



**78 SOUTHWOOD ROAD,  
HAYLING ISLAND**

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**FLOOD RISK ASSESSMENT**

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For

Mr N. Bending  
78 Southwood Road  
Hayling Island  
PO11 9QF

***June 2014***

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HAYLING ISLAND**

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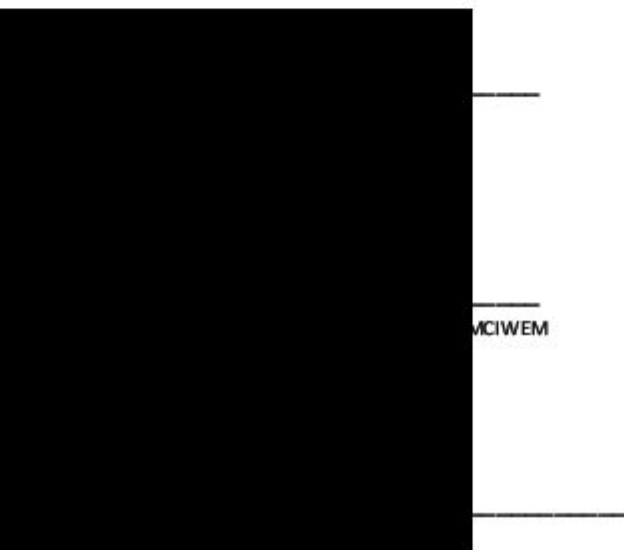
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## EXECUTIVE SUMMARY

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This Flood Risk Assessment was commissioned by Mr N. Bending, 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 Southwood Road.

The site is in an area identified as having a 'very low' to 'low' probability of flooding, the Environment Agency's flood mapping data identifies that the site is located within Flood Zones 1 and 2. The NPPF requires that planning applications for development proposals located within or in close proximity to Flood Zone 2 be accompanied by a Flood Risk Assessment. The residential nature of the development proposals means the classification of the site is 'more vulnerable' from the NPPF Table 2 and this is considered an appropriate development type within Flood Zones 1 and 2.

The site is also identified in the Local Development Framework which states that the site is within the regeneration area, specifically Core Strategy 6.4 (Regeneration of the Borough with reference to South Hayling). The focus being on the seafront boardwalk; the diversity and quality of the properties fronting this area will be of some importance.

As the proposed development is within Flood Zones 1 and 2 and in close proximity to the coast it is proposed that a minimum Finished Floor Level (FFL) be set. The proposed minimum Finished Floor Level should be set at 5.800mAOD, 325mm above the existing FFL (5.475mAOD) and 390mm above the sea wall (5.410mAOD) along the southern boundary.

It is highly recommended that residents sign up to the EA's Flood Warning Service. This will allow valuable advanced warning of any impending flood and 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 this is the only 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.

Consultation with Hampshire County Council highlighted that the site is located within an area susceptible to groundwater flooding however they have no record of flooding in the immediate vicinity of site. The council have also reviewed their Flood Maps for Surface Water (FMfSW) created using both the 1 in 30 and 1 in 200 year annual probability events, the FMfSW separate the level of flood risk into areas that could experience flooding in excess of 100mm and 300mm. Based on this mapping the council have concluded that the site is unlikely to be affected by surface water flooding for the 1 in 30 and 1 in 200 year annual probability of flooding.

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.

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.

## CONTENTS

|                                                           |     |
|-----------------------------------------------------------|-----|
| Document Tracking Sheet.....                              | iii |
| EXECUTIVE SUMMARY .....                                   | v   |
| Figures & Tables .....                                    | 8   |
| Specialist Software .....                                 | 9   |
| Abbreviations & Acronyms .....                            | 9   |
| 1.0 INTRODUCTION.....                                     | 10  |
| 1.1 Planning Policy Context .....                         | 10  |
| 1.2 Site Context.....                                     | 10  |
| 1.3 Consultation .....                                    | 10  |
| 2.0 EXISTING SITE SITUATION .....                         | 11  |
| 2.1 Location.....                                         | 11  |
| 2.2 Existing and Historical Land Use .....                | 11  |
| 2.3 Topography .....                                      | 12  |
| 3.0 DEVELOPMENT PROPOSALS .....                           | 13  |
| 3.1 Nature of the development .....                       | 13  |
| 4.0 SOURCES OF FLOOD RISK.....                            | 14  |
| 4.1 Fluvial & Tidal Flood Risk .....                      | 14  |
| <i>Fluvial Flooding</i> .....                             | 14  |
| <i>Tidal Flooding</i> .....                               | 14  |
| <i>Overtopping</i> .....                                  | 16  |
| <i>Breach</i> .....                                       | 16  |
| <i>Strategic Flood Risk Assessment (SFRA)</i> .....       | 17  |
| <i>Flood Zone Classification</i> .....                    | 18  |
| 4.2 Surface Water Flood Risk.....                         | 18  |
| <i>Sewers</i> .....                                       | 19  |
| <i>Overland Run-off (Pluvial)</i> .....                   | 19  |
| 4.3 Groundwater Flood Risk .....                          | 20  |
| 4.4 Artificial Sources of Flood Risk.....                 | 20  |
| <i>Reservoirs</i> .....                                   | 20  |
| <i>Canals</i> .....                                       | 20  |
| 4.5 Historical Flooding .....                             | 21  |
| 4.6 Flood Risk Mitigation Measures & Residual Risks ..... | 22  |
| <i>Mitigation Measures</i> .....                          | 22  |
| <i>Residual Risks</i> .....                               | 23  |
| 5.0 SURFACE WATER MANAGEMENT .....                        | 24  |
| 5.1 Pre-development Surface Water Run-off.....            | 24  |
| 5.2 Post-development Surface Water Run-off .....          | 24  |
| 5.3 Sustainable Drainage Systems (SuDS).....              | 24  |
| 5.4 Methods of Surface Water Management.....              | 25  |
| 5.5 Discharge via Infiltration .....                      | 25  |
| 5.6 Discharge to Watercourse .....                        | 26  |
| 5.7 Discharge to Sewer .....                              | 26  |
| 5.8 Climate Change .....                                  | 26  |

|             |                                         |    |
|-------------|-----------------------------------------|----|
| 6.0         | FOUL WATER MANAGEMENT .....             | 27 |
| 7.0         | SUMMARY AND CONCLUSIONS .....           | 28 |
| 8.0         | RECOMMENDATIONS .....                   | 30 |
|             | BIBLIOGRAPHY & REFERENCES .....         | 31 |
| APPENDIX A: | LOCATION PLAN .....                     | 33 |
| APPENDIX B: | TOPOGRAPHIC SURVEY .....                | 35 |
| APPENDIX C: | PROPOSED PLANNING LAYOUT .....          | 37 |
| APPENDIX D: | EA INFORMATION & CORRESPONDENCE .....   | 39 |
| APPENDIX E: | FEH CATCHMENT DATA & DESCRIPTORS .....  | 41 |
| APPENDIX F: | SURFACE WATER RUN-OFF CALCULATIONS..... | 43 |
| APPENDIX G: | NPPF EXTRACTS .....                     | 45 |
| APPENDIX H: | SOUTHERN WATER CORRESPONDENCE.....      | 47 |
| APPENDIX I: | LPA/LLFA CORRESPONDENCE .....           | 49 |
| APPENDIX J: | SFRA & PFRA INFORMATION.....            | 51 |
| APPENDIX K: | ESCP CORRESPONDENCE.....                | 53 |
| APPENDIX L: | NOTES OF LIMITATION .....               | 55 |

## Figures & Tables

|           |                                                                 |    |
|-----------|-----------------------------------------------------------------|----|
| Figure 1: | Aerial Photograph of site (Google Maps 2014).....               | 11 |
| Figure 2: | Topographic Survey Extract (Medlams – Surveys 2014).....        | 12 |
| Figure 3: | Planning Layout Extract (MTA Architects Ltd 2014) .....         | 13 |
| Figure 4: | Flood Zone Map Extract (Environment Agency 2014) .....          | 14 |
| Figure 5: | Detailed Flood Zone Map Extract (Environment Agency 2014).....  | 15 |
| Table 1:  | Flood Levels Extract (Environment Agency 2014).....             | 15 |
| Figure 6: | SFRA Defences Map Extract .....                                 | 16 |
| Figure 7: | SFRA Danger from Breaching Map Extract .....                    | 17 |
| Figure 8: | Surface Water Flood Map Extract (Environment Agency 2014) ..... | 19 |
| Figure 9: | Reservoir Flood Map Extract (Environment Agency 2014) .....     | 21 |

## 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    |       |                                          |

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## 1.0 INTRODUCTION

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### 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 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 Zones 1 and 2.

### 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 off Southwood Road.

### 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 D).
- 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 and Havant Borough 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 H).

## 2.0 EXISTING SITE SITUATION

### 2.1 Location

- 2.1.1 The development is accessed off Southwood Road, Hayling Island. The Ordnance Survey National Grid Reference (OS NGR) for the site is 473779 (Easting), 98204 (Northing) and the nearest postcode is PO11 9QF. The site location plan is shown in Appendix A.
- 2.1.2 The site is bounded; to the north by Southwood Road with residential housing beyond, to the east by residential dwellings off Southwood Road, to the south by the promenade, to the west by further residential dwellings and council depot off Southwood Road.
- 2.1.3 The total site area is approximately 1063m<sup>2</sup>, the site is considered to be 46% impermeable (determined from the topographic survey and aerial photographs) for the purposes of determining the pre-development surface water run-off.



### 2.2 Existing and Historical Land Use

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

## 2.3 Topography

- 2.3.1 The site entrance is at a similar level to Southwood Road (3.737mAOD), the levels along the drive up to the property range from 3.726mAOD in the north to 3.837mAOD in the south, the site then steps up to 5.093mAOD and is generally level from the front of the existing property (5.119mAOD) to the southern boundary (5.088mAOD).

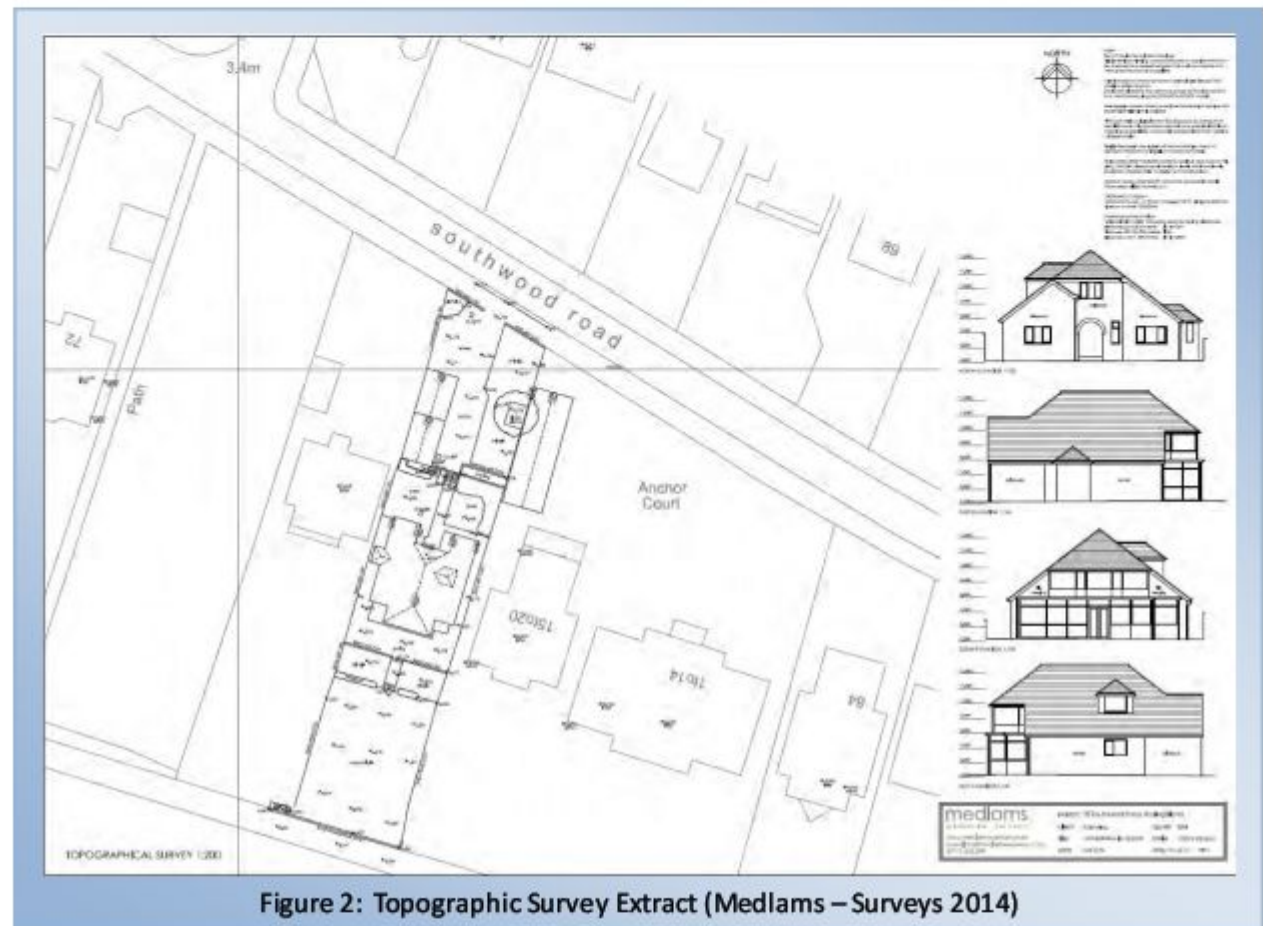


Figure 2: Topographic Survey Extract (Medlams – Surveys 2014)

## 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 1063m<sup>2</sup>, the site is considered to be 46% impermeable; proposed impermeable area of the development will decrease slightly too approximately 463m<sup>2</sup> (44%) of the total site area.

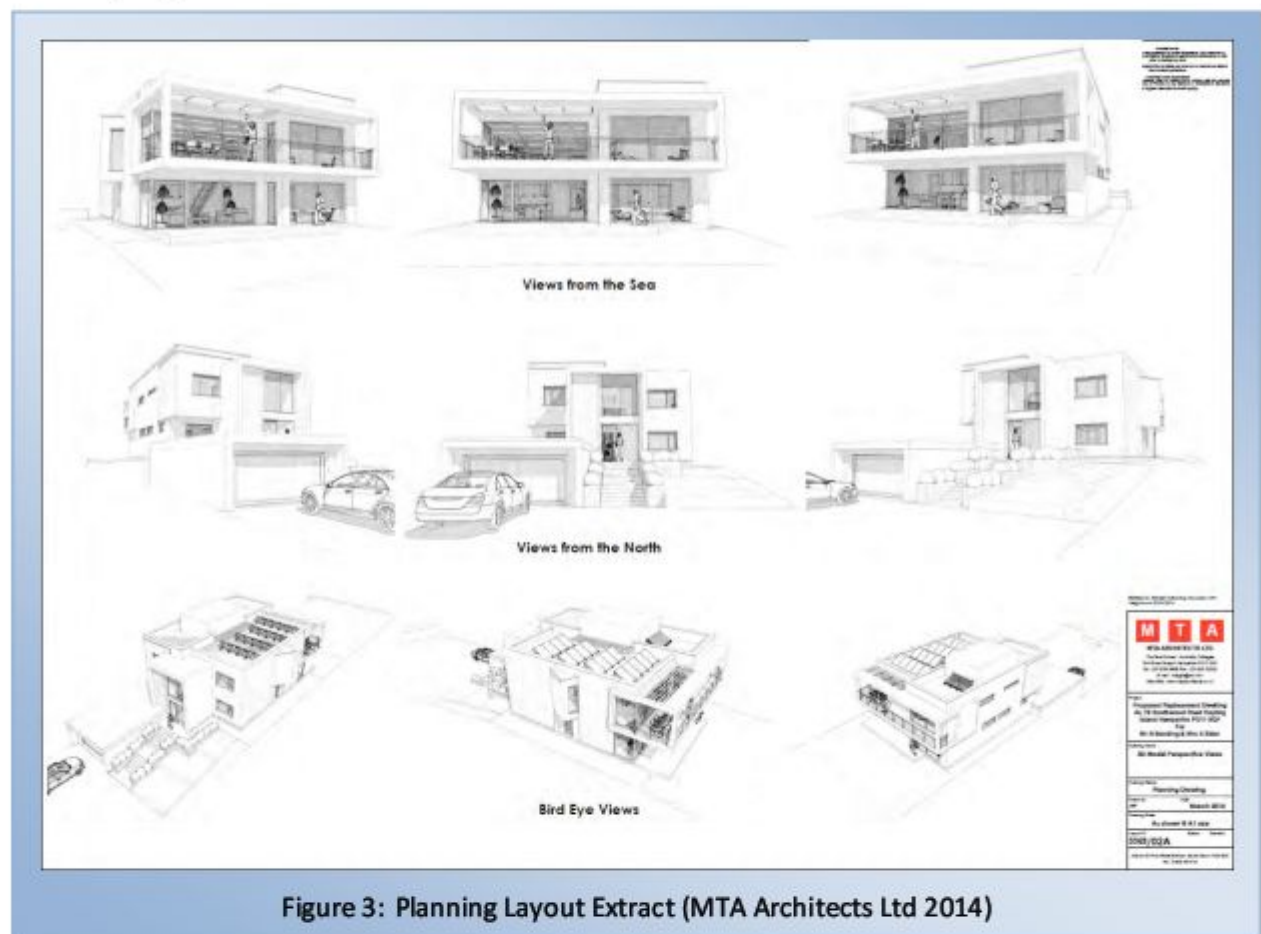
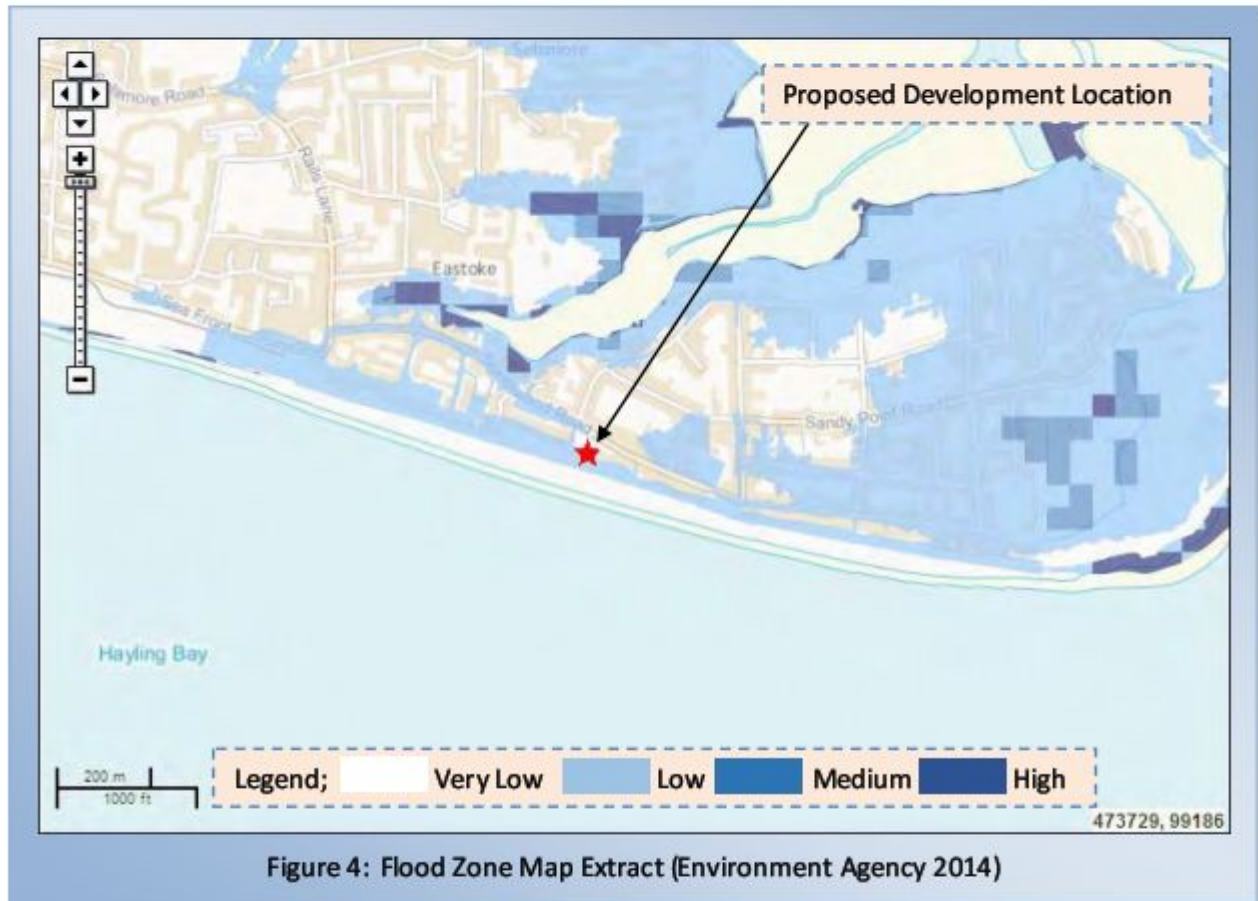


Figure 3: Planning Layout Extract (MTA Architects Ltd 2014)

## 4.0 SOURCES OF FLOOD RISK

### 4.1 Fluvial & Tidal 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 4 (below).

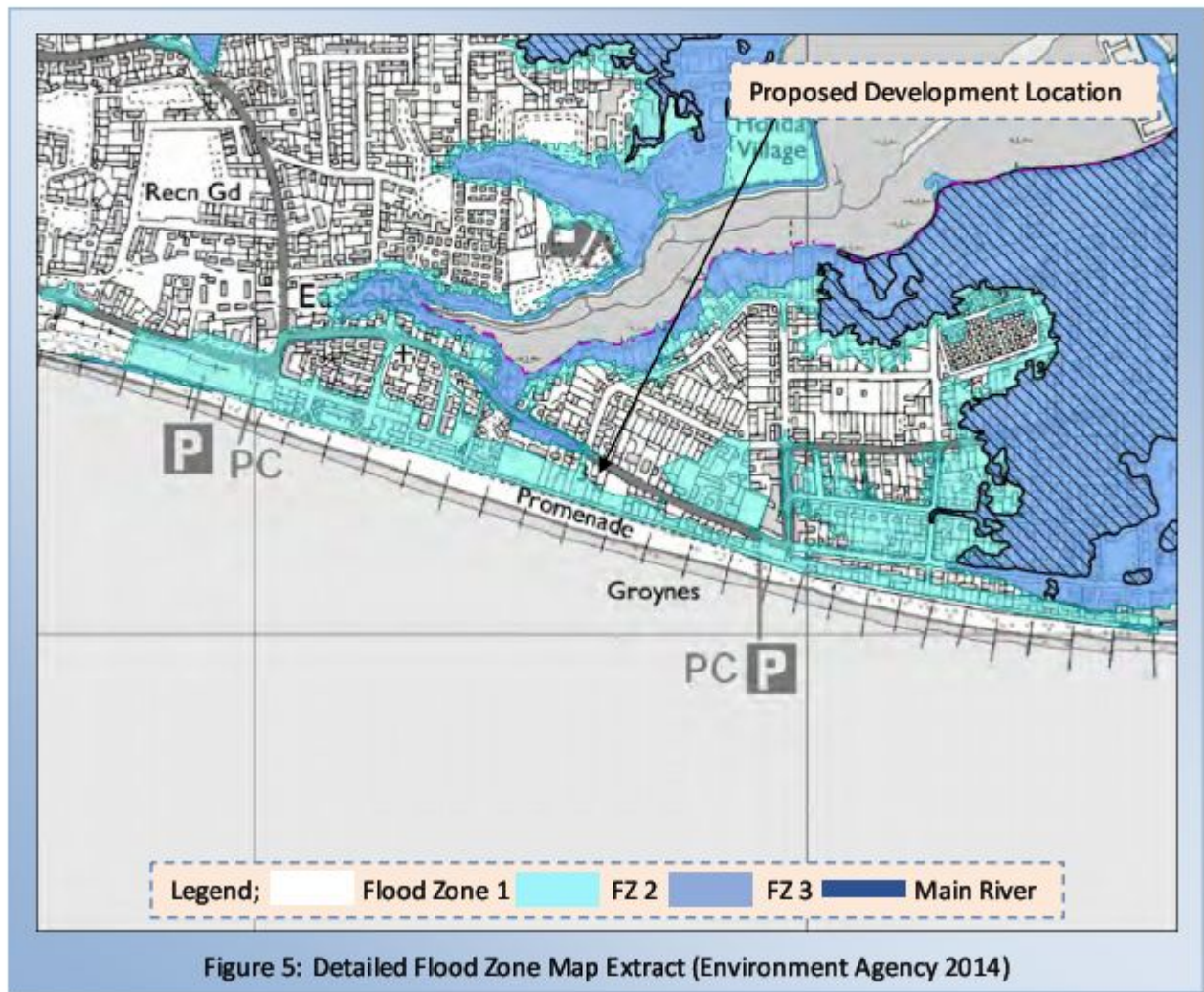


#### ***Fluvial Flooding***

- 4.1.2 The development is considered to be at 'very low' risk of flooding from fluvial sources as there are no watercourses in close proximity to site.

#### ***Tidal Flooding***

- 4.1.3 Examination of the EA's Online Flood Map shows that the site is considered to be at 'very low' to 'low' risk of tidal flooding.
- 4.1.4 The Environment Agency have been able to provide a more detailed Flood Zone plan (Figure 5 subsequent page, also included in Appendix D) which shows the site is located within Flood Zones 1 and 2. The EA have also provided tidal water levels data during the 0.5%AEP (1 in 200yr) event and the 0.1%AEP (1 in 1000yr) event (Table 1 subsequent page).



4.1.5 Figure 5 (above) indicates that the site is located in Flood Zones 1 and 2 with the existing building located within Flood Zone 2 (an area which may have a 0.1% chance of flooding annually (1 in 1000)), ignoring the presence and effect of any defences.

4.1.6 The Environment Agency were able to provide tidal water levels data for the 200yr and 1000yr storm events, included in Table 1 (below).

| 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) |
|      | Uncertainty: +/- 0.3m                                            | Uncertainty: +/- 0.6m                                             |
| 2010 | 3.3                                                              | 3.5                                                               |
| 2070 | 3.8                                                              | 4.0                                                               |
| 2115 | 4.4                                                              | 4.6                                                               |

\*Levels in metres above Ordinance Datum Newlyn

(Based on Data from 2008 base data and projected for climate change)

Table 1: Flood Levels Extract (Environment Agency 2014)

- 4.1.7 The development area is protected by sea wall adjacent to the southern boundary. Details of the defences are highlighted in SFRA map extracts included in Appendix J.
- 4.1.8 The PUSH SFRA Map Set indicates that the development is located within an area which benefits from flood defences (see Figure 6 below). One of these defences is located along the southern boundary in the form of a sea wall with a crest level of 5.410mAOD (taken from the Topographic survey).



Figure 6: SFRA Defences Map Extract

### ***Overtopping***

- 4.1.9 Based on the Sea Wall crest level of 5.410mAOD and a top water level of 4.4mAOD (with a +/- 0.3m uncertainty range) during the 1 in 200yr 2115 event, no overtopping is likely to occur.
- 4.1.10 The peak flood level expected during the 1 in 1000yr 2115 event (4.6mAOD with a +/- 0.6m uncertainty range) is also unlikely to overtop the sea wall.

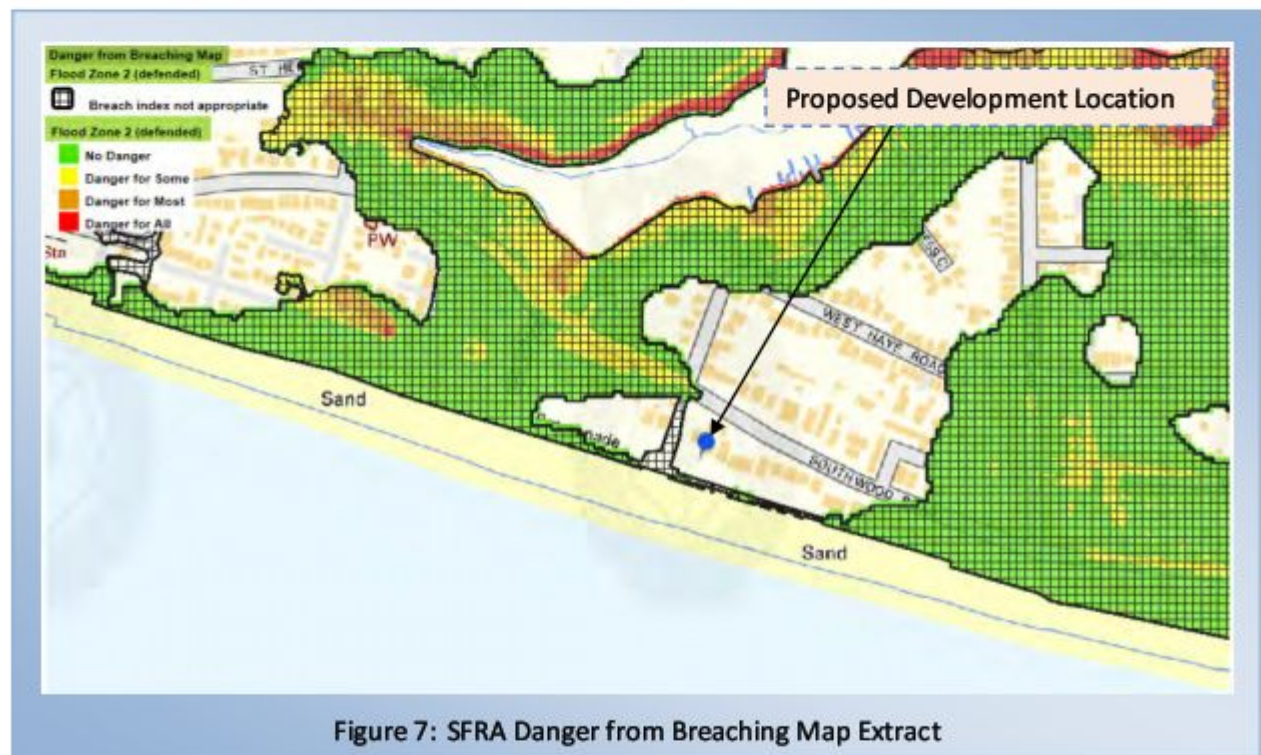
### ***Breach***

- 4.1.11 The site entrance is at a similar level to Southwood Road (3.737mAOD), the level along the drive up to the property is approximately 3.837mAOD, the site then steps up to 5.093mAOD and is generally level from the front of the existing property (5.119mAOD) to the southern boundary (5.088mAOD).
- 4.1.12 The potential peak flood level on site during the 0.5% AEP (1 in 200 year - 2115) event is approximately 863mm on the drive/site entrance, no flooding is expected to the rear of the property.
- 4.1.13 The potential peak flood levels on site during the 0.1% AEP (1 in 1000 year - 2115) event are approximately 1.363m on the drive/site entrance and approximately 112mm to the rear of the property.

- 4.1.14 The primary mitigation measure is the setting of a minimum Finished Floor Level of the proposed dwelling to a minimum level of 5.800m AOD; this is 325mm above the existing FFL (5.475m AOD) and 390mm above the sea wall (5.410m AOD) along the southern boundary.

#### ***Strategic Flood Risk Assessment (SFRA)***

- 4.1.15 Havant Borough Councils have produced a PUSH SFRA Map Set which indicates the impact of various flood events, hazards and details of structures and investment. (Relevant mapping is included in Appendix J)
- 4.1.16 Figure 7 (below) shows the Danger from Breaching Map during the 1 in 1000yr event (defended), this map shows that the site is considered to be at very low risk of a breach in defences.



- 4.1.17 The site is not shown to be within Tidal Flood Zones 2 or 3 when Climate Change is applied to year 2025 and 2055.
- 4.1.18 Tidal FZ2 does encroach on to the northern half of site (the drive and site entrance) and isolates the development during times of flooding, when Climate Change is applied for the year 2085 and 2115.
- 4.1.19 The Wave Energy Maps show that the moderate Wave Energy Frontage is located along the southern boundary and that the site is beyond the low Wave Energy Frontage, however historic wave overtopping from events in 1989 are shown to have impacted on the proposed development area.
- 4.1.20 There are two defences protecting site, one to the southern boundary and one some 235m to the north. Both of these existing defences are considered to have a crest/tide protection in excess of the 1000 year event (present day).

- 4.1.21 Mapping indicating investment to provide 200 year event crest/tide protection for the present day flood events shows that there is to be no investment to the defences along the southern boundary and to the defences to the north. The crest/tide level of the southern boundary defence is considered to offer in excess of the 1000 year event protection for the present day flood events.

The potential investment to provide crest/tide 200 year event protection for 2115 climate change event is considered to be 'none' for the defence along the southern boundary and 'low' for the defence to the north. The crest/tide level of the southern boundary defence is considered to offer in excess of the 1000 year event protection in 2115, however the defences to the north are considered to offer less 20 year event protection in 2115.

- 4.1.22 Although the site lies partially within Flood Zone 2 and may be adversely affected by climate change, the presence of the existing sea defences reduce this risk, especially when there is the potential for investment to improve defences in the area. It must be acknowledged that some residual risk exists from a breach or overtopping of the defences it is considered that the measures discussed within this report would adequately mitigate this risk.
- 4.1.23 There are a large number of existing residential dwellings on Hayling Island that fall fully within Flood Zone 2 and also a significant number in Flood Zone 3 and therefore it is likely that defences in the area will be maintained to a high standard.

#### ***Flood Zone Classification***

- 4.1.24 Examination of the Flood Map shows that the site is located within Flood Zones 1 and 2, and is summarised to be at 'very low' to 'low' risk (refer to Appendix F for details); Appendix D shows the online flood map and statement in full.
- 4.1.25 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 Zones 1 and 2.

## **4.2 Surface Water Flood Risk**

- 4.2.1 Surface Water flooding occurs when rainwater is unable to drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. The blue shading on Figure 8 (subsequent page) shows the varying risk of flooding from surface water.
- 4.2.2 The proposed development area is within an area considered to be at 'Very Low' flood risk from surface water. The PUSH SFRA maps also indicate that the dwelling is not within an area considered to be susceptible to surface water flooding.



### ***Sewers***

- 4.2.2 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.
- 4.2.3 Consultation with various parties has not identified any existing sewer flood risk issues or historical flooding of the immediate site area.

### ***Overland Run-off (Pluvial)***

- 4.2.4 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.
- 4.2.5 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 hard standing; 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.

- 4.2.6 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.

### **4.3 Groundwater Flood Risk**

- 4.3.1 In general terms groundwater flooding can occur from three main sources: - raised water tables, seepage and percolation and groundwater recovery or rebound.
- 4.3.2 If groundwater levels are naturally close to the surface then this can present a flood risk during times of intense rainfall. 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.
- 4.3.3 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.
- 4.3.4 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.

### **4.4 Artificial Sources of Flood Risk**

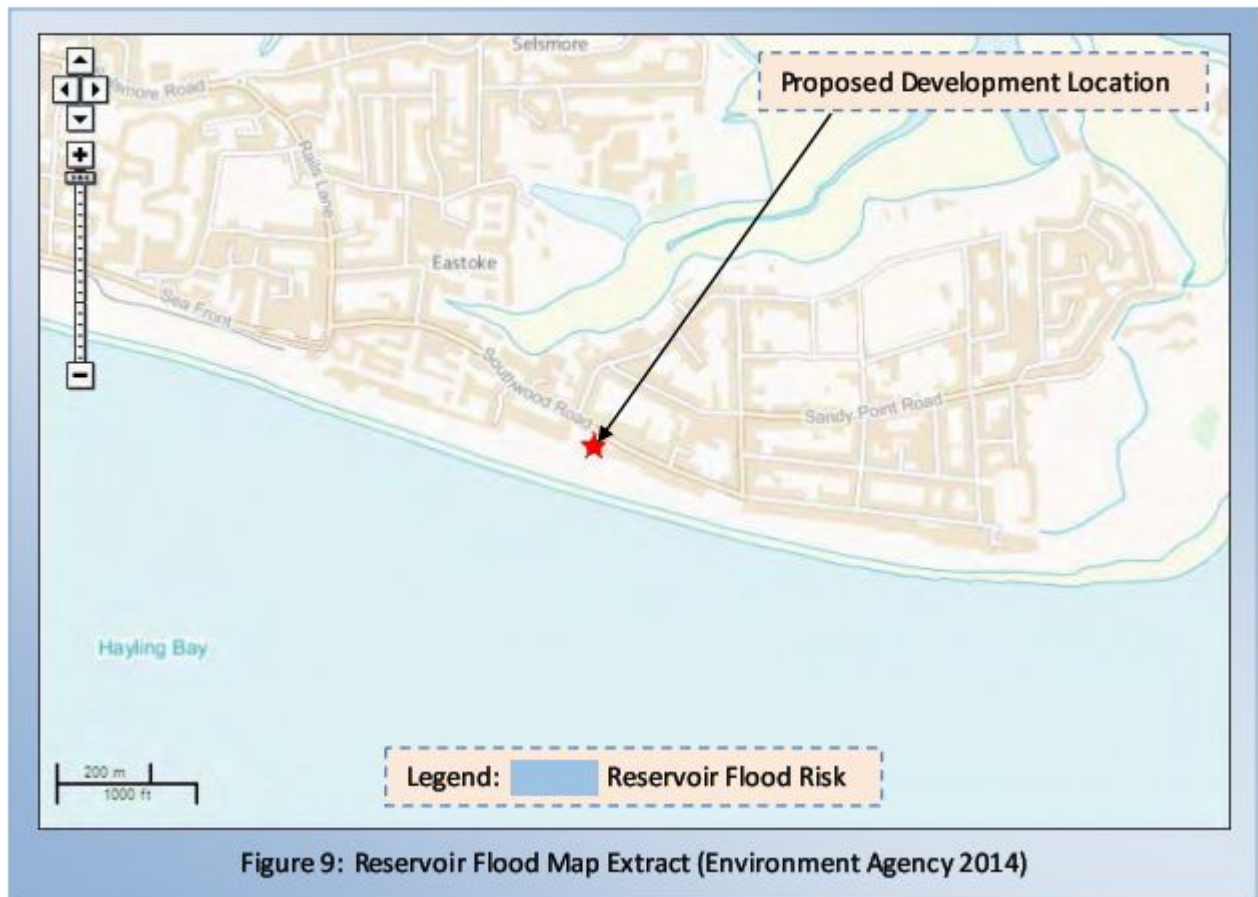
- 4.4.1 Figure 8 (subsequent page) shows an extract of the EA's online Reservoir flood map; Appendix D shows the EA's reservoir flood map in full.

#### ***Reservoirs***

- 4.4.2 Due to the site location and elevation relative to any reservoirs the risk of flooding from this source is considered low; as indicated in Figure 9 (subsequent page).
- 4.4.3 It should be noted that the risk of catastrophic failure of any reservoir is considered to be very low, as reservoirs are such major assets; it is understood that there are appropriate maintenance regimes and regular reviews undertaken confirming integrity of the embankments.

#### ***Canals***

- 4.4.4 There are no canals within the immediate vicinity of the proposed development, as such the risk from this source is considered to be 'very low'.



## 4.5 Historical Flooding

- 4.5.1 An Internet based search for flooding events did not recall any historical flooding in the immediate site area.
- 4.5.2 Consultation with Hampshire County Council highlighted that the site is located within an area susceptible to groundwater flooding however they have no record of flooding in the immediate vicinity of site. The council have also reviewed their Flood Maps for Surface Water (FMfSW) created using both the 1 in 30 and 1 in 200 year annual probability events, the FMfSW separate the level of flood risk into areas that could experience flooding in excess of 100mm and 300mm. Based on this mapping the council have concluded that the site is unlikely to be affected by surface water flooding for the 1 in 30 and 1 in 200 year annual probability of flooding.
- 4.5.3 The Environment Agency have provided a Flood Incident Report (included in Appendix D) produced by Havant Borough Council following events in November 2005. Flooding occurred as a result of high tides and large Atlantic swells overtopping the most vulnerable defences on the southern frontage of the Eastoke Peninsula. This resulted in several temporary road closures (approximately 4 hours) due to ponding of flood water which was unable to drain via surface water drainage system until the tide levels in Chichester Harbour lowered sufficiently. It is understood that during this event only a small number of residential properties experienced internal flooding.
- 4.5.4 The frequency of flood incidents and scale of damage has been significantly reduced since the implementation of a Beach Replenishment/Nourishment Scheme and the Council has been committed to exercising its permissive powers under the Coast Protection Act to manage this

risk further details are included within Appendix D. However, it should be remembered that there will always be a risk to people residing in such locations.

- 4.5.3 Review of the Strategic Flood Risk Assessment (SFRA) PUSH mapping highlighted events in 1989 which resulted in flooding of the rear garden. Recent storm events in late 2013 resulted in similar flooding of the rear garden but no flood waters encroached into the existing dwelling; some mapping information has been included within Appendix I indicating this.

## **4.6 Flood Risk Mitigation Measures & Residual Risks**

- 4.6.1 As the development is located in flood zones 1 and 2, and in close proximity to the coast it is proposed that a minimum Finished Floor Level be set.

### ***Mitigation Measures***

- 4.6.2 It is proposed that a minimum Finished Floor Level (FFL) should be set as the site is located within Flood Zones 1 and 2, and in close proximity to the coast. Therefore it is proposed that a minimum Finished Floor Level should be set at 5.800mAOD, 325mm above the existing FFL (5.475mAOD) and 390mm above the sea wall (5.410mAOD) along the southern boundary.
- 4.6.3 As the proposed development is 2 storeys the 1<sup>st</sup> floor can provide a place of safe refuge in the event of an extreme flood event.
- 4.6.4 Defending ground floor openings can be achieved by using temporary barriers, non-return valves and wet-proofing. Temporary barriers consist of moveable flood defences which can be fitted into doorways and/or windows. The permanent fixings required to install the temporary defence should be discrete and keep architectural impact to a minimum. Any other opening such as air bricks and vents can either be fitted with temporary covers or non-return valves.
- 4.6.5 Wet-proofing of the interior design reduces the damage caused by flooding and ideal should include; electrical circuitry installed at higher level with power cable being carried down from the ceiling rather than up from the floor. In addition using water-resistant materials for floors, walls and fixtures will minimise damage should any internal flooding occur.
- 4.6.6 Non-return flap valves on the private drainage system to prevent internal flooding should also be installed; these should be regularly maintained to avoid blockage.
- 4.6.7 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.
- 4.6.8 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.
- 4.6.9 To minimise the flood risk to the proposed dwellings and neighboring property 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.
- 4.6.10 It is highly recommended that the EA's Flood Warning Service is signed up to. This will allow valuable advanced warning of any impending flood and 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.

#### ***Residual Risks***

- 4.6.11 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.
- 4.6.12 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.
- 4.6.13 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.

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## **5.0 SURFACE WATER MANAGEMENT**

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### **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 Brownfield; the total area of the site is 1063m<sup>2</sup> (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 1.9l/s based on an area of 487m<sup>2</sup>.
- 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 46.8m<sup>3</sup>; 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 and sustainable approach being adopted means that there will be a reduction in the impermeable area of the site, resulting in a reduction 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 463m<sup>2</sup>, approximately 44% of the total development area.
- 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 40.1m<sup>3</sup>; 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 inclusion of SUDs (i.e. water harvesting, permeable paving) in the design of the site would ensure that the development would not increase the risk of flooding elsewhere.

## 5.4 Methods of Surface Water Management

- 5.4.1 At present the site is Brownfield; the total site area is 1063m<sup>2</sup> and is considered to be 46% impermeable.
- 5.4.2 The proposed impermeable area of the development is approximately 44% 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:** Wittering Formation - Sand, Silt and Clay. Sedimentary Bedrock formed approximately 40 to 56 million years ago in the Palaeogene Period. Local environment previously dominated by shallow seas.

**Setting:** shallow seas. These rocks were formed in shallow seas with mainly siliciclastic sediments (comprising of fragments or clasts of silicate minerals) deposited as mud, silt, sand and gravel.

**1:50 000 scale superficial deposits description:** Storm Beach Deposits - Gravel. Superficial Deposits formed up to 3 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.

- 5.2.3 The National Soil Resources Institute (NSRI) indicates that the site is located in a classification of, 'wet, acid meadows and woodland'. Drainage is considered to be impeded.
- 5.2.4 Based upon the infiltration constraints above it is unlikely that infiltration drainage will be a suitable method of surface water discharge for 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 via the existing connections to the public sewer network, mimicking the pre-development scenario.

## **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.

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## 6.0 FOUL WATER MANAGEMENT

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- 6.1 It is proposed that foul water flows will discharge via the existing connections to the public sewer network. The existing foul drainage infrastructure will be re-used as much as feasibly possible subject to condition and capacity analysis.
- 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).

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## 7.0 SUMMARY AND CONCLUSIONS

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- 7.1 The Flood Risk Assessment has been prepared to support an outline planning application for the replacement of an existing dwelling off Southwood Road.
- 7.2 The preparation of this report has been undertaken in consultation with the following interested parties; Havant Borough Council, Hampshire County Council, the Environment Agency and Southern Water.
- 7.3 The residential nature of the development proposals means the classification of the site is 'more vulnerable' from the NPPF Table 2 and this is considered an appropriate development type within Flood Zones 1 and 2.
- 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. Review of the SFRA PUSH mapping revealed that the rear of the development was affected by tidal flooding in 1989.
- 7.6 The Environment Agency have provided a Flood Incident Report produced by Havant Borough Council following events in November 2005 (included in Appendix D). The frequency of similar flood incidents and scale of damage has been significantly reduced since the implementation of a Beach Replenishment/Nourishment Scheme and the Council has been committed to exercising its permissive powers under the Coast Protection Act to manage this risk, further details are included within Appendix D. However, it should be remembered that there will always be a risk to people residing in such locations.
- 7.7 Consultation with Hampshire County Council highlighted that the site is located within an area susceptible to groundwater flooding however they have no record of flooding in the immediate vicinity of site. The council have also reviewed their Flood Maps for Surface Water (FMfSW) created using both the 1 in 30 and 1 in 200 year annual probability events, the FMfSW separate the level of flood risk into areas that could experience flooding in excess of 100mm and 300mm. Based on this mapping the council have concluded that the site is unlikely to be affected by surface water flooding for the 1 in 30 and 1 in 200 year annual probability of flooding.
- 7.8 It is proposed that a minimum Finished Floor Level (FFL) should be set as the site is located within Flood Zones 1 and 2, and in close proximity to the coast. Therefore it is proposed that a minimum Finished Floor Level should be set at 5.800mAOD, 325mm above the existing FFL (5.475mAOD) and 390mm above the sea wall (5.410mAOD) along the southern boundary.
- 7.9 There are a large number of existing residential dwellings on Hayling Island that fall fully within Flood Zone 2 and also a significant number in Flood Zone 3 and it is likely, that defences will be maintained to a high standard. Not to allow the replacement of an existing home on the edge of Flood Zone 2 would send out a message of no confidence in the security from flooding of these existing homes.

- 7.9 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.
- 7.10 It is proposed that the flows generated by the development continue to discharge to the public sewer network, mimicking the pre-development scenario. Due to the reduction of surface water run-off due to the reduction in impermeable area, it is proposed that the flows generated by the development continue to discharge via the existing connections to the public sewer network.
- 7.11 It is 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.
- 7.12 As with any drainage system blockages within either the foul or surface water sewer systems have the potential to cause flooding or disruption.
- 7.13 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.

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## 8.0 RECOMMENDATIONS

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- 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.
- 8.5 It is proposed that a minimum Finished Floor Level should be set at 5.800mAOD, 325mm above the existing FFL and 390mm above the adjacent sea wall.

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CIRIA 523: Sustainable urban drainage systems – best practice manual (2001).  
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Chronology of British Hydrological Events – [www.dundee.ac.uk/](http://www.dundee.ac.uk/)  
CIRIA – <http://www.ciria.org/>  
Cranfield University – <http://www.landis.org.uk/soilscapes/>  
Environment Agency – [www.environment-agency.gov.uk/](http://www.environment-agency.gov.uk/)  
Cheshire West and Chester County Council - <http://www.cheshirewestandchester.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/>  
Welsh Water - <http://www.dwrcymru.com/>

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## **APPENDIX A: LOCATION PLAN**

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## LOCATION PLAN

78 Southwood Road, Hayling Island



|                   |                       |
|-------------------|-----------------------|
| OS X (Eastings)   | 473779                |
| OS Y (Northings)  | 98204                 |
| Nearest Post Code | PO11 9QF              |
| Lat (WGS84)       | N50:46:43 (50.778731) |
| Long (WGS84)      | W0:57:18 (-0.954917)  |
| LR                | SZ737982              |
| mX                | -106300               |
| mY                | 6549123               |

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## **APPENDIX B: TOPOGRAPHIC SURVEY**

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Note:  
Do not Scale from printed drawings  
All dimensions relating to subcontractors or suppliers work must be checked and agreed between the main contractor and the sub-contractors and suppliers.

Although this is a digital survey the accuracy and amount of detail shown is only commensurate with the graphical scale of mapping as specified. Care should be exercised when working to larger scales.

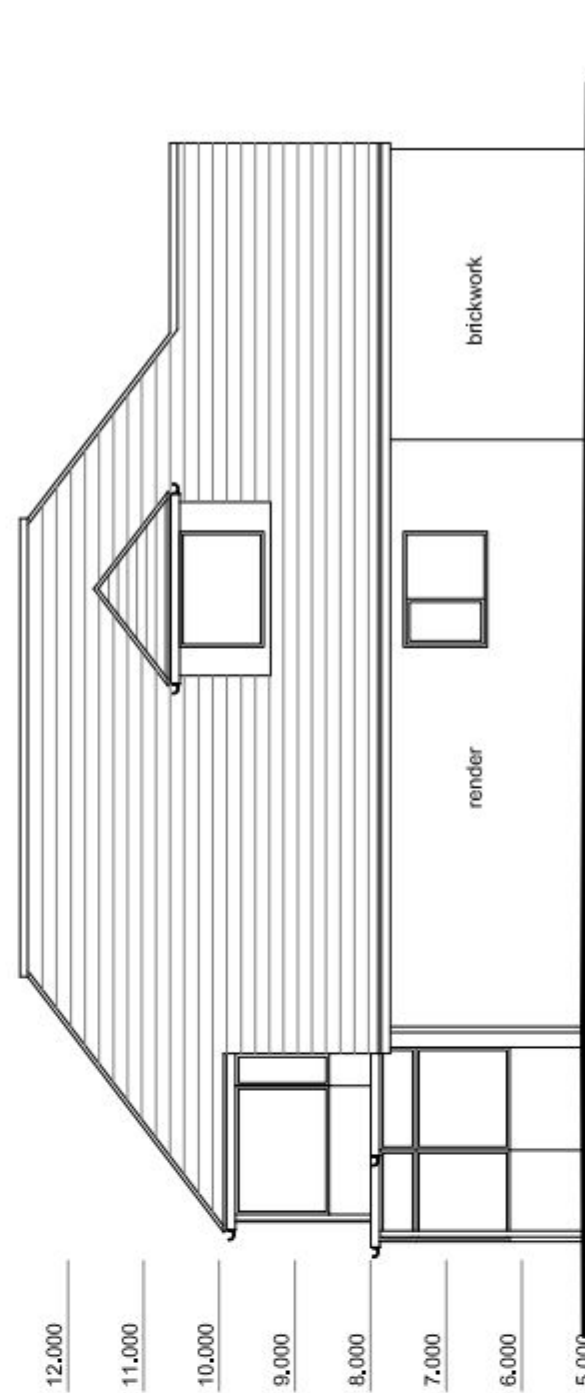
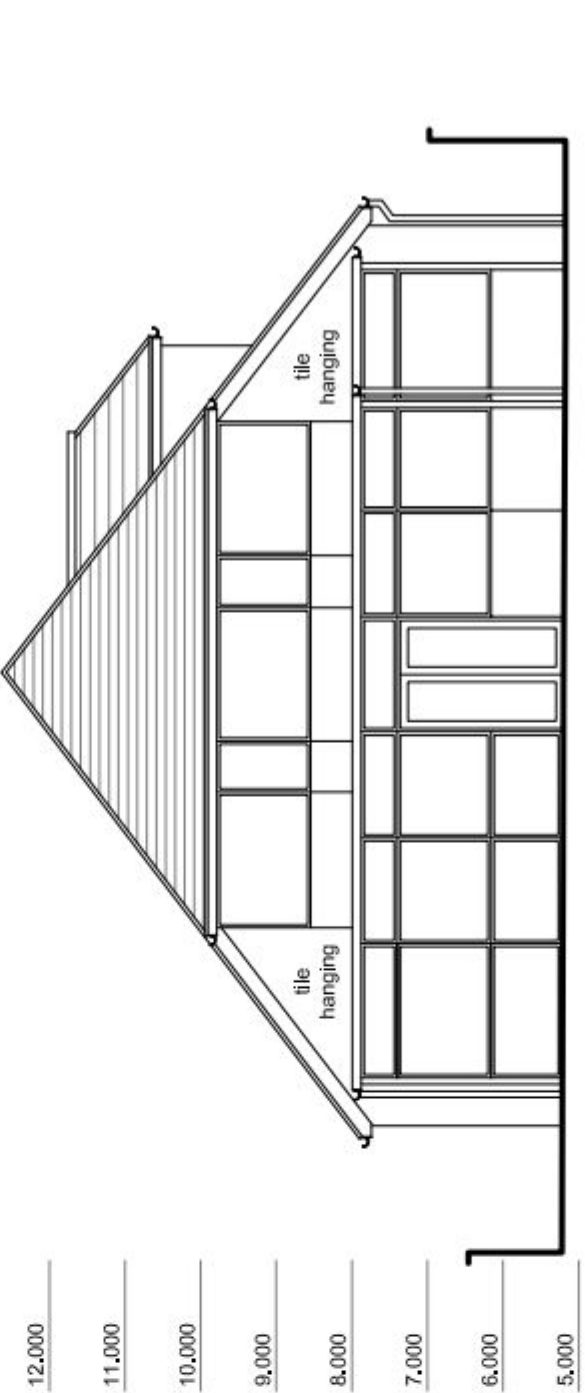
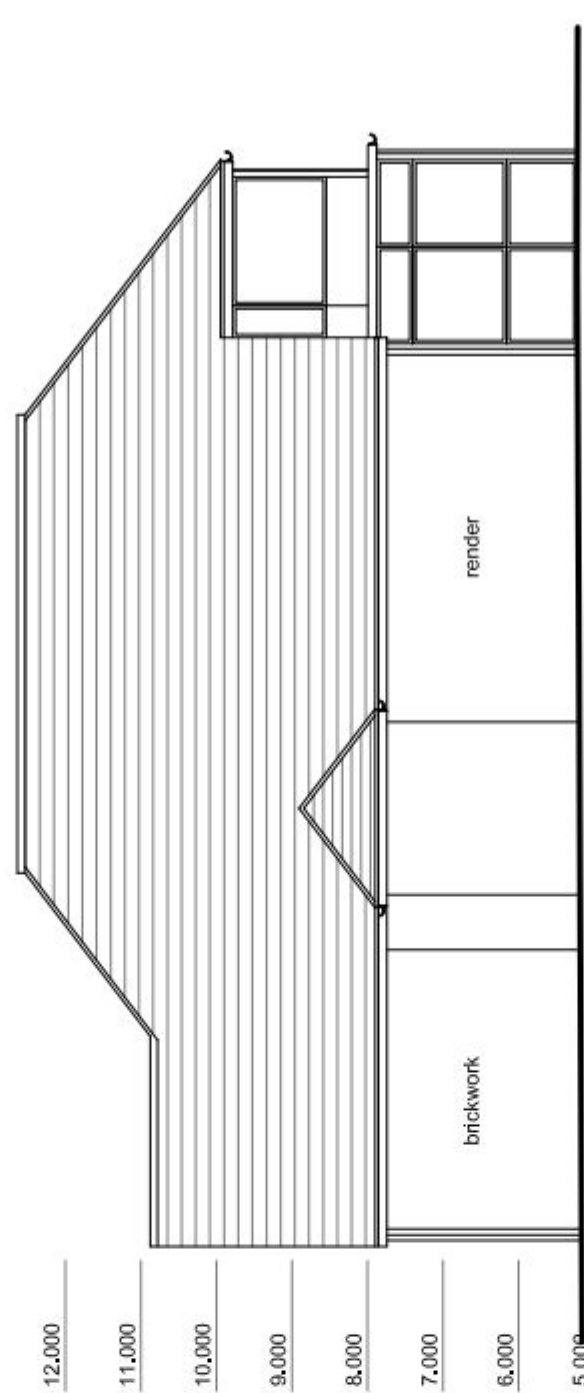
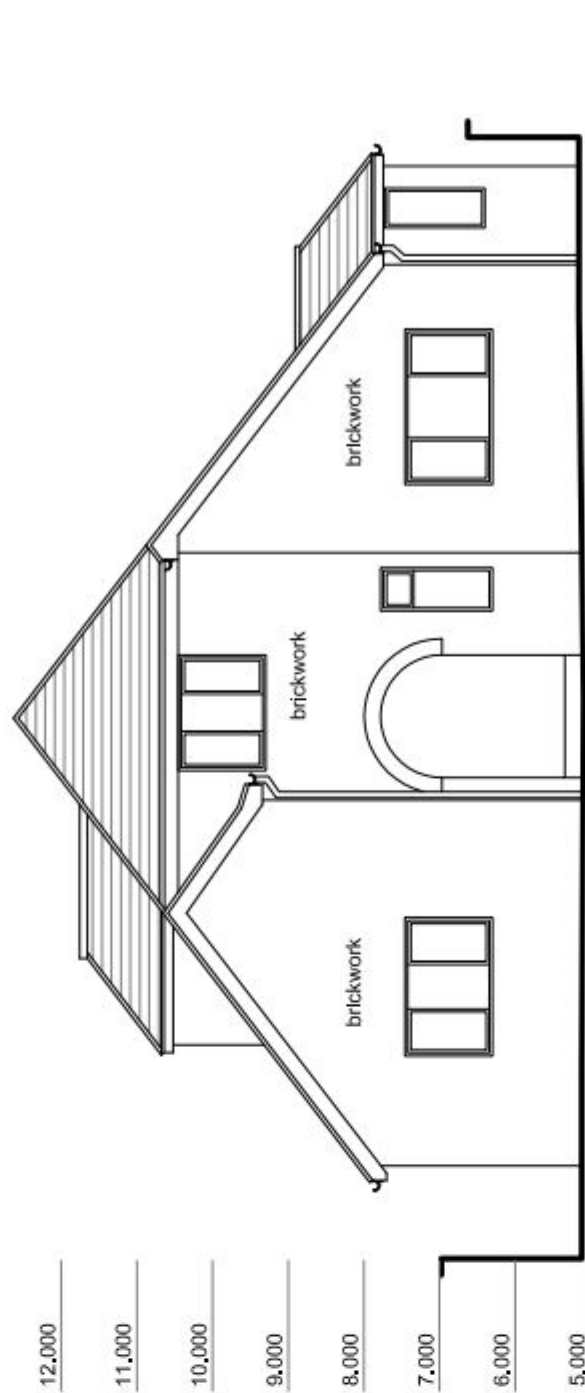
Visible features in the vicinity of the boundaries, may not represent the extent of legally conveyed ownership.

Whilst every effort has been made to achieve accuracy on this plan, CRUCIAL clearance dimensions, levels and invert levels should be checked prior to design and construction.

Areas of dense undergrowth cannot be surveyed in detail, these areas will be shown in out

ORDNANCE OVERLAY  
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Ordnance Survey Overlay  
National Grid 1:2500 (Accuracy data) Surveying tolerances:  
Distances up to 200 metres  $\pm 1$  in 100m  
Distances 200 to 1,000 metres  $\pm 2$ m  
Distances over 1,000 metres  $\pm 1$  in 500m



TOPOGRAPHICAL SURVEY 1:200

**medlams**  
measured surveys  
www.medlams-surveys.co.uk  
bmedlams@medlams-surveys.co.uk  
07717 205 388

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title: TOPOGRAPHICAL SURVEY scale 1:2001:100 @A1  
date Mar 2014 dwg no: EX 01 rev:

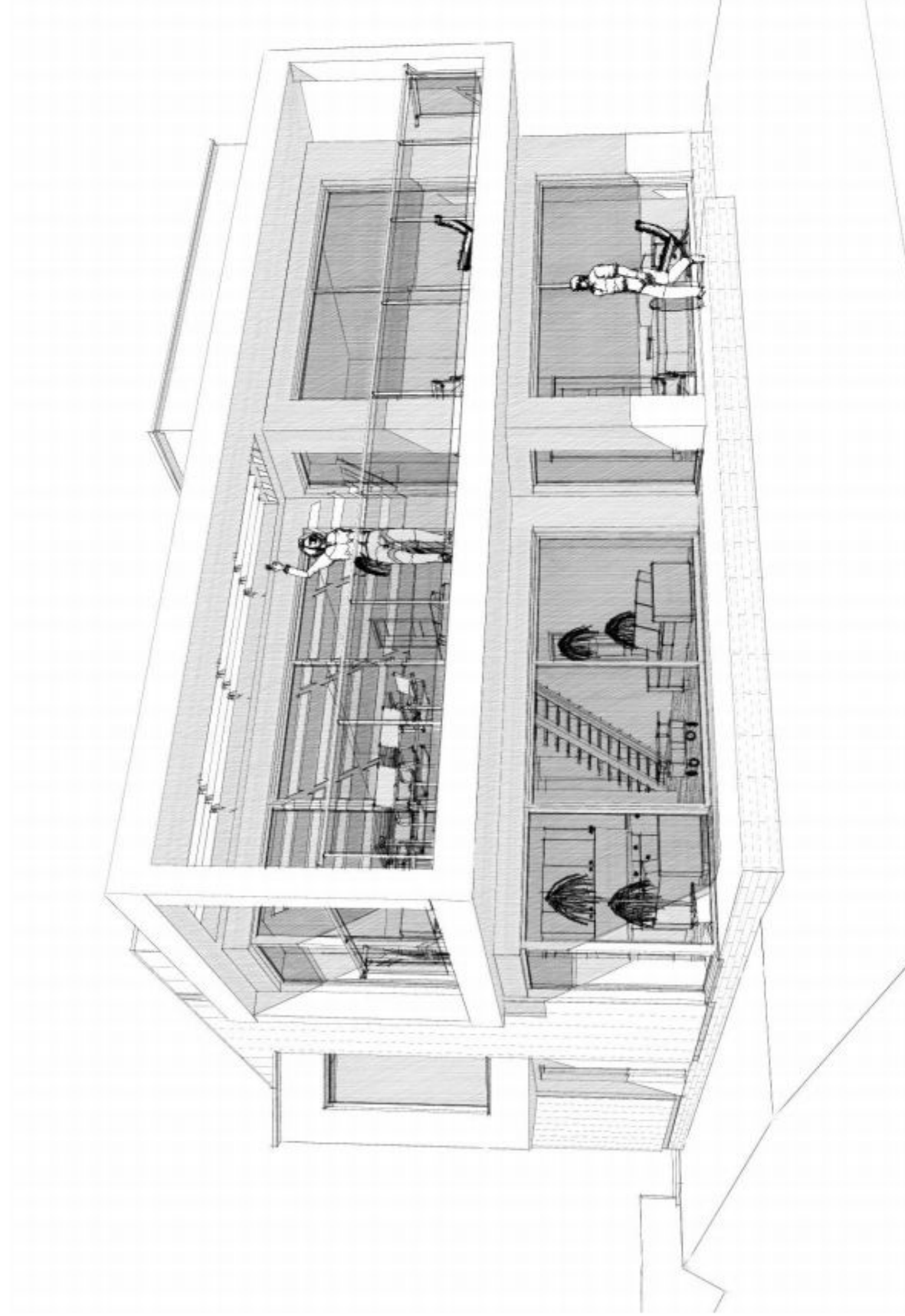
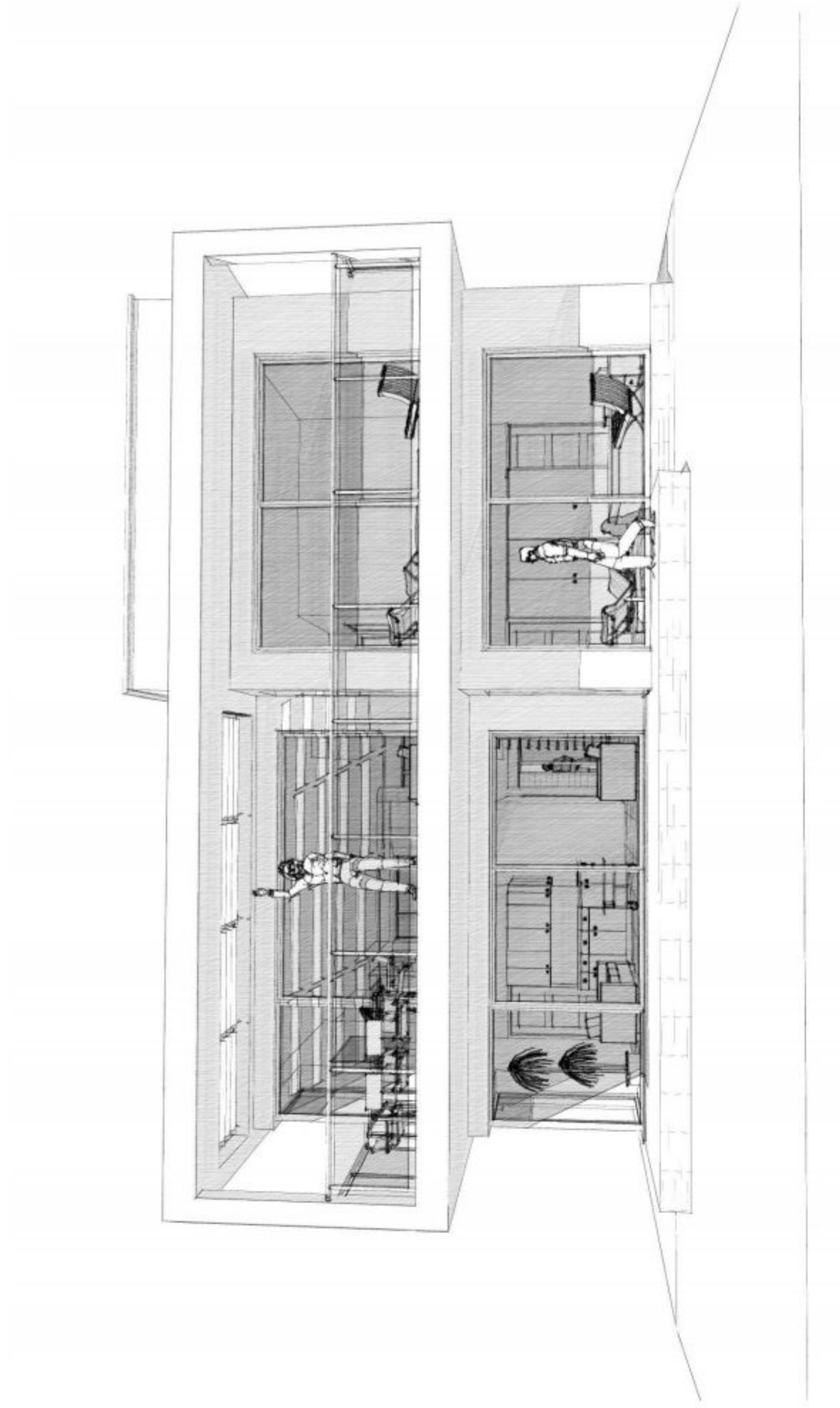
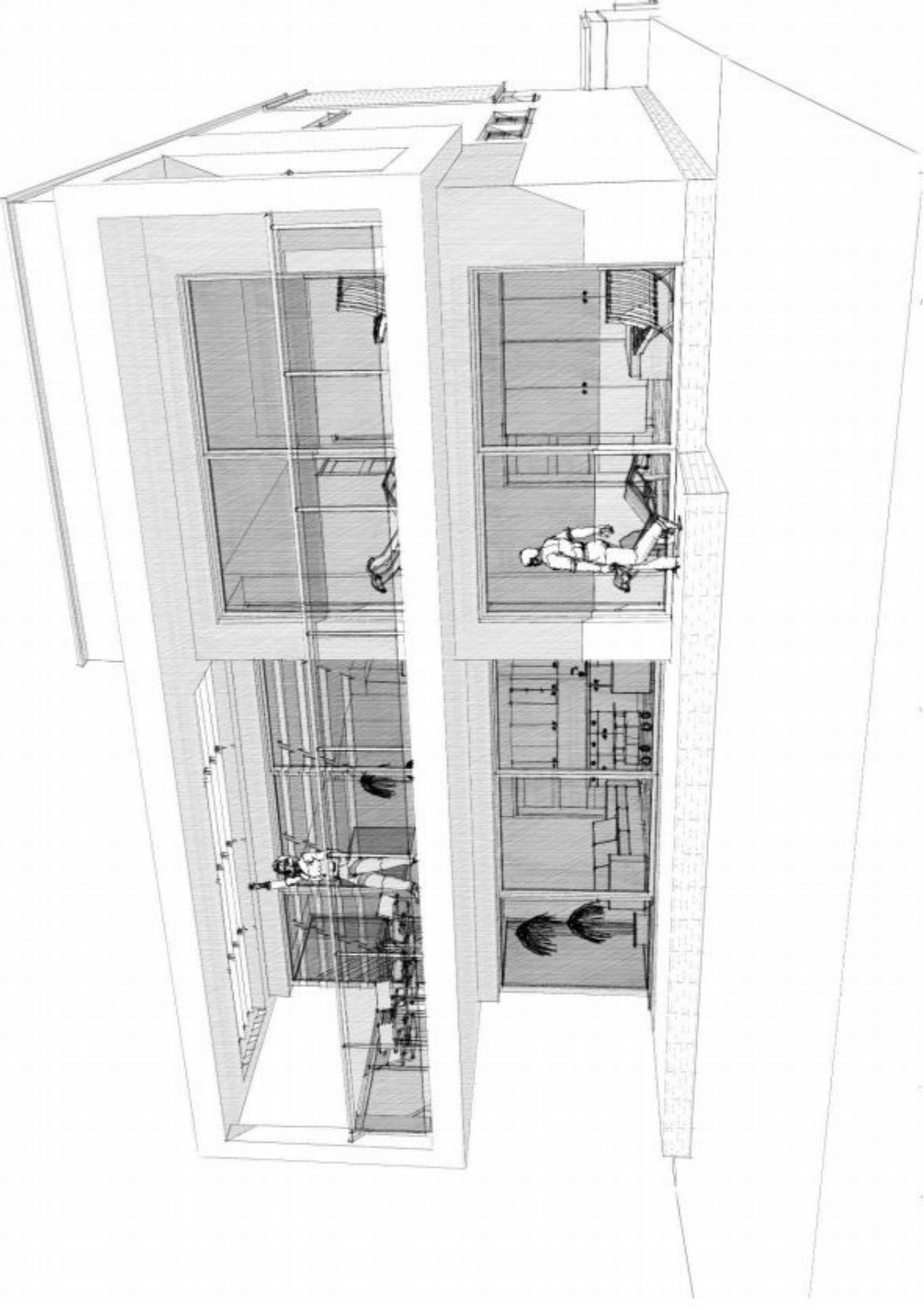
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## **APPENDIX C: PROPOSED PLANNING LAYOUT**

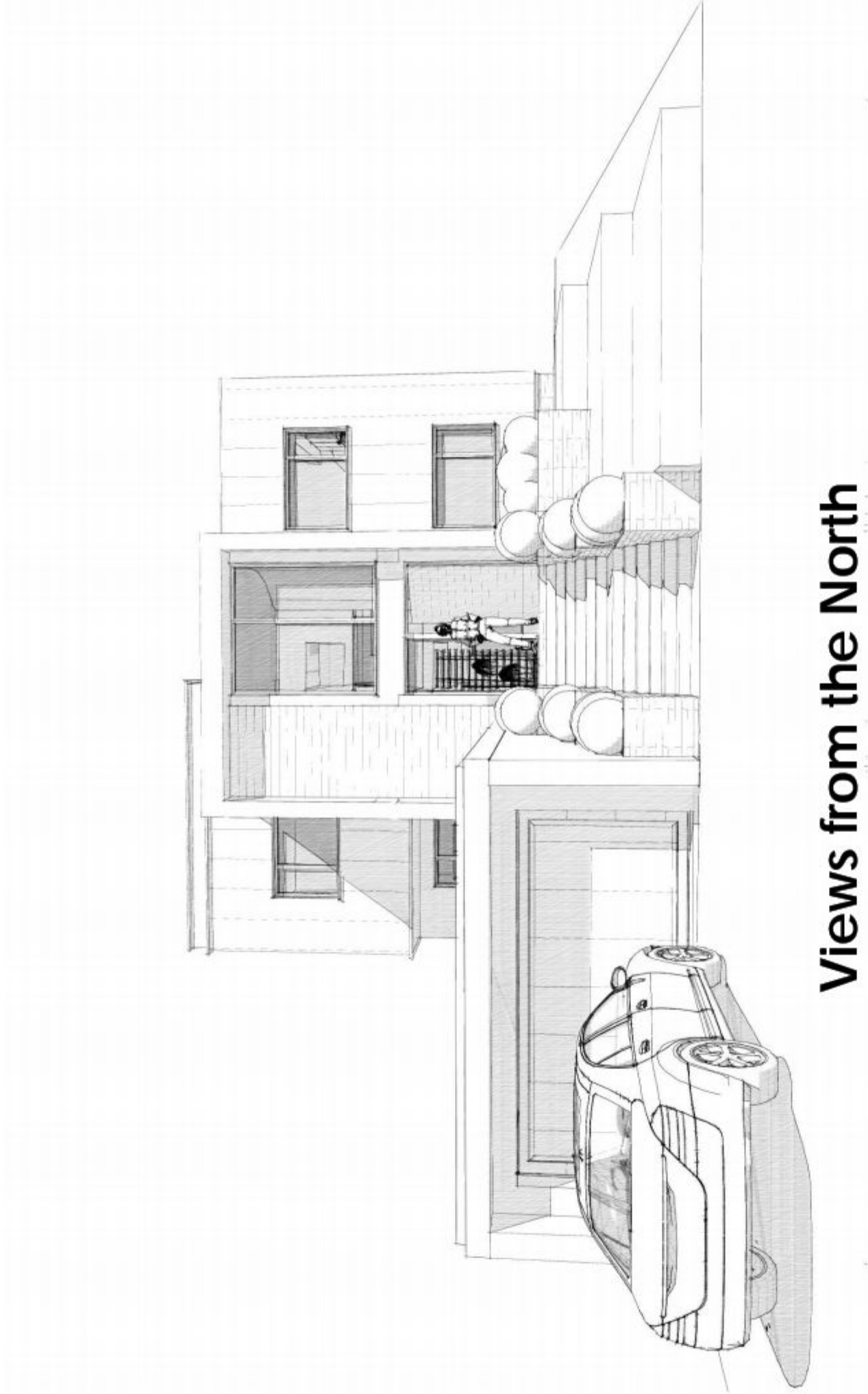
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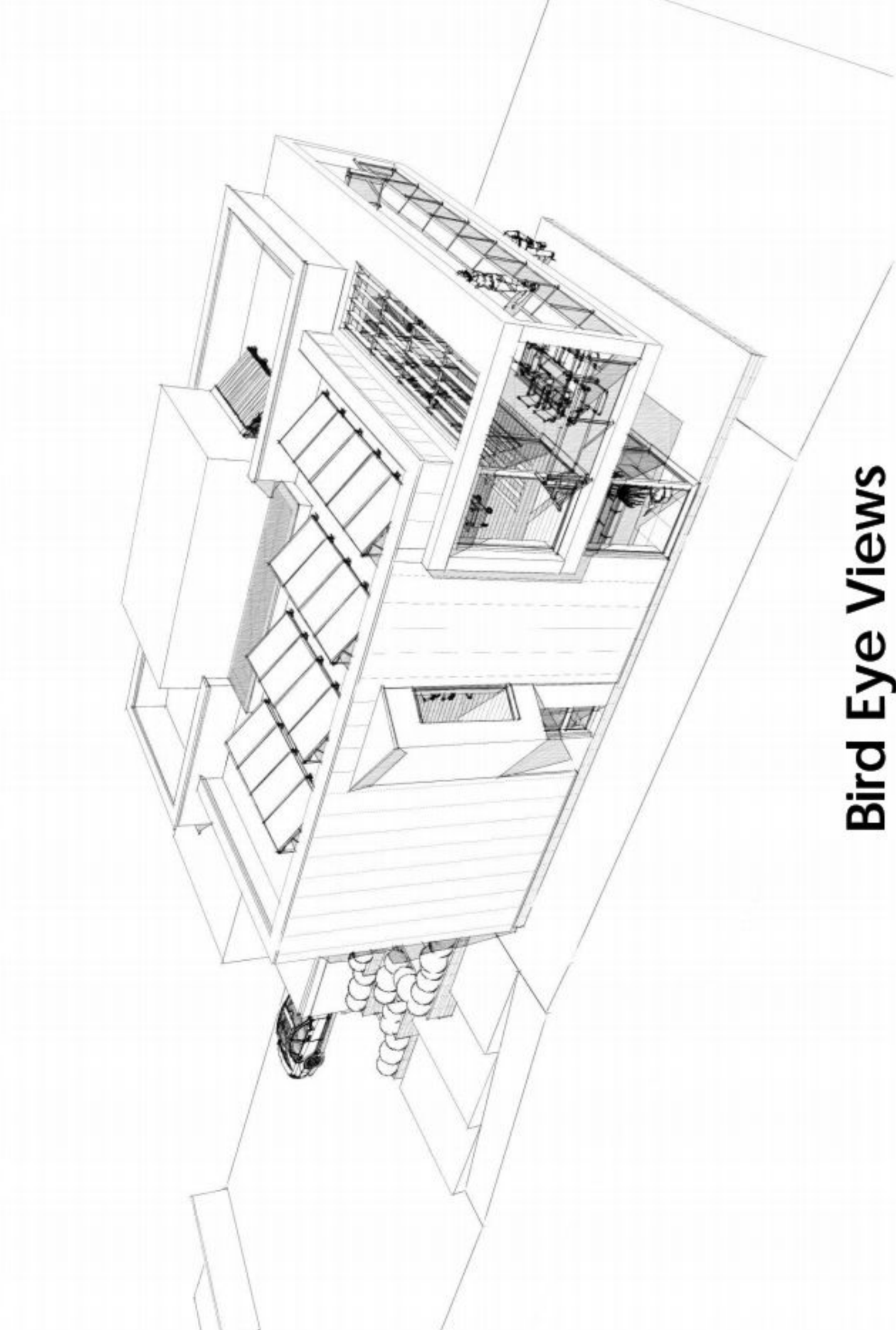
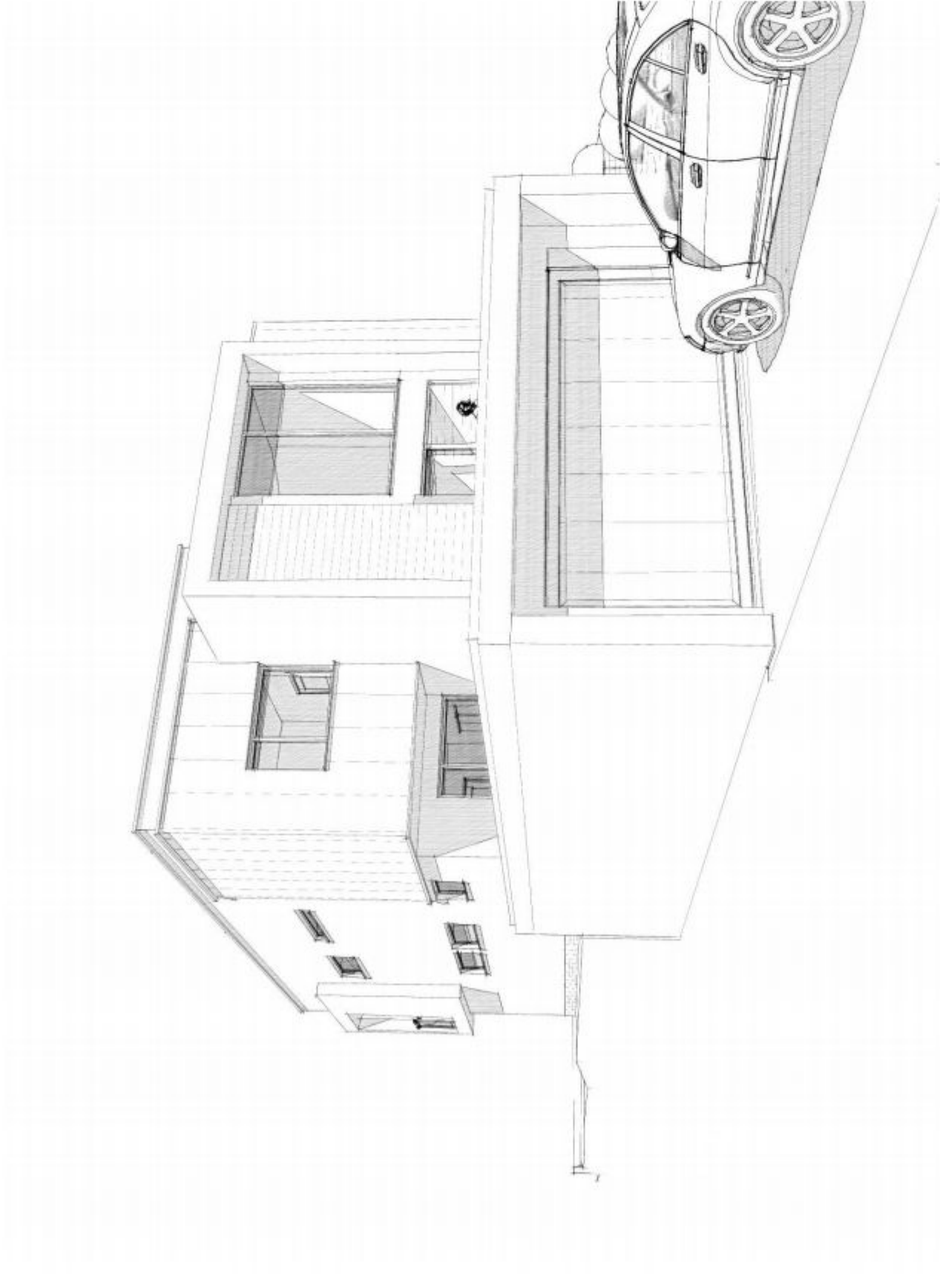
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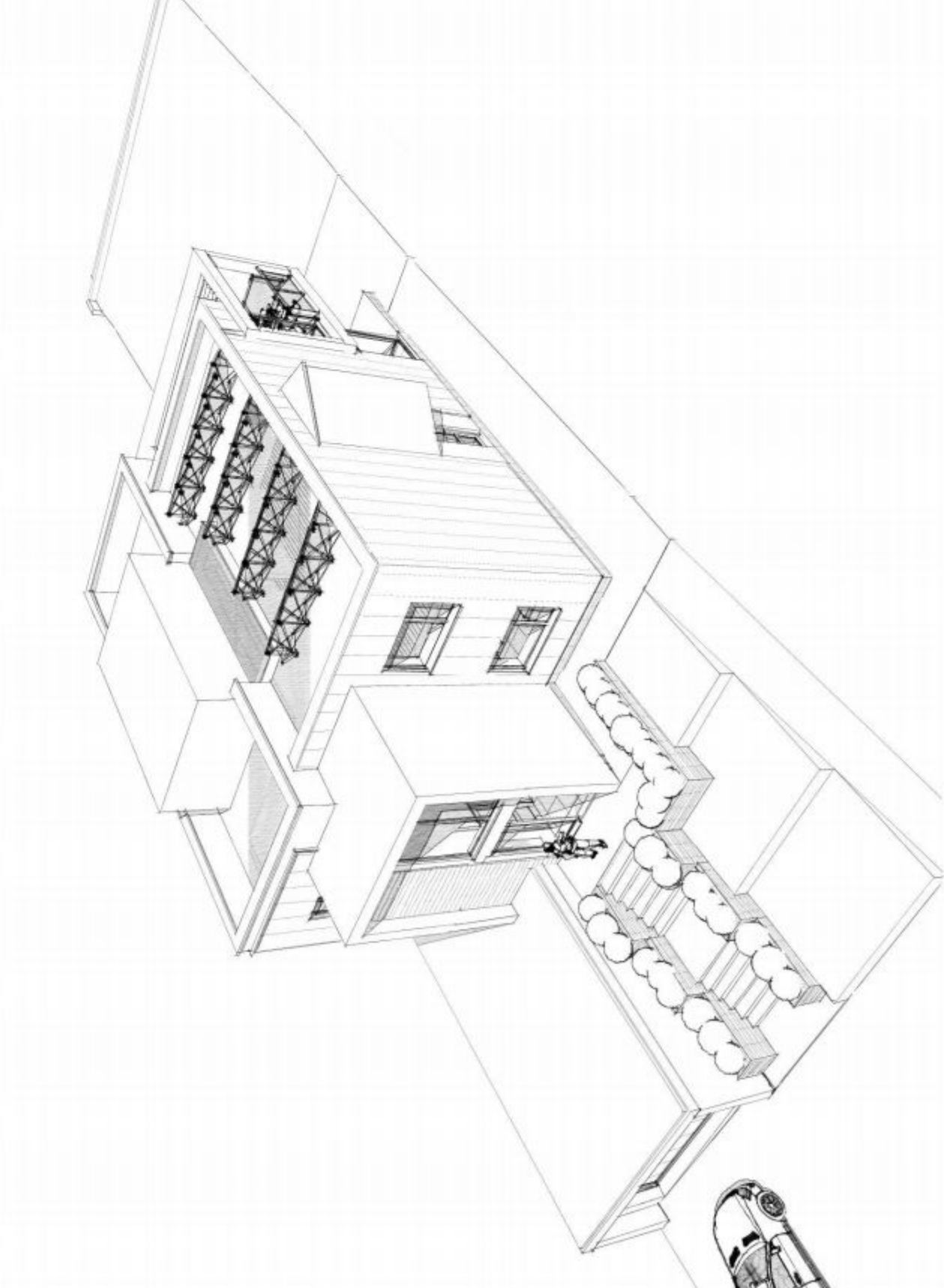
Views from the Sea



Views from the North



Bird Eye Views



Revision A, Revised following discussion with Neighbours 29/04/2014

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Project  
Proposed Replacement Dwelling  
At 78 Southwood Road Hayling  
Island Hampshire PO11 9QF  
For  
Mr N Bending & Mrs S Elder

Drawing Name  
3D Model Perspective Views

Drawing Status  
Planning Drawing

Drawn by  
JMT

Date  
March 2014

Drawing Scale  
As shown @ A1 size

Layout ID  
3369/02A

Status  
Revision

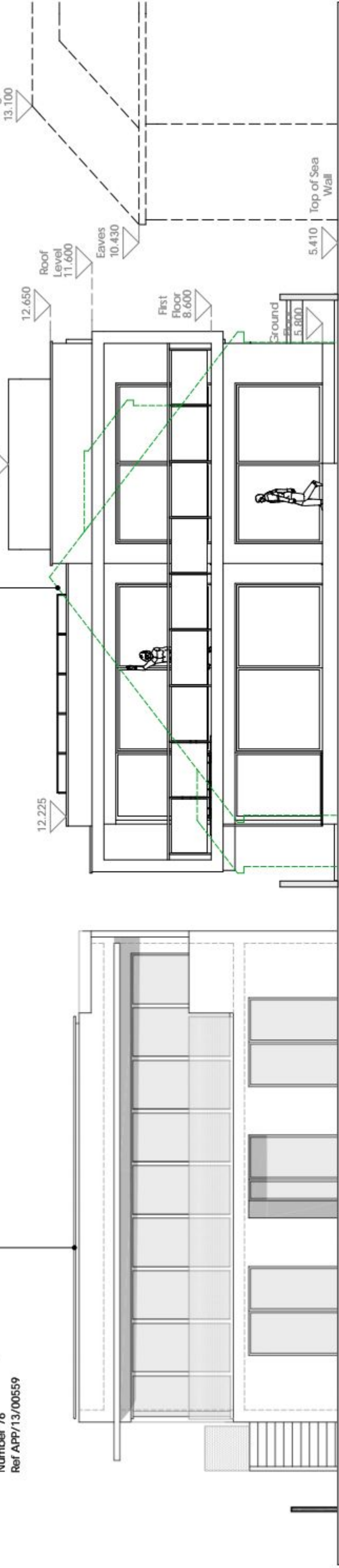
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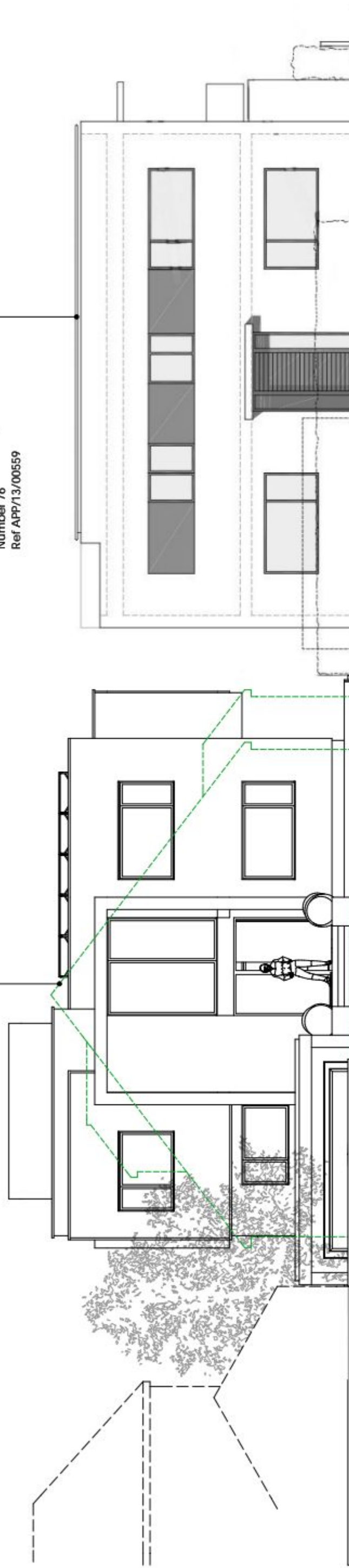
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Outline of Existing Property  
Outline of Proposed Dwelling at Number 76  
Ref APP/13/00559



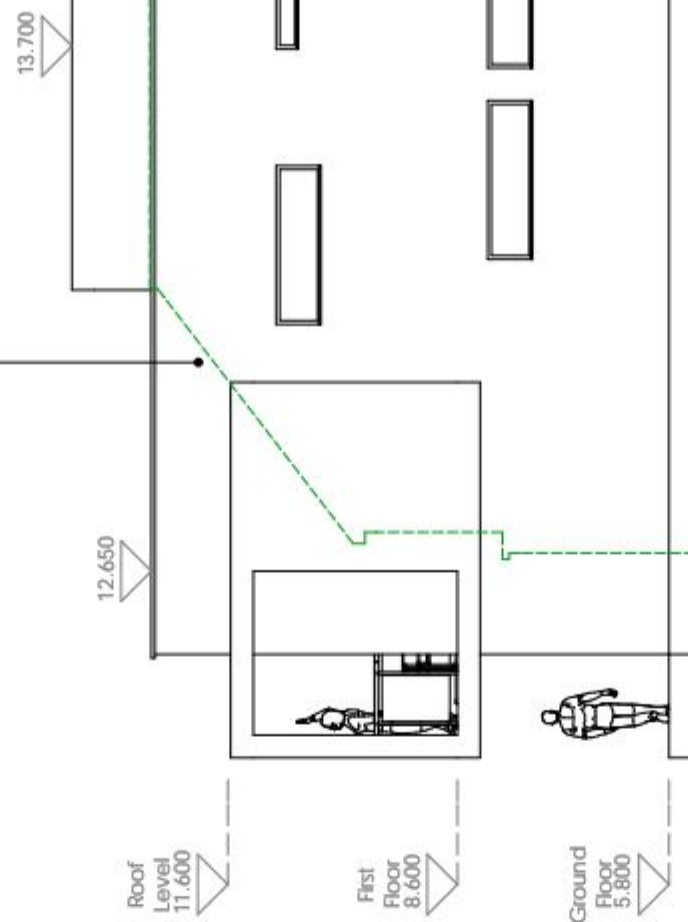
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Outline of Existing Property



Proposed North (Road) Elevation 1:100

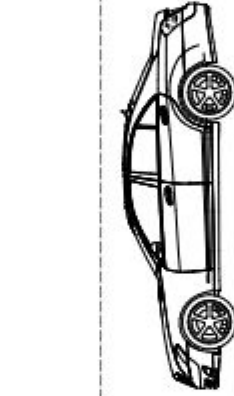
Outline of Existing Property



Proposed East Elevation 1:100

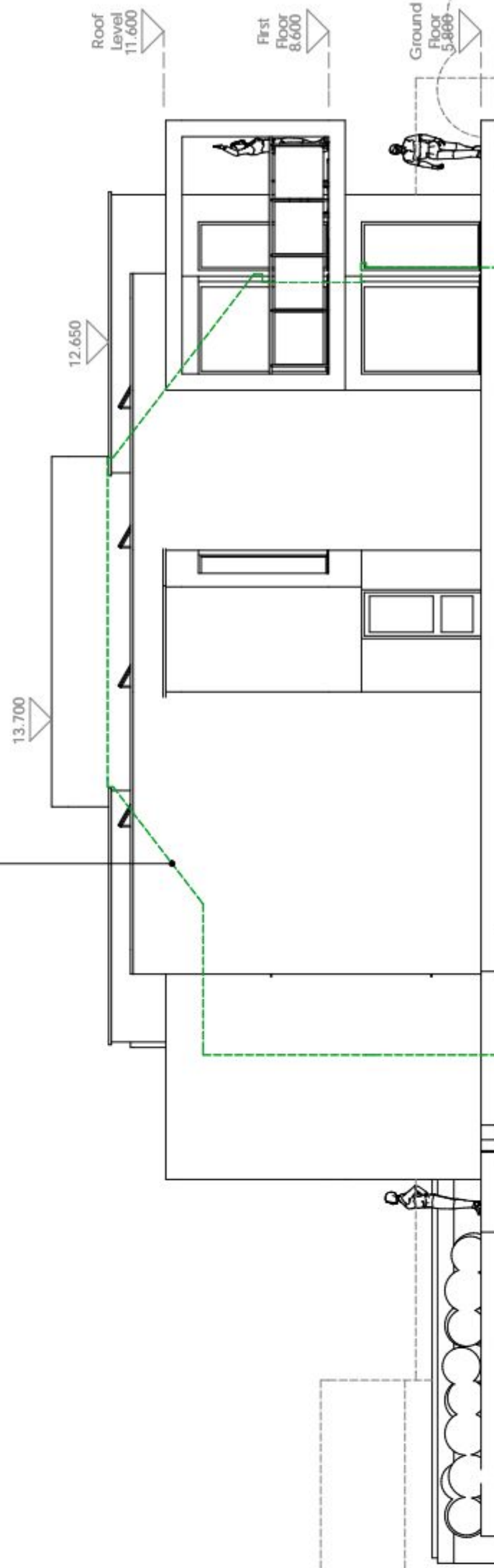
Beach

5.410 Top of Sea Wall



Southwood Road

Outline of Existing Property



Proposed West Elevation 1:100

Southwood Road

Beach

5.410 Top of Sea Wall

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Project  
**Proposed Replacement Dwelling  
At 76 Southwood Road Hayling  
Island Hampshire PO11 9QF  
For  
Mr N Bending & Mrs S Elder**

Drawing Name

Proposed Elevations

Drawing Status

Planning Drawing

Drawn by  
JMT

Date  
March 2014

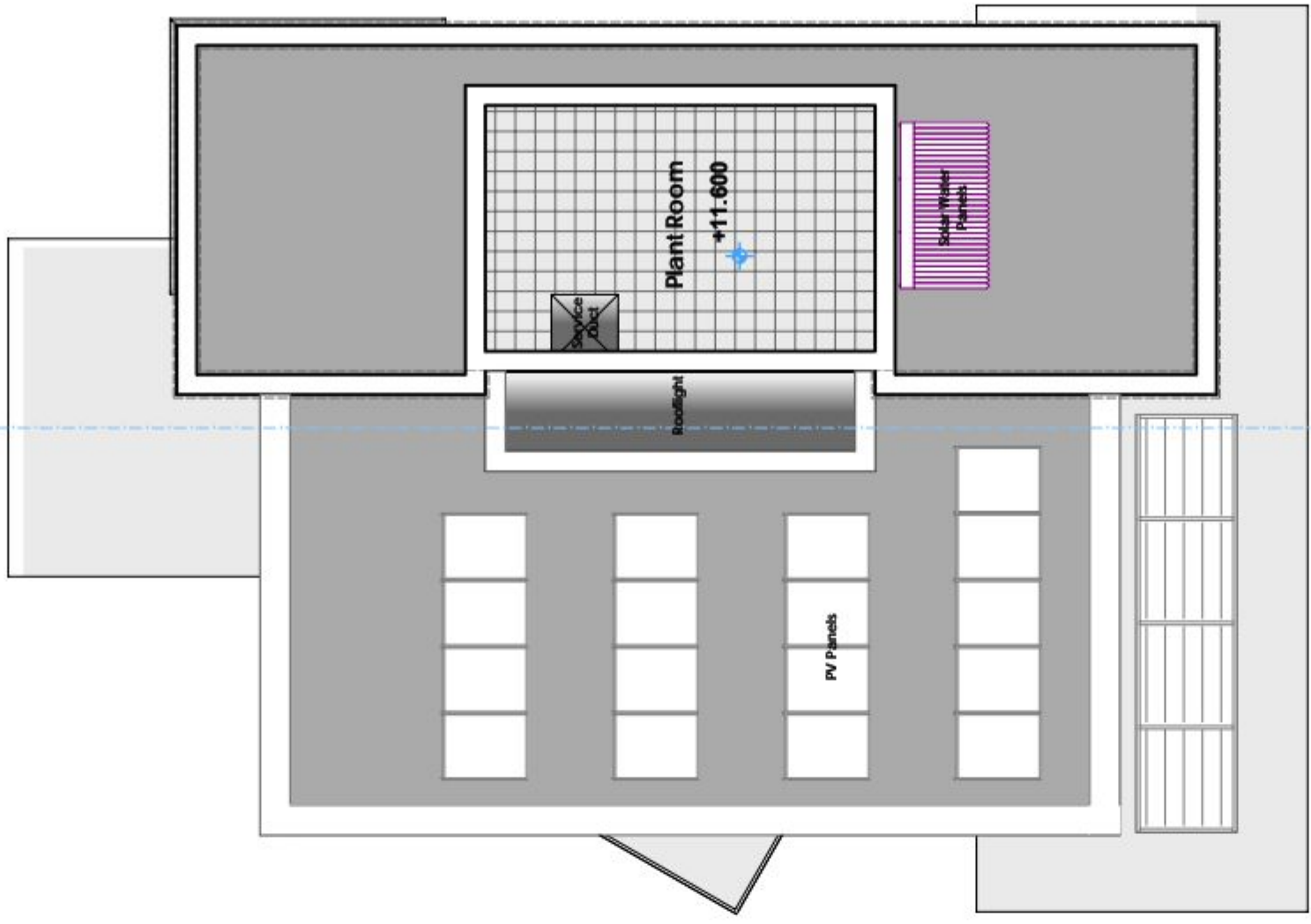
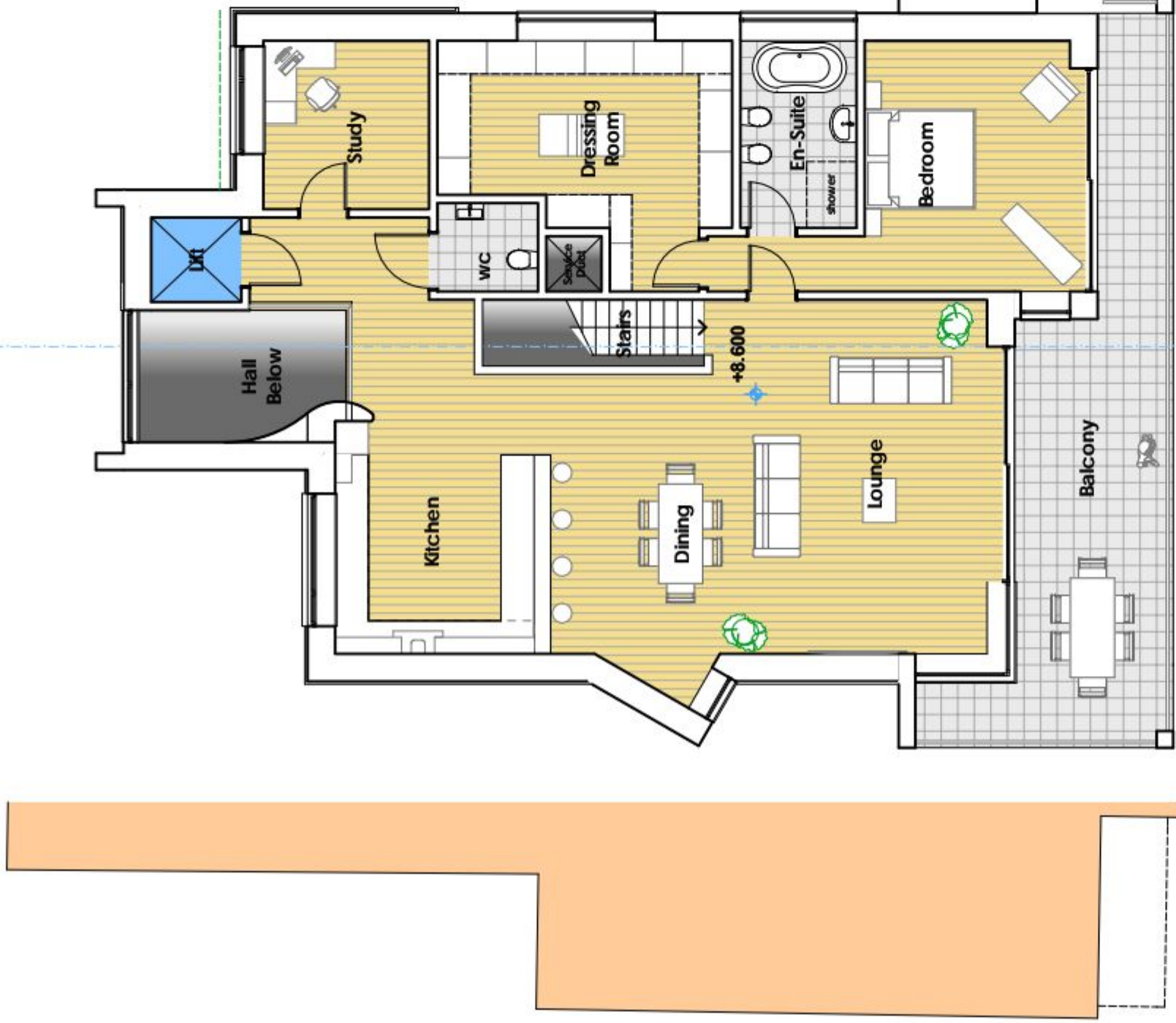
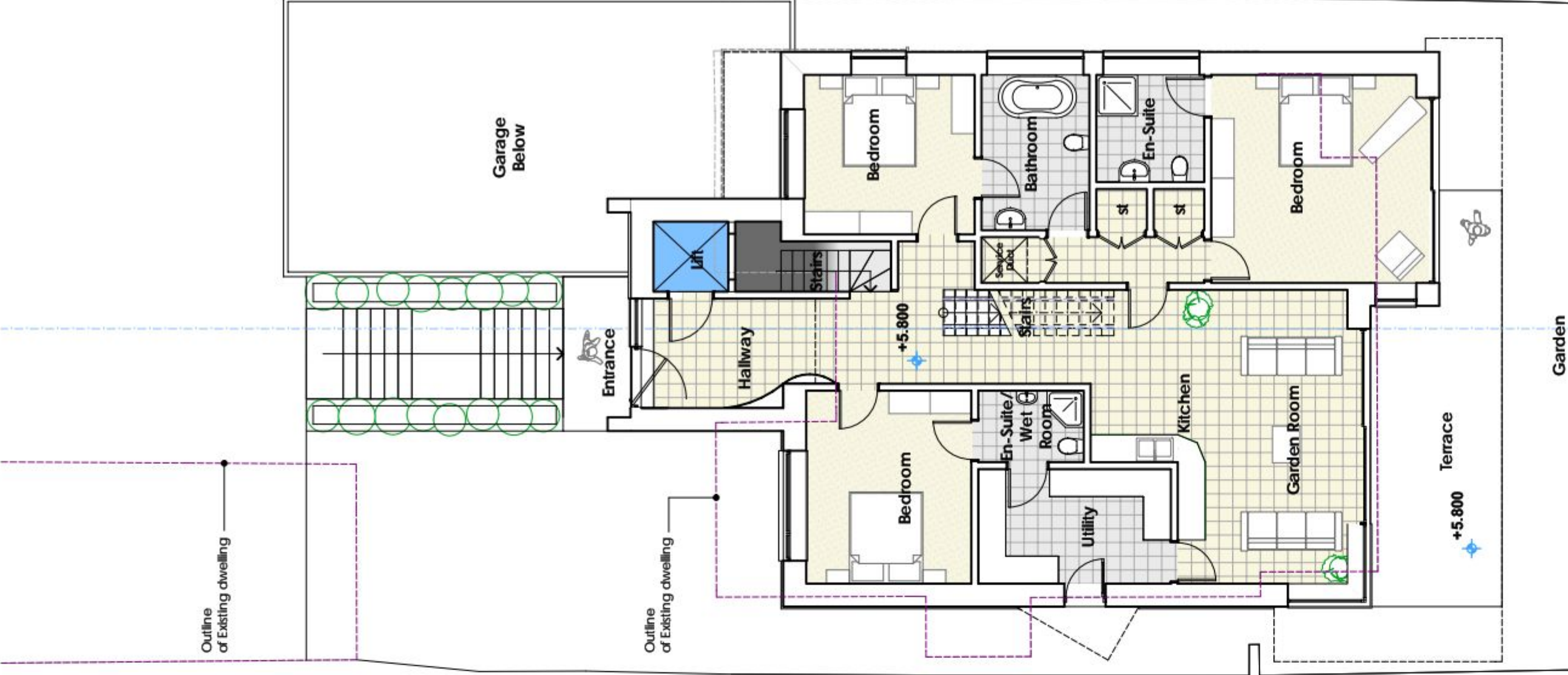
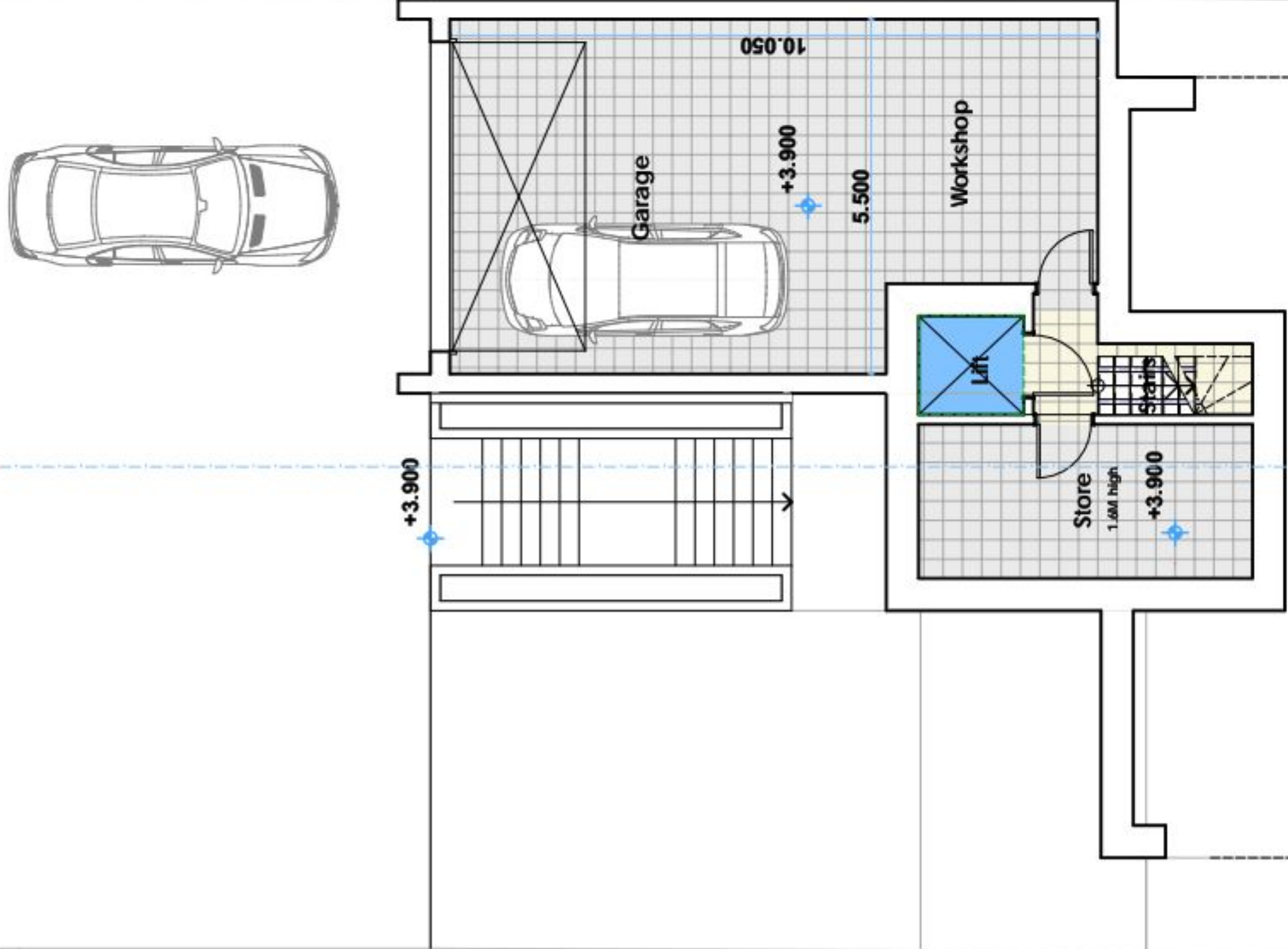
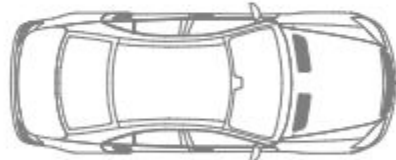
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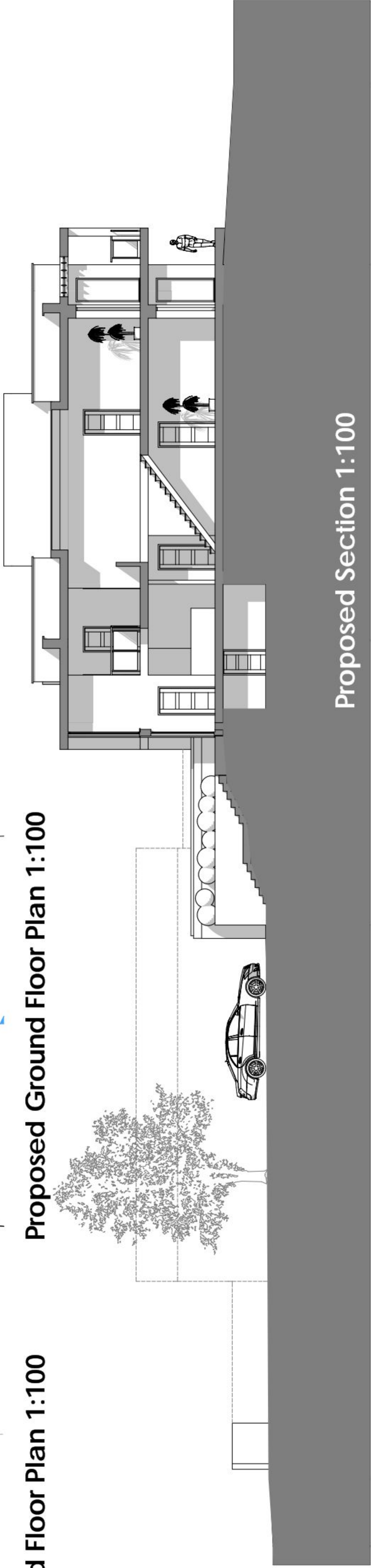
Status  
Revision

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Tel: 01803 851010



Proposed Lower Ground Floor Plan 1:100

Proposed Ground Floor Plan 1:100



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**Project**  
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**Island Hampshire PO11 9QF**  
**For**  
**Mr N Bending & Mrs S Elder**

**Drawing Name**

**Proposed Concept Floor Plans & Section**

**Drawing Status**  
**Planning Drawing**

**Drawn by**  
**MTA**

**Date**  
**March 2014**

**Drawing Scale**  
**As shown @ A1 size**

**Layout ID**  
**3369 /01**

**Status**  
**Revision**

**Also at 52 Fow Street Bournemouth South Devon TD5 8DZ**  
**Tel: 01803 851010**

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All work shown on this drawing must be carried out to conform with the relevant standards of the Building Regulations. Where the standards are not specified, the applicable, then the higher standard shall apply.

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## **APPENDIX D: EA INFORMATION & CORRESPONDENCE**

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Enter a postcode or place name:

Other topics for this area...



Risk of Flooding from Rivers and Sea ▾

[View other Interactive Maps](#)

## Risk of Flooding from Rivers and Sea

River flooding happens when a river cannot cope with the amount of water draining into it from the surrounding land. Sea flooding happens when there are high tides and stormy conditions.

The shading on the map shows the risk of flooding from rivers and the sea in this particular area.

Click on the map for a more detailed explanation.

**Map legend**

☒ Risk of Flooding from Rivers and Sea

■ High

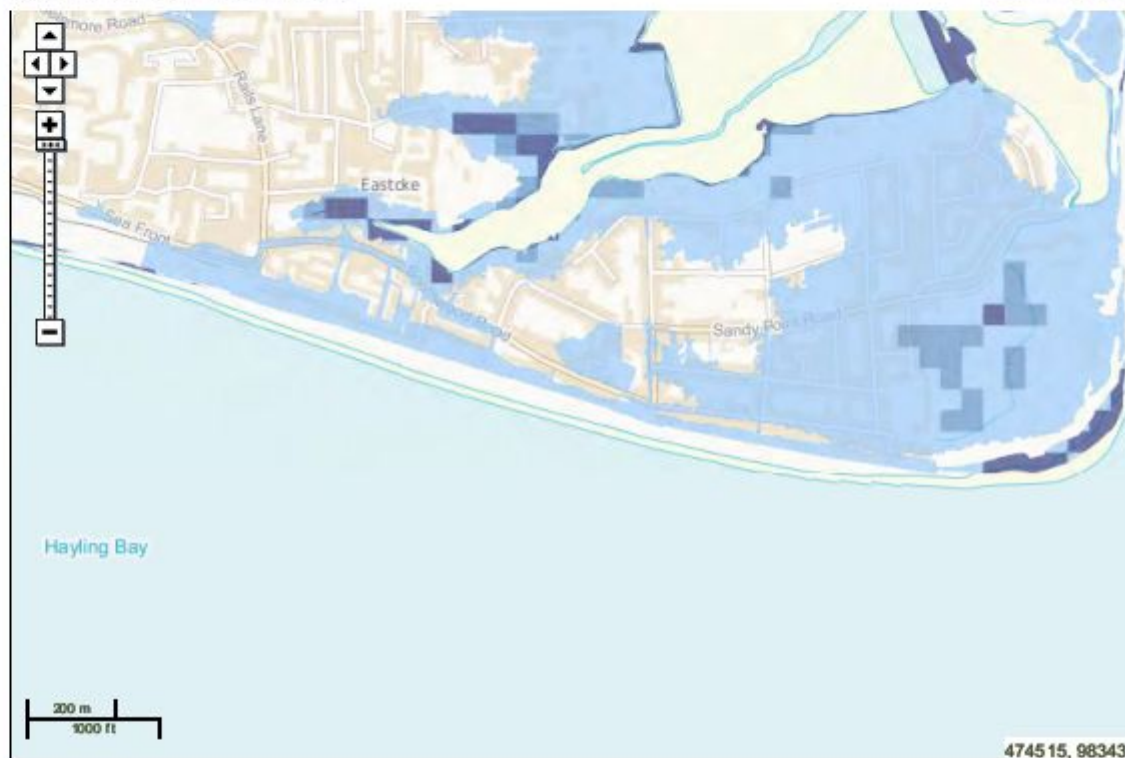
■ Medium

■ Low

■ Very Low

Map of PO11 9QF at scale 1:10,000

[Data search](#)



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## Interactive Maps

### Risk of Flooding from Rivers and Sea for X:473619, Y:98269

The location you have selected is in an area that has a low chance of flooding from rivers or the sea.

Very Low

Low

Medium

High



#### What does 'low' mean?

Low means that each year, this area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%).

This takes into account the effect of any flood defences that may be in this area. Flood defences reduce, but do not completely stop the chance of flooding as they can be overtopped or fail.

#### Floods Destroy. Be prepared

It is important to remember that while the risk is low, we can never eliminate all flooding. Surrounding roads and services may still be affected and could impact you.

- Check if you can receive free flood warnings
- Complete a flood plan
- Find out how to prepare your property for flooding

#### Planning a development

This information is not suitable for use in land-use planning. If you are planning a development, you need to use the [Risk of Flooding for Land-Use Planning \(Rivers and Sea\) for England](#) or [Development Advisory Map for Wales](#). This is because for planning purposes you need to use information based on flooding without defences.

#### Further information

You can use the information in this area to see which areas are more likely to flood first, deepest, or most often.

You can also check the [level and flow estimates for rivers and sea](#), and the [latest river and sea levels](#).

If you have any further questions on how to prepare for flooding, please call Floodline on 0845 988 1188.

This area may be at risk from other types of flooding.

- Check your risk of flooding from [surface water](#).
- Check your risk of flooding from [reservoirs](#).

For the purposes of the Flood Risk Regulations 2009 and the EU Directive 2007/60/EC on the assessment and management of flood risks, this is a Flood Hazard Map

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Other topics for this area...



Risk of Flooding from Reservoirs

[View other Interactive Maps](#)

## Risk of Flooding from Reservoirs

Reservoir flooding is extremely unlikely to happen.

The shading on the map shows the area that could be flooded if a large reservoir were to fail and release the water it holds. A large reservoir is one that holds over 25,000 cubic metres of water, equivalent to approximately 10 Olympic sized swimming pools. Since this is a worst case scenario, it's unlikely that any actual flood would be this large.

Click on the shading to see details of reservoirs that could cause flooding in this area.

Map of X: 473.778; Y: 98.203 at scale 1:10,000

[Data search](#)

**Map legend**

☒ Risk of Flooding from Reservoirs

☐ Maximum extent of flooding



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Enter a postcode or place name:

Other topics for this area...



Risk of Flooding from Surface Water ▼

[View other Interactive Maps](#)

## Risk of Flooding from Surface Water

Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

The shading on the map shows the risk of flooding from surface water in this particular area.

Click on the map for a more detailed explanation.

Map of X: 473,778; Y: 98,203 at scale 1:10,000

[Data search](#)

**Map legend**

☒ Risk of Flooding from Surface Water

High

Medium

Low

Very Low



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## Interactive Maps

### Risk of Flooding from Surface Water for X:473634, Y:98272

The location you have selected is in an area that has a very low chance of flooding from surface water.

**Very Low**



Low

Medium

High

What does 'very low' mean?

Very low means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

This type of flooding can be difficult to predict, much more so than river or sea flooding as it is hard to forecast exactly where or how much rain will fall in any storm.

This is based on the best information we have available, such as ground levels and drainage.

Floods Destroy. Be prepared

Don't wait until it's too late. Prepare for flooding by taking some simple steps to reduce the impact on your home or business.

- [Complete a flood plan](#)
- [Find out how to prepare your property for flooding](#)
- [Check the three-day flood risk forecast](#)

Further Information

The map has been produced by the Environment Agency, using information from Lead Local Flood Authorities where it is available. Lead Local Flood Authorities are responsible for managing the risk from surface water flooding.

If you have questions about how the map was produced, please call Floodline on 0845 988 1188.

If you would like more information on how surface water is being managed in this area, you can speak to [Hampshire County Council](#).

You can use the information in this area to see the approximate areas that would flood, and which parts would be shallower or deeper.

The potential impact of surface water flooding can vary according to the depth of the water, and its velocity (speed and direction that it is flowing in).

This area may be at risk from other types of flooding.

- Check your risk of flooding from [rivers and sea](#).
- Check your risk of flooding from [reservoirs](#).

For the purposes of the Flood Risk Regulations 2009 and the EU Directive 2007/60/EC on the assessment and management of flood risks, this is a Flood Hazard Map.

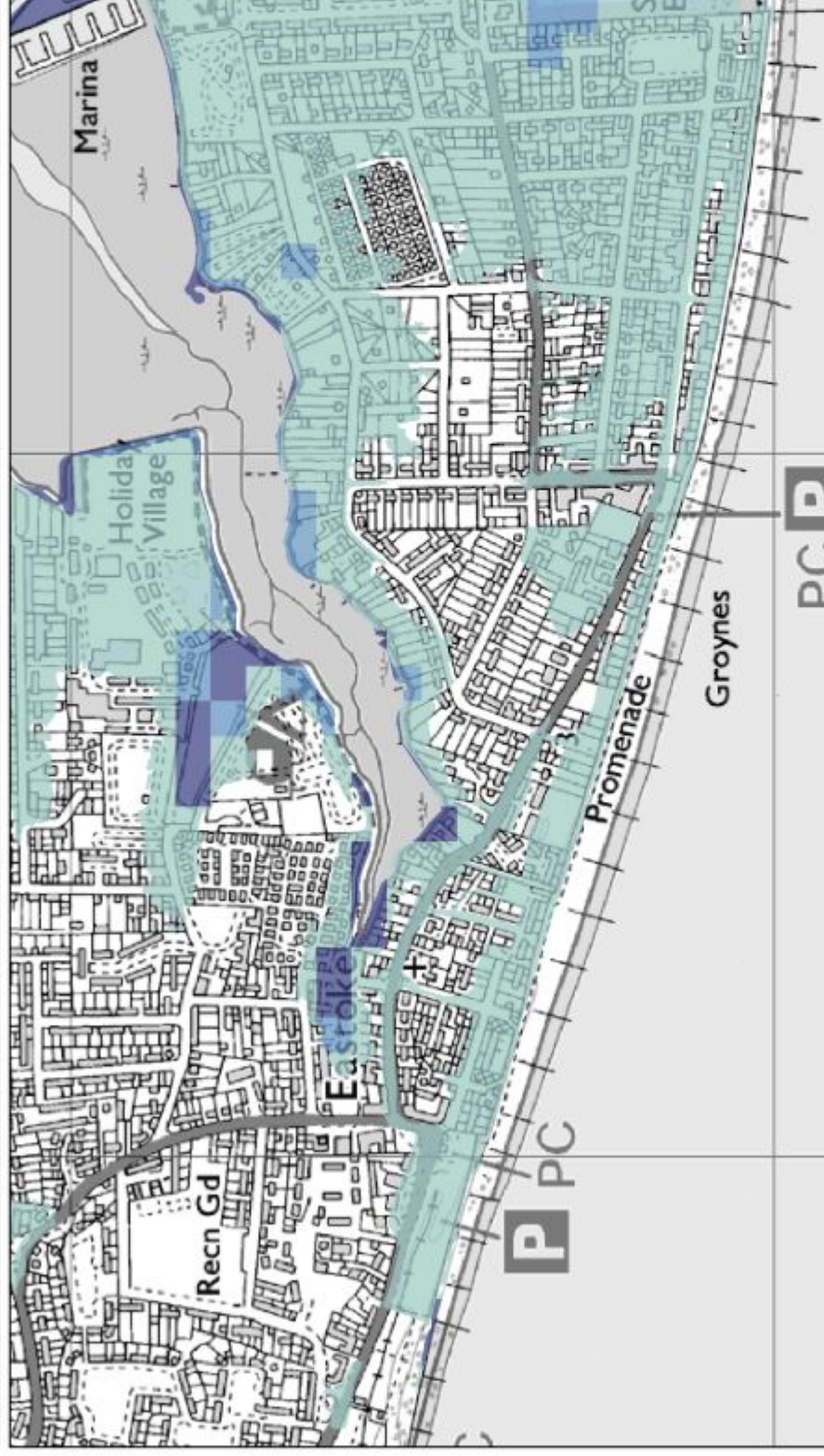
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# Risk of Flooding from Rivers and Sea centred on PO11 9QF - created 09 April 2014

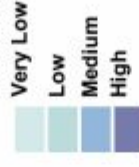


Scale 1:10,001



## Likelihood of Flooding from Rivers and the Sea

National Flood Risk Assessment (NaFRA)



**Likelihood of Flooding from Rivers and the Sea (taking into account defences)**

**High:** Greater than or equal to 1 in 30 (3.3%) chance in any given year

**Medium:** Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year.

**Low:** Less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year

**Very Low:** Less than 1 in 1,000 (0.1%) chance in any given year

This information is shown on the Risk of Flooding from Rivers & the Sea map on our website.

## Chris Pickles

---

**From:** Chris Pickles  
**Sent:** 10 April 2014 9:31 AM  
**To:** enquiries@environment-agency.gov.uk  
**Subject:** 78 Southwood Road, Hayling Island  
**Attachments:** Location Plan.pdf

To whom it may concern,

**78 Southwood Road, Hayling Island PO11 9QF**

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  
Chris

**Christopher Pickles**  
*Flood Risk & 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](mailto:chris.pickles@betts-associates.co.uk)  
[www.betts-associates.co.uk](http://www.betts-associates.co.uk)

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**From:** Partnership and Strategic Overview team, HIOW <psohiow@environment-agency.gov.uk>  
**Sent:** 27 May 2014 11:36 AM  
**To:** Chris Pickles  
**Cc:** SSD Enquiries  
**Subject:** Flood Risk Information for Southwood Road - Ref: SSD/3907  
**Attachments:** Flood Map.pdf; HBC incident report 20Dec05.doc; IRR Letter (Outside EFO).docx; Standard Notice.pdf

Dear Christopher,

**Provision of Product 4 for 78 Southwood Road, Hayling Island, PO11 9QF**

Thank you for your request of 10 April 2014 to use Environment Agency data, Product 4, in the development of 78 Southwood Road, Hayling Island, PO11 9QF. The information is attached.

If you have requested this information to help inform a development proposal, then you should note the detail in the attached advisory text on the use of Environment Agency Information for Flood Risk Assessments / Flood Consequence Assessments.

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 2 - an area which may have a 0.1% chance of flooding annually (1 in 1000), **ignoring** the presence and effect of any flood defences.

The Environment Agency is aware of flooding to this area in November 2005, and a report detailing this event is attached. Not all flooding events are reported to us and further information may be available from Havant Borough Council.

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

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: 4604 | Easting: 474761 | Northing: 095963 |
|----------------------|-----------------|------------------|

| 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) |
|      | Uncertainty: +/- 0.3m                                           | Uncertainty: +/- 0.6m                                            |
| 2010 | 3.3                                                             | 3.5                                                              |
| 2070 | 3.8                                                             | 4.0                                                              |
| 2115 | 4.4                                                             | 4.6                                                              |

\* Levels in metres above Ordnance Datum Newlyn.

These values are based on 2008 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:**

Uncertainty estimates for the 0.5% and 0.1% probability sea levels have been provided. This information should be used to test whether the outcome of the decision being made would change if the value of the sea level data is not the central estimate, but lies within the range of uncertainty bounds.

**Note 3:**

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.

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

**Aimee Cox**

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

Direct dial (01794) 834569

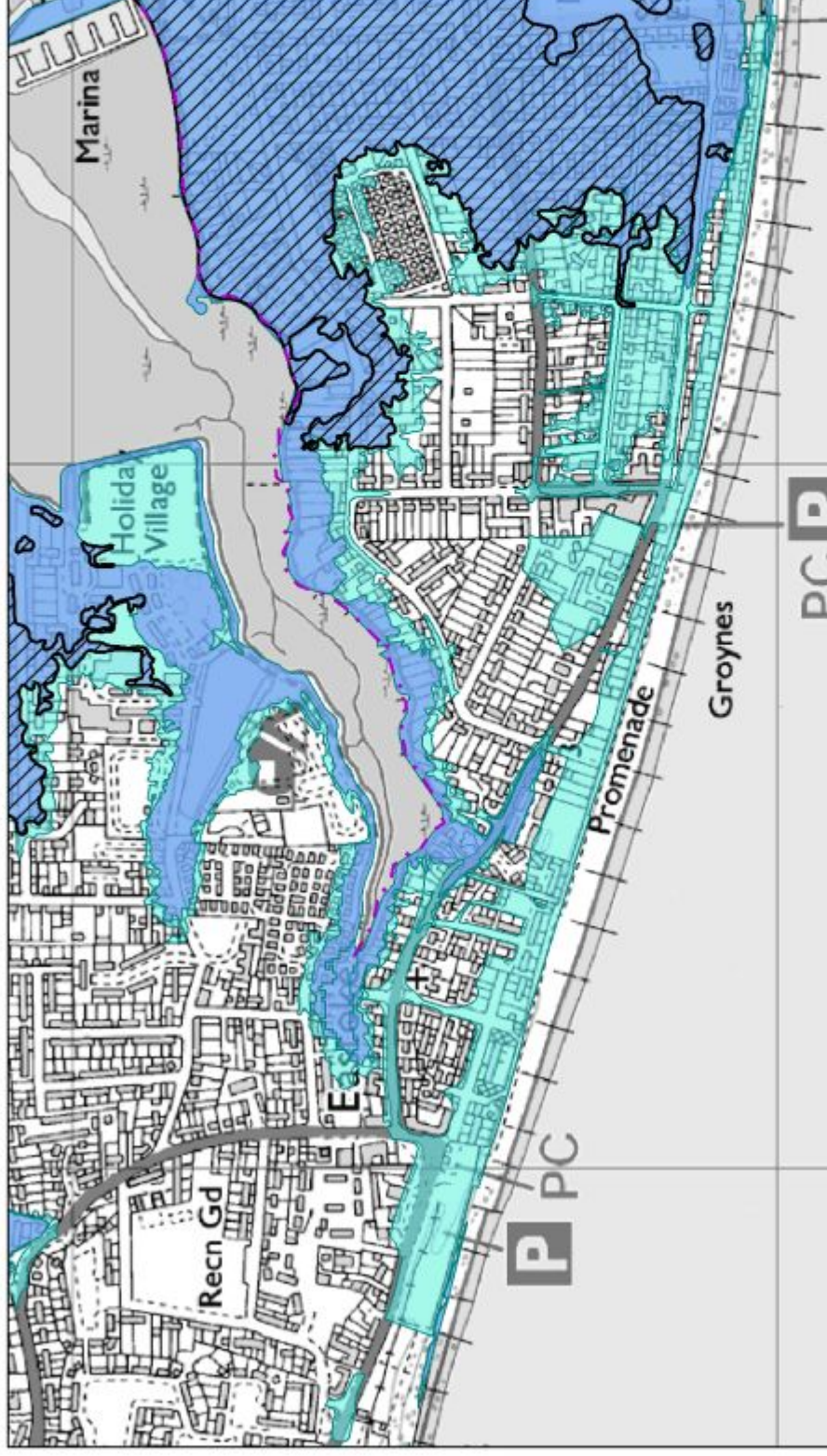
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# Flood Map (Rivers & Sea) Centered on Southwood Road - Created 27 May 2014



Scale 1:10,001

## Flood Map for Planning (Rivers and Sea)

- Flood Map - Defences
- Areas Benefiting from Flood Defences
- Flood Map - Flood Storage Areas
- Flood Map - Flood Zone 3
- Flood Map - Flood Zone 2

## Flood Map for Planning (Rivers and Sea) (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.

# Havant Borough Council Report

Eastoke Flood Incident  
3rd November 2005



## Flood Incident 3<sup>rd</sup> November 2005

Location: Eastoke Peninsula, Hayling Island

### Background

The Eastoke peninsula is within a known flood and erosion risk area, which has historically experienced numerous flood incidents.



The following figures show the extent to which flooding and damage to properties used to regularly occur prior to the 1985 Beach Nourishment Scheme.



\\11app\Cadcorp\Engineering\COASTAL\_TEAM\Borough\_Coastal\_Management\Flood\_Incidents\20051103\_Eastoke\Flood\_Incident\_3Nov2005.doc

Cleaner, Safer,  
More Prosperous

 **Havant**  
BOROUGH COUNCIL

The frequency of flood incidents and scale of damage has been significantly reduced since the Beach Replenishment and the Borough has been committed to exercising its permissive powers under the Coast Protection Act to manage this risk. However, it should be remembered that there will always be a risk to people residing in such locations.

In order to manage these risks into the future, the Borough Council has been working within Coastal Groups and in partnership with the Environment Agency to develop the Eastoke Coastal Defence Strategy Plan. This Strategy Plan recommends that the northern frontage should provide defence against a 1 in 100 year storm event and that the southern frontage should provide protection against a 1 in 200 year storm event. The Agency has completed the first phase of the recommended works along the northern frontage and the Borough Council has been implementing the preferred option of Beach Management along the southern frontage. The following is an update of the key actions taken along the southern frontage:

- Annual monitoring of the south Hayling frontage, consisting of topographic and bathymetric surveys; data available from the Channel Coastal Observatory website at [www.channelcoast.org](http://www.channelcoast.org)
- Annual Beach Recycling from accreting areas along the south Hayling frontage back to Eastoke, ~ cost of £50,000 per annum
- Proposals are at a planning stage for the next Beach Nourishment operation with a desired start in 2006, subject to licences and funding. An Environmental Statement and a study to inform the Appropriate Assessment have been prepared for this proposed operation and may be viewed on Havant Borough Council's website at [www.havant.gov.uk/havant-4862](http://www.havant.gov.uk/havant-4862), ~ cost £1,000,000
- A detailed coastal defence study is also under preparation for the Eastoke Point frontage around the Sandy Point Nature Reserve. This study will consider all the coastal defence options and the various environmental impacts. The intention is that there will be an opportunity for the various consultees to comment on the alternative options at the appropriate time as the study develops over the next 6 months.

Additional details about the Beach Recycling and Nourishment operations are available on the Havant Borough Council website at [www.havant.gov.uk/havant-2295](http://www.havant.gov.uk/havant-2295).

At this present time, the Borough Council needs to "inject", through beach nourishment, approximately 100,000 cubic metres of beach material in order to provide the desired level of protection along the whole frontage. As described above, officers are working towards obtaining the various licences and funding to undertake the works.

### Flood Incident

The combination of a high tide, surge and large waves, particularly long period Atlantic swell waves, overtopped the most vulnerable areas of the southern frontage which subsequently resulted in flooding.



The incident on the 3<sup>rd</sup> November caused disruption and inconvenience due to several roads needing to be temporarily closed for approximately 4 hours. The road closure was required because of "ponding" of the overtopping floodwater on the roads, which was unable to drain via the surface water drainage system until the tide levels in Chichester Harbour had lowered sufficiently.



W:\11app\Icadcorp\Engineering\COASTAL\_TEAM\Borough\_Coastal\_Management\Flood\_Incidents\20051103\_Eastokeflood\_incident\_3Nov2005.doc

Once the tide levels started fall in the harbour the surface water system drained the standing water very quickly. This was aided by the efforts of the Council, Fire Service and many individuals who kept the drainage gullies clear of debris. At this stage, it is believed that there were only a small number of residents that experienced flooding inside their buildings.

The Agency and the Borough Council are working closely together to gather additional information to record exactly how residents were affected and providing advice to householders as to how they can be better prepared. For example we are circulating details of the Agency's flood warning service and advice on what measures individuals can take to make their property flood resistant. The following figure indicates our present understanding of the extent of flooding.



A questionnaire has been delivered to the Eastoke residents and the intention is that once the results have been analysed the Council and the Agency will develop ways of raising public awareness of these issues through the use of exhibitions, presentations, notice boards and the Internet. I hope the above information provides some reassurance that the Borough Council does take these issues seriously and that we are taking the appropriate actions to manage these risks in a responsible and sustainable way.

Name  
Address 1  
Address 2  
Address 3  
Address 4

Our ref: XXXXX  
Your ref:  
  
Date: XXXXX

Dear [Sir / Madam]

**Risk of flooding from rivers and the sea information for [address]**

Thank you for your recent request for information on the risk of flooding from rivers and the sea that the Environment Agency holds. I can confirm that the above property/site is located in an area where the likelihood of flooding from both rivers and the sea has been assessed as less than 1 in 1,000 (0.1%) chance in any given year.

**Therefore the likelihood of flooding is estimated as 'very low' - less than 1 in 1,000 (0.1%) chance in any given year.**

You may wish to send this letter to your insurer so that they are also aware of the Environment Agency's information on the likelihood of flooding from rivers and the sea in your area.

Water causing flooding can come from different places, for example from rivers or the sea; 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 or from groundwater rising up from underground aquifers.

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea. However you should be aware that in recent years, there has been an increase in flood damage caused by surface water flooding or drainage systems that have been overwhelmed. We have worked with Lead Local Flood Authorities (LLFAs) to develop a map which incorporates the best local and national scale information on surface water flood risk. You can look at this map on the Environment Agency website at <http://www.environment-agency.gov.uk/flood>. Local Authorities and/or Water Companies may be able to provide further knowledge on the risk of flooding from other sources.

Insurers choose whether they want to use Environment Agency data to inform their decision making. If they use it they do so alongside their own existing data and other relevant data, including any that the customer may be able to provide. Insurers will then make an assessment as to whether they can provide insurance cover and under what terms.

Further information is available on our web site [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk) on the Flood Map page of *What's in Your Backyard*. Please note that the likelihood of flooding is an estimate based on the information currently available and may change in future due to climate change or other factors.

I enclose two attachments:

- *Flooding Information Sheet – Your Questions Answered*, a document we have produced jointly with the Association of British Insurers
- *Standard Notice for the supply of Environment Agency Information*, which explains the use of our data

I hope the information provided to you is helpful. Please contact us again if you require any further information, quoting the reference number on this letter.

Yours sincerely

**Name**

**Title**

Direct dial XXXXX

Direct fax XXXXX

Direct e-mail XXXXXX

enc.

Standard Notice

EA / ABI Joint Fact Sheet

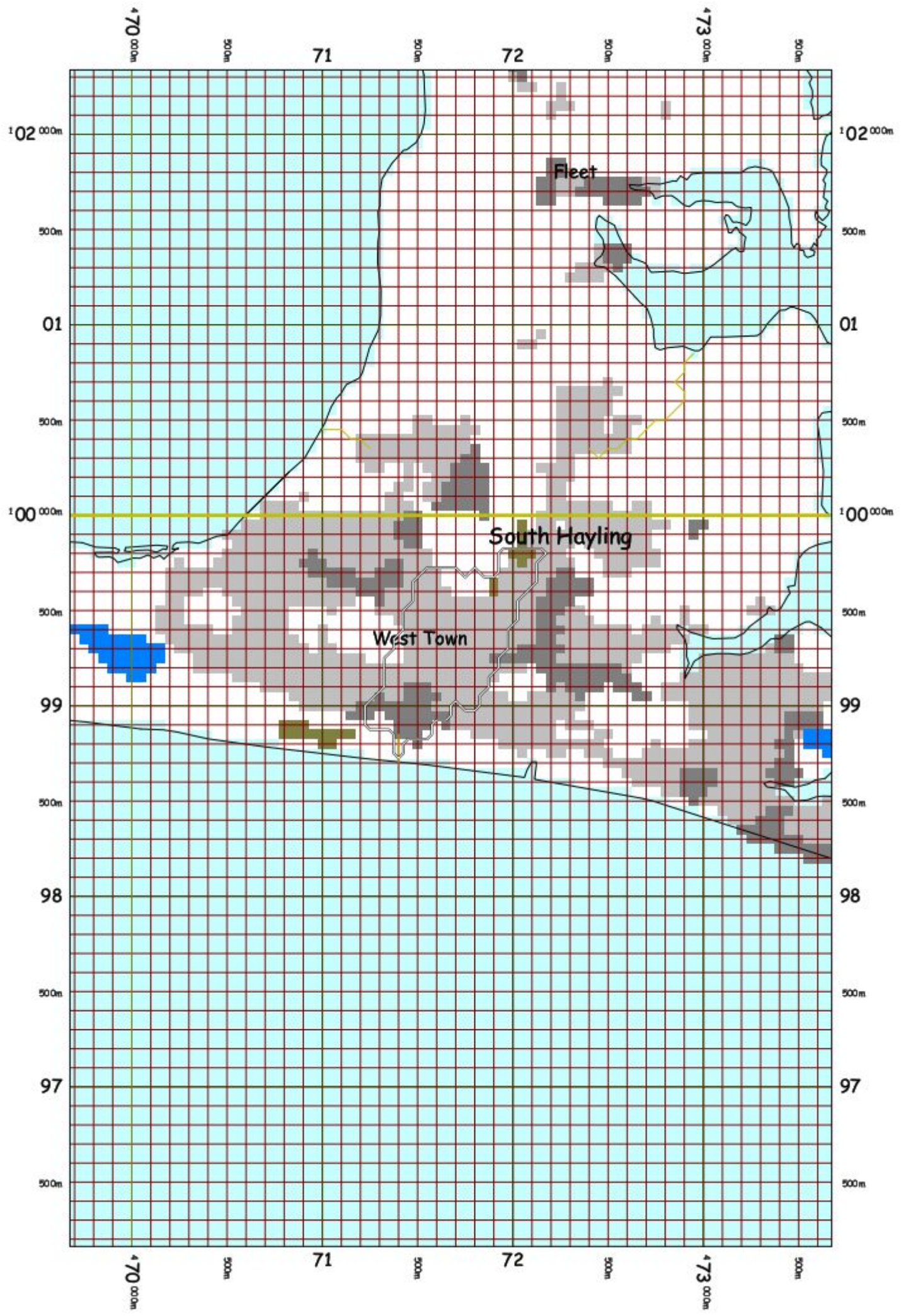
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## **APPENDIX E: FEH CATCHMENT DATA & DESCRIPTORS**

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|             |            |         |       |                |                  |           |
|-------------|------------|---------|-------|----------------|------------------|-----------|
| VERSION     | FEH CD-ROM | Version | 3     | exported at    | 11:35:37 GMT Tue | 15-Apr-14 |
| CATCHMENT   | GB         | 471400  | 98750 | SZ 71400 98750 |                  |           |
| AREA        |            | 0.51    |       |                |                  |           |
| ALTBAR      |            | 5       |       |                |                  |           |
| ASPBAR      |            | 200     |       |                |                  |           |
| ASPVAR      |            | 0.19    |       |                |                  |           |
| BFIHOST     |            | 0.696   |       |                |                  |           |
| DPLBAR      |            | 0.99    |       |                |                  |           |
| DPSBAR      |            | 11.2    |       |                |                  |           |
| FARL        |            | 1       |       |                |                  |           |
| LDP         |            | 1.56    |       |                |                  |           |
| PROPWET     |            | 0.34    |       |                |                  |           |
| RMED-1H     |            | 8.9     |       |                |                  |           |
| RMED-1D     |            | 33.2    |       |                |                  |           |
| RMED-2D     |            | 41.2    |       |                |                  |           |
| SAAR        |            | 687     |       |                |                  |           |
| SAAR4170    |            | 682     |       |                |                  |           |
| SPRHOST     |            | 29.47   |       |                |                  |           |
| URBCONC1990 |            | 0.688   |       |                |                  |           |
| URBEXT1990  |            | 0.3227  |       |                |                  |           |
| URBLOC1990  |            | 1.024   |       |                |                  |           |
| C           |            | -0.028  |       |                |                  |           |
| D1          |            | 0.44171 |       |                |                  |           |
| D2          |            | 0.28192 |       |                |                  |           |
| D3          |            | 0.38519 |       |                |                  |           |
| E           |            | 0.30981 |       |                |                  |           |
| F           |            | 2.2304  |       |                |                  |           |
| C(1 km)     |            | -0.027  |       |                |                  |           |
| D1(1 km)    |            | 0.435   |       |                |                  |           |
| D2(1 km)    |            | 0.273   |       |                |                  |           |
| D3(1 km)    |            | 0.391   |       |                |                  |           |
| E(1 km)     |            | 0.308   |       |                |                  |           |
| F(1 km)     |            | 2.264   |       |                |                  |           |

## DESIGN RAINFALL DEPTHS

Calculate : **Design rainfall** for

☒ catchment 471400 98750 [SZ 71400 98750]  
☐ 1 km grid point 474000 98000 [SZ 74000 98000]  
☐ Manually entered values ☐ for a point

Area : 0.5075 km<sup>2</sup>

C : -0.02800 D3 : 0.38519  
D1 : 0.44171 E : 0.30981  
D2 : 0.28192 F : 2.23040

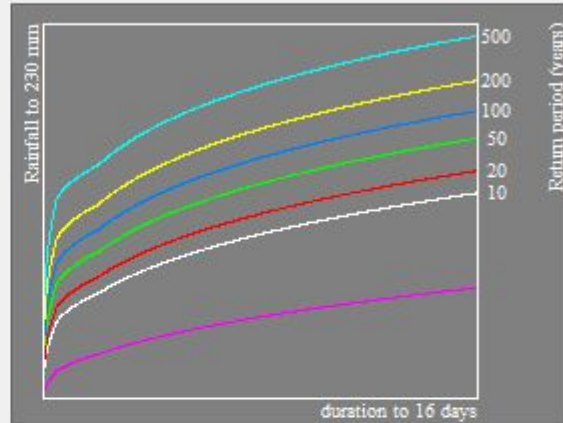
Duration : 6 Hours ☐ Fixed ☒ Sliding  
Return period : 1.0004 Years ☒ AM ☐ POT

Rainfall depth 11.8397 mm

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

 An areal reduction factor of 0.984 has been applied to a point rainfall of 12.0 mm to yield a catchment design rainfall of 11.8 mm.





Calculate : **Design rainfall** for

☒ catchment 471400 98750 [SZ 71400 98750]  
☐ 1 km grid point 474000 98000 [SZ 74000 98000]  
☐ Manually entered values ☐ for a point

Area : 0.5075 km<sup>2</sup>

C : -0.02800 D3 : 0.38519  
D1 : 0.44171 E : 0.30981  
D2 : 0.28192 F : 2.23040

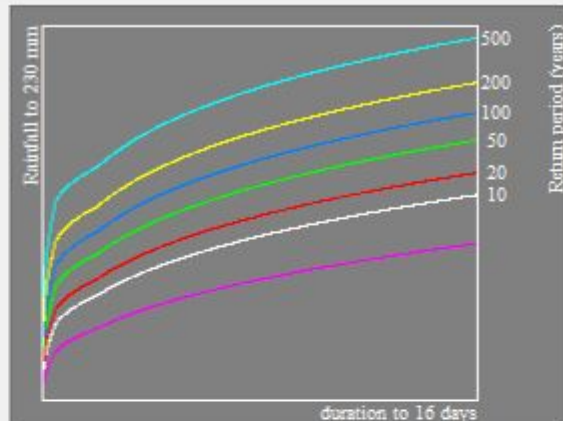
Duration : 6 Hours ☐ Fixed ☒ Sliding  
Return period : 2.0 Years ☒ AM ☐ POT

Rainfall depth 22.2150 mm

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

 An areal reduction factor of 0.984 has been applied to a point rainfall of 22.6 mm to yield a catchment design rainfall of 22.2 mm.





Calculate : **Design rainfall** for

- ☒ catchment 471400 98750 [SZ 71400 98750]  
☐ 1 km grid point 474000 98000 [SZ 74000 98000]  
☐ Manually entered values ☐ for a point

Area : 0.5075 km<sup>2</sup>

C : -0.02800

D3 : 0.38519

D1 : 0.44171

E : 0.30981

D2 : 0.28192

F : 2.23040

Duration : 6

Hours

- ☐ Fixed  
☒ Sliding

Return period : 30.0

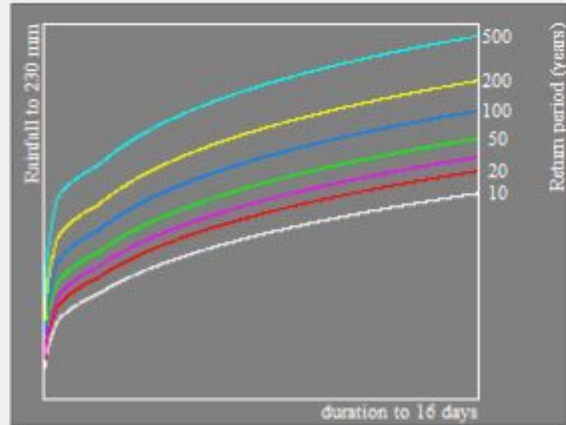
Years

- ☒ AM  
☐ POT

Rainfall depth

48.6332

mm



Calculate...

Export...

Cancel



An areal reduction factor of 0.984 has been applied to a point rainfall of 49.4 mm to yield a catchment design rainfall of 48.6 mm.



Calculate : **Design rainfall** for

- ☒ catchment 471400 98750 [SZ 71400 98750]  
☐ 1 km grid point 474000 98000 [SZ 74000 98000]  
☐ Manually entered values ☐ for a point

Area : 0.5075 km<sup>2</sup>

C : -0.02800

D3 : 0.38519

D1 : 0.44171

E : 0.30981

D2 : 0.28192

F : 2.23040

Duration : 6

Hours

- ☐ Fixed  
☒ Sliding

Return period : 100.0

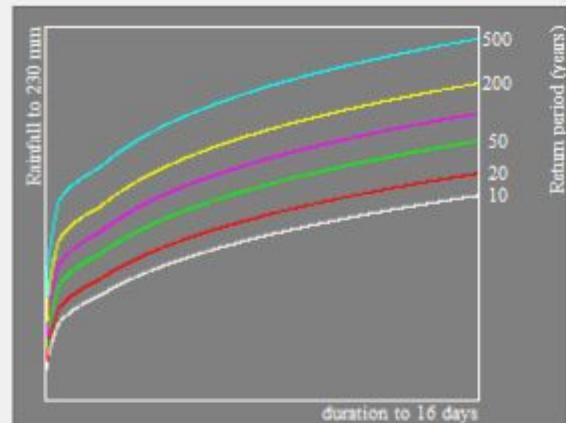
Years

- ☒ AM  
☐ POT

Rainfall depth

66.6857

mm



Calculate...

Export...

Cancel



An areal reduction factor of 0.984 has been applied to a point rainfall of 67.8 mm to yield a catchment design rainfall of 66.7 mm.



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## **APPENDIX F: SURFACE WATER RUN-OFF CALCULATIONS**

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# SURFACE WATER RUN-OFF CALCULATION SHEET

Development 78 Southwood Road, Hayling Island  
Project No. FRA 259

Revision 1.0 Completed by CP  
Date 15.04.2014 Checked by RDN



## Areas

|                                      |       |    |
|--------------------------------------|-------|----|
| Total Site                           | 0.106 | ha |
| Existing Impermeable                 | 0.048 | ha |
| Existing pervious                    | 0.058 | ha |
| Proposed Impermeable (total)         | 0.046 | ha |
| Proposed Impermeable (domestic only) |       | ha |

## Catchment Characteristics

|           |      |       |
|-----------|------|-------|
| SAAR      | 687  | mm    |
| SPR       | 29.5 | %     |
| $i_1$     | 13.7 | mm/hr |
| $i_{100}$ | 45.2 | mm/hr |
| $d_1$     | 11.8 | mm    |
| $d_{100}$ | 66.7 | mm    |

## Run-off Rates

|                                         |          |     |     |
|-----------------------------------------|----------|-----|-----|
| Pre-development<br>Impermeable          | 1yr      | 1.8 | l/s |
|                                         | 100yr    | 6.0 | l/s |
|                                         | 50mm/hr  | 6.7 | l/s |
| Pervious                                | 1yr      | 0.1 | l/s |
|                                         | 100yr    | 0.6 | l/s |
|                                         | QBar     | 0.2 | l/s |
| Total                                   | 1yr      | 1.9 | l/s |
|                                         | 100yr    | 6.6 | l/s |
| Post-development<br>Impermeable (total) | 1yr      | 1.8 | l/s |
|                                         | 100yr+CC | 7.6 | l/s |
| Impermeable (domestic only)             | 1yr      | 0.0 | l/s |
|                                         | 100yr+CC | 0.0 | l/s |

## Volumes

|                                         |          |      |      |
|-----------------------------------------|----------|------|------|
| Pre-development<br>Impermeable          | 1yr      | 5.7  | cu.m |
|                                         | 100yr    | 32.0 | cu.m |
|                                         | 50mm/hr  | 32.0 | cu.m |
| Pervious                                | 1yr      | 4.0  | cu.m |
|                                         | 100yr    | 14.8 | cu.m |
|                                         | QBar     | 4.0  | cu.m |
| Total                                   | 1yr      | 9.7  | cu.m |
|                                         | 100yr    | 46.8 | cu.m |
| Post-development<br>Impermeable (total) | 1yr      | 5.5  | cu.m |
|                                         | 100yr+CC | 40.1 | cu.m |
|                                         | 100yr+CC | 0.0  | cu.m |
| Impermeable (domestic only)             | 1yr      | 0.0  | cu.m |
|                                         | 100yr+CC | 0.0  | cu.m |
| Reduction (total)                       | 14%      | 6.7  | cu.m |
| Reduction (domestic only)               |          |      | cu.m |

## Quick storage Estimate

|               |          | low | high | mean | Imp. Area (ha) | Max. Discharge (l/s) | Rainfall | CC  |
|---------------|----------|-----|------|------|----------------|----------------------|----------|-----|
| Return Period | 1yr      |     |      | 0    |                |                      | FEH      | 0   |
| Return Period | 30yr     |     |      | 0    |                |                      | FEH      | 0   |
| Return Period | 100yr+CC |     |      | 0    |                |                      | FEH      | 30% |
| Return Period | 1yr      |     |      | 0    |                |                      | FSR      | 0   |
| Return Period | 30yr     |     |      | 0    |                |                      | FSR      | 0   |
| Return Period | 100yr+CC |     |      | 0    |                |                      | FSR      | 30% |

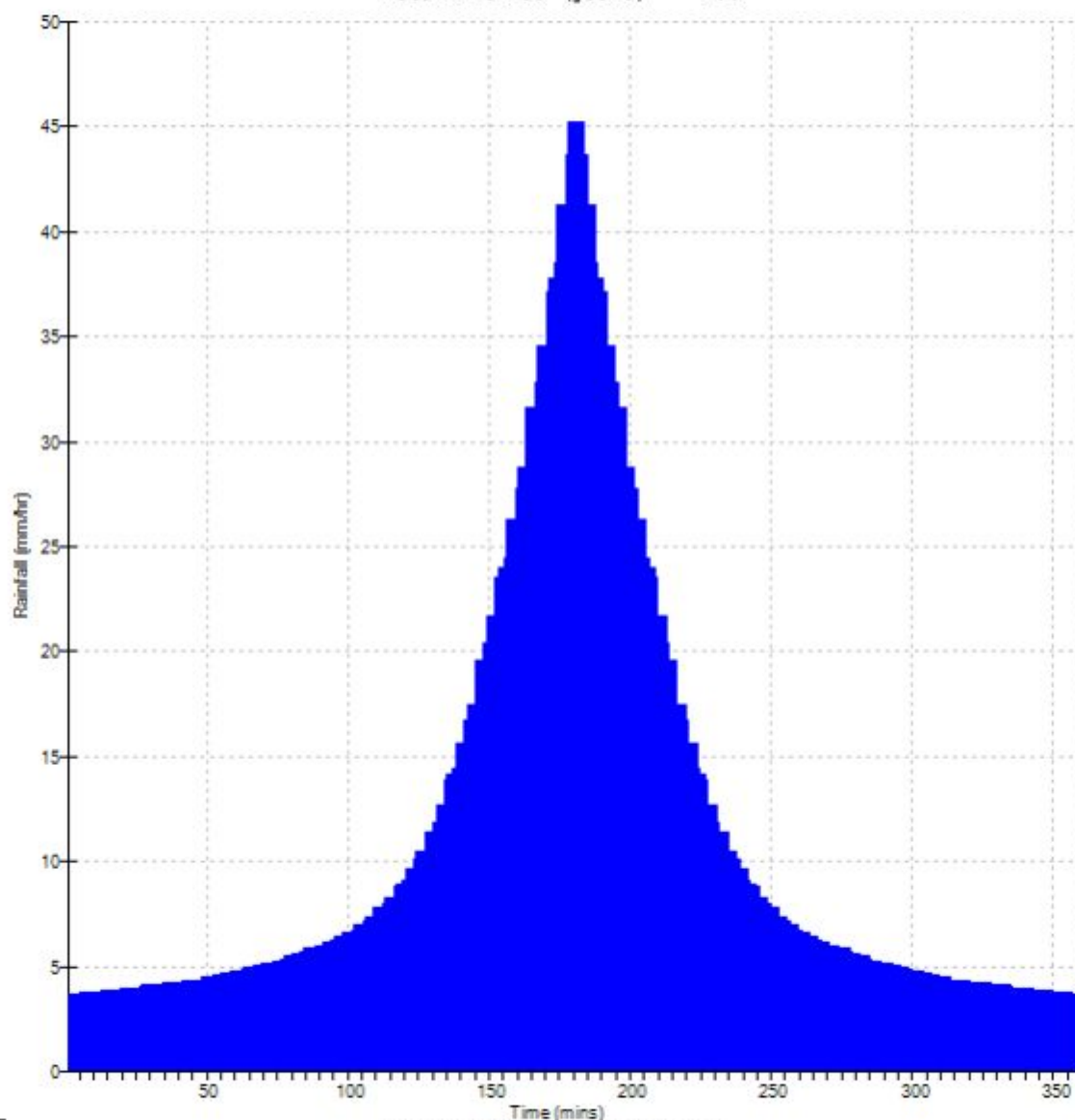
|                                                                  |                                   |                                                                                     |
|------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------|
| Betts Associates Ltd                                             |                                   | Page 1                                                                              |
| Old Marsh Farm Barns<br>Welsh Road<br>Sealand Flintshire CH5 2LY | 78 Southwood Rd<br>Hayling Island |  |
| Date 15.04.2014                                                  | Designed by CP                    |                                                                                     |
| File                                                             | Checked by RDN                    |                                                                                     |
| Micro Drainage                                                   | Network 2014.1                    |                                                                                     |

### Rainfall profile

Storm duration (mins) 360

#### FEH Data

|                        |        |
|------------------------|--------|
| C(1km)                 | -0.027 |
| D1(1km)                | 0.435  |
| D2(1km)                | 0.273  |
| D3(1km)                | 0.391  |
| E(1km)                 | 0.308  |
| F(1km)                 | 2.264  |
| Peak Intensity (mm/hr) | 45.243 |
| Ave. Intensity (mm/hr) | 11.542 |
| Return Period (years)  | 100    |



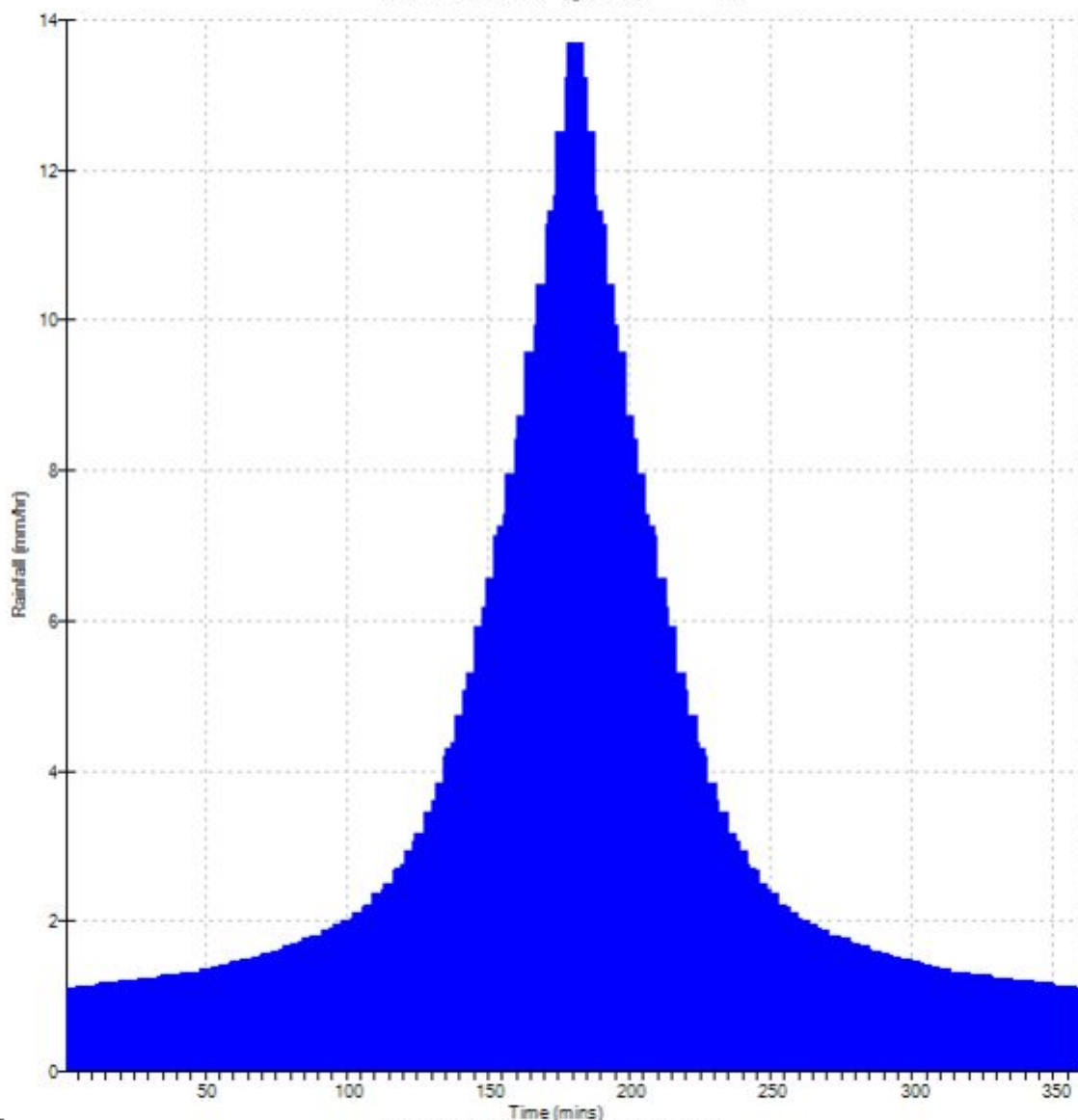
|                                                                  |                                   |                                                                                     |
|------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------|
| Betts Associates Ltd                                             |                                   | Page 1                                                                              |
| Old Marsh Farm Barns<br>Welsh Road<br>Sealand Flintshire CH5 2LY | 78 Southwood Rd<br>Hayling Island |  |
| Date 15.04.2014                                                  | Designed by CP                    |                                                                                     |
| File                                                             | Checked by RDN                    |                                                                                     |
| Micro Drainage                                                   |                                   | Network 2014.1                                                                      |

### Rainfall profile

Storm duration (mins) 360

#### FEH Data

|                        |        |
|------------------------|--------|
| C(1km)                 | -0.027 |
| D1(1km)                | 0.435  |
| D2(1km)                | 0.273  |
| D3(1km)                | 0.391  |
| E(1km)                 | 0.308  |
| F(1km)                 | 2.264  |
| Peak Intensity (mm/hr) | 13.705 |
| Ave. Intensity (mm/hr) | 3.496  |
| Return Period (years)  | 1      |



|                                                                  |                                         |                                                                                     |
|------------------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------|
| Betts Associates Ltd                                             |                                         | Page 1                                                                              |
| Old Marsh Farm Barns<br>Welsh Road<br>Sealand Flintshire CH5 2LY |                                         |  |
| Date 16/04/2014 15:17<br>File                                    | Designed by chris.pickles<br>Checked by |                                                                                     |
| Micro Drainage Source Control 2014.1                             |                                         |                                                                                     |

ICP SUDS Mean Annual Flood

Input

|                       |       |               |          |
|-----------------------|-------|---------------|----------|
| Return Period (years) | 1     | Soil          | 0.290    |
| Area (ha)             | 0.106 | Urban         | 0.000    |
| SAAR (mm)             | 687   | 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 | 0.6 |

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|                                                                  |                           |                                                                                     |
|------------------------------------------------------------------|---------------------------|-------------------------------------------------------------------------------------|
| Betts Associates Ltd                                             |                           | Page 1                                                                              |
| Old Marsh Farm Barns<br>Welsh Road<br>Sealand Flintshire CH5 2LY |                           |  |
| Date 16/04/2014 15:20                                            | Designed by chris.pickles |                                                                                     |
| File                                                             | Checked by                |                                                                                     |
| Micro Drainage                                                   | Source Control 2014.1     |                                                                                     |

### Greenfield Runoff Volume

#### FEH Data

|                        |                                |
|------------------------|--------------------------------|
| Return Period (years)  | 1                              |
| Storm Duration (mins)  | 360                            |
| Site Location          | GB 471400 98750 SZ 71400 98750 |
| C(1km)                 | -0.027                         |
| D1(1km)                | 0.435                          |
| D2(1km)                | 0.273                          |
| D3(1km)                | 0.391                          |
| E(1km)                 | 0.308                          |
| F(1km)                 | 2.264                          |
| Areal Reduction Factor | 1.00                           |
| Area (ha)              | 0.058                          |
| SAAR (mm)              | 687                            |
| CWI                    | 102.660                        |
| SPR Host               | 29.470                         |
| URBEXT (1990)          | 0.3227                         |

#### Results

|                                            |       |
|--------------------------------------------|-------|
| Percentage Runoff (%)                      | 33.04 |
| Greenfield Runoff Volume (m <sup>3</sup> ) | 4.019 |

|                                                                  |                           |                                                                                     |
|------------------------------------------------------------------|---------------------------|-------------------------------------------------------------------------------------|
| Betts Associates Ltd                                             |                           | Page 1                                                                              |
| Old Marsh Farm Barns<br>Welsh Road<br>Sealand Flintshire CH5 2LY |                           |  |
| Date 16/04/2014 15:20                                            | Designed by chris.pickles |                                                                                     |
| File                                                             | Checked by                |                                                                                     |
| Micro Drainage                                                   | Source Control 2014.1     |                                                                                     |

### Greenfield Runoff Volume

#### FEH Data

|                        |                                |
|------------------------|--------------------------------|
| Return Period (years)  | 100                            |
| Storm Duration (mins)  | 360                            |
| Site Location          | GB 471400 98750 SZ 71400 98750 |
| C(1km)                 | -0.027                         |
| D1(1km)                | 0.435                          |
| D2(1km)                | 0.273                          |
| D3(1km)                | 0.391                          |
| E(1km)                 | 0.308                          |
| F(1km)                 | 2.264                          |
| Areal Reduction Factor | 1.00                           |
| Area (ha)              | 0.058                          |
| SAAR (mm)              | 687                            |
| CWI                    | 102.660                        |
| SPR Host               | 29.470                         |
| URBEXT (1990)          | 0.3227                         |

#### Results

|                                            |        |
|--------------------------------------------|--------|
| Percentage Runoff (%)                      | 36.87  |
| Greenfield Runoff Volume (m <sup>3</sup> ) | 14.808 |

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## **APPENDIX G: NPPF 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 systems<sup>2</sup>.

### **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 *only* 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**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Essential infrastructure</b></p> <ul style="list-style-type: none"> <li>• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.</li> <li>• 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.</li> <li>• Wind turbines.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p><b>Highly vulnerable</b></p> <ul style="list-style-type: none"> <li>• Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding.</li> <li>• Emergency dispersal points.</li> <li>• Basement dwellings.</li> <li>• Caravans, mobile homes and park homes intended for permanent residential use<sup>3</sup>.</li> <li>• Installations requiring hazardous substances consent<sup>4</sup>. (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")<sup>5</sup>.</li> </ul>                                                                                                    |
| <p><b>More vulnerable</b></p> <ul style="list-style-type: none"> <li>• Hospitals.</li> <li>• Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.</li> <li>• Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.</li> <li>• Non-residential uses for health services, nurseries and educational establishments.</li> <li>• Landfill and sites used for waste management facilities for hazardous waste<sup>6</sup>.</li> <li>• Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan</i>.<sup>7</sup></li> </ul>                                                                                                                                                                                                                                                                                                                                              |
| <p><b>Less vulnerable</b></p> <ul style="list-style-type: none"> <li>• Police, ambulance and fire stations which are <i>not</i> required to be operational during flooding.</li> <li>• Buildings used for shops, financial, professional and other services,</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure.</p> <ul style="list-style-type: none"> <li>• Land and buildings used for agriculture and forestry.</li> <li>• Waste treatment (except landfill and hazardous waste facilities).</li> <li>• Minerals working and processing (except for sand and gravel working).</li> <li>• Water treatment works which do <i>not</i> need to remain operational during times of flood.</li> <li>• Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).</li> </ul>                                                                                                                                                                                                                                                                                                                                 |
| <p><b>Water-compatible development</b></p> <ul style="list-style-type: none"> <li>• Flood control infrastructure.</li> <li>• Water transmission infrastructure and pumping stations.</li> <li>• Sewage transmission infrastructure and pumping stations.</li> <li>• Sand and gravel working.</li> <li>• Docks, marinas and wharves.</li> <li>• Navigation facilities.</li> <li>• Ministry of Defence defence installations.</li> <li>• Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.</li> <li>• Water-based recreation (excluding sleeping accommodation).</li> <li>• Lifeguard and coastguard stations.</li> <li>• Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.</li> <li>• Essential ancillary sleeping or residential accommodation for staff required by uses in this category, <i>subject to a specific warning and evacuation plan</i>.</li> </ul> |

---

## **APPENDIX H: SOUTHERN WATER CORRESPONDENCE**

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# Water supply and drainage enquiries

The title of the email will be:

**Development enquiries**  
RECORD OF FORM SENT TO SOUTHERN WATER.  
Date: 14/04/2014 : 14:32:46  
Please [print this form](#) for your records.

2

## Contact details

### Customer Ref No

This is found at the top right hand side of your bill.  
[Show me](#)

Name  
Chris Pickles

Address  
Old Marsh Farm Barns, Welsh Road, Sealand  
Flintshire

Postcode  
CH5 2LY

Email address  
[chris.pickles@belt-associates.co.uk](mailto:chris.pickles@belt-associates.co.uk)

Preferred contact number  
01244 288178

Alternate contact number

We may need to get in touch with you about your message. Please let us know the best time for us to call (Mon-Fri) by ticking one or more of the boxes below.

- 08:00 to 10:00
- 10:00 to 12:00
- 12:00 to 14:00
- 14:00 to 16:00
- 16:00 to 18:00

2

Your message to Southern Water  
(maximum 1000 words)

To whom it may concern, 78 Southwood Road, Hayling Island PO11 9QF Please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment for the above site, including details of historical flooding. Kind regards Chris

Please tick here if you have contacted us about this previously

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## **APPENDIX I: LPA/LLFA CORRESPONDENCE**

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## Chris Pickles

---

**From:** Chris Pickles  
**Sent:** 14 April 2014 2:22 PM  
**To:** 'Sarah.reghif@hants.gov.uk'  
**Subject:** 78 Southwood Road, Hayling Island PO11 9QF

Sarah,

I have you contact details from a reply to a flood risk enquiry for a development at Wittering Road, Hayling Island in early 2013, I have another site in the area and was wondering if you could provide appropriate contact details for my flood risk enquiry?

Kind regards  
Chris

**Christopher Pickles**  
*Flood Risk & 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](mailto:chris.pickles@betts-associates.co.uk)  
[www.betts-associates.co.uk](http://www.betts-associates.co.uk)

**CIVIL | STRUCTURAL | GEO-ENVIRONMENTAL | TECHNICAL DUE DILIGENCE  
FLOOD RISK MANAGEMENT | STRUCTURAL SURVEYS | PARTY WALL DUTIES | ECOLOGY**

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## Chris Pickles

---

**From:** Reghif, Sarah <sarah.reghif@hants.gov.uk>  
**Sent:** 14 April 2014 2:48 PM  
**To:** Chris Pickles  
**Cc:** Flood & Water Management  
**Subject:** RE: 78 Southwood Road, Hayling Island PO11 9QF

Leave this with me and I'll get back to you with the information in due course. In future these enquiries should be addressed to [fwm@hants.gov.uk](mailto:fwm@hants.gov.uk).

They still end up with me but then if I'm away, someone else will be able to help

Regards  
Sarah

---

**From:** Chris Pickles [mailto:chris.pickles@betts-associates.co.uk]  
**Sent:** 14 April 2014 14:22  
**To:** Reghif, Sarah  
**Subject:** 78 Southwood Road, Hayling Island PO11 9QF

Sarah,

I have you contact details from a reply to a flood risk enquiry for a development at Wittering Road, Hayling Island in early 2013, I have another site in the area and was wondering if you could provide appropriate contact details for my flood risk enquiry?

Kind regards  
Chris

**Christopher Pickles**  
*Flood Risk & 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](mailto:chris.pickles@betts-associates.co.uk)  
[www.betts-associates.co.uk](http://www.betts-associates.co.uk)

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## Chris Pickles

---

**From:** Reghif, Sarah <sarah.reghif@hants.gov.uk>  
**Sent:** 17 April 2014 7:48 AM  
**To:** Chris Pickles  
**Cc:** Flood & Water Management  
**Subject:** FW: 78 Southwood Road, Hayling Island PO11 9QF

Dear Mr Pickles

Thank you for your enquiry regarding flooding in 78 Southwood Road, Hayling Island, Hampshire (postcode PO11 9QF).

Hampshire County Council currently holds historic surface water flooding data only. For details of river or sewer flooding please contact the Environment Agency or the relevant Water Authority accordingly.

Our records show that there has not been any flooding in the immediate vicinity of your site.

Your site is relatively flat and is bounded by Southwood Road to the north and South Hayling coastline to the south. Your site is within the Monks Brook catchment. Please note that the coast adjacent to your site (immediately to the south) is a Biodiversity Opportunity Area (Chichester/Langstone Harbours & Hayling Island BOA), a Site of Interest for Nature Conservation (Hayling Island Beach SINC) and a Solent Wader Geese Strategy Site.

We have reviewed our Flood Maps for Surface Water (FMfSW) produced in November 2010 for this location. The FMfSW maps were created using both 1:30 and 1:200 annual probability and separate the level of flood risk into areas that could experience flooding in excess of 100mm and 300mm.

Based on your plan it appears that your site is unlikely to be affected by surface water flooding for 1:30 and 1:200 annual probability of flooding. Please note that the FWfSW is not designed to identify individual properties at risk but need to be considered as part of your application.

The site is located within an Area Susceptible to Groundwater Flooding. However no groundwater flooding has been recorded in the immediate vicinity of your site.

Please be aware that this answer has been provided using the best knowledge and information at the time. Please note that the FMfSW should not be used with base mapping of more than 1:25,000 and is not designed to identify individual properties at risk. 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 for the purpose of insuring the property.

I hope this assists.

Regards  
Sarah

---

**From:** Chris Pickles [<mailto:chris.pickles@betts-associates.co.uk>]  
**Sent:** 14 April 2014 14:22  
**To:** Reghif, Sarah  
**Subject:** 78 Southwood Road, Hayling Island PO11 9QF

Sarah,

## Chris Pickles

---

**From:** customer.services@havant.gov.uk on behalf of Havant Borough Council  
<customer.services@havant.gov.uk>  
**Sent:** 14 April 2014 2:25 PM  
**To:** Chris Pickles  
**Subject:** Your query for Havant Borough Council

Thank you for completing the online form. We will get in touch with you using the contact details you supplied if a response is required.

Your reference number for this form is 329/7748

You submitted the form on Mon, 14/04/2014 - 13:24

The details you gave us are:

--Your contact details--  
Your first name: Chris  
Your last name: Pickles  
Your email address: chris.pickles@betts-associates.co.uk  
House number/name: 78  
Road name: Southwood Road  
Town/village: Hayling Island  
Post code: PO11 9QF  
Preferred contact method: Email  
Do you require responses to be in a certain format?

--Which team would you like to contact?--  
Service: Flooding

--Your reason for contacting us--  
Your query or comment:  
To whom it may concern,

78 Southwood Road, Hayling Island PO11 9QF

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  
Chris

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## **APPENDIX J:     SFRA & PFRA INFORMATION**

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# HISTORICAL FLOODING

## Legend



Historic Flood Map



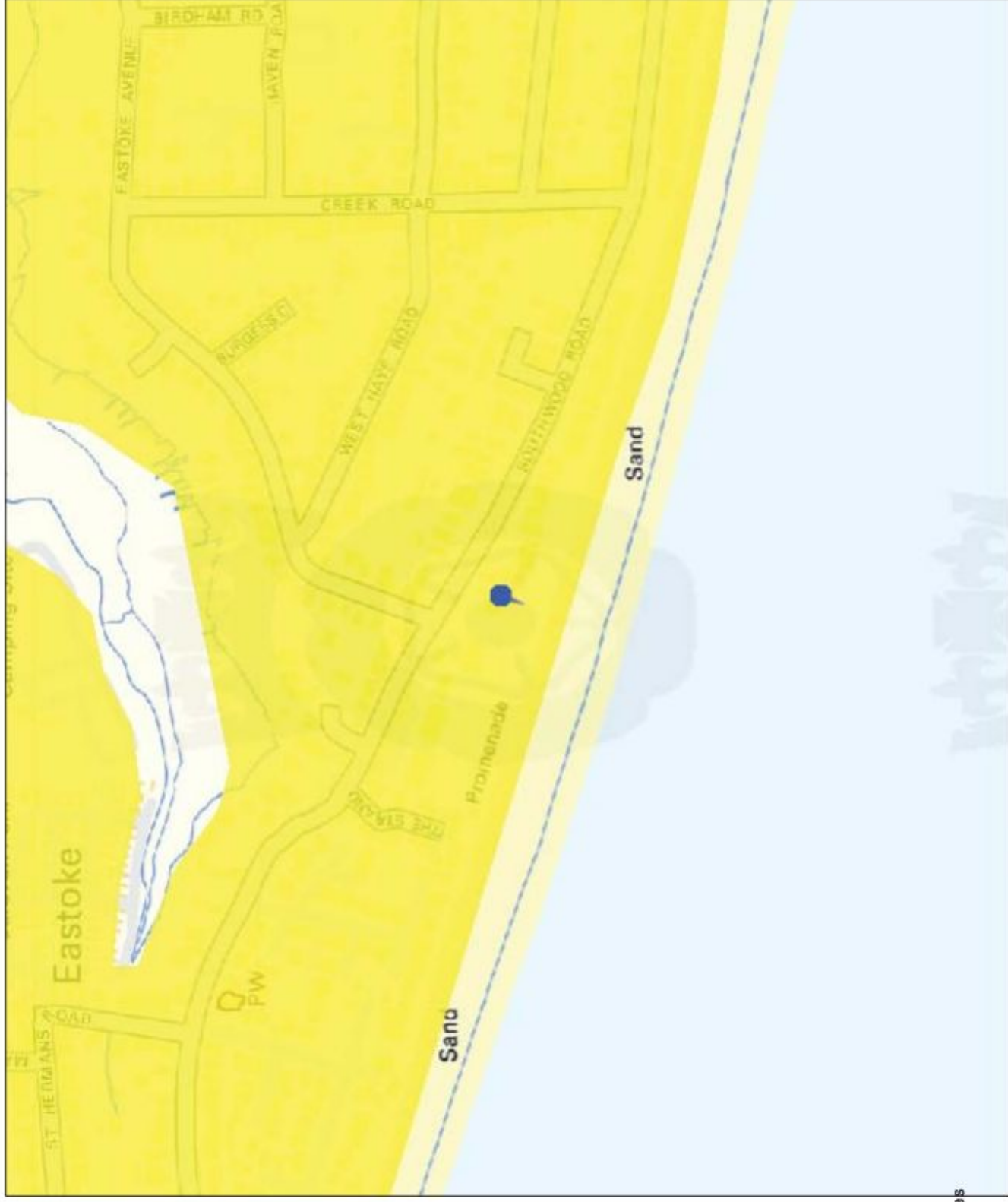
# GROUNDWATER FLOODING

## Legend

Groundwater Vulnerability Zones

 MAJOR

 MINOR



# FLOOD MAP

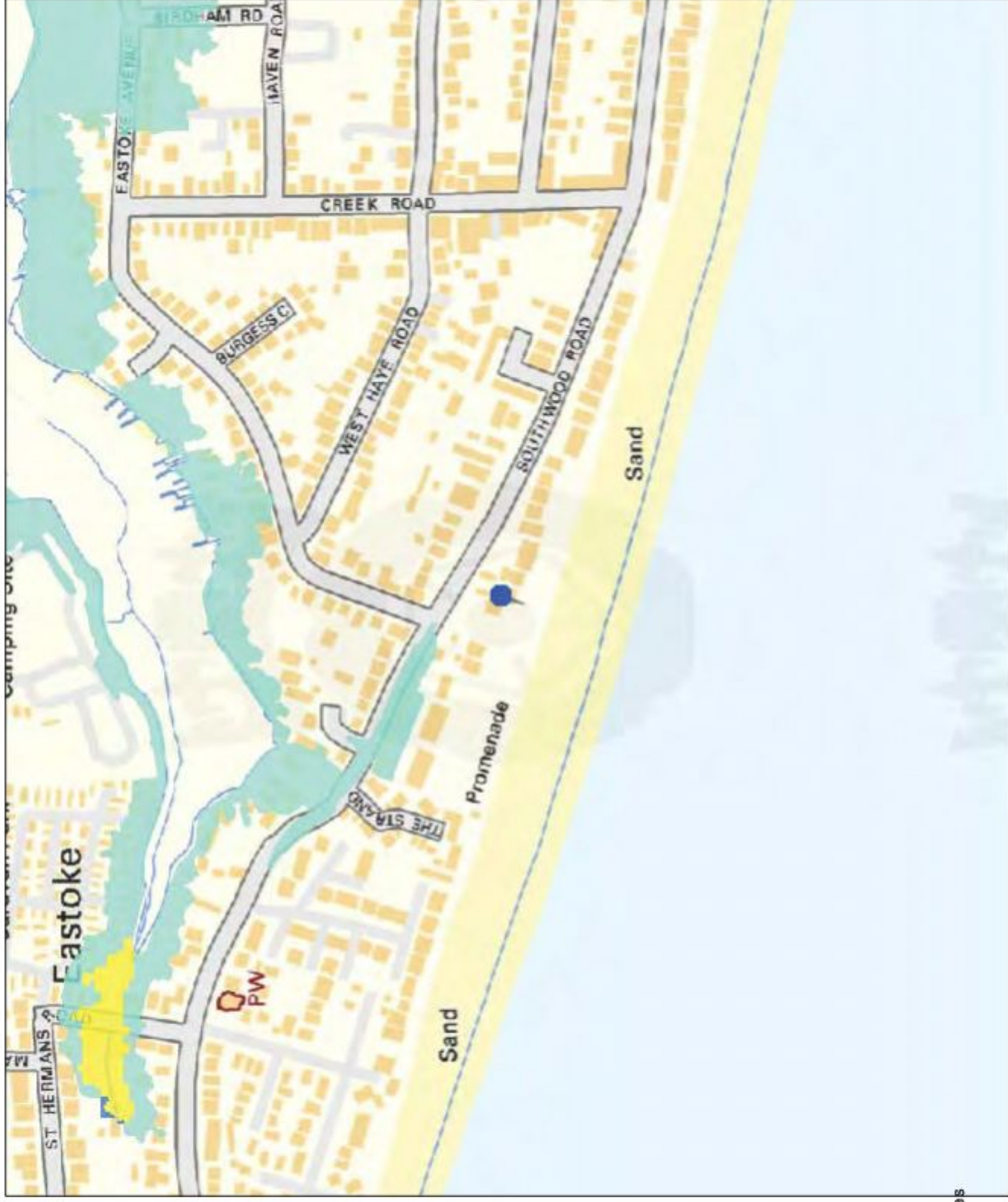
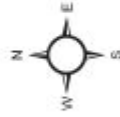
## Legend

Flood Zone 3

Tidal Models

Fluvial / Tidal Models

Fluvial Models

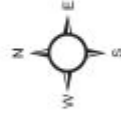


# FLOOD MAP

## Legend

### Flood Zone 2

- Coastal Events
- Fluvial / Tidal Models
- Fluvial / Tidal Models and Coastal Events
- Fluvial Events
- Fluvial Models
- Fluvial Models and Fluvial Events
- Tidal Models
- Tidal Models and Coastal Events

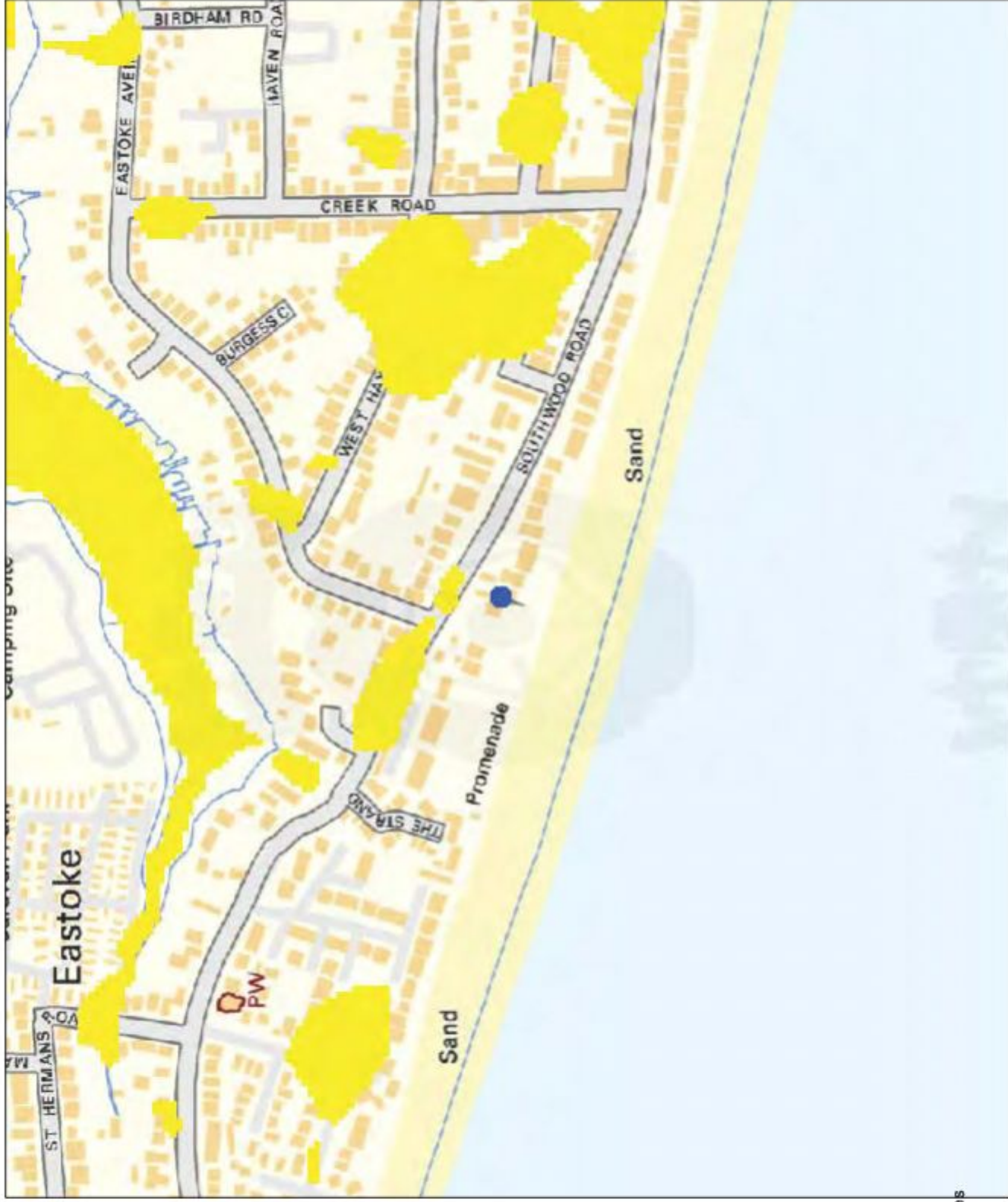


# SURFACE WATER FLOODING

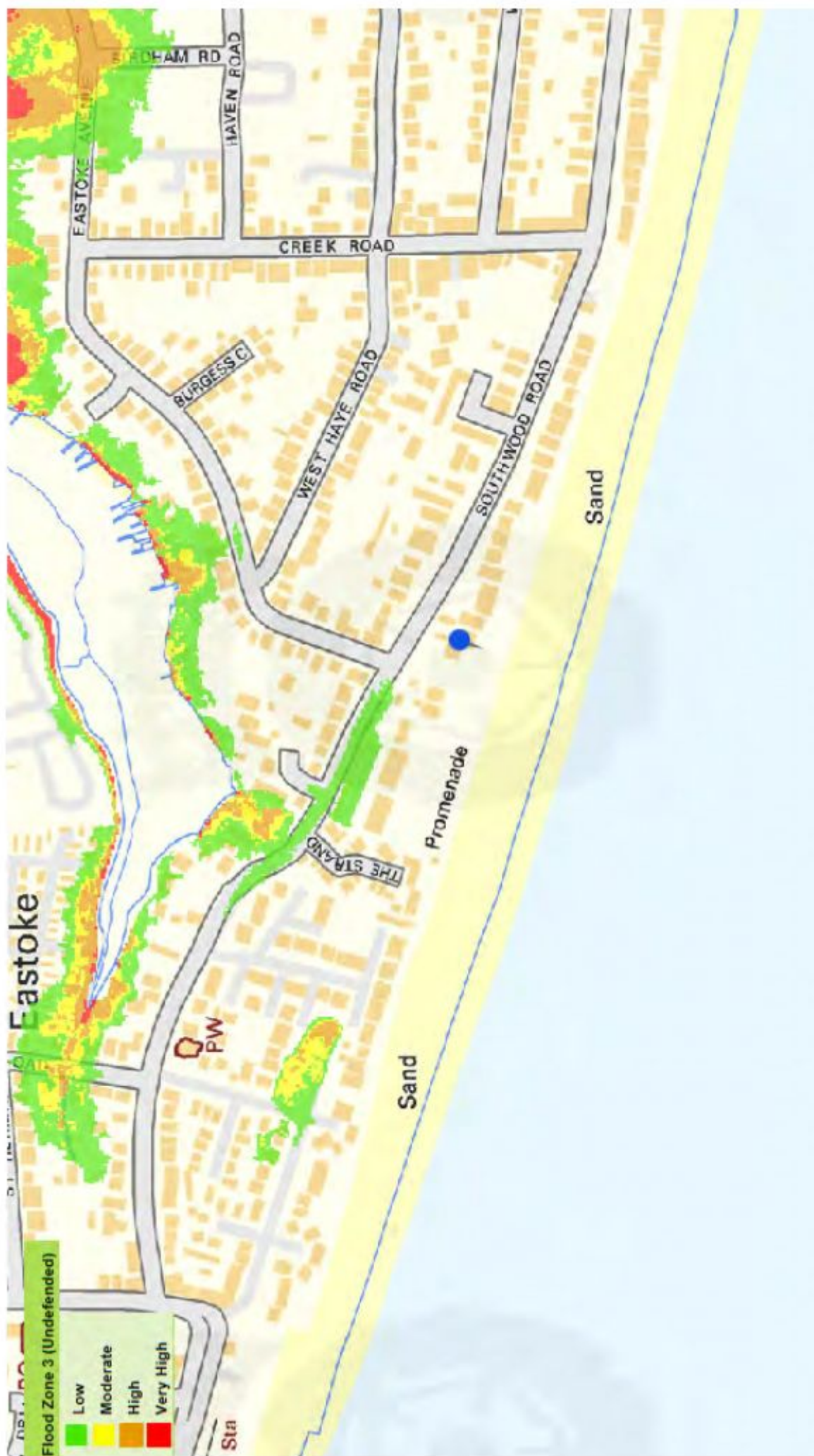
## Legend

 Areas Susceptible to Surface Water Flooding - Low

 Areas Susceptible to Surface Water Flooding - High



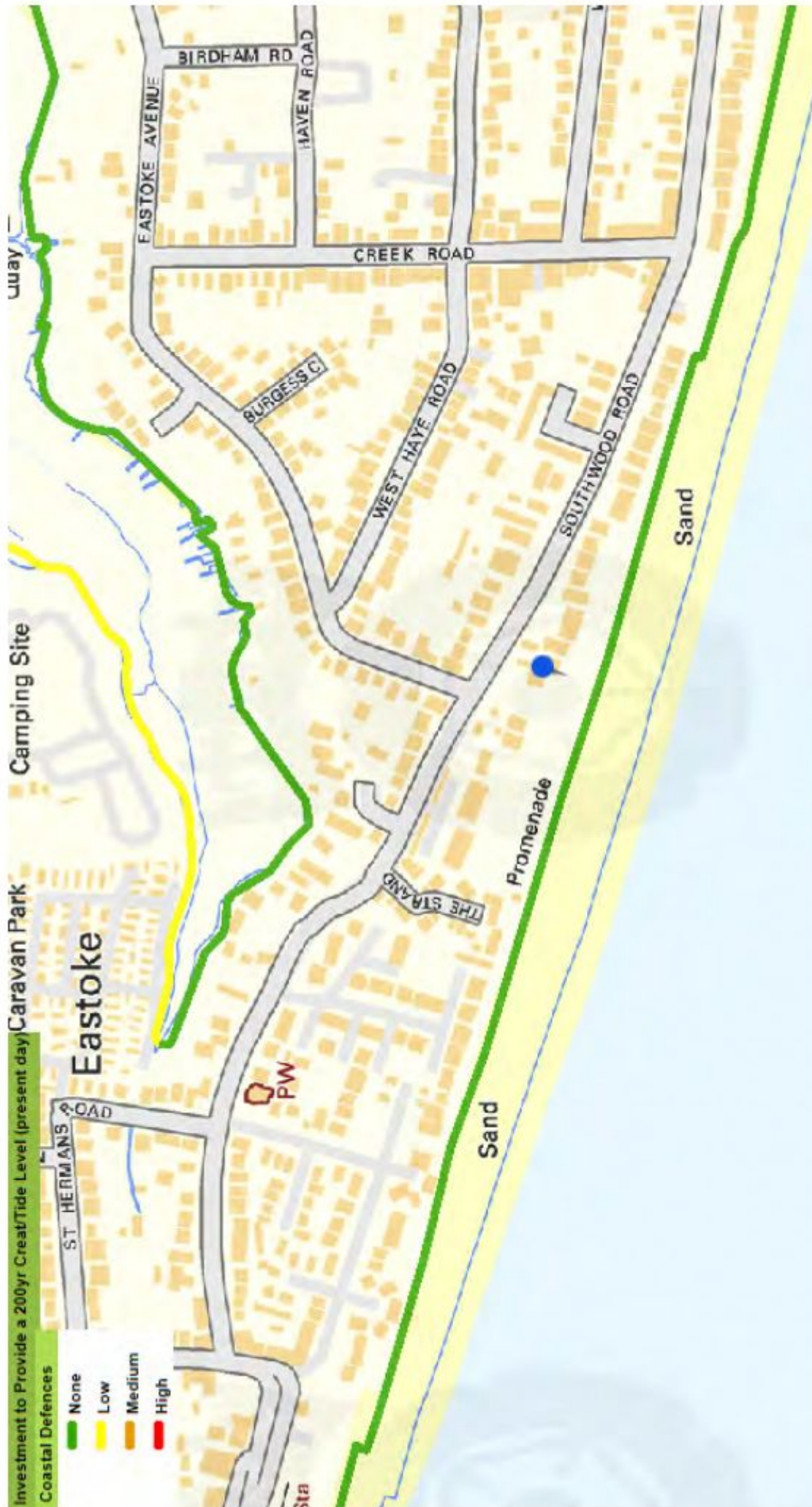




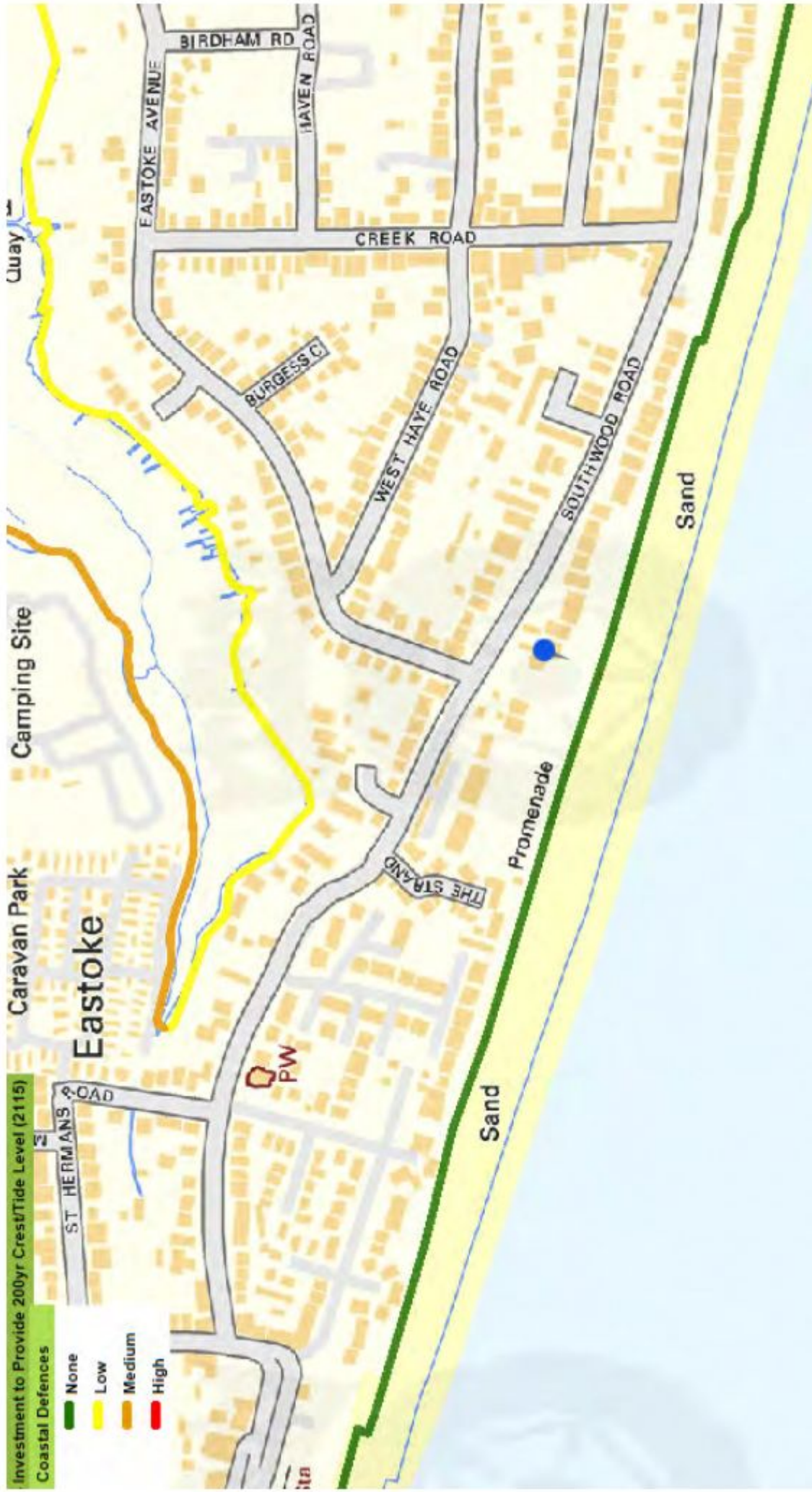


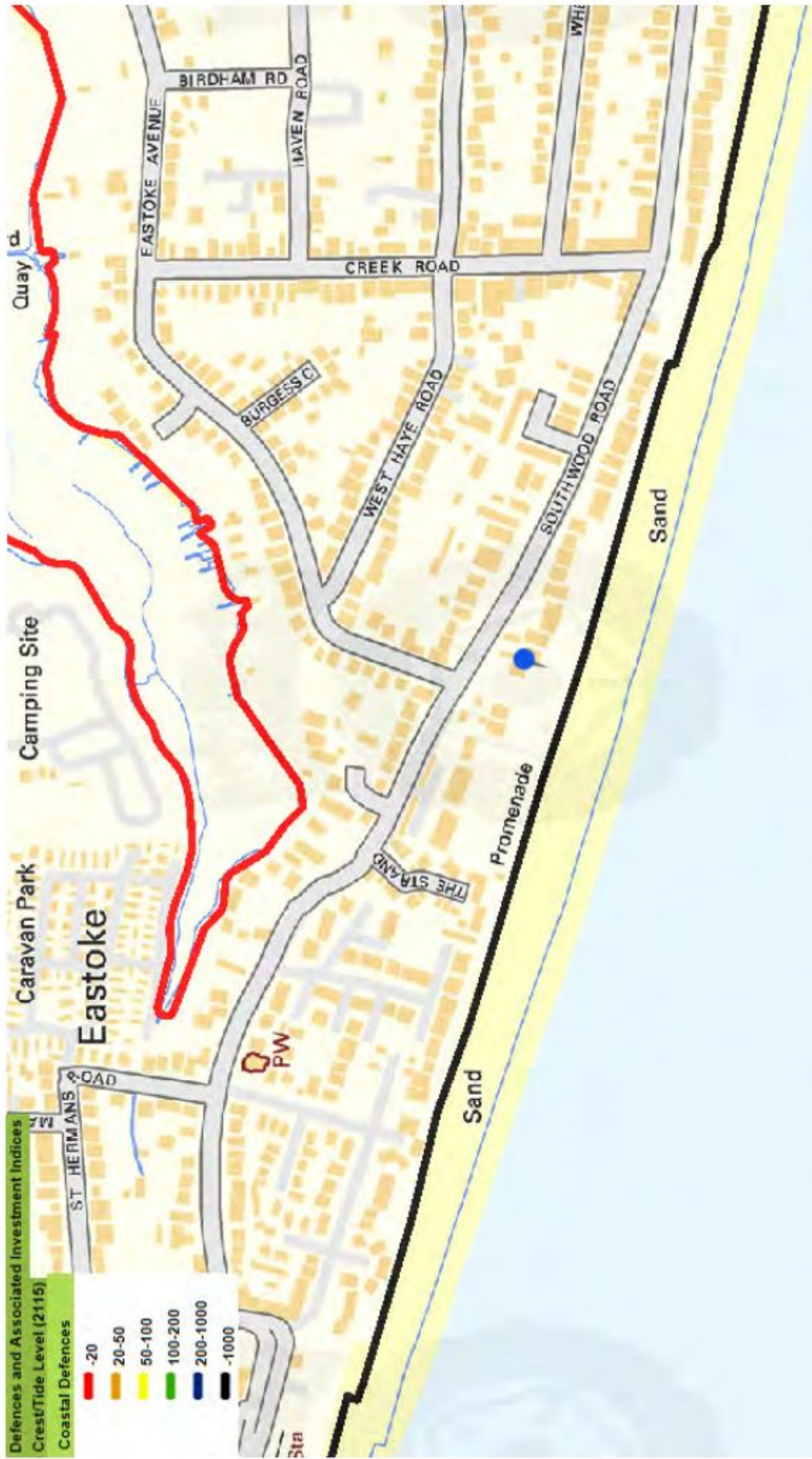




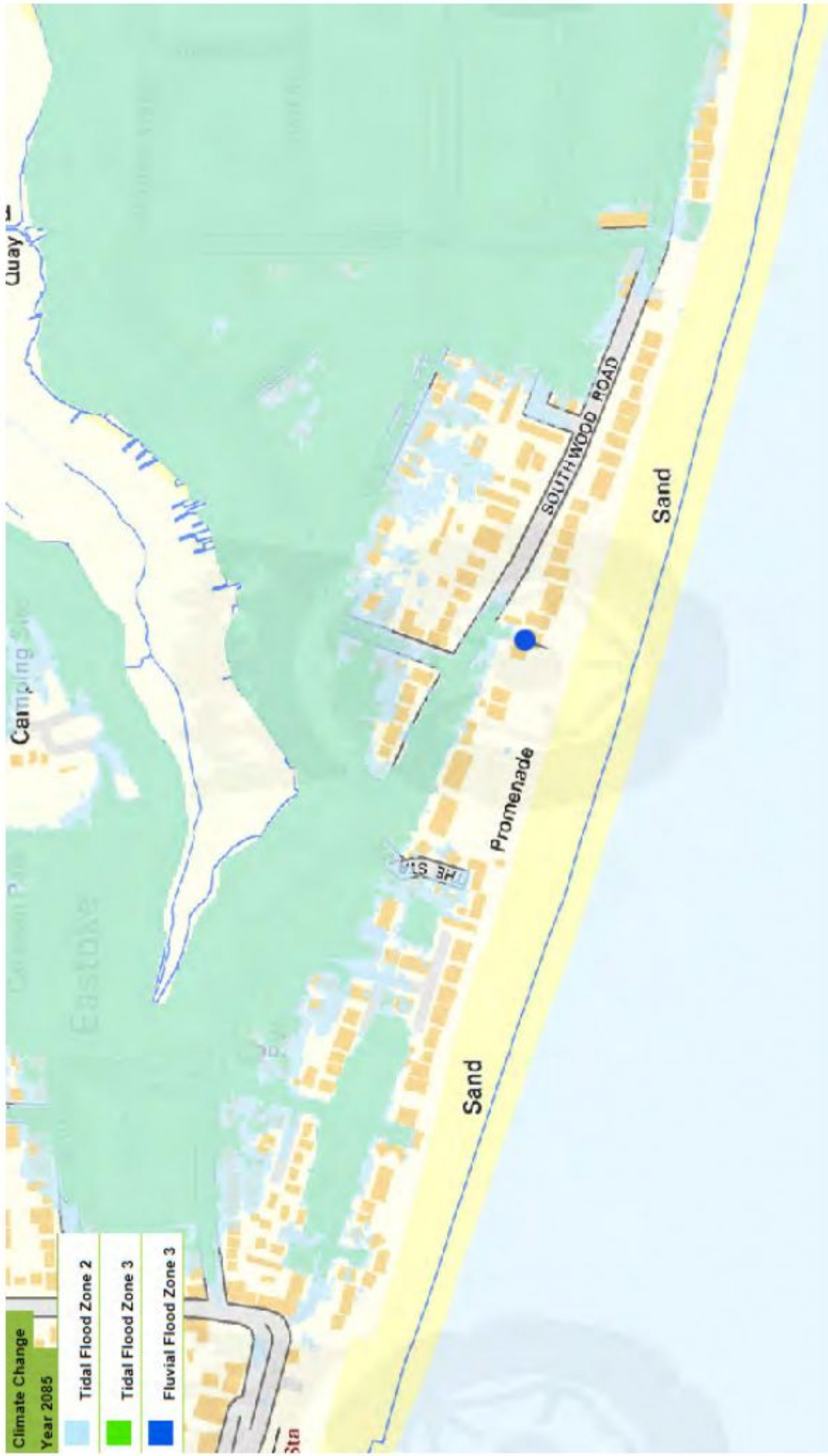


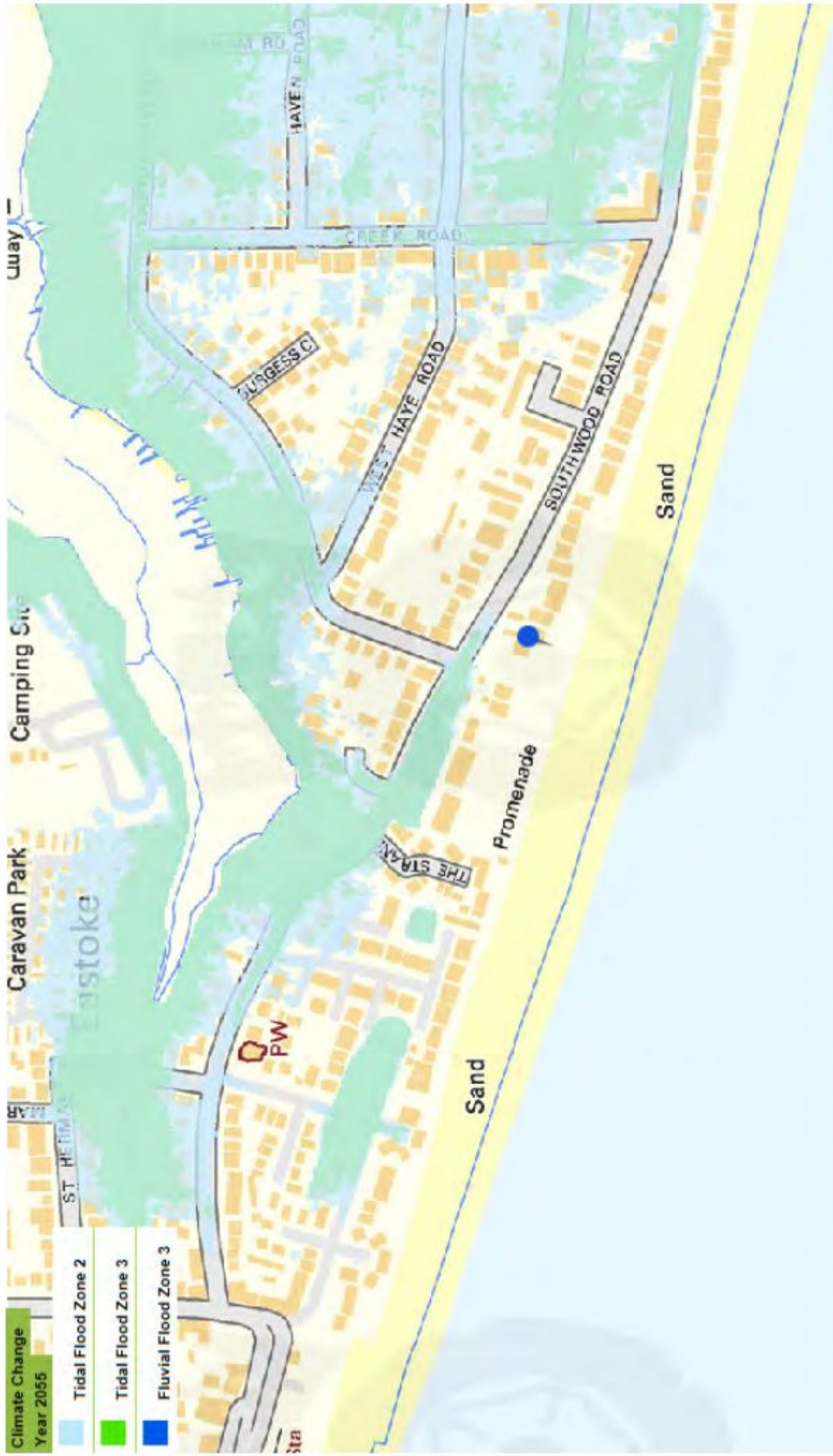




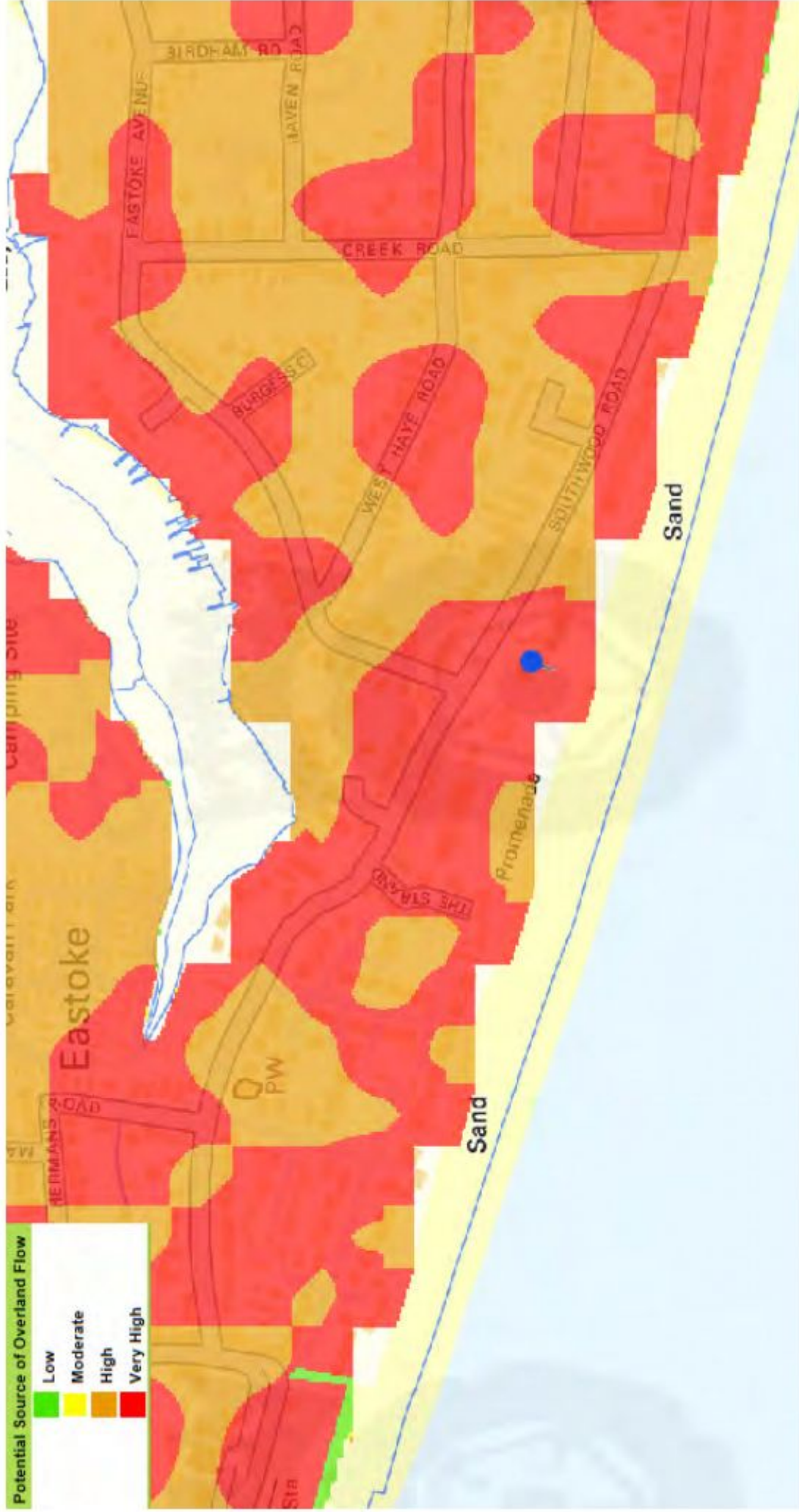












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## **APPENDIX K:    ESCP CORRESPONDENCE**

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## Chris Pickles

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**From:** Chris Pickles  
**Sent:** 17 April 2014 10:55 AM  
**To:** 'james.addicott@havant.gov.uk'  
**Subject:** 78 Southwood Road, Hayling Island  
**Attachments:** Location Plan.pdf

James,

**78 Southwood Road, Hayling Island PO11 9QF**

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); 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  
Chris

**Christopher Pickles**  
*Flood Risk & 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](mailto:chris.pickles@betts-associates.co.uk)  
[www.betts-associates.co.uk](http://www.betts-associates.co.uk)

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## Chris Pickles

---

**From:** James Addicott <james.addicott@havant.gov.uk>  
**Sent:** 22 April 2014 9:02 AM  
**To:** Chris Pickles  
**Subject:** RE: 78 Southwood Road, Hayling Island

Thanks Chris,  
Just to let you know that I have received your email.  
I am playing catch up with planning applications at the moment so will give it my attention as soon as I feasibly can.

Looking at my diary commitments this will have to be next week so I will work on having a response back to you by Thurs 1st.

Thanks  
James

**James Addicott**  
Coastal Project Engineer

Tel: 02392 446223  
Mobile: 07974 367547

Our website: <http://www.escp.org.uk>



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---

**From:** Chris Pickles [mailto:chris.pickles@betts-associates.co.uk]  
**Sent:** 17 April 2014 10:55  
**To:** James Addicott  
**Subject:** 78 Southwood Road, Hayling Island

James,

**78 Southwood Road, Hayling Island PO11 9QF**

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); 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  
Chris

**Christopher Pickles**  
Flood Risk & Engineering Technician

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## **APPENDIX L:     NOTES OF LIMITATION**

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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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