



Fowley Cottage
Warblington Road
Emsworth



FLOOD RISK ASSESSMENT

On behalf of
P. Blake & L. Burnet

MT/5970/FRA.1



Document Control Sheet

Client: P Blake & L Burnet
Longshore
3 Western Parade
Emsworth
Hants
PO10 7HS

Report Issue No.	Status	Date	Author	Authorised
MT/5970/FRA.1	Final	22 nd December 2023	MT	MT

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CONTENTS

SECTIONS

1.	INTRODUCTION	1
2.	FLOOD RISK ASSESSMENT	9
3.	DRAINAGE STRATEGY	10
4.	SUMMARY & CONCLUSIONS	12

APPENDICES

Appendix 1	Topographical Survey
Appendix 2	EA Flood Map For Planning
Appendix 3	EA Product 4 Package
Appendix 4	Southern Water Asset Plan
Appendix 5	Ground Investigation Data

1.0 INTRODUCTION

1.1 Bellamy Roberts has been instructed by P. Blake & L. Burnet to prepare a Flood Risk Assessment (FRA) in support of a planning application for a residential development of 15 dwellings on land at Fowley Cottage, located to the south of Warblington Road, Emsworth. This assessment has been undertaken to ascertain whether there are any constraints to the development of this site, and to assess the impact of the proposal, with regard to flood risk.

1.2 It is recognised that developments that are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. Current guidance on development and flood risk identifies several key aims for a development to ensure that it is sustainable in flood risk terms. These aims are as follows:

- the development should not be exposed to flood risk such that the health, safety, and welfare of the users of the development, or the population elsewhere, are threatened;
- the development should not be at a significant risk of flooding and should not be susceptible to damage due to flooding;
- safe access to and from the development should be possible during flood events;
- the development should not increase flood risk elsewhere;
- the development should not prevent safe maintenance of watercourses or maintenance and operation of flood defences;
- the development should not be associated with an onerous or difficult operation and maintenance regime to manage flood risk. The responsibility for any operation and maintenance required should be clearly defined;
- future users of the development should be made aware of any flood risk issues relating to the development;
- the development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, because of flood risk issues;
- the development should not lead to degradation of the environment, and

- the development should meet all the above criteria for its entire lifetime, including consideration of the potential effects of climate change.

1.3 This assessment has been prepared with due consideration of these sustainability aims.

1.4 In accordance with paragraph 173 of the NPPF (December 2023), it will be ensured that:

- the most vulnerable development is located in areas of lowest flood risk.
- the development is appropriately flood resistant and resilient.
- it incorporates sustainable drainage systems.
- safe access and escape routes are included.

1.5 It will also be ensured that the development accords with the guidance set out at paragraph 175 of the NPPF, in that the scheme will incorporate sustainable drainage systems, has maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development and that the scheme provides multifunctional benefits.

1.6 The site has an approximate area of 0.83ha and is located in present day Flood Zone 1. Government guidance states that Flood Risk Assessments are generally only necessary in Flood Zone 1 when the development area is greater than 1ha. However, an FRA is required for developments of less than 1ha when the proposed development will provide a more vulnerable use class. This Assessment has been prepared to accompany an indicative sustainable drainage design, and will also consider the expected greenfield run-off rates, soil types, and Environment Agency (EA) flood mapping.

1.7 Planning permission for 7 residential units was dismissed at Appeal in October 2020 (ref. APP/X1735/W/20/3252953). A subsequent planning application for 9 residential units was refused planning permission in May 2021 (ref. APP/20/00376). No reasons for refusal relating to flooding or drainage matters were given. The Environment Agency were consulted and raised no objection following the addition of an appropriate freeboard to the proposed Finished Floor Levels (FFL) to make the scheme flood resilient over its lifetime.

Site Location and Features

- 1.8** The National Grid reference for the site is 474407, 105452. For clarity, a site location plan is provided at Figure 1.

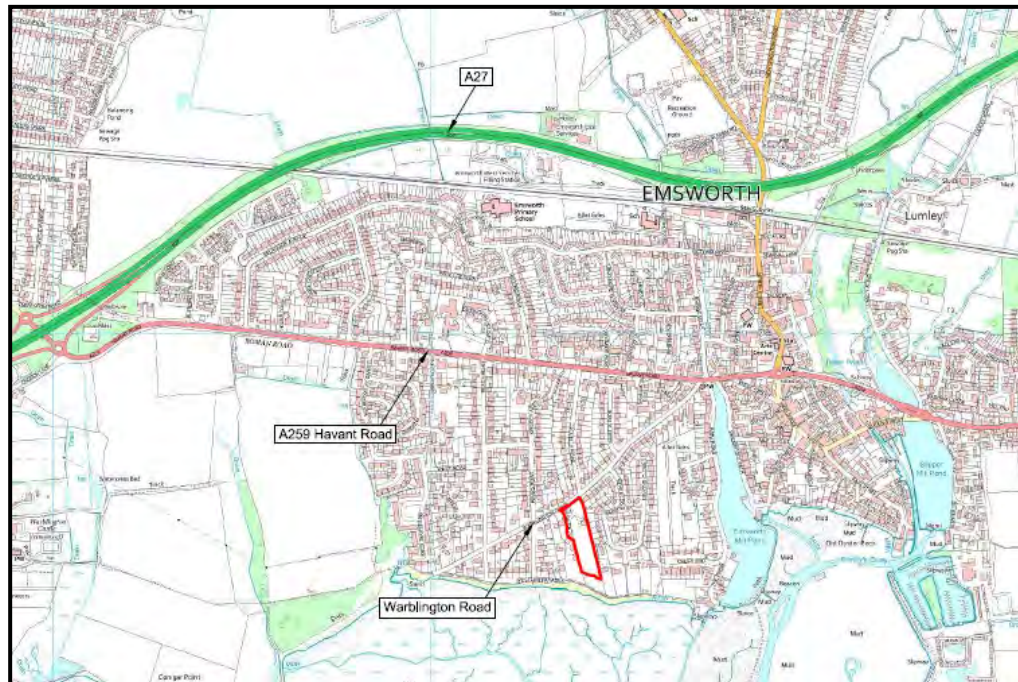


Figure 1: Site Location Plan

Site Topography

- 1.9** The topography falls from 6.75m in the northern corner to 1.98m in the southern corner. A topographical survey of the site [Appendix 1](#).

2 SOURCES OF FLOODING

River/Sea Flooding – Present Day

2.1 Environment Agency mapping reveals that the majority of the site is located in flood zone 1, meaning there is less than 0.1% annual probability of river and sea flooding. The southern extent of the application site is shown to be located within Flood Zones 2 and 3, and the proposed dwellings have been sequentially located to ensure they are outside the flood zone 2 and 3 outlines. The Environment Agency's flood map for planning is presented at [Appendix 2](#) and an extract of this is provided at Figure 2 for reference.

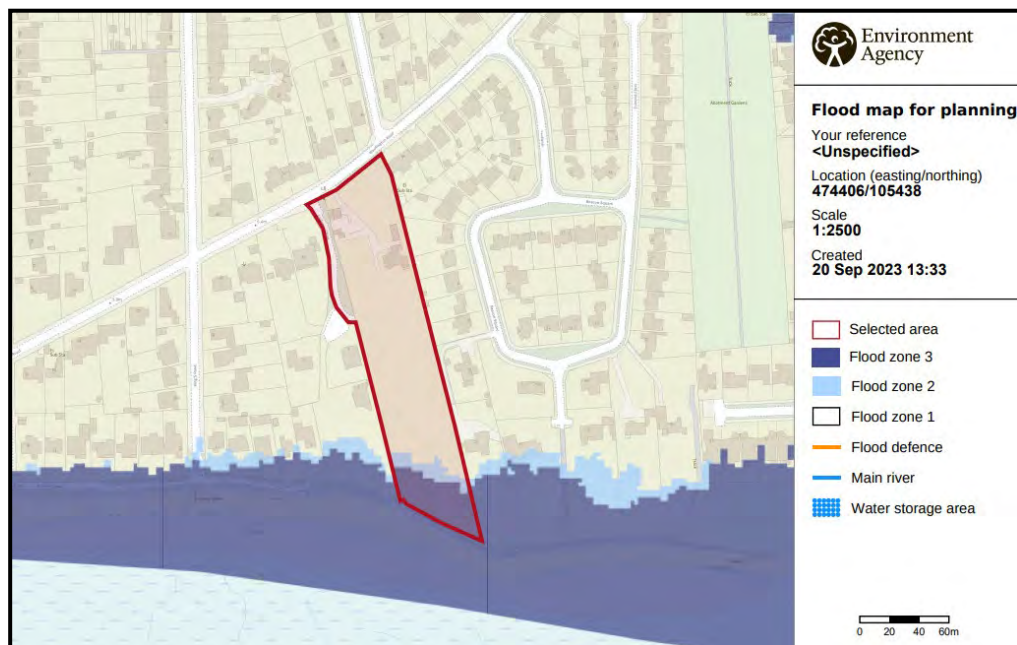


Figure 2: Flood Zone Map (Source: EA)

2.2 With reference to Table 1 of the Technical Guidance to the National Planning Policy Framework (March 2012), all uses of land are appropriate within flood zone 1.

River/Sea Flooding – Future Year

2.3 Given the site's location, it is important to consider rising sea levels as a result of climate change. In this regard, the Partnership for Urban South Hampshire (PUSH) Strategic Flood Risk Assessment (SFRA) has been reviewed, specifically the accompanying flood mapping showing the future impacts of climate change. This demonstrates that the application site is at risk from future tidal flooding to the year

2115. See Figure 3 which shows the areas of the site which are within future tidal flood zones 2 and 3.



Figure 3: Future Tidal Flood Zones (Source: PUSH SFRA)

2.4 The future tidal flood outline encroaches into part of the footprint of one unit, however the access to the unit remains in flood zone 1. The Planning Case Officer has previously indicated that a pragmatic view will be taken in this regard and that small areas of encroachment would be considered acceptable, as is the case in this instance.

2.5 In addition to considering the PUSH SFRA mapping, Product 4 data has been obtained from the EA. This reveals a maximum flooding level of 4.59m AOD which occurs during the 0.5% AEP storm event for the year 2115. A copy of both documents is provided at [Appendix 3](#).

2.6 When designing the appropriate FFLs for the proposed units, it is appropriate to include an additional 'freeboard' allowance on top of the forecasted flood level to account for residual uncertainty. The freeboard level has been calculated using the Environment Agency (EA) document '*Accounting for residual uncertainty: updating the freeboard guide*' (February 2017), and the data received from the EA.

2.7 The method of determining the level of residual uncertainty involves assigning confidence scores to different aspects of the evidence and combining these estimates into an overall confidence rating. The three stages of this assessment are as follows:

- Stage 1 - Identify and record all primary sources of uncertainty
- Stage 2 - Estimate the magnitude of the residual uncertainties
- Stage 3 - Determine the appropriate response

2.8

The results of Stages 1 and 2 are set out in Table 1, which accords with Tables 3.1 and 3.2 of the EA freeboard guidance.

Table 1: Scale of Residual Uncertainty

Consideration	Applicability	Score	Reasons
How appropriate is the flood risk analysis?	Yes	1	There have been no changes in the intervening period that would affect the accuracy of the model.
How well is the flood plain modelled?	Yes	1	LIDAR coverage of the floodplain was used, with the majority of the area covered with 1m data.
How well has the potential for defence failure been modelled?	N/A	-	No flood defences at the site.
What is the confidence in the hydrology?	N/A	-	Tidally dominated site.
How good is the coastal/estuarine/tidal boundary?	Yes	1	The Chichester Harbour Model is within the desired calibration accuracy of +/- 150mm. The water level rise for climate change was based on the latest UKCP09 sea-level change guidance.
How have the fluvial threats been represented?	N/A	-	Tidally dominated site.
How have coastal threats been represented?	Yes	1	2D model. Wave overtopping based on EurOtop methods. Up to date Bathymetry data used in assessment. Eight annual likelihoods modelled (20, 5, 3.33, 1.33, 1, 0.5, 0.2, and 0.1% AEP events)
How has surface water run-off been represented?	N/A	-	The site is not at risk of surface water flooding.
How have groundwater hazards been represented?	N/A	-	No history of groundwater flooding.
What is the strength of evidence?	Yes	1	The wave model was calibrated against ten storm events. Further calibration took place using four more recent storm events. Calibration accuracy +/-150mm.

2.9

To calculate the confidence rating, the two lowest scores in Table 1 are applied to Table 3.3 within the EA freeboard guidance to determine the confidence rating. In this instance, the two lowest scores are '1' and in this regard the confidence rating has been calculated as '5 star', which indicates that the flood modelling is highly likely to be locally reliable. A '5 star' confidence rating corresponds to a minimum freeboard depth of 300mm.

2.10 In this regard, it will be ensured that the proposed dwellings will have a minimum FFL of 4.89m AOD (i.e. 2115 flood level of 4.59m AOD + 300mm freeboard allowance). It will also be ensured that the level of the road will be set at a minimum level of 4.89m AOD. To ensure safe access for all vehicles, including emergency vehicles.

2.11 The proposed minimum FFL has previously been agreed with the Environment Agency.

Surface Water Flooding

2.12 In addition to fluvial flooding, surface water flooding must also be considered. This often occurs when intense, often short duration rainfall is unable to soak into the ground or enter the local drainage system. It is made worse when soils are saturated so that they cannot accept any more water. This type of flooding is usually short lived, localised and associated with heavy downpours of rain, and often has very little warning before it occurs. The amount of runoff is also a function of geology, slope, climate, rainfall, saturation, soil type, urbanisation and vegetation.

2.13 An extract from the EA surface water flood risk map is provided in Figure 4. This demonstrates that the site is not at risk of flooding from this source.



Figure 4: Surface Water Flood Risk Map (Source: EA)

Sequential & Exception Tests

2.14

This section of the FRA has undertaken a review of the risk of flooding from all sources. In conclusion, the proposed dwellings have been sequentially located within flood zone 1, taking into consideration future flood risk. The sequential and exception tests are not required in this instance.

3 DRAINAGE STRATEGY

Disposal of Surface and Foul Water

3.1 The existing dwelling is connected to the Southern Water surface water and foul water sewerage system located in the vicinity of the site Road. A plan showing the location of these existing assets is provided at [Appendix 4](#).

3.2 The surface water sewer borders the western boundary of the application site and outfalls into Chichester Harbour. There are two foul water sewers in the vicinity of the site, one bisects the application site on a broadly west/east alignment and the other is present within Warblington Road.

Surface Water

3.3 In order to properly mitigate flood risk post-development, it is important that adequate measures are considered to ensure surface water run-off is dealt with, ensuring flood risk is not increased either on or off-site. Surface water drainage at the site will be based on SuDS principles and in accordance with the Government's Planning Practice Guidance, the aim will be to discharge the surface water run-off as high up the following hierarchy of drainage options as possible:

- Infiltration into the ground.
- To a surface water body, such as a river, ditch, pond or stream.
- To a surface water sewer.
- To a combined sewer.

3.4 Soakaway testing, in accordance with BRE365, has previously been undertaken at the site. The testing observed that no infiltration was possible and concluded that the soils are not likely to perform to a satisfactory standard. The full testing results are attached at [Appendix 5](#).

3.5 No watercourses are present at the site therefore the drainage strategy will comprise attenuation with a restricted discharge to the existing surface water sewer that crosses the site. The discharge rate will be controlled via a hydro-brake, and will be restricted to the greenfield runoff rates.

Foul Water

3.6 The proposed dwellings will connect to the existing foul sewerage network.

Water Quality Measures

3.7 Water quality management of surface water should be carried out in accordance with the CIRIA SuDS Manual specifically Part E of Chapter 26. Table 26.2 of the SuDS Manual provides the pollution hazard indices for different land use classifications. See Figure 5.

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

Figure 5: Pollution Hazard Indices for Different Land Use Classification (Table 26.2 CIRIA SuDS Manual 2016)

3.8 Based on the guidance in Table 26.2, the land use classification for the surface water drainage for the scheme will be *residential roofs* and *low traffic roads*. The pollution hazard indices for these land uses are as set out in Table 2.

Table 2: Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2	0.2	0.05
Low Traffic Roads	Low	0.5	0.4	0.4

3.9

The SuDS Manual goes on to state that “to deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index”. This can be summarised as follows:

$$\text{Total SuDS mitigation index} \geq \text{pollution hazard index}$$

3.10

The pollution mitigation indices for different SuDS components are set out in Table 26.15 of the SuDS Manual. See Figure 6.

SuDS type	Total suspended solids pollution mitigation index (PMI_{TSS})	Hydrocarbon pollution mitigation index (PMI_{PAH})	Organic pollution mitigation index (PMI_{Org})	Heavy metal pollution mitigation index (PMI_{HM})
Filter drains	0.6	0.8	0.7	0.7
Porous asphalt	0.7	0.9	0.9	0.9
Porous paving	0.2	0.3	0.2	0.3
Sedimentation tank	0.95	0.95	0.95	0.95
Green roof	0.8–0.9	0.9	0.5	0.7–0.9
Filter strip	0.9	0.8	0.8	0.7
Swales	0.7	0.6	0.4	0.4
Soakaways	0.3	0.6	0.5	0.5
Infiltration trench	0.3	0.6	0.5	0.5
Infiltration basin	0.05	0.05	0.01	0.05
Retention pond	0.6	0.5	0.6	0.5
Detention basin	0.7	0.7	0.8	0.6
Extended detention basins	0.4	0.4	0.4	0.4
Lagoons	0.9	0.9	0.9	0.8
Constructed wetlands				
▪ subsurface flow	0.2	0.1	0.1	0.1
▪ surface flow	0.4	0.2	0.2	0.2
Conventional gully and pipe drainage	1.0	1.0	1.0	1.0

Figure 6: Pollution Mitigation Indices for SuDS Components (Table 26.15 CIRIA SuDS Manual 2015)

3.11

Run off from the building roof and carriageways/parking area will be directed to the cellular storage tank via conventional gully and pipe drainage which will provide sufficient treatment.

Maintenance and Management

3.12

The continued management and maintenance of the new drainage system will be essential in ensuring the continued protection of the development from the surface water flooding. Visual inspection of the drainage network and outfalls should be undertaken on a regular basis to identify any siltation/blockage/disrepair of the drainage network and attenuation facilities. Siltation of any porous paving infiltration system may lead to a reduction in storage capacity over time and it is important to ensure that any siltation is removed and the overall volume of storage provided is maintained. A surface water management system therefore needs to be drawn up as part of any planning consent that is issued for the site.

3.13

The internal drainage network will remain private and a site management company will be set up to maintain and manage the on-site drainage. This will follow the principles as set out in the CIRIA SuDS Manual which is summarised in Figure 7.

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks			
	Maintenance schedule	Required action	Typical frequency
	Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
		Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
		For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
		Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
	Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
	Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
		Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Figure 7: Operation and Maintenance Requirements for Attenuation Storage Tanks

4 SUMMARY AND CONCLUSIONS

4.1 Bellamy Roberts has been instructed by P. Blake & L. Burnet to prepare a Flood Risk Assessment (FRA) in support of a planning application for a residential development of 15 dwellings on land at Fowley Cottage, located to the south of Warblington Road, Emsworth. This assessment has been undertaken to ascertain whether there are any constraints to the development of this site, and to assess the impact of the proposal, with regard to flood risk.

4.2 All proposed units have been sequentially located to reflect the future risk of flooding.

4.3 The suggested drainage strategy is based on SuDS principles.

Conclusions

4.4 The proposed development accords with the guidance set out at paragraph 173 of the NPPF, in that:

- the most vulnerable development is located in areas of lowest flood risk;
- the development is appropriately flood resistant and resilient;
- it incorporates sustainable drainage systems; and
- safe access and escape routes are included.

4.5 The proposed development accords with the guidance set out at paragraph 175 of the NPPF, in that the scheme incorporates sustainable drainage systems, has maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development and the scheme provides multifunctional benefits.

4.6 The scheme therefore accords with all relevant policies within the NPPF and is acceptable in flooding and drainage terms.

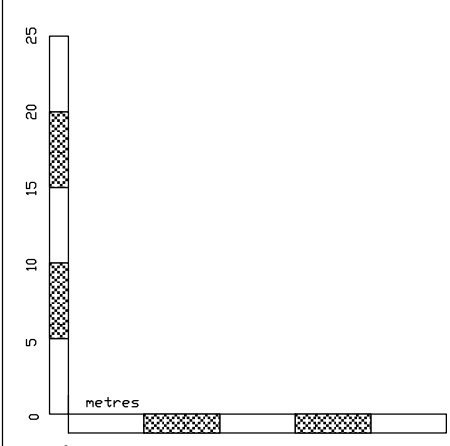
APPENDICES

APPENDIX 1

Topographical Survey



KEY:	
bt	British Telecom
cb	Control Box
cl	Cover Level
ctv	Cable Television
dk	Drop Kerb
el	Electric
ep	Electricity Pole
fh	Fire Hydrant
gu	Gully
gsv	Gas Stop Valve
ht	Height
ic	Inspection Cover
il	Invert Level
lp	Lamp Post
mr	Marker
o/h	Overhead
pb	Post Box
p/g	Pan Crossing
np	Name Plate
rs	Road Sign
sv	Stop Valve
tb	Telephone Box
tl	Traffic Light
tt	Top of Tree
th	Threshold
tw	Top of Wall
utl	Unable to Lift
vp	Vent pipe
wm	Water Meter
wsv	Water Stop Valve



NOTES:
LEVELS RELATE TO O.S. DATUM
TREE SPECIES SHOULD BE VERIFIED WHERE OF
CRITICAL IMPORTANCE
THE ARCHITECT SHOULD SATISFY HIMSELF THAT ALL TREES
LIKELY TO AFFECT HIS DESIGN HAVE BEEN SHOWN
INTER CONNECTION OF MANHOLES SHOULD BE VERIFIED
WHERE OF CRITICAL IMPORTANCE USING CCTV
PIPE SIZES & INVERTS DETERMINED WITHOUT
ENTRY INTO MANHOLE

P STUBBINGTON LAND SURVEYS LTD	
THE MEAD DURLEY BROOK ROAD DURLEY SOUTHAMPTON HAMPSHIRE SO32 2AR	
TEL : 023 8060 1876 MOBILE: - 07973 348165 EMAIL: PAUL@PSTLANDSURVEYS.COM	
CLIENT: -	MR C GLANVILLE
CONTRACT: -	46 WARBLINGTON ROAD, EMSWORTH PO10 7HH
TITLE: -	TOPOGRAPHIC SURVEY
SCALE: -	1: 500 @A1
DRAWING NO.	5383/01
DATE: -	JANUARY 2016
SURVEYOR: -	PS

APPENDIX 2

EA Flood Map for Planning

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
474412/105440

Created
22 Dec 2023 10:41

**Your selected location is in flood zone 3
– an area with a high probability of flooding.**

This means:

- you may need to complete a flood risk assessment for development in this area
- you should ask the Environment Agency about the level of flood protection at your location and request a Flood Defence Breach Hazard Map (You can email the Environment Agency at: enquiries@environment-agency.gov.uk)
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (find out more at www.gov.uk/guidance/flood-risk-assessment-standing-advice)

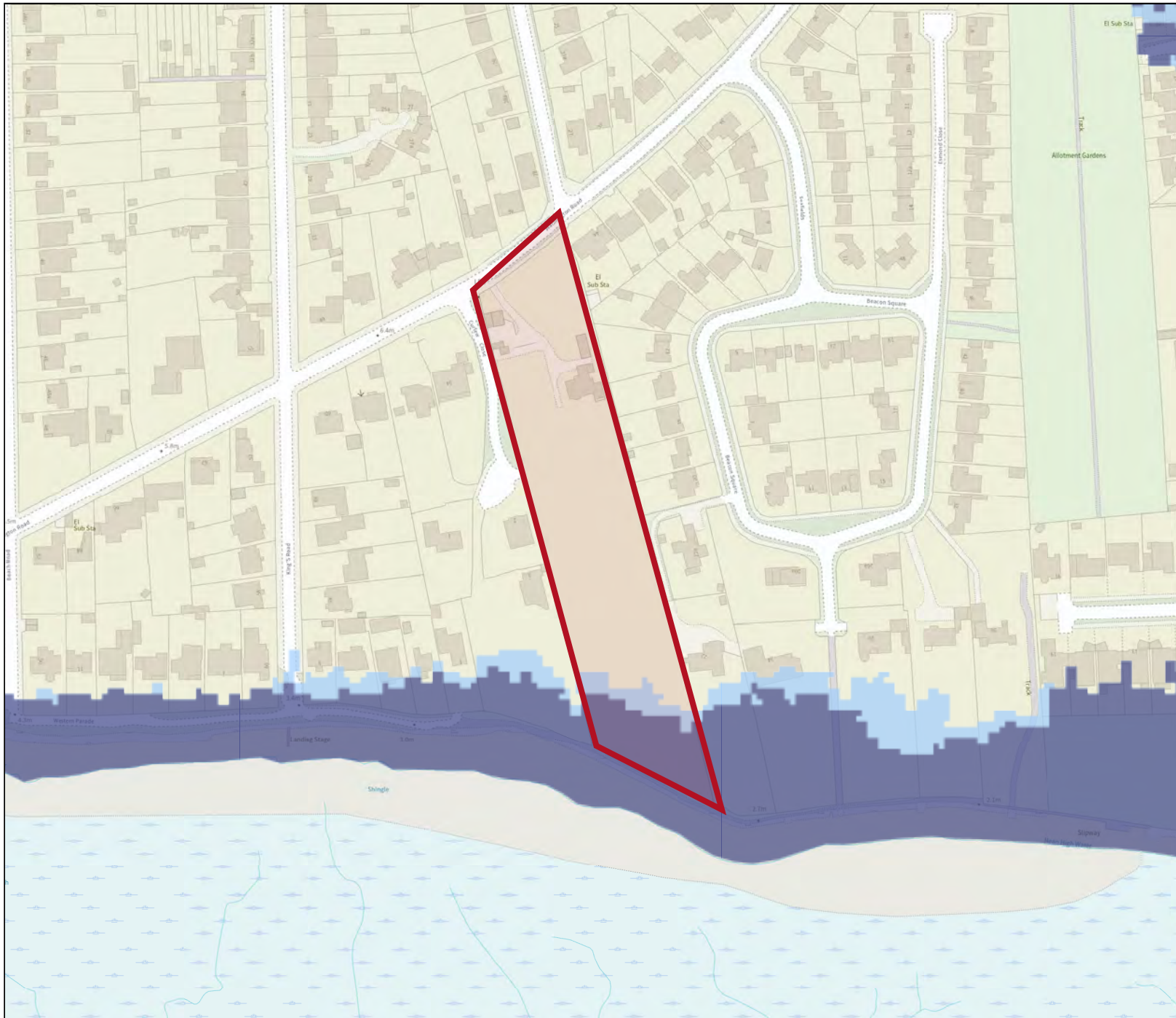
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
474412/105440

Scale
1:2500

Created
22 Dec 2023 10:41

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

0 20 40 60m

APPENDIX 3

EA Product 4 Package

Matt Twinberrow
Bellamy Roberts
Clover House
Western Lane
Odiham
Hampshire
RG29 1TU

Our ref: SSD177914
Date: 07/08/2020

Dear Matt Twinberrow,

Enquiry Regarding Product 4 for Flood Risk Assessment for Fowley Cottage, Warblington Road, Emsworth, PO10 7HH.

Thank you for your enquiry which was received on 14 July 2020.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004. The information is attached.

The information on Flood Zones in the area relating to this address is as follows:

The site is in an area located within Flood Zone 1, 2 & 3 as shown on our Flood Map for Planning (Rivers and Sea).

Note - This information relates to the area that the above named property is in and is not specific to the property itself as it is influenced by factors such as the height of door steps, air bricks or the height of surrounding walls. We do not have access to this information and is not currently used in our flood modelling.

Flood Zone definitions can be found at www.gov.uk/guidance/flood-risk-and-coastal-change#Table-1-Flood-Zones

Flood Defences

There are no formal raised flood defences in the vicinity of the site.

Model Information

The model used was the Chichester Coastal Modelling (2D) which was completed by JBA Consulting in 2016.

Flood History

We hold no record of previous flooding events affecting this site.

Please note our records are not comprehensive and may not include all events. I recommend contacting the Lead Local Flood Authority, **Hampshire County Council** or the Local Authority, **Havant District Council** for a more comprehensive flood history check.

[FRA advisory text](#)

Name	Product 4
Description	Detailed Flood Risk Assessment Map for Fowley Cottage, Warblington Road, Emsworth, PO10 7HH.
Licence	Open Government Licence
Information Warnings	The flood risk data provided is based on existing EA hydraulic models for existing 0.5% annual probability events with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 17 December 2019. You should refer to ' Flood risk assessments: climate change allowances ' for the most up to date allowances. You will need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.
Information Warning - OS background mapping	<i>The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.</i>
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2020 Ordnance Survey 100024198.

Data Available Online

Many of our flood datasets are available online:

- Flood Map For Planning ([Flood Zone 2](#), [Flood Zone 3](#), [Flood Storage Areas](#), [Flood Defences](#), [Areas Benefiting from Defences](#))
- [Risk of Flooding from Rivers and Sea](#)
- [Historic Flood Map](#)
- [Current Flood Warnings](#)

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Environment
Agency



N

Legend

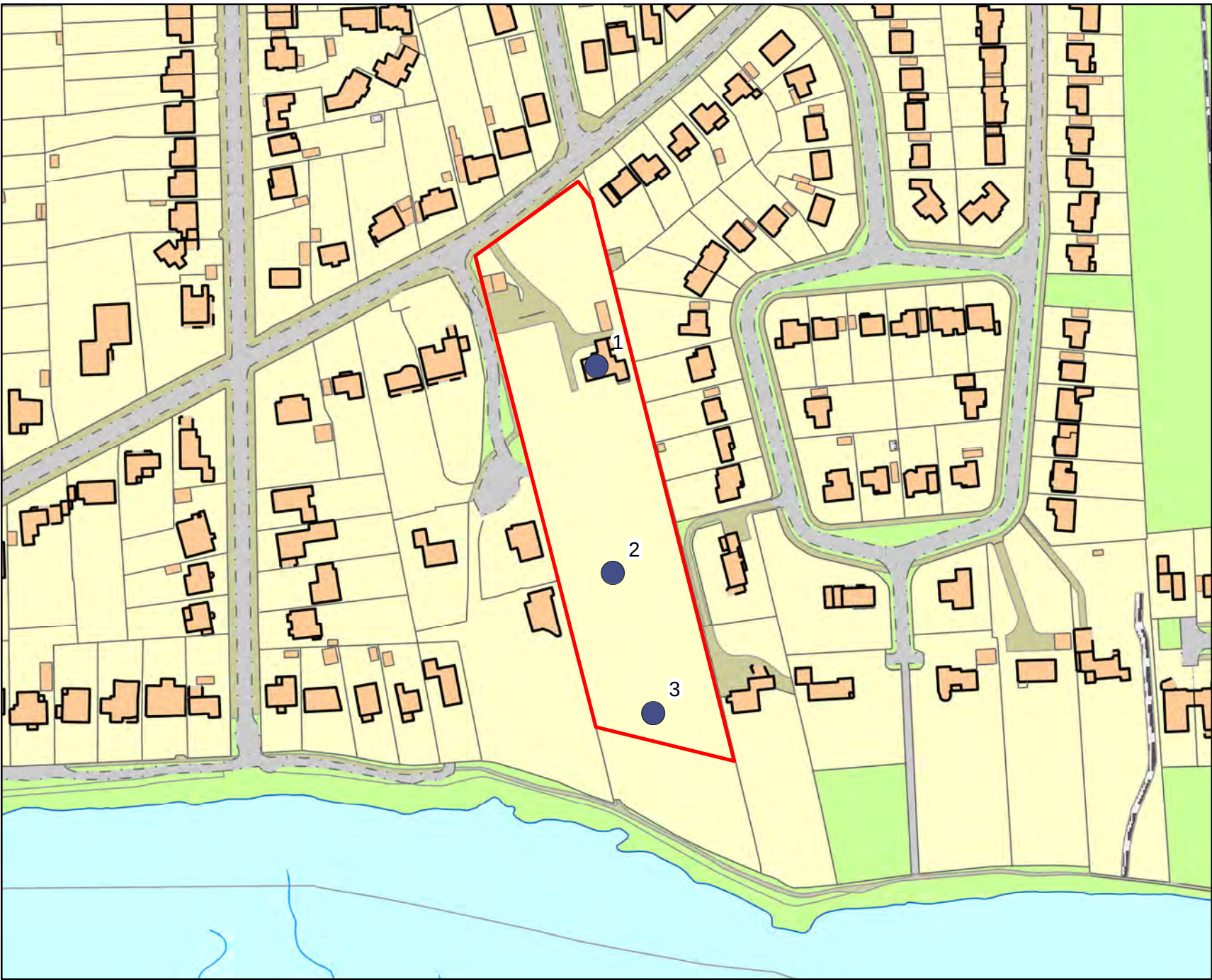
-  Site_Nodes
-  Site_Boundary

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:2,000



0 0.045 0.09
Kilometers



Product 4 Flood Risk Data Requested by: Bellamy Roberts

Site: Fowley Cottage, Warblington Road, Emsworth, PO10 7HH

Table 1: Water Levels: Tidal Undefended

Node Ref	NGR		Modelled Flood Levels in Metres AOD			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	474404	105497	-	-	-	-
2	474410	105420	-	-	4.57	-
3	474425	105368	-	3.96	4.57	-

Table 2: Water Levels: Tidal Defended

Node Ref	NGR		Modelled Flood Levels in Metres AOD			
	Eastings	Northings	Defended Annual Exceedance Probability			
			0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	474404	105497	-	-	-	-
2	474410	105420	-	-	4.59	-
3	474425	105368	-	3.95	4.59	-

Table 3: Water Depths: Tidal Undefended

Node Ref	NGR		Modelled Flood Depths in Metres			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	474404	105497	-	-	-	-
2	474410	105420	-	-	0.01	-
3	474425	105368	-	0.13	0.74	-

Table 4: Water Depths: Tidal Defended

Node Ref	NGR		Modelled Flood Depths in Metres			
	Eastings	Northings	Defended Annual Exceedance Probability			
			0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	474404	105497	-	-	-	-
2	474410	105420	-	-	0.01	-
3	474425	105368	-	0.17	0.81	-

All levels taken from: Chichester (2D)

Produced on: 07/08/2020

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.



Environment
Agency

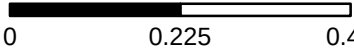


Legend

-  Site_Boundary
-  0.5% AEP (Defended Tidal)
-  0.5% AEP (2070) NPPF (Defended Tidal)
-  0.5% AEP (2115) NPPF (Defended Tidal)
-  0.1% AEP (Defended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



0 0.225 0.45
Kilometers



Environment Agency



Legend

-  Site_Boundary
-  0.5% AEP (Un defended Tidal)
-  0.5% AEP (2070) NPPF (Un defended Tidal)
-  0.5% AEP (2115) NPPF (Un defended Tidal)
-  0.1% AEP (Un defended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



0 0.225 0.45 Kilometers

APPENDIX 4

Southern Water Asset Plan



Atkins Global
The Hub, 500
Park Avenue
Bristol
BS32 4RZ

Your ref 54886
Our ref 245484
Date 22 May 2017
Contact searches@southernwater.co.uk
Tel 0845 272 0845
0330 303 0276
Fax 01634 844514

Attention: Andrew Aitken

Dear Customer

Re: Provision of public sewer record extract

Location: Site surrounding Warblington Road, Emsworth, PO10 7HD

Thank you for your order regarding the provision of extracts of our sewer and/or water main records. Please find enclosed the extracts from Southern Water's records for the above location.

We confirm payment of your fee in the sum of £49.92 and enclose a VAT receipt for your records.

Customers should be aware that there are areas within our region in which there are neither sewers nor water mains. Similarly, whilst the enclosed extract may indicate the approximate location of our apparatus in the area of interest, it should not be relied upon as showing that further infrastructure does not exist and may subsequently be found following site investigation. Actual positions of the disclosed (and any undisclosed) infrastructure should therefore be determined on site, because Southern Water does not accept any responsibility for inaccuracy or omission regarding the enclosed plan. Accordingly it should not be considered to be a definitive document.

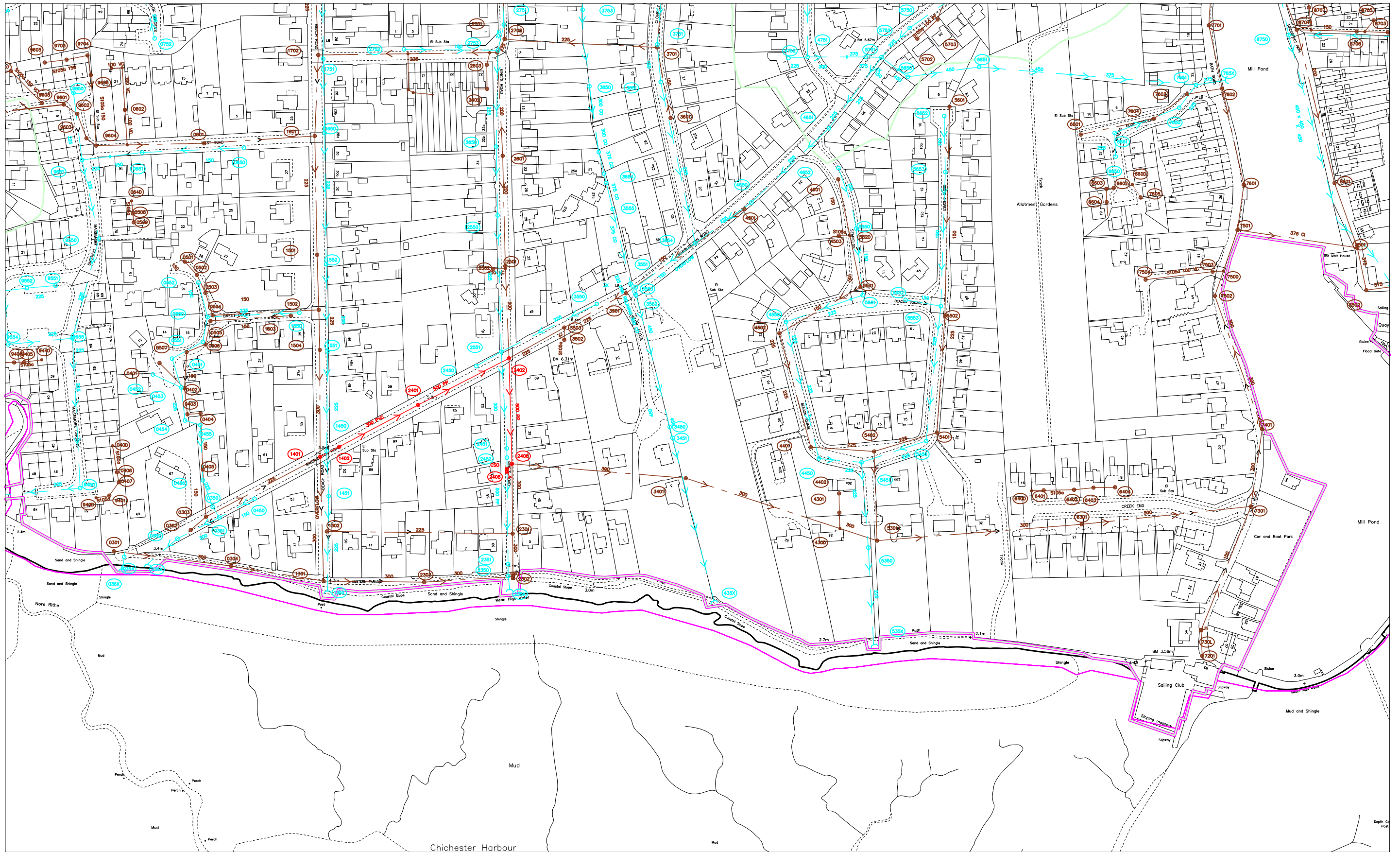
Should you require any further assistance regarding this matter, please contact the LandSearch team.

Yours faithfully

LandSearch

SEWER RECORDS PAGE 1 OF 2

105739



105161

473929

O.S. REF.

SU7405SW

Title: 245484_Site surrounding Warbli

Drawn by: yadavsa

Scale: 1:2500

Date: 22/05/2017

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.

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

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Southern
Water

1101

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	
0301X	3.761	2.554	300	UNK	CIRC	2350X	3.269	1.749	UNK	UNK	CIRC	4652X	6.132	5.232	150	UNK	CIRC	8707Y			UNK	UNK	UNK	
0302X			UNK	UNK	CIRC	2401X	5.779	2.487	500	PP	CIRC	4751X	6.436		300	UNK	CIRC	870DX			150	UNK	CIRC	
0303X	4.279		225	UNK	CIRC	2402X	6.144		500	PP	CIRC	4752X	6.61		225	UNK	CIRC	871DY			150	UNK	CIRC	
0304X	3.429	2.478	300	UNK	CIRC	2406Y	4.75		300	UNK	CIRC	*	5301X	3.761		300	UNK	CIRC	8750X	3.035		450	UNK	RECT
0350X	4.382	3.312	225	UNK	CIRC	2406X	4.75	2.065	500	PP	CIRC	*	5350X	3.558	2.478	225	UNK	CIRC	9401X			UNK	UNK	CIRC
0351X	4.281		300	UNK	CIRC	2408X	4.61	2.628	500	PP	CIRC		5401X	5.069	3.094	225	UNK	CIRC	9404X			UNK	UNK	CIRC
0352X	3.562	2.652	300	UNK	CIRC	2450X			UNK	UNK	CIRC		5402X	4.721		UNK	UNK	CIRC	9405X			UNK	UNK	CIRC
0354X	2.62	2.17	UNK	UNK	CIRC	2451X	4.8	3.277	500	PP	CIRC	*	5450X	4.82	3.43	225	UNK	CIRC	9450X			225	UNK	CIRC
0401X	5.599	4.229	UNK	UNK	CIRC	2451Y	4.8	3.254	300	UNK	CIRC	*	5451X	4.536		225	UNK	CIRC	9550X	4.952	3.512	225	UNK	CIRC
0402X	5.583	4.033	UNK	UNK	CIRC	2452X	4.61	2.796	500	PP	CIRC		5501X	5.974	4.325	150	UNK	CIRC	9551X	4.471	3.701	225	UNK	CIRC
0403X	5.363	3.933	UNK	UNK	CIRC	2501X	6.334		200	UNK	CIRC		5502X	5.63	3.572	225	UNK	CIRC	9552X	4.469	3.619	225	UNK	CIRC
0404X	5.397	3.907	150	UNK	CIRC	2502X			100	VC	CIRC		552DX			150	UNK	CIRC	9554X	4.054	3.478	225	UNK	CIRC
0405X	4.398	3.258	150	UNK	CIRC	250DX			200	UNK	CIRC		5550X	6.155	5.055	150	UNK	CIRC	9555X	4.368		225	UNK	CIRC
0406X			UNK	UNK	CIRC	2550X	6.489	4.519	225	UNK	CIRC		5551X	5.922	4.792	150	UNK	CIRC	9601X			UNK	UNK	CIRC
0407X			UNK	UNK	CIRC	2551X	6.244		300	UNK	CIRC		5552X	5.777	4.387	150	UNK	CIRC	9602X			UNK	UNK	CIRC
040DX			UNK	UNK	CIRC	2601X	6.507	5.09	200	UNK	CIRC	*	5553X	5.624		225	UNK	CIRC	9603X			UNK	UNK	CIRC
0450X	4.919	3.109	150	UNK	CIRC	2601Y	6.507		200	UNK	CIRC	*	5552X			225	UNK	CIRC	9604Y			UNK	UNK	CIRC
0451X	5.558	4.518	225	UNK	CIRC	2602X			150	VC	CIRC		5601X	5.352	4.59	150	UNK	CIRC	9605X			150	UNK	CIRC
0452X	5.642	4.362	225	UNK	CIRC	2603X			150	VC	CIRC		5650X	5.568		450	UNK	CIRC	9606X			150	UNK	CIRC
0453X	5.758		225	UNK	CIRC	263DX			150	VC	CIRC		5651X	4.815	3.935	450	UNK	CIRC	9650X			225	UNK	CIRC
0454X	5.33	4.18	UNK	UNK	CIRC	264DX			150	VC	CIRC		5652X	5.352	4.812	150	UNK	CIRC	9651X	5.669	4.109	225	UNK	CIRC
0455X	4.635	3.835	225	UNK	CIRC	2650X	6.516	4.916	UNK	UNK	CIRC		5653X	5.902	4.602	150	UNK	CIRC	9652X			225	UNK	CIRC
0456X	4.379	3.409	225	UNK	CIRC	2701Y	6.571	4.596	225	UNK	CIRC		565ZX			450	UNK	CIRC	9703X			150	UNK	CIRC
0501X	5.7	4.15	150	UNK	CIRC	2702X	6.958		225	UNK	CIRC		5702X			150	PF	CIRC	9704X			150	UNK	CIRC
0502X	5.61	3.99	150	UNK	CIRC	270DX			225	UNK	CIRC		5703X			150	PF	CIRC						
0503X	5.69	3.84	150	UNK	CIRC	271DX			225	UNK	CIRC		5750X	5.196	4.536	225	UNK	CIRC						
0504X	5.55	3.77	150	UNK	CIRC	2751X	6.938	6.288	225	UNK	CIRC		5751X	5.608	4.308	375	UNK	CIRC						
0505X	5.865	4.565	UNK	UNK	CIRC	2752X	7.156	5.876	150	UNK	CIRC		5752X	5.231		225	UNK	CIRC	*					
0506X	5.785	4.335	UNK	UNK	CIRC	2753X	6.541	5.301	225	UNK	CIRC		5752Y	5.231		150	UNK	CIRC	*					
0507X	5.525	4.205	150	UNK	CIRC	3401X	4.596	1.694	300	UNK	CIRC		5752X			375	UNK	CIRC						
0508X			UNK	UNK	CIRC	3450X			450	UNK	CIRC		6301X	3.529	0.884	300	UNK	CIRC						
0509X			UNK	UNK	CIRC	3451X			450	UNK	CIRC		6401X			UNK	UNK	CIRC						
0550X	5.994		225	UNK	CIRC	3501X	6.489	4.413	225	UNK	CIRC		6402X			UNK	UNK	CIRC						
0551X	5.826	4.816	225	UNK	CIRC	3502X			UNK	VC	CIRC		6403X			UNK	UNK	CIRC						
0552X			150	UNK	CIRC	3503X			225	UNK	CIRC		640DX			UNK	UNK	CIRC						
0601X			UNK	UNK	CIRC	3550X	6.478	4.998	225	UNK	CIRC		6601X			UNK	UNK	CIRC						
0602X			100	VC	CIRC	3551Z	6.56	5.36	225	CO	CIRC	*	6603X			UNK	PF	CIRC						
060DX			100	VC	CIRC	3551Y	6.56	5.36	225	CO	CIRC	*	6604X			UNK	PF	CIRC						
061DX			100	VC	CIRC	3551X	6.56	5.36	300	CO	CIRC	*	6650X	3.474	2.604	225	UNK	CIRC						
063DX			UNK	UNK	CIRC	3552Y	6.564		450	UNK	CIRC		6651X	3.287	2.291	225	UNK	CIRC						
0650X	6.35	5.52	150	UNK	CIRC	3553Y	6.477		225	UNK	CIRC		6652X			375	UNK	CIRC						
0651X	5.81	5.2	150	UNK	CIRC	3554X	6.693		150	UNK	CIRC		7201X	3.017	1.493	UNK	UNK	CIRC						
0752X	7.642	6.382	225	UNK	CIRC	3555X			375	CO	CIRC		7301X	2.975	0.637	300	UNK	CIRC						
1301X	4.514	2.39	300	UNK	CIRC	3601X	6.431	5.294	150	UNK	CIRC		730LX			150	UNK	CIRC						
1302X	4.803	3.514	225	UNK	CIRC	3650Y	6.546		300	CO	CIRC	*	7401X	2.929	0.515	300	UNK	CIRC						
1401Y	5.443	2.649	300	PVC	CIRC	3650X	6.546	6.046	300	CO	CIRC	*	7501X	3.011		375	CI	CIRC						
1401Y	5.443		300	UNK	CIRC	3651X	6.364	5.544	225	UNK	CIRC		7502X	3.006	0.283	300	UNK	CIRC						
1401X	5.443	3.58	300	PVC	CIRC	3652X			375	CO	CIRC		7503X			UNK	UNK	CIRC						
1450X	5.445	4.195	UNK	UNK	CIRC	3653X	6.529		375	CO	CIRC		7504X			100	VC	CIRC						
1451X	5.095	3.875	225	UNK	CIRC	3654X			375	CO	CIRC		750DX			300	UNK	CIRC						
1501X	6.431	3.222	225	UNK	CIRC	3701X	6.495		225	UNK	CIRC		7601X			UNK	UNK	CIRC						
1502X	6.15		225	UNK	CIRC	3751X	6.517	5.867	150	UNK	CIRC		7602X			UNK	UNK	CIRC						
1503X	6.343	5.083	150	UNK	CIRC	3753X			300	CO	CIRC		7603X			UNK	UNK	CIRC						
1504X	6.047	2.972	300	UNK	CIRC	4301X			UNK	UNK	CIRC		7604X			UNK	UNK	CIRC						
1550X	6.391	5.741	225	UNK	CIRC	430DX			300	UNK	CIRC		7605X			UNK	UNK	CIRC						
1551X	5.993	4.683	225	UNK	CIRC	4401X	4.88	3.612	225	UNK	CIRC		7650X	3.005	2.245	225	UNK	CIRC						
1552X	6.366	5.156	225	UNK	CIRC	4402X			UNK															

LINE STYLES / COLOURS

Brown

Foul

Foul Syphon Sewer

Foul Vacuum Main

Foul Rising Main

Combined

Combined Syphon Sewer

Combined Rising Main

Lateral Drain

Building Over Agreement Area

Treated Effluent

Sludge

Sewer Catchment

Section 104 Area

Surface Water

Surface Water Rising Main

Private

Access Shaft

Decommissioned

MATERIALS

AK Alkathene

BAC Bonded Asbestos Cement

BRC Brick (Common)

BRE Brick (Engineering)

CC Concrete Box Culvert

CI Cast Iron

CO Concrete (In-Situ)

CP Concrete (Pre-Cast)

CSB Concrete Segments (bolted)

CSU Concrete Segments (unbolted)

DI Ductile Iron

GRC Glass Reinforced Concrete

GRP Glass Reinforced Plastic

MAC Masonry in regular Courses

MAR Masonry in random Courses

PE Polyethylene

PF Pitch Fibre

PP Polypropylene

PVC Polyvinyl Chloride

RPM Reinforced Plastic Matrix

SI Spun Iron

ST Steel

VC Vitrified Clay

XXX Other

ZZZ Unknown

LEGEND - SEWERS

Manhole (SW)

Manhole (F&C)

Lamp hole (SW)

Lamp hole (F&C)

Pumping Station (SW)

Pumping Station (F&C)

Side entry manhole (SW)

Side entry manhole (F&C)

Blind shaft (SW)

Blind shaft (F&C)

Ejector station (SW)

Ejector station (F&C)

Watertight door (SW)

Watertight door (F&C)

Flushing ch. Min-e (SW)

Flushing ch. Min-e (F&C)

Flushing ch. No-e (SW)

Flushing ch. No-e (F&C)

Demarcation Chamber

Washout (SW)

Washout (F&C)

Rodding Eye (SW)

Rodding Eye (F&C)

Gauging point (SW)

Gauging point (F&C)

Intercept chamber (SW)

Intercept chamber (F&C)

Storm Tank (SW)

Storm Tank (F&C)

Vortex chamber (SW)

Vortex chamber (F&C)

Label ellipse

Dummy/S24 manhole

Outfall

Penstock chamber

Damboards

Storm Overflow

Backdrop manhole

Other (s)

Other

Change in sewer (s)

Change in sewer

Reflex valve

Flap valve

Cascade

Anode

Valve

Closed Valve

Air Valve

Hatch box (SW)

Hatch box (F&C)

Direction arrow

Emptying valve

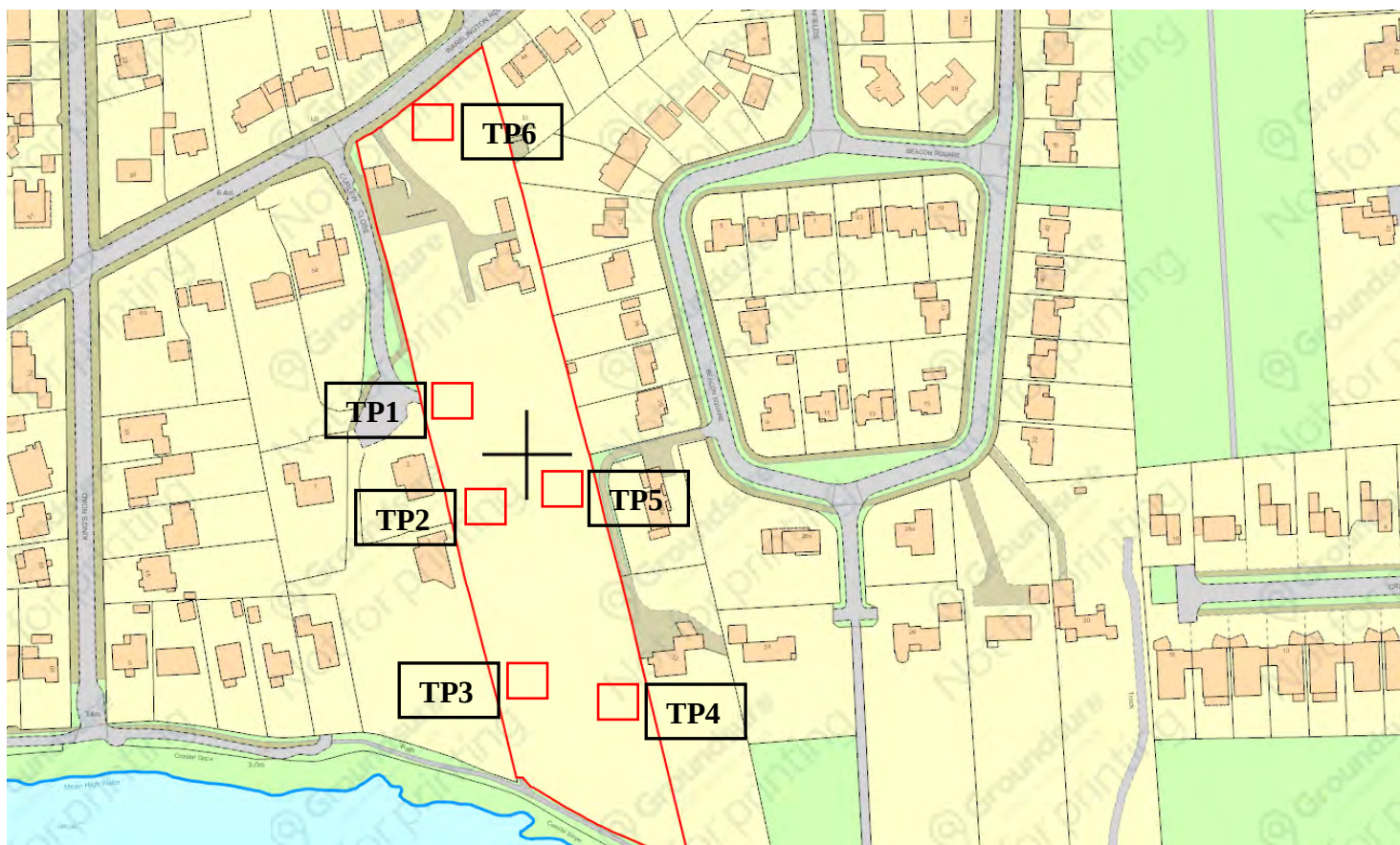
Catchpit

Soakaway

Inlet

APPENDIX 5

Ground Investigation Data



NOT TO SCALE

APPROXIMATE SITE BOUNDARY

Project: Fowley Cottage, 46 Warblington Road, Emsworth, Hampshire PO10 7HD

Client: Charles Glanville c/o Re-Format Limited

Trial Hole Location Plan

Date: July 2016

Ref: GWPR1704

Figure 1

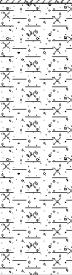
ground&water

Ground and Water Ltd							Trialpit No TP1 Sheet 1 of 1	
Project Name Fowley Cottage			Project No. GWPR1704		Co-ords: - Level: -		Date 20/06/2016	
Location: 46 Warblington Road, Emsworth, Hampshire PO10 7HD					Dimensions: -		Scale 1:25	
Client: Charles Glanville c/o Re-Format Ltd					Depth 4.30m		Logged By JL	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
Depth (m)	Type	Results						
0.20	D		0.30			TOPSOIL: Mid brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare to occasional, sub-angular to sub-rounded, fine to coarse flint.		
0.50	D					RIVER TERRACE DEPOSITS: Mottled light/mid brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is rare to occasional, fine to medium, sub-angular to sub-rounded flint.		
0.80	D							
1.20	D		1.30			RIVER TERRACE DEPOSITS: Mottled light brown/orange silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine, sub-angular to sub-rounded flint and chalk fragments.		
1.50	D							
1.80	D							
2.20	D		2.00			RIVER TERRACE DEPOSITS: Mottled light brown/grey/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is abundant, fine, sub-angular to sub-rounded chalk fragments.		
2.50	D							
2.80	D							
3.00	D		3.90			RIVER TERRACE DEPOSITS: Light brown/off white sandy gravelly CLAY. Sand is fine to coarse grained. Gravel is abundant, fine to medium, sub-angular to sub-rounded flint and chalk.		
3.40	D							
3.80	D							
4.30	D		4.30			Trialpit Complete at 4.30 m		
Remarks: Roots noted to 1.80m bgl.								
Groundwater: No groundwater encountered.								

Ground and Water Ltd							Trialpit No TP2 Sheet 1 of 1	
Project Name Fowley Cottage			Project No. GWPR1704		Co-ords: - Level: -		Date 20/06/2016	
Location: 46 Warblington Road, Emsworth, Hampshire PO10 7HD					Dimensions: -		Scale 1:25	
Client: Charles Glanville c/o Re-Format Ltd					Depth 3.40m		Logged By JL	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
Depth (m)	Type	Results						
0.20	D		0.30			TOPSOIL: Mid brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare, sub-angular to sub-rounded, fine to coarse flint.		
0.50	D					RIVER TERRACE DEPOSITS: Mottled light brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is rare, fine to medium, sub-angular to sub-rounded flint.		
0.80	D							
1.20	D		1.30			RIVER TERRACE DEPOSITS: Mottled light brown/orange silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine, sub-angular to sub-rounded flint and chalk.		
1.50	D							
1.80	D					2.10		
2.20	D							
2.50	D		3.40					
2.80	D							
3.40	D							
Remarks: Roots noted to 0.80m bgl								
Groundwater: No groundwater encountered.								

Ground and Water Ltd							Trialpit No TP3 Sheet 1 of 1	
Project Name Fowley Cottage			Project No. GWPR1704		Co-ords: - Level: -		Date 20/06/2016	
Location: 46 Warblington Road, Emsworth, Hampshire PO10 7HD					Dimensions: -		Scale 1:25	
Client: Charles Glanville c/o Re-Format Ltd					Depth 3.00m		Logged By JL	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
Depth (m)	Type	Results						
0.10	D		0.15			TOPSOIL: Mid brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare to occasional, fine to coarse, sub-angular to sub-rounded flint.		
0.30	D					RIVER TERRACE DEPOSITS: Light brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is rare, fine to medium, sub-angular to sub-rounded flint.		
0.50	D							
1.00	D		1.50			RIVER TERRACE DEPOSITS: Mottled light brown/orange silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine, sub-angular to sub-rounded flint and chalk.		
1.40	D							
1.80	D					2.10		
2.50	D		2.40					
2.80	D							
			3.00			Trialpit Complete at 3.00 m		
Remarks: Roots noted to 0.70m bgl.								
Groundwater: No groundwater encountered.								

Ground and Water Ltd						Trialpit No TP4 Sheet 1 of 1	
Project Name Fowley Cottage			Project No. GWPR1704		Co-ords: - Level: -		Date 20/06/2016
Location: 46 Warblington Road, Emsworth, Hampshire PO10 7HD				Dimensions: -		Scale 1:25	
Client: Charles Glanville c/o Re-Format Ltd				Depth 3.10m		Logged By JL	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.15	D		0.15			TOPSOIL: Mid brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare, fine to coarse, sub-angular to sub-rounded flint.	
0.30	D					RIVER TERRACE DEPOSITS: Light brown/mid-brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is rare to occasional, fine to medium, sub-angular to sub-rounded flint.	
0.90	D		1.70			RIVER TERRACE DEPOSITS: Light brown/orange silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine, sub-angular to sub-rounded flint and chalk.	
1.20	D					RIVER TERRACE DEPOSITS: Light brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is abundant, fine to coarse, flint and chalk.	
1.50	D		2.10			RIVER TERRACE DEPOSITS: Light brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is abundant, fine to coarse, flint and chalk.	
1.80	D					RIVER TERRACE DEPOSITS: Light grey/off white sandy gravelly CLAY. Sand is fine to coarse grained. Gravel is abundant, sub-angular to sub-rounded, fine to coarse flint and chalk.	
2.20	D		2.90			RIVER TERRACE DEPOSITS: Light grey/off white sandy gravelly CLAY. Sand is fine to coarse grained. Gravel is abundant, sub-angular to sub-rounded, fine to coarse flint and chalk.	
2.50	D					Trialpit Complete at 3.10 m	
3.00	D		3.10				
Remarks: Roots noted to 1.00m bgl.							
Groundwater: No groundwater encountered.							

Ground and Water Ltd						Trialpit No TP5 Sheet 1 of 1	
Project Name Fowley Cottage			Project No. GWPR1704		Co-ords: - Level: -		Date 20/06/2016
Location: 46 Warblington Road, Emsworth, Hampshire PO10 7HD					Dimensions: -		Scale 1:25
Client: Charles Glanville c/o Re-Format Ltd					Depth 3.90m		Logged By JL
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.20	D		0.20			TOPSOIL: Mid brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare, fine to medium, sub-angular to sub-rounded flint.	
0.50	D					RIVER TERRACE DEPOSITS: Mid brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is rare, fine to medium, sub-angular to sub-rounded flint.	
0.80	D						
1.20	D		1.10			RIVER TERRACE DEPOSITS: Light brown/orange/grey silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded flint and chalk. Coarse chalk fragments noted from 2.40m bgl.	
1.50	D						
1.80	D						
2.20	D						
2.70	D						
3.40	D						
3.80	D		3.90			Trialpit Complete at 3.90 m	
Remarks: Roots to 1.30m bgl.							
Groundwater: No groundwater encountered.							



Ground and Water Ltd							Trialpit No TP6 Sheet 1 of 1	
Project Name Fowley Cottage			Project No. GWPR1704		Co-ords: - Level: -		Date 20/06/2016	
Location: 46 Warblington Road, Emsworth, Hampshire PO10 7HD					Dimensions: -		Scale 1:25	
Client: Charles Glanville c/o Re-Format Ltd					Depth 3.70m		Logged By JL	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description		
Depth (m)	Type	Results						
0.20	D		0.20			TOPSOIL: Mid to dark brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare, fine to coarse, sub-angular to sub-rounded flint.		
0.50	D					MADE GROUND: Light brown silty sandy gravelly clay. Sand is fine to medium grained. Gravel is fine to abundant, angular to sub-rounded, fine to coarse flint, chalk and brick.		
0.80	D		0.80			RIVER TERRACE DEPOSITS: Mottled light brown/orange silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine to medium, sub-angular to sub-rounded flint and chalk.		
1.20	D							
1.50	D							
1.80	D							
2.20	D							
2.70	D							
			2.90					
3.20	D					RIVER TERRACE DEPOSITS: Mottled light brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is abundant, sub-angular to sub-rounded, fine to medium chalk and flint.		
3.70	D		3.70			Trialpit Complete at 3.70 m		
Remarks: Roots noted to 1.80m bgl.								
Groundwater: No groundwater encountered.								

CLIENT	Charles Glanville c/o Re-Format Limited		
SITE ADDRESS	Fowley Cottage, 46 Warblington Road, Emsworth, Hampshire PO10 7HD		
REPORT REFERENCE	GWPR1704		
ENGINEER	Joshua Laite, Ground and Water Limited		
INVESTIGATION LOCATIONS	Please see Figure 1 attached. Site works were undertaken on 20 th June 2016 and comprised the excavation of six trial pits (TP1-TP6) with soakaway testing in accordance with the principles of BRE365 in TP1-TP3 and TP5-TP6.		
GROUND CONDITIONS ENCOUNTERED	Summary of Strata Encountered (TP1-TP6)		
	Strata	Depth Encountered (m bgl)	Thickness (m)
	TOPSOIL: Mid brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare to occasional, sub-angular to sub-rounded, fine to coarse flint.	GL	0.15 – 0.30
	MADE GROUND (TP6): Light brown silty sandy gravelly clay. Sand is fine to medium grained. Gravel is fine to abundant, fine to coarse, angular to sub-rounded flints, chalk and bricks.	0.20	0.60
	RIVER TERRACE DEPOSITS: Mottled light / mid brown / orange, silty sandy gravelly CLAY. Sand is fine grained. Gravel is rare to occasional, fine to medium, sub-angular to sub-rounded flint.	0.15 – 0.30	0.90 – 1.55
	RIVER TERRACE DEPOSITS: Mottled light / mid brown / orange silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine to coarse, sub-rounded to sub-angular flints and chalk.	0.80 – 1.70	0.90 - 2.90
	RIVER TERRACE DEPOSITS (TP1 and TP4): Light brown / off white sandy gravelly CLAY. Sand is fine to coarse grained. Gravel is abundant, fine to medium, sub-angular to sub-rounded, flint and chalk.	2.90 - 3.90	0.20 – 0.40
	LEWES NODULAR CHALK FORMATION (TP3): Structureless CHALK composed of cream gravelly sandy SILT. Gravel are moderately weak, high density, white and sub-angular. Locally white / light brown with a trace of light brown clay.	2.40	0.60
ROOTS	Roots were noted between 0.70 - 1.80m bgl.		
GROUNDWATER	Groundwater was not encountered during this investigation.		

INFILTRATION RATE

Soakaway tests, in accordance with the principles of BRE365, were undertaken at depths from 3.10m bgl – 4.30m bgl (TP1, TP3, TP5 and TP6) within the soils of the 1st River Terrace Deposits, comprising a silty sandy gravelly clay.

No infiltration was recorded and therefore soakaways constructed within the soils of the 1st River Terraced Deposits are **not** likely to perform to a satisfactory standard.

Soakaway Testing (TP1, TP2, TP5 and TP6)				
Trial Hole	Starting Depth (m bgl)	Final Depth (m bgl)	Time Elapsed (mins)	Infiltration Rate (m/sec)
TP1	2.50	2.49	125	0
TP2	2.03	2.01	156	0
TP5	1.82	1.80	154	0
TP6	2.10	2.20	190	0

A soakaway test, in accordance with the principles of BRE365, was undertaken at a depth of 3.00m bg in TP3 within the soils of the Lewes Nodular Chalk Formation, comprising a cream gravelly sandy SILT. No infiltration was noted and therefore the soils of the Lewes Nodular Chalk Formation are also **not** likely to perform to a satisfactory standard.

Soakaway Testing (TP3)				
Trial Hole	Starting Depth	Final Depth	Time Elapsed	Infiltration Rate
TP3	1.10m bgl	1.10m bgl	116 min	0 m/sec

The site was located within a **Secondary A Aquifer** relating to superficial deposits of the River Terrace Deposits, beneath a **Principal Aquifer** comprising the bedrock deposits of Lewes Nodular Chalk Formation is present.

Examination of the Environment Agency records showed that the site **was not** located within a **Groundwater Source Protection Zone** as classified in the Policy and Practice for the Protection of Groundwater.

Consultation with the Environment Agency must be sought regarding any use that may have an impact on groundwater resources.

ANTICIPATED VOLUME CHANGE POTENTIAL

RIVER TERRACE DEPOSITS: Likely to have moderate to high volume change potential.

LEWES NODULAR CHALK FORMATION: Likely to have no volume change potential.

All in accordance with NHBC Standards Chapter 4.2 and BRE240. Subject to confirmation of results of geotechnical classification testing.

FOUNDATION RECOMMENDATIONS

At the time of reporting, June 2016, it is our understanding that the proposed development will incorporate the retention of the existing property and construction of 6No. detached properties with gardens in the surrounding grounds. Ancillary structures, such as site access, parking areas and private gardens will also be formed.

Foundations must not be placed within cohesive root penetrated and/or desiccated soils and the influence of the trees surrounding the site must be taken into account. The base of foundation excavations must extend at least 300mm into non-root penetrated soils. Should trees be removed from footprint of proposed development then a piled foundation should be considered.

Roots were generally noted ranging between 0.70 - 1.80m bgl, foundations minimum foundations depths rare likely to range from 1.00 - 2.10m bgl into the River Terrace Deposits.

Foundations constructed on the River Terrace Deposits at 1.00m bgl can be designed based on a presumed safe bearing capacity of 75kN/m², increasing to 100kN/m² at 2.10m bgl. This is based on trial hole records, inspection of samples recovered, geotechnical laboratory results, and referral to BS 8004:1986, Code of Practice for Foundations, the results of the insitu testing, and based on a 5m long by 1.0m wide foundation and a maximum settlement of ~25mm.

Given that the cohesive soils of the 1st River Terrace Deposits are likely to have a volume change potential in accordance with BRE Digest 240 and NHBC Chapter 4.2, a suspended slab should be considered. The volume change potential of the shallow surface soils must be taken into account in final design (underfloor void diameter/compressible material/void formers etc).

This preliminary information may be subject to amendment in the final report and no liability can be accepted for any actions based on this preliminary information.

