Lesley and Mark Richardson
The Grange
Short Street Chillenden
CT3 1PR

16 October 2023

Dear Sir/Madam,

Hearing Statement

Please accept this letter as our hearing statement in relation to the examination of the Dover Local Plan.

We consider the Local Plan review to be unsound due to the inclusion of SAP50 land adjacent to Short Street, Chillenden (GOO006). The reasons for our representation are set out below.

Soundness

The Plan has not adequately considered the following when including (GOO006):

Findings from the sustainability appraisal in which Chillenden scores "significant negative effect". The appraisal appears to have disregarded:

- Sustainable Transport
- Resources,
- Flood risk
- Historic environment

1. Location

1.1 SAP50 is 1 of only 3 sites identified by the Plan as suitable for the development of residential dwellings (executive style house). There does not appear to be any rationale as to why this type of dwelling is deemed suitable for the specified site, nor does the Plan identify how many executive homes are expected to be delivered overall by the Plan.

1.2 Chillenden is a small hamlet of 45 properties which has evolved around agricultural and rural uses over the centuries. It includes the original farmstead, converted farm barns and a number of older properties of which several are listed all developed within a rural context. The small number of newer properties (3 built within the last 40 years and 5 built in the late 70's) were developed on brownfield sites there by conserving the rural nature of the hamlet. The proposal of 5 executive houses on this site would have a detriment impact on the historical agricultural context of the village. SAP50 is on Source Protected Zone 2 and 3 Grade 1-2 agricultural land (SA Appendix F2022) and remains crop-producing to this day but further brownfield development opportunities remain within the hamlet.

1.3 There is an old cart track (The Lane) which runs from Short Street to Station Road through the proposed site and, until 1974, was the only means of vehicular access to the listed 13th century Grange (now named The Grange), whilst also providing vehicular access to Chillenden House and the garth, forming part of the glebe. The Lane, which is understood to be "unadopted" land, joins the road adjacent to 'The Glebe' (Station Road) and cuts through to Short Street.

1.4 Southern Water own a foul water pumping station on the perimeter of the proposed site and have a right of access along The Lane to the pumping station. Research is currently ongoing to obtain a

copy of the pipework and any relevant easements leading to and from the pumping station. It is more than likely there are technical easements the entire length of the lane and also directly across the middle of the site heading to the next foul pumping station at Rawling. The pumping station it should be noted, omits foul-smelling odours and any properties developed within the vicinity would be at risk of being developed within the pumping station odour zone.

1.5 The Lane has been utilised as a safe passage for pedestrians for generations. The Goodnestone Parish Council minutes often make comment about speeding in Chillenden and Station Road down from Knowlton to its junction with Goodnestone Road. The speed restriction on Station Road is 60 mph and there are no safety features for pedestrians, horse riders or cyclists (without climbing onto the bank or hedgerow), from passing cars or farm vehicles. Therefore, using The Lane provides a significant amount of safety to this group of road users.

1.6 Research has established that The Lane or Cart Track is clearly shown on all historic and current OS maps and on 'Mudges' map (which dates from the early 19th century). However, it is not shown as a 'public right of way' on the Definitive Map published by Kent County Council (KCC) who, I understand, are the highway authority. There is little doubt that it is an historic public right of way. Research is currently underway to establish if there is a mechanism for petitions to be made to the KCC for The Lane to be included on the Definitive Map.

1.7 The proposed site SAP50 is shown on the Dover District Council Local Plan as one area, but it should be shown as two distinct areas either side of The Lane. Or potentially three areas given the high degree of probability that the pumped foul drain from Rawling dissects the field diagonally. Additionally, one side of the potential site is within a Conservation Area which presumably restricts such development. Local residents of Chillenden and the Parish are concerned that The Lane would be "swallowed up" by any development.

2. Sustainable Transport

2.1 The Sustainability Assessment stated that SAP50 (GO006) generally had poorer access to a good range of local services and facilities and the district's sustainable transport network.

2.2 Since the Sustainability Assessment was published in 2022 the weekly bus service has now been withdrawn leaving no bus service to or from Chillenden. Therefore, it is argued that the assessment should be updated from Minor Negative to Significant Negative.

- The site is not within 2,000m of a railway station.
- The site is not within 300m of a bus stop.
- The site is not within 1,200m of an NHS GP Surgery.
- The site is not within 200m of a Public Right of Way/Cycle Path.
- The site is not within 1,200m of a primary or middle school.
- The site is not within 2,000m of a secondary school.
- The site is not within 2,000m of further/higher education facilities.
- The site is not within 2,000m of Strategic Employment Sites/Enterprise Zones.
- The site is not within 1,200m of a town centre.
- The site is within 300m of open space, sport, recreation facilities, open country or registered common land.

3. Resources

3.1 The key objective of the National Planning Policy Framework is a presumption in favour of sustainable development which is the fundamental basis for the assessment of applications. This involves economic, social and environmental considerations. The main aim of Policy SP1 is: "to develop sustainable communities and seek to ensure that adequate community facilities are

provided." The commission for Rural Communities' State of the Countryside document sets out key services which it perceives as being important to the sustainability of a rural community. These are:

- Banks
- Petrol Station/ car sales/repairs
- Shops
- Post Office
- GP surgeries
- Dentists

Sustainable communities are defined as those possessing a range of services and alternative modes of transport in order to minimise the daily use of the car.

3.2 Chillenden does not comply with this definition by virtue of the lack of facilities in the village. There are no community facilities other than the pub, the local church and village hall.

3.3 There are poor transport links to and from Chillenden. The weekly bus service has now been withdrawn leaving no bus service to or from Chillenden. There is a school bus, which travels along Short Street, that services the village daily during school terms.

3.4 There is very little employment within Chillenden meaning residents travel out of the area for work and as there is no public transport, residents depend upon the use of a private vehicle. This contributes to the number of vehicles within Chillenden and travelling on the district's road network, with resulting increased congestion and pollution.

3.5 To gain access to the nearest rural service centre at Aylesham, which has a wider range of facilities and a better bus service, involves a 1 hour walk along roads without pavements or lighting. The nearest local train station is located at either Snowdown or Aylesham both are equidistant from Chillenden (2-3 miles), and both have limited parking.

3.6 Chillenden has been identified in the small villages and hamlets category in the settlement hierarchy where windfall infill development would be acceptable in principle. To ensure any windfall schemes are integrated properly within Chillenden, any development proposals would need to show how it can complement Chillenden's existing settlement character in terms of its layout, design, scale, and appearance.

3.7 It is believed that the development of the site would:

- Create a significant adverse impact on the amenity of the existing residents of both Short Street and Station Road. (14 households, approx. 33% of the total number of households).
- It would result in significant harm to the landscape and heritage assets.
- It is not capable of having safe lighting and pedestrian access provided without a significant impact on neighbours or on the integrity of the street scene.

3.8 It is therefore argued that windfall infill development of the site cannot be satisfactorily integrated into the existing settlement.

4. Highway Impact

4.1 Access and egress to this site would be via either Short Street or Station Road which are both single lanes with no pedestrian access. In the case of Station Road, the current speed limit is 60mph and the provision of suitable visibility splays and added challenge of a 2metre incline to Station Road would result in significant hedge row removal to comply with traffic safety audits required as part of the S278 works. Any road widening or highway improvements to facilitate access to housing on the site may require the purchase of land for such works.

4.2 Parts of Short Street are bordered by existing residential properties, which are situated directly adjacent to the highway, and the volume and nature of the increase in traffic would have a significant impact on their residential amenities.

4.3 A working farm, Yew Tree Farm, is situated at the junction of Short Street and the main road through Chillenden. Short Street is used daily by agricultural vehicles travelling to and from the farmyard and the fields.

Short Street towards Station Road

Short Street towards the village

Short Street towards junction with Station Road

Station Road junction with Short Street

Station Road towards Cave Lane

PICTURE MISSING

6. Flood risk

6.1 The Level 2 Strategic Flood Risk Assessment categorises Site SAP50, as being a site in Flood Zone 1 with >40% of the site at risk from surface water flooding. 62% of the site is considered developable.

6.2 The SAP50 Site Allocation entry in the Reg 19 Consultation, indicates that a site-specific Flood Risk Assessment is required to guide development to areas of low flood risk, in accordance with the Sequential and Exception Tests.

6.3 A locally commissioned Surface Water Assessment and Flood Study (Appendix A) reviewed the Chillenden catchment hydrology, local topography and observed historical flood events. The study demonstrates that the SFRA flood mapping used by Dover District Council in Site Allocation assumptions, does not reflect the topography, or observed flood behaviour at the site. Specifically, this study concludes that:

- Current EA/SFRA surface water flood mapping does not reflect specific topography at the site.
- 98% of the site is at a high risk of surface water flooding.
- Conventional or SuDS drainage of the development is precluded by topography (no outfall),
- The site and Chillenden itself are both situated at the bottom of a 'bowl' and as such experience regular flooding after periods of torrential rain when all the surrounding agricultural land extending to well over a thousand acres of predominately clay geology collect and discharge thousands of gallons of surface water into the field and surrounding area. The most recent occurrence was 16th June 2021 when the entire field was under over 300mm of standing water and local residents can recall similar events over the years, in particular 1973 when the site and hamlet were immersed in 1m of flood water. Clay hydrogeology (no infiltration) means that the development of this field will further significantly increase the risk of flooding to properties surrounding the field and also any newly constructed dwellings.
- Measures required to pass the Exception Test would increase flood risk offsite.

6.4 Site SAP50 currently falls into the category 'Sites in Flood Zone 1 with a High Chance of Surface Water Flooding', which are listed in Table 2 of Dover District Council's Strategic Flood Risk Assessment Level 2, Sequential and Exception Test Summary and Review Note, May 2022.

6.5 Although site SAP50 is in Flood Zone 1 and would pass the Sequential test for residential land use, the known surface water flooding issues effectively put the flood risk into the categories of Flood Zone 2 and Flood Zone 3.

6.6 The Level 2 Strategic Flood Risk Assessment states that the developable area based on the surface water flooding is reduced from 1.02ha to .62ha, (developable area being reduced by 39.3%), however Dover District Council still appears to support the building of five executive homes. Will DDC consider reducing the number of dwellings to be built on the site accordingly? Annex A indicates that 98% of the field is at risk not 38% and this has been proven and evidenced by actual flooding events as recent as 2021.

7. Historic Environment.

7.1 Part of the site is adjacent to the Conservation Area and part within. It is also adjacent to a Grade II listed building (The Grange) and is within an Area of Archaeological Protection.

7.2 Due to the lack of vegetation the site is visible from the Grade II listed windmill and forms an important transition area between the village and the rural landscape.

7.3 The Conservation Area is characterised by large open spaces and very loose development grain. Many of the historic buildings have an agricultural character. The grade 2 listed The Grange has enjoyed a unique agricultural setting since its construction in the 13th century where it has, until

recently, sat within an open field environment that will be lost forever if the development proceeds as proposed.

7.4 Development of the site at the number of units indicated would result in dense development which would be contrary to the character of the Conservation Area causing harm. The site has been assessed as having a heritage impact that would cause significant detrimental harm to identified heritage assets.

7.5 The site has been judged by Council Officers to have the potential to significantly affect the district's historic environment (SA Appendix F published September 2022).

8. Conclusion

8.1 Whilst it is accepted that some growth is required in small hamlets such as Chillenden to ensure they grow and strive (NPPF Para 79), this should be proportionate to the size of the settlement. However, due to:

- The location of the Site
- The lack of facilities
- The adverse impact on existing residents of Short Street
- The adverse impact on the existing street scene
- The significant harm to the Landscape and Heritage assets
- The potential for loss of High-Grade agricultural Land
- The elevated risk of flooding 98% of the site at risk of serious flooding

it is considered that the proposed site in Chillenden is not sustainable, nor can it be satisfactorily integrated into the existing settlement, nor does it offer the most appropriate strategy for delivering the required growth in housing.

Yours sincerely,

Lesley and Mark Richardson

Encl. Appendix A - Surface Water Assessment and Flood Study

Appendix A

DOVER LOCAL PLAN

SAP50 (GOO006)

Chillenden

Dear Inspectors

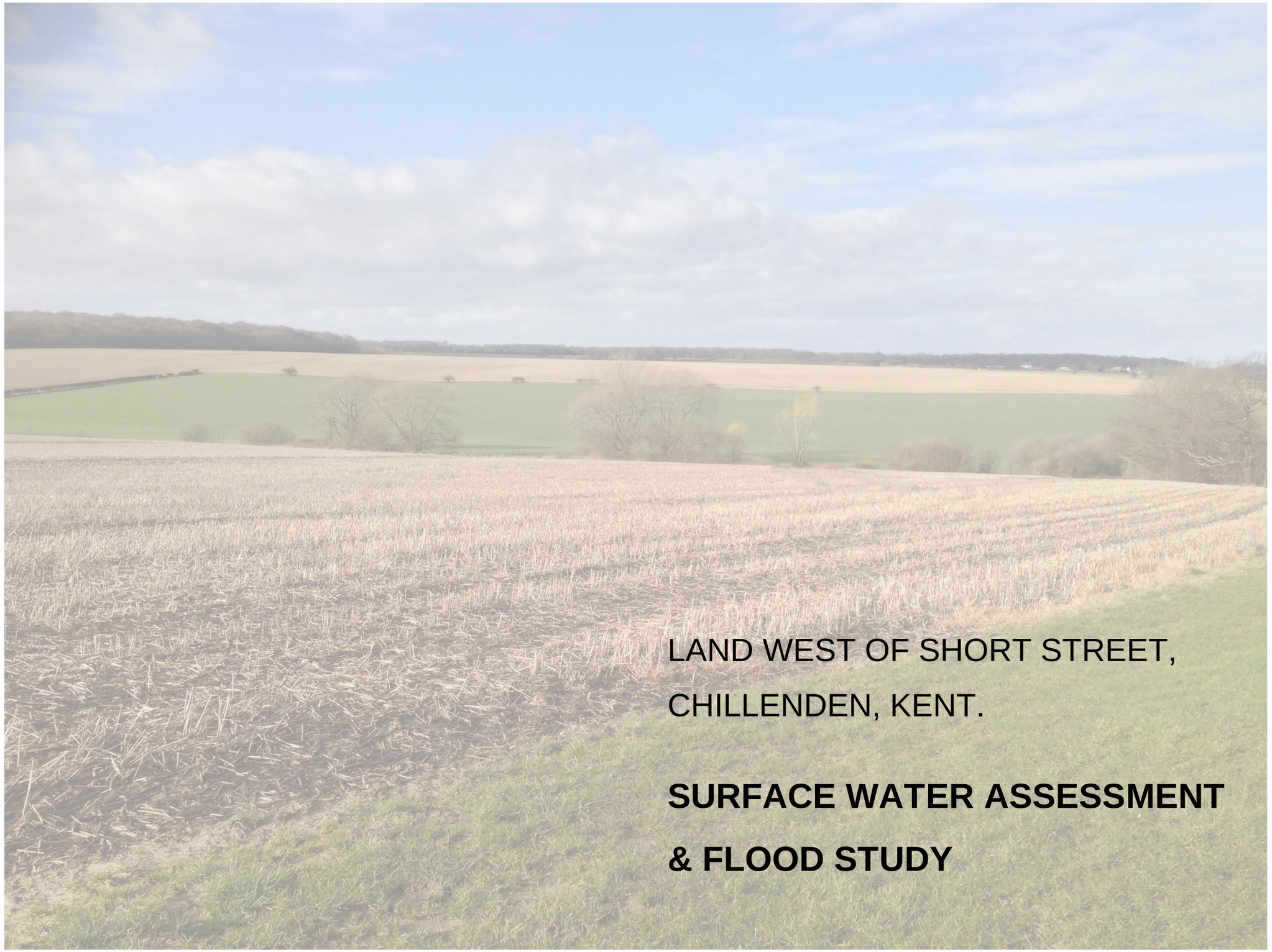
We are the resident owners at The Grange (a Grade II listed 13th Century Medieval Hall House dating back to 1287 and set in an agricultural environment). The proposed site is to be considered being positioned right behind our hedge and obstructing access to our dwelling. A previous planning application (The Glebe field/paddock) was refused due to its close proximity to our Listed property. This proposed land adjacent to Short Street is somewhat even closer to our perimeter. Therefore, why is it to be considered differently by this land owner? It is currently farmed.

We are also attaching a Surface Water Assessment and Flood Study. This site at Chillenden is very vulnerable to flooding and the attached report has been professionally and independently accessed as not suitable for development. There is a 98% chance of surface water flooding.

Yours sincerely

Mark and Lesley Richardson
The Grange
Chillenden

QVA Consulting
qvaconsulting.co.uk



LAND WEST OF SHORT STREET,
CHILLENDEN, KENT.

SURFACE WATER ASSESSMENT & FLOOD STUDY

TECHNICAL NOTE

QVA Consulting
qvaconsulting.co.uk

Job Name:	Chillenden, Site GOO 006
Job No:	1025
Note No:	QVA-1025-TN-001
Date:	December 2022
Prepared By:	P. Rogers
Checked by:	PR
Subject:	**Assessment of Surface Water flood risk at Site GOO 006, Short Street, Chillenden.**

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Appendix B - Local Area Topography and Flooding Extents.

Appendix C - ReFH2 Catchment analysis results

Appendix D - Table 3.2 from Dover DC Level 2 SFRA – Sites in Flood Zone 1

1. Executive Summary

The Dover District Council (Dover SC) Level 2 Strategic Flood Risk Assessment (SFRA) categorises the Chillenden site, referenced as Site SAP50 (or Site Allocation ref: GOO 006, Land off Short Street Chillenden), as being a site in Flood Zone 1 with >40% of the site at risk from surface water flooding. 62% of the site is considered developable. On the basis of the perceived fraction of developable land, the site is included in the list of sites for Housing Allocation in the Dover SC Local Plan Regulation 19 Consultation.

The SAP50 Site Allocation entry in the Reg 19 Consultation, indicates that a site specific FRA is required to guide development to areas of low flood risk, in accordance with the Sequential and Exception Tests.

This Surface Water Assessment and Flood Study reviews the Chillenden catchment hydrology, local topography and observed, historical flood events and demonstrates that the SFRA flood mapping used by Dover DC in Site Allocation assumptions, does not reflect the topography, or observed flood behaviour, at the site.

Specifically, this Flood Study concludes that:

- Current EA/SFRA surface water flood mapping does not reflect specific topography at the site.
- 98% of the site is at a high risk of surface water flooding.
- Conventional or SuDS drainage of the development is precluded by topography (no outfall), hydrogeology (no infiltration) and statutory flood risk obligations (increased flood risk offsite).
- Measures required to pass the Exception Test would increase flood risk offsite

2. Introduction

This technical assessment of overland, surface water flood risk has been prepared to contribute to the information available to the planning authority when considering the allocation of Site G00 006, Chillenden, for residential use.

Site GOO 006 comprises land off Short Street, Chillenden and has been proposed to accommodate 5 dwellings. The site is known, anecdotally, to flood from overland, surface water and from groundwater sources. This report sets out the technical justification to consider the whole site as being at a high risk from flooding and the likely impact of that flooding on the site, its neighbours and on any dwellings proposed within the site.

3. Existing Site - Overview

The site comprises 1.03ha of arable land, currently pasture, which lies in a dry valley bottom, immediately to the west of Short Street and to the south of Station Road, Chillenden. The site is centred on OS Grid Ref TR 27104 53701 (OS coordinates 627104 E, 153701 N), with the postcode CT3 1PR. The aerial image below, Figure 1, indicates the context of the site, which lies on the northeast side of Chillenden village.

Figure 2 below indicates a view across the site from Station Road, looking southeast towards the village.

Figure 1 – Site boundary and local context

Figure 2 – View across site towards southeast

4. Existing Hydrogeological Conditions

4.1. Geology

The site lies in a valley bottom which is underlain by superficial (near-surface) Drift deposits, below which lies Chalk bedrock at approximately 3.5m below ground level.

The Drift deposits are described as *Head - Silt and gravel sedimentary* deposits in the British Geological Survey (BGS) entry for the location (Figure 3).

Local borehole data (BGS ID 16091774, Grid Ref: 626540E 152750N,), located 1km upstream of the site in the same valley bottom, describes the same Drift material as layers of sandy, silty CLAY, or sandy, clayey SILT, or silty SAND, overlying Chalk at 4.0m below ground level.

Local Borehole data (BGS ID: 743654, Grid Ref: 628170E,155170N), located 1.8km downstream of the site in the same valley bottom, describes the Drift material as Brown Clay & Gravel, overlying chalk at 2.5m below ground level.

Interpolating from the above boreholes, chalk at the site would be expected to be at a depth of 3.5m below ground level, overlain by a sandy, silty, clayey Drift material.

4.2. Hydrology

The underlying Seaford Chalk Bedrock is a Principal Aquifer which supplies water for drinking (Figure 4).

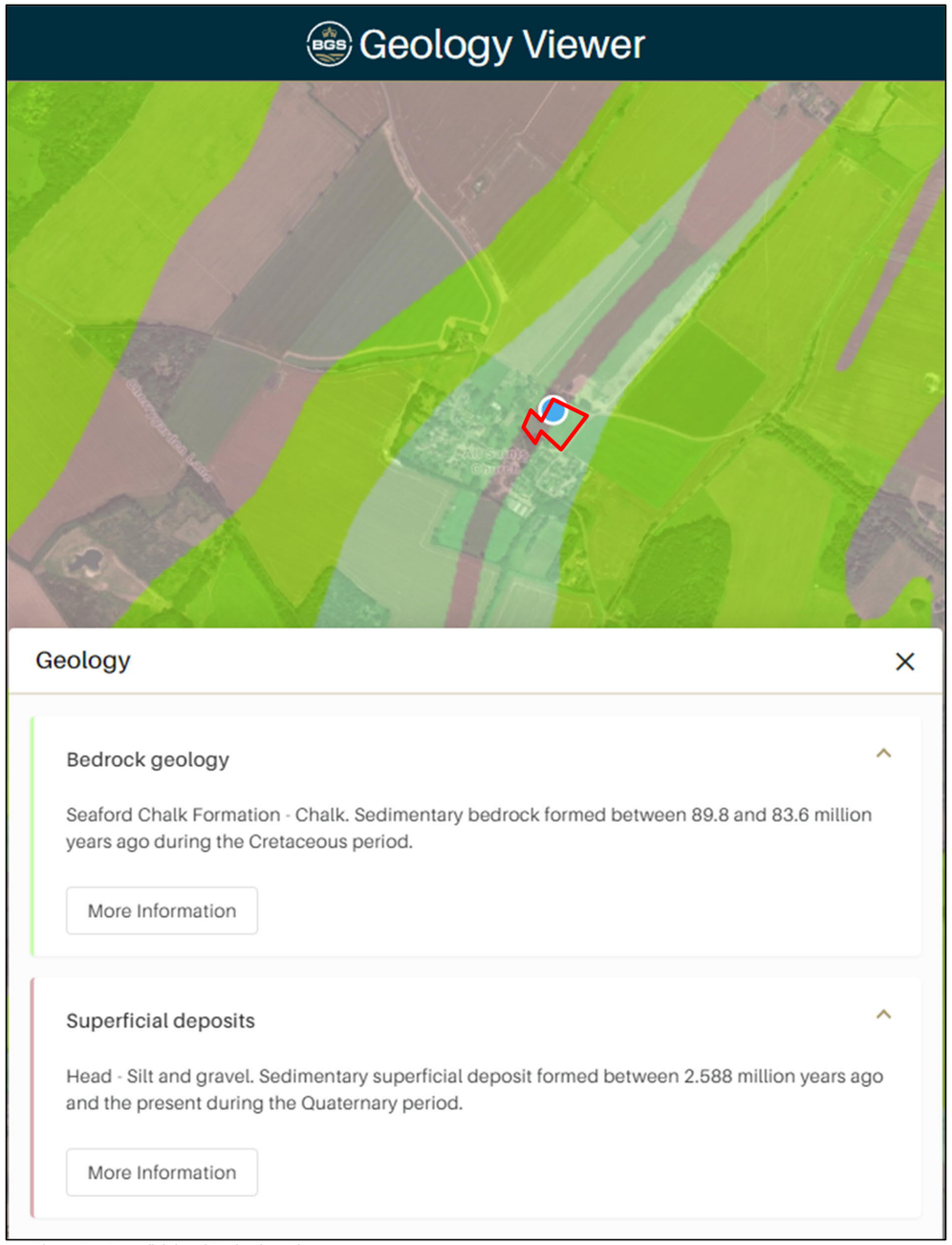


Figure 3 – Superficial and Bedrock geology

Groundwater in the Drift deposit, the valley-bottom shallow material, is classified as being in a Medium-High Vulnerability class (Figure 5).

Groundwater in the Chalk is in a High Vulnerability Class (Figure 5).

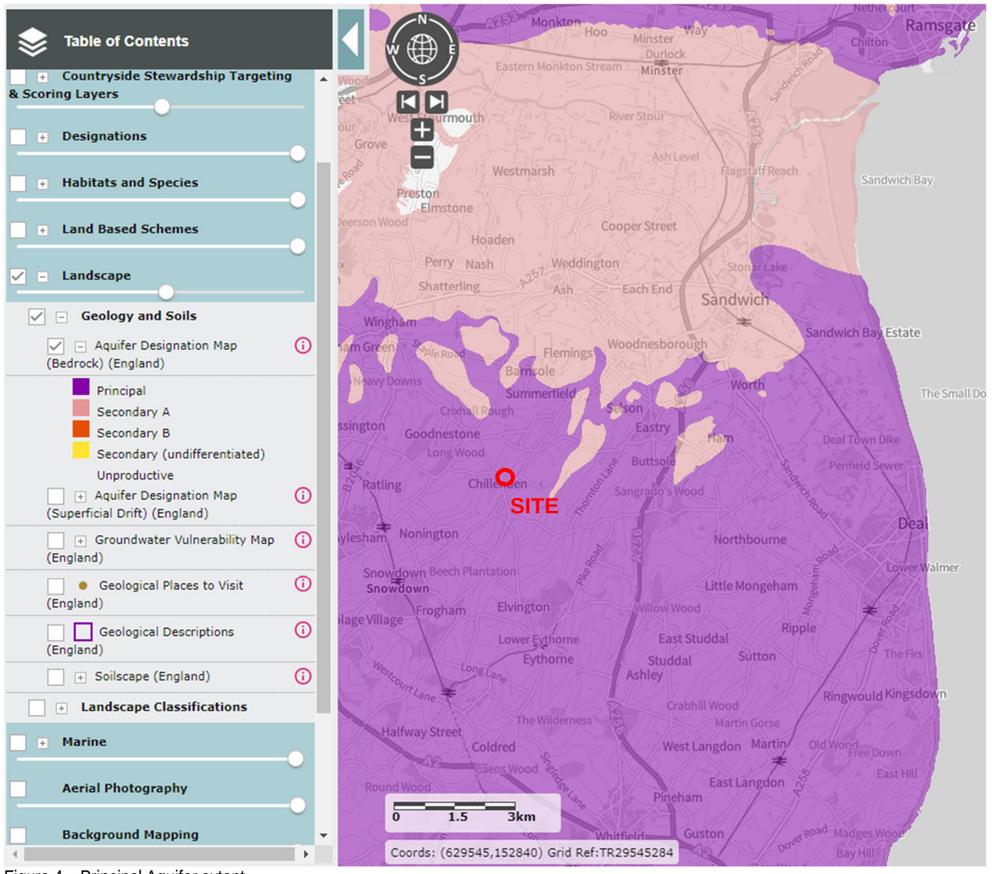


Figure 4 – Principal Aquifer extent

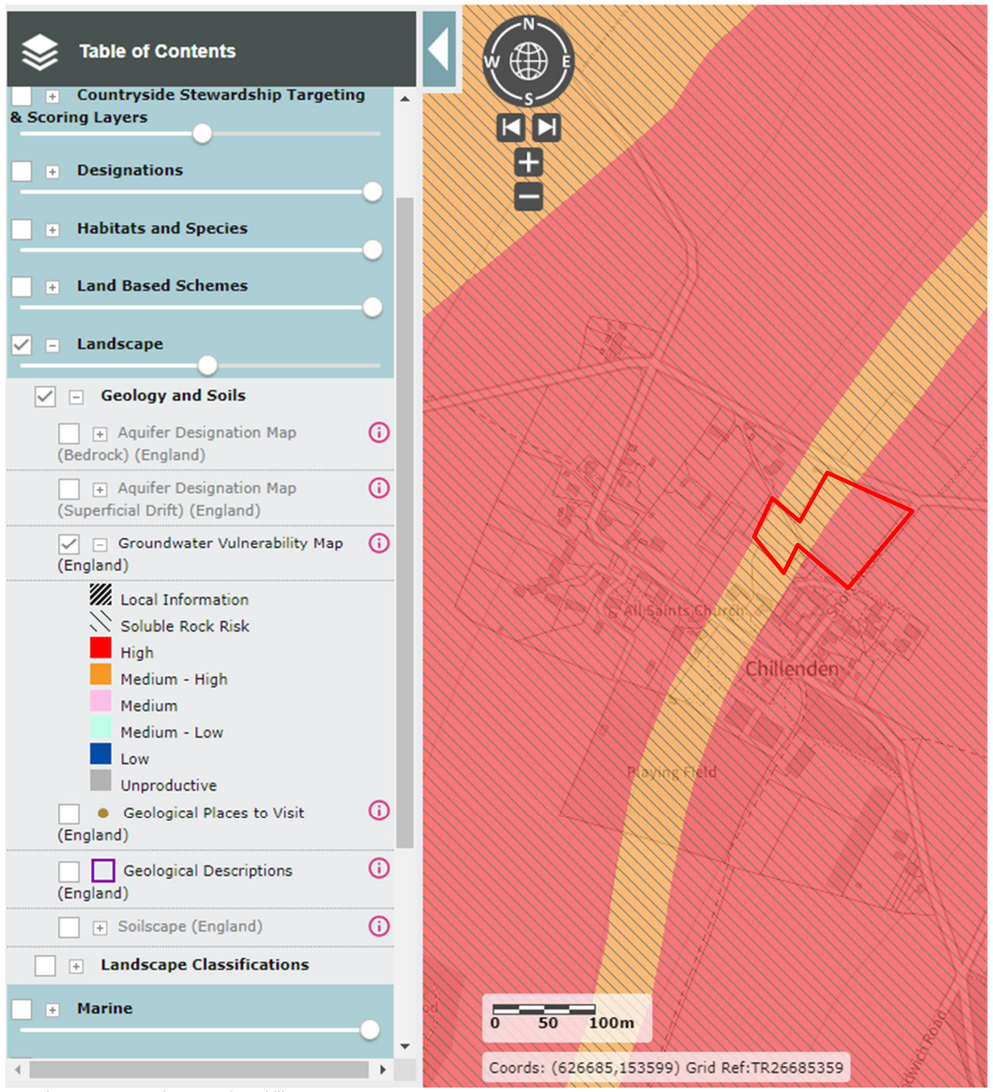


Figure 5 – Groundwater Vulnerability

The site lies within an outer, groundwater Source Protection Zone, Zone II (Figure 6). Rainfall (and pollutants) entering groundwater at the site would take 50-400 days to travel through the aquifer groundwater to a point of abstraction. In this case, the point of abstraction is near Hammill Park, 2km downstream, to the northeast.

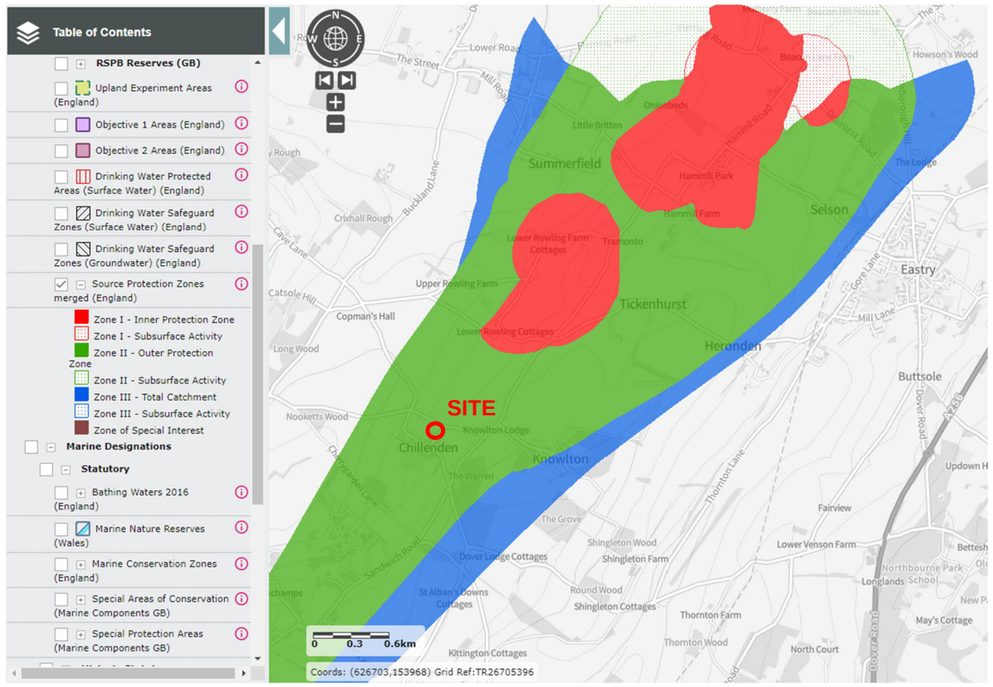
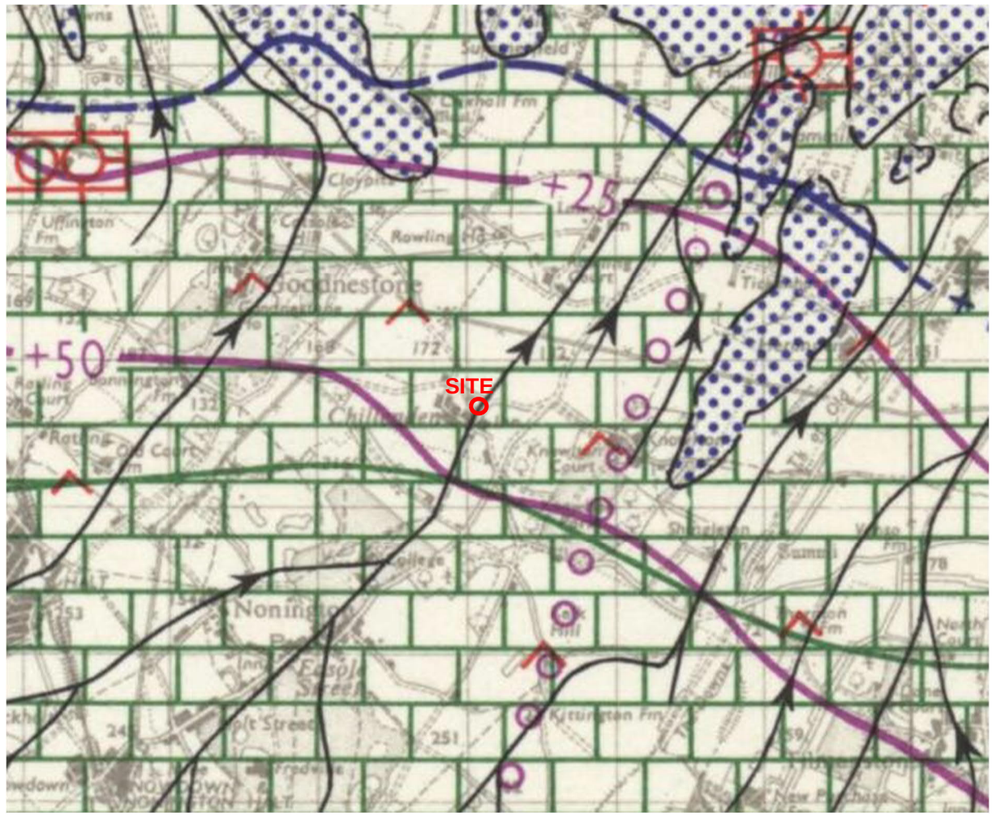


Figure 6 – Groundwater Source Protection Zones

The site can be seen to lie on the centreline of the bottom of a Principal Dry Valley in the Chalk, as recorded on the Institute of Geological Sciences' Hydrogeological Map of the Chalk and Lower Greensand of Kent, Sheet 1 (Figure7).



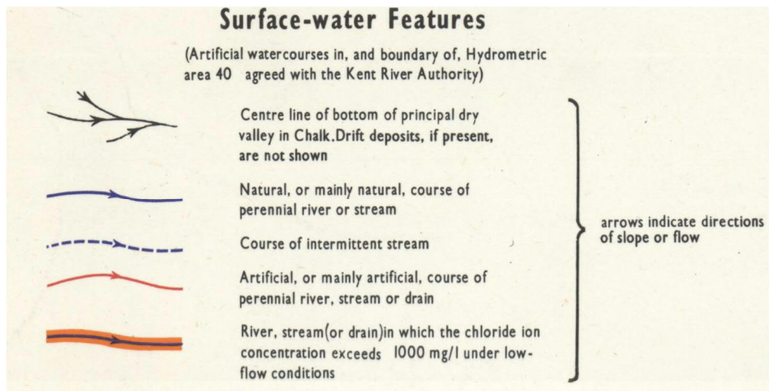


Figure 7 – Principle Dry Valleys in Chalk

4.3. Groundwater

BGS Well-record data at the site (BGS ID: 656681, Grid ref: 627020E 153730N), indicates a depth to the water table of 20m below ground level.

A review of similar well-records in the area indicate that the depth to water table in the chalk varies, typically, from 9m to 20m, which would be an expected seasonal variation in principal aquifer water table levels, resulting from successive dry and wet seasons.

The superficial Drift deposits overlying the chalk are classified as a Secondary A Aquifer, formerly known as a Minor Aquifer, which are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. At Chillenden, the local water table is known to stand above surface level for long periods in the valley bottom, and the groundwater in the Drift deposit forms an important source of baseflow, contributing to watercourses further downstream in the catchment.

4.4. Surface Water

The Environment Agency's (EA) online surface water mapping service indicates that in the Medium Risk scenario (30 year - 100year return period), a depth of surface water on the site would be between 300mm to 900mm (Figure 8).

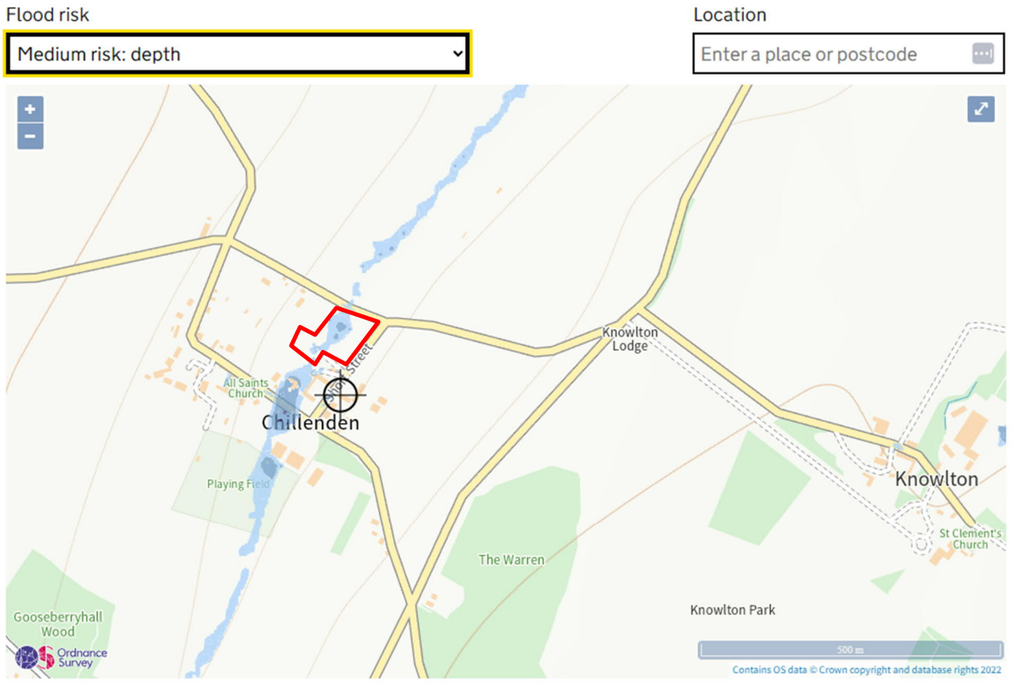


Figure 8 – Surface Water flood extents (Environment Agency)

The EA's mapping combining a range of surface water flood risks is indicated in Figure 9. The risk ranges are:

- High risk: chance of flooding of greater than 1 in 30 (3.3%), in any year.
- Medium risk: chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%), in any year.
- Low risk: chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%), in nay year.

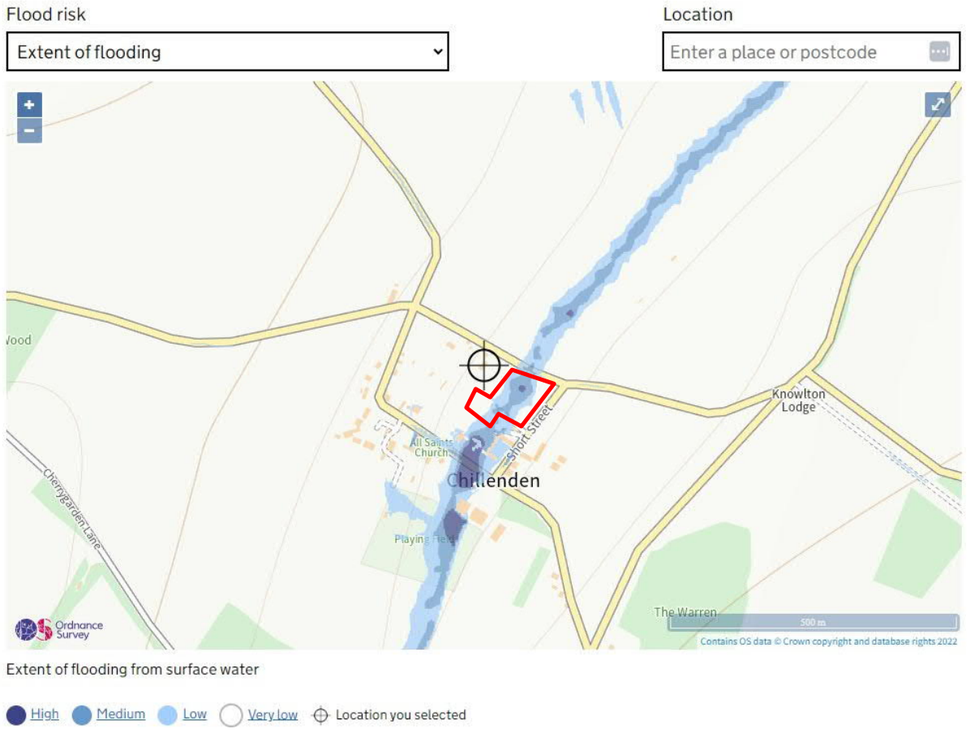


Figure 9 – EA SW flood risk mapping

It can be seen that the EA mapping in Figures 8 and 9 matches the surface water flood risk mapping that is referenced in the Dover District Council (Dover DC) Level 2 SFRA, an extract of which is reproduced below, in figure 10.

Dover District Council Level 2 Strategic Flood Risk Assessment
Land adjacent to Short Street, Chillenden

nerrington CONSULTING LIMITED

50-Land adjacent to Short Street, Chillenden

DDC Site Reference: GOO006		**Existing Land Use:** Greenfield
Site Area: 1.02ha		**Proposed Land Use:** Residential
Flood Zone Classification based on the EA's 'Flood Map for Planning'	*Flood Zone 1*	100.00%
	Flood Zone 2	0.00%
	Flood Zone 3	0.00%
	Flood Zone 3b	00.00%
Susceptible to Climate Change	Yes	
Exception Test required?	The Exception Test is not required to be applied for development classified as 'more vulnerable'.	
Nearby Waterbodies	There are no watercourses near to the site.	
Geology	***Bedrock***: Seaford Chalk Formation - Chalk ***Superficial***: The western part of the site is overlain by Head (silt and gravel).	
Flood History	Incidents within the site: None. Incidents within proximity of the site: None.	

Percentage of site at risk of flooding from tidal sources based off modelling data available from the EA	***Percentage of site at risk of flooding from tidal sources during the defended scenario for key return period events. Maximum flood level on site shown in brackets.***			
	1 in 200 year return period event	*1 in 200 year return period event - 2070*	*1 in 200 year return period event - 2115*	*1 in 1000 year return period event*
	0.00%	0.00% (m AODN)	0.00% (m AODN)	0.00% (m AODN)
Residual Risk	None			
Percentage of site at risk of flooding from surface water based on the EA's 'Risk of Flooding from Surface Water' Map	*'High' risk scenario* 1.09%	*'Medium' risk scenario* 21.13%	*'Low' risk scenario* 27.05%	

Flood Zone Map

Surface Water Map

Figure 10 – Dover DC Level 2 SFRA SW flood risk mapping – extract for Site GOO 006

Finally, overland flows occur when surface soils are saturated and precipitation exceeds the capacity to infiltrate. These overland flow routes are represented in the UK Centre for Ecology and Hydrology (UKCEH) catchment mapping as blue flow lines, indicated in Figure 11, which is an extract of the full catchment layout 1025-QVA-XX-ZZ-DR-C-0001, included in Appendix A of this report.

Baseflows within the superficial deposits would follow similar flow routes as the surface flows in Figure 11.

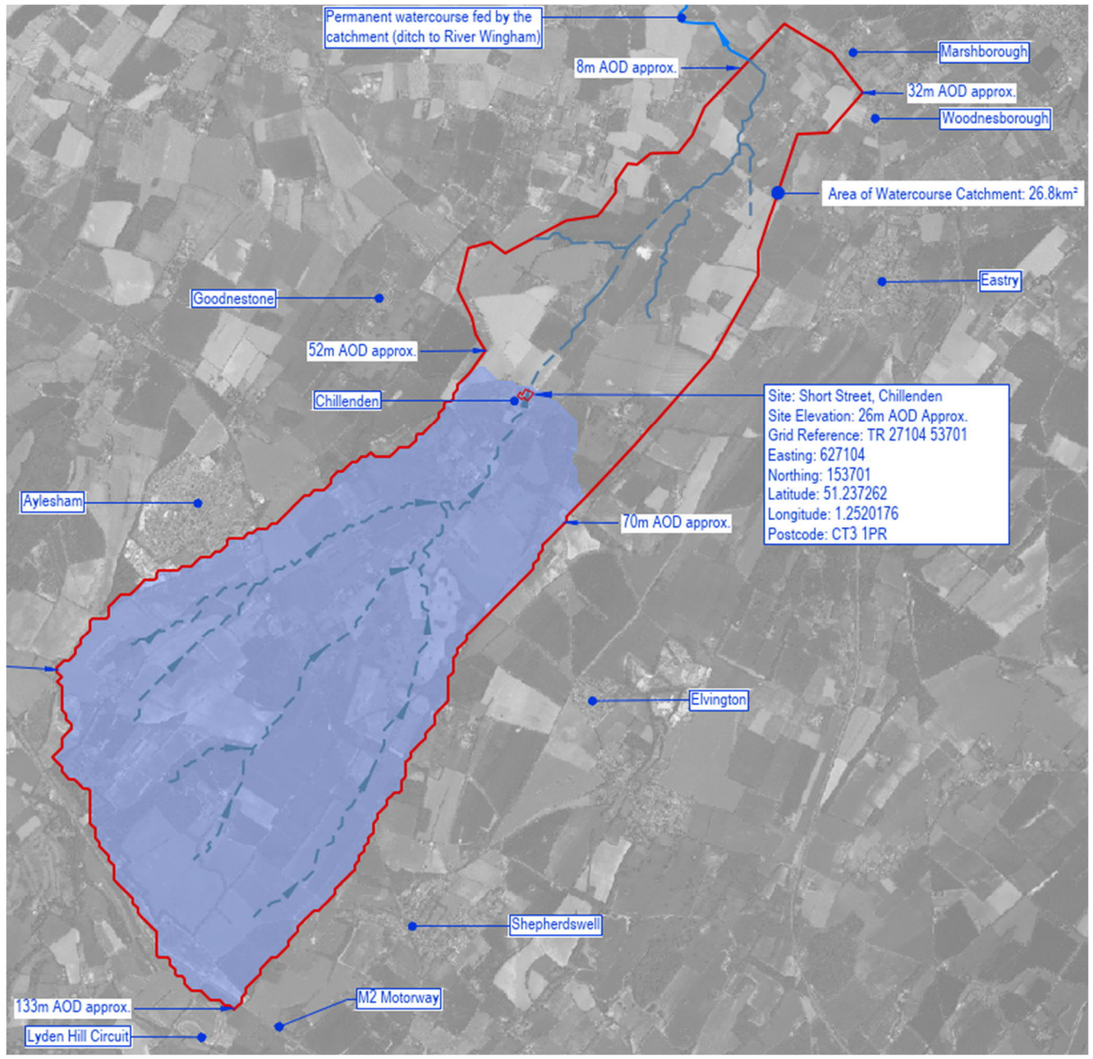


Figure 11 – Surface Water flow lines (UKCEH)

4.5. Watercourses

The site is not within fluvial floodplain, and would be classed as being in Flood Zone 1 (< 0.001% probability of fluvial flooding in any one year).

The nearest permanent watercourse is a field ditch, 4km to the north at Marshborough (figure 11), within the same dry valley in the chalk, where the depth to groundwater in the chalk aquifer reduces to zero and forms springs, which comprise the headwaters of the River Wingham.

The full catchment of the watercourse at Marshborough is 26.8 km^2. The sub-catchment at the site at Chillenden is 18.5 km^2, or 69% of the Marshborough catchment. All surface and baseflows from the

18.5 km2 sub-catchment can be seen to pass through Chillenden, which is 17m higher in elevation than Marshborough.

5. Further Assessment of Site Hydrology

5.1. Local Observations

There is significant local, observed evidence within the village of Chillenden, which confirms that site GOO 006 floods in periods of extended rainfall, to a greater extent than the EA-mapped extent (Figures 8, 9 and 10).

The site is also known to flood beyond its boundary and into neighbouring properties, namely The Grange to the west and the converted farm properties to the south, along Short Street. The Grange, immediately ot the west of the site, at an approximate level of 27.75mAOD, is known to have flooded in 1984.

There is also direct, observed experience of surface water flows from the southwest entering the village pond, to the southwest of the site (near the junction of Griffin Hill and Short Street), which in turn overflows to the northeast, through properties along Short Street and in to the site under consideration.

5.2. Implications of Local Topography

Flows are unable to pass northeast along the theoretical flowline, as is suggested in the EA mapping, because Station Road is raised on a causeway 2.5m above the site, across the valley bottom. There is no culvert or pipe present that might allow overland flows to pass along the valley-bottom flowline to the northeast. When the capacity of the site to hold impounded water has been exceeded, the level of standing water rises sufficiently to back up beyond the site boundary in Figure 1, either to the west or to the southwest, through the adjacent properties on Short Street.

On inspection, it can be seen that the EA surface water mapping (Figure 8) does not reflect the site levels to a sufficient resolution to accurately reflect the impact of the Station road causeway.

The EA mapping indicates a depth of surface water on Station Road of 300mm in the 100-year event. In the same flooding scenario, it indicates a depth of water on the site of 900mm, which implies a level-difference of 600mm from Station Road down to the site. In reality, the level difference is 2.5m (low point in Station Road @ 28.75m ADO, low point in site @ 26.2m AOD). There is a potential for impounded waters on the site to reach a depth of 2.5m before it spills over Station Road and continues the overland route towards downstream towards Marshborough.

Similarly, on inspection of EA mapping in Figures 9 and 10, the low and medium risk flood extents are shown as continuous across Station Road from the site to the field on the opposite, northeast side. Topographically, this is impossible. The 2.5m-high causeway on which Station Road is constructed would dam surface flows across the site and result in deeper standing water than is currently indicated by EA shading depths and extents; in Figure 8, shading would instead be in the >900mm depth category over much of the site; in Figures 9 and 10, the high and medium risk extents would instead be present over much of the site.

In order to quantify the likely extent of flooding on site GOO 006, resulting from overland flows being impounded by Station Road, a further hydrological desk study analysis has been carried out, to better assess the effect of local topography against the predicted quantities of overland flow.

5.3. Methodology of Further Assessment

Predicted overland surface water flows and base (groundwater) flows at the site have been calculated using the Wallingford HydroSolutions catchment modelling programme **ReFH2**, ver. 3.3. Results of all modelled flood scenarios are included in Appendix C.

Rainfall and Catchment Descriptors have been obtained from the UKCEH Flood Estimation Handbook web-service for the sub-catchment location 627150E, 153750N.

A Climate Change Allowance of 45% has been applied to the 100-year modelled event, in accordance with the upper-end allowance for 100-year rainfall events, in the current DEFRA guidance on rainfall (Figure 11).

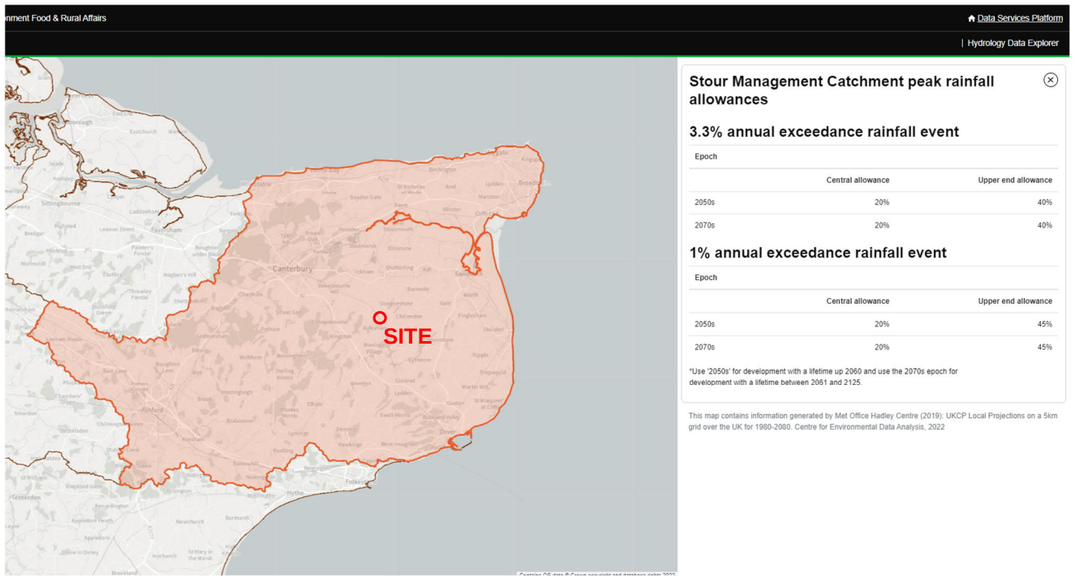


Figure 11 – Climate Change allowances (DEFRA)

Local area and Site GOO 006 level data has been derived from DEFRA 1m Composite LIDAR data (2020).

A topographical analysis has been undertaken to identify the following flooding conditions at the site, which are presented as the coloured, flood-outlines 1, 2 and 3 below, on drawing 1025-QVA-XX-ZZ-DR-C-0002, in Appendix B.

1. S**ite Full'** condition (light blue outline @ 26.85mAOD). This flood outline is when water has filled the site, just before it starts to spread beyond its boundaries.

2. **'Site + village connected'** condition (dark blue outline @ 26.95mAOD). This flood outline is when either the water in the site has risen just enough to backflow to the village, or the village has just overspilled into the site.

3. **'Station Road overspill'** condition (red outline @ 28.70mAOD). This flood outline is when water in the site has risen to its very highest, before it spills over Station Road.

The volumes of water required to achieve the flood outlines 1 -3 have been calculated with InfraWorks ground-modelling software, and are presented in the Assessment Results, Table 1.

An extract of the flood outlines layout in Appendix B is presented in Figure 12. The EA's own flood risk modelling is overlaid on the local topography, for comparison.

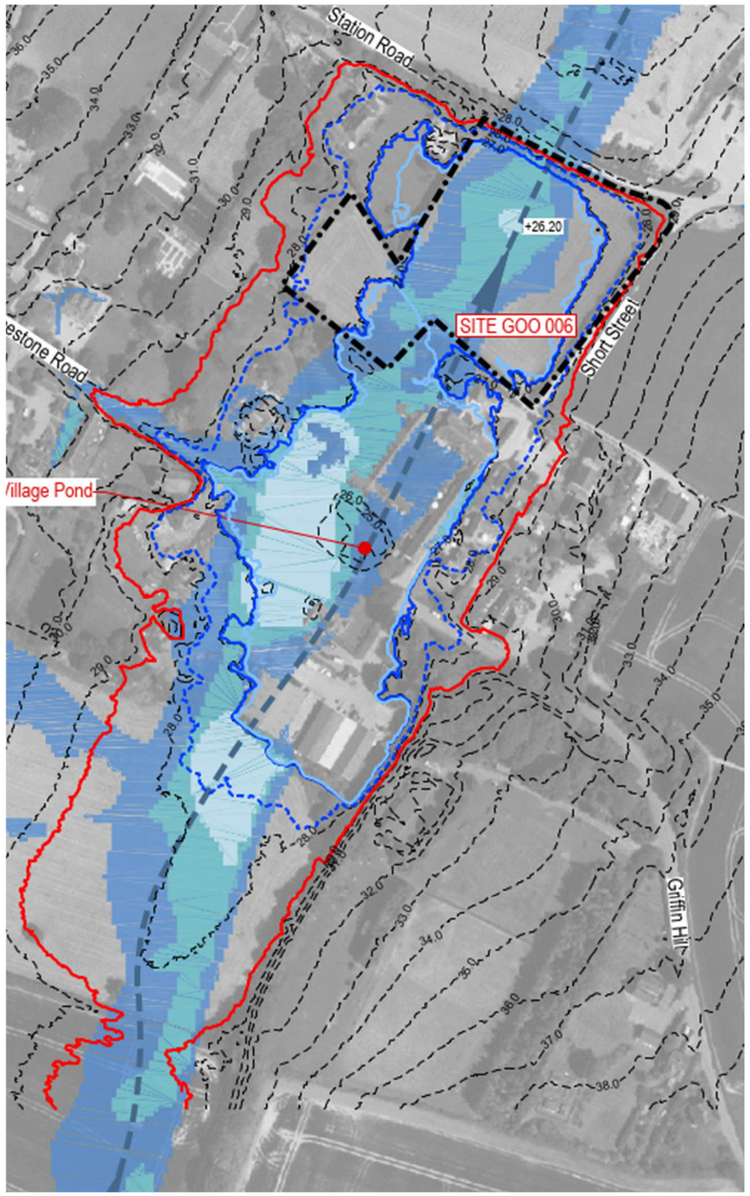


Figure 12 – Local topography & flood scenario outlines

5.4. Assessment Results

The following results for overland flow volumes and flow rates at the Chillenden site GOO 006, have been derived from the ReFH2 analysis, which has identified the 9-hour rainfall event as being the storm duration critical to the location under consideration in the Chillenden sub-catchment.

The modelled scenarios of overland flows and volumes, have been presented alongside historical, observed events in Chillenden and in the full Marshborough catchment for context. Full catchment events were recorded at the River Wingham measuring-gauge at Durlock, near Marshborough, downstream of the site. The comparison with observed events is not intended as a rigorous calibration of the ReFH2 modelling, but it serves as a useful comparison, which offers some assurance that the ReFH2 modelling predicts overland flow figures that are to be reasonably expected in the observed context.

5.5. Analysis of Results

Scenario	Return period (+ % climate change)	Max Water Level @ site	Rainfall Event		Peak Surface Water flowrate	Total Surface Water Runoff volume	Notes
	years	mAOD	Rain duration (hrs)	Rain depth (mm)	l/s	m3	
Predicted	1		9	19	588	20,862 pred'ctd	@ Site GOO 006
Predicted	30		9	43	1,582	56,239 pred'ctd	@ Site GOO 006
Observed (27/12/2003)	50 approx		n/a	53 (archive)	1,950	n/a	R. Wingham at Durlock, 28/12/03
Predicted	100		9	59	2,331	82,902 pred'ctd	@ Site GOO 006
Predicted	100 (+ 45%CC)		9	81	3,720	139,040 pred'ctd	@ Site GOO 006 Upper End Allowance for 1% (100-year) exceedance rainfall from current DEFRA climate change guidance
Observed (20/09/1973)	100+ pprox			117 (archive)	2,240	n/a	R. Wingham at Durlock, 21/9/73
Observed (1984) Dark Blue dashed		27.75m approx.				32,223 est'd	The Grange, Station road (adj. to GOO006), flooded, FFL 27.75mAOD
Site Full - Outline 1 (Light Blue)		26.85				1,683 req'd on the Site, separated from 5,533 req'd in the Village.	Return periods indicative from comparison with predicted
Site+Village - Outline 2 Dark Blue)		26.95				9,242 req'd	Return periods indicative from comparison with predicted
Over Station Rd - Outline 3 (Red)		28.70				75,205 req'd	Return periods indicative from comparison with predicted

Table 1 – ReFH2 results and Comparison with Observed events

Discussion of Assessment Results

The ReFH2 analysis predicts surface, overland flow volumes arriving at Chillenden in the 1-year, 30-year and 100-year critical duration (9hr) rainfall events, including the 100-year + Climate change event. Surface runoff volumes predicted to accumulate at Chillenden vary from 20,862 m^3 in a critical 1-year event, to 82,902 m^3 in a 100-year critical duration event (excluding climate change).

Observed, significant rainfall events have resulted in similar surface water volumes in the full catchment, which corroborates the order of magnitude of predicted surface flows (and therefore volumes) that can be reasonably justified at the site.

Overland flows typically comprise 24% of the total movement of water through the catchment in this location, ie. 76% of all rain falling in the catchment moves through the catchment as baseflow below ground level, which contributes to the large variation in seasonal water table levels.

Predicted overland flow rates at Chillenden vary from 588 l/s (a 750mm dia pipe equivalent) in the 1 year event, to 2,331 l/s (a 1,250mm dia. pipe equivalent) in the 100 year event, excluding climate change. There is no culvert or pipe under Station Road that would connect throughflows at Site GOO 006 to the downstream, overland drainage network.

The Predicted Surface (Overland) Runoff Volumes are compared to the volumes of water required to produce the flood outlines 1, 2 and 3 in the village. In this way, it can be demonstrated that the flood outlines can be achieved by the predicted surface water runoff events. Areas within these flood outlines would be deemed non-developable by planning policy, due to the high risk of surface water flooding.

The depths of flooding indicated on EA online mapping and in Dover District Council's Level 2 Strategic Flood Risk Assessment (presented as Evidence for the site allocation Evidence Base (doverdistrictlocalplan.co.uk) are misleading as the mapping is not based on topographical data that reflects the dam-effect of Station Road.

Inspection of the EA mapping (Section 4.2) implies that Station Road is 600mm higher than site GOO 006. DEFRA 1m Composite LIDAR data (2020) indicates that Station Road is 2.5m higher than the site, which is corroborated by a site walkover. The effect of this is that surface water passing through the catchment to the northeast cannot pass over Station Road, as is implied in the EA mapping, but rather, it is impounded to a potential maximum height of 2.5m. Observations from Chillenden corroborate that the water has risen historically to 27.75m, or 1.55m above site's lowest level, rather than the 900mm depth indicated in EA mapping. The observed extent of surface water flooding to 27.75m AOD is over approximately 98% of the site, leaving just 20 m^2 developable.

Dover DC's description of the site does not tally with the observed characteristics above. Dover DC's narrative of the surface water flooding, in the Level 2 SFRA (refer to the extract in Appendix D), describes surface flows across the site continuing to the northeast, accumulating in local depressions only, leaving 0.62 ha of the site as developable land above the low flood-risk area (< 1 in 1,000 year chance). The observed and predicted flood events indicate that virtually none of the site falls into the low risk flooding category.

6. Implications in Flood Risk Planning Policy

6.1. Sequential Test.

Site GOO 006 falls into the category '*Sites in Flood Zone 1 and with a High Chance of Surface Water Flooding'*, which are listed in Table 2 of Dover DC's Strategic Flood Risk Assessment Level 2, Sequential and Exception Test Summary and Review Note, May 2022. Although the site is in Flood Zone 1, and would pass the Sequential test for residential land use, the known surface water flooding issues effectively put the flood risk into the categories of Flood Zone 2 (flood risk between 1 in 100 years and 1 in 1,000 years) and Flood Zone 3 (Flood Risk > 1 in 100 years). The supplementary Surface Water Assessment in this report demonstrates that an observed water level on the site of 27.75m (1984) would result from a volume of overland runoff accumulating at the site, which can be impounded by the topography and which is predicted with a chance of less than 1 in 100 years. Furthermopre, the observed event is shown to cover 98% of Site GOO 006, as well as some of Chillenden village.

Floor Levels would be required to be at least above the known surface water flood level of 27.75m, which would require raising of the site by 1.55m, which would itself incur a significant increase in flood risk offsite due to the loss of natural flood storage onsite. Flood outline 2 indicates that the site and village act as one basin relatively quickly, as soon as the flood level on the site rises above 26.85m, or 650mm depth.

Flood compensation would not be not possible to offset the loss of surface water flood storage from land-raising or the construction of buildings, as the whole site floods in the 100-year surface water event (Figure 12). Flood compensation would need to be provided in 3rd party land and modelled to demonstrate that like-for-like volume compensation is provided in the same time frame, which is unlikely to be achieved, given that the site has no positive outfall and fills at the same time as the village during the 100-year surface water event.

Conventional methods of surface water drainage are considered impractical because there is no positive outfall from the impounded site downstream to the northeast of Station Road, and infiltration is unlikely to be possible. Inundation by surface water inflows coincides with large baseflows and the raising of the water table to near surface levels. The lack of infiltration potential, absence of a surface water outfall and inflow of significant overland volumes from the upstream catchment to an impounded site, make the site almost impossible to drain without passing large volumes of overland runoff downstream to 3rd party land via a pump or culvert, which would significantly increase flood risk offsite, given the large inflows and baseflows and lack of space for attenuating structures.

6.2. Exception Test

In order to met Exception Test criteria, the Dover DC guidance document *Site-specific Guidance for Managing Flood Risk* advises that a site meet two criteria:

1. *It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared;*

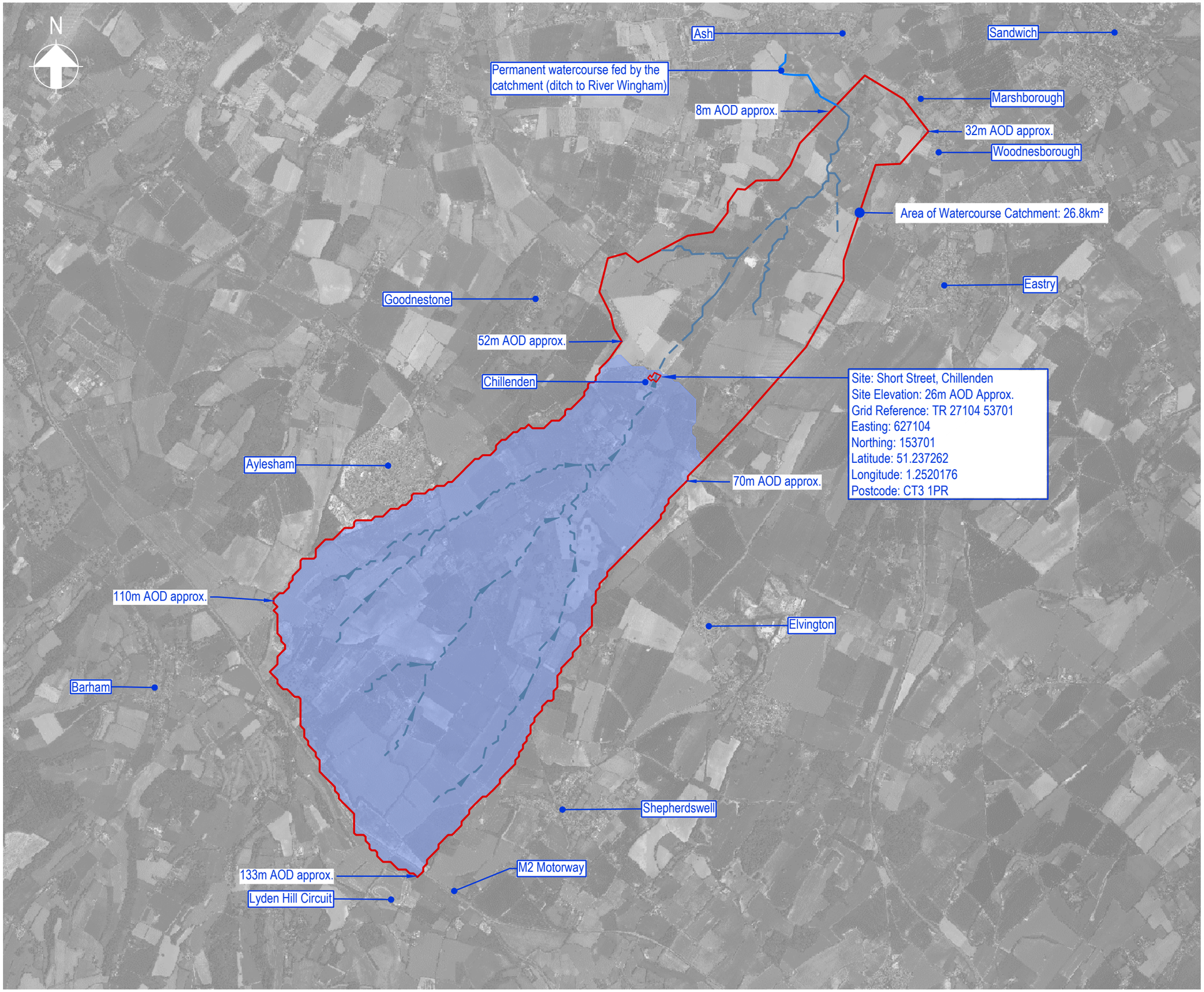
2. *A site-specific Flood Risk Assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and where possible, will reduce flood risk overall.*

On the first Exception Test criteria, it has been demonstrated that SuDS are not feasible and that the Level 2 SFRA, which is intended to inform the assessment of sustainability benefits, presents a misleading level of baseline flooding, which cannot practically be overcome.

On the second Exception Test criteria, this Surface Water Assessment & Flood Study and the observed, historical events, indicate that any development of the site that would inevitably reduce the natural flood storage of site GOO 006, will increase the already high levels of flood risk on adjacent properties and wider village of Chillenden.

Appendix A - Chillenden Sub-Catchment Layout

Drawing 1025-QVA-XX-ZZ-DR-C-0001



Notes:

1. Do not scale from this drawing.
2. Catchment boundaries and flowlines are taken from mapping by the UK Centre for Ecology & Hydrology.

Legend:

- Site Boundary (indicative only)
- Catchment Boundary
- Sub-Catchment area
- Overland and Baseflow Flowlines with Direction of Flow

0 0.5 1 1.5 2 2.5 km

SCALE 1:50000

Rev	Description	Date	Drw	Chk
001	For information	05/12/2022	KC	PR

Drawing Title: Surface Flow and Baseflow Sub-catchment at Station Road, Chillenden

Project Title: Chillenden, Kent Flood Study

Client: Planning Consultation Response

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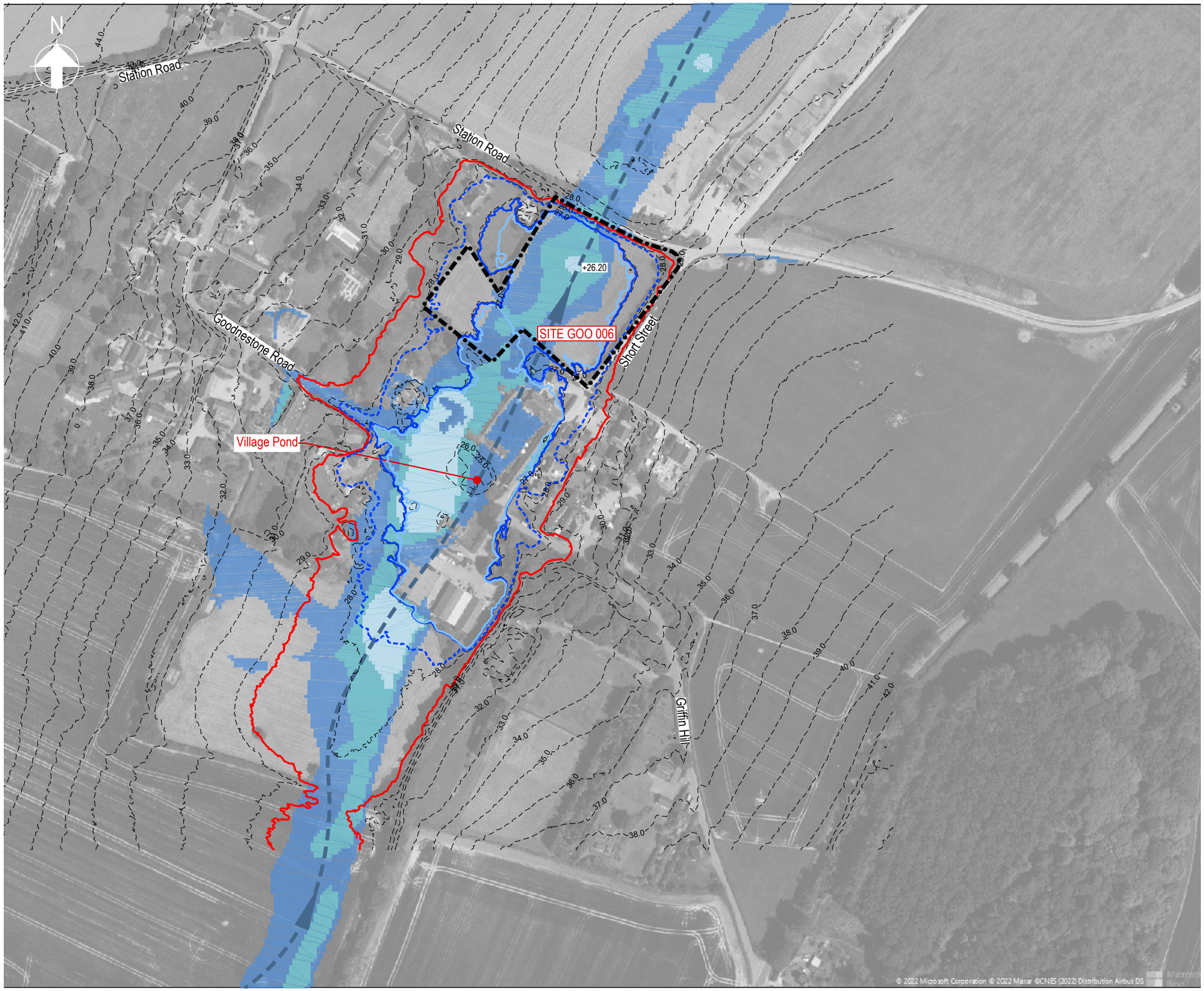
QVA Project	1025			Client Project	-	
Drawn	Checked	Approved	Scale at A3	Date	Suitability	Revision
KC	PR	PR	1:50000	01/12/2022	S3	001

Drawing Number: 1025 - QVA - XX - ZZ - DR - C - 0001
Project Originator Volume Location Type Role Number

Regen to apply changes to the drawing frame metadata

Appendix B - Local Area Topography and Flooding Extents.

Drawing 1025-QVA-XX-ZZ-DR-C-0002



Location Plan

Notes:

1. Do not scale from this drawing.

Legend:

DEFRA model surface water flood extents

- RoFSW_TR25_Extent_1in30
- RoFSW_TR25_Extent_1in100
- RoFSW_TR25_Extent_1in1000
- Site Boundary (indicative only)
- Overland and Baseflow Flowlines with Direction
- 'Station Road overspill' scenario: Water Level @ 28.7m
- 'Site & village Full' scenario: Water Level @ 26.95m
- Water Level @ 27.75m (Observed Event, 1984)
- 'Site Full' scenario: Water Level @ 26.85m
- 36.0 — Existing surface Contours @ 1m Intervals

0 25 50 75 100 125 m

SCALE 1:2500

Rev	Description	Date	Drw	Chk
001	For information	05/12/2022	KC	PR

Drawing Title: Comparison of flood extents In Chillenden Village

Project Title: Chillenden, Kent Flood Study

Client: Planning Consultation Response

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QVA Project	1025			Client Project	-	
Drawn	Checked	Approved	Scale at A3	Date	Suitability	Revision
KC	PR	PR	1:2500	01/12/2022	S3	001

Drawing Number: 1025-QVA-XX-ZZ-DR-C-0002
Project Originator Volume Location Type Role Number

Regen to apply changes to the drawing frame metadata

Appendix C - ReFH2 Catchment analysis results

UK Design Flood Estimation

Generated on Tuesday, December 6, 2022 3:44:53 PM by phill
Printed from the ReFH2 Flood Modelling software package, version 3.3.8355.27598

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: C65B-CD88

Site name: FEH_Catchment_Descriptors_627150_153750_v4_0_0

Easting: 627150

Northing: 153750

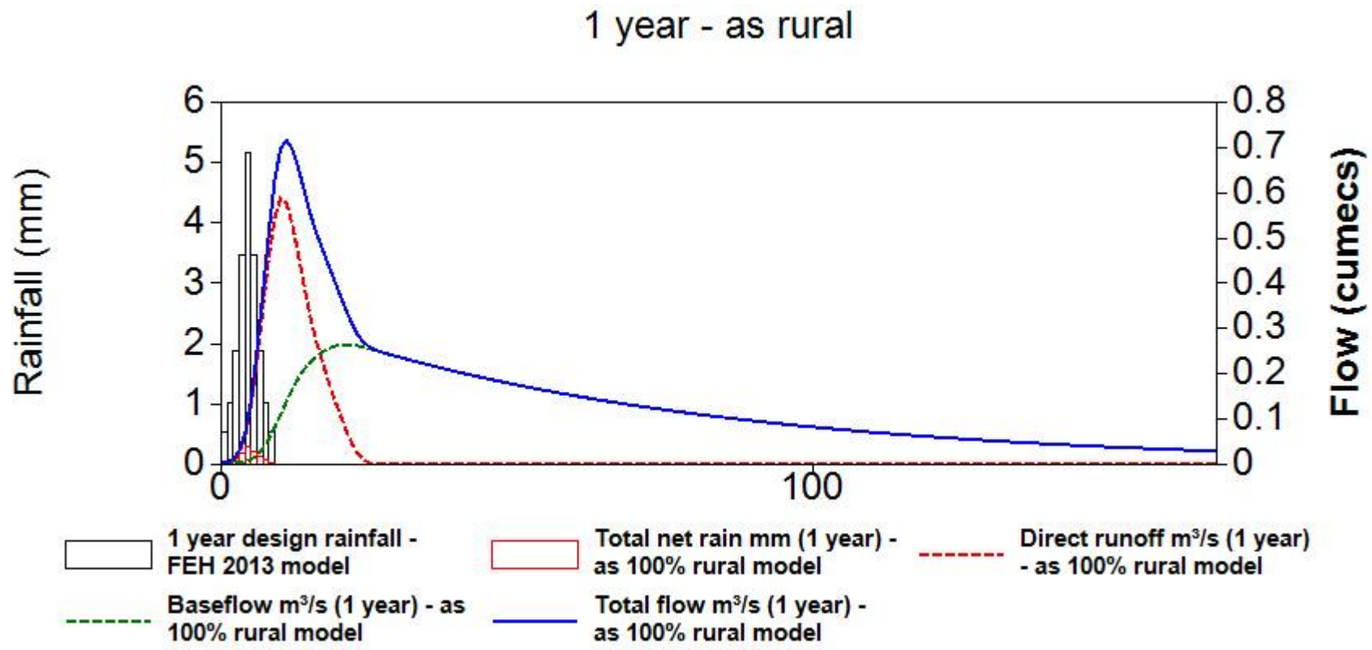
Country: England, Wales or Northern Ireland

Catchment Area (km²): 18.49

Using plot scale calculations: No

Model: 2.3

Site description: None



Model run: 1 year

Summary of results

Rainfall - FEH 2013 model (mm):	27.46	Total runoff (ML):	22.62
Total Rainfall (mm):	19.01	Total flow (ML):	90.14
Peak Rainfall (mm):	5.17	Peak flow (m³/s):	0.76

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	09:00:00	No
Timestep (hh:mm:ss)	01:00:00	No
SCF (Seasonal correction factor)	0.73	No
ARF (Areal reduction factor)	0.95	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	54.21	No
Cmax (mm)	1073.54	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	5.08	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m³/s)	0	No
BL (hr)	66.47	No
BR	3.54	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km²)	0.35	No
Urbext 2000	0.01	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km²)	0.00	Yes
Sewer capacity (m³/s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	0.543	0.000	0.030	0.000	0.003	0.003
01:00:00	1.019	0.000	0.058	0.002	0.003	0.006
02:00:00	1.896	0.000	0.110	0.010	0.004	0.014
03:00:00	3.463	0.000	0.209	0.030	0.004	0.035
04:00:00	5.171	0.000	0.333	0.073	0.007	0.079
05:00:00	3.463	0.000	0.237	0.152	0.012	0.163
06:00:00	1.896	0.000	0.134	0.266	0.021	0.287
07:00:00	1.019	0.000	0.074	0.395	0.036	0.430
08:00:00	0.543	0.000	0.040	0.517	0.056	0.573
09:00:00	0.000	0.000	0.000	0.608	0.081	0.690
10:00:00	0.000	0.000	0.000	0.646	0.110	0.756
11:00:00	0.000	0.000	0.000	0.625	0.139	0.764
12:00:00	0.000	0.000	0.000	0.569	0.166	0.735
13:00:00	0.000	0.000	0.000	0.495	0.190	0.684
14:00:00	0.000	0.000	0.000	0.417	0.209	0.626
15:00:00	0.000	0.000	0.000	0.345	0.225	0.570
16:00:00	0.000	0.000	0.000	0.286	0.238	0.523
17:00:00	0.000	0.000	0.000	0.235	0.247	0.482
18:00:00	0.000	0.000	0.000	0.189	0.254	0.444
19:00:00	0.000	0.000	0.000	0.148	0.260	0.408
20:00:00	0.000	0.000	0.000	0.111	0.262	0.373
21:00:00	0.000	0.000	0.000	0.076	0.264	0.340
22:00:00	0.000	0.000	0.000	0.046	0.263	0.309
23:00:00	0.000	0.000	0.000	0.024	0.261	0.285
24:00:00	0.000	0.000	0.000	0.011	0.258	0.269
25:00:00	0.000	0.000	0.000	0.004	0.254	0.258
26:00:00	0.000	0.000	0.000	0.001	0.251	0.252
27:00:00	0.000	0.000	0.000	0.000	0.247	0.247
28:00:00	0.000	0.000	0.000	0.000	0.243	0.243
29:00:00	0.000	0.000	0.000	0.000	0.240	0.240
30:00:00	0.000	0.000	0.000	0.000	0.236	0.236
31:00:00	0.000	0.000	0.000	0.000	0.233	0.233
32:00:00	0.000	0.000	0.000	0.000	0.229	0.229
33:00:00	0.000	0.000	0.000	0.000	0.226	0.226
34:00:00	0.000	0.000	0.000	0.000	0.222	0.222

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
35:00:00	0.000	0.000	0.000	0.000	0.219	0.219
36:00:00	0.000	0.000	0.000	0.000	0.216	0.216
37:00:00	0.000	0.000	0.000	0.000	0.213	0.213
38:00:00	0.000	0.000	0.000	0.000	0.209	0.209
39:00:00	0.000	0.000	0.000	0.000	0.206	0.206
40:00:00	0.000	0.000	0.000	0.000	0.203	0.203
41:00:00	0.000	0.000	0.000	0.000	0.200	0.200
42:00:00	0.000	0.000	0.000	0.000	0.197	0.197
43:00:00	0.000	0.000	0.000	0.000	0.194	0.194
44:00:00	0.000	0.000	0.000	0.000	0.191	0.191
45:00:00	0.000	0.000	0.000	0.000	0.188	0.188
46:00:00	0.000	0.000	0.000	0.000	0.186	0.186
47:00:00	0.000	0.000	0.000	0.000	0.183	0.183
48:00:00	0.000	0.000	0.000	0.000	0.180	0.180
49:00:00	0.000	0.000	0.000	0.000	0.177	0.177
50:00:00	0.000	0.000	0.000	0.000	0.175	0.175
51:00:00	0.000	0.000	0.000	0.000	0.172	0.172
52:00:00	0.000	0.000	0.000	0.000	0.170	0.170
53:00:00	0.000	0.000	0.000	0.000	0.167	0.167
54:00:00	0.000	0.000	0.000	0.000	0.165	0.165
55:00:00	0.000	0.000	0.000	0.000	0.162	0.162
56:00:00	0.000	0.000	0.000	0.000	0.160	0.160
57:00:00	0.000	0.000	0.000	0.000	0.157	0.157
58:00:00	0.000	0.000	0.000	0.000	0.155	0.155
59:00:00	0.000	0.000	0.000	0.000	0.153	0.153
60:00:00	0.000	0.000	0.000	0.000	0.150	0.150
61:00:00	0.000	0.000	0.000	0.000	0.148	0.148
62:00:00	0.000	0.000	0.000	0.000	0.146	0.146
63:00:00	0.000	0.000	0.000	0.000	0.144	0.144
64:00:00	0.000	0.000	0.000	0.000	0.142	0.142
65:00:00	0.000	0.000	0.000	0.000	0.139	0.139
66:00:00	0.000	0.000	0.000	0.000	0.137	0.137
67:00:00	0.000	0.000	0.000	0.000	0.135	0.135
68:00:00	0.000	0.000	0.000	0.000	0.133	0.133
69:00:00	0.000	0.000	0.000	0.000	0.131	0.131
70:00:00	0.000	0.000	0.000	0.000	0.129	0.129

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
71:00:00	0.000	0.000	0.000	0.000	0.127	0.127
72:00:00	0.000	0.000	0.000	0.000	0.126	0.126
73:00:00	0.000	0.000	0.000	0.000	0.124	0.124
74:00:00	0.000	0.000	0.000	0.000	0.122	0.122
75:00:00	0.000	0.000	0.000	0.000	0.120	0.120
76:00:00	0.000	0.000	0.000	0.000	0.118	0.118
77:00:00	0.000	0.000	0.000	0.000	0.116	0.116
78:00:00	0.000	0.000	0.000	0.000	0.115	0.115
79:00:00	0.000	0.000	0.000	0.000	0.113	0.113
80:00:00	0.000	0.000	0.000	0.000	0.111	0.111
81:00:00	0.000	0.000	0.000	0.000	0.110	0.110
82:00:00	0.000	0.000	0.000	0.000	0.108	0.108
83:00:00	0.000	0.000	0.000	0.000	0.106	0.106
84:00:00	0.000	0.000	0.000	0.000	0.105	0.105
85:00:00	0.000	0.000	0.000	0.000	0.103	0.103
86:00:00	0.000	0.000	0.000	0.000	0.102	0.102
87:00:00	0.000	0.000	0.000	0.000	0.100	0.100
88:00:00	0.000	0.000	0.000	0.000	0.099	0.099
89:00:00	0.000	0.000	0.000	0.000	0.097	0.097
90:00:00	0.000	0.000	0.000	0.000	0.096	0.096
91:00:00	0.000	0.000	0.000	0.000	0.094	0.094
92:00:00	0.000	0.000	0.000	0.000	0.093	0.093
93:00:00	0.000	0.000	0.000	0.000	0.092	0.092
94:00:00	0.000	0.000	0.000	0.000	0.090	0.090
95:00:00	0.000	0.000	0.000	0.000	0.089	0.089
96:00:00	0.000	0.000	0.000	0.000	0.087	0.087
97:00:00	0.000	0.000	0.000	0.000	0.086	0.086
98:00:00	0.000	0.000	0.000	0.000	0.085	0.085
99:00:00	0.000	0.000	0.000	0.000	0.084	0.084
100:00:00	0.000	0.000	0.000	0.000	0.082	0.082
101:00:00	0.000	0.000	0.000	0.000	0.081	0.081
102:00:00	0.000	0.000	0.000	0.000	0.080	0.080
103:00:00	0.000	0.000	0.000	0.000	0.079	0.079
104:00:00	0.000	0.000	0.000	0.000	0.078	0.078
105:00:00	0.000	0.000	0.000	0.000	0.076	0.076
106:00:00	0.000	0.000	0.000	0.000	0.075	0.075

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
107:00:00	0.000	0.000	0.000	0.000	0.074	0.074
108:00:00	0.000	0.000	0.000	0.000	0.073	0.073
109:00:00	0.000	0.000	0.000	0.000	0.072	0.072
110:00:00	0.000	0.000	0.000	0.000	0.071	0.071
111:00:00	0.000	0.000	0.000	0.000	0.070	0.070
112:00:00	0.000	0.000	0.000	0.000	0.069	0.069
113:00:00	0.000	0.000	0.000	0.000	0.068	0.068
114:00:00	0.000	0.000	0.000	0.000	0.067	0.067
115:00:00	0.000	0.000	0.000	0.000	0.066	0.066
116:00:00	0.000	0.000	0.000	0.000	0.065	0.065
117:00:00	0.000	0.000	0.000	0.000	0.064	0.064
118:00:00	0.000	0.000	0.000	0.000	0.063	0.063
119:00:00	0.000	0.000	0.000	0.000	0.062	0.062
120:00:00	0.000	0.000	0.000	0.000	0.061	0.061
121:00:00	0.000	0.000	0.000	0.000	0.060	0.060
122:00:00	0.000	0.000	0.000	0.000	0.059	0.059
123:00:00	0.000	0.000	0.000	0.000	0.058	0.058
124:00:00	0.000	0.000	0.000	0.000	0.057	0.057
125:00:00	0.000	0.000	0.000	0.000	0.057	0.057
126:00:00	0.000	0.000	0.000	0.000	0.056	0.056
127:00:00	0.000	0.000	0.000	0.000	0.055	0.055
128:00:00	0.000	0.000	0.000	0.000	0.054	0.054
129:00:00	0.000	0.000	0.000	0.000	0.053	0.053
130:00:00	0.000	0.000	0.000	0.000	0.052	0.052
131:00:00	0.000	0.000	0.000	0.000	0.052	0.052
132:00:00	0.000	0.000	0.000	0.000	0.051	0.051
133:00:00	0.000	0.000	0.000	0.000	0.050	0.050
134:00:00	0.000	0.000	0.000	0.000	0.049	0.049
135:00:00	0.000	0.000	0.000	0.000	0.049	0.049
136:00:00	0.000	0.000	0.000	0.000	0.048	0.048
137:00:00	0.000	0.000	0.000	0.000	0.047	0.047
138:00:00	0.000	0.000	0.000	0.000	0.047	0.047
139:00:00	0.000	0.000	0.000	0.000	0.046	0.046
140:00:00	0.000	0.000	0.000	0.000	0.045	0.045
141:00:00	0.000	0.000	0.000	0.000	0.044	0.044
142:00:00	0.000	0.000	0.000	0.000	0.044	0.044

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
143:00:00	0.000	0.000	0.000	0.000	0.043	0.043
144:00:00	0.000	0.000	0.000	0.000	0.042	0.042
145:00:00	0.000	0.000	0.000	0.000	0.042	0.042
146:00:00	0.000	0.000	0.000	0.000	0.041	0.041
147:00:00	0.000	0.000	0.000	0.000	0.041	0.041
148:00:00	0.000	0.000	0.000	0.000	0.040	0.040
149:00:00	0.000	0.000	0.000	0.000	0.039	0.039
150:00:00	0.000	0.000	0.000	0.000	0.039	0.039
151:00:00	0.000	0.000	0.000	0.000	0.038	0.038
152:00:00	0.000	0.000	0.000	0.000	0.038	0.038
153:00:00	0.000	0.000	0.000	0.000	0.037	0.037
154:00:00	0.000	0.000	0.000	0.000	0.037	0.037
155:00:00	0.000	0.000	0.000	0.000	0.036	0.036
156:00:00	0.000	0.000	0.000	0.000	0.035	0.035
157:00:00	0.000	0.000	0.000	0.000	0.035	0.035
158:00:00	0.000	0.000	0.000	0.000	0.034	0.034
159:00:00	0.000	0.000	0.000	0.000	0.034	0.034
160:00:00	0.000	0.000	0.000	0.000	0.033	0.033
161:00:00	0.000	0.000	0.000	0.000	0.033	0.033
162:00:00	0.000	0.000	0.000	0.000	0.032	0.032
163:00:00	0.000	0.000	0.000	0.000	0.032	0.032
164:00:00	0.000	0.000	0.000	0.000	0.031	0.031
165:00:00	0.000	0.000	0.000	0.000	0.031	0.031
166:00:00	0.000	0.000	0.000	0.000	0.031	0.031
167:00:00	0.000	0.000	0.000	0.000	0.030	0.030
168:00:00	0.000	0.000	0.000	0.000	0.030	0.030
169:00:00	0.000	0.000	0.000	0.000	0.029	0.029
170:00:00	0.000	0.000	0.000	0.000	0.029	0.029
171:00:00	0.000	0.000	0.000	0.000	0.028	0.028

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km²)	18.49	No
ALTBAR	80	No
ASPBAR	37	No
ASPVAR	0.35	No
BFIHOST	0.88	No
BFIHOST19	0.87	No
DPLBAR (km)	5.03	No
DPSBAR (mkm-¹)	41	No
FARL	1	No
LDP	8.95	No
PROPWET	0.34	No
RMED1H	12.3	No
RMED1D	35.1	No
RMED2D	49.5	No
SAAR (mm)	770	No
SAAR4170 (mm)	776	No
SPRHOST	13.15	No
Urbext2000	0.01	No
Urbext1990	0.01	No
URBCONC	0.54	No
URBLOC	0.8	No
DDF parameter C	-0.02	No
DDF parameter D1	0.33	No
DDF parameter D2	0.42	No
DDF parameter D3	0.28	No
DDF parameter E	0.31	No
DDF parameter F	2.53	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.33	No
DDF parameter D2 (1km grid value)	0.44	No
DDF parameter D3 (1km grid value)	0.22	No
DDF parameter E (1km grid value)	0.31	No
DDF parameter F (1km grid value)	2.52	No

UK Design Flood Estimation

Generated on Tuesday, December 6, 2022 3:44:09 PM by phill
Printed from the ReFH2 Flood Modelling software package, version 3.3.8355.27598

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: C65B-CD88

Site name: FEH_Catchment_Descriptors_627150_153750_v4_0_0

Easting: 627150

Northing: 153750

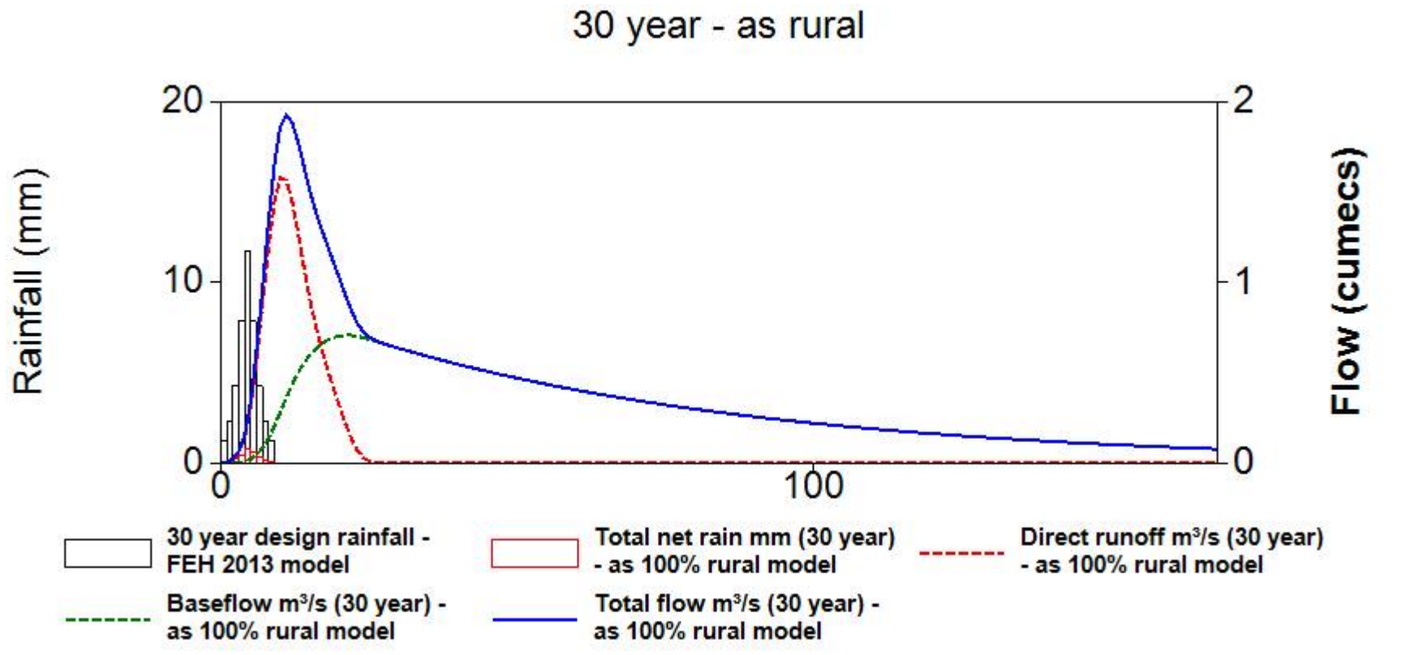
Country: England, Wales or Northern Ireland

Catchment Area (km²): 18.49

Using plot scale calculations: No

Model: 2.3

Site description: None



Model run: 30 year

Summary of results

Rainfall - FEH 2013 model (mm):	62.27	Total runoff (ML):	60.17
Total Rainfall (mm):	43.11	Total flow (ML):	240.88
Peak Rainfall (mm):	11.72	Peak flow (m³/s):	2.04

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	09:00:00	No
Timestep (hh:mm:ss)	01:00:00	No
SCF (Seasonal correction factor)	0.73	No
ARF (Areal reduction factor)	0.95	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	54.21	No
Cmax (mm)	1073.54	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	5.08	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m³/s)	0	No
BL (hr)	66.47	No
BR	3.54	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km²)	0.35	No
Urbext 2000	0.01	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km²)	0.00	Yes
Sewer capacity (m³/s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	1.232	0.000	0.069	0.000	0.003	0.003
01:00:00	2.311	0.000	0.133	0.005	0.003	0.008
02:00:00	4.298	0.000	0.261	0.024	0.004	0.028
03:00:00	7.850	0.000	0.522	0.070	0.006	0.076
04:00:00	11.723	0.000	0.885	0.171	0.011	0.183
05:00:00	7.850	0.000	0.664	0.368	0.023	0.391
06:00:00	4.298	0.000	0.388	0.660	0.046	0.707
07:00:00	2.311	0.000	0.216	1.000	0.084	1.084
08:00:00	1.232	0.000	0.117	1.330	0.137	1.467
09:00:00	0.000	0.000	0.000	1.591	0.204	1.796
10:00:00	0.000	0.000	0.000	1.714	0.281	1.995
11:00:00	0.000	0.000	0.000	1.678	0.360	2.038
12:00:00	0.000	0.000	0.000	1.538	0.434	1.972
13:00:00	0.000	0.000	0.000	1.346	0.499	1.844
14:00:00	0.000	0.000	0.000	1.137	0.553	1.690
15:00:00	0.000	0.000	0.000	0.942	0.597	1.540
16:00:00	0.000	0.000	0.000	0.781	0.632	1.413
17:00:00	0.000	0.000	0.000	0.644	0.659	1.303
18:00:00	0.000	0.000	0.000	0.522	0.680	1.202
19:00:00	0.000	0.000	0.000	0.412	0.694	1.106
20:00:00	0.000	0.000	0.000	0.311	0.703	1.014
21:00:00	0.000	0.000	0.000	0.217	0.706	0.924
22:00:00	0.000	0.000	0.000	0.134	0.705	0.839
23:00:00	0.000	0.000	0.000	0.071	0.700	0.771
24:00:00	0.000	0.000	0.000	0.032	0.692	0.724
25:00:00	0.000	0.000	0.000	0.012	0.683	0.695
26:00:00	0.000	0.000	0.000	0.003	0.673	0.676
27:00:00	0.000	0.000	0.000	0.000	0.663	0.664
28:00:00	0.000	0.000	0.000	0.000	0.654	0.654
29:00:00	0.000	0.000	0.000	0.000	0.644	0.644
30:00:00	0.000	0.000	0.000	0.000	0.634	0.634
31:00:00	0.000	0.000	0.000	0.000	0.625	0.625
32:00:00	0.000	0.000	0.000	0.000	0.615	0.615
33:00:00	0.000	0.000	0.000	0.000	0.606	0.606
34:00:00	0.000	0.000	0.000	0.000	0.597	0.597

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
35:00:00	0.000	0.000	0.000	0.000	0.588	0.588
36:00:00	0.000	0.000	0.000	0.000	0.579	0.579
37:00:00	0.000	0.000	0.000	0.000	0.571	0.571
38:00:00	0.000	0.000	0.000	0.000	0.562	0.562
39:00:00	0.000	0.000	0.000	0.000	0.554	0.554
40:00:00	0.000	0.000	0.000	0.000	0.546	0.546
41:00:00	0.000	0.000	0.000	0.000	0.537	0.537
42:00:00	0.000	0.000	0.000	0.000	0.529	0.529
43:00:00	0.000	0.000	0.000	0.000	0.522	0.522
44:00:00	0.000	0.000	0.000	0.000	0.514	0.514
45:00:00	0.000	0.000	0.000	0.000	0.506	0.506
46:00:00	0.000	0.000	0.000	0.000	0.499	0.499
47:00:00	0.000	0.000	0.000	0.000	0.491	0.491
48:00:00	0.000	0.000	0.000	0.000	0.484	0.484
49:00:00	0.000	0.000	0.000	0.000	0.477	0.477
50:00:00	0.000	0.000	0.000	0.000	0.469	0.469
51:00:00	0.000	0.000	0.000	0.000	0.462	0.462
52:00:00	0.000	0.000	0.000	0.000	0.456	0.456
53:00:00	0.000	0.000	0.000	0.000	0.449	0.449
54:00:00	0.000	0.000	0.000	0.000	0.442	0.442
55:00:00	0.000	0.000	0.000	0.000	0.435	0.435
56:00:00	0.000	0.000	0.000	0.000	0.429	0.429
57:00:00	0.000	0.000	0.000	0.000	0.423	0.423
58:00:00	0.000	0.000	0.000	0.000	0.416	0.416
59:00:00	0.000	0.000	0.000	0.000	0.410	0.410
60:00:00	0.000	0.000	0.000	0.000	0.404	0.404
61:00:00	0.000	0.000	0.000	0.000	0.398	0.398
62:00:00	0.000	0.000	0.000	0.000	0.392	0.392
63:00:00	0.000	0.000	0.000	0.000	0.386	0.386
64:00:00	0.000	0.000	0.000	0.000	0.380	0.380
65:00:00	0.000	0.000	0.000	0.000	0.375	0.375
66:00:00	0.000	0.000	0.000	0.000	0.369	0.369
67:00:00	0.000	0.000	0.000	0.000	0.363	0.363
68:00:00	0.000	0.000	0.000	0.000	0.358	0.358
69:00:00	0.000	0.000	0.000	0.000	0.353	0.353
70:00:00	0.000	0.000	0.000	0.000	0.347	0.347

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
71:00:00	0.000	0.000	0.000	0.000	0.342	0.342
72:00:00	0.000	0.000	0.000	0.000	0.337	0.337
73:00:00	0.000	0.000	0.000	0.000	0.332	0.332
74:00:00	0.000	0.000	0.000	0.000	0.327	0.327
75:00:00	0.000	0.000	0.000	0.000	0.322	0.322
76:00:00	0.000	0.000	0.000	0.000	0.317	0.317
77:00:00	0.000	0.000	0.000	0.000	0.313	0.313
78:00:00	0.000	0.000	0.000	0.000	0.308	0.308
79:00:00	0.000	0.000	0.000	0.000	0.303	0.303
80:00:00	0.000	0.000	0.000	0.000	0.299	0.299
81:00:00	0.000	0.000	0.000	0.000	0.294	0.294
82:00:00	0.000	0.000	0.000	0.000	0.290	0.290
83:00:00	0.000	0.000	0.000	0.000	0.286	0.286
84:00:00	0.000	0.000	0.000	0.000	0.281	0.281
85:00:00	0.000	0.000	0.000	0.000	0.277	0.277
86:00:00	0.000	0.000	0.000	0.000	0.273	0.273
87:00:00	0.000	0.000	0.000	0.000	0.269	0.269
88:00:00	0.000	0.000	0.000	0.000	0.265	0.265
89:00:00	0.000	0.000	0.000	0.000	0.261	0.261
90:00:00	0.000	0.000	0.000	0.000	0.257	0.257
91:00:00	0.000	0.000	0.000	0.000	0.253	0.253
92:00:00	0.000	0.000	0.000	0.000	0.250	0.250
93:00:00	0.000	0.000	0.000	0.000	0.246	0.246
94:00:00	0.000	0.000	0.000	0.000	0.242	0.242
95:00:00	0.000	0.000	0.000	0.000	0.239	0.239
96:00:00	0.000	0.000	0.000	0.000	0.235	0.235
97:00:00	0.000	0.000	0.000	0.000	0.231	0.231
98:00:00	0.000	0.000	0.000	0.000	0.228	0.228
99:00:00	0.000	0.000	0.000	0.000	0.225	0.225
100:00:00	0.000	0.000	0.000	0.000	0.221	0.221
101:00:00	0.000	0.000	0.000	0.000	0.218	0.218
102:00:00	0.000	0.000	0.000	0.000	0.215	0.215
103:00:00	0.000	0.000	0.000	0.000	0.211	0.211
104:00:00	0.000	0.000	0.000	0.000	0.208	0.208
105:00:00	0.000	0.000	0.000	0.000	0.205	0.205
106:00:00	0.000	0.000	0.000	0.000	0.202	0.202

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
107:00:00	0.000	0.000	0.000	0.000	0.199	0.199
108:00:00	0.000	0.000	0.000	0.000	0.196	0.196
109:00:00	0.000	0.000	0.000	0.000	0.193	0.193
110:00:00	0.000	0.000	0.000	0.000	0.190	0.190
111:00:00	0.000	0.000	0.000	0.000	0.188	0.188
112:00:00	0.000	0.000	0.000	0.000	0.185	0.185
113:00:00	0.000	0.000	0.000	0.000	0.182	0.182
114:00:00	0.000	0.000	0.000	0.000	0.179	0.179
115:00:00	0.000	0.000	0.000	0.000	0.177	0.177
116:00:00	0.000	0.000	0.000	0.000	0.174	0.174
117:00:00	0.000	0.000	0.000	0.000	0.171	0.171
118:00:00	0.000	0.000	0.000	0.000	0.169	0.169
119:00:00	0.000	0.000	0.000	0.000	0.166	0.166
120:00:00	0.000	0.000	0.000	0.000	0.164	0.164
121:00:00	0.000	0.000	0.000	0.000	0.161	0.161
122:00:00	0.000	0.000	0.000	0.000	0.159	0.159
123:00:00	0.000	0.000	0.000	0.000	0.157	0.157
124:00:00	0.000	0.000	0.000	0.000	0.154	0.154
125:00:00	0.000	0.000	0.000	0.000	0.152	0.152
126:00:00	0.000	0.000	0.000	0.000	0.150	0.150
127:00:00	0.000	0.000	0.000	0.000	0.147	0.147
128:00:00	0.000	0.000	0.000	0.000	0.145	0.145
129:00:00	0.000	0.000	0.000	0.000	0.143	0.143
130:00:00	0.000	0.000	0.000	0.000	0.141	0.141
131:00:00	0.000	0.000	0.000	0.000	0.139	0.139
132:00:00	0.000	0.000	0.000	0.000	0.137	0.137
133:00:00	0.000	0.000	0.000	0.000	0.135	0.135
134:00:00	0.000	0.000	0.000	0.000	0.133	0.133
135:00:00	0.000	0.000	0.000	0.000	0.131	0.131
136:00:00	0.000	0.000	0.000	0.000	0.129	0.129
137:00:00	0.000	0.000	0.000	0.000	0.127	0.127
138:00:00	0.000	0.000	0.000	0.000	0.125	0.125
139:00:00	0.000	0.000	0.000	0.000	0.123	0.123
140:00:00	0.000	0.000	0.000	0.000	0.121	0.121
141:00:00	0.000	0.000	0.000	0.000	0.119	0.119
142:00:00	0.000	0.000	0.000	0.000	0.118	0.118

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
143:00:00	0.000	0.000	0.000	0.000	0.116	0.116
144:00:00	0.000	0.000	0.000	0.000	0.114	0.114
145:00:00	0.000	0.000	0.000	0.000	0.112	0.112
146:00:00	0.000	0.000	0.000	0.000	0.111	0.111
147:00:00	0.000	0.000	0.000	0.000	0.109	0.109
148:00:00	0.000	0.000	0.000	0.000	0.107	0.107
149:00:00	0.000	0.000	0.000	0.000	0.106	0.106
150:00:00	0.000	0.000	0.000	0.000	0.104	0.104
151:00:00	0.000	0.000	0.000	0.000	0.103	0.103
152:00:00	0.000	0.000	0.000	0.000	0.101	0.101
153:00:00	0.000	0.000	0.000	0.000	0.100	0.100
154:00:00	0.000	0.000	0.000	0.000	0.098	0.098
155:00:00	0.000	0.000	0.000	0.000	0.097	0.097
156:00:00	0.000	0.000	0.000	0.000	0.095	0.095
157:00:00	0.000	0.000	0.000	0.000	0.094	0.094
158:00:00	0.000	0.000	0.000	0.000	0.092	0.092
159:00:00	0.000	0.000	0.000	0.000	0.091	0.091
160:00:00	0.000	0.000	0.000	0.000	0.090	0.090
161:00:00	0.000	0.000	0.000	0.000	0.088	0.088
162:00:00	0.000	0.000	0.000	0.000	0.087	0.087
163:00:00	0.000	0.000	0.000	0.000	0.086	0.086
164:00:00	0.000	0.000	0.000	0.000	0.084	0.084
165:00:00	0.000	0.000	0.000	0.000	0.083	0.083
166:00:00	0.000	0.000	0.000	0.000	0.082	0.082
167:00:00	0.000	0.000	0.000	0.000	0.081	0.081
168:00:00	0.000	0.000	0.000	0.000	0.080	0.080
169:00:00	0.000	0.000	0.000	0.000	0.078	0.078
170:00:00	0.000	0.000	0.000	0.000	0.077	0.077
171:00:00	0.000	0.000	0.000	0.000	0.076	0.076

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km²)	18.49	No
ALTBAR	80	No
ASPBAR	37	No
ASPVAR	0.35	No
BFIHOST	0.88	No
BFIHOST19	0.87	No
DPLBAR (km)	5.03	No
DPSBAR (mkm-¹)	41	No
FARL	1	No
LDP	8.95	No
PROPWET	0.34	No
RMED1H	12.3	No
RMED1D	35.1	No
RMED2D	49.5	No
SAAR (mm)	770	No
SAAR4170 (mm)	776	No
SPRHOST	13.15	No
Urbext2000	0.01	No
Urbext1990	0.01	No
URBCONC	0.54	No
URBLOC	0.8	No
DDF parameter C	-0.02	No
DDF parameter D1	0.33	No
DDF parameter D2	0.42	No
DDF parameter D3	0.28	No
DDF parameter E	0.31	No
DDF parameter F	2.53	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.33	No
DDF parameter D2 (1km grid value)	0.44	No
DDF parameter D3 (1km grid value)	0.22	No
DDF parameter E (1km grid value)	0.31	No
DDF parameter F (1km grid value)	2.52	No

UK Design Flood Estimation

Generated on Tuesday, December 6, 2022 3:43:11 PM by phill
Printed from the ReFH2 Flood Modelling software package, version 3.3.8355.27598

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: C65B-CD88

Site name: FEH_Catchment_Descriptors_627150_153750_v4_0_0

Easting: 627150

Northing: 153750

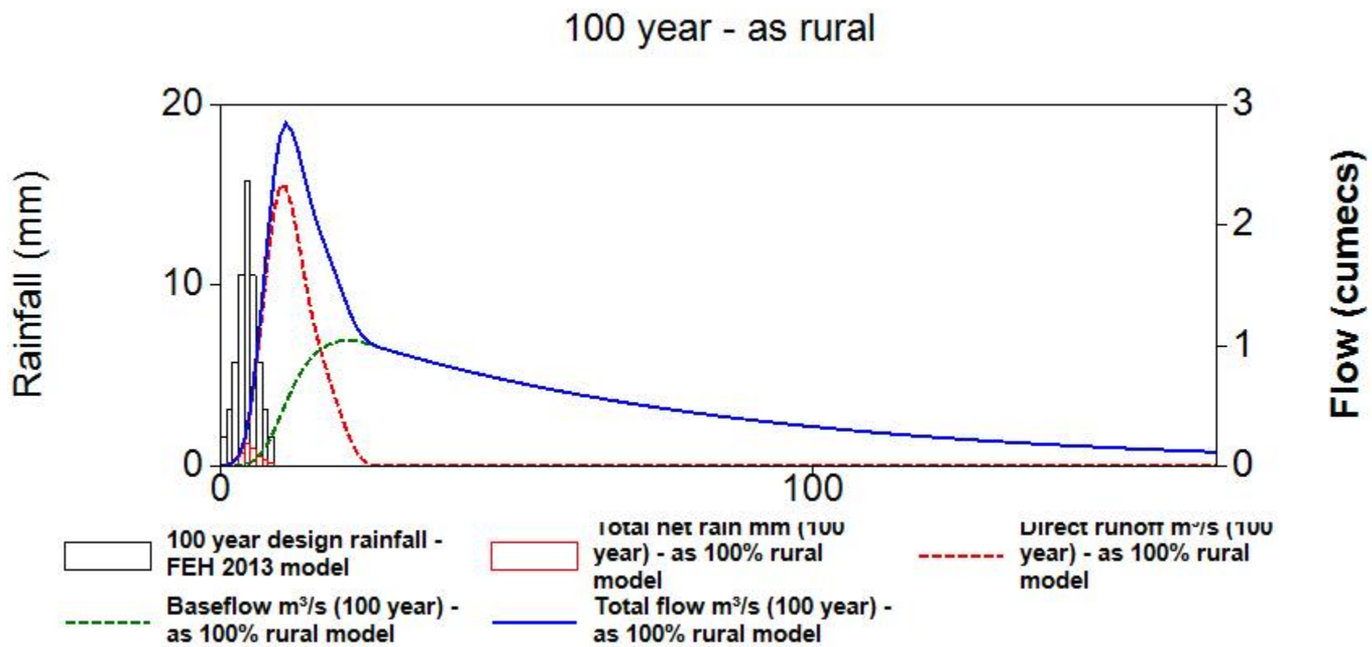
Country: England, Wales or Northern Ireland

Catchment Area (km²): 18.49

Using plot scale calculations: No

Model: 2.3

Site description: None



Model run: 100 year

Summary of results

Rainfall - FEH 2013 model (mm):	83.63	Total runoff (ML):	88.14
Total Rainfall (mm):	57.89	Total flow (ML):	354.14
Peak Rainfall (mm):	15.75	Peak flow (m³/s):	2.99

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	09:00:00	No
Timestep (hh:mm:ss)	01:00:00	No
SCF (Seasonal correction factor)	0.73	No
ARF (Areal reduction factor)	0.95	No
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	54.21	No
Cmax (mm)	1073.54	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	5.08	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m³/s)	0	No
BL (hr)	66.47	No
BR	3.54	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km²)	0.35	No
Urbext 2000	0.01	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km²)	0.00	Yes
Sewer capacity (m³/s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	1.654	0.000	0.093	0.000	0.003	0.003
01:00:00	3.104	0.000	0.182	0.007	0.003	0.010
02:00:00	5.772	0.000	0.361	0.032	0.004	0.037
03:00:00	10.544	0.000	0.740	0.096	0.007	0.103
04:00:00	15.745	0.000	1.297	0.236	0.014	0.250
05:00:00	10.544	0.000	0.997	0.513	0.031	0.544
06:00:00	5.772	0.000	0.589	0.934	0.064	0.998
07:00:00	3.104	0.000	0.330	1.429	0.118	1.547
08:00:00	1.654	0.000	0.179	1.917	0.195	2.112
09:00:00	0.000	0.000	0.000	2.312	0.293	2.605
10:00:00	0.000	0.000	0.000	2.508	0.406	2.913
11:00:00	0.000	0.000	0.000	2.468	0.522	2.990
12:00:00	0.000	0.000	0.000	2.271	0.632	2.902
13:00:00	0.000	0.000	0.000	1.992	0.729	2.720
14:00:00	0.000	0.000	0.000	1.685	0.810	2.495
15:00:00	0.000	0.000	0.000	1.397	0.876	2.273
16:00:00	0.000	0.000	0.000	1.159	0.928	2.087
17:00:00	0.000	0.000	0.000	0.956	0.969	1.925
18:00:00	0.000	0.000	0.000	0.778	0.999	1.777
19:00:00	0.000	0.000	0.000	0.616	1.021	1.637
20:00:00	0.000	0.000	0.000	0.467	1.034	1.502
21:00:00	0.000	0.000	0.000	0.328	1.040	1.368
22:00:00	0.000	0.000	0.000	0.204	1.039	1.243
23:00:00	0.000	0.000	0.000	0.108	1.032	1.140
24:00:00	0.000	0.000	0.000	0.049	1.020	1.070
25:00:00	0.000	0.000	0.000	0.019	1.007	1.026
26:00:00	0.000	0.000	0.000	0.005	0.993	0.997
27:00:00	0.000	0.000	0.000	0.000	0.978	0.978
28:00:00	0.000	0.000	0.000	0.000	0.963	0.963
29:00:00	0.000	0.000	0.000	0.000	0.949	0.949
30:00:00	0.000	0.000	0.000	0.000	0.935	0.935
31:00:00	0.000	0.000	0.000	0.000	0.921	0.921
32:00:00	0.000	0.000	0.000	0.000	0.907	0.907
33:00:00	0.000	0.000	0.000	0.000	0.893	0.893
34:00:00	0.000	0.000	0.000	0.000	0.880	0.880

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
35:00:00	0.000	0.000	0.000	0.000	0.867	0.867
36:00:00	0.000	0.000	0.000	0.000	0.854	0.854
37:00:00	0.000	0.000	0.000	0.000	0.841	0.841
38:00:00	0.000	0.000	0.000	0.000	0.829	0.829
39:00:00	0.000	0.000	0.000	0.000	0.816	0.816
40:00:00	0.000	0.000	0.000	0.000	0.804	0.804
41:00:00	0.000	0.000	0.000	0.000	0.792	0.792
42:00:00	0.000	0.000	0.000	0.000	0.780	0.780
43:00:00	0.000	0.000	0.000	0.000	0.769	0.769
44:00:00	0.000	0.000	0.000	0.000	0.757	0.757
45:00:00	0.000	0.000	0.000	0.000	0.746	0.746
46:00:00	0.000	0.000	0.000	0.000	0.735	0.735
47:00:00	0.000	0.000	0.000	0.000	0.724	0.724
48:00:00	0.000	0.000	0.000	0.000	0.713	0.713
49:00:00	0.000	0.000	0.000	0.000	0.702	0.702
50:00:00	0.000	0.000	0.000	0.000	0.692	0.692
51:00:00	0.000	0.000	0.000	0.000	0.682	0.682
52:00:00	0.000	0.000	0.000	0.000	0.671	0.671
53:00:00	0.000	0.000	0.000	0.000	0.661	0.661
54:00:00	0.000	0.000	0.000	0.000	0.651	0.651
55:00:00	0.000	0.000	0.000	0.000	0.642	0.642
56:00:00	0.000	0.000	0.000	0.000	0.632	0.632
57:00:00	0.000	0.000	0.000	0.000	0.623	0.623
58:00:00	0.000	0.000	0.000	0.000	0.613	0.613
59:00:00	0.000	0.000	0.000	0.000	0.604	0.604
60:00:00	0.000	0.000	0.000	0.000	0.595	0.595
61:00:00	0.000	0.000	0.000	0.000	0.586	0.586
62:00:00	0.000	0.000	0.000	0.000	0.578	0.578
63:00:00	0.000	0.000	0.000	0.000	0.569	0.569
64:00:00	0.000	0.000	0.000	0.000	0.560	0.560
65:00:00	0.000	0.000	0.000	0.000	0.552	0.552
66:00:00	0.000	0.000	0.000	0.000	0.544	0.544
67:00:00	0.000	0.000	0.000	0.000	0.536	0.536
68:00:00	0.000	0.000	0.000	0.000	0.528	0.528
69:00:00	0.000	0.000	0.000	0.000	0.520	0.520
70:00:00	0.000	0.000	0.000	0.000	0.512	0.512

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
71:00:00	0.000	0.000	0.000	0.000	0.504	0.504
72:00:00	0.000	0.000	0.000	0.000	0.497	0.497
73:00:00	0.000	0.000	0.000	0.000	0.489	0.489
74:00:00	0.000	0.000	0.000	0.000	0.482	0.482
75:00:00	0.000	0.000	0.000	0.000	0.475	0.475
76:00:00	0.000	0.000	0.000	0.000	0.468	0.468
77:00:00	0.000	0.000	0.000	0.000	0.461	0.461
78:00:00	0.000	0.000	0.000	0.000	0.454	0.454
79:00:00	0.000	0.000	0.000	0.000	0.447	0.447
80:00:00	0.000	0.000	0.000	0.000	0.441	0.441
81:00:00	0.000	0.000	0.000	0.000	0.434	0.434
82:00:00	0.000	0.000	0.000	0.000	0.428	0.428
83:00:00	0.000	0.000	0.000	0.000	0.421	0.421
84:00:00	0.000	0.000	0.000	0.000	0.415	0.415
85:00:00	0.000	0.000	0.000	0.000	0.409	0.409
86:00:00	0.000	0.000	0.000	0.000	0.403	0.403
87:00:00	0.000	0.000	0.000	0.000	0.397	0.397
88:00:00	0.000	0.000	0.000	0.000	0.391	0.391
89:00:00	0.000	0.000	0.000	0.000	0.385	0.385
90:00:00	0.000	0.000	0.000	0.000	0.379	0.379
91:00:00	0.000	0.000	0.000	0.000	0.373	0.373
92:00:00	0.000	0.000	0.000	0.000	0.368	0.368
93:00:00	0.000	0.000	0.000	0.000	0.362	0.362
94:00:00	0.000	0.000	0.000	0.000	0.357	0.357
95:00:00	0.000	0.000	0.000	0.000	0.352	0.352
96:00:00	0.000	0.000	0.000	0.000	0.346	0.346
97:00:00	0.000	0.000	0.000	0.000	0.341	0.341
98:00:00	0.000	0.000	0.000	0.000	0.336	0.336
99:00:00	0.000	0.000	0.000	0.000	0.331	0.331
100:00:00	0.000	0.000	0.000	0.000	0.326	0.326
101:00:00	0.000	0.000	0.000	0.000	0.321	0.321
102:00:00	0.000	0.000	0.000	0.000	0.316	0.316
103:00:00	0.000	0.000	0.000	0.000	0.312	0.312
104:00:00	0.000	0.000	0.000	0.000	0.307	0.307
105:00:00	0.000	0.000	0.000	0.000	0.302	0.302
106:00:00	0.000	0.000	0.000	0.000	0.298	0.298

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
107:00:00	0.000	0.000	0.000	0.000	0.294	0.294
108:00:00	0.000	0.000	0.000	0.000	0.289	0.289
109:00:00	0.000	0.000	0.000	0.000	0.285	0.285
110:00:00	0.000	0.000	0.000	0.000	0.281	0.281
111:00:00	0.000	0.000	0.000	0.000	0.276	0.276
112:00:00	0.000	0.000	0.000	0.000	0.272	0.272
113:00:00	0.000	0.000	0.000	0.000	0.268	0.268
114:00:00	0.000	0.000	0.000	0.000	0.264	0.264
115:00:00	0.000	0.000	0.000	0.000	0.260	0.260
116:00:00	0.000	0.000	0.000	0.000	0.256	0.256
117:00:00	0.000	0.000	0.000	0.000	0.253	0.253
118:00:00	0.000	0.000	0.000	0.000	0.249	0.249
119:00:00	0.000	0.000	0.000	0.000	0.245	0.245
120:00:00	0.000	0.000	0.000	0.000	0.241	0.241
121:00:00	0.000	0.000	0.000	0.000	0.238	0.238
122:00:00	0.000	0.000	0.000	0.000	0.234	0.234
123:00:00	0.000	0.000	0.000	0.000	0.231	0.231
124:00:00	0.000	0.000	0.000	0.000	0.227	0.227
125:00:00	0.000	0.000	0.000	0.000	0.224	0.224
126:00:00	0.000	0.000	0.000	0.000	0.221	0.221
127:00:00	0.000	0.000	0.000	0.000	0.217	0.217
128:00:00	0.000	0.000	0.000	0.000	0.214	0.214
129:00:00	0.000	0.000	0.000	0.000	0.211	0.211
130:00:00	0.000	0.000	0.000	0.000	0.208	0.208
131:00:00	0.000	0.000	0.000	0.000	0.205	0.205
132:00:00	0.000	0.000	0.000	0.000	0.202	0.202
133:00:00	0.000	0.000	0.000	0.000	0.198	0.198
134:00:00	0.000	0.000	0.000	0.000	0.196	0.196
135:00:00	0.000	0.000	0.000	0.000	0.193	0.193
136:00:00	0.000	0.000	0.000	0.000	0.190	0.190
137:00:00	0.000	0.000	0.000	0.000	0.187	0.187
138:00:00	0.000	0.000	0.000	0.000	0.184	0.184
139:00:00	0.000	0.000	0.000	0.000	0.181	0.181
140:00:00	0.000	0.000	0.000	0.000	0.179	0.179
141:00:00	0.000	0.000	0.000	0.000	0.176	0.176
142:00:00	0.000	0.000	0.000	0.000	0.173	0.173

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
143:00:00	0.000	0.000	0.000	0.000	0.171	0.171
144:00:00	0.000	0.000	0.000	0.000	0.168	0.168
145:00:00	0.000	0.000	0.000	0.000	0.166	0.166
146:00:00	0.000	0.000	0.000	0.000	0.163	0.163
147:00:00	0.000	0.000	0.000	0.000	0.161	0.161
148:00:00	0.000	0.000	0.000	0.000	0.158	0.158
149:00:00	0.000	0.000	0.000	0.000	0.156	0.156
150:00:00	0.000	0.000	0.000	0.000	0.154	0.154
151:00:00	0.000	0.000	0.000	0.000	0.151	0.151
152:00:00	0.000	0.000	0.000	0.000	0.149	0.149
153:00:00	0.000	0.000	0.000	0.000	0.147	0.147
154:00:00	0.000	0.000	0.000	0.000	0.145	0.145
155:00:00	0.000	0.000	0.000	0.000	0.143	0.143
156:00:00	0.000	0.000	0.000	0.000	0.140	0.140
157:00:00	0.000	0.000	0.000	0.000	0.138	0.138
158:00:00	0.000	0.000	0.000	0.000	0.136	0.136
159:00:00	0.000	0.000	0.000	0.000	0.134	0.134
160:00:00	0.000	0.000	0.000	0.000	0.132	0.132
161:00:00	0.000	0.000	0.000	0.000	0.130	0.130
162:00:00	0.000	0.000	0.000	0.000	0.128	0.128
163:00:00	0.000	0.000	0.000	0.000	0.126	0.126
164:00:00	0.000	0.000	0.000	0.000	0.125	0.125
165:00:00	0.000	0.000	0.000	0.000	0.123	0.123
166:00:00	0.000	0.000	0.000	0.000	0.121	0.121
167:00:00	0.000	0.000	0.000	0.000	0.119	0.119
168:00:00	0.000	0.000	0.000	0.000	0.117	0.117
169:00:00	0.000	0.000	0.000	0.000	0.115	0.115
170:00:00	0.000	0.000	0.000	0.000	0.114	0.114
171:00:00	0.000	0.000	0.000	0.000	0.112	0.112

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km²)	18.49	No
ALTBAR	80	No
ASPBAR	37	No
ASPVAR	0.35	No
BFIHOST	0.88	No
BFIHOST19	0.87	No
DPLBAR (km)	5.03	No
DPSBAR (mkm-¹)	41	No
FARL	1	No
LDP	8.95	No
PROPWET	0.34	No
RMED1H	12.3	No
RMED1D	35.1	No
RMED2D	49.5	No
SAAR (mm)	770	No
SAAR4170 (mm)	776	No
SPRHOST	13.15	No
Urbext2000	0.01	No
Urbext1990	0.01	No
URBCONC	0.54	No
URBLOC	0.8	No
DDF parameter C	-0.02	No
DDF parameter D1	0.33	No
DDF parameter D2	0.42	No
DDF parameter D3	0.28	No
DDF parameter E	0.31	No
DDF parameter F	2.53	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.33	No
DDF parameter D2 (1km grid value)	0.44	No
DDF parameter D3 (1km grid value)	0.22	No
DDF parameter E (1km grid value)	0.31	No
DDF parameter F (1km grid value)	2.52	No

UK Design Flood Estimation

Generated on Tuesday, December 6, 2022 3:40:57 PM by phill
Printed from the ReFH2 Flood Modelling software package, version 3.3.8355.27598

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: C65B-CD88

Site name: FEH_Catchment_Descriptors_627150_153750_v4_0_0

Easting: 627150

Northing: 153750

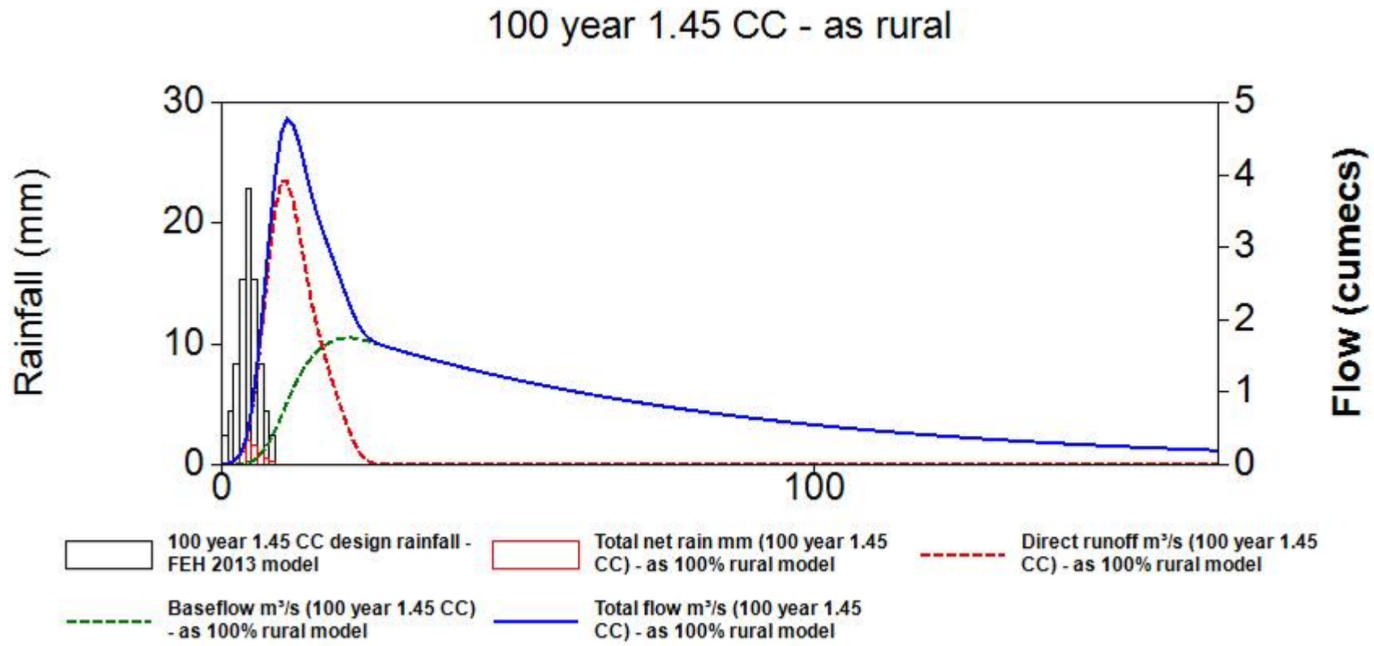
Country: England, Wales or Northern Ireland

Catchment Area (km²): 18.49

Using plot scale calculations: No

Model: 2.3

Site description: None



Model run: 100 year 1.45 CC

Summary of results

Rainfall - FEH 2013 model (mm):	121.26	Total runoff (ML):	146.54
Total Rainfall (mm):	83.94	Total flow (ML):	592.09
Peak Rainfall (mm):	22.83	Peak flow (m³/s):	4.98

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	09:00:00	No
Timestep (hh:mm:ss)	01:00:00	No
SCF (Seasonal correction factor)	0.73	No
ARF (Areal reduction factor)	0.95	No
Seasonality	Winter	No
Climate change factor	1.45	Yes

Loss model parameters

Name	Value	User-defined?
Cini (mm)	54.21	No
Cmax (mm)	1073.54	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	5.08	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m³/s)	0	No
BL (hr)	66.47	No
BR	3.54	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km²)	0.35	No
Urbext 2000	0.01	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km²)	0.00	Yes
Sewer capacity (m³/s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	2.399	0.000	0.136	0.000	0.003	0.003
01:00:00	4.501	0.000	0.269	0.010	0.004	0.013
02:00:00	8.369	0.000	0.551	0.047	0.005	0.052
03:00:00	15.288	0.000	1.174	0.142	0.009	0.151
04:00:00	22.830	0.000	2.156	0.356	0.020	0.376
05:00:00	15.288	0.000	1.714	0.794	0.046	0.840
06:00:00	8.369	0.000	1.030	1.476	0.098	1.574
07:00:00	4.501	0.000	0.581	2.292	0.185	2.477
08:00:00	2.399	0.000	0.317	3.114	0.311	3.425
09:00:00	0.000	0.000	0.000	3.798	0.473	4.272
10:00:00	0.000	0.000	0.000	4.161	0.661	4.822
11:00:00	0.000	0.000	0.000	4.126	0.857	4.983
12:00:00	0.000	0.000	0.000	3.816	1.043	4.859
13:00:00	0.000	0.000	0.000	3.359	1.208	4.567
14:00:00	0.000	0.000	0.000	2.846	1.347	4.194
15:00:00	0.000	0.000	0.000	2.363	1.460	3.822
16:00:00	0.000	0.000	0.000	1.961	1.549	3.510
17:00:00	0.000	0.000	0.000	1.622	1.618	3.240
18:00:00	0.000	0.000	0.000	1.323	1.671	2.994
19:00:00	0.000	0.000	0.000	1.053	1.708	2.762
20:00:00	0.000	0.000	0.000	0.803	1.732	2.535
21:00:00	0.000	0.000	0.000	0.568	1.743	2.311
22:00:00	0.000	0.000	0.000	0.357	1.741	2.098
23:00:00	0.000	0.000	0.000	0.191	1.730	1.921
24:00:00	0.000	0.000	0.000	0.087	1.712	1.799
25:00:00	0.000	0.000	0.000	0.033	1.689	1.722
26:00:00	0.000	0.000	0.000	0.008	1.665	1.674
27:00:00	0.000	0.000	0.000	0.000	1.641	1.641
28:00:00	0.000	0.000	0.000	0.000	1.616	1.616
29:00:00	0.000	0.000	0.000	0.000	1.592	1.592
30:00:00	0.000	0.000	0.000	0.000	1.568	1.568
31:00:00	0.000	0.000	0.000	0.000	1.545	1.545
32:00:00	0.000	0.000	0.000	0.000	1.522	1.522
33:00:00	0.000	0.000	0.000	0.000	1.499	1.499
34:00:00	0.000	0.000	0.000	0.000	1.477	1.477

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
35:00:00	0.000	0.000	0.000	0.000	1.455	1.455
36:00:00	0.000	0.000	0.000	0.000	1.433	1.433
37:00:00	0.000	0.000	0.000	0.000	1.411	1.411
38:00:00	0.000	0.000	0.000	0.000	1.390	1.390
39:00:00	0.000	0.000	0.000	0.000	1.370	1.370
40:00:00	0.000	0.000	0.000	0.000	1.349	1.349
41:00:00	0.000	0.000	0.000	0.000	1.329	1.329
42:00:00	0.000	0.000	0.000	0.000	1.309	1.309
43:00:00	0.000	0.000	0.000	0.000	1.290	1.290
44:00:00	0.000	0.000	0.000	0.000	1.270	1.270
45:00:00	0.000	0.000	0.000	0.000	1.251	1.251
46:00:00	0.000	0.000	0.000	0.000	1.233	1.233
47:00:00	0.000	0.000	0.000	0.000	1.214	1.214
48:00:00	0.000	0.000	0.000	0.000	1.196	1.196
49:00:00	0.000	0.000	0.000	0.000	1.178	1.178
50:00:00	0.000	0.000	0.000	0.000	1.161	1.161
51:00:00	0.000	0.000	0.000	0.000	1.143	1.143
52:00:00	0.000	0.000	0.000	0.000	1.126	1.126
53:00:00	0.000	0.000	0.000	0.000	1.110	1.110
54:00:00	0.000	0.000	0.000	0.000	1.093	1.093
55:00:00	0.000	0.000	0.000	0.000	1.077	1.077
56:00:00	0.000	0.000	0.000	0.000	1.061	1.061
57:00:00	0.000	0.000	0.000	0.000	1.045	1.045
58:00:00	0.000	0.000	0.000	0.000	1.029	1.029
59:00:00	0.000	0.000	0.000	0.000	1.014	1.014
60:00:00	0.000	0.000	0.000	0.000	0.999	0.999
61:00:00	0.000	0.000	0.000	0.000	0.984	0.984
62:00:00	0.000	0.000	0.000	0.000	0.969	0.969
63:00:00	0.000	0.000	0.000	0.000	0.955	0.955
64:00:00	0.000	0.000	0.000	0.000	0.940	0.940
65:00:00	0.000	0.000	0.000	0.000	0.926	0.926
66:00:00	0.000	0.000	0.000	0.000	0.912	0.912
67:00:00	0.000	0.000	0.000	0.000	0.899	0.899
68:00:00	0.000	0.000	0.000	0.000	0.885	0.885
69:00:00	0.000	0.000	0.000	0.000	0.872	0.872
70:00:00	0.000	0.000	0.000	0.000	0.859	0.859

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
71:00:00	0.000	0.000	0.000	0.000	0.846	0.846
72:00:00	0.000	0.000	0.000	0.000	0.834	0.834
73:00:00	0.000	0.000	0.000	0.000	0.821	0.821
74:00:00	0.000	0.000	0.000	0.000	0.809	0.809
75:00:00	0.000	0.000	0.000	0.000	0.797	0.797
76:00:00	0.000	0.000	0.000	0.000	0.785	0.785
77:00:00	0.000	0.000	0.000	0.000	0.773	0.773
78:00:00	0.000	0.000	0.000	0.000	0.762	0.762
79:00:00	0.000	0.000	0.000	0.000	0.750	0.750
80:00:00	0.000	0.000	0.000	0.000	0.739	0.739
81:00:00	0.000	0.000	0.000	0.000	0.728	0.728
82:00:00	0.000	0.000	0.000	0.000	0.717	0.717
83:00:00	0.000	0.000	0.000	0.000	0.707	0.707
84:00:00	0.000	0.000	0.000	0.000	0.696	0.696
85:00:00	0.000	0.000	0.000	0.000	0.686	0.686
86:00:00	0.000	0.000	0.000	0.000	0.675	0.675
87:00:00	0.000	0.000	0.000	0.000	0.665	0.665
88:00:00	0.000	0.000	0.000	0.000	0.655	0.655
89:00:00	0.000	0.000	0.000	0.000	0.646	0.646
90:00:00	0.000	0.000	0.000	0.000	0.636	0.636
91:00:00	0.000	0.000	0.000	0.000	0.626	0.626
92:00:00	0.000	0.000	0.000	0.000	0.617	0.617
93:00:00	0.000	0.000	0.000	0.000	0.608	0.608
94:00:00	0.000	0.000	0.000	0.000	0.599	0.599
95:00:00	0.000	0.000	0.000	0.000	0.590	0.590
96:00:00	0.000	0.000	0.000	0.000	0.581	0.581
97:00:00	0.000	0.000	0.000	0.000	0.572	0.572
98:00:00	0.000	0.000	0.000	0.000	0.564	0.564
99:00:00	0.000	0.000	0.000	0.000	0.555	0.555
100:00:00	0.000	0.000	0.000	0.000	0.547	0.547
101:00:00	0.000	0.000	0.000	0.000	0.539	0.539
102:00:00	0.000	0.000	0.000	0.000	0.531	0.531
103:00:00	0.000	0.000	0.000	0.000	0.523	0.523
104:00:00	0.000	0.000	0.000	0.000	0.515	0.515
105:00:00	0.000	0.000	0.000	0.000	0.507	0.507
106:00:00	0.000	0.000	0.000	0.000	0.500	0.500

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
107:00:00	0.000	0.000	0.000	0.000	0.492	0.492
108:00:00	0.000	0.000	0.000	0.000	0.485	0.485
109:00:00	0.000	0.000	0.000	0.000	0.478	0.478
110:00:00	0.000	0.000	0.000	0.000	0.471	0.471
111:00:00	0.000	0.000	0.000	0.000	0.464	0.464
112:00:00	0.000	0.000	0.000	0.000	0.457	0.457
113:00:00	0.000	0.000	0.000	0.000	0.450	0.450
114:00:00	0.000	0.000	0.000	0.000	0.443	0.443
115:00:00	0.000	0.000	0.000	0.000	0.437	0.437
116:00:00	0.000	0.000	0.000	0.000	0.430	0.430
117:00:00	0.000	0.000	0.000	0.000	0.424	0.424
118:00:00	0.000	0.000	0.000	0.000	0.417	0.417
119:00:00	0.000	0.000	0.000	0.000	0.411	0.411
120:00:00	0.000	0.000	0.000	0.000	0.405	0.405
121:00:00	0.000	0.000	0.000	0.000	0.399	0.399
122:00:00	0.000	0.000	0.000	0.000	0.393	0.393
123:00:00	0.000	0.000	0.000	0.000	0.387	0.387
124:00:00	0.000	0.000	0.000	0.000	0.381	0.381
125:00:00	0.000	0.000	0.000	0.000	0.376	0.376
126:00:00	0.000	0.000	0.000	0.000	0.370	0.370
127:00:00	0.000	0.000	0.000	0.000	0.364	0.364
128:00:00	0.000	0.000	0.000	0.000	0.359	0.359
129:00:00	0.000	0.000	0.000	0.000	0.354	0.354
130:00:00	0.000	0.000	0.000	0.000	0.348	0.348
131:00:00	0.000	0.000	0.000	0.000	0.343	0.343
132:00:00	0.000	0.000	0.000	0.000	0.338	0.338
133:00:00	0.000	0.000	0.000	0.000	0.333	0.333
134:00:00	0.000	0.000	0.000	0.000	0.328	0.328
135:00:00	0.000	0.000	0.000	0.000	0.323	0.323
136:00:00	0.000	0.000	0.000	0.000	0.318	0.318
137:00:00	0.000	0.000	0.000	0.000	0.314	0.314
138:00:00	0.000	0.000	0.000	0.000	0.309	0.309
139:00:00	0.000	0.000	0.000	0.000	0.304	0.304
140:00:00	0.000	0.000	0.000	0.000	0.300	0.300
141:00:00	0.000	0.000	0.000	0.000	0.295	0.295
142:00:00	0.000	0.000	0.000	0.000	0.291	0.291

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m³/s)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
143:00:00	0.000	0.000	0.000	0.000	0.287	0.287
144:00:00	0.000	0.000	0.000	0.000	0.282	0.282
145:00:00	0.000	0.000	0.000	0.000	0.278	0.278
146:00:00	0.000	0.000	0.000	0.000	0.274	0.274
147:00:00	0.000	0.000	0.000	0.000	0.270	0.270
148:00:00	0.000	0.000	0.000	0.000	0.266	0.266
149:00:00	0.000	0.000	0.000	0.000	0.262	0.262
150:00:00	0.000	0.000	0.000	0.000	0.258	0.258
151:00:00	0.000	0.000	0.000	0.000	0.254	0.254
152:00:00	0.000	0.000	0.000	0.000	0.250	0.250
153:00:00	0.000	0.000	0.000	0.000	0.246	0.246
154:00:00	0.000	0.000	0.000	0.000	0.243	0.243
155:00:00	0.000	0.000	0.000	0.000	0.239	0.239
156:00:00	0.000	0.000	0.000	0.000	0.236	0.236
157:00:00	0.000	0.000	0.000	0.000	0.232	0.232
158:00:00	0.000	0.000	0.000	0.000	0.229	0.229
159:00:00	0.000	0.000	0.000	0.000	0.225	0.225
160:00:00	0.000	0.000	0.000	0.000	0.222	0.222
161:00:00	0.000	0.000	0.000	0.000	0.219	0.219
162:00:00	0.000	0.000	0.000	0.000	0.215	0.215
163:00:00	0.000	0.000	0.000	0.000	0.212	0.212
164:00:00	0.000	0.000	0.000	0.000	0.209	0.209
165:00:00	0.000	0.000	0.000	0.000	0.206	0.206
166:00:00	0.000	0.000	0.000	0.000	0.203	0.203
167:00:00	0.000	0.000	0.000	0.000	0.200	0.200
168:00:00	0.000	0.000	0.000	0.000	0.197	0.197
169:00:00	0.000	0.000	0.000	0.000	0.194	0.194
170:00:00	0.000	0.000	0.000	0.000	0.191	0.191
171:00:00	0.000	0.000	0.000	0.000	0.188	0.188

Appendix

Catchment descriptors

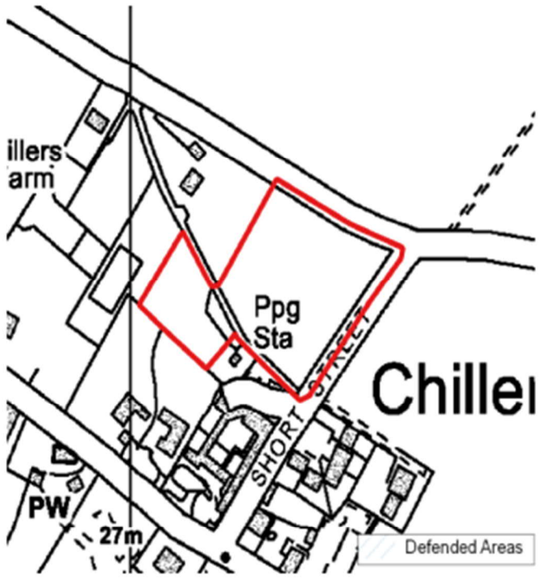
Name	Value	User-defined value used?
Area (km²)	18.49	No
ALTBAR	80	No
ASPBAR	37	No
ASPVAR	0.35	No
BFIHOST	0.88	No
BFIHOST19	0.87	No
DPLBAR (km)	5.03	No
DPSBAR (mkm-¹)	41	No
FARL	1	No
LDP	8.95	No
PROPWET	0.34	No
RMED1H	12.3	No
RMED1D	35.1	No
RMED2D	49.5	No
SAAR (mm)	770	No
SAAR4170 (mm)	776	No
SPRHOST	13.15	No
Urbext2000	0.01	No
Urbext1990	0.01	No
URBCONC	0.54	No
URBLOC	0.8	No
DDF parameter C	-0.02	No
DDF parameter D1	0.33	No
DDF parameter D2	0.42	No
DDF parameter D3	0.28	No
DDF parameter E	0.31	No
DDF parameter F	2.53	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.33	No
DDF parameter D2 (1km grid value)	0.44	No
DDF parameter D3 (1km grid value)	0.22	No
DDF parameter E (1km grid value)	0.31	No
DDF parameter F (1km grid value)	2.52	No

Appendix D - Table 3.2 from Dover DC Level 2 SFRA – Sites in Flood Zone 1

50-Land adjacent to Short Street, Chillenden

DDC Site Reference: GOO006		**Existing Land Use:** Greenfield
Site Area: 1.02ha		**Proposed Land Use:** Residential
Flood Zone Classification based on the EA's 'Flood Map for Planning'	*Flood Zone 1*	100.00%
	Flood Zone 2	0.00%
	Flood Zone 3	0.00%
	Flood Zone 3b	00.00%
Susceptible to Climate Change	Yes	
Exception Test required?	The Exception Test is not required to be applied for development classified as 'more vulnerable'.	
Nearby Waterbodies	There are no watercourses near to the site.	
Geology	***Bedrock***: Seaford Chalk Formation - Chalk ***Superficial***: The western part of the site is overlain by Head (silt and gravel).	

Flood Zone Map



Surface Water Map

Flood History	Incidents within the site: None. Incidents within proximity of the site: None.			
Percentage of site at risk of flooding from tidal sources based off modelling data available from the EA	***Percentage of site at risk of flooding from tidal sources during the defended scenario for key return period events. Maximum flood level on site shown in brackets.***			
	1 in 200 year return period event	*1 in 200 year return period event - 2070*	*1 in 200 year return period event - 2115*	*1 in 1000 year return period event*
	0.00%	0.00% (m AODN)	0.00% (m AODN)	0.00% (m AODN)
Residual Risk	None			
Percentage of site at risk of flooding from surface water based on the EA's 'Risk of Flooding from Surface Water' Map	*'High' risk scenario*	*'Medium' risk scenario*	*'Low' risk scenario*	
	1.09%	21.13%	27.05%	

Description of Surface Water Flooding (EA's RoFSW Maps)	During the 'low' risk scenario, surface water flows across the centre of the site in a northeasterly direction. During the 'medium' risk scenario, surface water generated on site flows across the centre of the site in a north easterly direction. During the 'high' risk scenario, there are only localised accumulation on site, which could be attributed to localised depressions in the topography.
Developable Area based on surface water flooding	0.62ha
Required Actions / Recommended Mitigation Measures	The site covers an area of greater than 1ha and is shown to be at risk of flooding from surface water. As a result, an FRA, including a comprehensive investigation into surface water flood risk, is required. SuDS should be considered to be included within the development where possible, in accordance with the NPPF and its planning practice guidance. All major development will require a SWMS to be produced to show how SuDS will be included to manage surface water runoff from the site. For major developments, or where there are historic sewer flooding incidents, developers should consult the relevant water authority at an early stage to ensure that there will be sufficient capacity in the wastewater system to accommodate the development and any upgrades are carried out where necessary. The Sequential Approach should be applied to the layout of the site by locating the most vulnerable elements in the lowest risk areas. The Sequential Approach should also be applied to the internal layout of buildings, in particular where floor levels cannot be raised. Floor levels should be raised above the depth of flooding from surface water, including an additional freeboard where practicable. Flood resistance and resilience measures should be considered for inclusion. Suitable mitigation (i.e. compensatory flood storage, floodable voids) should be provided where development would displace surface water and increase the risk of flooding to the surrounding area.