND D400 CAR DRIVeways. SLOTTED CHANNEL TO BE USED FOR AREAS WITH FALLS <1:15 MESH GRATING TO BE USED WHERE FALLS >1:15.
- GULLY AND CHANNEL DRAIN POSITIONS ARE LIABLE TO AMENDMENT WHEN THE DESIGN LEVELS HAVE BEEN DETERMINED.
- MODULAR GEOCELLULAR STORAGE/SOAKAWAY SYSTEM TO CONFORM TO CIRIA C793 THE SUBS MANUAL, C880 STRUCTURAL DESIGN OF MODULAR GEOCELLULAR DRAINAGE TANKS & C888 SITE HANDBOOK FOR THE CONSTRUCTION OF SUBS. THE MANUFACTURER SHOULD PROVIDE A COMPLETE SET OF INDEPENDENT TEST RESULTS FOR A PROPOSED SYSTEM INCLUDING, AS A MINIMUM, STRESS/STRAIN CURVES FOR VERTICAL AND LATERAL COMPRESSION, AND CREEP TESTS UNDER SUSTAINED LONG-TERM LOADS. A BBA CERTIFICATE IS NOT INDEPENDENT TEST DATA.
- ALL REDUNDANT DRAINAGE TO BE ABANDONED ONCE THE CONTRACTOR HAS SATISFIED HIMSELF THAT NO CONNECTIONS REMAIN LIVE. REDUNDANT DRAINAGE TO BE GRUBBED OUT.
- ALL BELOW GROUND CONCRETE TO ACCORD WITH BS5928:1997 SULPHATE CLASS TBA.
- IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. GENERALLY SUB SOIL DRAINS AFFECTED ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER DRAINAGE SYSTEM. PIPE DIAMETERS AND GRADIENTS ARE TO BE MAINTAINED.
- BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SPURS TO WHICH CONNECTIONS ARE PROPOSED. ADDITIONAL SPURMANHOLE CONNECTIONS ARE TO BE AGREED WITH THE RELEVANT ADOPTING AUTHORITY. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
- ROAD REINSTATEMENTS ARE TO BE TO THE HIGHWAY AUTHORITY APPROVAL.
- NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.

FOR DRAINAGE LEGEND SEE DRAWING NUMBER: 21060-C-0500 (PROPOSED BELOW GROUND DRAINAGE SHEET 1)

PO1	31/10/23	SPB	FIRST ISSUE
REV	DATE	BY	DESCRIPTION
DRAWING STATUS			
PRELIMINARY			
			
CLIENT			
HAVANT & SOUTHDOWNS COLLEGE			
PROJECT			
NEW TEACHING BLOCK			
DRAWING TITLE			
PROPOSED BELOW GROUND DRAINAGE SHEET 2 OF 2			
DRAWING No.			REV.
21060-C-0501			P01
SCALE	DATE	DRAWN	CHECKED
1:100	31/10/23	SB	SF
SHT.			A1
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IMPORTANT NOTE: CAUTION

ALL INFORMATION SHOWN ON THIS DRAWING FOR UNDERGROUND SERVICES/STATUTORY UNDERTAKERS' PLANT IS APPROXIMATE AND IS PROVIDED FOR THE CONTRACTOR'S INFORMATION ONLY. IT SHOULD NOT BE RELIED ON FOR EXCAVATION OR ANY OTHER WORKS PURPOSES AND CONTRACTORS MUST SATISFY THEMSELVES OF THEIR LOCATIONS PRIOR TO THE COMMENCEMENT OF WORKS.

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
SW MH 01.00			11.000	600	471434.500	106868.250	1.275
SW MH 02.00	0.064	5.00	11.000	450	471431.300	106883.410	1.000
SW MH 03.00			11.100	450	471456.300	106875.510	0.700
SW MH 04.00		5.00	11.100	450	471456.120	106885.510	0.600
SW SOAKAWAY			9.865	50	471441.520	106861.040	1.425

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
2.000	SW MH 02.00	SW MH 01.00	15.494	0.600	10.000	9.800	0.200	77.5	150	5.23	50.0
1.000	SW MH 04.00	SW MH 03.00	10.002	0.600	10.500	10.400	0.100	100.0	150	5.17	50.0
1.001	SW MH 03.00	SW MH 01.00	22.977	0.600	10.400	9.800	0.600	38.3	150	5.40	50.0
1.002	SW MH 01.00	SW SOAKAWAY	10.063	0.600	9.725	8.440	1.285	7.8	225	5.44	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
2.000	1.143	20.2	8.7	0.850	1.050	0.064	0.0	69	1.102
1.000	1.005	17.8	0.0	0.450	0.550	0.000	0.0	0	0.000
1.001	1.631	28.8	0.0	0.550	1.050	0.000	0.0	0	0.000
1.002	4.704	187.0	8.7	1.050	1.200	0.064	0.0	33	2.433

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
2.000	15.494	77.5	150	Circular	11.000	10.000	0.850	11.000	9.800	1.050
1.000	10.002	100.0	150	Circular	11.100	10.500	0.450	11.100	10.400	0.550
1.001	22.977	38.3	150	Circular	11.100	10.400	0.550	11.000	9.800	1.050
1.002	10.063	7.8	225	Circular	11.000	9.725	1.050	9.865	8.440	1.200

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.000	SW MH 02.00	450	Manhole	Adoptable	SW MH 01.00	600	Manhole	Adoptable
1.000	SW MH 04.00	450	Manhole	Adoptable	SW MH 03.00	450	Manhole	Adoptable
1.001	SW MH 03.00	450	Manhole	Adoptable	SW MH 01.00	600	Manhole	Adoptable
1.002	SW MH 01.00	600	Manhole	Adoptable	SW SOAKAWAY	50	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW MH 01.00	471434.500	106868.250	11.000	1.275	600		1	2.000	9.800
						2	1.001	9.800	
						0	1.002	9.725	
SW MH 02.00	471431.300	106883.410	11.000	1.000	450		0	2.000	10.000
SW MH 03.00	471456.300	106875.510	11.100	0.700	450		1	1.000	10.400
SW MH 04.00	471456.120	106885.510	11.100	0.600	450		0	1.000	10.500
							1	1.002	8.440
SW SOAKAWAY	471441.520	106861.040	9.865	1.425	50				

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Node SW SOAKAWAY Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.04320	Invert Level (m)	8.265	Depth (m)	
Side Inf Coefficient (m/hr)	0.04320	Time to half empty (mins)	1092	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	9.500	Number Required	1
Porosity	0.95	Pit Length (m)	3.000		

Results for 1 year Critical Storm Duration. Lowest mass balance: 98.95%

Node Event	US	Peak	Level	Depth	Inflow	Node	Flood	Status
	Node	(mins)	(m)	(m)	(l/s)	Vol (m³)	(m³)	
15 minute winter	SW MH 01.00	10	9.759	0.034	8.8	0.0097	0.0000	OK
15 minute winter	SW MH 02.00	10	10.073	0.073	9.0	0.1049	0.0000	OK
15 minute summer	SW MH 03.00	1	10.400	0.000	0.0	0.0000	0.0000	OK
15 minute summer	SW MH 04.00	1	10.500	0.000	0.0	0.0000	0.0000	OK
360 minute winter	SW SOAKAWAY	304	8.569	0.129	1.4	8.2254	0.0000	OK

Link Event	US	Link	DS	Outflow	Velocity	Flow/Cap	Link
(Upstream Depth)	Node		Node	(l/s)	(m/s)		Vol (m³)
15 minute winter	SW MH 01.00	1.002	SW SOAKAWAY	8.8	2.369	0.047	0.0374
15 minute winter	SW MH 02.00	2.000	SW MH 01.00	8.8	1.076	0.438	0.1273
15 minute summer	SW MH 03.00	1.001	SW MH 01.00	0.0	0.000	0.000	0.0000
15 minute summer	SW MH 04.00	1.000	SW MH 03.00	0.0	0.000	0.000	0.0000
360 minute winter	SW SOAKAWAY	Infiltration		0.2			

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW MH 01.00	11	9.779	0.054	21.2	0.0153	0.0000	OK
15 minute winter	SW MH 02.00	11	10.182	0.182	22.1	0.2618	0.0000	SURCHARGED
15 minute summer	SW MH 03.00	1	10.400	0.000	0.0	0.0000	0.0000	OK
15 minute summer	SW MH 04.00	1	10.500	0.000	0.0	0.0000	0.0000	OK
600 minute winter	SW SOAKAWAY	570	9.058	0.618	2.0	21.4742	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	SW MH 01.00	1.002	SW SOAKAWAY	21.2	3.021	0.113	0.1818
15 minute winter	SW MH 02.00	2.000	SW MH 01.00	21.2	1.239	1.049	0.2637
15 minute summer	SW MH 03.00	1.001	SW MH 01.00	0.0	0.000	0.000	0.0000
15 minute summer	SW MH 04.00	1.000	SW MH 03.00	0.0	0.000	0.000	0.0000
600 minute winter	SW SOAKAWAY	Infiltration		0.3			

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	SW MH 01.00	690	9.804	0.079	3.2	0.0225	0.0000	OK
15 minute winter	SW MH 02.00	11	10.794	0.794	40.2	1.1426	0.0000	FLOOD RISK
15 minute summer	SW MH 03.00	1	10.400	0.000	0.0	0.0000	0.0000	OK
15 minute summer	SW MH 04.00	1	10.500	0.000	0.0	0.0000	0.0000	OK
720 minute winter	SW SOAKAWAY	690	9.804	1.364	3.2	41.6803	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
720 minute winter	SW MH 01.00	1.002	SW SOAKAWAY	3.2	1.239	0.017	0.2630
15 minute winter	SW MH 02.00	2.000	SW MH 01.00	38.2	2.167	1.889	0.2700
15 minute summer	SW MH 03.00	1.001	SW MH 01.00	0.0	0.000	0.000	0.0000
15 minute summer	SW MH 04.00	1.000	SW MH 03.00	0.0	0.000	0.000	0.0000
720 minute winter	SW SOAKAWAY	Infiltration		0.4			