



# Residential Density Evidence Paper

January 2019



# Residential Density Evidence Paper

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Purpose of this paper | To establish appropriate densities for residential development within Havant Borough                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Why?                  | The National Planning Policy Framework states that councils should set their own policies on housing densities to optimise the use of land                                                                                                                                                                                                                                                                                                                                                                                                 |
| Objectives            | <ul style="list-style-type: none"><li>▪ Analyse guidance, and opportunities and constraints that may arise from differing density models in Havant borough</li><li>▪ To establish the local circumstances that should be reflected regarding residential density</li><li>▪ Identify parts of the borough w suitable for significantly increased densities, having regard to their accessibility to services and public transport</li><li>▪ To provide a robust evidence base for a minimum density standard(s) in Havant Borough</li></ul> |

Any queries about the report should be sent to:

Email [policy.design@havant.gov.uk](mailto:policy.design@havant.gov.uk)

Telephone 023 9244 6539

Address: Havant Borough Council  
Public Service Plaza  
Civic Centre Way  
Havant  
PO9 2AX

# Contents

|                              | Page |
|------------------------------|------|
| 1. INTRODUCTION .....        | 1    |
| 2. POLICY CONTEXT .....      | 3    |
| 3. LOCAL CIRCUMSTANCES ..... | 5    |
| 4. OPPORTUNITY AREAS.....    | 7    |
| 5. RECOMMENDATIONS.....      | 10   |
| APPENDIX 1.....              | 11   |
| APPENDIX 2.....              | 12   |
| APPENDIX 3.....              | 0    |

# 1. Introduction

- 1.1 The finite amount of undeveloped land and environmental designations in the borough, means that there remain relatively limited opportunities for significantly new development. It is therefore important that development is provided in a sustainable way which maximises this finite resource. Building new homes at higher densities will be essential to ensure that Havant borough is able meet its own housing need.
- 1.2 This paper assesses national planning policy related to higher density housing, as well as opportunities and constraints that may arise from differing density models in Havant borough.
- 1.3 It will provide recommendations for parts of the borough which can accommodate differing densities of development including town centres and other locations that are well served by public transport. This paper will also inform the Council's approach to assessing potential housing yields for development on proposed allocation sites within the borough.

## Calculating Density

- 1.4 The main benefits for using and measuring density on developments include ensuring that:
- (i) housing is available for the population;*
  - (ii) what is built is appropriate to its location and in relation to surrounding areas;*
  - (iii) households can easily access services, infrastructure and employment, and*
  - (iv) available services and infrastructure are effectively used and can help planning for the provision of facilities and services in the future.*
- 1.5 By measuring density, development can be appropriately planned in order to make the most efficient use of land available. Housing density can be measured as follows:
- Number of habitable rooms
  - Quantity of floor area (in sq metres)
  - Number of Dwellings per hectare (dph)
- 1.6 Dwellings per hectare (dph) is the most widely used density measure nationwide and is considered to be the most appropriate means of measuring density for the purposes of this document.

## Calculating Site Area for Density Measures

- 1.7 Housing density can be assessed as either a measure of dwellings per hectare of the site's gross area or its net area. The term 'gross site area' is defined as the total land area of which the development will form part. The term 'net site area' is defined as the land that is available for development, otherwise known as the developable area.
- 1.8 In planning practice, it is common to determine the net site area as a percentage of the gross site area, known as the gross to net ratio. However, as individual sites developable area can vary, net

site areas can be broadly established through analysis of known constraints and designations affecting the site using GIS mapping tools.

- 1.9 Clarification of elements of development that would be included within any net area calculation are shown in Figure 1 below.

**Figure 1: Development Elements for Gross and Net Area Calculations**

**Net site area, including:**

- Roads within the site;
- Private garden space;
- Car parking areas;
- Incidental open space;
- Children's play areas.

**Gross site area, including:**

- Major distributor roads and large-scale access requirements;
- Primary schools, churches, shopping areas etc.;
- Open spaces specifically designed to serve a wider area;
- Any significant buffer areas required for landscape, ecological or infrastructure such as underground pipes

## 2. Policy Context

- 2.1 Paragraph 122 of the National Planning Policy Framework (NPPF) states that planning policies and decisions should support development that makes efficient use of land, taking into account:
- a) the identified need for different types of housing and other forms of development, and the availability of land suitable for accommodating it;
  - b) local market conditions and viability;
  - c) the availability and capacity of infrastructure and services – both existing and proposed – as well as their potential for further improvement and the scope to promote sustainable travel modes that limit future car use;
  - d) the desirability of maintaining an area's prevailing character and setting (including residential gardens), or of promoting regeneration and change; and
  - e) The importance of securing well-designed and healthy places.
- 2.2 Paragraph 123 of the NPPF indicates where there is an existing or anticipated shortage of land for meeting identified housing needs, it is especially important that planning policies and decisions avoid homes being built at low densities and ensure that developments make optimal use of the potential of each site. In these circumstances:
- a. plans should contain policies to optimise the use of land in their area and meet as much of the identified need for housing as possible. This should include the use of minimum density standards for town centres and other locations that are well served by public transport. These standards should seek a significant uplift in the average density of residential development within these areas, unless it can be shown that there are strong reasons why this would be inappropriate;
  - b. the use of minimum density standards should also be considered for other parts of the plan area. It may be appropriate to set out a range of densities that reflect the accessibility and potential of different areas; and
  - c. local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework.
- 2.3 Paragraph 123 goes on to state that planning policies and decisions should avoid being built at low densities and ensure that developments make optimal use of the potential of each site. In this respect:
- a. plans should contain policies to optimise the use of land in their area and meet as much of the identified need for housing as possible. These standards should seek significant uplift in the average density of residential development within city and town centres and other locations that are well served by public transport, unless it can be shown that there are strong reasons why this would be inappropriate;
  - b. the use of minimum density standards should also be considered for other parts of the plan area. It may be appropriate to set out a range of densities that reflect the accessibility and potential of different areas, rather than one broad density range; and

- c. local planning authorities should refuse applications which they consider to fail to make efficient use of land, taking into account the policies in this Framework.

2.4 In addition to the above, paragraph 102 of the NPPF clarifies that transport issues should be considered from the earliest stages of plan-making so that opportunities from transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated.

## 3. Local Circumstances

### Housing Supply

- 3.1 The Council's 2017 Housing Constraints and Supply Analysis provides an in-depth review of housing need within the Borough when assessed against potential land supply.
- 3.2 The analysis concludes that there is relatively limited potential for significant new development. As such, there is a need to make the most efficient use of land within Havant borough. It is therefore important to provide a policy framework that supports appropriate densities to provide sustainable development.

### Access to Transport, Services and Open Space

- 3.3 Access to transport, services and appropriate open space are key considerations when considering appropriate densities for residential development.
- 3.4 Within the borough, there are a number of locations which benefit from good access to transport, services and open space. By assessing these areas alongside localised character and landscape considerations, it is possible to identify areas capable of supporting high density residential development. Areas considered to have the potential for higher density due to proximity to services (opportunity areas) are discussed further at section 4 of this report.
- 3.5 However, some parts of the Borough are relatively isolated and do not benefit from good proximity to goods services and public transport. The density and character of new development in such areas needs to reflect its accessibility. This will affect the way that new residents live, for example, the amount of parking needed to serve new dwellings in such areas.

### Local Character and Design

- 3.6 To support development of an appropriate density, due regard should be given to the character of the local area as well as the design of the development as discussed at paragraph 1.10.
- 3.7 Information relating to the landscape character areas of the Borough can be found in the Council's 2015 Landscape Capacity Study. The Landscape Capacity Study assessed the capacity of different areas of the borough to accommodate development, using a 35dph benchmark and two and three storey dwellings.

### Density and other Local Policies

- 3.8 The Havant Borough Local Plan 2036 (HBLP 2036) proposes the introduction of internal space standards, as well as requiring a third of all residential development required to be provided as 2-bedroom homes.
- 3.9 By following good urban design and the formation of residential layouts that promote terraced properties, the requirement for internal space standards would be achievable whilst achieving an appropriate density.

- 3.10 It should also be noted that where high density development is promoted then it is likely that the built form in these areas would support 3+ storey development and would therefore be able to meet the requirements for density, housing mix and internal space standards.

## 4. Opportunity Areas

### Defining Opportunity Areas

- 4.1 Opportunities for higher density residential development are dependent on accessibility to services that would support future occupants. An accessibility hierarchy of areas within the borough by non-car means is provided within the Council's Supplementary Planning Document on Parking<sup>1</sup>.
- 4.2 Using the existing hierarchy and the currently available public transport options provided in Appendix 1, as well as information on accessibility to shops, the following opportunity areas have been identified:
- Havant Town Centre (shops and services, train and bus stations with shops and services)
  - Waterlooville Town Centre (shops and services, on a premium bus corridor)
  - Emsworth (shops and services, train station, bus routes)
  - Leigh Park (multiple bus routes, close proximity to Havant Town Centre, shops)
- 4.3 The town and district centres<sup>2</sup> are near to services, and have the most potential to support higher densities, with a reduced parking requirement.
- 4.4 The areas within easily accessible walking distance (ped-shed)<sup>3</sup> to the services concentrated in the opportunity areas also have the potential to support higher densities. Figure 2 below provides an indicative mix and characteristics for differing densities. Appendix 2 provides further illustration of the built form that differing densities can produce. Appendix 3 provides maps of the town or district centres, identified in paragraph 4.2 and the 'ped-shed' areas surrounding them.

### Minimum Density Standards in Practice

- 4.5 It would not be appropriate to identify an upper limit to density, due to site specific design characteristics and differing local character profiles. To ensure that appropriate densities are achieved as far as possible, the applicant's design and access statement should clearly explain the rationale of the design and layout to justify the proposed density with reference to the accessibility to services and local character.
- 4.6 Appendix 2 provides a range of examples at varying densities which show the different types of built form which can be achieved according to their location and the character of the surrounding area. As shown by the examples it is anticipated that at least 1 parking space per dwelling can be provided at 55dph.

---

<sup>1</sup> <http://www.havant.gov.uk/planning-and-environment/planning-policy/supplementary-planning-documents/parking-supplementary>

<sup>2</sup> As defined on the Town Centre Policy Map – HBLP2036

<sup>3</sup> The walking times are created by setting the distance that would be walked within 10 minutes based on a walking speed of 3mph. The data this is based on is the Ordnance Survey ITN road and path network.

Figure 2: Indicative density and mix characteristics

|                                                           |       | ← Increasingly mixed range of product |                                                                                                                      |                                                                                                                     |                                                                                                                    |                                                                                                  |                                                                             |                                                                            |
|-----------------------------------------------------------|-------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|
|                                                           |       | Site Size                             |                                                                                                                      |                                                                                                                     |                                                                                                                    |                                                                                                  |                                                                             |                                                                            |
|                                                           |       | Density                               | 10ha                                                                                                                 | 3 ha                                                                                                                | 1 ha                                                                                                               | 0.5 ha                                                                                           | 0.25 ha                                                                     | 0.1 ha                                                                     |
| ↑<br>Increasing proportion of flats and smaller dwellings | Urban | 90 dph                                |                                                                                                                      | 270 dwellings:<br>1 bed flats: 30%<br>2 bed flats: 50%<br>3 bed flats: 20%                                          | 90 dwellings<br>1 bed flats: 30%<br>2 bed flats: 50%<br>3 bed flats: 20%                                           | 45 dwellings<br>1 bed flats: 30%<br>2 bed flats: 50%<br>3 bed flats: 20%                         | 23 dwellings<br>1 bed flats: 30%<br>2 bed flats: 50%<br>3 bed flats: 20%    | 9 dwellings<br>1 bed flats: 30%<br>2 bed flats: 50%<br>3 bed flats: 20%    |
|                                                           |       | 70 dph<br>(Base Case)                 | 700 dwellings:<br>1 bed flats: 20%<br>2 bed flats: 30%<br>3 bed flats: 10%<br>2 bed houses: 20%<br>3 bed houses: 20% | 210 dwellings<br>1 bed flats: 20%<br>2 bed flats: 30%<br>3 bed flats: 10%<br>2 bed houses: 20%<br>3 bed houses: 20% | 70 dwellings<br>1 bed flats: 20%<br>2 bed flats: 30%<br>3 bed flats: 10%<br>2 bed houses: 20%<br>3 bed houses: 20% | 35 dwellings<br>1 bed flats: 20%<br>2 bed flats: 40%<br>2 bed houses: 30%<br>3 bed houses: 10%   | 18 dwellings<br>1 bed flats: 20%<br>2 bed flats: 40%<br>2 bed houses: 40%   | 7 dwellings<br>2 bed flats: 60%<br>2 bed houses: 40%                       |
|                                                           |       | 60 dph                                |                                                                                                                      | 120 dwellings<br>1 bed flats: 20%<br>2 bed flats: 30%<br>2 bed houses: 30%<br>3 bed houses: 20%                     | 60 dwellings<br>1 bed flats: 20%<br>2 bed flats: 30%<br>2 bed houses: 30%<br>3 bed houses: 20%                     | 30 dwellings<br>1 bed flats: 20%<br>2 bed flats: 30%<br>2 bed houses: 30%<br>3 bed houses: 20%   | 15 dwellings<br>1 bed flats: 20%<br>2 bed flats: 30%<br>2 bed houses: 50%   | 6 dwellings<br>2 bed flats: 50%<br>2 bed houses: 50%                       |
|                                                           |       | 55 dph                                |                                                                                                                      | 115 dwellings<br>1 bed flats: 10%<br>2 bed flats: 30%<br>2 bed houses: 30%<br>3 bed houses: 30%                     | 55 dwellings<br>1 bed flats: 10%<br>2 bed flats: 30%<br>2 bed houses: 30%<br>3 bed houses: 30%                     | 28 dwellings<br>1 bed flats: 10%<br>2 bed flats: 30%<br>2 bed houses: 30%<br>3 bed houses: 30%   | 14 dwellings<br>2 bed flats: 40%<br>2 bed houses: 30%<br>3 bed houses: 30%  | 6 dwellings<br>2 bed flats: 40%<br>2 bed houses: 60%                       |
|                                                           |       | 45 dph<br>(Base Case)                 | 450 dwellings<br>2 bed flats: 30%<br>2 bed houses: 20%<br>3 bed houses: 30%<br>4 bed houses: 20%                     | 135 dwellings<br>2 bed flats: 30%<br>2 bed houses: 20%<br>3 bed houses: 30%<br>4 bed houses: 20%                    | 45 dwellings<br>2 bed flats: 30%<br>2 bed houses: 20%<br>3 bed houses: 30%<br>4 bed houses: 20%                    | 23 dwellings<br>2 bed flats: 30%<br>2 bed houses: 20%<br>3 bed houses: 30%<br>4 bed houses: 20%  | 11 dwellings<br>2 bed houses: 40%<br>3 bed houses: 30%<br>4 bed houses: 30% | 5 dwellings<br>2 bed houses: 40%<br>3 bed houses: 40%<br>4 bed houses: 20% |
| Suburban                                                  |       | 35 dph                                |                                                                                                                      | 105 dwellings<br>2 bed houses: 30%<br>3 bed houses: 30%<br>4 bed houses: 30%<br>5 bed houses: 10%                   | 35 dwellings<br>2 bed houses: 30%<br>3 bed houses: 30%<br>4 bed houses: 30%<br>5 bed houses: 10%                   | 18 dwellings<br>2 bed houses: 30%<br>3 bed houses: 30%<br>4 bed houses: 30%<br>5 bed houses: 10% | 9 dwellings<br>3 bed houses: 40%<br>4 bed houses: 40%<br>5 bed houses: 20%  | 4 dwellings<br>3 bed houses: 50%<br>4 bed houses: 50%                      |

Source: Havant Borough Council (2010)

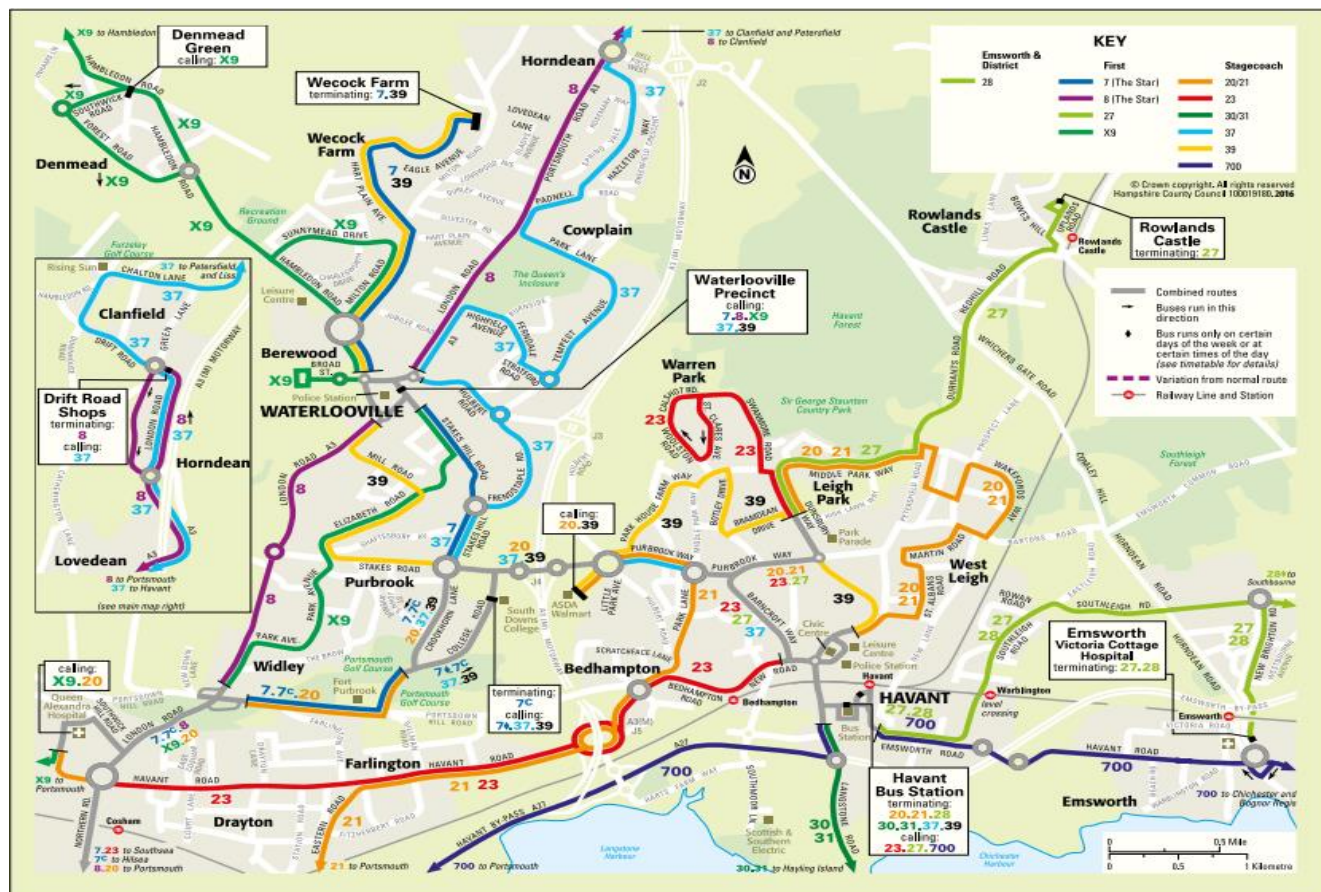
- 4.7 Based on the general characteristics of the densities contained in Figure 2, sites within the town centres would be suitable to support a minimum density of 70dph. Outside of the town centre areas but within the area of opportunities, a minimum density of 55dph would be appropriate to make most effective use of land, whilst still respecting the nature of the built form surrounding these areas.
- 4.8 Outside of these areas, there are suburban parts of the borough. Here it is considered that a lower density of 40dph would be appropriate having regard to the lower capacity for change identified by the Council's 2015 Landscape Capacity Study.

## 5. Recommendations

- 5.1 It is recommended that the following minimum density standards are set out in the HBLP 2036 based on access to services and the varying nature of local character within the borough:
- Development within the identified town and district centres of Havant, Emsworth, Waterlooville and Leigh Park should be expected to provide a minimum of 70 dwellings per hectare (net developable area).
  - Whilst development within the areas of opportunity surrounding the identified town and district centres (shown at Appendix 3) should be expected to provide a minimum of 55 dwellings per hectare (net developable area).
  - Development outside of the identified opportunity areas should be expected to provide a minimum 40 dwellings per hectare (net developable area).
- 5.2 In order to provide flexibility with future changes in accessibility to services, and where a deviation from the minimum density requirements may be justified in the context of the site's character. It is recommended that applicants provide full justification for development which would fall below the minimum density standard. This should be provided within the design and access statement which would be expected to be submitted alongside the application.
- 5.3 Where development fails to optimise the use of land, and where there is insufficient evidence to support density lower than the minimum standard, this should result in refusal of an application. This reflects the finite amount of undeveloped land in the borough, and the importance of achieving development in a sustainable manner. Where development is proposed at significantly higher levels than the minimum density standard, the higher density proposed should be fully evidenced within the applicant's design and access statement. Such an increase will be considered appropriate subject to compliance with the other policies in the Local Plan together with any other material considerations.
- 5.4 In such cases where policy compliant affordable housing would render a scheme unviable, the density of the proposed development should be maximised as far as practicable, where design parameters permit. Furthermore, development proposals which appear to artificially lower the capacity of a site relative to the accessibility of their location should be resisted. Efforts to circumvent certain policy requirements in such a manner such as affordable housing and open space will not be accepted by the local planning authority.

# Appendix 1

## Public transport map



# Appendix 2

## Density Built Form Examples

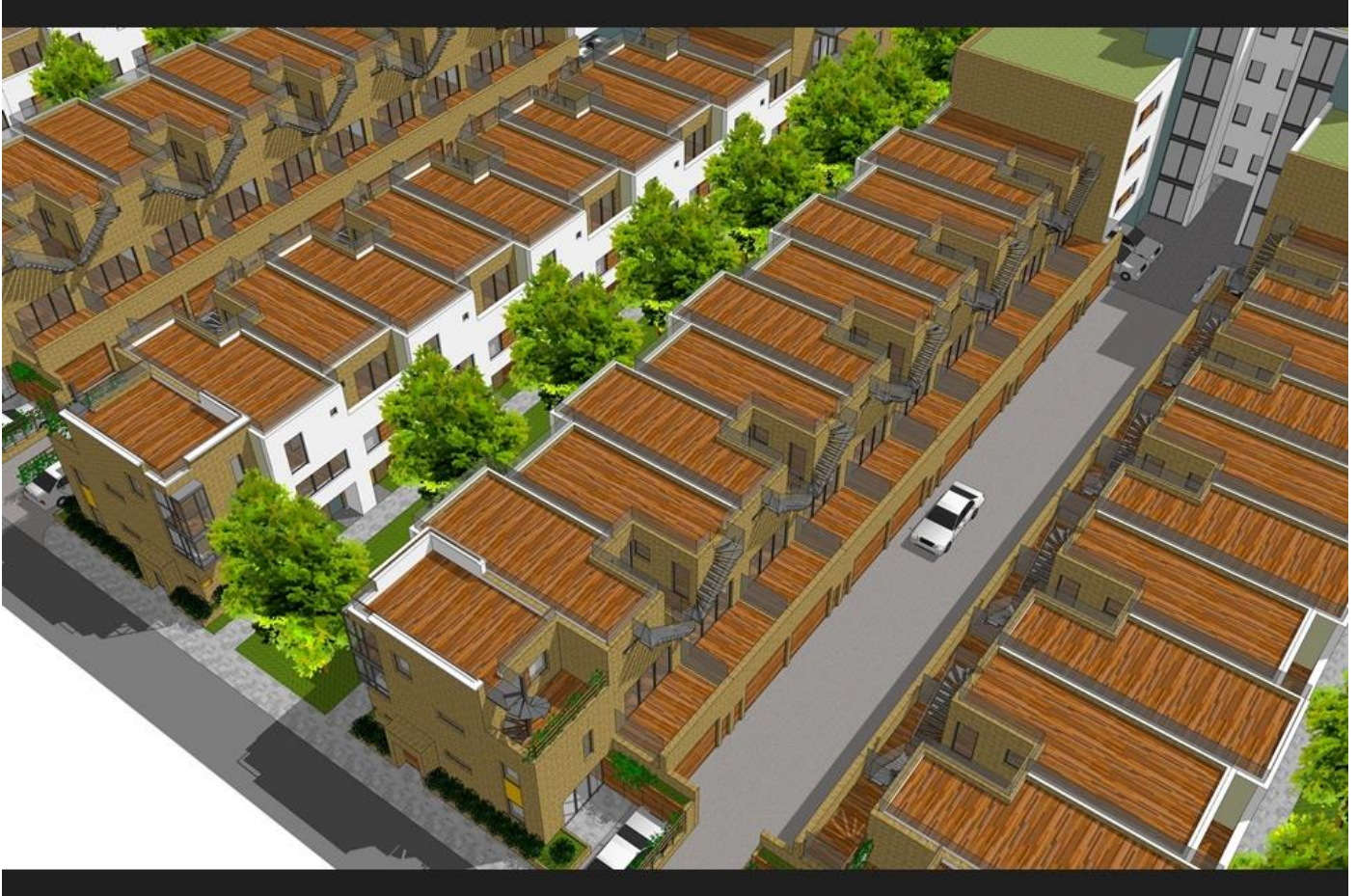
### **Detached Housing at 35dph**



### **Townhouses – semi-detached and short terraces at 50dph**



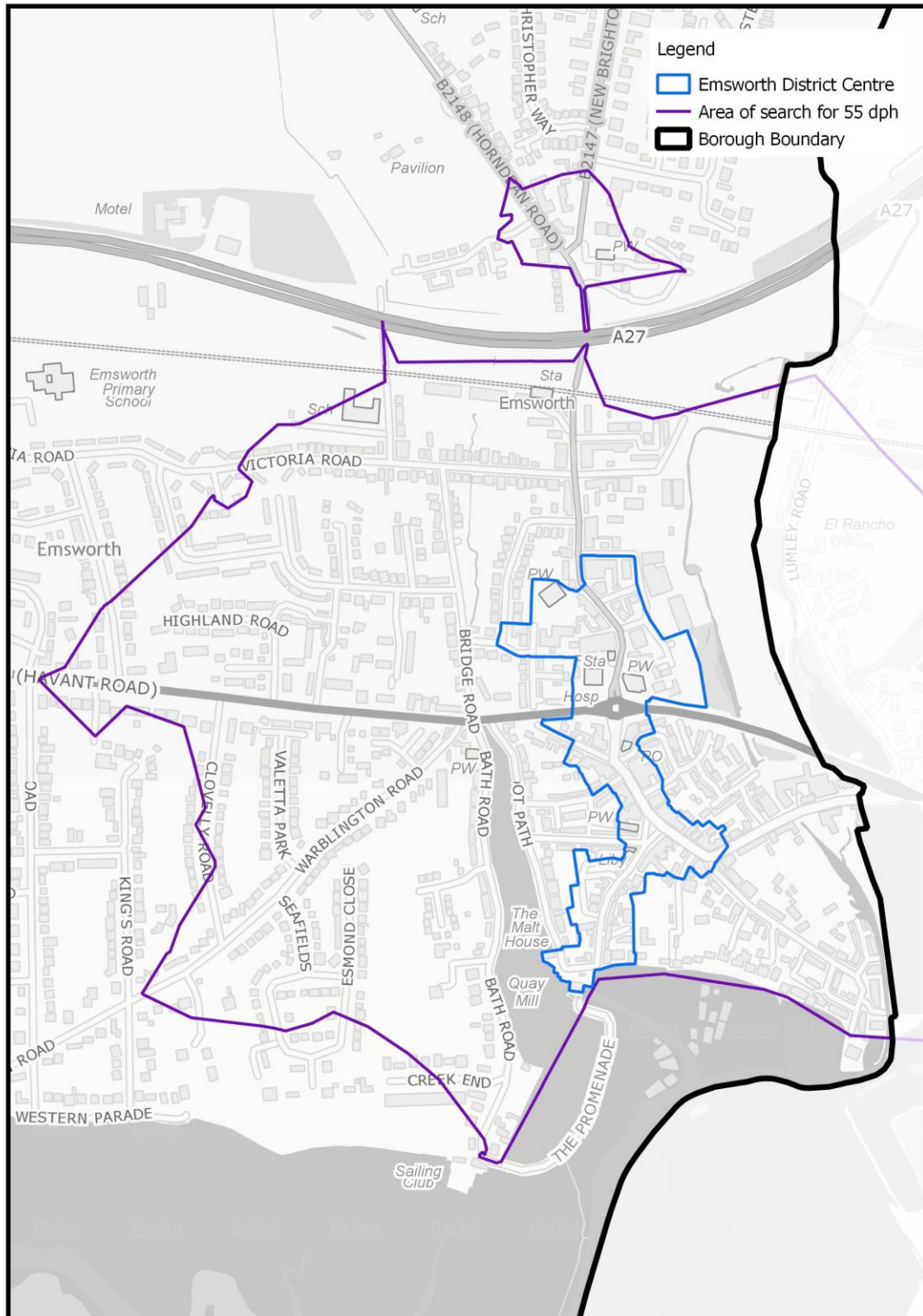
## Mews houses at 80dph



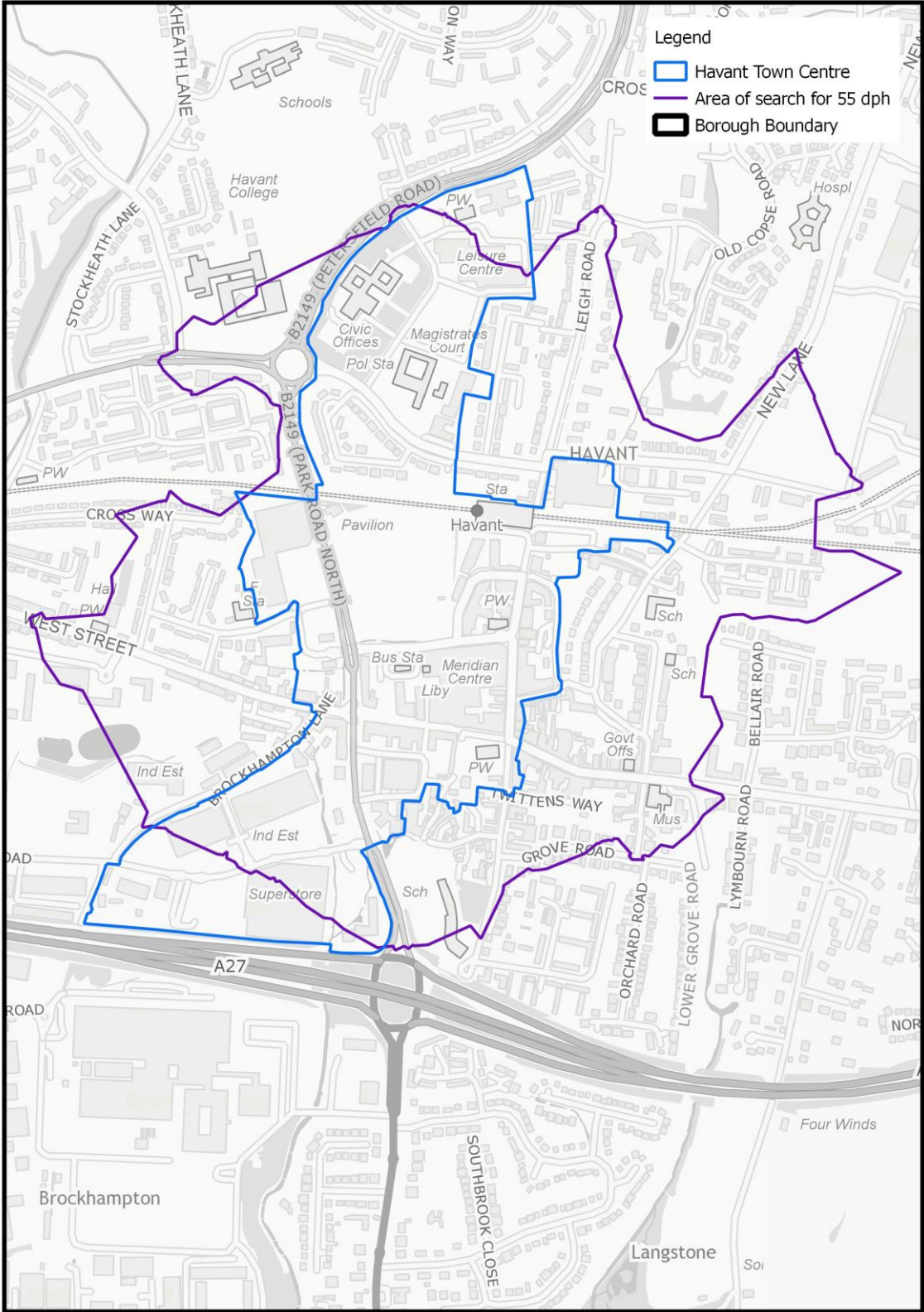
# Appendix 3

## Town Centre and Ped-Shed Areas

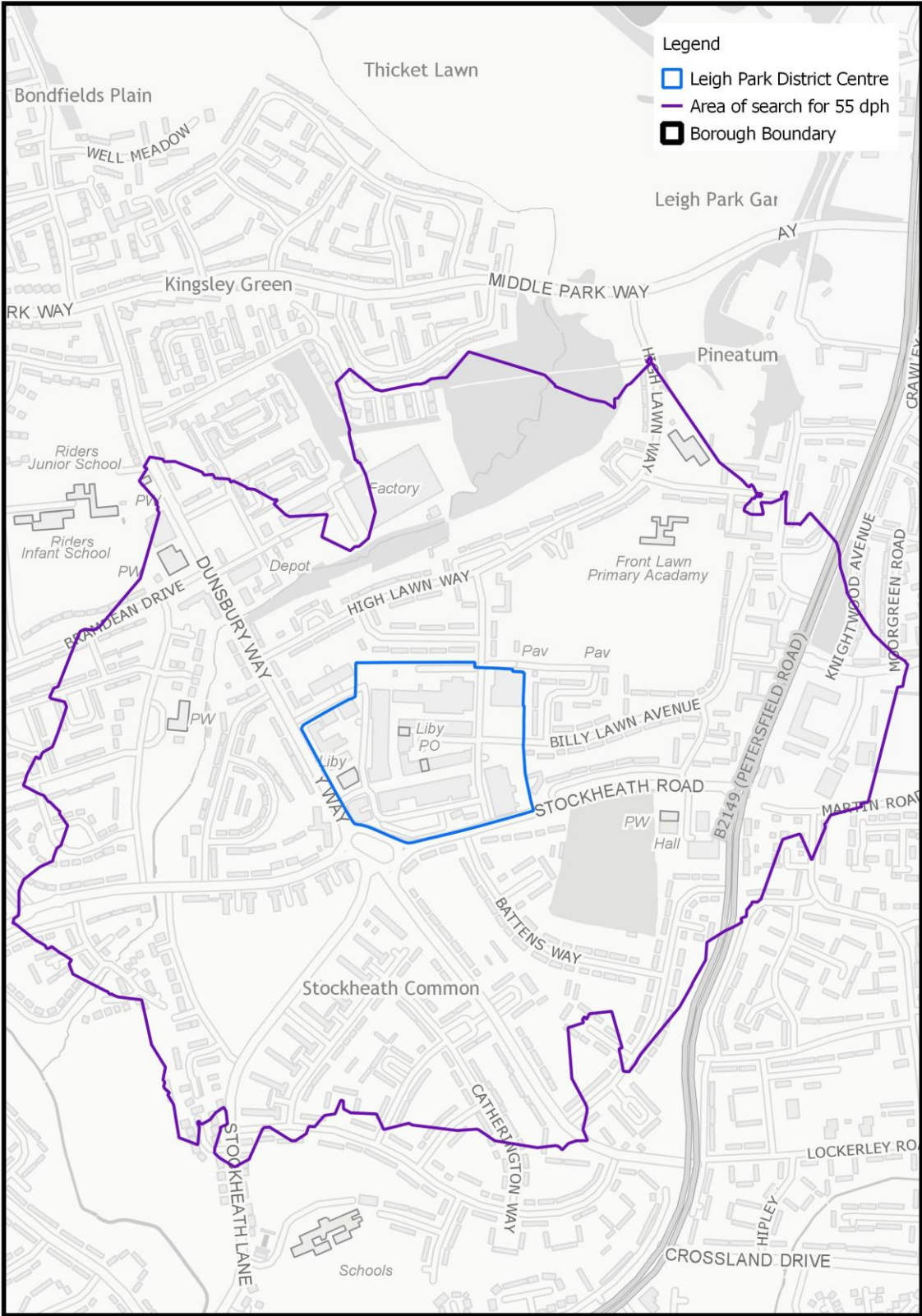
### Emsworth District Centre



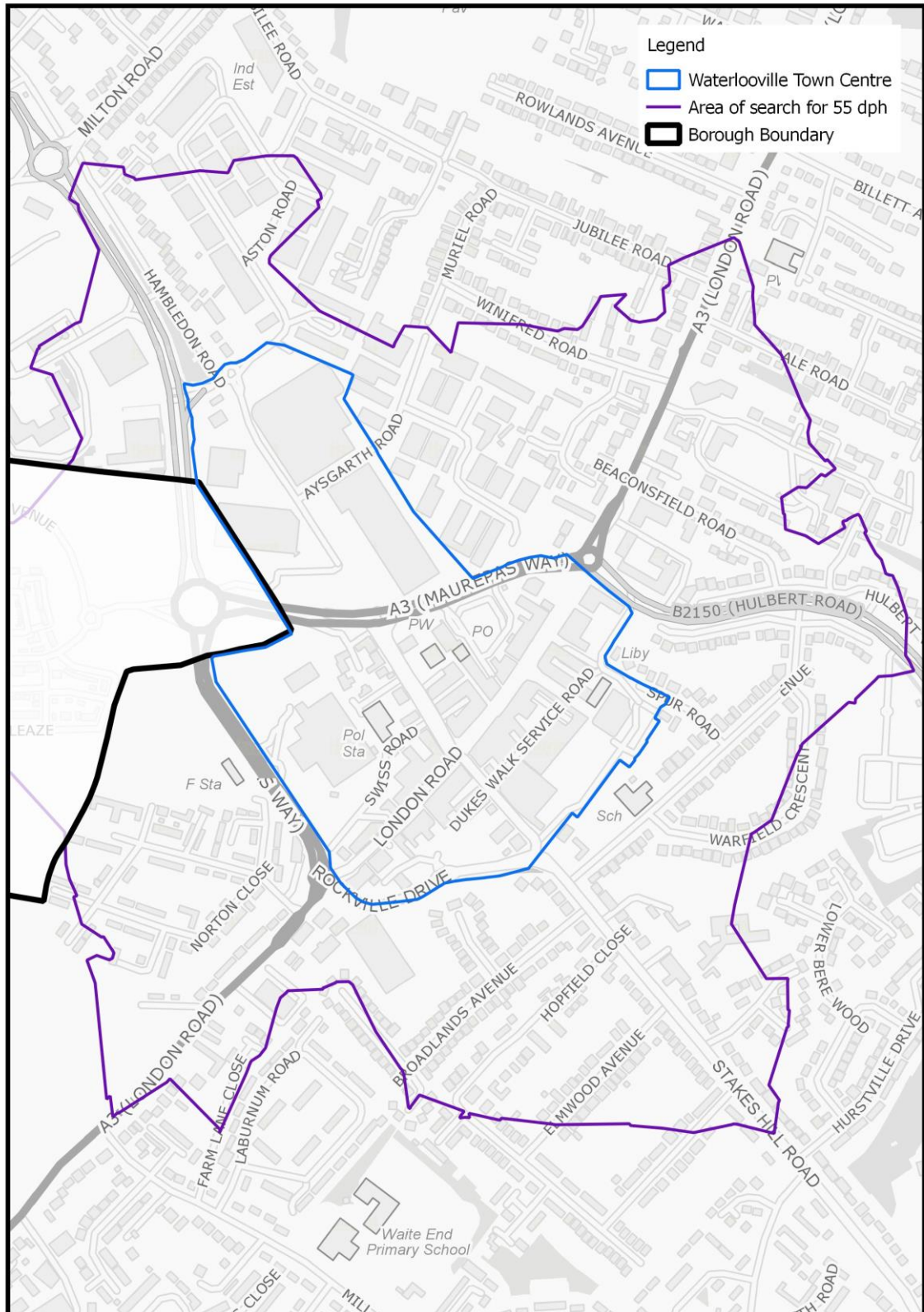
# Havant Town Centre



# Leigh Park District Centre



# Waterlooville Town Centre





Havant Borough Council  
Development Control  
Civic Offices Civic Centre Road  
Havant  
Hampshire  
PO9 2AX

**Our ref:** HA/2019/121470/01-L01  
**Your ref:** APP/19/00623  
**Date:** 30 July 2019

Dear Sir/Madam

**RETAIN THE EXISTING 'FOWLEY COTTAGE' DWELLING AND CONSTRUCTION OF 6NO. 5 BED DETACHED DWELLINGS, TWO ON THE WARBLINGTON ROAD FRONTAGE AND FOUR TO THE REAR GARDEN AREA. ACCESS TO PLOT 5 TO BE TAKEN OFF WARBLINGTON ROAD, ACCESS TO PLOTS 1-4 AND 6 TO BE TAKEN OFF CURLEW CLOSE FOWLEY COTTAGE, 46 WARBLINGTON ROAD, EMSWORTH, PO10 7HH**

Thank you for the consultation on the above application, please quote our reference on all correspondence.

We have reviewed the information as submitted and have the following comments.

**Environment Agency position**

In the absence of an acceptable flood risk assessment (FRA) we object to this application and recommend that planning permission is refused.

**Reason**

The submitted FRA does not comply with the requirements for site-specific flood risk assessments, as set out in paragraphs 30 to 32 of the Flood Risk and Coastal Change section of the planning practice guidance.

The FRA does not therefore adequately assess the flood risks posed by the development. In particular, the FRA fails to:

- take the impacts of climate change into account adequately. Flood risk mitigation measures to address flood risk for the lifetime of the development included in the design are inadequate because they will not make the development resilient to the flood levels for 2115 of 4.5mAOD as stated in paragraph 1.14 of FLOOD\_RISK\_ASSESSMENT-1180237 (FRA) submitted with the application. Consequently the development proposes inadequate:

Environment Agency  
Guildbourne House Chatsworth Road, Worthing, West Sussex, BN11 1LD.  
Customer services line: 03708 506 506  
[www.gov.uk/environment-agency](http://www.gov.uk/environment-agency)

Cont/d..

- Raised finished floor levels. Paragraph 1.16 of the FRA states “*In this regard, floor levels of the southernmost properties could be designed to be above the 2115 estimated flood level of 4.5m AOD*”, but it does not specify what they will actually be. The drawing in Appendix 6 titled “*Foul and Surface Water Drainage Strategy*” shows the 2 southern most properties as having finished floor levels (FFL) of 4.2mAOD and 4.1mAOD which are both below the expected 2115 flood level of 4.5mAOD.
- consider the requirement for flood emergency planning including flood warning and evacuation of people for a range of flooding events up to and including the extreme event
  - Safe access and egress routes
- consider how a range of flooding events (including extreme events) will affect people and property
  - Resistance and resilience measures

### **Overcoming our objection**

To overcome our objection, the applicant should submit a revised FRA which addresses the points highlighted above.

### **Advice to Applicant**

#### **Finished floor levels (FFL)**

The FRA needs to ensure that built development proposals incorporate adequate flood risk mitigation up to the design flood level for 2115 of 4.5mAOD (as stated in the FRA). The following government website will assist the applicant in determining the adequate freeboard for the development (this includes coastal, estuarine and tidal) :

<https://www.gov.uk/government/publications/accounting-for-residual-uncertainty-an-update-to-the-fluvial-freeboard-guide>

#### **Safe access and egress**

The application needs to demonstrate that occupants can remain safe for the lifetime of the development when allowances for climate change are taken into consideration. There needs to be sufficient flood risk mitigation up to the design flood level and/or specified arrangements for safe access and egress.

#### **Flood resistance and resilience**

We strongly recommend the use of flood resistance and resilience measures if appropriate. Physical barriers, raised electrical fittings and special construction materials are just some of the ways you can help reduce flood damage.

#### **Revised FRA**

If this cannot be achieved, we are likely to maintain our objection. Please re-consult us on any revised FRA submitted and we'll respond within 21 days of receiving it.

### **Environmental permit**

Planning permission does not remove the requirement for an Environmental Permit. The Environmental Permitting (England and Wales) Regulations 2016 require a permit to be obtained for any activities which will take place:

- on or within 8 metres of a main river (16 metres if tidal)
- on or within 8 metres of a flood defence structure or culvert (16 metres if tidal)
- on or within 16 metres of a sea defence
- involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert

- in a floodplain more than 8 metres from the river bank, culvert or flood defence structure (16 metres if it's a tidal main river) and you don't already have planning permission.

For further guidance please visit <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits> or contact our National Customer Contact Centre on 03702 422 549. The applicant should not assume that a permit will automatically be forthcoming once planning permission has been granted, and we advise them to consult with us at the earliest opportunity.

Please do not hesitate to contact me on the number below should you have any queries on the above information.

Yours faithfully

**Mrs Sophie Brown**  
**Sustainable Places Planning Advisor**

Direct dial 02030 257250

Direct e-mail [planningSSD@environment-agency.gov.uk](mailto:planningSSD@environment-agency.gov.uk)





Warblington Road  
Emsworth  
(7 Unit Scheme)

## FLOOD RISK ASSESSMENT

On behalf of  
Mr. Charles Glanville

ITR/MT/5042.FRA.5a  
May 2020

*Experience and expertise working together*

## CONTENTS

|     |                             |    |
|-----|-----------------------------|----|
| 1.0 | INTRODUCTION .....          | 1  |
| 2.0 | FLOOD RISK ASSESSMENT ..... | 8  |
| 3.0 | DRAINAGE STRATEGY .....     | 9  |
| 4.0 | SUMMARY & CONCLUSIONS ..... | 11 |

## APPENDICES

|            |                                                          |
|------------|----------------------------------------------------------|
| Appendix 1 | Environment Agency Comments (30 <sup>th</sup> July 2019) |
| Appendix 2 | Ground Investigation Data                                |
| Appendix 3 | British Geological Survey Mapping                        |
| Appendix 4 | Qbar Calculation (Micro Drainage)                        |
| Appendix 5 | Southern Water Surface & Foul Water Sewer System         |
| Appendix 6 | Indicative Drainage Strategy (5042/006)                  |
| Appendix 7 | Micro Drainage Calculations                              |

## 1.0 INTRODUCTION

- 1.1 Bellamy Roberts LLP has been retained by Mr. Charles Glanville to prepare a Flood Risk Assessment (FRA) in support of the current planning application (APP/19/00623), submitted in June 2019, for a residential development of 7 dwellings on land south of Warblington Road, Emsworth. The site is currently occupied by a single residential dwelling (46 Warblington Road) and this is to remain. This assessment has been undertaken to ascertain whether there are any constraints to the development of this site, and to assess the impact of the proposal, with regard to flood risk.
- 1.2 The site has an approximate area of 0.83ha and is located in Flood Zone 1. Government guidance states that Flood Risk Assessments are generally only necessary in Flood Zone 1 when the development area is greater than 1ha. However, an FRA is required for developments of less than 1ha when the proposed development will provide a more vulnerable use class. This Assessment has been prepared to accompany an indicative sustainable drainage design, and will also consider the expected greenfield run-off rates, soil types, and Environment Agency (EA) Flood Mapping.
- 1.3 Consultation comments were received from the Environment Agency (30<sup>th</sup> July 2019) and further information was requested. A copy of the EA comments are provided at **Appendix 1**, and this FRA has been prepared to address the issues raised by the EA. In summary, the EA has requested the following:
- Confirmation of the proposed Finished Floor Levels;
  - Provision of safe access and egress routes; and
  - Provision of resistance and resilience measures.

### Site Location and Features

- 1.4 The National Grid reference for the site is 474407, 105452. For clarity, a site location plan is provided at Figure 1.



Figure 1: Site Location Plan

### Site Topography

- 1.5 The topography falls from 6.75m in the northern corner to 1.98m in the southern corner. See Figure 2 on the following page.



Figure 2: (Source LIDAR) – Topography of site

- 1.6 The site is accessed off Warblington Road which borders the northern boundary of the site. Residential development is located on all sides other than the southern boundary which is bounded by Chichester Harbour.

#### Appropriateness of Development Proposal

- 1.7 National guidance states that Flood Zone 1 is suitable for all types of development. Reproduced at Figure 3 is an extract from the EA Flood Zone map which demonstrates that the proposed dwellings will lie within Flood Zone 1. The southern extent of the application site is shown to be located within Flood Zone 3,

and it will be ensured that no dwellings will be located within this area. The site access will also be located solely within Flood Zone 1.

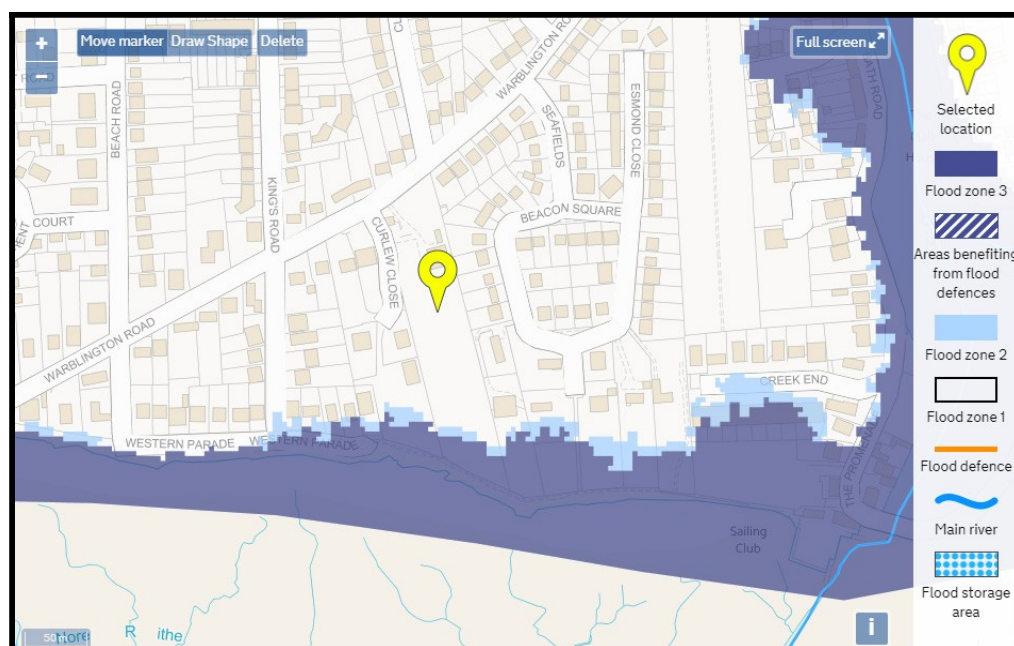


Figure 3: Flood Zone Map (Source: EA)

- 1.8 An extract from the EA surface water flood risk map is provided in Figure 4. This demonstrates that the site is not at risk of flooding from this source.

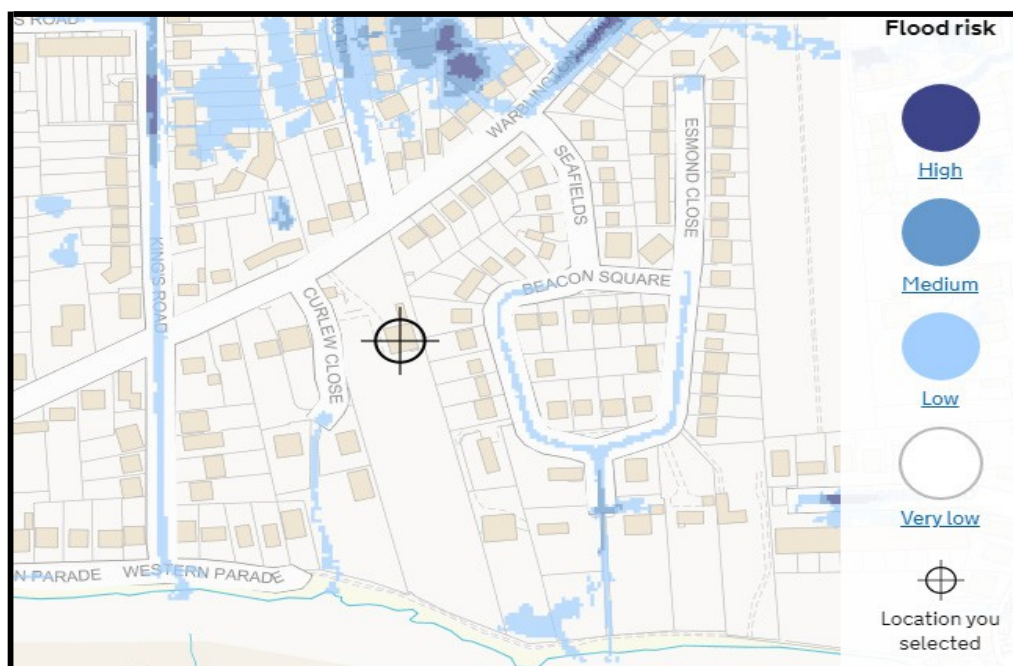


Figure 4: Surface Water Flood Risk Map (Source: EA)

- 1.9 In addition to surface water flood risk, it is also important to consider the risk of flooding from rivers and the sea. In this regard, EA mapping has further been interrogated to determine the risk posed from this type of flooding (see Figure 5).

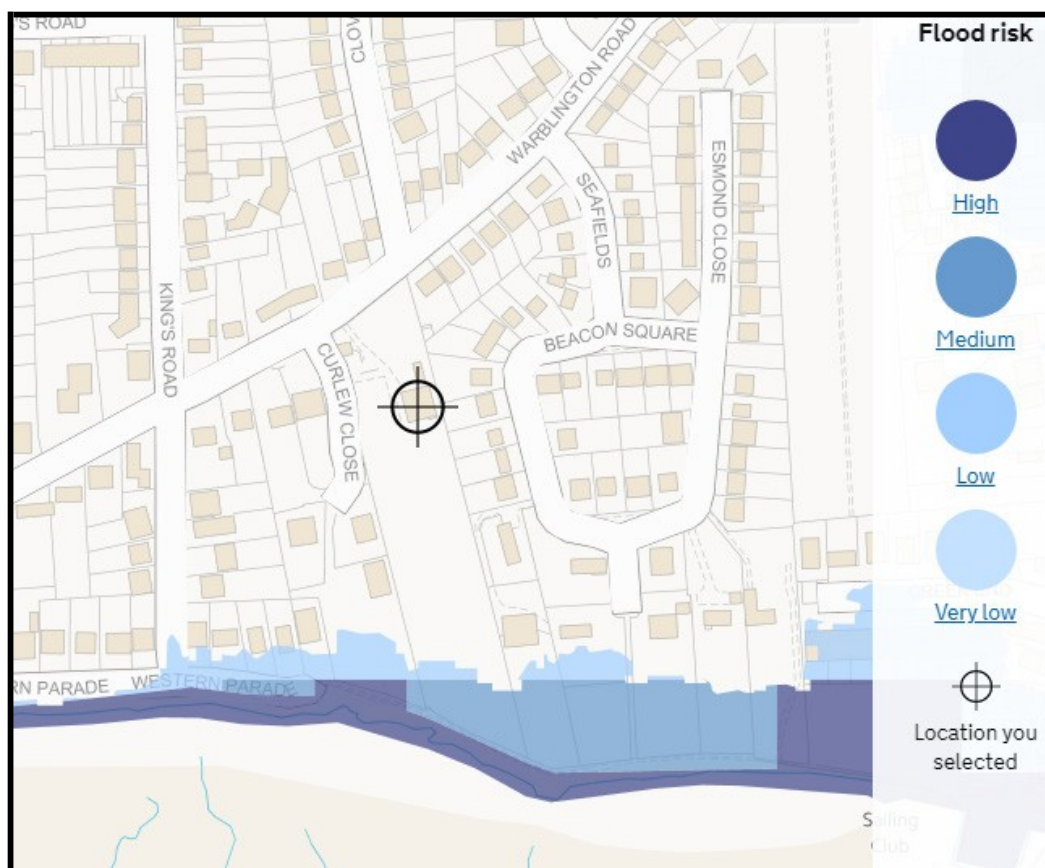


Figure 5: Rivers/Sea Flood Risk Map (Source: EA)

- 1.10 Figure 5 demonstrates that the southern extremity of the site has a low to medium risk of river or sea flooding.
- 1.11 The proposed development has been designed with due regard to this potential risk. As such, the proposed units have not been located within the area at risk of flooding.
- 1.12 Given the site's location, it is important to consider rising sea levels as a result of climate change and in this regard, the 2115 Tidal Model has been obtained from the EA which illustrates an expected flooding level for 2115 of 4.5m AOD (see Figure 6).



Figure 6: Tidal Model for 2115

- 1.13 It is evident from Figure 6 that the majority of the site falls outside of the area affected by the forecasted 2115 estimated flood levels. Nevertheless due to the topography of the site, the two southernmost properties may be affected (plots 1 and 2). In this regard, it will be ensured that the Finished Floor Level (FFL) of these properties will be a minimum of 4.5m AOD, and therefore above the 2115 estimated flood level. Such an undertaking will ensure that future occupants will remain safe for the lifetime of the development, without the need for additional flood resistance and resilience measures, allowing future occupants the ability to safely access and exit their dwellings in flood conditions.
- 1.14 With regards to the site access road, a small section at its southernmost extremity falls within the 2115 estimated future tidal flood risk area. Due to the topography of the site, the remainder will not be affected. To ensure safe access and egress to the entire development, the level of the access road will be a minimum of 4.5m AOD. This will ensure safe access for all vehicles, including emergency vehicles. The detailed design of the site access road and finished floor levels will be considered in further detail at the detailed design stage.

### Ground Investigation Data

- 1.15 Soakaway testing, in accordance with BRE365, has previously been undertaken at the site. The testing observed that no infiltration was possible and concluded that the soils are not likely to perform to a satisfactory standard. The full testing results are attached at **Appendix 2**.
- 1.16 In addition, British Geological Survey mapping indicates that there are superficial deposits of sand, silt and clay (fluvial in origin), and the bedrock at the site is chalk. The BGS mapping extract is provided at **Appendix 3**.

## 2.0 FLOOD RISK ASSESSMENT

### *Flood Risk Assessment Methodology and Objectives*

- 2.1 It is recognised that developments that are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. Current guidance on development and flood risk identifies several key aims for a development to ensure that it is sustainable in flood risk terms. These aims are as follows:
- the development should not be exposed to flood risk such that the health, safety and welfare of the users of the development, or the population elsewhere, are threatened;
  - the development should not be at a significant risk of flooding and should not be susceptible to damage due to flooding;
  - safe access to and from the development should be possible during flood events;
  - the development should not increase flood risk elsewhere;
  - the development should not prevent safe maintenance of watercourses or maintenance and operation of flood defences;
  - the development should not be associated with an onerous or difficult operation and maintenance regime to manage flood risk. The responsibility for any operation and maintenance required should be clearly defined;

- future users of the development should be made aware of any flood risk issues relating to the development;
- the development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, as a result of flood risk issues;
- the development should not lead to degradation of the environment, and;
- the development should meet all of the above criteria for its entire lifetime, including consideration of the potential effects of climate change.

2.2 This Assessment has been prepared with due consideration of these sustainability aims, to inform the proposed scheme. A development lifetime of 100 years has been assumed in line with PPG guidance on residential development life cycles.

#### Existing Greenfield Run-off Rates

2.3 The existing greenfield run-off rates have been obtained from within the MicroDrainage computer software (see **Appendix 4**), which has identified the following Qbar figures:

- Qbar - 3.4l/s
- Q1 - 2.9l/s
- Q30 - 7.7l/s
- Q100 - 10.9l/s

## 3.0 DRAINAGE STRATEGY

#### Disposal of Surface and Foul Water

3.1 The existing dwelling (46 Warblington Road) utilises the Southern Water surface/foul water sewers located in the vicinity of the application site. The location of the existing foul and surface water sewers is provided on the plan attached at **Appendix 5**.

3.2 The surface water sewer borders the western boundary of the application site and outfalls into Chichester Harbour. There are two foul water sewers in the vicinity of the site, one bisects the application site on a broadly west/east alignment and the other is located within Warblington Road.

### *Surface Water*

- 3.3 In accordance with SuDS principles, the proposal will initially seek to provide soakaway drainage to serve each plot. However, based on the results of the infiltration testing previously undertaken at the site, the sub-strata is not suitable for soakaway drainage (see Appendix 2).
- 3.4 In this regard, an alternative option has been considered which will provide three storage tanks within the site to store the surface water from the proposed units and carriageway (all driveways are to be permeable paving). Each tank will discharge into the nearby surface water sewer. The discharge rate will be controlled via a hydro-brake, and will be limited to 10.9 l/s, as per the calculated Qbar figure (see paragraph 2.3). The total storage capacity has been calculated using the MicroDrainage software for the 1 in 100 year, + 40% allowance for climate change, storm event. The indicative surface water drainage strategy is provided at **Appendix 6** and the accompanying MicroDrainage analysis is at **Appendix 7**, which shows no risk of flooding during the modelled storm events.
- 3.5 As stated previously, it will be ensured that the Finished Floor Level (FFL) of the proposed dwellings, and level of the access road, will be a minimum of 4.5m AOD, and above the 2115 estimated flood level. Flood resistant construction can prevent entry of water or minimise the amount that may enter a building where there is short duration flooding outside with water depths of 0.6 metres or less. This form of construction should be used with caution and accompanied by resilience measures, as effective flood exclusion may depend on occupiers ensuring some elements, such as barriers to doorways, are put in place and maintained in a good state. Examples of flood resistance measures include flood doors and windows; and non-return valves fitted on drain/pipes.
- 3.6 In accordance with Planning Practice Guidance, the proposed buildings should be designed and constructed with flood resilience measures in mind, thus reducing the impact in the unlikely event that flood water enters the proposed buildings, to ensure no permanent damage is caused, structural integrity is maintained and drying and cleaning is easier. In this regard, the proposed dwellings will be designed in accordance with the Communities and Local Government document entitled, Improving the Flood Performance of New Buildings - Flood Resilient Construction. Examples of flood resilience measure include raised electrical sockets; sump and

pump systems; and using water resistant materials in kitchens and bathrooms.

#### *Foul Water*

- 3.7 With regards to the foul water strategy, it is proposed that plots 5 and 6 will connect to the existing foul water sewer within Warblington Road, and the remainder (plots 1-4 and plot 7) will connect to the foul water sewer that bisects the site. The foul strategy is shown on the plan at Appendix 6.

#### *Maintenance and Management*

- 3.8 The continued management and maintenance of the drainage system will be essential in ensuring the continued protection of the development from the surface water flooding.
- 3.9 Visual inspection of the drainage network and outfalls should be undertaken on a regular basis to identify any siltation/blockage/disrepair of the drainage network and attenuation facilities.
- 3.10 A surface water management system therefore needs to be drawn up as part of any planning consent that is issued for the site.

## **4.0 SUMMARY AND CONCLUSIONS**

- 4.1 Bellamy Roberts LLP has been retained by Mr. Charles Glanville to undertake a Flood Risk Assessment (FRA) in support of a planning application for a residential development comprising 7 units on land south of Warblington Road, Emsworth.
- 4.2 Environment Agency mapping has been reviewed and it has been determined that the site lies wholly within Flood Zone 1, and no risk of flooding from sources such as surface water and rivers.
- 4.3 Due to the topography of the application site, part of the proposed built development falls within the estimated future tidal flood risk area for 2115. In this regard, floor levels of the southernmost properties, and the access road, will be designed to be above the 2115 estimated flood level of 4.5m AOD.

- 4.4 Surface water storage tanks will be provided to serve the proposed dwellings and access road. Each tank will discharge into the nearby surface water sewer and the discharge rate will be controlled via a hydro-brake, limited to the calculated Qbar figure of 10.9l/s.
- 4.5 With regards to the foul water strategy, it is proposed that the northernmost plots will connect to the existing foul water sewer within Warblington Road, and the remaining plots will connect to the foul water sewer that bisects the site.

## APPENDICES

## APPENDIX 1

Havant Borough Council  
Development Control  
Civic Offices Civic Centre Road  
Havant  
Hampshire  
PO9 2AX

**Our ref:** HA/2019/121470/01-L01  
**Your ref:** APP/19/00623  
**Date:** 30 July 2019

Dear Sir/Madam

**RETAIN THE EXISTING 'FOWLEY COTTAGE' DWELLING AND CONSTRUCTION OF 6NO. 5 BED DETACHED DWELLINGS, TWO ON THE WARBLINGTON ROAD FRONTAGE AND FOUR TO THE REAR GARDEN AREA. ACCESS TO PLOT 5 TO BE TAKEN OFF WARBLINGTON ROAD, ACCESS TO PLOTS 1-4 AND 6 TO BE TAKEN OFF CURLEW CLOSE FOWLEY COTTAGE, 46 WARBLINGTON ROAD, EMSWORTH, PO10 7HH**

Thank you for the consultation on the above application, please quote our reference on all correspondence.

We have reviewed the information as submitted and have the following comments.

**Environment Agency position**

In the absence of an acceptable flood risk assessment (FRA) we object to this application and recommend that planning permission is refused.

**Reason**

The submitted FRA does not comply with the requirements for site-specific flood risk assessments, as set out in paragraphs 30 to 32 of the Flood Risk and Coastal Change section of the planning practice guidance.

The FRA does not therefore adequately assess the flood risks posed by the development. In particular, the FRA fails to:

- take the impacts of climate change into account adequately. Flood risk mitigation measures to address flood risk for the lifetime of the development included in the design are inadequate because they will not make the development resilient to the flood levels for 2115 of 4.5mAOD as stated in paragraph 1.14 of FLOOD\_RISK\_ASSESSMENT-1180237 (FRA) submitted with the application. Consequently the development proposes inadequate:

Environment Agency  
Guildbourne House Chatsworth Road, Worthing, West Sussex, BN11 1LD.  
Customer services line: 03708 506 506  
[www.gov.uk/environment-agency](http://www.gov.uk/environment-agency)

Cont/d..

- Raised finished floor levels. Paragraph 1.16 of the FRA states “*In this regard, floor levels of the southernmost properties could be designed to be above the 2115 estimated flood level of 4.5m AOD*”, but it does not specify what they will actually be. The drawing in Appendix 6 titled “*Foul and Surface Water Drainage Strategy*” shows the 2 southern most properties as having finished floor levels (FFL) of 4.2mAOD and 4.1mAOD which are both below the expected 2115 flood level of 4.5mAOD.
- consider the requirement for flood emergency planning including flood warning and evacuation of people for a range of flooding events up to and including the extreme event
  - Safe access and egress routes
- consider how a range of flooding events (including extreme events) will affect people and property
  - Resistance and resilience measures

### **Overcoming our objection**

To overcome our objection, the applicant should submit a revised FRA which addresses the points highlighted above.

### **Advice to Applicant**

#### **Finished floor levels (FFL)**

The FRA needs to ensure that built development proposals incorporate adequate flood risk mitigation up to the design flood level for 2115 of 4.5mAOD (as stated in the FRA). The following government website will assist the applicant in determining the adequate freeboard for the development (this includes coastal, estuarine and tidal) :

<https://www.gov.uk/government/publications/accounting-for-residual-uncertainty-an-update-to-the-fluvial-freeboard-guide>

#### **Safe access and egress**

The application needs to demonstrate that occupants can remain safe for the lifetime of the development when allowances for climate change are taken into consideration. There needs to be sufficient flood risk mitigation up to the design flood level and/or specified arrangements for safe access and egress.

#### **Flood resistance and resilience**

We strongly recommend the use of flood resistance and resilience measures if appropriate. Physical barriers, raised electrical fittings and special construction materials are just some of the ways you can help reduce flood damage.

#### **Revised FRA**

If this cannot be achieved, we are likely to maintain our objection. Please re-consult us on any revised FRA submitted and we'll respond within 21 days of receiving it.

### **Environmental permit**

Planning permission does not remove the requirement for an Environmental Permit. The Environmental Permitting (England and Wales) Regulations 2016 require a permit to be obtained for any activities which will take place:

- on or within 8 metres of a main river (16 metres if tidal)
- on or within 8 metres of a flood defence structure or culvert (16 metres if tidal)
- on or within 16 metres of a sea defence
- involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert

- in a floodplain more than 8 metres from the river bank, culvert or flood defence structure (16 metres if it's a tidal main river) and you don't already have planning permission.

For further guidance please visit <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits> or contact our National Customer Contact Centre on 03702 422 549. The applicant should not assume that a permit will automatically be forthcoming once planning permission has been granted, and we advise them to consult with us at the earliest opportunity.

Please do not hesitate to contact me on the number below should you have any queries on the above information.

Yours faithfully

**Mrs Sophie Brown**  
**Sustainable Places Planning Advisor**

Direct dial 02030 257250

Direct e-mail [planningSSD@environment-agency.gov.uk](mailto:planningSSD@environment-agency.gov.uk)

## APPENDIX 2

|                               |                                                                                                                                                                                                                                           |                           |               |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------|
| CLIENT                        | Charles Glanville c/o Re-Format Limited                                                                                                                                                                                                   |                           |               |
| SITE ADDRESS                  | Fowley Cottage, 46 Warblington Road, Emsworth, Hampshire PO10 7HD                                                                                                                                                                         |                           |               |
| REPORT REFERENCE              | GWPR1704                                                                                                                                                                                                                                  |                           |               |
| ENGINEER                      | Joshua Laite, Ground and Water Limited                                                                                                                                                                                                    |                           |               |
| INVESTIGATION LOCATIONS       | Please see Figure 1 attached. Site works were undertaken on 20 <sup>th</sup> June 2016 and comprised the excavation of six trial pits (TP1-TP6) with soakaway testing in accordance with the principles of BRE365 in TP1-TP3 and TP5-TP6. |                           |               |
| GROUND CONDITIONS ENCOUNTERED | Summary of Strata Encountered (TP1-TP6)                                                                                                                                                                                                   |                           |               |
|                               | Strata                                                                                                                                                                                                                                    | Depth Encountered (m bgl) | Thickness (m) |
|                               | TOPSOIL: Mid brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare to occasional, sub-angular to sub-rounded, fine to coarse flint.                                                                                       | GL                        | 0.15 – 0.30   |
|                               | MADE GROUND (TP6): Light brown silty sandy gravelly clay. Sand is fine to medium grained. Gravel is fine to abundant, fine to coarse, angular to sub-rounded flints, chalk and bricks.                                                    | 0.20                      | 0.60          |
|                               | RIVER TERRACE DEPOSITS: Mottled light / mid brown / orange, silty sandy gravelly CLAY. Sand is fine grained. Gravel is rare to occasional, fine to medium, sub-angular to sub-rounded flint.                                              | 0.15 – 0.30               | 0.90 – 1.55   |
|                               | RIVER TERRACE DEPOSITS: Mottled light / mid brown / orange silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine to coarse, sub-rounded to sub-angular flints and chalk.                                    | 0.80 – 1.70               | 0.90 - 2.90   |
|                               | RIVER TERRACE DEPOSITS (TP1 and TP4): Light brown / off white sandy gravelly CLAY. Sand is fine to coarse grained. Gravel is abundant, fine to medium, sub-angular to sub-rounded, flint and chalk.                                       | 2.90 - 3.90               | 0.20 – 0.40   |
|                               | LEWES NODULAR CHALK FORMATION (TP3): Structureless CHALK composed of cream gravelly sandy SILT. Gravel are moderately weak, high density, white and sub-angular. Locally white / light brown with a trace of light brown clay.            | 2.40                      | 0.60          |
| ROOTS                         | Roots were noted between 0.70 - 1.80m bgl.                                                                                                                                                                                                |                           |               |
| GROUNDWATER                   | Groundwater was not encountered during this investigation.                                                                                                                                                                                |                           |               |

## INFILTRATION RATE

Soakaway tests, in accordance with the principles of BRE365, were undertaken at depths from 3.10m bgl – 4.30m bgl (TP1, TP3, TP5 and TP6) within the soils of the 1<sup>st</sup> River Terrace Deposits, comprising a silty sandy gravelly clay.

No infiltration was recorded and therefore soakaways constructed within the soils of the 1<sup>st</sup> River Terraced Deposits are **not** likely to perform to a satisfactory standard.

| Soakaway Testing (TP1, TP2, TP5 and TP6) |                        |                     |                     |                           |
|------------------------------------------|------------------------|---------------------|---------------------|---------------------------|
| Trial Hole                               | Starting Depth (m bgl) | Final Depth (m bgl) | Time Elapsed (mins) | Infiltration Rate (m/sec) |
| TP1                                      | 2.50                   | 2.49                | 125                 | 0                         |
| TP2                                      | 2.03                   | 2.01                | 156                 | 0                         |
| TP5                                      | 1.82                   | 1.80                | 154                 | 0                         |
| TP6                                      | 2.10                   | 2.20                | 190                 | 0                         |

A soakaway test, in accordance with the principles of BRE365, was undertaken at a depth of 3.00m bg in TP3 within the soils of the Lewes Nodular Chalk Formation, comprising a cream gravelly sandy SILT. No infiltration was noted and therefore the soils of the Lewes Nodular Chalk Formation are also **not** likely to perform to a satisfactory standard.

| Soakaway Testing (TP3) |                |             |              |                   |
|------------------------|----------------|-------------|--------------|-------------------|
| Trial Hole             | Starting Depth | Final Depth | Time Elapsed | Infiltration Rate |
| TP3                    | 1.10m bgl      | 1.10m bgl   | 116 min      | 0 m/sec           |

The site was located within a **Secondary A Aquifer** relating to superficial deposits of the River Terrace Deposits, beneath a **Principal Aquifer** comprising the bedrock deposits of Lewes Nodular Chalk Formation is present.

Examination of the Environment Agency records showed that the site **was not** located within a **Groundwater Source Protection Zone** as classified in the Policy and Practice for the Protection of Groundwater.

Consultation with the Environment Agency must be sought regarding any use that may have an impact on groundwater resources.

## ANTICIPATED VOLUME CHANGE POTENTIAL

RIVER TERRACE DEPOSITS: Likely to have moderate to high volume change potential.

LEWES NODULAR CHALK FORMATION: Likely to have no volume change potential.

All in accordance with NHBC Standards Chapter 4.2 and BRE240. Subject to confirmation of results of geotechnical classification testing.

## FOUNDATION RECOMMENDATIONS

At the time of reporting, June 2016, it is our understanding that the proposed development will incorporate the retention of the existing property and construction of 6No. detached properties with gardens in the surrounding grounds. Ancillary structures, such as site access, parking areas and private gardens will also be formed.

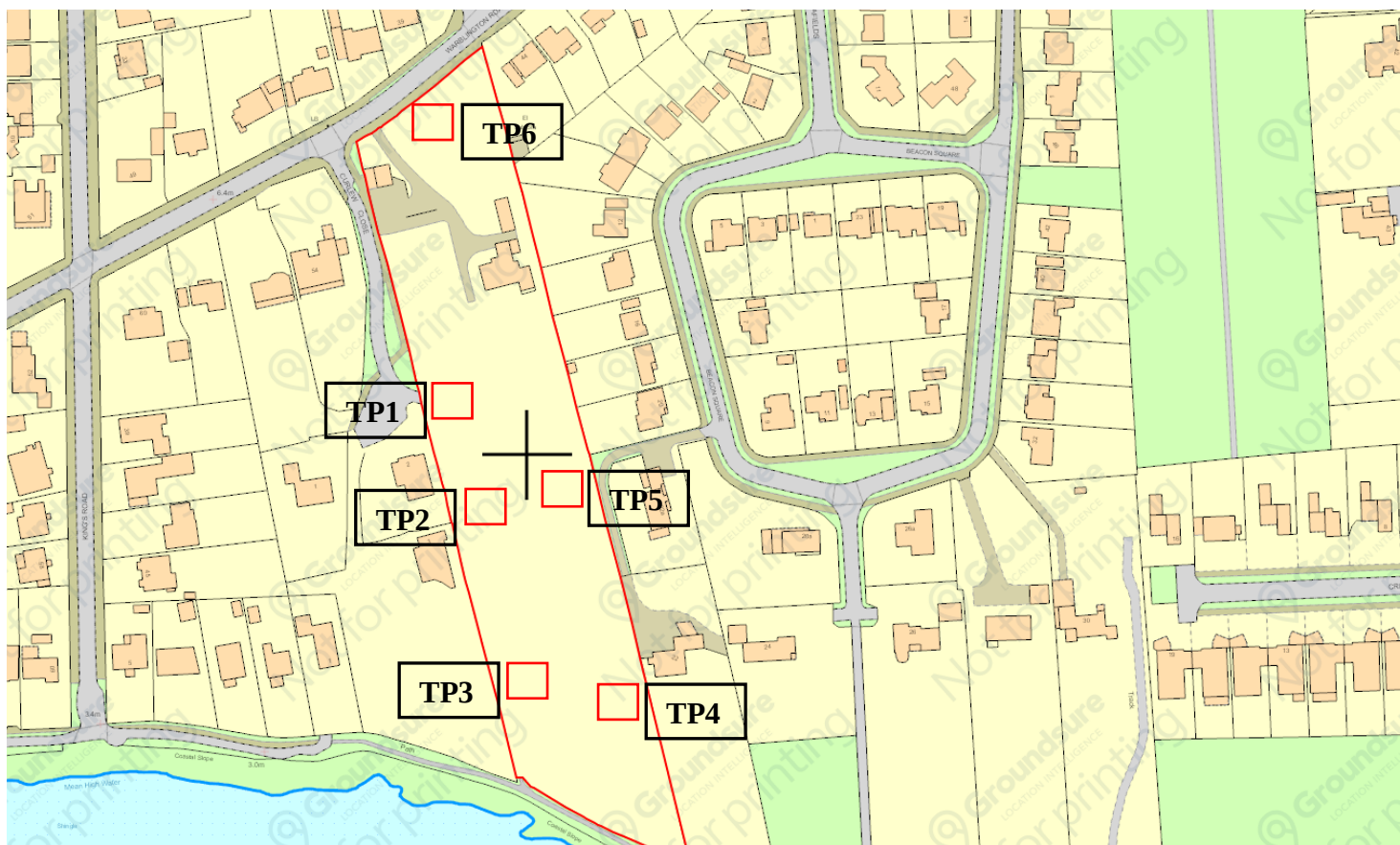
Foundations must not be placed within cohesive root penetrated and/or desiccated soils and the influence of the trees surrounding the site must be taken into account. The base of foundation excavations must extend at least 300mm into non-root penetrated soils. Should trees be removed from footprint of proposed development then a piled foundation should be considered.

Roots were generally noted ranging between 0.70 - 1.80m bgl, foundations minimum foundations depths rare likely to range from 1.00 - 2.10m bgl into the River Terrace Deposits.

Foundations constructed on the River Terrace Deposits at 1.00m bgl can be designed based on a presumed safe bearing capacity of 75kN/m<sup>2</sup>, increasing to 100kN/m<sup>2</sup> at 2.10m bgl. This is based on trial hole records, inspection of samples recovered, geotechnical laboratory results, and referral to BS 8004:1986, Code of Practice for Foundations, the results of the insitu testing, and based on a 5m long by 1.0m wide foundation and a maximum settlement of ~25mm.

Given that the cohesive soils of the 1<sup>st</sup> River Terrace Deposits are likely to have a volume change potential in accordance with BRE Digest 240 and NHBC Chapter 4.2, a suspended slab should be considered. The volume change potential of the shallow surface soils must be taken into account in final design (underfloor void diameter/compressible material/void formers etc).

**This preliminary information may be subject to amendment in the final report and no liability can be accepted for any actions based on this preliminary information.**



NOT TO SCALE

APPROXIMATE SITE BOUNDARY

Project:

Fowley Cottage, 46 Warblington Road, Emsworth, Hampshire PO10 7HD

Client:

Charles Glanville c/o Re-Format Limited

Date:

July 2016

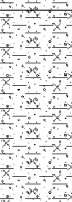
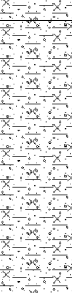
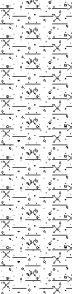
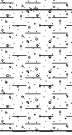
Trial Hole Location Plan

Ref:

GWPR1704

Figure 1

ground&water

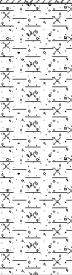
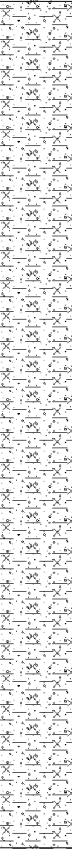
|                                                             |      |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                           |  |
|-------------------------------------------------------------|------|---------|-------------------------|------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--|
| Ground and Water Ltd                                        |      |         |                         |                  |                                                                                     |                                                                                                                                                                                               | Trialpit No<br><b>TP1</b><br>Sheet 1 of 1 |  |
| Project Name<br>Fowley Cottage                              |      |         | Project No.<br>GWPR1704 |                  | Co-ords: -<br>Level: -                                                              |                                                                                                                                                                                               | Date<br>20/06/2016                        |  |
| Location: 46 Warblington Road, Emsworth, Hampshire PO10 7HD |      |         |                         |                  | Dimensions: -                                                                       |                                                                                                                                                                                               | Scale<br>1:25                             |  |
| Client: Charles Glanville c/o Re-Format Ltd                 |      |         |                         |                  | Depth<br>4.30m                                                                      |                                                                                                                                                                                               | Logged By<br>JL                           |  |
| Samples & In Situ Testing                                   |      |         | Depth<br>(m)            | Level<br>(m AOD) | Legend                                                                              | Stratum Description                                                                                                                                                                           |                                           |  |
| Depth (m)                                                   | Type | Results |                         |                  |                                                                                     |                                                                                                                                                                                               |                                           |  |
| 0.20                                                        | D    |         | 0.30                    |                  |    | TOPSOIL: Mid brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare to occasional, sub-angular to sub-rounded, fine to coarse flint.                                           |                                           |  |
| 0.50                                                        | D    |         |                         |                  |    | RIVER TERRACE DEPOSITS: Mottled light/mid brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is rare to occasional, fine to medium, sub-angular to sub-rounded flint.       |                                           |  |
| 0.80                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                           |  |
| 1.20                                                        | D    |         | 1.30                    |                  |   | RIVER TERRACE DEPOSITS: Mottled light brown/orange silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine, sub-angular to sub-rounded flint and chalk fragments. |                                           |  |
| 1.50                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                           |  |
| 1.80                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                           |  |
| 2.20                                                        | D    |         | 2.00                    |                  |  | RIVER TERRACE DEPOSITS: Mottled light brown/grey/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is abundant, fine, sub-angular to sub-rounded chalk fragments.                |                                           |  |
| 2.50                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                           |  |
| 2.80                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                           |  |
| 3.00                                                        | D    |         | 3.90                    |                  |  |                                                                                                                                                                                               |                                           |  |
| 3.40                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                           |  |
| 3.80                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                           |  |
| 4.30                                                        | D    |         | 4.30                    |                  |  | RIVER TERRACE DEPOSITS: Light brown/off white sandy gravelly CLAY. Sand is fine to coarse grained. Gravel is abundant, fine to medium, sub-angular to sub-rounded flint and chalk.            |                                           |  |
|                                                             |      |         |                         |                  |                                                                                     | Trialpit Complete at 4.30 m                                                                                                                                                                   |                                           |  |
| Remarks: Roots noted to 1.80m bgl.                          |      |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                           |  |
| Groundwater: No groundwater encountered.                    |      |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                           |  |



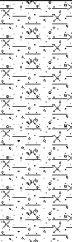
|                                                             |      |         |                         |                  |                        |                                                                                                                                                                                     |                                           |  |
|-------------------------------------------------------------|------|---------|-------------------------|------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--|
| Ground and Water Ltd                                        |      |         |                         |                  |                        |                                                                                                                                                                                     | Trialpit No<br><b>TP2</b><br>Sheet 1 of 1 |  |
| Project Name<br>Fowley Cottage                              |      |         | Project No.<br>GWPR1704 |                  | Co-ords: -<br>Level: - |                                                                                                                                                                                     | Date<br>20/06/2016                        |  |
| Location: 46 Warblington Road, Emsworth, Hampshire PO10 7HD |      |         |                         |                  | Dimensions: -          |                                                                                                                                                                                     | Scale<br>1:25                             |  |
| Client: Charles Glanville c/o Re-Format Ltd                 |      |         |                         |                  | Depth<br>3.40m         |                                                                                                                                                                                     | Logged By<br>JL                           |  |
| Samples & In Situ Testing                                   |      |         | Depth<br>(m)            | Level<br>(m AOD) | Legend                 | Stratum Description                                                                                                                                                                 |                                           |  |
| Depth (m)                                                   | Type | Results |                         |                  |                        |                                                                                                                                                                                     |                                           |  |
| 0.20                                                        | D    |         | 0.30                    |                  |                        | TOPSOIL: Mid brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare, sub-angular to sub-rounded, fine to coarse flint.                                               |                                           |  |
| 0.50                                                        | D    |         |                         |                  |                        | RIVER TERRACE DEPOSITS: Mottled light brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is rare, fine to medium, sub-angular to sub-rounded flint.               |                                           |  |
| 0.80                                                        | D    |         |                         |                  |                        |                                                                                                                                                                                     |                                           |  |
| 1.20                                                        | D    |         | 1.30                    |                  |                        | RIVER TERRACE DEPOSITS: Mottled light brown/orange silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine, sub-angular to sub-rounded flint and chalk. |                                           |  |
| 1.50                                                        | D    |         |                         |                  |                        |                                                                                                                                                                                     |                                           |  |
| 1.80                                                        | D    |         |                         |                  |                        | 2.10                                                                                                                                                                                |                                           |  |
| 2.20                                                        | D    |         |                         |                  |                        |                                                                                                                                                                                     |                                           |  |
| 2.50                                                        | D    |         | 3.40                    |                  |                        |                                                                                                                                                                                     |                                           |  |
| 2.80                                                        | D    |         |                         |                  |                        |                                                                                                                                                                                     |                                           |  |
| 3.40                                                        | D    |         |                         |                  |                        |                                                                                                                                                                                     |                                           |  |
| Remarks: Roots noted to 0.80m bgl                           |      |         |                         |                  |                        |                                                                                                                                                                                     |                                           |  |
| Groundwater: No groundwater encountered.                    |      |         |                         |                  |                        |                                                                                                                                                                                     |                                           |  |



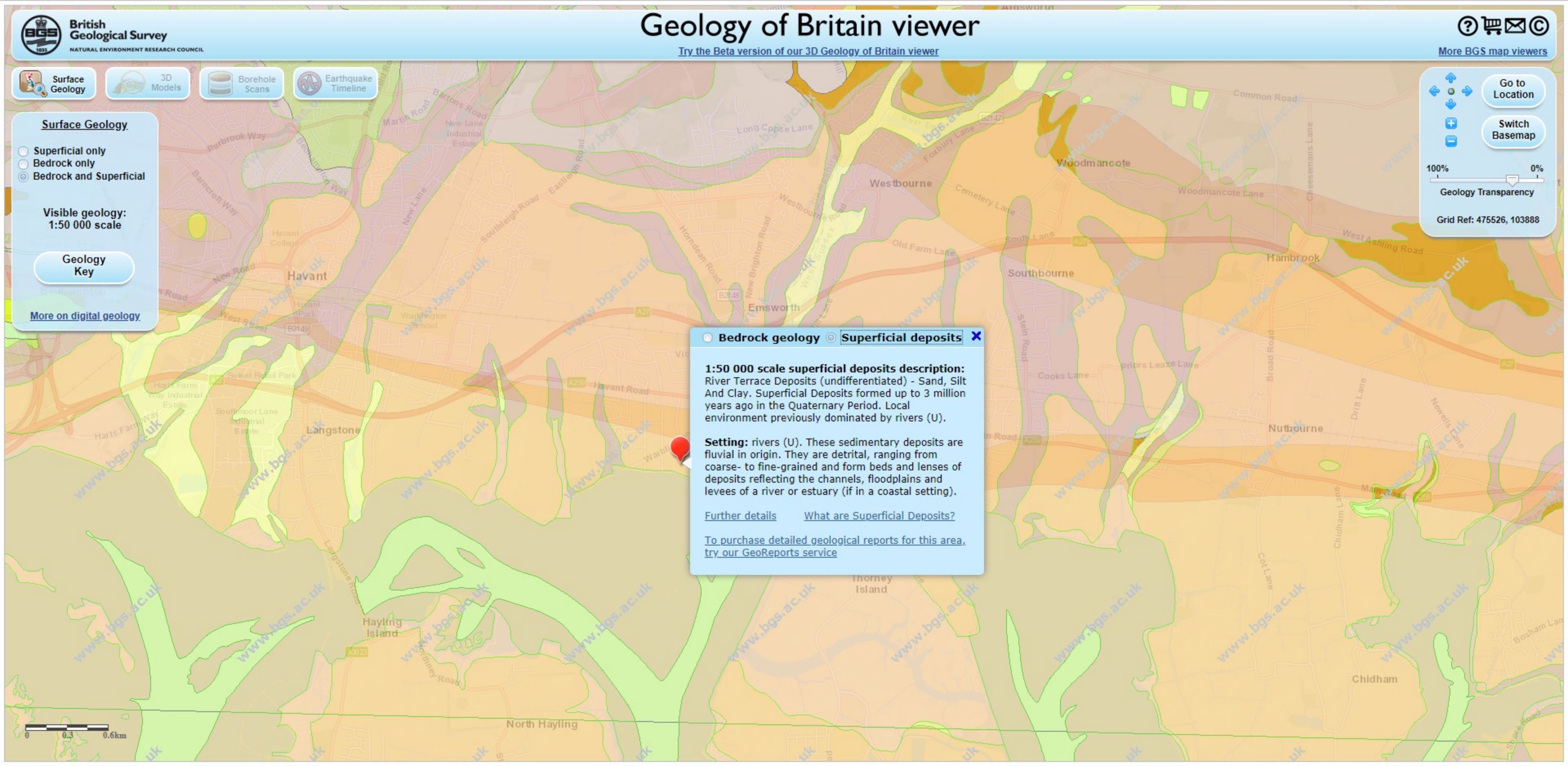
|                                                             |      |         |                         |                  |                        |                                                                                                                                                                                       |                    |
|-------------------------------------------------------------|------|---------|-------------------------|------------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Ground and Water Ltd                                        |      |         |                         |                  |                        | Trialpit No<br><b>TP4</b><br>Sheet 1 of 1                                                                                                                                             |                    |
| Project Name<br>Fowley Cottage                              |      |         | Project No.<br>GWPR1704 |                  | Co-ords: -<br>Level: - |                                                                                                                                                                                       | Date<br>20/06/2016 |
| Location: 46 Warblington Road, Emsworth, Hampshire PO10 7HD |      |         | Dimensions: -           |                  |                        | Scale<br>1:25                                                                                                                                                                         |                    |
| Client: Charles Glanville c/o Re-Format Ltd                 |      |         | Depth<br>3.10m          |                  |                        | Logged By<br>JL                                                                                                                                                                       |                    |
| Samples & In Situ Testing                                   |      |         | Depth<br>(m)            | Level<br>(m AOD) | Legend                 | Stratum Description                                                                                                                                                                   |                    |
| Depth (m)                                                   | Type | Results |                         |                  |                        |                                                                                                                                                                                       |                    |
| 0.15                                                        | D    |         | 0.15                    |                  |                        | TOPSOIL: Mid brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare, fine to coarse, sub-angular to sub-rounded flint.                                                 |                    |
| 0.30                                                        | D    |         |                         |                  |                        | RIVER TERRACE DEPOSITS: Light brown/mid-brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is rare to occasional, fine to medium, sub-angular to sub-rounded flint. |                    |
| 0.90                                                        | D    |         |                         |                  |                        |                                                                                                                                                                                       |                    |
| 1.20                                                        | D    |         |                         |                  |                        |                                                                                                                                                                                       |                    |
| 1.50                                                        | D    |         |                         |                  |                        |                                                                                                                                                                                       |                    |
| 1.80                                                        | D    |         | 1.70                    |                  |                        | RIVER TERRACE DEPOSITS: Light brown/orange silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine, sub-angular to sub-rounded flint and chalk.           |                    |
| 2.20                                                        | D    |         | 2.10                    |                  |                        | RIVER TERRACE DEPOSITS: Light brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is abundant, fine to coarse, flint and chalk.                                      |                    |
| 2.50                                                        | D    |         |                         |                  |                        |                                                                                                                                                                                       |                    |
| 3.00                                                        | D    |         | 2.90                    |                  |                        | RIVER TERRACE DEPOSITS: Light grey/off white sandy gravelly CLAY. Sand is fine to coarse grained. Gravel is abundant, sub-angular to sub-rounded, fine to coarse flint and chalk.     |                    |
|                                                             |      |         | 3.10                    |                  |                        | Trialpit Complete at 3.10 m                                                                                                                                                           |                    |
| <div>1</div> <div>2</div> <div>3</div> <div>4</div>         |      |         |                         |                  |                        |                                                                                                                                                                                       |                    |
| Remarks: Roots noted to 1.00m bgl.                          |      |         |                         |                  |                        |                                                                                                                                                                                       |                    |
| Groundwater: No groundwater encountered.                    |      |         |                         |                  |                        |                                                                                                                                                                                       |                    |

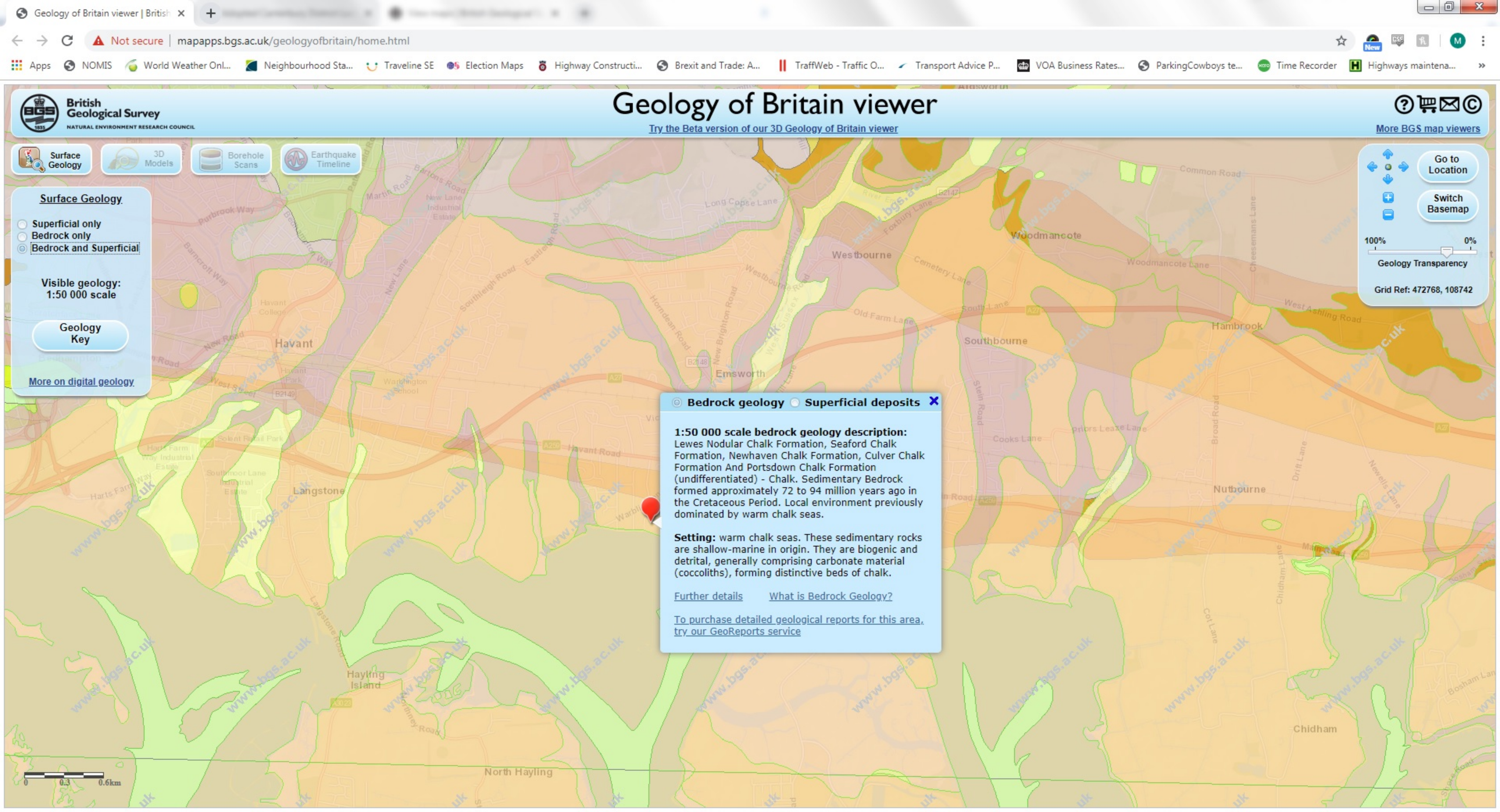
|                                                             |      |         |                         |                  |                                                                                    |                                                                                                                                                                                                                                         |                    |
|-------------------------------------------------------------|------|---------|-------------------------|------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Ground and Water Ltd                                        |      |         |                         |                  |                                                                                    | Trialpit No<br><b>TP5</b><br>Sheet 1 of 1                                                                                                                                                                                               |                    |
| Project Name<br>Fowley Cottage                              |      |         | Project No.<br>GWPR1704 |                  | Co-ords: -<br>Level: -                                                             |                                                                                                                                                                                                                                         | Date<br>20/06/2016 |
| Location: 46 Warblington Road, Emsworth, Hampshire PO10 7HD |      |         |                         |                  | Dimensions: -                                                                      |                                                                                                                                                                                                                                         | Scale<br>1:25      |
| Client: Charles Glanville c/o Re-Format Ltd                 |      |         |                         |                  | Depth<br>3.90m                                                                     |                                                                                                                                                                                                                                         | Logged By<br>JL    |
| Samples & In Situ Testing                                   |      |         | Depth<br>(m)            | Level<br>(m AOD) | Legend                                                                             | Stratum Description                                                                                                                                                                                                                     |                    |
| Depth (m)                                                   | Type | Results |                         |                  |                                                                                    |                                                                                                                                                                                                                                         |                    |
| 0.20                                                        | D    |         | 0.20                    |                  |   | TOPSOIL: Mid brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare, fine to medium, sub-angular to sub-rounded flint.                                                                                                   |                    |
| 0.50                                                        | D    |         |                         |                  |   | RIVER TERRACE DEPOSITS: Mid brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is rare, fine to medium, sub-angular to sub-rounded flint.                                                                             |                    |
| 0.80                                                        | D    |         |                         |                  |                                                                                    |                                                                                                                                                                                                                                         |                    |
| 1.20                                                        | D    |         | 1.10                    |                  |  | RIVER TERRACE DEPOSITS: Light brown/orange/grey silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine to coarse, sub-angular to sub-rounded flint and chalk. Coarse chalk fragments noted from 2.40m bgl. |                    |
| 1.50                                                        | D    |         |                         |                  |                                                                                    |                                                                                                                                                                                                                                         |                    |
| 1.80                                                        | D    |         |                         |                  |                                                                                    |                                                                                                                                                                                                                                         |                    |
| 2.20                                                        | D    |         |                         |                  |                                                                                    |                                                                                                                                                                                                                                         |                    |
| 2.70                                                        | D    |         |                         |                  |                                                                                    |                                                                                                                                                                                                                                         |                    |
| 3.40                                                        | D    |         |                         |                  |                                                                                    |                                                                                                                                                                                                                                         |                    |
| 3.80                                                        | D    |         | 3.90                    |                  |                                                                                    | Trialpit Complete at 3.90 m                                                                                                                                                                                                             |                    |
| Remarks: Roots to 1.30m bgl.                                |      |         |                         |                  |                                                                                    |                                                                                                                                                                                                                                         |                    |
| Groundwater: No groundwater encountered.                    |      |         |                         |                  |                                                                                    |                                                                                                                                                                                                                                         |                    |



|                                                             |      |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                                                                       |  |
|-------------------------------------------------------------|------|---------|-------------------------|------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|
| Ground and Water Ltd                                        |      |         |                         |                  |                                                                                     |                                                                                                                                                                                               | Trialpit No<br><b>TP6</b><br>Sheet 1 of 1                                             |  |
| Project Name<br>Fowley Cottage                              |      |         | Project No.<br>GWPR1704 |                  | Co-ords: -<br>Level: -                                                              |                                                                                                                                                                                               | Date<br>20/06/2016                                                                    |  |
| Location: 46 Warblington Road, Emsworth, Hampshire PO10 7HD |      |         |                         |                  | Dimensions: -                                                                       |                                                                                                                                                                                               | Scale<br>1:25                                                                         |  |
| Client: Charles Glanville c/o Re-Format Ltd                 |      |         |                         |                  | Depth<br>3.70m                                                                      |                                                                                                                                                                                               | Logged By<br>JL                                                                       |  |
| Samples & In Situ Testing                                   |      |         | Depth<br>(m)            | Level<br>(m AOD) | Legend                                                                              | Stratum Description                                                                                                                                                                           |                                                                                       |  |
| Depth (m)                                                   | Type | Results |                         |                  |                                                                                     |                                                                                                                                                                                               |                                                                                       |  |
| 0.20                                                        | D    |         | 0.20                    |                  |    | TOPSOIL: Mid to dark brown silty sandy gravelly clay. Sand is fine grained. Gravel is rare, fine to coarse, sub-angular to sub-rounded flint.                                                 |                                                                                       |  |
| 0.50                                                        | D    |         |                         |                  |    | MADE GROUND: Light brown silty sandy gravelly clay. Sand is fine to medium grained. Gravel is fine to abundant, angular to sub-rounded, fine to coarse flint, chalk and brick.                |                                                                                       |  |
| 0.80                                                        | D    |         | 0.80                    |                  |   | RIVER TERRACE DEPOSITS: Mottled light brown/orange silty sandy gravelly CLAY. Sand is fine to medium grained. Gravel is abundant, fine to medium, sub-angular to sub-rounded flint and chalk. |                                                                                       |  |
| 1.20                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                                                                       |  |
| 1.50                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                                                                       |  |
| 1.80                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                                                                       |  |
| 2.20                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                                                                       |  |
| 2.70                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                                                                       |  |
|                                                             |      |         | 2.90                    |                  |  | RIVER TERRACE DEPOSITS: Mottled light brown/orange silty sandy gravelly CLAY. Sand is fine grained. Gravel is abundant, sub-angular to sub-rounded, fine to medium chalk and flint.           |                                                                                       |  |
| 3.20                                                        | D    |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                                                                       |  |
| 3.70                                                        | D    |         | 3.70                    |                  |                                                                                     | Trialpit Complete at 3.70 m                                                                                                                                                                   |                                                                                       |  |
| Remarks: Roots noted to 1.80m bgl.                          |      |         |                         |                  |                                                                                     |                                                                                                                                                                                               |  |  |
| Groundwater: No groundwater encountered.                    |      |         |                         |                  |                                                                                     |                                                                                                                                                                                               |                                                                                       |  |

## APPENDIX 3





## APPENDIX 4

|                                                       |                                      |                                                                                     |
|-------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------|
| Bellamy Roberts                                       |                                      | Page 1                                                                              |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU |                                      |  |
| Date 14/01/2020 12:33<br>File                         | Designed by jasonbrown<br>Checked by |                                                                                     |
| XP Solutions Source Control 2015.1                    |                                      |                                                                                     |

ICP SUDS Mean Annual Flood

Input

|                       |       |               |          |
|-----------------------|-------|---------------|----------|
| Return Period (years) | 100   | Soil          | 0.400    |
| Area (ha)             | 1.000 | Urban         | 0.000    |
| SAAR (mm)             | 700   | Region Number | Region 7 |

**Results    l/s**

|            |      |
|------------|------|
| QBAR Rural | 3.4  |
| QBAR Urban | 3.4  |
| Q100 years | 10.9 |
| Q1 year    | 2.9  |
| Q30 years  | 7.7  |
| Q100 years | 10.9 |

©1982-2015 XP Solutions

## APPENDIX 5



Atkins Global  
The Hub, 500  
Park Avenue  
Bristol  
BS32 4RZ

Your ref 54886  
Our ref 245484  
Date 22 May 2017  
Contact [searches@southernwater.co.uk](mailto:searches@southernwater.co.uk)  
Tel 0845 272 0845  
0330 303 0276  
Fax 01634 844514

Attention: Andrew Aitken

Dear Customer

**Re: Provision of public sewer record extract**

**Location: Site surrounding Warblington Road, Emsworth, PO10 7HD**

Thank you for your order regarding the provision of extracts of our sewer and/or water main records. Please find enclosed the extracts from Southern Water's records for the above location.

We confirm payment of your fee in the sum of £49.92 and enclose a VAT receipt for your records.

Customers should be aware that there are areas within our region in which there are neither sewers nor water mains. Similarly, whilst the enclosed extract may indicate the approximate location of our apparatus in the area of interest, it should not be relied upon as showing that further infrastructure does not exist and may subsequently be found following site investigation. Actual positions of the disclosed (and any undisclosed) infrastructure should therefore be determined on site, because Southern Water does not accept any responsibility for inaccuracy or omission regarding the enclosed plan. Accordingly it should not be considered to be a definitive document.

Should you require any further assistance regarding this matter, please contact the LandSearch team.

Yours faithfully

LandSearch

105739



SU7405SW

Drawn by: yadavsa

Scale: 1:2500

Date: 22/05/2017

WARNING: BAC pipes are constructed of Bonded Asbestos Cement  
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement

N



Southern  
Water

474074

SEWER RECORDS PAGE 2 OF 2

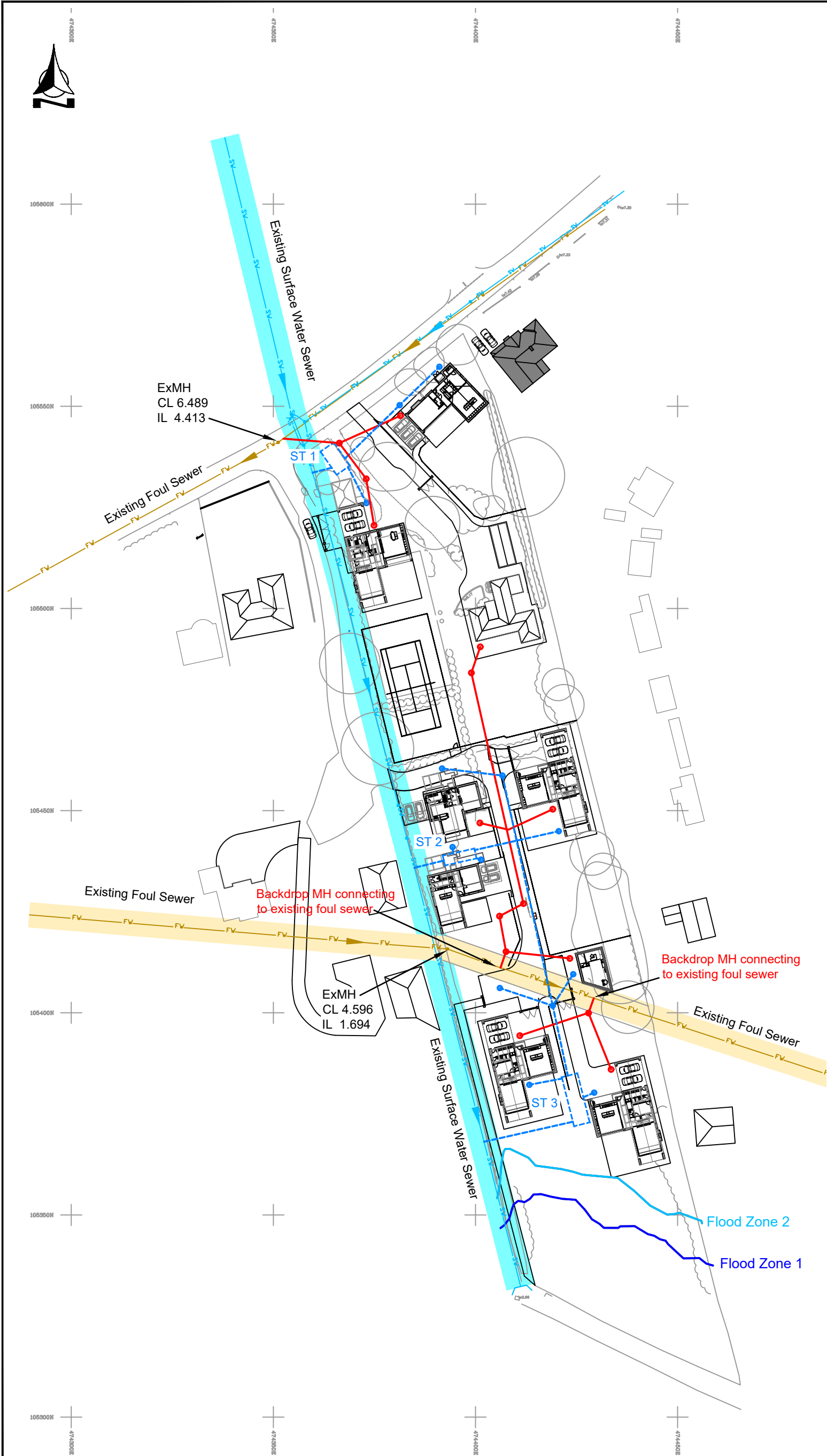
| Node  | Cover | Invert | Size | Material | Shape | Node  | Cover | Invert | Size | Material | Shape | Node  | Cover | Invert | Size  | Material | Shape | Node  | Cover | Invert | Size  | Material | Shape |      |
|-------|-------|--------|------|----------|-------|-------|-------|--------|------|----------|-------|-------|-------|--------|-------|----------|-------|-------|-------|--------|-------|----------|-------|------|
| 0301X | 3.761 | 2.554  | 300  | UNK      | CIRC  | 2350X | 3.269 | 1.749  | UNK  | UNK      | CIRC  | 4652X | 6.132 | 5.232  | 150   | UNK      | CIRC  | 8707Y |       |        | UNK   | UNK      | UNK   |      |
| 0302X |       |        | UNK  | UNK      | CIRC  | 2401X | 5.779 | 2.487  | 500  | PP       | CIRC  | 4751X | 6.436 |        | 300   | UNK      | CIRC  | 870DX |       |        | 150   | UNK      | CIRC  |      |
| 0303X | 4.279 |        | 225  | UNK      | CIRC  | 2402X | 6.144 |        | 500  | PP       | CIRC  | 4752X | 6.61  |        | 225   | UNK      | CIRC  | 871DY |       |        | 150   | UNK      | CIRC  |      |
| 0304X | 3.429 | 2.478  | 300  | UNK      | CIRC  | 2406Y | 4.75  |        | 300  | UNK      | CIRC  | *     | 5301X | 3.761  |       | 300      | UNK   | CIRC  | 8750X | 3.035  |       | 450      | UNK   | RECT |
| 0350X | 4.382 | 3.312  | 225  | UNK      | CIRC  | 2406X | 4.75  | 2.065  | 500  | PP       | CIRC  | *     | 5350X | 3.558  | 2.478 | 225      | UNK   | CIRC  | 9401X |        |       | UNK      | UNK   | CIRC |
| 0351X | 4.281 |        | 300  | UNK      | CIRC  | 2408X | 4.61  | 2.628  | 500  | PP       | CIRC  |       | 5401X | 5.069  | 3.094 | 225      | UNK   | CIRC  | 9404X |        |       | UNK      | UNK   | CIRC |
| 0352X | 3.562 | 2.652  | 300  | UNK      | CIRC  | 2450X |       |        | UNK  | UNK      | CIRC  |       | 5402X | 4.721  |       | UNK      | UNK   | CIRC  | 9405X |        |       | UNK      | UNK   | CIRC |
| 0354X | 2.62  | 2.17   | UNK  | UNK      | CIRC  | 2451X | 4.8   | 3.277  | 500  | PP       | CIRC  | *     | 5450X | 4.82   | 3.43  | 225      | UNK   | CIRC  | 9450X |        |       | 225      | UNK   | CIRC |
| 0401X | 5.599 | 4.229  | UNK  | UNK      | CIRC  | 2451Y | 4.8   | 3.254  | 300  | UNK      | CIRC  | *     | 5451X | 4.536  |       | 225      | UNK   | CIRC  | 9550X | 4.952  | 3.512 | 225      | UNK   | CIRC |
| 0402X | 5.583 | 4.033  | UNK  | UNK      | CIRC  | 2452X | 4.61  | 2.796  | 500  | PP       | CIRC  |       | 5501X | 5.974  | 4.325 | 150      | UNK   | CIRC  | 9551X | 4.471  | 3.701 | 225      | UNK   | CIRC |
| 0403X | 5.363 | 3.933  | UNK  | UNK      | CIRC  | 2501X | 6.334 |        | 200  | UNK      | CIRC  |       | 5502X | 5.63   | 3.572 | 225      | UNK   | CIRC  | 9552X | 4.469  | 3.619 | 225      | UNK   | CIRC |
| 0404X | 5.397 | 3.907  | 150  | UNK      | CIRC  | 2502X |       |        | 100  | VC       | CIRC  |       | 552DX |        |       | 150      | UNK   | CIRC  | 9554X | 4.054  | 3.478 | 225      | UNK   | CIRC |
| 0405X | 4.398 | 3.258  | 150  | UNK      | CIRC  | 250DX |       |        | 200  | UNK      | CIRC  |       | 5550X | 6.155  | 5.055 | 150      | UNK   | CIRC  | 9555X | 4.368  |       | 225      | UNK   | CIRC |
| 0406X |       |        | UNK  | UNK      | CIRC  | 2550X | 6.489 | 4.519  | 225  | UNK      | CIRC  |       | 5551X | 5.922  | 4.792 | 150      | UNK   | CIRC  | 9601X |        |       | UNK      | UNK   | CIRC |
| 0407X |       |        | UNK  | UNK      | CIRC  | 2551X | 6.244 |        | 300  | UNK      | CIRC  |       | 5552X | 5.777  | 4.387 | 150      | UNK   | CIRC  | 9602X |        |       | UNK      | UNK   | CIRC |
| 040DX |       |        | UNK  | UNK      | CIRC  | 2601X | 6.507 | 5.09   | 200  | UNK      | CIRC  | *     | 5553X | 5.624  |       | 225      | UNK   | CIRC  | 9603X |        |       | UNK      | UNK   | CIRC |
| 0450X | 4.919 | 3.109  | 150  | UNK      | CIRC  | 2601Y | 6.507 |        | 200  | UNK      | CIRC  | *     | 5552X |        |       | 225      | UNK   | CIRC  | 9604Y |        |       | UNK      | UNK   | CIRC |
| 0451X | 5.558 | 4.518  | 225  | UNK      | CIRC  | 2602X |       |        | 150  | VC       | CIRC  |       | 5601X | 5.352  | 4.59  | 150      | UNK   | CIRC  | 9605X |        |       | 150      | UNK   | CIRC |
| 0452X | 5.642 | 4.362  | 225  | UNK      | CIRC  | 2603X |       |        | 150  | VC       | CIRC  |       | 5650X | 5.568  |       | 450      | UNK   | CIRC  | 9606X |        |       | 150      | UNK   | CIRC |
| 0453X | 5.758 |        | 225  | UNK      | CIRC  | 263DX |       |        | 150  | VC       | CIRC  |       | 5651X | 4.815  | 3.935 | 450      | UNK   | CIRC  | 9650X |        |       | 225      | UNK   | CIRC |
| 0454X | 5.33  | 4.18   | UNK  | UNK      | CIRC  | 264DX |       |        | 150  | VC       | CIRC  |       | 5652X | 5.352  | 4.812 | 150      | UNK   | CIRC  | 9651X | 5.669  | 4.109 | 225      | UNK   | CIRC |
| 0455X | 4.635 | 3.835  | 225  | UNK      | CIRC  | 2650X | 6.516 | 4.916  | UNK  | UNK      | CIRC  |       | 5653X | 5.902  | 4.602 | 150      | UNK   | CIRC  | 9652X |        |       | 225      | UNK   | CIRC |
| 0456X | 4.379 | 3.409  | 225  | UNK      | CIRC  | 2701Y | 6.571 | 4.596  | 225  | UNK      | CIRC  |       | 565ZX |        |       | 450      | UNK   | CIRC  | 9703X |        |       | 150      | UNK   | CIRC |
| 0501X | 5.7   | 4.15   | 150  | UNK      | CIRC  | 2702X | 6.958 |        | 225  | UNK      | CIRC  |       | 5702X |        |       | 150      | PF    | CIRC  | 9704X |        |       | 150      | UNK   | CIRC |
| 0502X | 5.61  | 3.99   | 150  | UNK      | CIRC  | 270DX |       |        | 225  | UNK      | CIRC  |       | 5703X |        |       | 150      | PF    | CIRC  |       |        |       |          |       |      |
| 0503X | 5.69  | 3.84   | 150  | UNK      | CIRC  | 271DX |       |        | 225  | UNK      | CIRC  |       | 5750X | 5.196  | 4.536 | 225      | UNK   | CIRC  |       |        |       |          |       |      |
| 0504X | 5.55  | 3.77   | 150  | UNK      | CIRC  | 2751X | 6.938 | 6.288  | 225  | UNK      | CIRC  |       | 5751X | 5.608  | 4.308 | 375      | UNK   | CIRC  |       |        |       |          |       |      |
| 0505X | 5.865 | 4.565  | UNK  | UNK      | CIRC  | 2752X | 7.156 | 5.876  | 150  | UNK      | CIRC  |       | 5752X | 5.231  |       | 225      | UNK   | CIRC  | *     |        |       |          |       |      |
| 0506X | 5.785 | 4.335  | UNK  | UNK      | CIRC  | 2753X | 6.541 | 5.301  | 225  | UNK      | CIRC  |       | 5752Y | 5.231  |       | 150      | UNK   | CIRC  | *     |        |       |          |       |      |
| 0507X | 5.525 | 4.205  | 150  | UNK      | CIRC  | 3401X | 4.596 | 1.694  | 300  | UNK      | CIRC  |       | 5752X |        |       | 375      | UNK   | CIRC  |       |        |       |          |       |      |
| 0508X |       |        | UNK  | UNK      | CIRC  | 3450X |       |        | 450  | UNK      | CIRC  |       | 6301X | 3.529  | 0.884 | 300      | UNK   | CIRC  |       |        |       |          |       |      |
| 0509X |       |        | UNK  | UNK      | CIRC  | 3451X |       |        | 450  | UNK      | CIRC  |       | 6401X |        |       | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 0550X | 5.994 |        | 225  | UNK      | CIRC  | 3501X | 6.489 | 4.413  | 225  | UNK      | CIRC  |       | 6402X |        |       | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 0551X | 5.826 | 4.816  | 225  | UNK      | CIRC  | 3502X |       |        | UNK  | VC       | CIRC  |       | 6403X |        |       | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 0552X |       |        | 150  | UNK      | CIRC  | 3503X |       |        | 225  | UNK      | CIRC  |       | 640DX |        |       | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 0601X |       |        | UNK  | UNK      | CIRC  | 3550X | 6.478 | 4.998  | 225  | UNK      | CIRC  |       | 6601X |        |       | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 0602X |       |        | 100  | VC       | CIRC  | 3551Z | 6.56  | 5.36   | 225  | CO       | CIRC  | *     | 6603X |        |       | UNK      | PF    | CIRC  |       |        |       |          |       |      |
| 060DX |       |        | 100  | VC       | CIRC  | 3551Y | 6.56  | 5.36   | 225  | CO       | CIRC  | *     | 6604X |        |       | UNK      | PF    | CIRC  |       |        |       |          |       |      |
| 061DX |       |        | 100  | VC       | CIRC  | 3551X | 6.56  | 5.36   | 300  | CO       | CIRC  | *     | 6650X | 3.474  | 2.604 | 225      | UNK   | CIRC  |       |        |       |          |       |      |
| 063DX |       |        | UNK  | UNK      | CIRC  | 3552Y | 6.564 |        | 450  | UNK      | CIRC  |       | 6651X | 3.287  | 2.291 | 225      | UNK   | CIRC  |       |        |       |          |       |      |
| 0650X | 6.35  | 5.52   | 150  | UNK      | CIRC  | 3553Y | 6.477 |        | 225  | UNK      | CIRC  |       | 6652X |        |       | 375      | UNK   | CIRC  |       |        |       |          |       |      |
| 0651X | 5.81  | 5.2    | 150  | UNK      | CIRC  | 3554X | 6.693 |        | 150  | UNK      | CIRC  |       | 7201X | 3.017  | 1.493 | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 0752X | 7.642 | 6.382  | 225  | UNK      | CIRC  | 3555X |       |        | 375  | CO       | CIRC  |       | 7301X | 2.975  | 0.637 | 300      | UNK   | CIRC  |       |        |       |          |       |      |
| 1301X | 4.514 | 2.39   | 300  | UNK      | CIRC  | 3601X | 6.431 | 5.294  | 150  | UNK      | CIRC  |       | 730LX |        |       | 150      | UNK   | CIRC  |       |        |       |          |       |      |
| 1302X | 4.803 | 3.514  | 225  | UNK      | CIRC  | 3650Y | 6.546 |        | 300  | CO       | CIRC  | *     | 7401X | 2.929  | 0.515 | 300      | UNK   | CIRC  |       |        |       |          |       |      |
| 1401Y | 5.443 | 2.649  | 300  | PVC      | CIRC  | 3650X | 6.546 | 6.046  | 300  | CO       | CIRC  | *     | 7501X | 3.011  |       | 375      | CI    | CIRC  |       |        |       |          |       |      |
| 1401Y | 5.443 |        | 300  | UNK      | CIRC  | 3651X | 6.364 | 5.544  | 225  | UNK      | CIRC  |       | 7502X | 3.006  | 0.283 | 300      | UNK   | CIRC  |       |        |       |          |       |      |
| 1401X | 5.443 | 3.58   | 300  | PVC      | CIRC  | 3652X |       |        | 375  | CO       | CIRC  |       | 7503X |        |       | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 1450X | 5.445 | 4.195  | UNK  | UNK      | CIRC  | 3653X | 6.529 |        | 375  | CO       | CIRC  |       | 7504X |        |       | 100      | VC    | CIRC  |       |        |       |          |       |      |
| 1451X | 5.095 | 3.875  | 225  | UNK      | CIRC  | 3654X |       |        | 375  | CO       | CIRC  |       | 750DX |        |       | 300      | UNK   | CIRC  |       |        |       |          |       |      |
| 1501X | 6.431 | 3.222  | 225  | UNK      | CIRC  | 3701X | 6.495 |        | 225  | UNK      | CIRC  |       | 7601X |        |       | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 1502X | 6.15  |        | 225  | UNK      | CIRC  | 3751X | 6.517 | 5.867  | 150  | UNK      | CIRC  |       | 7602X |        |       | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 1503X | 6.343 | 5.083  | 150  | UNK      | CIRC  | 3753X |       |        | 300  | CO       | CIRC  |       | 7603X |        |       | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 1504X | 6.047 | 2.972  | 300  | UNK      | CIRC  | 4301X |       |        | UNK  | UNK      | CIRC  |       | 7604X |        |       | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 1550X | 6.391 | 5.741  | 225  | UNK      | CIRC  | 430DX |       |        | 300  | UNK      | CIRC  |       | 7605X |        |       | UNK      | UNK   | CIRC  |       |        |       |          |       |      |
| 1551X | 5.993 | 4.683  | 225  | UNK      | CIRC  | 4401X | 4.88  | 3.612  | 225  | UNK      | CIRC  |       | 7650X | 3.005  | 2.245 | 225      | UNK   | CIRC  |       |        |       |          |       |      |
| 1552X | 6.366 | 5.156  | 225  | UNK      | CIRC  | 4402X |       |        | UNK  |          |       |       |       |        |       |          |       |       |       |        |       |          |       |      |

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

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

|                      |
|----------------------|
| Manhole (SW)         |
| Manhole (F&C)        |
| Lamp hole (SW)       |
| Lamp hole (F&C)      |
| Pumping Station (SW) |
| Pumping Station      |

## APPENDIX 6



**Notes**

This drawing shall be read in conjunction with all other relevant Engineering, Architectural, Landscaping details, drawings and specifications and all relevant Highway Authority Plans.

Any works constructed prior to technical approval are at the contractors own risk.

All levels to be checked prior to any works undertaken. Existing surface water sewer along Warblington Road to be identified to ensure new proposed foul sewer doesn't conflict with any existing pipes.

Drainage calculations for soak-aways to Digest 365 have been undertaken by Ground & Water which has indicated that the existing ground make up is unsuitable for any type of infiltration.

Storage tanks for all plots have been calculated using Microdrainage and are designed to 1 in 100 yr storm plus 40% for climate change and discharge into the nearby existing surface water sewer controlled via hydro-brakes, restricted to 10.9l/s as indicated in the Qbar calculations.

All driveways to be permeable paving blocks

Storage tank ST1 requires 28m<sup>2</sup> x 1.0m deep  
Storage tank ST2 requires 20m<sup>2</sup> x 1.0m deep  
Storage tank ST3 requires 50m<sup>2</sup> x 1.0m deep

| Key |                                                  |
|-----|--------------------------------------------------|
|     | 3.5m stand-off distance for surface water system |
|     | 3m stand-off distance for foul water system      |
|     | Surface water sewer                              |
|     | Surface water storage tank                       |
|     | Foul water sewer                                 |



Clover House  
Western Lane  
Odiham  
Hampshire, RG29 1TU

Tel: 01256 703355  
Email: info@bellamyroberts.co.uk

|                                                   |                           |              |
|---------------------------------------------------|---------------------------|--------------|
| CLIENT<br>Premier Coastal Properties Ltd.         |                           |              |
| PROJECT<br>Warblington Road, Emsworth             |                           |              |
| TITLE<br>Foul and Surface Water Drainage Strategy |                           |              |
| DRAWN BY<br>JCB                                   | DESIGN BY<br>JCB          | CHK BY<br>MT |
| DATE<br>20/05/20                                  | DRAWING No.<br>5042 / 006 |              |
| SCALE<br>1:1000 @ A3                              | REV No.                   |              |

## APPENDIX 7

|                                                             |                     |                                                                                |                             |                       |                                                                                     |
|-------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------|-----------------------------|-----------------------|-------------------------------------------------------------------------------------|
| Bellamy Roberts                                             |                     |                                                                                |                             | Page 1                |                                                                                     |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU       |                     | Premier Coastal Properties Ltd<br>Warblington Road, Emsworth<br>Storage Tank 1 |                             |                       |  |
| Date 20/05/2020<br>File 100YRS ST1.SRCX                     |                     | Designed by JCB<br>Checked by MT                                               |                             |                       |                                                                                     |
| XP Solutions                                                |                     | Source Control 2017.1                                                          |                             |                       |                                                                                     |
| <u>Summary of Results for 100 year Return Period (+40%)</u> |                     |                                                                                |                             |                       |                                                                                     |
| Storm<br>Event                                              | Max<br>Level<br>(m) | Max<br>Depth<br>(m)                                                            | Max<br>Control<br>(l/s)     | Max<br>Volume<br>(m³) | Status                                                                              |
| 15 min Summer                                               | 5.022               | 0.522                                                                          | 2.6                         | 14.6                  | O K                                                                                 |
| 30 min Summer                                               | 5.159               | 0.659                                                                          | 2.9                         | 18.5                  | O K                                                                                 |
| 60 min Summer                                               | 5.249               | 0.749                                                                          | 3.1                         | 21.0                  | O K                                                                                 |
| 120 min Summer                                              | 5.286               | 0.786                                                                          | 3.1                         | 22.0                  | O K                                                                                 |
| 180 min Summer                                              | 5.272               | 0.772                                                                          | 3.1                         | 21.6                  | O K                                                                                 |
| 240 min Summer                                              | 5.241               | 0.741                                                                          | 3.0                         | 20.7                  | O K                                                                                 |
| 360 min Summer                                              | 5.174               | 0.674                                                                          | 2.9                         | 18.9                  | O K                                                                                 |
| 480 min Summer                                              | 5.114               | 0.614                                                                          | 2.8                         | 17.2                  | O K                                                                                 |
| 600 min Summer                                              | 5.059               | 0.559                                                                          | 2.7                         | 15.7                  | O K                                                                                 |
| 720 min Summer                                              | 5.011               | 0.511                                                                          | 2.6                         | 14.3                  | O K                                                                                 |
| 960 min Summer                                              | 4.931               | 0.431                                                                          | 2.4                         | 12.1                  | O K                                                                                 |
| 1440 min Summer                                             | 4.816               | 0.316                                                                          | 2.1                         | 8.8                   | O K                                                                                 |
| 2160 min Summer                                             | 4.711               | 0.211                                                                          | 1.7                         | 5.9                   | O K                                                                                 |
| 2880 min Summer                                             | 4.650               | 0.150                                                                          | 1.5                         | 4.2                   | O K                                                                                 |
| 4320 min Summer                                             | 4.582               | 0.082                                                                          | 1.2                         | 2.3                   | O K                                                                                 |
| 5760 min Summer                                             | 4.561               | 0.061                                                                          | 1.0                         | 1.7                   | O K                                                                                 |
| 7200 min Summer                                             | 4.552               | 0.052                                                                          | 0.8                         | 1.5                   | O K                                                                                 |
| 8640 min Summer                                             | 4.546               | 0.046                                                                          | 0.7                         | 1.3                   | O K                                                                                 |
| 10080 min Summer                                            | 4.543               | 0.043                                                                          | 0.6                         | 1.2                   | O K                                                                                 |
| 15 min Winter                                               | 5.089               | 0.589                                                                          | 2.7                         | 16.5                  | O K                                                                                 |
| 30 min Winter                                               | 5.248               | 0.748                                                                          | 3.1                         | 20.9                  | O K                                                                                 |
| Storm<br>Event                                              | Rain<br>(mm/hr)     | Flooded<br>Volume<br>(m³)                                                      | Discharge<br>Volume<br>(m³) | Time-Peak<br>(mins)   |                                                                                     |
| 15 min Summer                                               | 126.074             | 0.0                                                                            | 16.3                        | 17                    |                                                                                     |
| 30 min Summer                                               | 84.745              | 0.0                                                                            | 21.9                        | 31                    |                                                                                     |
| 60 min Summer                                               | 54.368              | 0.0                                                                            | 28.1                        | 54                    |                                                                                     |
| 120 min Summer                                              | 33.674              | 0.0                                                                            | 34.8                        | 86                    |                                                                                     |
| 180 min Summer                                              | 25.065              | 0.0                                                                            | 38.9                        | 122                   |                                                                                     |
| 240 min Summer                                              | 20.180              | 0.0                                                                            | 41.8                        | 156                   |                                                                                     |
| 360 min Summer                                              | 14.839              | 0.0                                                                            | 46.1                        | 224                   |                                                                                     |
| 480 min Summer                                              | 11.923              | 0.0                                                                            | 49.3                        | 290                   |                                                                                     |
| 600 min Summer                                              | 10.054              | 0.0                                                                            | 52.0                        | 354                   |                                                                                     |
| 720 min Summer                                              | 8.741               | 0.0                                                                            | 54.3                        | 418                   |                                                                                     |
| 960 min Summer                                              | 7.003               | 0.0                                                                            | 58.0                        | 540                   |                                                                                     |
| 1440 min Summer                                             | 5.114               | 0.0                                                                            | 63.5                        | 780                   |                                                                                     |
| 2160 min Summer                                             | 3.727               | 0.0                                                                            | 69.4                        | 1144                  |                                                                                     |
| 2880 min Summer                                             | 2.973               | 0.0                                                                            | 73.8                        | 1500                  |                                                                                     |
| 4320 min Summer                                             | 2.159               | 0.0                                                                            | 80.4                        | 2204                  |                                                                                     |
| 5760 min Summer                                             | 1.718               | 0.0                                                                            | 85.3                        | 2936                  |                                                                                     |
| 7200 min Summer                                             | 1.438               | 0.0                                                                            | 89.3                        | 3672                  |                                                                                     |
| 8640 min Summer                                             | 1.245               | 0.0                                                                            | 92.8                        | 4320                  |                                                                                     |
| 10080 min Summer                                            | 1.102               | 0.0                                                                            | 95.8                        | 5120                  |                                                                                     |
| 15 min Winter                                               | 126.074             | 0.0                                                                            | 18.2                        | 17                    |                                                                                     |
| 30 min Winter                                               | 84.745              | 0.0                                                                            | 24.5                        | 31                    |                                                                                     |
| ©1982-2017 XP Solutions                                     |                     |                                                                                |                             |                       |                                                                                     |

|                                                             |                     |                                                                                |                             |                                                                                     |        |
|-------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|--------|
| Bellamy Roberts                                             |                     |                                                                                |                             | Page 2                                                                              |        |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU       |                     | Premier Coastal Properties Ltd<br>Warblington Road, Emsworth<br>Storage Tank 1 |                             |  |        |
| Date 20/05/2020<br>File 100YRS ST1.SRCX                     |                     | Designed by JCB<br>Checked by MT                                               |                             |                                                                                     |        |
| XP Solutions                                                |                     | Source Control 2017.1                                                          |                             |                                                                                     |        |
| <u>Summary of Results for 100 year Return Period (+40%)</u> |                     |                                                                                |                             |                                                                                     |        |
| Storm<br>Event                                              | Max<br>Level<br>(m) | Max<br>Depth<br>(m)                                                            | Max<br>Control<br>(l/s)     | Max<br>Volume<br>(m³)                                                               | Status |
| 60 min Winter                                               | 5.357               | 0.857                                                                          | 3.3                         | 24.0                                                                                | O K    |
| 120 min Winter                                              | 5.390               | 0.890                                                                          | 3.3                         | 24.9                                                                                | O K    |
| 180 min Winter                                              | 5.363               | 0.863                                                                          | 3.3                         | 24.2                                                                                | O K    |
| 240 min Winter                                              | 5.315               | 0.815                                                                          | 3.2                         | 22.8                                                                                | O K    |
| 360 min Winter                                              | 5.214               | 0.714                                                                          | 3.0                         | 20.0                                                                                | O K    |
| 480 min Winter                                              | 5.125               | 0.625                                                                          | 2.8                         | 17.5                                                                                | O K    |
| 600 min Winter                                              | 5.048               | 0.548                                                                          | 2.7                         | 15.3                                                                                | O K    |
| 720 min Winter                                              | 4.982               | 0.482                                                                          | 2.5                         | 13.5                                                                                | O K    |
| 960 min Winter                                              | 4.878               | 0.378                                                                          | 2.2                         | 10.6                                                                                | O K    |
| 1440 min Winter                                             | 4.744               | 0.244                                                                          | 1.8                         | 6.8                                                                                 | O K    |
| 2160 min Winter                                             | 4.641               | 0.141                                                                          | 1.4                         | 3.9                                                                                 | O K    |
| 2880 min Winter                                             | 4.587               | 0.087                                                                          | 1.2                         | 2.4                                                                                 | O K    |
| 4320 min Winter                                             | 4.556               | 0.056                                                                          | 0.9                         | 1.6                                                                                 | O K    |
| 5760 min Winter                                             | 4.546               | 0.046                                                                          | 0.7                         | 1.3                                                                                 | O K    |
| 7200 min Winter                                             | 4.541               | 0.041                                                                          | 0.6                         | 1.1                                                                                 | O K    |
| 8640 min Winter                                             | 4.537               | 0.037                                                                          | 0.5                         | 1.0                                                                                 | O K    |
| 10080 min Winter                                            | 4.535               | 0.035                                                                          | 0.5                         | 1.0                                                                                 | O K    |
| Storm<br>Event                                              | Rain<br>(mm/hr)     | Flooded<br>Volume<br>(m³)                                                      | Discharge<br>Volume<br>(m³) | Time-Peak<br>(mins)                                                                 |        |
| 60 min Winter                                               | 54.368              | 0.0                                                                            | 31.5                        | 58                                                                                  |        |
| 120 min Winter                                              | 33.674              | 0.0                                                                            | 39.0                        | 92                                                                                  |        |
| 180 min Winter                                              | 25.065              | 0.0                                                                            | 43.6                        | 130                                                                                 |        |
| 240 min Winter                                              | 20.180              | 0.0                                                                            | 46.8                        | 168                                                                                 |        |
| 360 min Winter                                              | 14.839              | 0.0                                                                            | 51.6                        | 240                                                                                 |        |
| 480 min Winter                                              | 11.923              | 0.0                                                                            | 55.3                        | 308                                                                                 |        |
| 600 min Winter                                              | 10.054              | 0.0                                                                            | 58.3                        | 374                                                                                 |        |
| 720 min Winter                                              | 8.741               | 0.0                                                                            | 60.8                        | 438                                                                                 |        |
| 960 min Winter                                              | 7.003               | 0.0                                                                            | 64.9                        | 560                                                                                 |        |
| 1440 min Winter                                             | 5.114               | 0.0                                                                            | 71.1                        | 806                                                                                 |        |
| 2160 min Winter                                             | 3.727               | 0.0                                                                            | 77.7                        | 1148                                                                                |        |
| 2880 min Winter                                             | 2.973               | 0.0                                                                            | 82.7                        | 1528                                                                                |        |
| 4320 min Winter                                             | 2.159               | 0.0                                                                            | 90.1                        | 2204                                                                                |        |
| 5760 min Winter                                             | 1.718               | 0.0                                                                            | 95.6                        | 2928                                                                                |        |
| 7200 min Winter                                             | 1.438               | 0.0                                                                            | 100.0                       | 3544                                                                                |        |
| 8640 min Winter                                             | 1.245               | 0.0                                                                            | 103.9                       | 4296                                                                                |        |
| 10080 min Winter                                            | 1.102               | 0.0                                                                            | 107.3                       | 5056                                                                                |        |
| ©1982-2017 XP Solutions                                     |                     |                                                                                |                             |                                                                                     |        |

|                                                       |                                                                                |                                                                                     |
|-------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Bellamy Roberts                                       |                                                                                | Page 3                                                                              |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU | Premier Coastal Properties Ltd<br>Warblington Road, Emsworth<br>Storage Tank 1 |  |
| Date 20/05/2020<br>File 100YRS ST1.SRCX               | Designed by JCB<br>Checked by MT                                               |                                                                                     |
| XP Solutions Source Control 2017.1                    |                                                                                |                                                                                     |

Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.200            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

Time Area Diagram

Total Area (ha) 0.069

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |
| 0           | 4 0.069  |

©1982-2017 XP Solutions

|                                                       |                                                                                |                                                                                     |
|-------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Bellamy Roberts                                       |                                                                                | Page 4                                                                              |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU | Premier Coastal Properties Ltd<br>Warblington Road, Emsworth<br>Storage Tank 1 |  |
| Date 20/05/2020<br>File 100YRS ST1.SRCX               | Designed by JCB<br>Checked by MT                                               |                                                                                     |
| XP Solutions Source Control 2017.1                    |                                                                                |                                                                                     |

Model Details

Storage is Online Cover Level (m) 6.500

Tank or Pond Structure

Invert Level (m) 4.500

| Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------|------------------------|-----------|------------------------|-----------|------------------------|
| 0.000     | 28.0                   | 1.000     | 28.0                   | 1.100     | 0.0                    | 2.000     | 0.0                    |

Hydro-Brake® Optimum Outflow Control

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SCU-0058-3500-1000-3500 |
| Design Head (m)                   | 1.000                      |
| Design Flow (l/s)                 | 3.5                        |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Linear discharge profile   |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 58                         |
| Invert Level (m)                  | 4.500                      |
| Minimum Outlet Pipe Diameter (mm) | 75                         |
| Suggested Manhole Diameter (mm)   | 1200                       |

| Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|
| Design Point (Calculated) | 1.000    | 3.5        |
| Flush-Flo™                | 0.078    | 1.2        |
| Kick-Flo®                 | 0.086    | 1.2        |
| Mean Flow over Head Range | -        | 2.4        |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100     | 1.2        | 1.200     | 3.8        | 3.000     | 5.9        | 7.000     | 8.8        |
| 0.200     | 1.7        | 1.400     | 4.1        | 3.500     | 6.3        | 7.500     | 9.1        |
| 0.300     | 2.0        | 1.600     | 4.4        | 4.000     | 6.7        | 8.000     | 9.3        |
| 0.400     | 2.3        | 1.800     | 4.6        | 4.500     | 7.1        | 8.500     | 9.6        |
| 0.500     | 2.5        | 2.000     | 4.8        | 5.000     | 7.5        | 9.000     | 9.9        |
| 0.600     | 2.8        | 2.200     | 5.1        | 5.500     | 7.8        | 9.500     | 10.1       |
| 0.800     | 3.2        | 2.400     | 5.3        | 6.000     | 8.1        |           |            |
| 1.000     | 3.5        | 2.600     | 5.5        | 6.500     | 8.5        |           |            |

©1982-2017 XP Solutions

|                                                             |                        |                              |                                                                                |                                      |                                                                                     |               |
|-------------------------------------------------------------|------------------------|------------------------------|--------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------|---------------|
| Bellamy Roberts                                             |                        |                              |                                                                                |                                      | Page 1                                                                              |               |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU       |                        |                              | Premier Coastal Properties Ltd<br>Warblington Road, Emsworth<br>Storage Tank 2 |                                      |  |               |
| Date 20/05/2020<br>File 100YRS ST2.SRCX                     |                        |                              | Designed by JCB<br>Checked by MT                                               |                                      |                                                                                     |               |
| XP Solutions                                                |                        |                              | Source Control 2017.1                                                          |                                      |                                                                                     |               |
| <u>Summary of Results for 100 year Return Period (+40%)</u> |                        |                              |                                                                                |                                      |                                                                                     |               |
|                                                             | <b>Storm<br/>Event</b> | <b>Max<br/>Level<br/>(m)</b> | <b>Max<br/>Depth<br/>(m)</b>                                                   | <b>Max<br/>Control<br/>(l/s)</b>     | <b>Max<br/>Volume<br/>(m³)</b>                                                      | <b>Status</b> |
|                                                             | 15 min Summer          | 3.386                        | 0.586                                                                          | 2.7                                  | 11.7                                                                                | O K           |
|                                                             | 30 min Summer          | 3.525                        | 0.725                                                                          | 3.0                                  | 14.5                                                                                | O K           |
|                                                             | 60 min Summer          | 3.608                        | 0.808                                                                          | 3.2                                  | 16.2                                                                                | O K           |
|                                                             | 120 min Summer         | 3.627                        | 0.827                                                                          | 3.2                                  | 16.5                                                                                | O K           |
|                                                             | 180 min Summer         | 3.594                        | 0.794                                                                          | 3.1                                  | 15.9                                                                                | O K           |
|                                                             | 240 min Summer         | 3.547                        | 0.747                                                                          | 3.1                                  | 14.9                                                                                | O K           |
|                                                             | 360 min Summer         | 3.458                        | 0.658                                                                          | 2.9                                  | 13.2                                                                                | O K           |
|                                                             | 480 min Summer         | 3.383                        | 0.583                                                                          | 2.7                                  | 11.7                                                                                | O K           |
|                                                             | 600 min Summer         | 3.318                        | 0.518                                                                          | 2.6                                  | 10.4                                                                                | O K           |
|                                                             | 720 min Summer         | 3.263                        | 0.463                                                                          | 2.5                                  | 9.3                                                                                 | O K           |
|                                                             | 960 min Summer         | 3.175                        | 0.375                                                                          | 2.2                                  | 7.5                                                                                 | O K           |
|                                                             | 1440 min Summer        | 3.059                        | 0.259                                                                          | 1.9                                  | 5.2                                                                                 | O K           |
|                                                             | 2160 min Summer        | 2.962                        | 0.162                                                                          | 1.5                                  | 3.2                                                                                 | O K           |
|                                                             | 2880 min Summer        | 2.909                        | 0.109                                                                          | 1.3                                  | 2.2                                                                                 | O K           |
|                                                             | 4320 min Summer        | 2.864                        | 0.064                                                                          | 1.0                                  | 1.3                                                                                 | O K           |
|                                                             | 5760 min Summer        | 2.851                        | 0.051                                                                          | 0.8                                  | 1.0                                                                                 | O K           |
|                                                             | 7200 min Summer        | 2.845                        | 0.045                                                                          | 0.7                                  | 0.9                                                                                 | O K           |
|                                                             | 8640 min Summer        | 2.841                        | 0.041                                                                          | 0.6                                  | 0.8                                                                                 | O K           |
|                                                             | 10080 min Summer       | 2.838                        | 0.038                                                                          | 0.5                                  | 0.8                                                                                 | O K           |
|                                                             | 15 min Winter          | 3.463                        | 0.663                                                                          | 2.9                                  | 13.3                                                                                | O K           |
|                                                             | 30 min Winter          | 3.626                        | 0.826                                                                          | 3.2                                  | 16.5                                                                                | O K           |
|                                                             | <b>Storm<br/>Event</b> | <b>Rain<br/>(mm/hr)</b>      | <b>Flooded<br/>Volume<br/>(m³)</b>                                             | <b>Discharge<br/>Volume<br/>(m³)</b> | <b>Time-Peak<br/>(mins)</b>                                                         |               |
|                                                             | 15 min Summer          | 126.074                      | 0.0                                                                            | 13.5                                 | 17                                                                                  |               |
|                                                             | 30 min Summer          | 84.745                       | 0.0                                                                            | 18.1                                 | 31                                                                                  |               |
|                                                             | 60 min Summer          | 54.368                       | 0.0                                                                            | 23.2                                 | 48                                                                                  |               |
|                                                             | 120 min Summer         | 33.674                       | 0.0                                                                            | 28.8                                 | 82                                                                                  |               |
|                                                             | 180 min Summer         | 25.065                       | 0.0                                                                            | 32.1                                 | 118                                                                                 |               |
|                                                             | 240 min Summer         | 20.180                       | 0.0                                                                            | 34.5                                 | 152                                                                                 |               |
|                                                             | 360 min Summer         | 14.839                       | 0.0                                                                            | 38.1                                 | 218                                                                                 |               |
|                                                             | 480 min Summer         | 11.923                       | 0.0                                                                            | 40.8                                 | 282                                                                                 |               |
|                                                             | 600 min Summer         | 10.054                       | 0.0                                                                            | 43.0                                 | 344                                                                                 |               |
|                                                             | 720 min Summer         | 8.741                        | 0.0                                                                            | 44.8                                 | 406                                                                                 |               |
|                                                             | 960 min Summer         | 7.003                        | 0.0                                                                            | 47.9                                 | 528                                                                                 |               |
|                                                             | 1440 min Summer        | 5.114                        | 0.0                                                                            | 52.5                                 | 766                                                                                 |               |
|                                                             | 2160 min Summer        | 3.727                        | 0.0                                                                            | 57.3                                 | 1124                                                                                |               |
|                                                             | 2880 min Summer        | 2.973                        | 0.0                                                                            | 61.0                                 | 1472                                                                                |               |
|                                                             | 4320 min Summer        | 2.159                        | 0.0                                                                            | 66.4                                 | 2200                                                                                |               |
|                                                             | 5760 min Summer        | 1.718                        | 0.0                                                                            | 70.5                                 | 2936                                                                                |               |
|                                                             | 7200 min Summer        | 1.438                        | 0.0                                                                            | 73.8                                 | 3608                                                                                |               |
|                                                             | 8640 min Summer        | 1.245                        | 0.0                                                                            | 76.6                                 | 4360                                                                                |               |
|                                                             | 10080 min Summer       | 1.102                        | 0.0                                                                            | 79.1                                 | 5080                                                                                |               |
|                                                             | 15 min Winter          | 126.074                      | 0.0                                                                            | 15.1                                 | 17                                                                                  |               |
|                                                             | 30 min Winter          | 84.745                       | 0.0                                                                            | 20.3                                 | 30                                                                                  |               |
| ©1982-2017 XP Solutions                                     |                        |                              |                                                                                |                                      |                                                                                     |               |

|                                                             |                     |                                                                                |                             |                       |                                                                                     |
|-------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------|-----------------------------|-----------------------|-------------------------------------------------------------------------------------|
| Bellamy Roberts                                             |                     |                                                                                |                             | Page 2                |                                                                                     |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU       |                     | Premier Coastal Properties Ltd<br>Warblington Road, Emsworth<br>Storage Tank 2 |                             |                       |  |
| Date 20/05/2020<br>File 100YRS ST2.SRCX                     |                     | Designed by JCB<br>Checked by MT                                               |                             |                       |                                                                                     |
| XP Solutions                                                |                     | Source Control 2017.1                                                          |                             |                       |                                                                                     |
| <u>Summary of Results for 100 year Return Period (+40%)</u> |                     |                                                                                |                             |                       |                                                                                     |
| Storm<br>Event                                              | Max<br>Level<br>(m) | Max<br>Depth<br>(m)                                                            | Max<br>Control<br>(l/s)     | Max<br>Volume<br>(m³) | Status                                                                              |
| 60 min Winter                                               | 3.719               | 0.919                                                                          | 3.4                         | 18.4                  | O K                                                                                 |
| 120 min Winter                                              | 3.729               | 0.929                                                                          | 3.4                         | 18.6                  | O K                                                                                 |
| 180 min Winter                                              | 3.673               | 0.873                                                                          | 3.3                         | 17.5                  | O K                                                                                 |
| 240 min Winter                                              | 3.600               | 0.800                                                                          | 3.2                         | 16.0                  | O K                                                                                 |
| 360 min Winter                                              | 3.469               | 0.669                                                                          | 2.9                         | 13.4                  | O K                                                                                 |
| 480 min Winter                                              | 3.363               | 0.563                                                                          | 2.7                         | 11.3                  | O K                                                                                 |
| 600 min Winter                                              | 3.276               | 0.476                                                                          | 2.5                         | 9.5                   | O K                                                                                 |
| 720 min Winter                                              | 3.206               | 0.406                                                                          | 2.3                         | 8.1                   | O K                                                                                 |
| 960 min Winter                                              | 3.102               | 0.302                                                                          | 2.0                         | 6.0                   | O K                                                                                 |
| 1440 min Winter                                             | 2.980               | 0.180                                                                          | 1.6                         | 3.6                   | O K                                                                                 |
| 2160 min Winter                                             | 2.896               | 0.096                                                                          | 1.2                         | 1.9                   | O K                                                                                 |
| 2880 min Winter                                             | 2.864               | 0.064                                                                          | 1.0                         | 1.3                   | O K                                                                                 |
| 4320 min Winter                                             | 2.848               | 0.048                                                                          | 0.7                         | 1.0                   | O K                                                                                 |
| 5760 min Winter                                             | 2.841               | 0.041                                                                          | 0.6                         | 0.8                   | O K                                                                                 |
| 7200 min Winter                                             | 2.836               | 0.036                                                                          | 0.5                         | 0.7                   | O K                                                                                 |
| 8640 min Winter                                             | 2.833               | 0.033                                                                          | 0.4                         | 0.7                   | O K                                                                                 |
| 10080 min Winter                                            | 2.831               | 0.031                                                                          | 0.4                         | 0.6                   | O K                                                                                 |
| Storm<br>Event                                              | Rain<br>(mm/hr)     | Flooded<br>Volume<br>(m³)                                                      | Discharge<br>Volume<br>(m³) | Time-Peak<br>(mins)   |                                                                                     |
| 60 min Winter                                               | 54.368              | 0.0                                                                            | 26.0                        | 52                    |                                                                                     |
| 120 min Winter                                              | 33.674              | 0.0                                                                            | 32.2                        | 90                    |                                                                                     |
| 180 min Winter                                              | 25.065              | 0.0                                                                            | 36.0                        | 126                   |                                                                                     |
| 240 min Winter                                              | 20.180              | 0.0                                                                            | 38.6                        | 162                   |                                                                                     |
| 360 min Winter                                              | 14.839              | 0.0                                                                            | 42.6                        | 230                   |                                                                                     |
| 480 min Winter                                              | 11.923              | 0.0                                                                            | 45.7                        | 296                   |                                                                                     |
| 600 min Winter                                              | 10.054              | 0.0                                                                            | 48.1                        | 360                   |                                                                                     |
| 720 min Winter                                              | 8.741               | 0.0                                                                            | 50.2                        | 422                   |                                                                                     |
| 960 min Winter                                              | 7.003               | 0.0                                                                            | 53.6                        | 542                   |                                                                                     |
| 1440 min Winter                                             | 5.114               | 0.0                                                                            | 58.8                        | 780                   |                                                                                     |
| 2160 min Winter                                             | 3.727               | 0.0                                                                            | 64.2                        | 1144                  |                                                                                     |
| 2880 min Winter                                             | 2.973               | 0.0                                                                            | 68.3                        | 1468                  |                                                                                     |
| 4320 min Winter                                             | 2.159               | 0.0                                                                            | 74.4                        | 2192                  |                                                                                     |
| 5760 min Winter                                             | 1.718               | 0.0                                                                            | 79.0                        | 2880                  |                                                                                     |
| 7200 min Winter                                             | 1.438               | 0.0                                                                            | 82.6                        | 3560                  |                                                                                     |
| 8640 min Winter                                             | 1.245               | 0.0                                                                            | 85.8                        | 4384                  |                                                                                     |
| 10080 min Winter                                            | 1.102               | 0.0                                                                            | 88.6                        | 5136                  |                                                                                     |
| ©1982-2017 XP Solutions                                     |                     |                                                                                |                             |                       |                                                                                     |

|                                                       |                                                                                |                                                                                     |
|-------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Bellamy Roberts                                       |                                                                                | Page 3                                                                              |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU | Premier Coastal Properties Ltd<br>Warblington Road, Emsworth<br>Storage Tank 2 |  |
| Date 20/05/2020<br>File 100YRS ST2.SRCX               | Designed by JCB<br>Checked by MT                                               |                                                                                     |
| XP Solutions Source Control 2017.1                    |                                                                                |                                                                                     |

Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.200            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

Time Area Diagram

Total Area (ha) 0.057

|                    |             |
|--------------------|-------------|
| <b>Time (mins)</b> | <b>Area</b> |
| <b>From: To:</b>   | <b>(ha)</b> |
| 0      4           | 0.057       |

©1982-2017 XP Solutions

|                                                       |                                                                                |                                                                                     |
|-------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Bellamy Roberts                                       |                                                                                | Page 4                                                                              |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU | Premier Coastal Properties Ltd<br>Warblington Road, Emsworth<br>Storage Tank 2 |  |
| Date 20/05/2020<br>File 100YRS ST2.SRCX               | Designed by JCB<br>Checked by MT                                               |                                                                                     |
| XP Solutions Source Control 2017.1                    |                                                                                |                                                                                     |

Model Details

Storage is Online Cover Level (m) 4.800

Tank or Pond Structure

Invert Level (m) 2.800

| Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------|------------------------|-----------|------------------------|-----------|------------------------|
| 0.000     | 20.0                   | 1.000     | 20.0                   | 1.100     | 0.0                    | 2.000     | 0.0                    |

Hydro-Brake® Optimum Outflow Control

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SCU-0058-3500-1000-3500 |
| Design Head (m)                   | 1.000                      |
| Design Flow (l/s)                 | 3.5                        |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Linear discharge profile   |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 58                         |
| Invert Level (m)                  | 2.800                      |
| Minimum Outlet Pipe Diameter (mm) | 75                         |
| Suggested Manhole Diameter (mm)   | 1200                       |

| Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|
| Design Point (Calculated) | 1.000    | 3.5        |
| Flush-Flo™                | 0.078    | 1.2        |
| Kick-Flo®                 | 0.086    | 1.2        |
| Mean Flow over Head Range | -        | 2.4        |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100     | 1.2        | 1.200     | 3.8        | 3.000     | 5.9        | 7.000     | 8.8        |
| 0.200     | 1.7        | 1.400     | 4.1        | 3.500     | 6.3        | 7.500     | 9.1        |
| 0.300     | 2.0        | 1.600     | 4.4        | 4.000     | 6.7        | 8.000     | 9.3        |
| 0.400     | 2.3        | 1.800     | 4.6        | 4.500     | 7.1        | 8.500     | 9.6        |
| 0.500     | 2.5        | 2.000     | 4.8        | 5.000     | 7.5        | 9.000     | 9.9        |
| 0.600     | 2.8        | 2.200     | 5.1        | 5.500     | 7.8        | 9.500     | 10.1       |
| 0.800     | 3.2        | 2.400     | 5.3        | 6.000     | 8.1        |           |            |
| 1.000     | 3.5        | 2.600     | 5.5        | 6.500     | 8.5        |           |            |

©1982-2017 XP Solutions

|                                                             |                     |                                                                                |                             |                       |                                                                                     |
|-------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------|-----------------------------|-----------------------|-------------------------------------------------------------------------------------|
| Bellamy Roberts                                             |                     |                                                                                |                             | Page 1                |                                                                                     |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU       |                     | Premier Coastal Properties Ltd<br>Warblington Road, Emsworth<br>Storage Tank 3 |                             |                       |  |
| Date 20/05/2020<br>File 100YRS ST3.SRCX                     |                     | Designed by JCB<br>Checked by MT                                               |                             |                       |                                                                                     |
| XP Solutions                                                |                     | Source Control 2017.1                                                          |                             |                       |                                                                                     |
| <u>Summary of Results for 100 year Return Period (+40%)</u> |                     |                                                                                |                             |                       |                                                                                     |
| Storm<br>Event                                              | Max<br>Level<br>(m) | Max<br>Depth<br>(m)                                                            | Max<br>Control<br>(l/s)     | Max<br>Volume<br>(m³) | Status                                                                              |
| 15 min Summer                                               | 2.515               | 0.515                                                                          | 2.9                         | 25.7                  | O K                                                                                 |
| 30 min Summer                                               | 2.663               | 0.663                                                                          | 3.3                         | 33.2                  | O K                                                                                 |
| 60 min Summer                                               | 2.784               | 0.784                                                                          | 3.6                         | 39.2                  | O K                                                                                 |
| 120 min Summer                                              | 2.845               | 0.845                                                                          | 3.7                         | 42.2                  | O K                                                                                 |
| 180 min Summer                                              | 2.853               | 0.853                                                                          | 3.7                         | 42.7                  | O K                                                                                 |
| 240 min Summer                                              | 2.841               | 0.841                                                                          | 3.7                         | 42.1                  | O K                                                                                 |
| 360 min Summer                                              | 2.801               | 0.801                                                                          | 3.6                         | 40.1                  | O K                                                                                 |
| 480 min Summer                                              | 2.756               | 0.756                                                                          | 3.5                         | 37.8                  | O K                                                                                 |
| 600 min Summer                                              | 2.712               | 0.712                                                                          | 3.4                         | 35.6                  | O K                                                                                 |
| 720 min Summer                                              | 2.671               | 0.671                                                                          | 3.3                         | 33.5                  | O K                                                                                 |
| 960 min Summer                                              | 2.596               | 0.596                                                                          | 3.1                         | 29.8                  | O K                                                                                 |
| 1440 min Summer                                             | 2.477               | 0.477                                                                          | 2.8                         | 23.9                  | O K                                                                                 |
| 2160 min Summer                                             | 2.354               | 0.354                                                                          | 2.5                         | 17.7                  | O K                                                                                 |
| 2880 min Summer                                             | 2.271               | 0.271                                                                          | 2.2                         | 13.6                  | O K                                                                                 |
| 4320 min Summer                                             | 2.172               | 0.172                                                                          | 1.8                         | 8.6                   | O K                                                                                 |
| 5760 min Summer                                             | 2.116               | 0.116                                                                          | 1.5                         | 5.8                   | O K                                                                                 |
| 7200 min Summer                                             | 2.080               | 0.080                                                                          | 1.4                         | 4.0                   | O K                                                                                 |
| 8640 min Summer                                             | 2.068               | 0.068                                                                          | 1.2                         | 3.4                   | O K                                                                                 |
| 10080 min Summer                                            | 2.060               | 0.060                                                                          | 1.1                         | 3.0                   | O K                                                                                 |
| 15 min Winter                                               | 2.579               | 0.579                                                                          | 3.1                         | 28.9                  | O K                                                                                 |
| 30 min Winter                                               | 2.749               | 0.749                                                                          | 3.5                         | 37.5                  | O K                                                                                 |
| Storm<br>Event                                              | Rain<br>(mm/hr)     | Flooded<br>Volume<br>(m³)                                                      | Discharge<br>Volume<br>(m³) | Time-Peak<br>(mins)   |                                                                                     |
| 15 min Summer                                               | 126.074             | 0.0                                                                            | 27.6                        | 18                    |                                                                                     |
| 30 min Summer                                               | 84.745              | 0.0                                                                            | 37.1                        | 32                    |                                                                                     |
| 60 min Summer                                               | 54.368              | 0.0                                                                            | 47.7                        | 60                    |                                                                                     |
| 120 min Summer                                              | 33.674              | 0.0                                                                            | 59.1                        | 98                    |                                                                                     |
| 180 min Summer                                              | 25.065              | 0.0                                                                            | 66.0                        | 130                   |                                                                                     |
| 240 min Summer                                              | 20.180              | 0.0                                                                            | 70.8                        | 166                   |                                                                                     |
| 360 min Summer                                              | 14.839              | 0.0                                                                            | 78.1                        | 234                   |                                                                                     |
| 480 min Summer                                              | 11.923              | 0.0                                                                            | 83.7                        | 302                   |                                                                                     |
| 600 min Summer                                              | 10.054              | 0.0                                                                            | 88.2                        | 370                   |                                                                                     |
| 720 min Summer                                              | 8.741               | 0.0                                                                            | 92.0                        | 436                   |                                                                                     |
| 960 min Summer                                              | 7.003               | 0.0                                                                            | 98.3                        | 566                   |                                                                                     |
| 1440 min Summer                                             | 5.114               | 0.0                                                                            | 107.7                       | 820                   |                                                                                     |
| 2160 min Summer                                             | 3.727               | 0.0                                                                            | 117.7                       | 1188                  |                                                                                     |
| 2880 min Summer                                             | 2.973               | 0.0                                                                            | 125.2                       | 1532                  |                                                                                     |
| 4320 min Summer                                             | 2.159               | 0.0                                                                            | 136.3                       | 2248                  |                                                                                     |
| 5760 min Summer                                             | 1.718               | 0.0                                                                            | 144.7                       | 2952                  |                                                                                     |
| 7200 min Summer                                             | 1.438               | 0.0                                                                            | 151.4                       | 3672                  |                                                                                     |
| 8640 min Summer                                             | 1.245               | 0.0                                                                            | 157.3                       | 4400                  |                                                                                     |
| 10080 min Summer                                            | 1.102               | 0.0                                                                            | 162.4                       | 5136                  |                                                                                     |
| 15 min Winter                                               | 126.074             | 0.0                                                                            | 30.9                        | 18                    |                                                                                     |
| 30 min Winter                                               | 84.745              | 0.0                                                                            | 41.6                        | 32                    |                                                                                     |
| ©1982-2017 XP Solutions                                     |                     |                                                                                |                             |                       |                                                                                     |

|                                                             |                     |                                                                                |                             |                       |                                                                                     |
|-------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------|-----------------------------|-----------------------|-------------------------------------------------------------------------------------|
| Bellamy Roberts                                             |                     |                                                                                |                             | Page 2                |                                                                                     |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU       |                     | Premier Coastal Properties Ltd<br>Warblington Road, Emsworth<br>Storage Tank 3 |                             |                       |  |
| Date 20/05/2020<br>File 100YRS ST3.SRCX                     |                     | Designed by JCB<br>Checked by MT                                               |                             |                       |                                                                                     |
| XP Solutions                                                |                     | Source Control 2017.1                                                          |                             |                       |                                                                                     |
| <u>Summary of Results for 100 year Return Period (+40%)</u> |                     |                                                                                |                             |                       |                                                                                     |
| Storm<br>Event                                              | Max<br>Level<br>(m) | Max<br>Depth<br>(m)                                                            | Max<br>Control<br>(l/s)     | Max<br>Volume<br>(m³) | Status                                                                              |
| 60 min Winter                                               | 2.893               | 0.893                                                                          | 3.8                         | 44.6                  | O K                                                                                 |
| 120 min Winter                                              | 2.964               | 0.964                                                                          | 3.9                         | 48.2                  | O K                                                                                 |
| 180 min Winter                                              | 2.968               | 0.968                                                                          | 3.9                         | 48.4                  | O K                                                                                 |
| 240 min Winter                                              | 2.948               | 0.948                                                                          | 3.9                         | 47.4                  | O K                                                                                 |
| 360 min Winter                                              | 2.885               | 0.885                                                                          | 3.8                         | 44.3                  | O K                                                                                 |
| 480 min Winter                                              | 2.817               | 0.817                                                                          | 3.6                         | 40.9                  | O K                                                                                 |
| 600 min Winter                                              | 2.751               | 0.751                                                                          | 3.5                         | 37.6                  | O K                                                                                 |
| 720 min Winter                                              | 2.690               | 0.690                                                                          | 3.4                         | 34.5                  | O K                                                                                 |
| 960 min Winter                                              | 2.585               | 0.585                                                                          | 3.1                         | 29.2                  | O K                                                                                 |
| 1440 min Winter                                             | 2.427               | 0.427                                                                          | 2.7                         | 21.4                  | O K                                                                                 |
| 2160 min Winter                                             | 2.281               | 0.281                                                                          | 2.2                         | 14.0                  | O K                                                                                 |
| 2880 min Winter                                             | 2.194               | 0.194                                                                          | 1.9                         | 9.7                   | O K                                                                                 |
| 4320 min Winter                                             | 2.104               | 0.104                                                                          | 1.4                         | 5.2                   | O K                                                                                 |
| 5760 min Winter                                             | 2.068               | 0.068                                                                          | 1.2                         | 3.4                   | O K                                                                                 |
| 7200 min Winter                                             | 2.057               | 0.057                                                                          | 1.0                         | 2.9                   | O K                                                                                 |
| 8640 min Winter                                             | 2.051               | 0.051                                                                          | 0.9                         | 2.5                   | O K                                                                                 |
| 10080 min Winter                                            | 2.046               | 0.046                                                                          | 0.8                         | 2.3                   | O K                                                                                 |
| Storm<br>Event                                              | Rain<br>(mm/hr)     | Flooded<br>Volume<br>(m³)                                                      | Discharge<br>Volume<br>(m³) | Time-Peak<br>(mins)   |                                                                                     |
| 60 min Winter                                               | 54.368              | 0.0                                                                            | 53.4                        | 60                    |                                                                                     |
| 120 min Winter                                              | 33.674              | 0.0                                                                            | 66.2                        | 112                   |                                                                                     |
| 180 min Winter                                              | 25.065              | 0.0                                                                            | 73.9                        | 140                   |                                                                                     |
| 240 min Winter                                              | 20.180              | 0.0                                                                            | 79.3                        | 178                   |                                                                                     |
| 360 min Winter                                              | 14.839              | 0.0                                                                            | 87.5                        | 254                   |                                                                                     |
| 480 min Winter                                              | 11.923              | 0.0                                                                            | 93.7                        | 326                   |                                                                                     |
| 600 min Winter                                              | 10.054              | 0.0                                                                            | 98.8                        | 396                   |                                                                                     |
| 720 min Winter                                              | 8.741               | 0.0                                                                            | 103.1                       | 464                   |                                                                                     |
| 960 min Winter                                              | 7.003               | 0.0                                                                            | 110.1                       | 598                   |                                                                                     |
| 1440 min Winter                                             | 5.114               | 0.0                                                                            | 120.6                       | 852                   |                                                                                     |
| 2160 min Winter                                             | 3.727               | 0.0                                                                            | 131.8                       | 1212                  |                                                                                     |
| 2880 min Winter                                             | 2.973               | 0.0                                                                            | 140.2                       | 1560                  |                                                                                     |
| 4320 min Winter                                             | 2.159               | 0.0                                                                            | 152.7                       | 2288                  |                                                                                     |
| 5760 min Winter                                             | 1.718               | 0.0                                                                            | 162.1                       | 2936                  |                                                                                     |
| 7200 min Winter                                             | 1.438               | 0.0                                                                            | 169.6                       | 3648                  |                                                                                     |
| 8640 min Winter                                             | 1.245               | 0.0                                                                            | 176.2                       | 4344                  |                                                                                     |
| 10080 min Winter                                            | 1.102               | 0.0                                                                            | 181.9                       | 5136                  |                                                                                     |
| ©1982-2017 XP Solutions                                     |                     |                                                                                |                             |                       |                                                                                     |

|                                                       |                                                                                |                                                                                     |
|-------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Bellamy Roberts                                       |                                                                                | Page 3                                                                              |
| Clover House<br>Western Lane<br>Odiham Hants RG29 1TU | Premier Coastal Properties Ltd<br>Warblington Road, Emsworth<br>Storage Tank 3 |  |
| Date 20/05/2020<br>File 100YRS ST3.SRCX               | Designed by JCB<br>Checked by MT                                               |                                                                                     |
| XP Solutions Source Control 2017.1                    |                                                                                |                                                                                     |

Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.200            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

Time Area Diagram

Total Area (ha) 0.117

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |
| 0           | 4 0.117  |

©1982-2017 XP Solutions

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            |                                |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------|------------|-----------|------------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-------|------|-------|------|-------|-----|-------|-----|----------------|----------|------------|---------------------------|-------|-----|------------|-------|-----|-----------|-------|-----|---------------------------|---|-----|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|-------|------|-------|-----|-------|-----|-------|-----|--|--|-------|-----|-------|-----|-------|-----|--|--|
| Bellamy Roberts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            |                                |            | Page 4    |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Clover House                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            | Premier Coastal Properties Ltd |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Western Lane                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            | Warblington Road, Emsworth     |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Odiham Hants RG29 1TU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            | Storage Tank 3                 |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Date 20/05/2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            | Designed by JCB                |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| File 100YRS ST3.SRCX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            | Checked by MT                  |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            | Source Control 2017.1          |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| <div>Model Details</div> <div>Storage is Online Cover Level (m) 4.000</div> <div>Tank or Pond Structure</div> <div>Invert Level (m) 2.000</div> <table><tr><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td></tr><tr><td>0.000</td><td>50.0</td><td>1.000</td><td>50.0</td><td>1.100</td><td>0.0</td><td>2.000</td><td>0.0</td></tr></table> <div>Hydro-Brake® Optimum Outflow Control</div> <div>Unit Reference MD-SCU-0062-4000-1000-4000</div> <div>Design Head (m) 1.000</div> <div>Design Flow (l/s) 4.0</div> <div>Flush-Flo™ Calculated</div> <div>Objective Linear discharge profile</div> <div>Application Surface</div> <div>Sump Available Yes</div> <div>Diameter (mm) 62</div> <div>Invert Level (m) 2.000</div> <div>Minimum Outlet Pipe Diameter (mm) 75</div> <div>Suggested Manhole Diameter (mm) 1200</div> <table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>1.000</td><td>4.0</td></tr><tr><td>Flush-Flo™</td><td>0.089</td><td>1.4</td></tr><tr><td>Kick-Flo®</td><td>0.093</td><td>1.4</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>2.7</td></tr></table> <p>The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated</p> <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>1.4</td><td>1.200</td><td>4.4</td><td>3.000</td><td>6.7</td><td>7.000</td><td>10.0</td></tr><tr><td>0.200</td><td>1.9</td><td>1.400</td><td>4.7</td><td>3.500</td><td>7.2</td><td>7.500</td><td>10.4</td></tr><tr><td>0.300</td><td>2.3</td><td>1.600</td><td>5.0</td><td>4.000</td><td>7.7</td><td>8.000</td><td>10.7</td></tr><tr><td>0.400</td><td>2.6</td><td>1.800</td><td>5.3</td><td>4.500</td><td>8.1</td><td>8.500</td><td>11.0</td></tr><tr><td>0.500</td><td>2.9</td><td>2.000</td><td>5.5</td><td>5.000</td><td>8.5</td><td>9.000</td><td>11.3</td></tr><tr><td>0.600</td><td>3.2</td><td>2.200</td><td>5.8</td><td>5.500</td><td>8.9</td><td>9.500</td><td>11.6</td></tr><tr><td>0.800</td><td>3.6</td><td>2.400</td><td>6.0</td><td>6.000</td><td>9.3</td><td></td><td></td></tr><tr><td>1.000</td><td>4.0</td><td>2.600</td><td>6.3</td><td>6.500</td><td>9.7</td><td></td><td></td></tr></table> |            |                                |            |           |            | Depth (m) | Area (m²)  | Depth (m) | Area (m²) | Depth (m) | Area (m²) | Depth (m) | Area (m²) | 0.000 | 50.0 | 1.000 | 50.0 | 1.100 | 0.0 | 2.000 | 0.0 | Control Points | Head (m) | Flow (l/s) | Design Point (Calculated) | 1.000 | 4.0 | Flush-Flo™ | 0.089 | 1.4 | Kick-Flo® | 0.093 | 1.4 | Mean Flow over Head Range | - | 2.7 | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | 0.100 | 1.4 | 1.200 | 4.4 | 3.000 | 6.7 | 7.000 | 10.0 | 0.200 | 1.9 | 1.400 | 4.7 | 3.500 | 7.2 | 7.500 | 10.4 | 0.300 | 2.3 | 1.600 | 5.0 | 4.000 | 7.7 | 8.000 | 10.7 | 0.400 | 2.6 | 1.800 | 5.3 | 4.500 | 8.1 | 8.500 | 11.0 | 0.500 | 2.9 | 2.000 | 5.5 | 5.000 | 8.5 | 9.000 | 11.3 | 0.600 | 3.2 | 2.200 | 5.8 | 5.500 | 8.9 | 9.500 | 11.6 | 0.800 | 3.6 | 2.400 | 6.0 | 6.000 | 9.3 |  |  | 1.000 | 4.0 | 2.600 | 6.3 | 6.500 | 9.7 |  |  |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Area (m²)  | Depth (m)                      | Area (m²)  | Depth (m) | Area (m²)  | Depth (m) | Area (m²)  |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 50.0       | 1.000                          | 50.0       | 1.100     | 0.0        | 2.000     | 0.0        |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Control Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Head (m)   | Flow (l/s)                     |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Design Point (Calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.000      | 4.0                            |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.089      | 1.4                            |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Kick-Flo®                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.093      | 1.4                            |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Mean Flow over Head Range                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | -          | 2.7                            |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Flow (l/s) | Depth (m)                      | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.4        | 1.200                          | 4.4        | 3.000     | 6.7        | 7.000     | 10.0       |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.9        | 1.400                          | 4.7        | 3.500     | 7.2        | 7.500     | 10.4       |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2.3        | 1.600                          | 5.0        | 4.000     | 7.7        | 8.000     | 10.7       |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2.6        | 1.800                          | 5.3        | 4.500     | 8.1        | 8.500     | 11.0       |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2.9        | 2.000                          | 5.5        | 5.000     | 8.5        | 9.000     | 11.3       |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3.2        | 2.200                          | 5.8        | 5.500     | 8.9        | 9.500     | 11.6       |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 0.800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3.6        | 2.400                          | 6.0        | 6.000     | 9.3        |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| 1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4.0        | 2.600                          | 6.3        | 6.500     | 9.7        |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |
| ©1982-2017 XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                                |            |           |            |           |            |           |           |           |           |           |           |       |      |       |      |       |     |       |     |                |          |            |                           |       |     |            |       |     |           |       |     |                           |   |     |           |            |           |            |           |            |           |            |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |       |      |       |     |       |     |       |     |  |  |       |     |       |     |       |     |  |  |



Clover House  
Western Lane  
Odiham  
Hampshire  
RG29 1TU  
Tel: 01256 703355



Reg No OC303725. Registered Office: Clover House, Western Lane, Odiham, Hampshire RG29 1TU

**Partner:**  
IT Roberts MCIHT  
**Associate Partner:**  
MJ Twinberrow BEng  
**Consultant:**  
GD Bellamy BSc CEng MICE

Bellamy Roberts LLP (trading as  
Bellamy Roberts) is a Limited Liability  
Partnership registered in England.



## Jeremy Farrelly

---

**From:** Norton, Tristan <Tristan.Norton@hants.gov.uk>  
**Sent:** 26 July 2019 08:26  
**To:** Adrian Meurer  
**Subject:** RE: Site at: "Fowley Cottage", 46 Warblington Road, Emsworth PO10 7HH

Hi Adrian,

Yes, I can confirm that for the Fowley Cottage site I would not expect bespoke wader and brent goose surveys to be carried out – your information justifies this. The site is not in very close proximity to any of the known wintering bird supporting habitat sites as shown in the latest SWBGS. For information, [this link](#) is the latest iteration of the Strategy and shows the current status of each site (the old classification system from the 2010 Strategy – important, uncertain etc. - is now defunct).

The site itself is unlikely to support SPA bird species. However, the application site is within close proximity to Chichester & Langstone Harbours SPA/Ramsar, Solent Maritime SAC and Chichester Harbour SSSI and so any planning submission will of course need to include an analysis of potential direct and indirect sources of impact. This will entail the submission of information sufficient to allow the LPA to undertake a Habitats Regulations Assessment.

Recreational disturbance impacts will be covered by a contribution to the Solent Recreation Mitigation Strategy, in accordance with local planning policy. Construction-phase impacts such as noise, dust, light and waterborne pollution will need to be addressed in detail within any future submission, and ultimately avoidance and mitigation will be secured through a CEMP.

In accordance with a recent CJEU judgement and Natural England advice, the issue of nutrient neutrality will need to be addressed.

I hope this assists. If you have any queries please don't hesitate to contact me.

Kind regards,

Tristan

**Tristan Norton**

**Senior Ecologist  
Ecology Team**

Specialist Environment Services  
Economy, Transport and Environment Department  
Hampshire County Council  
Elizabeth II Court West  
The Castle, Winchester  
Hampshire SO23 8UD  
Direct Line: 01962 832335  
E-mail: [tristan.norton@hants.gov.uk](mailto:tristan.norton@hants.gov.uk); [www.hants.gov.uk/biodiversity](http://www.hants.gov.uk/biodiversity)



**Hampshire Services offers a range of professional consultancy services to partner organisations.** Specialist Environment Services provides data, advice and assessments for ecology, heritage and landscape.

[www.hants.gov.uk/sharedexpertise](http://www.hants.gov.uk/sharedexpertise)



Please consider the environment before printing this email.

**From:** Adrian Meurer <am@hda-enviro.co.uk>

**Sent:** 25 July 2019 21:06

**To:** Norton, Tristan <Tristan.Norton@hants.gov.uk>

**Subject:** RE: Site at: "Fowley Cottage", 46 Warblington Road, Emsworth PO10 7HH

Hi Tristan

Many thanks for returning my call earlier this week to discuss whether a wintering bird survey is required in support of the application for 6 dwellings at Fowley Cottage, 46 Warblington Road, Emsworth.

As discussed, despite an Ecological Appraisal of the site (ECOSA 2015) having identified the site as having only low/negligible risk of supporting wintering bird species associated with the SPA, and that it is '*extremely unlikely*' that the site is of any importance to Brent Geese and waders associated with the off-site SPA, I am concerned that a recommendation has been carried forward in EcoSupport's May 2019 draft report for a wintering bird survey in support of the current planning application which is pending determination.

ECOSA reached their conclusion that the site was '*extremely unlikely*' to be of any importance to Brent Geese and waders on the basis of an analysis of the habitat present and its urban context (with which I agree) and a desk study including retrieval of records from the Brent Goose and Waders Strategy, which appeared not include any records for the site.

I have looked at further evidence in this regard, with the benefit of experience gained through carrying out several Brent Goose and waders surveys of arable land, golf courses, caravan parks etc in and around Chichester and Langstone Harbours SPA myself, and of course being a keen birder. This further evidence includes:

- ☐ The Solent Brent Goose and Wader Strategy data does not identify the site as being of current or potential future value for Brent Geese and Waders (see attached plans).
- ☐ The applicant has lived in the property for 25 years and the property has been in his family for 65 years. Neither he nor his family have ever recorded Brent Geese or waders at the site (see email below);
- ☐ The paddock area (i.e. the open grassland) is rented by a sheep dog trainer. She has used the paddock on an almost daily basis throughout the year for the past 20 years and has never recorded Brent Geese or Waders as being present. The trainer is familiar with Brent Geese and waders having lived on the foreshore for 50 years. An email from the dog trainer dated 13/7/2019 stating this is attached.
- ☐ The applicant has also provided a letter from Anne de Poitier, Conservation Officer at the Chichester Harbour Conservancy dated 10/9/2001 which confirms that she is confident that the site is not used by wintering wildfowl.

The draft Ecosupport document does not appear to include consideration of the above factors to determine the likely significance of the site in relation to bird species for which the SPA is designated prior to recommending the wintering bird survey.

Given the above considerations and that a planning application is currently pending determination, I consider that delay or refusal of the application in the absence of a wintering bird survey is somewhat disproportionate to the

matter at hand, as a likely significant effect on the SPA as a result of loss of land to the proposed development is extremely unlikely to occur, either alone or in combination with other plans or projects.

Notwithstanding this, although no effect on the SPA would be expected to occur as a result of loss of land to the development, in accordance with Ecosupport's advice it would still be necessary to make a contribution towards the Solent Brent Goose and Wader Strategy to manage potential cumulative effects of additional recreation arising as a result of the proposed development.

I would be grateful if you could confirm whether you support my opinion that a wintering bird survey is not required in this instance prior to determination of the application, and that subject to a proportionate contribution towards the Solent Brent Goose and Wader Strategy no likely significant effect on the SPA would be expected to arise.

Thank you again for your time in considering this matter. Please do not hesitate to get in touch with any questions you may have.

Best regards

Adrian

Adrian Meurer MCIEEM

Director

**hankinson duckett associates**

The Stables, Howbery Park, Benson Lane, Wallingford, Oxfordshire, OX10 8BA  
t 01491 838175 w [www.hda-enviro.co.uk](http://www.hda-enviro.co.uk)

**From:** Charles Glanville <[charlesglanville@mail.com](mailto:charlesglanville@mail.com)>

**Sent:** 03 July 2019 17:24

**To:** Adrian Meurer <[am@hda-enviro.co.uk](mailto:am@hda-enviro.co.uk)>

**Subject:** Site at: "Fowley Cottage", 46 Warblington Road, Emsworth PO10 7HH

Dear Adrian

Good to speak yesterday.

Attached are 2 Ecology reports, site plan from the planning application, and aerial view.

An application for planning for 6 new build houses and keeping the existing house was 'validated' by Havant Borough Council on 21<sup>st</sup> June. I am planning to carry out the development myself, having bought out other family members. We would like to remove the requirement for an overwintering migratory bird survey which would delay the application.

There is a busy public footpath along the southern border of the site where it joins Chichester Harbour Conservancy land and the SSSI. The field here has been used by a neighbour, Gene Howell, to train sheep dogs for at least the last 10 years. She has an informal license in exchange for maintaining the grass.

My parents bought Fowley Cottage about 65 years ago. We have always been conscious of the arrival and departure of the Brent Geese, but certainly never seen any in the field .

I would appreciate your views.

Many thanks

Charles

21<sup>st</sup> June

Click [here](#) to report this email as spam.

This message has been scanned for malware by Websense. [www.websense.com](http://www.websense.com)



# Pre-Submission Consultation Summary: Main Issues raised

November 2019



# Contents

|                                                                                    |           |
|------------------------------------------------------------------------------------|-----------|
| <b>1. INTRODUCTION .....</b>                                                       | <b>1</b>  |
| Purpose and content of this report .....                                           | 1         |
| <b>2. THE PRE-SUBMISSION (REGULATION 19) CONSULTATION .....</b>                    | <b>2</b>  |
| Approval of the Pre-Submission Local Plan .....                                    | 2         |
| Who was consulted and how? .....                                                   | 2         |
| Responses Received .....                                                           | 3         |
| <b>3. MAIN ISSUES: LEGAL COMPLIANCE .....</b>                                      | <b>4</b>  |
| Procedural.....                                                                    | 4         |
| Duty to cooperate.....                                                             | 4         |
| Habitat Regulations Assessment .....                                               | 4         |
| Consultation and compliance with the Statement of Community Involvement (SCI)..... | 5         |
| <b>4. MAIN ISSUES: SOUNDNESS.....</b>                                              | <b>6</b>  |
| Development strategy – Meeting Need .....                                          | 6         |
| Land not included in the plan .....                                                | 7         |
| Development on Hayling Island.....                                                 | 8         |
| Nutrient Neutral Development .....                                                 | 10        |
| Approach to Solent Waders and Brent Geese .....                                    | 10        |
| Key Projects.....                                                                  | 12        |
| Infrastructure .....                                                               | 14        |
| The Environment .....                                                              | 15        |
| Housing .....                                                                      | 19        |
| Commercial Development.....                                                        | 20        |
| Development Allocations: Emsworth .....                                            | 21        |
| Development Allocations: Havant & Bedhampton .....                                 | 22        |
| Development Allocations: Hayling Island .....                                      | 25        |
| Development Allocations: Leigh Park .....                                          | 26        |
| Development Allocations: Waterlooville .....                                       | 26        |
| <b>5. NEXT STEPS.....</b>                                                          | <b>28</b> |

# 1. Introduction

## Purpose and content of this report

- 1.1 In accordance with Regulation 22 (subsection c.v.) of The Town and Country Planning (Local Planning) (England) Regulations 2012 (as amended), this document sets out the number of representations made on the Council's Proposed Submission Local Plan and provides a summary of the main issues raised in those representations.
- 1.2 The report does not cover all of the issues that were raised during the consultation on the Pre-Submission Local Plan. Rather, it gives a summary of the main issues, focussing on those that go to the heart of the soundness or the legal compliance either of the Local Plan as a whole, a specific policy, the evidence base, or the process the council has followed to arrive at the draft plan.
- 1.3 These summaries allow the reader to determine quickly the key remaining questions regarding the plan's legal compliance and soundness. These are likely to form the matters that will be questioned and discussed during the plan's examination.
- 1.4 This does not imply that other comments have been disregarded. The council has thoroughly reviewed all comments received, and where appropriate has suggested amendments to the plan in its schedule of proposed changes, which will be submitted to the inspector along with the full consultation responses.

1.153 No main issues raised.

## **C6 | Local centres, local shops and services**

1.154 No main issues raised.

## **C7 | Protection of existing community facilities and shops**

1.155 The policy should make explicit reference to it being applicable to cultural facilities which may include sui generis uses (for consistency with NPPF paragraph 92).

## **C8 | Food, drink and entertainment uses**

1.156 Object to the policy on the basis that there have been no assessments of demand or need for hot food takeaways; the impact on jobs, accessibility, choice, vitality and viability; and what concentrations might be acceptable Borough wide having regard to catchments and town centres.

1.157 Support for policy but reference to use of menu sampling conditions would have an unacceptable impact on business and would take an inconsistent approach to different types of food operations.

## **Development Allocations: Emsworth**

### **H8 | Land north of Long Copse Lane**

Objection to the allocation, broadly covering:

- The site is in an isolated, sensitive, unsustainable location;
- The site yield is not needed for the Council to meet its housing target;
- Development here would be detrimental to the landscape / the rural character of this part of the borough, and would have an impact on the South Downs National Park;
- Unacceptable impacts on transport and social infrastructure of surrounding area; as well as road safety;
- Unacceptable impact on habitats and biodiversity, in particular the wildlife corridors from the South Downs National Park to Chichester Harbour AONB;
- Increased flood risk.

1.158 **West Sussex County Council** considers that the quantum of development should be based on drainage capacity.

1.159 The Landscape Study is inconsistent in its consideration of land parcels at site H8.

### **H9 | Land at Selangor Avenue**

No main issues raised.

### **H10 | Land west of Coldharbour Farm**

No main issues raised.

### **H11 | Gas Site, Palmer's Road**

No main issues raised.

### **H12 | Emsworth Victoria Cottage Hospital**

No main issues raised.

### **H13 | Fowley Cottage**

- 1.160 **Chichester Harbour Conservancy** considers that the proposal constitutes a major development just outside the AONB, which will affect the character and setting of the protected landscape.
- 1.161 Other representations also object to the scale of development proposed on the allocation, and the increase from 7 dwellings in the Draft Local Plan to 40 dwellings in the Pre-Submission Local Plan; concerns are related to:
- the developable area likely to be restricted due to flood risk and aquifers which underlie the site;
  - restricted access and highway safety;
  - significant extra car parking associated with improved/new access to coastal path;
  - impact on mature and protected trees;
  - impact on local infrastructure;
  - the loss of open space / greenfield site.

### **C9 | Interbridges West**

- 1.162 Potential conflict between allocation here and need to safeguard land for A27 junction, calling into question deliverability of one or the other.

## Development Allocations: Havant & Bedhampton

### **H14 | Forty Acres**

- 1.163 **Highways England** acknowledge the current planning application, and discussions between the applicant, Havant Borough Council and Hampshire County Council regarding a suitable potential mitigation package to integrate pedestrian and cycle routes between the development and the Rusty Cutter roundabout and ensure the safe and efficient operation of the strategic and local road networks are maintained for all road users.
- 1.164 The site promoter is supportive of the policy but does not consider that mitigation for Solent and Waders should be provided pre-development, but the first winter season following commencement of development. They also consider that parts of the policy should be more positively worded. Wording changes proposed.
- 1.165 Other main issues raised:
- concerns around further traffic in this area; highway safety and school children having to walk/cycle to school; and highway improvements needed around the Rusty Cutter roundabout;
  - concern about noise and air pollution both to future occupants and caused by development; impact on residents' health and wellbeing.
  - Impact on wildlife and ecology; site should be designated as a Primary Support Area for Brent Geese and Waders; and loss of protected wildlife including bats.