SENSUS

Flood Risk Assessment and Drainage Strategy

Proposed improvement works to Existing Car Park

Drapers Place, Spalding



View from north side of Drapers Place

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Flood Risk Assessment

1.0 INTRODUCTION

1.1 This Flood Risk Assessment related to an application being made by Lincolnshire Trading and Management Limited, for hard surfacing, installation of CCTV and lighting to an existing established car park at Draper's Place, Spalding. The proposal also includes the demolition of existing garaging on the site, to extend the current area of parking.

1.2 The site is within Flood Zone 3 as shown on the Environment Agency's Flood Zone Map for Planning. This map does not take account of existing flood defences.

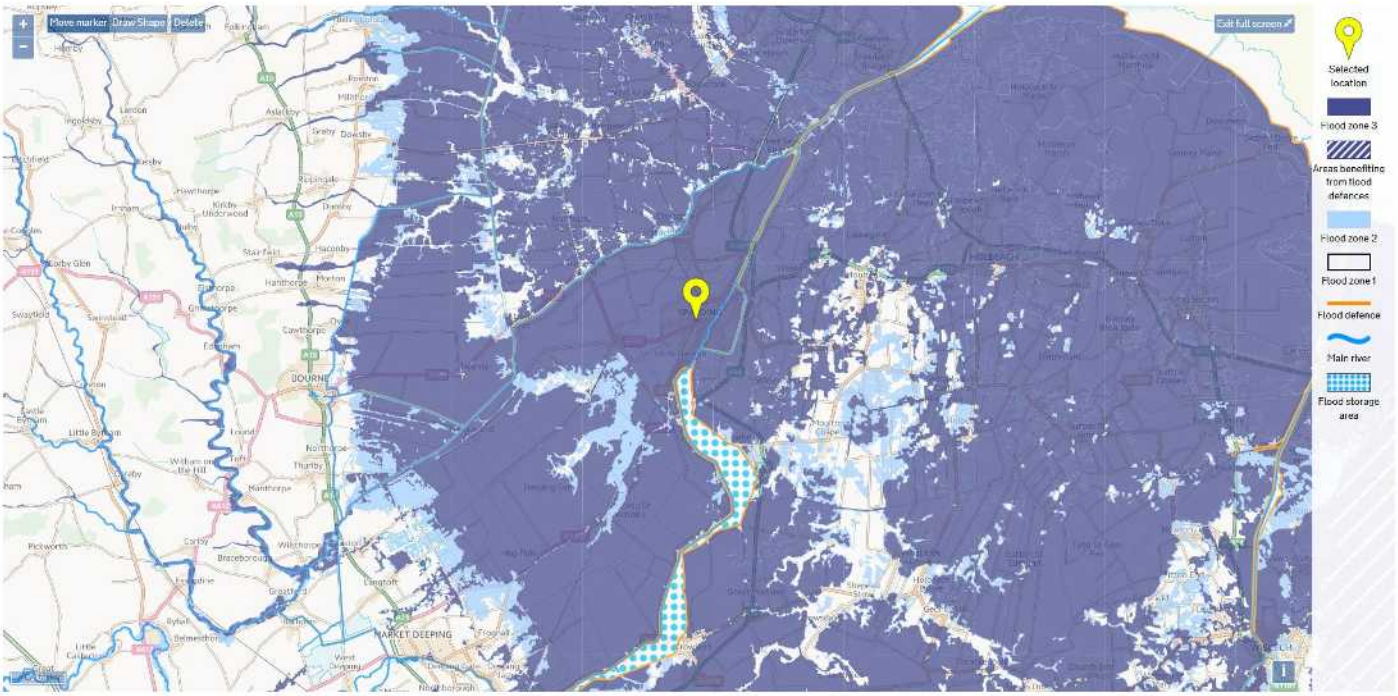


Fig.: Extract from EA Flood Map, with marker showing site location

1.3 *The site's current, established use is as car parking, and this will remain unchanged as a result of this application.*

1.4 The proposal is deemed for Planning purposes to fall within the 'Less Vulnerable' classification, but only by default; it should be noted that the actual works proposed do not result in any significant change to flood risk from that present with the existing land use, of parking, which will continue unchanged (albeit slightly increased in capacity).

2.0 The Site

2.1 The application site is located on the western side of the River Welland (approximately 200m. distant), close to the historic centre of the town. The National Grid Reference of the site is 524720 322585. The location and extent of the site is shown on drawings which accompany the application.

2.2 As the site is within a defended area, the proposed development is assessed as falling within Flood Zone 3a, with a 'High' probability of flooding as defined on Table 1 of the technical guidance:

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.(Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Fig: Table 1 – Flood Zones

2.3 Applying the flood risk vulnerability classification in Table 2 of the guidance, a car park can be classified as 'less vulnerable'. Under Table 3 of the guidance, it can therefore be considered an appropriate form of development in Flood Zone 3a.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Fig: Table 3 – Flood Risk Vulnerability Classification

2.4 It should be stressed, however, that this application relates to minor development – resurfacing, lighting, CCTV and minor extension (though demolition of existing buildings) – of an *existing* car park. Application of the Sequential and Exception Tests are therefore not relevant in this instance.

2.5 The default lifetime assumed for commercial development is 75 years, unless otherwise agreed with the Planning authority. In realistic and practical terms, the use of the site is unlikely to be affected by climate change.

3.0 STRATEGIC FLOOD RISK ASSESSMENT

3.1 The following information about the flood risk relating to the application site has been derived from the South Holland Strategic Flood Risk Assessment – Spalding Maps (2016 update), available on this link:

http://www.southeastlincslocalplan.org/2016-update-of-south-holland-strategic-flood-risk-assessment-spalding-maps/

- The Residual Risk Extent Maps show the site to be at low risk of flooding, subject to flood defences, for all scenarios
- The Residual Peak Depth Maps indicate a peak depth of zero, for all scenarios.
- Residual Peak flood velocity is zero, for all scenarios.
- The Residual Flood Hazard Maps show the site to have no residual hazard classification, for all scenarios.

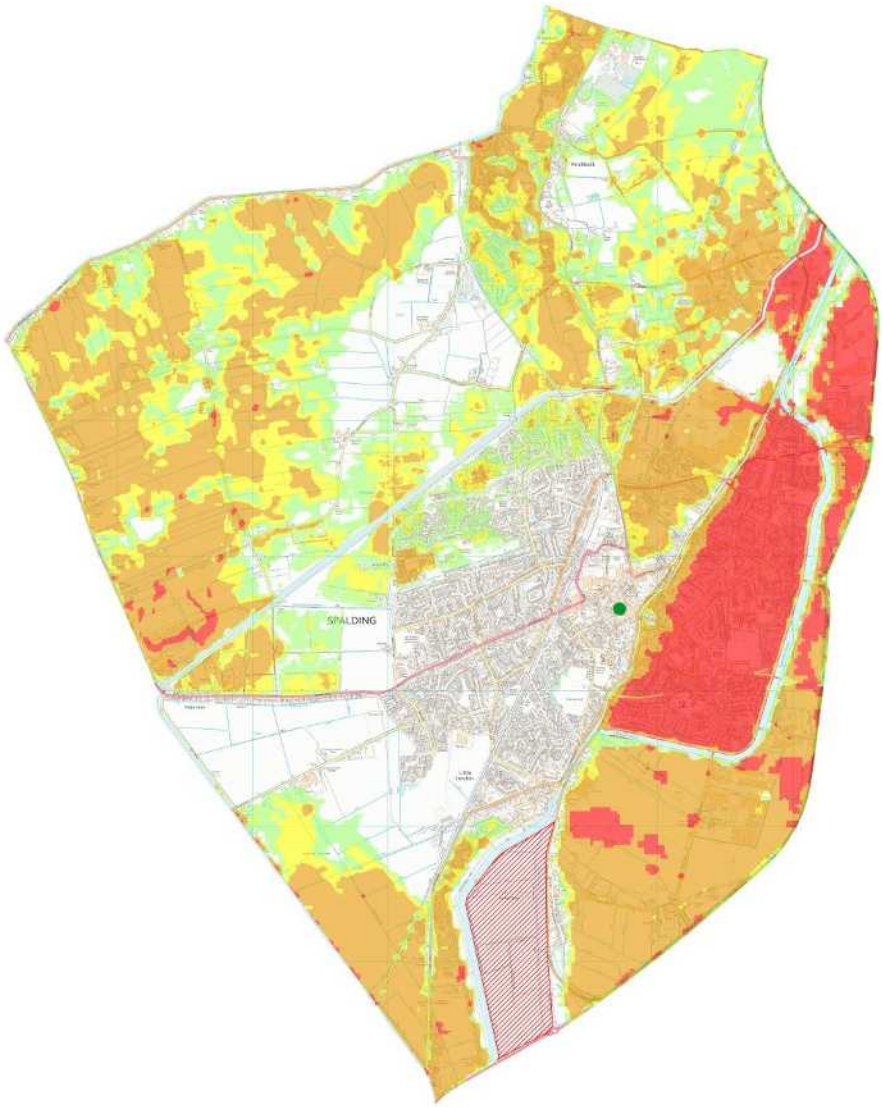


Fig. Residual Flood Hazard: Year 2115 1% Fluvial/0.5% Tidal Event Probability (site marked with green dot)

4.0 SITE LEVELS

4.1 Existing levels on site vary from approximately 5.60 AOD in the north east corner of the site, down to approximately 4.41 AOD in the south west corner.

4.2 The Environment Agency has provided predicted flood levels for the River Welland immediately to the east of the site, taken from the Welland Catchment Model, as:

	2007	2115
Peak 1 in 100 year flood level:	4.39m AOD	4.68m AOD
Peak 1 in 1,000 year flood level	4.4m AOD	4.68m AOD

4.3 The defence level of the left bank of Spalding Welland is 5.20m AOD

5.0 EXISTING FLOOD ALLEVIATION MEASURES

5.1 The site is within a defended flood plain, as defined in Appendix 1 of the Environment Agency's "Policy and Practice for the Protection of Flood Plains" and is considered to be passive until such time that flooding occurs greater than the defences can withstand. The likelihood of flooding due to overtopping or failure of the defences is considered to be very low.

5.2 The River Welland is a main river and maintained by the Environment Agency.

5.3 The area between the site and the River Welland is drained by surface water sewers maintained by Anglian Water, which discharge either directly into the Welland or into drainage channels maintained by the Welland and Deepings Internal Drainage Board. The levels of the IDB channels are controlled by the level of South Drove Drain, which is also under the control of Welland and Deepings IDB.

6.0 POTENTIAL SOURCES OF FLOODING

6.1 The site lies upon some of the highest prevailing land levels in the area, and there is no historic evidence of flooding having occurred in this part of Spalding. The following potential sources of flooding have been considered, however:

6.2 Breach of Sea Defences

6.2.1 The strategic Flood Risk Assessment states that tidal defences are adequate to withstand a 1 in 200 year (0.5%) probability flood event for present day. It is predicted that some of the banks would overtop in such an even in 2115, allowing for climate change. If such a breach occurred, however, the water would flow from the tidal Welland (south of Fulney Lock, approximately 2km north of the application site) onto lower lying land to the west. The centre of Spalding is predicted to remain unaffected, even if a tide of extreme proportions occurred.

6.2.2 It is reasonable to assume that works will be undertaken to ensure that a 1 in 200 year standard of defence will be maintained into the indefinite future.

6.2.3 The risk of flooding from this source is therefore negligible and can be discounted.

6.3 Breach of banks of the River Welland

6.3.1 The west bank of the River Welland is at a level of 5.20m AOD for the section along London Road, immediately to the east of the application site. As noted above, the maximum predicted

fluvial flood level of the Welland at this point is given as 4.68m AOD. Soon after this level is reached, siphons are activated to spill water onto Cowbit and Crowland Washes, upstream to the south east of Spalding.

6.3.2 The risk of flooding from this source is therefore negligible and can be discounted.

6.4 Flooding from IDB Watercourses

6.4.1 The highest predicted water levels in Welland and Deeping IDB drainage channels are in Vernatts Drain, at 3.79m AOD.

6.4.2 As minimum levels on the application site are at approx. 4.41 AOD, this source of flooding can be discounted.

6.4.3 Maximum predicted water levels in the IDB catchment controlled by Pode Hole Pumping Station in a 1 in 100 year event in 2115 are below 1.00m AOD and so can also be discounted as a source of flood risk to the site.

6.5 Flooding from Ground Water

6.5.1 A site investigation has been carried out and borehole information showed that to a depth of 2.5 metres the subsoil is made ground, and below this the soil is sandy, clayey silt.

6.5.2 Groundwater was first encountered at a depth of 7.0 metres and rose to 5.3 metres.

6.5.3 There is no historic evidence of groundwater flooding of the site, and it is reasonable to assume that this can also be discounted as a source of flood risk.

6.6 Surface Water Flooding

6.6.1 As part of the proposed works, the existing unmade (compacted stone) surface is to be replaced with tarmac, supported by a purpose designed drainage system as outlined in the accompanying drainage statement. Discharge will be to either properly designed soakaways, or attenuated on site to suit Anglian Water requirements prior to discharge to their public sewer network.

6.6.2 It is therefore very unlikely that pluvial flooding will occur either on site, or be exacerbated elsewhere as a result of the proposed works.

7.0 CONCLUSIONS

7.1 The application site is not in a functional flood plain as defined by the Technical Guidance.

7.2 Although the site is in Flood Zone 3, the actual risk of flooding from any source is negligible.

7.3 Although not a matter for the consideration of this application, the existing use of the site as parking is 'less vulnerable' to flooding and no additional risk is imposed by the works to which this application relates.

7.4 No residual flood risk has been identified, and no mitigation measures are considered necessary as the proposed works do not increase the level of flood risk in any way beyond that for the existing use of the site (which will continue without material change).

7.5 Surface water drainage will be appropriately dealt with, as outlined in the drainage statement, below, and will present neither any risk of flooding on the site itself, nor increased flood risk elsewhere.

7.6 On the basis of the above, flood risk is not considered to be a remaining factor in the determination of this application.

DRAINAGE STRATEGY

8.0 INTRODUCTION

8.1 The proposed development consists of hard surfacing and setting-out of parking spaces, with provision of lighting and CCTV, on an existing area of land with established use for parking, along with the demolition of existing garages on the site to incorporate their land as additional parking.

8.2 The site slopes gently down from its north eastern corner to the south western corner, with a difference in levels of approximately 1.2 metres over a distance of approximately 55 metres (giving a fall of roughly 1:46).

8.1 EXISTING DRAINAGE

8.1.1 Typical of town centre sites in South Lincolnshire, the centre of Spalding retains a historic drainage network consisting of foul, combined and surface water systems.

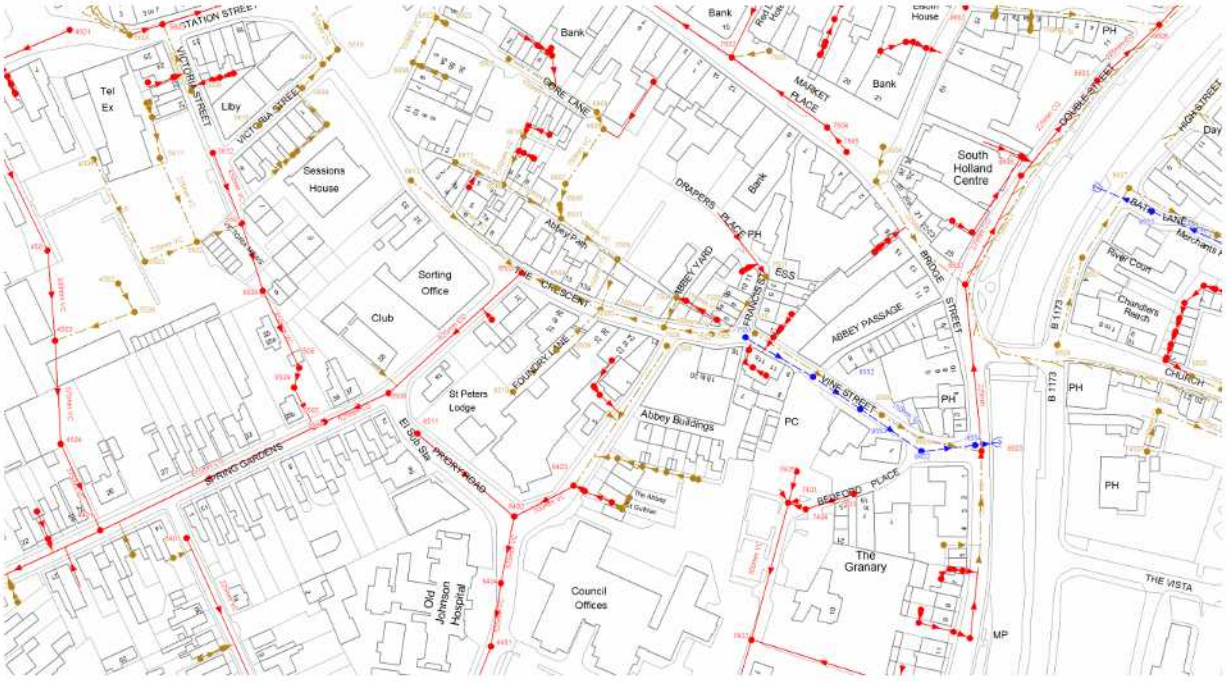


Fig: Anglian Water drainage network in the vicinity of the site

8.1.2 The application site is currently surfaced with compacted stone, with no formal drainage system visible. Existing surface water drainage appears to be by means of infiltration into the ground.

8.2 PROPOSED DRAINAGE

8.2.1 The proposed hard surfacing of the car park requires that a formal drainage system be implemented. This will be subject to infiltration tests and ground investigation, the result of which will determine the strategy to be adopted, with drainage gulleys connected to a positive drainage system discharging to:

a) Soakaways designed in accordance with BRE Digest 365.

<u>If the soakaway is not effective, then we would seek option b or c below.</u>

b) Attenuation crates, providing on-site storage of rainwater in a storm event, allowing its gradual infiltration into the ground water table.

c) On-site, below ground storage with attenuated discharge to Anglian Water's network at manhole 7509, at a rate to be agreed (anticipated to be 5 litres/second, as previously agreed in connection with South Holland Planning approval ref. H16-0888-17).

…or a combination of these approaches.

8.2.2 To enable the Council to have assurance that the drainage scheme will be implemented effectively, we would recommend that a condition be imposed requiring surface water to be drained via a soakway designed in accordance with BRE Digest 365 and if this cannot be satisfied than a drainage strategy incorporating b) or c) above be submitted to the LPA for approval. This is a reasonable and proportionate approach given the existing use of the site will not change.

8.2.3 The proposed development does not incorporate any requirement for foul drainage.