

FLOOD RISK ASSESSMENT

Replacement Buildings Holbeach Police Station

**Lincolnshire Police
and G4S
January 2021**

DOCUMENT ISSUE RECORD

Document Reference	RLC/0702/FRA01
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Revision		Date of Issue
0.1	Draft issued for comment	26/01/2021

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Limitations

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The information in this report is based on statistical data and qualitative analysis which are for guidance purposes only. This study provides no guarantee against flooding or of the absolute accuracy of water levels, flows and associated probabilities.

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EXECUTIVE SUMMARY

This Flood Risk Assessment is compliant with the requirements set out in the National Planning Policy Framework 2019, and the associated online Planning Practice Guidance. It has been produced on behalf of Lincolnshire Police and G4S. This report demonstrates that the proposed development is not at significant flood risk, and will not increase flood risk to others, subject to the recommended flood mitigation strategies being implemented.

Policy

Development Type	Flood Zone	Vulnerability	Sequential Test
Emergency Services, (required in times of flood)	3	Highly Vulnerable	Not Required

Climate Change Allowance

Peak River Flow

ANGLIAN RIVER BASIN DISTRICT	
Allowance Category	Percentage Increase
Higher Central	20
Central	15

Sea Level Rise

Area of England	Allowance	2000-2035 (mm/year)	2036-2065 (mm/year)	2066-2095 (mm)/year	2096-2125 (mm/year)
Anglian	Higher Central	5.8	8.7	11.6	13.0
	Upper End	7.0	11.3	15.8	18.1

Flood Risk and Mitigation

Flood Risk Source	Level of Risk Without Mitigation	Proposed Mitigation
Fluvial Tidal Groundwater Sewers	Low	Floor levels no lower than existing.
Pluvial Reservoir Canal/Artificial	None	

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1.0 INTRODUCTION

- 1.1 This Flood Risk Assessment, (FRA), is compliant with the requirements set out in the National Planning Policy Framework 2019, (NPPF), and the associated online Planning Practice Guidance.
- 1.2 The FRA has been produced on behalf of Lincolnshire Police and G4S in respect of a planning application for replacement buildings at Holbeach Police Station.

Data Used

- 1.3 This FRA is based on the following information:
- Topographic Survey
 - Proposed Plans
 - British Geological Survey Drift & Geology Maps
 - Environment Agency Data
 - South East Lincolnshire Strategic Flood Risk Assessment March 2017
 - British Geological Survey Hydrogeology Data

Existing Site

- 1.4 The site is located at grid reference TF3630624799 as shown in **Figure 1.1** below.

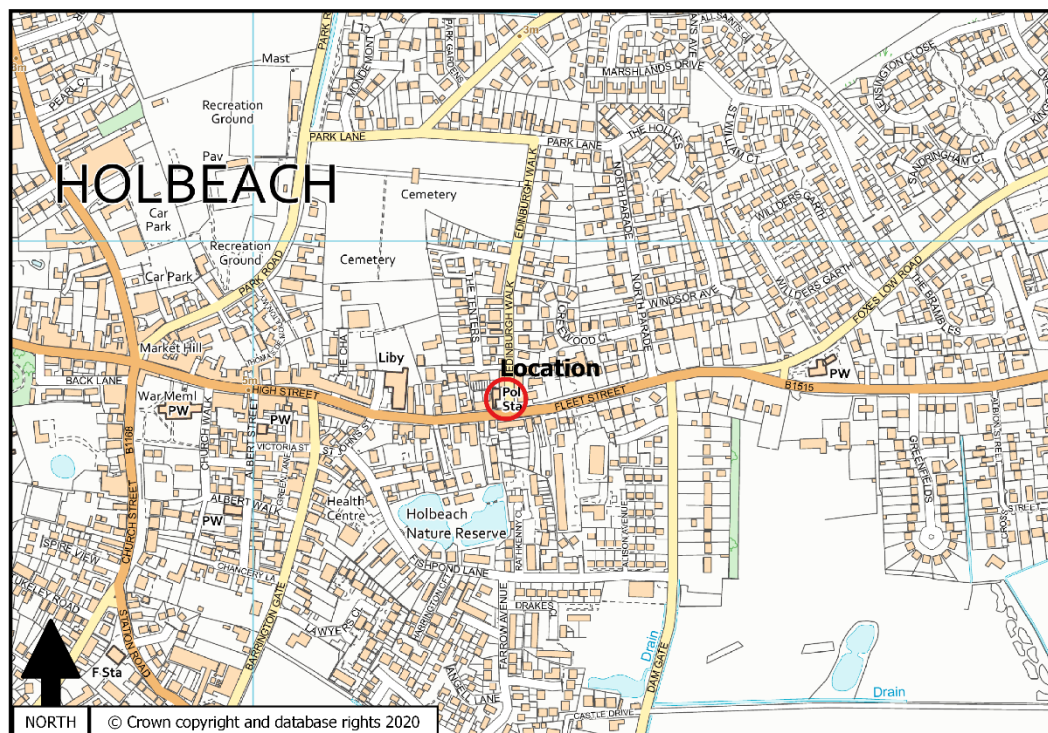


Figure 1.1 Site Location

- 1.5 A topographic survey shows that the site is at approximately 3.30m AOD.
- 1.6 The online British Geological Survey maps indicates that the site is located on superficial deposits of clay and silt over a bedrock of mudstone.

Proposed Development

- 1.7 The proposed development consists of replacing existing portacabins with traditional masonry buildings on the site of an existing police station, as shown on the extract of the existing and proposed plan below in **Figure 1.2**



Existing Site Plan
Figure 1.2 Plans

Proposed Site Plan

2.0 FLOOD RISK PLANNING POLICY

National Planning Policy Framework 2019

- 2.1 The NPPF sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. A supporting web-based Planning Practice Guidance is also available.
- 2.2 The guidance uses four Flood Zones to characterise flood risk which refer to the probability of river and sea flooding, ignoring the presence of defences.

Sequential Test

- 2.3 The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding and the Flood Zones provide the basis for applying the Test.

Flood Zone Definition

Flood Zone 1	Low probability (1 in 1000 annual probability of river or sea flooding (<0.1%)).
Flood Zone 2	Medium probability (between 1 in 100 and 1 in 1000 annual probability of river flooding (1.0%-.0.1%) or between 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5%-.0.1%) in any given year).
Flood Zone 3a	High probability (1 in 100 or greater annual probability of river flooding (>1.0%) or 1 in 200 or greater annual probability of sea flooding (>0.5%) in any given year).
Flood Zone 3b	This zone comprises land where water must flow or be stored in times of flood. Land which would flood with an annual probability of 1 in 20 (5.0%), or is designed to flood in an extreme flood (0.1%) should provide a starting point for discussions to identify functional floodplain.

- 2.4 The Flood Zones do not consider the projected effects of climate change and may not represent potential flooding from smaller watercourses.
- 2.5 The aim is to steer new development to Flood Zone 1 and where there are no reasonably available sites in Flood Zone 1, local planning authorities in their decision making should consider the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2, applying the Exception Test if required.
- 2.6 Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in Flood Zone 3 be considered, considering the flood risk vulnerability of land uses and applying the Exception Test if required.
- 2.7 The guidance also sets out the vulnerability to flooding of different land uses and some of these are detailed below.

Flood Risk Vulnerability Classification

Essential Infrastructure	Transport Infrastructure; Utility Infrastructure; Wind Turbines.
Water Compatible	Flood Control Infrastructure; Water and Sewage Infrastructure; Navigation Facilities.
Highly Vulnerable	Emergency Services (which are required in times of flood); Basement Dwellings; Caravans, Mobile Homes and Park Homes, (intended for permanent residential use); Installations requiring Hazardous Substances Consent.
More Vulnerable	Hospitals and other Health Services; Residential Institutions; Dwelling Houses, Drinking Establishments; Nightclubs; Hotels; Non-residential uses for Health Services; Nurseries; Educational Establishments; Landfill and Hazardous Waste Management Facilities; Sites used for Holiday or short-let Caravan and Camping sites, (subject to a specific warning and evacuation plan).
Less Vulnerable	Commercial Establishments; Emergency Services not required in times of flood; Land and Buildings used for Agriculture and Forestry. Waste Treatment; Minerals Working; Water Treatment Works; Sewage Treatment Works.

Appropriate Development

- 2.8 Based on the vulnerability of a development the guidance states what Flood Zone(s) the development is appropriate within. The flood risk compatibility is summarised below.

Flood Zone 1	Appropriate Development – All.
Flood Zone 2	Exception Test - Highly vulnerable. Appropriate Development - Essential Infrastructure; More vulnerable; Less vulnerable and Water Compatible.
Flood Zone 3a	Should not be permitted – Highly vulnerable. Exception Test – Essential Infrastructure, More vulnerable. Appropriate Development – Less vulnerable; Water compatible.
Flood Zone 3b	Should not be permitted – Highly vulnerable; More vulnerable; Less vulnerable. Exception Test – Essential Infrastructure. Appropriate Development – Water compatible.

- 2.9 The Planning Practice Guidance also states that all sources of flooding should be considered when preparing a FRA.

Exception Test

- 2.10 The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.
- 2.11 The first part of the Exception Test is to show that the proposed development will provide wider sustainability benefits to the community that outweigh flood risk. The second part is the requirement for a FRA to demonstrate that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.

Development Proposals

- 2.12 The proposed development consists of Emergency Services, (required in times of flood).

Flood Zones

- 2.13 The Flood Zones are shown on **Figure 2.1** below which shows the site to be in Flood Zone 3.

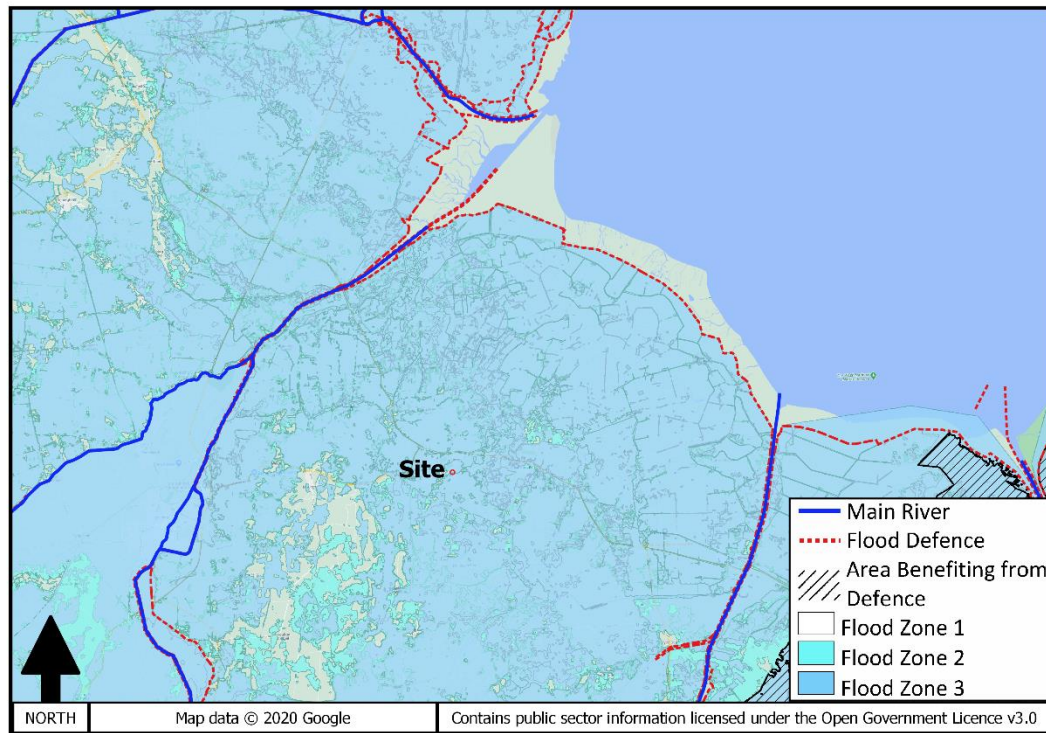


Figure 2.1 Flood Zones

Development Vulnerability

- 2.14 Emergency Services, (required in times of flood), are Highly Vulnerable.

Site Sequential Test

- 2.15 The proposed development is to replace existing portacabins with traditional buildings and therefore not subjected to the Sequential and Exception Tests.

Exception Test

- 2.16 Whilst the development is considered appropriate a FRA is required to ensure the development will remain safe over its lifetime from all sources of flooding and not increase flood risk elsewhere.

3.0 CLIMATE CHANGE

- 3.1 The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change.
- 3.2 As the Government's expert on flood risk on 19th February 2016 the Environment Agency, (EA), published revised climate change allowances to support the NPPF. The sea level rise allowances were further revised on the 17th December 2019.
- 3.3 The climate change allowances are based on projections and different scenarios of carbon dioxide (CO₂) emissions to the atmosphere and provide predictions of anticipated change for:
- peak river flow by river basin district;
 - peak rainfall intensity;
 - sea level rise;
 - offshore wind speed and extreme wave height.

Peak River Flow Allowances

- 3.4 The peak river flow allowances show the anticipated changes to peak flow by River Basin District, (RBD), with three allowances; central; higher central and upper end.
- 3.5 This proposed development is in the Anglian RBD.
- 3.6 The appropriate allowance depends on the Flood Zone and vulnerability classification of the development and for this proposal it is appropriate to use the upper end and higher central allowances.
- 3.7 The allowances change over three periods of time over the next century. The appropriate period should be chosen based on the expected lifetime of the development and for commercial that is 50 years.
- 3.8 The following climate change allowances in peak river flows therefore need to be applied:

ANGLIAN RIVER BASIN DISTRICT	
Allowance Category	Percentage Increase
Higher Central	20
Central	15

Table 3.1 Climate Change Allowances for Peak River Flow

Peak Rainfall Intensity Allowance

- 3.9 Increased rainfall affects river levels and land and urban drainage and should be applied to surface water drainage systems. However, the proposed development does not increase the impermeable area enough for these allowances to apply.

Sea Level Allowances

- 3.10 There is a range of allowances for each region and epoch or time frame for sea level rise as follows:

Area of England	Allowance	2000-2035 (mm/year)	2036-2065 (mm/year)	2066-2095 (mm)/year	2096-2125 (mm/year)
Anglian	Higher Central	5.8	8.7	11.6	13.0
	Upper End	7.0	11.3	15.8	18.1

Table 3.2 Climate Change Allowances for Sea Level Rise

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4.0 FLOOD RISK SOURCES

- 4.1 The following flood risk sources have been identified and where mitigation is required to reduce the flood risk this is discussed in **Section 5**.

Fluvial

Main River

- 4.2 The nearest EA Main Rivers to the site are the River Nene, approximately 8.50km to the north west and the River Welland, approximately 12.20km to the south east.
- 4.3 The EA Flood Zones for this area are derived from tidal modelling and it is therefore assumed that the tidal sources will have the greatest flood risk.

Ordinary Watercourses

- 4.4 The site lies within the district of the South Holland Internal Drainage Board, (IDB), and the Boards maintained culverted watercourse is located approximately 0.20km to the north of the site.
- 4.5 Flood risk from this watercourse is considered low.
- 4.6 The risk of flooding from fluvial sources is low.

Tidal

- 4.7 The site is approximately 10.80km from the Wash Estuary to the north east.

Actual Risk of Flooding

- 4.8 The EA have produced maps which show the flood risk from rivers or the sea. These maps take into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail. The maps **do not** take into account the potential effect of climate change.
- 4.9 The risk of flooding map is shown below in **Figure 4.1** which shows the site to be at a low risk of flooding.

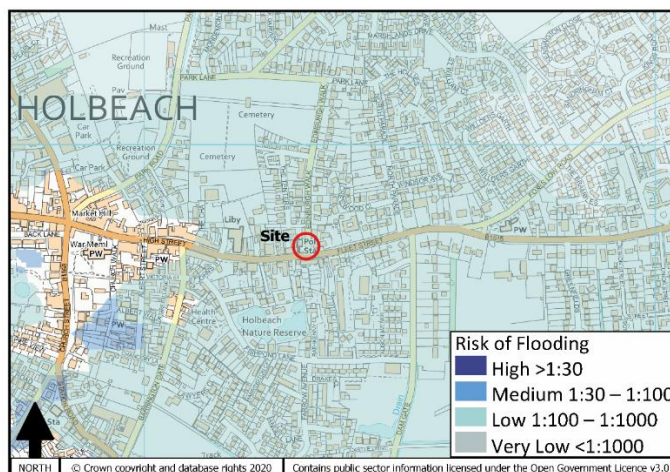


Figure 4.1 Flood Risk Map

Residual Risk

- 4.10 The site is protected from flooding from the Wash Estuary by defences, including a raised defence. However, if that defence was to be overtopped or fail then flooding could occur .
- 4.11 The South East Lincolnshire Joint Planning Unit produced a Strategic Flood Risk Assessment in 2017, (SFRA), which includes a Level 2 assessment in the form of hazard mapping. **Figure 4.2** below shows the residual flood hazard for the year **2115** for the combined 1% Fluvial and 0.5% tidal events for the area covered by the SFRA whilst **Figure 4.3** shows the same information but focused on the area around the site.

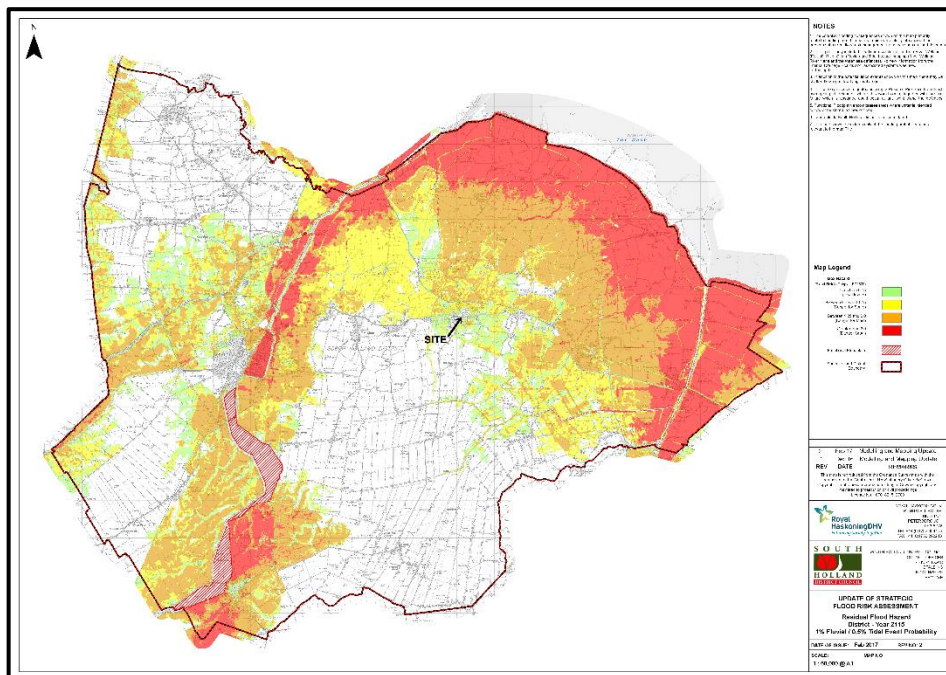


Figure 4.2 Hazard Mapping 2115 (SFRA Area)

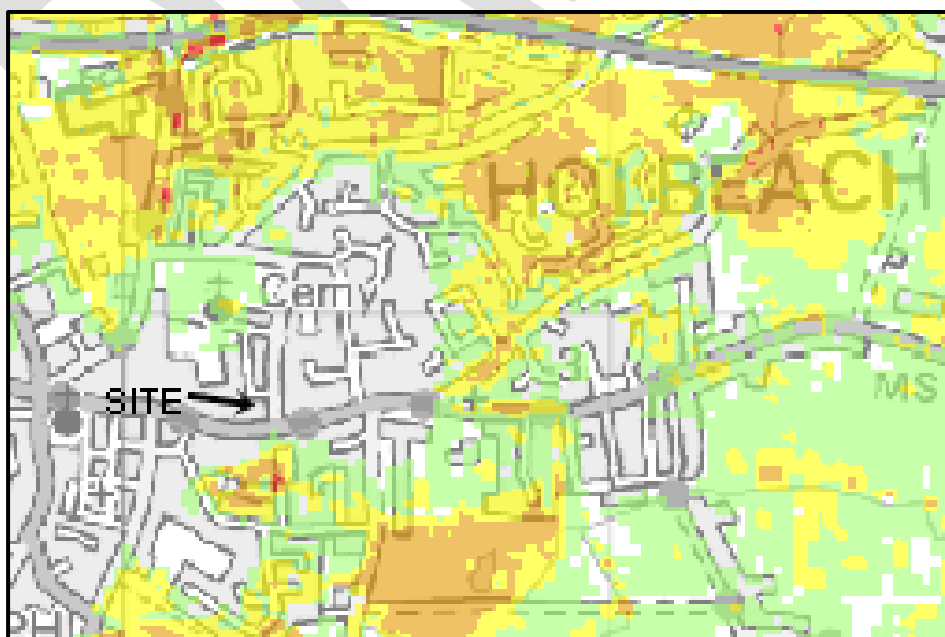


Figure 4.3 Hazard Mapping 2115 (Site)

- 4.12 The site is shown not to be affected by fluvial or tidal flooding in 2115.

Pluvial

- 4.13 The EA have produced maps showing flooding when rainwater lies or flows over the ground. The surface water flooding extents are shown below in **Figure 4.4**. Unlike the fluvial mapping, which is based on a detailed hydraulic model, this mapping is based purely on applying rainfall to a digital terrain model. As such this mapping serves to represent a worst-case scenario which may well overstate the actual probability of flooding in this area.
- 4.14 There is a caveat, as to the use of these maps and that they are not to be used to identify that an individual property will flood. Because of the way they have been produced and the fact that they are indicative these maps are not appropriate to act as the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to flooding at any scale without further supporting studies or evidence.

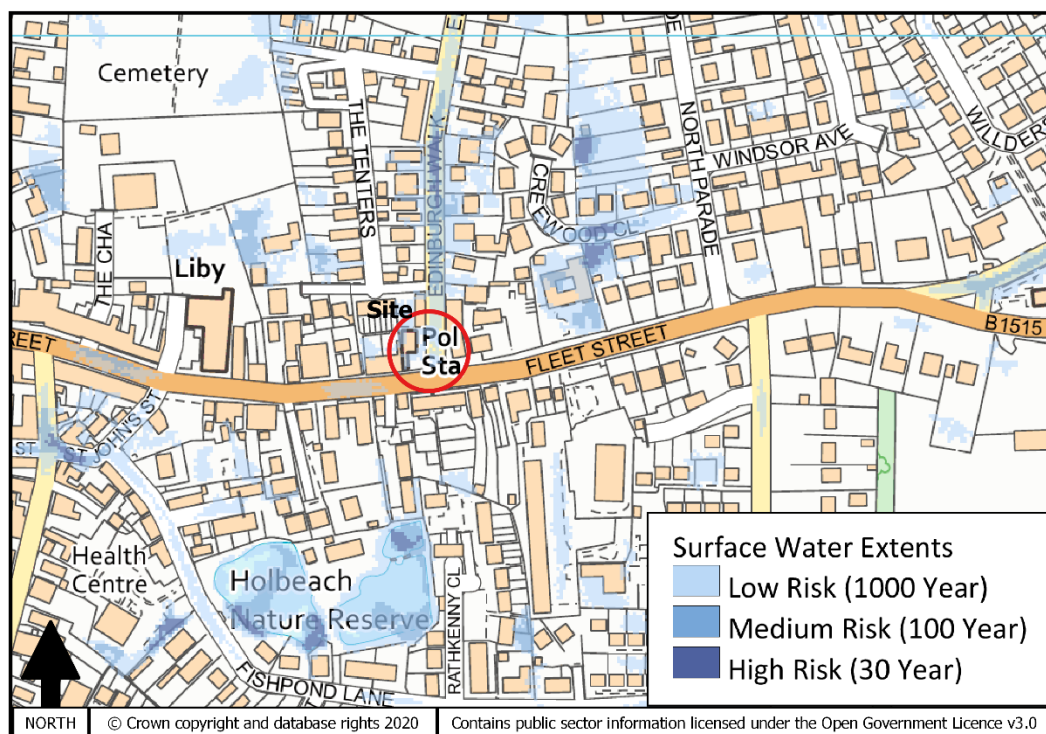


Figure 4.4 Surface Water Flooding Extents

- 4.15 The site is not at risk of flooding from pluvial sources.

Groundwater

- 4.16 The site is located on rocks with essentially no groundwater and there are no known instances of groundwater flooding in the area.
- 4.17 The risk of flooding from groundwater is low.

Sewers

- 4.18 Public maintained sewers run adjacent to the site but are unlikely to pose a significant flood risk as they are well maintained.
- 4.19 The risk of flooding from existing sewers is low.

Reservoirs

- 4.20 The EA has prepared reservoir failure flood risk mapping to show the largest area that might be flooded if a reservoir were to fail and release the water it holds. The mapping displays a worst-case scenario and is only intended as a guide.
- 4.21 The site is not at risk of flooding from reservoirs.

Canals and Artificial Water Bodies

- 4.22 The site is not at risk of flooding from canals.

5.0 MITIGATION

- 5.1 Section 4.0 has identified the sources of flooding which could potentially pose a risk to the site and the proposed development. This section of the FRA sets out the mitigation measures which are to be incorporated within the proposed development to address and reduce the risk of flooding to within acceptable levels.

Site Layout

- 5.2 The proposed development is only at a low risk of flooding from fluvial, tidal, groundwater and existing sewers. The floor levels of the proposed replacement buildings will be no lower than existing.

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6.0 CONCLUSIONS

- 6.1 This FRA is compliant with the requirements set out in the NPPF and the associated online Planning Practice Guidance.
- 6.2 The FRA has been produced on behalf of Lincolnshire Police and G4S.
- 6.3 This report demonstrates that the proposed development is not at significant flood risk, and will not increase flood risk to others, subject to the recommended flood mitigation strategies being implemented.
- 6.4 The identified risks and mitigation measures are summarised below;

Flood Risk Source	Level of Risk Without Mitigation	Proposed Mitigation
Fluvial Tidal Groundwater Sewers	Low	Floor levels no lower than existing.
Pluvial Reservoir Canal/Artificial	None	

Table 6.1 Summary of Risk and Mitigation

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