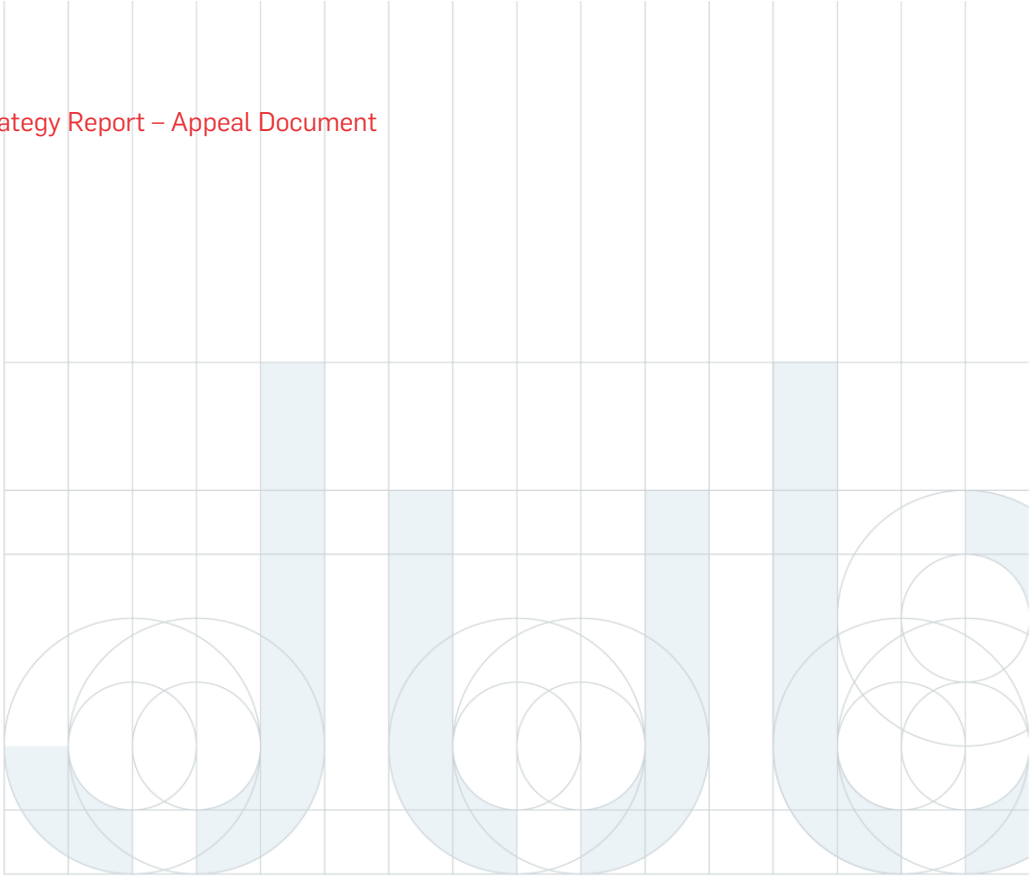




Land off Cobbett Way Botley



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1 Project Information

1.1 Project Information

Client The Trustees of The Mulberry Investment Pension Scheme

1.2 Project Details

Project Name Land off Cobbett Way, Botley

Location Botley Parish

Jubb Project Number 24247

1.3 Report Details

Version 2.0

Status For Submission

Date 13/11/24

1.4 Project Authorisation

ISSUE HISTORY:

Version	Date	Detail
1.0	04/10/24	First Issue
2.0	13/11/24	Revised to LLFA Comments

AUTHORISATION:

Prepared By	Approved By
AH	RL
AH	RL

2 Introduction

2.1 Instruction

- 2.1.1 Jubb has been commissioned on behalf of the trustees of The Mulberry Investment Pension Scheme to undertake a Flood Risk Assessment and Drainage Strategy report in support of a Planning Appeal following the rejection of Outline planning application (O/23/96432) for the Land off Cobbett Way located in Botley.

2.2 Brief

- 2.2.1 This Flood Risk Assessment is prepared in accordance with the requirements of the National Planning Policy Framework (NPPF) published by the Department of Communities and Local Government. The NPPF sets out the government's national policies to protect people and property from flooding in both existing and future situations as a result of development.
- 2.2.2 Section 14 of the NPPF and the associated Planning Practice Guidance for Flood Risk and Coastal Change sets out the framework for planning decisions made by the local, regional and national government and the Environment Agency (EA). In order for planning authorities to make informed decisions on the Development of sites in areas at risk of flooding, NPPF requires the developer to carry out an assessment of flood risk.
- 2.2.3 This report addresses the requirements given in Section 14 of the NPPF and other issues which are deemed relevant to flood risk. These requirements include the following:
- Assessment of the magnitude and severity of flood risk to the Site, including consideration of current and future impacts of climate change;
 - Assess suitability of Site and future development through the application of the Sequential Test and Exception Test (where required);
 - Assess the impacts of current and future development of the site on flood risk to adjacent developments;
 - Determine ability of existing and proposed drainage to accommodate development flows with respect to surface water runoff and flood risk;
 - Demonstrate that appropriate mitigation measures have been taken to prevent flooding;
 - Demonstrate that appropriate emergency situations have been considered e.g. overland flow path and evacuation routes.
- 2.2.4 This report also considers the disposal of wastewater generated by the proposed Development. Existing infrastructure will be reviewed to identify potential options for the disposal of foul and surface water runoff for future development.
- 2.2.5 Reason 3 for rejection of the planning application by Eastleigh Borough Council is as follows:
- 'Insufficient information has been provided to demonstrate that the sustainable drainage can provide three forms of natural filtration, and mitigate all pollution hazards, which is necessary to maintain the quality of runoff water entering the Solent and Southampton Water Special Protection Area and Ramsar Site and Solent Maritime Special Area of Conservation. The application is therefore contrary to the requirements of Policies S1, DM5, DM6, DM10 and DM11 of the Local Plan, the provisions of the National Planning Policy Framework (2023), and the Conservation of Habitats and Species Regulations (2017) (as amended).'*

3 Site Location & Description

3.1 Background

- 3.1.1 The Site is 2.81ha in size and is located adjacent on the west edge of Botley, within the parish of Botley Parish Council.
- 3.1.2 The current proposals comprise the erection of 34 dwellings (including 35% affordable housing) together with associated access, parking, pedestrian and cycle routes, landscaping, green infrastructure and drainage.



Figure 1: Site Masterplan

3.2 Site location & land use

- 3.2.1 Land off Cobbett Way is located in Botley, adjacent to the A334, in Hampshire (coordinates: 450,439E, 113,103N), the nearest postcode is SO30 2EU.
- 3.2.2 The Site comprises agricultural land adjacent to the south of the A334. The Site is located to the east of Cobbett Way and directly north of The Bridleway.).

3.2.3 Refer to Appendix A for a Site Location Plan.

3.3 Site Topography

3.3.1 General site levels vary from 12.63mAOD at the north of the site to 13.57mAOD at the south. Then to the east of the site the levels vary from 13.50mAOD to 15.43mAOD to the west of the site. The overall site follows the natural topography with the higher levels being to the west of the site and low points being to the east of the site, with an approximate gradient of 1:67. The site also falls south to north direction, with an approximately fall of 1:177.

3.3.2 Refer to Appendix B for topographical survey.

3.4 Site Geology

3.4.1 Datasets have been obtained from the British Geological Survey (BGS) website to provide a high-level geology across the district. An extract of the BGS mapping is displayed in Figure 2 below. It indicates that the site is underlain by the Earnley Sand formation – Clay, Silt and Sand. Superficial deposits are not recorded across the site.

3.4.2 A review of the boreholes from the ground investigation that has been done on the Land off Cobbett Way site. They confirm presence of Dark grey very silty Clay (Earnley Sand Formation) within the area and indicate groundwater 2.6-5m below ground level.

3.4.3 EA maps (<https://magic.defra.gov.uk/>) were used to confirm that the site is not located within a Source Protection zone and is not within an Aquifer Designation (Bedrock & Superficial Drift).

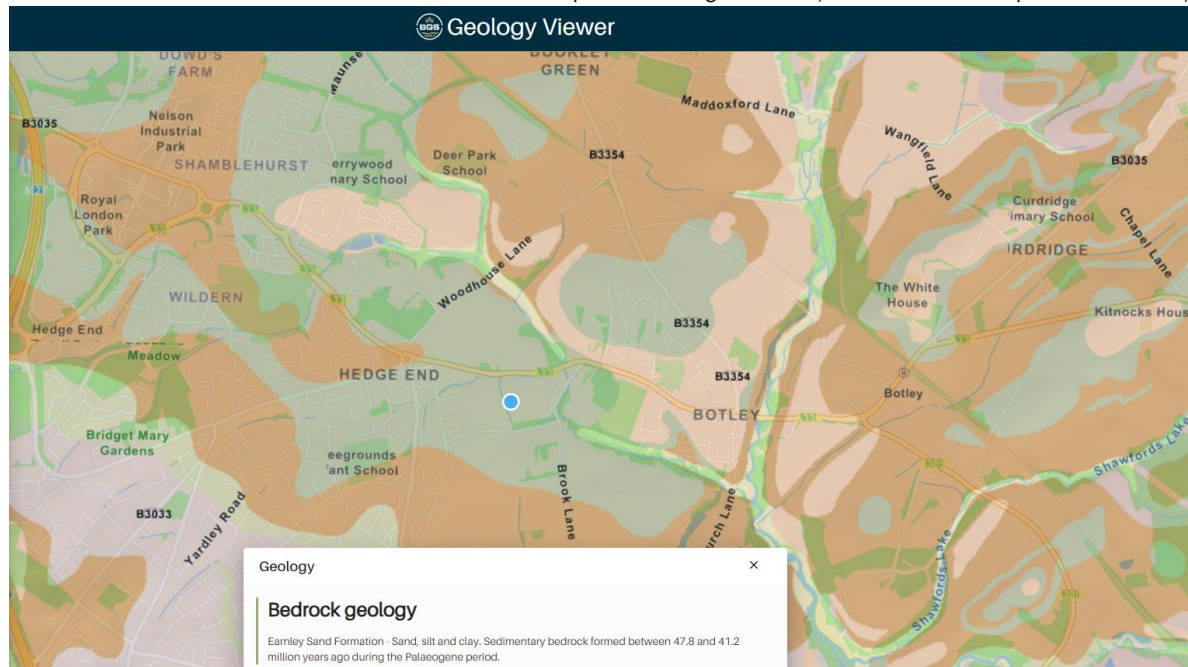


Figure 2: Extract of British Geological Survey mapping indicating Bedrock Geology

3.5 Local Watercourses

- 3.5.1 Hamble river, a designated main river and a tributary of the Hamble River is approximately 200m east of the Site. This watercourse flows 200m east before joining the Hamble River.
- 3.5.2 An unnamed ordinary watercourse located to the north, west and south of the site which drains towards the River Hamble (approximately 1.3km north of the site).

3.6 Existing Drainage

- 3.6.1 The application Site is classified as a greenfield site and currently drains via natural overland runoff towards the unnamed ordinary existing watercourses that surrounds the site. The topographical survey (Appendix B) indicates that there is a dry ditch running alongside the A33 to the west of the site.
- 3.6.2 Comprehensive below ground drainage records for the whole site are not available. The topographical survey of the site (Appendix B) undertaken by Encompass Surveys in April 2023 recorded all private drainage features including ditches, headwalls, pipe diameters.
- 3.6.3 An updated topographical survey of the proposed discharge location was undertaken in November 2024. This has been included in Appendix B.
- 3.6.4 A site visit was undertaken in November 2024 to locate the existing outfall for the site. Photos from the site visit are included within the appendices.

4 Flood Risk to The Existing Site

4.1 Fluvial Flooding

- 4.1.1 The Environment Agency (EA) produces floodplain maps for the UK, which show the area at risk of fluvial and tidal flooding. 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.
- 4.1.2 The EA's Flood Map for Planning (Figure 3) indicates the site to be located within Flood Zone 1 (Low Probability) and therefore defined as having less than a 1 in 1,000 annual probability of river flooding.

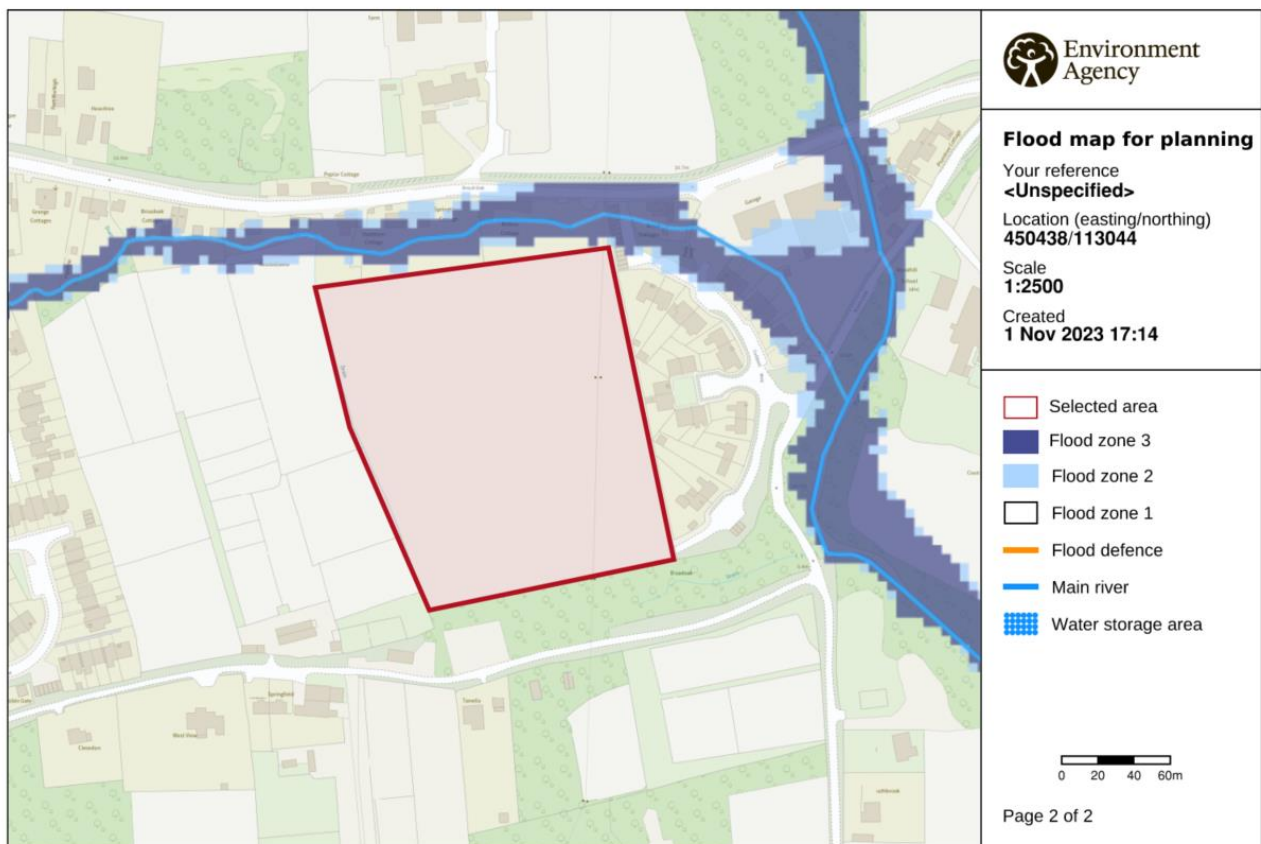


Figure 3: Extract from Environment Agency Tidal and Fluvial Flood Risk Map

- 4.1.3 Table 2 of the NPPF Planning Practice Guidance for Flood Risk and Coastal Change states in terms of flood risk vulnerability, that all types of development are suitable within this flood zone.

4.2 Overland (Surface Water) Flooding

- 4.2.1 The EA also produces maps which highlight the risk of flooding from surface water flows. The Long-Term Flood Risk Information maps can illustrate when the capacity of existing surface water drainage networks or channels are exceeded in extreme rainfall events. These maps are produced, as with fluvial modelling, based on generalised information, and need to be verified in terms of topographical ground levels and indicated flow routes.

4.2.2 Figure 4 indicates that the site will not be affected by surface water flooding, therefore it is in the low risk scenarios. This flood risk reflects the localised topography.

4.2.3 The development Site indicates to be at risk of surface water flooding, hence developing and changing the topography of this area will have a minimal impact on the surrounding overland flow routes.

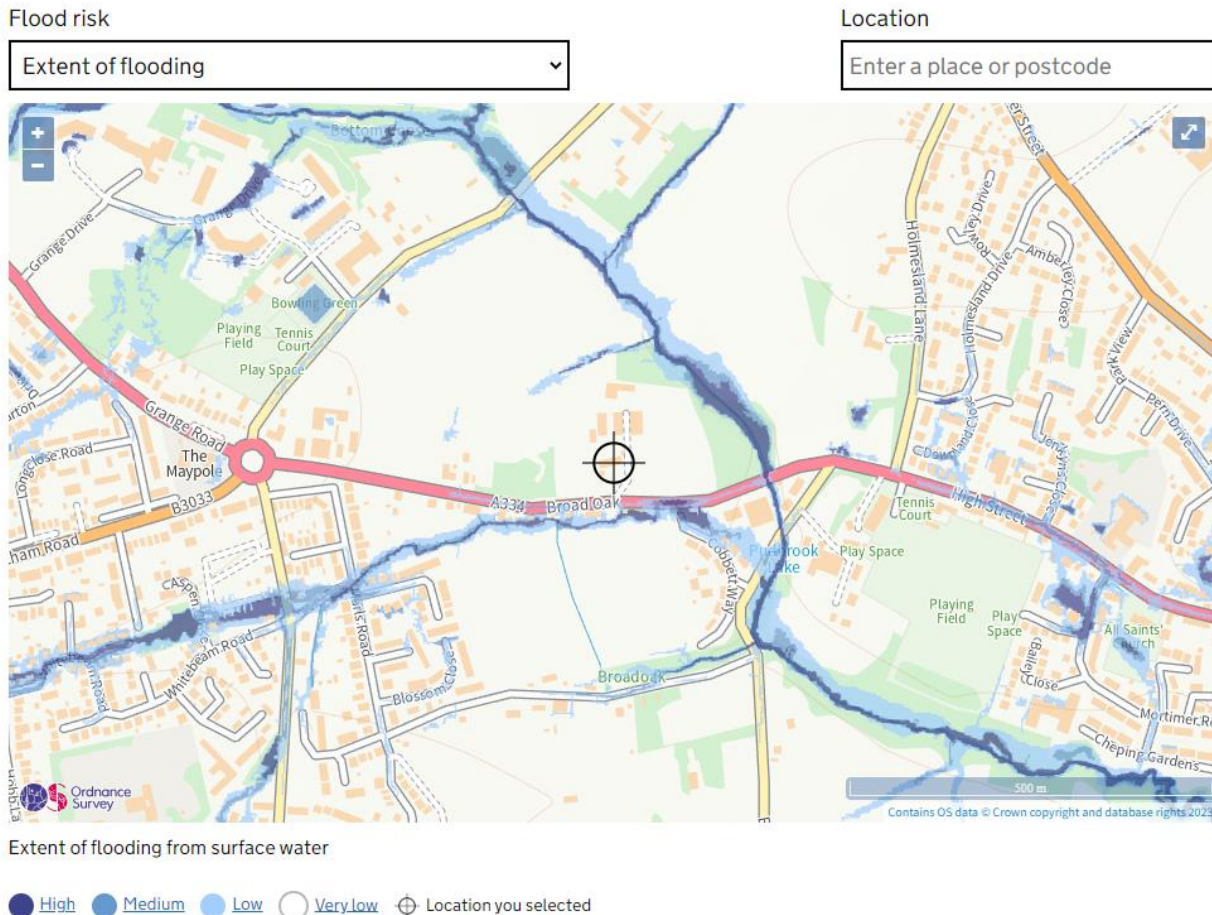


Figure 4: Extract from Environment Agency's Long-Term Flood Risk mapping indicating Surface Water Flood Risk

4.3 Flooding from Groundwater

4.3.1 PUSH (Partnership for Urban South Hampshire) Strategic Flood Risk Assessment (SFRA) prepared by Wallingford HydroSolutions Limited and dated December 2016 states groundwater in Botley is typically caused by three main mechanisms:

- Rising water levels in superficial deposits;
- Groundwater flooding and fluvial flooding interactions; and
- Rising water levels in aquifers.

4.3.2 As previously detailed, there are no identified superficial deposits beneath the site. The bedrock strata is classified as a 'unproductive strata'. The Site area is not located within a groundwater Source Protection Zone.

4.3.3 A site-specific ground investigation has been undertaken which showed there to be no soakage.

4.3.4 In view of the above information, the Site is considered to be at low risk of flooding from groundwater.

4.4 Flooding from Sewers

4.4.1 There have been no recorded historic incidents of flooding resulting from sewers within the site boundary. Similarly, there are no recorded historic incidents of sewer flooding outside of the site boundary resulting in flooding of the Site. No other recorded information or anecdotal evidence regarding sewer flooding has been obtained.

4.4.2 The topography of the surrounding area and road network serves to naturally convey flood waters away from the Site. Therefore, the proposed site is considered to be at very low risk of flooding from sewers.

4.5 Flooding from Artificial Sources

4.5.1 The EA's Long-Term Flood Risk Information mapping also indicates the potential extent of flooding from reservoir breach/failure. The proposed site is not identified to be at risk of flooding from artificial sources.

5 Proposed Development

5.1 Development Description

- 5.1.1 As previously detailed, the current proposals comprise the erection of 34 dwellings (including 35% affordable housing) together with associated access, parking, pedestrian and cycle routes, landscaping, green infrastructure and drainage. The architect's masterplan is included in Appendix C.

5.2 Development Suitability

- 5.2.1 The NPPF aims to direct development to suitable areas with low probability of flooding. The table below illustrates the acceptable classifications of development within each flood zone.

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone 1 (<1 in 1000)	✓	✓	✓	✓	✓
Flood Zone 2 (up to 1 in 1000)	✓	✓	Exception Test	✓	✓
Flood Zone 3a (1 in 100 fluvial) (1 in 200 tidal)	Exception Test	✓	X	Exception Test	✓
Flood Zone 3b (functional floodplain)	Exception Test	✓	X	X	X

Table 1: Flood Risk Vulnerability Classification

- 5.2.2 Proposals within the Masterplan are classified as 'More Vulnerable' within Table 2 of the NPPF Planning Practice Guidance, and therefore is deemed acceptable for location within Flood Zone 1.

6 Proposed Drainage Strategy

6.1 Surface Water Drainage

- 6.1.1 New surface water drainage will be required to drain surface water runoff from any proposed buildings, carriageways, and associated car parking and pedestrian hard standing areas.
- 6.1.2 It is a requirement of the Eastleigh Borough Council SFRA that any development should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. Generally, the aim should be to discharge surface water run-off in accordance with the following hierarchy of surface water disposal options wherever reasonably practicable, (in order of preference):
- Into the ground (infiltration);
 - To a surface water body;
 - To a surface water sewer, highway drain, or another drainage system; or
 - To a combined sewer.
- 6.1.3 Furthermore, Sustainable Drainage Systems (SuDS) should be used to reduce and manage surface water run-off to and from proposed developments as near to source as possible. In line with the Eastleigh Borough Council Local Plan, SuDS must be implemented for all development sites unless it is demonstrated that SuDS are not suitable.
- 6.1.4 As detailed previously, infiltration measures in the form of traditional soakaways, cellular below ground tanks and infiltration basins will be ruled out due to poor ground conditions.
- 6.1.5 In consideration of the drainage hierarchy, discharge to a surface water body should be considered next, following ruling out infiltration. As detailed previously, there is a watercourse located along the western and southern boundaries. These will be reviewed for their suitability to accept the surface water discharge from the site.
- 6.1.6 The proposed development of the site in line with Masterplan will increase the impervious area within the overall development. Due to this increase in impermeable areas, the surface water runoff will need to be restricted to prevent an increase of surface water discharging off the site. Due to the greenfield nature of the site, the runoff rate will be restricted to Qbar. The site layout currently included within the planning application is illustrative as per the outline nature of the overall submission. The current layout shows a developable area of 1.65ha, this figure will be used for calculating the greenfield runoff rate.
- 6.1.7 In order to enable discharge to the watercourse at a restricted discharge equivalent to the existing Greenfield runoff rate in line with Eastleigh Borough Council requirements, any increase in impervious area within the site boundary will need to be suitably attenuated prior to discharge. Attenuation will be designed and positioned in relation to the Phase of the development coming forward and will interact with existing drainage systems and SuDS as appropriate. Any proposed attenuation systems will be designed to accommodate a 1 in 100-year storm return period plus a 45% allowance for climate change.
- 6.1.8 The Qbar rate for the developable site has been calculated as 10.9l/s. Calculations are included within Appendix D.
- 6.1.9 The surface water drainage strategy for the site is to attenuate within 2 detention basins, located in the south eastern portion of the site. The basins will provide min. 500m³ of storage, allowing for the

restriction of runoff to greenfield rates for all storms up to and including a 1 in 100-year storm plus 45% climate change allowance.

- 6.1.10 The attenuation basins have been split into two to avoid an existing sewer which crosses the site in this location. The smaller basin will also provide an additional level of cleansing for the access road.
- 6.1.11 The site will continue to discharge towards the watercourse to the south of the site.
- 6.1.12 Proposed drainage design can be found in Appendix E, extract shown in Figure 5 below. Infodrainage network calculations for all storms of up to and including 1 in 100 + 45% CC can be found in Appendix D. FEH2013 Storm data has been used for the modelling as this is the most up to date modelling information available for the site.



Figure 5, Proposed Drainage Strategy

- 6.1.13 To keep drainage shallow, roadside swales could be used to convey surface water flows to detention basins. This would allow levels on the site to remain similar to existing. Figure 6 below shows a cross section of a what the swales could look like. These swales would provide source control cleansing and also avoid the need for positive surface water drainage.

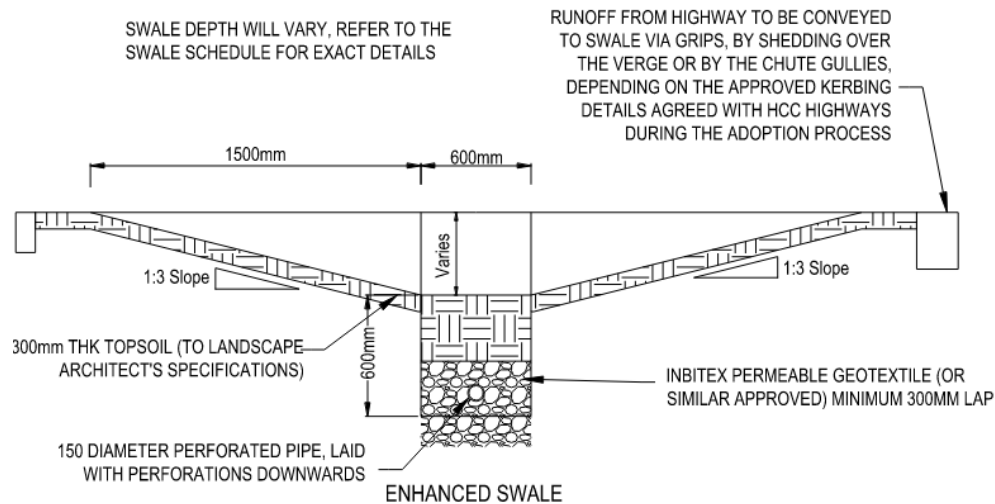


Figure 6, Roadside Swale

6.2 Proposed Site Levels

- 6.2.1 The existing levels of the site show a fall from west to east. On the proposed drainage layout, included in Appendix E, some indicative proposed levels have been included. These levels show, with some earth moving on site, the site levels can be adjusted to ensure sufficient falls are provided to drain to the designated attenuation basins. The maximum raise in levels is c1m to create a high point in the North east of the site. These level changes provide falls of c1:100 for the roads and keep the surface water flows as close to existing as possible. The shown proposed levels also ensure the overland flows can access green areas and keep away from habitable areas.

7 Water Quality

7.1 Water Quality Principles

- 7.1.1 Surface water management should incorporate sustainable drainage techniques to restrict surface water discharge from the Site, in addition to improving water quality of runoff. Runoff from the proposed development may contain hydrocarbons, pollutants and nutrients which may be harmful if discharged directly to the ground. Whilst there is no UK wide legislation, the EBC local plan policy DM 6 requires three levels of filtration prior to discharge. This strategy complies with this requirement.
- 7.1.2 It is proposed to use attenuation in the form of detention basins and permeable paving discharging to the watercourse system off-site, as a means of surface water management in relation to delivery of the proposed Masterplan. Swales will be used to convey surface water into the detention basins in place of using a standard gully and pipe system. Sizing and positions of any proposed drainage will be confirmed through detailed design and intrusive site investigation for each phase of development.
- 7.1.3 All roof water downpipes will be sealed against pollutants entering the system from polluted surface runoff, effluent disposal or other forms of discharge, and will discharge to a catchpit manhole upstream of any proposed attenuation tanks to ensure all sediment and silts are removed upstream of discharging to the watercourse system.
- 7.1.4 To provide interception attenuation for RWPs, rainwater harvesting is proposed in the form of water butts. These will reduce the amount of surface water entering the drainage system.

7.2 Simple Index Method

- 7.2.1 The SuDS Manual (CIRIA C753) recommends that the Simple Index Approach is used to ensure that there is adequate treatment proposed. This approach assigns pollution hazard indices to land types (see Table 2), and SuDS mitigation indices to different SuDS components (see Table 3).
- 7.2.2 As infiltration has been found to not be feasible, only SuDS mitigation indices for discharging to surface water are considered.

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2	0.2	0.05
Property Driveways & Low Traffic Roads	Low	0.5	0.4	0.4

Table 2: Pollution Hazard Indices for applicable land use classifications (from Table 26.2 CIRIA SuDS Manual 2015, C753)

- 7.2.3 Indicative SuDS mitigation indices for discharges to surface water sewers are indicated in Table 6 below for the types of SuDS proposed within the development.

Type of SuDS Component	Mitigation Indices		
	TSS	Metals	Hydrocarbons
Permeable Paving	0.7	0.6	0.7
Swale	0.5	0.6	0.6
Pond	0.7	0.7	0.5

Table 3: Indicative SuDS Mitigation Indices for discharges to Surface Water (from Table 26.3 CIRIA SuDS Manual 2015, C753)

7.2.4 To ensure adequate treatment, the SuDS components used should, for each contaminant type, ensure:

Total SuDS Mitigation Index $\geq$ Pollution Hazard Index

7.2.5 It is anticipated that the SuDS incorporated within the proposed drainage strategy will deliver a treatment train approach, with runoff being intercepted and conveyed through the SuDS features. Any mitigation provided by secondary and tertiary measures will have their values halved inline with CIRIA requirements. Table 4 below shows the final values being applied.

Type of SuDS Component	Mitigation Indices		
	TSS	Metals	Hydrocarbons
Permeable Paving	0.7	0.6	0.7
Swale	0.25	0.3	0.3
Pond	0.35	0.35	0.25
Total	1.3	1.25	1.25

Table 4: Final SuDS Mitigation Indices for discharges to surface water (from Table 26.3 CIRIA SuDS Manual 2015, C753)

7.2.6 Based on the values indicated in Tables 2, 3 & 4 above, the SuDS Mitigation Index is greater than the Pollution Hazard Index, and therefore it is anticipated that the proposed strategy will provide sufficient mitigation against the pollution hazards expected on-site.

7.2.7 The figure below details the SuDS treatment train that will provide the three levels of filtration.

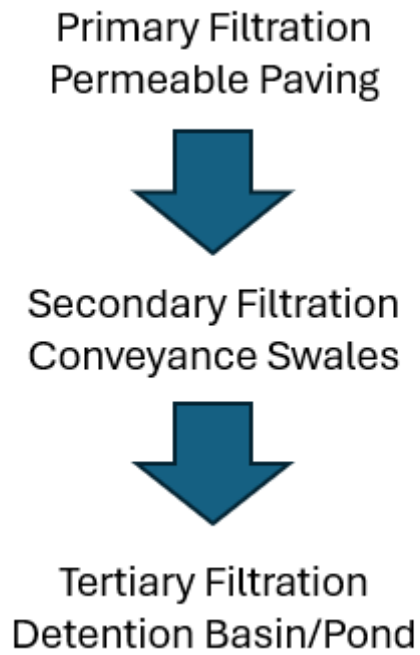


Figure 7, Filtration Tree

7.2.8 The above measures will ensure the site complies with EBC Local Plan policies DM6, DM8, and DM10.

8 SuDS Management & Maintenance

- 8.1.1 All main drainage runs within the proposed development will be offered up for adoption to Southern Water and have been designed in line with the relevant adoptable standards.
- 8.1.2 All SuDS and private drainage within the proposed development site will be privately owned and is not proposed to be adopted by the local water authority Southern Water, in accordance with their policies. These systems will be managed and maintained privately by the landowner, either through an internal maintenance team or an external site management company.
- 8.1.3 As the Masterplan is developed and individual phases progressed, management and maintenance practices for any proposed SuDS/drainage infrastructure will be determined, and continually reviewed and updated with a final confirmed plan to be detailed at the completion of the construction.
- 8.1.4 SuDS features will be managed in accordance with the guidelines outlined within The SuDS Manual (CIRIA C753, Chapter 32). Given the nature of the development and the status of the planning process, final details of the SuDS system and exact maintenance requirements are yet to be fully determined.

9 Management of Residual Risk

- 9.1.1 The Site is not considered to be at risk of fluvial flooding in the future, however the development of the different phases within the Masterplan and the delivery of Masterplan overall, should be designed to further mitigate the potential surface water flood risk posed to and from the site as rainfall intensities increase.

9.2 Flood Resistance

- 9.2.1 It has been identified there are no areas on the Site at risk from surface water flooding.
- 9.2.2 The proposed drainage and levels strategy for the site ensures that during all phases, surface water within the Site boundary will be captured and any low points drained. The proposed attenuation measures incorporated to manage surface water flows are appropriately sized with an allowance for future flows and climate change.
- 9.2.3 Finished external levels will direct surface water away from any proposed or existing buildings to lower risk areas of the Site such as car park and open space.
- 9.2.4 The risk of surface water flooding will be mitigated as highlighted above, therefore surface water flooding is considered low risk.

9.3 Flood Resilience

- 9.3.1 In addition to flood resistance measures, any ground floor, or below ground structures should be designed to be resilient against flooding. Potential measures could include:
- Building facades to be constructed with water resilience materials;
 - Construction materials to be waterproof and washable wherever possible;
 - Below ground infrastructure to be waterproofed in accordance with Building Regulations guidelines.
- 9.3.2 Potential pollutants (plan fuels, oils, petrols etc.) should also be stored securely and bunded where required.

9.4 Access and Egress

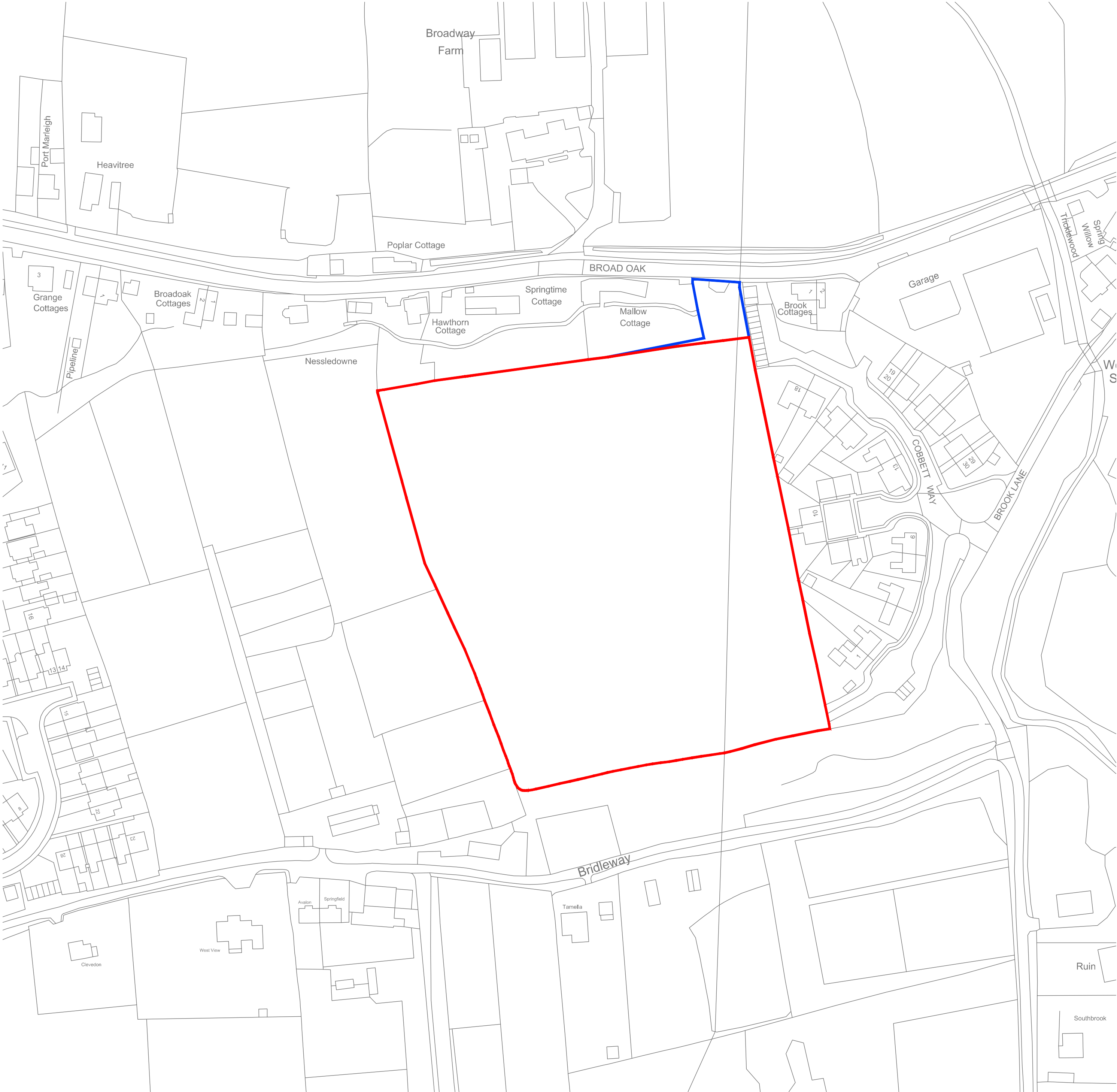
- 9.4.1 Safe access and egress are required to enable the evacuation of people from the development and to provide the emergency services with access to the development during times of flood.
- 9.4.2 The site access is contained within an area with a very low flood risk. This will provide a safe and dry access and egress in times of emergency.

10 Conclusions and Recommendations

10.1.1 It is considered that this assessment represents a comprehensive and robust analysis of the flood impact of the current Masterplan proposals on the Site itself and on adjacent properties. In addition, this report demonstrates that the proposed Masterplan can be delivered sustainably in terms of flood risk, which can be summaries as follows:

Subject	Conclusion
TIDAL & FLUVIAL FLOOD RISK	Flood Zone 1 - Low Risk
FLOOD RISK FROM OTHER SOURCES	Low Risk from all other sources,
DEVELOPMENT SUITABILITY	Development suitable in line with table 2 of the NPPF.
EXISTING DRAINAGE	There are existing FW and SW sewers near the site. Existing site drains overland towards an unnamed ordinary watercourse to the north of the site.
PROPOSED DRAINAGE	Foul water will flow towards the existing Southern Water network. Surface water will continue to discharge towards the ordinary watercourses to the west and south.
SURFACE WATER MANAGEMENT	Runoff rates will be limited to greenfield rates for all storms up to and including 1 in 100 + 45% Climate Change. Attenuation will be provided via detention basins to the west of the site. Inline with the CIRIA guidance, the detention basins will provide suitable levels of treatment but additional will be provided to meet the Eastleigh Borough Council Local Plan requirements.
FOUL WATER DISPOSAL	It is proposed to discharge the foul water from the site to the existing adopted foul water network. It is proposed to discharge this via gravity.

Appendix A: Site Location Plan



- SITE BOUNDARY
6.945ac / 2.810ha
- LAND WITHIN THE CONTROL OF THE APPLICANT
BUT NOT PART OF THE APPLICATION
0.142ac / 0.057ha

what3words:
///shelters.dragonfly.various

Scale @ A2:
0 10 20 30 40 50m
Scale 1:1250



Rev	Date	Drawn	Checked
C	13.11.23	BL	BB
CHANGE TO PROJECT NAME			
D	22.11.23	BL	BB
BLUE LINE ADDED			

Date: JUNE 2023

Drawn by : BL Checked by : BB

Drg No: CB_63_311_PARAM_000 Rev: D

Project: LAND OFF COBBETT WAY,
BOTLEY, SOUTHAMPTON

Title: SITE LOCATION
PLAN

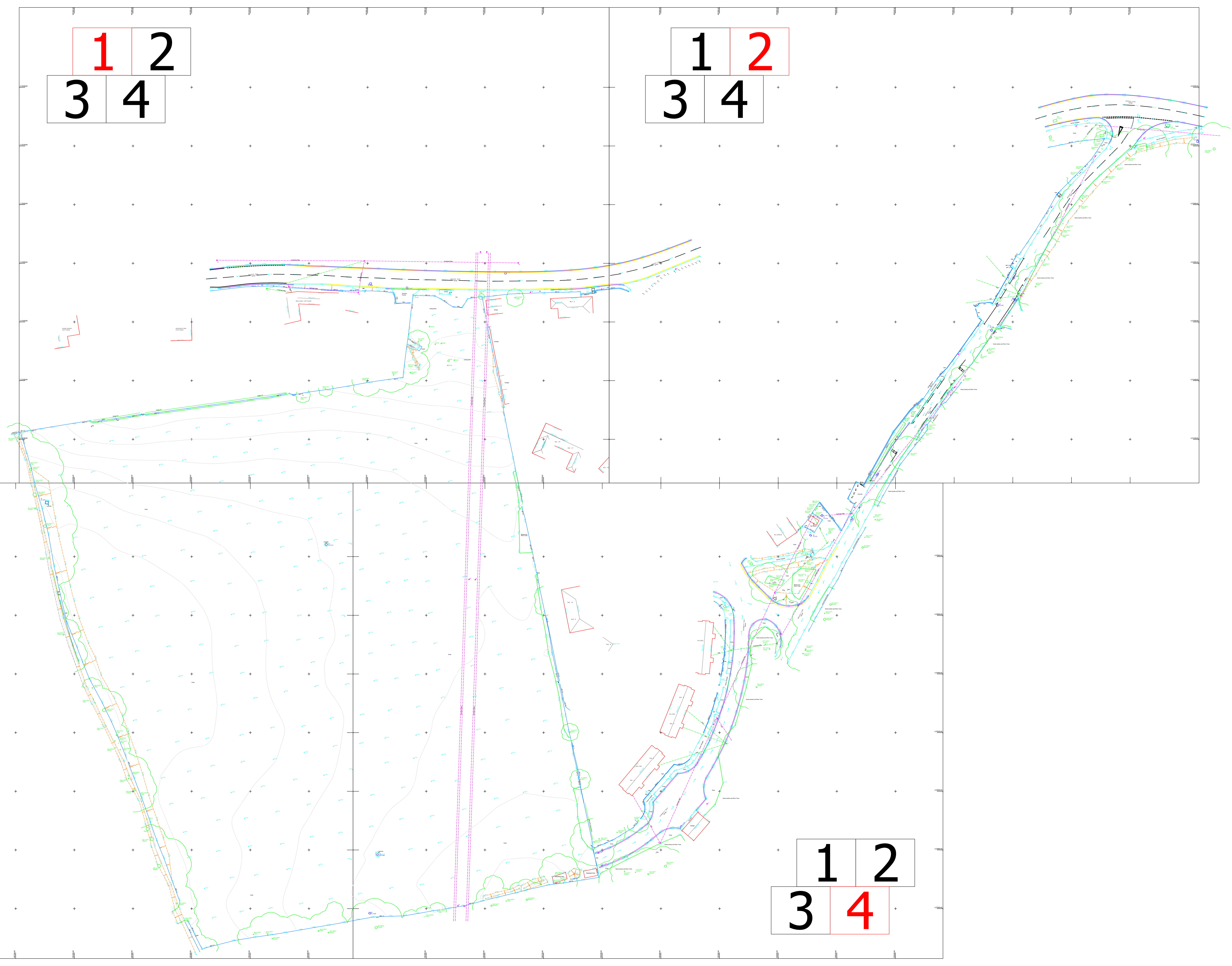


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Appendix B: Topographical Survey

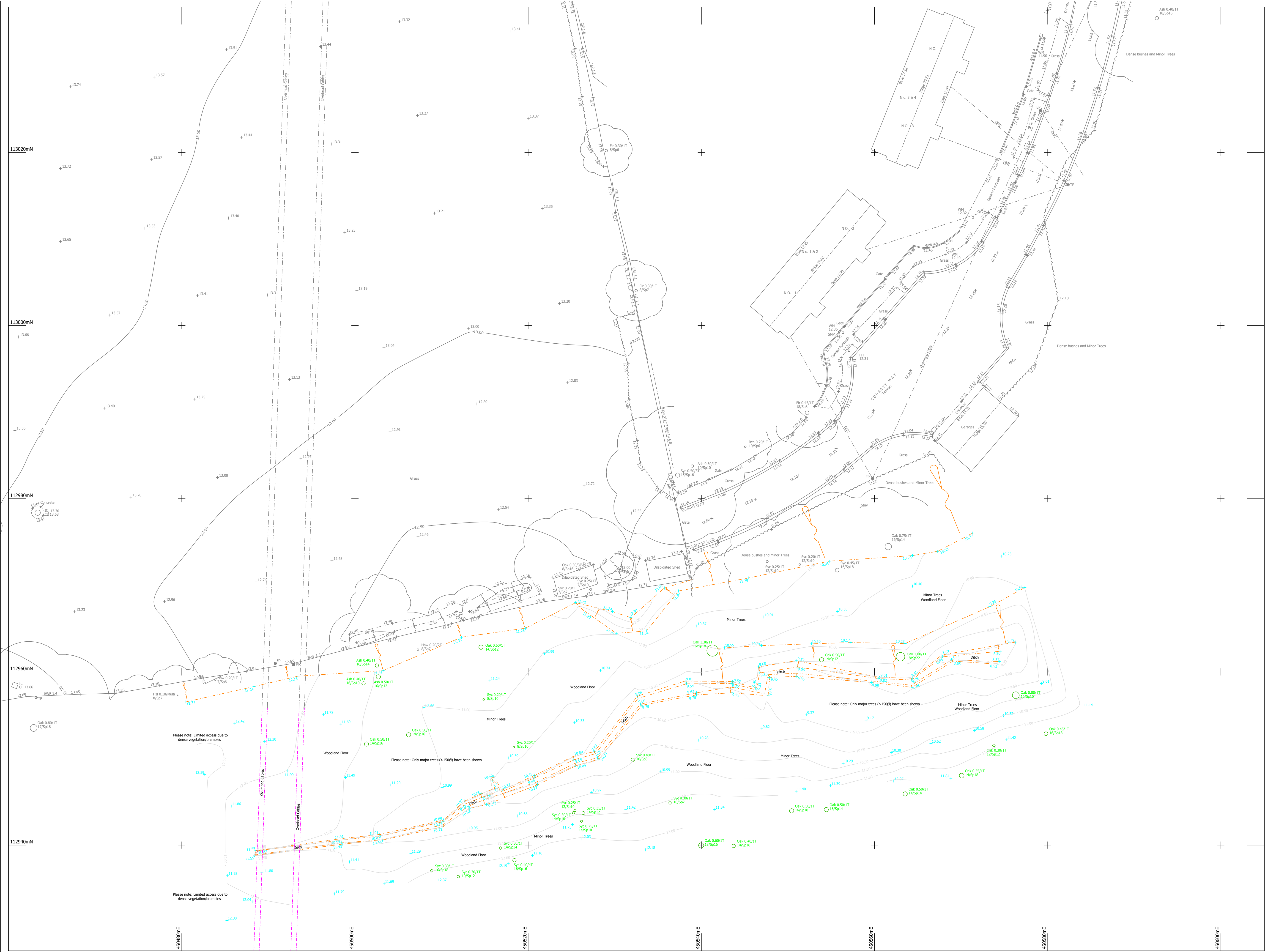
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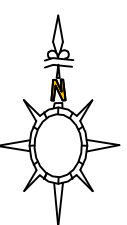
NOTES:
Drainage:
Inspection Covers are lifted where possible and all drainage invert information has been obtained through visual inspection only, with no entry into manholes. Therefore the complete accuracy cannot be guaranteed. Where drainage is of critical importance we suggest the services of a specialist drainage expert be used.

Trees:
Every effort has been made to identify and detail all trees on site but where trees are of critical importance we suggest the use of a specialist such as an arborist. Tree spread and heights are indicative.

GPS:
GPS detail is relative to the time and date of survey. GPS levels and grid are obtained using industry standard guidelines and can vary according to the quality of the GPS network at the time of survey. Unless stated otherwise, surveys are Scale factor 1 and Horizontal and Vertical Datums are established from a central site fix and baseline orientation station utilising GNSS correction data.

Survey notes:
Survey specification is linked to the original purpose of the survey commissioned at source and is to be used for this purpose only. Survey is accurate within limitations of site conditions at the time of survey. In areas difficult to survey due to restricted access, lines of sight or dense vegetation, critical dimensions and positions should be verified following suitable clearance.
Survey detail obtained and shown is relative to the plotting scale.

Copyright:
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LEGEND			
OVERALL TREE SPECIES INFORMATION			
ALDER	ALD	LONDON PLANE	LPN
ASH	ASH	MAGNOLIA	MAG
ASPEN	ASP	MARLE	MPL
BEECH	BCH	OAK	OAK
CHERRY	CHY	PINE	PNE
ELM	ELM	POPULAR	POP
FIR	FIR	RHODODENDRONS	RDN
FRUIT	FRT	ROWAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SIB
HAZEL	HAZ	SWEET CHESTNUT	SCH
HOLLY	HLV	WALNUT	WNT
HORSE CHESTNUT	HCH	WILLOW	WLW
LIME	LIM	YEW	YEW
LOCUST	LOC	SPECIES UNKNOWN	SPU
		COPPED	COP
TREE ANNOTATIONS: Tree Species / Tree Bole Size / No of Boles Tree Height / Tree Canopy Spread			
FENCE INFORMATION		LEVEL INFORMATION	
BARBED WIRE FENCE	BWF	RED LEVEL	BL
CHAIN LINK FENCE	CLF	COVER LEVEL	CL
CHESTNUT PALING FENCE	CPF	FLOOR LEVEL	FL
CLOSE BOARD FENCE	CBF	INVERT LEVEL	IL
CONCRETE SLAT FENCE	CCF	OUTFALL LEVEL	OL
CORRUGATED IRON FENCE	CIF	THRESHOLD LEVEL	THL
CRASH BARRIER	CBR	FOUL WATER	FW
HANDRAIL	HDL	SURFACE WATER	SW
IRON RAILINGS	IRF	UNABLE TO LIFT	UTL
LARCH LAF FENCE	LLF	WATER LEVEL	WL
MISCELLANEOUS FENCE	MSF	SURFACE INFORMATION	
PALESADE FENCE	PSF	CONCRETE	Cc
PICKET FENCE	PKF	BRICK PAVING	BP
POST AND CHAIN FENCE	PCF	FLORBERED	FB
POST AND RAIL FENCE	PRF	PAVING SLABS	PS
POST AND WIRE FENCE	PWF	RETAINING WALL	RWall
SECURITY FENCE	SCF	SCAPINGS	Scap
STOCK WIRE FENCE	SWF	TACTILE PAVING	Tac
THRILLS FENCING	TLF		
WIRE MESH FENCE	WMF		
FEATURE INFORMATION			
BOLLARD	BO	NAME PLATE	NP
TELECOMS IC	BTIC	NOTICE BOARD	NB
BUS STOP	BS	POST	P
CABLE TELEVISION IC	CATV	RAIN WATER PIPE	RWP
EARTHING ROD	ER	ROAD SIGN	RS
ELECTRICITY CABLE PIT	ELCP	RODDING EYE	RE
ELECTRICITY POLE	EP	SERVICE MARKER POST	SMP
FIRE HYDRANT	FH	SOIL VENT PIPE	SNP
FLAG POLE	FP	STOP VALVE	SV
GUIDE POST	GP	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TRAFFIC SIGNAL	TS
LAMP POST	LP	TRAFFIC SIGNALS IC	TSSC
LETTER BOX	LB	WASH OUT	WO
KERB OUTLET	KO	WATER METER	WM
REVISIONS			

Level Datum:
Levels are related to previous survey (959A) by Encompass Surveys

Grid:
Grid is related to previous survey (959A) by Encompass Surveys

Northpoint:



Encompass Surveys Ltd
Yarmouth House
1300 Parkway
Solent Business Park
Whiteley, Fareham
Hampshire, PO15 7AX

Tel: (+44)2380 692002 Email: info@encompass-surveys.co.uk
Website: encompass-surveys.co.uk

Client: Doswell Projects

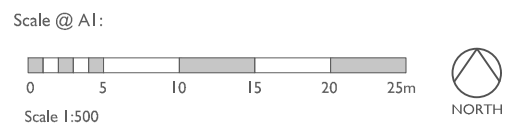
Survey Location: Southern boundary of the land at Broad Oak
Cobbett Way, Botley, Southampton
SO30 2ET

Survey type: Topographical	Scale: 1:200@A1
Drawing ref: ENC/081124/2739 S1	Date: Nov 2024
Drawn/QA: SE / BF	Plot No. -

Appendix C: Illustrative Masterplan



- KEY
- SITE BOUNDARY
 - SITE ACCESS
 - POTENTIAL PEDESTRIAN ACCESS
 - POTENTIAL PEDESTRIAN CONNECTION
 - PROPOSED BUILDINGS
 - PROPOSED ROAD
 - PRIVATE DRIVE
 - FOOTPATH
 - OPEN SPACE PATH
 - PUBLIC OPEN SPACE
 - FOCAL SPACE
 - EXISTING TREES
 - PROPOSED TREES
 - INDICATIVE SuDS



Rev	Date	Drawn	Checked
-----	------	-------	---------

REV E

Date: JUNE 2024	
Drawn by: BL	Checked by: BB
Dwg No: CB_63_311_PARAM_001	Rev:

Project: LAND OFF COBBETT WAY, BOTLEY, SOUTHAMPTON

Title: ILLUSTRATIVE MASTERPLAN LAYOUT

Client: THE MULBERRY INVESTMENTS PERGON SCHEME



Please note these drawings are not for construction but for concept design and planning applications purposes only. Cooper Baillie Limited - Cornmaugh House, 24 Guildford Road, Bagshot, Surrey GU24 0JN - Telephone 01274 40039 - www.cooperbaillie.co.uk. This drawing and the works depicted are the copyright of Cooper Baillie Ltd and may not be reproduced or altered without written permission. No liability will be accepted for amendments made by other persons.

Appendix D: Surface Water Calculations

Jubb Consulting Engineers Ltd (Bristol)		Page 1
St James's Court, Suite B Ground Floor West, St James ... Bristol, BS1 3LH	23233 Land off Cobbett Way Broad Oak	
Date 16/01/2024 File tmpFE3E.tmp	Designed by AH Checked by RL	
Innovyze		
Source Control 2020.1		
ICP SUDS Mean Annual Flood Input Return Period (years)1Soil0.480 Area (ha) 1.650Urban0.000 SAAR (mm)880Region NumberRegion 7 Results1/s QBAR Rural10.9 QBAR Urban10.9 Q1 year9.3 Q1 year9.3 Q30 years24.7 Q100 years34.8		
©1982-2020 Innovyze		

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Jubb :		





Catchment Area

Type : Catchment Area

Area (ha)	0.88
-----------	------

Preliminary Sizing

Volumetric Runoff Coefficient	0.750
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Jubb:		



Pond (1)

Type : Pond

Dimensions

Exceedance Level (m)	0.000
Depth (m)	1.300
Base Level (m)	-1.300
Freeboard (mm)	300
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	6.158
Total Volume (m³)	456.110

Depth (m)	Area (m²)	Volume (m³)
0.000	250.00	0.000
1.000	700.00	456.110
1.300	900.00	695.483

Inlets

Inlet

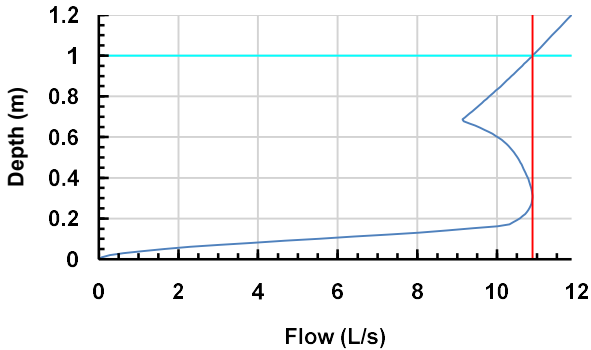
Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	(None)
Outlet Type	Hydro-Brake®
Invert Level (m)	-1.300
Design Depth (m)	1.000
Design Flow (L/s)	10.9
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☒

Unit Reference	SHE-0152-1090-1000-1090
----------------	-------------------------



Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Jubb :		



Advanced	
Perimeter	Circular
Length (m)	91.134
Friction Scheme	Manning's n
n	0.03

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
	Jubb :		
Report Details: Type: Inflow Summary Storm Phase: Phase			



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	Pond (1)		Time of Concentration	0.88	100	0	100	0.88
TOTAL		0.0		0.88				0.88

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
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

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
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
Max. Diameter (mm)	0

Diameter (mm)	Min. Slope (1:X)	Max. Slope (1:X)
100	0.00	0.00
150	0.00	0.00

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Network Design Criteria Storm Phase: Phase	Jubb:		



Manhole Options

Apply Offset ☐

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

Broad Oak, Botley, Southampton:	Date: 14/11/2024			
	Designed by: KG	Checked by:	Approved By:	
	Report Details: Type: Outfall Details Storm Phase: Phase			
Jubb :				

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Pond (1)	Free Discharge		

Broad Oak, Botley, Southampton:	Date: 14/11/2024			
	Designed by: KG	Checked by:	Approved By:	
	Jubb:			
Report Title: Rainfall Analysis Criteria				

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall		
FEH	Type: FEH	
Site Location	GB 450457 113045 SU 50457 13045	
Rainfall Version	2022	
Summer	☒	
Winter	☒	

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0.000
30.0	40.000
100.0	45.000

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

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Jubb :		





FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FEH: 2 years: +0 %: 15 mins: Winter	0.88	145.5	69.029

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Jubb :		





FEH: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FEH: 30 years: +40 %: 15 mins: Winter	0.88	425.9	200.330

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Jubb :		





FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FEH: 100 years: +45 %: 15 mins: Winter	0.88	550.1	258.357

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Jubb:		





FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max.
Avg. Depth

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. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Pond (1)	FEH: 2 years: +0 %: 120 mins: Winter	-0.977	-0.978	0.323	0.322	49.9	99.449	0.000	0.000	10.9	119.279	78.196	OK

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Jubb :		





FEH: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max.
Avg. Depth

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. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Pond (1)	FEH: 30 years: +40 %: 240 mins: Winter	-0.485	-0.486	0.815	0.814	78.7	335.660	0.000	0.000	10.9	255.182	26.408	OK

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Jubb :		





FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By:
Max. Avg. Depth

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. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Pond (1)	FEH: 100 years: +45 %: 240 mins: Winter	-0.310	-0.310	0.990	0.990	100.2	449.173	0.000	0.000	10.9	272.880	1.521	OK

Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Phase Management Storm Phase: Phase	Jubb:		





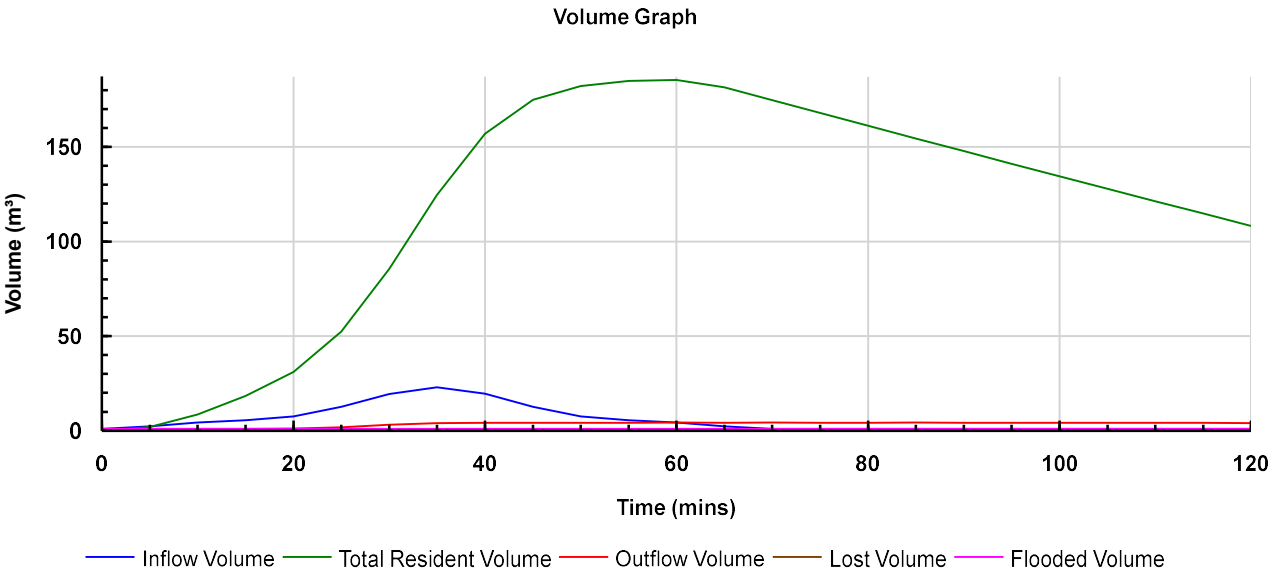
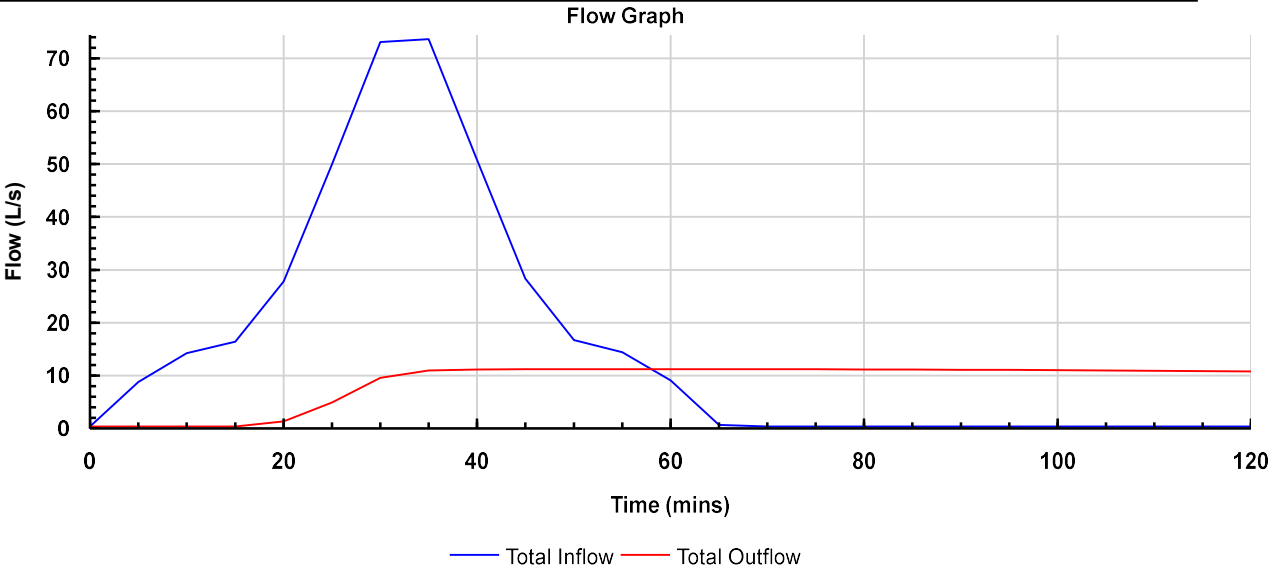
Phase

FEH: 2 years: Increase Rainfall (%): +0: 60 mins: Winter

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
Pond (1)			10.9	61.066
TOTAL	73.7	114.343	10.9	61.066

Graphs



Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Phase Management Storm Phase: Phase	Jubb:		





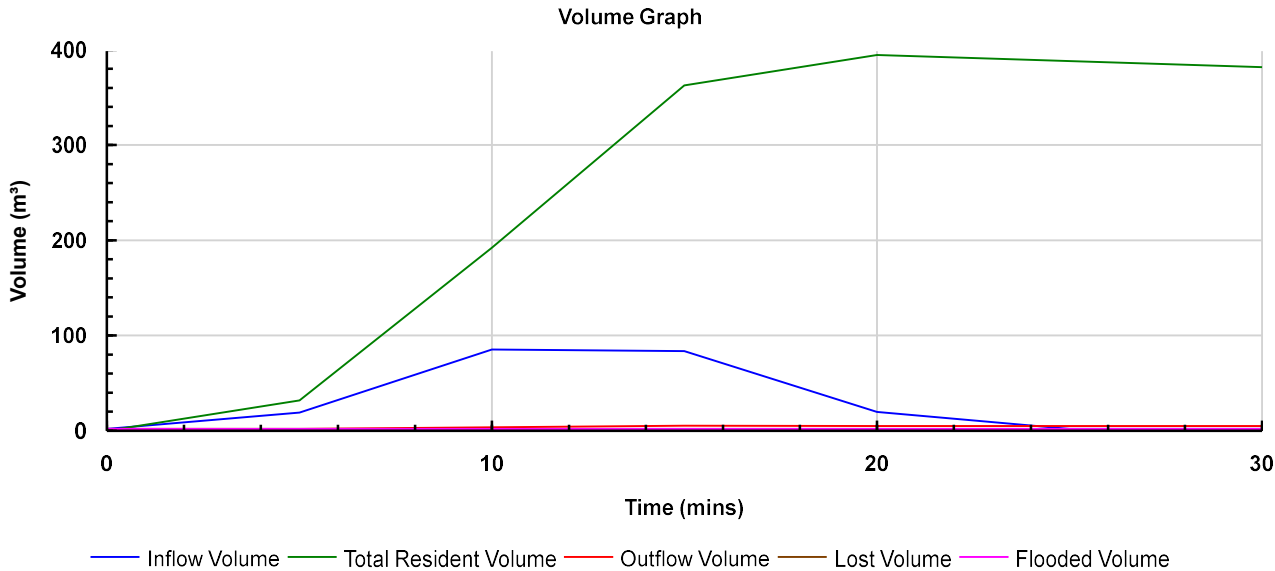
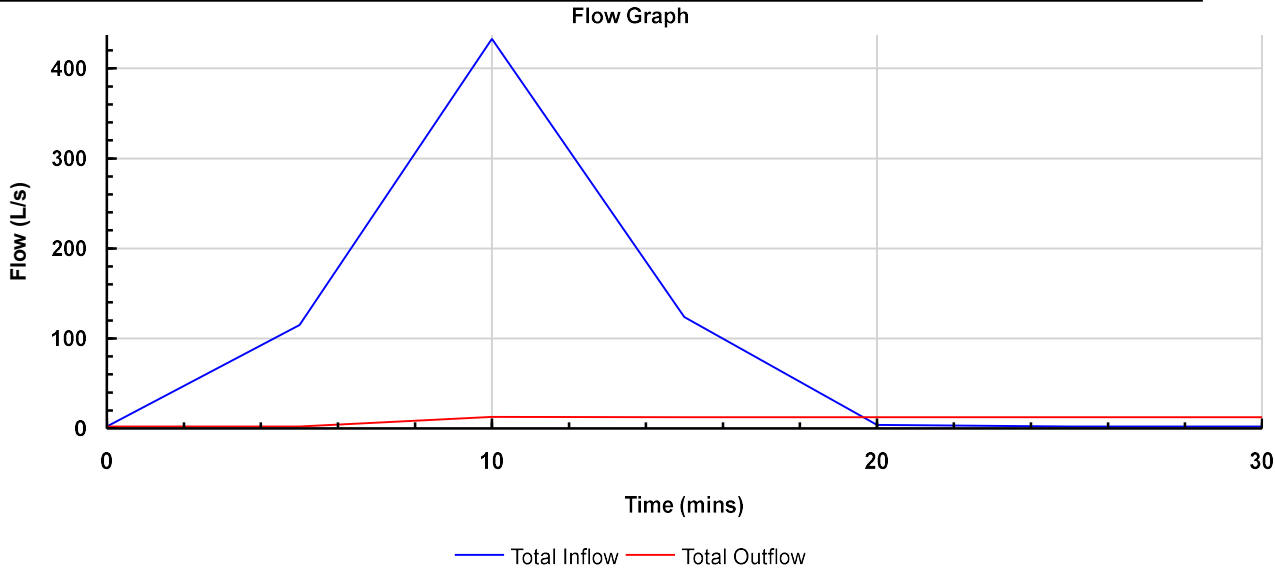
Phase

FEH: 30 years: Increase Rainfall (%): +40: 15 mins: Winter

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
Pond (1)			10.9	14.089
TOTAL	432.7	200.330	10.9	14.089

Graphs



Broad Oak, Botley, Southampton:	Date: 14/11/2024		
	Designed by: KG	Checked by:	Approved By:
Report Details: Type: Phase Management Storm Phase: Phase	Jubb:		





Phase

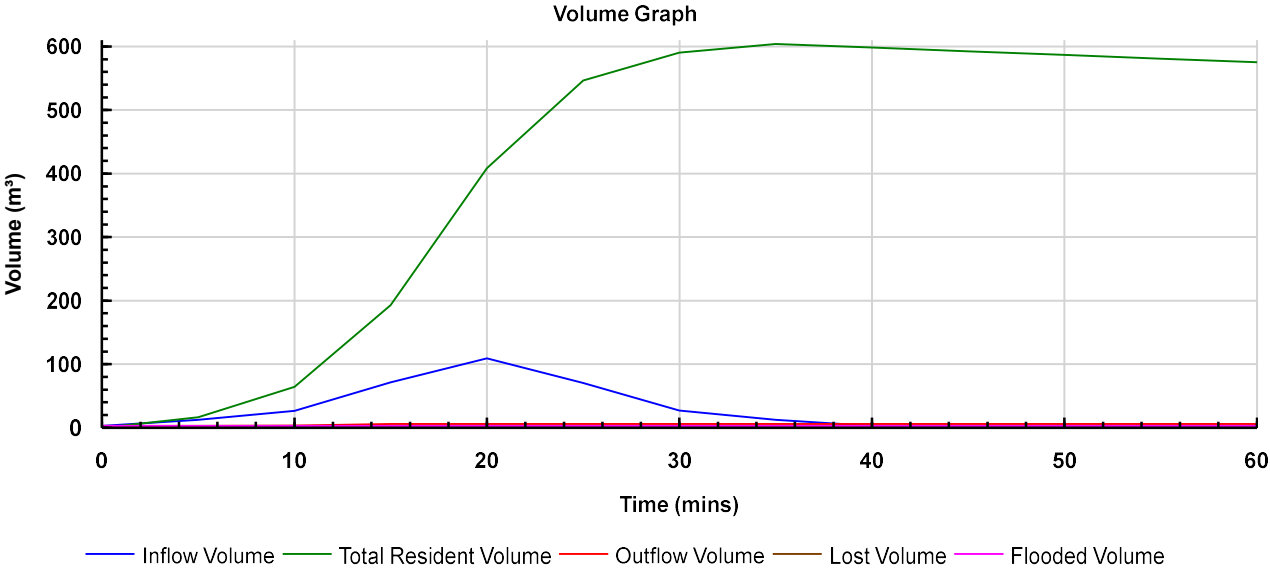
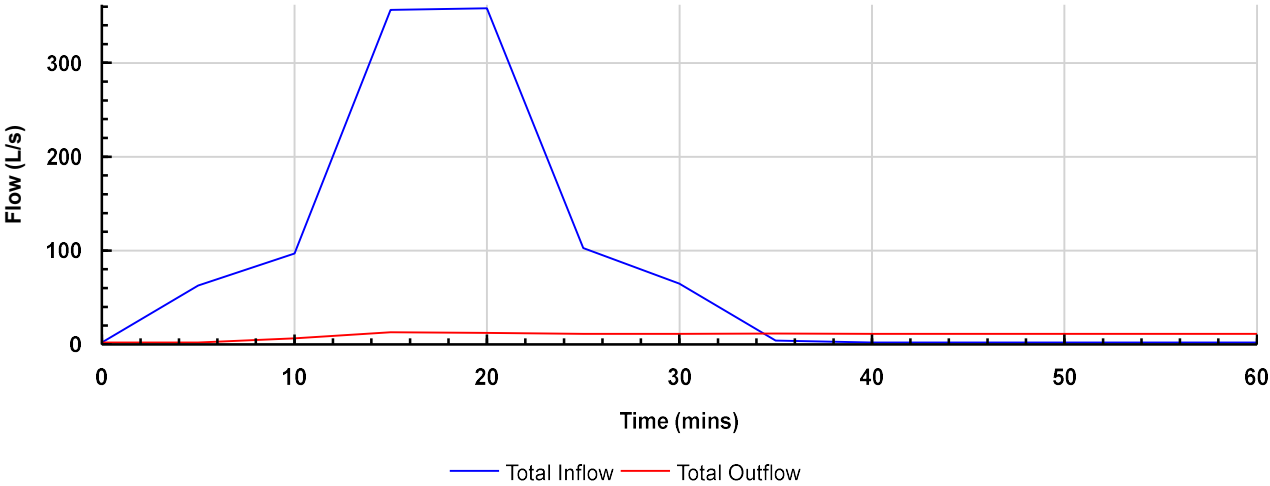
FEH: 100 years: Increase Rainfall (%): +45: 30 mins: Summer

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
Pond (1)			10.9	28.771
TOTAL	358.2	309.553	10.9	28.771

Graphs

Flow Graph



Appendix E: Drainage Layout



- NOTES
1. All surface water drains to be min. 100mmØ @ 1:100, unless stated otherwise.
 2. All private drains based on uPVC drains. All adoptable drainage to be to adoptable standards (Clayware).
 3. Levels TBC during further design stages.
 4. Where design connects to existing drains/ditches. Levels of existing to be confirmed onsite prior to new connections being made.
 5. All drain points to be set out in accordance with the architects drawings and layouts.
 6. Cover levels are approximate and to be adjusted onsite to suit Landscape Architect's proposed levels

CONNECTION INVERT LEVELS
TO BE CONFIRMED PRIOR
TO CONSTRUCTION

- Flow Arrow
- Swale
- Permeable paving
- 12.55 Proposed Level
- 12.55 Existing Level

P3	12/11/24	Updated Strategy	KG	RL
P2	31/10/24	Updated Strategy	KG	RL
P1	29/7/24	Preliminary issue	AH	RL
Rev	Date	Description	By	Apvd

PROJECT:
BROAD OAK, BOTLEY, SOUTHAMPTON

TITLE:
SURFACE WATER DRAINAGE STRATEGY

CLIENT:
THE MULBERRY INVESTMENTS

SCALE@A1:
1:500

PROJECT REF:
24247

DRAWING No:
JUB_XX_XX_DR_C_500

REV:
P3

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

Jubb

Appendix F: Site Photos

Sketch of photograph Locations
Not to scale.

Locations of photos approximate.
28 - 10 - 2024, ENG: KG

Pic. 1

Pic. 9-12

Pic. 2

Area to be surveyed

Pic. 5-8

Pic. 3-4

8.1 - Video of site currently
discharging towards existing ditch

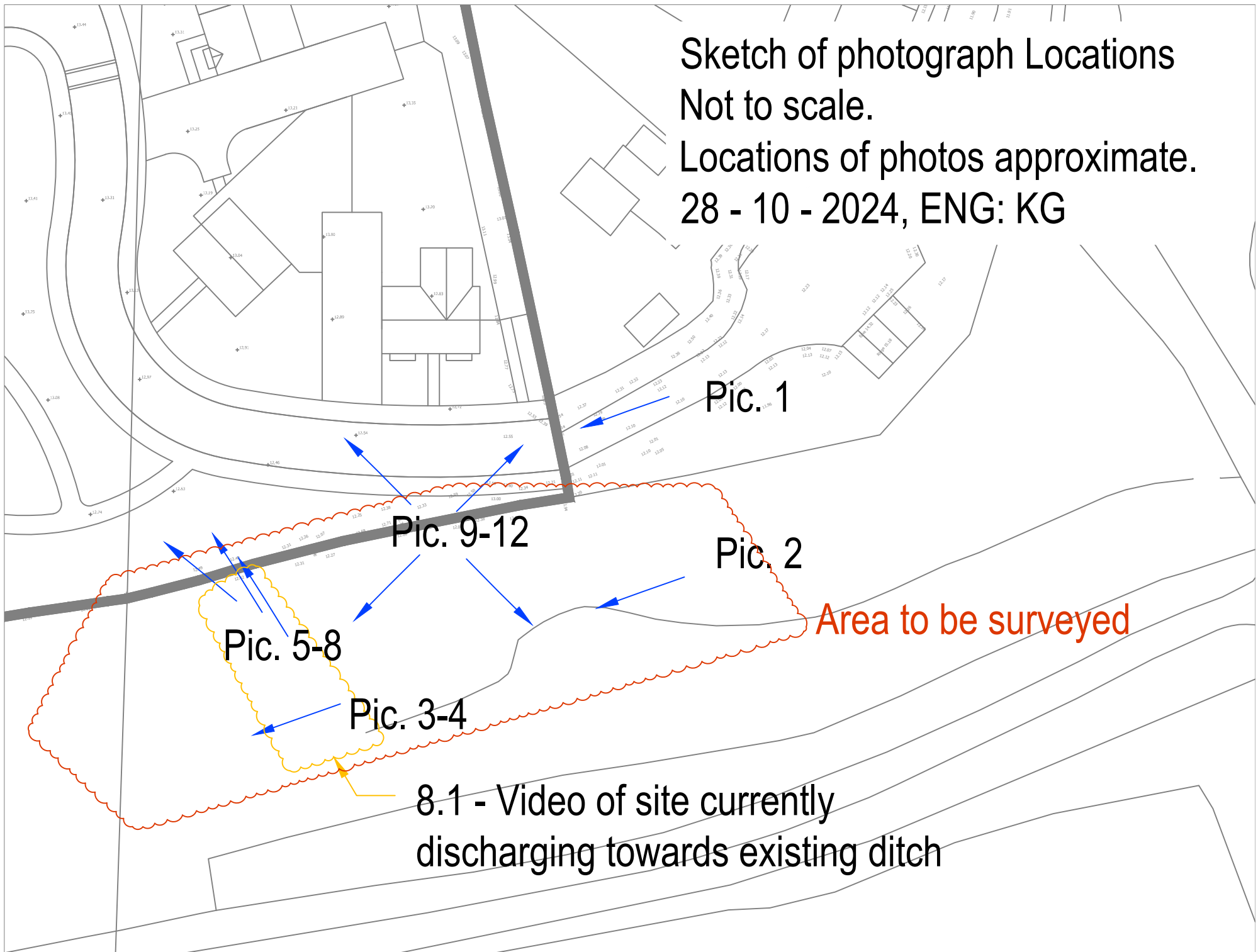




Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12