CGV Transport Consultants Ltd
TRANSPORT PLANNING & HIGHWAY ENGINEERING

Flood Risk Assessment

Land South of Saltmarsh Lane
Hayling Island, PO11 0JT

for

Hayling Island Builders Limited
1139

July 2025

Version 4.0

Flood Risk Assessment

Land South of Saltmarsh Lane

for

Hayling Island Builders Limited

Revision	Date of issue	Comments	Prepared By	Checked By
1.0	29.07.2021	Initial Issue	AJ	DB
2.0	14.10/2021	Layout Change	AJ	DB
3.0	27.06.2022	Updated to new template, updated to new climate change data, Coastal Partners epoch flood information reviewed against new received flood data from the EA	AJ	DB
4.0	03.07.2025	Updated to 2025 SW Flood data and Havant 2024 SFRA	CV	DB

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Executive Summary

Description	
CGV Transport Consultants has been instructed by Hayling Island Builders Limited, to produce a Flood Risk Assessment under National Planning Policy Framework (NPPF) to support the Planning Application for the site at Land South of Saltmarsh Lane, Hayling Island, PO11 0JT.	
Flood Risk Assessment	
Coastal: Fluvial: Pluvial: Groundwater: Other sources:	Zone 1 Zone 1 Low Low Low
Flood Resilience Measures	
None required	
Conclusions	
The site is not at risk of any forms of flooding. There is SFRA mapping that indicates there may be an undefended risk to the site using an epoch baseline. A hierarchical approach has been used to examine this risk and found not to be an issue as accepted by Coastal Partners.	

Contents

Appendices

1.0 Introduction

1.1.1 Hayling Island Builders Limited is planning a proposed development on the site at Land South of Saltmarsh Lane, Hayling Island, PO11 0JT.

1.1.2 CGV Transport Consultants has been instructed by Hayling Island Builders Limited, to produce an updated Flood Risk Assessment to support the Planning Application.

1.1.3 This report aims to demonstrate that the site is not at risk of any form of flooding.

1.1.4 This report aims to demonstrate that any concerns raised by the planning authority have been addressed. This includes information supplied by the Coastal Partners in case sea levels rise. The findings of version 3 of this report were accepted by Coastal Partners, but there was a need to update to include the latest Surface Water flood mapping and the check the updated Havant SFRA.

1.1.5 The general limitations of this assessment are that:

- Several data sources have been used in compiling this report. Whilst CGV Transport Consultants believe them to be trustworthy; it is unable to guarantee the accuracy of the information that has been provided by others.
- This report is based on information available at the time of preparation. There is potential for further information to become available, which may create a need to modify conclusions drawn in this report.

2.0 Location of Site

2.1.1 The site is located south of Saltmarsh Lane in Hayling Island. A location plan is enclosed in **Appendix A**.

2.1.2 The Local Authorities are Havant Borough Council and Hampshire County Council.

3.0 Site Description

3.1 Existing Site

3.1.1 The existing site is the parcel of land to the south of Saltmarsh Lane. A topographical survey has been commissioned for the site and can be found in **Appendix B**.

3.2 Existing Geology

3.2.1 The geology of the site has been ascertained by reference to the 1:50,000 British Geological Survey website. The data provided on the website indicates the bedrock and superficial drift geology for the site.

3.2.2 The strata of the site London Clay Formation - Clay, silt and sand. Sedimentary bedrock formed between 56 and 47.8 million years ago during the Palaeogene period. formation, described as follows:

"The London Clay mainly comprises bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin courses of carbonate concretions ('cementstone nodules') and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation. At the base, and at some other levels, thin beds of black rounded flint gravel occurs in places. Glauconite is present in some of the sands and in some clay beds, and white mica occurs at some levels."

3.2.3 The strata of the site (superficial drift) comprises River Terrace Deposits, described as follows:

"River Terrace Deposits (undifferentiated) - Sand, Silt and Clay. Superficial Deposits formed up to 3 million years ago in the Quaternary Period. Local environment previously dominated by rivers (U). These sedimentary deposits are fluvial in origin. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting)."

3.3 Hydrogeology Setting

3.3.1 The Environment Agency (EA) mapping service, as provided by Magic Map, indicates the aquifer designation for the bedrock and superficial drift geology and the groundwater vulnerability in the area. The mapping, as included at **Appendix C**, provide the following information for the site:

Geology Map	Site Description
Aquifer Designation (Bedrock)	Unproductive
Aquifer Designation (Superficial Drift)	Secondary A
Groundwater Vulnerability	Medium / Low
Groundwater Source Protection Zone	None

4.0 Proposed Development

4.1.1 The proposal is for 60 No. new residential units. A site plan Is included at **Appendix D**.

4.1.2 A fairly detailed drainage design has been submitted as part of this application together with a proposed levels plan, for ease of reference these are in attached in **Appendix K**.

5.0 Flooding Information

5.1.1 As set out in the National Planning Policy Framework (NPPF), inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. For these purposes:

- "areas at risk of flooding" means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems, and which has been notified to the local planning authority by the Environment Agency;
- "flood risk" means risk from all sources of flooding - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

5.1.2 Flooding information for Planning from the Environment Agency (EA) has indicated the site is located within Flood Zone 1, as found in the map at **Appendix E**.

5.1.3 As the site is within Flood Zone 1, no further data was required from the Environment Agency to support versions 1.0 and 2.0 of this report.

5.1.4 There is an identified risk of flooding on the SFRA mapping using epoch baselines, which will be assessed in this report. To support this, further data was requested from the Environment Agency and can be found at **Appendix H**.

5.1.5 As part of the data capture, data and mapping from the Havant Strategic Flood Risk Assessment (SFRA) was sought. This will be included and references in the relevant sections below.

6.0 Flood Risk Classification

6.1.1 The data on the EA's website in their updated mapping, shows the site has a "very low" risk of flooding.

6.1.2 The EA confirmed that the proposed development site is located in Flood Zone 1 for Planning.

6.1.3 According to Table 2 of National Planning Policy Framework (NPPF), the development, being residential, is classed as 'more vulnerable'.

6.1.4 According to NPPF Table 3 'Flood Risk Vulnerability and Flood Zone Compatibility', the development should be permitted.

Table 3: Flood risk vulnerability and flood zone 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

Key: ✓ Development is appropriate.
× Development should not be permitted.

6.2 Sequential Test

6.2.1 Local Planning Authorities (LPA) are encouraged to take a risk-based approach to proposals for development in or affecting flood risk areas through the application of the Sequential Test and the objectives of this test are to steer new development away from high-risk areas towards those at lower risk of flooding.

6.2.2 However, in some areas where developable land is in short supply, there can be an overriding need to build in areas that are at risk of flooding. In such circumstances, the application of the Sequential Test is used to ensure that the lower risk sites are developed before the higher risk ones.

6.2.3 Sequential Test should be applied at all stages of the planning process, and the starting point is generally the Environment Agency's flood zone maps. The need to undertake sequential tests for all forms of flooding has been questioned by many flood risk and planning practitioners as impact on residents and properties from surface water flooding in the most instances is negligible.

6.2.4 Paragraph 175 of the NPPF states *"The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk)."*

This site-specific report has demonstrated that no built development is within the surface water flood risk area including access or escape routes and not be in an area at risk of flooding now and in the future. The report has also demonstrated that the site will not be at risk of sea levels rising If the finished floor levels are fixed at least 300mm above the flood level including climate change allowances.

6.2.5 These maps and the associated information are intended for guidance and cannot provide details for individual properties. They do not consider other considerations such as existing flood defences, alternative flooding mechanisms and detailed site-based surveys. They do, however, provide high level information on the type and likelihood of flood risk in any area of the country.

6.2.6 As the site is within Flood Zone 1 and the built area is not within an area of surface water flood risk area a sequential test is not applicable. Notwithstanding that there is no justification to undertake a sequential test, a sequential test was requested by the LPA and subsequently undertaken and submitted as part of the planning process.

6.3 Exception Test

6.3.1 The Exception Test is an additional test to be applied by decision-makers following application of the Sequential Test. The Exception Test has two elements as shown below, both of which must be satisfied for development in a flood risk area to be considered acceptable.

6.3.2 The Exception Test is only appropriate for use when there are large areas in Flood Zones 2 and 3, where the Sequential Test alone cannot deliver acceptable sites, but where some continuing development is needed for wider sustainable development reasons, considering the need to avoid social or economic blight and the need for essential civil infrastructure to remain operational during floods.

6.3.3 For the Exception Test to be passed:

a. It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA; and,
b. A site-specific FRA must demonstrate that the development will be safe for its lifetime, without increasing flood risk elsewhere and, where possible, reducing flood risk overall.

6.3.4 The site does not require an exception test in accordance with NPPF.

7.0 Climate Change Allowance

7.1.1 Climate change allowances, as set out by the Government guidance, are predictions of anticipated change for peak river flow, peak rainfall intensity, sea level rise and offshore wind speed / extreme wave height.

7.1.2 To increase resilience to flooding and coastal change, allowances for climate change are considered in any flood risk assessment.

7.1.3 The allowances are based on percentiles from UKCP18 climate change prediction data. A percentile is a measure used in statistics. They describe the proportion of possible scenarios that fall below an allowance level. The:

- Central allowance is based on the 50th percentile
- Higher central allowance is based on the 70th percentile
- Extreme allowance is based on the 95th percentile

7.1.4 To manage river flooding in on the site, any flood assessment should use the:

- Central allowance as your design allowance
- Higher central allowance to test the impacts of higher scenarios of climate change and any extra mitigation
- Extreme allowance to test your option under more extreme climate change and exceedance events
- 2080s epoch allowances for changes beyond the 2080s epoch and up to 2115

7.2 Climate Change Allowances

7.2.1 The Environment Agency have prepared a River Catchment map (**Climate change allowances for peak river flow in England (data.gov.uk)** that identifies the percentage allowances required for a specific postcode.

Baseline	Central	Higher	Upper
2020s	19%	24%	37%
2050s	22%	30%	51%
2080s	**37%**	**51%**	**88%**

8.0 Flood Data

8.1.1 Havant Borough Council Coastal Partners objected to the Planning Application, stating that there was evidence within the PfSH SFRA that indicated that the site would be at risk using an epoch baseline. The following zones are present within the site:

Baseline	Model Outline	Affects the Site
2025	Fluvial FZ3 2025 (WMS)	NO
	Tidal FZ2 2025 (WMS)	YES
	Tidal FZ3 2025 (WMS)	NO
2055	Fluvial FZ3 2055 (WMS)	NO
	Tidal FZ2 2055 (WMS)	YES
	Tidal FZ3 2055 (WMS)	YES
2085	Fluvial FZ3 2085 (WMS)	NO
	Tidal FZ2 2085 (WMS)	YES
	Tidal FZ3 2085 (WMS)	YES
2085	Fluvial FZ3 2115 (WMS)	NO
	Tidal FZ2 2115 (WMS)	YES
	Tidal FZ3 2115 (WMS)	YES

8.1.2 The Environment Agency provided tidal flood levels for the site, following a new data request. These levels have been taken from the East Solent Coastal model that was produced in 2018 by JBA Consulting. The resulting water levels are as follows:

Year	1 in 200 Year (0.5% AEP) Flood Zone 3	1 in 1000 Year (0.1% AEP) Flood Zone 2
2015	3.32	3.51
2065	3.65	3.83
2115	4.07	4.26

8.1.3 The report uses different baselines for the tidal flood model, so there is no requirement to apply additional climate change uplift to the flood levels as this is to be applied to river fluvial levels.

9.0 Hierarchal Approach to Future Flooding

9.1.1 The Environment Agency flood information indicates some risk from fluvial sources on the site in the epoch tidal events. It should be noted that these are undefended levels.

9.1.2 The design flood level for the 2015 baseline is 3.32m AOD, for the 2065 baseline is 3.65m AOD and for the 2115 baseline is 4.07m AOD. A flood contour map of the site has been produced and can be found at **Appendix J**.

9.1.3 The proposed measures for the site have been assessed using a hierarchy of preference, with reference to current guidance, best practice and expected works to the area.

9.2 Option 1 – Flood Defences by Others

9.2.1 The tidal flood mechanism enters the site from Saltmarsh Lane. This road is noted to rise to the west and so would block any flood route directly from the west.

9.2.2 Examination of the flood outlines for different baselines indicates that the water passes through the residential development to the north of the site (which is at a lower topographical level) prior to entering the site.

9.2.3 Based on the existing ground levels, it can be stated that these houses would experience significant flooding and hazard prior to any of the proposed units experiencing a hazard.

9.2.4 Therefore, it is reasonable to assume that there would be planned flood defence works in the area to prevent this potential flood mechanism by the critical deadline of 2065 (noting that the existing houses may have an earlier critical deadline such as 2025).

9.2.5 It is anticipated that the Environment Agency or Coastal Partnership would implement some form of tidal defence in the next few years, which would in turn protect the development site from flooding.

9.2.6 If this is the case, there would be no risk to the site and the overall fluvial risk can be considered as low.

9.3 Option 2 – Works to Current Guidance

9.3.1 If no defence works are planned in the area and the existing houses in Saltmarsh Lane are anticipated to flood, then there would be a hazard to 3 No. units on site.

9.3.2 The design life of the development is typically 50 years, indicating a design life up to 2075. This would indicate a design (tidal) flood level of 3.65m AOD.=, using the 1 in 200 year event.

9.3.3 As the site is within Flood Zone 1 for Planning, there are no constraints on raising ground levels and ensuring the safety of the dwellings in accordance with NPPF.

9.3.4 Therefore, it can be proposed that the minimum finished floor level on site can be 3.95m AOD, with external ground levels raised to suit to ensure no hazard to occupants.

9.3.5 This has already been considered in the outline drainage strategy, which identifies external levels at approximately 4.0m AOD in the hazard area to enable the surface water strategy to work by gravity.

9.3.6 It should be noted that there have been no objections by the LLFA or others on the submitted strategy. The raising of ground levels in this area would remove the flood risk to the site.

9.3.7 There is a point that the raising of ground levels within the site would result in loss of floodplain storage for future tidal events.

9.3.8 However, given that the flood mechanism is future and not present, and that it is a tidal event, there is not a strong argument for providing floodplain compensation on the site.

9.4 Option 3 – Future Proofing

9.4.1 In the unlikely event that there are no flood defences and the strategy outlined in Option 2 is not permitted, then the final option would be to assume that the flooding occurs as per the undefended mapping and that no ground raising is allowed.

9.4.2 To ensure the development is appropriate, ground levels will not be raised above existing, to ensure that there is no future issue with flood compensation.

9.4.3 The proposed dwellings should be raised above the ground with voids underneath to allow the free passage of water.

9.4.4 In this scenario, flood protection should be introduced to 300mm above the resilience flood level, or higher. Protection should be up to a level of 4.56m AOD, based on the 1000 year tidal epoch event.

9.4.5 It is recommended that active flood measures, such as gates or doors, be used in the risk properties. If flood doors are to be used, they will be closed in their natural state and act as semi-passive protection.

9.5 Applicant Stance

9.5.1 It is the view of the design team that, while Option 3 may be technically viable, there will be significant impact on other parameters of the site such as the drainage strategy, overlooking etc. which need to be considered.

9.5.2 Therefore, it is requested that the Environment Agency and Coastal Partnership are formally consulted on Option 1 (flood defenses) and that the Environment Agency are asked for opinion on Option 2 (with regard to the NPPF) to ensure that the correct approach is being taken for this site. Coastal Partners reviewed this approach in depth in 2023 and had no objections. In the same consultations period, the EA also had no objections.

9.6 Flood Protection

9.6.1 It is impossible to completely guard against flooding since an extreme event is always possible; however, the risk can be minimised by employing flood resilient construction techniques to the proposed building as listed below:

- The use of concrete floor with waterproof membrane
- Waterproof walls up to a height providing 300mm freeboard to the assumed flood level
- Sealed service ducts
- Location of electrical and other plant above the floor
- High electrical sockets and
- Ensuring security of supplies.

9.6.2 It is recommended that the developer considers all the mitigation measures and above techniques when discussing and agreeing the precise detail of the development with the Local Authority.

9.6.3 The owner/occupier of the property will be responsible for the maintenance of the flood protection measures and at the appropriate time replace of any of these measures if required.

10.0 Flood Risk Assessment

10.1 Fluvial Flooding Risk

10.1.1 This has been covered in the previous section.

10.2 Historic Flood Data

10.2.1 The Environment Agency and Havant SFRA have no information indicating that the site was flooded historically from fluvial sources.

10.3 Groundwater

10.3.1 Groundwater flooding is caused by the emergence of water originating from sub-surface permeable strata. A ground water flood event results from a rise in ground water level, sufficient for the water table to intersect the ground surface and inundate low lying land. Groundwater floods may emerge from either a single point or diffuse locations.

10.3.2 The underlying strata throughout the area and investigations into the SFRA geology data suggest that there is a risk of groundwater emergence which is likely to relate to the geology of the area. However, groundwater flooding risks are often highly localised, and dependent upon geological interfaces between permeable and impermeable subsoils. Therefore, sustainable construction techniques for surfacing will minimise any potential groundwater risk.

10.3.3 The Havant SFRA indicates that the site is within an area with low permeability but does not identify any historic groundwater flood incidents.

10.4 Flooding from Sewers

10.4.1 Flooding from sewers can occur because of different reasons; if sewers are blocked during the heavy rainfalls, or if a sewer cannot provide adequate capacity, then flooding can cause a large amount of damage.

10.4.2 The Havant SFRA has no information indicating the site has been flooded by artificial sources historically.

10.5 Flooding from Reservoirs

10.5.1 Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the Environment Agency ensures that reservoirs are inspected regularly, and essential safety work is carried out.

10.5.2 However, in the unlikely event that a reservoir dam failed, a large volume of water would escape at once and flooding could happen with little or no warning. If the site is within a risk area, plans should be made for safe evacuation and escape. Residents may need to evacuate

immediately, know the safest route to safety, and be ready to follow the advice of emergency services.

10.5.3 The EA data indicates that the site is at no risk from reservoir flooding.

10.6 Surface Water Flooding

10.6.1 Overland flow / surface water flooding typically arise because of intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems. It can run quickly off land and result in localised flooding.

10.6.2 The Environment Agency has produced illustrative mapping (Flood Map for Surface Water) relating to flooding risks from surface water. They are classified as Flood Hazard Maps for the purpose of the Flood Risk Regulations 2009. These maps are the next generation on from the previous "Area Susceptible to Surface Water Flooding" maps, which are contained within the SFRA.

10.6.3 The EA maps show high resolution image and indicative flow paths for pluvial events. The maps are based on coarse level data and indicate ridges, valleys and flat spots where water would collect. Typically, the flow paths follow valleys, rivers and watercourses.

10.6.4 The surface water flood mapping for this site indicates flooding at a very small scale in a localised low spot in an area to front of the site and a ditch to the south. (see maps in **Appendix F**.) The areas of the ditch and the EA mapping do not 100% match due to the limited Lidar data that the EA mapping use. For our assessment of the potential surface water flooding, we have assumed that the potential flooding will occur in the ditch and the localised low spot. The ditches are there to take the runoff from this site. The topography of the land supports this with a gentle slope from the boundaries of the site to the middle. See the topographical survey in **Appendix B**. There is data on surface flood risk both in the SFRA and the EA maps for planning. Using the QGIS the depths of any potential flooding are shown.

10.6.5 The surface water depths are between 150mm and 600mm, but this is not an issue for the site as this is the location is where a pond will be formed to take the runoff from the site as detailed in the supporting Drainage Strategy report. By potentially developing the site all surface water runoff will be mitigated and controlled before it reaches the pond area so it will not be an issue.

10.6.6 An assessment of the "medium" risk scenario (up to 1 in 100-year event), indicates that there would be some flood water on the site. The water appears to be highly localised and shallow and away from the developed area.

10.6.7 The worst-case hazard rating (up to 1 in 100-year event) for the site can be refined and calculated using the formulae in the guidance document in **Appendix G**.

10.6.8 The flood Hazard Rating (HR) is based primarily on consideration to the direct risks of people exposed to floodwaters and is expressed below.

HR = d (v + n) + DF	d = Depth of water (m)
HR = 0.300 x (0.25 + 0.5) + 0.5	v = Velocity of water (m/s)
HR = 0.725	n = constant taken as 0.5

10.6.9 The guidance document provides details of the potential risk to occupants of the site as per the table below:

Thresholds for Flood Hazard Rating H = d x (v + 0.5) + DF		**Degree of Flood Hazard**	**Description**
FD2321	**FD2320**		
<0.75	<0.75	Low	**Caution -** "Flood zone with shallow flowing water or deep standing water"
0.75 - 1.25	0.75 - 1.25	Moderate	**Dangerous for some (i.e. children) -** "Danger: Flood zone with deep or fast flowing water"
1.25 - 2.5	1.25 - 2.0	Significant	**Dangerous for most people -** "Danger: flood zone with deep fast flowing water"
>2.5	>2.0	Extreme	**Dangerous for all -** "Extreme danger: flood zone with deep fast flowing water"

10.6.10 The worst possible flood hazard from surface water based on this calculation is "Low". This indicates that there is a hazard level of "Caution", from potential shallow water, which should not prevent any occupants from escaping.

11.0 Route of Escape

11.1.1 In an extreme storm event, there is not likely to be flood water on site with safe escape possible via the main access to site.

11.1.2 This report has indicated that there are several units at risk in the tidal events with a future baseline.

11.1.3 If this flooding is not mitigated as mentioned in this report (option 1 or option 2) then there may be flood water present near these properties.

11.1.4 The overall flood depth is such that it should not present a significant hazard to occupants and the time of inundation and warning levels are such that there would be adequate time to evacuate in a storm event.

11.1.5 It is not envisaged that there would be any problem for access of emergency vehicles in an extreme storm event as there is no flood depth unless the extreme storm scenario occurs. Emergency vehicles may operate in depths of 0.5m with velocity of 5 metres per second (with some operating at depths of 1m).

11.1.6 The Planning Authority must be in consultation with the emergency services as to the appropriate access and safe routes for the site during an extreme storm event, in accordance with Section 13.S3.3 of the FRA Guidance for New Developments. Emergency Response Plans for the local area are available on the council website and would require updating for the proposed residence. It is not envisaged that there will be any additional burden on emergency services during a flood event.

11.1.7 General Evacuation Advice:

- Avoid walking or driving through flood water, as only 150mm of fast flowing flood water is able to knock a person over and 600mm is able to float a car. Flooding can cause manhole covers to come off, leaving hidden dangers.
- Do not walk on sea defences or riverbanks.
- Take care or avoid crossing bridges when water levels are high.
- Take care crossing culverts as they are dangerous when flooded.
- Look out for other hazards such as fallen power lines and trees.
- Keep Children away from flood water.
- Wash hands thoroughly if you come into contact with flood water as it may be contaminated with sewage.
- Always follow the advice provided at the time by the Emergency Services. The Emergency Services may direct you to a Local Authority Evacuation Centre, which has been specially prepared for people being evacuated from their homes. Free food and bedding is provided, however spare clothing should be taken, essential medication and any baby care products should an infant be involved in the evacuation.

12.0 Flood Compensation

12.1.1 The site is not within a Flood Zone for planning so there is no statutory requirement to assess the requirement for flood compensation.

12.1.2 In the unlikely event that option 3 is progressed on the scheme, flood compensation has been minimised with the use of underfloor voids and keeping external levels as existing.

12.1.3 Any flood compensation required will be undertaken as part of a detailed design submission, with ground lowering across the site on a level by level and volume by volume basis but this should not be necessary.

13.0 Summary and Conclusions

13.1.1 Hayling Island Builders Limited is planning a proposed development on the site at Land South of Saltmarsh Lane, Hayling Island, PO11 0JT.

13.1.2 CGV Transport Consultants has been instructed by Hayling Island Builders Limited, to produce a Flood Risk Assessment under National Planning Policy Framework (NPPF) to support the Planning Application.

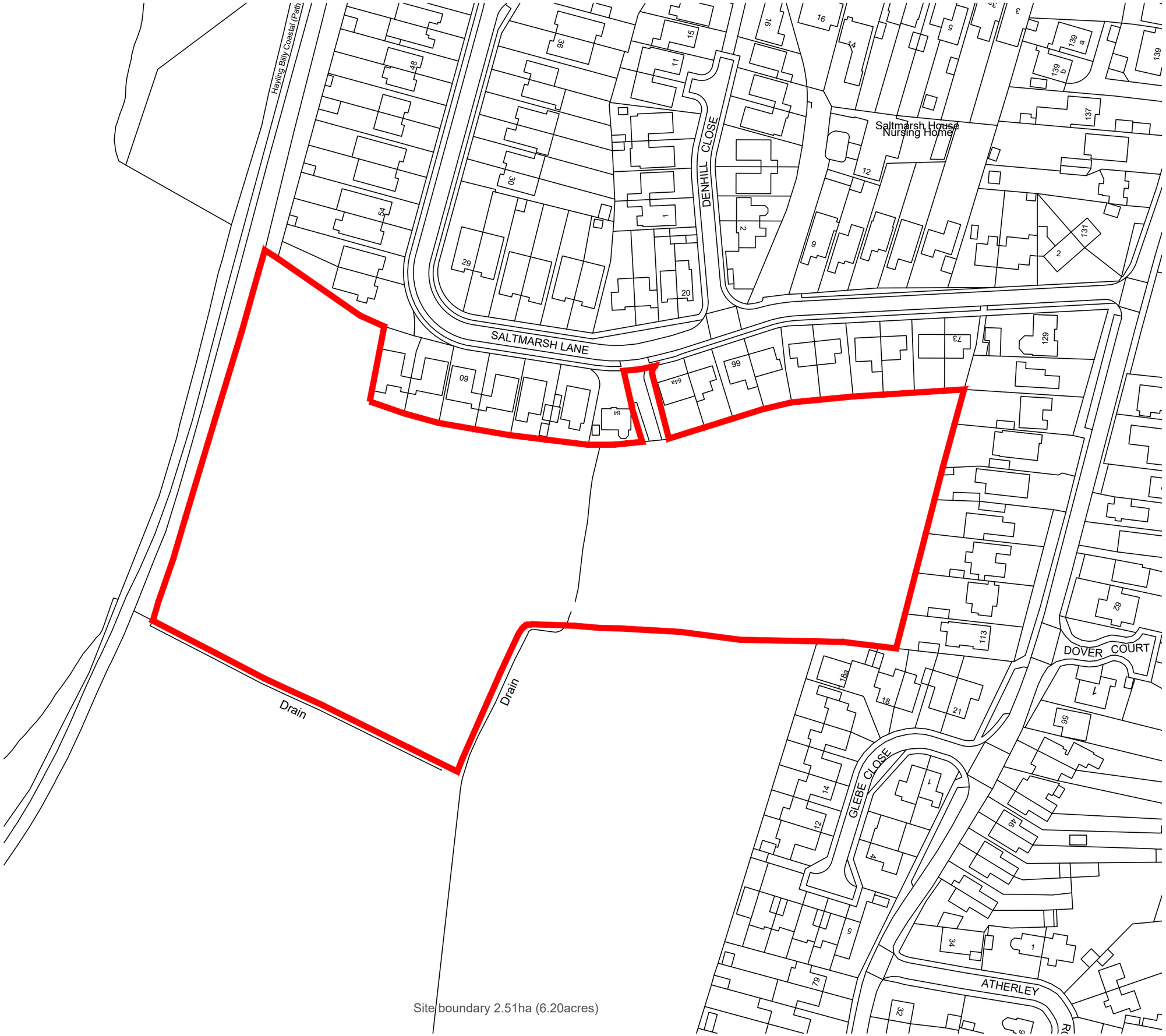
13.1.3 The Environment Agency mapping indicates that the site is within Flood Zone 1 and has a very low risk of fluvial flooding.

13.1.4 There is noted undefended tidal flooding to the site using a future baseline. The potential risks and mitigation measures for this have been covered in the report, with comments and advice expected from statutory consultees, noting that in 2022 there were no objections from the EA and none in 2023 from the Coastal Partners.

13.1.5 All other sources of flooding for the site have been investigated and shown to be of minimal or no risk.

13.1.6 The proposed development is appropriate and sustainable in the terms as set out in NPPF.

Appendix A
Location Plan



N

0 metres 50

(1:1,250)

Site boundary 2.51ha (6.20acres)

Project
Land South of Saltmarsh Lane

Drawing Title
Site Location Plan

Date	Scale	Drawn by	Check by
08/03/2021	1:1,250 at A3	ML	SR

Project No	Drawing No	Revision
1240	001	-

Mosaic

Appendix B
Topographical Survey

Notes

1. **The survey grid is a local grid, coincident with Ordnance Survey National Grid at 3STN.**
2. **Surveyed boundary features are not necessarily legal boundaries.**
3. **Dimensions should not be scaled. All dimensions should be checked on site before any fabrication / construction.**
4. **Copyright of all data produced by Technics Group shall remain with Technics Group unless otherwise specifically agreed.**
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7. **If the AutoCAD drawing is being read by any system other than AutoCAD it should be checked against a hard copy. Technics Group cannot accept liability for omissions.**
8. **All utilities have been identified to the best of the surveyors knowledge. The correct identification of the utility types can not be 100% guaranteed, therefore these should be independently verified prior to use in any design and building works.**
9. **External eaves levels are surveyed to lowest tile position.**

Level Datum

ALL LEVELS ARE ORTHOMETRIC HEIGHTS RELATED TO OSGM15 GPS DATUM, COMPUTED USING LEICA SMARTNET RTK NETWORK.

Topo Key

STREET FURNITURE			
BB	Belisha Beacon		
BL	Basement Light		
Bin	Litter Bin		
BO	Bollard		
BS	Bus Stop		
CPO	Concrete Post		
ECP	Electric Charging Point		
EP	Electric Pole		
FB	Flower Bed		
FHM	Fire Hydrant Marker		
FL	Flood Light		
FP	Flag Pole		
FPO	Fence Post		
JB	Junction Box		
GB	Grit Box		
GMK	Gas Marker Post		
GPO	Gate Post		
IBO	Illuminating Bollard		
LH	Lamp Hole		
LP	Lamp Post		
LPO	Lockable Post		
MK	Marker		
MPO	Metal Post	SSL	
NP	Name Plate		
PB	Post Box		
PM	Parking Meter		
RPO	Reflector Post		
RS	Road Sign	USL	
SI	Sign		
STN	Survey Station		
Tap	Water Tap	WSL	
TCB	Telephone Cell Box		
TL	Traffic Light		
TLCB	Traffic Light Control Box		
TP	Telegraph Post		
TPO	Timber Post		

PIPES & SERVICES	
ACU	Air Condition Unit
DP	Down Pipe
FWP	Foul Water Pipe
GP	Gas Pipe
RWP	Rain Water Pipe
SP	Stand Pipe
SVP	Soil Vent Pipe
VP	Vent Pipe
WP	Waste Pipe

LEVELS & DEPTHS			
A	Approximate		
BD	Back Drop Depth		
BDL	Back Drop Level		
CD	Chamber Depth		
DHL	Door Head Level		
DSL	Door Sill Level		
DPC	Damp Proof Course		
EL	Eaves Level		
FFL	Finished Floor Level		
FRL	Flat Roof Level		
ICL	Cover Level		
ID	Invert Depth		
IL	Invert Level		
OD	Outlet Depth		
OL	Outlet Level		
PWL	Parapet Wall Level		
RL	Ridge Level		
SD	Sump Depth		
SFD	Soffit Depth		
SFL	Soffit Level		
SIL	Sill Level		
SL	Sump Level		
Structural Slab Level		TCIC	
TFL	Top of Fence Level		
THL	Threshold Level		
TPL	Top of Pipe Level		
TWL	Top of Wall Level		
Underside Level		WM	
WL	Water Level		
WHL	Window Head Level		
Window Sill Level			

FENCES & WALLS			
BW	Block Wall	BPav	
BRP	Brick Pier		
BRTW	Brick Retaining Wall		
BRW	Brick Wall		
BWF	Barbed Wire Fence		
CBF	Close Board Fence		
CIF	Corrugated Iron Fence		
CLF	Chain Link Fence		
CPF	Chestnut Paling Fence		
CRW	Concrete Retaining Wall		
CW	Concrete Wall		
CWF	Chicken Wire Fence		
DI	Dilapidated		
HR	Handrail		
IWF	Interwoven Fence		
LF	Lattice Fence		
MF	Miscellaneous Fence		
MRF	Metal Railing Fence		
OBF	Open Board Fence		
PCF	Post & Chain Fence		
PNF	Panel Fence		
PRF	Post & Rail Fence		
PWF	Post & Wire Fence		
RTW	Retaining Wall		
STW	Stone Wall		
SRTW	Stone Retaining Wall		
WMF	Wire Mesh Fence		

INSPECTION CHAMBERS			
BH	Borehole		
CATV	Cable Television		
CDC	Concrete Drainage Channel		
EIC	Electric Inspection Cover		
ER	Earth Rod		
FH	Fire Hydrant		
FWIC	Foul Water Inspection Cover		
GIC	Gas Inspection Cover		
GM	Gas Meter		
GV	Gas Valve		
G	Gully		
IC	Inspection Cover		
KI	Kerb Inlet		
LHP	London Hydraulic Power		
MDC	Metal Drainage Channel		
MW	Monitoring Well		
NFI	No Further Information		
RE	Rodding Eye		
SDIC	Service Duct Inspection Cover		
SV	Stop Valve		
SWCP	Storm Water Catch Pit		
SWIC	Storm Water Inspection Cover		
Traffic Control Inspection Cover			
TIC	Telecom Inspection Cover		
UIC	Unidentified Inspectional Cover		
UTR	Unable to Raise		
WIC	Water Inspection Cover		
Water Meter			
WWO	Water Wash Out		
WSV	Water Stop Valve		

SURFACES	
Brick Paving	
Conc	Concrete
CPav	Crazy Paving
CPS	Concrete Paving Slabs
FB	Flower/Shrub Border
KFC	Kidney Flint Cobbles
SPS	Stone Paving Slabs
T	Tiles
Tmac	Tarmac
TPav	Tactile Paving
TS	Trench Scar

MEASUREMENTS	
d	Depth(m)
Ø	Diameter (mm)
Ext. Ø	External Diameter (mm)
H	Object Height (m)

Symbology

Single Gate
Double Gate
Banking
Step Up
Diameter shown in mm
Survey Station

Linetypes

Telecom Overhead
Power Overhead
Foul Water
Surface Water
Combined Water
Unknown Services
Change of Surface
Drop Kerb
Fence
Wall
Kerb
Building Face
Overhead Feature
Trench Scar
Tree Canopy
Bushes/Foliage/Overgrowth
Tree Canopy Extents

Trees

SPECIES ABBREVIATION

AL	Alder	HL	Hemlock	RH	Rhododendron
BE	Beech	HO	Holly	RO	Rowan
CE	Cedar	HZ	Hazel	SAP	Sapling
CH	Cherry	LA	Larch	SB	Silver Birch
CON	Coniferous	LB	Laburnum	SCN	Sweet Chestnut
CY	Cypress	LM	Lime	SHR	Shrub
DE	Dead	LO	Locust	ST	Stump
DEC	Deciduous	LU	Laurel	SY	Sycamore
ED	Elder	MA	Maple	WB	Whitebeam
EU	Eucalyptus	MG	Magnolia	WG	Wellingtonia
FR	Fruit	NS	Norway Spruce	WI	Willow
HA	Hawthorn	PI	Pine	WN	Walnut
HB	Hornbeam	PO	Poplar		
HC	Horse Chestnut	PL	Plane		

NOTES:
1. The tree species have been identified to the best of the surveyors knowledge. They have not been verified by an arborist and are not guaranteed. If they are important they should be verified.
2. Tree heights are estimated.
3. A CAD layer exists with the full tree canopies intact which is turned off.
4. Trees with bole diameters below the specified minimum size may not have been surveyed.
5. Multibole sizes are indicative.

SURVEY STATIONS			
Name	Easting	Northing	Height
1STN	471352.886	100208.049	4.519
2STN	471281.177	100211.211	4.296
3STN	471204.421	100201.008	4.229
4STN	471143.864	100230.739	4.823
K1STN	471341.633	100173.046	5.080
K2STN	471267.943	100234.529	3.560
K3STN	471234.351	100164.648	4.445
K4STN	471161.726	100281.814	4.795
K5STN	471112.329	100181.178	5.394

CLIENT

Hayling Island Builders Limited

SITE
Parcel 2
Land South of Saltmarsh Lane
Hayling Island PO11 0JT

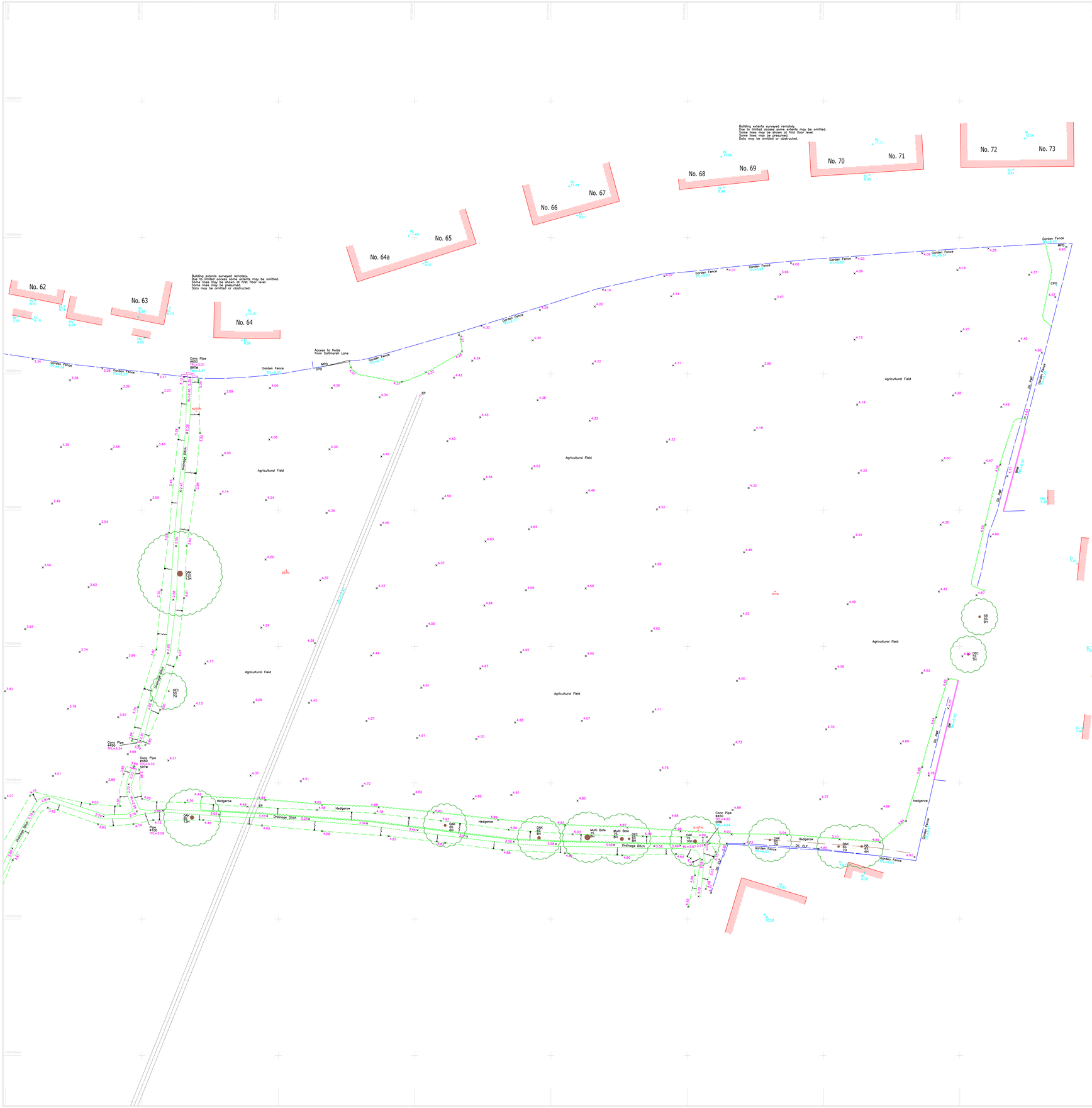
DRAWING TITLE
Topographical Survey

PROJECT NUMBER	DRAWING NUMBER	DATE
SP21219	SD21219-01	Mar 2021
SURVEYED BY	DRAWN BY	CHECKED BY
CJ	CJ	CJ
SCALE	SHEET SIZE	SHEET
1:200	A0	3 OF 4

Technics
Geospatial Consultant Surveyors

Technics Group
Technics House
Merrow Business Park
Guildford
Surrey. GU4 7WA

T: 01483 230 080
E: mail@technicsgroup.com
W: technicsgroup.com



Notes

1. **The survey grid is a local grid, coincident with Ordnance Survey National Grid at 3STN.**
2. **Surveyed boundary features are not necessarily legal boundaries.**
3. **Dimensions should not be scaled. All dimensions should be checked on site before any fabrication / construction.**
4. **Copyright of all data produced by Technics Group shall remain with Technics Group unless otherwise specifically agreed.**
5. **Information provided should not be altered or modified in any way. It should not be used for any purpose other than for which it was intended and should not be issued to other parties without prior agreement of Technics Group.**
6. **Technics Group cannot accept responsibility for any damage to computer systems which may result from viruses which may be contained in the data provided.**
7. **If the AutoCAD drawing is being read by any system other than AutoCAD it should be checked against a hard copy. Technics Group cannot accept liability for omissions.**
8. **All utilities have been identified to the best of the surveyors knowledge. The correct identification of the utility types can not be 100% guaranteed, therefore these should be independently verified prior to use in any design and building works.**
9. **External eaves levels are surveyed to lowest tile position.**

Level Datum

ALL LEVELS ARE ORTHOMETRIC HEIGHTS RELATED TO OSGM15 GPS DATUM, COMPUTED USING LEICA SMARTNET RTK NETWORK.

Topo Key

STREET FURNITURE

BB	Bollins Beacon
BL	Basement Light
BO	Bollard
BS	Bus Stop
CPO	Concrete Post
ECP	Electric Charging Point
EP	Electric Point
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FP	Flag Pole
GPO	Gate Post
JB	Junction Box
GB	Grit Box
GMK	Gas Marker Post
GPO	Gate Post
HBO	Hose Reeling Bollard
LV	Lamp Vent
LP	Lamp Post
LPO	Lockable Post
MK	Marker
MPO	Metal Post
NP	Name Plate
PB	Planting Bed
PM	Parking Meter
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RS	Road Sign
SI	Sign
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MEASUREMENTS

d	Depth(m)
Ø	Diameter (mm)
Ext. Ø	External Diameter (mm)
H	Object Height (m)

Symbology

Single Gate
Double Gate
Banking
Step Up
Diameter shown in mm
Survey Station

Linetypes

Telecom Overhead
Power Overhead
Foul Water
Surface Water
Combined Water
Unknown Services
Change of Surface
Drop Kerb
Fence
Wall
Hedge
Building Face
Overhead Feature
Trench Scar
Tree Canopy
Bushes/Foliage/Overgrowth
Tree Canopy Extents

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HB	Hornbeam	PO	Poplar		
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N

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4STN	471143.864	100230.739	4.823
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K3STN	471234.351	100164.648	4.445
K4STN	471161.726	100281.814	4.765
K5STN	471112.329	100181.178	5.394

CLIENT

Hayling Island Builders Limited

SITE

Parcel 2
Land South of Saltmarsh Lane
Hayling Island PO11 0JT

DRAWING TITLE

Topographical Survey

PROJECT NUMBER	DRAWING NUMBER	DATE
SP21219	SD21219-01	Mar 2021
SURVEYED BY	DRAWN BY	CHECKED BY
CJ	CJ	CJ
SCALE	SHEET SIZE	SHEET
1:200	A0	4 OF 4

Technics
Geospatial Consultant Surveyors

Technics Group
Technics House
Merrow Business Park
Guildford
Surrey, GU4 7WA

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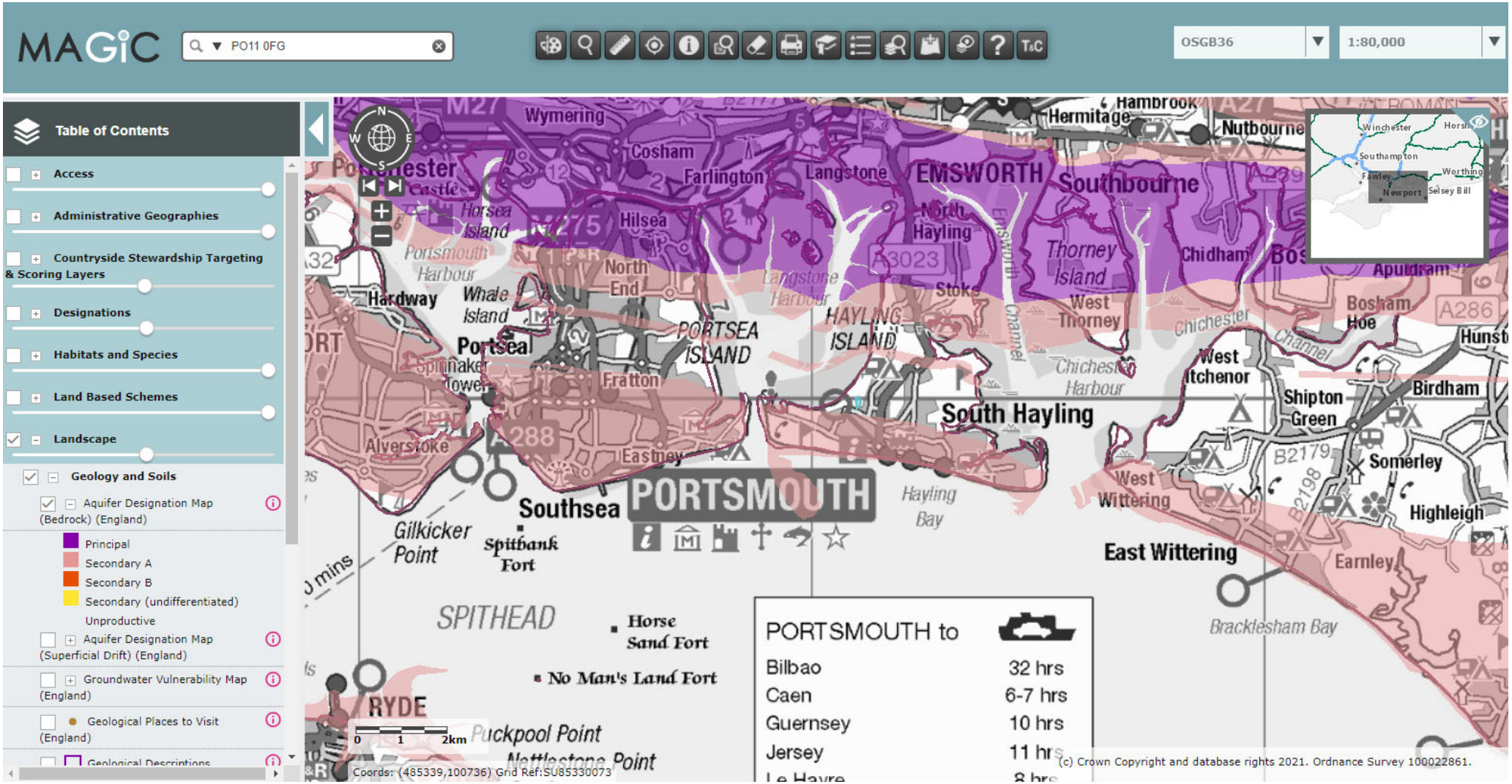
E: mail@technicsgroup.com
W: technicsgroup.com

Appendix C
Magic Map Geology Information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PO11 0FG
OSGB36
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Table of Contents
Access
Administrative Geographies
Countryside Stewardship Targeting & Scoring Layers
Designations
Habitats and Species
Land Based Schemes
Landscape
Geology and Soils
Aquifer Designation Map (Bedrock) (England)
Principal
Secondary A
Secondary B
Secondary (undifferentiated)
Unproductive
Aquifer Designation Map (Superficial Drift) (England)
Groundwater Vulnerability Map (England)
Geological Places to Visit (England)
PORTSMOUTH
Southsea
Gilkicker Point
Spitbank Fort
SPITHEAD
Horse Sand Fort
No Man's Land Fort
RYDE
Puckpool Point
Nettlestone Point
Hayling Bay
South Hayling
East Wittering
West Wittering
Bracklesham Bay
Emsworth
Southbourne
Hermitage
Nutbourne
Cosham
Farlington
Langstone
Hilsea
North Hayling
Thorney Island
Chidham
Hardway
Whale Island
Portsea
PORTSEA ISLAND
HAYLING ISLAND
Fratton
Eastney
Alverstoke
Stoke
West Thorney
Chichester Harbour
Shipton Green
Somerley
Birdham
Highleigh
Earnley
Bosham
Hoe
Apuldram
PORTSMOUTH to
Bilbao 32 hrs
Caen 6-7 hrs
Guernsey 10 hrs
Jersey 11 hrs
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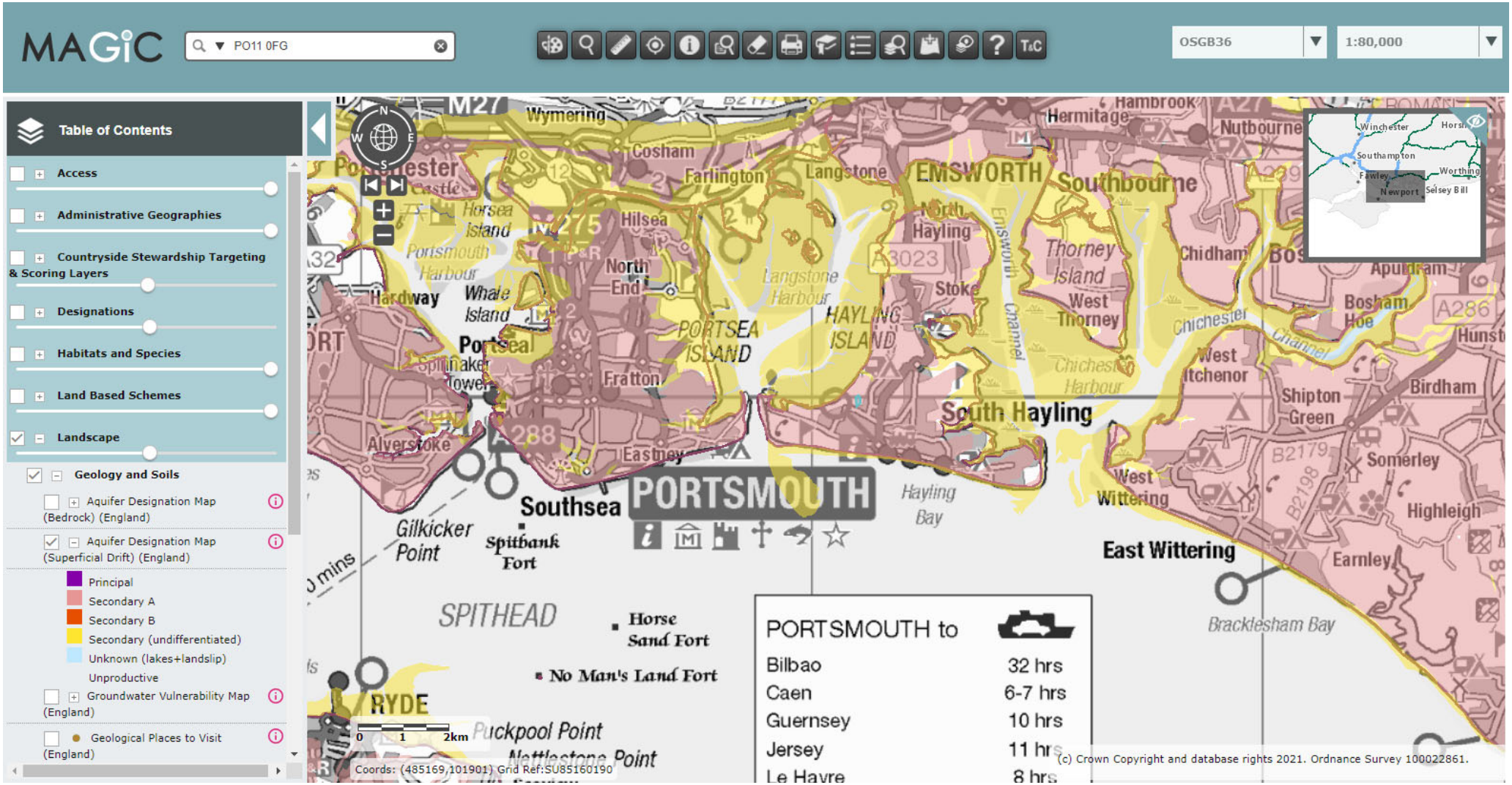
(c) Crown Copyright and database rights 2021. Ordnance Survey 100022861.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OSGB36
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Table of Contents
Access
Administrative Geographies
Countryside Stewardship Targeting & Scoring Layers
Designations
Habitats and Species
Land Based Schemes
Landscape
Geology and Soils
Aquifer Designation Map (Bedrock) (England)
Aquifer Designation Map (Superficial Drift) (England)
Principal
Secondary A
Secondary B
Secondary (undifferentiated)
Unknown (lakes+landslip)
Unproductive
Groundwater Vulnerability Map (England)
Geological Places to Visit (England)
PORTSMOUTH
Southsea
Gilkicker Point
Spitbank Fort
SPITHEAD
Horse Sand Fort
No Man's Land Fort
RYDE
Puckpool Point
Nettlestone Point
Hayling Bay
East Wittering
Bracklesham Bay
EMSWORTH
Southbourne
Hayling Island
South Hayling
Thorney Island
West Thorney
Langstone Harbour
Chichester Harbour
Portsea Island
Fratton
Eastney
Hilsea
North End
Cosham
Farlington
Langstone
Wymering
Hermitage
Nutbourne
Chidham
Bosham
Hoe
Apuldram
West Itchenor
Shipton Green
Birdham
Somerley
Earnley
West Wittering
Highleigh
Alverstoke
Gosport
Hardway
Whale Island
Spinnaker Tower
Portsmouth Harbour
Horsea Island
Stoke
North Hayling
Emsworth Channel
Chichester Channel
PORTSMOUTH to
Bilbao 32 hrs
Caen 6-7 hrs
Guernsey 10 hrs
Jersey 11 hrs
Le Havre 8 hrs
0 1 2km
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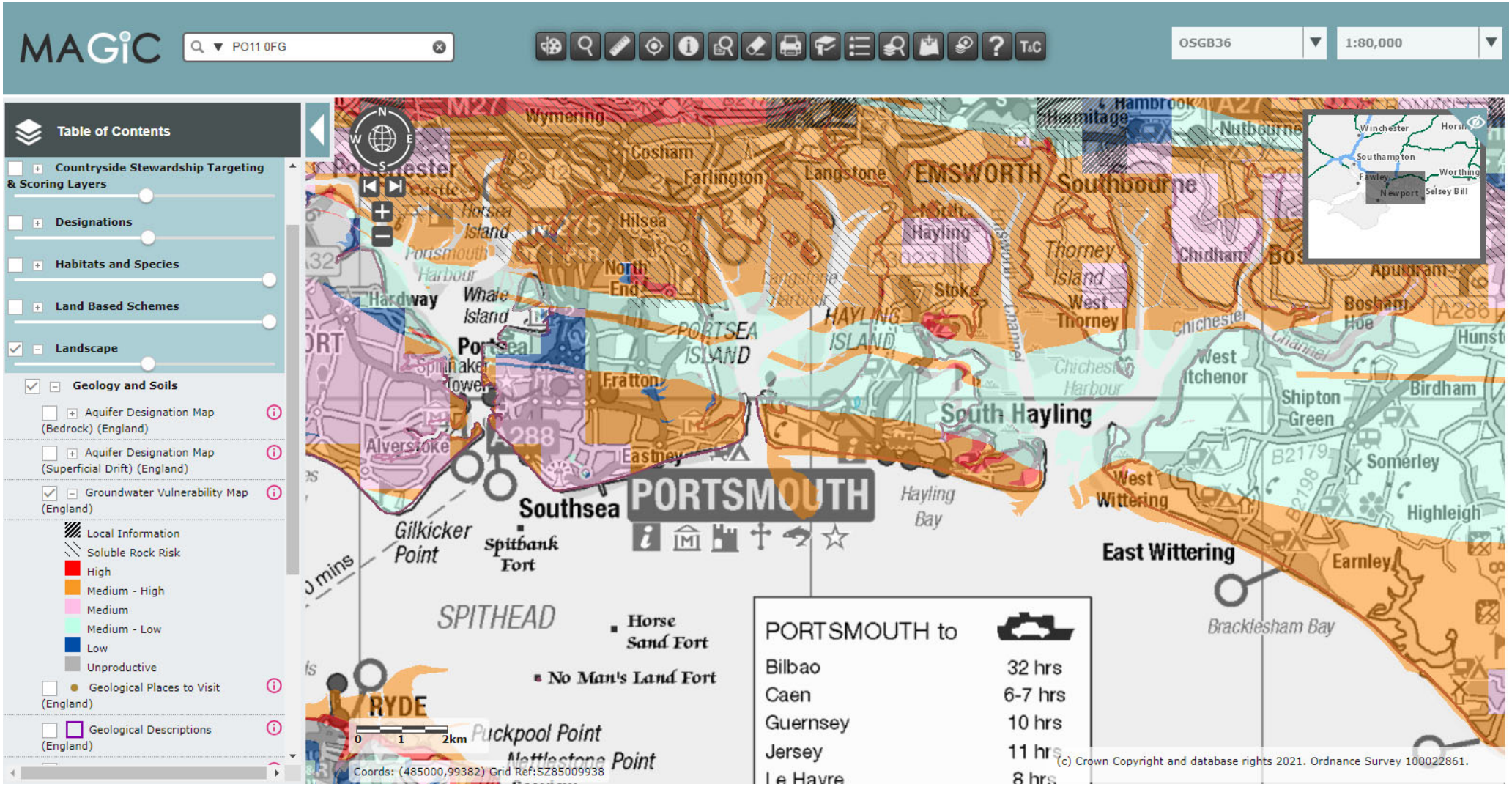
(c) Crown Copyright and database rights 2021. Ordnance Survey 100022861.


MAGIC
PO11 0FG
OSGB36
1:80,000
Table of Contents
Countryside Stewardship Targeting & Scoring Layers
Designations
Habitats and Species
Land Based Schemes
Landscape
Geology and Soils
Aquifer Designation Map (Bedrock) (England)
Aquifer Designation Map (Superficial Drift) (England)
Groundwater Vulnerability Map (England)
Local Information
Soluble Rock Risk
High
Medium - High
Medium
Medium - Low
Low
Unproductive
Geological Places to Visit (England)
Geological Descriptions (England)
PORTSMOUTH
Southsea
Gilkicker Point
Spitbank Fort
SPITHEAD
Horse Sand Fort
No Man's Land Fort
RYDE
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Hayling Bay
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EMSWORTH
Southbourne
HAYLING ISLAND
PORTSEA ISLAND
Langstone Harbour
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PORTSMOUTH to
Bilbao 32 hrs
Caen 6-7 hrs
Guernsey 10 hrs
Jersey 11 hrs
Le Havre 8 hrs
0 1 2km
Coords: (485000,99382) Grid Ref:SZ85009938
(c) Crown Copyright and database rights 2021. Ordnance Survey 100022861.

Appendix D
Site Plan

N

0 metres 50

(1:1,250)

Site boundary 2.51ha (6.20acres)

Project
Land South of Saltmarsh Lane

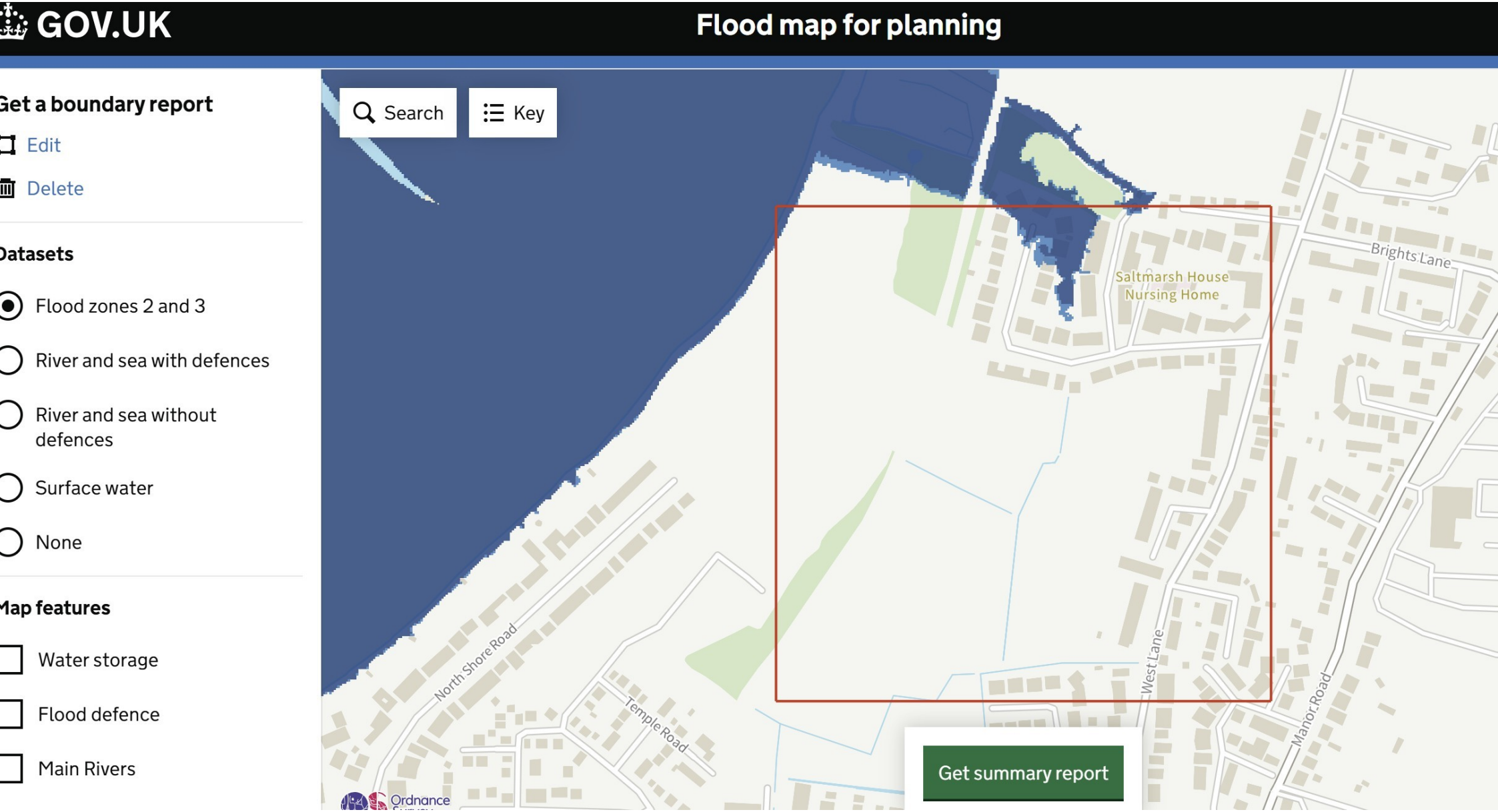
Drawing Title
Illustrative Masterplan

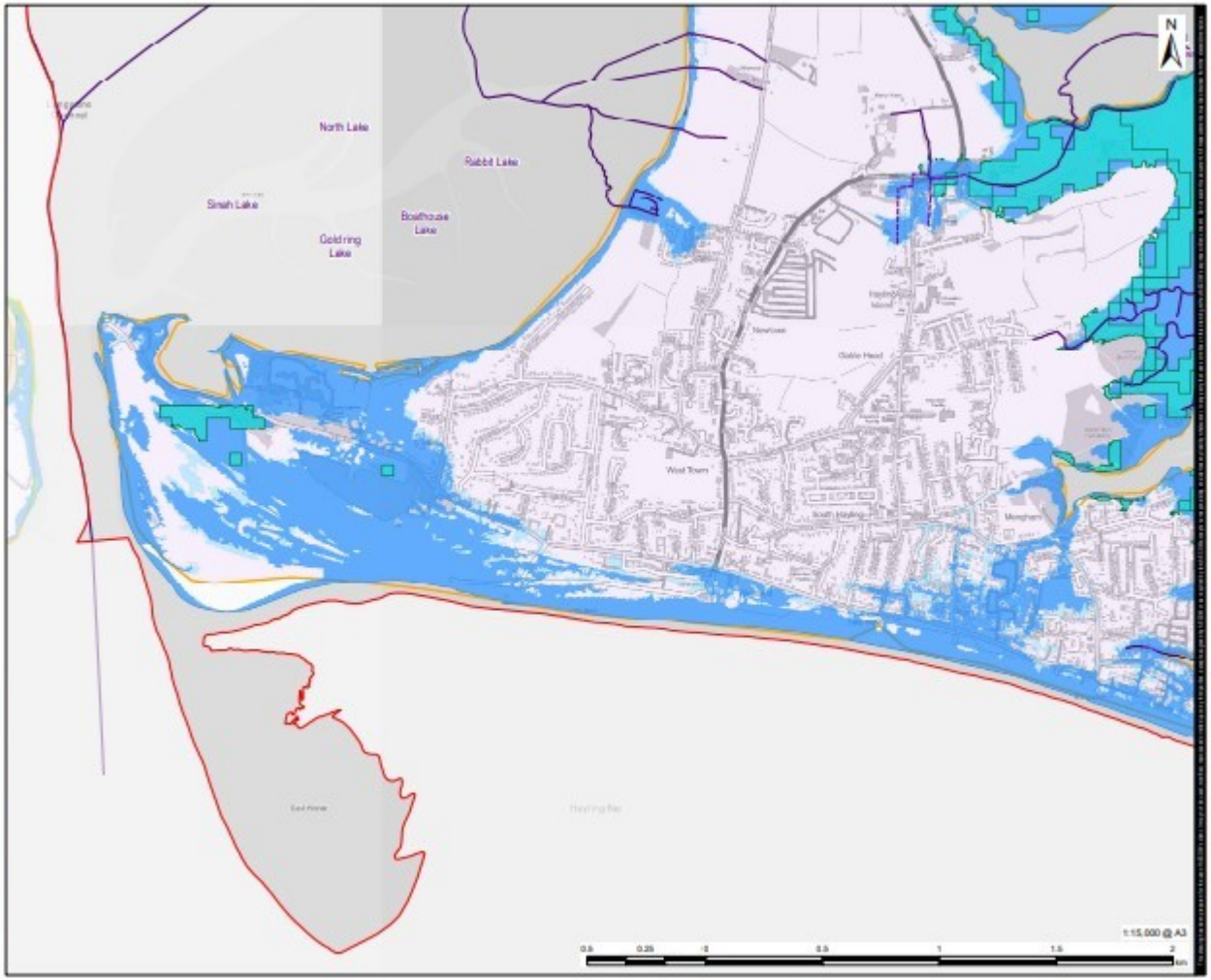
Date	Scale	Drawn by	Check by
07/10/2021	1:1,250 at A3	CT	SR/ML

Project No	Drawing No	Revision
1240	005	E

Mosaic

Appendix E
Environment Agency Flood Map (For Planning)


GOV.UK
Flood map for planning
Get a boundary report
Edit
Delete
Datasets
Flood zones 2 and 3
River and sea with defences
River and sea without defences
Surface water
None
Map features
Water storage
Flood defence
Main Rivers
Search
Key
Saltmarsh House Nursing Home
Brights Lane
North Shore Road
Temple Road
West Lane
Manor Road
Get summary report
Ordnance



AECOM

PROJECT
Partnership for South Hampshire Strategic Flood Risk Assessment

CLIENT
Portsmouth City Council on behalf of Havant Borough Council

CONSULTANT
AECOM Limited
Surrey House
4 Bedford Park
Croydon, CR0 2AP
www.aecom.com

LEGEND
- Havant Borough Boundary
- Reduction in Risk of Flooding from Rivers and Sea due to Defences
- Catchments
- Flood Zone 2
- Flood Zone 3
- Total Flood Extent, Defended 3.3% AEP

Watercourses
- Surface
- Below Surface

OVERVIEW

NOTES

This map is intended to provide a strategic overview and should not be used to assess individual properties. Refer to the accompanying SFRA Report for details of the datasets and purpose of their use.

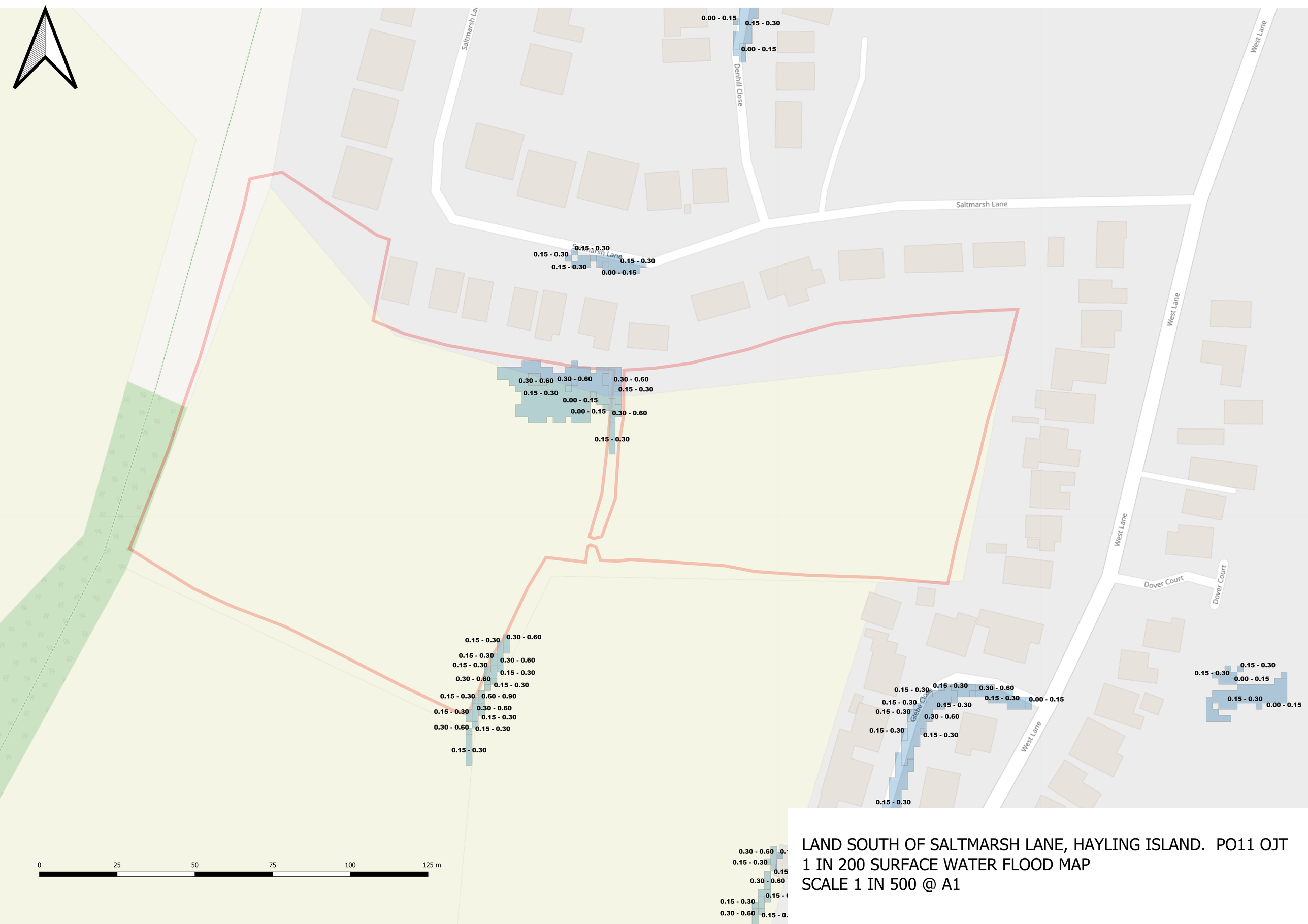
ISSUE PURPOSE
For Information

PROJECT NUMBER
60653132

FIGURE TITLE
Flood Zones
Sheet 6 of 7

FIGURE NUMBER
Figure 1F

Appendix F
Environment Agency Surface Water Flood Map



LAND SOUTH OF SALTMARSH LANE, HAYLING ISLAND. PO11 OJT
1 IN 200 SURFACE WATER FLOOD MAP
SCALE 1 IN 500 @ A1

GENERAL NOTES

1.1. THIS DRAWING IS COPYRIGHT AND SHOULD NOT BE REPRODUCED IN WHOLE OR PART WITHOUT THE WRITTEN CONSENT OF CGV TRANSPORT CONSULTANTS LTD.
1.2 DO NOT SCALE FROM THIS DRAWING.
1.3. LOCATIONS OF ALL EXISTING SERVICES ON-SITE TO BE CONFIRMED & PROVIDED TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORKS.
1.4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT CGV TRANSPORT CONSULTANTS LTD DRAWINGS & SPECIFICATIONS.

Rev.	Amendments	Date	By
P0	First Issue		

Revisions

CGV Transport Consultants Ltd
TRANSPORT PLANNING & HIGHWAY ENGINEERING
Website: www.CGVtransportconsultantsltd.co.uk
Email: info@CGVcivils.co.uk

Client

Project

Drawing

Scales 1:500 At original size A1

Drawn
Date

Checked

Status PRELIMINARY

Drawing No.

Rev. P0

Flood risk

Extent of flooding

Location

Enter a place or postcode

Extent of flooding from surface water

High Medium Low Very low Location you selected

AECOM

PROJECT
Partnership for South Hampshire Strategic Flood Risk Assessment

CLIENT
Portsmouth City Council on behalf of Havant Borough Council

CONSULTANT
AECOM Limited
Sunley House
4 Bedford Park
Croydon, CR0 2AP
www.aecom.com

LEGEND
- Havant Borough Boundary
- Recorded Highway Flooding
- Flood Investigation

Watercourses
- Surface
- Below Surface

Risk of Flooding from Surface Water (RoFSW)
- 3.3% AEP (High Probability)
- 1% AEP (Medium Probability)
- 0.1% AEP (Low Probability)

OVERVIEW

NOTES

This map is intended to provide a strategic overview and should not be used to assess individual properties. Refer to the accompanying SFRA Report for details of the datasets and purpose of their use.

ISSUE PURPOSE
For Information

PROJECT NUMBER
60653132

FIGURE TITLE
Risk of Flooding from Surface Water
Sheet 6 of 7

FIGURE NUMBER
Figure 3F

Flood risk

Medium risk: depth

Location

Enter a place or postcode

Surface water flood risk: water depth in a medium risk scenario

Flood depth (millimetres)

Over 900mm | 300 to 900mm | Below 300mm | Location you selected

Appendix G
Hazard Technical Note

SUPPLEMENTARY NOTE ON FLOOD HAZARD RATINGS AND THRESHOLDS FOR DEVELOPMENT PLANNING AND CONTROL PURPOSE – Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1.

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Steven Wade and Helen Udale-Clarke (HR Wallingford)
May 2008

Introduction

This document is a supplementary note to reconcile information provided in the 'Flood Risks to People Methodology' (FD2321/TR1[1]) and the 'Framework and Guidance for Assessing and Managing Flood Risk for New Development' (FD2320/TR2[2]) reports about the Flood Hazard Rating. It has been produced because both PPS25 in England and TAN15 in Wales require that people should be appropriately safe around new development. The document emphasises that for FRAs and FCAs at all levels to inform development allocations and proposals the simplified approach of FD2320 with regard to flood hazard rating should be used rather than the approach in FD2321. Although the final version of FD2321/TR1 post-dates FD2320/TR2, the work presented actually pre-dates the guidance in FD2320/TR2. This supplementary guidance is issued for those involved in development planning and control and to clarify the detail or difference of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1.

FD2321/TR1 was a research project based on the detailed literature review and analysis of empirical evidence related to flood hazard, derived mainly from theoretical assumptions and some basic laboratory experiments. Factors that affected flood hazard and vulnerability were combined in a form of multi-criteria analysis that was be used to identify the hot-spots and broadly estimate the probability of people seriously harmed and fatalities during the event of a flood. The multi-criteria method was calibrated to actual events, validated using data from seven flood events and shown to work well. The FD2321 (Risk to people) methodology illustrates the fundamental concepts and demonstrate how the approach could be used for different applications - it did not set a policy for flood hazard thresholds.

(Nevertheless there are a number of assumptions used in the FD2321 methodology, particularly with respect to the impact of debris and people's behaviour during flood events. There is a requirement for further research to collate more evidence on flood hazard, particularly the impacts of debris, and vulnerability in order to refine assumptions made in the flood hazard calculations, flood hazard thresholds and risks to people guidance. The study recommend more laboratory and field based tests on the impact of physical water quality aspect such as debris, mudflow; chemical and biological water quality that cause seriously harm or fatalities to people.)

[1] Defra and Agency (2006) *The Flood Risks to People Methodology*, Flood Risks to People Phase 2, FD2321 Technical Report 1, HR Wallingford et al. did the report for Defra/EA Flood and Coastal Defence R&D Programme, March 2006.
(http://sciencesearch.defra.gov.uk/Document.aspx?Document=FD2321_3436_TRP.pdf)
[2] Defra and Agency (2005) *Framework and Guidance for Assessing and Managing Flood Risk for New Development*, Flood Risk Assessment Guidance for New Development, FD2320 Technical Report 2, HR Wallingford et al. did the report for Defra/EA Flood and Coastal Defence R&D Programme, October 2005.
(http://sciencesearch.defra.gov.uk/Document.aspx?Document=FD2320_3364_TRP.pdf)

FD2320/TR2 (FRA guidance for new development) provides guidance that is a specific interpretation of the methodology developed under FD2321, within the context of development planning and control. Based on FD2320 consultation workshops, the project board (key users and experts) advised the project team to provide a simple methodology. Due uncertainties and limitations related to estimating risks to people, FD2320 adopted a precautionary approach, particularly with respect to the selection of debris factors and flood hazard thresholds

Risk to People (Ninj)

Ninj = **Nz** x **Flood Hazard Rating** x **Area Vulnerability** x **People Vulnerability**

where,

Ninj (Risk to People)	= number of injuries within a particular hazard 'zone';
Nz	= number of people within the hazard zone (at ground/basement level);
Flood Hazard Rating	= HR = function of flood depth/velocity (within the hazard zone being considered) and debris factor;
Area Vulnerability	= function of effectiveness of flood warning, speed of onset of flooding and nature of area (including types of buildings); and
People Vulnerability	= function of presence of people who are very old and/or infirm/disabled/long-term sick

Flood Hazard Rating (HR) and thresholds

The revised 'hazard rating' expression based primarily, on consideration to the direct risks of people exposed to floodwaters.

HR = **d** x (**v** + **n**) + **DF**

where, HR = (flood) hazard rating;
d = depth of flooding (m);
v = velocity of floodwaters (m/sec); and
DF = debris factor (0, 0.5, 1 depending on probability that debris will lead to a hazard)
n = a constant of 0.5

This final revised Flood Hazard Rating formula from the Flood Risks to People project is presented on page 10 (section 3.5) of FD2321/TR1. The formula is identical in both FD2320 and FD2321 reports.

Based on Table 3.2 of FD2321, the Figure 3.2 of FD2321 illustrates the "Hazard to People Classifications" as a function of depth, velocity and debris factor. Such categorisation and the look-up table with flood hazard threshold could be useful for a range of application as an initial indication of Risks to People.

In this case (Figure 3.2 of FD2321) the calculation takes a debris factor as zero (**HR** = **d** x (**v** + **0.5**) + **0**).

However FD2321 strongly recommends the use of the debris factor and the formulas described in the Guidance Document for further calculation. The Table 3.1 of FD2321/TR1 (Table 1 of this note) suggests appropriate debris factors for different depths, velocities and the dominant land use.

Table 1: Guidance on debris factors for different flood depths, velocities and dominant land uses. (Source FD2321 Table 3.1):

Depths (d)	**Pasture/Arable**	**Woodland**	**Urban**
0 to 0.25 m	0	0	0
0.25 to 0.75 m	0	0.5	1
d>0.75 m and\or v>2	0.5	1	1

The way that Flood Hazard Rating and thresholds have been presented in Table 13.1 in FD2320/TR2 compared to Figure 3.2 of FD2321/TR1

A concern was raised in the FD2320 consultation workshops and by the FD2320 Project Board during discussions on FD2321, that the methodology was complex and the results presented in the Figure 3.2 of FD2321 were not reflecting the potential risk to people (as this table was of hazard rating for different depths and velocity without debris). There was a need for further work to include debris, area vulnerability and people vulnerability aspects. They requested a simpler single table to represent the risk to people.

For example Figure 3.2 of FD2321 did not reflect the fact that there is a risk from drowning even at low depths and velocities. In reality FD2321/TR1 recognises this but only in the subsequent "people vulnerability" calculation (risk to children, old, sick and disable). For still water up to 1.25m depth, the Figure 3.2 of FD2321/TR1 assumes that there is low hazard, if there are no debris or vulnerable group. However to avoid further calculation, but include the vulnerability aspect the Table 13.1 of FD2320 for still water with the depths between 0.25–1.25m were reclassified as "danger to some", which was felt to be more appropriate for development planning and control, where users may make use of flood hazard without completing he more complex full calculations including people and area vulnerability.

Similarly Figure 3.2 of FD2321/TR1 shows that at the depth of 0.25m, if there is no debris then up to the flow velocity of 2.0 m/sec there would be low hazard. However FD2321/TR1 suggests the usage of an appropriate debris factor dependent on depth, velocity and the dominant land use. To make the process simpler (whatever the land use), FD2320/TR2 includes a default debris factor. In the Table 13.1 of FD2320/TR2 a debris factor of 0.5 has been applied for depths less than and equal to 0.25m and a debris factor of 1.0 has been used for depths greater than 0.25m. Therefore, in the Table 13.1 of FD2320/TR2 at the depth of 0.25m, up to the flow velocity of 0.30 m/sec is treated as low hazard.

Table 3.2 of FD2321/TR1 (Table 2 of this note) provides thresholds for classifying the hazard to people. In the FD2321/TR1 report the threshold between "danger for most" and "danger for all" is 2.5 and it was used as an initial indication of Risk to People (further calculation is recommended using the formulas). However as there is no further analysis in FD2320 but the Project Board decided that the threshold between "danger for most" and "danger for all" should be more precautionary and a Flood Hazard Rating of 2.0 is selected as a key threshold. i.e. In FD2321 the threshold for "danger for all" is 2.5 and it lowered to 2.0 in FD2320. Therefore, the Flood Hazard Rating between 2.0 to 2.5 in FD2320 is not classified as it is in FD2321.

Table 2: Hazard to People (Source Table 3.2 in FD2321/TR1)

Thresholds for Flood Hazard Rating H = d x (v + 0.5) + DF		**Degree of Flood Hazard**	**Description**
FD2321	**FD2320**		
<0.75	<0.75	Low	**Caution -** "Flood zone with shallow flowing water or deep standing water"
0.75 - 1.25	0.75 - 1.25	Moderate	**Dangerous for some (i.e. children) -** "Danger: Flood zone with deep or fast flowing water"
1.25 - 2.5	1.25 - 2.0	Significant	**Dangerous for most people -** "Danger: flood zone with deep fast flowing water"
>2.5	>2.0	Extreme	**Dangerous for all -** "Extreme danger: flood zone with deep fast flowing water"

The final difference between Table 13.1 in FD2320/TR2 and Figure 3.2 of FD2321/TR1 is the use of smaller increments of depth, so that lower depths are presented more fully in FD2320/TR2. This was felt to be more helpful for identifying what might be judged as acceptable depending on site specific circumstances.

Conclusions

Table 13.1 of FD2320 and Figure 3.2 of FD2321 look very similar but there are significant differences (see Table 3 of this paper). Either Table/Figure can be used as the basis for assessing the risks to people associated with different flood depths velocities and debris factors.

Table 3: comparison of Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1

	In Table 13.1 of FD2320/TR2	**In Figure 3.2 of FD2321/TR1**
The depths above 0.25m	Danger for some, most or all	For still water, up to 1.25m the hazard is low (In addition to hazard rating further calculation to include vulnerability aspect is recommended)
Debris factor	Debris factor of 0.5 has been applied for depths $\leq$0.25m and a debris factor of 1.0 has been used for depths $\geq$ 0.25m.	In this case a Debris factor of zero applied (in addition to this further calculation is recommended using debris factor and the formulas)
HR Thresholds for "Dangerous for all" hazard classification	>2.0 (precautionary due to uncertainties and to avoid further calculation as FD2321)	>2.5
Increments of depth	Small increments at lower depths	Every 0.25 m

Table 13.1 of FD2320/TR2 is a simple method applies the precautionary principle and uses suitable assumptions (so that there is no need for further calculations) for application in the development planning and control context (see Table 4 of this paper - an extended version of table 13.1).

This table is recommended for development planning and control use.

Table 4 – Hazard to People Classification using Hazard Rating *(HR= d x (v + 0.5) + DF)* for (Source Table 13.1 of FD2320/TR2 - Extended version)

HR	Depth of flooding - d (m)												
	DF = 0.5				DF = 1								
Velocity - v (m/s)	0.05	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.80	1.00	1.50	2.00	2.50
0.0	0.03 + 0.5 = 0.53	0.05 + 0.5 = 0.55	0.10 + 0.5 = 0.60	0.13 + 0.5 = 0.63	0.15 + 1.0 = 1.15	0.20 + 1.0 = 1.20	0.25 + 1.0 = 1.25	0.30 + 1.0 = 1.30	0.40 + 1.0 = 1.40	0.50 + 1.0 = 1.50	0.75 + 1.0 = 1.75	1.00 + 1.0 = 2.00	1.25 + 1.0 = 2.25
0.1	0.03 + 0.5 = 0.53	0.06 + 0.5 = 0.56	0.12 + 0.5 = 0.62	0.15 + 0.5 = 0.65	0.18 + 1.0 = 1.18	0.24 + 1.0 = 1.24	0.30 + 1.0 = 1.30	0.36 + 1.0 = 1.36	0.48 + 1.0 = 1.48	0.60 + 1.0 = 1.60	0.90 + 1.0 = 1.90	1.20 + 1.0 = 2.20	1.50 + 1.0 = 2.50
0.3	0.04 + 0.5 = 0.54	0.08 + 0.5 = 0.58	0.15 + 0.5 = 0.65	0.19 + 0.5 = 0.69	0.23 + 1.0 = 1.23	0.30 + 1.0 = 1.30	0.38 + 1.0 = 1.38	0.45 + 1.0 = 1.45	0.60 + 1.0 = 1.60	0.75 + 1.0 = 1.75	1.13 + 1.0 = 2.13	1.50 + 1.0 = 2.50	1.88 + 1.0 = 2.88
0.5	0.05 + 0.5 = 0.55	0.10 + 0.5 = 0.60	0.20 + 0.5 = 0.70	0.25 + 0.5 = 0.75	0.30 + 1.0 = 1.30	0.40 + 1.0 = 1.40	0.50 + 1.0 = 1.50	0.60 + 1.0 = 1.60	0.80 + 1.0 = 1.80	1.00 + 1.0 = 2.00	1.50 + 1.0 = 2.50	2.00 + 1.0 = 3.00	2.50 + 1.0 = 3.50
1.0	0.08 + 0.5 = 0.58	0.15 + 0.5 = 0.65	0.30 + 0.5 = 0.80	0.38 + 0.5 = 0.88	0.45 + 1.0 = 1.45	0.60 + 1.0 = 1.60	0.75 + 1.0 = 1.75	0.90 + 1.0 = 1.90	1.20 + 1.0 = 2.20	1.50 + 1.0 = 2.50	2.25 + 1.0 = 3.25	3.00 + 1.0 = 4.00	3.75 + 1.0 = 4.75
1.5	0.10 + 0.5 = 0.60	0.20 + 0.5 = 0.70	0.40 + 0.5 = 0.90	0.50 + 0.5 = 1.00	0.60 + 1.0 = 1.60	0.80 + 1.0 = 1.80	1.00 + 1.0 = 2.00	1.20 + 1.0 = 2.20	1.60 + 1.0 = 2.60	2.00 + 1.0 = 3.00	3.00 + 1.0 = 4.00	4.00 + 1.0 = 5.00	5.00 + 1.0 = 6.00
2.0	0.13 + 0.5 = 0.63	0.25 + 0.5 = 0.75	0.50 + 0.5 = 1.00	0.63 + 0.5 = 1.13	0.75 + 1.0 = 1.75	1.00 + 1.0 = 2.00	1.25 + 1.0 = 2.25	1.50 + 1.0 = 2.50	2.00 + 1.0 = 3.00	3.50	4.75	6.00	7.25
2.5	0.15 + 0.5 = 0.65	0.30 + 0.5 = 0.80	0.60 + 0.5 = 1.10	0.75 + 0.5 = 1.25	0.90 + 1.0 = 1.90	1.20 + 1.0 = 2.20	1.50 + 1.0 = 2.50	1.80 + 1.0 = 2.80	3.40	4.00	5.50	7.00	8.50
3.0	0.18 + 0.5 = 0.68	0.35 + 0.5 = 0.85	0.70 + 0.5 = 1.20	0.88 + 0.5 = 1.38	1.05 + 1.0 = 2.05	1.40 + 1.0 = 2.40	1.75 + 1.0 = 2.75	3.10	3.80	4.50	6.25	8.00	9.75
3.5	0.20 + 0.5 = 0.70	0.40 + 0.5 = 0.90	0.80 + 0.5 = 1.30	1.00 + 0.5 = 1.50	1.20 + 1.0 = 2.20	1.60 + 1.0 = 2.60	3.00	3.40	4.20	5.00	7.00	9.00	11.00
4.0	0.23 + 0.5 = 0.73	0.45 + 0.5 = 0.95	0.90 + 0.5 = 1.40	1.13 + 0.5 = 1.63	1.35 + 1.0 = 2.35	1.80 + 1.0 = 2.80	3.25	3.70	4.60	5.50	7.75	10.00	12.25
4.5	0.25 + 0.5 = 0.75	0.50 + 0.5 = 1.00	1.00 + 0.5 = 1.50	1.25 + 0.5 = 1.75	1.50 + 1.0 = 2.50	2.00 + 1.0 = 3.00	3.50	4.00	5.00	6.00	8.50	11.00	13.50
5.0	0.28 + 0.5 = 0.78	0.60 + 0.5 = 1.10	1.10 + 0.5 = 1.60	1.38 + 0.5 = 1.88	1.65 + 1.0 = 2.65	3.20	3.75	4.30	5.40	6.50	9.25	12.00	14.75

Flood Hazard Rating (HR)	Colour Code	Hazard to People Classification
Less than 0.75		Very low hazard - Caution
0.75 to 1.25		Danger for some – includes children, the elderly and the infirm
1.25 to 2.0		Danger for most – includes the general public
More than 2.0		Danger for all – includes the emergency services

Appendix H
Environment Agency Flood Data

From:	Partnership and Strategic Overview team, HIOW
To:	Andy Johnson
Cc:	SSD Enquiries
Subject:	Flood Risk Information (Product 4) for Saltmarsh Lane - Ref: SSD/265551 [Filed 23 Jun 2022 13:16]
Date:	23 June 2022 13:08:55
Attachments:	Defences Map.pdf Flood Map for Planning (Rivers and Sea).pdf Risk of Flooding from Surface Water.pdf Open Government Licence.pdf Use of EA Information for FRAs.pdf

Dear Andy,

Enquiry regarding Product 4 for Land South of Saltmarsh Lane, Hayling Island, PO11 0JT.

Thank you for your enquiry which was received on 16 May 2022.

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

We can confirm that the above property/site is located in Flood Zone 1 - an area where the chance of flooding from both rivers and the sea has been assessed as less than 0.1% in any year (1 chance in 1,000 in any year).

The Environment Agency has no record of flooding to this property/area. Please note our records are not comprehensive and may not include all events. I recommend contacting the Lead Local Flooding Authority, Hampshire County Council or the Local Authority, Havant Borough Council for a more comprehensive flood history check.

Defences – See attached map.

Tidal flood levels for the 0.5% (1:200) and the 0.1% (1:1000) annual exceedance probabilities relevant to your site are provided in the table below. These levels have been taken from the East Solent Coastal model that was produced in 2018 by JBA Consulting.

Year	Tide Level (mAOD*)	
	0.5% annual exceedance probability/1 in 200 Year (Flood Zone 3)	**0.1% annual exceedance probability/1 in 1000 Year (Flood Zone 2)**
2015	3.32	3.51
2065	3.65	3.83
2115	4.07	4.26

* Levels in metres above Ordnance Datum Newlyn.

Climate change
The climate change data included in the models may not include the latest Flood risk assessments: climate change allowances'. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding. The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

FRA advisory text

Name	Product 4
Description	Basic / Detailed Flood Risk Assessment Map for Land South of Saltmarsh Lane, Hayling Island, PO11 0JT
Licence	Open Government Licence
Information Warnings	The majority of our models will not have the new climate change allowances. +20% is not suitable for the majority of planning purposes and the new allowances to use should be checked here: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
Information Warning - OS background mapping	*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.*
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2017 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

Does Your Proposal Have Environmental Issues or Opportunities? Speak To Us Early!

If you are planning a new project or development, we want to work with you to make the process as smooth as possible. Early engagement can improve subsequent planning applications to you and your clients' benefit and deliver environmental outcomes. For a cost recovery fee of £100 per hour plus VAT we will provide you with a project manager who will coordinate all meetings and reviews in order to give you detailed specialist advice with guaranteed delivery dates. More information can be found on our website here.

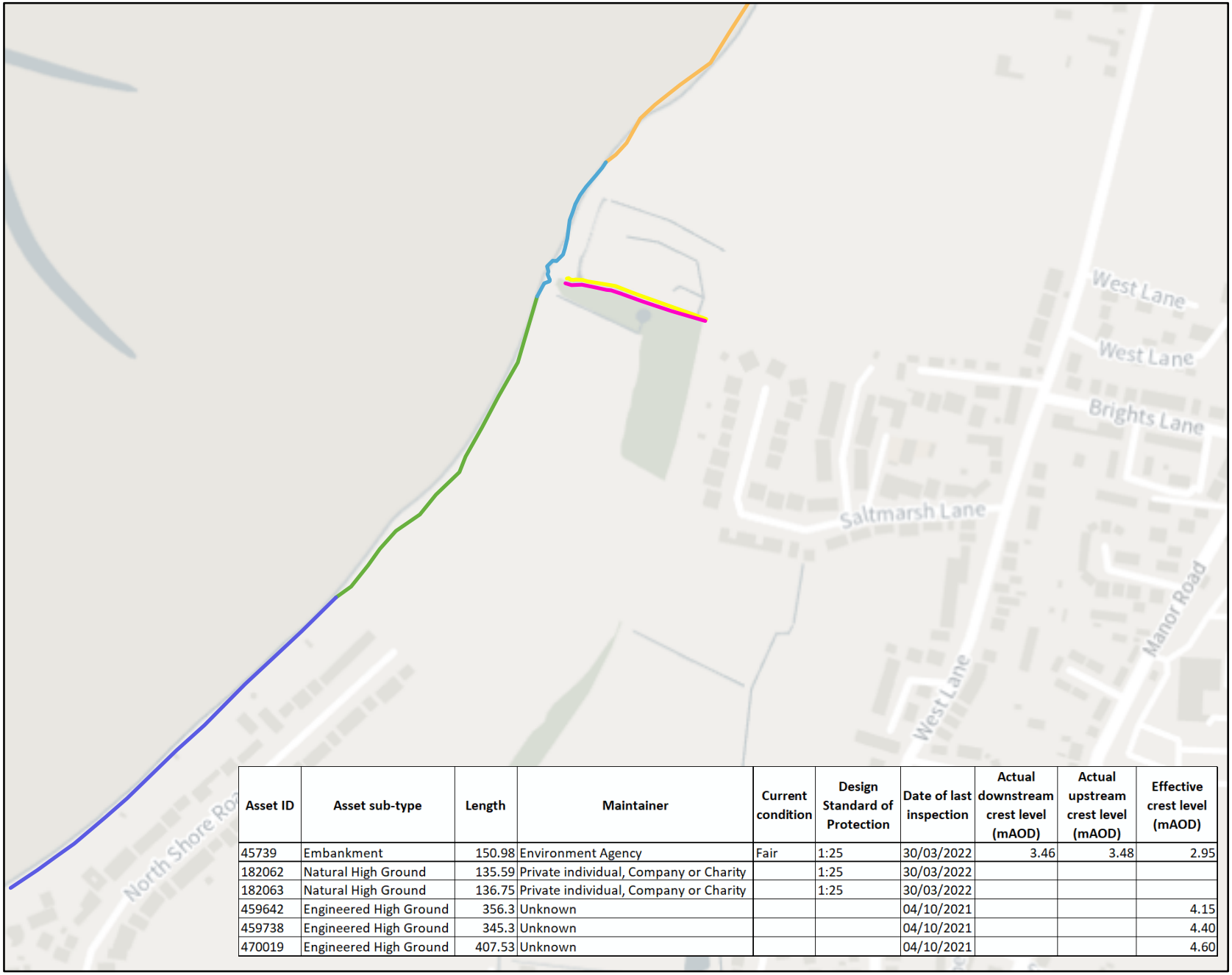
Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely,

Aimee Etheridge
Partnership and Strategic Overview team, Hampshire and Isle of Wight
Environment Agency

Direct dial 020 8474 5815
Email psohiow@environment-agency.gov.uk

Defences Centred on Saltmarsh Lane - Created 23 June 2022



Asset ID	Asset sub-type	Length	Maintainer	Current condition	Design Standard of Protection	Date of last inspection	Actual downstream crest level (mAOD)	Actual upstream crest level (mAOD)	Effective crest level (mAOD)
45739	Embankment	150.98	Environment Agency	Fair	1:25	30/03/2022	3.46	3.48	2.95
182062	Natural High Ground	135.59	Private individual, Company or Charity		1:25	30/03/2022			
182063	Natural High Ground	136.75	Private individual, Company or Charity		1:25	30/03/2022			
459642	Engineered High Ground	356.3	Unknown			04/10/2021			4.15
459738	Engineered High Ground	345.3	Unknown			04/10/2021			4.40
470019	Engineered High Ground	407.53	Unknown			04/10/2021			4.60

Environment Agency

Legend

asset_id

- 45739
- 182062
- 182063
- 459642
- 459738
- 470019

1:5,189 *

*when printed at A4.

N

0 100 200

Metres

Contact Us: National Customer Contact Centre, PO BOX 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Appendix J
Flood Contour Map