

Technical Note

Project Cambridge South
Subject Flood Risk Statement
Project no 0049081
Date 28 April 2021

Revision	Description	Issued by	Date	Approved (signature)
00	Final Issue	MD	28.04.21	JF

1 Introduction

1.1 Background

This Flood Risk Statement (FRS) has been prepared by Buro Happold to support the development of a feasibility study for the Cambridge South masterplan. This is not a formal Flood Risk Assessment or a Drainage Strategy and does not include commentary on drainage design.

This FRS responds to the following technical clarifications:

1. Accuracy of interpretation of Flood Zone 3 in the north east corner of Cambridge South (i.e. it should not be treated as a development constraint) based on 2016 Peter Brett Associates (PBA) hydraulic modelling.
2. Accuracy of Environment Agency surface water flood risk modelling and impact on developable areas at Cambridge South; and
3. Validity of 2016 PBA hydraulic modelling to inform concept masterplan (climate change allowances).

1.2 Site Context

Four major landowners (Jesus College, St John's College, Cambridgeshire County Council and a private family trust) own approximately 466 hectares (ha) to the south and west of Cambridge Biomedical Campus (CBC) referred to as Cambridge South. The extent of the Cambridge South study area is illustrated in Figure 1—1, with the PBA hydraulic modelling study area boundary highlighted in yellow:



Figure 1—1 Development site location with approximate boundary highlighted with red line and

The study area encompasses land that forms two gateways to Cambridge from the south east and south west, divided by existing linear development along Cambridge Road. The Cambridge South study area is bordered to the north by Hauxton Road and Addenbrooke's Road with Trumpington and CBC beyond the local road network; to the west by the M11; and to the east by Babraham Road. To the south, the study area is enclosed by the River Cam corridor, the King's Cross branch of the Cambridge to London Railway line, the village of Great Shelford and Hinton Way. Beyond Cambridge South, to the south east, land rises towards the Gog Magog Hills.

Hobson's Brook, an Ordinary Watercourse, runs west of the railway line through the centre of the Cambridge South study area, flowing south to north. There is a spring at Nine Wells to the east of the railway line, and a drainage channel in the north east corner of the study area.

1.3 Information Reviewed

A baseline assessment has been undertaken for Cambridge South with regard to flood risk. The assessment considers all sources of flood risk and has been undertaken in accordance with the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG) to the NPPF. The conclusions presented in this FRS have been developed based on the information available, including:

- South Cambridgeshire and Cambridge City Level 1 Strategic Flood Risk Assessment (SFRA) (September 2010);
- Cambridgeshire County Council Surface Water Management Plan (Updated September 2014);
- Environment Agency (EA) flood maps; and
- Peter Brett Associates (PBA) Flood Modelling and Drainage Strategy (FMDS) Report for the Extension to Bio-Medical Campus, Cambridge (October 2016).

2 Technical Clarifications

2.1 Clarification 1

Buro Happold to advise to accuracy of interpretation of Flood Zone 3 the north east corner of the Cambridge South study area to determine whether it poses a development constraint, based on 2016 PBA hydraulic modelling for Phase 3.

The Environment Agency (EA) flood mapping is based on a coarse regional model, that is not designed for site specific assessment. The EA Flood Map for Planning shows that the north east corner of Cambridge South consists of Flood Zone 1 and Flood Zone 3, as depicted in Figure 2—1:

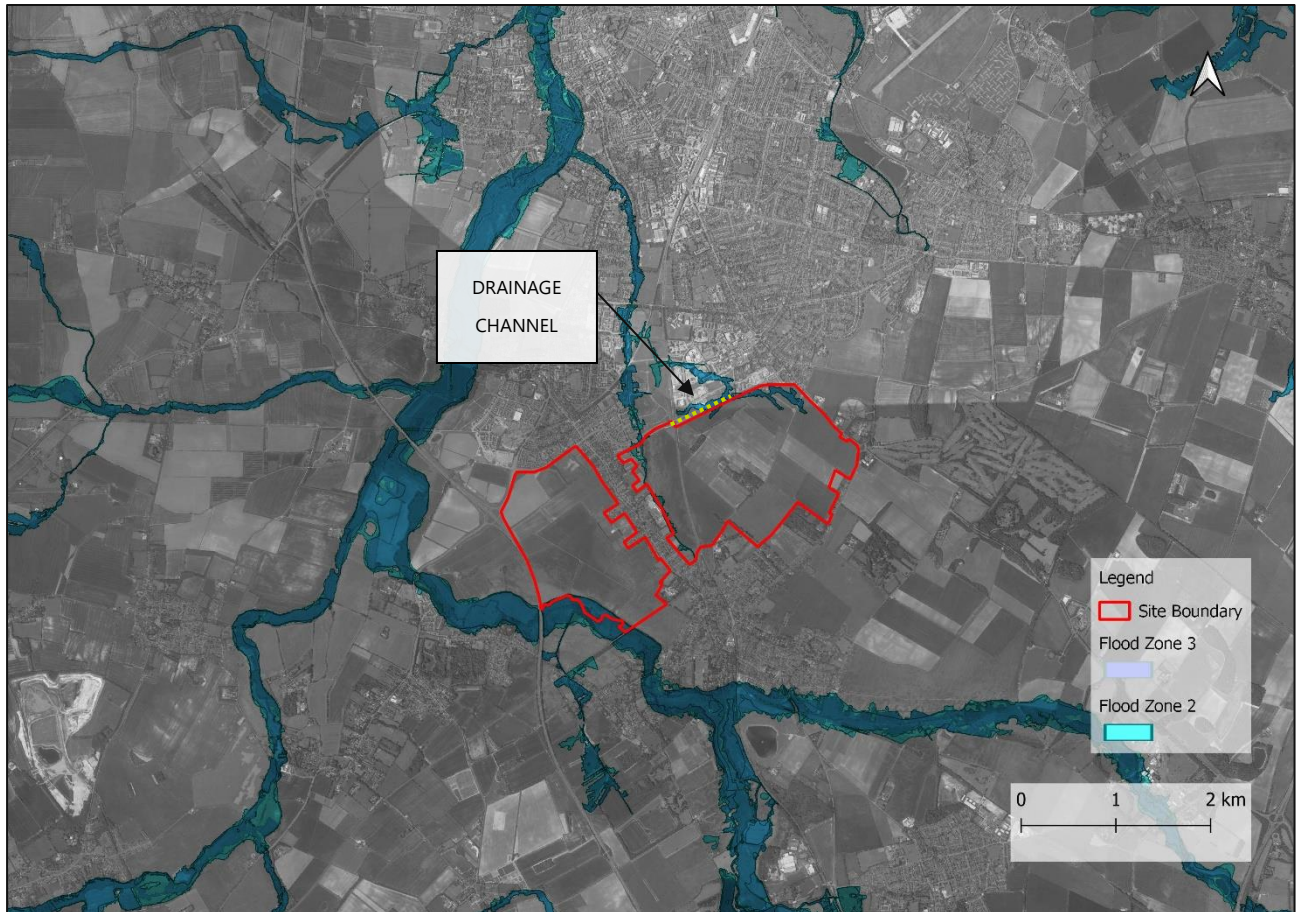


Figure 2—1 EA Flood Map for Planning, depicting fluvial Flood Zones with approximate site boundaries highlighted with red dashed line and existing drainage channel indicated with green dashed line

EA Flood Zones reflect the probability associated with fluvial (river) flooding or flooding from the sea. Flood Zone 1 is defined as having less than a 1 in 1,000 (0.1%) annual probability of river or sea flooding in any given year, which is classified as a *Low* probability of flooding. Flood Zone 3a is defined as having more than a 1 in 100 (1%) annual probability of river flooding in any given year, or more than 1 in 200 (0.5%) annual probability of sea flooding in any given year. Flood Zone 3b is defined as having more than a 1 in 20 (5%) annual probability of flooding in any given year.

The classification of a site as Flood Zone 1, 2 or 3 is significant in terms of planning, because the NPPF sets of the use classes which are considered appropriate for development within each zone. For example, *More Vulnerable* uses such as residential units are not considered appropriate for development in Flood Zone 3.

From inspection of the site topography and aerial imagery, there is no river channel that corresponds to the areas of Flood Zone 3 shown within the north east corner of Cambridge South.

PBA prepared a Flood Modelling and Drainage Strategy (FMDS) Report in 2016 to support the planning application for an Extension to the CBC. This site is located within the Cambridge South study area, along the northern boundary.

PBA developed and analysed a surface water model to inform the conclusions presented in the FMDS Report. This is not a fluvial model, but has been used to inform understanding conclusions around the flood zones at the site. The FMDS Report identifies drainage channels north of the site as being possible sources of inaccurate Flood Zone allocation, marked on Figure 2—1 as a green dotted line.

PBA concludes that the site is at risk of surface water flooding during the 1 in 30, 1 in 100, 1 in 100 + 40% Climate Change (CC), and 1 in 1,000 year rainfall events. PBA undertook analysis to show that during all of these events, the water level in the drainage channel north of the site does not exceed the level of the banks of the channel. It therefore does not overtop the drainage channel banks and cause fluvial flooding. The PBA FMDS Report therefore concludes that the CBC extension site should be classified as being entirely within Flood Zone 1.

Whilst PBA have demonstrated that the site allocated for the CBC extension site is not at risk of fluvial flooding, the analysis did not extend beyond the site boundary to consider the additional areas shown as Flood Zone 3 that are included in the Cambridge South study area, in particular in the north east corner. It therefore does not draw any definitive conclusions around the Flood Zone allocation across Cambridge South as a whole.

However, from inspection there is no clear and definitive fluvial channel that corresponds with the areas of Flood Zone 3 shown in the north east corner of the Cambridge South study area. It is understood that the areas shown as Flood Zone 3 in this area are likely associated with surface water flooding that presents the same probability of flooding as that associated with Flood Zone 3. It is therefore suggested that the north east corner of Cambridge South is considered to be located entirely within Flood Zone 1 for the purpose of developing the layout for the concept masterplan.

It should be noted that consultation with the EA will be undertaken to confirm that the north east corner of Cambridge South may be considered to be located fully within Flood Zone 1. Assuming that this area is re-classified as Flood Zone 1, there remains a risk of surface water flooding, which will need to be mitigated.

2.2 Clarification 2

Buro Happold to confirm accuracy of Environment Agency surface water flood risk modelling and impact on developable areas for Cambridge South.

Surface water flood risk does not dictate developable areas or permissible use classes in the same way as fluvial Flood Zones. Surface water flood risk can often be managed through the implementation of a surface water strategy including sustainable drainage systems (SuDS).

The EA surface water flood risk classifications are defined as follows:

- **Very Low** – probability of flooding <0.1% (1 in 1,000)
- **Low** – probability of flooding between 0.1% and 1% (1 in 100)
- **Medium** – probability of flooding between 1% and 3.3% (1 in 30)
- **High** – probability of flooding >3.3%

The EA surface water flood risk map is included in Figure 2—2, showing that the Cambridge South study area is mostly *Very Low* risk of flooding, with some areas of *Low* to *Medium* risk of surface water flooding identified outside of natural drainage paths which are classified as *High* risk:

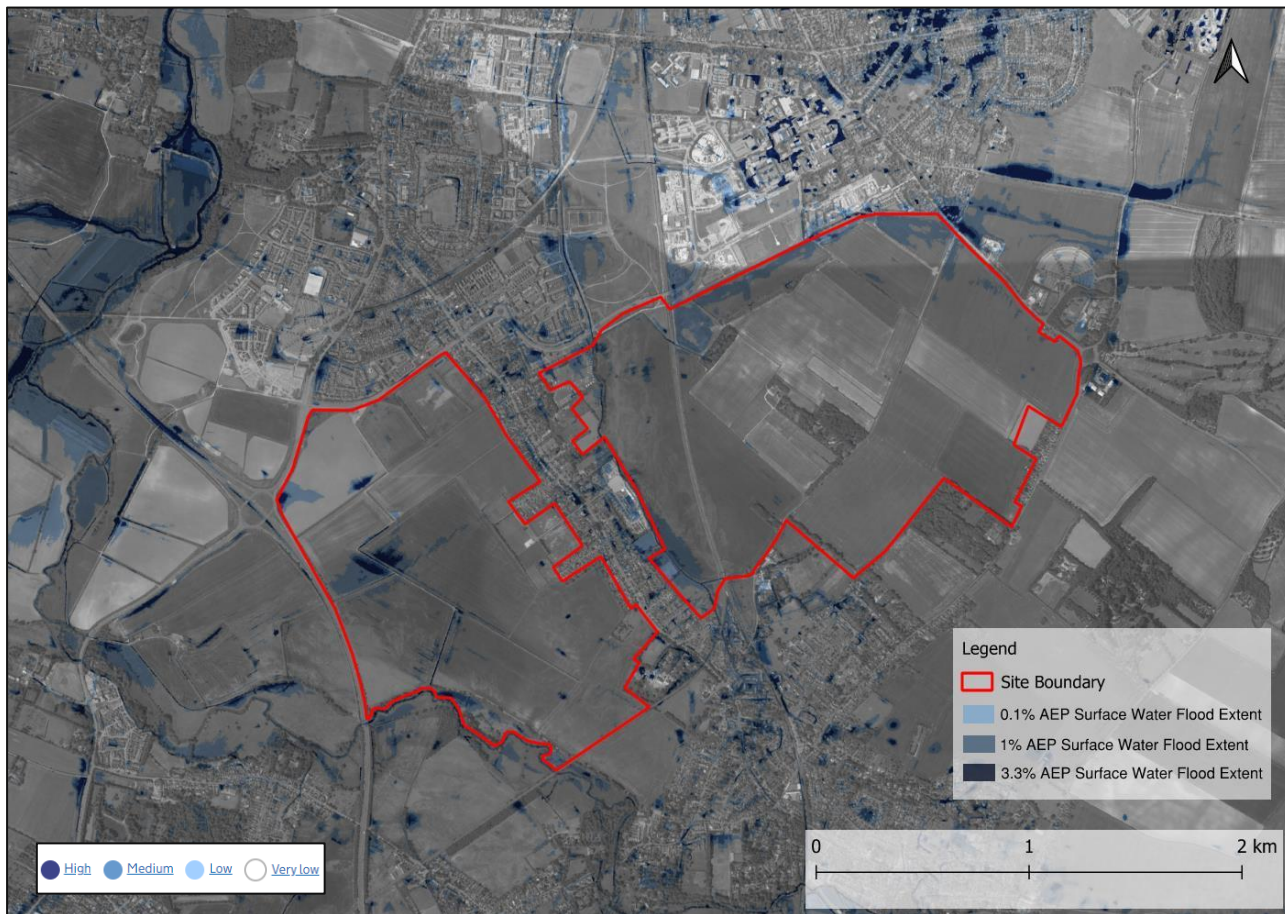


Figure 2—2 EA flood map showing surface water flood risk with approximate boundaries highlighted with red dashed line

The results of the PBA surface water model include flood depths across the wider catchment during the 3.3%, 1%, 1% + 40% Climate Change (CC), and 0.1% rainfall events. This analysis includes the north east corner of Cambridge South. The PBA depth maps show that flooding occurs across similar areas as that shown in the EA surface water flood map, as shown in Figure 2—3:

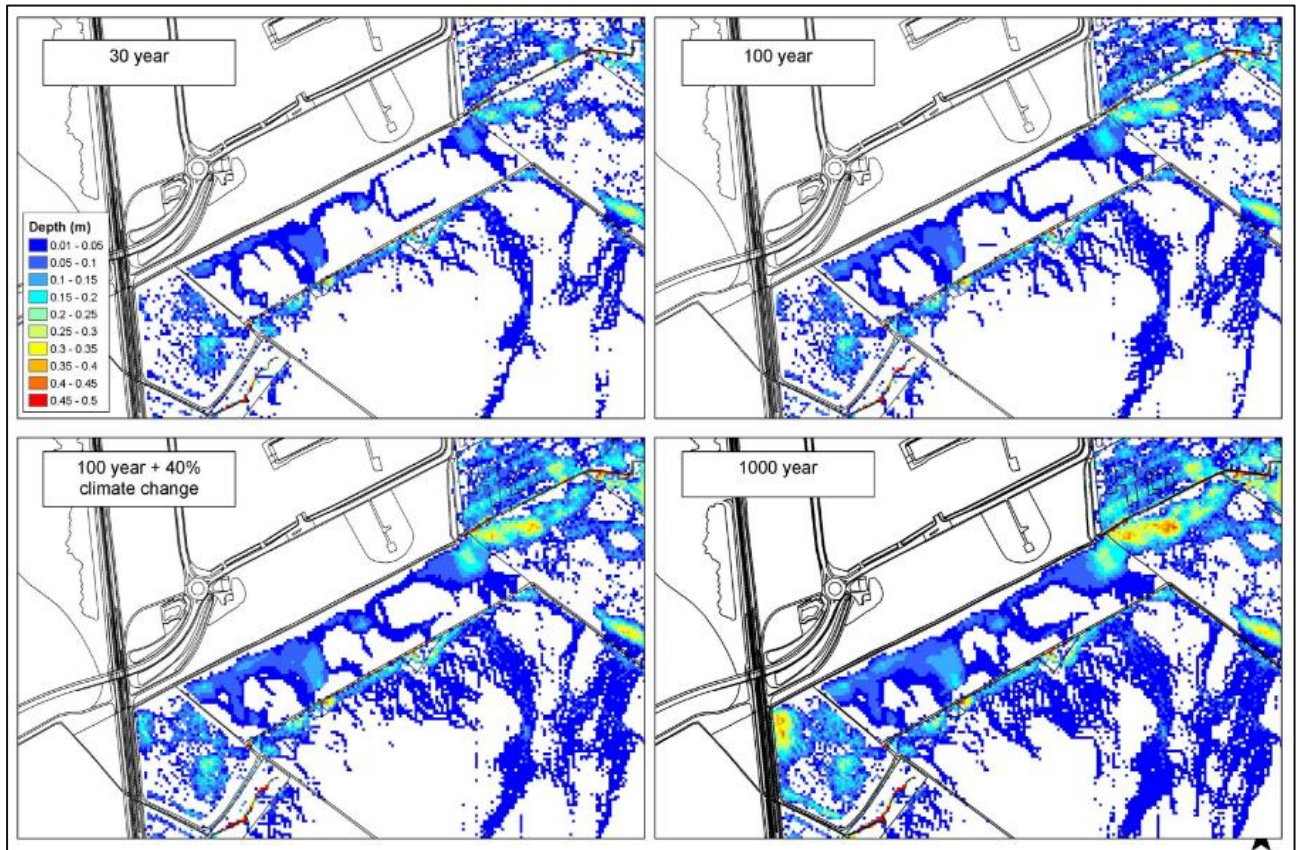


Figure 2—3 PBA outputs from surface water flood model showing flooded depths in 3.3%, 1%, 1%+ 40%CC and 0.1% rainfall events

The PBA outputs show greater flooded areas during the 3.3% event compared with that shown in the EA surface water flood map as that defined as *Medium to High* risk. The PBA map for the 1% and 0.1% events show similar, but slightly greater, flooded areas as that shown as *Low* risk in the EA surface water flood map.

2.3 Clarification 3

Buro Happold to advise on validity of 2016 PBA hydraulic modelling to inform concept masterplan (climate change allowances).

Although the PBA hydraulic modelling was carried out in 2016, the study used allowances for climate change which are in line with the current guidance as defined by the EA. The climate change allowance applied to rainfall is 40% which is considered appropriate. It is therefore considered that the results of the PBA hydraulic modelling remain valid and applicable to the analysis of flood risk at the proposed development at Cambridge South.

3 Conclusion

Buro Happold have undertaken a review of flood risk at Cambridge South. EA flood mapping indicates that the north east corner of the Cambridge South study area is designated as Flood Zone 3. However, hydraulic modelling undertaken by PBA in 2016, for a parcel of land situated with the Cambridge South study area, concluded that the site should be classified as being entirely within Flood Zone 1.

Whilst undertaken in 2016, the PBA model uses up-to-date climate change guidance as defined by the EA, incorporating a 40% climate change allowance, and it is considered that the results of the report remain valid. A clear and definitive fluvial channel, corresponding with the areas of Flood Zone 3 shown in the north east corner of the Cambridge South study area, has not been identified through this assessment. It is considered that the areas shown as Flood Zone 3 in this area are likely associated with surface water flooding.

It is therefore proposed that the north east corner of Cambridge South is located entirely within Flood Zone 1 and that fluvial flood risk is Low and does not present significant development constraints in this area.

There remains a risk of surface water flooding; however it is considered that surface water flood risk can be managed through the implementation of a surface water drainage strategy including sustainable drainage systems (SuDS) and therefore does not dictate developable areas or permissible use classes.