OAKSHIRE
ENVIRONMENTAL

Report type	Preliminary Flood Risk Assessment
Date	3 November 2022
Client	Faramarz Mir Javadi and Robert Marian Fechete
Site address	98 London Road, Spalding, PE11 2TN
Report prepared by	Mr Louis Turner BSc (Hons)
Supervised by	Mr Joseph Turner

OAKSHIRE
ENVIRONMENTAL

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1. Introduction

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

1.1 Project Overview

The proposed project involves the assessment of flood risk at 98 London Road, Spalding, PE11 2TN. 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 includes 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 to include photographs, maps and plans of the site.

1.4 Limitations

Quantum Intelligent Trading Ltd is previously and hereafter referred to as “Oakshire Environmental” or “the company”. Oakshire Environmental has exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant when undertaking works of this nature. This report is only valid when used in its entirety and any information or advice contained within the report should not be relied upon until considered in the context of the whole report. Oakshire Environmental disclaims any responsibility to the client and others in respect of any matters outside the scope of this work. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate. This report has been prepared solely for the benefit of the client and any other party using or placing reliance upon any information contained in this report does so at their own risk. Oakshire Environmental accepts no responsibility or liability for the contents of this report being used for any purpose or project for which it was not commissioned. Oakshire Environmental accepts no liability whatsoever for any loss or damage arising from the interpretation or use of the information contained within this report. Furthermore, Oakshire Environmental does not accept any liability for the consequences of any legislative changes or the release of subsequent guidance documentation and following delivery of the report has no obligation to advise the client or any other party of such changes or their repercussions.

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 and location, in addition to, proposed site development and use, utilising information obtained from the client and publicly available sources.

2.1 Site Description and Location

The site is located between London Road and St Thomas' Road, in Spalding, and is approximately 400m^2. The site is comprised of a semi-detached dwelling, with a small front garden at the south east and a long narrow rear garden at the north west. The front garden is comprised of grass, patio and gravel and the rear garden is comprised of grass, patio and a wooden shed. The site slopes gently from 4.89m AOD at the south east to 3.86m AOD at the north west.

The site is bordered by residential dwellings and gardens to the north east and south west, London Road to the south east and St Thomas' Road to the north west. The surrounding area is predominantly residential with some commercial premises.

The River Welland (an Environment Agency main river) is situated 18m south east of the site and this branches off into the Coronation Channel (canal) 85m north east. The site is situated within Flood Zone 3 of the 'Flood risk map for planning', which means that the land has a high probability of flooding (>1% annual probability of river flooding).

National Grid Reference: TF 24456 21686

2.2 Proposed Development

The proposed development involves an extension to the existing dwelling and the construction of a new single storey dwelling at the north west of the site. The finished floor level of the extension will be the same as the existing dwelling and the finished floor level for the new dwelling will be 9.4mAOD. Ground levels around the buildings will be the same as existing.

Proposed landscaping includes a new gravel driveway to the front of the existing dwelling at the south east of the site and block paving for the driveway for the new dwelling at the north west and proposed footpaths. Soakaways will be installed at the south east and north west boundaries beneath proposed hardstanding.

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 residential development falls within the category of 'more vulnerable'.

The flood risk map for planning indicates that the site falls within Flood Zone 3. The South Holland District Council Strategic Flood Risk Assessment (SFRA) shows that the site is not within the functional flood plain (Flood Zone 3b).

While the Sequential Test is not required for residential extensions, the proposed developed involves the construction of a new dwelling so the Sequential Test will be carried out.

More vulnerable developments are permitted in Flood Zone 3a provided the Exception Test is passed so this will 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

An appraisal of the South East Lincolnshire Strategic Housing Land Availability Assessment (SHLAA) has been conducted and St. John's ward has been selected as an appropriate search area based on the small scale of the proposed development and its urban location. 3 sites were identified in the area, which will be reviewed with respect to the proposed residential development to determine their suitability.

Table 2: Sequential Assessment of sites in St John's ward outlined in the South East Lincolnshire SHLAA

Strategic Housing Land Availability Assessment		
Site Location	Size (ha)	Comments
2-4 St John's Road	0.98	Flood Zone 3a Considered too large for the proposed development Capacity of at least 20 dwellings Existing planning permission for 53 dwellings
Former PO Sorting Office, The Crescent	0.10	Flood Zone 3a Existing planning permission for 12 dwellings Within conservation area
Hawthorn Bank	0.22	Flood Zone 3a Existing planning permission for 7 dwellings

Based on the above assessment, there are multiple constraints on all of the available sites, most notably their size and flood risk. The available sites are considered to be too large for the proposed development and would require more dwellings in order to meet the required housing supply for Spalding. The flood risk at each of these sites is also equal to that of the proposed site making them no more suitable.

Expanding the search area to the whole of Spalding identified only 3 sites in lower flood zones (Flood Zone 2) than the proposed site and these are also considered too large for the proposed development.

Table 3: Sequential Assessment of all sites in Spalding outlined in the South East Lincolnshire SHLAA

Strategic Housing Land Availability Assessment		
Site Location	Size (ha)	Comments
2-4 Land to the south of Horseshoe Road	35.3	Considered too large for the proposed development Not accessible to Spalding's existing services and facilities and is not located adjacent to Spalding's existing built-up area
Land to the south of Horseshoe Road and west of South Drove	25.46	Considered to be undevelopable as it is Grade 2 agricultural land and is isolated from any existing settlement Services and facilities are not accessible by foot and bicycles share the existing highway network
Land to the east of Spalding Common	4.66	Considered too large for the proposed development Capacity of at least 93 dwellings Not as accessible to Spalding's existing services and facilities as other sites and is not located within/adjacent Spalding's existing built up area Services and facilities are not accessible by foot and bicycles have to share road space

Based on the findings of this assessment, there are considered to be no other reasonably available sites that would be appropriate for the proposed development, therefore, the Sequential Test has been passed.

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

Information collated through detailed desk studies has identified the following potential sources of flooding.

Rivers & Seas

The site is situated 18m north west of the River Welland and the site is considered to have a high probability of flooding, based on the Environment Agency's flood risk map for planning. In contrast, Environment Agency mapping taking into account the impact of flood defences show that the east of the site is at very low risk while the west of the site is at medium risk.

There are flood defences along both banks of the River Welland as it passes the site, in the form of natural high ground with a design Standard of Protection (SoP) of 100 years. The Crowland and Cowbit Washes flood storage areas along the River Welland downstream of the site also have a design SoP of 100 years.

Residual flood risk maps from the South Holland District Council SFRA show that the site is at low or medium risk (<1% AEP) in the event of a failure or overtopping of these flood defences. Maps suggest that the depth of fluvial and tidal flooding and the hazard posed at the site would be negligible.

Environment Agency data shows that the site and the surrounding area has not previously flooded.

The risk of tidal flooding is considered to be negligible.

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 is very low. Minor surface water flooding is anticipated along St Thomas' Road to the north west of the site, however, this is not considered to impact the site.

The underlying bedrock geology at the site is impermeable Oxford Clay Formation Mudstone with superficial deposits of Alluvium. This will may limit water infiltration, increasing the risk of 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 site and surrounding land is relatively low lying, suggesting a potential risk of groundwater flooding, however, the underlying bedrock is a unproductive aquifer and there is an extensive network of land drains and pumping infrastructure in the area that keeps the water table artificially low. Furthermore, there are no records of groundwater flooding in the vicinity of the site suggesting a negligible risk of groundwater flooding.

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 very low risk of surface water flooding in the area suggests that the risk of sewer flooding is likely to be low.

Reservoirs

The level and standard of inspection and maintenance required for reservoirs means that the risk of flooding from reservoirs is generally very low. Environment Agency mapping shows there to be a risk to the site from reservoir flooding when there is also river flooding. Given the low risk of river flooding at the site, the risk of reservoir flooding is considered to be low.

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, which is generally considered to be 100 years for a residential 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 2080s in the Welland management catchment is 17%.

Modelling of the 1% AEP flood extent including a climate change allowance of 20% has been carried out for the South Holland District Council SFRA in order to assess the impact of climate on flood risk at the site. This modelling shows that the residual risk to the site would remain low and flood depths and the flood hazard would remain negligible. SFRA maps show that the extent and depth of flooding would increase only marginally and the site would remain unaffected in the event of a failure or overtopping of flood defences.

In the absence of surface water modelling, taking into account climate change, the 0.1% AEP flood extent can be used as a proxy. This suggests that the site will not be at risk of surface water flooding.

3.2 Potential Flood Receptors

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

- Residential end users
- Proposed dwelling and extension

3.3 Potential Flood Pathways

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

- River Welland
- Surface water along St Thomas' Road
- Low lying land
- Local sewers
- Crowland and Cowbit Washes

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

High Risk

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

Moderate Risk

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

Low Risk

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

Very Low Risk

There is a low possibility that harm/damage could arise to a receptor. In the event of such harm/damage 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 Welland	Residential end users Proposed dwelling and extension	**Medium**	**Unlikely**	**Low**	Environment Agency maps that include the impact of flood defences show that the actual risk to the site is considered to be very low to medium and modelling of the residual extent and depth of flooding shows that the site is at low risk in the event of a failure or overtopping of flood defences, suggesting that the residual risk to the site is also low.
Surface Water Flooding	Surface water along St Thomas' Road		**Mild**	**Unlikely**	**Very Low**	Minor surface water flooding is possible along St Thomas' Road to the north west of the site, however, this is not likely to impact the site.
Groundwater Flooding	Low lying land		**Mild**	**Unlikely**	**Very Low**	The site and surround land is relatively low lying, however, the underlying bedrock is unproductive and groundwater levels are kept artificially low through the extensive network of land drains and pumping infrastructure in the area, suggesting that groundwater flooding is unlikely.
Sewer Flooding	Local sewers		**Mild**	**Low Likelihood**	**Low**	The very low risk of surface water flooding at the site and in the surrounding area, suggests that the risk of sewer flooding at the site is low.
Reservoir Flooding	Crowland and Cowbit Washes		**Medium**	**Unlikely**	**Low**	Environment Agency mapping shows there to be a risk to the site from reservoir flooding when there is also river flooding. Given the low risk of river flooding at the site, the risk of reservoir flooding is considered to be low.
Climate Change	River Welland Surface water along St Thomas' Road		**Medium**	**Unlikely**	**Low**	Climate change modelling shows that the residual risk to the site would remain low and flood depths would remain negligible in the event of a failure or overtopping of flood defences. In the absence of surface water modelling, taking into account climate change, the 0.1% AEP flood extent can be used as a proxy. This suggests that the site will not be at risk of surface water flooding.

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 risk** to residential end users and the proposed dwelling and extension from river flooding from the River Welland to the south east.
- There is a **very low risk** to residential end users and the proposed dwelling and extension from surface water flooding along St Thomas' Road to the north west of the site.
- There is a **very low risk** to residential end users and the proposed dwelling and extension from groundwater flooding of low lying land.
- There is a **low risk** to residential end users and the proposed dwelling and extension from sewer flooding in local sewers.
- There is a **low risk** to residential end users and the proposed dwelling and extension from reservoir flooding from the Crowland and Cowbit Washes to the south of the site.
- There is a **low risk** to residential end users and the proposed dwelling and extension from river and surface water flooding, taking into account climate change.

4.2 Existing Flood Mitigation Measures

There are no formal flood defences at the site.

4.3 Proposed Flood Mitigation Measures

Based on the identified flood risk, formal mitigation measures are not considered necessary.

The site benefits from being within an area which receives free Environment Agency flood warnings and alerts, so it is advised that the homeowners sign-up to receive these alerts.

4.4 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. Most of the existing surface water discharges into the ground and it is assumed that surface runoff from the impermeable surfaces will discharge into the existing sewers.

The proposed extension will be situated on the existing impermeable patio area which will have a minimal impact on flood plain storage, however, the new proposed dwelling will introduce building footprints onto existing areas of soft landscaping which will increase the amount of impermeable surfaces across the site. As a result, the rate and volume of runoff will be greater than the existing run-off rate and volume and flood plain storage capacity will, therefore, be decreased and the flood risk off-site may be increased. In order to address this and offset the decrease in flood plain storage, soakaway crates will be installed beneath proposed hardstanding at the south east and north west of the site. These will need to provide sufficient storage to offset the increase in runoff caused by the introduction of new buildings and hardstanding.

In addition to the proposed surface water storage, sustainable drainage systems (SuDS) should be implemented in the form of permeable paving, where reasonably practical, in order to control surface water runoff as close to where it falls as possible and mimic the natural catchment process.

Given the potential risk of sewer flooding at the site, it is recommended that any new drainage pipes are designed to absorb run-off from 1 in 100 year rainfall events with an 17% increase in rainfall intensity for climate change.

4.5 Safe Access and Egress

The site is protected by flood defences and the residual risk of flooding in the event of a failure or overtopping of these defences is low. Safe access and egress will, therefore, be possible to and from the proposed dwelling during design conditions, without the intervention of emergency services.

4.6 Exception Test

The Exception Test is applied after the Sequential Test has been undertaken and when 'more vulnerable' development cannot be located in Flood Zones 1 and 2. The Exception Test requires the proposed development to show that it will provide wider sustainability benefits to the community that outweigh the flood risk and that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.

Given the low residual risk of flooding at the site, the provision of additional housing supply is considered to outweigh the flood risk. Climate change modelling also shows that the site will remain safe from flooding for its lifetime and the proposed surface water management techniques will ensure that flood risk off-site will not be increased.

4.7 Further Investigation

The site lies within Flood Zone 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 South Holland District Council SFRA, shows that the site is considered to be at low risk from river, sewer and reservoir flooding and a very low risk from surface water and groundwater flooding. The risk from tidal flooding is considered to be negligible.

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

In the event of a flood there is considered to be safe access and egress, with residents able to safely enter and exit the building without the intervention of emergency services or others during design flood conditions.

The development will increase the amount of impermeable surfaces due to the introduction of new building footprints and hardstanding, therefore, surface water storage and SuDS will be implemented to ensure that flood plain storage will be maintained and the flood risk off-site will not be increased.

It can be concluded that the proposed residential development will be safe from flooding for its lifetime, 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.

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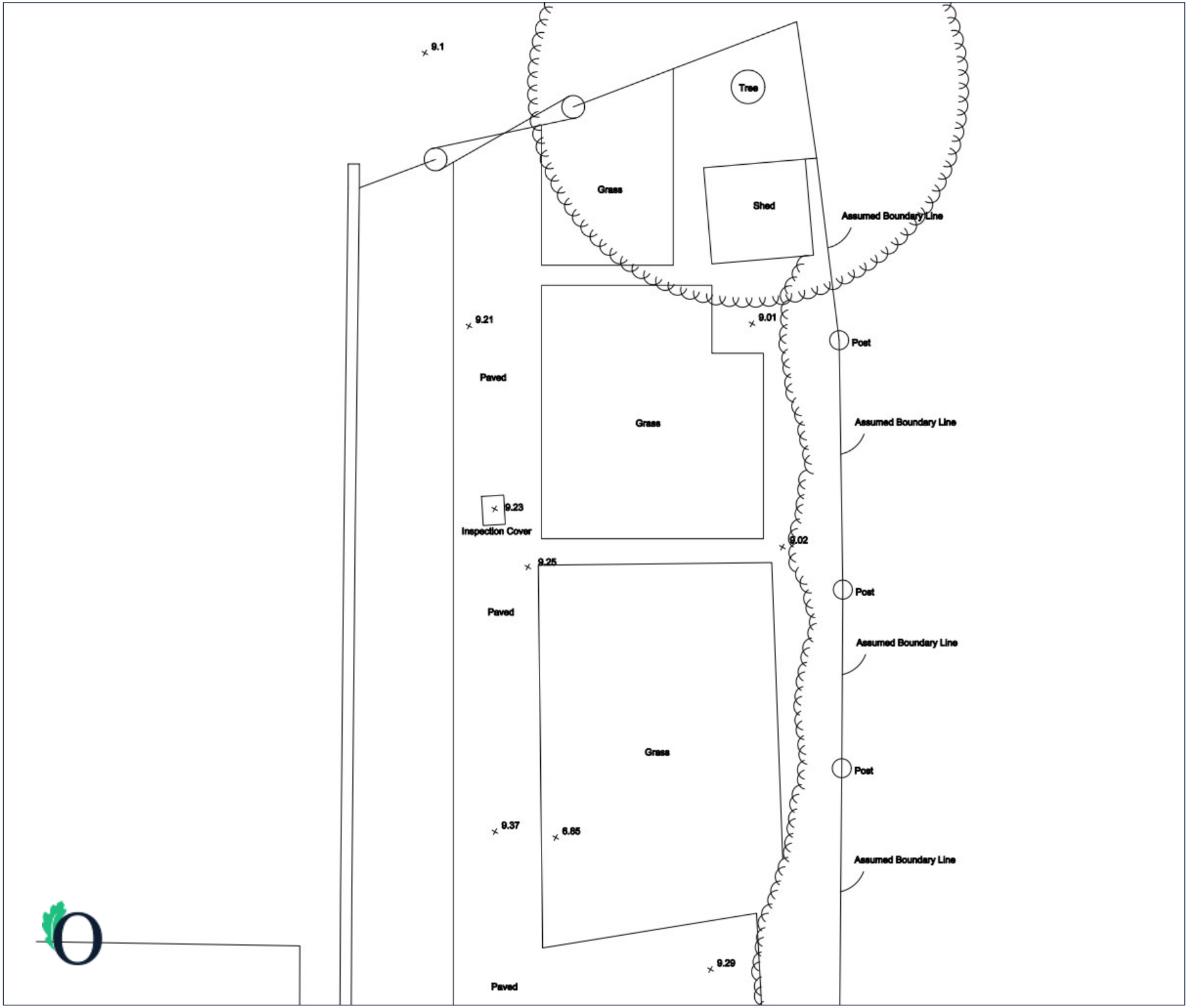
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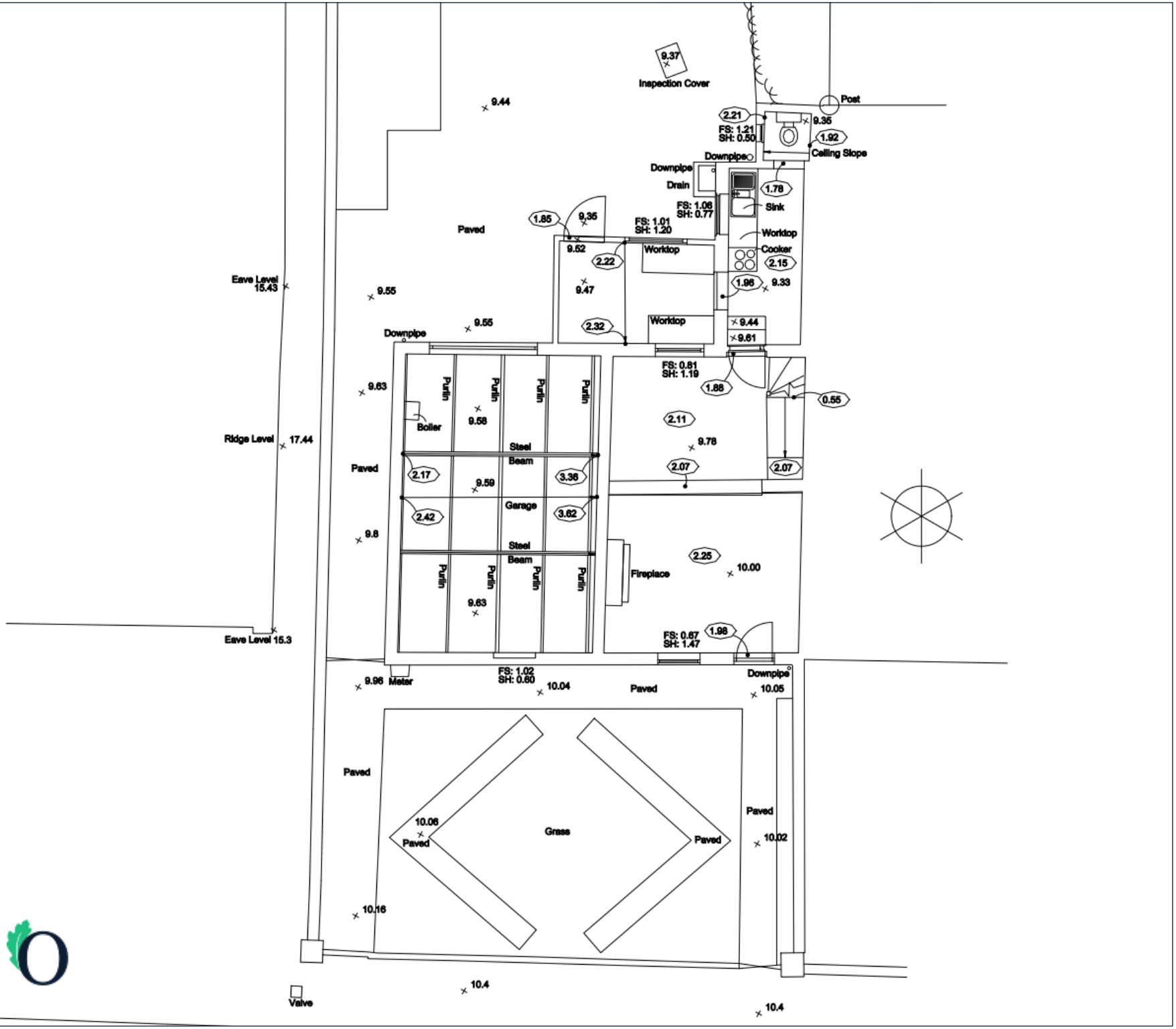
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Appendix A - Site Maps & Plans	
Description	
OS location plan	
Sources	
Contains OS data © crown copyright and database rights 2022.	
Key	
	Site boundary
Name	Figure 1



Appendix A - Site Maps & Plans	
Description	
Existing site plan and topographical survey (1 of 2) *It should be noted that site elevations are in relation to an arbitrary datum, not ordnance datum*	
Sources	
The Scan Station	
Key	
Name	Figure 2



Appendix A - Site Maps & Plans	
Description	
Existing site plan and topographical survey (2 of 2) *It should be noted that site elevations are in relation to an arbitrary datum, not ordnance datum*	
Sources	
The Scan Station	
Key	
Name	Figure 3



Appendix A - Site Maps & Plans	
Description	
Proposed block plan	
Sources	
Julian Warrick	
Key	
	Site boundary
	Existing lateral sewer
	Existing mains sewer
	Proposed soakaway crates
Name	Figure 4

N



Appendix B - Site Photos	
Description	
Photo of the site from London Road, facing west	
Sources	
Google Street View, 2015	
Key	
Name	Figure 5



Appendix B - Site Photos	
Description	
Photo of the site from London Road, facing north	
Sources	
Google Street View, 2015	
Key	
Name	Figure 6

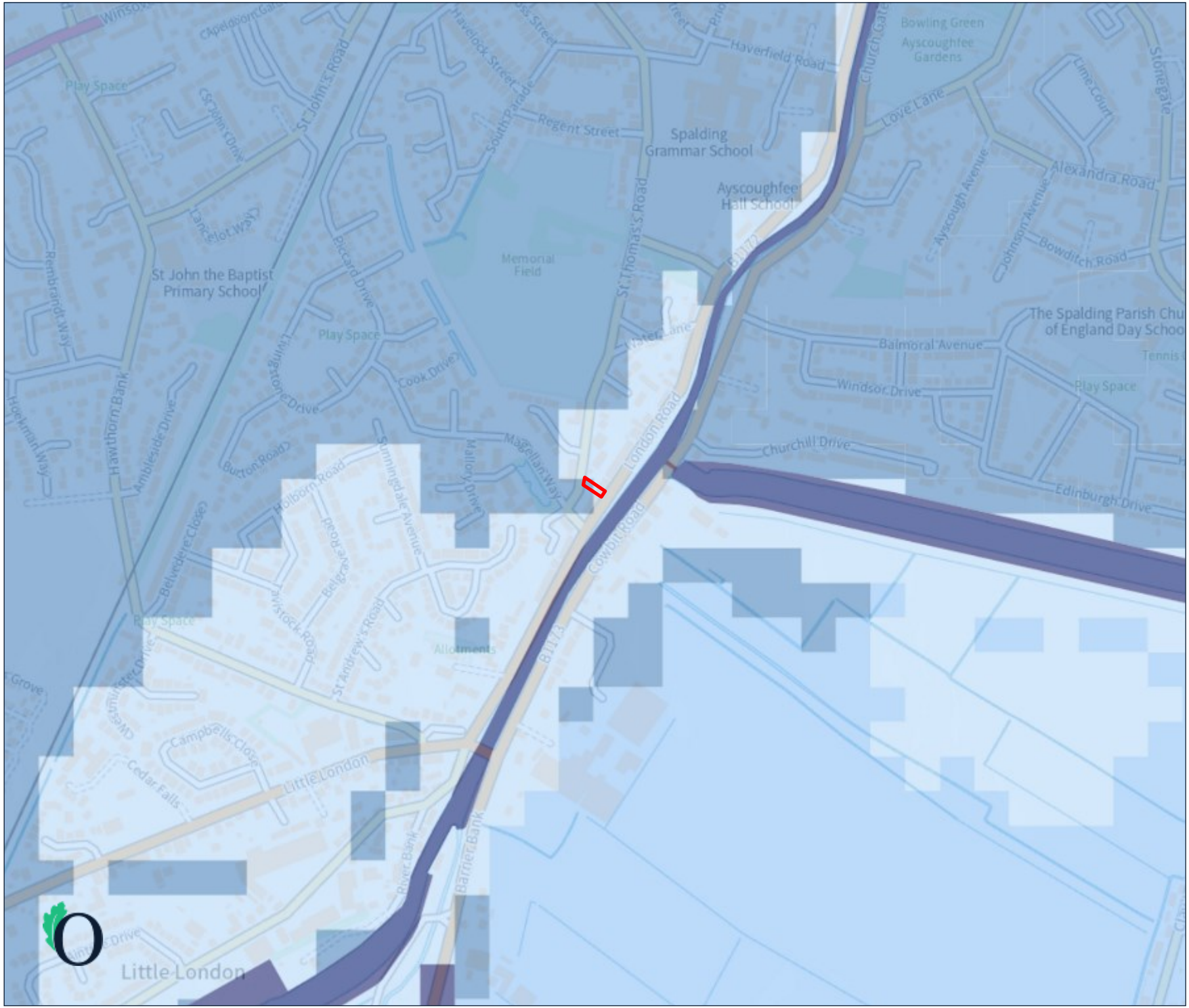


Appendix B - Site Photos	
Description	
Photo of the site from St Thomas' Road, facing east	
Sources	
Google Street View, 2016	
Key	
Name	Figure 7



Appendix C - Flood Risk Maps	
Description	
Flood zone map for planning	
Sources	
Environment Agency OS data © Crown copyright and database rights 2022	
Key	
	Site boundary
	Flood Zone 1
	Flood Zone 2
	Flood Zone 3
	Main river
	Flood defence
	Water storage area
Name	Figure 8

N



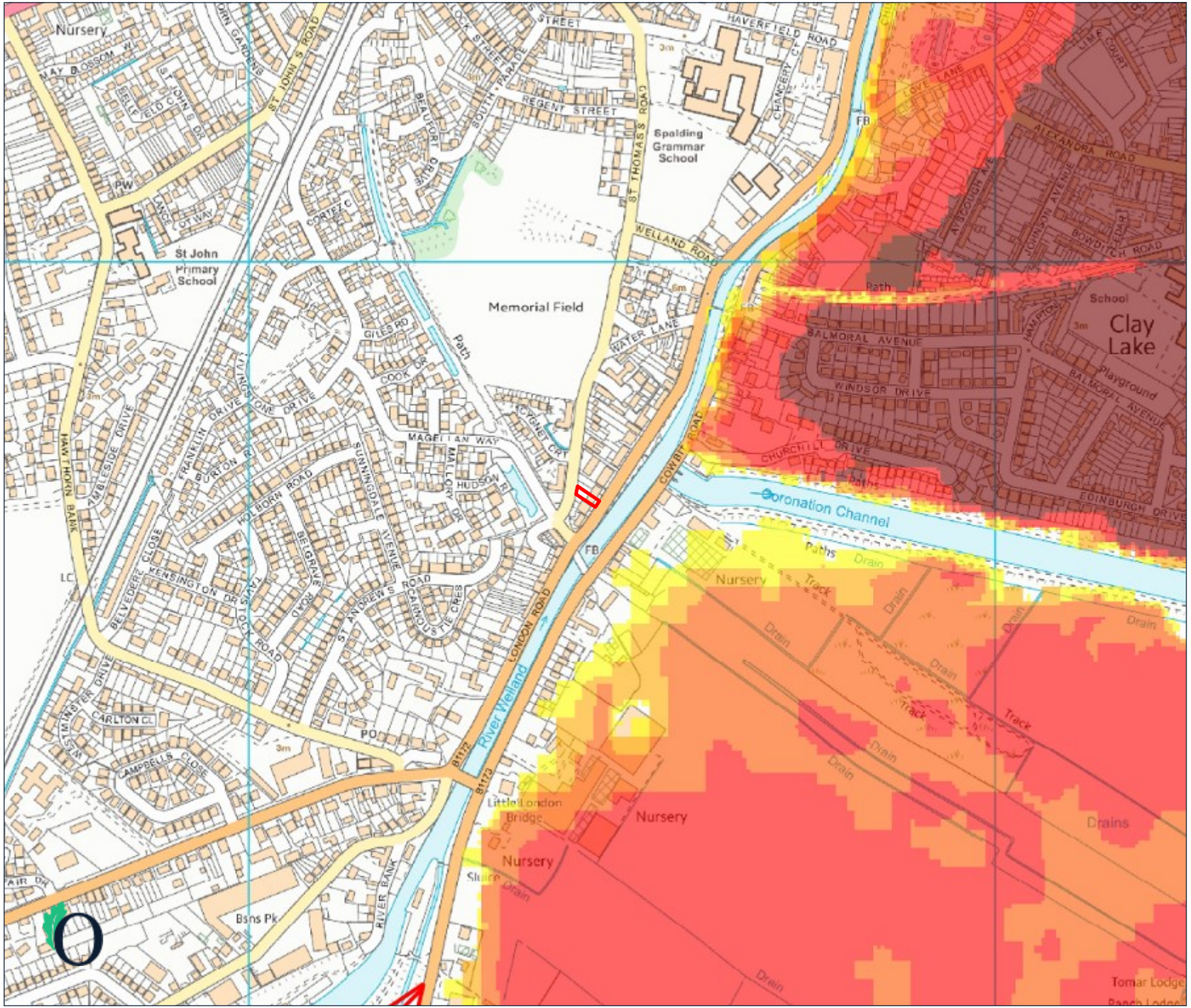
Appendix C - Flood Risk Maps	
Description	
Environment Agency map showing the risk of flooding from rivers or the sea, taking into account the impact of flood defences	
Sources	
Environment Agency © Crown copyright and database rights 2022	
Key	
	Site boundary
	Very Low
	Low
	Medium
	High
Name	Figure 9

N



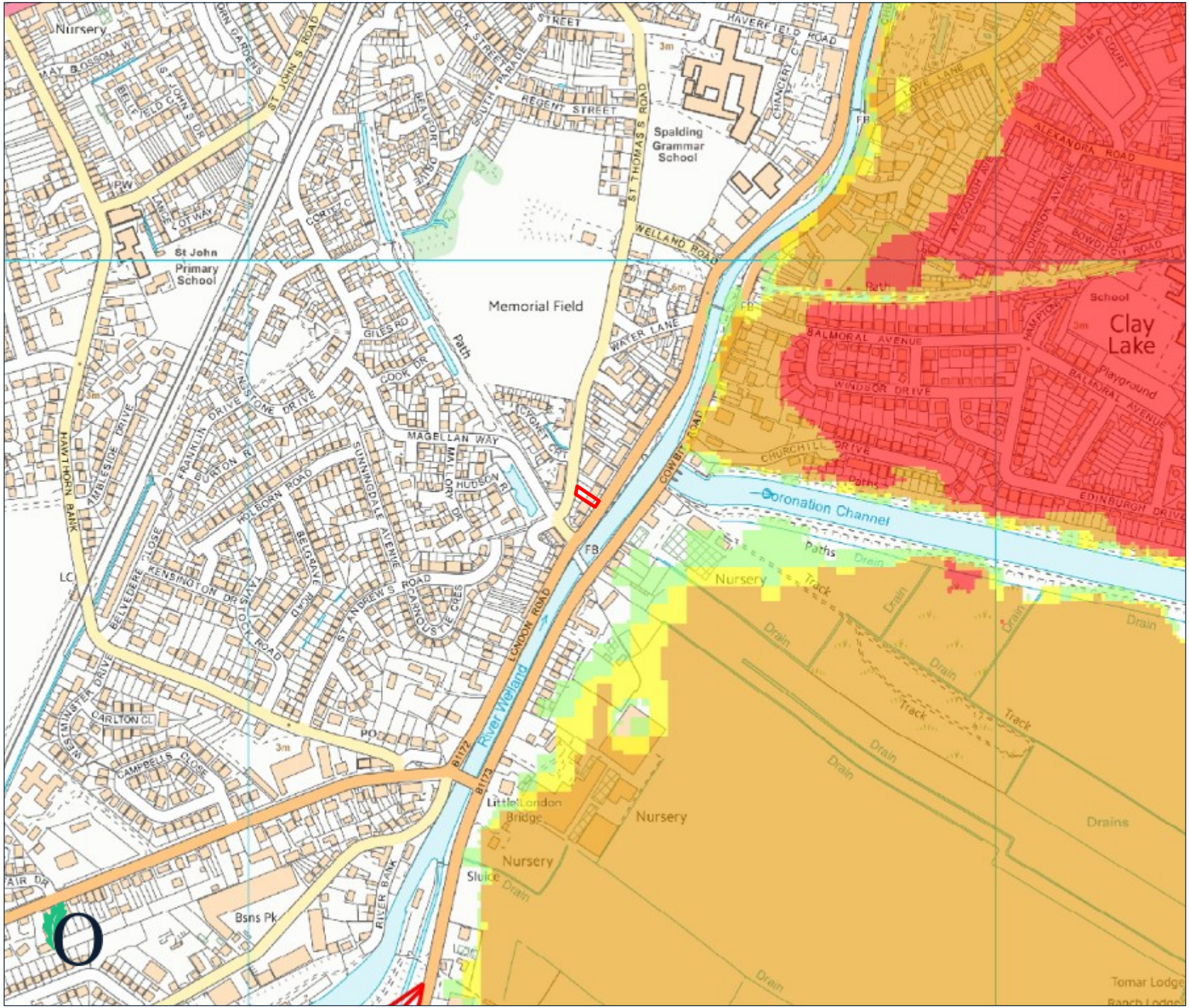
Appendix C - Flood Risk Maps	
Description	
Map from South Holland District Council SFRA showing the modelled present day fluvial flood extent in the event of a failure or overtopping of flood defences	
Sources	
South Holland District Council, 2017.	
Key	
	Site boundary
	High (>1%)
	Low or Medium (< 0.1% or 1% - 0.1%)
	Functional floodplain
Name	Figure 10

N



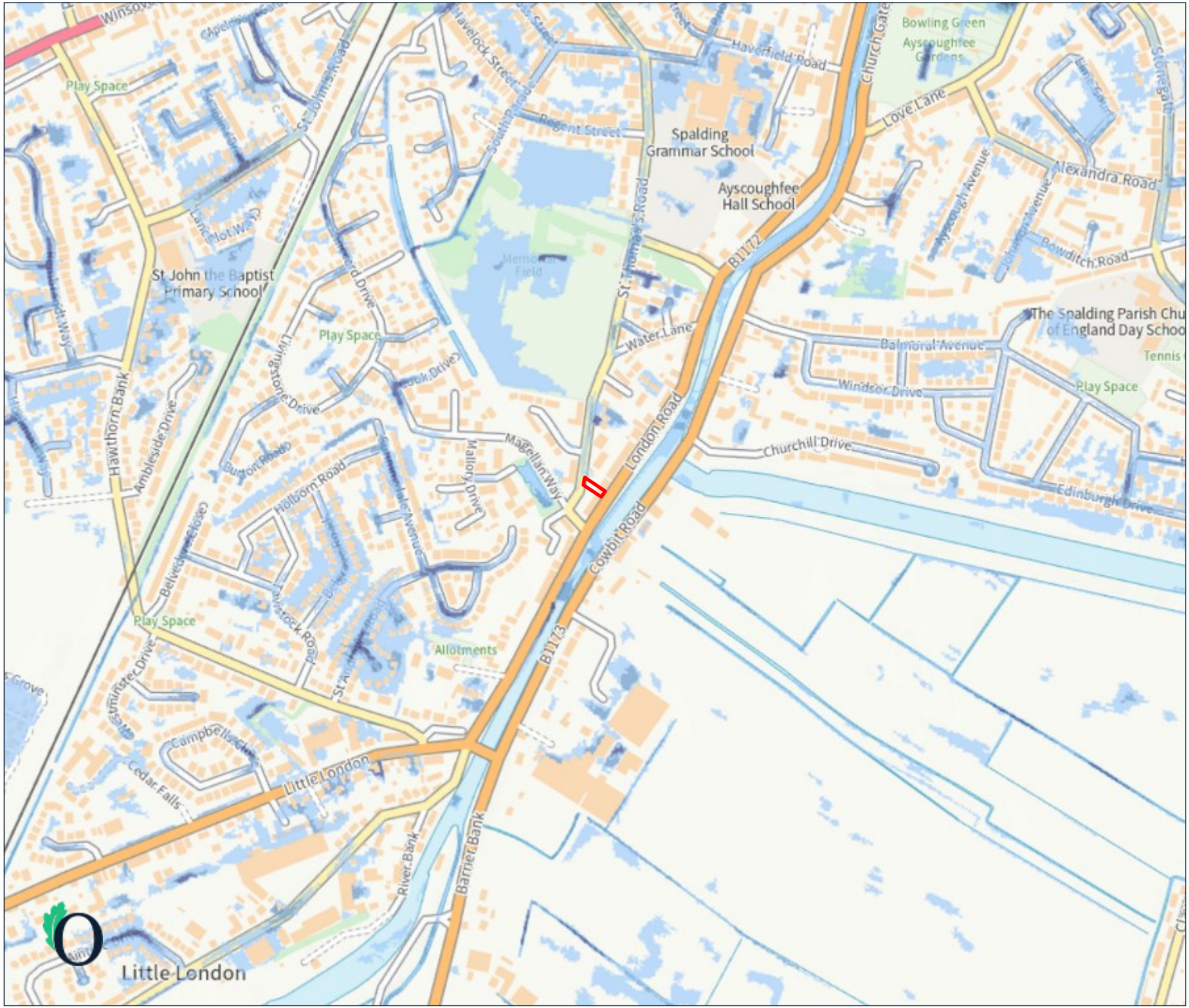
Appendix C - Flood Risk Maps	
Description	
Map from South Holland District Council SFRA showing modelled present day fluvial and tidal flood depths for the 1% AEP event in the event of a failure or overtopping of flood defences	
Sources	
South Holland District Council, 2017.	
Key	
	Site boundary
	0m - 0.25m
	0.25m - 0.5m
	0.5m - 1m
	1m - 2m
	2m +
Name	Figure 11

N



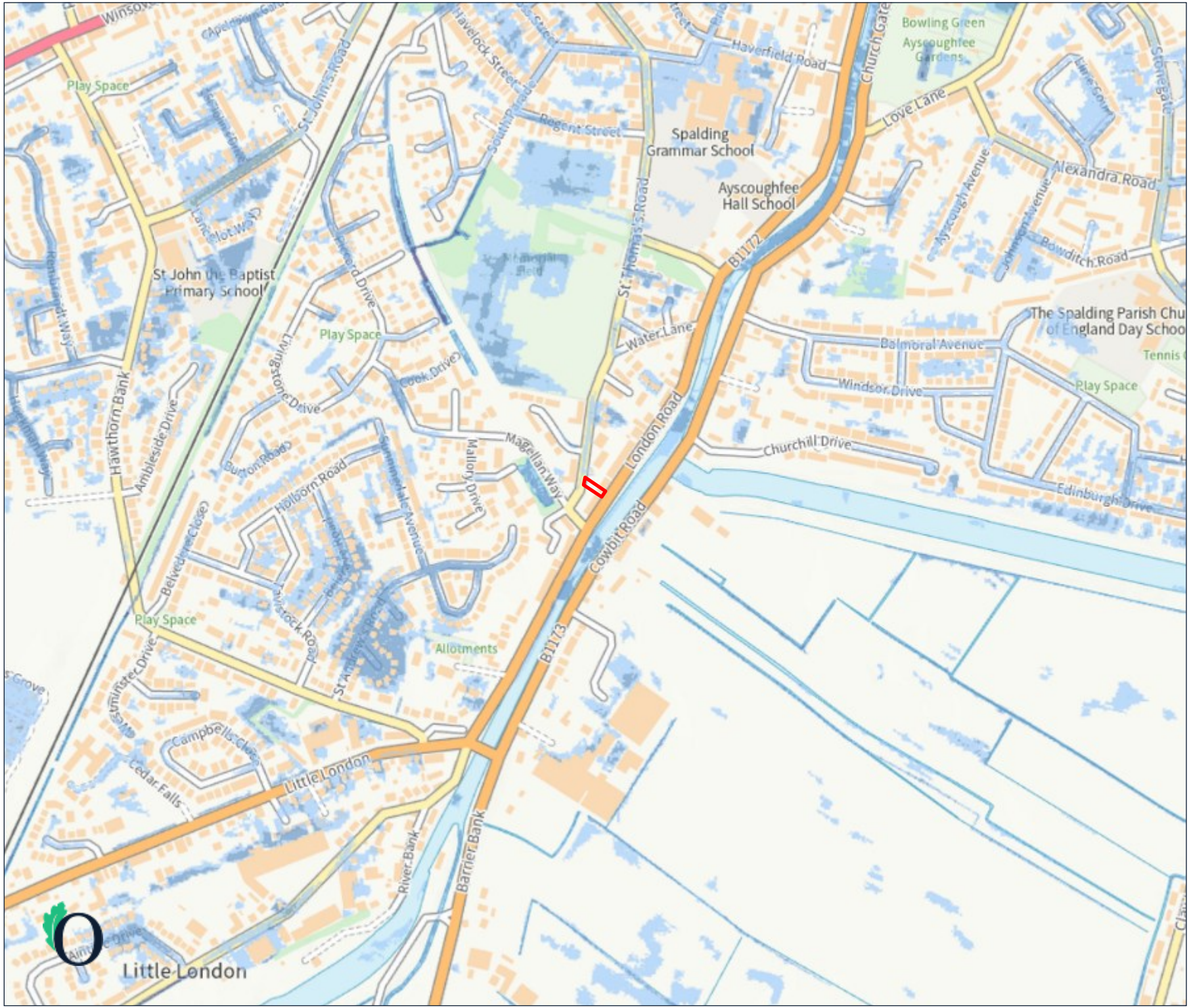
Appendix C - Flood Risk Maps	
Description	
Map from South Holland District Council SFRA showing the modelled present day fluvial and tidal flood hazard for the 1% AEP event in the event of a failure or overtopping of flood defences	
Sources	
South Holland District Council, 2017.	
Key	
	Site boundary
	Low Hazard
	Danger for Some
	Danger for Most
	Danger for All
Name	Figure 12

N



Appendix C - Flood Risk Maps	
Description	
Environment Agency map showing the modelled risk of flooding from surface water	
Sources	
Environment Agency © Crown copyright and database rights 2022	
Key	
	Site boundary
	Very Low
	Low
	Medium
	High
Name	Figure 13

N



Appendix C - 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 © Crown copyright and database rights 2022	
Key	
	Site boundary
	Below 0.3m
	0.3m to 0.9m
	Over 0.9m
Name	Figure 14

N



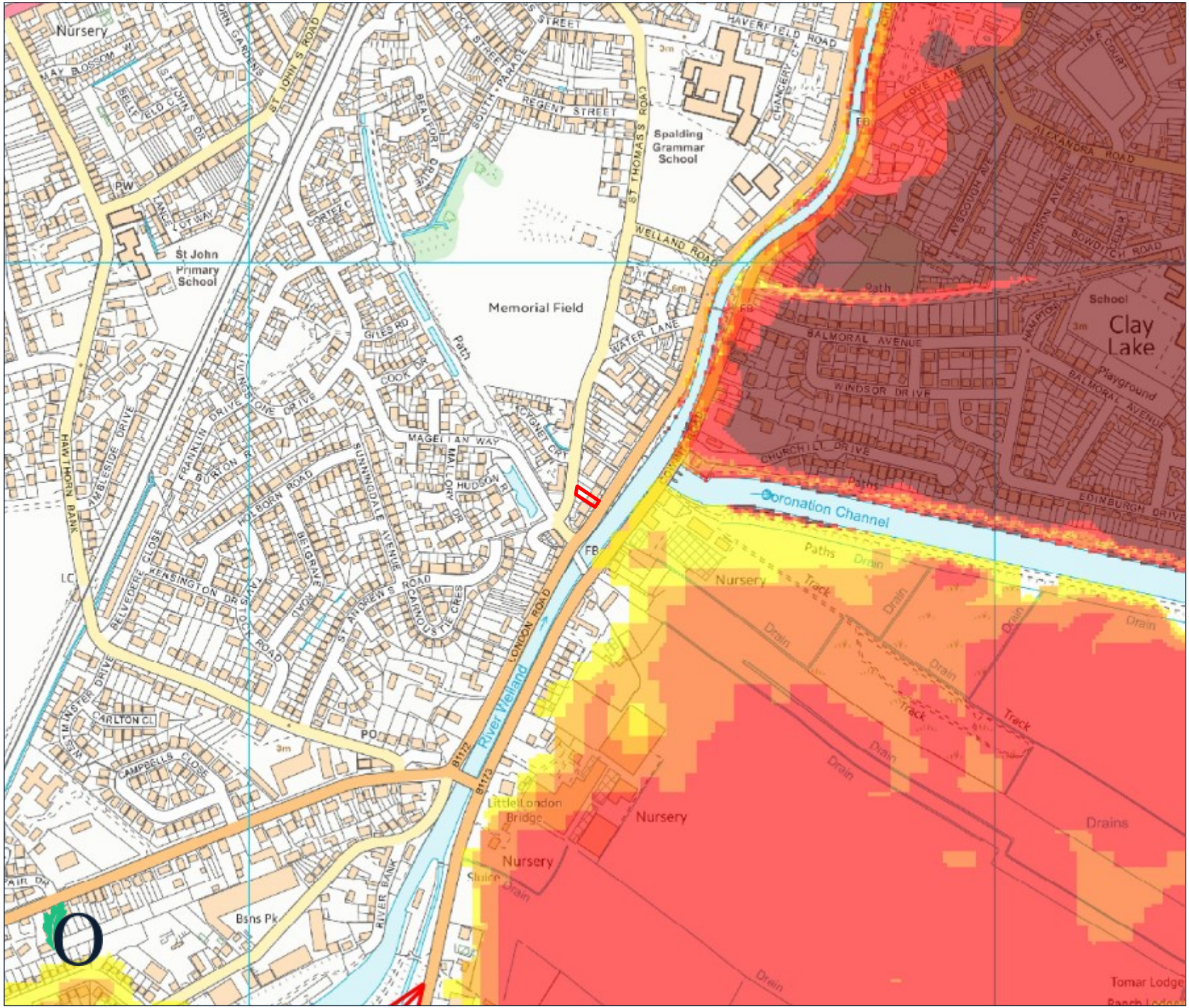
Appendix C - Flood Risk Maps	
Description	
Environment Agency map showing the modelled extent of flooding from reservoirs	
Sources	
Environment Agency © Crown copyright and database rights 2022	
Key	
	Site boundary
	When river levels normal
	When there is river flooding
Name	Figure 15

N



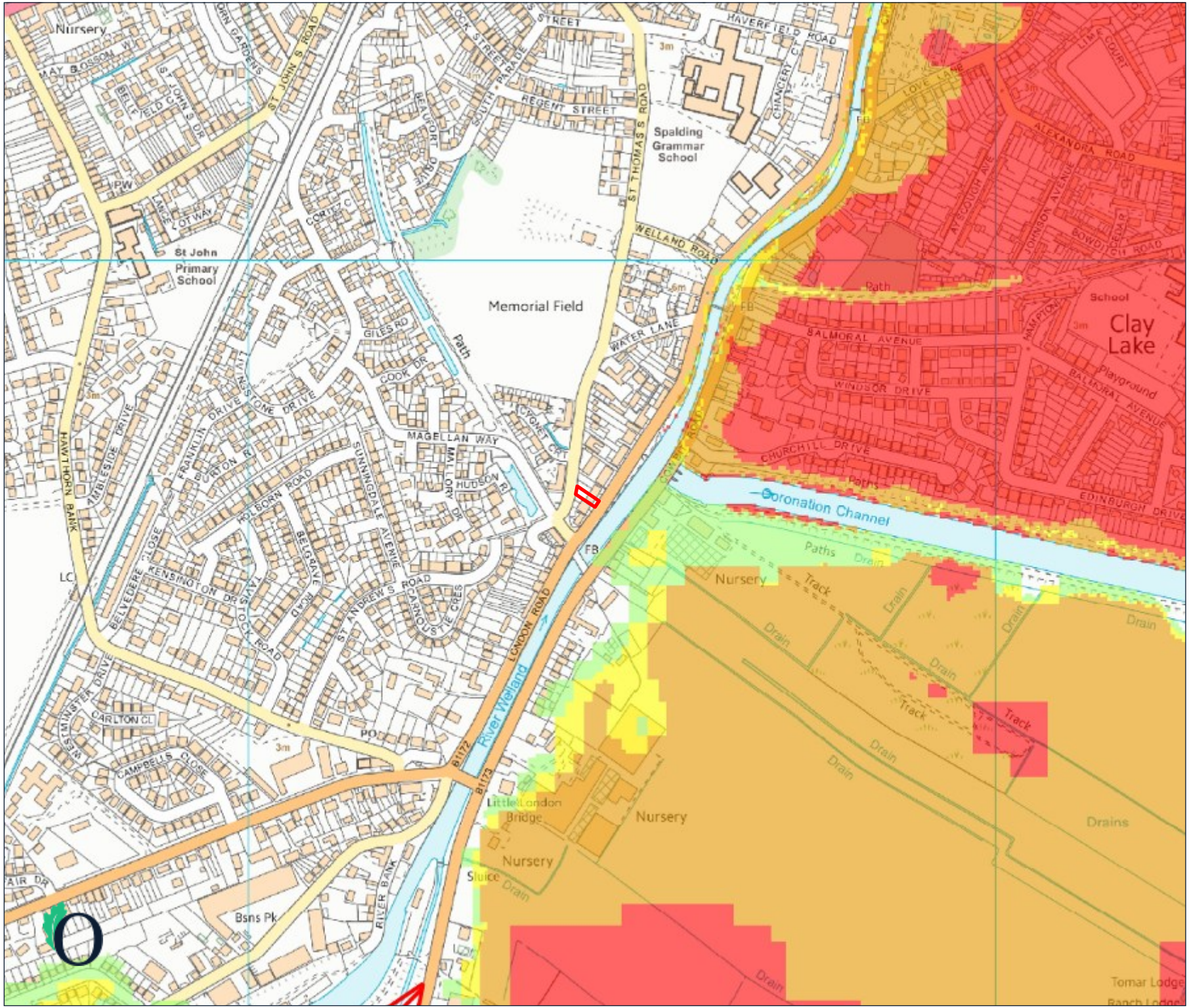
Appendix C - Flood Risk Maps	
Description	
Map from South Holland District Council SFRA showing the modelled 2115 fluvial flood extent in the event of a failure or overtopping of flood defences	
Sources	
South Holland District Council, 2017.	
Key	
	Site boundary
	High (>1%)
	Low or Medium (< 0.1% or 1% - 0.1%)
	Functional floodplain
Name	Figure 16

N



Appendix C - Flood Risk Maps	
Description	
Map from South Holland District Council SFRA showing modelled 2115 fluvial and tidal flood depths for the 1% AEP event in the event of a failure or overtopping of flood defences	
Sources	
South Holland District Council, 2017.	
Key	
	Site boundary
	0m - 0.25m
	0.25m - 0.5m
	0.5m - 1m
	1m - 2m
	2m +
Name	Figure 17

N



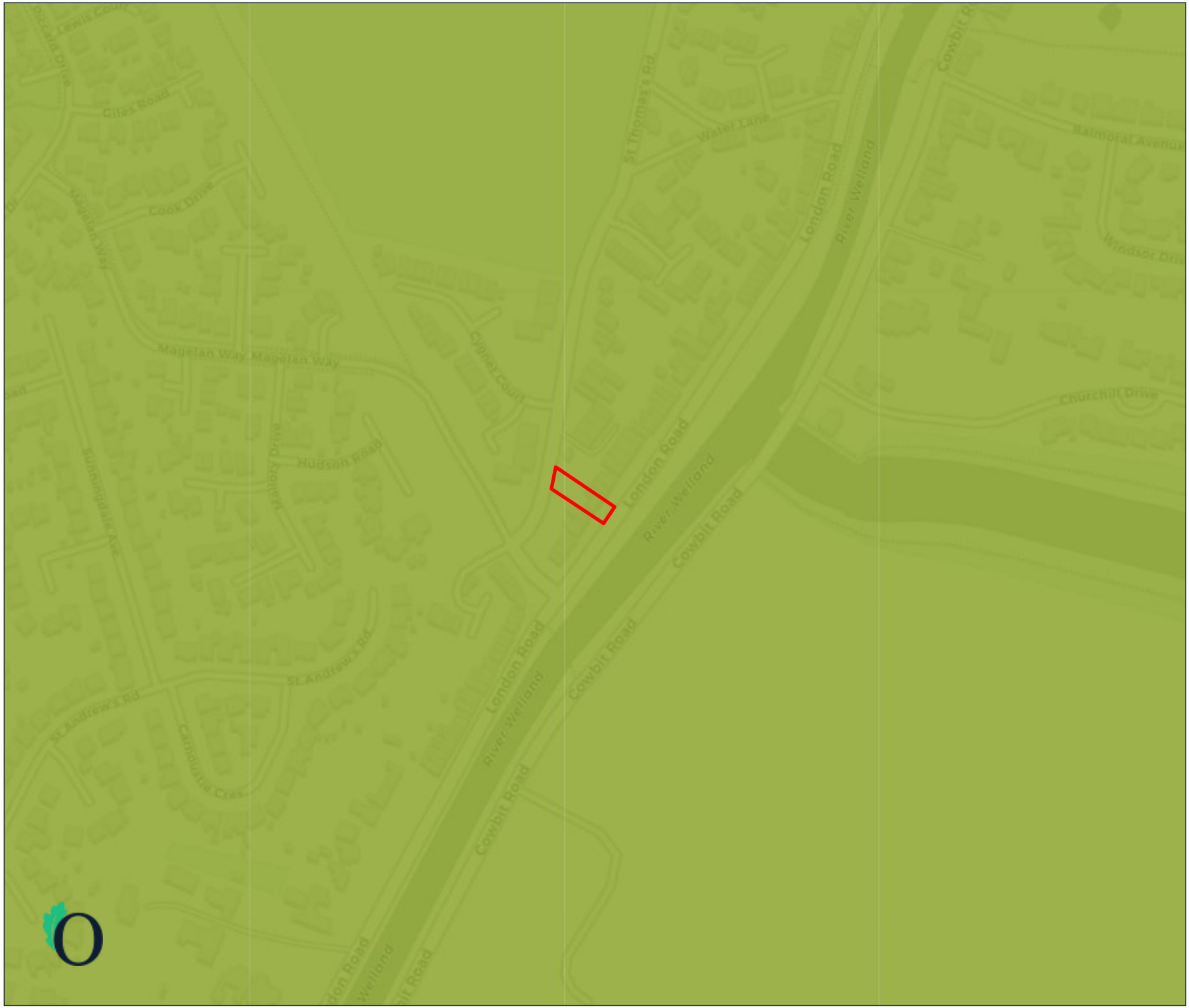
Appendix C - Flood Risk Maps	
Description	
Map from South Holland District Council SFRA showing the modelled 2115 fluvial and tidal flood hazard for the 1% AEP event in the event of a failure or overtopping of flood defences	
Sources	
South Holland District Council, 2017.	
Key	
	Site boundary
	Low Hazard
	Danger for Some
	Danger for Most
	Danger for All
Name	Figure 18

N



Appendix D - Geological Maps	
Description	
Superficial deposits at the site	
Sources	
British Geological Survey	
Key	
	Site boundary
	Alluvium
Name	Figure 19

N



Appendix D - Geological Maps	
Description	
Bedrock geology on the site	
Sources	
British Geological Survey	
Key	
	Site boundary
	Mudstone
Name	Figure 20

N