

Preliminary Flood Risk Assessment

03 October 2022

David Greaves Design

Fernhill, Hoveringham Road, Caythorpe, Nottinghamshire, NG14 7EE

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Supervised by Mr Joseph Turner

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1. Introduction

The following document is a Preliminary Flood Risk Assessment carried out by Oakshire Environmental, and includes details of the site, vulnerability classification, flood linkages and an evaluation of risk.

1.1 Project Overview

The client's proposed project involves the installation of a tennis court at Fernhill, Hoveringham Road, Caythorpe, Nottinghamshire, NG14 7EE. An assessment of flood risk has been requested by the client, to support a planning application for the proposed project. Oakshire Environmental have carried out a Preliminary Flood Risk Assessment, as described below.

1.2 Purpose of Investigation

The objectives of the Preliminary Flood Risk Assessment were to:

- Develop a detailed assessment of the site.
- Apply the Sequential Test and Exception Test.
- Identify potential flood sources, receptors and pathways at the site.
- Assess the level of potential flood risk.
- Determine the requirement or scope of further investigations or mitigation measures.

1.3 Scope of Work

- Brief introductory information has been noted to provide context to the report and include an Introduction, Project Overview, Scope of Work and Limitations.
- To develop a detailed assessment of the site and apply the Sequential Test and Exception Test, desk studies have been carried out to collate information obtained from sources including the Environment Agency, Local & National Authorities, Strategic Flood Risk Assessments and Detailed Terrain Model (DTM) LiDAR topographical surveys.
- This information has been used to identify potential flood sources, receptors and pathways at the site, as part of an initial Conceptual Site Model.
- To assess the level of potential flood risk, a Conceptual Site Model have been produced to categorise the potential severity of the impact of the flood linkage on the receptor and the probability of the flood linkage being present.
- Following the assessment of flood linkages, an evaluation of flood risk, mitigation measures, surface water management and safe access and egress has been conducted to determine the requirement or scope of further investigations.
- Supporting appendix include photographs, maps, and plans of the site.

1.4 Limitations

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This report excludes consideration of potential hazards arising from any activities at the site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities. Oakshire Environmental does not warrant or guarantee that the site is free of hazardous or potentially hazardous materials or conditions. It should be noted that this report has been produced for environmental purposes only.

2. Site

The following section provides a description of the site, location and proposed development, in addition to, planning and site history, utilising information obtained from the client and publicly available sources.

2.1 Site Description and Location

The site is located on Hoveringham Road, east of the village of Caythorpe, and is approximately 0.8ha. The site is comprised of a single detached dwelling, private garden and patio at the north west with a tarmac driveway along the north east boundary and lawn covering the remainder of the site. The dwelling, garden and patio at the north west of the site are significantly higher than the rest of the site with a ground level no lower than 17.2m AOD, while the driveway and lawn are at approximately 15.4m AOD. Approximately halfway up the lawn, there is a NE-SW linear depression in the ground level.

The site is bordered by another detached dwelling with a large garden and a tennis court to the south west, Hoveringham Road to the south east and agricultural fields to the north east and north west. The surrounding area is predominantly agricultural, with some isolated residential dwellings.

The River Trent is situated 120m east of the site, which is an Environment Agency main river, and Causeway Dyke is 230m north, which is maintained by Trent Valley Internal Drainage Board. The site is situated within Flood Zones 2 & 3 of the 'Flood risk map for planning', which means that the land has a medium to high probability of flooding (>0.1% to >1% annual probability of river flooding).

National Grid Reference: SK 69602 45738

2.2 Proposed Development

The proposed development involves the development of a tennis court in the lawn area at the south of the site. The tennis court will be constructed with a 150mm of compacted stone sub-base, 40mm open graded asphalt, 25mm binder course and a 6mm open graded asphalt course with an 18mm multi-use sports carpet. A 600mm wide gravel maintenance path will also be constructed curtailing the tennis court along with a hedgerow.

The tennis court will have an area of 648m² and the gravel path will cover an area of approximately 65m² resulting in a total footprint of 713m². The tennis court will be situated at the existing ground level which is 15.4m AOD.

2.3 Vulnerability Classification

Table 2 in the NPPF technical guidance (Flood Risk Vulnerability Classification) assesses the flood risk vulnerability of a site based on the site's use. Based on this assessment, the proposed use of the site for outdoor sports and recreation falls within the category of 'water compatible'.

The flood risk map for planning indicates that the site falls within Flood Zones 2 & 3 and the proposed development falls entirely within Flood Zone 3. The Newark and Sherwood Strategic Flood Risk Assessment (SFRA) shows that this area of Flood Zone 3 is also denoted as functional flood plain (Flood Zone 3b).

Water compatible developments are permitted in all Flood Zones without the need for the Exception Test so this will not be carried out.

It should be noted that these Flood Zones do not take into account the impact of any flood defences or site specific mitigation measures.

Table 1: Flood Risk Vulnerability Classification table from National Planning Policy Framework Technical Guidance

Flood Risk Vulnerability Classification					
Flood Zones	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	•	•	•	•	•
Zone 2	•	Exception Test required	•	•	•
Zone 3a	Exception Test required	x	Exception Test required	•	•
Zone 3b	Exception Test required	x	x	x	•

Key: • Development is appropriate
 x Development should not be permitted

2.4 Sequential Test

The proposed development involves a householder development within the curtilage of the existing dwelling and the Sequential Test is, therefore, not required.

There are also no available areas of the site at lower risk than the proposed development area.

3. Initial Conceptual Site Model

The following section outlines potential flood sources, pathways and receptors, utilising information gathered in the previous sections, to develop an initial conceptual site model.

3.1 Potential Flood Sources

The following section outlines potential flood sources, pathways and receptors, utilising information gathered in the previous sections, to develop an initial conceptual site model.

Rivers & Seas

The site is situated 120m west of the River Trent and 230m south of Causeway Dyke. The development area is considered to have a high probability of flooding, based on the Environment Agency's flood risk map for planning and Environment Agency maps that include the impact of flood defences also show that the development area is at high risk of river flooding. The River Trent & Tributaries at Newark Flood Risk and Hazard Mapping Study, carried out in 2011, shows that the majority of the site, including the proposed development area, would flood to between 1m and 2m in a 1% AEP event. It should be noted that the dwelling at the north west of the site is not considered to be at risk of flooding to any depth in this event.

There are flood defences along the River Trent in the form of embankments and engineered high ground with a design Standard of Protection (SoP) of 10 years. These will offer some protection, however, the site is still at risk from the 1% AEP event.

Environment Agency data shows that the site has previously flooded on multiple occasions including 1932, 1947, 1977 and 2000. The north west of the site was only impacted in the 1932 event, however, the development area was flooded in all of these events. These events were all caused by an exceedance of the River Trent's channel capacity and there were no raised defences in place at the time.

Surface Water

Surface water runoff is caused by heavy rainfall that can overwhelm the drainage network. The Environment Agency Risk of Flooding from Surface Water mapping can be used to identify areas at risk of surface water flooding. Map data shows that surface water predominantly follows topographical flow paths of existing watercourses or dry valleys and can pond in low-lying areas. The risk is most often confined to roads with some run-off flow routes around properties.

Environment Agency maps show that the risk of surface water flooding at the site and the surrounding area is very low and the site is not considered to be at risk from a 1% AEP event.

The underlying bedrock geology at the site is impermeable Gunthorpe Member Mudstone with superficial deposits of Alluvium. While this may limit water infiltration, the extensive network of land drains in the area, managed by Trent Valley Internal Drainage Board, offer the area significant protection from surface water flooding.

Groundwater

Flooding from groundwater can occur when the water table rises and reaches ground level allowing water to seep through to the surface. This means that water may rise up through floors or underground rooms such as cellars or basements. Groundwater flooding is much slower to occur than river flooding and will usually happen days, weeks or even months after heavy or prolonged rainfall. And it may last weeks or even months.

The underlying bedrock is a secondary aquifer of low productivity, suggesting a low risk of flooding from groundwater, however, the superficial deposits of alluvium may allow water to reach the surface, particularly given the site's proximity to the River Trent. Environment Agency mapping outlined in the Newark and Sherwood District Council SFRA shows that the site lies within an area considered to be of high susceptibility to groundwater flooding, however, there are no records of groundwater flooding in the vicinity of the site.

It should be noted that this map shows the proportion of each 1km grid square where geological and hydrogeological conditions indicate a susceptibility to groundwater emergence. It does not show the likelihood of groundwater flooding occurring.

Sewers

Sewer flooding occurs when heavy rainfall and flooding overloads sewer capacity or when sewers cannot discharge to watercourses due to high water levels. Sewer flooding can also be caused by blockages, collapses, equipment failure or groundwater leaking into sewer pipes. Sewer flooding is often synonymous with other sources of flooding such as river, surface water and groundwater flooding.

The Newark and Sherwood SFRA shows that there are no historic sewer flood records in the vicinity of the site. The risk of surface water flooding in the vicinity of the site is also very low and development in the area is sparse suggesting that sewer flooding is unlikely.

Reservoirs

The level and standard of inspection and maintenance required for reservoirs means that the risk of flooding from reservoirs is generally very low. There are no reservoirs close to the site, however, Environment Agency mapping shows there to be a risk to the site in the event that downstream reservoirs were to fail or overtop and the River Trent will act as a pathway.

Climate Change

Climate change projections show an increased chance of warmer, wetter winters and hotter, drier summers with a higher likelihood of more frequent and intense rainfall. This is likely to make severe flooding happen more often. It is necessary to ensure that a development will be safe from flooding for its lifetime. The proposed tennis court is unlikely to have a lifetime of more than 60 years, similar to that of a commercial development.

Environment Agency guidance recommends that the impacts of climate change on peak river flow are assessed based on management catchments and recommends the use of the 'central' allowances for more vulnerable developments. To assess the impacts of climate change on peak rainfall intensity in large rural catchments the peak river flow allowances should also be used. The central climate change allowance for the 2050s in the Lower Trent and Erewash management catchment is 17%.

Modelling of the 1% AEP flood extent, including a 30% peak river flow allowance for climate change, shows that the development area could flood to a depth of up to 1.94m. This would have a significant impact on the proposed development area, however, the dwelling at the north west of the site would flood to no more than 0.127m.

Climate change modelling of surface water has not been carried out for the site, however, the 0.1% AEP event can be used as a proxy. Based on this, the site is not considered to be at risk of surface water flooding, taking into account climate change.

3.2 Potential Flood Receptors

Given the proposed use of the site, the following receptors are considered:

- Site users
- Proposed tennis court

It should be noted that the proposed tennis court is for private use by residents of the site, therefore, site users will be limited to the existing residents and visitors.

The tennis court itself is also not considered to be vulnerable to flooding as it is unlikely that damage would be caused in the event of a flood. This will be reflected in the Conceptual Site Model.

3.3 Potential Flood Pathways

Based on the expected on-site receptors, relevant pathways for the above receptors include:

- River Trent
- Causeway Dyke
- Surface water
- Semi-permeable superficial deposits
- Local sewers

Pathways between off-site sources and off-site receptors is beyond the scope of this assessment.

3.4 Risk Assessment Methodology

The potential level of risk posed by a particular source is determined by assessing the potential severity of the impact of the flood linkage on the receptor, if it is assumed to be present, and the probability of the flood linkage being present.

Severities are categorised from Minor to Severe and probabilities are categorised from Unlikely to High Likelihood to give a potential level of risk output.

Table 3: Risk Matrix

Probability	Severity of Consequence			
	Severe	Medium	Mild	Minor
High Likelihood	Very High Risk	High Risk	Moderate Risk	Low / Moderate Risk
Likely	High Risk	Moderate Risk	Low / Moderate Risk	Low Risk
Low Likelihood	Moderate Risk	Low / Moderate Risk	Low Risk	Very Low Risk
Unlikely	Low / Moderate Risk	Low Risk	Very Low Risk	Very Low Risk

Very High Risk

There is a high probability that severe harm could arise to a designated receptor from an identified source; or there is evidence that severe harm to a designated receptor is currently happening.

High Risk

Harm is likely to arise to a designated receptor from an identified source.

Moderate Risk

It is possible that harm could arise to a designated receptor from an identified source. It is relatively unlikely that any such harm would be severe or if any harm were to occur it is more likely that the harm would be relatively mild.

Low Risk

It is possible that harm could arise to a designated receptor from an identified source, however, it is likely that this harm, if realised, would normally be mild.

Very Low Risk

There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

3.5 Conceptual Site Model

The information in this section has been compiled to produce an initial conceptual site model outlining the potential sources, pathways and receptors to consider at the site. The level of risk was categorised by considering the severity and probability, as outlined in the previous section.

Table 4: Conceptual site model

Sources	Pathways	Receptors	Severity	Probability	Potential Level of Risk	
Fluvial Flooding	River Trent Causeway Dyke	Site users Proposed tennis court	Mild	Likely	<p>The development area is at high risk of river flooding with modelled flood depths of between 1m and 2m, however, the dwelling at the north west is not considered to be at risk of river flooding as a result of its significant elevation in relation to the rest of the site.</p> <p>While the depth of flooding across the proposed development area is significant, the severity is considered to be mild due to the proposed recreational use.</p>	
Surface Water Flooding	Surface water		Mild	Unlikely	Very Low	Surface water flooding in the area is unlikely as a result of the extensive surface water drainage network.
Groundwater Flooding	Semi-permeable superficial deposits		Mild	Likely	Low to Moderate	<p>The semi-permeable underlying superficial deposits and the site's proximity to the River Trent suggests that the site is susceptible to groundwater flooding.</p> <p>While the site is highly susceptible to groundwater flooding, the severity of this flooding is considered to be mild due to the proposed recreational use.</p>
Sewer Flooding	Local sewers		Mild	Low Likelihood	Low	There are no records of historic sewer flooding in the area and the low density of development along with the very low risk of surface water flooding, suggests that the risk of sewer flooding is low.
Reservoir Flooding	River Trent		Medium	Unlikely	Low	The development area is considered to be at risk of flooding in the event of a failure of overtopping of downstream reservoirs, while the dwelling at the north west of the site is only considered to be at risk when there is also river flooding. This suggests that there is a residual risk of flooding, however, the actual risk is considered to be low due to the very low likelihood of reservoir failure or overtopping.
Climate Change	River Trent Causeway Dyke		Mild	Likely	Low to Moderate	<p>Fluvial models, taking into account climate change, suggest that flood depths across the proposed development area could reach up to 1.94m while the dwelling at the north west of the site would be unaffected with only minor flooding up to 0.127m.</p> <p>While the depth of flooding across the proposed development area is significant, the severity is considered to be mild due to the proposed recreational use.</p>
	Surface water		Mild	Unlikely	Very Low	Surface water flooding in the area up to and including the 0.1% AEP event is unlikely as a result of the extensive surface water drainage network.

4. Conclusions

4.1 Risk Evaluation

The initial conceptual site model identified the following potential flood linkages present at the site and the following conclusions have been drawn:

- There is a **low to moderate risk** to site users and the proposed tennis court from river flooding from the River Trent to the east and Causeway Dyke to the north.
- There is a **very low risk** to site users and the proposed tennis court from surface water flooding.
- There is a **low to moderate risk** to site users and the proposed tennis court from groundwater flooding through the semi-permeable superficial deposits.
- There is a **low risk** to site users and the proposed tennis court from sewer flooding in local sewers.
- There is a **low risk** to site users and the proposed tennis court from reservoir flooding via the River Trent.
- There is a **low to moderate risk** to site users and the proposed tennis court from river flooding, taking into account climate change.
- There is a **very low risk** to site users and the proposed tennis court from surface water flooding, taking into account climate change.

4.2 Existing Flood Mitigation Measures

The site is protected by flood defences along the River Trent and multiple land drains in the surrounding area, however, there are no formal flood defences in the development area. The existing dwelling is raised significantly in relation to the rest of the site, offering it a degree of protection from flooding in a 1% AEP event, including allowances for climate change.

4.3 Proposed Flood Mitigation Measures

While the development area is considered to be at risk of flooding, formal mitigation measures are not considered necessary due to the proposed recreational use. Alternatively, it is recommended that site users are adequately prepared for a potential flood event. The proposed tennis court is for private use by the existing residents of the site so it will not be necessary to ensure that the site remains operational during a flood. Therefore, it is recommended that residents sign up to receive Environment Agency flood warnings and that the tennis court is not used when a flood warning is received.

4.3 Surface Water Management

Generally, it is desirable to discharge surface water runoff into the ground before allowing discharge to a surface water body, surface water sewer, highway drain, or a combined sewer. Across the proposed development area surface water currently discharges directly into the ground and excess runoff will discharge towards the depression in the ground level to the north west.

The proposed tennis court will include a stone sub-base, open graded asphalt and a 'sports carpet' surface material with a gravel path along the borders. Provided that these are constructed to allow the infiltration of surface water and the existing rate and volume of runoff is not increased, flood plain storage capacity will be maintained, and the flood risk off-site will not be increased.

4.4 Safe Access and Egress

The proposed development area is at risk of flooding the land immediately adjacent to the existing dwelling is also likely to be inundated in the 1% AEP event, including a 30% allowance for climate change. Flood depths around the dwelling would be shallow (<0.2m) and it is unlikely that the dwelling itself would be affected. As a result, safe access and egress will not be possible during design conditions, and it is recommended that residents seek refuge on the upper floor of the dwelling in the event of a flood.

4.5 Further Investigation

The site lies within Flood Zones 2 & 3, based on the Environment Agency's Flood Map for Planning. Assessment of the risk to the site from all sources of flooding, including consultation of the Newark and Sherwood District Council SFRA, shows that the site is considered to be at low to moderate risk from river and groundwater sewer flooding, a low risk from sewer and reservoir flooding and a very low risk from surface water flooding.

There is also considered to be a low to moderate risk to the site from river flooding and a very low risk from surface water flooding when taking into account climate change.

Despite the identified risk, flood mitigation measures are not required as it is not considered necessary for the tennis court to remain operational during a flood event. Alternatively, site users (residents) should sign up to the Environment Agency's flood warnings and avoid using the tennis court when a flood warning is issued.

The tennis court and curtiling path should be constructed to allow the infiltration of surface water to ensure that flood plain storage is maintained and the flood risk off-site is not increased.

In the event of a flood there will not be safe access and egress from the existing dwelling, however, safe refuge can be provided within the dwelling in the event of a flood, and it is recommended that residents complete a Personal Flood Plan to ensure they are prepared for a flood event.

It can be concluded that, provided the recommendations outlined in this report are adhered to, site users will be safe from flooding during the lifetime of the development, while not increasing flood risk elsewhere. It should be noted that this conclusion is based on the currently proposed development plan, therefore, flood risk at the site should be re-assessed if material changes are made to the proposed development.

5. References

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Appendix - Site Maps & Plans	
Description	
Site location plan	
Sources	
© Crown Copyright. Ordnance Survey	
Key	
	Site boundary
	North

Appendix - Site Maps & Plans

Description

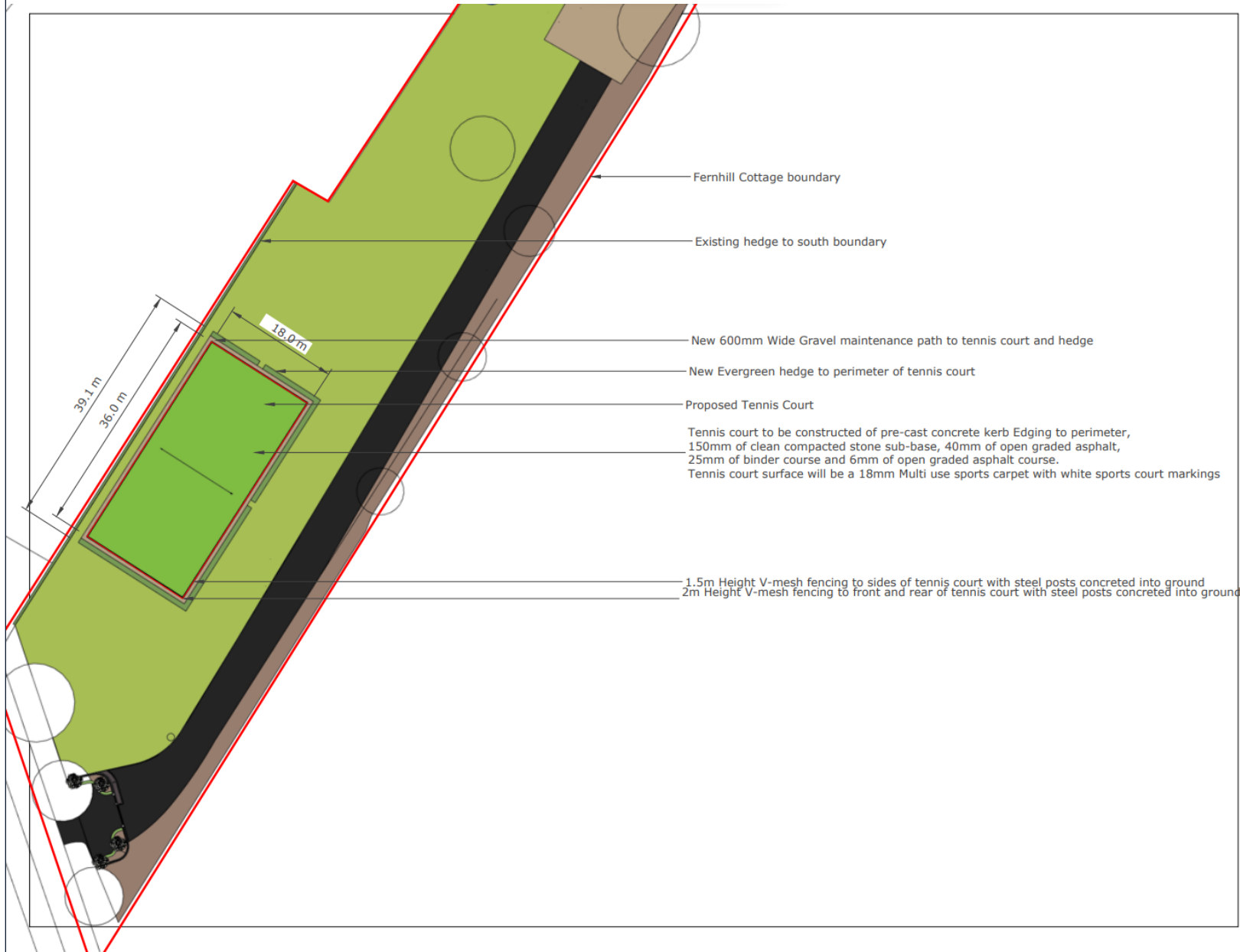
Proposed site plan

Sources

David Greaves Landscape Design & Construction

Key

Site boundary





Appendix - Site Photos
Description
Photo of the access to the site from Hoveringham Road, facing west
Sources
David Greaves



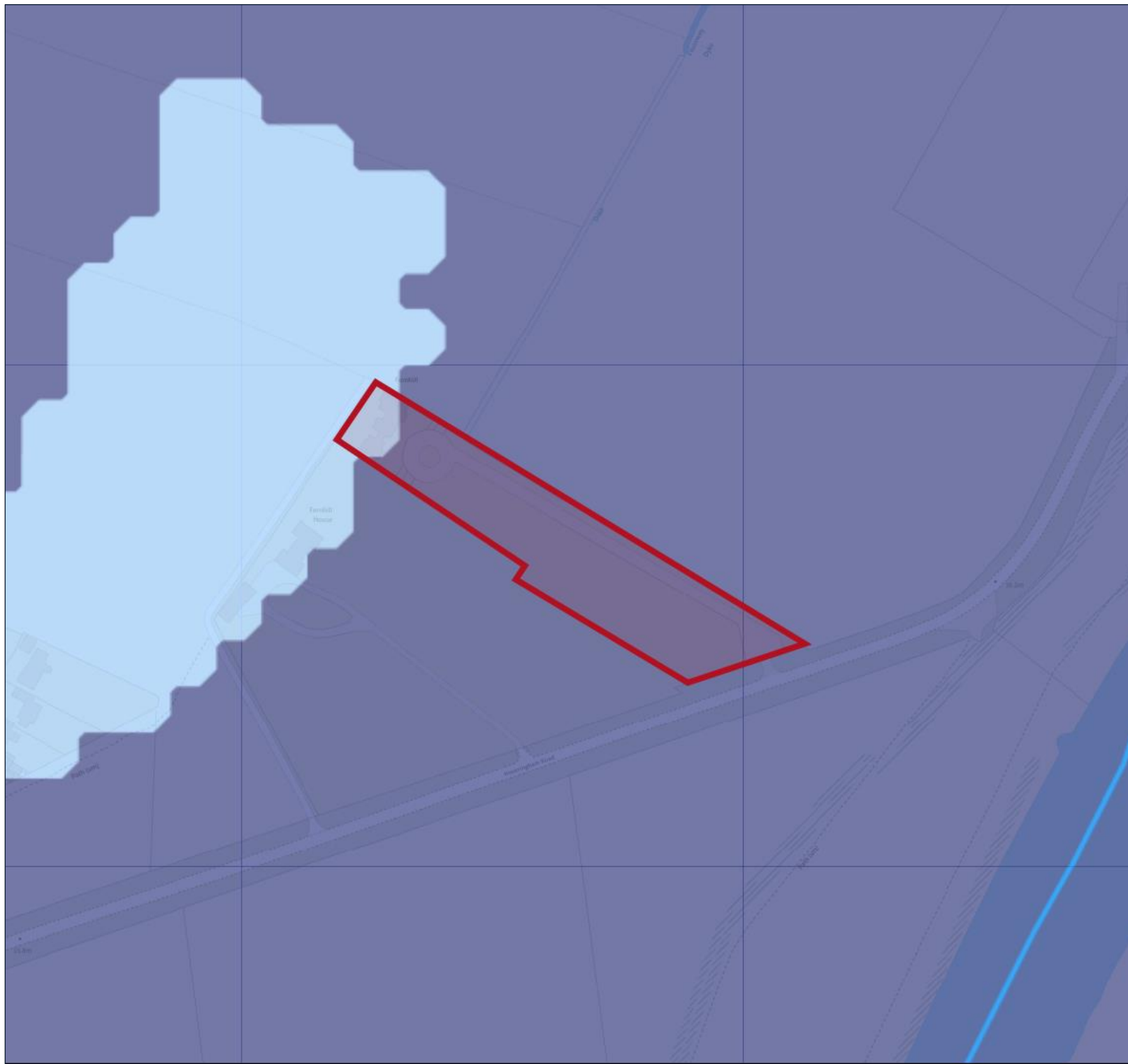
Appendix - Site Photos
Description
Photo of the lawn area at the south east of the site, facing south west
Sources
David Greaves











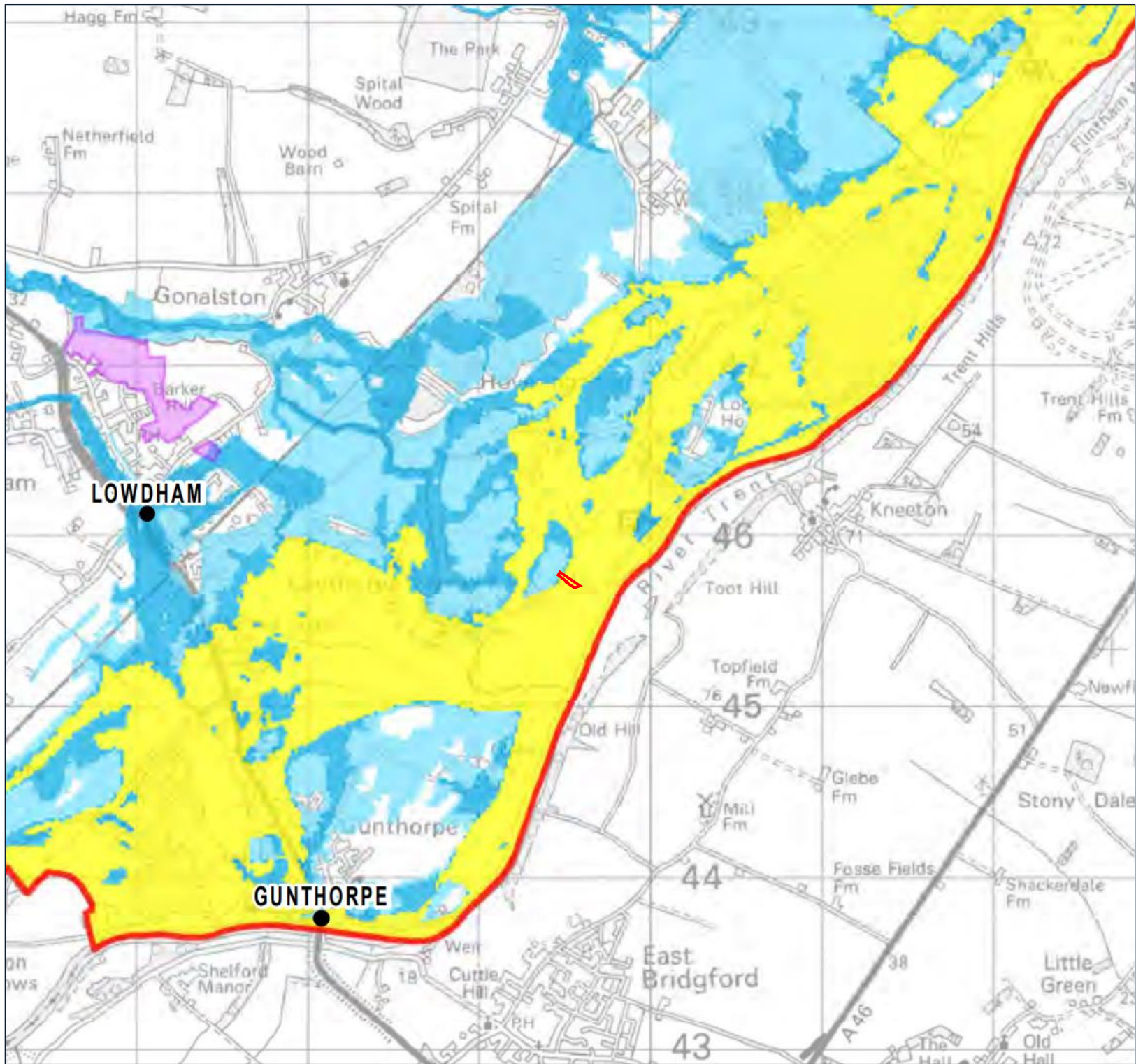
Appendix - Site Photos
Description
Photo of the lawn area and driveway at the south east of the site, facing west
Sources
David Greaves








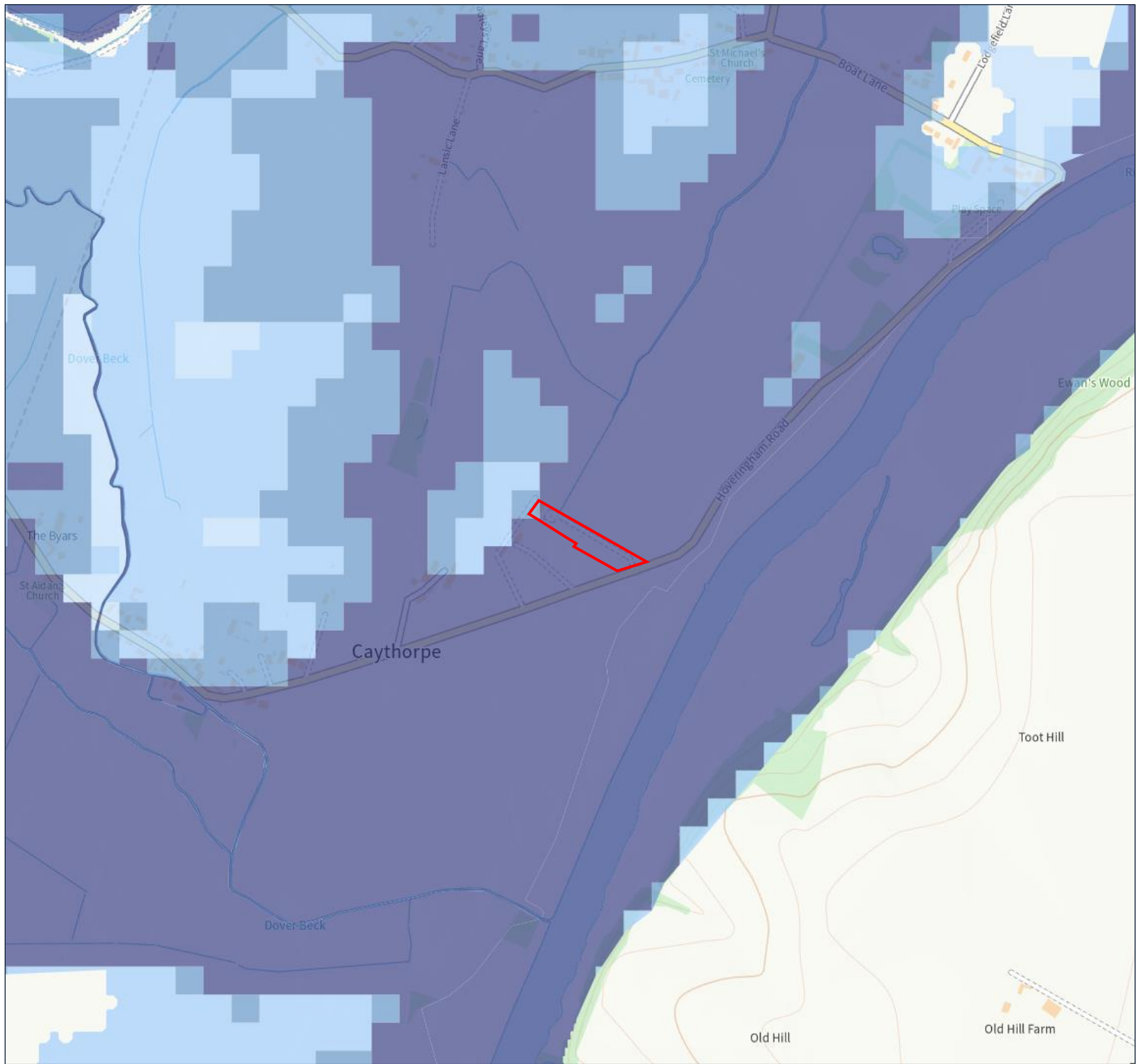
Appendix - Site Photos
Description
Photo of the lawn area and driveway, facing north west
Sources
David Greaves









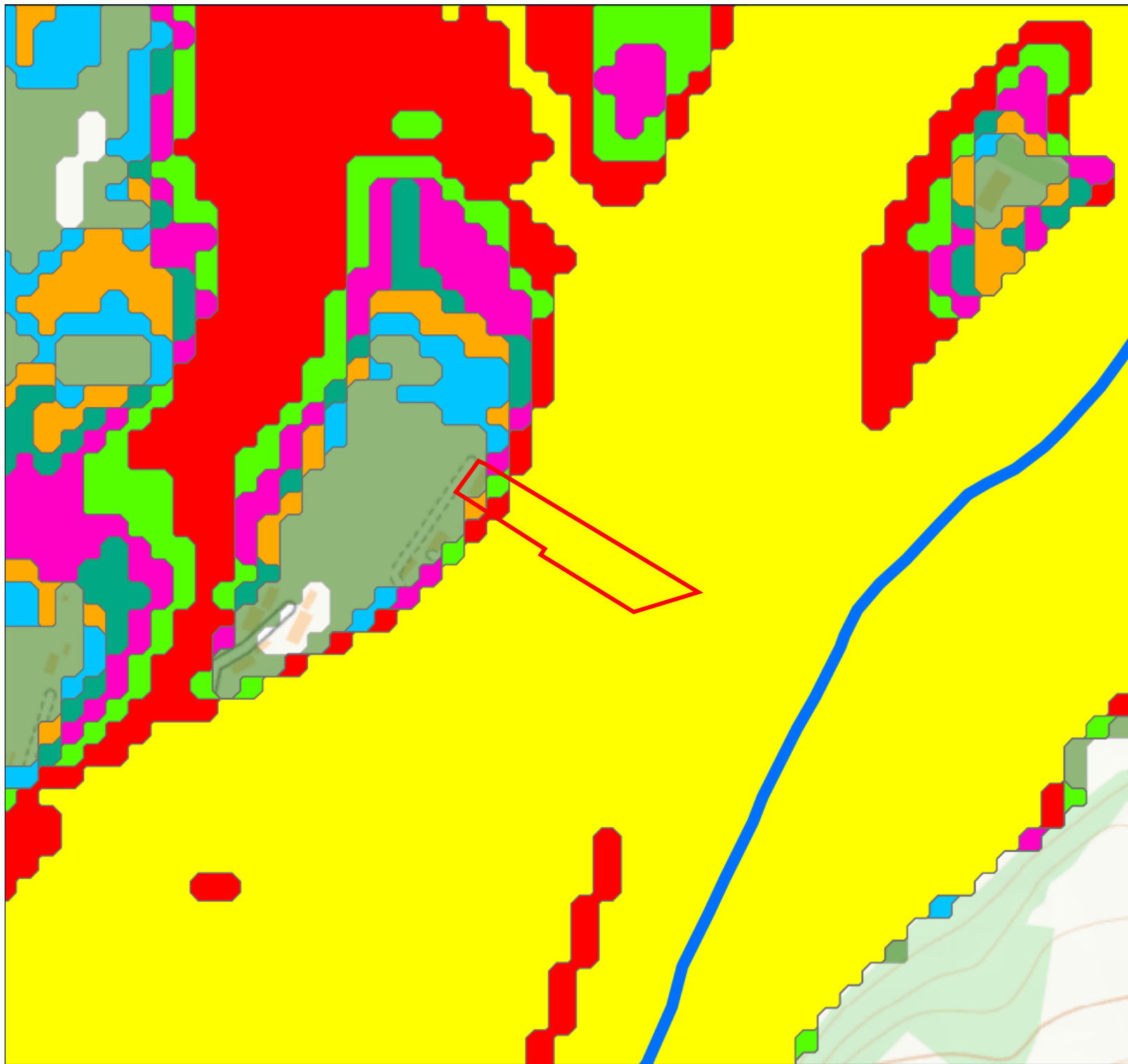
Appendix – Flood Risk Maps	
Description	
Flood zone map for planning	
Sources	
Environment Agency OS data © Crown copyright and database rights	
Key	
	Site boundary
	Flood Zone 1
	Flood Zone 2
	Flood Zone 3
	Areas benefitting from flood defences
	Main river
	Flood defence
	North













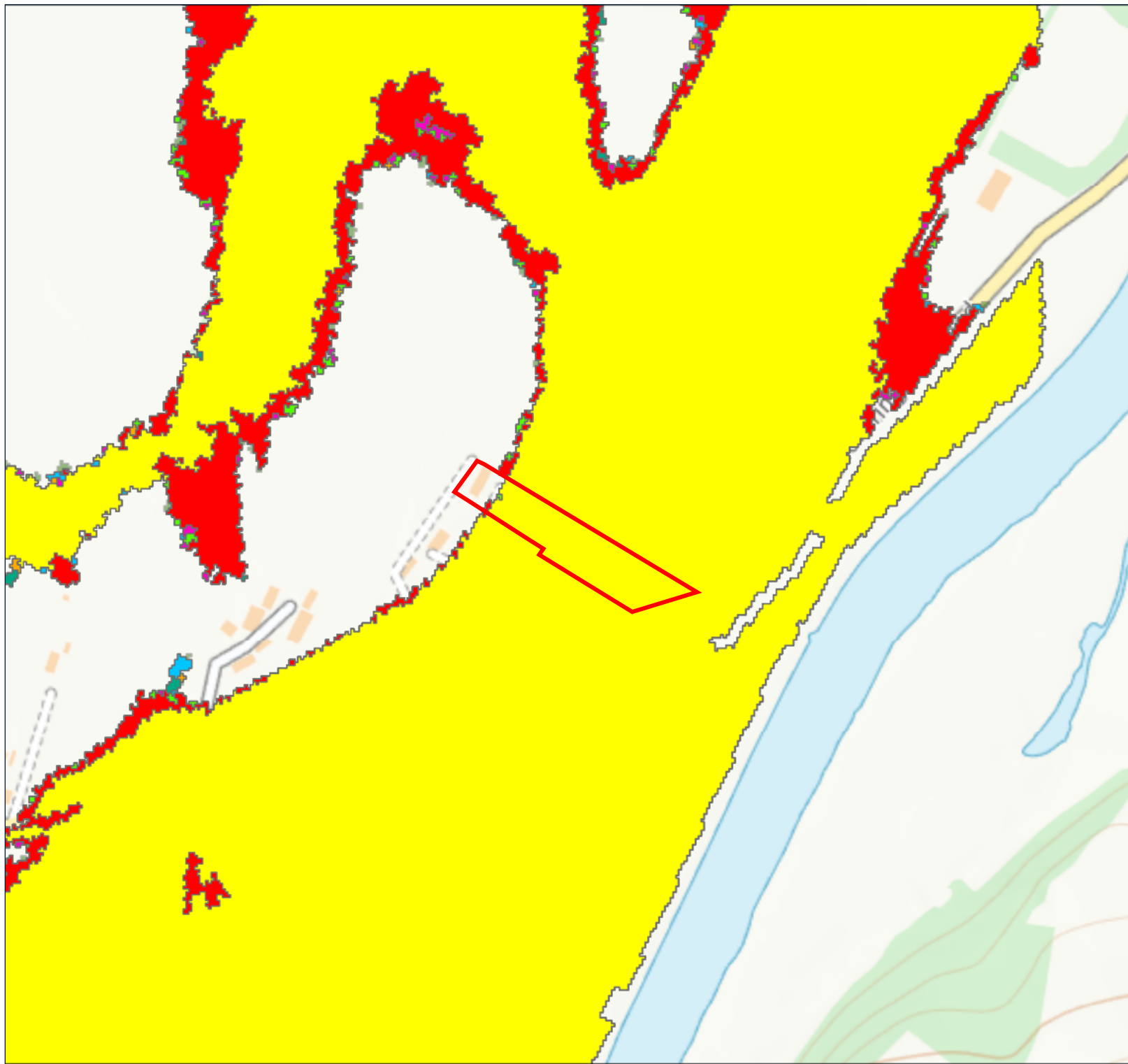
Appendix - Flood Risk Maps	
Description	
Map from Newark and Sherwood District Council SFRA outlining areas of functional flood plain	
Sources	
WSP OS data © Crown copyright and database rights	
Key	
	Site boundary
	Flood Zone 2
	Flood Zone 3
	Functional Floodplain
	North













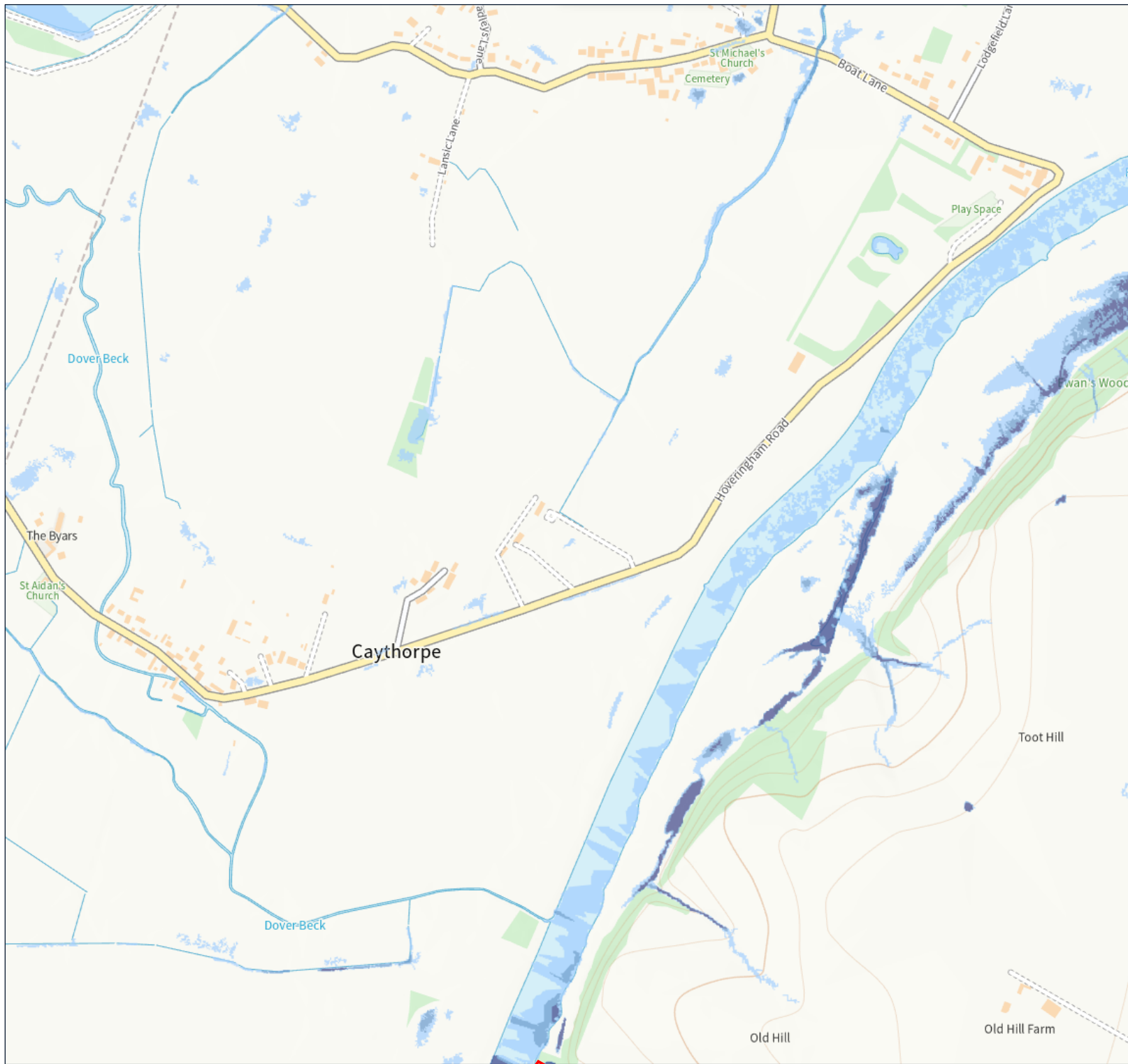
Appendix - Flood Risk Maps	
Description	
Environment Agency map showing the extent of flooding from rivers or the sea	
Sources	
Environment Agency OS data © Crown copyright and database rights	
Key	
	Site boundary
	Very Low
	Low
	Medium
	High
	North









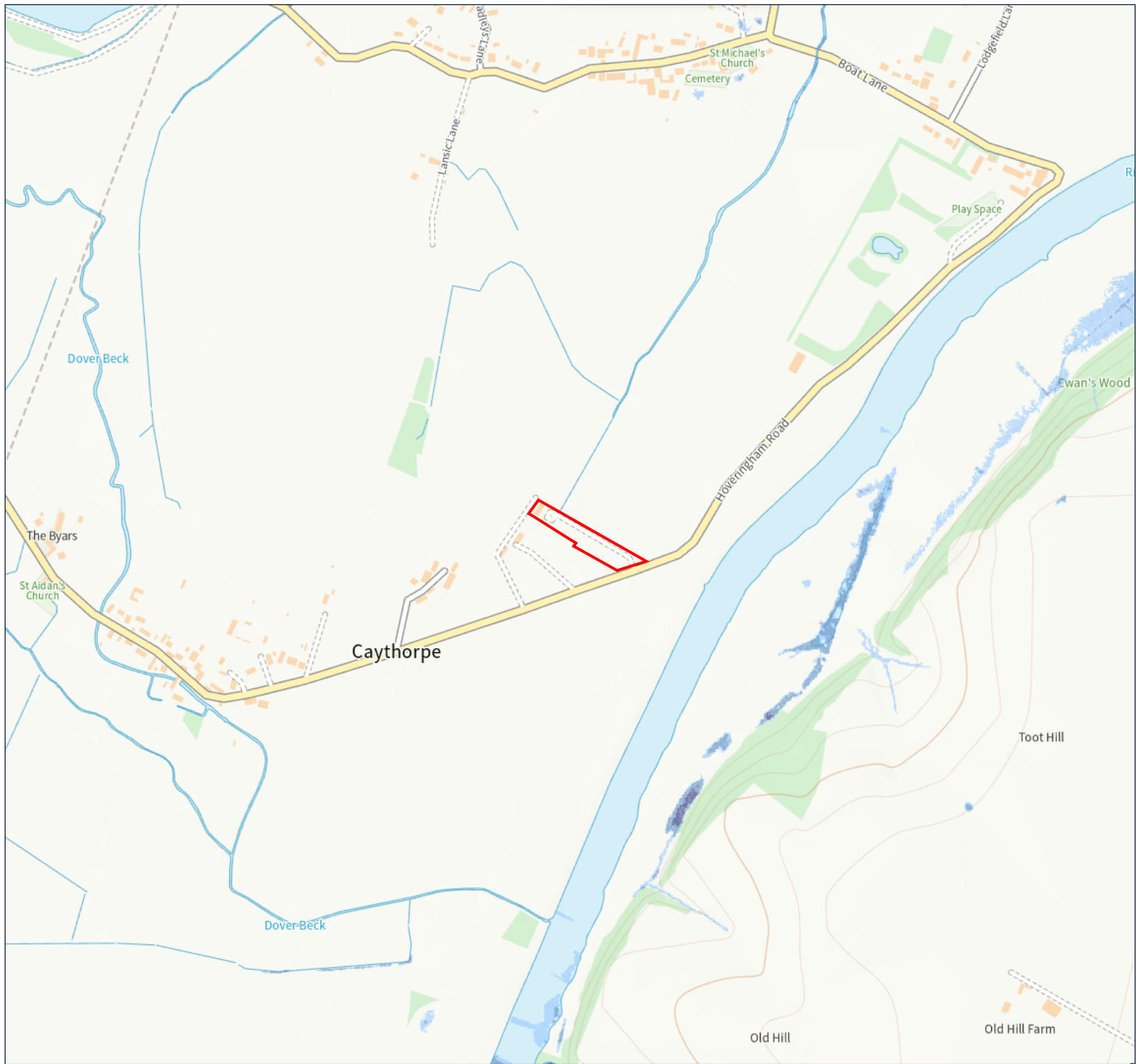
Appendix - Flood Risk Maps	
Description	
Map from Newark and Sherwood District Council SFRA showing modelled flood extents from the River Trent for a range of flood events	
Sources	
Halcrow Group, 2021 CC Update, EA, 2021 OS data © Crown copyright and database rights	
Key	
	Site boundary
	20% AEP
	10% AEP
	5% AEP
	2% AEP
	1.33% AEP
	1% AEP
	0.5% AEP
	0.1% AEP
	North








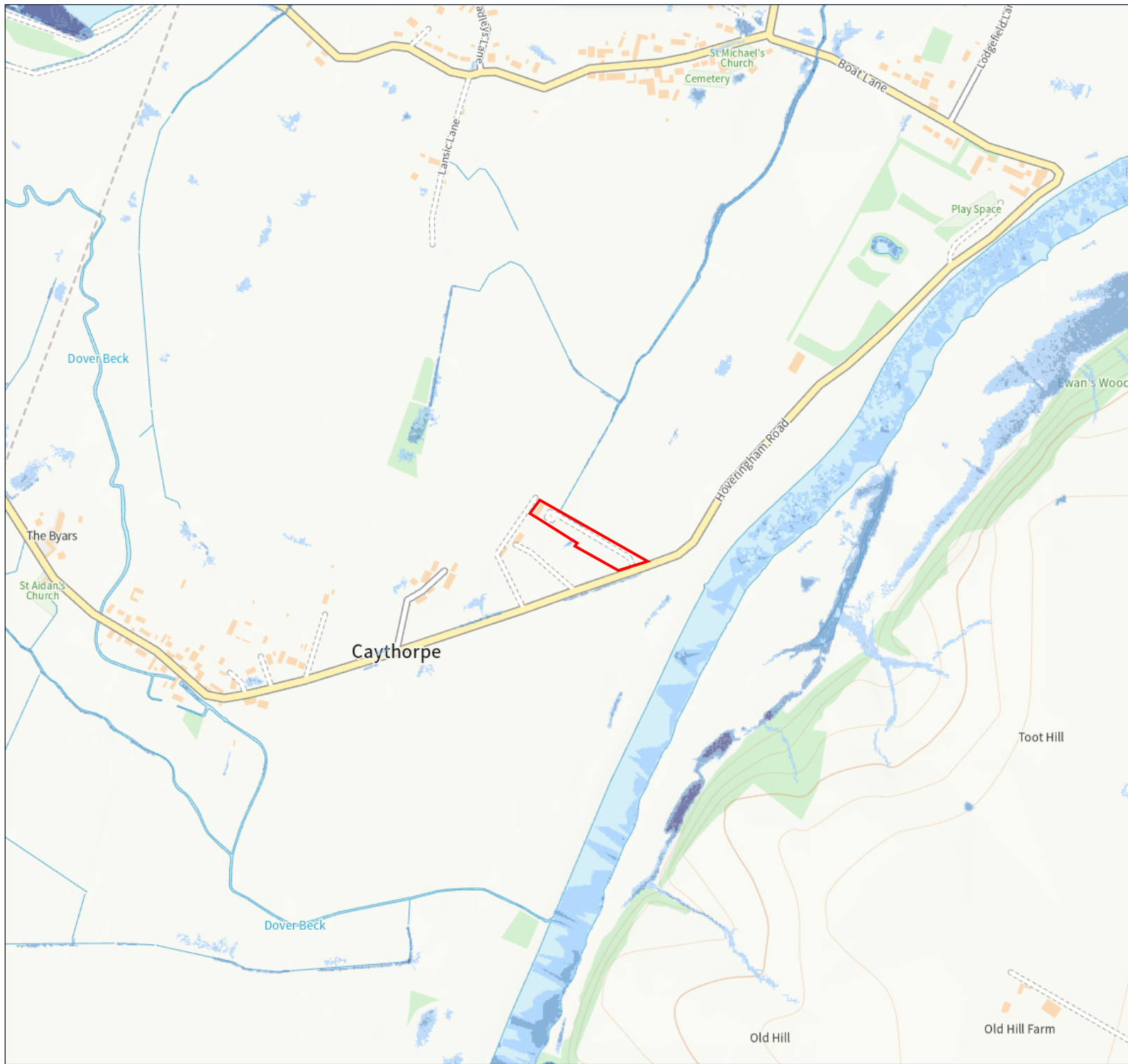
Appendix - Flood Risk Maps	
Description	
Map from Newark and Sherwood District Council SFRA showing modelled flood extents from Dover Beck for a range of flood events	
Sources	
Halcrow Group, 2021 CC Update, EA, 2021 OS data © Crown copyright and database rights	
Key	
	Site boundary
	20% AEP
	10% AEP
	5% AEP
	2% AEP
	1.33% AEP
	1% AEP
	0.5% AEP
	0.1% AEP
	North








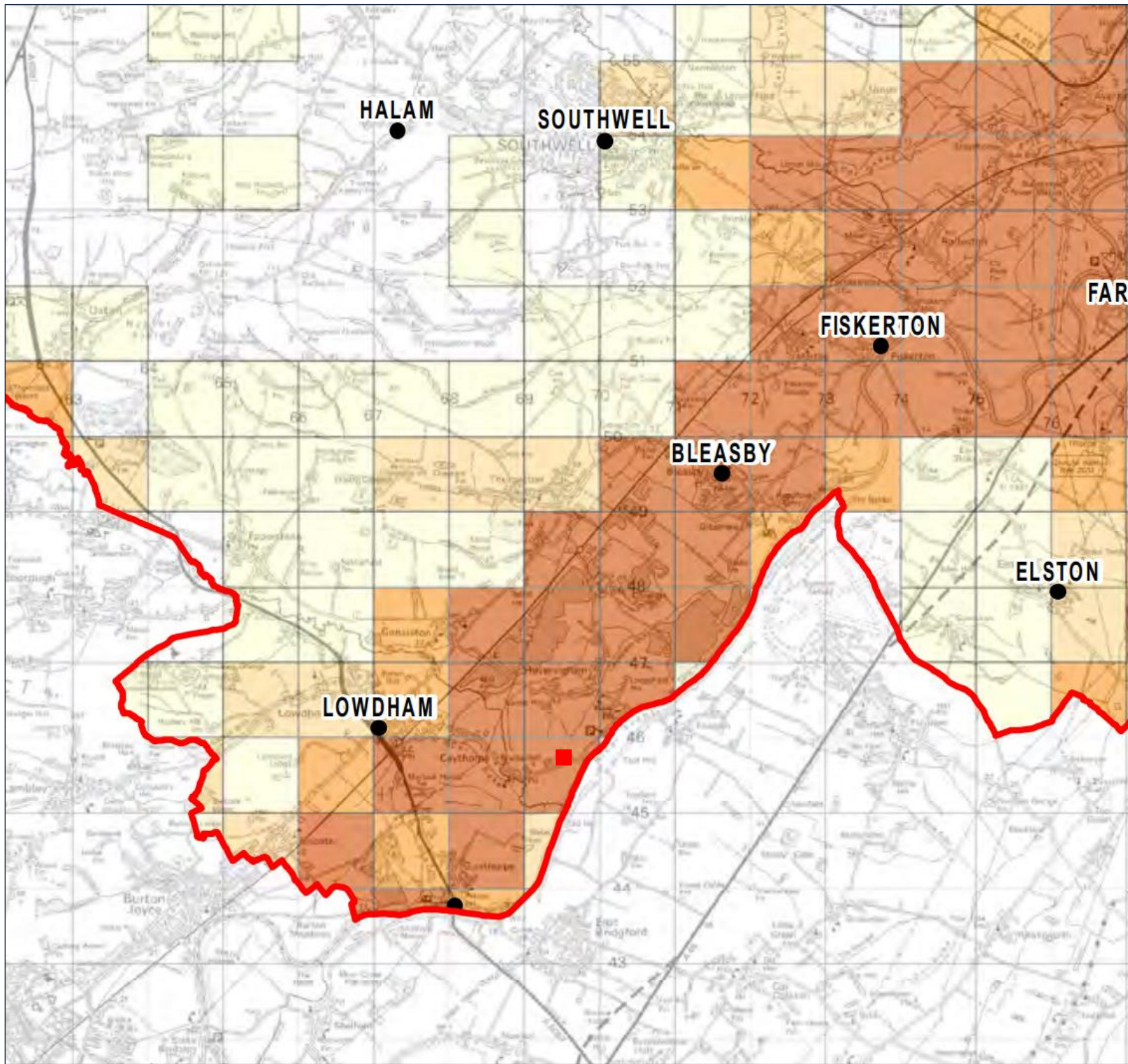
Appendix - Flood Risk Maps	
Description	
Environment Agency map showing the extent of flooding from surface water	
Sources	
Environment Agency OS data © Crown copyright and database rights	
Key	
	Site boundary
	Very Low
	Low
	Medium
	High
	North









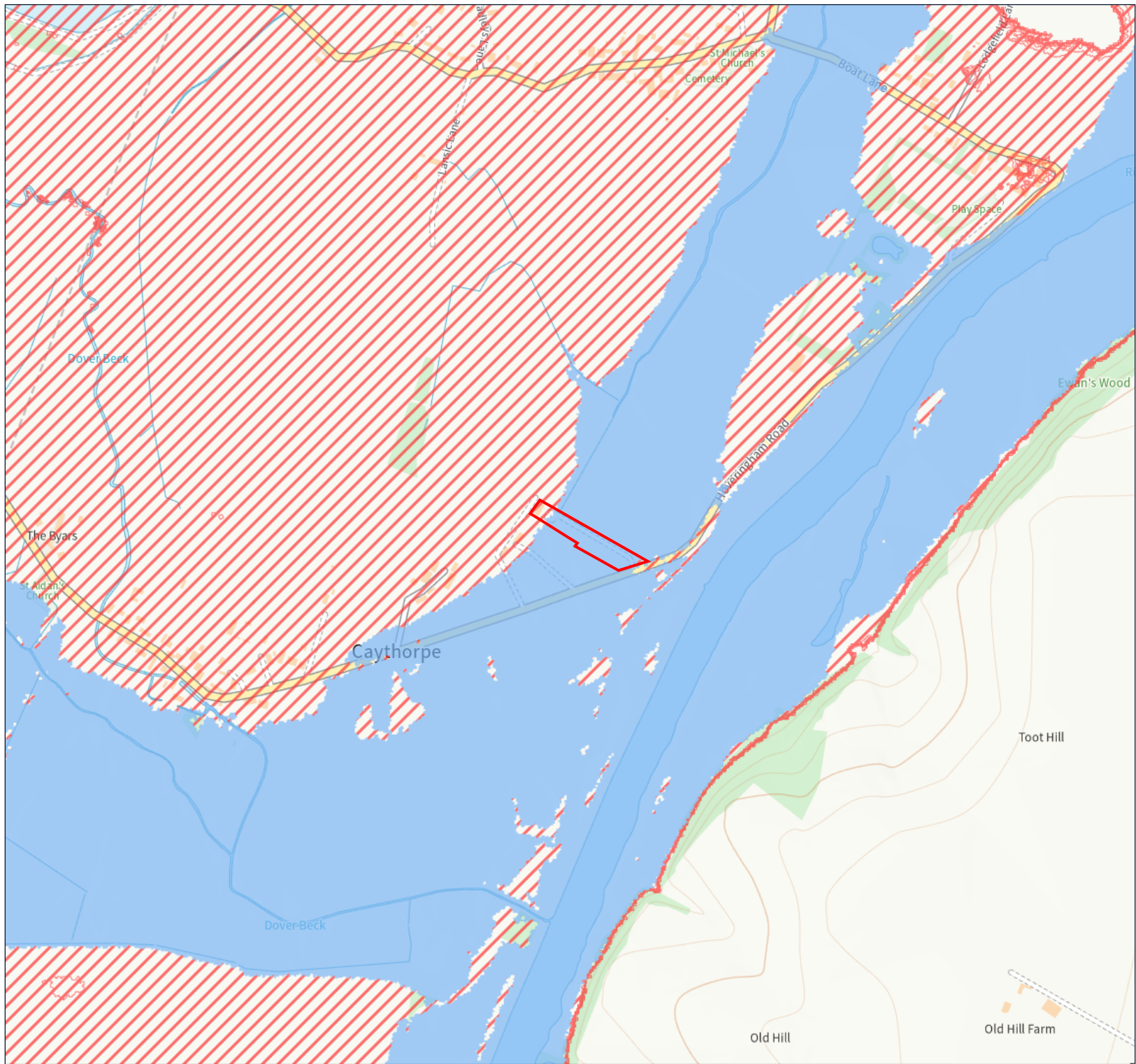
Appendix - Flood Risk Maps	
Description	
Environment Agency map showing the modelled depth of flooding from surface water in a medium risk scenario (1% - 3.3% chance each year)	
Sources	
Environment Agency OS data © Crown copyright and database rights	
Key	
	Site boundary
	Below 0.3m
	0.3m to 0.9m
	Over 0.9m
	North







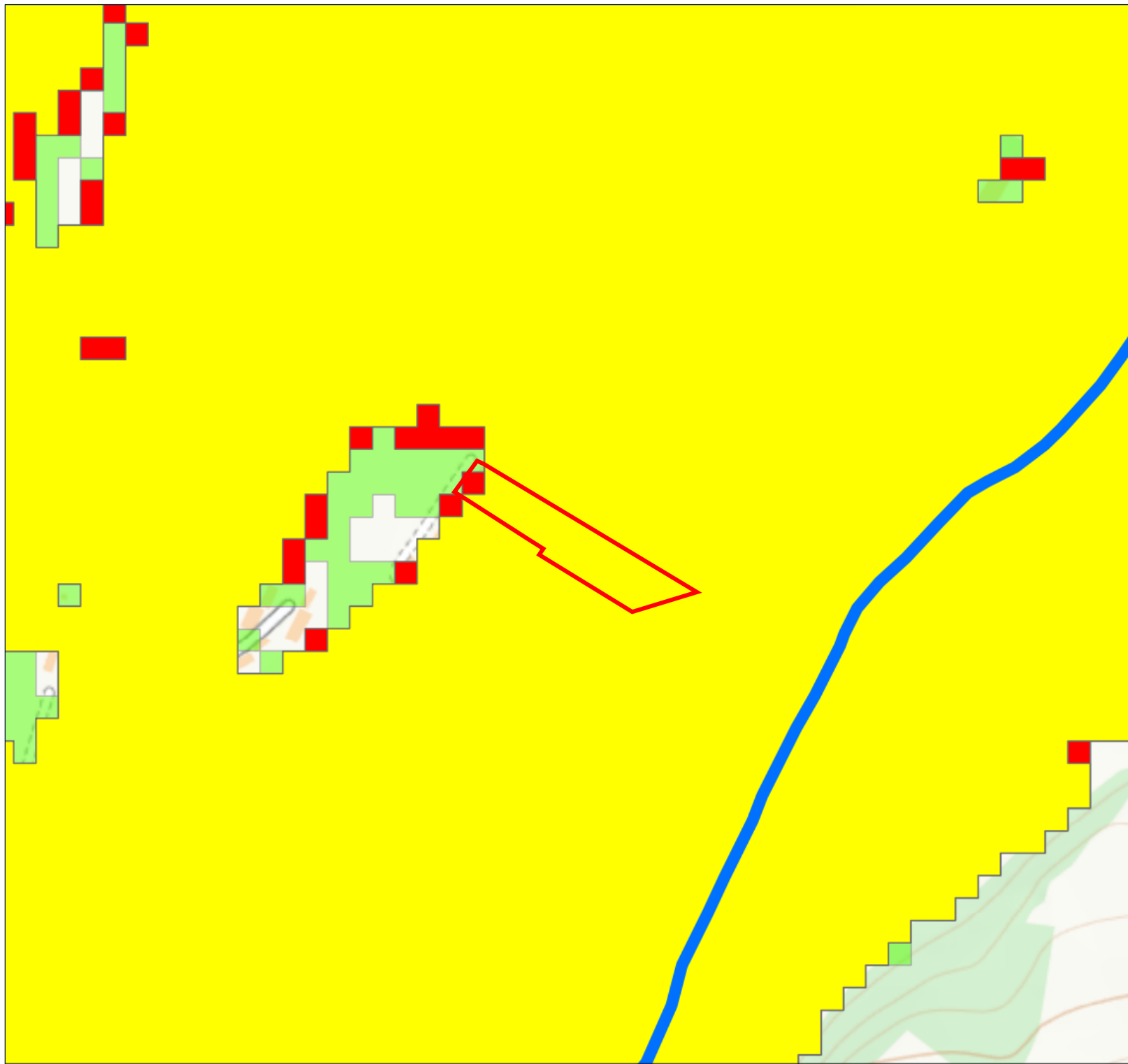
Appendix - Flood Risk Maps	
Description	
Environment Agency map showing the modelled depth of flooding from surface water in a low risk scenario (0.1% - 1% chance each year)	
Sources	
Environment Agency OS data © Crown copyright and database rights	
Key	
	Site boundary
	Below 0.3m
	0.3m to 0.9m
	Over 0.9m
	North








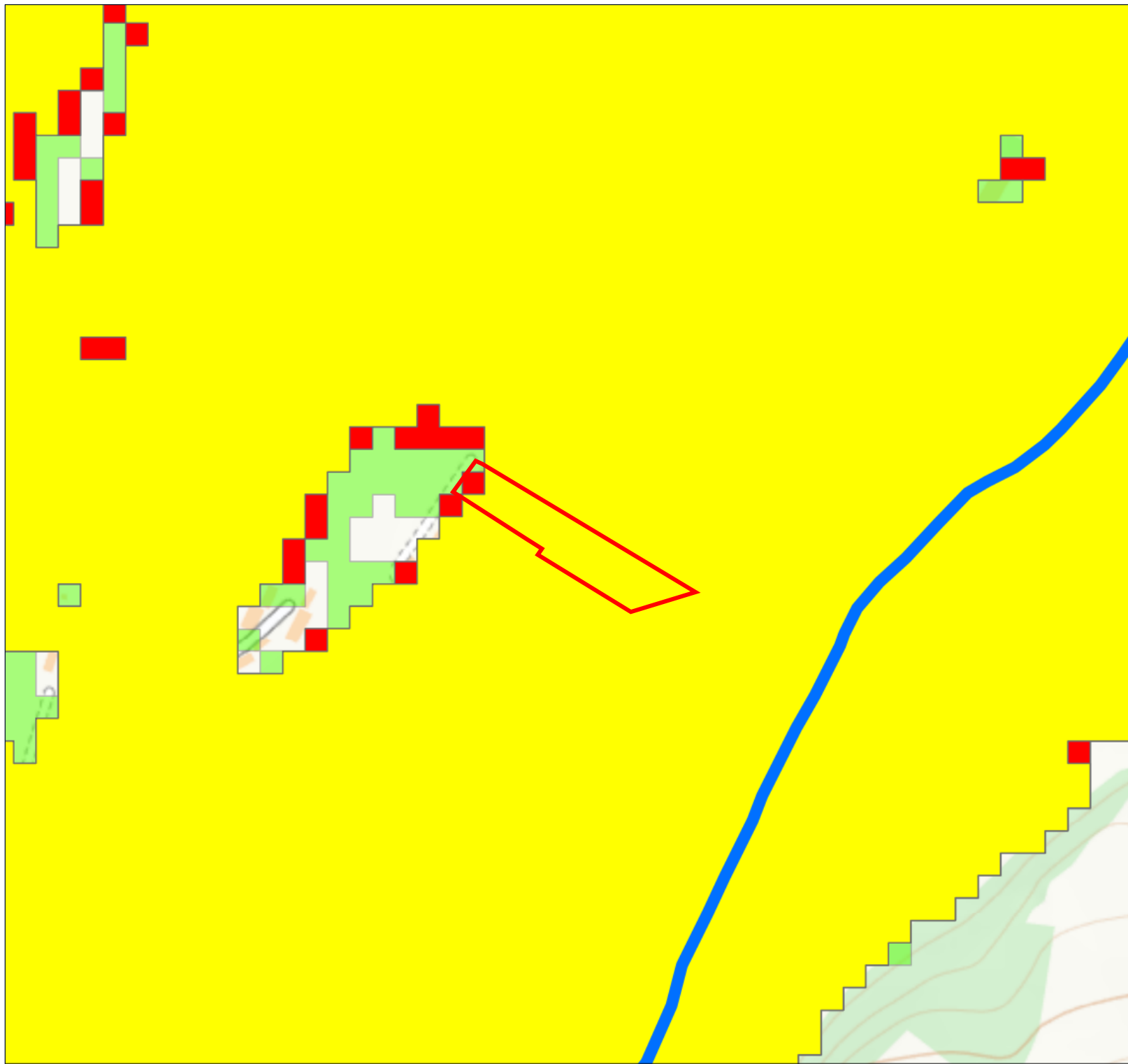
Appendix - Flood Risk Maps	
Description	
Map from Newark and Sherwood District Council SFRA showing susceptibility to groundwater flooding in the area	
Sources	
Environment Agency OS data © Crown copyright and database rights	
Key	
	Site location
	< 25%
	≥ 25% < 50%
	≥ 50% < 75%
	≥ 75%
	North








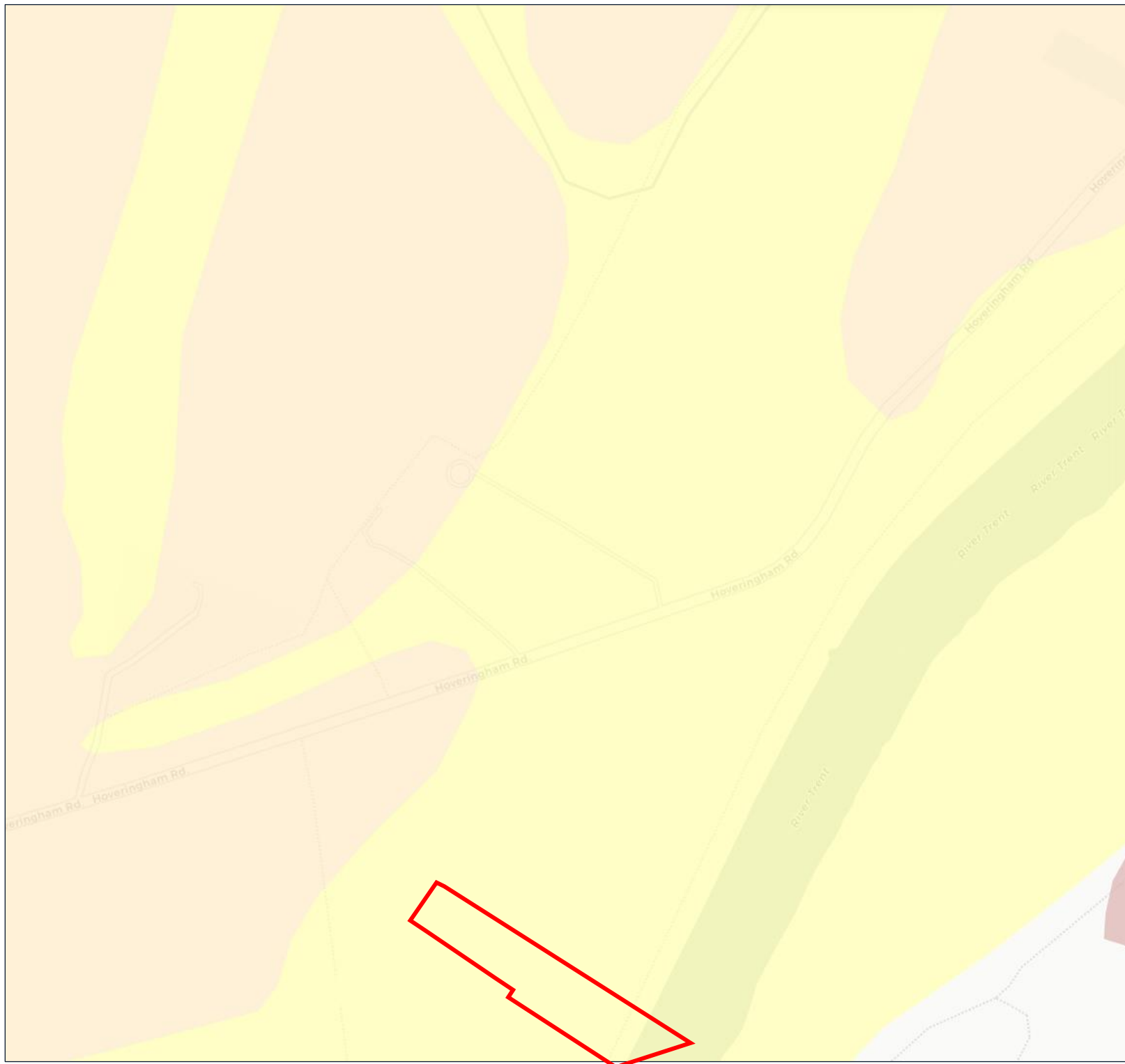
Appendix - Flood Risk Maps	
Description	
Environment Agency map showing the modelled extent of flooding from reservoirs	
Sources	
Environment Agency OS data © Crown copyright and database rights	
Key	
	Site boundary
	When river levels normal
	When there is river flooding
	North







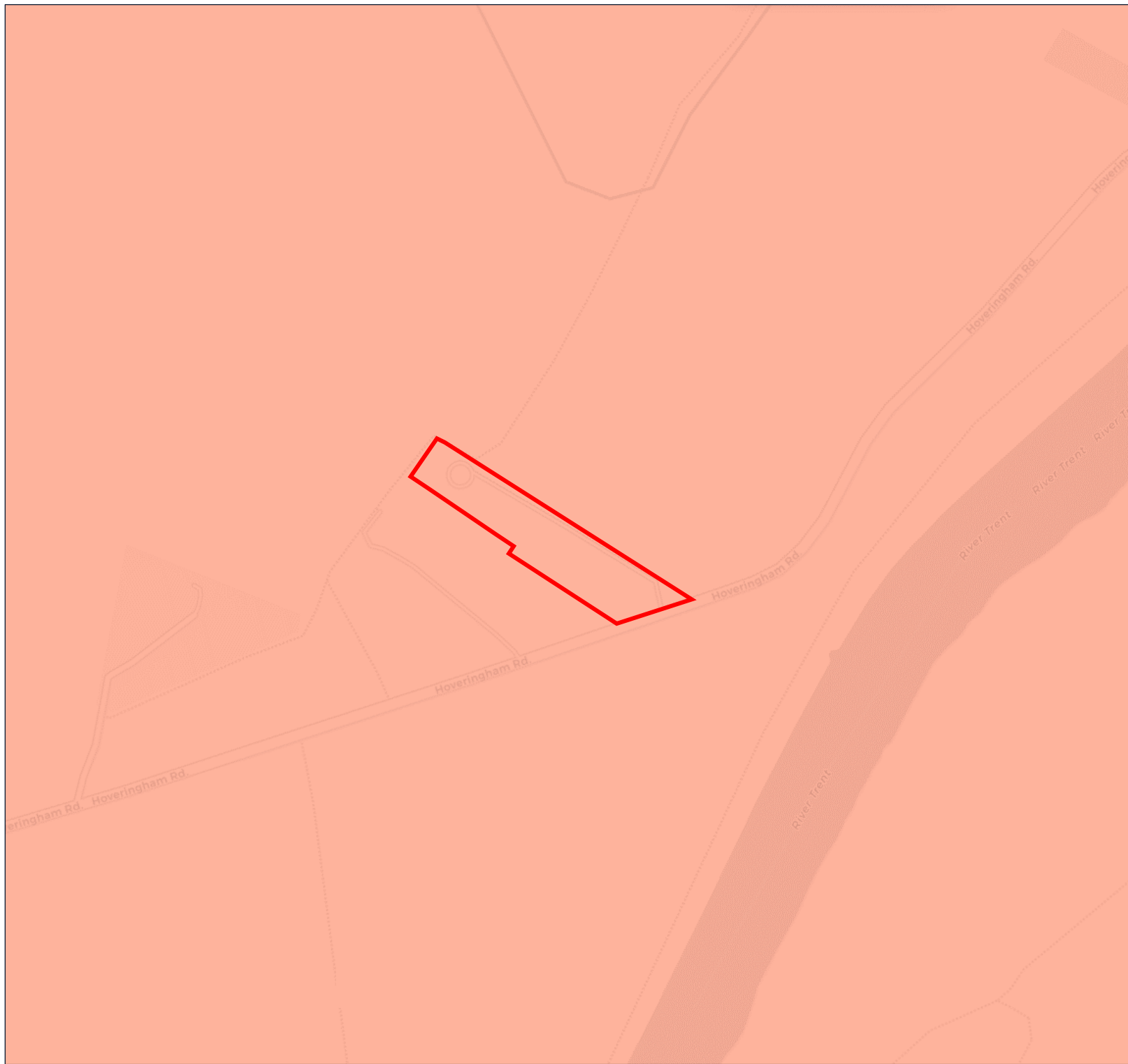
Appendix - Flood Risk Maps	
Description	
Map from Newark and Sherwood District Council SFRA showing modelled flood extents from the River Trent for the 1% AEP event, including allowances for climate change	
Sources	
Halcrow Group, 2021 CC Update, EA, 2021 OS data © Crown copyright and database rights	
Key	
	Site boundary
	1% AEP + 20%CC
	1% AEP + 30%CC
	1% AEP + 50%CC
	North






Appendix - Flood Risk Maps	
Description	
Map from Newark and Sherwood District Council SFRA showing modelled flood extents from Dover Beck for the 1% AEP event, including allowances for climate change	
Sources	
Halcrow Group, 2021 CC Update, EA, 2021 OS data © Crown copyright and database rights	
Key	
	Site boundary
	1% AEP + 20%CC
	1% AEP + 30%CC
	1% AEP + 50%CC
	North



Appendix - Geological Maps	
Description	
Superficial deposits at the site	
Sources	
British Geological Survey (2022)	
Key	
	Site boundary
	Alluvium
	Holme Pierrepont Sand and Gravel Member
	North



Appendix - Geological Maps	
Description	
Bedrock geology at the site	
Sources	
British Geological Survey (2022)	
Key	
	Site boundary
	Gunthorpe Member Mudstone
	North