



Flood Risk Assessment

**Deacons Marina, Deacons House, Bridge Road,
Bursledon, Southampton, SO31 8AZ**

Boatfolk Marinas Limited

Deacons Marina

July 2021

Preface

Site Address: Deacons Marina, Deacons House, Bridge Road, Bursledon,
Southampton, SO31 8AZ

NGR: E: 449062 N: 1009652

Site Use: Marina and Boatyard

Site Area: 2.76 Hectares (6.82 Acres)

Date of Inspection: 15 June 2021

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Instruction Number: 01C100407

Report Control:

Status:		Date:
Version 1		July 2021
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For and on behalf of Avison Young (UK) Limited		
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1. Scope of Instruction and Brief

Objectives

- 1.1 Instructions were received from Boatfolk Marinas Limited (the Client) to undertake a Flood Risk Assessment. The objectives were to assess the current and future flood risk and review resilience and mitigation options both in the short and long term at Deacons Marina.
- 1.2 This report has been split into the following key flood risk sections:
- **Section 4 Flood Risk** – *within this section we have reviewed the current flood risk, history of flooding and potential flood depths taking into account climate change;*
 - **Section 5 Flood Mitigation** – *within this section we have reviewed the flood mitigation measures and provided recommendations to improve resilience; and*
 - **Section 6 Masterplanning** – *within this section we have reviewed and provided comment on the current Masterplan.*

Data Sources

- 1.3 This report is based upon a detailed review of the following readily available documentation:
- Ambiantal Flood Risk Report, May 2021;
 - Boatfolk Project Flak Jacket Deacons Marina Inspection Reports, 01 – 06, April 2021;
 - Environment Agency Product 4 (Ref. SSD/21709);
 - Eastleigh Surface Water Management Plan, (no date);
 - Landmark Envirocheck Report (Ref. 106694972_1_1);
 - PUSH Strategic Flood Risk Assessment Final Report, December 2007;
 - PUSH Strategic Flood Risk Assessment Update, February 2016; and
 - Southern Water sewer map.
- 1.4 Regulatory enquiries with the Environment Agency, Eastleigh Borough Council (Lead Local Flood Authority), Southern Water have been undertaken to obtain historic flood records and an understanding of the local flood risk (if any).
- 1.5 The findings and opinions conveyed in this report are based on information obtained from a variety of sources as detailed in the report and which Avison Young assumes to be reliable but has not been

independently confirmed. Therefore, Avison Young cannot and does not guarantee the authenticity or reliability of third-party information it has relied upon.

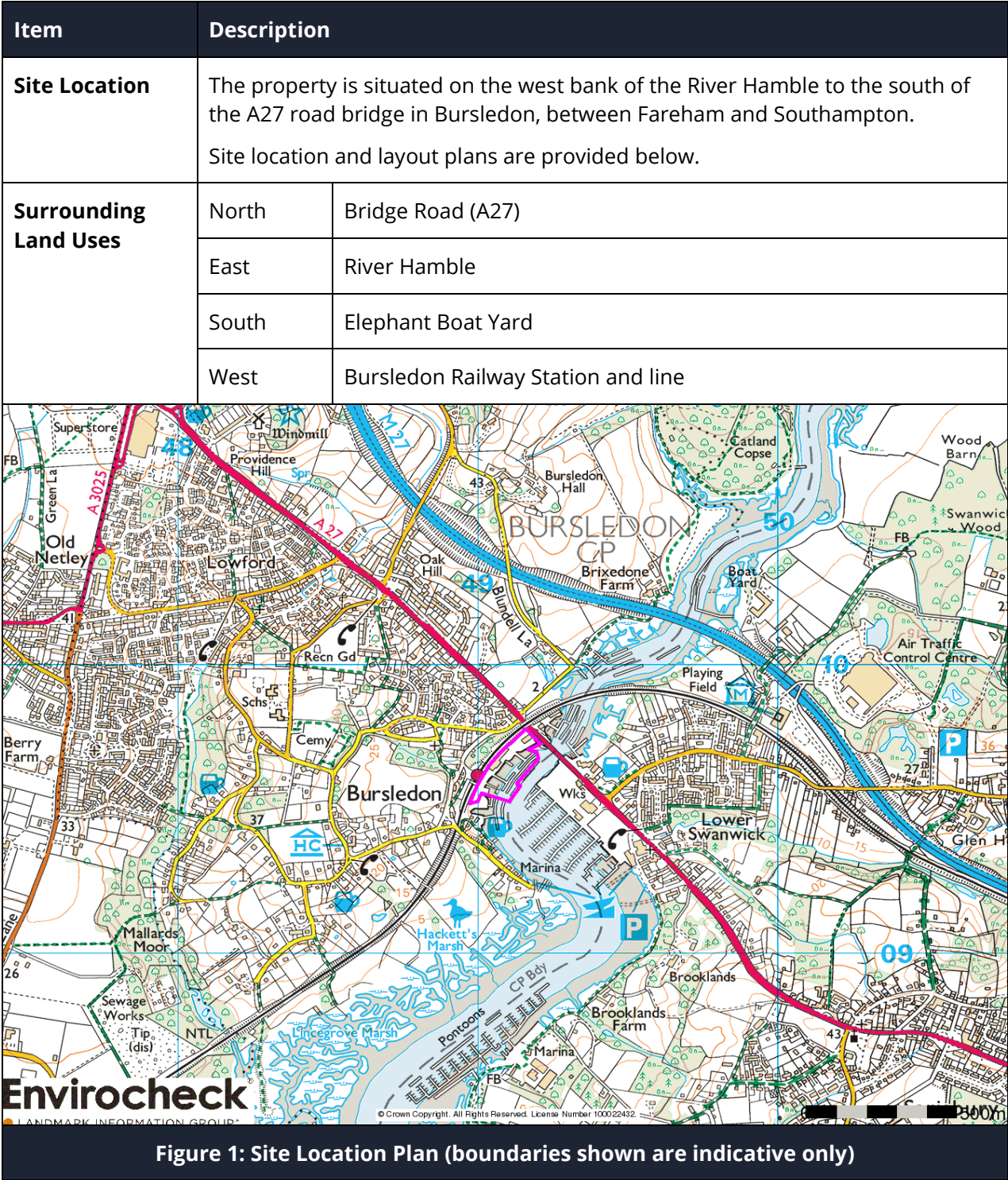
- 1.6 All Ordnance Survey Mapping contained within this report is © Crown Copyright. All rights reserved, licence number 100000795.

Report Preparation

- 1.7 This report has been written with reference to the National Planning Policy Framework and accompanying Technical Guidance which sets out how Local Planning Authorities should aim to mitigate and adapt to climate change taking full account of flood risk, coastal change and water supply demand considerations. The methodology in CIRIA C624: Development and Flood Risk – Guidance for the Construction Industry has also been considered.
- 1.8 This report does not constitute a Flood Risk Assessment that can be used to support a planning application.

2. Site Location

2.1 The following site location plan and table provides a summary of the site's location and surrounding land uses.



3. Site Setting

3.1 The following site layout plan and table provides a summary of the site's condition and setting.

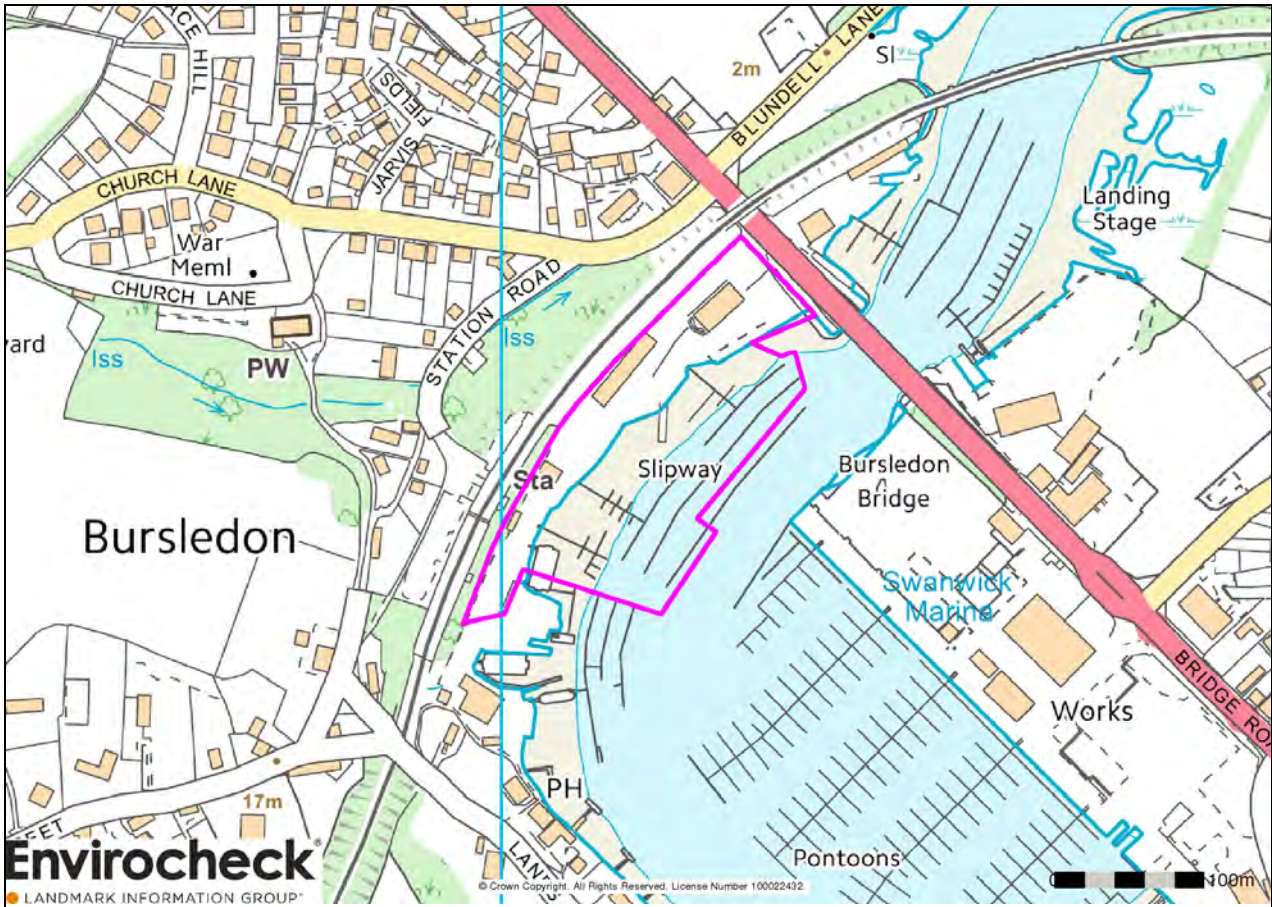


Figure 2: Site Layout Plan (boundaries shown are indicative only)

Item	Description
General Description General	Deacons Marina and Boatyard have operated from the site for nearly a century. The property is situated on the lower reaches of the River Hamble between Southampton and Fareham and can accommodate 135no. berths afloat and space for around 180no. boats ashore with craneage facilities for boats up to 20 tonnes and 45 feet in length. The site area is roughly rectangular in shape and extends along the bank of the River Hamble with pontoons that extend into the river channel. The site is occupied by a terrace of tenanted units (2 storeys) with a shower and toilet block at the southern end. For reference purposes within this report, we have called this building 'Commercial Building'. The ground floor is known as 'The Workshops' and the upper for as the 'Sail Loft'. Following a storm surge and resultant flooding of the ground floor on 14 February 2014, a low rise (750mm) concrete wall with demountable barriers have been installed to protect the ground floor.

Item	Description
General Description <i>(continued)</i>	There is also a two-storey building used at ground floor level for food retail (Alexandra's Restaurant) and Force 4 Chandlery, with Boatfolk office accommodation at second floor level, known as 'Deacons House'. Finished floor levels on this building are elevated by 1m above the surrounding ground. Beneath the building is a large void that would allow flood water to pass beneath. Immediately to the north east of Deacons House there is a small, ground floor only building referenced within this report as 'Why Boats Brokerage Building'. The finished floor level of this building is raised by approximately 450mm. Externally, the property benefits from an extensive car park, boat storage area surfaced with stone chippings. The area appears to have settled differentially in parts and there is evidence of repairs being undertaken to make up site levels. Within the central southern portion of the site there is a 'Spray Painting Building'. Along the edge of the river foreshore, there is a combination of sheet pile retained sections, gabion basket stone walls and natural mudflats. We understand from site management that the newly installed gabion baskets are the preferred method of stabilising the riverbank and the plan is to continue these at the southern extent of the property.
Site Services	From our site inspection, there is a Scottish and Southern Energy (SSE) substation located on the northern boundary adjacent to the site entrance. All on shore incoming electricity supplied and power connection boxes and pedestals were located approximately 0.75m above existing ground level.
Topography	A topographical survey of the site has been carried out by P Stubbington Land Surveys Ltd, June 2017 (Ref 6214/01). Within the northern and central part of the site, levels generally fall in a south-easterly direction from approximately 2.60m AOD to approximately 2.40m AOD. The lowest point being at the bottom of the concrete capped pile wall which runs partly along the north-eastern boundary. The top of this wall is at 3.62m AOD. Within the southern portion of the site, ground levels are generally lower, with levels falling from 2.25m AOD to 2.10m AOD. A gabion wall runs along the eastern and southern boundary. Based on the survey data from 2017, the top of the wall was generally recorded at 2.60m AOD. However, we understand that these gabion walls were recently replaced and from site observations, the top of the gabion wall is likely now to be higher than 2.60m AOD. The finished floor levels of the onsite buildings are as follows: • Why Boats Brokerage Building – Approximately 3.00m AOD • Deacons House – 3.52m AOD • Commercial Buildings (The Workshops) – 2.41m AOD to 2.50m AOD • Spray Painting Building – 2.28m AOD A copy of the topographical survey can be found in Appendix I.

Item	Description												
Geological Conditions	From a review of the British Geological Survey (BGS) Solid & Drift Sheet 315, Southampton at a scale of 1:50,000 the following geological succession has been identified at the site.												
	<table><tr><th>Strata</th><th>Description</th><th>Approx. Thickness</th></tr><tr><td>Artificial Ground</td><td>Variable composition. Man-made superficial deposit.</td><td><5m</td></tr><tr><td>Tidal Flat Deposits</td><td>Normally consolidated soft silty clay, with layers of sand, gravel and peat.</td><td><5m</td></tr><tr><td>London Clay Formation</td><td>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.</td><td>>50m</td></tr></table>	Strata	Description	Approx. Thickness	Artificial Ground	Variable composition. Man-made superficial deposit.	<5m	Tidal Flat Deposits	Normally consolidated soft silty clay, with layers of sand, gravel and peat.	<5m	London Clay Formation	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.	>50m
	Strata	Description	Approx. Thickness										
	Artificial Ground	Variable composition. Man-made superficial deposit.	<5m										
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	London Clay Formation	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.	>50m										
The BGS map does not indicate the presence of any geological faults within a 1km radius of the site.													
From a review of the Eastleigh Borough Council Planning Portal, we have reviewed the following ground investigation that was undertaken to support the construction of a detached building to provide 10no. industrial units (ref.09/65283):													
Geo-Environmental Site Investigation Report, Deacons Boat Yard, Bursledon Hampshire, REC Report 50822/report 1.1, dated April 2009 undertaken on behalf of SGC Projects Ltd.													
The report presents the findings of a combined geotechnical and geo-environmental investigation at Deacons Boatyard, Bursledon, Hampshire. This report confirmed the anticipated geology tabulated above.													
Groundwater was encountered between 10.4m to 11.4m bgl in a gravel layer that appeared to be constrained within the clays. It was considered that the groundwater was unlikely to be in direct hydraulic continuity with the river due to the depth at which it was encountered and the presence of the sheet pile dock wall.													
A copy of the exploration records are provided in Appendix II .													
Catchment Hydrology	The closest surface watercourse is the tidally influenced River Hamble which is located immediately east of the site. A small watercourse runs approximately 100m from the north-western boundary of the site. This watercourse is a tributary of the River Hamble and is partially culverted. The watercourse discharges into another culverted watercourse, located approximately 20m to the north east of the site. This culverted watercourse flows in a south easterly direction, under the site's north eastern boundary, where it eventually discharges into the River Hamble. According to Environment Agency data, these watercourses are classed as Main Rivers.												

Item	Description
Catchment Hydrogeology	According to the Envirocheck Report, the underlying superficial deposits and deeper bedrock geology are both classified as Unproductive Strata with low permeability and have negligible significance for water supply or for the supply of base flow to streams and rivers. The Envirocheck Report does not identify any groundwater abstractions authorised by the Environment Agency on site or within 500m of the property
Existing Site Drainage	Sewer records obtained from Southern Water shows that there are no public sewers located within the site. However, the records show a 225mm public foul water sewer running in a south-westerly direction in parallel to the site from Bridge Road (A27). There are no public surface sewers in the vicinity of the site. A CCTV drainage survey was carried out in May 2017 to establish the onsite drainage arrangements. According to this survey, there are two separate networks which receive surface water from private yard gullies, ACO channel drains and French drains which all ultimately discharge onto the River Hamble via two separate outfall pipes. A copy of the Southern Water Asset Plans and Existing Arrangements can be found in Appendix III.

Site Photographs

3.2 A selection of site photographs taken on 15 June 2021 is presented below.



Photo 1: View of the Marina, photo taken from Bridge Road



Photo 2: Entrance to Marina, note the fall in levels to the right of the photo



Photo 3: View of Deacons House, note the raised floor level, approx. 1.m elevation from ground level



Photo 4: View of central portion of site with commercial buildings and car parking shown.



Photo 5: View of southern portion of the site.



Photo 6: View of southern boundary



Photo 7: View of metal sheet piling with concrete cap which would act as a defence located along north-eastern boundary along bank of River Hamble.



Photo 8: No sheet pile wall or gabions in the centre of the site. During high tides water ingresses onto the site from this area.



Photo 9: Recently installed Gabion Wall located along the central southern boundary. Note: these are not flood defences, they were installed to slow erosion



Photo 10: Southern boundary with no sheet pile wall or gabions



Photo 11: Unit located along the central southern boundary. This flooded in 2014 by approximately 600mm



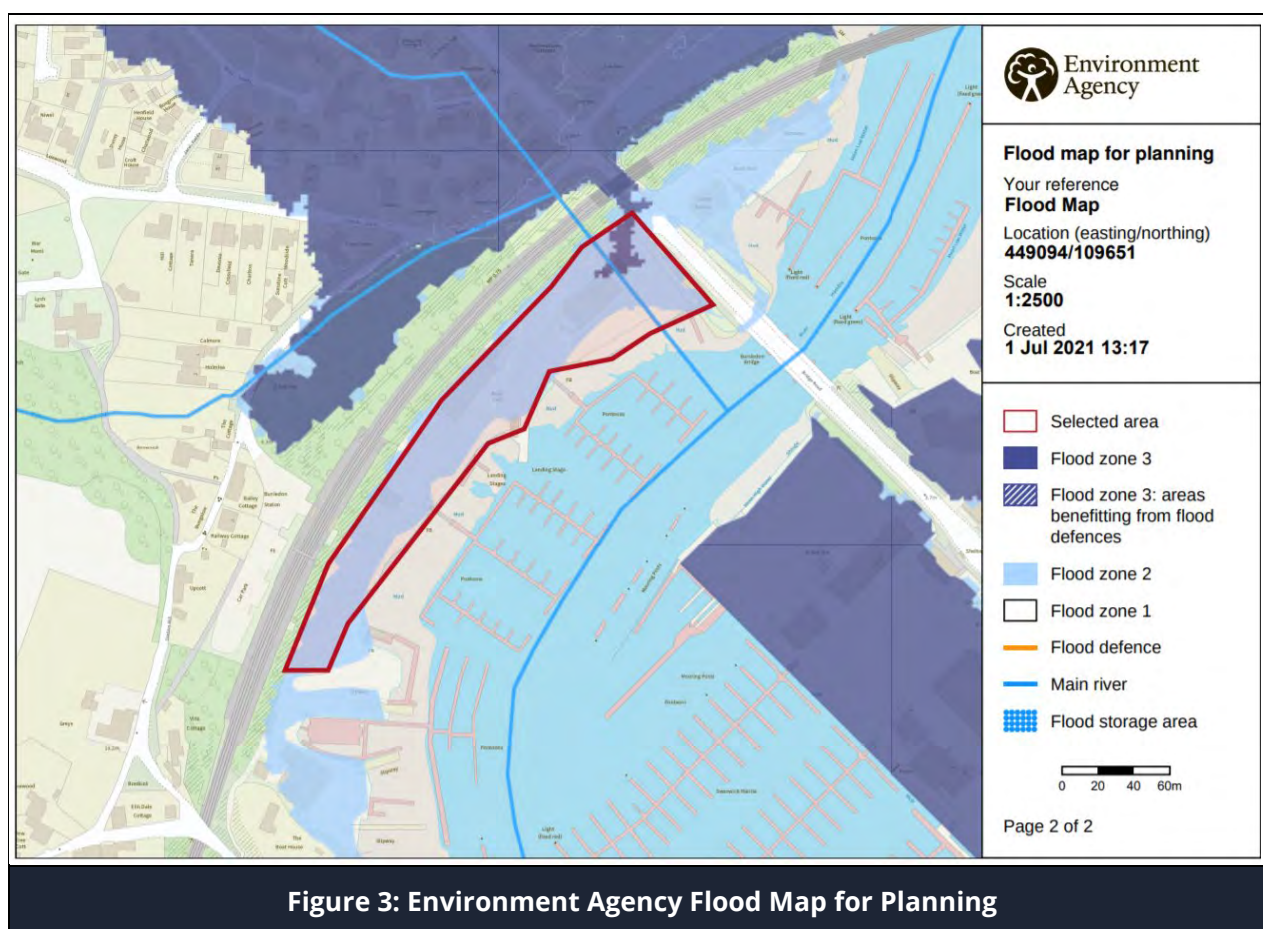
Photo 12: Example of floodgate protecting The Workshops

4. Flood Risk

- 4.1 This section identifies what potential sources of flooding could affect the site and includes further details on how flooding might occur.

Environment Agency Flood Maps

- 4.2 According to the publicly available Environment Agency Flood Map for Planning, the majority of the site is located within Environment Agency Flood Zone 2 (land assessed as having a between 1 in 1,000 and 1 in 100 chance of flooding from rivers in any year or between 1 in 1,000 and 1 in 200 chance of flooding from the sea in any year). We understand that this risk is associated with flooding from the tidal River Hamble.
- 4.3 The entrance to the site is shown to be located within Flood Zone 3 (land assessed as having a 1 in 100 year or greater annual probability of river or sea flooding in any year). We understand that this risk is predominately from a tributary of the River Hamble located 100m to the north of the site.



- 4.4 Upon review of the Environment Agency's Long-Term Flood Risk Map, the majority of the site is at 'Low' risk of flooding, with an annual probability of river or sea flooding of between 1 in 1,000 and 1 in 100. The north-eastern corner of the site is shown to be at 'high' risk of flooding with an annual probability of river or sea flooding greater than 1 in 30.

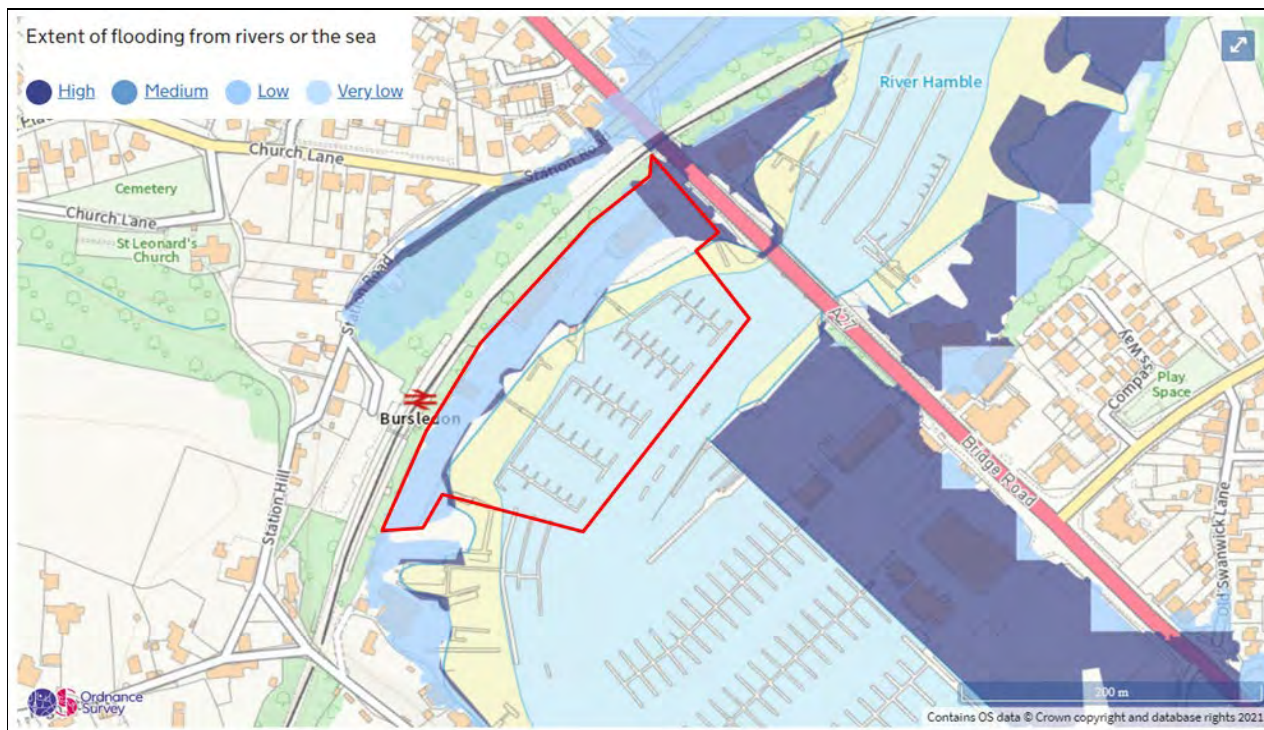


Figure 4: Environment Agency Long Term Flood Risk Map

- 4.5 The Long-Term Flood Risk Map takes into account the effect of any flood defences that may be in this area. However, whilst flood defences reduce the risk they do not completely stop the chance of flooding and they can overtop or fail.

Tidal

Tidal flooding is the term used to describe flooding which occurs when the sea height exceeds the mean high tide mark often submerging low-lying land with seawater. During larger events, often combined with large waves, flood water makes its way further inland, potentially impacting land, property and infrastructure. Tidal flooding can also occur when barriers / flood defences are overtopped.

Tidal Influences and Meteorology

- 4.6 An unusual phenomenon of a 'double high water' is experienced each day in the Southampton and Solent tidal areas, including the River Hamble. This double tide provides a high tide, which lasts over 2 hours which is then followed by a short ebb tide which is then followed by a long flood tide.

- 4.7 Historically, the highest tidal levels recorded within the River Hamble occur when high fluvial flows combine with Spring Tides and deep low pressure systems. It is during these conditions that the risk of flooding to the site is at its greatest.
- 4.8 When tide charts forecast levels exceeding 4.8m above Chart Datum (chart datum being 2.74m below Ordnance Datum at this location) there is a risk of flooding.

Environment Agency Product 4

- 4.9 We have obtained Environment Agency Product 4 data for the site (Reference SSD/21709). This included the modelling data taken from the Southampton Water Coastal Model, which was produced in 2014 by JBA, information on flood defences within the area and historic flood mapping. The data did not include any fluvial data for the small watercourse which runs approximately 100m from the north-western boundary of the site.
- 4.10 A copy of the Environment Agency Product 4 can be found in **Appendix IV**.

Southampton Water Coastal Model

- 4.11 The tidal flood levels for the 1 in 200-year and 1 in 1,000-year flood event are provided in the table below. These levels have been taken from the Southampton Water Coastal Model.

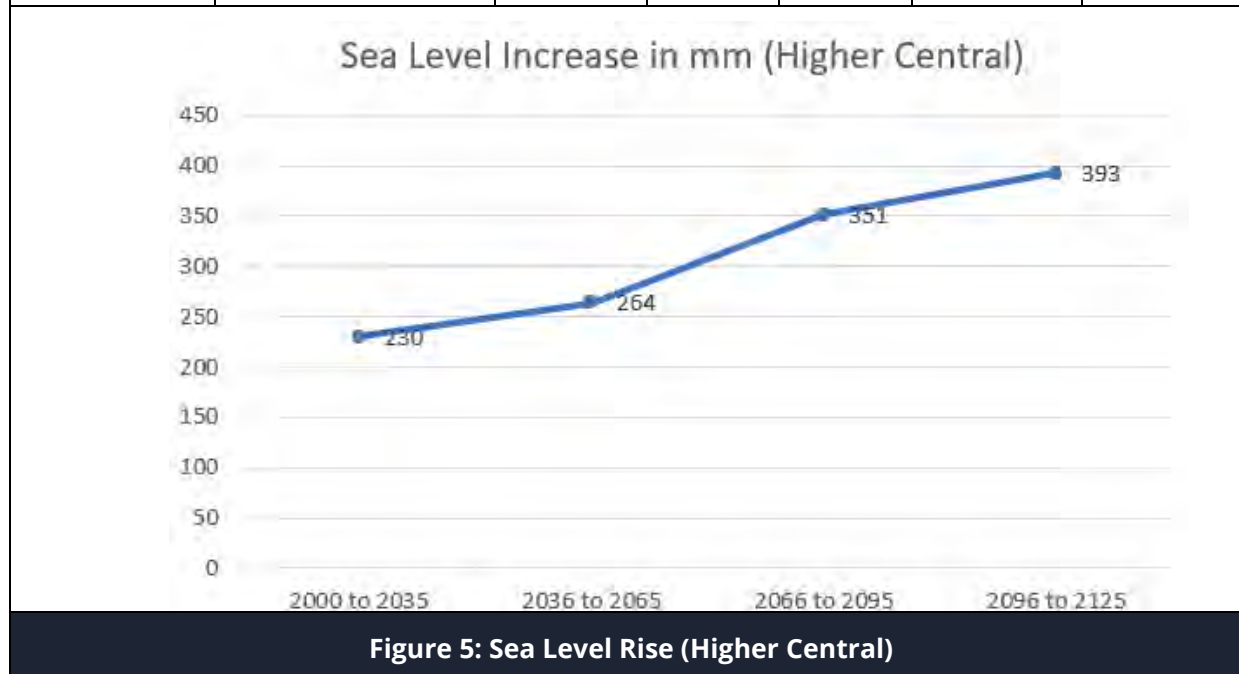
Year	Tidal Level (m AOD)	
	1 in 200 Year (Flood Zone 3)	1 in 1000 Year (Flood Zone 2)
2015	3.2m AOD	3.3m AOD
2070	3.7m AOD	3.8m AOD
2115	4.3m AOD	4.5m AOD

- 4.13 In summary, during a 1 in 200-year event, today's level is 3.2m AOD rising to 4.3m AOD in the next 100 years. During a 1 in 1,000-year extreme flood event, today's level is 3.3m AOD, however, this level will rise to 4.5m AOD in the next 100 years.
- 4.14 Climate change data is continually being revised. The flood data shown above is based on the climate allowance applicable in 2014. The Environment Agency has since published new Climate Change Guidance which provides insight into how flood levels will rise in the next 100 years, taking into account today's projections¹.

¹ <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

- 4.15 The rate of sea level rise for South East England is shown below. The projections vary based on the vulnerability of the end development. A more cautious approach is applied to developments of a Highly Vulnerable nature i.e. Residential Caravan Sites. For Marina Developments, including Office Use and Restaurants, we have applied the High Central allowance which is a more conservative approach.

Area of England	Allowance	Predicted Increase in Sea Level Over the next 100 years				
		2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2000 to 2125 (m)
South East	Higher Central (for more vulnerable development)	203	264	351	393	1.21m



- 4.16 As discussed in Section 4.13, the current 2015, 1 in 200-year modelled level is 3.2m AOD. We can add the latest climate change allowances (1.2m) to get a finished floor level of **4.41m AOD**. This is for development with a design life of 100 years.
- 4.17 However, if the development has a design life of 50 years, we can calculate the allowance based on increments. The Environment Agency has calculated the increments based on which part of the country you are in. These figures are summarised below and show that in 50 years' time the predicted flood level is **3.66m AOD**.
- 4.18 For further information on how these were calculated please see: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-3>

South East	2015 0.5% AED	2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2071 (mm)	Cumulative rise 2014 to 2071 (m)	2071 Finished Floor Level
Higher Central	3.2m AOD	125.4mm	261mm	69.6mm	$0.1254 + 0.261 + 0.0696 = \mathbf{0.456m}$	$3.2 + 0.46 = \mathbf{3.66m AOD}$

Environment Agency Climate Change Summary

4.19 In summary, for development with a design life of:

- **50 years**, we recommended finished floor levels are set above **3.66m AOD**; and
- **100 years**, we recommended finished floor levels are set above **4.41m AOD**.

4.20 The above excludes any allowance for freeboard. Freeboard is an additional height added to defences or finished floor levels to take into account potential wave action. For fluvial (river) flooding, it is standard practice to add an additional 300mm to 600mm of freeboard to the top of a defence or finished floor level. However, at present, there is no national guidance on tidal freeboard.

Ambiental Flood Data – Climate Change

4.21 We have purchased additional climate change data from Ambiental's UK FloodFutures flood model that considers nine possible climate change scenarios between 2020 and 2080 and is based on UK Climate Projections – UKCP09.

4.22 Data from UK Climate Projections (UKCP) indicates that in the UK we are likely to receive more bouts of heavy rain more frequently and sea levels will continue to rise in the future as a result of climate change. The number of flood events is likely to increase.

4.23 We have reviewed data created for medium emissions and high emissions for the years 2020 and 2080. Emissions refers to the likely output of carbon emissions that will impact upon climate change and sea level rise. This data is summarised below and a copy of the Ambiental Flood Report can be found in **Appendix V**.

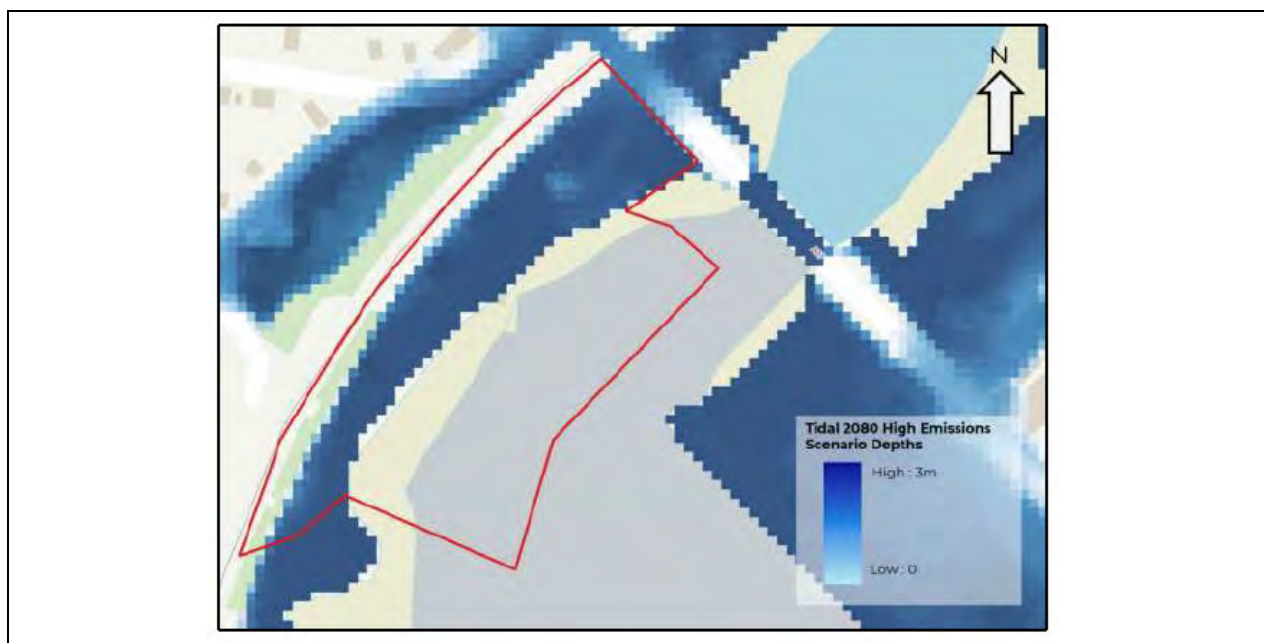


Figure 6: Sea Inundation 2080

Emission Scenario	Max Onsite Depth (m AOD)	Mean On Site Depth (m AOD)
2020 Medium Emission RCP 6.0	2.97	2.97
2020 High Emission RCP 8.5	3.20	3.19
2080 Medium Emission RCP 6.0	3.46	3.45
2080 High Emission RCP 8.5	4.29	4.28

4.24 The data shows that by 2080, mean depths could range between 3.45m AOD to 4.28m AOD.

Comparison of Environment Agency and Ambiantal Data

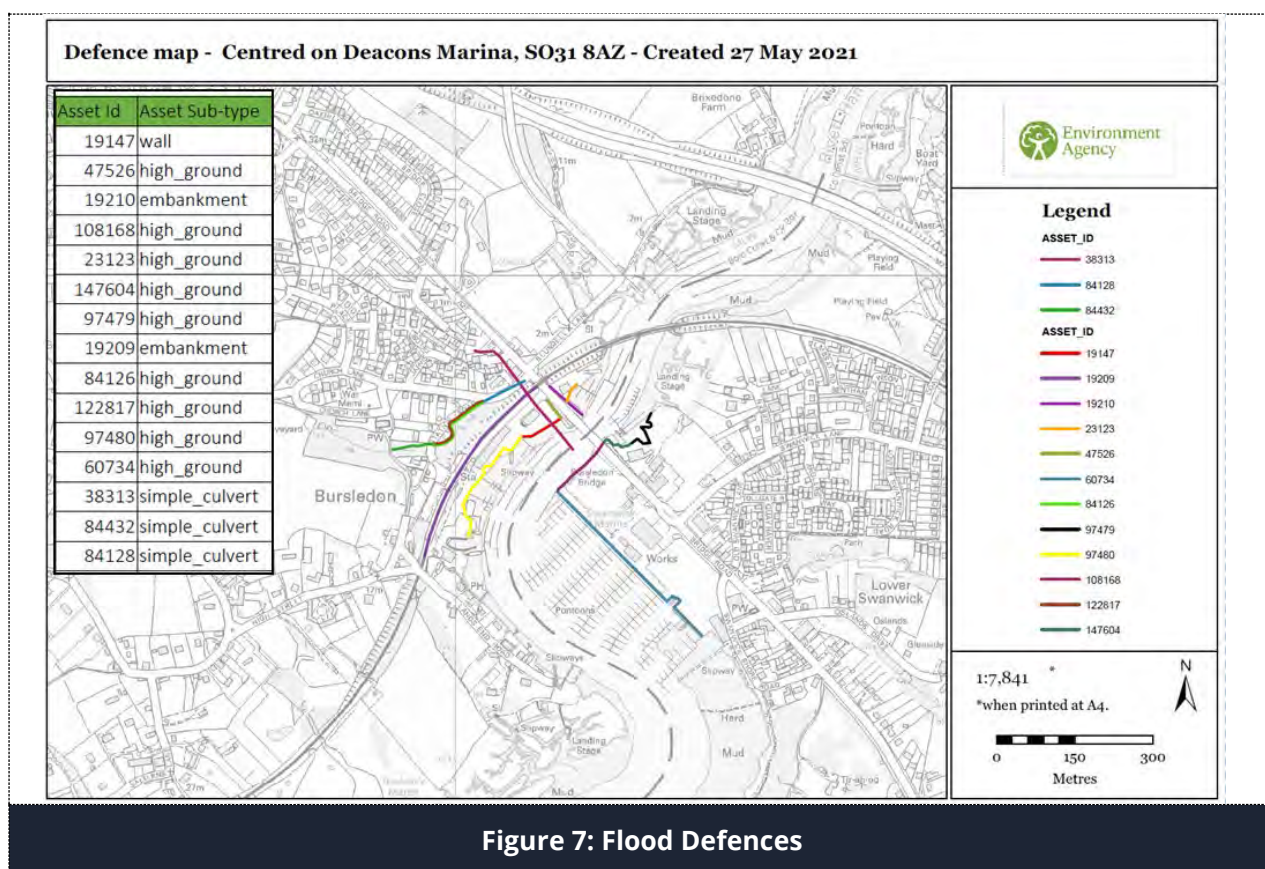
4.25 The Ambiantal Data is similar to the Environment Agency data. In summary, there is the potential for tidal levels to rise by 1m plus in the next 80 to 100 years.

4.26 We recommend that future defence heights and finished floor levels are based on the Environment Agency projections. As such the following should be used:

- **50 years**, we recommend finished floor levels are set above 3.66m AOD; and
- **100 years**, we recommend finished floor levels are set above 4.41m AOD.

Flood Defences

- 4.27 According to the Product 4 data, the site and surrounding area benefit from a number of natural flood defences together with engineered defences, including a steel pile wall, a steel wall, a concrete seawall, a shingle embankment and a stone filled gabion. The location of the defences are presented in Figure 7 below.
- 4.28 According to Environment Agency data, these defences provide the subject site with a design standard of protection of 100 years. The defences were last inspected in 2020 and were found to be in a 'Fair' condition and are privately owned (assumed to be owned by Boatfolk).



Flood History

- 4.29 We understand that the River Hamble, at this locality, overtops its banks annually during the high Spring Tide and results in flooding of the yard areas in the central and southern portion to a depth of approximately 400mm. We understand that the high tide is experienced for a period of no longer than two hours and can be predicted by reference to Admiralty Tide Charts. Photo 13 and 14 below show the extent of an 'annual' flood



Photo 13: Water being held back by flood defences from The Workshops



Photo 14: Example of the boatyard under water

- 4.30 We understand that a Spring Tide that occurred on 14 February 2014 coincided with a low pressure system and onshore wind that resulted in a storm surge in the Solent/English Channel. During this event, site management confirmed that the site flooded and flood water affected the yard to a depth of between 300mm to 400mm at the river edge reducing to 50mm at the boundary with the railway. In addition, the tenanted workshops were flooded to a depth of between 100mm to 200mm and the toilets/showers to a depth of 50mm. Following this event, flood resilience measures have been installed, which are discussed further in Section 5.
- 4.31 The Deacons House building benefits from raised floor levels that according to the SCG drawings that accompanied planning application (ref.09/65283) are raised to 3.52m AOD. We have no historic records of this building being affected from flood water during this or other events.

Tidal Flood Risk Summary

- 4.32 In summary, although the site is shown to be at Low risk from flooding on the Environment Agency's website, the site has a significant history of tidal flooding. We consider the site is at High risk of tidal flooding, however, due to flood resilience measures and raised finished floor levels, the risk of water ingressing into the main buildings is considered as low to medium.

Fluvial

Fluvial flooding is the term used to describe flooding which occurs when rivers experience large flows causing them to exceed their capacity. In the natural environment open spaces near the river act as storage areas or 'flood plains' for out-of-channel flow, alleviating downstream flood risk.

- 4.33 A small watercourse runs approximately 100m from the north-western boundary of the site. This watercourse is a tributary of the River Hamble and is partially culverted. The watercourse discharges into another culverted watercourse, located approximately 20m to the north east of the site. This watercourse is also a tributary of the River Hamble and flows within a culvert, in a south easterly direction from Bursledon Heights road, (located approximately 550m to the north west of the site) until it discharges into the River Hamble immediately to the east of the site. The culvert runs under a small section of the site's north eastern boundary. The estimated location of the culvert is shown in Figure 7 above (ref. 38313).
- 4.34 A CCTV survey would be required should further details regarding the condition and route of the culvert be required.
- 4.35 Fluvial flood modelling data was not provided as part of the Product 4. We have made further enquiries with the Environment Agency to establish if there is any model data available for the watercourse. However, we consider that the tidal depths summarised within this report will be deeper than any potential fluvial depths from the watercourse.
- 4.36 Based on the Environment Agency Flood Maps, we understand that during a 1 in 100-year flood event there is the potential for water to ingress into the site via the main entrance. Due to the site topography we would expect water to flow down the path which runs immediately outside of the north-eastern boundary and discharge directly into the River Hamble. Alternatively, as shown in Figure 8 below, water could follow the black arrows flowing through the northern portion of the site, ultimately discharging into the River Hamble.
- 4.37 During a fluvial flood event, water would not ingress into Deacons House due to the raised floor levels. Water could potentially ingress into the Workshops, therefore deployment of onsite flood defences discussed in Section 5 will be required.

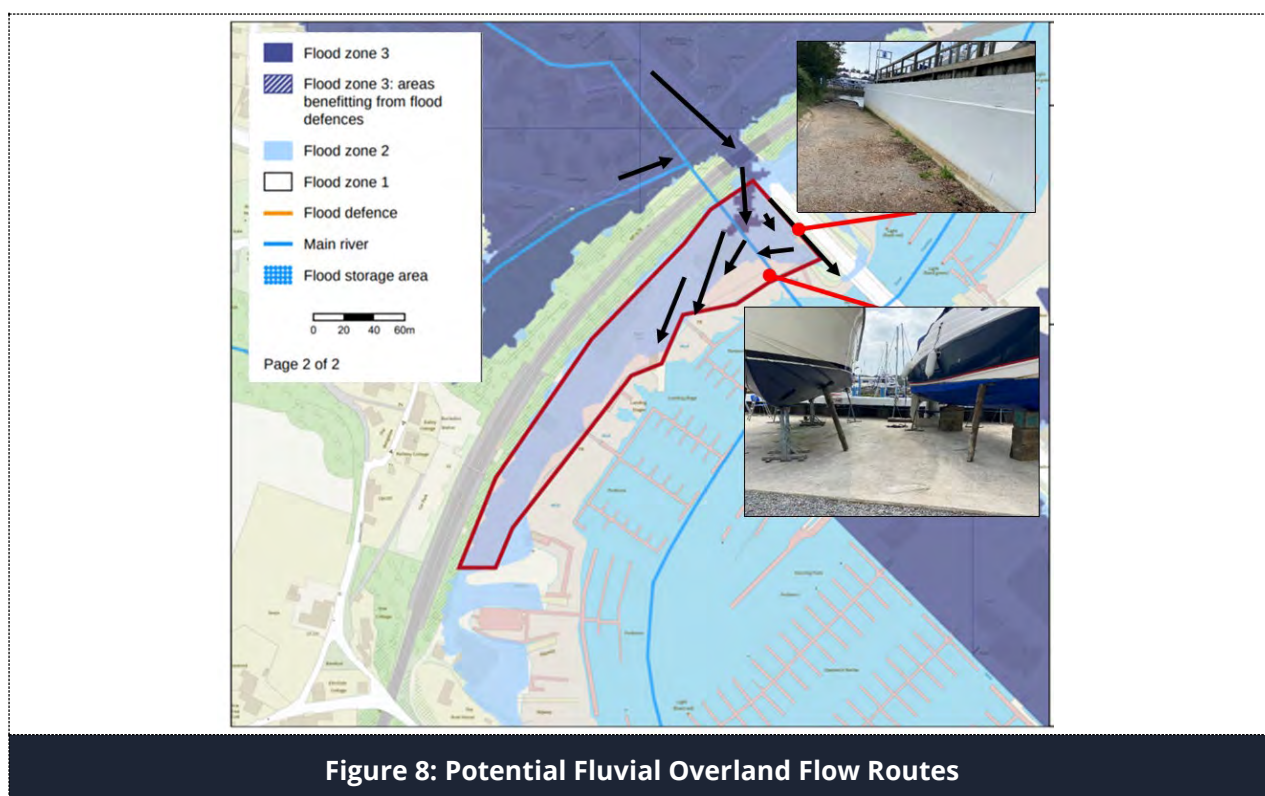


Figure 8: Potential Fluvial Overland Flow Routes

Surface Water

Surface water flooding (otherwise known as pluvial) is the term used to describe flooding which occurs when intense, often short duration rainfall is unable to be conveyed either into the ground or a drainage network, and as a consequence flows over ground on the surface causing flooding.

- 4.38 According to the Environment Agency Surface Water Flood Map, the majority of the site is at 'very low' risk of surface water flooding, with an annual chance of flooding of less than 1 in 1,000.
- 4.39 No records of surface water flooding are held by the Environment Agency or contained within the Council's Strategic Flood Risk Assessment. Site management have no records of the site having been affected by surface water flooding.

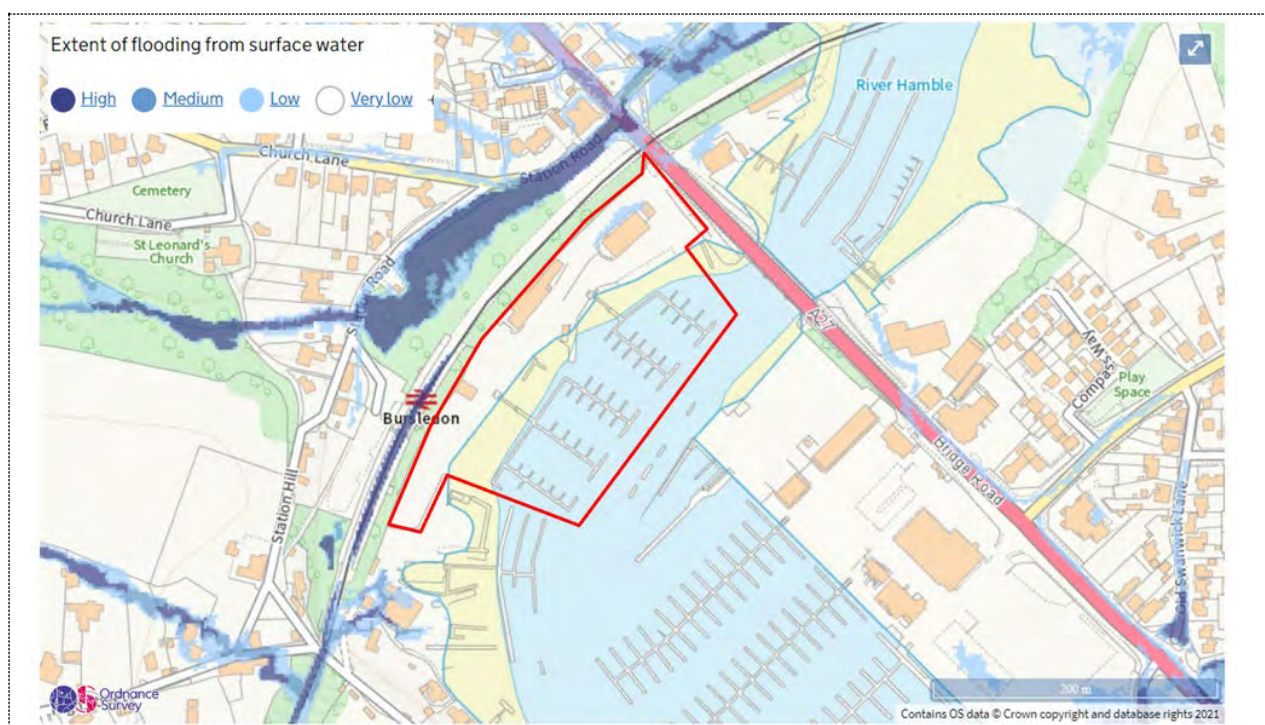


Figure 9: Environment Agency Surface Water Risk

4.40 The risk of surface water flooding to the site is considered as **'very low'**.

Groundwater

Groundwater flooding is the term used to describe the emergence at surface level of water originating from a permeable sub surface stratum where the groundwater level rises above the local ground level.

4.41 From a review of the British Geological Survey 'Groundwater Flooding Susceptibility Map', the site is located in an area where there is potential for groundwater flooding of property situated at the surface and below ground level. However, during the 2009 site investigation groundwater was encountered between 10.4m - 11.4m bgl in the gravel layer and appeared to be constrained within the clay. Therefore, we consider that the site is at low to medium risk of Groundwater flooding.

4.42 The risk of groundwater flooding is considered to be **'low to medium'**.

Sewer

Sewer flooding is the term used to describe flooding which occurs when local drainage systems (foul or surface water or combined) become overwhelmed by run off or foul water due to either lack of capacity or to maintenance issues such as blockages.

- 4.43 There are no public sewers located on site. The nearest sewer is a 225mm public foul water sewer running in a south-westerly direction in parallel to the site from Bridge Road (A27). There are no public surface sewers in the vicinity of the site.
- 4.44 The risk of sewer flooding to the site is considered to be '**low**'.

Reservoirs

Reservoir flooding is the term used to describe an area that could be flooded if a large reservoir were to fail and release the water it holds. Reservoir flooding is extremely unlikely to happen. 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.

- 4.45 The Environment Agency Reservoir Flood Map shows that the site is not at risk from reservoir flooding.
- 4.46 The risk of flooding from reservoirs is considered to be '**negligible**'.

Artificial Sources

Artificial Sources of flooding is the term used to describe flooding caused by manmade waterways such as canals or water storage areas.

- 4.47 There are no canals in close proximity (1km) to the subject site.
- 4.48 The risk of flooding from artificial sources is considered to be '**negligible**'.

5. Flood Mitigation

- 5.1 This section of the report reviews the existing on-site protection measures then discusses options to improve on-site resilience.

Existing On-site Protection Measures

The Workshops

- 5.2 Following the 14th February 2014 flood event, we understand that Deacons Marina in conjunction with Aquabex Limited designed their own flood defence scheme to provide some degree of flood protection to the tenanted businesses and shower/toilet block.
- 5.3 A 750mm high concrete wall was constructed around the building's perimeter. During a flood event, demountable Aquabex flood gates and a barrier are installed across the entrance areas. Critical plant / services located behind the flood wall have also been lifted off the ground by approximately 750mm. Photos showing the wall and demountable barriers can be seen below.



Photo 13: View of Permanent Concrete Flood Protection Measures



Photo 14: View of Demountable Flood Barrier

- 5.4 We understand that the scheme was designed to protect the tenanted business and shower / toilet block from similar flood levels to those experienced in February 2014. The use of Environment Agency level data was not used to design the flood defence measures.
- 5.5 Based on the topographical survey carried out by P Stubbington Land Surveys Ltd, June 2017 (Ref 6214/01) the top of the wall is 3.12m AOD. When the Floodgates are installed, there is approximately a 160mm gap from the top of the floodgate to the top of the wall, therefore, the top of the defence is approximately 2.96m AOD. The 1 in 200-year flood level is 3.20m AOD with no allowance for climate change, therefore, should a 1 in 200-year flood event occur, the defences will overtop.

- 5.6 Since 2014, these protection measures have been deployed on average twice a year and they have successfully prevented water from ingressing into the buildings.
- 5.7 We further understand that the company purchased a number of submersible pumps designed to pump water out of the protected area.

Services

- 5.8 Within the Workshops, with the exception of one electrical socket, the majority of services have been raised by approximately 500mm. Externally a pumping station has been raised and is located behind the concrete flood wall.
- 5.9 Within the marina, the majority of the electrical supply boxes were noted to be raised by approximately 750mm. However, some were only raised by approximately 500mm. We understand that historically these have not been impacted by flood water. However all would benefit from being raised to 3.66m AOD as a minimum, preferably above 4.41m AOD.

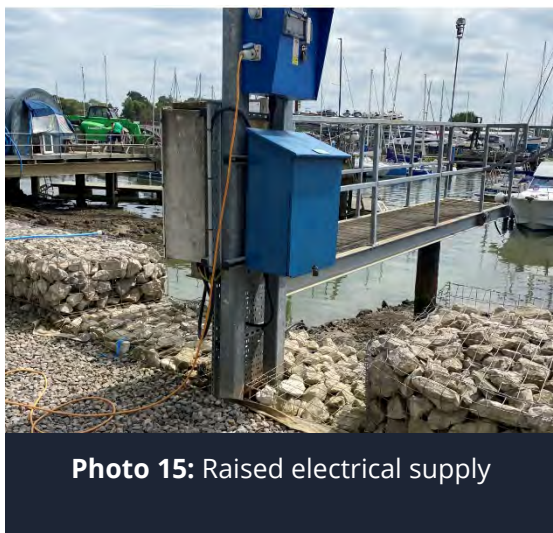


Photo 15: Raised electrical supply

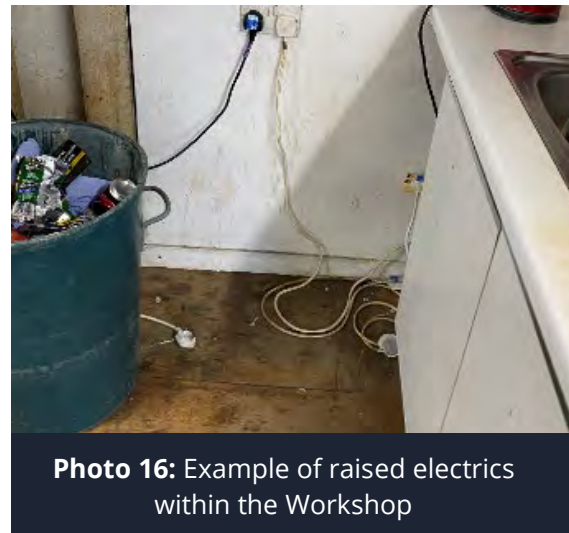


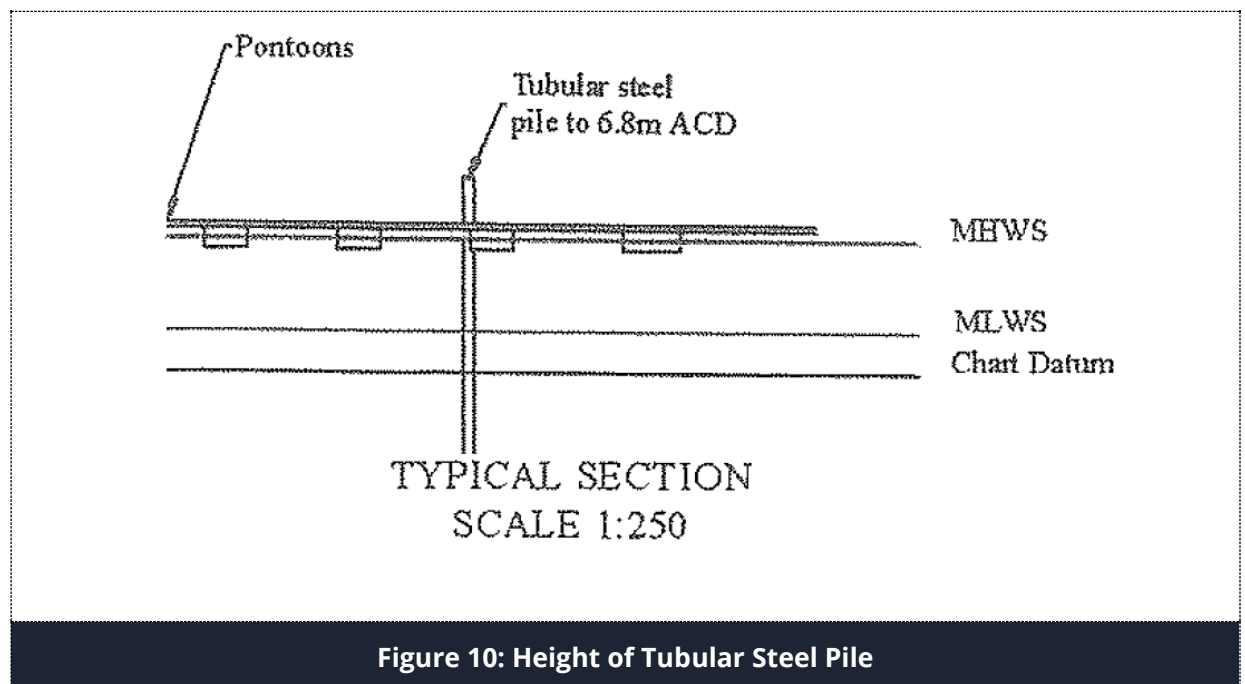
Photo 16: Example of raised electrics within the Workshop

Deacons House

- 5.10 Based on the topographical survey the finished floor level of the building is set at 3.52m AOD. Based on Environment Agency flood data excluding climate change allowance, this level is set above the current 1 in 200 year and 1 in 1,000-year flood level (3.2m AOD and 3.3m AOD respectively). However, these levels do not factor in any allowance for climate change.
- 5.11 If Deacons House was to be rebuilt, we would recommend the finished floor level was set above 3.66m AOD as a minimum, preferably above 4.41m AOD.

Pontoons

- 5.12 Following a review of existing and proposed detail drawings for the pontoons which were completed by Lymington Technical Services Ltd, we understand that the tubular steel piles have a height of 6.8m ACD (or 4.06m AOD). This level is above the (50-years) 3.66m AOD level, but below the (100-years) level of 4.41m AOD.
- 5.13 A copy of a typical section taken from drawing reference No.10479/9 dated October 2016 is shown below.
- 5.14 Unfortunately, the recently completed topographical survey did not provide spot heights to confirm that the top of the piles is 6.8m ACD (or 4.06m AOD). It is recommended an additional survey is undertaken to confirm the heights before considering if these should be raised to account for climate change.



Potential Flood Mitigation

5.15 We have provided 5 options which, with the exception of Option 1, if implemented would reduce the risk of flooding onsite. This list is not exhaustive and are conceptual ideas based on site visit observations, flood and topographical data. No hydraulic flood modelling has been undertaken to support this Options Appraisal.

Options for Consideration

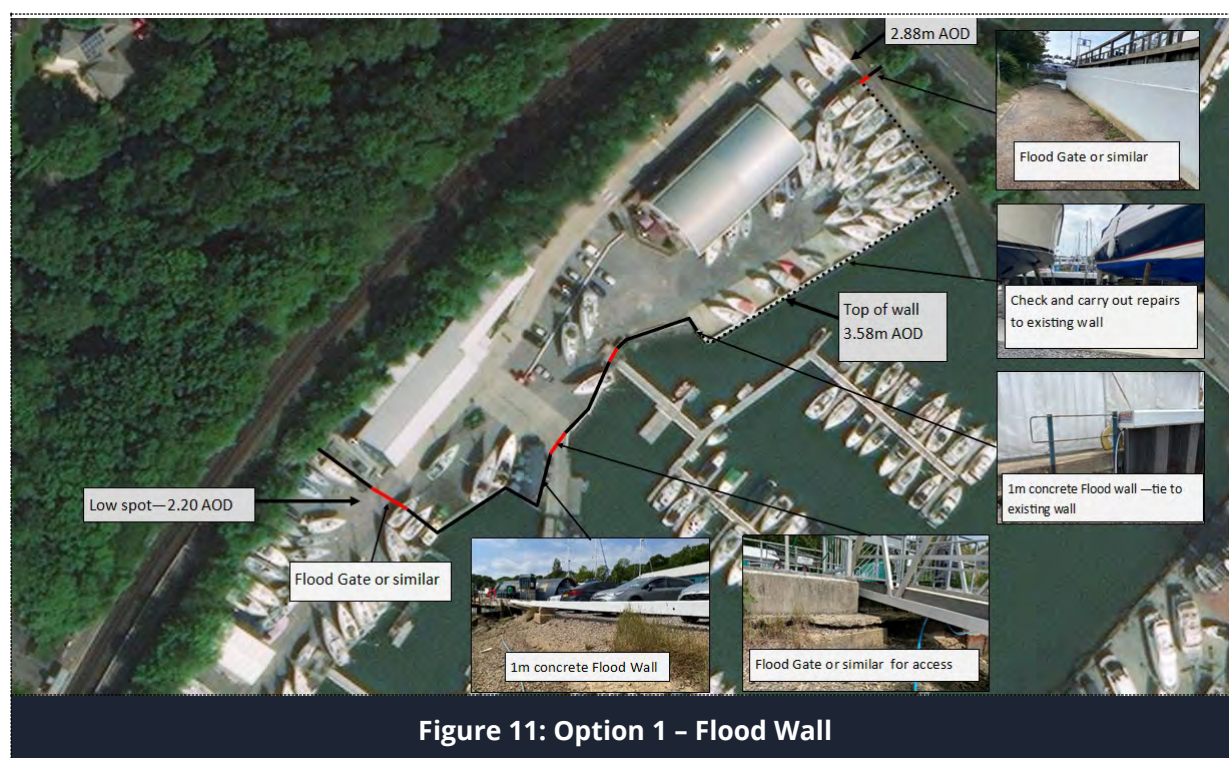
- **Option 1** – No additional work is undertaken. During a flood, the existing floodgates continue to be deployed, cars moved off site. Based on flood modelling, during a 1 in 200-year flood event, The Workshops defences will overtop.
- **Option 2** – Construct a Flood Wall to protect the central and northern portion of the site. The wall would tie into the existing steel pile wall located along the north-eastern portion of the site. The level of the wall would be approximately 3.50m AOD. This is 0.6m higher than the existing floodgates which protect The Workshops. During a flood, cars within the southern portion of the site could be moved to the defended area and cars within the central and northern portion of the site would not need to be moved. The height of the flood defences would be the same level as Deacons House finished floor level. There is scope to raise the height of the defences further.
- **Option 3** – Invest in new Floodgates to take advantage of additional 160mm of freeboard from top of current gates to wall.
- **Option 4** – The Workshop flood wall - close the potential water ingress route identified during site visit.
- **Option 5** – As part of the ongoing Masterplanning for the site, design all buildings to be flood resilient with finished floor levels set above the predicted flood levels including climate change. Explore raising the external ground levels.

Option 1 – No additional work is undertaken.

- 5.16 Based on flood modelling, there is a risk that during a 1 in 200-year flood event or greater, The Workshops defences will overtop. We do not have flood model data for events smaller than 1 in 200-years, therefore we cannot accurately confirm what level of protection they provide. However, based on historic flood records and level data, we estimate that these defences provide between a 1 in 50 and 1 in 100-year level of protection.
- 5.17 Deacons Building is also sufficiently raised above the 1 in 200-year flood level. However, when adding in climate change allowance, the finished floor level falls below the flood level and therefore is at risk of flooding.
- 5.18 The Marina has adapted to living with flood risk and although not ideal, when high tides are forecast, the Marina takes the correct steps to reduce the impact of flooding (notifying customers, moving cars, installing defences).

Option 2 – Flood wall to protect central and north portion of the site

- 5.19 Construct a 1m high concrete flood defence wall around the perimeter of the central portion of the site. This will ensure the main buildings are defended, there is minimal disruption during a flood event and cars can be safely moved behind the defences.
- 5.20 The flood wall would tie into the existing concrete pile cap wall (existing top of wall level of 3.58m AOD) which runs along the north eastern and eastern boundary. Repair works to the existing wall will be necessary to ensure the wall holds water back.
- 5.21 The wall would generally have a level of approximately 3.5m AOD. Some ground level raising would be required along the southern sections to maintain this level. A flood gate or similar would be installed allowing vehicle access to the southern portion of the site. Flood gates may be required for access to the pontoons, however, raising the walkways may be an alternative option.
- 5.22 A hydraulic flood modelling exercise would be required to confirm flood wall levels and feasibility. The exercise would also check whether the proposed defences increase flood risk to third party land.
- 5.23 It may be possible to increase the height of the existing flood wall by adding an additional concrete cap. This would allow the proposed wall to be increased in height from 3.66m AOD to potentially 4.41m AOD.
- 5.24 It is likely the Environment Agency would support these plans because we would be upgrading existing onsite defences shown in Figure 7.

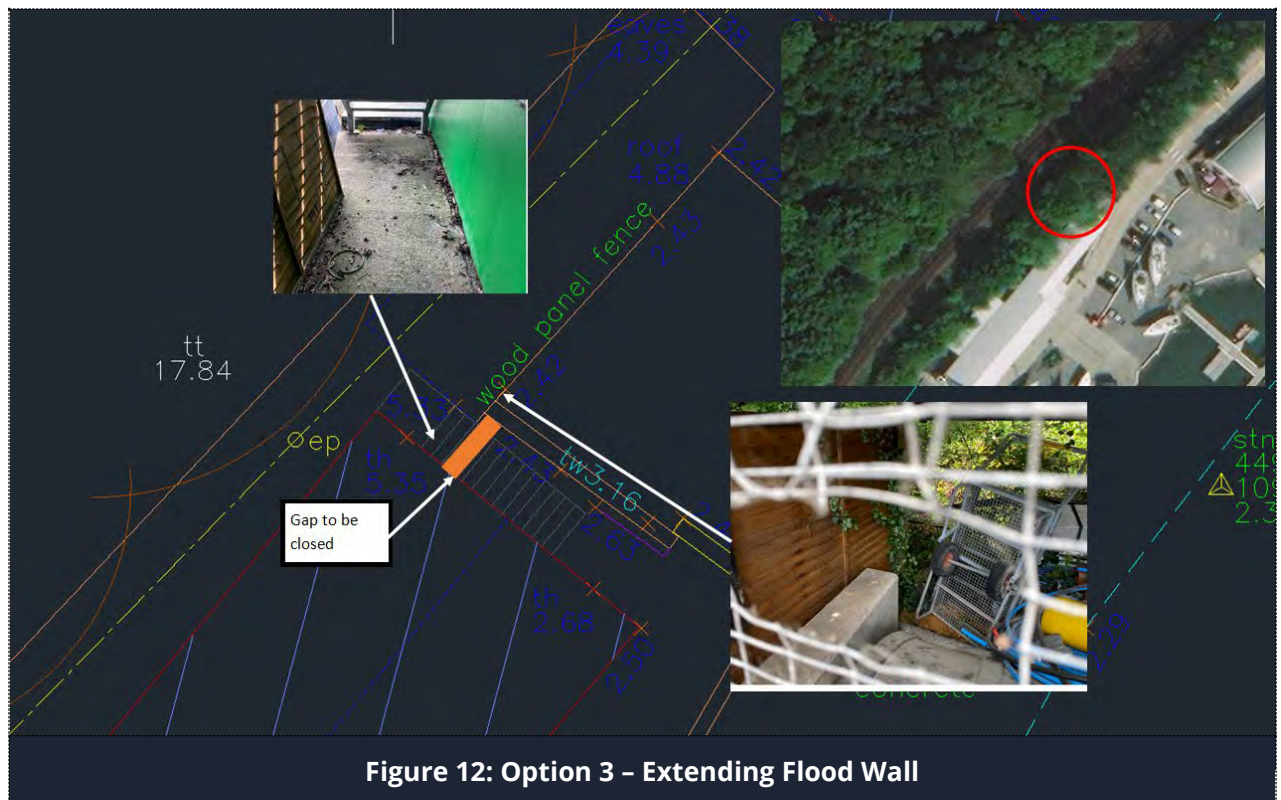


Option 3 – Invest in new Floodgates to take advantage of additional 160mm of freeboard from top of current gates to top of wall.

- 5.25 Existing floodgates could be replaced and increased in height by approximately 160mm. This would increase the height of the defences from 2.96m AOD to 3.12m AOD. However, this level would still fall short of the current 1 in 200-year flood level of 3.20m AOD.

Option 4 – The Workshops flood wall - close potential water ingress route identified during site visit

- 5.26 During the site inspection, we found that the north-eastern corner of the flood wall did not tie into the earth embankment which runs along the northern boundary.
- 5.27 As shown below, ground levels where the area where the wall is missing are approximately 2.42m AOD, whereas the top of the floodgates are approximately 2.96m AOD. During a flood event, it is likely water would flow around the back of the wall and ingress into the buildings.
- 5.28 It is recommended that an additional flood gate is installed to close the potential flow route, or a final section of the wall is installed.



Option 5 – Design all new buildings as part of the ongoing Masterplanning for the site to be flood resilient with finished floor levels set above the predicted flood levels including climate change.

5.29 Please see Section 6 for further details.

6. Masterplanning

Planning Aspirations

6.1 We understand that planning applications will be submitted in the future to support the proposed Masterplan (reference PA20-139-01(G)), shown in Figure 13 below and within **Appendix VI**.

6.2 We understand the current aspirations include:

- A new entrance and car park to the north of the site;
- Workshop and Offices with car parking; and
- Boat Storage Area and shed.

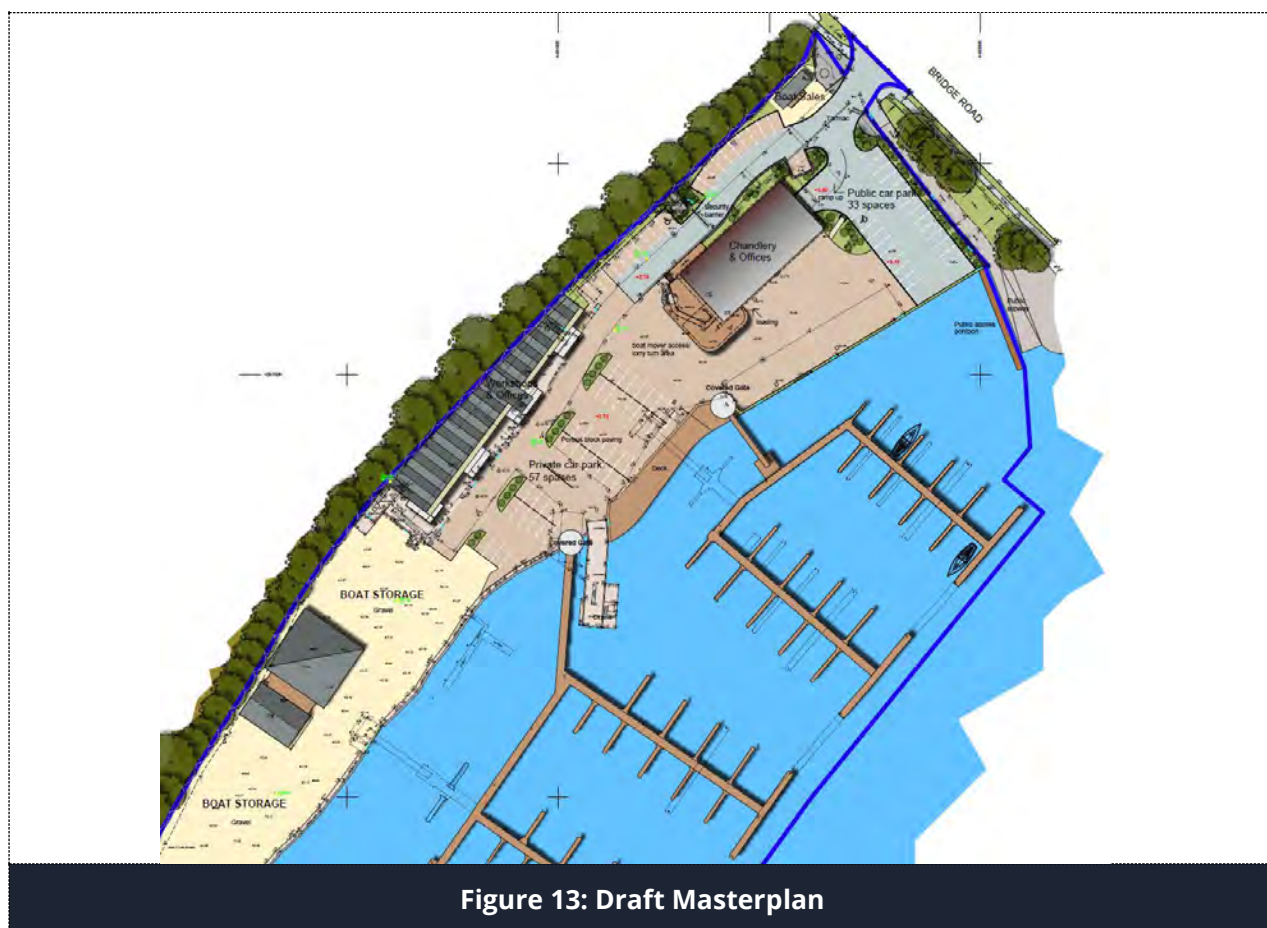


Figure 13: Draft Masterplan

Recommendations

Finished Flood Levels

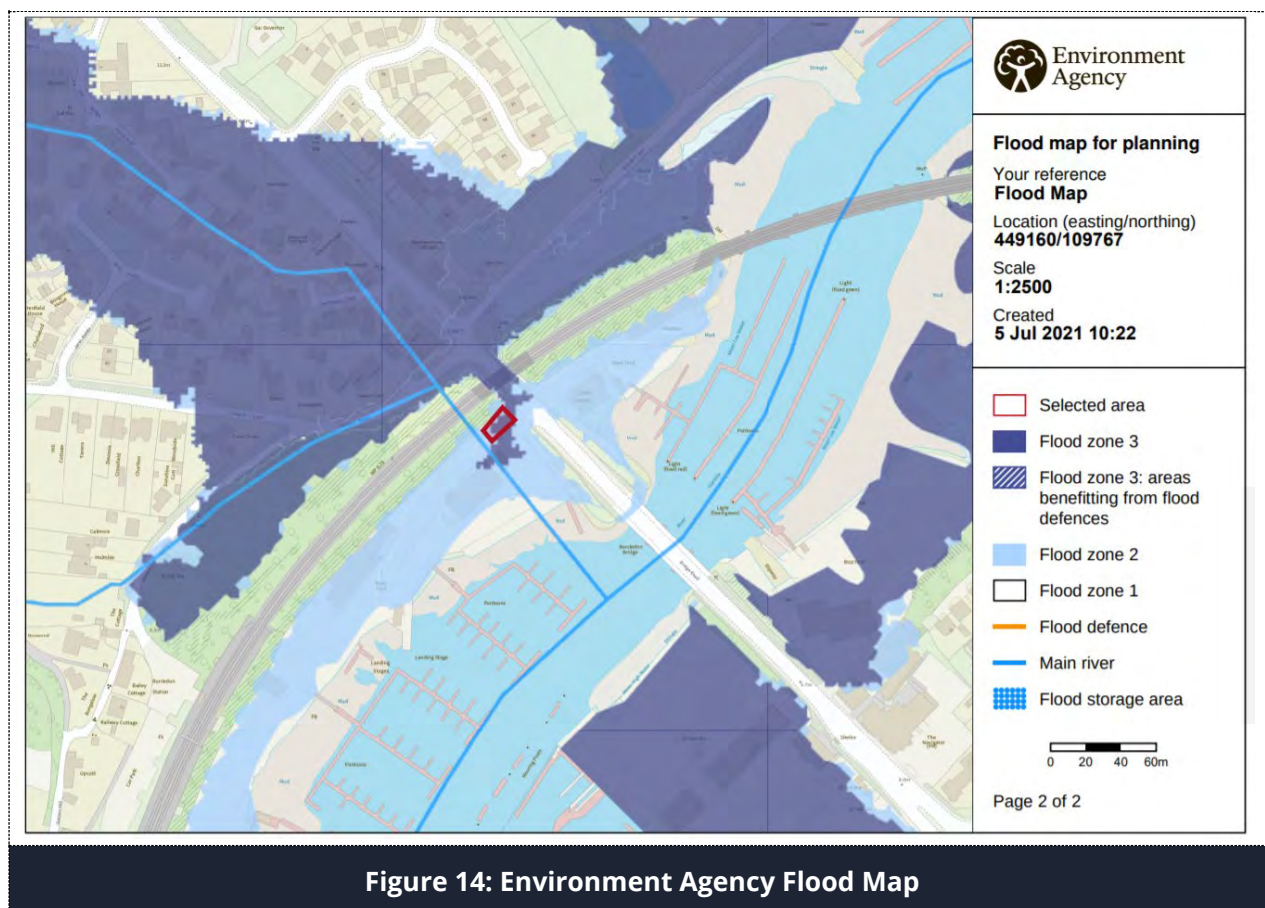
- 6.3 We have presented both the existing and proposed finished floor levels in the table below for consideration.

Building	Existing Finished Floor Level	Proposed Finished Floor Level 50-year lifespan (3.66m AOD)	Proposed Finished Floor Level 100-year lifespan (4.41m AOD)
Boat Sales	Ground level 2.83m AOD	Increase by 0.83m	Increase by 1.58m
Chandlery and Offices	Finished Floor Level 3.5m AOD	Increase by 0.16m	Increase by 0.91m
Workshop and Offices	2.41m to 2.50m AOD	Increase by 1.25m to 1.16m	Increase by 2m to 1.91m
Workshop Flood Defences	2.96m AOD	Increase by 0.70m	Increase by 1.45m
Boat Storage	2.28m AOD	Increase by 1.38m	Increase by 2.13m
Northern Car Park	2.60m AOD falling to 2.40m AOD	Increase by 1.06m to 1.26m	Increase by 1.81m to 2.01m
Central Car Park	2.35m AOD falling to 2.20m AOD	Increase by 1.31 to 1.46	Increase by 2.06m to 2.01m
Southern Car Park	Varies 2.50m AOD to 2.30m AOD	Increase by 1.16m to 1.36m	Increase by 1.91m to 2.11m
Pontoon - Tubular Steel Pile	4.06m AOD (To be confirmed)	No raising required	Increase by 0.35m
Services	Levels vary across the site	Increase to 3.66m AOD	Increase to 4.41m AOD

Proposed Boat Sales Building

- 6.4 As shown below in Figure 14, the proposed location of the Sales building is located within Flood Zone 3. The Environment Agency / Lead Local Flood Authority may request that the sales office is relocated to an area of lower risk (Flood Zone 2).

- 6.5 Normally, an 8m easement would be required from the culvert which runs beneath the site. We recommend early consultation is undertaken with the Environment Agency to negotiate easements. To confirm the location of the culvert, a CCTV survey will be required.



Flood Zone Classification

- 6.6 The flood data provided by the Environment Agency shows that the site falls within Flood Zone 2. However, the reality is that the site has a history of flooding and site levels are generally lower than the 1 in 200-year flood level and therefore should be located within Flood Zone 3.
- 6.7 We are not aware that the Environment Agency is currently undertaking any flood modelling works which could potentially result in the Flood Map being revised. However, there is a risk that this could be undertaken which would make obtaining planning permission a challenge and potentially could increase insurance premiums.

Flood Risk Assessment

- 6.8 A site-specific Flood Risk Assessment and Drainage Strategy will be required to support the planning application.

7. Conclusion

- 7.1 Instructions were received from Boatfolk Marinas Limited (the Client) to undertake a Flood Risk Assessment. The objectives were to assess the current and future flood risk and review resilience and mitigation options both in the short and long term at Deacons Marina.

Flood Levels

- 7.2 Based on our assessment we consider that the following levels which take into account the latest climate change allowances should be used to inform planning:

- Development with a 50-year lifespan – **3.66m AOD**
- Development with a 100-year lifespan – **4.41m AOD**

- 7.3 Further information can be found in Section 4.

Flood Mitigation

- 7.4 We have provided 5 flood mitigation options for consideration:

- Option 1 – No additional work is undertaken and the site continues to live with annual flooding, however, should a 1 in 200-year flood event occur, The Workshop defences will overtop
- Option 2 – Defend the northern and central portion of the site by constructing a flood wall around the central portion of the site
- Option 3 – Invest in new Floodgates which protect The Workshops to take advantage of additional 160mm of freeboard from top of current gates to wall;
- Option 4 – The Workshop flood wall - close potential water ingress routes identified during site visit;
- Option 5 – As part of the ongoing Masterplanning for the site, design all buildings to be flood resilient with finished floor levels set above the predicted flood levels including climate change.

- 7.5 Further information can be found in Section 5.

Planning

- 7.6 We have reviewed Masterplan (reference PA20-139-01(G)) and made a number of recommendations including finished floor levels. This information can be found in Section 6.

Recommendations

7.7 We recommend undertaking the following:

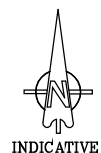
- Discuss the two flood levels 3.66m AOD and 4.41m AOD plus the potential for freeboard. Decide which is the most suitable level for the business;
- Discuss and consider implementing Options 1 to 5 within Section 5 of this report;
- Consider Planning recommendations within Section 6 of this report;
- Consider instructing a CCTV survey to confirm the location of the culvert which runs beneath the north-eastern corner of the site; and
- Undertake an additional survey to confirm the height of the tubular steel piles which support the pontoons.

7.8 A copy of Avison Young Standard Terms of Appointment is presented in **Appendix VII**.

Appendix I

Topographical Survey

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



449050E

449100E

449150E

449200E

109750N

109700N

RIVER HAMBLE

NOTES:
LEVELS RELATE TO D.S. DATUM

**P STUBBINGTON
LAND SURVEYS LTD**

THE MEAD
DURLEY BROOK ROAD
DURLEY
SOUTHAMPTON
HAMPSHIRE
SO32 2AR

TEL : 023 8060 1876

MOBILE :
07979 348165

EMAIL :
PAUL@PSLANDSURVEYS.COM

CLIENT: - DEACONS MARINA & BOATYARD

CONTRACT: - DEACONS MARINA & BOATYARD
BURSLEDON BRIDGE,
PARK GATE

TITLE: - TOPOGRAPHIC SURVEY

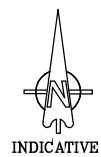
SCALE: - 1: 250 @A1

DRAWING NO. 6214/01

DATE: - AUGUST 2017

SURVEYOR: - PS

bt	British Telecom
cb	Control Box
cl	Cover Level
clv	Cable Television
dk	Drop Kerb
el	Electric
ep	Electricity Pole
fh	Fire Hydrant
gu	Gully
gsv	Gas Stop Valve
ht	Height
ic	Inspection Cover
il	Invert Level
lp	Lamp Post
nkr	Marker
a/h	Overhead
ps	Post Box
pxg	Pan Crossing
np	Name Plate
sg	Sign
sv	Stop Valve
tb	Telephone Box
tr	Traffic Light
ti	Top of Tree
th	Threshold
ta	Tap of Wall
utl	Unable to Lift
vp	Vent Pipe
w	Water Meter
wsv	Water Stop Valve

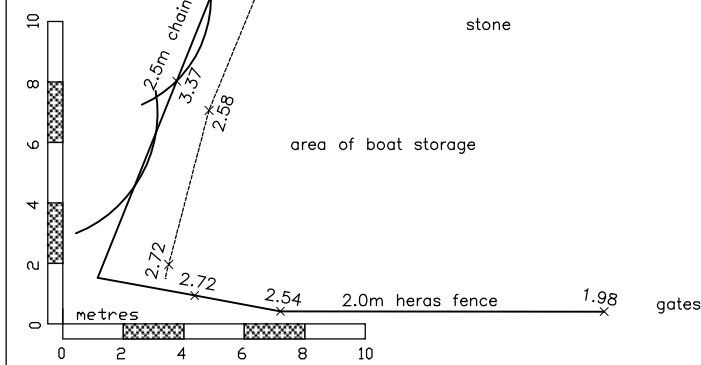


109650N

109600N

109550N

R I V E R H A M B L E



NOTES: LEVELS RELATE TO O.S. DATUM
P STUBBINGTON LAND SURVEYS LTD
THE MEAD DURLEY BROOK ROAD DURLEY SOUTHAMPTON HAMPSHIRE SO32 2AR TEL : 023 8060 1876 MOBILE :- 07973 348165 EMAIL :- PAUL@PSLANDSURVEYS.COM
CLIENT: - DEACONS MARINA & BOATYARD CONTRACT: - DEACONS MARINA & BOATYARD BURSLEDON BRIDGE, PARK GATE TITLE: - TOPOGRAPHIC SURVEY SCALE: - 1:250 @A1 DRAWING NO. 6214/02 DATE: - AUGUST 2017 SURVEYOR: - PS

Appendix II

BGS Borehole Logs

Contains British Geological Survey Materials © UKRI 2020



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 408274 : BGS Reference: SU40NE8
British National Grid (27700) : 449190,109820

[Report an issue with this borehole](#)

<<

< Prev

Page 1 of 1 ▾

Next >

>>

U 1050, U. 1051
U. 1052
U. 1053.

SU40NE/8-11

British Geological Survey

British Geological Survey

Bursledon.

SU 40 NE/8
NGR 449190.09820

Geol. Map 315, new ser.

Heather

Four borings along the centre-line of the Netley and Fareham Railway.

Communicated by Mr. J. DRAGE (L. S. W. Co.'s District Engineer), 1886.

A. On the mud-land on the right side of the Hamble River, a little eastward of the cross-roads (high-road).

U. 1050

		Thickness. Feet.	Depth. Feet.
[Alluvium.]	Soft dark alluvial soil ...	1	5
	Dark gravel, dirty ...	7	12
	Soft yellow clay ...	8	20
[London Clay.]	Dark blue clay ...	6	26
	Hard dark blue clay ...	1	27
	Light-coloured compact sandstone [? septaria] ...		

British Geological Survey

Heather

B. At the right edge of the Hamble River, a little E. of S. of the house named Maidenstone Heath.

U 1051

		Thickness. Feet.	Depth. Feet.
[Alluvium.]	Soft dark alluvial soil ...	4	4
	Soft yellow clay ...	7	11
[London Clay.]	Dark blue clay ...	10	21
	Hard dark blue clay ...	20	41

British Geological Survey

British Geological Survey

SU 40 NE/9
NGR 449190.09875

Heather

C. Eastward of the middle of the river, S.E. of Maidenstone Heath.

U. 1052

		Thickness. Feet.	Depth. Feet.
[Alluvium.]	Soft dark alluvial soil ...	11	11
	Soft yellow clay ...	6	17
	Gravel mixed with clay ...	5	22
[London Clay.]	Dark blue clay ...	6	28
	Hard dark blue clay ...	4	32

British Geological Survey

British Geological Survey

SU 40 NE/10
NGR 449380.09960

Heather

D. Near edge of mud-land on the left side of the River Hamble eastward of C. (about a quarter of a mile W. of N. from Lower Swanwick).

U. 1053.

		Thickness. Feet.	Depth. Feet.
[Alluvium.]	Mud ...	3	3
	Light-yellow clay ...	5	8
[London Clay.]	Dark blue clay ...	14	22
	Hard dark blue clay ...	13	35

British Geological Survey

British Geological Survey

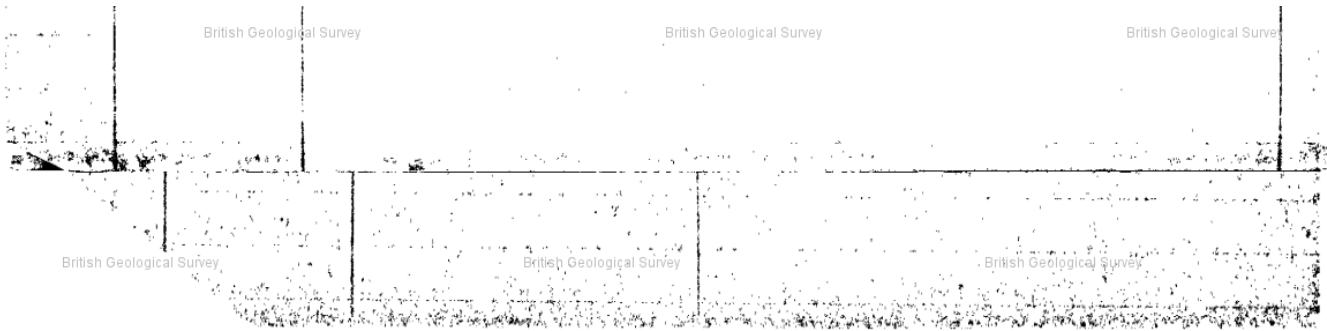
SU 40 NE/11
NGR 449450.09970

In a geological section across the River Hamble, on the tracing from which the above were taken, Mr. Drage regards all the yellow clay as a continuous mass, above the gravel of boring C. I am inclined to think, however, that except in that boring, it is merely the discoloured top of the London Clay.

British Geological Survey

British Geological Survey

British Geological Survey

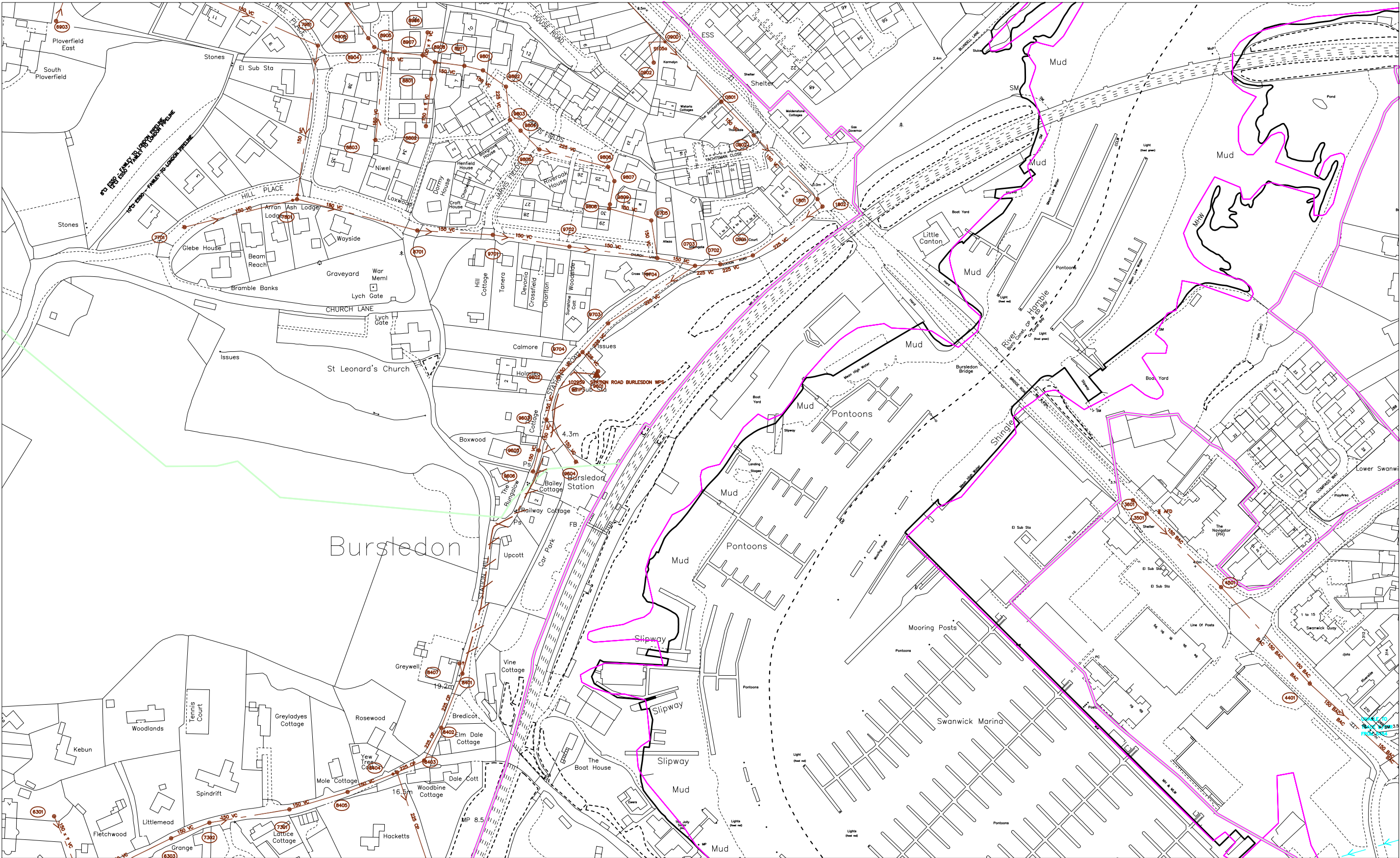


Appendix III

Southern Water Records and Existing Private Sewer Plan

SEWER RECORDS PAGE 1 OF 2

109944



109366

448583

O.S. REF.

SU4909NW

Title: 348405_Deacons Boat Yard, Swan

Drawn by: rohandas

Scale: 1:2500

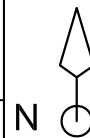
Date: 15/08/2019

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

Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved
Licence No. WU 298530.



449527

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
0701X	2.86	1.42	225	VC	CIRC																		
0702X	3.11	1.31	225	VC	CIRC																		
0703X	3.76	1.27	225	VC	CIRC																		
0704X	5.29	3.24	150	VC	CIRC																		
0705X	7.54	4.317	150	VC	CIRC																		
0801X	5.65	4.1	150	VC	CIRC																		
0802X	4.8	2.93	150	VC	CIRC																		
0902X			UNK	UNK	CIRC																		
090DX			150	VC	CIRC																		
1801X			150	VC	UNK																		
1802X	2.88	1.6	225	VC	CIRC																		
3501X			150	BAC	CIRC																		
3601X	3.66		150	BAC	CIRC																		
4401X	3.87	0.53	150	BAC	CIRC																		
4501X	4.12		150	BAC	CIRC																		
6301X			150	VC	UNK																		
6303X	23.85	22.09	150	VC	CIRC																		
6903X			150	VC	UNK																		
7301X	21.14	19.6	150	VC	CIRC																		
7302X	23.38	21.43	150	VC	CIRC																		
7701X	25.26	23.92	150	VC	CIRC																		
7801X	20.97	16.46	150	VC	CIRC																		
7901X	20.52	18.26	150	VC	CIRC																		
8401X	19.31	17.63	225	CP	CIRC																		
8402X	16.32	14.54	225	CP	CIRC																		
8403X	15.67	14.11	225	CP	CIRC																		
8404X	16.24	14	225	CP	CIRC																		
8405X	18.69	16.82	150	VC	CIRC																		
8407X			150	VC	CIRC																		
8701X	15.71	14.26	150	VC	CIRC																		
8801X	14.87	13.48	150	VC	CIRC																		
8802X			150	VC	UNK																		
8803X	16.68	15.7	150	VC	CIRC																		
8903X			150	VC	UNK																		
8904X			150	VC	CIRC																		
8905X	16.65	15.02	150	VC	CIRC																		
8906X			100	VC	UNK																		
8907X	15.23	13.79	150	VC	CIRC																		
8908X			150	VC	CIRC																		
8911X			150	VC	CIRC																		
9601X	3.48	0.75	225	VC	CIRC																		
9602X	3.31	1.74	150	VC	CIRC																		
9603X	3.6	2.05	150	VC	CIRC																		
9604X	5.81	3.77	150	VC	CIRC																		
9605X	5.91	4.55	150	VC	CIRC																		
9606X	7.94	6.57	150	VC	CIRC																		
961PX	3.45		125	CI	UNK																		
9701X	12.44	10.43	150	VC	CIRC																		
9702X	8.94	7.11	150	VC	CIRC																		
9703X	3.47	0.98	225	VC	CIRC																		
9704X	3.48	0.79	225	VC	CIRC																		
9801X		11.15	150	VC	CIRC																		
9802X		9.5	225	VC	CIRC																		
9803X		9.404	225	VC	CIRC																		
9804X		8.827	225	VC	CIRC																		
9805X		8.755	225	VC	CIRC																		
9806X		6.394	225	VC	CIRC																		
9807X		6.066	225	VC	CIRC																		
9808X	7.54	5.578	150	VC	CIRC																		
9809X		5.769	225	VC	CIRC																		

LINE STYLES / COLOURS	
Brown	Foul
Dark Blue	Foul Syphon Sewer
Purple	Foul Vacuum Main
Red	Foul Rising Main
Orange	Combined
Dark Blue	Combined Syphon Sewer
Purple	Combined Rising Main
Light Blue	Lateral Drain
Yellow	Building Over Agreement Area
Green	Treated Effluent
Green	Sludge
Green	Sewer Catchment
Green	Section 104 Area
Green	Surface Water
Green	Surface Water Rising Main
Green	Private
Green	Access Shaft
Green	Decommissioned

MATERIALS	
AK	Alkathene
BAC	Bonded Asbestos Cement
BRC	Brick (Common)
BRE	Brick (Engineering)
CC	Concrete Box Culvert
CI	Cast Iron
CO	Concrete (In-Situ)
CP	Concrete (Pre-Cast)
CSB	Concrete Segments (bolted)
CSU	Concrete Segments (unbolted)
DI	Ductile Iron
GRG	Glass Reinforced Concrete
GRP	Glass Reinforced Plastic
MAC	Masonry in regular Courses
MAR	Masonry in random Courses
PE	Polyethylene
PF	Pitch Fibre
PP	Polypropylene
PVC	Polyvinyl Chloride
RPM	Reinforced Plastic Matrix
SI	Spun Iron
ST	Steel
VC	Verified Clay
XXX	Other
ZZZ	Unknown

LEGEND - SEWERS	
Washout (SW)	Other (s)
Washout (F&C)	Other
Rodding Eye (SW)	Change in sewer (s)
Rodding Eye (F&C)	Reflex valve
Gauging point (SW)	Flap valve
Gauging point (F&C)	Cascade
Intercept chamber (SW)	Anode
Intercept chamber (F&C)	Valve
Storm Tank (SW)	Closed Valve
Storm Tank (F&C)	Air Valve
Vortex chamber (SW)	Hatch box (SW)
Vortex chamber (F&C)	Hatch box (F&C)
Label ellipse	Direction arrow
Dummy/S24 manhole	Emptying valve
Outfall	Catchpit
Penstock chamber	Soakaway
Damboards	Inlet
Storm Overflow	Balancing Pond
Backdrop manhole	

SHAPES (S)	
A	Arched
B	Barrel
C	Circular
E	Egg
H	Horseshoe
R	Rectangular
S	Square
T	Trapezoidal
U	U Shape
X	Other

NODE REFERENCING SYSTEM

1st digit: hundred metre easting identifier

2nd digit: hundred metre northing identifier

3rd digit: sewer type identifier

4th digit: next sequential node

0-4 = Foul/Combined

5-9 = Surface Water

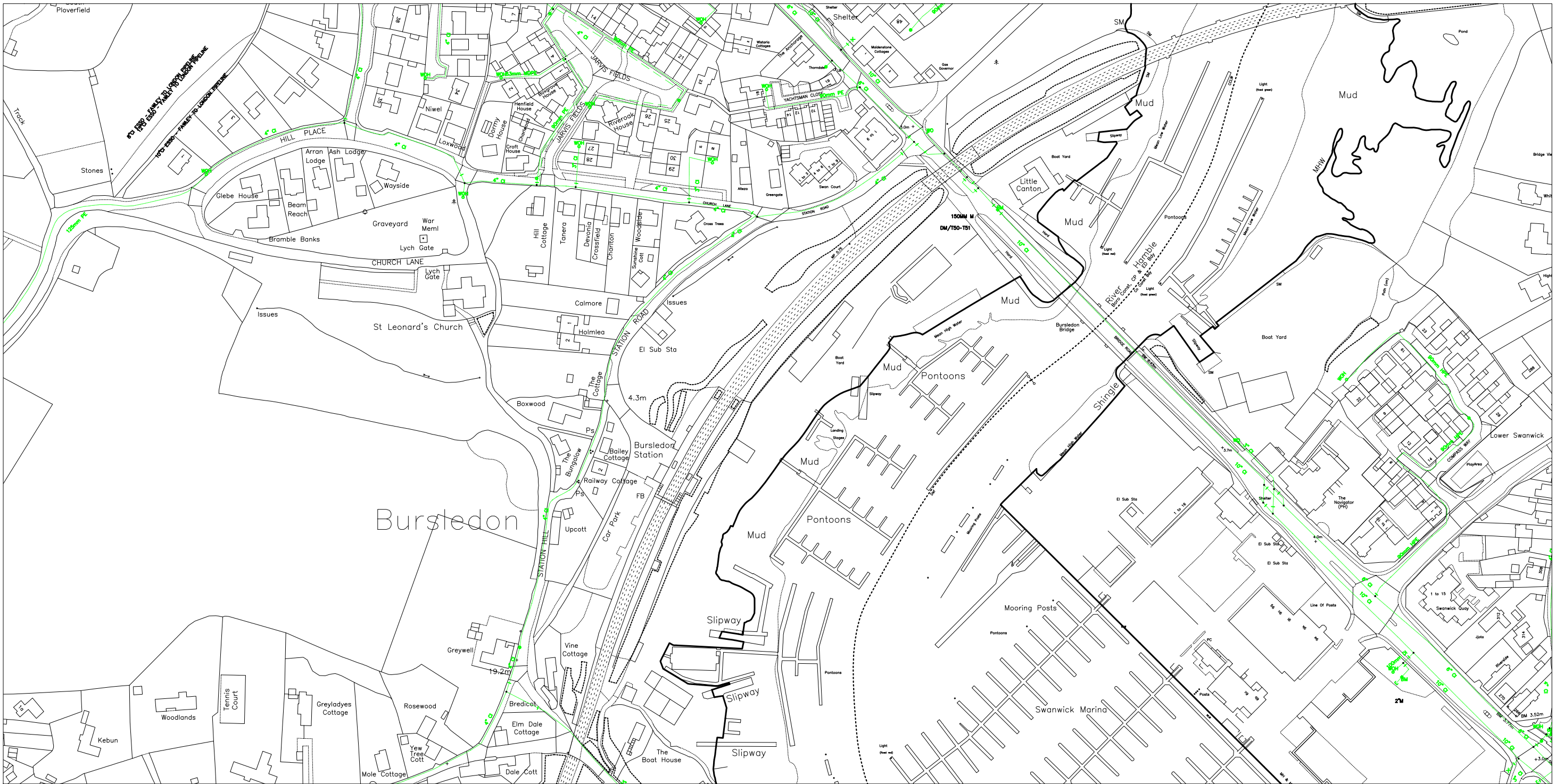
Drawn by: rohandas

Title: 348405_Deacons Boat Yard, Swan

Date: 15/08/2019



109898



109412

448572

LEGEND - MAINS

	Distribution Main / Communication pipe		Clockwise closing valve
	Trunk Main		Fire Hydrant
	Raw water main		Washout
	Non potable		Washout hydrant
	Abandoned main		Meter
	Proposed Main		Capped end
	Fire main		Emptying plug
	Non SWS		Stopcock
	Sluice valve		Leak Noise Correlator Survey Point
	Closed valve		Anode
	Air valve		Telemetry cable
	Butterfly valve		Access point / hatchbox
	Pressure reducing valve		
	Reflux valve		
	Motorised valve		

MATERIALS

	Dialysis machine	Alkathene
	Break pressure tank	Cast iron
	Change node	Spun (grey) iron
	Pumping station	Concrete
	Booster station	Ductile iron
	Insertion Flow Meter Point	Bonded Asbestos Cement
	Water tower	Glass reinforced plastic
	Service reservoir	Glass reinforced epoxy
	Water Supply Works	(Unplasticised) Polyvinyl chloride
	Bore hole / Well	Polyethylene
	Intake	Steel
	Customer site	Concrete segments bolted
	Swab insertion point	Concrete segments unbolted
		Galvanised iron
		Ductile sleeve
		Concrete pre-stressed
		High performance polyethelene
		Unknown

AK
CI
SI
CO
DI
BAC
GRP
GRE
PVC
PE
ST
CSB
CSU
GI
DS
CPS
HPE
??

Drawn by: rohandas

Scale: 1:2500

Date: 15/08/2019

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 of pipes should be determined on site.

Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.

O.S.Ref: SU4909NW

TITLE: 348405_Deacons Boat Yard, Swan



WARNING: BAC pipes are constructed of Bonded Asbestos Cement

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement

449537

Appendix IV

Environment Agency Product 4

From: [Partnership and Strategic Overview team, HIOW](#)
To: [Hoppe, David \(Avison Young - UK\)](#)
Cc: [SSD Enquiries](#)
Subject: Flood Risk Information (Product 4) for Deacons Marina, SO31 8AZ - Ref: SSD/21709
Date: 27 May 2021 14:24:01
Attachments: [Defence 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](#)

External Sender

Dear David Hoppe,

Enquiry regarding Product 4 for site at Deacons Marina, Bursledon Bridge, Bridge Road, Southampton, SO31 8AZ.

Deacons Marina, Bursledon Bridge, Bridge Road, Southampton SO31 8AZ

Thank you for your enquiry which was received on 28 April 2021.

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

The site may be affected by an extreme flood. According to our published flood map, which provides a general estimate of the likelihood of flooding across England & Wales, the property is shown to be within Flood Zone 3 - an area which may have a 1% chance of flooding annually (1 in 100), **ignoring** the presence and effect of any flood defences.

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, Eastleigh Borough Council" for a more comprehensive flood history check.

Defences – See attached map.

Information on any nearby sea defences is available from Eastleigh Borough Council.

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 Southampton Water Coastal Model which was produced in 2014 by JBA.

Chainage point: 184	Easting: 449139.376	Northing: 109592.915
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	3.2	3.3
2070	3.7	3.8
2115	4.3	4.5

* Levels in metres above Ordnance Datum Newlyn.

These values are based on 2012 base data.

- Please note the climate change allowances provided are not up to date. These were updated on 17 December 2019. You should refer to '[Flood risk assessments: climate change allowances](#)' for the most up to date allowances. You will need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

[FRA advisory text](#)

Name	Product 4
Description	Basic / Detailed Flood Risk Assessment Map for Deacons Marina, Bursledon Bridge, Bridge Road, Southampton, SO31 8AZ
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	<i>The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.</i>
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 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,

Callum Robins
Partnership and Strategic Overview team, Hampshire and Isle of Wight
Environment Agency

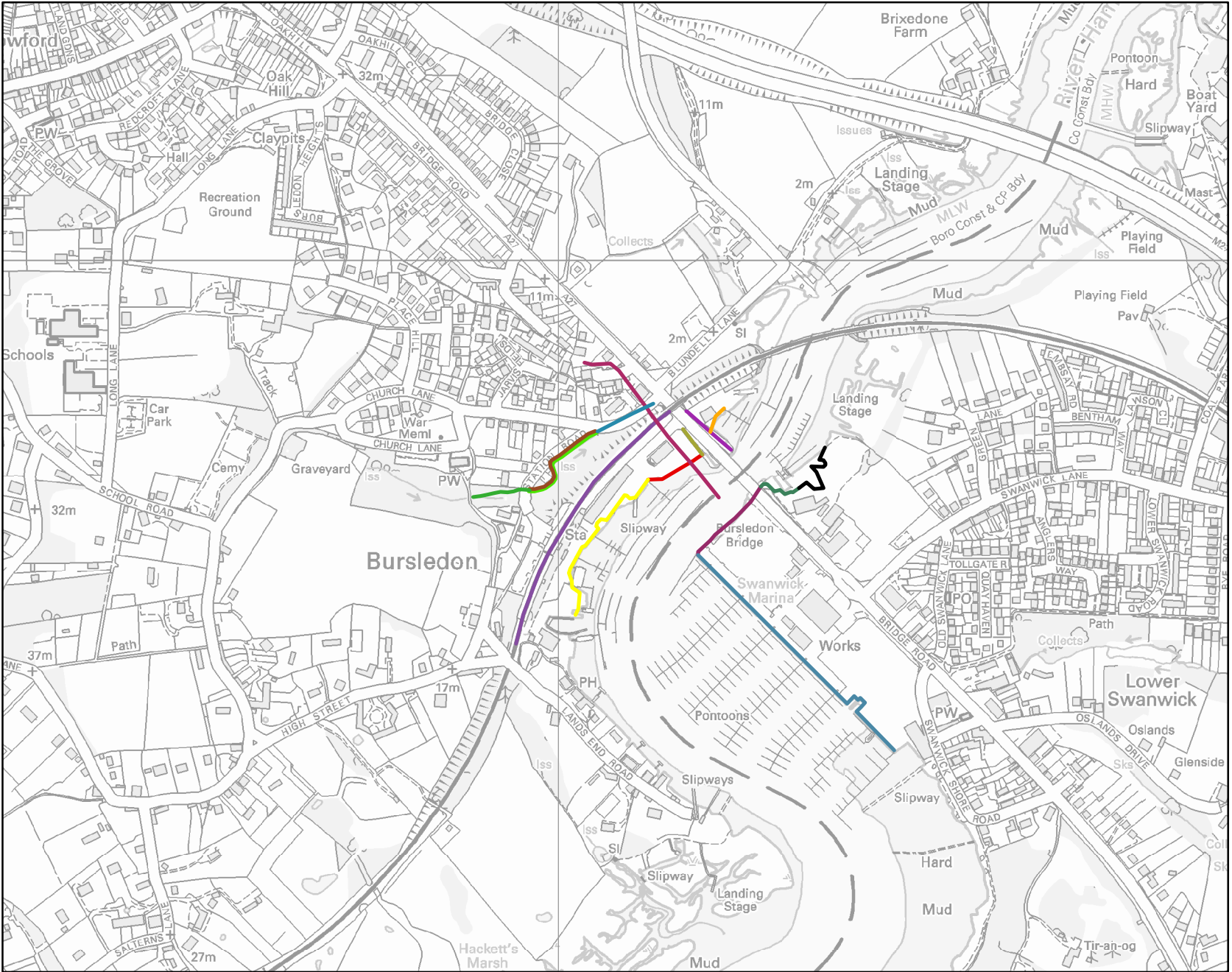
Direct dial 020 7714 0418

Email psohiow@environment-agency.gov.uk

-

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Defence map - Centred on Deacons Marina, SO31 8AZ - Created 27 May 2021

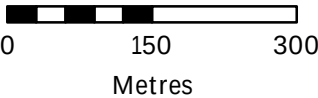


Legend

- ASSET_ID**
- 38313
 - 84128
 - 84432
- ASSET_ID**
- 19147
 - 19209
 - 19210
 - 23123
 - 47526
 - 60734
 - 84126
 - 97479
 - 97480
 - 108168
 - 122817
 - 147604

1:7,841 *

*when printed at A4.



Asset Id	Asset Sub-type	Length (m)	Asset Maintainer	Actual Condition	Standard of Protect (Years)	Last Inspection Date
19147	wall	86.31	private	Good	100	15/06/2020
47526	high_ground	45.05	private	Fair	100	15/06/2020
19210	embankment	83.42	private	Fair	100	28/02/2017
108168	high_ground	132.38	private	Fair	No Data	15/06/2020
23123	high_ground	39.47	private	Fair	100	15/06/2020
147604	high_ground	64.5	private	Good	100	15/06/2020
97479	high_ground	129.81	private	Good	100	15/06/2020
19209	embankment	400.07	private	Fair	100	28/02/2017
84126	high_ground	142.33	private	Fair	20	08/06/2020
122817	high_ground	141.01	private	Fair	20	08/06/2020
97480	high_ground	259.13	private	Fair	100	15/06/2020
60734	high_ground	424.96	private	Fair	5	09/06/2020
38313	simple_culvert	279.6	private	Poor	100	09/06/2020
84432	simple_culvert	81.44	private	Poor	20	09/06/2020
84128	simple_culvert	87.79	private	Fair	20	09/06/2020

Flood Map for Planning (Rivers and Sea) - Centred on Deacons Marina, SO31 8AZ - Created 27 May 2021



1: 10,000

0 Metres 250



Flood Map for Planning (Rivers & Sea)

- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

From: [Partnership and Strategic Overview team, HIOW](#)
To: [Hoppe, David \(Avison Young - UK\)](#)
Cc: [Bayliss, Helen \(Avison Young - UK\)](#)
Subject: RE: Flood Risk Information (Product 4) for Deacons Marina, SO31 8AZ - Ref: SSD/21709
Date: 02 July 2021 16:47:04
Attachments: [image007.png](#)

External Sender

Hi David,

Thank you for your call.

If the development is just offices then would be classified “less vulnerable” but please check our Flood Risk Vulnerability Classification table for more details <https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-2-Flood-Risk-Vulnerability-Classification>.

The site is located in the South East area <https://www.gov.uk/government/publications/river-basin-district-map> not the South West but the principle is the same. Basically, yes, you can just add the cumulative rise for South East Higher Central (1.20m) to the current (2015) 0.5% AED (3.20mAOD) and get a finished floor level of 4.20mAOD.

If the lifetime of the development is estimated to be less than the default 100 years you can use the “mm per year” rates to calculate the allowance if appropriate <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-3>. For example, if you determine that the lifetime of the development is 50 years, then the allowances could be as follows:

	2015 0.5% AED	2014 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2071 (mm)	Cumulative rise 2014 to 2071 (m)	2071 FFL
Higher central	3.2mAOD	5.7*22 = 125.4mm	8.7*30 = 261mm	11.6*6 = 69.6mm	0.125.4 + 0.261 + 0.696 = 0.456m	3.2 + 0.46 = 3.76mAOD

However, please do your own calculations and assessments to determine which is the most appropriate allowance. When you submit a Flood Risk Assessment with your planning application then you must detail your calculations and assessments.

I hope that helps. It is a bit confusing and the guidance isn't as clear as I think it could be.

Kind regards,

Laura Humphries BSc(Hons) MSc

Flood and Coastal Risk Management Officer | New Forest, Test and Itchen Partnership and Strategic Overview Team

Environment Agency | Canal Walk, Romsey, Hampshire SO51 7LP

E: laura.humphries@environment-agency.gov.uk

T: 020 7714 0418

Appendix V

Ambiental Flood Report



Ambiental Flood risk report

Site Overview: Deacons Marina, Bridge Road,
Bursledon, Southampton, Hampshire, SO31 8AZ

AMBIENTAL
RISK ANALYTICS

—
a company of Royal HaskoningDHV

Compiled by:	Ambiental
Doc. version:	1.0
Issue date:	6th July 2021
Primary contact:	Angus Stevens
Email:	Angus.Stevens@rhdhv.com
Tel:	+44 (0) 203 857 8545

Pluvial Screening for surface water Flooding:

	Max Depth (m)	Mean Depth (m)
Pluvial (RTP100)	No depths returned	No depths returned
Pluvial (RTP1000)	No depths returned	No depths returned

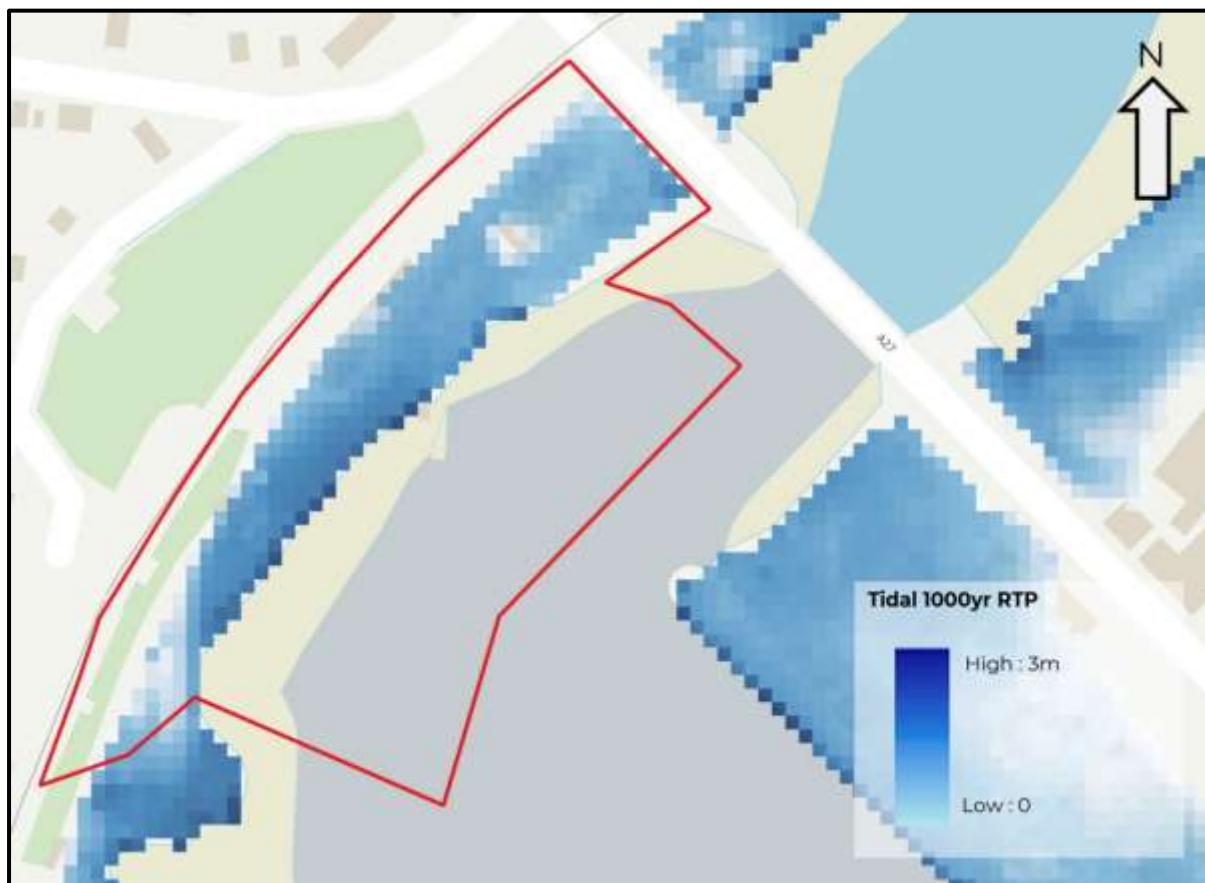
The flood depths provided in the table above are extracted from modelled outputs from Ambiental's UK FloodMap™ data. The depths are extracted from the digitized property extent, which is highlighted in red on the map above. The max depth refers to the maximum depth experienced within the digitized extent for the location, whilst the mean depth refers to an average of all flood depths experienced within this extent.

Fluvial Screening for River Flooding:

	Max Depth (m)	Mean Depth (m)
Fluvial (RTP100)	No depths returned	No depths returned
Fluvial (RTP1000)	No depths returned	No depths returned

The flood depths provided in the table above are extracted from modelled outputs from Ambiental's UK FloodMap™ data. The depths are extracted from the digitized property extent, which is highlighted in red on the map above. The max depth refers to the maximum depth experienced within the digitized extent for the location, whilst the mean depth refers to an average of all flood depths experienced within this extent.

Tidal Screening for Storm Surge Flooding:



	Max Depth (m)	Mean Depth (m)
Tidal (RTP100)	1.96	0.58
Tidal (RTP1000)	2.16	0.75

	Max Depth (m) mAOD	Mean Depth (m) mAOD
Tidal (RTP100)	2.83	2.83
Tidal (RTP1000)	3.03	3.02

The flood depths provided in the table above are extracted from modelled outputs from Ambiental's UK FloodMap™ data. The depths are extracted from the digitized property extent, which is highlighted in red on the map above. The max depth refers to the maximum depth experienced within the digitized extent for the location, whilst the mean depth refers to an average of all flood depths experienced within this extent.

Pluvial Screening for future surface water Flooding:

Emissions Scenario	Max Depth (m)	Mean Depth (m)
2020 Medium Emissions RCP 6.0	No Depths Returned	No Depths Returned
2020 High Emissions RCP 8.5	No Depths Returned	No Depths Returned
2050 Medium Emissions RCP 6.0	No Depths Returned	No Depths Returned
2050 High Emissions RCP 8.5	No Depths Returned	No Depths Returned
2080 Medium Emissions RCP 6.0	No Depths Returned	No Depths Returned
2080 High Emissions RCP 8.5	No Depths Returned	No Depths Returned

The flood depths provided in the table above are extracted from modelled outputs from Ambiental's UK FloodFutures™ data. The depths are extracted from the digitized property extent, which is highlighted in red on the map above. The max depth refers to the maximum depth experienced within the digitized extent for the location, whilst the mean depth refers to an average of all flood depths experienced within this extent.

Fluvial Screening for future River Flooding:

Emissions Scenario	Max Depth (m)	Mean Depth (m)
2020 Medium Emissions RCP 6.0	No Depths Returned	No Depths Returned
2020 High Emissions RCP 8.5	No Depths Returned	No Depths Returned
2050 Medium Emissions RCP 6.0	No Depths Returned	No Depths Returned
2050 High Emissions RCP 8.5	No Depths Returned	No Depths Returned
2080 Medium Emissions RCP 6.0	No Depths Returned	No Depths Returned
2080 High Emissions RCP 8.5	No Depths Returned	No Depths Returned

The flood depths provided in the table above are extracted from modelled outputs from Ambiental's UK FloodFutures™ data. The depths are extracted from the digitized property extent, which is highlighted in red on the map above. The max depth refers to the maximum depth experienced within the digitized extent for the location, whilst the mean depth refers to an average of all flood depths experienced within this extent.

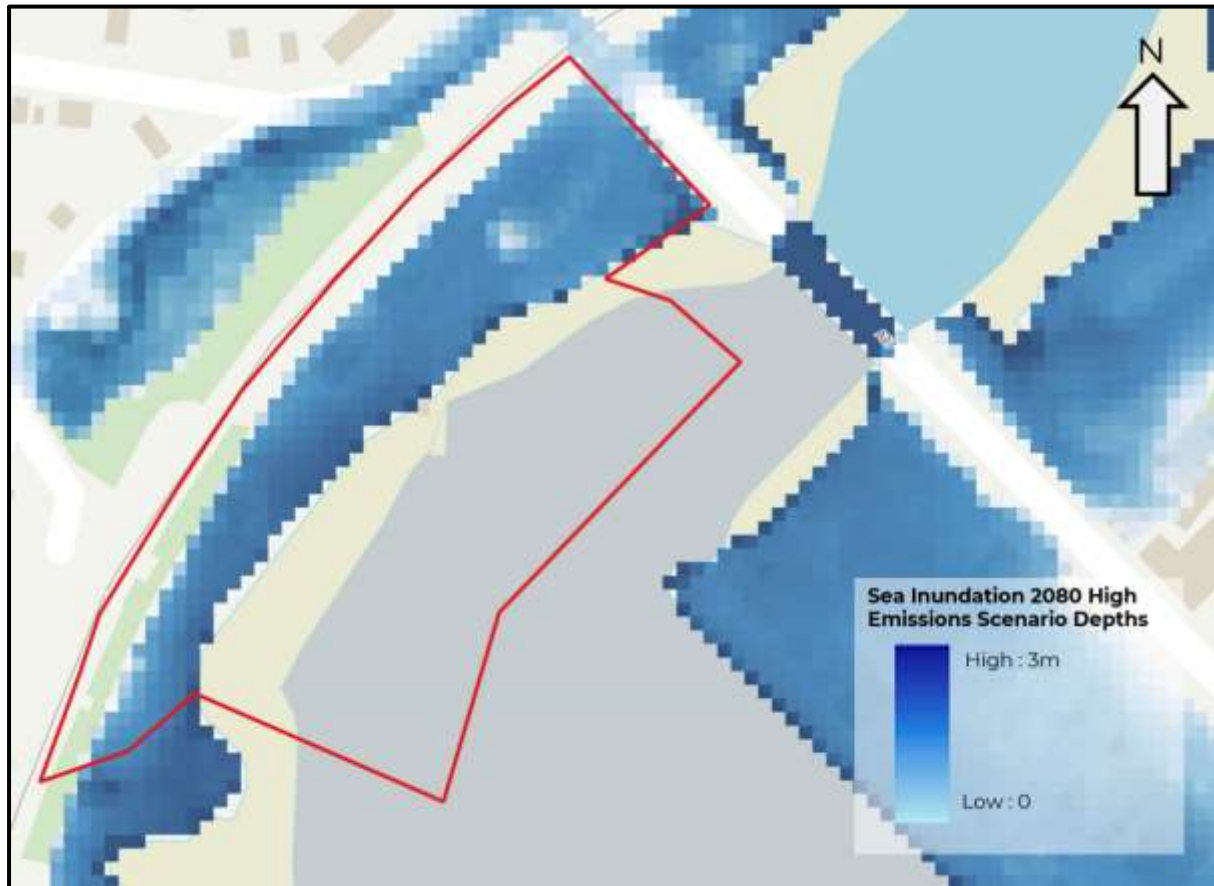
Tidal Screening for future Storm Surge Flooding:



Emissions Scenario	Max Depth (m)	Mean Depth (m)
2020 Medium Emissions RCP 6.0	2.43	0.71
2020 High Emissions RCP 8.5	2.65	0.91
2050 Medium Emissions RCP 6.0	2.61	0.87
2050 High Emissions RCP 8.5	3.02	1.25
2080 Medium Emissions RCP 6.0	2.91	1.15
2080 High Emissions RCP 8.5	3.74	1.90

The flood depths provided in the table above are extracted from modelled outputs from Ambiental's UK FloodFutures™ data. The depths are extracted from the digitized property extent, which is highlighted in red on the map above. The max depth refers to the maximum depth experienced within the digitized extent for the location, whilst the mean depth refers to an average of all flood depths experienced within this extent.

Sea Inundation Screening for future Storm Surge Flooding:



Emissions Scenario	Max Depth (m)	Mean Depth (m)
2020 Medium Emissions RCP 6.0	1.60	0.29
2020 High Emissions RCP 8.5	1.82	0.30
2050 Medium Emissions RCP 6.0	1.78	0.30
2050 High Emissions RCP 8.5	2.19	0.49
2080 Medium Emissions RCP 6.0	2.01	0.40
2080 High Emissions RCP 8.5	2.91	1.14

The flood depths provided in the table above are extracted from modelled outputs from Ambiental's UK FloodFutures™ data. The depths are extracted from the digitized property extent, which is highlighted in red on the map above. The max depth refers to the maximum depth experienced within the digitized extent for the location, whilst the mean depth refers to an average of all flood depths experienced within this extent.

Tidal Screening for future Storm Surge Flooding: mAOD

Emissions Scenario	Max Depth (m) mAOD	Mean Depth (m) mAOD
2020 Medium Emissions RCP 6.0	2.97	2.97
2020 High Emissions RCP 8.5	3.20	3.19
2050 Medium Emissions RCP 6.0	3.16	3.15
2050 High Emissions RCP 8.5	3.57	3.56
2080 Medium Emissions RCP 6.0	3.46	3.45
2080 High Emissions RCP 8.5	4.29	4.28

The flood levels provided in the table above are extracted from modelled outputs from Ambiental's UK FloodFutures™ data. The depths are extracted from the digitized property extent, which is highlighted in red on the map above. The max depth refers to the maximum level experienced within the digitized extent for the location, whilst the mean depth refers to an average of all flood level experienced within this extent.

Sea Inundation Screening for future Storm Surge Flooding: mAOD

Emissions Scenario	Max Depth (m) mAOD	Mean Depth (m) mAOD
2020 Medium Emissions RCP 6.0	2.14	2.14
2020 High Emissions RCP 8.5	2.36	2.36
2050 Medium Emissions RCP 6.0	2.32	2.32
2050 High Emissions RCP 8.5	2.73	2.73
2080 Medium Emissions RCP 6.0	2.62	2.62
2080 High Emissions RCP 8.5	3.45	3.45

The flood levels provided in the table above are extracted from modelled outputs from Ambiental's UK FloodFutures™ data. The depths are extracted from the digitized property extent, which is highlighted in red on the map above. The max depth refers to the maximum level experienced within the digitized extent for the location, whilst the mean depth refers to an average of all flood level experienced within this extent.

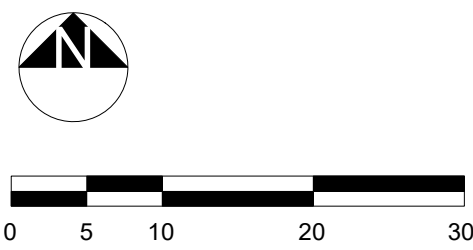
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Appendix VI

Draft Masterplan



SITE LAYOUT PLAN: as proposed
1:500



Appendix VII

Avison Young Standard Terms of Appointment

Environmental Definitions

1. Environmental Reports

Any reference to environmental reports should be taken to mean one or all of the following types of report:

Phase 1

This is a desk-based study (supported by a site inspection if agreed) of past and present uses of the site, geological and hydrogeological conditions, regulatory review and qualitative risk assessment.

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties.

The opinions given in the report have been dictated by the finite data on which it is based and is relevant only to the purpose for which the report was commissioned.

The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions.

Should additional information become available which may affect the opinions expressed in this report, Avison Young reserves the right to review such information and, if warranted, to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase 2

This is an intrusive phase of works involving the drilling of boreholes/trial pits and the testing of soil, groundwater and soil gas samples for environmental and geotechnical purposes.

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions to provide a reasonable assessment of the environmental risks together with engineering and development implications. If costs have been included in relation to site remediation these must be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site can only provide a general indication of site conditions.

The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes.

There may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out.

It should be noted that groundwater levels will vary owing to seasonal, tidal and weather related effects.

The scope of the investigation was selected based on the specific development proposed by the Client and may be inappropriate to another form of development or scheme.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

Avison Young accepts no liability what so ever for the content or conduct of the Environmental Consultant/Engineer of Sub Consultants/ Contractors appointed on behalf of the client by us.

2. Geology and Mining

2.1. Ground Conditions

Ground conditions consider the underlying geology, the presence of mining or quarrying, geological faults and the potential for contaminated land.

2.2. Superficial Deposits

Superficial deposits are the youngest geological deposits that rest on older deposits or rocks referred to as bedrock. They generally comprise unconsolidated sediments such as gravels, sand, silt and clay. They may be present as relatively thin discontinuous patches or larger spreads.

2.3. Bedrock Geology

The bedrock geology (sometimes referred to as solid geology) is the term used for the main units of rocks that have formed the Earth over millions of years. They may be present at the surface or concealed beneath younger superficial deposits. Bedrock is classified as either igneous, metamorphic or sedimentary.

2.4. Geological Fault

A fracture in the rock along which movement takes place.

Environmental Definitions

2.5. Underground Workings

Areas where coal or other minerals and rock has been mined, or is currently being mined under the surface. Historic mining may have been undertaken from bell pits, pillar and stall workings or longwall techniques.

2.6. Mine Entries

Refers to a mineshaft or adit which provides an opening to gain access to underground workings.

2.7. Brine Compensation District

Formed by the Cheshire Brine Pumping (Compensation for Subsidence) Act 1952 as a District within which a person can serve a notice on the Brine Board if they think their property has suffered damage resulting from subsidence caused by extraction of brine.

3. Hydrogeology and Hydrology

3.1. Controlled Water

Section 104 of the Water Resources Act 1991 defines Controlled Waters as all inland freshwaters, i.e. rivers, watercourses, lakes and ponds (other than public sewers or sewers or drains which drain into a public sewer), groundwater, coastal waters (extending landward from the limit of the highest tide or freshwater limit) and relevant territorial waters (extending seaward for three miles from the baseline from which the breadth of the territorial sea is measured).

3.2. Groundwater

Groundwater is all water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

3.3. Surface Water

Any inland freshwaters, coastal waters or relevant territorial waters i.e. water that is above the surface of the ground.

3.4. Tributary

A stream or river that flows into a larger stream or river.

3.5. Confluence

The point at which two rivers or streams join together.

3.6. Catchment

The total area from which rainfall flows into a river or stream.

3.7. Discharge Consents

For England, discharge consents to Controlled Waters (surface water and groundwater) are authorised by the Environment Agency under the Environmental Permitting (England and Wales) Regulations 2010. In considering whether or not to grant consents the Environment Agency takes account of whether the point source discharges into the water environment has the potential to cause pollution relevant to quality standards and whether it will affect the appropriate uses of the water. These consents do not apply to discharges to sewers, since the sewerage undertaker regulates these.

Discharges for sewage effluent are exempt where they are 5m³/day or less to surface water or 2m³/day to ground. Exempt discharges are not required to be reported and as such they are not considered within our assessments.

3.8. Water Abstractions

The Environment Agency has a duty under the Water Resources Acts 1963 and 1991 to take action, when necessary, in order to conserve, re-distribute, or increase water resources in England, and to secure its proper use. They may also draw up provisions for determining acceptable flows or minimum volumes for inland waters. Those wishing to abstract water above a specified quantity must apply to the Agency for Abstraction Licences and adhere to the conditions that apply. Premises abstracting less than 20m³ water per day from watercourses and the ground can do so without the need of a licence and as such these locations are not recorded.

These records are held under Scottish legislation to protect the public water supply. These records therefore relate only to public water supplies.

3.9. Water Industry Act Referrals

The Environment Agency is given powers to regulate some discharges to public sewers or certain dangerous substances under the Water Industry Act 1991.

3.10. Aquifer Designations

An aquifer is a geological unit containing sufficient saturated permeable rock that will yield water. The following aquifer designations are consistent with the Water Framework Directive and reflect their importance in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems.

Unproductive Strata

Defined as rock layers or drift deposits with low permeability that has negligible significance for water supply or river base flow.

Environmental Definitions

Principal Aquifer

Defined as rock layers or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary Aquifers

These include a wide range of rock layers or drift deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into two types ('A' and 'B').

Secondary 'A' Aquifers

Defined as rock layers or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary 'B' Aquifers

Defined as predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

Secondary Undifferentiated

The Secondary Undifferentiated classification is assigned in cases where it has not been possible to attribute either category Secondary A or Secondary B to a rock type.

3.11. Groundwater Source Protection Zones

The Environment Agency has defined Source Protection Zones (SPZ) for 2000 groundwater sources such as wells, boreholes and springs used for public water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. There are three main zones:

Inner Zone (Zone 1) – defined as the 50 day travel time from any point below the water table to the source. This zone has a minimum radius of 50m;

Outer Zone (Zone 2) – defined as a 400 day travel time from a point below the water table. The previous methodology gave an option to define SPZ2 as the minimum recharge area required to support 25% of the protected yield;

Total Catchment (Zone 3) – defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. In confined aquifers, the source catchment may be displaced some distance from the source. For heavily exploited aquifers, the final source catchment protection zone can be defined as the whole aquifer recharge area where the ratio of the groundwater abstraction to aquifer recharge is >0.75 .

In the past, the Environment Agency has also applied a fourth zone of special interest:

Special Interest (Zone 4) – this represents a surface water catchment which drains into the aquifer feeding the groundwater supply.

3.12. Groundwater Vulnerability

The pollution hazard of an activity will be greater in certain hydrological, geological and soil situations than in others. Superficial aquifers are the most vulnerable to pollution due to their shallow water table and little or no protective cover. Bedrock aquifers can be equally vulnerable where drift deposits are absent and where the unsaturated zone is thin or fractured.

Activities in areas of unproductive strata do not represent a risk to groundwater resources and therefore are not assigned a groundwater vulnerability.

High

These are high priority groundwater resources that have very limited natural protection. This results in a high overall pollution risk to groundwater from surface activities. Operations or activities in these areas are likely to require additional measures over and above good practice pollution prevention requirements to ensure that groundwater isn't impacted.

Medium-high

These are high priority groundwater resources that have limited natural protection. This results in a medium-high overall pollution risk to

groundwater from surface activities. Activities in these areas may require additional measures over and above good practice to ensure they do not cause groundwater pollution.

Medium

These are medium priority groundwater resources that have some natural protection resulting in a moderate overall groundwater risk. Activities in these areas should as a minimum follow good practice to ensure they do not cause groundwater pollution.

Environmental Definitions

Medium-low

These are lower priority groundwater resources that have some natural protection resulting in a moderate to low overall groundwater pollution risk. Activities in these areas should follow good practice to ensure they do not cause groundwater pollution.

Low

These are low priority groundwater resources that have a high degree of natural protection. This reduces their overall risk of pollution from surface activities. However, activities in these areas may be a risk to surface water due to increased run-off from lower permeability soils and near-surface deposits. Activities in these areas should be adequately managed to ensure they do not cause either surface or groundwater pollution.

Further information relating to groundwater vulnerability is provided in the Environment Agency report (Ref: SC040016/R) 'New groundwater vulnerability mapping methodology in England and Wales'.

3.13. Soil Leaching

The potential for soil leaching considers a range of soil properties such as moisture content, soil clay content and carbon content. There are three soil leaching classes:

High (H)

Soils of high leaching potential with little ability to attenuate diffuse soil pollutants and in which non-adsorbed diffuse source pollutants and liquid discharges have the potential to move rapidly to underlying strata or groundwater. Three subclasses are recognised:

H1 – soils that readily transmit liquid discharges because they are either shallow or susceptible to rapid flow;

H2 – deep, permeable, coarse-textured soils that readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential;

H3 – coarse-textured or moderately shallow soils that rapidly transmit non-adsorbed pollutants and liquid discharges, but which have some ability to attenuate adsorbed pollutants because of their clay or organic matter.

Intermediate (I)

Soils of intermediate leaching potential that have a moderate ability to attenuate diffuse source pollutants or in which it is possible that some non-adsorbed diffuse source pollutants and liquid discharges could penetrate the soil layer. Two subclasses are recognised:

I1 – soils that can potentially transmit a wide range of pollutants;

I2 – Soils that can potentially transmit a wide range of pollutants and liquid discharges but are unlikely to transmit adsorbed pollutants.

Low (L)

Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal or they have a significant ability to attenuate diffuse source pollutants.

4. Flood Risk

4.1. National Planning Policy Framework (Flooding)

This relates to the National Planning Policy Framework and the associated Technical Guidance.

4.2. Floodplain

A floodplain is the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.

4.3. Flood Zones

Flood Zone 1

The area where flooding from rivers or sea is very unlikely as defined by the Environment Agency. There is less than 0.1% (1 in 1000) chance of flooding occurring each year.

Flood Zone 2

The area of medium probability of flooding as defined by the Environment Agency – a flood with an annual chance of occurring of between 1% (1 in 100) to 0.1% (1 in 1000) for river flooding and 0.5% (1 in 200) to 1% (1 in 1000) for coastal flooding.

Flood Zone 3A

The area of high probability of flooding as defined by the Environment Agency – a flood with an annual chance of occurring of 1% (1 in 100) or greater for river flooding and 0.5% (1 in 200) or greater for coastal flooding.

Flood Zone 3B

The boundary between 3a and 3b is a planning decision made by the Local Authority. This information is usually in the strategic flood risk assessment. This area is a functional floodplain as defined by the Environment Agency. It is an area which is designed to flood – a flood return period of 1 in 20 or less.

4.4. Flood Return Period

A return period is an estimate of the likelihood of an event occurring. Flood return periods are commonly expressed as either a ratio or a percentage, for example, a 1% or 1 in 100 year event, means there is a 1% (1 in 100) chance of flooding occurring each year.

Environmental Definitions

4.5. Pluvial (Surface Water) Flooding

Pluvial flooding results from rainfall running over ground before entering a watercourse or sewer. It is usually associated with high intensity rainfall events (typically greater than 30mm per hour) but can also occur with lower intensity rainfall or melting snow where the ground is already saturated, frozen, developed (for example in an urban setting) or otherwise has low permeability.

4.6. Groundwater Flooding

Groundwater flooding is defined as the emergence of groundwater at the surface, rising up from the underlying rocks and tends to after long periods of sustained rainfall.

4.7. Flood Risk Rating

Low – The site is at little or no risk of flooding from any sources.

Low to Moderate – It is possible that flooding could arise and the presence of features such as watercourses, canals, flood defences or flood storage areas in the locality may suggest that the site could be at risk of flooding. Flood resilient materials may be required in the construction of properties.

Moderate - Information from existing datasets suggests that there are certain features which may present a risk of flooding to the site and its occupants. Appropriate measures to manage flood risk may be required in addition to the use of water resistant materials in the construction of properties.

Moderate to High - Information from existing datasets suggests that there are certain features which may present a significant risk to the site and its occupants. Flood defences may be required to reduce the risk of flooding and flood storage areas may be required.

High – There is a risk to life and property. This means that existing datasets reveal significant flood risk issues which will need to be addressed.

4.8. Flood Resistance

Flood resistance refers to products that may be permanent or temporary and are designed to stop water entering a property through existing openings (doors, windows, vents and pipes). Permanent measures do not need to be deployed, whilst temporary measures need to be installed before flood water arrives.

4.9. Flood Resilience

Flood resilience measures are designed to reduce the amount of damage to a property when water enters a building. They will enable the clean-up to take place more easily without the need for major refurbishment.

4.10. Flood Defence

Infrastructure used to protect an area against floods such as floodwalls and embankments. They are designed to a specific standard of protection (design standard).

4.11. Standard of Protection

The flood event return period above which significant damage and possible failure of the flood defences could occur.

4.12. Flood Storage

A temporary area that stores excess runoff or river flow, which are often ponds or reservoirs.

5. Drainage

5.1. Attenuation

The storing of water to reduce the peak discharge of water.

5.2. Below Ground Attenuation Storage

Large below ground voided spaces used to temporarily store surface water runoff before infiltration, controlled release to the public sewer network or re-use. The storage structure can be formed by a tank, oversized pipework or geocellular modular crates.

5.3. Brownfield Site

A site that has been previously developed as either residential, commercial or industrial use.

5.4. CCTV Survey

A survey of inaccessible below ground drainage assets by controlled closed-circuit television, which is operated remotely.

5.5. Culvert

A tunnel (pipe or box-shaped) carrying a stream or open drain under a road, railway or land.

5.6. Design for Exceedance

Designing a system to manage effectively events that exceed (bigger or rarer than) the drainage systems required level of service so that they do not impact upon life or property.

5.7. Design Life

The period of time during which a component or product is expected by its designers to work within its specified parameters.

Environmental Definitions

5.8. Detention Basins

During a rainfall event, surface water runoff drains to a landscaped depression with an outlet that restricts flow, so that the basin fills and provides attenuation. Basins are generally designed to be vegetated dry features, except during and immediately following the rainfall event. Runoff is treated filtered as it flows across the vegetation in the base of the basin.

5.9. Exceedance Flow

Surface water flows during rainfall events bigger or rarer than the design standard of the drainage system.

5.10. Filter Strips

Runoff from an impermeable area is allowed to flow across a grassed or planted area to promote sedimentation and filtration.

5.11. Filter Drains

Runoff is temporarily stored below the surface in a shallow trench filled with stone / gravel and provides attenuation, conveyance and treatment.

5.12. Flow Control Device

A device used to limit the flow rate on surface water from the outlet of drainage or SuDS component. This is usually limited to meet a required discharge rate.

5.13. Freeboard

The height above the designed water level in a pond or infiltration basin or the distance between the base of a soakaway and the resting groundwater level.

5.14. Greenfield

Land that has never been developed and has only been used for agricultural or recreational use.

5.15. Greenfield Run-off

The rate of surface water run-off from a site before development.

5.16. Green Roofs

A planted soil layer constructed on the roof of a building to create a living roof. Water is stored in the soil layer and absorbed by the vegetation.

5.17. Infiltration Systems

These systems collect and store runoff allowing it to infiltrate into the ground. Pollution risk to underlying groundwater can be reduced by the overlying vegetation or unsaturated soils.

5.18. Peak Discharge Rate

The highest rate of flow of water from a given rainfall event.

5.19. Pervious Pavements

Surface water runoff is allowed to soak through structural paving i.e. the gaps between block paving or porous paving where water filters through the block itself. Water can be stored in the sub-base of the pavement/roadway and potentially allowed to infiltrate to the ground or passed forward to a carrier drain.

5.20. Ponds and Wetlands

Features that have a permanent pool of water that can be used to provide attenuation. The outfall has a controlled discharge and the water levels increase following rainfall events. Ponds and wetlands also enhance the treatment of rainwater and promote biodiversity.

5.21. Rainwater Harvesting Systems

Rainwater is collected from the roof of a building or other paved impermeable surfaces in an over ground or underground tank, which then allows the water to be reused either for landscape irrigation or for flushing or toilets. Some treatment may be required depending on the reuse of the water.

5.22. Return Period (Drainage)

An estimate of the likelihood of a particular event occurring. A 100 year storm refers to the storm that occurs on average once every hundred years. In other word, its annual probability of exceedance is 1% (or 1 in 100 years).

5.23. Sewer Flooding

Flooding caused by a blockage or overflowing in a sewer or urban drainage system.

5.24. Surface Water Runoff

The flow of water from rainfall over the ground surface.

5.25. Sustainable Drainage Systems (SuDS)

Sustainable Drainage Systems are designed to manage and use rainwater close to where it falls on the surface incorporating vegetation to improve water quality, amenity and biodiversity. They can take the form of both above and below ground features and most SUDS schemes use a combination of components to achieve the overall design objectives.

5.26. Swales

A grassed channel used to convey and treat surface water runoff at the surface. They can be designed to infiltrate water to the ground or lined so that water is passed forward to other SuDS features. Swales can be designed to be wet or dry features.

Environmental Definitions

6. Environmental Regulatory Information

6.1. Pollution Incidents

The Environment Agency and Natural Resource Wales have a duty to investigate pollution incidents reported to them by members of the public, emergency services, local authorities, government departments, other regulators, industry, and agency staff. Substantiated incidents are held on a public register of information and relate to specific events that fall within their responsibility given that they may have an environmental and/or operational impact.

Examples may include reports that may affect land, air, and water, fish kills, illegal abstraction, low river flows, speeding vessels, and flooding. Public register information is provided by regional offices.

Incidents are graded from category 1 (Major Incident) to category 4 (No Impact). An impact category must be assigned for each affected environmental media; air, land, and water. An impact level is assigned to a particular incident but is determined by the maximum severity affecting one of the three media.

6.2. Landfill

Sites accepting waste were not required to be licensed until the introduction of the Control of Pollution Act 1974 and landfilling prior to this is often unrecorded unless captured through planning records or on historic plans.

Information on landfill sites relates to open and closed site and is captured from a number of sources within the Landmark Envirocheck Report to include:

- A survey of active landfill sites conducted on behalf of the Department of Environment in 1973, which over 3,000 sites accepting waste prior to the Control of Pollution Act 1974, and would therefore not have been subject to any strict regulation or monitoring;
- Information sourced from individual Local Authorities that were able to provide information on sites operating prior to the introduction of the Control of Pollution Act 1974;
- Information from the British Geological Survey which includes outline plans, site descriptions, waste types and tipping histories;
- Consents for landfill sites issued by the Environment Agency under Section 64 of the Environmental Protection Act 1990 (Part 2), prescribed by Regulation 10 of SI No.1056 the Waste Management Licensing Regulations 1994 and the Environmental Permitting (England Wales) Regulations 2010; and

- Information sourced from consents that were issued by the Environment Agency and the Scottish Environment Protection Agency, under the Control of Pollution Act 1974 and Section 36 of the Environmental Protection Act 1990.

6.3. Environmental Permitting

The Environmental Permitting (England and Wales) Regulations 2010 (as amended) (EPR 2010) have been introduced over a number of years so that they now encompass licences that were previously held under the several sets of legislation. The Landmark Envirocheck Report provides information on open and closed sites under each of the following pieces of legislation:

- Integrated Pollution Controls (IPC) held under the former Environment Protection (Prescribed Processes and Substances) Regulations 1991;
- Records of Local Authority Integrated Pollution Prevention and Control (LAIPPC) and Integrated Pollution Prevention and Control (IPPC) were previously maintained under the Pollution Prevention and Control Act 1999, originally set up under the Environmental Protection Act 1990. LAIPPC continue to be regulated by the Local Authority and are referred to as Part A2 Installations and Part B Installations, whilst the IPPC continue to be regulated the Environment Agency and are referred to as Part A1 Installations.
- Registered Waste Transfer, Treatment and Disposal Sites were previously recorded under the Control of Pollution Act (COPA) 1974, Section 36 of the Environmental Protection Act (EPA) 1990 and the Environmental Permitting (England and Wales) Regulations 2007.
- All waste activities now fall within EPR 2010 under a number of waste exemptions, standard rules environmental permits and bespoke environmental permits.

6.4. Waste Exemptions

Waste exemptions allow the use, storage, disposal and treatment of specific wastes that only create a low risk of pollution, when the quantities of waste are limited and stored in a specific manner.

6.5. Standard Rules Environmental Permits

Standard Rules environmental permits allow low to medium risk waste storage, transfer and treatment activities to occur at specific locations and are issued where the Environment Agency does not need to make a site specific decision about whether the regulated activity can take place at a specific location.

Environmental Definitions

6.6. Bespoke Environmental Permits

A Bespoke Environmental Permit is required where there are no exemptions or Standard Rules Environmental Permits available for the proposed activity. The Environment Agency makes a site specific assessment about the proposed regulated activity in relation to its environment to ensure waste and emissions do not have a detrimental effect.

7. Land Designations

7.1. Areas of Outstanding Natural Beauty (AONB)

The National Parks and Access to the Countryside Act 1949 as amended by the Countryside Act 1968, Wildlife and Countryside Act 1981 and Environment Act 1995, allowed for the designation of Areas of Outstanding Natural Beauty (AONB). The equivalent designations for Scotland are National Scenic Areas.

AONBs are landscapes of national conservation importance for their distinctive character and natural beauty. They are generally smaller than National Parks, and are owned by individuals e.g. farmers. Some are adjacent to National Parks and many include areas of Heritage Coast. Planning law protects development within them.

7.2. Sites of Special Scientific Interest

Sites of Special Scientific Interest (SSSI) have been designated under the Wildlife and Countryside Act 1981 Section 28 to protect areas of important flora, fauna, geological and/or physiographical features. They provide the basis for other national and international designations. Parties notified include site owner(s) and occupier(s), local planning authorities, water and sewerage companies, and the appropriate Secretary of State. The Land Registry also records these as local land changes.

The appropriate party must be consulted on developments, or notified of potentially damaging operations, which may affect an SSSI.

Most SSSIs are privately owned or managed. Others are owned or managed by public bodies such as the Forestry Commission, Ministry of Defence and the Crown Estate, or by the voluntary conservation movement. Some SSSIs are also designated as Special Protection Areas and Ramsar Sites.

7.3. RAMSAR Sites

Under the Convention on Wetlands of International Importance especially as Waterfowl Habitat, the Government is committed to designate 'Wetlands of International Importance'. The Convention was adopted in Ramsar, Iran in 1971 and ratified by the UK Government in 1976.

The purpose is to stem progressive encroachment on and loss of wetlands now and in the future. Aims include the conservation, management and wise use of migratory wildfowl stocks and to promote the conservation of wetlands.

Wetlands are areas of peat land, fen, marsh or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water.

7.4. Local Nature Reserves

These reserves are areas created by Local Authorities in conjunction with their appropriate national authority in the interest of conservation, amenity value and public enjoyment of the countryside. Some, but not all Local Nature Reserves (LNRs) are also designated SSSIs. They are controlled by bylaws.

7.5. National Nature Reserves

These reserves have been designated under the Wildlife and Countryside Act 1981 or the National Parks and Access to the Countryside Act 1949, Section 19, as areas of high national or international importance for nature conservation. They are designated by Natural England, Scottish Natural Heritage and the Countryside Council for Wales.

National Nature Reserves are Sites of Special Scientific Interest, and may have coastal frontage or be offshore islands.

7.6. Special Areas of Conservation

Special Areas of Conservation are lands designated under the ECC Directive on the Conservation of Natural Habitats and Wild Fauna and Flora (92/43/EEC), commonly known as the Habitats and Species Directive. These sites are to be afforded absolute protection subject to 'imperative reasons of overriding public interest, including those of a social or economic nature.

7.7. Special Protection Areas

Special Protection Areas are classified under Article 4 of the EC Directive on the Conservation of Wild Birds 1979, commonly known as the Wild Birds Directive.

The purpose of Special Protection Areas is to safeguard the habitats of migratory and certain particularly threatened bird species. Together with Special Areas of Conservation, they constitute 'Natura 2000' areas for protection.

Environmental Definitions

8. Hazardous Substances

8.1. Asbestos Containing Materials (ACM's)

Includes any of the following materials; crocidolite, amosite, chrysotile, fibrous actinolite, fibrous anthophyllite, fibrous tremolite and any mixture containing any of these materials.

8.2. Asbestos Surveys

Any reference to asbestos surveys is given the same meaning as that given in HSE Guidance Document HSG 264 entitled 'Asbestos: The Survey Guide'.

8.3. Control of Major Accident Hazard Sites

The Health and Safety Executive in conjunction with the Environment Agency and the Scottish Environment Protection Agency keeps records of those sites, which manufacture or store dangerous toxic or flammable chemicals (including petrochemicals, pharmaceuticals and agrochemicals) and explosives in excess of threshold quantities specified in the Control of Major Accident Hazards (COMAH) Regulations 2015. Sites are divided into upper and lower tier sites based on the type and quantities of substances being stored or manufactured.

The COMAH Regulations require emergency plans to be kept up to date and regularly tested.

8.4. Planning Hazardous Substance Consents

This data is collected, collated and geo-coded by Landmark. The records relate to consents granted under the Planning (Hazardous Substances) Act 1990 as amended, for England and Wales and the Planning (Hazardous Substances) (Scotland) Act 1997, in Scotland.

The regulations require a consent to be granted by the Local Authority for sites where the storage of certain hazardous substances is above the specified or controlled quantity.

9. Non-Native Invasive Plants

The Wildlife and Countryside Act 1981 (as amended) is the principal legislation which regulates the release of non-native species. Section 14(2) prohibits the release of certain invasive non-native plants into the wild in Great Britain; it is an offence under Section 14(2) to "plant or otherwise cause to grow in the wild" any plants listed on Part II of Schedule 9. The most common plant species found on brownfield and urban sites include Japanese Knotweed, Giant Hogweed and Himalayan Balsam.

Japanese Knotweed

Japanese knotweed is a strong-growing, clump-forming perennial, with tall, dense stems. Stem growth is renewed each year from the existing crown of the rhizomes which grows underground. Japanese Knotweed is a particular problem as not only does it out compete native species, it also has the potential to damage buildings, pavements, roads, etc.

Himalayan Balsam

This is a non-native invasive terrestrial plant species that has spread to most parts of UK, particularly along the banks of watercourse and in damp woodland. Individual plants reach 2m in height and its rapid growth shades out most of our native species.

Giant Hogweed

Giant Hogweed is part of the same family as Cow Parsley and Hogweed, but is significantly larger in size extending up to 4m in height. The sap of Giant Hogweed contains toxic chemicals known as furanocoumarins, which when contact with the skin, and in the presence of sunlight cause a condition called phyto-photodermatitis (reddening of the skin, burns and blistering).

10. Environmental Risk Assessment

10.1. Contamination

This is taken to mean specifically, the presence of toxic, noxious or polluting substances in, on or under land.

10.2. Contaminated Land

Any reference to contaminated land should be construed in the statutory sense.

Land is defined as being contaminated land under Section 78 of the Environmental Protection Act 1990 where any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that:

Significant harm is being caused or there is a significant possibility of such harm being caused; or

Significant pollution of controlled waters is being, or is likely to be caused.

10.3. Conceptual Site Model (CSM)

The conceptual site model is the initial phase of the environmental risk assessment process which identifies the all potential sources of contamination, the receptors capable of being harmed and the pathways capable of exposing a receptor to the contaminant source. Only where there are complete source-pathway-receptor linkages is there considered to be a potential risk.

Environmental Definitions

10.4. Environmental Risk

Any reference to environmental risk shall be taken to mean:

High Risk

Those properties where environmental risks have been identified that will affect land value, business interruption, lead to regulatory intervention and/or result in material financial expenditure by the client in the short term.

Moderate Risk

Those properties where environmental risks have been identified that have the potential to affect land value, lead to regulatory intervention and/or result in material financial expenditure by the client in the medium to long term.

Low Risk

Those properties where no environmental risks have been identified that have the potential to affect land value, lead to regulatory intervention and/or result in material financial expenditure by the client.

Environmental Reservations

Composite Panels and Insurance

We will not test any panels within the property to see whether there are any polystyrene insulated composite panels. The presence of such panels may result in the property being uninsurable, which would have an adverse impact on value.

Enquiries

Where necessary, any enquiries (verbal and written) undertaken by Avison Young of local authorities and statutory undertakers are made in respect of environmental issues. Local searches are not undertaken and no responsibility is accepted for any inaccurate information provided.

Environmental Liability

Any reference to environmental liability should be taken to mean a combination of the following types of liabilities:

Actual Liabilities

These are known present obligations of the business arising from past or future events, the settlement of which will require future expenditure.

These will include costs associated with regulatory compliance e.g. known monitoring, decommissioning requirements, fines, damages, and surrender provisions imposed by statute and /or contract.

Latent and Contingent Liabilities

These are unknown obligations arising from past or future events that exist, but where the outcome will only be known following the occurrence or non-occurrence of future events that are outside the control of the business.

These might include, unknown costs associated with site remediation, decommissioning and the possibility of unforeseen future events such as a pollution incident.

Ground Conditions

Any discussion of ground conditions in this report have been based on a review of existing documentary information prepared by British Geological Survey, the Coal Authority and/or other parties. Avison Young accepts no responsibility for the accuracy or completeness of information prepared by third parties.

Information

All information supplied by the Client, the Client's staff and professional advisers, local authorities, other statutory bodies, investigation agencies and other stated sources is accepted as being correct unless otherwise specified.

Legal issues

Any interpretation of leases and other legal documents and legal assumptions is given in our capacity as Property Consultants (including Chartered Surveyors and Chartered Town Planners) and must be verified by a suitability qualified lawyer if it is to be relied upon. No responsibility or liability is accepted for the true interpretation of the legal position of the client or other parties.

Where opinions expressed in this report are based on current available guidelines and legislation, no liability can be accepted by Avison Young for the effects of any future changes to such guidelines and legislation.

Plans

Any plans supplied are for identification purposes only unless otherwise stated. The Report assumes site boundaries are as indicated to us. The reproduction of Ordnance Survey sheets has been sanctioned by the Controller of Her Majesty's Stationery Office, Crown Copyright reserved.

Property Condition

Our inspection of a property does not constitute a structural survey. When preparing our report we have regard to apparent defects and wants of repair and take into account the age of the property. We do not however carry out a detailed search for defects which is undertaken as part of the structural survey neither do we necessarily set out the various defects when making the report. We do not inspect woodwork or other parts of the structure which are covered, unexposed or inaccessible. We do not arrange for any investigation to be carried out to determine whether or not high alumina cement concrete or calcium chloride additive or any other deleterious materials or permanent woodwool shuttering or composite panelling has been used in the construction.

Unless so instructed we do not arrange for any investigations to be carried out to determine whether or not any deleterious or hazardous material or techniques have been used in the construction of the property or has since been incorporated and the services are not tested.

We are therefore unable to report that the property is free from defect in these respects.

For reporting purposes we assume unless otherwise stated that the property (including associated plant and machinery, fixtures and fittings) is in serviceable order and will remain so for the foreseeable future. It will be assumed that the building(s) is/are in good repair, except for defects specifically noted.

Environmental Reservations

Services Installations

Unless otherwise instructed, we do not inspect or test any of the water, mechanical, heating, electrical or drainage installations. Where appropriate we will make recommendations in relation to the execution of specialist tests to establish the condition. The implementation of such work would normally involve an additional fee.

Site Areas

Site areas are normally computed from plans or the Ordnance Survey and not from a physical site survey. They are approximate unless otherwise indicated.

Tenure

Title Deeds and Leases are not inspected (unless specifically stated) and, unless we are informed to the contrary, it is assumed that a property is free of any onerous covenants, easements, other restrictions or liabilities including mortgages, grants and capital allowances that may affect the value.

Warranties

The client warrants and represents that, to the best of its knowledge, information and belief, the information supplied by and on its behalf to Avison Young is true and accurate and that it will advise and instruct its third party advisers to advise Avison Young in the event that it and/they receive notice that any such information is either misleading or inaccurate.

Contact Details

Enquiries

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