

**DEVELOPMENT ADJACENT TO 21 HOCOMBE ROAD
Hocombe Road, Chandlers Ford
SO53 5SL**

FLOOD RISK ASSESSMENT REPORT

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1. Introduction

Instructions were received on August 7th 2018 to carry out a Flood Risk Assessment Report on this site, in accordance with our quotation of July 16th 2018. It is understood that a pre-application consultation is to be submitted on this site and this report supports the submission.

The developer has requested a Flood Risk Assessment report, in accordance with the current recommendations given by the National Planning Policy Framework (NPPF) to submit with the planning application.

Following a desk study and deliberations with the Environment Agency (EA), this report has been prepared to determine the risk of flooding on the site for the proposed development and recommendations are hereby given to protect the development and its residents from any potential flood risk. This report also aims to investigate the risk of flooding for the proposed development and to provide recommendations to protect the development and its users from any potential flood risk.

2. The Existing Site

The site is located at the South Western side of the Hocombe Road, Chandler's Ford, Hampshire, at grid reference SU 44744 22467. Appendix A contains a location plan for the site. A topographical plan showing the existing ground levels on the site is shown on Appendix B.

The existing site mainly consists of a soft top soil surface and tree planting. The geology of the grounds are expected to comprise of Pebbles with Sand and Gravel Bedrock from Whitecliff Sand member. The levels are provided to ordnance survey datum. The topographical survey plan shows the existing ground levels on the site are approximately between 66.50m and 63.25m Above Ordinance Datum (AOD). The site has an extent of approximately 0.161 hectares.

There is a Council maintained ditch/water stream that runs parallel to the western boundary of the site, at approximately 0.5 metres below the lower level of the site at site entrance which becomes shallower at the South-westernmost part of the site, flowing into a concrete weir channel at this point (Figure 1).

The site is enclosed by trees and slopes predominantly East to West, although the southernmost section of the site slopes south-westerly. The site perimeter at East, West and South boundaries is densely delineated by trees. Within the site grounds there is an ample appointment of tree planting which includes among other species oak and pine trees (Figure 2). At approximately three-fifths of the

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East boundary, from the entrance of the site (North boundary), there is also a large sweet chestnut tree which appears to be dying.

From our site walkover carried out on August 21st 2018 it was possible to establish that the Northernmost portion of the site is less populated with trees, and is the proposed designated area for the new development. The site grounds slopes at approximately 15° degrees towards the ditch/water stream, with an average fall of 1.3 metres from East to West boundaries.

At the time of the site walkover the grounds were dry, possibly due to the good weather conditions of the previous weeks, similarly, the existing ditch/water stream was also dry (Figure 1). We were able to ascertain at the time that the soil top surface was a mixture of fine graded sandy clay with pebbles, which was expected at this location. According to the British Geological Survey (BGS), 1:50,000 series, the geology of the grounds is expected to be underlain by a thin layer of Bagshot sands overlaying London Clay.



Figure 1: Existing Site, Ditch/Water Stream Channel

From our site walkover we can confirm that there is existing foul water infrastructure within the site premises which appears to be piped underground and connects to a private foul water manhole at the South East boundary of the neighbouring property (Figure 3). Abandoned infrastructure of a septic tank to number 21 Hocombe Road can be found to the northernmost section of the site.



Figure 2: Existing Site, Grounds



Figure 3: Existing Site, Foul Water infrastructure

With regards to drainage water infrastructure, aside the existing ditch/water course located at the western boundary of the property there are no other surface water drainage infrastructure within the

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site boundary; the site therefore appears to make use of natural evapotranspiration process. A walkover outside site boundaries provided a better understanding of the purpose of the ditch/water course onsite. The exploration of the surrounding area showed that existing site ditch/water stream caters for about 750 metres of surface water from Hocombe Road (Figure 4a). Along each side of the road verge there is a ditch channel that caters for the road surface runoff which is connected via underground pipes to ditch/water on the existing site.

Additionally, where Hocombe Road dips towards the site, the lower end of the road slopes directly through the verge and footpath to the location of the ditch/water course onsite (Figure 4b). The lower level of the road at this location is at approximately 0.950m above the level of the front boundary of the site. Similarly, analysing the storm drainage in the amenities of the road it was possible to attain that the existing ditch/water course also caters for the overflow from a higher ground Woodland Copse Pond (Figure 5).



Figure 4a: Existing Site surroundings, Hocombe Road



Figure 4b: Existing Site surroundings, Hocombe Road Storm Water infrastructure



Figure 5: Existing Site amenities, Woodlands Copse Pond

3. The Proposed Development

The proposed development involves the construction of one new built dwelling. The new development will also comprise of the construction of drainage systems that will be connected to the existing drainage infrastructure. Detailed information on the new property is not currently available but an approximate outline and area of 103m² is shown on the layout plan which can be found in Appendix C.

4. Policy Background

The Government's sustainable development strategy (SDS) makes it a requirement to assess appropriate procedures for developments in areas at risk of flooding. This is to avoid any unnecessary increase in requirements for flood defences. The aim is to assess the potential risk for the development, demonstrating how flood risk will be managed presently taking also into account climate change.

The NPPF requires that developers making planning applications on sites that are potentially at risk from flooding should consult with the Environment Agency (EA), and where appropriate produce a

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flood risk assessment (FRA). The aim is to assess the potential risk for the development, demonstrating how flood risk will be managed onsite ensuring that flood risk is not increased elsewhere. The EA flood matrix was consulted and showed that a flood risk assessment is appropriate for this site.

5. Flood Risk Maps and Available Information

Appendix D, E and F contain a copy of the EA Flood Maps for this area. This shows that although part of the site is within flood zone 1, the majority of the proposed development site is within flood zones 2 and 3 for risk of flooding from river and sea, and is within flood Zone 1 for the risk of flooding from surface water. EA flood map records have shown that the flood in this area is caused by one of Monks Brook's tributary, notwithstanding, and according to information within page 17 of Eastleigh Surface Water Management Plan (Dec. 2012), Appendix O, there is a reduced flood risk in Hocombe Road, which is dependent upon suitable maintenance regime.

Information received from the EA shows that flood defences have been recorded along the watercourse length within the site perimeter. The same data shows that according to inspection data from October 19th 2017 the maintenance of culvert upstream site location is very poor and the high ground defences within site locations are fair, and the condition of the culvert downstream site location is unknown, Appendix F.

Further consultation was carried out with the Hampshire County Council (HCC) and the EA. Council-held information only had records from 2012. The information received from HCC Flood and Water Management showed records of a 2013 Thornbury Wood flood event (OW/2013/0067), approximately 63 metres downstream from site, resulting in saturated gardens (Appendix G).

As part of this flood risk assessment further information have been requested from the EA and their online flood mapping, and detailed flood model data (Product 4) was also consulted, Appendix H. The information confirmed that part of the site is within Flood Zones 2 and 3 - an area with 1 in 1000 years (0.1% chance) and 1 in 100 years (1% chance) respectively annual likelihood of flooding. The data indicates that part of the site is at risk from fluvial flooding from the water course adjacent to the West boundary of the site.

The ditch/water course that runs along the Western boundary of the site is only partially hidden and/or enclosed along its length, flowing via a simple culvert under Hocombe Road, along the westernmost section of the site to the southernmost point of our site boundary. Appendix H contains

detailed flood mapping data obtained from the Environment Agency. Flood Levels are given within the data calculated as part of Hocombe Road flood modelling survey, with data compiled in 2008.

The output from this modelling have been used to obtain estimated flood depths and extent are shown on the flood map and its data. The map shows an amplified view of our site and show the line of the water courses in gradients of blue and purple, representing low to higher depths respectively. The map also shows various depth locations where data was recorded and the logs related to point marked on the map are detailed on the table enclosed.

The Western section of the development site is shown to be within flood zones 2 and 3 and the Eastern section of the site within the flood zone 1, Appendix I. As the EA data provided on Appendix H for flood water depths does not include an allowance for climate change, for the purpose of discussion throughout this report a 45% climate change allowance (South East Higher Central allowance for 2115) has been added to the tabled data, highlighted in red on Appendix H table and shown in Appendix K.

Assuming that the proposed development is to be sited between points 4, 5 and 6, as Shown in Appendix J, the data provided in Appendix H indicate that maximum 65.393m AOD flood level, including 45% climate change allowance, is expected at point 4, and although the deepest flood level, 0.48m AOD, is encountered at point 5, the maximum level of flood at this location is 65.026m AOD. If points 4, 5 and 6 were to be considered simultaneously the average flood water level would be at 64.933 AOD, which is lower than the average existing ground level within Flood Zone 1 of about 65.651m AOD, and lower than the average ground level at proposed building location in of 65.325m AOD, Appendices B and J. The highest existing ground level is at point 4, 64.90m AOD.

If South East Higher Central allowance for 2115 estimated flood levels were to be compared to present day predicted flood levels, 15% climate change allowance (2015 to 2039), Appendix L, it can be seen that on average 2115 flood depths are about 0.09m deeper than current levels. The extent of flood levels, mapped on appendices K and L have been derived from topographical survey levels, JFLOW referenced ground Level and the tabled estimated flood levels.

During a flood event the appropriate flood zone 3 EA data flood levels would indicate that on average up to 0.406m above ground level of flood water would be present on within the referred points. This would actually be of a slightly greater depths on some areas on the westernmost end of the site seeing that the flood water streams from higher to lower grounds and the existing ground level at these locations is lower.

Although the proposed new dwelling is outside the mapped flood zone, Appendices J, K and L, a 0.300m of freeboard above the maximum predicted flood level at point 4, 65.393m AOD will be used to determine the minimum proposed finished floor level to be maintained above the predicted flood level surrounding the proposed dwelling.

Consequently, the proposed finish floor level (FFL) will be of 65.700m AOD and that the proposed DPC (damp-proof course) to be of 65.550m AOD. This measures ensure a FFL 0.800m above existing ground level where the maximum flood is expected, and 0.300m above the maximum predicted flood level steering the proposed dwelling away from the risk of any potential flood levels.

The predicted extent of Flood Zone 3, shown in Appendix K, indicates that flood water is expected to affect the proposing parking spaces and part of the driveway, which are intended to keep current site permeability rates with the use of top gravel surface finish. Through this measures it is believed that the proposed development is not at risk from flooding during the 1/100 year flood event according to the EA data.

Based on site inspection, site location and enclose environment as well as site survey information it is important to emphasize the site is wooded, and that some of the trees species identified during the site survey are moderate to high water demand trees, such as Sweet Chestnut and Oak trees. Further geotechnical investigation will be required to attain accurate properties of the soil, notwithstanding, and depending on the plasticity index of the soil and depths of the stratum, the identified trees are deemed to cause ground shrinkability and potential heave.

To determine foundation depths NHBC guidance recommends that buildings on conventional foundations should not be closer to single trees than the height of the tree at its maturity, depending on soil; tree water demand, height and lateral zone of influence; and climate. Similarly, precautionary measures are required to protect tree roots and potential root induced damage to property. Therefore, and based on these aspects we suggest that piled foundations will be recommended for this development.

6. Effects on Existing Drainage Strategy

Drainage from the new development must ensure that the impact of the new development does not increase flood risk onsite or elsewhere. Equally, new developments must account for flows from roads and overland as possible source for onsite flood, in order to manage, prevent and control runoff flow

patterns, both in terms of quantity and peak runoff. Similarly, the NPPF guidance advises that 'both the rates and volumes of runoff from new developments should be no greater than the rates prior to the proposed development'.

Currently, the proposed development site makes use of natural evapotranspiration, and the site walkover has shown that there are no drainage systems due to the site nature. Within the 0.161ha of proposed development area there are no areas of hardstanding, but the proposed area of hardstanding is of about 0.0239 ha, which will therefore increase the amount of surface runoff water from site in the event of a peak rainfall.

To limit the expected increase of Greenfield runoff rates to pre-development runoff rates a level for level compensation scheme will be necessary to meet government's policy and strategy requirements which strongly recommend sustainable approaches to prevent the increase in flood risk.

After consultation with Miss Suz Greenwood and Mr Iain Varney of the EA, it was agreed that 'If the use of the void is the preferable way forward then a maintenance and management scheme for the lifetime of the development will have to be agreed with the local planning authority and justification included within the FRA demonstrating that level for level compensation has been considered'.

To maintain current levels of Greenfield runoff a level for level compensation has been considered and assessed bearing in mind the site topography and currently estimated flood plain areas. The land to the south-eastern boundary of the site is deemed the most appropriate area for such consideration. To achieve the intended level for level compensation the ground levels would have to be reduced. This approach will widen and increase the flood plain area to the south of our site and consequently increase the risk of flood to the land and properties south to the southern boundary of the site at The Glade.

Current JFlow data, Appendix H, indicate wider and deeper flood plain at this location considering point 12, and bearing in mind that this point is closer to the south-eastern boundary of the site. Although without records of flood depths, the same appendix indicates an extensive flood plain on the adjacent land to the southern boundary of the site. When considering this element combined with records of flood on areas downstream to the site, which have resulted in saturated gardens, the consideration of a level for level compensation on the south of the site is deemed to increase the risk of flood to the land south of our site.

Therefore the use of level for level compensation has been disregarded and the use of a void considered the preferable option for this site. According to EA requirements *'It is imperative that the void space beneath the dwelling is kept free from debris throughout the lifetime of the development. This enables the voids to fulfil their flood storage role. The local planning authority should be satisfied that this is achievable and may wish to consider including a condition on any decision notice where permission is granted or requiring the applicant to enter into a legal agreement.'*

To date no feedback from the Local Planning Authority (LPA) has been received, thus we recommend that the required maintenance and management scheme for the void, with the agreement of the LPA and the EA, should be warranted as a condition to practical development commencing.

The proposed void is estimated to be outside the predicted flood plain for 2115. Nonetheless, and considering potential deviations the proposed void will provide additional freeboard for flood water thus additional safeguard to people and property by allowing an increase of flood plain beyond the predicted levels without detrimental effects onsite or elsewhere.

To limit proposed development surface runoff water and to achieve flow rates similar to the ones prior to the development a sustainable urban drainage systems (SUDs) scheme will be required. Government policy and strategy strongly recommends the use of SUDs as approach to prevent the increase in flood risk. Systems should be implemented to reduce the amount of surface runoff in the event of a peak rainfall.

The use of a gravel permeable system will be utilised on driveways and parking spaces to allow the current natural evapotranspiration to be maintained. Additional to the proposed permeable driveway and parking areas, we proposed the use of rainwater harvesting tank and attenuation storage, to provide adequate storage capacity and minimise the potential effects of surface runoff due to the new built footprint.

Initial calculations showing the feasibility of these proposed SUDs were carried out using the guidance given on R&D technical report W5-074/A/TR1/1 Rev. E (2012) *'Preliminary rainfall runoff management for developments'* which provides a preliminary indication of storage volume requirements. The guidelines provided on the report also emphasise the need for a detailed final drainage design after planning permission has been granted.

The preliminary study indicates that to maintain the initial rates and volumes of runoff from the site once developed, about 1m³ of storage will be required. This value is based on the principle that only

the proposed building area is impermeable and that rainwater harvesting system and a soakaway or attenuation tank, installed to the south western boundary of the site, will be used to cater for proposed dwelling roof runoff flows, allowing for a controlled management of the surface water runoff rates. Initial storage volume calculations are shown in Appendix M. However, based on the expected geology, further investigation will be required to attain site infiltration rates and determine if a soakaway construction is feasible or if an attenuation storage will be required on our site.

The new development will have an impact on the foul water flow due to the increase in number of people using the network, which will be directed to the local sewerage infrastructure. Foul water drainage used to be managed onsite with a treatment plant, sited on the northernmost section of the site. However, the current foul drainage infrastructure is managed via a manhole sited at the south-eastern boundary of number 21 Hocombe Road which is believed to be connected to Southern Water foul drainage infrastructure at The Glade, Thornbury Wood. Southern Water Sewer records are shown in Appendix N.

Although Southern water sewer records do not show the foul water manhole identified during site survey, which gives an indication that the identified drainage infrastructure is private, nor any foul or storm drainage infrastructure at The Glade, it is understood that a public sewer is installed at The Glade seeing that there are more than one property at the location. Hence, a full drainage survey is recommended to attain the accuracy of these assumptions and infrastructure discharge capacity at said location. Equally, attention must be paid to drainage infrastructure to avoid drainage infrastructure construction near and/or within floodplain areas and propose that any new inspection chambers placed within flood Zone 1. Providing that the measures considered above are put in place it is believed that the site will not affect or be affected by flood risk of the nearby watercourse.

7. Flood Water displacement

Although the proposed site is partially within predicted flood zone, the proposed new dwelling is outside the predicted flood zone and is not expected to affect the volume of displaced water, should a flooding event occur. Using the existing topographical levels on the site and the available EA flood data during the predicted flood zone 3 event approximately 50% of the site area will be covered by flood water, however, only the proposed parking space and part of the driveway area will be within the predicted flood zone 3. Appendix K show the extent of the predicted flood zone 3.

Due to site topography, maximum predicted onsite flood levels, and to preclude flood water damage due floodwater displaced from site we recommend that the new development proposed dwelling is constructed on a partially-voided suspended pile slab with the advised average 0.300m freeboard above the predicted flood levels minimise the likelihood of damage to people and property onsite or elsewhere. The proposed flood water displacement strategy is depicted below on Figure 6.

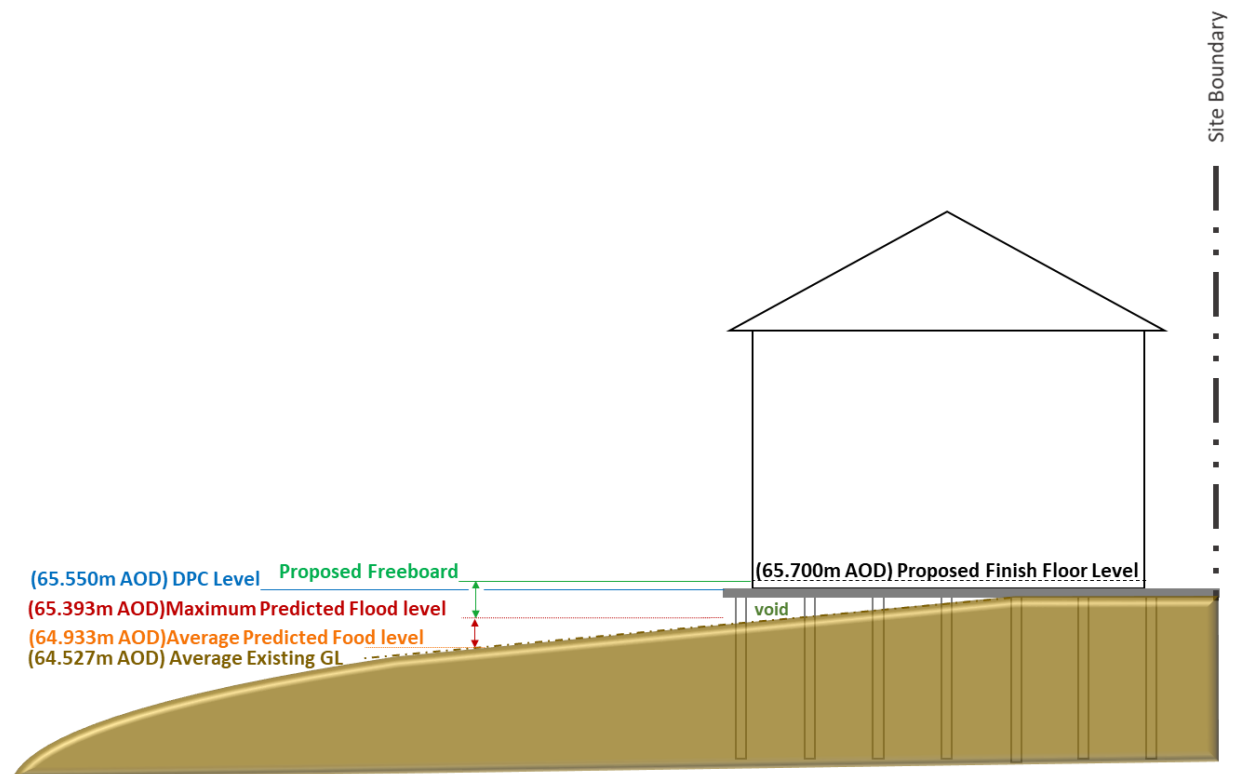


Figure 6: Proposed site, dwelling orientation and flood water strategy

Using an average flood water depth of 0.406m and the additional freeboard depth, the proposed approach to the new development area will allow onsite flood water volumes to remain the same without the loss of flood plain volumes. Additionally, the proposed use of rainwater harvesting tanks as well as the provision of a soakaway/attenuation system will cater for the additional surface runoff due to the construction of the new dwelling. Current site infiltration rates are to be maintained on parking area and driveway with the proposed overlay of gravel surface.

8. Risk Assessment

Consultations have been held with the EA. The information from the EA depicts that although the site is partially within Flood Zone 3 - an area where the chance of flooding from both rivers and the sea has been assessed as less than 1.0% in any year (1 chance in 100 in any year), the new proposed dwelling lies outside said zone. Notwithstanding, due to site topography and close proximity to flood risk measures are required as noted previously to ensure that a flood event will not adversely affect the site and nearby areas.

9. Sequential and Exception Test

Sequential and exception tests are required to prove that developments provide wider sustainability benefits to the community that outweigh flood risk. The NPPF classifies 'areas at risk of flooding' as land within Flood Zones 2 and 3, or land within Flood Zone 1 which have critical drainage problems and which have been notified as so to the local planning authority by the EA.

The aim of the sequential test is to steer developments towards flood zone 1 and avoid areas at risk. The information obtained from the EA shows that although the proposed development site is partially within flood zone 3, the proposed new dwelling is within flood zone 1 and outside the predicted flood zone. The previous discussions have established that as long as the proposed measures are implemented the new dwelling can be constructed avoiding any direct risk of flooding or causing additional flood risk. Although limited, access to and from the site will also be available during any flooding event, which is expected to effect the proposed parking area and part of the driveway.

Providing that the new development considers the flood risk strategies hereby provided, the proposed development site will account for the expected floodplain limits, allowing for the potential 45% climate change allowance increase. At its worst, the proposed approach to the flood risk will allow flood water to a maximum climate change increase of about 80% prior to any damage occurring to people or property.

Foul and storm water drainage issues can be suitably detailed to avoid increasing or being affected by any flooding issues. It will also be possible to avoid any flood water displacement by installing the measures as noted above. Therefore, considering the previous points we believe that the site is suitable for development as long as the proposed measures are installed as previously noted.

10. Conclusion and Recommendation

Investigation results have shown that according to the EA flood mapping and data part of the site is within flood zone 3, however the new proposed dwelling is sited within flood zone 1 outside the flood risk zone.

Using the predicted flood data supplied by the EA an average flood water level of 64.933m AOD can be expected with maximum predicted flood level of 65.393m AOD expected at point 4. As in the previous paragraphs we would propose that a new FFL for the new dwelling is set at a minimum of 65.700m AOD, thus providing a minimum freeboard of 0.300m above the predicted onsite flood event level.

Storm water drainage discharge from the site will be limited by using rainwater harvesting and a soakaway/attenuation storage system. Similarly, through the provision of permeable construction for new driveway/parking areas current site flow rates are expected to be maintained. Initial assessment estimates the requirement for 1m³ of attenuation storage for storm water which to be discharged into the soakaway/attenuation storage system located at the south western boundary of the site.

Foul water from the site is expected to be discharged into identified manhole in the neighbouring property. However, a site survey will be required to accurately attain foul water flow direction and connecting point to Southern Water Drainage infrastructure. Southern Water will need to be contacted and permission obtained to connect and discharge into the infrastructure system.

The foul water discharge from the site will slightly increase flows but with no significant effect. Similarly, foul water drainage is not expected to affect flood risk on the site. We would however propose that if any new drainage inspection chambers are installed within the predicted flood zone, it must be installed with sealed covers to ensure that no flood water will enter the foul water system during a flood event.

To ensure that no flood water is displaced from site we propose that ground levels on the site are kept as existing with the extreme western side of the site, as suggested throughout the analysis and established by the averages of points 4, 5 and 6 existing ground level of about 64.523m AOD, with the highest existing ground level, 64.90m AOD, at point 4, which is about 0.425m lower than average ground level at proposed building location in of 65.325m AOD.

In summary, the proposed dwelling is outside the identified flood zone with a FFL 0.300m above the maximum flood level and about 0.765m above the average flood level onsite. The proposed dwelling

is to be built using pile foundations within a raised floor level above existing ground level, allowing the expected flood zone and new development to coexist, whilst precluding flood water displacement. Therefore, we believe that the proposed dwelling can be built and will not result in any increase in flood risk to the site users or nearby areas.

APPENDIX

A. Site Location Plan

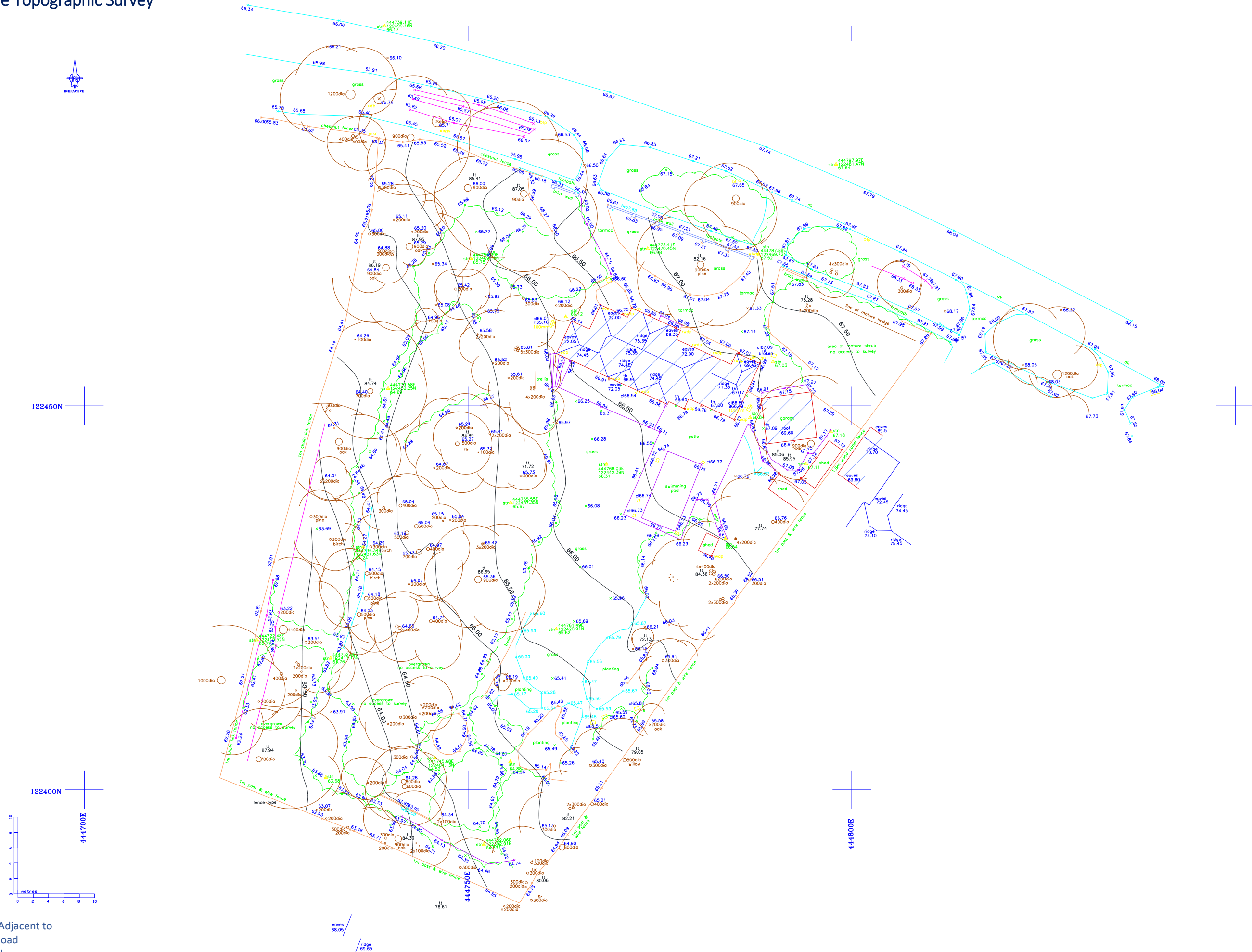


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Image compiled from Google Maps GIS, accessed on August 23rd 2018

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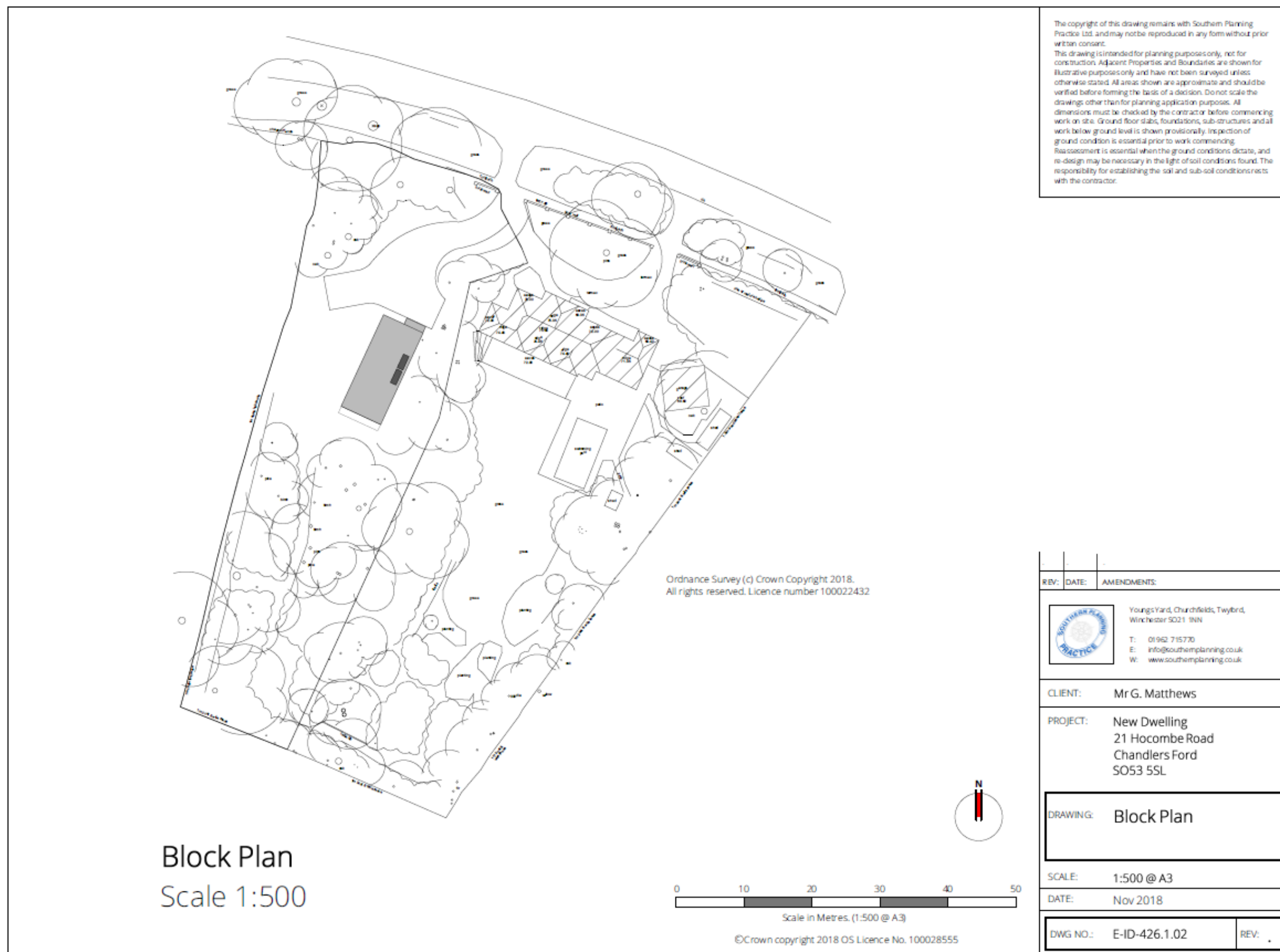
B. Site Topographic Survey



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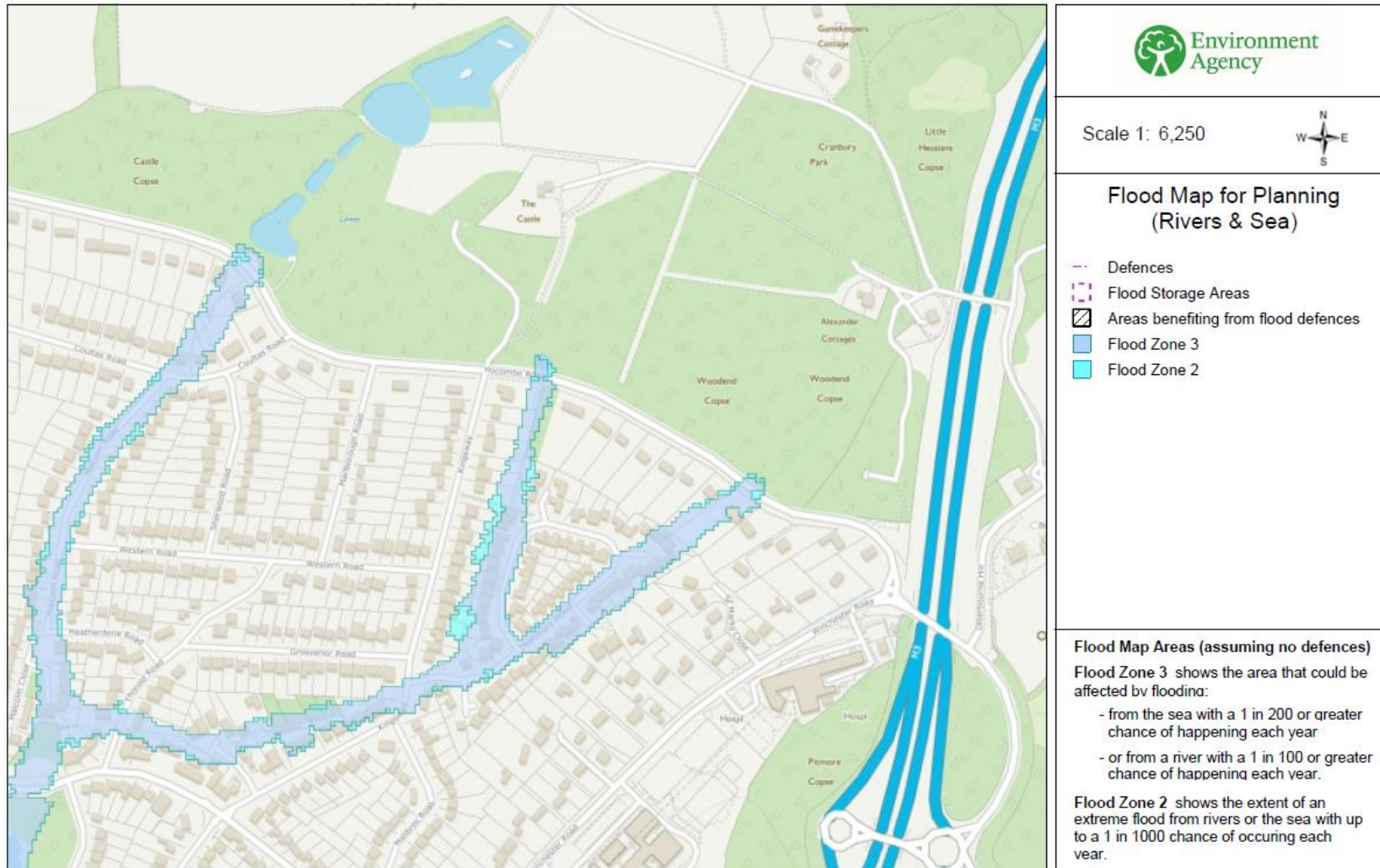
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C. Proposed Development Plan



D. Risk of Flooding from River and Sea

Flood Map for Planning (Rivers and Sea) Centred on Hocombe Road - Created 21 Sept 2018



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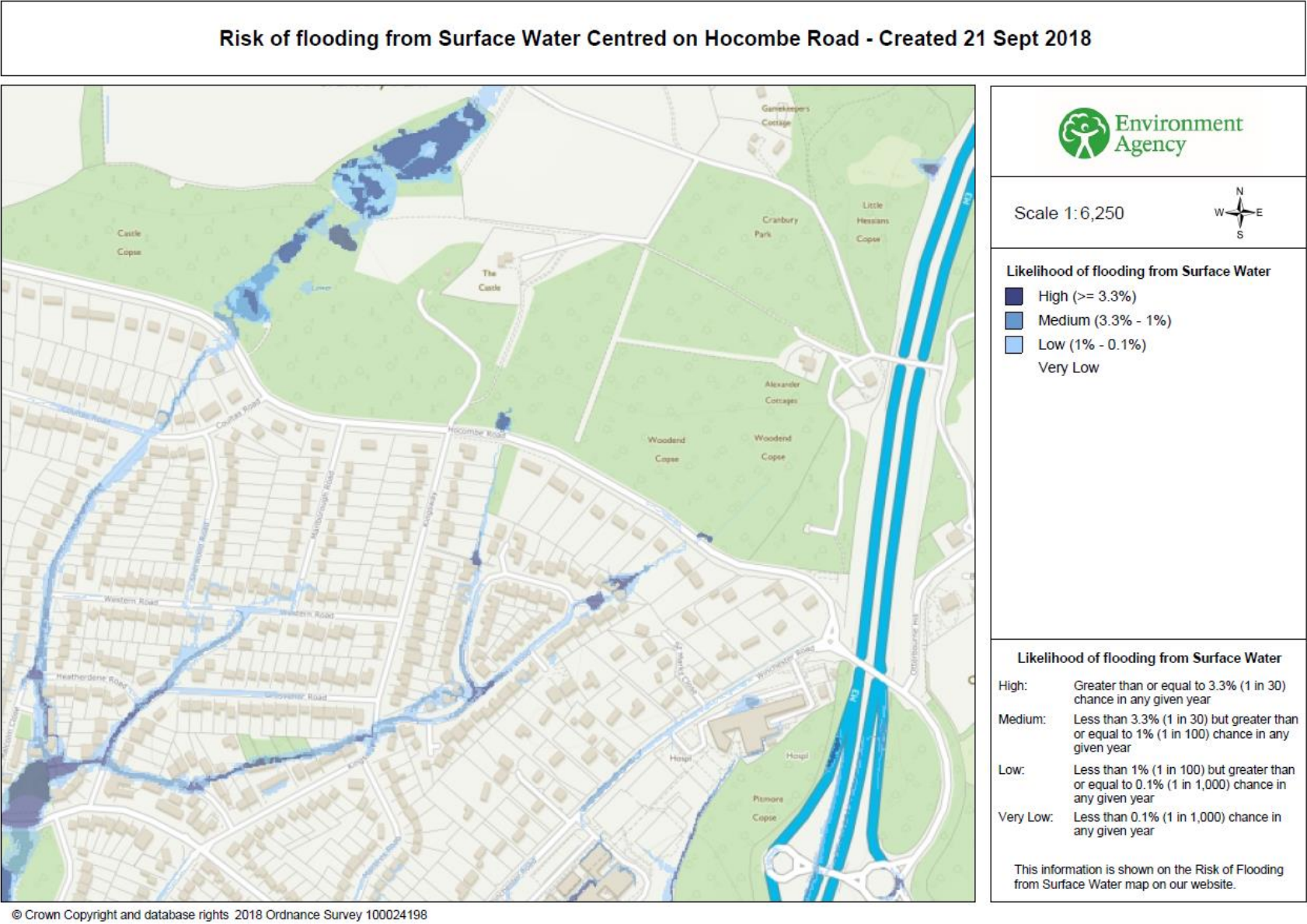
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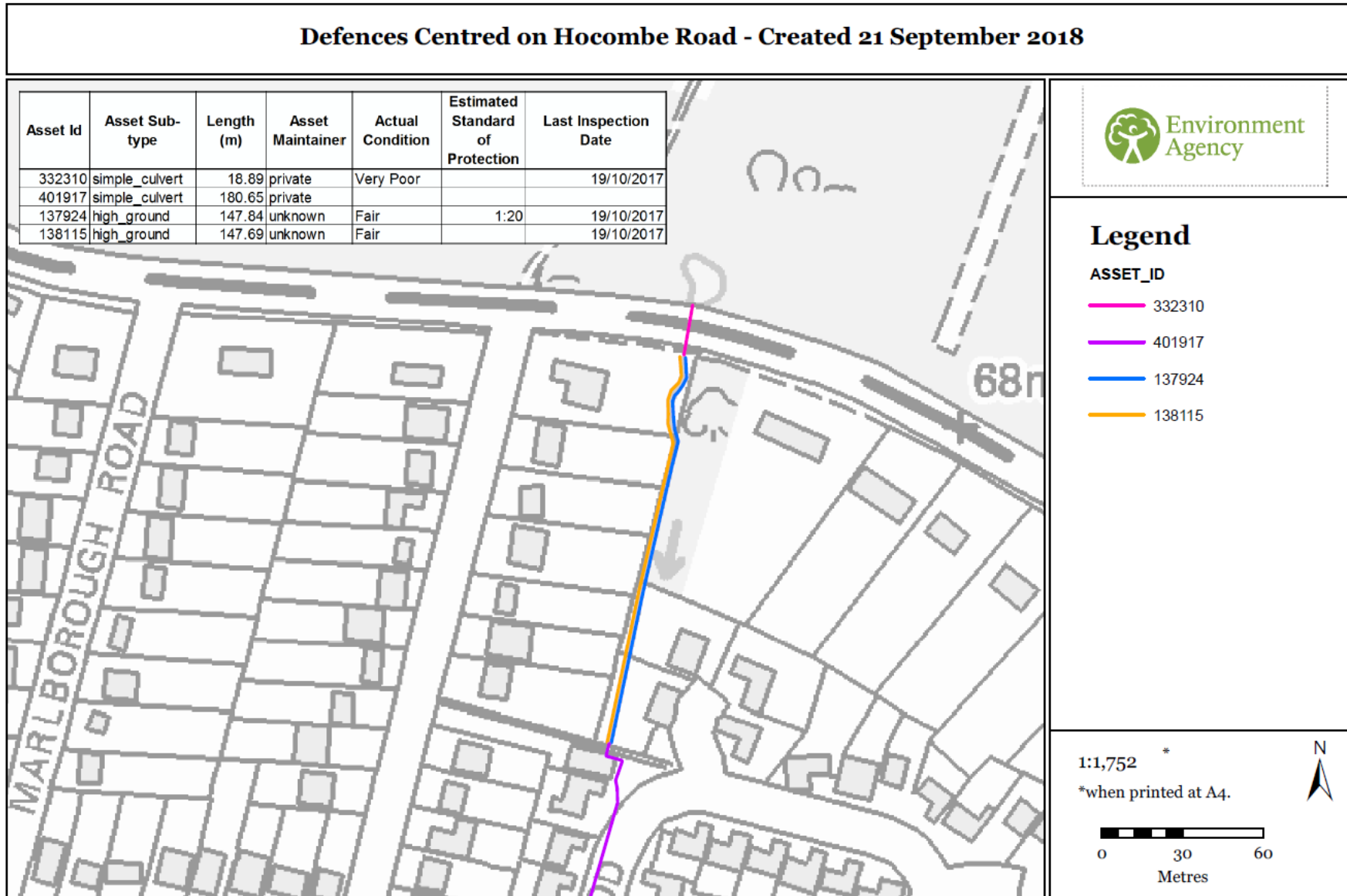
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E. Risk of Flooding from Surface Water



F. Flood Defences Centred in Hocombe Road



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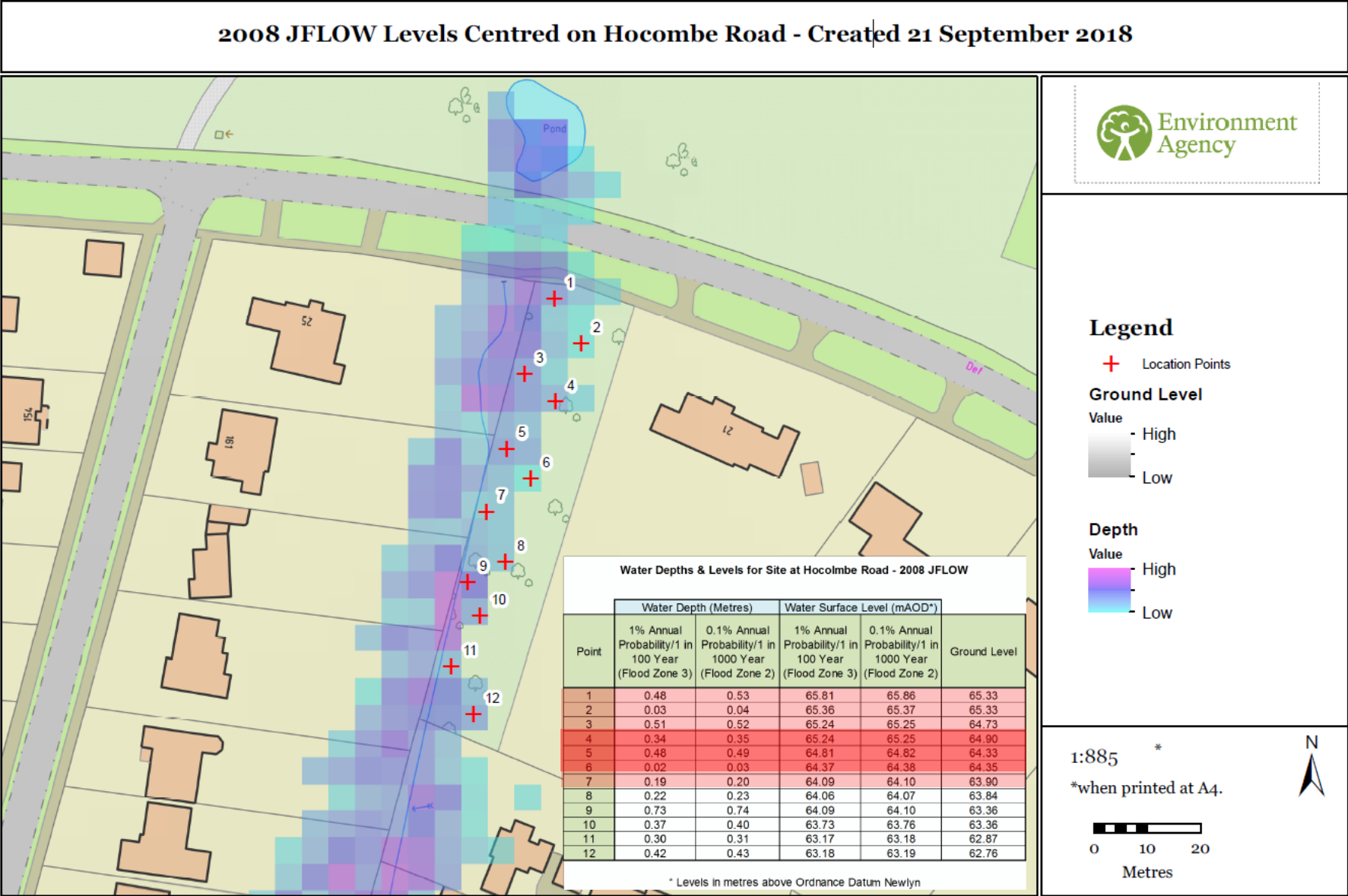
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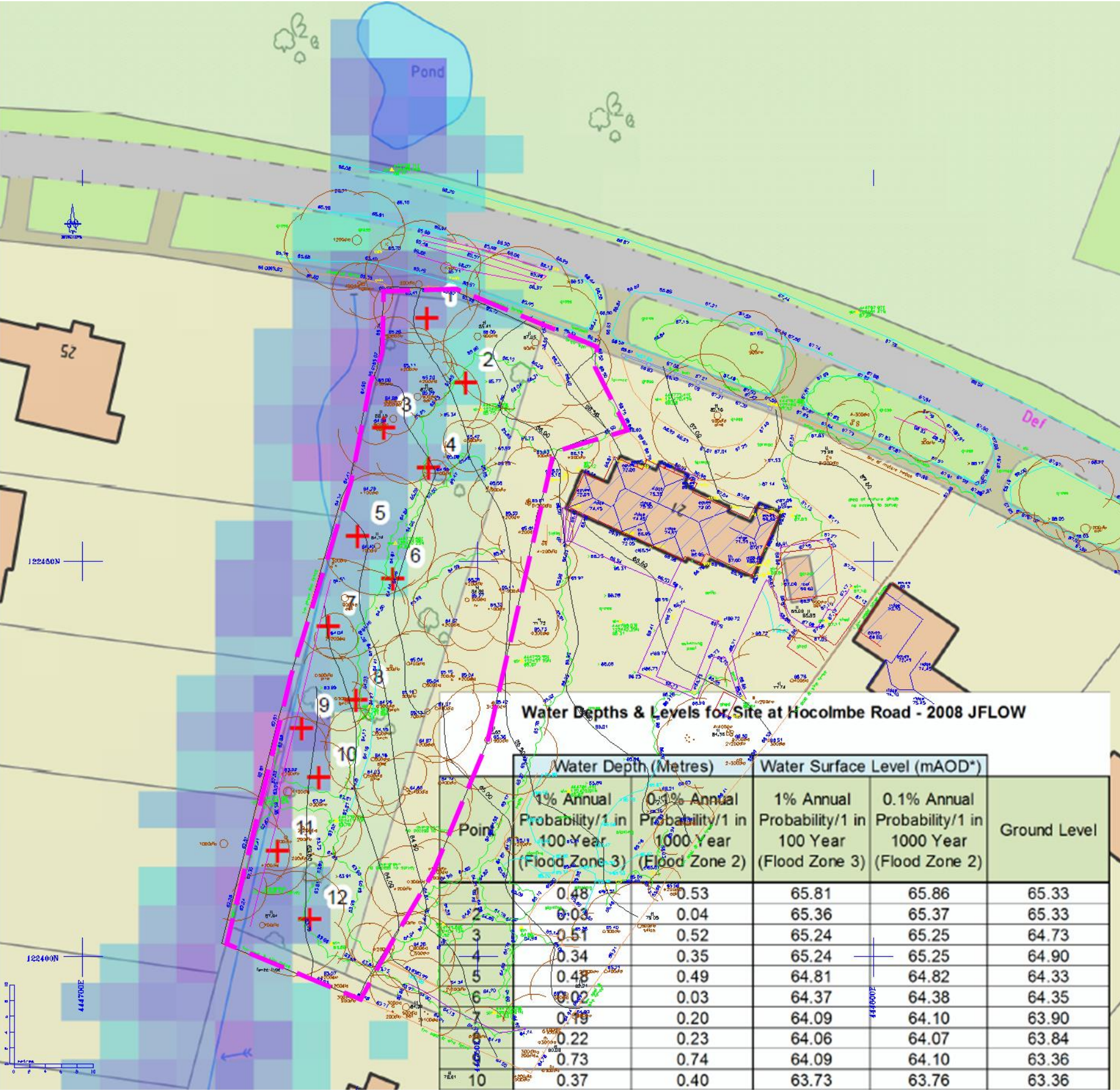
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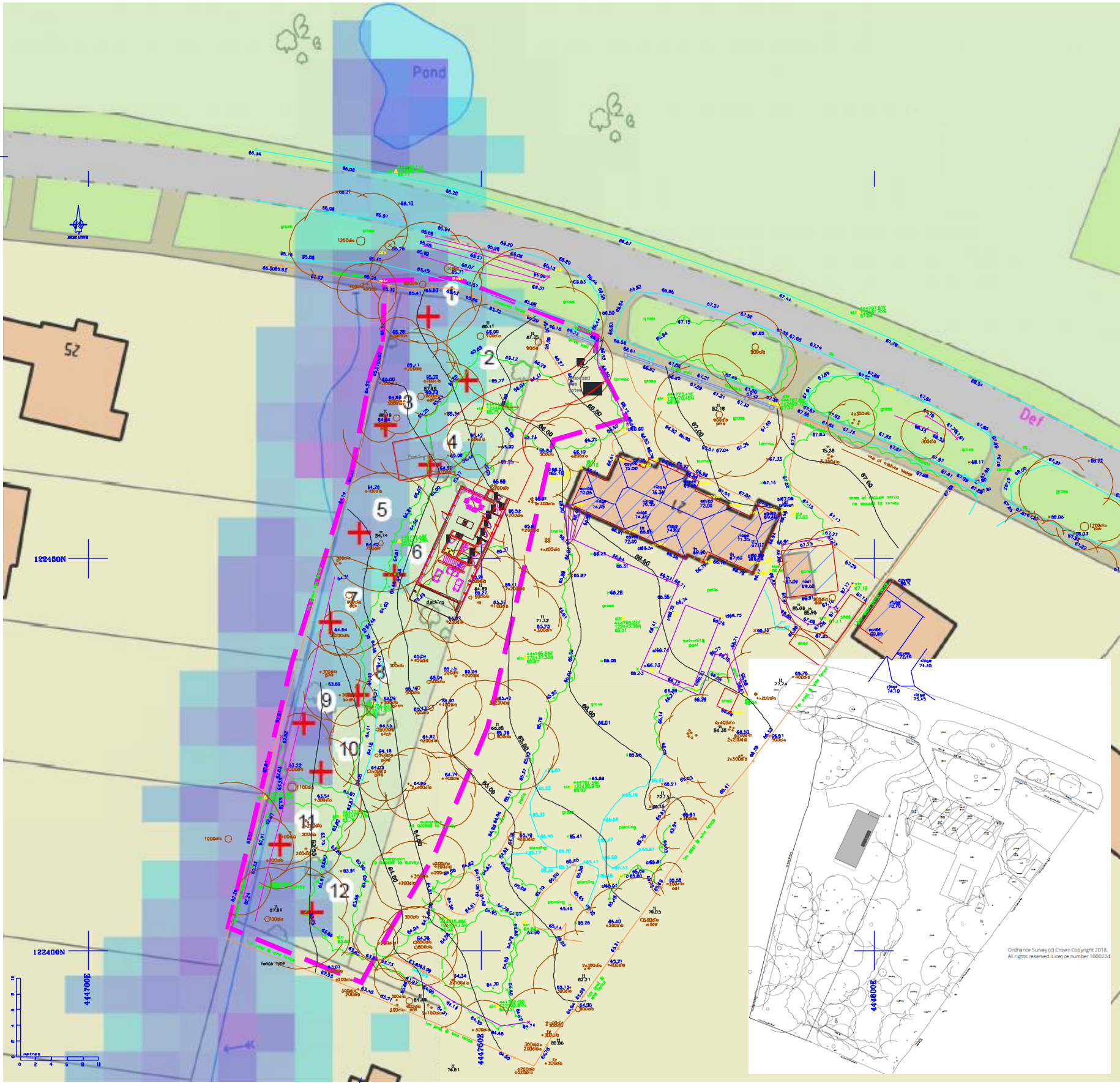
H. EA Product 4 Data



I. EA Product 4 Data with Site Topographic Survey Overlay



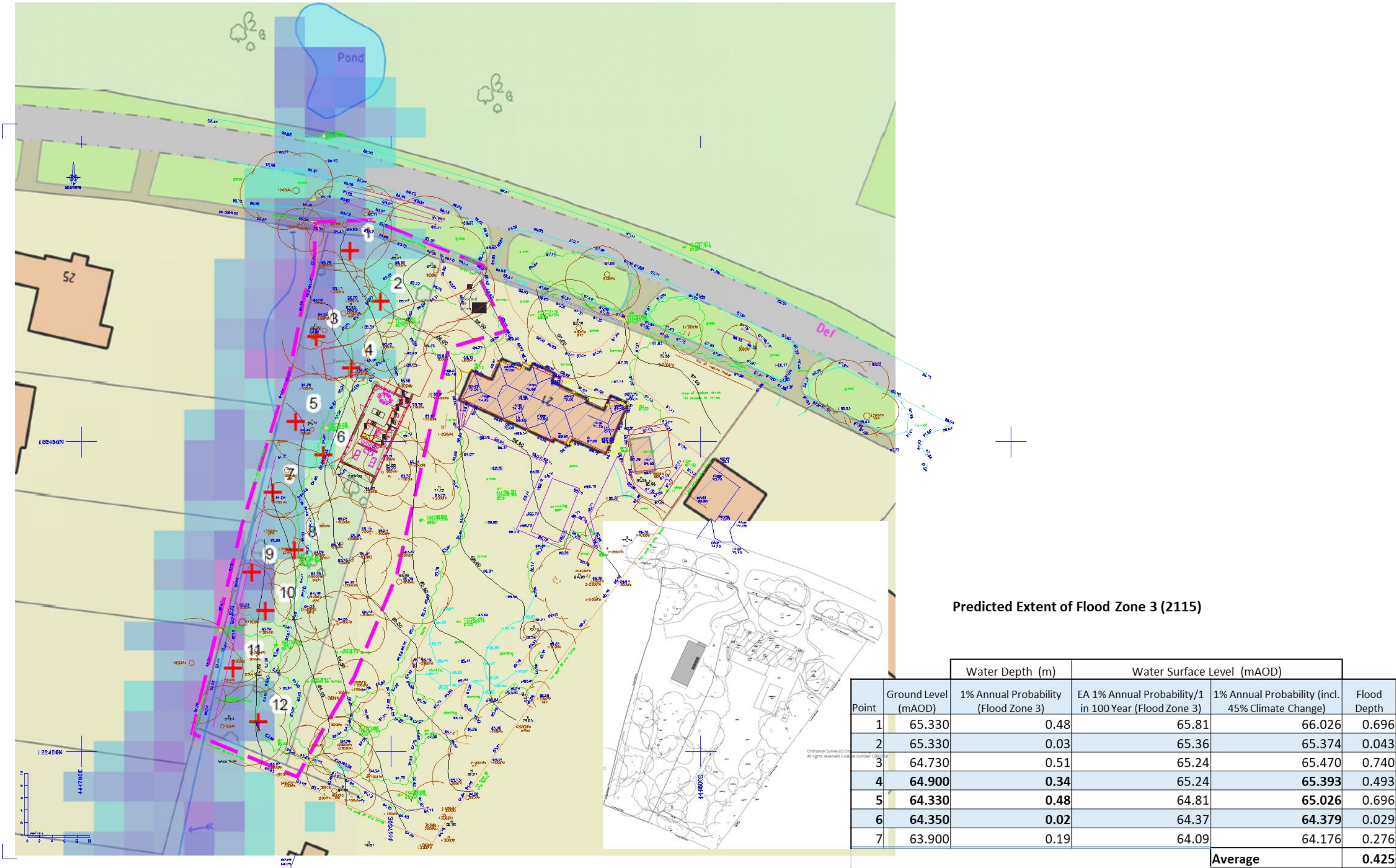
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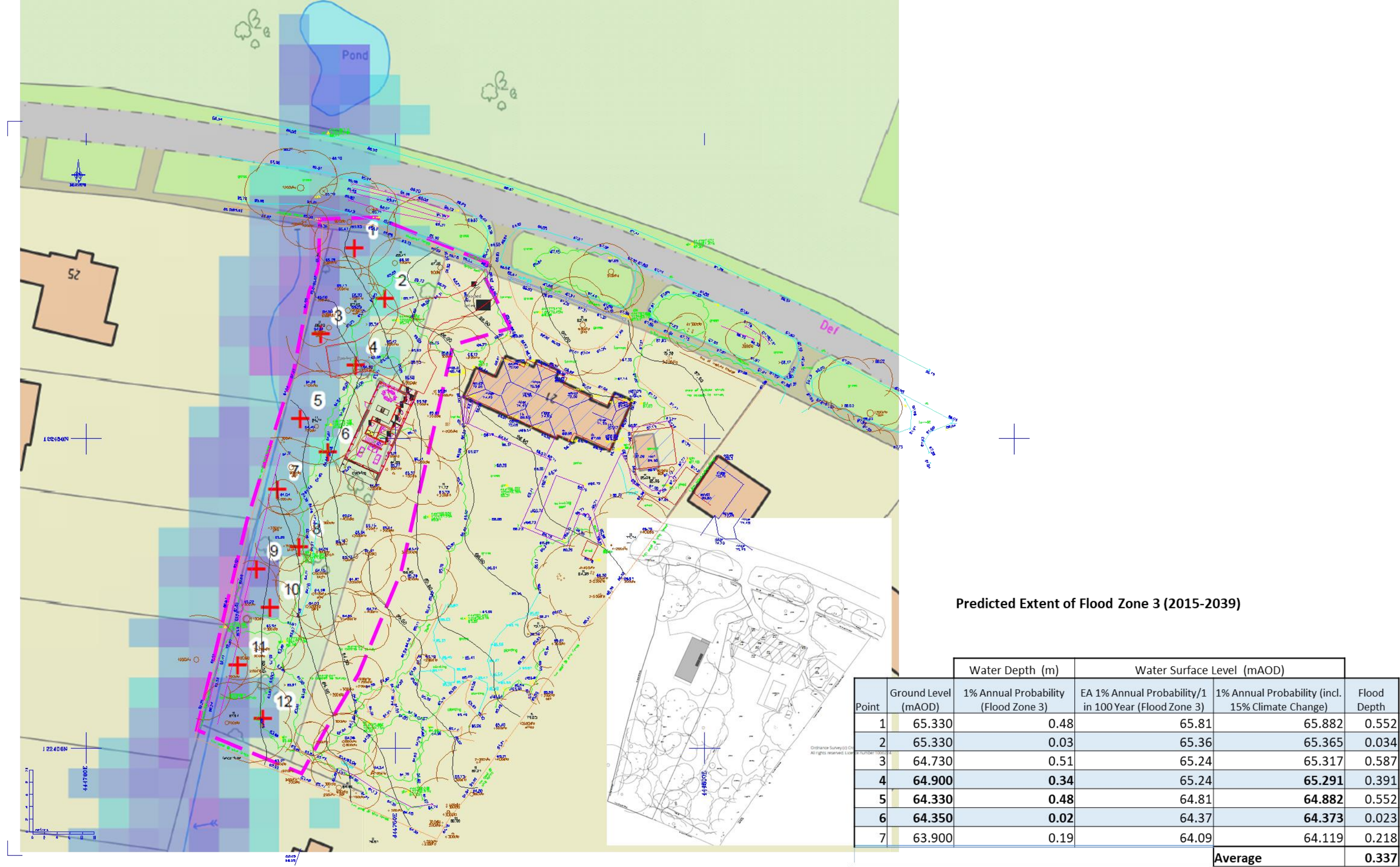
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K. EA Product 4 Data with Predicted Extent of 2115 Flood Zone 3



L. EA Product 4 Data with Predicted Extent of 2015 to 2039 Flood Zone 3



M. Surface Water Storage Requirements



Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by: Hedwilena Silva
Site name: Land Adjacent to 21 Hocombe Road
Site location: Chandlers Ford

Site coordinates
Latitude: 50.99976° N
Longitude: 1.36363° W

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the drainage scheme.

Reference: 6440092
Date: 2019-02-18T15:23:07

Methodology	IH124
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Site characteristics

Total site area (ha)	0.1614
Significant public open space (ha)	0.13
Area positively drained (ha)	0.0313999999
Pervious area contribution (%)	0
Impermeable area (ha)	0.0239
Percentage of drained area that is impermeable (%)	76
Impervious area drained via infiltration (ha)	0
Return period for infiltration system design (year)	100
Impervious area drained to rainwater harvesting systems (ha)	0
Return period for rainwater harvesting system design (year)	100
Compliance factor for rainwater harvesting system design (%)	66
Net site area for storage volume design (ha)	0.03
Net impermeable area for storage volume design (ha)	0.02

* Where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50 % of the 'area positively drained', the 'net site area' and the estimates of Qbar and other flow rates will have been reduced accordingly.

Design criteria

Volume control approach	Use long term storage	
	Default	Edited
Climate change allowance factor	1.45	1.45
Urban creep allowance factor	1.1	1.1
Interception rainfall depth (mm)	5	5
Minimum flow rate (l/s)	5	5
Qbar estimation method	Calculate from SPR and SAAR	
SPR estimation method	Calculate from SOIL type	
	Default	Edited
Qbar total site area (l/s)	0.89	—
SOIL type	4	4
HOST class	N/A	N/A
SPR	0.47	0.47

Hydrology

	Default	Edited
SAAR (mm)	784	784
M5-60 Rainfall Depth (mm)	20	20
'r' Ratio M5-60/M5-2 day	0.4	0.4
Rainfall 100 yrs 6 hrs	63	
Rainfall 100 yrs 12 hrs	86.24	
FEH/FSR conversion factor	1.12	1.12
Hydrological region	7	
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 10 year	1.62	1.62
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Site discharge rates	Default	Edited
Qbar total site area (l/s)	0.89	0.89
Qbar net site area (l/s)	0.17	0.17
1 in 1 year (l/s)	5	5
1 in 30 years (l/s)	5	5
1 in 100 years (l/s)	5	5

Estimated storage volumes	Default	Edited
Interception storage (m³)	1	1
Attenuation storage (m³)	0	0
Long term storage (m³)	0	0
Treatment storage (m³)	3	3
Total storage (excluding treatment) (m³)	1	1

This report was produced using the Storage estimation tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at <http://uksuds.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CIEH, Hydrocollutions or any other organisation for use of this data in the design or operational characteristics of any drainage scheme.

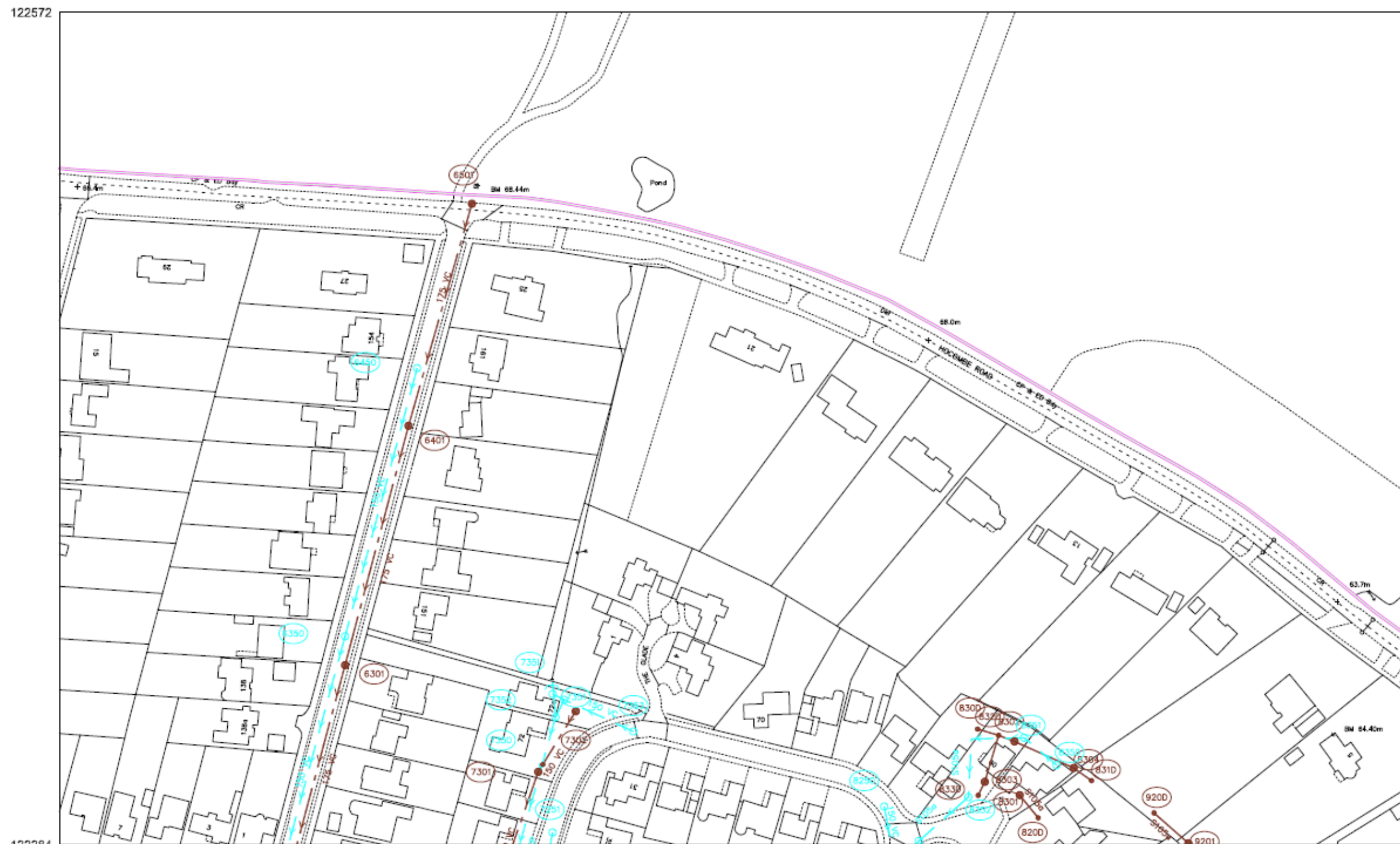
Ref.: 403947

Development Adjacent to
21 Hocombe Road
Chandlers Ford

Flood Risk Assessment Report

14 May 2019

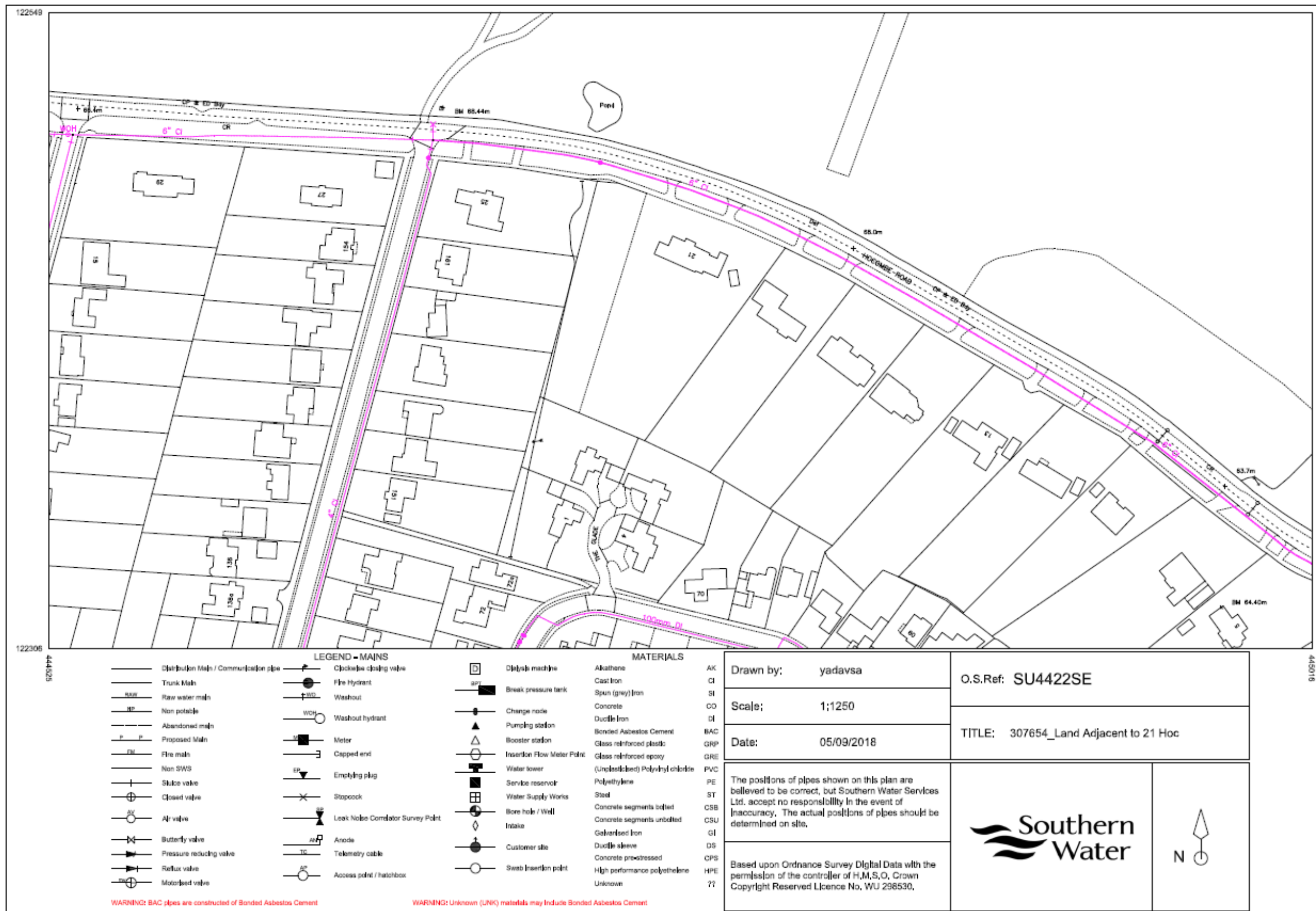
SEWER RECORDS PAGE 1 OF 2



O.S. REF. SU4422SE	Drawn by: yadvava	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	 N	
	Scale: 1:1250			
Title: 307654_Land Adjacent to 21 Hoc	Date: 05/09/2018	Based upon Ordinance Survey Digital Data with the permission of the controller of H,M,S,O, Crown Copyright Reserved Licence No. WU 298530.		

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape
6301X	62.8	60.85	175	VC	CIRC
6350X	63.22	62.04	150	VC	CIRC
6401X	65.42	63.6	175	VC	CIRC
6405X	66.05	64.93	150	VC	CIRC
6501X	67.46	65.52	175	VC	CIRC
7251X	58.87	57.77	150	VC	CIRC
7301X	59.68	57.76	150	VC	CIRC
7302X	60.69	59.81	150	VC	CIRC
7350X	60.56	58.46	600	CP	CIRC
7351X	60.61	59.08	300	VC	CIRC
7352X	60.39	59.22	300	VC	CIRC
7353X	61.16	59.64	150	VC	CIRC
7359X	62.29	59.69	600	CP	CIRC
8250X	61.29	60.24	150	VC	CIRC
8252X	60.6	59.56	150	VC	CIRC
8301X			UNK	UNK	CIRC
8302X			UNK	UNK	CIRC
8303X			UNK	UNK	CIRC
8304X			UNK	UNK	CIRC
830DX			UNK	UNK	CIRC
831DX			UNK	UNK	CIRC
832DX			UNK	UNK	CIRC
8350X			UNK	UNK	CIRC
8351X			UNK	UNK	CIRC
8352X			UNK	UNK	CIRC



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to provide water storage within the car park, reducing the impact on the surface water system. This site will require additional investigation to determine who is responsible for the drainage in this area.

The River Hamble is the source of much of the potential flood risk in the area and is identified by the EA as the 'Hamble Estuary' Flood Warning area.

In addition to the River Hamble, the Hungerford Stream, which is also a main river, starts in the Lowford area and flows south to meet the Hamble at the southern edge of the parish at the Portsmouth / Southampton railway line. The Hungerford Stream is highlighted as Flood Zone 3 and is also shown to have a potential to surface water flooding. This is likely to be due to the interaction of the stream and any surface water drainage out falling in that area.

Overall, Bursledon is considered to be at a relatively low risk of flooding although care must be taken when looking at future developments or drainage works in the vicinity of the watercourses in order to avoid flooding as a result of rising river levels.

The recommendations for Bursledon are:

- Hampshire County Council as LLFA should lead the investigation into Long Lane drainage issues to determine responsibility.
- The Planning Authority should ensure that future developments take into account potential flood risk and do not increase runoff rates within these areas

7.2.5. *Chandlers Ford*

At the most north westerly point of Eastleigh borough, Chandlers Ford is a heavily urbanised parish bordered by the adjoining boroughs and the M3. The Eastleigh to Romsey railway line runs through the centre of the parish.

This parish has a number of the Monks Brook tributaries running through its northern section forming the main Monks Brook River adjacent to the railway station which then runs south through Eastleigh town and into Southampton City.

There have been a number of flooding incidents within the parish of Chandlers Ford however, works have been undertaken on a number of them including Leigh Road, Cambridge Drive and Ford Avenue. Works have also been carried out on Hocombe Road which, although having reduced the risk of flooding, is dependent on a suitable maintenance regime being in place. Flooding is still a risk in Gordon Road, Common Road and Nickson Close where the watercourse has been known to overtop the culvert and Pine Road where debris is an issue, blocking the gullies. All of these areas are within the Monks Brook catchment and should be considered for further investigation and potential drainage improvements.