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Yacht Haven, Hayling Island Hampshire Flood Risk Assessment and Drainage Statement

Site reference

**Yacht Haven,
Copse Lane,
Hayling Island,
PO11 0RH**

Client

James Walters

Date

February 2017

Report No.

ICS-2441.07.001 Rev A

Revision	Compiled by	Checked by	Issue date
Initial	Richard White B.Sc (Hons) C.Env C.WEM I.Eng MCIWEM	William Piotrowski B.Sc. (Hons)	28 February 2017
Rev-A	Richard White B.Sc (Hons) C.Env C.WEM I.Eng MCIWEM	William Piotrowski B.Sc. (Hons)	01 March 2017

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Some of the information presented within this report is based on third party information which is believed to be correct; no liability will be accepted for any discrepancies in accuracy, mistakes or omissions in such information. The report also assesses the flood risk in relation to the requirements of the Environment Agency and as such assesses the site for a specific flood event and not all flood events.

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1.0 Summary

This Flood Risk Assessment (FRA) and drainage statement is to support proposed development at Yacht Haven, Hayling Island and finds the following:

ITEM	RESPONSE
Site Location	The site is located to the South of Copse Lane on Hayling Island, Hampshire, 4 miles East of Portsmouth. The approximate grid reference of E = 472980, N = 101910.
Size and Current Land Usage	The site area extends to 0.52 hectares and includes an existing 2 story dwelling, unmetalled driveway, and garden, extending to Mill Rithe/Emsworth Channel.
Flood Zone	The far end of the garden falls within Flood Zones 3, which is classified as high probability of flooding. The proposed dwelling falls within Flood Zone 1.
Tidal Flood Risk	High – Refer to Section 5.1. – Flooding is currently confined to the lower area of the site, and away from the dwelling. Floor levels set 600mm above predicted 0.5% annual exceedance level for 2115, at 5.1m AOD.
Fluvial Flood Risk	Low – Refer to Section 5.2. – No fluvial flooding is shown on the EA flood Maps.
Overland Flood Risk	Medium/Low – Refer to Section 5.3. – Surface flows can be mitigated with surface water design
Groundwater Flood Risk	Low – Refer to Section 5.4.
Sewerage Flood Risk	Low – Refer to Section 5.5.
Artificial Flood Risk	Low – Refer to Section 5.6.
Proposed Development	Demolition of existing 2 story dwelling and construction of new dwelling with associated driveway and gardens.
Sequential Test	The development is a demolition of an existing dwelling to allow the construction on a newer dwelling. This has been sequentially located on the plot to ensure it is wholly within Flood Zone 1. The development satisfies the requirements of the sequential test
Exception Test	The development satisfies the requirements of the exception test.
Floor Levels	Flood levels from the Environment Agency, for the 1 in 200-year tidal flood event vary due to climate change from 3.3m AOD in 2011 to 4.5m AOD in 2115. For the purposes of this report we will take the highest of these. Finished floor levels for the ground floor will be set at 5.1m AOD, 600mm above the highest flood risk modelled for the site to give an allowance for wave height.
Proposed Foul Drainage	The site will discharge via a gravity drainage system utilising the existing foul water connection within the site. Assumed to connect to the local pumping station via the adjacent holiday park
Proposed Surface Water Drainage	It is proposed to discharge surface water from the site into the sea/harbour via the existing French drain system, mirroring the existing system.



2.0 Introduction

2.1 Commission

The Client, Mr. Walters has commissioned Infrastruct CS Ltd to prepare a Flood Risk Assessment (FRA) and drainage statement to support a planning application for the development of a replacement dwelling.

2.2 Guidance

This flood risk assessment has been compiled in accordance with the recommendations of the National Planning Policy Framework and the Planning Practice Guidance to the National Planning Policy Framework.

2.3 Aims and Objectives

The purpose of this flood risk assessment is to demonstrate that the site can be developed safely, without exposing the new development to an unacceptable degree of flood risk or increasing the risk of flooding to third parties.

This report will identify the flood risk zone, potential sources of flood risk, consider the proposed drainage, recommend appropriate flood risk mitigation measures and will be used to support the planning application proposals.

This report is based on information made available at the time of writing. Consequently, there is potential for additional information to be published which may lead to changes to the conclusions drawn in this report. As such Infrastruct CS Ltd cannot be held responsible for such changes.

3.0 Site Details

3.1 Location

The site is located to the South of Copse Lane on Hayling Island, Hampshire, 4 miles East of Portsmouth.

The site area extends to 0.52 hectares and includes an existing unmetalled and tarmac drive, 2 story dwelling and large garden space to the rear. The site is surrounded by residential properties and holiday accommodation. The southern boundary of the site adjoins a tidal channel of Chichester Harbour.

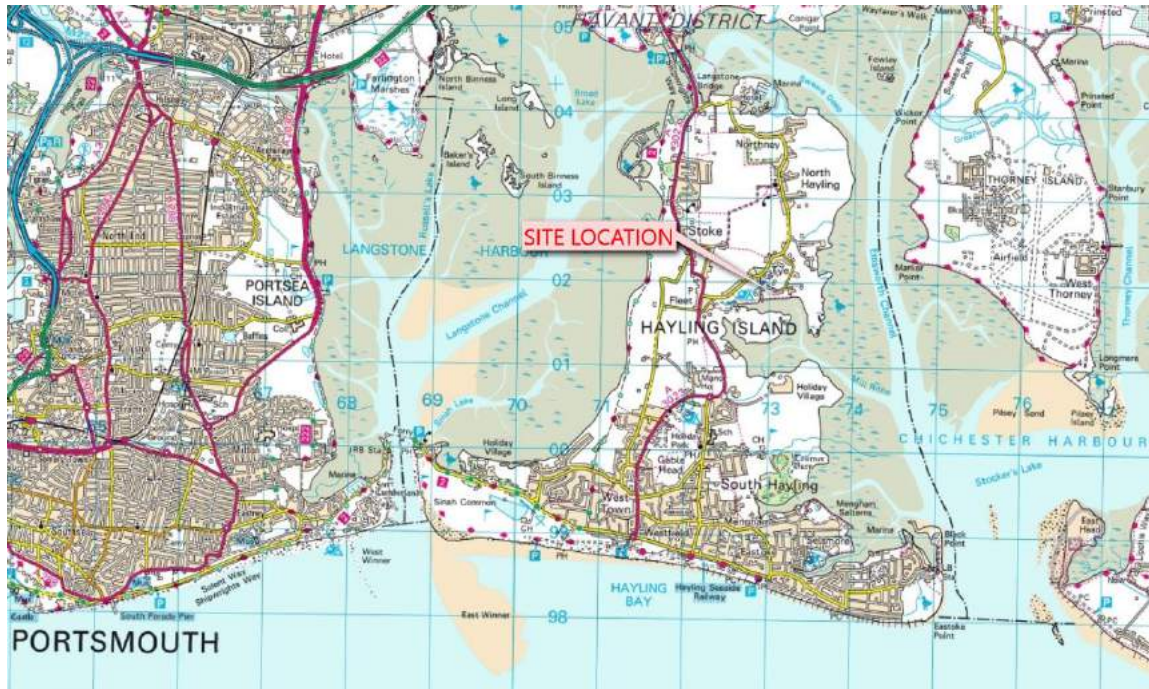


Fig 3.1 Location Plan

3.2 Grid Reference

The approximate Ordnance Survey national grid reference for the centre of the site;

E = 472980, N = 101910.

3.3 Topography and Description of the Site

A detailed topographic survey for the development site has been undertaken by Harris Surveys Ltd in December 2006 and this can be found within Appendix A of this report.

The site is rectangular in shape, approximately 150m in length and 30m in width,

The topography of the overall site slopes from North to South. The northern boundary, where the site is accessed is set at levels around 4.2m AOD. The level of this road is to be raised to allow the construction of the adjacent 6 homes.

The existing dwelling has a threshold level of 4.47m AOD with the rear garden starting at 3.90m AOD. The garden falls further to a level of 2.66m AOD at the southern boundary.

The site is currently occupied a single dwelling with accommodation at the first-floor level.

3.4 Geotechnical Conditions

A site investigation has been undertaken, but a formal copy has yet to be received, at the time of writing.

However informal comments from on-site investigations indicated clayey gravels at a high level with grey/brown clays from approx. 1.0m deep.

It is assumed from this and the existing ponding on the site, that the strata is entirely impermeable, and as such infiltration is not an option open to the site.

3.5 Existing Drainage Description

Existing foul flows generated from the development site discharge in a northerly direction into the adjacent caravan park. From there it is assumed they connect to the 150mm diameter PVC pipe running East to West to the 'Lower Tye' pumping station, located to the West of the access track.

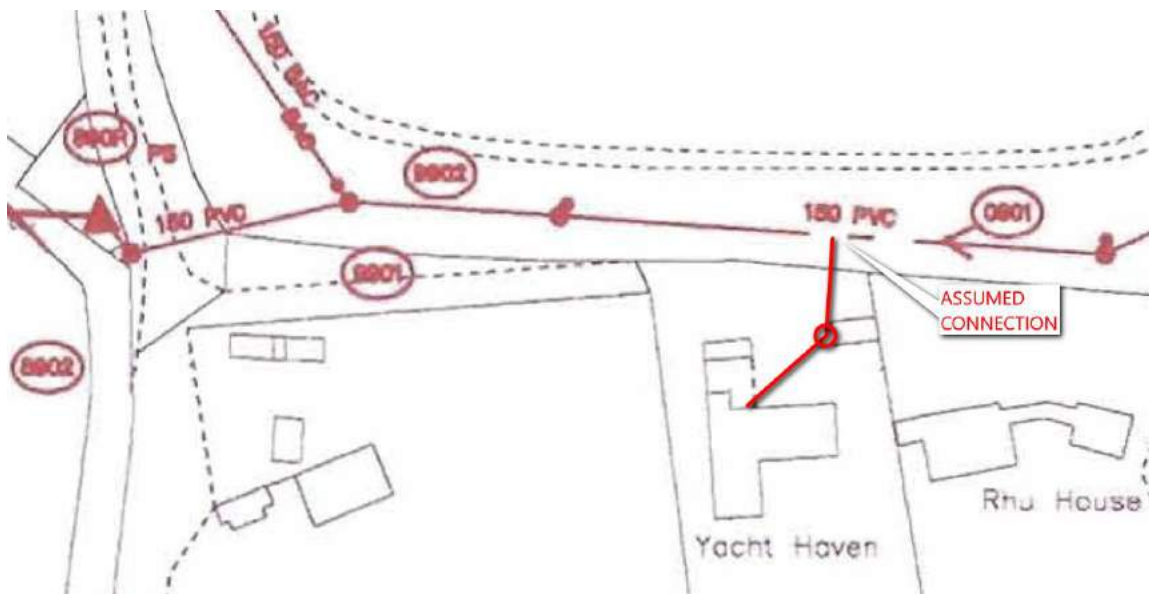


Fig 3.5.1 - Southern Water Sewer Record Extract

Existing surface water discharges to a piped system. The outfall of which could not be substantiated on site. However, it is assumed to discharge in to the on-site pond and French drain system, visible on the below aerial photograph:



Fig 3.5.2 – Aerial Photograph showing French drain



Fig 3.5.3 – Photograph showing French drain outfall

3.6 Local Rivers and Water Courses

The nearest main river watercourse to the development site is to the East, shown in blue on the below map, supplied by the Environment Agency.



Fig 3.6 – Local Watercourses

This is not shown to pose any risk to the development itself on the EA flood maps.



3.7 Proposed Development

It is proposed to demolish the existing 2 story dwelling and replace with a new 2 storey dwelling and detached indoor swimming pool. The footprint of the proposed dwelling is much the same as the existing dwelling with slight increase in size from 227m² to 260m².

In addition to this there is also a proposed to be 41m² garage and 158m² detached pool house. As the additional flows from these will discharge to the harbour, the increased flow rate from site will have a negligible impact on surrounding flood risk.

The access driveway will be realigned and reshaped to suit the new dwelling.

A copy of the site master plan and floor plans can be found within Appendix B of this report.

4.0 Flood Risk Policy

4.1 Environment Agency Flood Map

The development site is situated in the Environment Agency Solent and South Downs Region and their Flood Zone maps for the area indicate fluvial flooding extents.

The flood map for the development site shown below suggests that the southern extents of the site falls within Flood Zone 3, which is defined as land assessed as having a greater than 1 in 200 annual probability of tidal flooding in any one year.



Fig 4.1 – Environment Agency Flood Zone map

4.2 The National Planning Policy Framework

The National Planning Policy Framework and the accompanying Planning Practice Guidance gives direction for development with respect to flooding. These documents promote a sequential approach in order to encourage development away from areas that may or are susceptible to flooding. In doing so it categorises Flood Zones in the context of their probability of flooding, as shown in the table within Section 4.3 overleaf.

4.3 Flood Zone Definition

The National Planning Policy Framework Definition of Flood Zones

Flood zone	Fluvial	Tidal	Probability of flooding
1	< 1 in 1000 year	<1 in 1000 year	Low probability
2	Between < 1 in 1000 year and 1 in 100 year	Between <1 in 1000 year and 1 in 200 year	Medium Probability
3a	> 1 in 100 year	> 1 in 200 year	High probability
3b	Either > 1 in 20 or as agreed between the EA and the LPA	Either > 1 in 20 or as agreed between the EA and the LPA	Functional flood plain

4.4 Flood Zones – Table 1 NPPF

(Note: These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences)

Zone 3a - High Probability
Definition
This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Appropriate uses
The water-compatible and less vulnerable uses of land in (Table.2 NPPF) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable uses and essential infrastructure can be permitted in this zone if the Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in time of flood.
FRA requirements
All development proposals in this zone should be accompanied by a FRA.
Policy aims
In this zone, developers and local authorities should seek opportunities to: Reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques, and relocate existing development to land with a lower probability of flooding.

4.5 Flood Risk Vulnerability Classification – Extract from Table 2 NPPF

More Vulnerable

- Hospitals.
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels.
- Non-residential uses for health services, nurseries, and educational establishments.
- Landfill and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, **subject to a specific warning and evacuation plan.**

4.6 Flood Risk Vulnerability & Flood Zone Compatibility Table

Vulnerability classification flood zone	Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
1	√	√	√	√	√
2	√	√	Exception test required	√	√
3a	Exception test required	√	x	Exception test required	√
3b	Exception test required	√	x	x	x

√ Development is appropriate x development is not appropriate

The above table, taken from NPPF (table 3), confirms that residential properties within Flood Zone 3 require an exception test.

4.7 Other Flooding Mechanisms

In addition to the potential for assessing flooding from fluvial and tidal sources, the National Planning Policy Framework also requires that consideration is given to other mechanisms for flooding -

Flooding from land – intense rainfall, often in short duration, that is unable to soak into the ground or enter drainage systems, can run rapidly off land and result in local flooding.

Flooding from groundwater – occurs when water levels in the ground rise above the surface elevations.

Flooding from sewers – in urban areas, rainwater is frequently drained into surface water sewers or sewers containing both surface and waste water sewers known as combined sewers. Flooding can result causing surcharging when the sewer is overwhelmed by heavy rainfall.

Flooding from reservoirs, canals, and other artificial sources – non-natural or artificial sources of flooding can result from sources such as reservoirs, canals lakes etc., where water is held above natural ground levels.

4.8 Environment Agency Groundwater and Aquifer Protection

Reference to the Environment Agency Groundwater protection zone map shows the area is sited outside all groundwater protection zone. The Environment Agency have defined Source Protection Zones (SPZs) for groundwater sources such as wells, boreholes, and springs used for public drinking 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.

The Environment Agency use the zones to set up pollution prevention measures in areas which are at a higher risk, and to monitor the activities of potential polluters nearby.

4.9 Exception Test

The Exception Test is an additional test to be applied by decision-makers following application of the Sequential Test. The Exception Test is a series of three criteria as shown below, all of which must be satisfied for development in a flood risk area to be considered acceptable. For the Exception Test to be passed:

- a) It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk,
- b) The development should be on developable previously developed land or, if not, it must be demonstrated there is no such alternative land available; and
- c) A FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere, and, where possible, reducing flood risk overall.

4.9.1 Benefit to The Community

The current dwelling is currently in a state of disrepair and refurbishment is unlikely to be economically viable. The proposed dwelling will be much more fitting with the larger properties in the area.

4.9.2 Previously Developed Land

The existing property is in disrepair, outdated and in need of modernising. The proposed development gives a slight increase in impermeable areas within the site boundary, however, as this drains indirectly to the sea, the increased flows are inconsequential. As the proposed dwelling is a replacement dwelling on an existing site, this part of the exception test is satisfied.

4.9.3 Flood Risk

The use of SUDS will provide an effective method of managing surface water from the site, without adversely affecting the local catchment. The on-site French drain system will be increased in size to accommodate the existing flows.

Although the site is shown to be within Flood Zone 3a, closer analysis of this shows the boundary of the Flood Zone to be contained at the bottom of the garden, adjacent to the harbour. This Flood Zone is tidal and likely to increase as sea levels rise, because of this the estimated flood levels of for 2115 have been used to guide the development, giving a flood level of 4.5m. The proposed dwelling is located in the same position as the existing property and set on ground 600mm higher than the design flood level for a 1 in 200-year event, in the year 2115. This allow the proposed development to account for the expected climate change plus an anticipated wave height of 600mm, which due to the sheltered nature of the cove, this is seen to be the likely peak wave height. The proposed finished flood levels are illustrated on drawing

'ICS-2441-03-P01' (Appendix F).

As the proposed dwelling is set outside Flood Zone 3a and will reduce flood risk to the site and the local catchment, this part of the exception test is satisfied.

4.10 Environment Agency and HCC Flood Maps

The Environment Agency have supplied flood maps and flood level information for the site and adjacent estuary/harbour. See Appendix C for the EA level data, and Appendix A for these levels applied to the site topographic survey.

This Product 4, depth information indicates that there is potential for flooding of the lower parts of the site currently. With the risk increasing to over 95% of the developable site by the year 2115. The PUSH Flood maps available for HCC show this in detail. The levels have been noted on the topographic survey 'ICS_2441_61_P01'



Push – FZ1 &2



Push – FZ1 &2 Climate Change 2025



Push – FZ1 &2 Climate Change 2055



Push – FZ1 &2 Climate Change 2085



Push – FZ1 &2 Climate Change 2115

5.0 Flood Risk to the Development Site

5.1 Flooding from Fluvial Sources

The development site lies mainly within Flood Zone 1, with the exception one section of the garden area adjacent to the estuary which lies within Flood Zone 2 and 3. The proposed development has been sequentially developed to ensure that the proposed dwelling is located on higher land and contained completely within Flood Zone 1.

Although the lower areas of the site are within Flood Zone 3a, due to the raised ground levels, the property itself is at a low risk of flooding from fluvial sources.

It is the consideration of this FRA that the site has a **HIGH** risk of flooding from fluvial sources. However, the layout developed to ensure that proposed dwelling is located on land associated with Flood Zone 1 and therefore at a **LOW** risk.

5.2 Flooding from Overland Flows to The Site

The topographical survey and general topography of the area shows the development site to slope towards the estuary. Environment Agency data shows no risk of surface water flooding in the area. However due to the cohesive nature of the soils, the garden levels will need to be carefully graded in order to removing low spots and localised ponding of water.

It is, therefore, the consideration of this FRA that the site has a **MEDIUM** risk of flooding from overland flows prior to mitigation works. Suitable grading of the garden area could reduce this to a **LOW** risk.

5.3 Flooding from Rising Groundwater

A ground investigation was not available at the time of writing, however it had been undertaken for this site. Informal comments from the ground investigation company indicated a clay strata which by its nature is unlikely to be subject to fluctuations in ground water levels. Furthermore, the EA ground Water Source protection maps do not show this as an area in which source protection is in place.

It is, therefore, the consideration of this FRA that the site has a **LOW** risk of flooding from rising groundwater levels.

5.4 Flooding from The Local Sewerage Network

The nearest public sewers for the site relate to Southern Water sewers within the adjacent holiday park. We are unaware of any published reports of these sewers surcharging. If sewer flooding were to occur, the flows would be contained within the adjacent site and road before flowing towards the estuary. However as this is an adopted system, this sewer should be adequately maintained and less prone to blockage.

It is, therefore, the consideration of this FRA that the site has a **LOW** risk of flooding by surcharging of the local sewer network.

5.5 Flooding from Reservoirs, Canals & Other Artificial Sources

Review of location plans for the development site show there to be no signs of large manmade water sources within the local area.

It is, therefore, the consideration of this FRA that the site has a **LOW** risk of flooding by reservoirs, canals or other artificial sources.



6.0 Flood Risk as a Result of the Development

6.1 Effect of The Development Generally

Development by its nature usually has the potential to increase the impermeable area with a resultant increased risk of causing rapid surface water runoff to watercourses and sewers, thereby causing surcharging and potential flooding. There is also the potential for pollutants to be mobilised and consequently flushed into the receiving surface water system.

Increases in both the peak runoff rate (usually measured in litres per second l/s) and runoff volume (cubic metres m³) can result.

6.2 Surface Water Drainage & Sustainable Drainage Systems

Sustainable Drainage techniques (SUDS) covers a range of approaches to manage surface water runoff so that-

'Surface water arising from a developed site should, as far as is practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account. This should be demonstrated as part of the flood risk assessment.'

7.0 Assessment of SuDS Hierarchy

A hierarchical approach has been undertaken in consideration of the application of SuDS in relation to the development. This is in order to meet the design philosophy of ensuring that surface water run-off is managed as close to its source as possible and the existing situation is replicated as closely as possible.

The following drainage hierarchy has been undertaken with reference to the procedures set out in the SuDS Manual (CIRIA C753, 2015) to assess the viability of the application of SuDS techniques to this scheme:

1. store rainwater for later use
2. use infiltration techniques, such as porous surfaces in permeable strata areas
3. Attenuate rainwater in ponds or open water features for gradual release to a watercourse.
4. attenuate rainwater by storing in tanks or sealed water features for gradual release to a watercourse,
5. [discharge rainwater direct to a watercourse](#)
6. discharge rainwater to a surface water drain
7. discharge rainwater to the combined sewer.

The sustainable drainage hierarchy shown above is intended to ensure that all practical and reasonable measures are taken to manage surface water higher up the hierarchy (1 being the highest) and that the amount of surface water managed at the bottom of the hierarchy is minimised.

Sustainable urban drainage systems have been considered for this development unless there are practical reasons for not doing so. Such reasons include the local ground conditions, rising groundwater, and risk from fluvial flooding.

7.1 Store rainwater for later use

The provision for storing rainwater harvesting can be utilised for both irrigation of landscaping areas and also internal re-use within the building.

Water Butts will be considered for water reuse for the irrigation of the garden area, addressing point 1 of the drainage hierarchy. Rain water harvesting for reuse within the dwelling will be considered.

7.2 Use infiltration techniques in permeable strata

Due to the underlying clay strata, it is assumed that the use of infiltration is not feasible, however, soakage tests in accordance with BRE 365 need to be carried out to confirm this. This testing should occur at the detailed design phase. The purpose of this report is to demonstrate that the site can be drained without increasing flood risk to the site or elsewhere. For this instance, it has been assumed that there is no infiltration.

As such this report finds item 2 of the drainage hierarchy unsuitable given the constraints of the development site.

7.3 Attenuate rainwater in ponds for gradual release

It is the intention to mirror the existing situation. Slowing flows from site into the watercourse via the existing French drain system.

7.4 Attenuate rainwater by storing in tanks for gradual release

See section 7.3.



7.5 Discharge rainwater direct to a watercourse

The flows from site are intended to discharge to the adjacent watercourse via the existing French drain.

7.6 Discharge rainwater to a surface water/drain

There are no existing Southern Water surface water sewers in the vicinity of the development site, so this technique has been discounted.

7.7 Discharge rainwater to a combined water/drain

There are no existing Southern Water combined water sewers in the vicinity of the development site, so this technique has been discounted.

8.0 Proposed Drainage Strategy

8.1 Drainage Strategy & Design

The information below is not intended to provide a definitive solution to the drainage associated with the development site but to outline the design intent and ensure that a suitable solution is feasible within the constraints of the development site and development proposals. Reference should be made to the strategic drainage arrangement drawing listed within Appendix F of this report.

The investigations on site to date have substantiated that the existing foul flows generated from the development site discharge in a northerly direction and join the adopted foul water sewer within the adjacent holiday park. It is proposed to utilise the same connection to the Foul Water Sewer.

The surface water associated with the site primarily discharges unrestricted to the harbour via an on-site French drain system which runs through the middle of the garden, then along the southern boundary to the harbour.

8.2 Proposed Foul Water Strategy

Because the replacement dwelling is to be situated in the same location as the existing dwelling, it is proposed to utilise the existing chambers and pipework, making new connections where necessary. The existing connection discharges into the Southern Water Public Foul sewer within the adjacent holiday park. There is no increase in the number of bedrooms within the development, therefore no increase in flows to the Foul Sewer. Southern Water should be consulted to see whether a Section 106 agreement is required for the works.

8.3 Proposed Surface Water Strategy

The site is being redeveloped and as such a new drainage system will be incorporated into the design.

Due to the underlying clay strata, it is assumed that the use of infiltration is not feasible, however, soakage tests in accordance with BRE 365 need to be carried out to confirm this. This testing should occur at the detailed design phase. The purpose of this report is to demonstrate that the site can be drained without increasing flood risk to the site or elsewhere. For this instance, it has been assumed that there is no infiltration.

It is proposed that the new development utilise the current French drain network to drain the site to the harbour. Mirroring the existing situation. Due to the small increase in flows from site, and the discharge into a tidal watercourse, the impact on off-site flood risk will be negligible.



9.0 Flood Improvement Measures

Flood levels from the Environment Agency for the 1 in 200-year event tidal flood vary due to climate change from 3.3m AOD in 2011 to 4.5m AOD in 2115. For the purposes of this report we will take the highest of these.

Finished floor levels for the ground floor will be set at 5.1m AOD, 600mm above the highest flood risk modelled for the site to give an allowance for wave height.

10.0 Flood Warning and Dry Route of Escape

10.1 Flood warning in relation to the Site

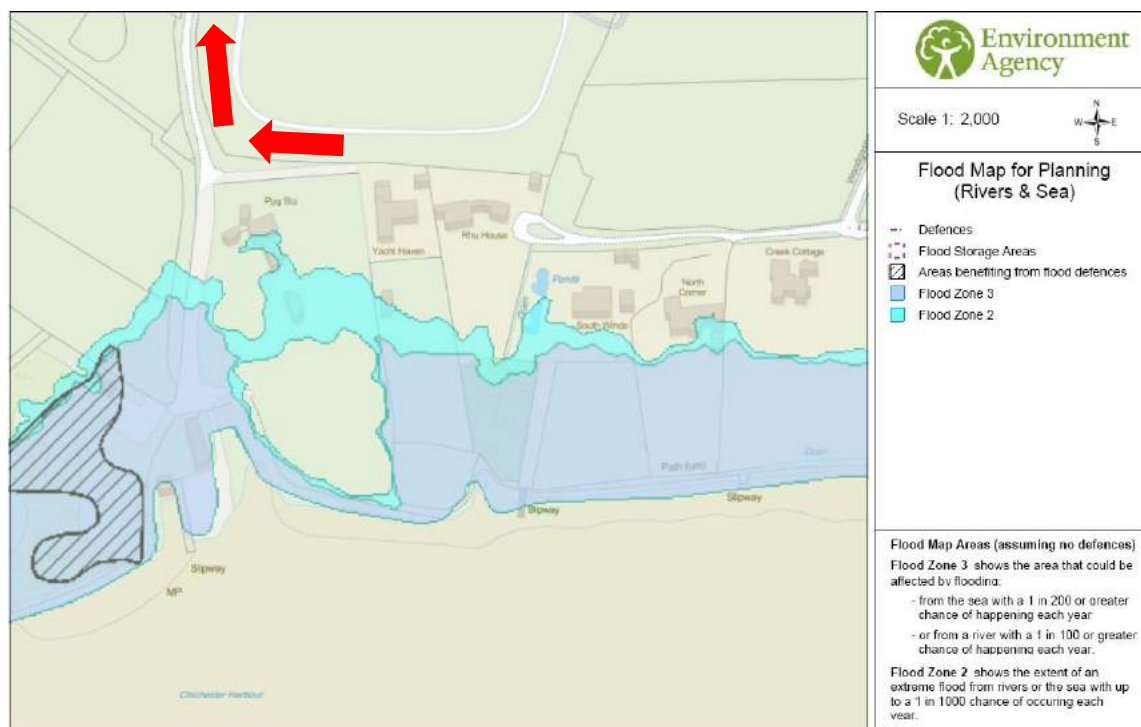
As a precautionary measure, it is recommended that the owner of the property signs up to the Environment Agency's Flood line service for either telephone, mobile, email SMS text message which gives warning of potential flooding events. Environment Agency operates a flood watch scheme called Floodline **0845 988 1188** (24-hour service) or Type talk 0845 602 6340.

10.2 Dry Access, Egress, and Escape

The only official access to the site is via a private Road to the front of the site, which currently lies within Flood Zone 1.

It is understood that in line with the planning permission for the site adjacent, that the level of this access is to be raised to a minimum of 4.250m to allow the minimum of 250mm flooding of the road in an extreme flood situation. This will need to be carried out prior to occupation on the new dwelling.

Based on the Environment Agency flood maps, the shortest route to an area in Flood Zone 1 is to utilise the existing access road.



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Figure 10.2 - Suggested route to Flood Zone 1

Table 4 'Hazard to People' (Appendix E) classifies a 250mm depth of flooding with 0.3m/s velocity to have a hazard rating of 0.69. This is classified as having a very low hazard. With the Emergency planning noted in section 11.0 of this report and the proposed development being higher than the extreme flood it can be shown that the dwelling would provide a safe haven should such a flood occur.

11.0 Emergency Planning

11.1 Awareness

Whilst the development is identified by the EA as subject to potential flooding for storms greater than the 1 in 200 plus climate change storm event. The Agency operates a flood watch scheme called Floodline discussed in section 10.1. In many places, the Agency can warn interested parties by either telephone, mobile, email, SMS text message or fax of a potential flood up to six hours in advance.

11.2 Equipment

The preparation of a flood kit is essential for instances when evacuation is required. This kit will also be useful for general emergency situations and should be stored for general emergency situations and be easily accessible if flooding occurs. These items should include:

- A torch
- Blankets or a sleeping bag, warm clothing and waterproofs
- A first-aid kit, including a supply of any essential medication
- A list of useful telephone numbers
- A supply of bottled water
- A stock of non-perishable food items
- A portable radio and supply of batteries
- Children's essentials (milk, baby food, sterilised bottles and spoons, nappies, wipes, nappy bags, clothing, comforter, teddy.
- Food and accommodation (cages) for pets (If allowed within the hotel)
- Wellington boots or similar waterproof boots
- Check your insurance cover – ensure it covers flood damage
- Know how to turn off the gas, electricity, and water mains supplies
- Think about what items you would want to move to safety during a flood

11.3 Flood Watch

On receipt of the Flood Watch warning from the Environment Agency, or from other sources, e.g. TV, Radio, local contacts.

- Flooding is possible, and the situation could worsen.
- Flood watch means – “Flooding of low lying land is expected. Be aware,
- Be prepared, Watch out.

When a flood watch warning is issued, residents should:

- Be aware of water levels and whether the river is rising or falling
- Reconsider travel plans
- Listen and watch for weather and flood warnings on local radio and television stations
- Contact Floodline on **0845 988 1188**
- Check that the flood kit has been prepared
- Copy vital hard copy and electronic records and store them in a safe place. This includes financial and insurance records.
- Keep a store of plastic bags (grocery bags are fine) to place around the legs of furniture when you receive a flood warning.
- At this stage, residents should ensure that their neighbours are aware of the Flood Watch alert in case they are not subscribed or did not receive the alert.

11.4 Severe Flood Warning

A flood evacuation should be implemented as a matter of urgency when a Severe Flood Warning is issued. Severe Flood Warning means severe flooding is now expected. There is



extreme danger to life and property and people are advised to act immediately, i.e. evacuate.

The Agency aim to provide at least 2 hours warning between the Flood Warning alert being issued and the commencement of flooding. The Agency recommends that residents should evacuate when a Flood Warning or Severe Flood Warning status is issued.

If flood levels continue to rise, residents are advised to evacuate before safe access is lost. At this level driving through flood water may become hazardous and residents must evacuate beforehand.

Residents should monitor the flood progression and evacuate, on foot, as soon as possible. Should the flood levels be higher than 100mm, residents should utilise the safe haven (dwelling) until such time that the flood waters subside.

11.5 All Clear

All clear means that flood watches or warning are no longer in force in this area.

- Keep listening to weather reports
- Only return to evacuated buildings if you are told it is safe
- Beware sharp objects and pollution in flood water.

Residents should contact the local authority to check that it is safe to return to their property. Residents should be aware that if floodwaters have entered the property it will need to be cleaned, disinfected and repaired and fully dried out prior to reoccupation. Check that the building is safe before entering, and if there are any doubts professional opinion should be sought. If there is any doubt that appliances may be water damaged they must be checked before switching the power or gas back on. Contact your insurance company as soon as possible to get their approval before arranging any clean-up or repairs.

12.0 Conclusion

The Environment Agency requires that for all sites, the following surface water flood risk principles have been followed. Based on the strategy within this report all of the following have been met.

- That surface water runoff from the development will not increase flood risk to the development or third parties.
- That an allowance for climate change has been incorporated, which means adding an extra amount to peak rainfall, which relates to the lifetime of the development.
- That the residual risk of flooding has been addressed should failure or exceedance of the drainage system occur. This could include measures to manage residual risk such as raising ground or floor levels where appropriate.

Furthermore, the development itself has achieved:

- Construction techniques that will mitigate against flood risk.
- A reduction in surface water runoff from the site will help reduce flood risk downstream.

Therefore, in line with the recommendations of the National Planning Policy Framework, the development site lies within land classified as Flood Zone 3, which is considered at a high risk of flooding, and therefore development of this nature need to pass an exception test. Having discussed the proposed development and flood mitigation measures, it has shown that the development:

- a) provides wider sustainability benefits to the community that outweigh flood risk,
- b) is on previously developed land,
- c) will be safe, without increasing flood risk elsewhere, and, where possible, reducing flood risk overall.

The benefits of redeveloping in this manner are such that development of this type should be considered as appropriate.



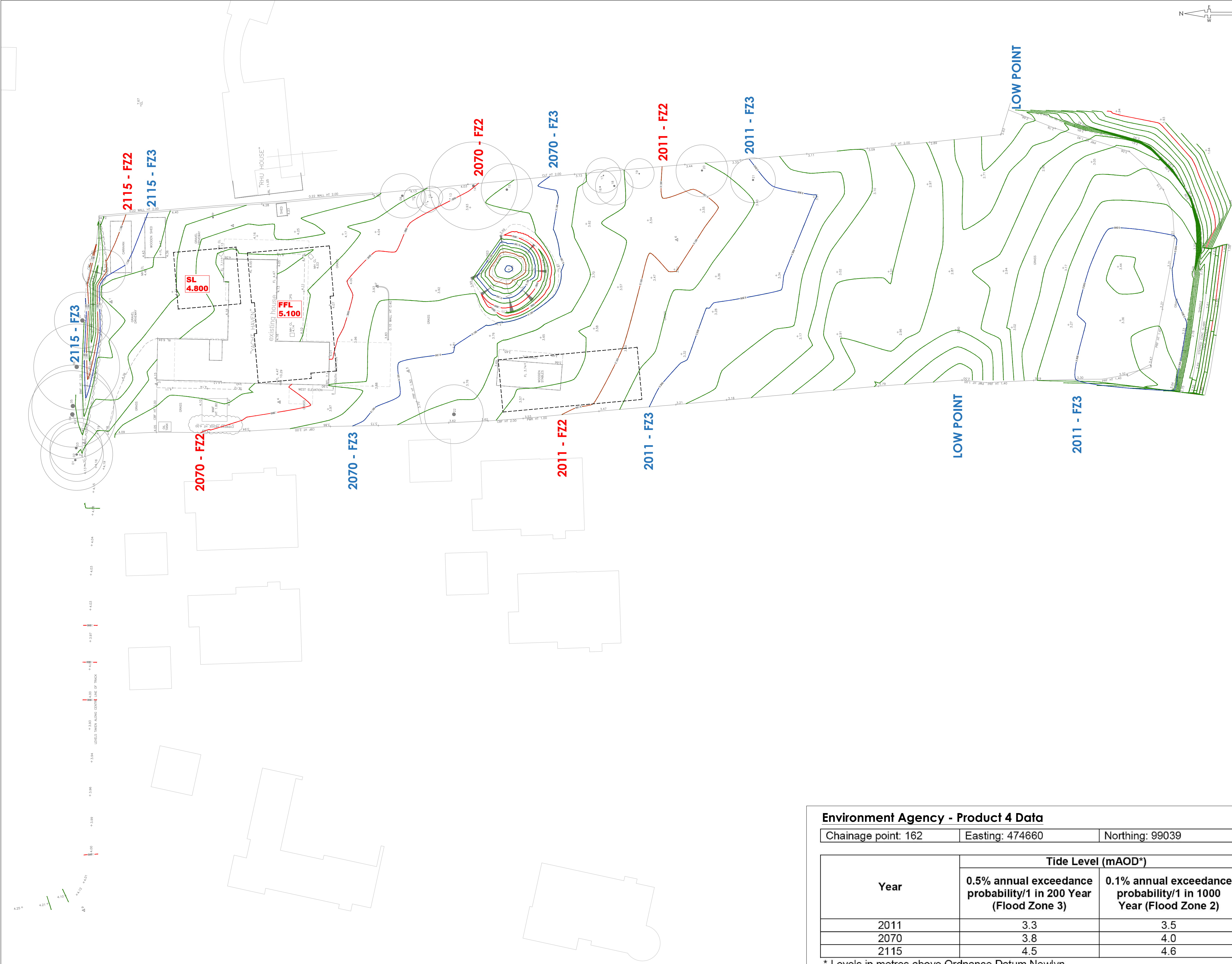
References & Bibliography

- The National Planning Policy Framework March 2012
- Planning Practice Guidance.
- Code for Sustainable Homes - Department of Communities and Local Government. Revised February 2008.
- Environment Agency - Rainfall-Runoff Management for Developments
- Environment Agency indicative flood maps <http://maps.environment-agency.gov.uk>
- Environment Agency indicative groundwater source protection zone maps <http://maps.environment-agency.gov.uk>
- Environment Agency indicative Aquifer designation maps <http://maps.environment-agency.gov.uk>
- CIRIA 2007, The Sustainable Drainage Systems (SUDS) Manual C697
- CIRIA 2015, The Sustainable Drainage Systems (SUDS) Manual C753
- Sewers for adoption 6th Edition and interim guidance prior to the introduction of sewers for adoption 7th edition WRC
- Flood Warning information <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>
- Environment Agency - Adapting to Climate Change: Advice for the Flood and Coastal Erosion Management Authorities March 2016
- Flood Risk Assessments: Climate Change Allowances <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>
- Surface Water Management Plan for Eastleigh Borough – Hampshire County Council December 2012
- PUSH Strategic Flood Risk Assessment – Atkins 2007
- Flood risk assessments: climate change allowances - Environment Agency Updated 12 April 2016.



Appendix A – Site Topographic Survey

(Including EA Flood Levels)



SURVEY INFORMATION
Survey Company - Harris Surveys LTD
DRG NUMBER: 06579
DATE RECEIVED: 14/02/2017

ARCHITECT SITE PLAN INFORMATION
ARCHITECT PRACTICE - Unknown
DRG NUMBER: P16-082-01-02-002
DATE RECEIVED: 14/02/2017

NOTES

- All dimensions and levels are in metres unless otherwise noted
- This drawing is to be read in conjunction with the relevant Architect's/Engineer's drawings, specifications and CDM documentation
- This drawings has been produced electronically and may have been photo reduced or enlarged when copied. Work to figured dimensions only (DO NOT SCALE). All dimensions to be checked on site. Any errors or omissions to be reported to the engineer immediately.
- This drawing contains coloured lines / information that may not be clear if reproduced in black and white.
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DESIGNERS CDM NOTE - RESIDUAL RISKS NOT IDENTIFIED

The design Engineer(s) have assessed this design as the scheme has been developed in order to identify if there are any residual risk hazards (i.e. unusual, unexpected, abnormal or difficult).

No residual risks have been identified for this scheme and therefore no entries were added to the risk register.

This statement assumes that a competent Contractor with the appropriate qualified staff will be employed for the works, and that they will be familiar with site wide construction risks and hazards that they can reasonably be expected to encounter as part of their work.

EA Flood Zone 2 - Extent of extreme flood (FZ2)
The extent of an extreme flood (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.

EA Flood Zone 3 - Flooding from rivers or sea (FZ3)
Flooding from rivers or sea without 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.

PO1	SNN	RJW	Initial Issue	17/01/17
Rev	Drawn by	Chk'd by	Comments	Date

DRAWING TITLE
EA Flood Zones 2 & 3 Plan
Product 4 Data

PROJECT
Yacht Haven House,
Copse Lane,
Hayling Island,
PO11 0RH

DESIGNED BY RJW	DRAFTED BY SNN	APPROVED BY DJ
DATE 17/01/2017	STATUS INFORMATION	
SCALE 1:500 @ A1		

CLIENT
Barclay Philips

Infrastruct CS Ltd

JOB NUMBER ICS-2441	DRAWING NUMBER 61	REVISION P01
------------------------	----------------------	-----------------

Environment Agency - Product 4 Data

Chainage point: 162	Easting: 474660	Northing: 99039
---------------------	-----------------	-----------------

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)
2011	3.3	3.5
2070	3.8	4.0
2115	4.5	4.6

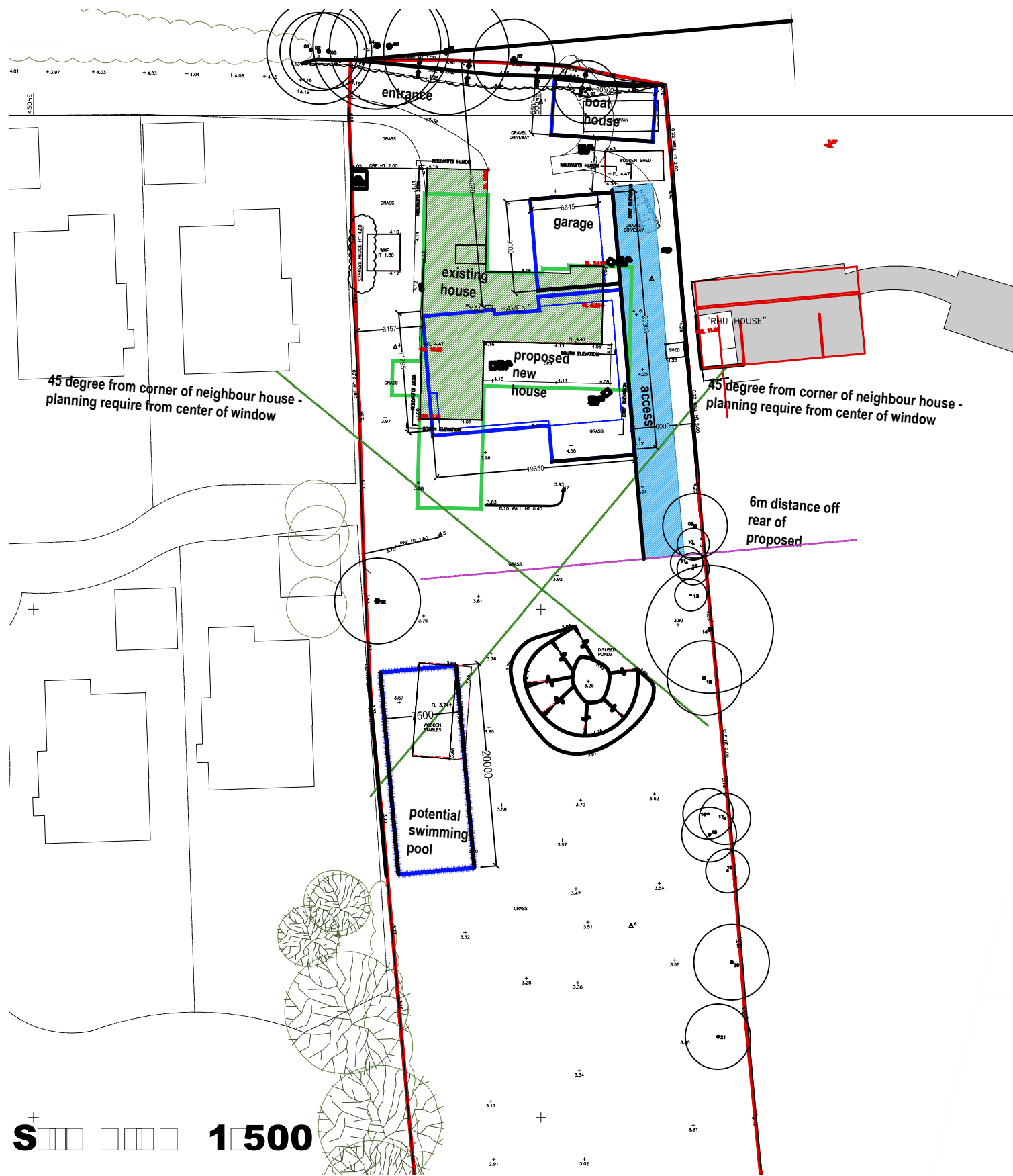
* Levels in metres above Ordnance Datum Newlyn.



Appendix B – Master Plans and Floor Plans

Yacht Haven, Hayling Island

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Key

- proposed location of rear of proposed
- proposed location of rear of proposed
- proposed house
- potential access route
- existing house

TREE SCHEDULE

No	Species	BoleØ	SpreadØ	Ht
01	OAK	0.30	8.0	8.0
02	OAK	0.30	8.0	8.0
03	OAK	0.35	10.0	7.0
04	OAK	0.60	12.0	11.0
05	OAK	0.60	12.0	11.0
06	OAK	0.60	12.0	10.0
07	OAK	0.60	8.0	8.0
08	OAK	0.20	6.0	6.0
09	HAWTHORN	0.30	6.0	5.0
10	HAWTHORN	0.10	3.0	5.0
11	HAWTHORN	0.10	3.0	5.0
12	HAWTHORN	0.10	3.0	5.0
13	HAWTHORN	0.10	3.0	5.0
14	OAK	0.35	12.0	8.0
15	WILLOW	0.30	7.0	7.0
16	HAWTHORN	0.15	5.0	5.0
17	CYPRESS	0.15	5.0	7.0
18	HAWTHORN	0.25	5.0	5.0
19	CYPRESS	0.15	4.0	7.0
20	OAK	0.25	7.0	8.0
21	OAK	0.25	6.0	6.0
22	CYPRESS	0.50	8.0	8.0

DRAFT 9-
14.02.17

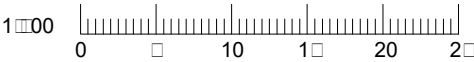
REVISIONS:

barclay+phillips
architects

The Studio, 5 Oakridge Office Park, Southampton Road, Whaddon,
Salisbury, Wiltshire, SP5 3HT.
Email: enquiries@barclay-phillips.co.uk

PROJECT:
Proposed new dwelling at Yacht Haven, Course Lane,
Hayling Island, PO11 0RH
CLIENT:
Mr & Mrs Walters

DRAWING TITLE:
Proposed sketch plan



SCALE:
1:100

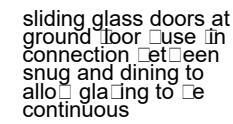
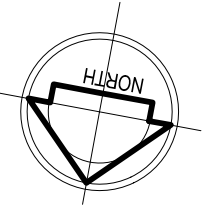
DATE:
NOV 2017

DRAWING No.
P1002
0102002

DRAWN BY:
N

CHECKED BY:

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fixed glazing
set in room
first floor
above

large glazed double doors to allow views from entrance through building to exterior

amil bathroom

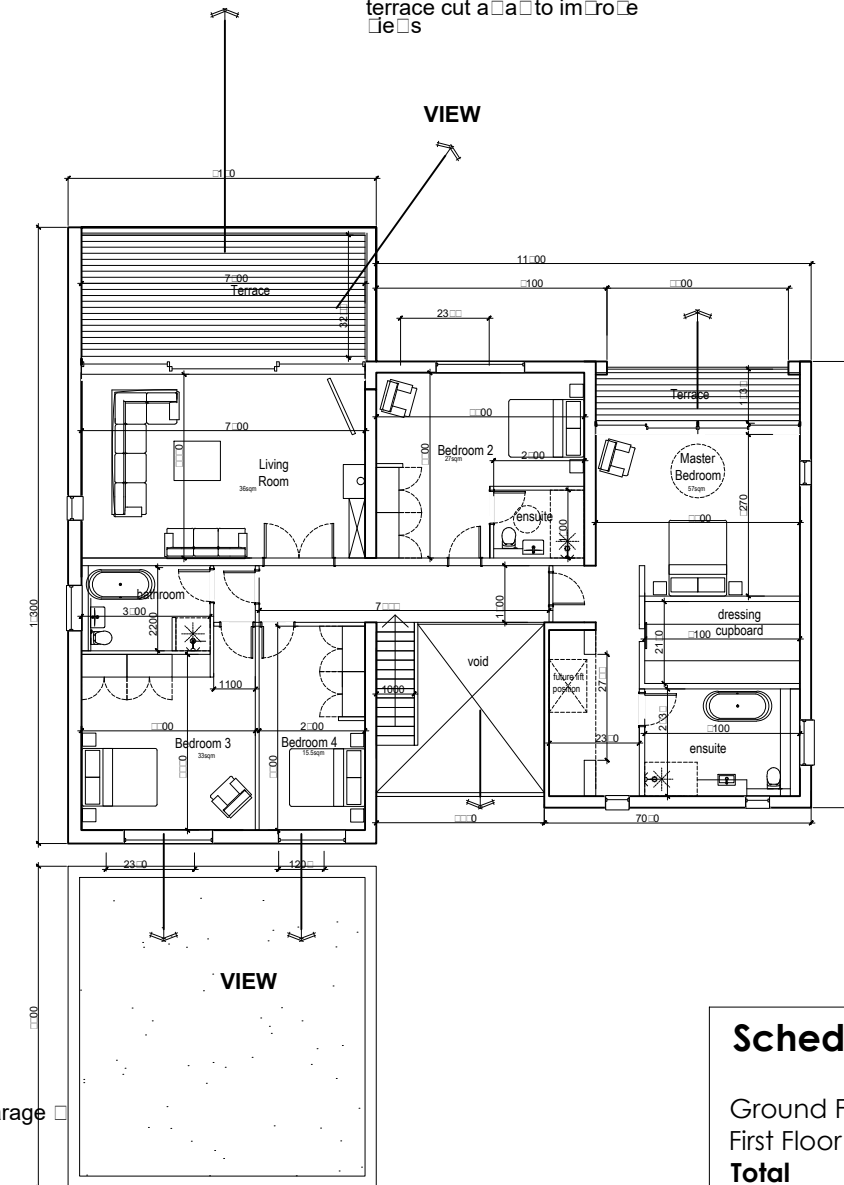
larger entrance loooo with
stairs running uo side oo
oo all and cooer oox

low storage accessed
from entrance includes
space for future lift

2 store□gla□ing

ie's rom to o'stairs
through gla'ed doors out to
ie'

cooer oxocorner oo
terrace cut aoaoto imorooe
oeos



Bedroom with access to terrace

Private terrace for master
bedroom with solid doors

circular rooftop

□athroom and dressing
space could s□a□ around to
im□ro□e la□out

☐ All doors full height to emphasise flow of space from room to room and light

Ground Floor	189 sqm /2033sqft
First Floor	192 sqm /2066sqft
Total	381sqm/4099sqft

(excludes terraces)	
Garage	53sqm/538sqft

Total

F ☐ ☐ ☐ ☐ ☐ ☐ **r** ☐ ☐ ☐

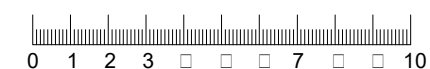
REVISIONS:

**DRAFT 7 -
13.02.17**

PROJECT:
Proposed new dwelling at 148t Haenloose Lane
Hauling Island P011 0RH

CLIENT:
Mr ☐ Mrs Walters

DRAWING TITLE:
Proposed Floor Plans



SCALE:
1 200 3
1 100 1

DATE:
NO 201

DRAWING No.
P102
0103001

DRAWN BY:
N□

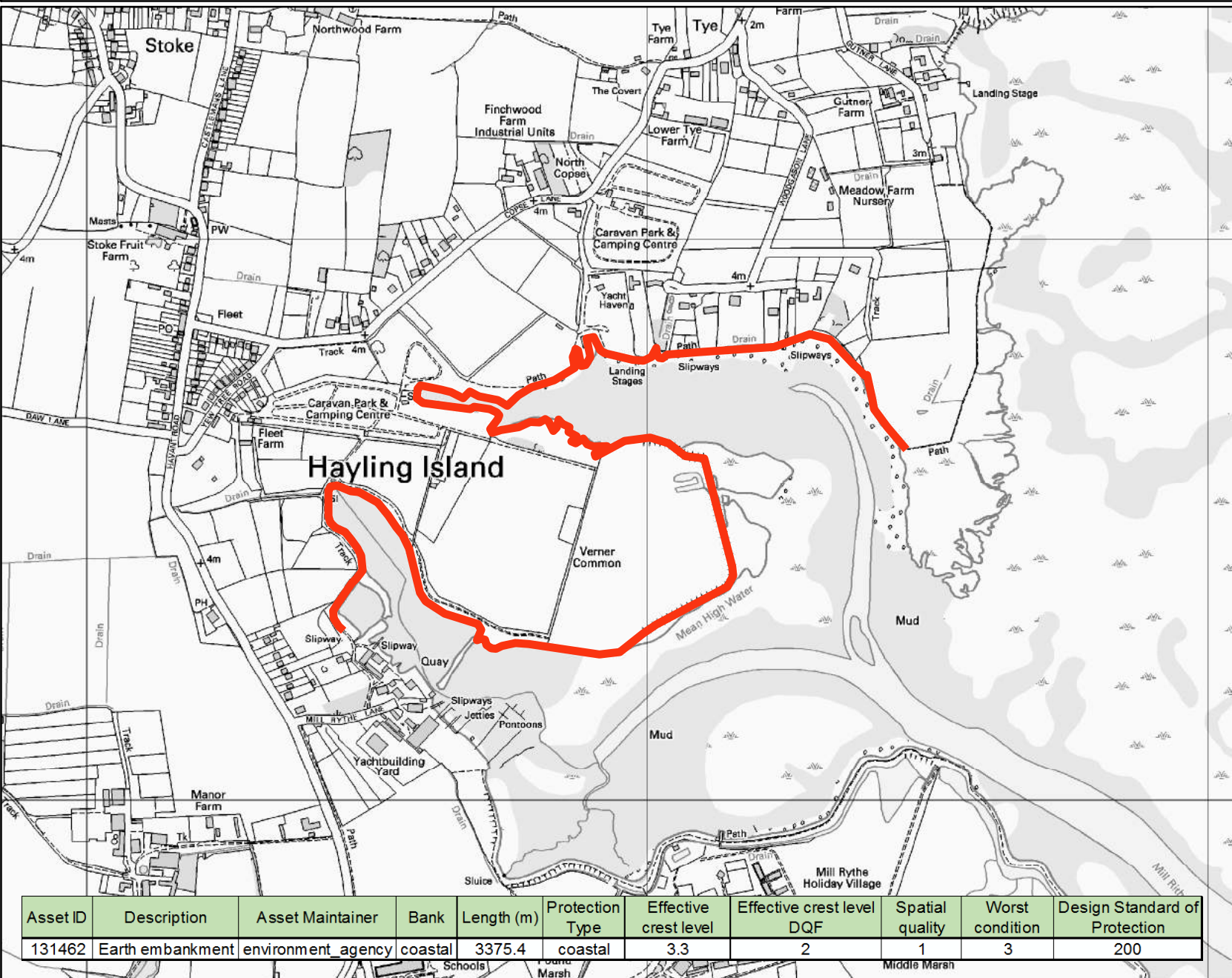
CHECKED BY:

The Studio, 5 Oakridge Office Park, Southampton Road, Whaddon,
Salisbury, Wiltshire, SP5 3HT. Tel: +44 (0) 1722 711177.
Email: enquiries@barclay-philips.co.uk www.barclay-philips.co.uk



Appendix C – EA Flood Data

Defence Location Map



Legend

GEOM_002

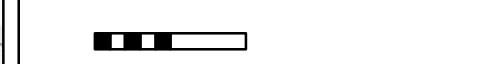
— <all other values>

ASSET_ID

131462

1:10,000 * 

*when printed at A4.



Metres	Fish
0	0
50	20
100	40
150	60
200	80

Metres

Asset ID	Description	Asset Maintainer	Bank	Length (m)	Protection Type	Effective crest level	Effective crest level DQF	Spatial quality	Worst condition	Design Standard of Protection
131462	Earth embankment	environment_agency	coastal	3375.4	coastal	3.3	2	1	3	200

Risk of flooding from Surface Water



Scale 1: 3,000



Likelihood of flooding from Surface Water

- High ($\geq 3.3\%$)
- Medium (3.3% - 1%)
- Low (1% - 0.1%)
- Very Low

Likelihood of flooding from Surface Water

- High:** Greater than or equal to 3.3% (1 in 30) chance in any given year
- Medium:** Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) chance in any given year
- Low:** Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance in any given year
- Very Low:** Less than 0.1% (1 in 1,000) chance in any given year

This information is shown on the Risk of Flooding from Surface Water map on our website.

richard@infrastructcs.co.uk

Our ref: SSD/34389

Your ref:

Date: January 26, 2017

Dear Richard White

Provision of Product 4 for Yacht Haven Copse Lane Hayling Island PO11 0RH

Thank you for your request of 11th January 2017 to use Environment Agency data, Product 4 in the development of the Flood risk Assessment. The information is attached.

Further details about the Environment Agency information supplied can be found on the GOV.UK website:

<https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments

<https://www.gov.uk/planning-applications-assessing-flood-risk>

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

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 0.5% chance of flooding annually (1 in 200), ignoring the presence and effect of any flood defences.

The Environment Agency has no record of flooding to this property/area, but not all flooding events are reported to us and further information may be available from Hampshire County Council.

Defences – See attached map. The defences were found to be in Fair condition when we last inspected them in 2012.

Environment Agency

Romsey Depot, Canal Walk, Romsey, SO51 8DU

Customer services line: 08708 506 506

Email: enquiries@environment-agency.gov.uk

www.environment-agency.gov.uk

Coastal Boundary Data

The Environment Agency holds data about extreme sea levels around the coast of England, Wales and Scotland.

Sea levels (still water design estimates) 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.

Chainage point: 162	Easting: 474660	Northing: 99039
---------------------	-----------------	-----------------

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)
2011	3.3	3.5
2070	3.8	4.0
2115	4.5	4.6

* Levels in metres above Ordnance Datum Newlyn.

These values are based on 2011 base data, and have been projected for climate change using estimates for sea level rise presented in Table 4 of the Technical Guidance to the National Planning Policy Framework.

Note 1:

Extreme sea level values are for still water sea levels only. Extreme sea level values include the effect of storm surge but do not account for any local increase in sea level that may be induced by onshore wave action. Wave set-up would need to be estimated separately.

Note 2:

Annual exceedance probability describes the likelihood (chance) of being exceeded in any given year.

This information is provided subject to the enclosed *notice*, which you should read.

I hope that we have correctly interpreted your request. Please see the attached Standard Notice or licence for details of permitted use.

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.

If you have any queries or would like to discuss the content of this letter further please call us on 08708 506506.

If you have any queries or would like to discuss the content of this letter further please contact the Partnership and Strategic Overview Team at the Environment Agency.

Yours faithfully

Alex Haydon

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

Email psohiow@environment-agency.gov.uk



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Further context, best practice and guidance can be found in the [UK Government Licensing Framework section](#) on The National Archives website.



Flooding Information Sheet

Flood Insurance - your questions answered

April 2016

The information in this document has been written in partnership by the Association of British Insurers, Flood Re and the Environment Agency.

1. FLOOD RISK INFORMATION

Q1. How can I find out if my property is at risk of flooding?

Water that causes flooding can arise from different sources – e.g. from surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system); overflowing or backing up of sewer or drainage systems which have been overwhelmed; groundwater rising up from underground aquifers; or from overflowing rivers or coastal storm surges.

The Environment Agency publishes maps showing flood risk to areas of land from rivers and the sea, reservoirs and surface water on the internet at www.gov.uk/government/organisations/environment-agency

The maps are called

- Risk of Flooding from Rivers and the Sea
- Risk of Flooding from Reservoirs
- Risk of Flooding from Surface Water

It is important that you check the various maps on the internet to see if you are in an area at risk of flooding from rivers, the sea, reservoirs and surface water, find out what you can do about it, and how the Environment Agency can help.

To find out the Environment Agency's view of the likelihood of flooding from rivers and the sea or surface water in your area, go to the Environment Agency's flood pages on the internet at www.gov.uk/check-if-youre-at-risk-of-flooding. Enter your postcode and click on the Risk of Flooding from Rivers and the Sea map / Risk of Flooding from Surface Water map to bring up the further information.

You can also get this information from the Environment Agency's 24 hour Floodline service on 0345 988 1188 or 0845 9881188 or National Customer Contact Centre on 08708 506506 (Mon to Fri 8am to 6pm) or email enquiries@environment-agency.gov.uk

Q2. What do the maps tell me?

The Risk of Flooding from Rivers and the Sea shows the extent and likelihood of flooding taking into account any flood defences. It has been produced from the Environment Agency's National Flood Risk Assessment. It doesn't show flooding from other sources, such as groundwater, or overflowing sewers. Your local Environment Agency office, Local Authority, Lead Local Flood Authority or Water Company may have more information on these.

The Risk of Flooding from Surface Water map shows the areas that are at risk from surface water flooding, and also provides additional information on flood depth, speed and volume of water.

	The information on flood risk for rivers and the sea and surface water is presented in four flood risk likelihood categories. These are: • High - Greater than or equal to 3.3% (1 in 30) chance in any given year • Medium - Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) chance in any given year • Low - Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance in any given year • Very Low - Less than 0.1% (1 in 1,000) chance in any given year. It is important to remember that the chance of a flood occurring is there at all times – this year, next year and future years. The Risk of Flooding from Reservoirs shows the area that could be flooded if a large reservoir were to fail and release the water it holds. The Environment Agency do not hold information on floor levels, construction characteristics and designs of properties that is needed to be able to say whether flooding of a certain depth would enter into a property and cause damage. Therefore, not all properties in areas shown at risk may flood, but it is important that you check the various maps on the internet to see if you are in an area at risk of flooding from rivers, the sea, reservoirs and surface water, find out what you can do about it, and how the Environment Agency can help.
Q3. What do you mean by the likelihood of flooding?	The likelihood of flooding is described as the chance that a location will flood in any one year. If a location has a 1% chance of flooding each year, this can also be expressed as having: • A 1 in 100 chance of flooding in that location in any year • Betting odds of 100 to 1 against a location being flooded in any year However, this doesn't mean that if a location floods one year, it will definitely not flood for the next 99 years. Nor, if it has not flooded for 99 years, will it necessarily flood this year. When the Environment Agency describe the chance of flooding, they give it one of four descriptions or put it into one of four categories. The lower the percentage then the less chance there is of flooding in any one year; the higher the percentage then the more chance there is of flooding in any one year. An example of chance is: A horse running in the Grand National with odds of 100 to 1 (or 1 chance in 100) has less chance of winning than one running at 30 to 1 (or 1 chance in 30). Similarly if the chance of flooding is 100 to 1 (or 1 chance in 100) then there is less chance of flooding than somewhere believed to have a chance of flooding of 30 to 1 (or 1 chance in 30).
Q4. Your maps shows my property to be at risk of flooding but I have lived here for many years and it has never flooded	The Environment Agency maps show the risk of flooding to land not individual properties, and shows where is at risk, not where has or has not flooded before. For example, there may be locations shown as high risk which have not flooded in the life of a typical mortgage (30 years). Although this means there is greater than a 2 in 3 chance that they would experience flooding during this time it also means that there is nearly a 1 in 3 chance that they wouldn't, which is why you may not have experienced flooding since you have lived there. This does not alter the risk of that location flooding in any given year. The maps should prompt people to be aware and find out more about how they can prepare their property for flooding.

Q5. I live on a second (or higher) floor flat and there is no chance that I will be flooded.	The Environment Agency maps show communities and streets but it cannot show whether individual properties are likely to be flooded. It is a guide to encourage awareness of flood risk among people in low-lying areas, near the coast, rivers and some other watercourses. Even if your own home is not affected the local area could be, so it is important to be aware and prepared. For example it only takes two feet of water to float a car, if the area is flooded you may not be able to get into or out of your home, and your power, gas or water supplies may be interrupted.
Q6. What if I think the flood risk information for my area/property is wrong?	For rivers and the sea flooding information, you should speak to your local Environment Agency office to see if they have more up to date information that has not yet been published, or any more detailed information that may be able to qualify the National Flood Risk Assessment – e.g. anticipated flood water levels which can be compared to the actual floor height of your property. For surface water flooding information you should contact your Lead Local Flood Authority (usually your Local Authority). You may be able to supply your insurer with information specific to your property that shows that the flood risk to your property is less than that applying to the area where it is located e.g: • You may have better topographical information to demonstrate that your property is higher than a particular flood level • You may be able to demonstrate that all occupied areas of the house are situated above these known levels • You can show that your community or you have taken individual action to stop flood water getting into your property or to reduce the damage if it does get in. You can consider asking an independent professional (e.g. members of an appropriate chartered institution such as the Chartered Institution of Civil Engineers, Royal Institution of Chartered Surveyors, Chartered Institution of Water and Environmental Management or the Association of Building Engineers), who is experienced in assessing flood risk for individual properties, to assess the flood risk specific to your property. The Environment Agency is the lead authority in flood mapping and risk assessment, but has no role in determining insurance cover or setting premiums – that is a matter for insurers. However the Environment Agency will take account of evidence from others on flood risk when updating their maps, so please share any information provided to your insurer with your local Environment Agency office. Call the Environment Agency's 24 hour Floodline on 0345 988 1188 or 0845 988 1188 or National Customer Contact Centre on 03708 506 506 (Mon to Fri 8am to 6pm) or email enquiries@environment-agency.gov.uk
Q7. Will I be charged for information and what would it cost?	Lots of flooding information is available on the internet free of charge at www.gov.uk/check-if-youre-at-risk-of-flooding if you require the Environment Agency to undertake a search for any further or specific information relating to the area your property is in and provide a written response. There may be a charge if you are a commercial organisation.
Q8. How often is the flooding information updated?	The Environment Agency plan to update their Risk of Flooding from Rivers and Sea information in Spring 2016 which will focus on locations that have recently benefited from new flood defences, and where they know the risk has changed. The next update to the Risk of Flooding from Rivers and Sea information will be in Summer 2017 that will update the Environment Agency's information for all of

	England. The Environment Agency cannot update the map earlier because they are reviewing it for the whole country and publishing all new information together. Following this, updates will be undertaken when needed and prioritised by where the Environment Agency need to understand more about risk and whether they have new information. You should check the map each year to see if the flood risk in your area has changed. The Environment Agency plan to update their Risk of Flooding from Surface Water information in Spring 2016. All updates are driven by whether Lead Local Flood Authorities have new information available. They aim to update this information at least annually, but this will be driven by what new information is available. The Risk of Flooding from Reservoirs information is planned to be updated by December 2019. This update is driven by changes in legislation. Any future updates will be driven by whether any new information is available.
Q9. The Environment Agency have just built a new defence in my local area which protects my property, but this hasn't been updated on the map. Why is this, and what can I do to show my new level of risk including the new defence?	Once local Environment Agency teams have completed a new defence scheme, they re-run the National Flood Risk Assessment in that location to reflect the change risk of flooding. Updates from across the country are gathered together to complete a bulk update to the Risk of Flooding from Rivers and the Sea information. This means there can be a delay between when a defence is completed and when it is reflected in the map. The Environment Agency plan to update the Risk of Flooding from Rivers and Sea information in Spring 2016 which will focus on locations that have recently benefited from new flood defences, and where they know the risk has changed The next planned update to our Risk of Flooding from Rivers and Sea information will be in Summer 2017. The Environment Agency cannot update the map earlier because they are reviewing it for the whole country and publishing all new information together. If you need evidence that the risk of flooding from rivers and the sea has changed in your area, please request an Insurance Related Request letter by contacting your local Environment Agency office. Future updates will be undertaken when needed and prioritised by where they need to understand more about risk and whether they have new information. You should check the map each year to see if the flood risk in your area has changed.
Q10. Does the Environment Agency hold records of flooding that has happened in the past?	The Environment Agency records the extent of floods from rivers, the sea, and groundwater, where they are aware of flooding and have reasonable confidence in the records. The data is collated into a map called the Historic Flood Map. Where records of historic flooding exist, the dates of flooding will be included in a written response to a request for further information relating to your property (see Q7 for charging information). Just because an area of land is shown outside the extents of recorded flooding does not mean it has never flooded. Equally, just because an area of land is shown as having flooded, this does not mean that any properties within that area actually flooded internally. It is also possible that the pattern of flooding in this area has changed and that this area would now flood under different circumstances. As more data on historic flooding comes to light, and as flood incidents occur, then the Environment Agency will record this where adequate information is available.

Q11. What protection do flood defences / river channels offer?	Flood defences, and the capacity of natural or engineered channels, can provide a level of flood protection to an area. It is important to remember that flood defences can fail or be overtopped during extreme flooding conditions. The Risk of Flooding from Rivers and the Sea map on the Environment Agency's internet site shows the risk of flooding taking into account the location and condition of flood defences. If you wish to find out more about the flood defences in your area, your local Environment Agency office will be able to provide you with more information – telephone the Environment Agency's Floodline on 0345 988 1188 or 0845 988 1188.
Q12. I hear that investigations / improvements are to be carried out in my area. What do you mean by this?	Before the Environment Agency can decide whether to carry out improvements to flood defences or natural river channels, an investigation is required to examine the feasibility of the proposed scheme. This looks at a number of issues including whether improvements to the flood defences would be cost effective. Following a satisfactory investigation stage, improvements may be planned and carried out.

2. HOW FLOOD RISK INFORMATION IS USED BY INSURERS

Q13. What information do insurance companies currently use to assess flood risk?	Insurance companies use a range of data sources including flood maps from the Environment Agency, other commercially developed maps purchased from the private sector and their own claims history when issuing insurance quotes. An increasing number of insurers are taking a more detailed view of whether a property could flood – down to property-level and street-level assessment of risk from fluvial flooding or other types of flooding such as from surface water – which will continue as modelling and mapping improves. There is no blanket approach taken by the insurance industry when issuing insurance quotes to consumers. The ways insurer's price premiums are individual commercial decisions made by insurers and it is part of a competitive market. Insurers can access the same information on river and sea, reservoir and surface water flood risk, and defences as you can access on the Environment Agency's website. The Environment Agency has no role in determining insurance cover or setting premiums. Insurers are free to use whichever data they like to determine whether to offer insurance and at what price. Furthermore, insurers may be open to receiving additional information about an individual property's flood risk from reliable sources, e.g. independent survey or flood risk assessment. The frequency that insurers update their systems with Environment Agency data, if they choose to use it, depends on their policies and capability for updating their systems.
Q14. I live in a flood risk area. What insurance cover will I be offered on my property?	In April 2016 the Flood Re scheme began. • The scheme enables participating insurers to pass the flood risk element of any home insurance policy to Flood Re. • The insurer will be charged a sum dependent on the property's council tax band for the flood risk element of the cover Flood Re • Insurers will continue to set the premiums they charge to their customers for home insurance, taking into account this flood risk, and other factors in the

	competitive UK property insurance market such as the risks of fire, theft, subsidence and other costs. Flood Re estimate that insurers could cede buildings, contents or combined home insurance policies to Flood Re, relating to around 350,000 households over time. Insurance cover against flooding is generally available for the vast majority of properties in the UK. However, insurers cannot guarantee to provide cover in all circumstances. In assessing flood risk, insurers may take all sources of flooding into account. Insurers will use best efforts to work with policyholders to establish on a case-by-case basis, what action they, the Environment Agency, the Local Authority or Water Company can take to enable cover to be continued. If you take steps to reduce the chance of your home flooding (resistance measures) or the damage that floodwater can cause (resilience measures), you should inform your insurers that these measures have been installed. Your insurer will take these measures into account when offering you cover. See Q17 for further information on what you can do to protect your property. In all cases, insurance terms are set by the insurer and will reflect differing degrees of risk. There may be reasons that are not related to flood risk which mean that an insurer may choose not to offer insurance.
Q15. How does my insurer find out if there are plans to build flood defences in my area?	The Environment Agency publishes a map showing the locations of their flood risk management schemes in England on their website. These schemes will reduce the risk of flooding from rivers or the sea. The map does not include schemes for other types of flooding, such as flooding from sewers, groundwater or surface water. This information is also available to the public by contacting Floodline on 0345 988 1188 or 0845 988 1188. The Environment Agency makes details of where flood defences are being built and an outline of plans for future defences available to insurers. Insurers can access the same information on flood risk as you can access on our website.

3. WHAT CAN YOU DO TO REDUCE THE RISK AND DAMAGE FROM FLOODING

Q16: What can I do to reduce risk of flooding to my property? Sign up to Floodline & make a flood plan	There are lots of things property owners can do to reduce the damage that flooding can cause. - Check if you can sign up to receive the Environment Agency's free flood warnings from Floodline Warnings Direct. If there's a risk of flooding in your local area you'll get an automated message by phone, email or text which will give you time to take action and minimise potential flood damage. - Create your own personal flood plan. Having a 'plan' of what you need to do and who you need to call if it floods can be really helpful. You can download a quick and easy personal flood plan template to fill in here or call Floodline on 0345 988 1188 or 0845 988 1188 If you wish to find out more about the flood warning service in your area, your local Environment Agency office will be able to provide you with more information – telephone the Environment Agency's Floodline on 0345 988 1188 or 0845 988 1188. Local flood action groups can also be a useful source of information.
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	A useful guide produced jointly by the Environment Agency, ABI, government and industry partners entitled 'Understanding your risk and preparing for flooding' is available free of charge by calling the Environment Agency's Floodline on 0345 988 1188 or 0845 988 1188 or by visiting the Environment Agency's website at www.gov.uk/check-if-youre-at-risk-of-flooding
Q17: What can I do to reduce risk of flooding to my property? Consider property level protection	Effective management to reduce the risk of damages by floodwater to individual properties (Property Flood Resilience) encompasses a wide range of actions: such as, installing physical measures (like flood barriers or air brick covers) to block apertures; minor building maintenance (such as repointing brickwork and sealing pipe and cable entry points); changes to street design; proactive maintenance of small local water courses; and, active preparation by householders through a "flood plan" and signing up to Environment Agency or other local alerts. The Environment Agency recommends the use of British standards (or equivalent) for all works: BS85500 covers adaptation and retrofit, and flood protection products should meet PAS1188 or similar standards. There is a free to download core document for BS85500 containing the main principles of the standard. There are a number of test centres accredited by BSI to test flood products, including HR Wallingford. Take steps to reduce the damage flood water could cause if it gets into your home. This could be as simple as moving valuables to a high shelf or upper storey. If your property is in an area of high flood risk it might be worth making structural changes such as raising power sockets above flood level or replacing carpets with tiles and rugs. The Environment Agency website www.gov.uk/check-if-youre-at-risk-of-flooding contains useful information and advice on flood protection products, including our 'Prepare your property for flooding' leaflet. Further information is available in the Environment Agency's Flood Product Advice Guide entitled "Using Flood Protection Products – A Guide to Homeowners" which can be obtained by calling the Floodline number on 0345 9881188 or 0845 988 1188 or from the website at www.gov.uk/check-if-youre-at-risk-of-flooding
Q18. Will insurers take account of measures I have taken myself to reduce flood risk?	The insurance industry is supportive of effective resistance and resilience property-level protection measures. These measures can help reduce the devastating impact that flooding can have on a person's property and possessions. The important factors for insurers considering property level protection measures will be confidence in reducing the risk of damage, competency of installation and ensuring the measures are properly maintained where required. If you take steps to reduce the chance of your home flooding or the damage that floodwater can cause, You should discuss these measures with your insurer, who will take this information into account when offering you cover. However, insurers may want you to provide a report from an independent professional, who is experienced in carrying out flood risk mitigation surveys, which advises on the residual risk of flooding to your property. If you are considering such work you are strongly advised to obtain an independent survey which should consider all sources of flood risk to your property; the potential depth of the flood water; how the water can get in; what can be done to keep it out (flood resistant measures); what can be done to limit the damage if it gets in (flood resilience measures); provide recommendations on these measures together with suitable products; advise on the impact of these measures on the risk of future flooding and potential damage costs and carry out a post implementation quality assurance inspection.

	It is important that such a survey is carried out by a professional with the requisite skills and experience – for example members of an appropriate chartered institution such as the Chartered Institution of Civil Engineers, Royal Institution of Chartered Surveyors, Chartered Institution of Water and Environmental Management or the Association of Building Engineers. When looking into flood protection products you should be aware of: • The British Standard Kitemark for flood protection products. You can find protection products and suppliers on the BSI Kitemark (www.kitemark.com). • The National Flood Forum 'Blue Pages Directory' (www.bluepages.org.uk). This directory contains details of flood protection products and suppliers. • The Flood Protection Association (http://thefpa.org.uk) also provides details of companies that can provide advice and supply flood protection products. If you have fitted flood protection products to your property, ask a qualified, independent surveyor to record your flood risk on a Flood Risk Report template. The insurance industry recognise this standard template for presenting the flood risk of a property. Insurers may take the information and flood protection measures into account when deciding the terms they will offer for continued or new cover. The Flood Risk report template is available from the Environment Agency at www.gov.uk/government/publications/property-flood-protection-flood-risk-report The ABI, in conjunction with the National Flood Forum and the Environment Agency has have prepared a “consumer guide to resistant and resilient repair after a flood”, which is available free of charge on www.abi.org.uk/flooding. The Environment Agency has also produced a Flood Product Advice Guide called “Using Flood Protection Products – A Guide to Homeowners” which can be obtained by calling Floodline on 0345 988 1188 or 0845 988 1188 or from the website at www.gov.uk/check-if-youre-at-risk-of-flooding
Q19. If my property is adequately protected will my insurance premium fall?	The premium will reflect your insurer's view of the future risk in the context of a competitive insurance market and existence of Flood Re. However you should be aware that insurance policies cover many different perils and are affected by many factors, other than the risk of flooding. Premiums are set independently by each insurer within a competitive market.

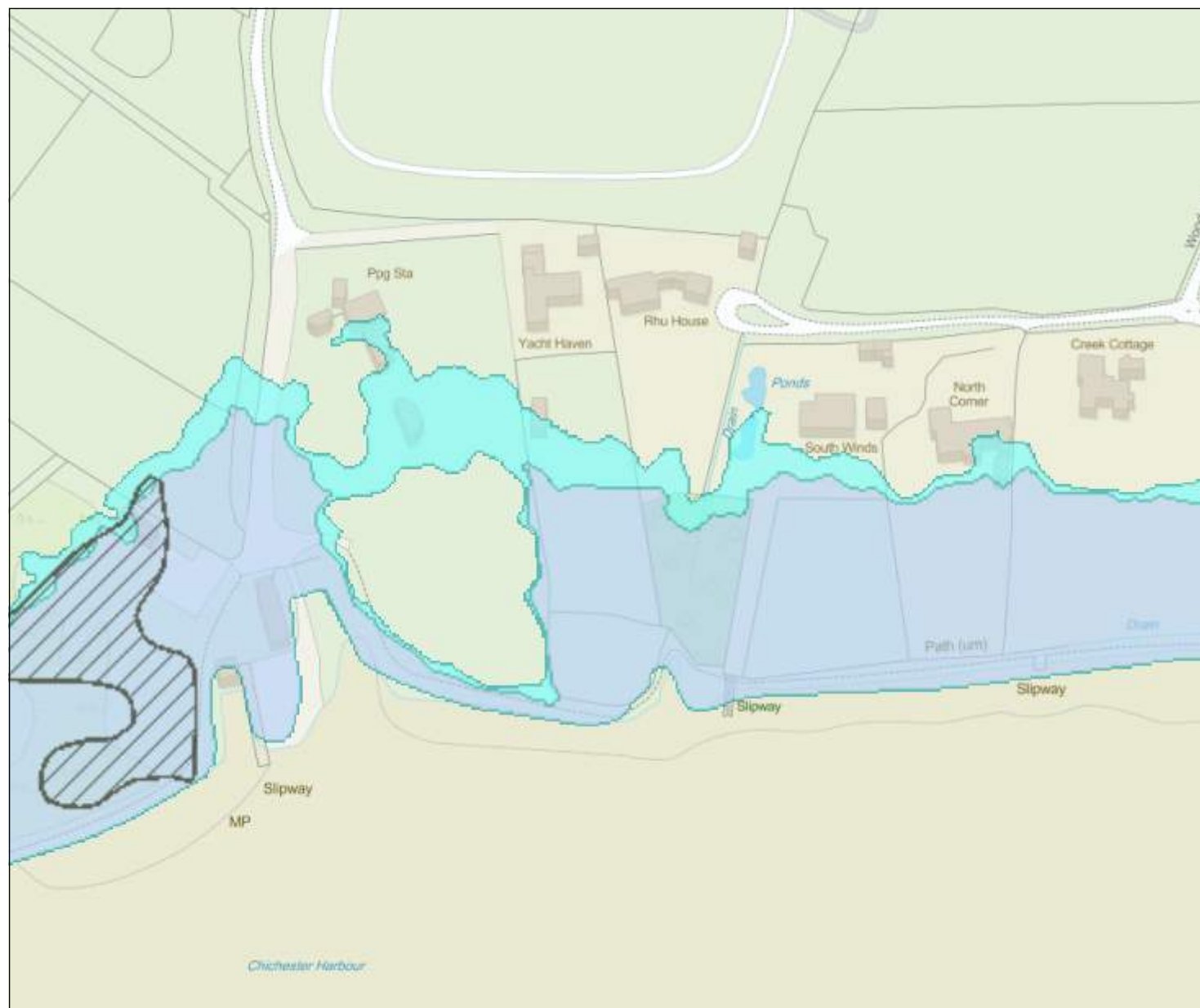
Issued by: Environment Agency, Flood and Coastal Risk Management, Horizon House, Deanery Road, Bristol, BS1 5AH.

Further information on flooding and insurance policy issues is available from www.abi.org.uk

Further information on Flood Re is available from www.floodre.co.uk

Updated by ABI, Flood Re and the Environment Agency April 2016.

Flood Map for Planning (Rivers and Sea)



Scale 1: 2,000



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.

Detailed River Network Map

Legend

- Sealed Main Rivers
- Detailed River Network
 - Primary River
 - Secondary River
 - Tertiary River
 - Lake / Reservoir
 - Canal
 - Canal Tunnel
 - Extended Culvert
 - Multiple Channel Culvert
 - Underground River (potential sewer)
 - Underground River (inferred)
 - Underground River (local knowledge)
 - Undefined
- Offline Drainage features



0 30 60 90
Metres





Appendix D – Flood Map for Development Site

(Based on EA Flood Map for Planning)



infrastructure CS Ltd: The Stables, High Cogges Farm, High Cogges, Witney, OX29 6UN - Tel: 01993 709709; info@infrastructure.co.uk; www.infrastructure.co.uk



Appendix E – Dry Access/Egress & Hazards to People

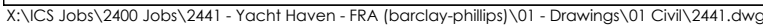
This table is recommended for development planning and control use.

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

HR	Depth of flooding - d (m)												
	DF = 0.5				DF = 1								
Velocity v (m/s)	0.05	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.80	1.00	1.50	2.00	2.50
0.0	0.03 + 0.5 = 0.53	0.05 + 0.5 = 0.55	0.10 + 0.5 = 0.60	0.13 + 0.5 = 0.63	0.15 + 1.0 = 1.15	0.20 + 1.0 = 1.20	0.25 + 1.0 = 1.25	0.30 + 1.0 = 1.30	0.40 + 1.0 = 1.40	0.50 + 1.0 = 1.50	0.75 + 1.0 = 1.75	1.00 + 1.0 = 2.00	1.25 + 1.0 = 2.25
0.1	0.03 + 0.5 = 0.53	0.06 + 0.5 = 0.56	0.12 + 0.5 = 0.62	0.15 + 0.5 = 0.65	0.18 + 1.0 = 1.18	0.24 + 1.0 = 1.24	0.30 + 1.0 = 1.30	0.36 + 1.0 = 1.36	0.48 + 1.0 = 1.48	0.60 + 1.0 = 1.60	0.90 + 1.0 = 1.90	1.20 + 1.0 = 2.20	1.50 + 1.0 = 2.55
0.3	0.04 + 0.5 = 0.54	0.08 + 0.5 = 0.58	0.15 + 0.5 = 0.65	0.19 + 0.5 = 0.69	0.23 + 1.0 = 1.23	0.30 + 1.0 = 1.30	0.38 + 1.0 = 1.38	0.45 + 1.0 = 1.45	0.60 + 1.0 = 1.60	0.75 + 1.0 = 1.75	1.13 + 1.0 = 2.13	1.50 + 1.0 = 2.50	1.88 + 1.0 = 2.88
0.5	0.05 + 0.5 = 0.55	0.10 + 0.5 = 0.60	0.20 + 0.5 = 0.70	0.25 + 0.5 = 0.75	0.30 + 1.0 = 1.30	0.40 + 1.0 = 1.40	0.50 + 1.0 = 1.50	0.60 + 1.0 = 1.60	0.80 + 1.0 = 1.80	1.00 + 1.0 = 2.00	1.50 + 1.0 = 2.50	2.00 + 1.0 = 3.00	2.50 + 1.0 = 3.50
1.0	0.08 + 0.5 = 0.58	0.15 + 0.5 = 0.65	0.30 + 0.5 = 0.80	0.38 + 0.5 = 0.88	0.45 + 1.0 = 1.45	0.60 + 1.0 = 1.60	0.75 + 1.0 = 1.75	0.90 + 1.0 = 1.90	1.20 + 1.0 = 2.20	1.50 + 1.0 = 2.50	2.25 + 1.0 = 3.25	3.00 + 1.0 = 4.00	3.75 + 1.0 = 4.75
1.5	0.10 + 0.5 = 0.60	0.20 + 0.5 = 0.70	0.40 + 0.5 = 0.90	0.50 + 0.5 = 1.00	0.60 + 1.0 = 1.60	0.80 + 1.0 = 1.80	1.00 + 1.0 = 2.00	1.20 + 1.0 = 2.20	1.60 + 1.0 = 2.60	2.00 + 1.0 = 3.00	3.00 + 1.0 = 4.00	4.00 + 1.0 = 5.00	5.00 + 1.0 = 6.00
2.0	0.13 + 0.5 = 0.63	0.25 + 0.5 = 0.75	0.50 + 0.5 = 1.00	0.63 + 0.5 = 1.13	0.75 + 1.0 = 1.75	1.00 + 1.0 = 2.00	1.25 + 1.0 = 2.25	1.50 + 1.0 = 2.50	2.00 + 1.0 = 3.00	3.50	4.75	6.00	7.25
2.5	0.15 + 0.5 = 0.65	0.30 + 0.5 = 0.80	0.60 + 0.5 = 1.10	0.75 + 0.5 = 1.25	0.90 + 1.0 = 1.90	1.20 + 1.0 = 2.20	1.50 + 1.0 = 2.50	1.80 + 1.0 = 2.80	3.40	4.00	5.50	7.00	8.50
3.0	0.18 + 0.5 = 0.68	0.35 + 0.5 = 0.85	0.70 + 0.5 = 1.20	0.88 + 0.5 = 1.38	1.05 + 1.0 = 2.05	1.40 + 1.0 = 2.40	1.75 + 1.0 = 2.75	3.10	3.80	4.50	6.25	8.00	9.75
3.5	0.20 + 0.5 = 0.70	0.40 + 0.5 = 0.90	0.80 + 0.5 = 1.30	1.00 + 0.5 = 1.50	1.20 + 1.0 = 2.20	1.60 + 1.0 = 2.60	3.00	3.40	4.20	5.00	7.00	9.00	11.00
4.0	0.23 + 0.5 = 0.73	0.45 + 0.5 = 0.95	0.90 + 0.5 = 1.40	1.13 + 0.5 = 1.63	1.35 + 1.0 = 2.35	1.80 + 1.0 = 2.80	3.25	3.70	4.60	5.50	7.75	10.00	12.25
4.5	0.25 + 0.5 = 0.75	0.50 + 0.5 = 1.00	1.00 + 0.5 = 1.50	1.25 + 0.5 = 1.75	1.50 + 1.0 = 2.50	2.00 + 1.0 = 3.00	3.50	4.00	5.00	6.00	8.50	11.00	13.50
5.0	0.28 + 0.5 = 0.78	0.60 + 0.5 = 1.10	1.10 + 0.5 = 1.60	1.38 + 0.5 = 1.88	1.65 + 1.0 = 2.65	3.20	3.75	4.30	5.40	6.50	9.25	12.00	14.75
Flood Hazard Rating (HR)		Colour Code		Hazard to People Classification									
Less than 0.75				Very low hazard - Caution									
0.75 to 1.25				Danger for some – includes children, the elderly and the infirm									
1.25 to 2.0				Danger for most – includes the general public									
More than 2.0				Danger for all – includes the emergency services									



Appendix F – Drainage Strategy



NOT FOR CONSTRUCTION
TO SHOW PROOF OF CONCEPT