Flood Risk Assessment

Proposed extensions to primary school

William Stukeley Church of England Primary School, Spalding Road, Holbeach, Spalding. PE12 7HG

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Contents

1	Introduction	3
2	Existing site	4
3	Proposed scheme	6
4	Historic flooding	6
5	Sequential & Exceptions Tests	6
6	Assessment of potential sources of flooding and mitigation measures	7
7	Conclusion	13

Appendices

A Environment Agency flood data

B Planning drawings

DOCUMENT HISTORY

ISSUE NO	COMMENTS	DATE
1	Client Issue	17.11.2022

1 Introduction

1.1 This assessment has been prepared to accompany a full planning submission for proposed extensions to a primary school at William Stukeley Church of England Primary School, Spalding Road, Holbeach, Spalding. PE12 7HG

1.2 The Government has placed increasing priority on the need to take full account of the risks associated with flooding at all stages of the planning and development process. This course of action seeks to reduce the future damage to property and risk to life resulting from incidents of flooding. National Planning Policy does not prevent all development in flood risk areas and this would be unsustainable and result in economic stagnation, depriving existing communities of much needed homes, services, employment opportunities etc. It is in the essential interests of the vitality of settlements and for the wider economic and social wellbeing of the community, that development opportunities are not unnecessarily constrained. Accordingly, the aims of this site specific FRA will be as follows:

- Identify and address flood risk issues associated with the development.
- Assess if the project is likely to be affected by flooding from all relevant sources both now and in the future.
- Assess whether the project will increase the flood risk elsewhere.
- Demonstrate that the project is safe and where possible, reduces flood risk.
- Propose measures to deal with the identified effects and risks.

2 Existing Site

2.1 The application site is known as William Stukeley CoE Primary School which is located to the south of Spalding Road in the market town of Holbeach, grid reference TF 35613 28420 (See Figure 1)

2.2 The site currently comprises the school building and associated outdoor hard and soft landscaped areas. The school building is a 1 storey structure which was constructed in 1994 and further extended in 2000, 2002 and 2019. The building is of brick cavity wall construction with a tiled roof. Externally the site comprises areas of hard surface car parking and play areas and soft landscaped playing fields and tree/shrub planting. The site is bound to the north by the previous grounds of Stukeley Hall. Residential dwellings are located to the east and west with an elderly residential home to the south.

2.3 The topography of the site is generally flat sloping up from a height of approximately 3.12 mAoD in the south western corner to approximately 4.38 mAoD in the north eastern corner.

2.4 The British Geological Survey (BGS) indicates the site is underlain by superficial tidal flat deposits with a bedrock of West Walton formation comprising mudstone and siltstone. A limited Phase 2 site investigation from 2018 which showed made ground underlaid by sandy silt which in turn was underlain by sand.

2.5 A CCTV survey of the existing drainage shows that the surface water from the school buildings and hardstanding areas is discharged to a number of soakaways to the north, west and south.

2.6 The Environment Agency flood map for planning identifies the site as being spilt between Flood Zone 2 and Flood Zone 3 (See Figure 2). The existing building is located within Flood Zone 2.

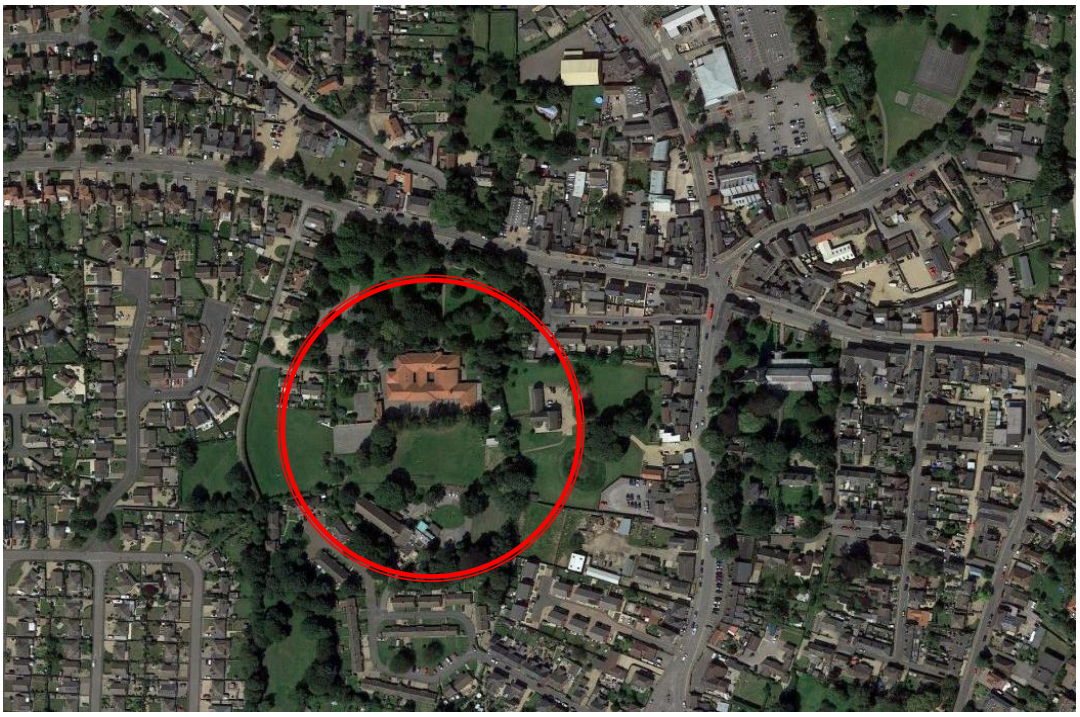


Figure 1- Aerial photograph showing the location of the site



Figure 2- Extract from the EA flood map for planning showing the site located within Flood Zones 2 and 3 but the buildings is only located within Flood Zone 2.

3 Proposed Scheme

3.1 The proposed development involves extensions to the existing school as follows;

- Single classroom extension
- Staff room and hall extension
- Three classroom extension

4 Historic Flooding

4.1 The Environment Agency have advised that do not have any records of flooding in this area.

5 Sequential and Exceptions Tests

5.1 The National Planning Policy Framework (NPPF) states at paragraph 168 that applications for minor developments and change of use should not be subject to the sequential or exceptions tests.

6 Assessment of potential sources of flooding and possible impact

6.0 This section presents an assessment of Flood Risk to the development from

a) external sources; and

b) potential of the proposed development to cause flood risk elsewhere

TABLE 1: POSSIBLE FLOODING MECHANISMS		
Source	**Significant?**	**Comment**
Fluvial	Low	Distance to water course
Tidal/Coastal	Yes	If a breach or over topping of the defences occurred
Pluvial (drainage)	Low	On site run off.
Groundwater	No	Unlikely due to local drainage network
Overland flow	No	No higher ground adjacent to the site
Blockage	No	No culverts or bridges close to the site
Infrastructure failure	No	No major infrastructure has been identified
Rainfall ponding	No	No depressed areas which could encourage ponding.

a) Assessment of Flood Risk to Development from External Sources

6.1 Assessment of Flood Risk from Fluvial/Tidal Sources

6.1.1 The North Sea is located approximately 8 miles to east of the site therefore tidal flooding is considered to be the main source of flood risk. The Hazard Maps provided by the Environment Agency (see Appendix A) show the hazard rating, depth and velocity of water for present day and future scenarios for a breach of the sea defences. These maps show that the site could be affected by tidal flooding from the North Sea if a breach or overtopping of the sea defences occurred. A summary of the risks shown by the Hazard Maps is shown in Table 2, below. The existing tidal defences protecting this site consist of earth embankments which are in fair condition and reduce the risk of flooding (at the defence) to a 0.67% (1 in 150) chance of occurring in any year. The Environment Agency inspect these defences routinely to ensure potential defects are identified.

Table 2: Summary of tidal hazard maps			
Breach Scenario	**Hazard Rating**	**Max Depth (m)**	**Max Velocity (m/s)**
Year 2115, 1 in 200 (0.5%)	'Low hazard' (Building located in no hazard)	0 – 0.25 (Building not shown in hazard)	0 – 0.3 (Building not shown in hazard)
Year 2115, 1 in 1000 (0.1%)	'Low hazard' (Building located in no hazard)	0 – 0.25 (Building not shown in hazard)	0 – 0.3 (Building not shown in hazard)

6.1.2 The hazard maps summarised in Table 2 above and the extract from the hazard maps (see figure 3 below) show that parts of the site are at risk of flooding from breach events up to a height of 0.25m but the existing building is not located within the area of hazard.

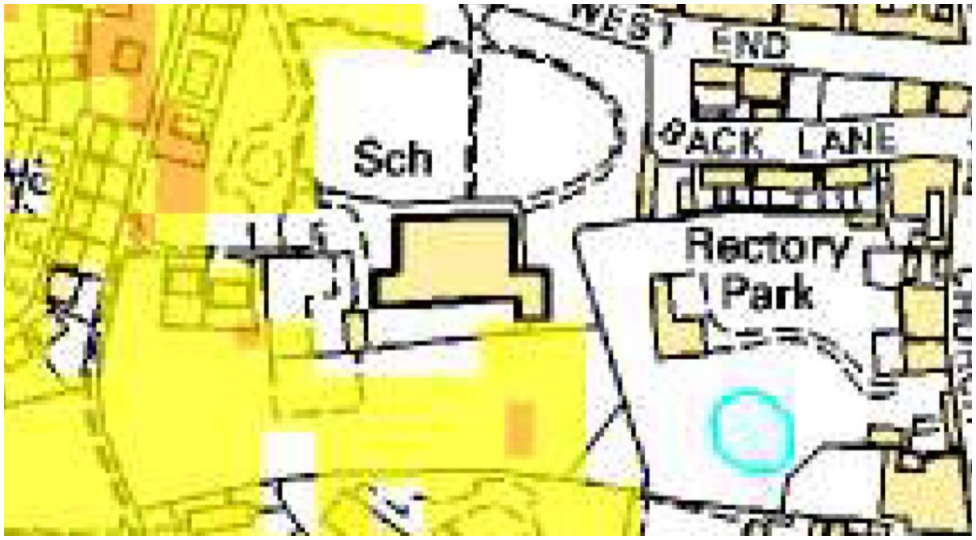


Figure 3- Extract from 0.1% (1 in 1000) 2115 tidal breach hazard map. This shows the site is at risk of 0 – 0.25m of flooding (yellow hatch but the building is not located in hazard area.

6.1.3 The information provided by the architects shows the location of the proposed extensions in relation to the existing building. The single classroom extension and the staff room and hall extension are located on the eastern and northern parts of the building and therefore will not be located within the hazard area shown on Figure 3. The proposed three classroom extension will be located on the southern

portion of the building and will fall within the 0 – 0.25m flooding depth for the 0.1% breach event as shown in Figure 4 below.

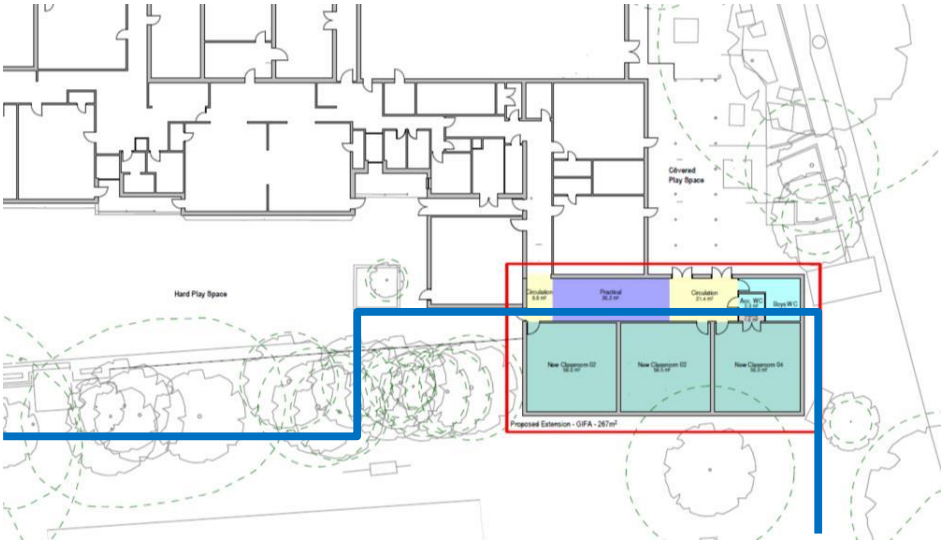


Figure 4- Blue line indicates 0 – 0.25m flooding depth (0.1% breach event overlaid onto the proposed floor. This shows that the proposed three classroom extension located on the southern portion of the building will be partly at risk of 0 – 0.25m flooding depth.

6.1.3 The site is located 7 miles to the east of the River Welland and 10 miles to the west of the River Nene. Given these large distances the potential of fluvial flooding affecting the site is extremely low.

6.2 Assessment of Flood Risk from Overland Flow (Pluvial)

6.2.1 The Environment Agency Surface Water Flood Map shows that the site is not at risk of surface water flooding.

6.3 Assessment of Flood Risk from Ground Water

6.3.1 The area surrounding the site is not known to suffer from ground water problems.

6.4 Assessment of Flood Risk from Reservoirs

6.4.1 The Environment Agency Risk of Flooding from Reservoirs Map shows the site is not at risk from reservoir flooding.

B) Potential of the Proposed Development to Cause Flood Risk Elsewhere

6.5 In order to mitigate flood risk posed from the site post development adequate control measures have been considered for the site. The proposed development will increase the area of impermeable area within the site. In accordance with recognised guidance there is a hierarchy of surface water from new development should be discharges. This should be as follows

- Infiltration
- Water course
- Public sewer

6.6 Given that the surface water from the existing buildings and areas of hard standing discharge into soakaways it is suggested that infiltration drainage may be possible for the proposed extensions subject to an investigation into the capacity of the existing soakaways and also infiltration testing. The design of the surface water system should be undertaken by a suitably qualified person.

MITIGATION MEASURES

6.7 Given that the proposals involve extensions to an existing building it is not practical to raise floor levels therefore the proposed floor levels will be the same as the existing building.

6.8 The hazard maps show that the single classroom extension and the staff room and hall extension are located outside of the hazard area and therefore further mitigation measures are not required.

6.9 The hazard maps show that the three classroom extension is partly located within the 0 – 0.25m flooding depth for the 0.1% breach event. The proposed extension will need to be constructed a minimum of 150mm above existing ground level to meet building regulations, this results in a residual flood risk of 100mm. It is recommended that the following resilient design methods are incorporated to the three classroom extension;

- Finished Floor Level (FFL) set a minimum of 150mm above existing ground level
- Ground supported floors preferable unless there are issues with soil/trees
- Good compaction of hardcore and blinding
- Ensure mortar joints are thoroughly filled
- Do not use highly porous brick such as hand made bricks
- Where possible use engineering bricks up to predicted flood depth (100mm above finished floor level) plus one course
- All external service entries should be sealed with closed cell material
- Avoid the use of absorbent cavity insulation
- Treated and sealed timber skirting and architraves
- Arrange for all service circuits and practical socket outlets, boilers etc. to be a minimum of 0.5m above the raised ground floor level
- Avoid the use of plasterboard and gypsum plaster and use water resistant cement render or lime mortar, or fix the plasterboard horizontally to the ground floor walls.
- Sealed PVC external framed doors and windows are recommended, where wooden units are a preferred option, all effort should be made to ensure a good fit and seal.

6.10 **A Flood Warning and Evacuation System** will be put into place within the site to minimise impact on human life.

6.11 The site will be registered with the Environment Agency's 'Warnings Direct' flood warning system. The Agency provides this flood warning service in England and Wales and supports the public taking action to prepare and respond when these warnings are issued. The warnings are provided for flooding from rivers and the sea but not for localised flash flooding that cannot be predicted, for example from blocked or overloaded sewers or local groundwater flooding. The Agency issues warnings through media on TV and radio weather bulletins and on its website (www.environment-agency.gov.uk/floodline). In areas of particular risk, the Agency can send a warning message direct to people at home or at work by telephone, fax or pager using an Automatic Voice Messaging (AVM) system.

6.12 The use of the warning system will be used to provide the sites flood marshal with information on the severity of the predicted flood. Depending on the severity different procedures will be put into place, with the most extreme being a full evacuation of the site to higher/safer ground. A copy of the Evacuation Plan and a map to show the route to the safer ground will be positioned on site.

6.13 Flooding events are generally predicted with a two hour warning being given on pending events and the road network is adequate to allow escape inland in the event of an unpredicted flooding event.

7 Conclusion

7.1 The following conclusions, in relation to the questions posed at the start of this document, are as follows:

7.2 ***Identify and address flood risk issues associated with the proposed development;***
The potential sources of flood risk have been discussed within this report. It has been established that tidal flooding is the dominant source of flood risk in the area.

7.3 ***Assess if the project is likely to be affected by flooding from all relevant sources both now and in the future:***
The Flood Maps show that the site could be affected by a breach of the sea defences in the future. The hazard maps show that the proposed single classroom extension and the staff room and hall extension are located outside of the hazard area. The three classroom extension is partly located within the 0 – 0.25m flooding depth for the 0.1% breach event.

7.4 ***Assess whether the project will increase the flood risk elsewhere:***
The proposals will increase the amount of impermeable area within the site. It is recommended that the additional surface water is safely discharged via soak aways.

7.5 ***Demonstrate the project is safe and where possible reduces flood risk overall and proposes measures to deal with the identified effects and risks:***
As the proposed single classroom extension and the staff room and hall extension are located outside of the hazard area mitigation measures are not required. The proposed three classroom extension is partly located within the 0 – 0.25m flooding depth for the 0.1% breach event therefore flood resilient measures have been recommended.

7.6 This report demonstrates the proposed development is compliant with the requirements of the National Planning Policy Framework, and it is considered that planning permission should not be refused on flood risk grounds.