



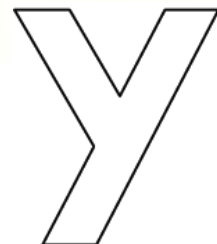
**12 WITTERING ROAD,
HAYLING ISLAND**

FLOOD RISK ASSESSMENT

For

Yeates Design LLP
74 Clerkenwell Road
London
EC1M 5QA

JULY 2013



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**12 WITTERING ROAD,
HAYLING ISLAND**

FLOOD RISK ASSESSMENT

Document Tracking Sheet

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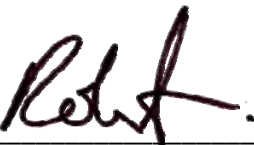
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EXECUTIVE SUMMARY

This Flood Risk Assessment was commissioned by Yeates Design LLP, referred to hereafter as 'the client'. The Flood Risk Assessment has been prepared to support a planning application for the replacement of an existing dwelling off Wittering Road.

The site is in an area identified as having a 'low' probability of flooding on the Environment Agency's flood mapping data identifies that the site is located within Flood Zone 1, but is in close proximity to Flood Zone 2 and 3. The NPPF only requires that planning applications for development proposals of 1 hectare or greater in Flood Zone 1 should be accompanied by a Flood Risk assessment; however to achieve the requirements of the Code for Sustainable Homes (SUR1 and SUR2) a Flood Risk Assessment has been undertaken. The residential nature of the development proposals means the classification of the site is 'more vulnerable' from NPPF Table 2.

Although the proposed development is within Flood Zone 1 it is proposed that a minimum Finished Floor Level (FFL) be set in view of the close proximity to Flood Zone 2 and 3 and the fact that when a climate change allowance is applied the 2115 event does impact on the proposed development location. The proposed minimum Finished Floor Level should be set at 4.500m AOD, 330mm above the existing FFL (4.17m AOD). This locates the dwelling above the 2115 Chichester Harbour water level of 4.5m AOD.

Although the property has been designed to remain flood free during the 100 year return period event for the duration of its 100 year lifetime it is still highly recommended that the EA's Flood Warning Service is signed up to. This will allow valuable advanced warning of any impending flood that will allow safe evacuation from Hayling Island to the mainland. Langstone Bridge via the A3023 is the primary means of access/egress from the island to Havant. No formal Evacuation Plan has been prepared as there is only the singular vehicular access to and from the island to Havant over Langstone Bridge with multiple routes between the dwelling and the Bridge. If evacuation is not possible then the property itself will allow safe refuge.

The Flood Risk Assessment has reviewed all sources of flood risk to both the proposed development and to the existing adjacent development as a result of the proposals, including; fluvial, tidal, pluvial, groundwater, sewers and flooding from artificial sources.

Based on the ground conditions identified above, it can be considered that infiltration drainage is unlikely to provide a suitable means of surface water disposal for the flows generated by the proposed development. If infiltration is to be pursued as a possible method of surface water drainage then further investigation is advised, with soakaway testing to BRE365 in specific locations where infiltration may be feasible. It is proposed that the flows generated by the development continue to discharge to the public sewer network, mimicking the pre-development scenario. The proposals include the introduction of Sustainable Drainage Systems (SUDS) in the form of permeable surfaces will provide numerous benefits and will assist in reducing the runoff and peak discharge of surface water flows from the development.

This report has been prepared in consultation with the relevant interested parties and incorporates their comments where possible. The Flood Risk Assessment is considered to be commensurate with the development proposals and in summary, the development can be considered appropriate in accordance with the NPPF.

This report is considered to satisfy the Flood Risk Assessment requirements of SUR1 and SUR2 of the Code for Sustainable Homes as required by BRE.

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Specialist Software

- Flood Estimation Handbook FEH CD-ROM (v.3.0) – *Determination of Catchment Descriptors and depths of rainfall*
- MicroDrainage WinDES (v.12.6.1) – *Calculation of Greenfield run-off rates IH124/ICP-SUDS, Greenfield run-off volumes, rates of rainfall and stormwater storage estimates*

Abbreviations & Acronyms

AEP	Annual Exceedance Probability	LPA	Local Planning Authority
BGL	Below Ground Level	mAOD	Metres Above Ordnance Datum
BGS	British Geological Survey	NGR	National Grid Reference
CC	Climate Change	NPPF	National Planning Policy Framework
EA	Environment Agency	NSRI	National Soil Resource Institute
FEH	Flood Estimation Handbook	OS	Ordnance Survey
FRA	Flood Risk Assessment	QSE	Quick Storage Estimate
FZ	Flood Zone	SFRA	Strategic Flood Risk Assessment
Ha	Hectare	SuDS	Sustainable Urban Drainage Systems
HCC	Hampshire County Council	SW	Southern Water
HBC	Havant Borough Council	TWL	Top Water Level
IDB	Internal Drainage Board	UKCIP	United Kingdom Climate Impacts Programme
LLFA	Lead Local Flood Authority		

1.0 INTRODUCTION

1.1 Planning Policy Context

- 1.1.1 All forms of flooding and their impact on the natural and built environment are material planning considerations. The National Planning Policy Framework (NPPF) sets out the Government's objectives for the planning system, and how planning should facilitate and promote sustainable patterns of development, avoiding flood risk and accommodating the impacts of climate change.
- 1.1.2 Government policy with respect to development in flood risk areas is contained within the NPPF and the supporting Technical Guidance.
- 1.1.3 The NPPF only requires that planning applications for development proposals of 1 hectare or greater in Flood Zone 1 should be accompanied by a Flood Risk Assessment; however to achieve the requirements of the Code for Sustainable Homes (SUR1 and SUR2) a Flood Risk Assessment has been undertaken.

1.2 Site Context

- 1.2.1 The Flood Risk Assessment has been prepared to support a planning application for the replacement of an existing dwelling.

1.3 Consultation

- 1.3.1 The preparation of this report has been undertaken in consultation with the following interested parties; Hampshire County Council (HCC), Havant Borough Council, the Environment Agency (EA) and Southern Water (SW).
- 1.3.2 The Local Planning Authority (LPA), Havant Borough Council, will make the final decision with regard to any planning permission. Hampshire County Council acts as the Lead Local Flood Authority (LLFA). The NPPF advises that the LPA should consult with the Environment Agency who will provide advice and guidance on flood issues at a strategic level and in relation to planning applications.
- 1.3.3 The Environment Agency was contacted to discuss the nature and extent of information to be provided in this Flood Risk Assessment (FRA) and for any background knowledge of flood risk specific to the site (correspondence is included in Appendix C).
- 1.3.4 Southern Water Developer Services were contacted to discuss whether SW have any historical flooding issues in the area or any background knowledge on flood risk specific to the site (correspondence is included in Appendix G).
- 1.3.5 Hampshire County Council were contacted to discuss the nature and extent of information to be provided in this Flood Risk Assessment (FRA) and for any background knowledge of flood risk specific to the site (correspondence is included in Appendix F).

2.0 EXISTING SITE SITUATION

2.1 Location

- 2.1.1 The development is accessed off Wittering Road, Hayling Island. The Ordnance Survey National Grid Reference (OS NGR) for the site is 474882 (Easting), 98706 (Northing) and the nearest postcode is PO11 9SP. The site location plan is shown in Appendix A.
- 2.1.2 The site is bounded; to the north by Bracklesham Bay, to the east by residential dwellings off Wittering Road with Bracklesham Road Beyond, to the south by Wittering Road and residential dwellings off Wittering Road and to the west by further residential dwellings off Wittering Road.
- 2.1.3 The total site area is approximately 923m², the site is considered to be 40% impermeable (determined from the proposed layout and aerial photographs) for the purposes of determining the pre-development surface water run-off.



Figure 1: Aerial Photograph of site (Google Maps 2013)
Birds Eye view of the proposed development area

2.2 Existing and Historical Land Use

- 2.2.1 At present the site consist of an existing residential detached property fronting Wittering Road with garden to the rear. No former historical land use of the site has been identified.

3.0 DEVELOPMENT PROPOSALS

3.1 Nature of the development

- 3.1.1 The Flood Risk Assessment has been prepared to support a planning application for the replacement of an existing dwelling.
- 3.1.2 The pertinent planning drawings are included in Appendix B; an extract of the development proposal is shown in figure 2 (below).
- 3.1.3 The total site area is approximately 923m² and is considered to be 40% impermeable; the proposed impermeable area of the development will be reduced slightly to approximately 45% of the total site area, however the external areas of hardstanding proposed are permeable paving.

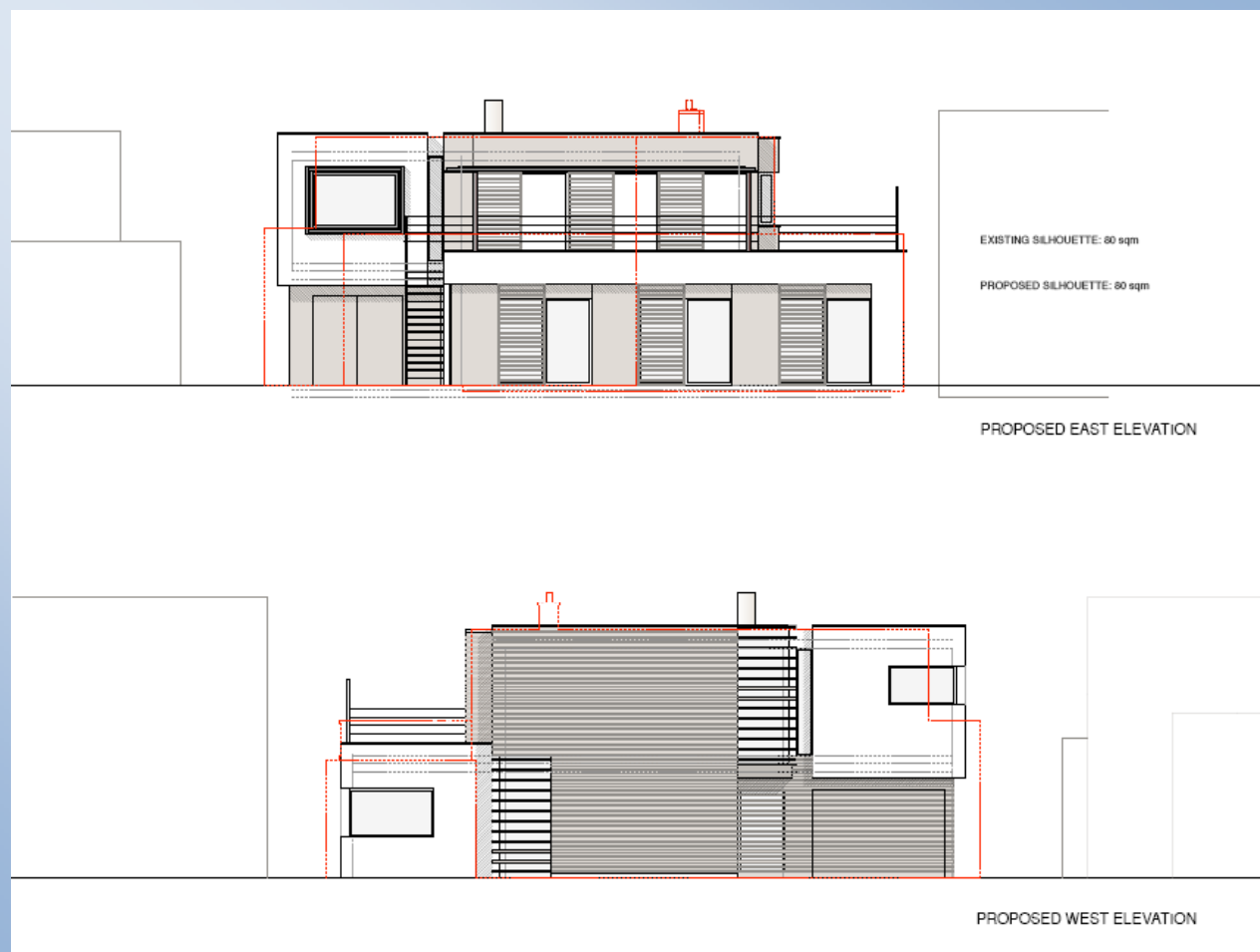
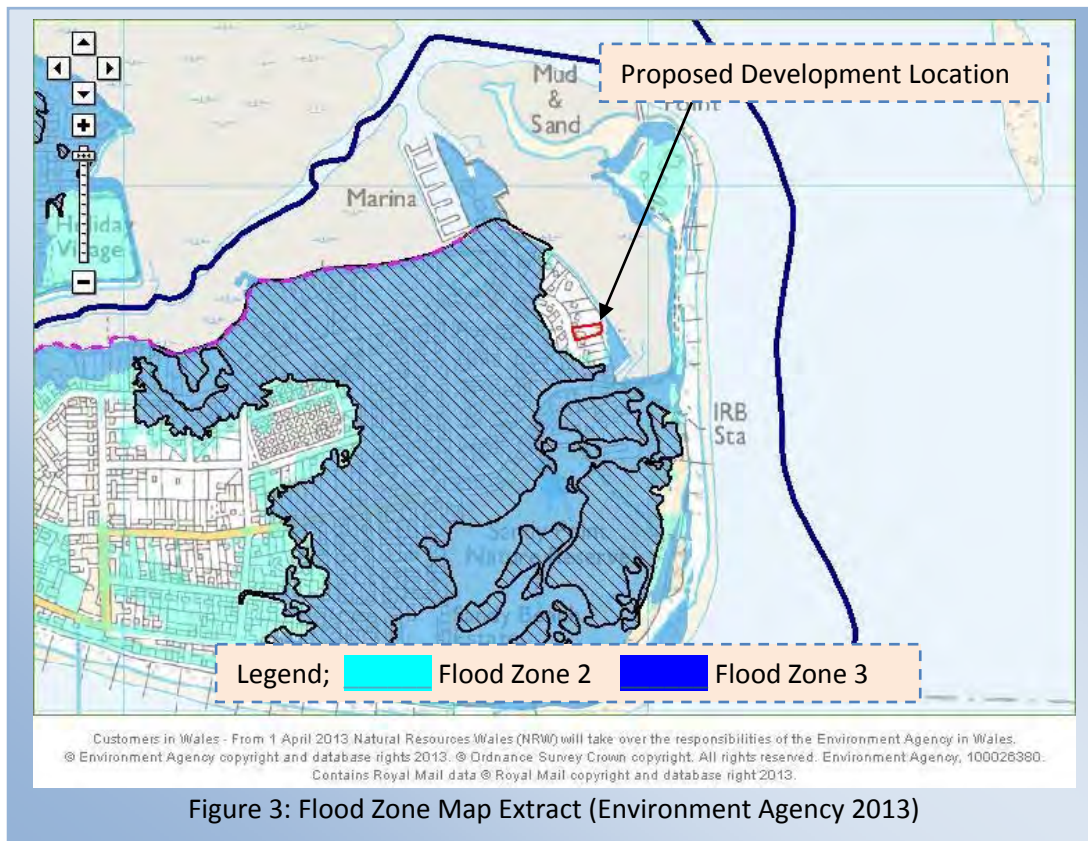


Figure 2: Planning Layout Extract (Yeates Design & Architecture 2013)

4.0 SOURCES OF FLOOD RISK

4.1 Fluvial Flood Risk

- 4.1.1 Information relating to the flood risk at the site has been obtained from the Environment Agency's (EA) website and online Flood Map, an extract of which is shown in Figure 3 (below).
- 4.1.2 Examination of the Flood Map shows that the site is located within Flood Zone 1, however it is within close proximity to Flood Zones 2 and 3; Appendix C shows the online flood map and statement in full.



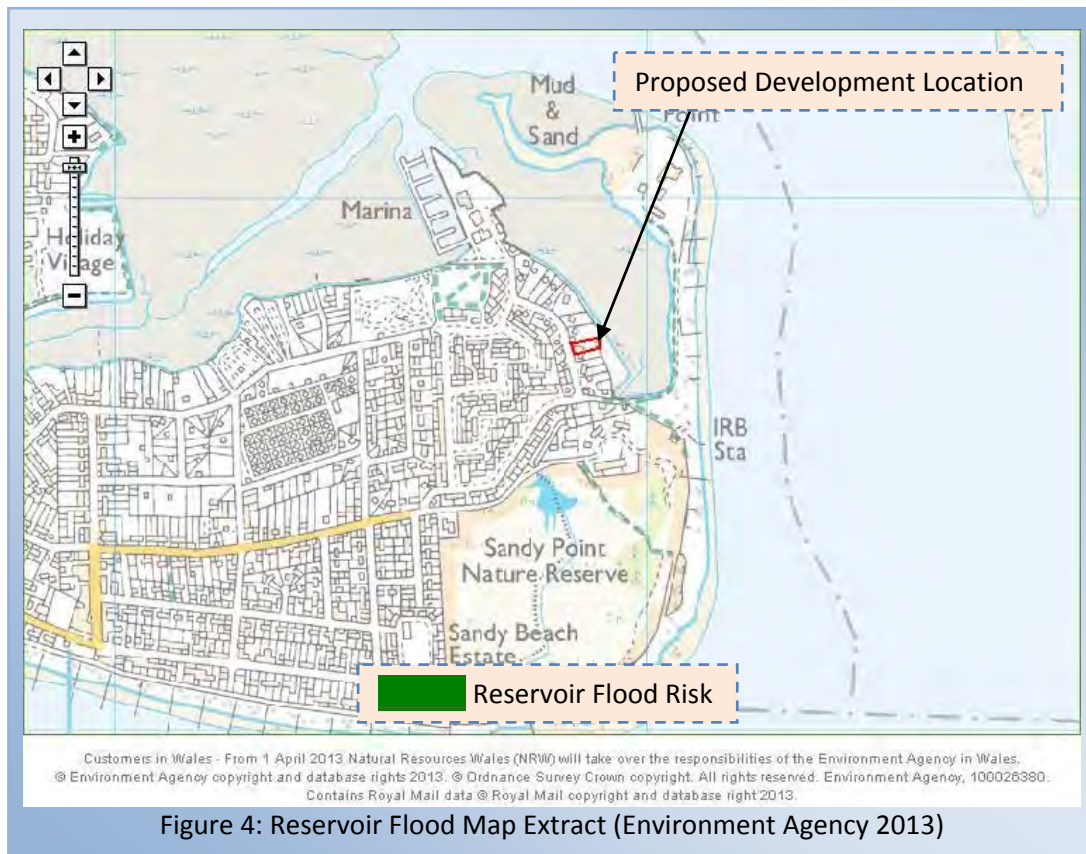
4.2 Tidal Flood Risk

- 4.2.1 Due to the site location it is potentially at risk of flooding from tidal sources the site itself is located in Flood Zone 1 but the local surrounding area is considered to be within Flood Zones 2 and 3.
- 4.2.2 The PUSH SFRA mapping data indicates that the current EA Mapping shows that the site is not within Flood Zones 2 or 3 but is surrounded by them. It also indicates that the proposed development is not within an Area Benefiting Defence (ABD).
- 4.2.3 The PUSH SFRA Map Set indicates that the Environment Agency Flood Zone to be Tidal & Fluvial FZ2. The Hazard Map for FZ2 (undefended) indicates the risk to be 'low'.

- 4.2.4 On the Danger from Breaching Map in FZ2 (defended) the site is shown to be within an area where the Breach Index is not appropriate and 'No Danger' is indicated.
- 4.2.5 The site is not shown to be within Flood Zones 2 or 3 when Climate Change is applied to 2025.
- 4.2.6 The site is shown to be on the cusp of Tidal Flood Zone 2 when Climate Change is applied to the year 2055.
- 4.2.7 The site is within Tidal FZ2 and 3 for the year 2085 and 2115.
- 4.2.8 The Wave Energy Frontage Maps show the site is beyond the moderate and low wave Energy Frontage and no historic wave overtopping is shown to have impacted on the proposed development area.
- 4.2.9 There are two defences discussed in the following text, one to the eastern boundary of the site and one further east along Black Point. The existing defence to the eastern boundary of the property is considered to have a crest/tide protection of less than 20 year event (present day), however the defence beyond is considered to have in excess of 1000 year event (present day) protection.
- 4.2.10 The investment to provide 200 year event crest/tide protection to the eastern boundary defence is considered 'low'. The crest/tide level of the eastern boundary and Black Point defence is considered to offer less than 20 year event protection in 2115. The investment to provide crest/tide 200 year event protection for 2115 is 'medium' for the eastern boundary protection and 'medium-low' for the Black Point defence.
- 4.2.11 The 0.5%AEP (1 in 200 year) extreme tide level for Chichester Harbour is 3.4mAOD, with site levels ranging from 2.1mAOD to 4.0mAOD and an existing threshold level of 4.17mAOD.
- 4.2.12 The 0.5%AEP (1 in 200 year) extreme tide event with an allowance for Climate Change up to 2115 for Chichester Harbour is 4.5mAOD; this is proposed at the minimum Finished Floor Level.

4.3 Artificial Sources of Flood Risk

- 4.3.1 Due to the site location and elevation relative to any artificial bodies of water such as reservoirs or canals the risk of flooding from this source is considered low. Figure 4 on the following page shows an extract of the EA's online Reservoir flood map; Appendix C shows the EA's reservoir flood map in full.
- 4.3.2 There are no canals within the immediate vicinity of the proposed development that present a flood risk to the site.



4.4 Pluvial Flood Risk

- 4.4.1 Intense rainfall that is unable to soak into the ground or enter drainage systems can run-off land and result in flooding. Local topography and the land use can have a strong influence on the direction and depth of flow. Large catchment areas are particularly prone to this type of flooding. The volume and rate of overland flow from land can be exacerbated if development increases the percentage of impermeable area.
- 4.4.2 The topography of the development and surrounding area means there is little likelihood of significant flows impacting on the proposed development or on land and property adjacent to the development. The only flows that are likely to be present on site are from direct rainfall on areas of hardstanding; however the PUSH SFRA Map indicates that the dwelling is potentially at 'very high' risk of overland flow. This will to an extent be mitigated by elevating the property relative to the surrounding area, with levels also falling away from the proposed dwelling.
- 4.4.3 Any overland flows generated by the proposed development must be carefully controlled; safe avenues of overland flow away from the existing and proposed dwellings are advised.

4.5 Groundwater Flood Risk

- 4.5.1 In general terms groundwater flooding can occur from three main sources: - raised water tables, seepage and percolation and groundwater recovery or rebound.

- 4.5.2 If groundwater levels are naturally close to the surface then this can present a flood risk during times of intense rainfall. No groundwater flood risk has been identified during consultation with the various interested parties. The PUSH SFRA map shows the dwelling to be located in an area where groundwater vulnerability is indicated to be 'minor' and no historical groundwater flooding is indicated. Bedrock permeability is indicated as low.
- 4.5.3 Seepage and percolation occur where embankments above ground level hold water. In these cases water travels through the embankment material and emerges on the opposite side of the embankment. At present there are no reported problems with groundwater flooding.
- 4.5.4 Groundwater recovery / rebound occurs where the water table has been artificially depressed by abstraction. When the abstraction stops the water table makes a recovery to its original level. There is the potential for groundwater flooding in low lying areas where groundwater levels have been depressed below their pre-pumping conditions, where these were at or close to ground level. As with the seepage scenario the likelihood of flooding from this source is low.

4.6 Sewer Flood Risk

- 4.6.1 In urban areas, rainwater is frequently drained into surface water sewers or sewers containing both surface and waste water known as 'combined sewers'. Foul water flooding often occurs in areas prone to overland flow and can result when the sewer is overwhelmed by heavy rainfall and will continue until the water drains away. It can also occur when the sewer becomes blocked or is of inadequate capacity, this could lead to there being a high risk of internal property flooding with contaminated water.
- 4.6.2 Consultation with various parties has not identified any existing sewer flood risk issues or historical flooding of the immediate site area.
- 4.6.3 The PUSH SFRA maps indicate that the dwelling is not within an area considered to be susceptible to surface water flooding, nor is it indicated to be at risk on the Flood Map for Surface Water. It is also shown not to be in an area at risk of surface water flooding from a 1 in 30 year rainfall event.
- 4.6.4 No Southern Water observed flooding events are recorded in close proximity to the proposed development, the nearest was in Earnley Road to the northwest.

4.7 Strategic Flood Risk Assessment (SFRA) Information

- 4.7.1 The PUSH SFRA Map information is indicated in the relevant flood risk source sub-sections of this paragraph.

4.8 Historical and Anecdotal Flooding Information

- 4.8.1 An Internet based search for flooding events did not recall any historical flooding in the immediate site area.
- 4.8.2 Consultation with various interested parties also failed to highlight any historical flooding to the development area.

4.9 Flood Risk Vulnerability Classification and Flood Zone Compatibility

- 4.9.1 The development is 'residential' in its nature and as such is classified as 'more vulnerable' in *Table 1: Flood Risk Vulnerability Classification* within the Technical Guidance to the National Planning Policy Framework, *Table 2: Flood Risk Vulnerability and Flood Zone 'Compatibility'* within the NPPF confirms that this type of land use is appropriate for Flood Zone 1.

4.10 Mitigation Measures

- 4.10.1 Although the proposed development is within Flood Zone 1 it is proposed that a minimum Finished Floor Level (FFL) be set in view of the close proximity to Flood Zone 2 and 3 and the fact that when a climate change allowance is applied the 2115 event does impact on the proposed development location. The proposed minimum Finished Floor Level should be set at 4.500mAOD, 330mm above the existing FFL (4.17mAOD). This locates the dwelling above the 2115 Chichester Harbour water level of 4.5mAOD.
- 4.10.2 As with any development it is also advised that external levels fall away from property to minimise the flood risk from a variety of sources.
- 4.10.3 As with any development overland flows generated by the proposed development must be carefully controlled; safe avenues of overland flow away from any existing and proposed buildings are advised.
- 4.10.4 To minimise the flood risk to neighboring development it is proposed that surface water run-off generated by the proposed development be managed effectively and ideally with the peak rates of run-off being restricted to the equivalent of the pre-development situation.
- 4.10.5 Although the property has been designed to remain flood free during the 100 year return period event for the duration of its 100 year lifetime it is still highly recommended that the EA's Flood Warning Service is signed up to. This will allow valuable advanced warning of any impending flood that will allow safe evacuation from Hayling Island to the mainland. Langstone Bridge via the A3023 is the primary means of access/egress from the island to Havant. No formal Evacuation Plan has been prepared as there is only the singular vehicular access to and from the island to Havant over Langstone Bridge with multiple routes between the dwelling and the Bridge. If evacuation is not possible then the property itself will allow safe refuge.

4.11 Residual Risks

- 4.11.1 The development is accessible for emergency access and egress during times of extreme flooding as the floodplain does not extend into the proposed development.
- 4.11.2 The development and its drainage systems should be designed to cope with intense storm events up to and including the 100 year return period rainfall event with an allowance for Climate Change (CC). If an extreme rainfall event exceeds the design criteria for the drainage system it is likely that there will be some overland flows that are unable to enter the system, it is important that these potential overland flows are catered for within the proposed planning layout in the event that the capacity of the drainage system is exceeded.
- 4.11.3 Any overland flows generated by the proposed development must be carefully controlled; safe avenues of overland flow away from the existing and proposed dwelling are advised.

- 4.11.4 As with any drainage system blockages within either the foul or surface water system have the potential to cause flooding or disruption. It is important that should any drainage systems not be offered for adoption to either the Water Company or the Local Authority then an appropriate maintenance regime be scheduled with an appropriate management company for these private drainage systems.

5.0 SURFACE WATER MANAGEMENT

5.1 Pre-development Surface Water Run-off

- 5.1.1 For the purposes of determining the existing rate of surface water run-off the site is considered to be both Brownfield; the total area of the site is 923m² (metres squared).
- 5.1.2 The surface water run-off rates have been calculated using the Modified Rational Method and rainfall catchment characteristics from the Flood Estimation Handbook (FEH), details of which are included Appendix H.
- 5.1.3 The existing impermeable area of site generates a peak run-off rate of 1.5l/s based on an area of 923m².
- 5.1.4 The approximate surface water run-off volume generated by the total site area based on the 1 in 100 year return period storm event is 36m³; estimated using the FEH rainfall catchment characteristics (6hr duration event).

5.2 Post-development Surface Water Run-off

- 5.2.1 The residential nature of the development proposals means that there will be an increase in the impermeable area of the site to approximately 410m²(45%), resulting in an increase in both the volume and the peak rate of surface water run-off if flows are unrestricted.
- 5.2.2 The proposed impermeable area will be approximately 410m², approximately 45% of the total development area; however it is proposed that the external areas of hardstanding be pervious to reduce this figure.
- 5.2.3 The approximate surface water run-off volume generated by the whole site area based on the 1 in 100 year return period storm event with a 30% allowance for climate change is 35.8m³; estimated using the FEH rainfall catchment characteristics (6hr duration event).

5.3 Sustainable Drainage Systems (SuDS)

- 5.3.1 In accordance with the NPPF, Sustainable Drainage Systems (SuDS) should be specified wherever possible to manage surface water. This in turn reduces the burden downstream on both watercourses and sewerage systems.
- 5.3.2 SuDS have the ability to address three core objectives; water quantity, water quality and amenity value. With the appropriate system specified, all three core objectives can be satisfied. Where possible, peak surface water discharge rates to watercourses and sewers should be reduced.
- 5.3.3 Preference should always be given to SuDS over the traditional methods of buried sewers wherever possible and practical. Runoff from car parking areas and roads could be conveyed through swales, permeable pavements, bio-retention areas and petrol interceptors to provide a degree of treatment before flows are carried to public sewers.

- 5.3.4 Opportunities should be taken to provide soft landscaping where at all possible on site to assist in minimising surface water run-off. Added benefits include biodiversity and visual enhancements.
- 5.3.5 The exact type of SuDS will be determined at the detailed design stage; however the proposals include the introduction of sustainable Drainage Systems (SUDS) in the form of permeable surfaces will provide numerous benefits and will assist in reducing the runoff and peak discharge of surface water flows from the development.

5.4 Methods of Surface Water Management

- 5.4.1 At present the site is Brownfield; the total site area is 923m² and is considered to be 40% impermeable.
- 5.4.2 The proposed impermeable area of the development is approximately 45% of the total site area.
- 5.4.3 There are three methods that have been reviewed for the management and discharge of surface water detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority listed below.
- Discharge via infiltration
 - Discharge to watercourse
 - Discharge to sewerage system

5.5 Discharge via Infiltration

- 5.5.1 Any impermeable areas that can drain to soakaway or an alternative method of infiltration would significantly improve the sustainability of any surface water systems.
- 5.5.2 The British Geology Survey (BGS) mapping data indicates that ground conditions are as follows: -

1:50 000 scale bedrock geology description: *London Clay Formation - Clay, Silt And Sand. Sedimentary Bedrock formed approximately 34 to 55 million years ago in the Palaeogene Period. Local environment previously dominated by deep seas.*

Setting: *Deep seas. These rocks were formed in deep seas from infrequent slurries of shallow water sediments which were then redeposited as graded beds.*

1:50 000 scale superficial deposits description: *Beach and Tidal Flat Deposits (Undifferentiated) - Clay, Silt, Sand and Gravel. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by shorelines.*

Setting: *shorelines. These rocks were formed in shoreline environments with sediments deposited in beaches and barrier islands.*

- 5.5.3 The National Soil Resources Institute (NSRI) indicates that the nature of the soil is likely to be; loamy with naturally high ground water; drainage is considered impeded.
- 5.5.3 Based on the ground conditions identified, it can be considered that infiltration drainage is unlikely to provide a suitable means of surface water disposal for the flows generated by the proposed development. If infiltration is to be pursued as a possible method of surface water

drainage then further investigation is advised, with soakaway testing to BRE365 in specific locations where infiltration may be feasible.

5.6 Discharge to Watercourse

- 5.6.1 There is no watercourse in close proximity to the development that would provide a suitable outfall for the surface water flows generated by the proposed development.

5.7 Discharge to Sewer

- 5.7.1 At present the existing development is understood to discharge to the existing sewer network.
- 5.7.2 It is proposed that the flows generated by the development continue to discharge to the public sewer network, mimicking the pre-development scenario.
- 5.7.3 The pre-developed peak rate of run-off is calculated to be approximately 1.5l/s, the post-development peak rate of run-off is calculated to be 1.5l/s; however the introduction of permeable paving to the external areas of hardstanding reduces this peak rate of run-off to 1.3l/s.
- 5.7.4 Restricting the surface water discharge to 5l/s generates a storage requirement during periods of intense rainfall. The resultant stormwater storage requirement for the 1 in 1 year return period storm event with a restricted discharge rate of 5l/s and an impermeable area of 410m² is approximately between 0m³ and 0.4m³.
- 5.7.5 The resultant storage requirement for the 1 in 30 year return period storm event with a restricted discharge rate of 5l/s and an impermeable area of 410m² is approximately between 1.1m³ and 4.6m³. It is proposed that the attenuated flows for these storm events be stored within traditional below ground sewer systems.
- 5.7.6 The resultant storage requirement for the 1 in 100 year return period storm event plus a 30% allowance for Climate Change with a restricted discharge rate of 5l/s and an impermeable area of 410m² is approximately between 6.1m³ and 12m³.

5.8 Climate Change

- 5.8.1 There are indications that the climate in the UK is changing significantly and it is widely believed that the nature of climate change will vary greatly by region. Current expert opinion indicates the likelihood that future climate change would produce more frequent short duration and high intensity rainfall events with the addition of more frequent periods of long duration rainfall.
- 5.8.2 The NPPF Technical Guidance Table 5 states that the recommended national precautionary sensitivity ranges for increase of peak rainfall intensity is 30% until 2115. It is widely believed that the impact of climate change means there is likely to be a long term increase in the average sea levels, with an expectation that sea levels will rise gradually.
- 5.8.3 An increase in flood water levels means that future flooding events will occur more frequently and will have a greater impact.

- 5.8.4 Any increase in the level of flood risk to the proposed development from climate change is likely to be related to the increase in rainfall intensity and duration and its impact upon the surface water drainage system or from rising sea levels due to its coastal location.
- 5.8.5 Climate Change should be accounted for within the design and it is recommended that an increase in peak rainfall intensity of 30% is allowed for. Climate Change has also been allowed for within the design with a minimum Finished Floor Level being set based on 100 years of sea level rise.

6.0 FOUL WATER MANAGEMENT

- 6.1 At present the foul water flows, are understood discharge to the public sewer network.
- 6.2 Based on the proposals for the construction of a single replacement dwelling the approximate peak foul water flows generated by the residential development are approximately 0.05l/s. This is based on 4000 litres per dwelling per 24 hours; the guidance contained within Sewers for Adoption (SfA).
- 6.3 It is proposed that the foul water generated by the development continue to be discharged to the public sewer network via the existing connection.

7.0 SUMMARY AND CONCLUSIONS

- 7.1 The Flood Risk Assessment has been prepared to support an outline planning application for the replacement of an existing dwelling off Wittering Road.
- 7.2 The site is in an area identified as having a 'low' probability of flooding on the Environment Agency Flood Map and is located in Flood Zone 1; but is within close proximity to Flood Zone 2 and 3.
- 7.3 NPPF only requires that planning applications for development proposals of 1 hectare or greater in Flood Zone 1 should be accompanied by a Flood Risk Assessment; however to achieve the requirements of the Code for Sustainable Homes (SUR1 and SUR2) a Flood Risk Assessment has been undertaken.
- 7.4 The Flood Risk Assessment (FRA) has reviewed all sources of flood risk to both the proposed development and to the existing adjacent development as a result of the proposals, including; fluvial, tidal, pluvial, groundwater, sewers and flooding from artificial sources.
- 7.5 An Internet based search for flooding events did not recall any historical flooding in the immediate site area. Consultation with various interested parties also failed to highlight any historical flooding in or adjacent to the proposed development area.
- 7.6 Although the proposed development is within Flood Zone 1 it is proposed that a minimum Finished Floor Level (FFL) be set in view of the close proximity to Flood Zone 2 and 3 and the fact that when a climate change allowance is applied the 2115 event does impact on the proposed development location. The proposed minimum Finished Floor Level should be set at 4.500m AOD, 330mm above the existing FFL (4.17m AOD). This locates the dwelling above the 2115 Chichester Harbour water level of 4.5m AOD.
- 7.7 Based on the ground conditions identified, it can be considered that infiltration drainage is unlikely to provide a suitable means of surface water disposal for the flows generated by the proposed development. It may be possible to use infiltration as a part solution; however soakaway testing to BRE365 in specific locations where this may be practical will be required to determine feasibility.
- 7.8 It is proposed that the flows generated by the development continue to discharge to the public sewer network, mimicking the pre-development scenario. The proposals include the introduction of sustainable Drainage Systems (SUDS) in the form of permeable surfaces which will provide numerous benefits including water quality and will assist in reducing the runoff and peak discharge of surface water flows from the development.
- 7.9 Restricting the surface water discharge to 5l/s generates a storage requirement during periods of intense rainfall. The resultant stormwater storage requirement for the 1 in 1 year return period storm event with a restricted discharge rate of 5l/s and an impermeable area of 410m² is approximately between 0m³ and 0.4m³.
- 7.10 The resultant storage requirement for the 1 in 30 year return period storm event with a restricted discharge rate of 5l/s and an impermeable area of 410m² is approximately between 1.1m³ and 4.6m³.

- 7.11 The resultant storage requirement for the 1 in 100 year return period storm event plus a 30% allowance for Climate Change with a restricted discharge rate of 5l/s and an impermeable area of 410m² is approximately between 6.1m³ and 12m³.
- 7.12 Although the property has been designed to remain flood free during the 100 year return period event for the duration of its 100 year lifetime it is still highly recommended that the EA's Flood Warning Service is signed up to. This will allow valuable advanced warning of any impending flood that will allow safe evacuation from Hayling Island to the mainland. Langstone Bridge via the A3023 is the primary means of access/egress from the island to Havant. No formal Evacuation Plan has been prepared as there is only the singular vehicular access to and from the island to Havant over Langstone Bridge with multiple routes between the dwelling and the Bridge. If evacuation is not possible then the property itself will allow safe refuge.
- 7.13 As with any drainage system blockages within either the foul or surface water sewer systems have the potential to cause flooding or disruption.
- 7.14 The Flood Risk Assessment is considered to be commensurate with the development proposals and in summary, the development can be considered appropriate in accordance with the NPPF, and is considered to satisfy the Flood Risk Assessment requirements of SUR1 and SUR2 of the Code for Sustainable Homes as required by BRE.

8.0 RECOMMENDATIONS

- 8.1 Opportunities should be taken to provide soft landscaping where at all possible on site to assist in minimising surface water run-off. Added benefits include biodiversity and visual enhancements.
- 8.2 Any overland flows generated by the proposed development must be directed away from residential properties; safe avenues of overland flow are advised.
- 8.3 The proposed onsite surface water drainage system will still need to be sized to cater for storm events up to and including the 100 year return period storm event with a 30% allowance for climate change.
- 8.4 As with any development it is also advised that external levels fall away from property to minimise the flood risk from a variety of sources.

BIBLIOGRAPHY & REFERENCES

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Sewers for Adoption 7th Edition, WRc (2012).
Technical Guidance to the National Planning Policy Framework, CLG (2012).

Web-based references

Bingmaps – <http://www.bing.com/Maps/>
British Geological Survey – <http://www.bgs.ac.uk/opengeoscience/home.html>
Chronology of British Hydrological Events – www.dundee.ac.uk/
CIRIA – <http://www.ciria.org/>
Cranfield University – <http://www.landis.org.uk/soilscapes/>
Environment Agency – www.environment-agency.gov.uk/
FloodProBE – <http://www.floodprobe.eu/>
Flood Forum – <http://www.floodforum.org.uk/>
Flood London – <http://www.floodlondon.com/>
Flood Resilience Group – <http://www.floodresiliencgroup.org/frg/>
Google Maps – <http://maps.google.co.uk/>
London Resilience – <http://www.londonprepared.gov.uk/>
Shire Group of IDB's – <http://www.shiregroup-idbs.gov.uk/default.asp>
Streetmap – <http://www.streetmap.co.uk/>
US Army Corps of Engineers – <http://www.hec.usace.army.mil/software/hec-ras/>
Watertight International – <http://www.watertightinternational.com/>

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APPENDIX A: LOCATION PLAN

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LOCATION PLAN

12 WITTERING ROAD, HAYLING ISLAND



OS X (Easting)	474882
OS Y (Northing)	98706
Nearest Post Code	PO11 9SP
Lat (WGS84)	N50:46:59 (50.783103)
Long (WGS84)	W0:56:21 (-0.939173)
LR	SZ748987
mX	-104548
mY	6549891

APPENDIX B: PROPOSED PLANNING LAYOUT

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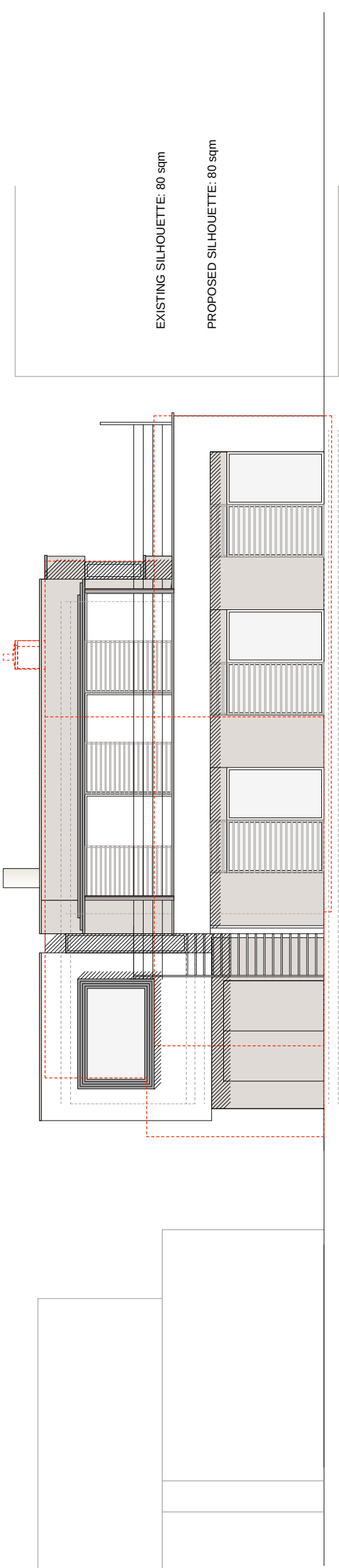
PROPOSED EAST ELEVATION

[illegible]

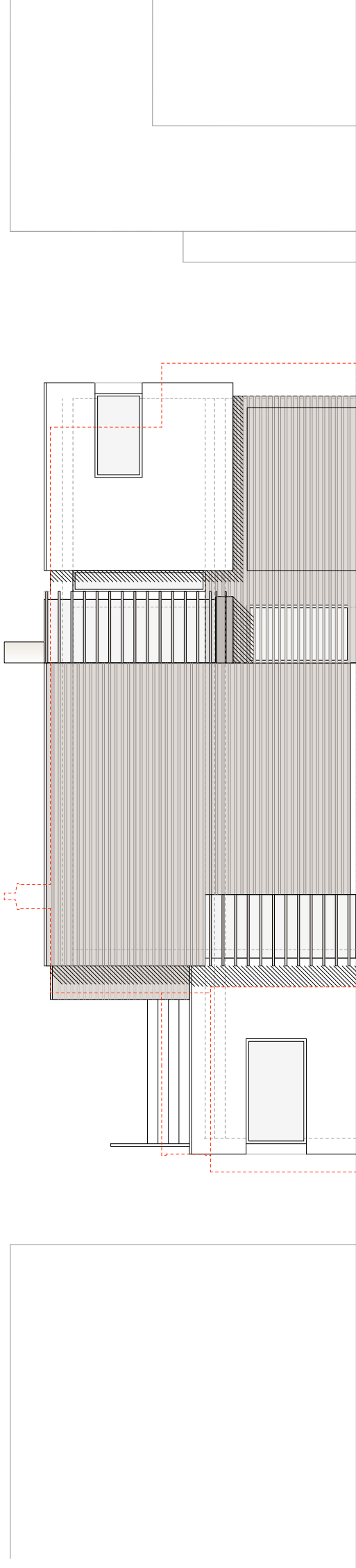


PROPOSED WEST ELEVATION

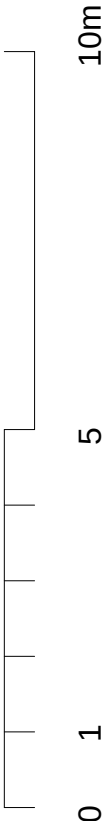
		Y Yeates Design+Architecture 74 Clerkenwell Road London EC1M 5NL tel: 020 7251 6667 www.yeatesdesign.co.uk
PROJECT :		12 WITTERING ROAD HAYLING ISLAND PO11 9SP
DRAWING :		Visuals of Proposed West Elevation
SCALE :		1:100@A3, 1:50@A1
DATE :		APRIL 2013
DWG NO.:		528/P/012
DWN BY :		
DRAWING STATUS :		FOR TENDER ☐
FOR PLANNING		☐ FOR CONSTRUCTION ☐

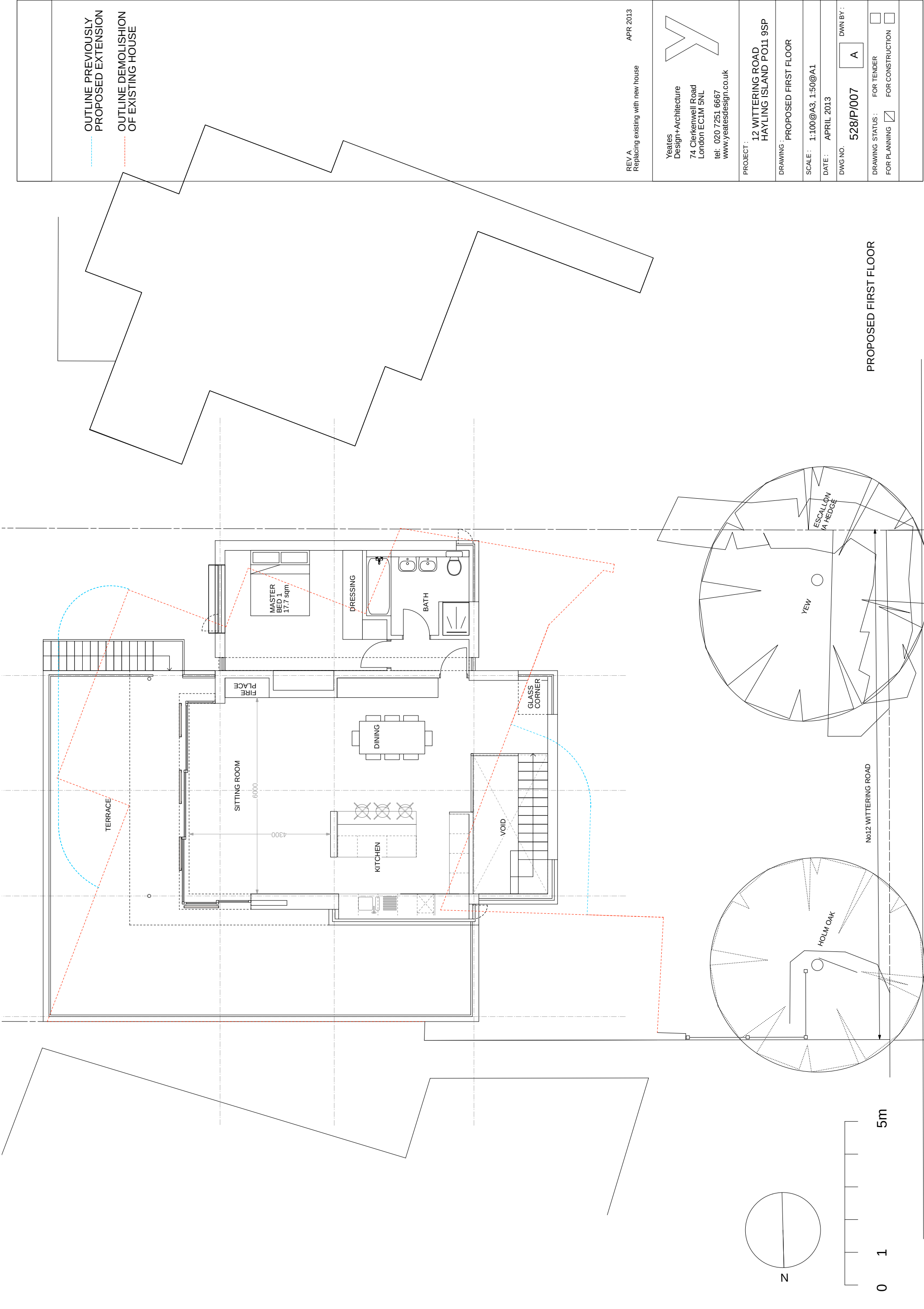


PROPOSED EAST ELEVATION



PROPOSED WEST ELEVATION





REV A Replacing existing with new house	APR 2013
Yeates Design+Architecture 74 Clerkenwell Road London EC1M 5NL tel: 020 7251 6667 www.yeatesdesign.co.uk	
PROJECT : 12 WITTERING ROAD HAYLING ISLAND PO11 9SP	
DRAWING : PROPOSED FIRST FLOOR	
SCALE : 1:100@A3, 1:50@A1	
DATE : APRIL 2013	
DWG NO.	DWN BY :
528/P/007	A
DRAWING STATUS : FOR PLANNING ☒ FOR TENDER ☐	FOR CONSTRUCTION ☐

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APPENDIX C: EA FLOODING INFORMATION & CORRESPONDENCE

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Enter a postcode or place name:

Other topics for this area...

Risk of Flooding from Rivers and Sea

Go

Map legend

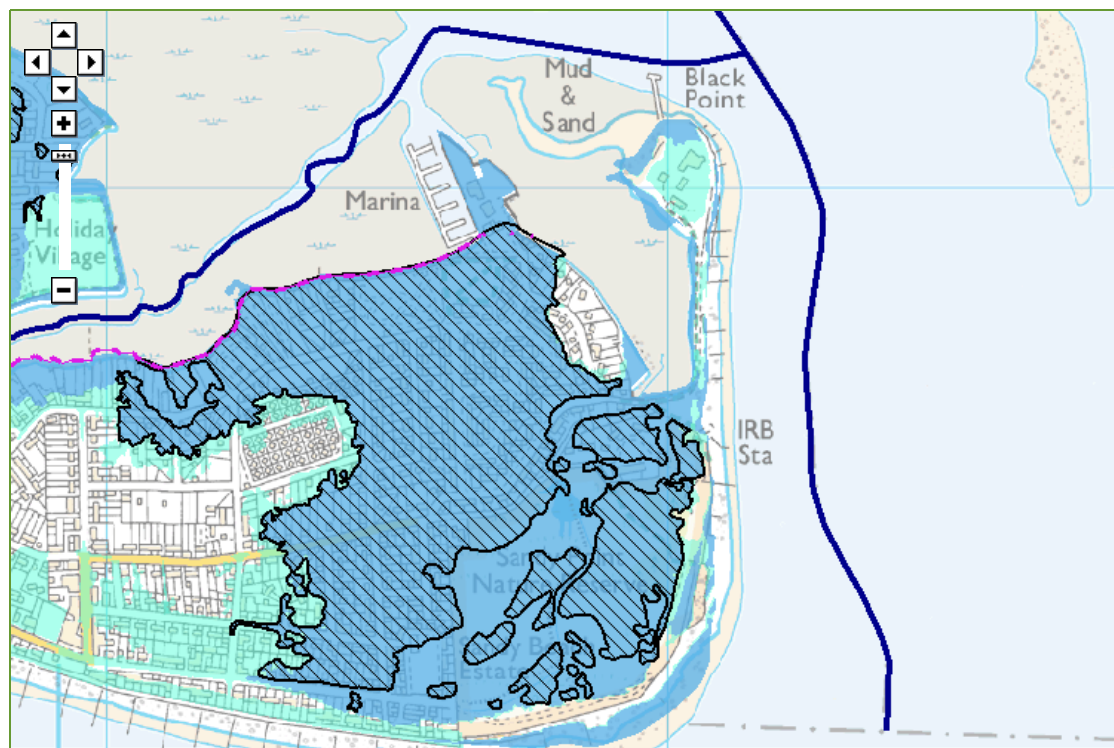
Map of X: 474,825; Y: 98,654 at scale 1:10,000

[Data search](#)[Text only version](#)

Click on the map to see what is the Risk of Flooding at a particular location.

☒ Flood Maps [i](#)

- Flooding from rivers or sea without defences
- Extent of extreme flood
- Flood defences (Not all may be shown*)
- Areas benefiting from flood defences (Not all may be shown*)
- Main rivers



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Flood Map – Information Warnings

Manchester Ship Canal

Flood Mapping of the Manchester Ship Canal in Trafford, Salford and Warrington was updated 9 August 2012 as a result of a judgment of the High Court. The judgment concluded that the Ship Canal sluice gates should not be regarded as 'formal' flood defences and that our decision to map the Ship Canal flood zones as if the sluice gates were closed was unlawful. We have applied to the Court of Appeal to appeal against this judgment, and we will keep this caveat updated. For further information please contact the Environment Agency on 03708 506 506.

* Legend Information: Flood defences and the areas benefiting from them are gradually being added through updates. Please contact your [local environment agency office](#) for further details.

More about flooding:

[Understanding the flood map](#)

A more detailed explanation to help you understand the flood map shown above.

[Current flood warnings](#)

We provide flood warnings online 24 hours a day. Find out the current flood warning status in your local area.

[Flood map - your questions answered](#)

Answers to commonly asked questions about the flood map.



Interactive Maps

Flood Risk for X:474880, Y:98714

Be prepared

We do not have an assessment of flood risk for the area which you have selected. This may be because the area selected is outside the floodplain. It could also be because we have been unable to assess the likelihood of flooding for this area because we did not have sufficient information (this applies to fewer than 1% of the properties in England and Wales in the flood outline)

For a fuller explanation of flood likelihood, [click here](#).

Be aware:

Our maps only cover flooding from rivers and the sea. Flooding can occur at any time and in any place from sources such as rising ground water levels, burst water mains, road drains, run-off from hillsides, sewer overflows etc.

[Click here](#) to find out more.

To find out how to be prepared for all types of flooding go to our [Floodline](#) pages or call Floodline on tel: 0845 988 1188.

The information on the likelihood of flooding is not intended to be used by people applying for planning permission for new developments. To find out how the Flood Map can help when planning a new development, [click here](#).

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Author: The Environment Agency | WIYBYSUPPORT@environment-agency.gov.uk
Last updated: 16th April 2013

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Enter a postcode or place name:

Other topics for this area...

Risk of Flooding from Reservoirs

Go

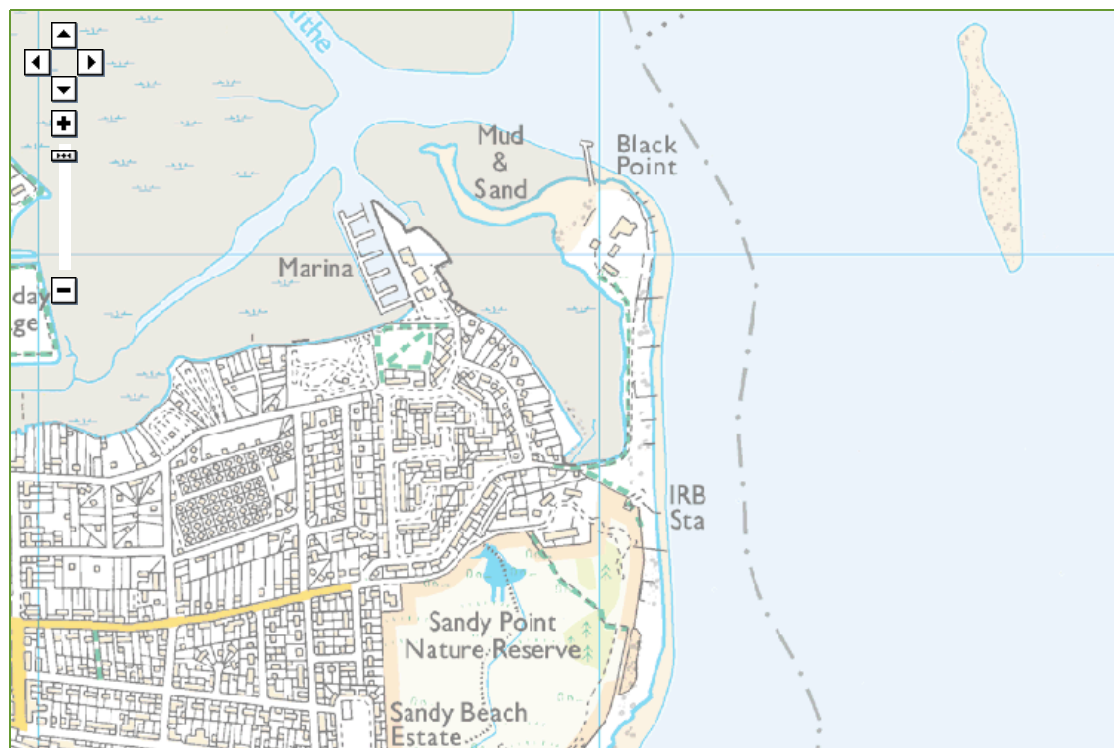
Map legend

Click within the extent of flooding to see which reservoirs affect this area

☒ Risk of Flooding from Reservoirs

Maximum extent of flooding

PO11 9SP at scale 1:10,000

[Data search](#)[Text only version](#)

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Find out more:

This map shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. Since this is a prediction of a worst case scenario, it's unlikely that any actual flood would be this large.

Remember - reservoir flooding is extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925. Since then reservoir safety legislation has been introduced to make sure [reservoirs are well maintained](#).

Please note that only flood maps for large reservoirs are displayed. Flood maps are not displayed for smaller reservoirs or for reservoirs commissioned after reservoir mapping began in spring 2009. The reservoir flood maps also don't give any information about how likely any area is to be flooded.

If your property is within the green highlighted area, then you could be affected by reservoir flooding. To find out more about the reservoirs that could cause this flooding, click on the map within the green highlighted area. You will find the name and ownership details of the reservoirs that could cause flooding in your area.

If you want to find out about local emergency plans you should [contact the local authority](#) responsible for that emergency plan but be aware that these reservoir flood plans may take some time to develop. You can find out which local authority to contact by clicking on the map.

[Reservoir flooding](#)[Guidance for people living near reservoirs](#)[Your questions answered](#)[Who to contact](#)

Chris Pickles

From: SSD Enquiries [SSDEnquiries@environment-agency.gov.uk]
Sent: 07 May 2013 15:19
To: Chris Pickles
Subject: (SSD/906/LT) 130427/DT04 FW: 12 Wittering Road, Hayling Island
 Dear Christopher,

Thank you for your enquiry.

A product 4 will cost £50 (excluding VAT.)

This will include:

A site centred map zoomed to your point of interest, showing:

- Ordnance Survey 1:25k colour raster base mapping;
- Flood Zone 2 and Flood Zone 3;
- Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
- Model(s) extents;
- FRA site boundary (where a suitable GIS layer is supplied);
- Flood defence locations (where available/relevant) and unique identifiers;
- Flood Map areas benefiting from defences (where available/relevant);
- Flood Map flood storage areas (where available/relevant);
- Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;
- Statutory (Sealed) Main River (where available within map extents);
- Bank top ePlanning tool; and
- A table showing:

- i) model node X/Y coordinate locations, unique identifiers, levels, flows and JFLOW depths;
- ii) Flood defence locations unique identifiers and attributes;
- iii) Historic flood events outlines unique identifiers and attributes; and
- iv) local flood history data (where available/relevant).

Please advise us which product you require and look at the following site to ensure that the product you require is suitable for your site <http://www.environment-agency.gov.uk/research/planning/93498.aspx>

If I can provide any further assistance, please do not hesitate to contact me.

We would be really grateful if you could spare five minutes to help us improve our service. Please click on the link below and fill in our survey – we use every piece of feedback we receive:
<http://www.surveymonkey.com/link/453a2>

Yours sincerely

Luke Thompson
Customers & Engagement Officer
 The Environment Agency - South East (Solent and South Downs Area)
Telephone: 01903 832064
Email: ssdenquiries@environment-agency.gov.uk
Write: Guildbourne House, Chatsworth Road, Worthing, West Sussex, BN11 1LD

From: Chris Pickles [mailto:Chris.Pickles@betts-associates.co.uk]
Sent: 26 April 2013 08:18
To: Enquiries, Unit
Subject: 12 Wittering Road, Hayling Island

To whom it may concern,

12 Wittering Road, Hayling Island, PO11 9SP

Please could you provide product 4. In addition, please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment for the above site (location plan attached), including details of historical flooding; this would be greatly appreciated.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind regards

Christopher Pickles
 Engineering Technician

Betts Associates Ltd

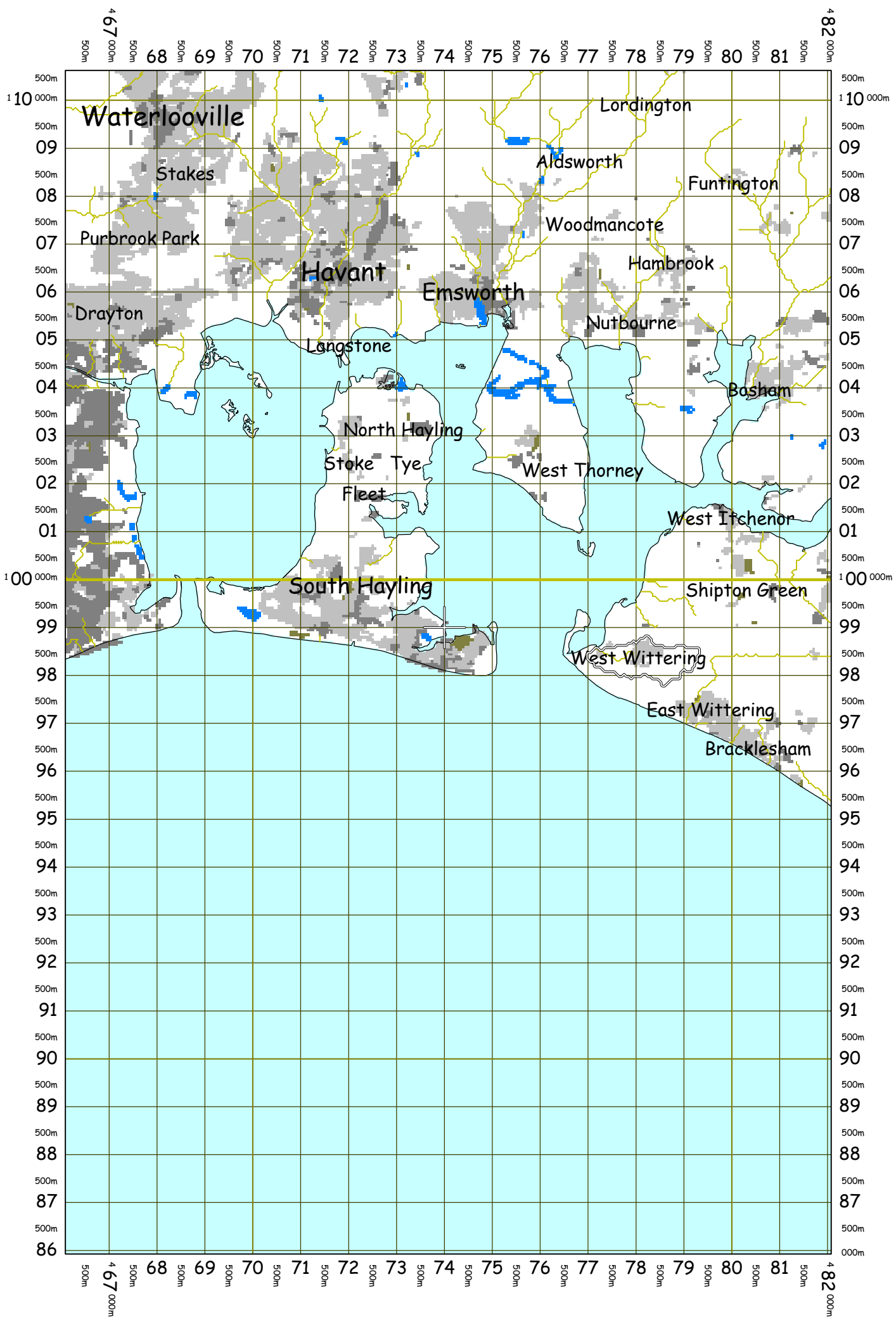
-

14/05/2013

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APPENDIX D: FEH CATCHMENT DATA & DESCRIPTORS

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VERSION	FEH CD-ROM	Version	3	exported at	14:29:08 GMT Fri 26-Apr-13
CATCHMENT	GB	477150 98550	SZ 77150 98550		
AREA		1.38			
ALTBAR		4			
ASPBAR		286			
ASPVAR		0.36			
BFIHOST		0.695			
DPLBAR		1.47			
DPSBAR		4.5			
FARL		1			
LDP		3.12			
PROPWET		0.34			
RMED-1H		9.2			
RMED-1D		33.7			
RMED-2D		42.2			
SAAR		680			
SAAR4170		705			
SPRHOST		29.52			
URBCONC1990		0.445			
URBEXT1990		0.098			
URBLOC1990		0.883			
C		-0.026			
D1		0.422			
D2		0.26887			
D3		0.38551			
E		0.30738			
F		2.27328			
C(1 km)		-0.027			
D1(1 km)		0.429			
D2(1 km)		0.268			
D3(1 km)		0.382			
E(1 km)		0.309			
F(1 km)		2.244			

DESIGN RAINFALL DEPTHS

Calculate : **Design rainfall** for

☒ catchment 477150 98550 [SZ 77150 98550]
☐ 1 km grid point 474000 99000 [SZ 74000 99000]
☐ Manually entered values for a point

Area : km²

C : D3 :
D1 : E :
D2 : F :

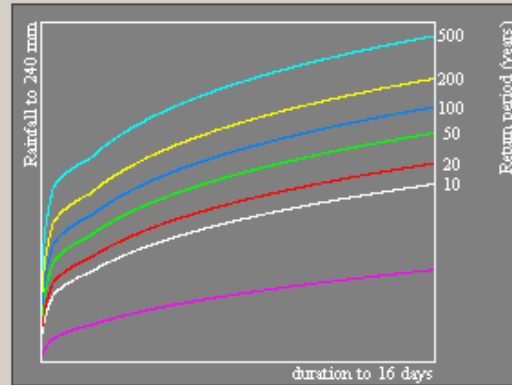
Duration : **Hours** ☐ Fixed ☒ Sliding
Return period : **Years** ☒ AM ☐ POT

Rainfall depth mm

Calculate... **Export...** **Cancel**

 An areal reduction factor of 0.977 has been applied to a point rainfall of 12.1 mm to yield a catchment design rainfall of 11.8 mm.





Calculate : **Design rainfall** for

☒ catchment 477150 98550 [SZ 77150 98550]
☐ 1 km grid point 474000 99000 [SZ 74000 99000]
☐ Manually entered values for a point

Area : km²

C : D3 :
D1 : E :
D2 : F :

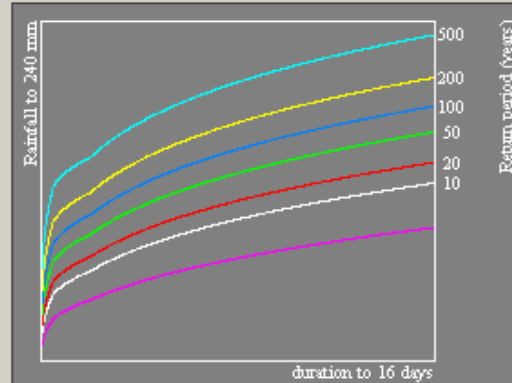
Duration : **Hours** ☐ Fixed ☒ Sliding
Return period : **Years** ☒ AM ☐ POT

Rainfall depth mm

Calculate... **Export...** **Cancel**

 An areal reduction factor of 0.977 has been applied to a point rainfall of 22.8 mm to yield a catchment design rainfall of 22.2 mm.





Calculate : Design rainfall for

☒ catchment 477150 98550 [SZ 77150 98550]
☐ 1 km grid point 474000 99000 [SZ 74000 99000]
☐ Manually entered values for a point

Area : 1.3775 km²

C : -0.02600 D3 : 0.38551
 D1 : 0.42200 E : 0.30738
 D2 : 0.26887 F : 2.27328

Duration : 6 Hours ☐ Fixed ☒ Sliding

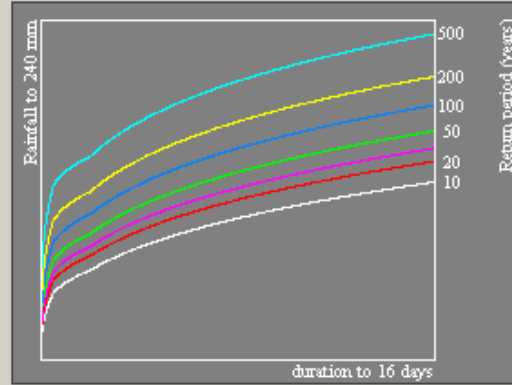
Return period : 30.0 Years ☒ AM ☐ POT

Rainfall depth 48.8617 mm

Calculate... Export... Cancel


 An areal reduction factor of 0.977 has been applied to a point rainfall of 50.0 mm to yield a catchment design rainfall of 48.9 mm.





Calculate : Design rainfall for

☒ catchment 477150 98550 [SZ 77150 98550]
☐ 1 km grid point 474000 99000 [SZ 74000 99000]
☐ Manually entered values for a point

Area : 1.3775 km²

C : -0.02600 D3 : 0.38551
 D1 : 0.42200 E : 0.30738
 D2 : 0.26887 F : 2.27328

Duration : 6 Hours ☐ Fixed ☒ Sliding

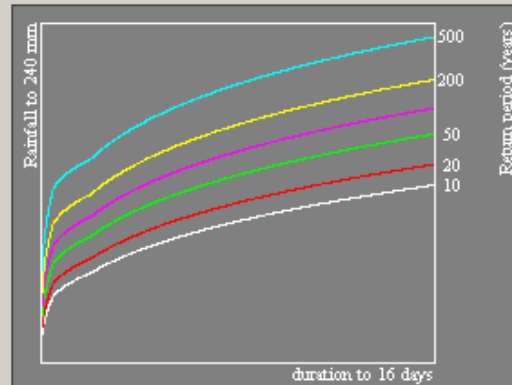
Return period : 100.0 Years ☒ AM ☐ POT

Rainfall depth 67.0931 mm

Calculate... Export... Cancel


 An areal reduction factor of 0.977 has been applied to a point rainfall of 68.7 mm to yield a catchment design rainfall of 67.1 mm.





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APPENDIX E: NPPF TECHNICAL GUIDANCE EXTRACTS

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Table 1: Flood zones

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

Zone 1 - low probability Definition This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%). Appropriate uses All uses of land are appropriate in this zone. Flood risk assessment requirements For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a flood risk assessment. This need only be brief unless the factors above or other local considerations require particular attention. Policy aims In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage systems².
Zone 2 - medium probability Definition This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year. Appropriate uses Essential infrastructure and the water-compatible, less vulnerable and more vulnerable uses, as set out in table 2, are appropriate in this zone. The highly vulnerable uses are <i>only</i> appropriate in this zone if the Exception Test is passed. Flood risk assessment requirements All development proposals in this zone should be accompanied by a flood risk assessment. 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 systems.
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 (table 2) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable uses and essential infrastructure should only 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 times of flood. Flood risk assessment requirements All development proposals in this zone should be accompanied by a flood risk assessment. 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 systems;

- relocate existing development to land in zones with a lower probability of flooding; and
- create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Zone 3b - the functional floodplain

Definition

This zone comprises land where water *has* to flow or be stored in times of flood.

Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.

Appropriate uses

Only the water-compatible uses and the essential infrastructure listed in table 2 that has to be there should be permitted in this zone. It should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows; and
- not increase flood risk elsewhere.

Essential infrastructure in this zone should pass the Exception Test.

Flood risk assessment requirements

All development proposals in this zone should be accompanied by a flood risk assessment.

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 systems;
- relocate existing development to land with a lower probability of flooding.

Table 2: Flood risk vulnerability classification

Essential infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly vulnerable • Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use³. • Installations requiring hazardous substances consent⁴. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "essential infrastructure")⁵.
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 waste⁶. • Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan</i>.⁷
Less vulnerable • Police, ambulance and fire stations which are <i>not</i> required to be operational during flooding. • Buildings used for shops, financial, professional and other services,
restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do <i>not</i> need to remain operational during times of flood. • Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).
Water-compatible development • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of Defence defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, <i>subject to a specific warning and evacuation plan</i>.

APPENDIX F: WATER COMPANY RECORDS & CORRESPONDENCE

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APPENDIX G: LA CORRESPONDENCE

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Chris Pickles

From: Chris Pickles
Sent: 1 May 2013 16:30
To: 'planning@hants.gov.uk'
Subject: Wittering Road, Hayling Island
Attachments: Location Plan.pdf

To whom it may concern,

12 WITTERING ROAD, HAYLING ISLAND PO11 9SP

-
Please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment for the above site (location plan attached), including details of historical flooding; this would be greatly appreciated.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind regards

Christopher Pickles
Engineering Technician

Betts Associates Ltd
Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY
T - 01244 288178
F - 01244 288516
chris.pickles@betts-associates.co.uk
www.betts-associates.co.uk

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Chris Pickles

From: Reghif, Sarah [sarah.reghif@hants.gov.uk]

Sent: 20 May 2013 07:50

To: Chris Pickles

Subject: RE: Wittering Road, Hayling Island

Dear Mr Pickles

Thank you for your enquiry regarding the site above.

We have now reviewed our database and have the following comments:

The development site is located approximately 20m west of Chichester Harbour Mud area and north-west of Saltmarsh, which the sea reaches when the tide is high (Mean High Water Level).

The nearest river is St Hermans Drain and it flows approximately 500 north of the site. This is marked as Main River and therefore is the Environment Agency responsibility. A small part of the site to the east is shown approaching Flood Zone 2 and 3 but for details and the extent of the food zones please refer to the Environment Agency flood maps.

Please note that Hampshire County Council generally only holds details of historic flood incidents caused by the surface water flooding. For details of flooding from watercourses or the sea please contact the Environment Agency or refer to the local Strategic Flood Risk Assessment undertaken by PUSH (Partnership for Urban South Hampshire). The PUSH SFRA mapping shows that although the majority of the site is currently outside of the flood zone, the future impact of climate change could change this situation and in 2055 the site could potentially be affected by Flood Zone 2 tidal flooding.

The historic flooding records indicate no incidents within the site itself. The nearest historic flooding was recorded along the Selsey Close, Earnley Road and Itchnor Road approximately 90m east of the site. This flooding was caused by tidal inundation and for more details regarding this event please contact the Environment Agency. Our records indicate that works may have been carried out in this area to reduce the likelihood of flooding. There are no further flooding incidents recorded within the vicinity of the site.

The maps showing risk of surface water flooding confirm that the site is not potentially affected by this flooding.

Local Plan (Allocations) for Havant confirms that Planning Applications for all developments in Coastal Change Management Areas (West Haylings and Hayling Beachfront) in accordance with National Planning Policy Framework must be accompanied by a Coastal Vulnerability Assessment. This should be proportionate to the scale and cost of the development and the level of impact from coastal change. As the details of the proposed development are not provided at this stage we suggest you discuss this requirements with the local planning department (Havant Borough Council) or refer to the Local Plan for Havant for more details.

Please be aware that this answer has been provided using the best knowledge and information at the time that the query was raised with the County Council and is based on past records of flooding. The County Council cannot be held liable for any damage to your property caused by a future flood event. You are advised to have a bespoke investigation carried out by a suitably qualified engineer or consultant if you wish to satisfy yourselves

further on the matter or if a full assessment of risk is required.

Regards

Sarah Reghif
Engineering Consultancy
Hampshire County Council
The Castle
Winchester
SO23 8UD

From: Flood & Water Management
Sent: 15 May 2013 08:44
To: Reghif, Sarah
Cc:
Subject: FW: Wittering Road, Hayling Island

From: County Planning
Sent: 15 May 2013 08:42
To: Flood & Water Management
Subject: FW: Wittering Road, Hayling Island

From: Chris Pickles [mailto:Chris.Pickles@betts-associates.co.uk]
Sent: 14 May 2013 16:30
To: County Planning
Subject: Wittering Road, Hayling Island

To whom it may concern,

12 WITTERING ROAD, HAYLING ISLAND PO11 9SP

-
Please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment for the above site (location plan attached), including details of historical flooding; this would be greatly appreciated.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind regards

Christopher Pickles
Engineering Technician

Betts Associates Ltd
Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY
T - 01244 288178
F - 01244 288516

chris.pickles@betts-associates.co.uk
www.betts-associates.co.uk

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MEMO



EASTERN
SOLENT

COASTAL
PARTNERSHIP

To: Mrs Heather Lealan Havant Borough Council	From: James Addicott Coastal Project Engineer Tel: 02392 446223
Date: 19 June 2013	On behalf of Eastern Solent Coastal Partnership

LOCATION: 12 Wittering Road, Hayling Island, PO11 9SP

PROPOSAL: Demolition of existing 4 bedroom single family dwelling house and replacement with 5-bedroom single family dwelling house.

REF: APP/13/00487

Response

The Coastal Partnership team request that **the applicant submit additional flood risk assessment information** for this site to accompany the application prior to determination.

Although the applicant has submitted a flood risk assessment compiled by Betts Associates Consulting Engineers Ref FRA 219 Revision 1.0 dated May 2013, it is considered deficient in some areas that should be clarified. These have been listed in the table below:

- For your information the present day 0.5% probability (1 in 200 year) extreme tide level for Chichester Harbour is 3.4mAODN and the 0.5% probability (1 in 200 year) extreme tide level for this area in the year 2115 is 4.5m AODN.

Ref	Page/Para	Comment	Action
1	Section 4.7	This section describes the relevance of the Strategic Flood Risk Assessment to the site. The text is considered lacking as there is considerable information on climate change mapping (mapset 1E) and asset standards (Mapset 3A).	Make an assessment of the SFRA mapping and relevance to this site. Please visit PUSH SFRA webpage http://maps.hants.gov.uk/push/Default.aspx
2	Section 4.10.1	FRA proposes to raise the flood slab level floor slab to 600mm above ground level, however this is not presented in the recommendations section of the report nor represented sufficiently on the design drawings	Provide ground level heights ideally in a cross section from the building to the coastal boundary and include the proposed building slab level in metres above Ordnance Datum Newlyn
3	Section 5.8	The section on Climate Change focuses on predicted increases to rainfall. For this coastal site there are implications from sea level rise.	The FRA should assess the predicted extreme tide levels for this area in comparison to ground levels of the site and proposed building levels
4	Section 7.6	The principle focus of the FRA is on surface water management. Although important it is likely that tidal flood risk and in particular the effects of climate change and sea level rise form the primary flood risk for this site.	Revise FRA to include greater assessment of tidal flood risk and in particular sea level rise predictions

Ref	Page/Para	Comment	Action
5	Section 7.12	The site is shown to be within the Flood Zone 1 of the Environment Agency's Flood Maps but extensively surrounded by areas of Flood Zone 3. Access to the site may therefore be limited during an extreme tidal flood event.	Access to site should be acknowledged in FRA. We recommend that the applicant ensure residual flood risk is managed on this site by compiling an appropriate flood warning and evacuation plan for the property.
6	Section 8.0	The recommendations section does not contain the slab level proposal from section 4.10.1 which suggests raising the ground floor slab level 600mm above ground level	Add reference to raise ground floor level and any further proposed flood resistance and resilience measures to be incorporated within the building.

We hope that these points are simple to resolve and look forward to providing further response to the application. Should the applicant or agent require any advice we are happy to discuss this.

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APPENDIX H: SURFACE WATER RUN-OFF CALCULATIONS

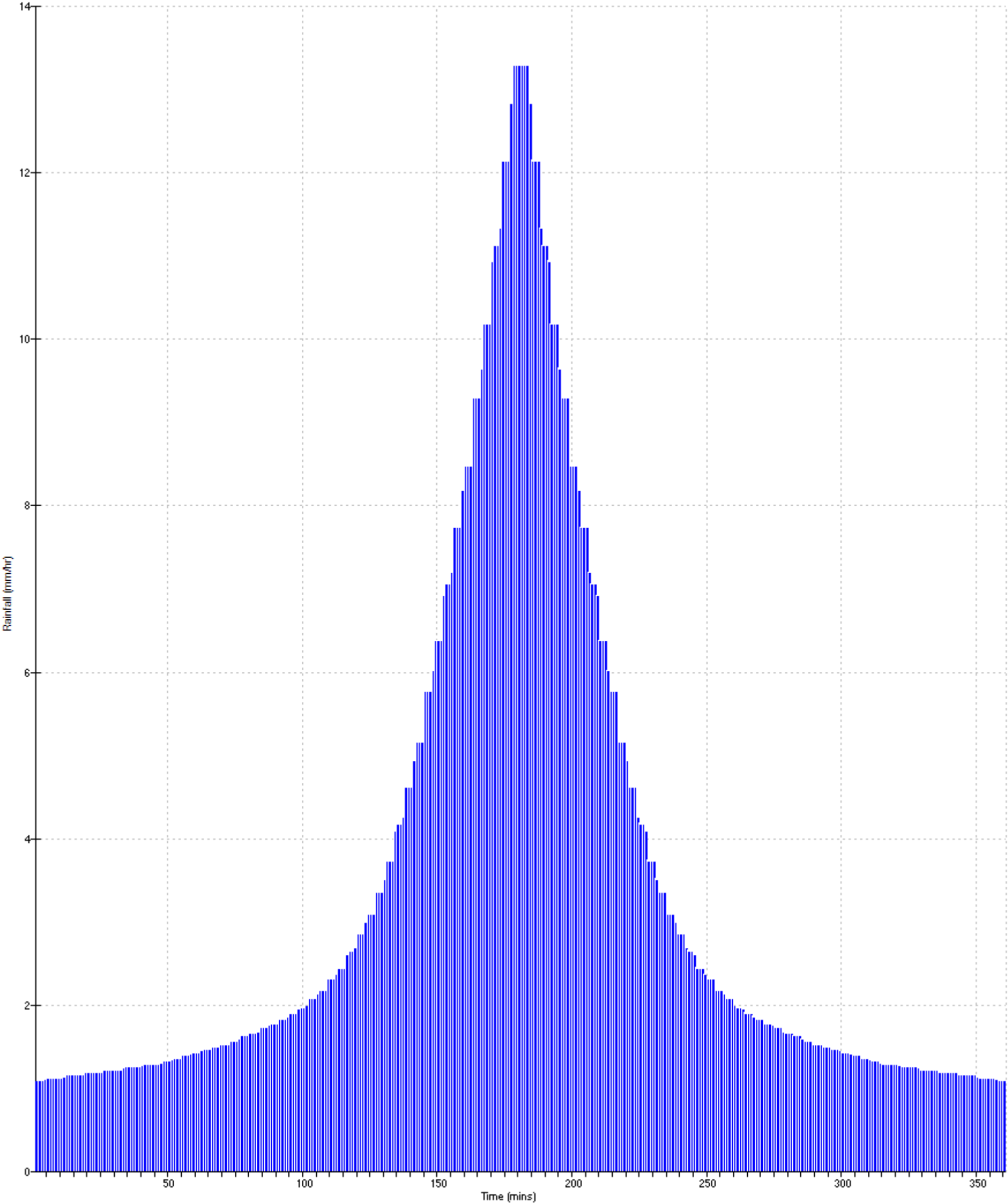
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Rainfall profile

Storm duration (mins) 360

FEH Data

C (1km)	-0.027
D1 (1km)	0.429
D2 (1km)	0.268
D3 (1km)	0.382
E (1km)	0.309
F (1km)	2.244
Peak Intensity (mm/hr)	13.290
Ave. Intensity (mm/hr)	3.390
Return Period (years)	1

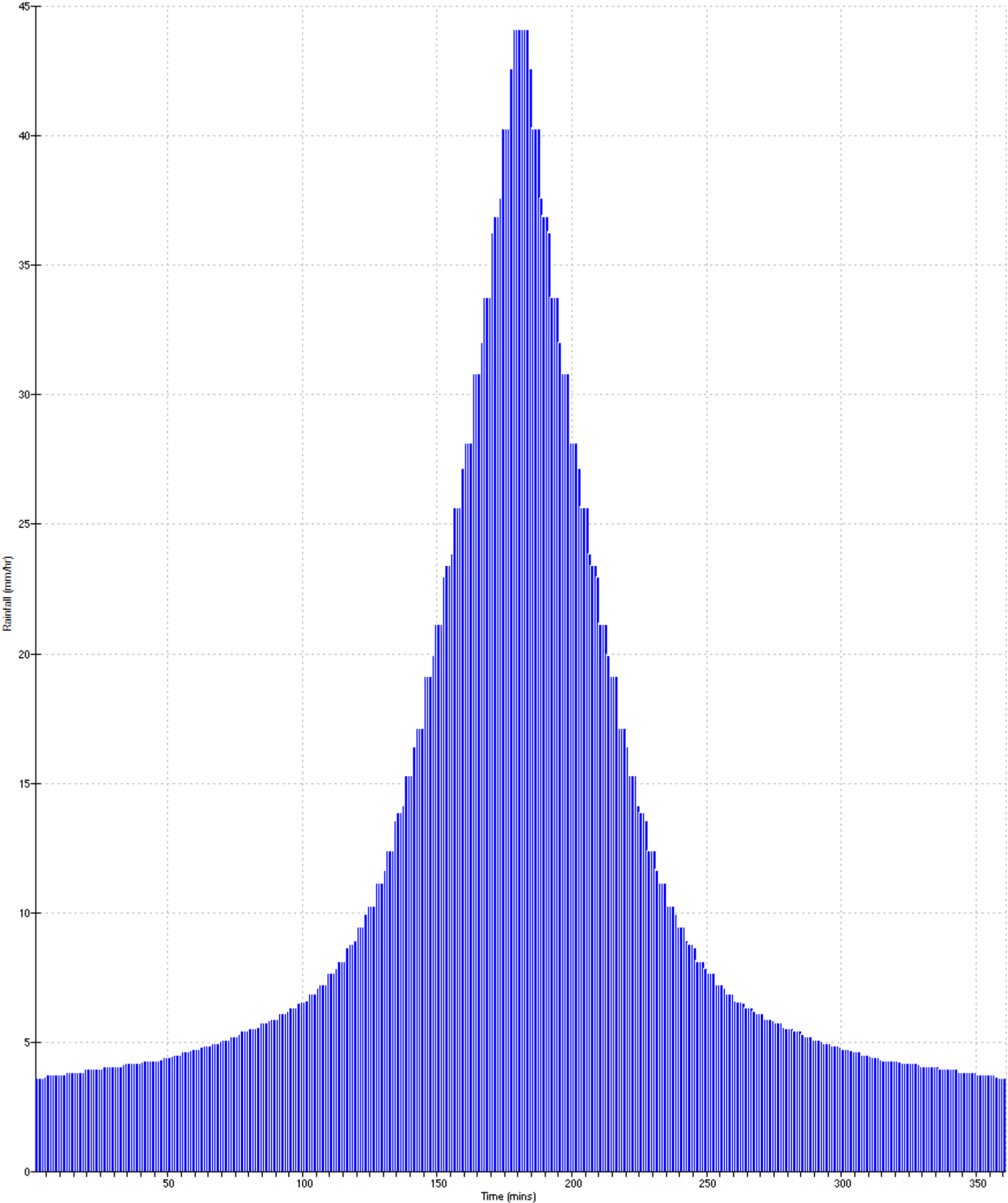


Rainfall profile

Storm duration (mins) 360

FEH Data

C (1km)	-0.027
D1 (1km)	0.429
D2 (1km)	0.268
D3 (1km)	0.382
E (1km)	0.309
F (1km)	2.244
Peak Intensity (mm/hr)	44.075
Ave. Intensity (mm/hr)	11.244
Return Period (years)	100



Betts Associates Ltd		Page 1
Old Marsh Farm Barns	12 Wittering Road	
Welsh Road Sealand	Hayling Island	
Flintshire CH5 2LY	Yeates Design	
Date 29.04.2013	Designed by CP	
File	Checked by	
Micro Drainage	Source Control W.12.6.1	

ICP SUDS Mean Annual Flood

Input

Return Period (years) 1 SAAR (mm) 680 Urban 0.000
Area (ha) 0.092 Soil 0.295 Region Number Region 7

Results 1/s

QBAR Rural 0.2
QBAR Urban 0.2

Q1 year 0.1

Q1 year 0.1
Q30 years 0.4
Q100 years 0.5

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Old Marsh Farm Barns	12 Wittering Road																																			
Welsh Road Sealand	Hayling Island																																			
Flintshire CH5 2LY	Yeates Design																																			
Date 29.04.2013	Designed by CP																																			
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Micro Drainage	Source Control W.12.6.1																																			
Greenfield Runoff Volume FEH Data <table><tr><td>Return Period (years)</td><td>1</td></tr><tr><td>Storm Duration (mins)</td><td>360</td></tr><tr><td>Site Location</td><td>GB 477150 98550 SZ 77150 98550</td></tr><tr><td>C (1km)</td><td>-0.027</td></tr><tr><td>D1 (1km)</td><td>0.429</td></tr><tr><td>D2 (1km)</td><td>0.268</td></tr><tr><td>D3 (1km)</td><td>0.382</td></tr><tr><td>E (1km)</td><td>0.309</td></tr><tr><td>F (1km)</td><td>2.244</td></tr><tr><td>Areal Reduction Factor</td><td>1.00</td></tr><tr><td>Area (ha)</td><td>0.056</td></tr><tr><td>SAAR (mm)</td><td>680</td></tr><tr><td>CWI</td><td>101.400</td></tr><tr><td>SPR Host</td><td>29.520</td></tr><tr><td>URBEXT (1990)</td><td>0.0980</td></tr></table> Results <table><tr><td>Percentage Runoff (%)</td><td>26.42</td></tr><tr><td>Greenfield Runoff Volume (m³)</td><td>3.009</td></tr></table>			Return Period (years)	1	Storm Duration (mins)	360	Site Location	GB 477150 98550 SZ 77150 98550	C (1km)	-0.027	D1 (1km)	0.429	D2 (1km)	0.268	D3 (1km)	0.382	E (1km)	0.309	F (1km)	2.244	Areal Reduction Factor	1.00	Area (ha)	0.056	SAAR (mm)	680	CWI	101.400	SPR Host	29.520	URBEXT (1990)	0.0980	Percentage Runoff (%)	26.42	Greenfield Runoff Volume (m³)	3.009
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APPENDIX I: STORMWATER STORAGE ESTIMATES

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STORMWATER STORAGE ESTIMATES

Micro Drainage		Variables	
		FEH Rainfall	Cv (Summer) 0.750
		Return Period (years) 1	Cv (Winter) 0.840
			Impermeable Area (ha) 0.041
Variables		Site Location	Maximum Allowable Discharge (l/s) 5.0
		GB 477150 98550 SZ 77150 98550 ...	
Results		C (1km) -0.027 D3 (1km) 0.382	
Design		D1 (1km) 0.429 E (1km) 0.309	Infiltration Coefficient (m/hr) 0.00000
Overview 2D		D2 (1km) 0.268 F (1km) 2.244	Safety Factor 2.0
Overview 3D			Climate Change (%) 0
Vt			

Micro Drainage		Results
		Global Variables require approximate storage of between 0.0 m³ and 0.4 m³.
		These values are estimates only and should not be used for design purposes.
Variables		
Results		
Design		
Overview 2D		
Overview 3D		
Vt		

Micro Drainage		Variables	
Variables Results Design Overview 2D Overview 3D Vt	FEH Rainfall		Cv (Summer) 0.750
	Return Period (years) 30		Cv (Winter) 0.840
	Site Location GB 477150 98550 SZ 77150 98550 ...		Impermeable Area (ha) 0.041
	C (1km) -0.027	D3 (1km) 0.382	Maximum Allowable Discharge (l/s) 5.0
	D1 (1km) 0.429	E (1km) 0.309	Infiltration Coefficient (m/hr) 0.00000
	D2 (1km) 0.268	F (1km) 2.244	Safety Factor 2.0
			Climate Change (%) 0

Micro Drainage		Results	
Variables Results Design Overview 2D Overview 3D Vt	Global Variables require approximate storage of between 1.1 m³ and 4.6 m³. These values are estimates only and should not be used for design purposes.		

Micro Drainage		Variables	
Variables Results Design Overview 2D Overview 3D Vt	FEH Rainfall		Cv (Summer) 0.750
	Return Period (years) 100		Cv (Winter) 0.840
	Site Location GB 477150 98550 SZ 77150 98550 ...		Impermeable Area (ha) 0.041
	C (1km) -0.027	D3 (1km) 0.382	Maximum Allowable Discharge (l/s) 5.0
	D1 (1km) 0.429	E (1km) 0.309	Infiltration Coefficient (m/hr) 0.00000
	D2 (1km) 0.268	F (1km) 2.244	Safety Factor 2.0
			Climate Change (%) 30

Micro Drainage		Results
Variables Results Design Overview 2D Overview 3D Vt	Global Variables require approximate storage of between 6.1 m³ and 12 m³. These values are estimates only and should not be used for design purposes.	

APPENDIX J: SFRA INFORMATION

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6 Conclusions and Recommendations

6.1 Introduction

The purpose of an SFRA is to provide a flood risk dataset to inform strategic decisions on spatial planning rather than to interpret the data and draw conclusions on managing flood risk. There are however, some key conclusions and recommendations that can be drawn from the process of developing this SFRA, and these are summarised in this chapter.

6.2 Conclusions

6.2.1 Feasibility of PUSH Housing Target

- The statistical analysis undertaken during Stage 1 of the SFRA concluded that the draft SEP housing target of 80,000 new dwellings in the PUSH sub-region by 2026 is feasible, with regard to flood risk, when assessed at the sub-regional level. This is due to the amount of Greenfield land available in Flood Zone 1.
- However, when assessed at the LPA area scale, some of the housing targets may not be feasible due to the extent of the Flood Zones 2 and 3 within some LPA areas. In particular, the administrative areas of Portsmouth, Southampton and Gosport are significantly constrained by the extent of Flood Zones 2 and 3.
- The large scale of the development required to meet the SEP objectives may result in pressure to locate new development within Flood Zones 2 and 3 for some LPA areas. To avoid or relieve this pressure, consideration may need to be given to revising the distribution of dwellings across the LPA areas to ensure that the individual LPA housing targets are feasible in terms of flood risk constraints.

6.2.2 Flood Risk

The Guidance Documents provided in Appendix C provide an overview of flood risk issues specific to each LPA. Across the sub-region the following broad conclusions can be drawn:

- The sub-region is exposed to flood risk from a number of sources. Flooding from the sea, due to extreme tides, is the predominant source of flood risk, due to the location of some of the sub-region's most populated areas on low lying coastlines in Portsmouth, Southampton, Gosport, Havant, Fareham, Eastleigh and the New Forest. All of the PUSH LPAs contain areas at risk of flooding from rivers and watercourses, with the Rivers Test, Itchen, Hamble, Meon, Wallington, Hermitage Stream and Lavant Stream passing through existing developed areas. In addition, the coastal frontages of Portsea and Hayling Island have experienced flooding caused by wave overtopping; a number of areas in Winchester, Test Valley and East Hampshire have been affected by groundwater flooding; and flooding due to excessive overland flow has caused significant problems in East Hampshire in the past.
- The sub-region is protected from flooding from the sea by defences along the majority of its coastal frontages. The level of protection afforded by the defences along each frontage varies considerably, with areas such as Portsea Island,

parts of Gosport and Southampton, and Hayling Island generally defended to a higher level than other frontages in the sub-region. There are no significant flood defences on rivers in the sub-region, although localised flood protection measures such as bank protection and maintenance of structures provide benefits in terms of flood risk in a number of locations.

- Climate change poses a significant risk to the sub-region. Predicted sea-level rise over the coming century will reduce the level of protection provided by most of the sub-region's flood defences and result in the inundation of larger areas by extreme tidal floods. In addition, increasing severity of storm events is predicted to result in an increase in river flood flows, which will subsequently increase the risk of flooding from rivers.
- The SFRA has assessed the sub-region's coastal flood defences based on the level of protection they provide. The SFRA has stopped short, however, of recommending what is an 'appropriate' standard of protection for the sub-region, or for individual LPA areas within the sub-region. During Stage 2 of the SFRA a review of standards of protection was undertaken based on a variety of guidance documents, policy and European best practice in an attempt to identify suitably appropriate standards that may be considered for the sub-region. This review is summarised in the Technical Note provided in Appendix D. It was concluded that appropriate standards of protection should be identified through a comprehensive review of social and economic factors and agreement from the LPAs, Central Government and the Environment Agency and is therefore beyond the scope of this SFRA. However, the SFRA has delivered a dataset that can assist in this assessment by presenting information on current and future indicative standards, the scale of the potential flood hazards and the social vulnerability of the areas at risk.

6.3 Recommendations

6.3.1 General

It is recommended that the Environment Agency and all Local Authorities in the PUSH sub-region give due consideration to the implications of climate change on flood risk across the sub-region. This SFRA provides a number of datasets that indicate, at a high level, the vulnerability of land to rising sea levels, the vulnerability of communities to flood risk and the levels of investment required to maintain defences to protect from flooding from the sea following predicted sea level rise. The SFRA outputs should be used to assess the sustainability of raising existing defences to contend with rising sea levels in a number of areas, particularly where the residual risks of flooding may remain unacceptably high. Such assessments are outside the scope of this SFRA, but the data collated and the high-level datasets produced should provide a sound basis for further studies in this area.

The SFRA outputs should be used to inform a review of existing defence standards and to assist in identifying potentially higher standards that may be more appropriate in light of climate change forecasts. However, the SFRA outputs alone cannot inform such an assessment, as it should include consideration of wider social and economic factors.

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APPENDIX K: NOTES OF LIMITATION

The data essentially comprised a study of available documented information from various sources together with discussions with relevant authorities and other interested parties. There may also be circumstances at the site that are not documented. The information reviewed is not exhaustive and has been accepted in good faith as providing representative and true data pertaining to site conditions. If additional information becomes available which might impact our conclusions, we request the opportunity to review the information, reassess the potential concerns and modify our opinion if warranted.

It should be noted that any risks identified in this report are perceived risks based on the available information.

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