

FLOOD RISK ASSESSMENT

Site Address

VIP Fitness Connection
The Pavilion
Foundry Steet
Ravensthorpe, WF13 3HW

Client

3indesign Ltd.

Date

01/09/2023



1 Document Control



FLOOD RISK ASSESSMENT



Site Address:	VIP Fitness Connection The Pavilion Foundry St Ravensthorpe, WF13 3HW
National Grid Reference:	422237, 420368
STM Reference:	FRA-2023-000073
Version No:	1.0
Prepared for:	3indesign Ltd.
Date:	01/09/2023
Report Author:	Yonas Makoni (BSc) Junior Flood Risk and Drainage Consultant
Reviewed By:	Georgia Travers (BSc) Flood Risk and Drainage Consultant
Authorised By:	Matthew Ashdown (BSc) Senior Flood Risk and Drainage Consultant

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2 Abbreviations

Abbreviation	Description
STM	STM Environmental Consultants Limited
BGS	British Geological Survey
EA	Environment Agency
OS	Ordnance Survey of Great Britain
FRA	Flood Risk Assessment
NPPF	National Planning Policy Framework
FWD	Floodline Warning Direct
FRMS	Flood Risk Management Strategy
KC	Kirklees Council
SWMP	Surface Water Management Plan
SFRA	Strategic Flood Risk Assessment
CDA	Critical Drainage Area
AEP	Annual Exceedance Probability
CC	Climate Change
SuDS	Sustainable Urban Drainage Systems
GWSPZ	Groundwater Source Protection Zone
LLFA	Lead Local Flood Authority
mbgl	metres below ground level
DCLG	Department for Communities and Local Government
PPGPS	Planning practice guidance and Planning system

3 Disclaimer

This report and any information or advice which it contains, is provided by STM Environmental Consultants Ltd (STM) and can only be used and relied upon by 3indesign Ltd (Client). Any party other than the Client using or placing reliance upon any information contained in this report, do so at their own risk.

STM 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. However, STM gives no warranty, representation or assurance as to the accuracy or completeness of any information, assessments or evaluations presented within this report.

4 Executive Summary

SECTION	SUMMARY
Location	VIP Fitness Connection, The Pavilion, Foundry St, Ravensthorpe, WF13 3HW Grid Reference: 422237, 420368
Area	521m ²
Proposed Development	Redesign of ground floor (internal) to incorporate a nutritional school for gym members.
Flood Zone	The site is located in Flood Zone 2.
Topography	The ground level at the site ranges from 42.1mAOD to 42.2mAOD.
Sequential and Exception Tests	Development is minor and more vulnerable so Sequential and Exception Tests should not be required.
Main Sources of Flooding	The River Calder, the Calder and Hebble Navigation canal, and the River Spen are all located within 500 - 700m of the site.
Flood Defences	The EA Flood Defences Map indicates that the site benefits from high ground along the River Calder and Calder and Hebble Navigation canal, as well as a wall along the River Spen.
Records of Historic Flooding	EA mapping and the LLFA's SWMP revealed records of No.6 fluvial incidents, the site was not impacted. No.2 surface water and No.1 sewer flooding incident in the vicinity of the site. The site was not reported to be impacted.
Fluvial (River) and Tidal (Sea) Flood Risk	Low – The site remains dry during the 1% AEP and 1% AEP + 20% CC scenarios. It may experience flood depths of up to 0.45m to a level of 42.59mAOD in the 0.1% AEP scenario.
Pluvial (Surface Water) Flood Risk	Low – The site remains mostly dry during all modelled pluvial events.
Flood Risk from Artificial (Canals and Reservoirs) Sources	Low – The site is at risk of flooding from the Calder and Hebble Navigation canal. The EA's 2015 Calder and Canals model indicates that the site remains dry in the 1% AEP + 20% CC scenario.
Groundwater Flood Risk	Medium – According to the BGS, the site is potentially susceptible to groundwater flooding at the surface.
Development Impacts on Local Flood Risk	The development will increase the site's built-up area by 14m ² . It will not increase the site's impermeable area, as it is being developed on existing hard standing. As such, it may have an adverse impact on flood risk. However, as the site remains dry in the 1% AEP + CC scenario, this risk is judged to be negligible.
Proposed Flood Risk Mitigation Measures	<ul style="list-style-type: none"> • Finished floor levels will be no lower than existing ground floor levels at 42.63mAOD; • Construction will utilise flood resistant materials and services will be placed as high as practicable to reduce impact of flooding; • Occupants will sign up for EA Emergency Flood Warning Direct Service; • Safe egress to Flood Zone 1 is a 3-minute walk away to Dearnley Street.

SECTION	SUMMARY
	<ul style="list-style-type: none"> As the site remains dry during the 1% AEP + CC scenario safe refuge is not required.
Surface Water Management (SuDS)	<p>Given the size and nature of the development, it is considered that there are limited opportunities for SuDS implementation. As the works consist mainly of internal alterations, no SuDS measures have been included at this time.</p>
Conclusions	<p>Based on the information reviewed and taking into account the proposed mitigation measures, it is considered that overall flood risk to the proposed development is and that it will not increase local flood risk. As such, the development is considered to be in compliance with local planning policy and the NPPF.</p>

5 Introduction

STM Environmental Consultants Limited (STM) were appointed by 3indesign Ltd (Client) to provide a Flood Risk Assessment (FRA) at a site located at VIP Fitness Connection, The Pavilion, Foundry St, Ravensthorpe, WF13 3HW.

6 Development Proposal

The FRA is required to support a planning application to redesign the ground floor of the existing building to incorporate a nutritional school for gym members.

Further details including drawings of the development plans are available in [Appendix 2](#).

7 Report Aims and Objectives

The purpose of this report is to establish the flood risk to the site from all potential sources and, where possible, to propose suitable mitigation methods to reduce any risks to an acceptable level. It aims to make an assessment of whether the development will be safe for its lifetime, taking into account climate change and the vulnerability of its users, without increasing flood risk elsewhere.

The FRA assesses flood risk to the site from tidal, fluvial, surface water, groundwater, sewers and artificial sources. The FRA has been produced in accordance with the National Planning Policy Framework (NPPF) and its supporting guidance.

8 Summary of Data Review Undertaken

The following research has been undertaken as part of the FRA:

- Desktop assessment of topographical, hydrological and hydrogeological settings through review of the information sourced from the British Geological Survey (BGS), the Environment Agency (EA) and the Ordnance Survey (OS);
- Review of publicly available flood risk mapping provided by the EA;
- Review of the Preliminary Flood Risk Assessment (PFRA) and Level 1 Strategic Flood Risk Assessment (SFRA) produced by the LLFA outlining flood risk from various sources within the borough.

9 Legislative and Policy Context

9.1 Legislative Context

The Flood and Water Management Act was introduced in 2010. The Act defines the role of lead local flood authority (LLFA) for an area. All LLFA are required to develop, maintain, apply and monitor a strategy for local flood risk management in its area, called “local flood risk management strategy”.

Alongside the Act, Flood Risk Regulations (2009) outline the roles and responsibilities of the various authorities, which include preparing Flood Risk Management Plans and identifying how significant flood risks are to be mitigated.

9.2 Policy Context

9.2.1 National Planning Policy Framework (NPPF)

The NPPF (updated July 2021) sets out the government’s planning policies for England and how these are expected to be applied. It also provides a set of guidelines and philosophy with which local planning authorities (LPAs) can build their own unique policies to appropriately regulate development within their jurisdictions.

Section 14 entitled “Meeting the challenge of climate change, flooding and coastal change” deals specifically with flood risk.

Paragraph 159 states that “Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether

existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere”.

In addition, Paragraph 161 outlines that “All plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:

- applying the sequential test and then, if necessary, the exception test as set out below;
- safeguarding land from development that is required, or likely to be required, for current or future flood management;
- using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, (making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management);
- where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations”.

The NPPF then states in Paragraph 163 that “if it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification”.

It further states that when determining any planning application, LPAs should “ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment⁵⁵. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
- development is appropriately flood resilient and resistant;
- it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
- any residual risk can be safely managed; and
- safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

Applications for minor development and changes of use should not be subject to the Sequential or Exception Tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.

Footnote 55 states: “A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.”

The NPPF also lays out requirements for how LPAs should deal with planning applications in coastal areas. They should ensure that should they “reduce risk from coastal change by avoiding inappropriate development in vulnerable areas or adding to the impacts of physical changes to the coast.”

Developments in Coastal Change Management Areas should only be considered appropriate where it is demonstrated that:

- it will be safe over its planned lifetime and will not have an unacceptable impact on coastal change;

- the character of the coast including designations is not compromised;
- the development provides wider sustainability benefits;
- the development does not hinder the creation and maintenance of a continuous signed and managed route around the coast.

9.2.2 Local Planning Policy – Kirklees Council

Policy LP27 Flood risk

Proposals for development which require a Sequential Test in accordance with national planning guidance will need to demonstrate that development has been directed to areas at the lowest probability of flooding, following a sequential risk based approach. The whole Kirklees district should be the starting point for the sequential test with applicants required to provide justification where a smaller area of search is proposed. If following application of the sequential test, there are no reasonably available sites which could accommodate the development in zones with a lower probability of flooding, it should also be demonstrated that a sequential approach has been applied within sites. This is to ensure that highly vulnerable and more vulnerable uses are directed towards the areas of lowest flood risk within the site. Proposals will also need to demonstrate that the exception test is passed, where applicable, as set out in national planning policy.

Proposals within flood zone 3a will be assessed in accordance with national policies relating to flood zone 3a but with all of the following additional restrictions:

- no new highly vulnerable or more vulnerable uses will be permitted;
- less vulnerable uses may only be permitted provided that the sequential test has been passed and;
- where extensions are linked operationally to an existing business or,
- where redevelopment of a site provides buildings with the same or a smaller footprint;

- all proposals will be expected to include flood mitigation measures such as compensatory storage which should be identified and considered through a site specific Flood Risk Assessment;
- development will not be permitted on any part of the site identified through a site specific Flood Risk Assessment as performing a functional floodplain role.

Proposals must be supported by an appropriate site specific Flood Risk Assessment in line with national planning policy. This must take account of all sources of flooding set out in the Strategic Flood Risk Assessment and demonstrate that the proposal will be safe throughout the lifetime of the development (taking account of climate change). The proposal must also not increase flood risk elsewhere and where possible should reduce flood risk. Mitigation measures, where necessary, should be proposed.

Proposals involving building over existing culverts or the culverting or canalisation of water courses will not be permitted unless it can be demonstrated to be in the interests of public safety or to provide essential infrastructure and that there will be no detrimental effect on flood risk and biodiversity. Where feasible, development proposals should incorporate re-opening of culverts, modification of canalised water courses and consideration of mitigation measures to achieve a more natural and maintainable state.

Proposals for natural management such as targeted vegetation planting in upper catchments and along river banks will be supported in appropriate locations where consistent with national and local plan policies and relevant water catchment management plans to reduce flood risk and improve water quality.

9.3 EA Standing Advice on Flood Risk

The Environment Agency's [standing advice](#) lays out the process that must be followed when carrying out flood risk assessments for developments.

Flood Risk Assessments are required for developments within one of the Flood Zones. This includes developments:

- in Flood Zone 2 or 3 including minor development and change of use more than 1 hectare (ha) in Flood Zone 1;
- less than 1 ha in Flood Zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs);
- in an area within Flood Zone 1 which has critical drainage problems as notified by the Environment Agency.

10 Site Description and Environmental Characteristics

10.1 Site Location and Area

The site is located at VIP Fitness Connection, The Pavilion, Foundry St, Ravensthorpe, WF13 3HW and is centred at national grid reference 422237, 420368. The site has an area of 509m².

A site location map and aerial photo are shown below. Photographs of the site are available in [Appendix 1](#).



Figure 1: Site Location Map



Figure 2: Site Aerial Map

10.2 Site Access

The site is accessible via Foundry Street.

10.3 Local Planning Authority

The site falls within the jurisdiction of Kirklees Council in terms of the planning process.

10.4 Lead Local Flood Authority

Kirklees Council is also the Lead Local Flood Authority (LLFA).

10.5 Flood Zone

For planning purposes, the site is located in Flood Zone 2 as defined by the EA and LLFA.

10.6 Site and Surrounding Land Uses

10.6.1 Site Current Land Use

The site is currently used as a commercial gym.

10.6.2 Surrounding Land Uses

A description of the current and surrounding land uses of the site is given in Table 1.

Table 1: Summary of surrounding land uses

Boundary	Land Use Description	
	Immediately Adjacent (Within 0 – 25m)	General Local Area (Within 25 – 250m)
Northern	Residential	Residential
Eastern	Residential	Residential
Southern	Residential	Canker Dyke
Western	Residential	Residential

10.7 Hydrology

The nearest main watercourse is the River Calder, which is located approximately 500m south of the site. The Calder and Hebble Navigation canal is located

approximately 600m southwest of the site, and the River Spen, is located approximately 700m east of the site.

10.8 Geology

Data from the British Geological Survey indicates that the underlying superficial geology is characterised as Alluvium. The underlying bedrock geology is characterized as Pennine Lower Coal Measures Formation.

10.9 Hydrogeology

The site lies upon a Secondary A superficial aquifer and a Secondary A bedrock aquifer.

[Appendix 3](#) provides BGS mapping showing the hydrogeology at the site location.

10.10 Topography

A LIDAR DTM map showing the topography of the site and surrounding area is available in [Appendix 3](#).

The site topography is flat, with ground levels ranging between 42.1mAOD and 42.2mAOD. The average ground level of the site is 42.18mAOD.

11 The Sequential and Exception Tests

11.1 The Sequential Test

The Sequential Test aims to steer developments and redevelopments to areas of lower flood risk. The test compares the proposed development site with other available sites, in terms of flood risk, to aid the steering process. The Sequential Test is not required if the proposed development is a minor development or if it involves a change of use unless the development is a caravan, camping chalet, mobile home or park home site.

Based on Government Guidance, Minor Development means:

- minor non-residential extensions: industrial/commercial/leisure etc extensions with a footprint less than 250 square metre.
- alterations: development that does not increase the size of buildings eg alterations to external appearance.
- householder development: For example; sheds, garages, games rooms etc within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling eg subdivision of houses into flats.

With regard to residential and commercial developments, major development, as defined by the Town and Country Planning (Development Management Procedure) means one or more of the following:

- c(i) - the number of dwelling houses to be provided is 10 or more; or
- c(ii) - the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);
- the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more;
- or development carried out on a site having an area of 1 hectare or more.

The development is considered to be minor and as such the Sequential Test should not be required by the LLFA.

11.2 The Exception Test

Where the Sequential Test is undertaken and alternative sites of lower flood risk are not available, then the proposed development may require an Exception Test in order to be granted planning permission. Where the exception test is required, it should be applied as soon as possible to all local development document allocations for developments and all planning applications other than for minor developments. All

three elements of the exception test have to be passed before development is allocated or permitted. For the exception test to be passed:

-  It must demonstrate that the development provides wider sustainability benefits to the community that outweigh the flood risk, informed by an SFRA, where one has been prepared;
-  The development should be on developed land or on previously developed land;
-  A flood risk assessment must demonstrate that the development will be safe without increasing flood risk elsewhere, and where possible will reduce the overall flood risk.

The requirements for an Exception Test are given in Table 2 and are defined in terms of Flood Zone and development vulnerability classification.

Table 2: NPPF Flood Zone vulnerability compatibility (source: NPPF).

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.

As the site is located in Flood Zone 2 and is classified as more vulnerable, the Exception Test should not be required by the LLFA.

12 Site Specific Flood Risk Analysis

The PFRA and Level 1 SFRA produced by the LLFA and maps from the EA provide information regarding historic flooding events and incidents as well as predictions of flood extents and depths during extreme rainfall events.

12.1 Fluvial (River) and Tidal (Sea) Flood Risk

12.1.1 Mechanisms for Fluvial Flooding

Fluvial, or river flooding, occurs when excessive rainfall over an extended period of time or heavy snow melt causes a river to exceed its capacity. The damage from a fluvial flood can be widespread as the overflow may affect downstream tributaries, overtopping defences and flooding nearby inhabited areas. Fluvial flooding consists of two main types:

-  Overbank flooding – this occurs when water rises steadily and overflows over the edges of a river or stream;
-  Flash flooding – this is characterized by an intense, high velocity torrent of water that occurs in an existing river channel with little to no notice. Flash floods are very dangerous and destructive not only because of the force of the water, but also the hurtling debris that is often swept up in the flow.

12.1.2 Definition of EA Modelled Fluvial Flood Risk Zones

Fluvial flood risk is assessed using flooding maps produced by the Environment Agency. These maps use available historic data and hydraulic modelling to define zones of flood risk. The maps allow a site to be defined in terms of its flood zone (e.g. 1, 2, 3) and in terms of the overall flood risk (very low, low, medium or high). It is important to note that existing flood defences are not taken into account within the models or the maps. The EA fluvial flood zones are defined as follows:

-  Flood zone 1: Less than 1 in 1000 (0.1%) annual probability of flooding;
-  Flood zone 2: Between 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of flooding;
-  Flood zone 3: Greater than 1 in 100 (1%) annual probability of fluvial flooding.

Flood zone 3 is split into two sub-categories (3a and 3b) by LLFAs depending on whether the land is considered to be a functional flood plain (i.e. an important storage area for flood waters in extreme events).

-  Flood zone 3a: Greater than 1 in 100 (1%) annual probability of fluvial flooding and/or greater than 1 in 200 (0.5%) annual probability of tidal flooding;
-  Flood zone 3b: Functional flood plain (definition specific to the LLFA). Less than a 1 in 20 (5%) annual probability of fluvial and/or tidal flooding.

12.1.3 Main Potential Sources of Local Fluvial Flooding

The nearest potential sources of fluvial flooding to the site is the River Calder, The Calder and Hebble Navigation canal, and the River Spen.

12.1.4 Records of Historic Fluvial Flooding Incidents

The EA's historic and recorded flood outline maps and the Product 4 Historic Flooding Map reveals 6 records of flooding along the Calder (in February 2022, February 2020, March 2019, December 2015, February 2002 and November 2000). None of these impacted the site. Copies of these maps are available in [Appendix 4](#).

12.1.5 Designated Fluvial Flood Risk Zone for the Site

The site is considered to be located within Flood Zone 2 as defined by the Environment Agency and the LLFA indicating that it has a between 0.1% and 1% annual probability of fluvial flooding.

12.1.6 Mechanisms for Tidal Flooding

Tidal flooding may be described simply as the inundation of low-lying coastal areas by the sea, or the overtopping or breaching of sea defences. Tidal flooding may be caused by seasonal high tides, storm surges and where increase in water level above the astronomical tide level is created by strong on shore winds or by storm driven wave action.

12.1.7 Definition of EA Tidal Flood Risk Zones

As with fluvial flood risk, tidal flood risk is assessed using flooding maps produced by the Environment Agency. The difference is in the probability return periods used to define tidal flood zones. The EA tidal Flood Zones are defined as:

-  Flood zone 1: Less than 1 in 1000 (0.1%) annual probability of flooding;
-  Flood zone 2: Between 1 in 200 (0.5%) and 1 in 1000 (0.1%) annual probability of tidal flooding;
-  Flood zone 3: Greater 1 in 200 (0.5%) annual probability of tidal flooding.

12.1.8 Potential Sources of Tidal Flooding

The area in which the site is located is considered unlikely to be affected by tidal flooding.

12.1.9 Flood Defences

The EA's flood defence map which is available in [Appendix 7](#) shows that the site benefits from flood defences in the form of high ground along the River Calder and the Calder and Hebble Navigation canal, approximately 500m south and 600m southwest of the site respectively.

The EA Product 4 data also revealed evidence of a wall along the River Spen, located approximately 700m east of the site. The downstream actual crest level of this defence is 40.69mAOD and the upstream actual crest level is 40.43mAOD.

12.1.10 Peak River Flow Climate Change Allowances

The EA's [climate change allowances for peak river flow](#) maps show that the site is considered to be in the Aire and Calder Management catchment. The climate change allowances for this catchment are available in [Appendix 11](#).

In flood zones 2 or 3a for:

-  essential infrastructure – use the higher central allowance
-  highly vulnerable – use central allowance (development should not be permitted in flood zone 3a)
-  more vulnerable – use the central allowance
-  less vulnerable – use the central allowance
-  water compatible – use the central allowance

In flood zone 3b for:

-  essential infrastructure – use the higher central allowance
-  highly vulnerable – development should not be permitted
-  more vulnerable – development should not be permitted
-  less vulnerable – development should not be permitted
-  water compatible – use the central allowance

The central allowance for more vulnerable developments indicates that a climate change allowance of 23% should be used.

12.1.11 Climate Change - EA Modelled Predictions of Fluvial and Tidal Flood Levels and Extents

The EA Product 6 dataset which is presented in [Appendix 11](#) provides modelled flood levels and flows for model node points close to the site. The dataset includes data

from 3 models: the 2009 FIM River Spen, the 2011 River Calder and the 2015 Calder and Canals models.

River Spen, 2009

The River Spen model contains no detailed data for the site.

River Calder, 2011

The River Calder model indicates that the site remains dry in the 1% AEP undefended scenario. The flood outline for the 1% AEP + 20% CC and the 0.1% AEP undefended scenarios cover the site; however, no flood level values were given as part of this dataset. The model does not contain any data for the defended scenario.

Calder and Canals, 2015

The Calder and Canals model indicates that the site remains dry in the 1% AEP and 1% AEP + 20% CC (in both the defended and undefended scenarios), but experiences flooding in the 0.1% AEP defended scenario. Data was not available for the 0.1% undefended scenario and no model provided data for flood heights. As such, flood levels in Table 3 below have been estimated by the adding the flood depths to the LIDAR topographical data.

The data shows that the development experiences maximum flood depths of 0.45m to a level of 42.59 in the 0.1% AEP scenario.

Table 3: EA Product 6 Data Table

Node	Easting	Northing	Topography (mAOD)	1% AEP	1% AEP + 20% CC	0.1% AEP	
						Depth	Level
0	422232	420369	42.14	N/A	N/A	0.45	42.59
1	422241	420355	42.20	N/A	N/A	0.36	42.55
2	422248	420362	42.25	N/A	N/A	0.38	42.63
3	422243	420368	42.22	N/A	N/A	0.36	42.57
4	422238	420363	42.17	N/A	N/A	0.40	42.57
5	422239	420374	42.17	N/A	N/A	0.38	42.55
6	422231	420377	42.16	N/A	N/A	0.39	42.55
7*	422227	420362	41.94	N/A	N/A	0.60	42.54
8*	422251	420368	42.05	N/A	N/A	0.46	42.50

* Not within site boundary

12.1.12 Long Term Fluvial/Tidal Flood Risk Considering Flood Defences

The EA's [long term flood risk maps](#) give an indication of the actual risk associated with flooding after taking into account the effect of any flood defences in the area. Copies of maps for the site which are available in [Appendix 9](#) indicate that the long-term risk from fluvial flooding to the site is low.

12.2 Pluvial (Surface Water) Flood Risk

A pluvial, or surface water flood, is caused when heavy rainfall creates a flood event independent of an overflowing water body. Surface water flooding occurs when high intensity rainfall leads to run-off which flows over the ground surface, causing ponding in low-lying areas when the precipitation rate or overland flow rate is greater than the rate of infiltration, or return into watercourses. Surface water flooding can be exacerbated when the underlying soil and geology is saturated (as a result of prolonged precipitation or a high-water table) or when the drainage network has insufficient capacity.

12.2.1 Mechanisms of Pluvial Flooding

The chief mechanisms for surface water flooding can be divided into the following categories:

-  Runoff from higher topography;
-  Localised surface water runoff – as a result of localised ponding of surface water;
-  Sewer Flooding – areas where extensive and deep surface water flooding is likely to be influenced by sewer flooding. Where the sewer network has reached capacity, and surcharged, this will exacerbate the flood risk in these areas;
-  Low Lying Areas – areas such as underpasses, subways and lowered roads beneath railway lines are more susceptible to surface water flooding;
-  Railway Cuttings – railway infrastructure cut into the natural geological formations can cause extra surface run off and pooling disrupting service and potentially affecting adjacent structures;

-  Railway Embankments – discrete surface water flooding locations along the upstream side of the raised network rail embankments where water flows are interrupted and ponding can occur;
-  Failure of artificial sources (i.e. man-made structures) such as such as canals and reservoirs.

12.2.2 Main Potential Sources of Local Pluvial Flooding

The main potential source of pluvial flooding to the site is considered to be surface water ponding and flooding associated with heavy rainfall.

12.2.3 Records of Historic Pluvial Flooding Incidents

Examination of the LLFA's Preliminary FRA revealed evidence of pluvial flooding in the vicinity of the site.

Kirklees Borough, including Ravensthorpe where the site is located, experienced widespread flooding in June 2007 following heavy rainfall. Ravensthorpe experienced another pluvial flood event in January 2008, again following heavy rainfall. It is not known whether these events impacted the site.

A table showing the location of surface water flooding incidents in the borough is available in [Appendix 4](#) .

12.2.4 Surface Water Flood Risk from Artificial Sources (Reservoirs and Canals)

An examination of OS mapping and the EA's mapping revealed that the Calder and Hebble Navigation, a canal associated with the River Calder, is located approximately 600m southwest of the site.

The EA's reservoir flood risk map indicates that the site lies within an area that is at risk of reservoir flooding. This risk appears also to be due to the proximity of the site to the Calder and Hebble Navigation Canal.

12.2.5 Sewer Flooding

Examination of the LLFA's Level 1 SFRA revealed evidence of one sewer flooding incident approximately 320m northwest of the site. It does not appear to have impacted the site.

A map showing recorded incidents of sewer flooding is available in [Appendix 4](#).

12.2.6 Climate Change - Modelled Predictions of Surface Water Run-off Flooding

Mapping of the predicted extent and depth of surface water flooding for the 1 in 30-year, 1 in 100-year, and 1 in 1000-year rainfall return periods provided by the EA are available in [Appendix 6](#).

The maps show that the site remains dry in the 1 in 30 and 1 in 100-year pluvial flood event.

The site remains mostly dry in the 1 in 1000-year flood event; however, small sections of the northwestern and southeastern corners may experience flooding of up to 300mm. This is thought to be due to the large cell size used within the EA surface water flood maps. The flood outlines do not impact the proposed development.

12.2.7 Long Term Surface Water Flood Risk

The EA's [long term flood risk maps](#) which are available in [Appendix 9](#) indicate that the long term risk of flooding from surface water is considered to be very low.

12.3 Risk of Flooding from Multiple Sources (ROFMS)

The Environment Agency provides a map which gives an indication of the overall flood risk to a site from fluvial, tidal and surface water sources after considering the presence of flood defences. This map indicates that there is between 1% and 0.1%, chance of flooding at the site in any year. A copy of the map is presented in [Appendix 8](#).

12.4 Groundwater Flood Risk

Groundwater flooding occurs when water rises from an underlying aquifer (i.e. at the location of a spring) to such a level where it intersects the ground surface and inundates the surrounding land. Groundwater flooding tends to occur after long periods of intense precipitation, in often low-lying areas where the water table is likely to be at a shallow depth. Groundwater flooding is known to occur in areas underlain by principal aquifers, although increasingly it is also being associated with more localised floodplain sands and gravels. A high groundwater table also has the potential to exacerbate the risk of surface water and fluvial flooding by reducing rainfall infiltration capacity, and to increase the risk of sewer flooding through sewer/groundwater interactions.

12.4.1 Historic Records of Groundwater Flooding

Examination of the LLFA's Level 1 SFRA revealed no records of groundwater flooding at or within 500m of the site.

12.4.2 Susceptibility to Groundwater Flooding

The Groundwater Flood Susceptibility Map provided by BGS and presented in [Appendix 10](#) indicates that the site has potential for groundwater flooding to occur at the surface. The Groundwater Depth map also provided by BGS indicates that the groundwater level may be at less than 3mbgl.

12.5 Critical Drainage Area

A Critical Drainage Area (CDA) may be defined as “a discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) cause flooding in one or more Local Flood Risk Zones during severe weather thereby affecting people, property or local infrastructure”. A CDA is defined in the Town and Country Planning (General Development Procedure) (Amendment) (No. 2) (England) Order 2006 as “an area within Flood Zone 1 which has critical drainage problems and which has been notified to the local planning authority by the Environment Agency”.

The site is not located within a Critical Drainage Area.

13 Potential Impacts of the Development on Local Flood Risk

13.1 Changes to Impermeable Area and Building Footprint

Changes in ground cover arising from the development are presented in Table 3 and Table 4 below.

Table 3: Existing and proposed site ground cover.

	Impermeable Area (m ²)	Permeable Area (m ²)	Total Area (m ²)
Existing	521	521	0
Proposed	521	521	0

Table 4: Break down of existing and proposed site uses

Use	Existing (m ²)	Proposed (m ²)	Difference (m ²)
Existing building	445	445	0
Canopy	0	14	+ 14
Decking	0	7	+ 7
Impermeable Paving	76	55	- 21
Total	0	0	0

As the development will not alter the impermeable area of the site, it is considered unlikely that it will impact upon flood flow and surface water runoff rates.

13.2 Impacts on Flood Storage and Flood Flow Routes

The development will change the site's built-up area by 14m², it is considered possible that it will have an impact on local flood storage and flood flow pathways.

However, given that the site remains dry in all pluvial events and the 1% AEP + CC scenario, this impact is considered to be negligible.

14 Flood Risk Mitigation Measures

14.1 SuDS

Planning practice guidance (PPG) which is prepared by the Ministry of Housing, Communities and Local Government (DCLG) states that developers and Local Authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development, and the appropriate application of sustainable drainage techniques.

As such, the developer has the option to implement a SuDS strategy in line with the drainage hierarchy as outlined in Table 5 below to reduce surface water discharges from the site.

Table 5: SuDS Options

	Store rainwater for later use;
	Use infiltration techniques, such as porous surfaces in non-clay areas;
	Attenuate rainwater in ponds or open water features for gradual release;
	Attenuate rainwater by storing in tanks or sealed water features for gradual release;
	Discharge directly to a water course;
	Discharge rainwater directly to a surface water sewer/drain;
	Discharge to a combined sewer.





Figure 3: Surface water storage facilities and potential SuDS features - rainwater harvesting, on-site tank storage, rain garden soak-away and green roofs. (Source: UK SuDS Manual)

As the works consist mainly of internal alterations, no SuDS measures have been included at this time.

14.2 Flood Resilience

Flood resilient construction uses methods and materials that reduce the impact from a flood, ensuring that structural integrity is maintained, and the drying out and cleaning required, following inundation and before reoccupation, is minimised.

14.2.1 Finished Floor Levels

The average ground level of the site is 42.18mAOD.

For **vulnerable developments**, the EA's Standing Advice states that the finished floor level of the lowest habitable room in any building, Finished Floor Levels (FFL) should be a minimum of 300mm above one of the following, whichever is higher;

-  Average Ground level; Or
-  Estimated flood level 1% AEP plus CC; Or
-  The Adjacent roadway;

As the development remains dry in the 1% AEP + CC scenario, it is recommended that the FFLs be set to match the existing levels at 42.63mAOD (450mm above ground level).

14.2.2 Compensatory Flood Storage (CFS)

All new development within Flood Zone 3 must not result in a net loss of flood storage capacity. Where possible, opportunities should be sought to achieve an increase in the provision of floodplain storage.

Where proposed development results in a change in building footprint, the developer must ensure that it does not impact upon the ability of the floodplain to store water, and should seek opportunities to provide a betterment with respect to floodplain storage.

As the site remains dry during the 1% AEP + CC scenario, CFS is not required.

14.2.3 Flood Resilience Construction Measures

In terms of achieving resilience, there are two main strategies, whose applicability is dependent on the water depth the property is subjected to. These are:

- Water Exclusion (Flood Resistance) Strategy - should be employed where predicted flood depths are less than 0.3m and are likely to be for short duration. Emphasis is placed on minimising water entry and giving occupants time to relocate ground floor contents, maintaining structural integrity, and on using materials and construction techniques to facilitate drying and cleaning;
- Water Entry (Flood Resilience) Strategy - Flood resilience measures are designed to allow water in but to limit damage and allow rapid re-occupancy. Resilience measures should be employed where flood depths are greater than 0.6m and where it is likely that structural damage will occur due to excessive water pressure.

Given that flood depths less than 0.3m are predicted in extreme scenarios, the water exclusion is considered most applicable for this site.

Water Exclusion Strategy:

There are a range of flood protection devices/methods that can be used in the Water Exclusion Strategy including:

- Using materials and construction with low permeability;

- Landscaping e.g. creation of low earth bunds (subject to this not increasing flood risk elsewhere);
- Raising thresholds and finished floor levels (e.g. porches with higher thresholds than main entrance);
- Flood gates with waterproof seals;
- Sump and pump for floodwater to remove waste water faster than it enters;
- Door guards and airbrick covers.

Flood resilience design and measures that will be implemented are outlined below. Water-resistant and resilient materials will be utilized throughout the construction to minimize the flood risk and potential impacts.

Floor construction:

- Use of resilient flooring materials as ceramic tiles or stone floor finishes;
- Use of a concrete slab 150mm thick;
- Use of ceramic tiles or stone floor finishes is recommended;
- Maintain existing under floor ventilation by UPVC telescopic vents above 400 mm to external face of extension;
- Damp proof membrane of impermeable polythene at least 1200 gauge;
- Avoid the use of MDF carpentry.

Wall construction:

- Include in the external face of the extension a damp – proof course, 250 mm above ground level, to prevent damp rising through the wall;
- Use rigid closed – cell material for insulation above the DPC;
- Spread hardcore over the site within the external walls of the building to such thickness as required to raise the finished surface of the site concrete. The hardcore should be spread until it is roughly level and rammed until it forms a compact bed for the oversite concrete. This hardcore bed will be 100 mm thick and composed by well compacted inert material, blinded with fine inert material.

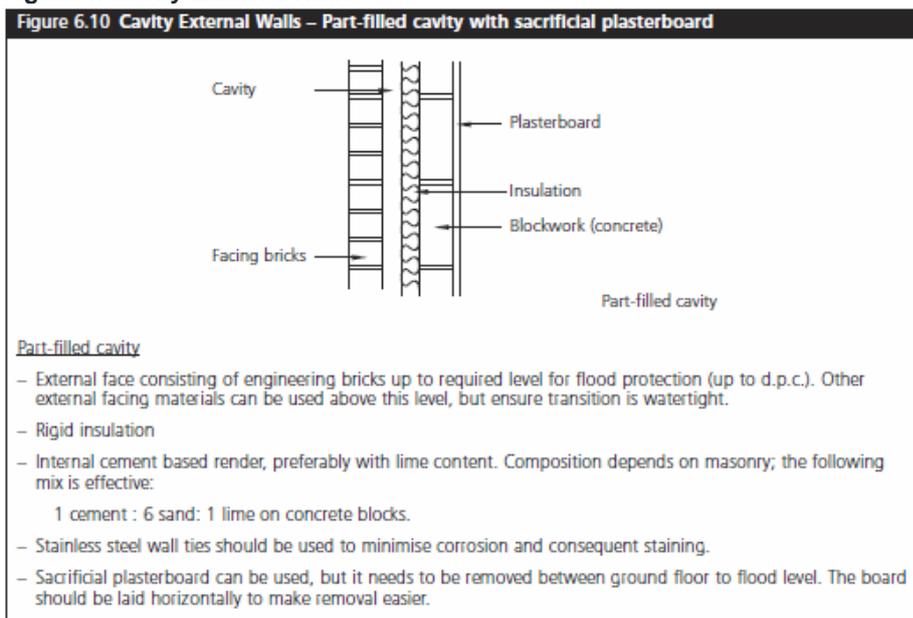
Doors:

- Seal doors around edges and openings. UPVC or composite material will be used with passive protection meaning that minimal intervention will be required in the event of flooding.

Underground drainage:

- Avoid use of metal for any underground piping;
- Use closed cell insulation for pipes that are below the predicted flood level;
- Provide non – return valves for the drainage system to prevent back water flow;
- Use UPVC or clay pipework for foudls and surface water drainage.

Figure 4: Cavity External Walls



As well as the above the following flood resilience features should be applied as part of the development:

- Electrical sockets should be installed above flood level for the ground floor;
- Utility services such as fuse boxes, meters, main cables, gas pipes, phone lines and sockets will be positioned as high as practicable;

- All external openings for pipes or vents below 400mm to be sealed around pipe or vent with expanding foam and mastic.

14.3 Emergency Plan

14.3.1 Assessment of Danger to People

The dangers associated with flood water to people are possible injury and/or death. This can occur as a result of drowning or being carried along by the waters into hard objects or vice versa. The risk to life is largely a function of the depth and velocity of the floodwater as it crosses the floodplain. Fast flowing deep water that contains debris would represent the greatest hazard.

The assessment of danger to people from walking in floodwater is described in the Flood Risks to People guidance documents (FD2321_TR1 and FD2321_TR2) by DEFRA/EA.

Danger can be estimated by the simple formula:

$$HR = d \times (v + 0.5) + DF$$

where, HR = (flood) hazard rating; d = depth of flooding (m); v = velocity of floodwaters (m/sec); and DF = debris factor.

The scoring methodology and calculation matrix for this is summarised in [Appendix 13](#).

As the site remains dry in the 1% AEP + CC scenario, it is considered to be in an area of Low hazard.

The use of a flood emergency plan is therefore sufficient for the proposed development. The key elements of the emergency plan are described below.

14.3.2 EA Flood Warnings Direct Service Subscription

The occupants will subscribe to the EA Flood Warnings Direct Service which is a free service offered by the EA providing flood warnings direct to people by telephone, mobile, email, SMS text message and fax. The EA aims to provide 2 hours' notice of flood, day or night, allowing timely evacuation of the site.

The agency operates a 24-hour telephone service on 0345 988 1188 that provides frequently updated flood warnings and associated floodplain information. In addition, this information can also be found at <https://fwd.environment-agency.gov.uk/app/olr/home> along with recommendations on what steps should be taken to prepare for floods, what to do when warnings are issued, and how best to cope with the aftermath of floods.

14.3.3 Access and Safe Egress

Flood Zone 1 may be accessed via a 3-minute walk to Dearnley Street, located approximately 230m north of the site. Directions of this route are presented in [Appendix 12](#).

14.3.4 Safe Refuge

Safe refuge is not required.

15 Conclusions and Recommendations

This assessment has considered the potential risks to the application site associated with flooding from fluvial, tidal, surface water, artificial and groundwater sources and the potential impacts of climate change.

A review of LLFA's PFRA and SFRA as well as data provided by the EA was undertaken. The main findings of the review and assessment are provided below:

 The site is classified as a more vulnerable minor development and should not require sequential and exception tests to be undertaken;

- The main sources of potential flooding to the site are the River Calder, the River Spen and the Calder and Hebble Navigation canal;
- The EA define the site as being within Flood Zone 2;
- The finished floor level will be set to match existing levels at 42.63mAOD;
- EA mapping indicates that the site benefits from flood defences in the form of high ground along the Calder, and a wall along the River Spen;
- 6 records of fluvial, 2 records of surface water and 1 record of sewer flooding were identified in the vicinity of the site. While the fluvial and sewer flooding incidents did not impact the site, it is not known to what extent the pluvial incidents impacted the site;
- The site is not within a CDA.;
- The development will increase the built-up area of the site by 14m² and may therefore have an adverse impact on local flood risk. However, as the site remains dry in the 1% AEP + CC scenario, this impact is judged to be negligible;
- There is limited opportunity for implementing SuDS mitigation measures. As the works consist mainly of internal alterations, no SuDS measures have been included at the present time;
- Flood resilient materials and construction methods will be used so as to ensure that the impacts of any potential flooding are minimised as much as possible;
- Occupants will subscribe to the EA Flood Warnings Direct Service;
- Safe egress routes to Flood Zone 1 are easily accessible via a 3-minute walk to Dearnley Street, located approximately 230m north of the site;

The proposed development is considered to be in general compliance with local planning policy and the NPPF.

16 References

1. Communities and Local Government - National Planning Policy Framework NPPF, July, 2021.
2. Communities and Local Government - Planning Practice Guidance: Flood Risk and Coastal Change, Updated 06 March 2014.
3. Strategic Flood Risk Assessment, Kirklees Council
4. Preliminary Flood Risk Assessment, Kirklees Council
5. Local Plan, Kirklees Council
6. Surface Water Management Plan, Kirklees Council
7. CIRIA, Defra, Environment Agency – UK SuDS Manual, 2015.

17 Appendices

17.1 Appendix 1 – Site Photographs





17.2 Appendix 2 – Development Plans

See next page.

Do not scale from this drawing. Its drawing or any portion of it may not be reproduced without the consent of MD Plans.

NOTES

All given dimensions to be checked on site prior to work commencing.
Boundary ownership confirmed by client.

Proposed -

The proposal is to revamp the existing building to make it more appealing to the members and also provide Nutritional school for members so they know how to prepare and eat healthy meals and make healthy body builder shakes.

Materials As Existing -

Walls - Brickwork & Blockwork external.
Doors/Windows - Upvc double glazed units.
Roof - Slate finish.

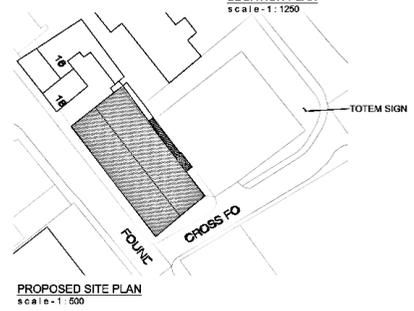
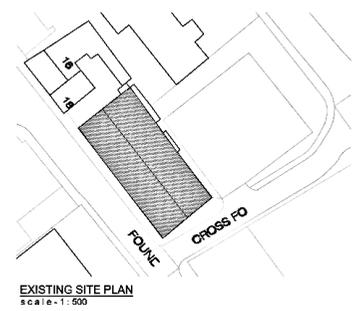
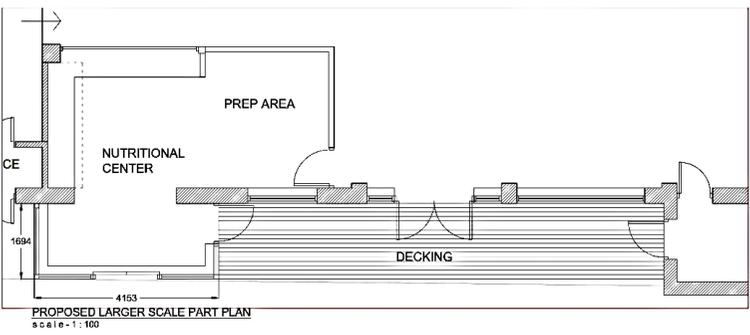
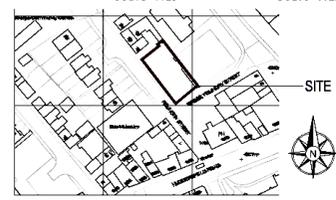
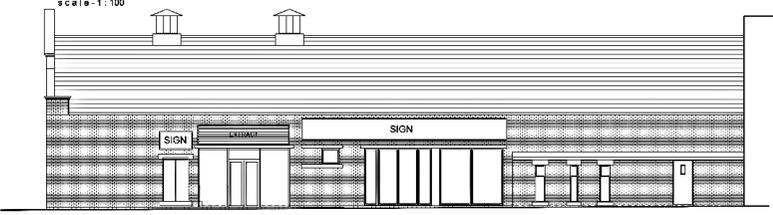
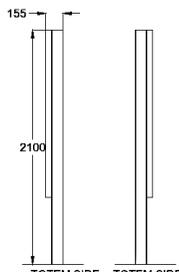
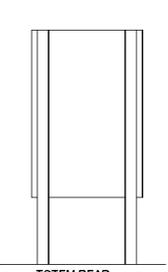
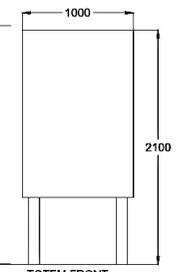
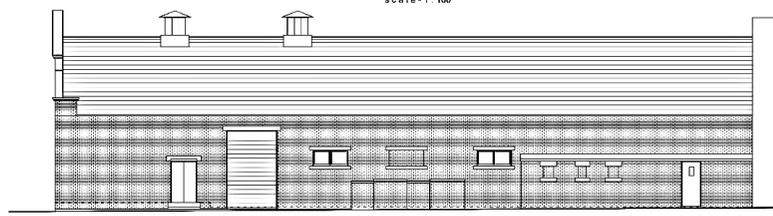
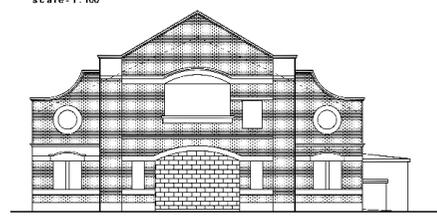
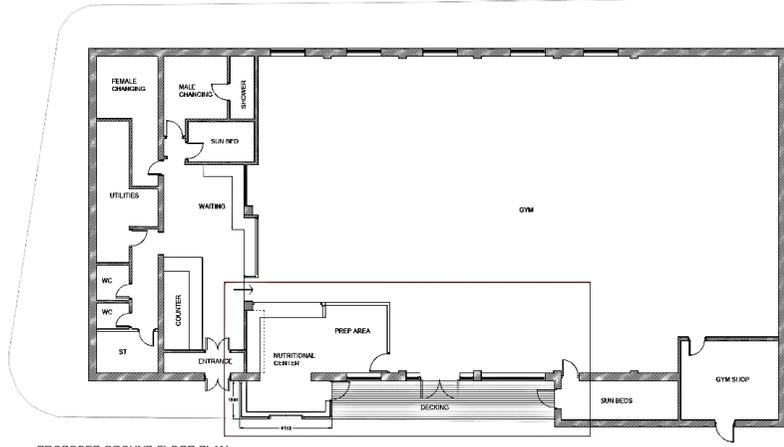
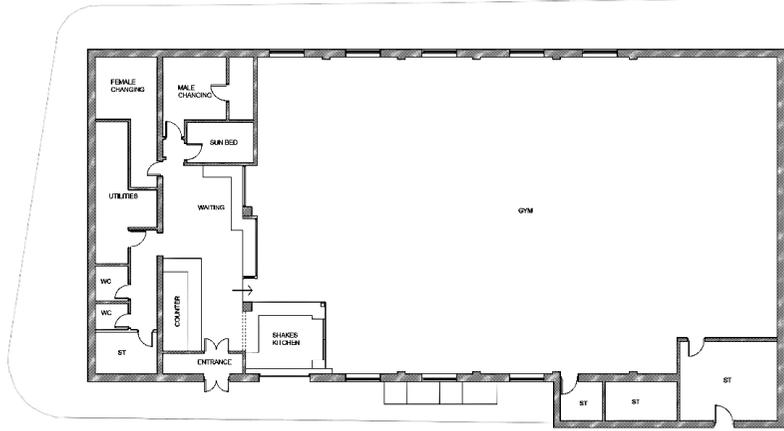
Facades/Guttering - Facade with black upvc guttering & downpipes.

Materials As Proposed -

Walls - Brickwork & Blockwork to match existing.
Doors/Windows - Upvc double glazed units & aluminium glazed front powdercoated grey.

Roof - Slate match existing.

Facades/Guttering - Facade with black upvc guttering & downpipes.



MD MD Plans
Architectural Design
m. 07878 340707

Client: VIP Fitness Connection, The Pavilion, Foundry Street, Ravensthorpe, WF13 3H-W

Project: Proposed Glazed Front, Larger Windows, Decking & Canopy Extract and Totem Sign

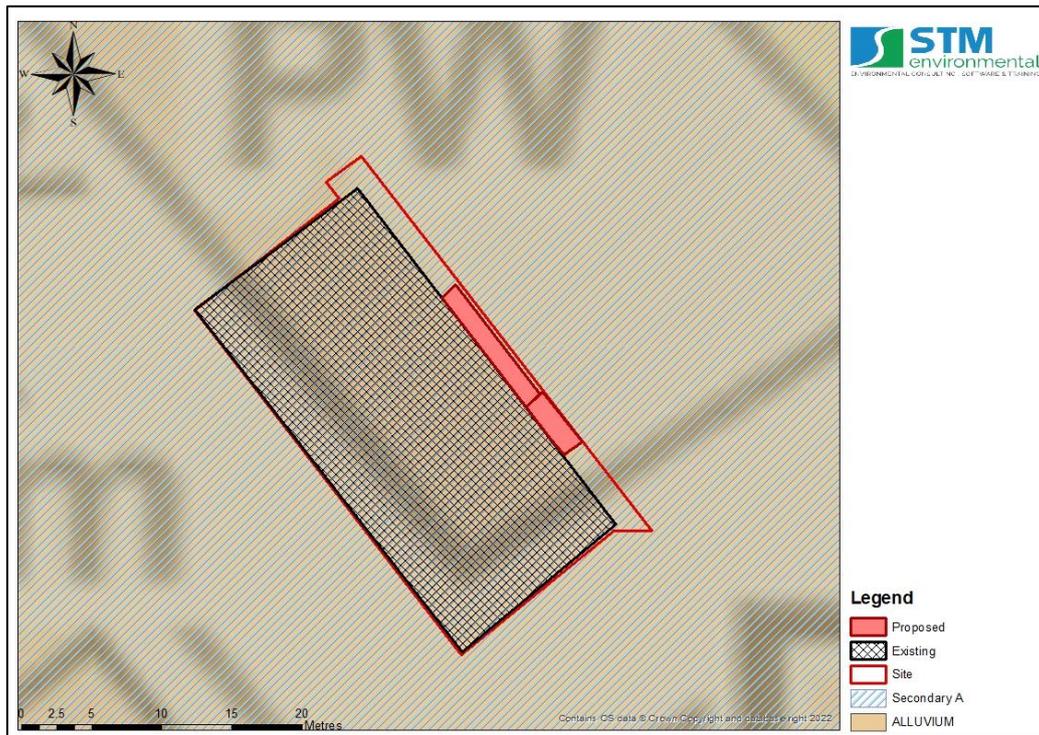
Drawings: Existing & Proposed Floor Plans, Elevations & Site/ Location Plan

Drawn by:	M.P.	Date:	04.2023
Checked by:	A.S.	Rev:	-

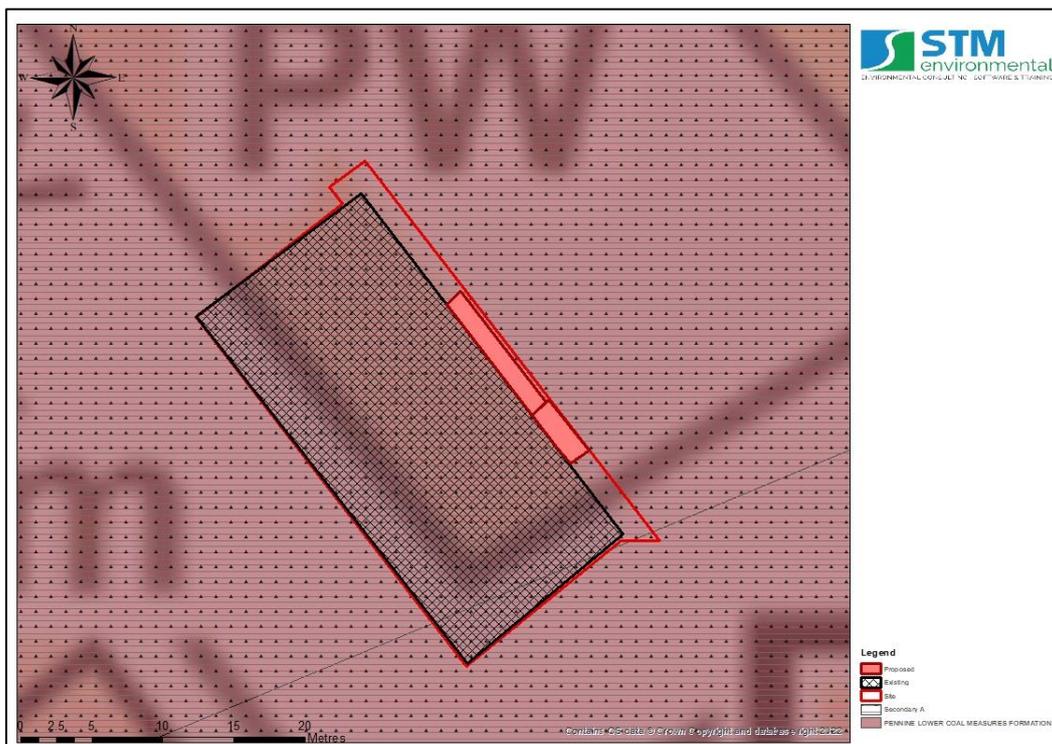
Planning Issue

17.3 Appendix 3 – Environmental Characteristics

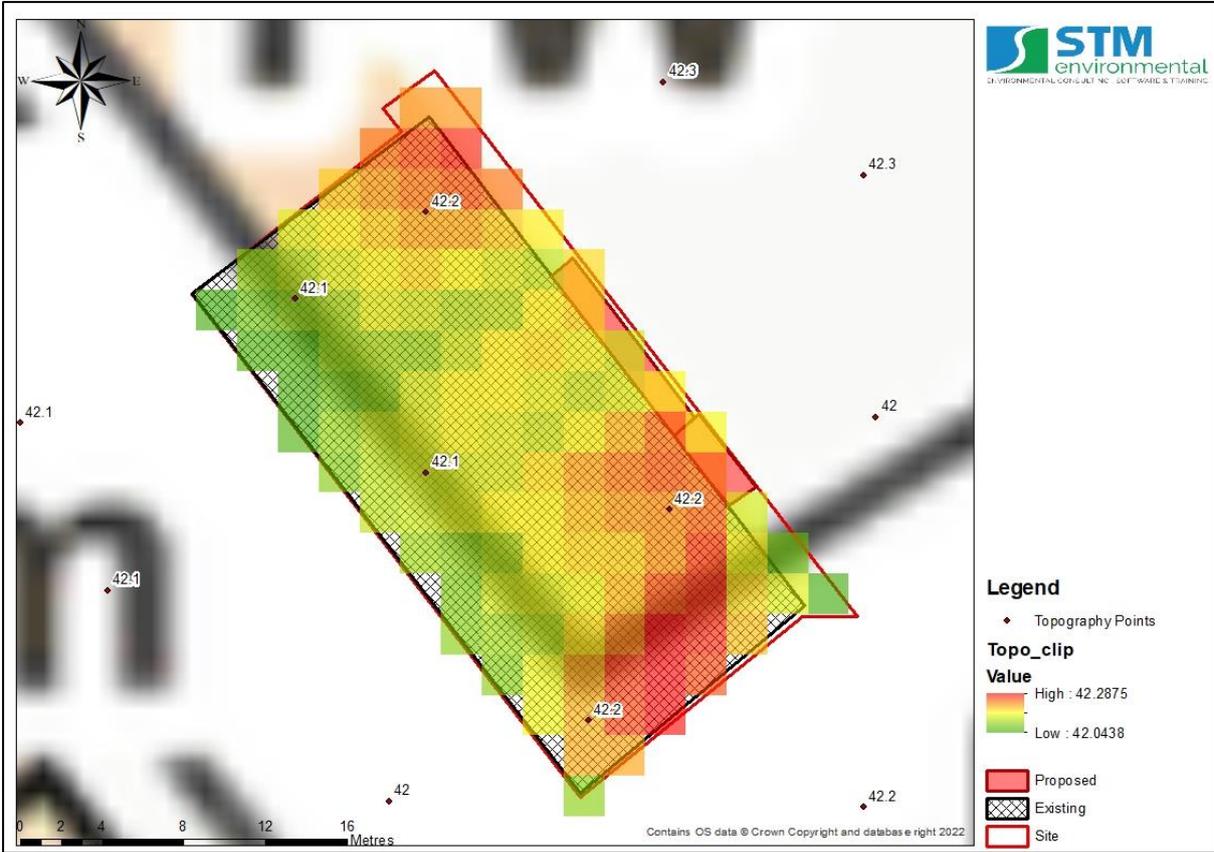
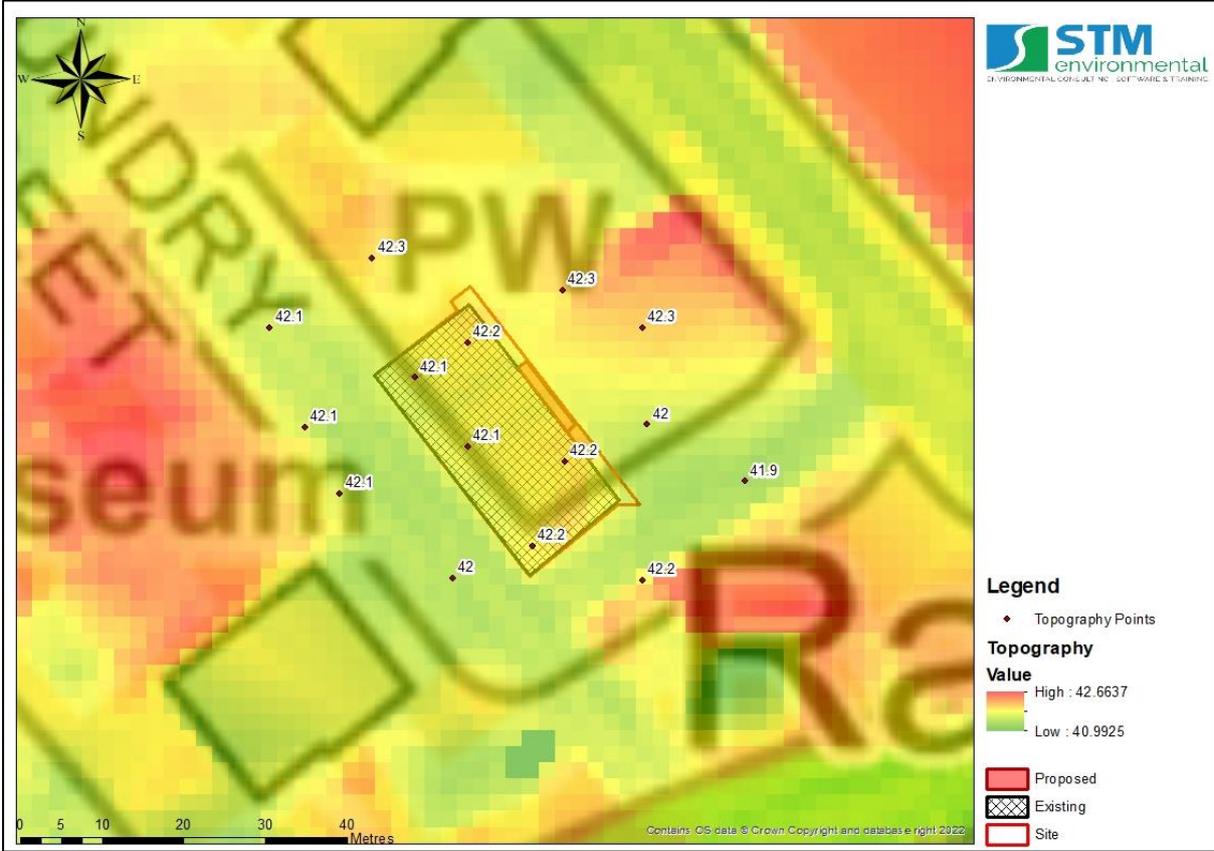
17.3.1 Superficial Hydrogeology Map



17.3.2 Bedrock Hydrogeology Map

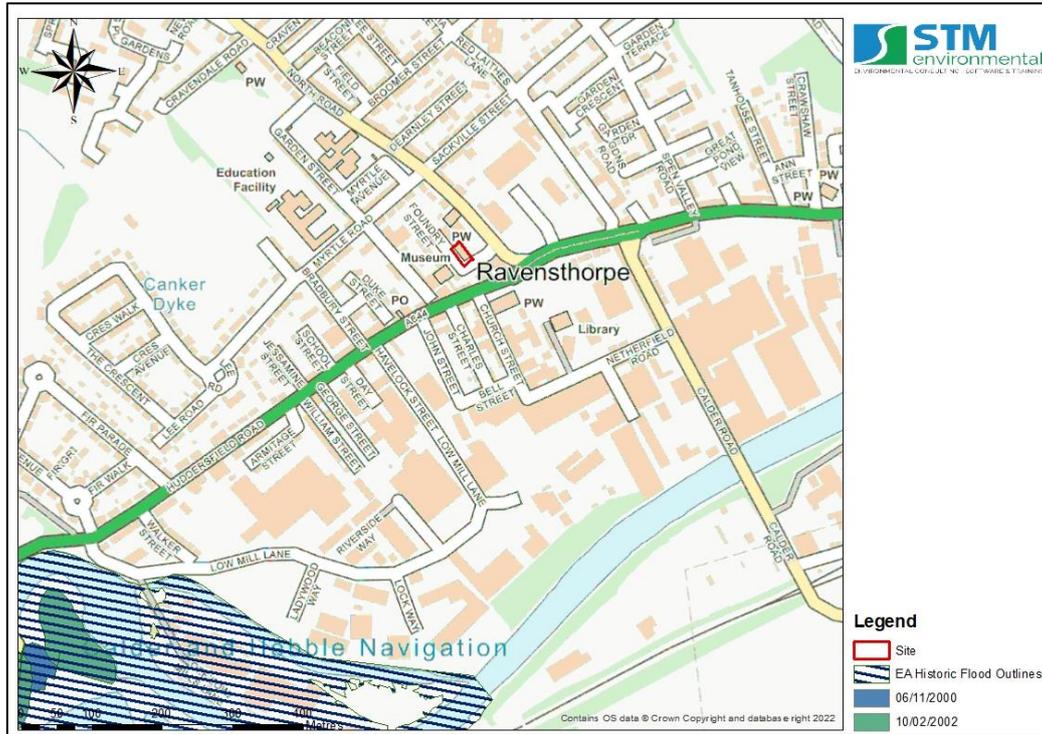


17.3.3 Topography Map

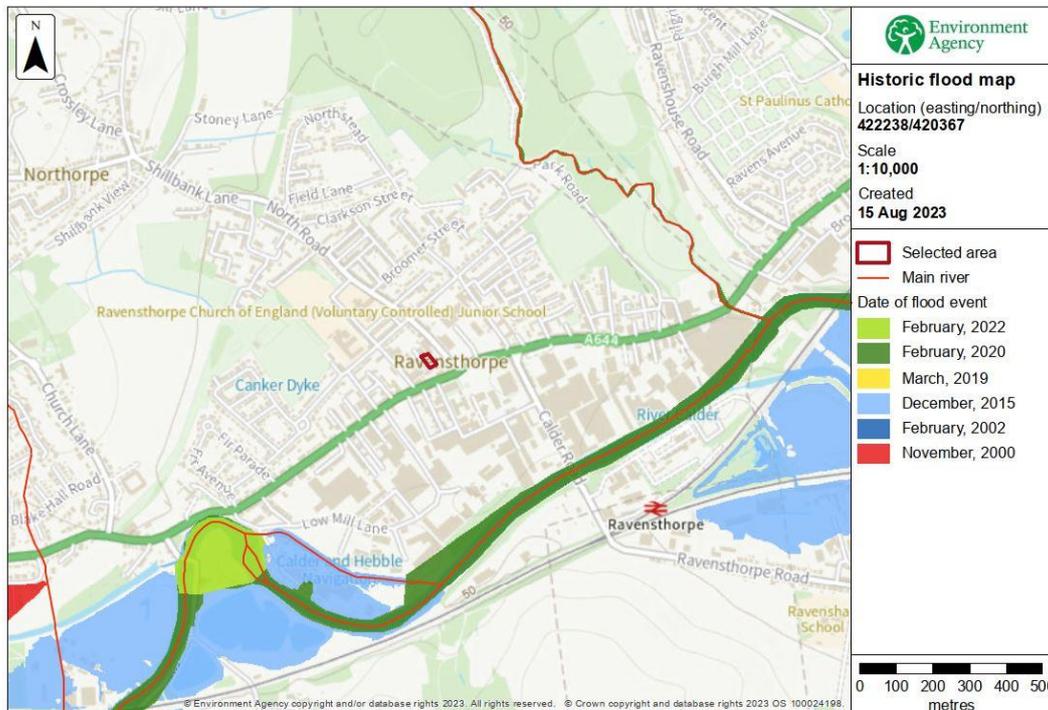


17.4 Appendix 4 – Historical Flood Incident Maps

17.4.1 EA Historic and Recorded Flood Outlines



17.4.2 EA Product 4 Historical Flood Map

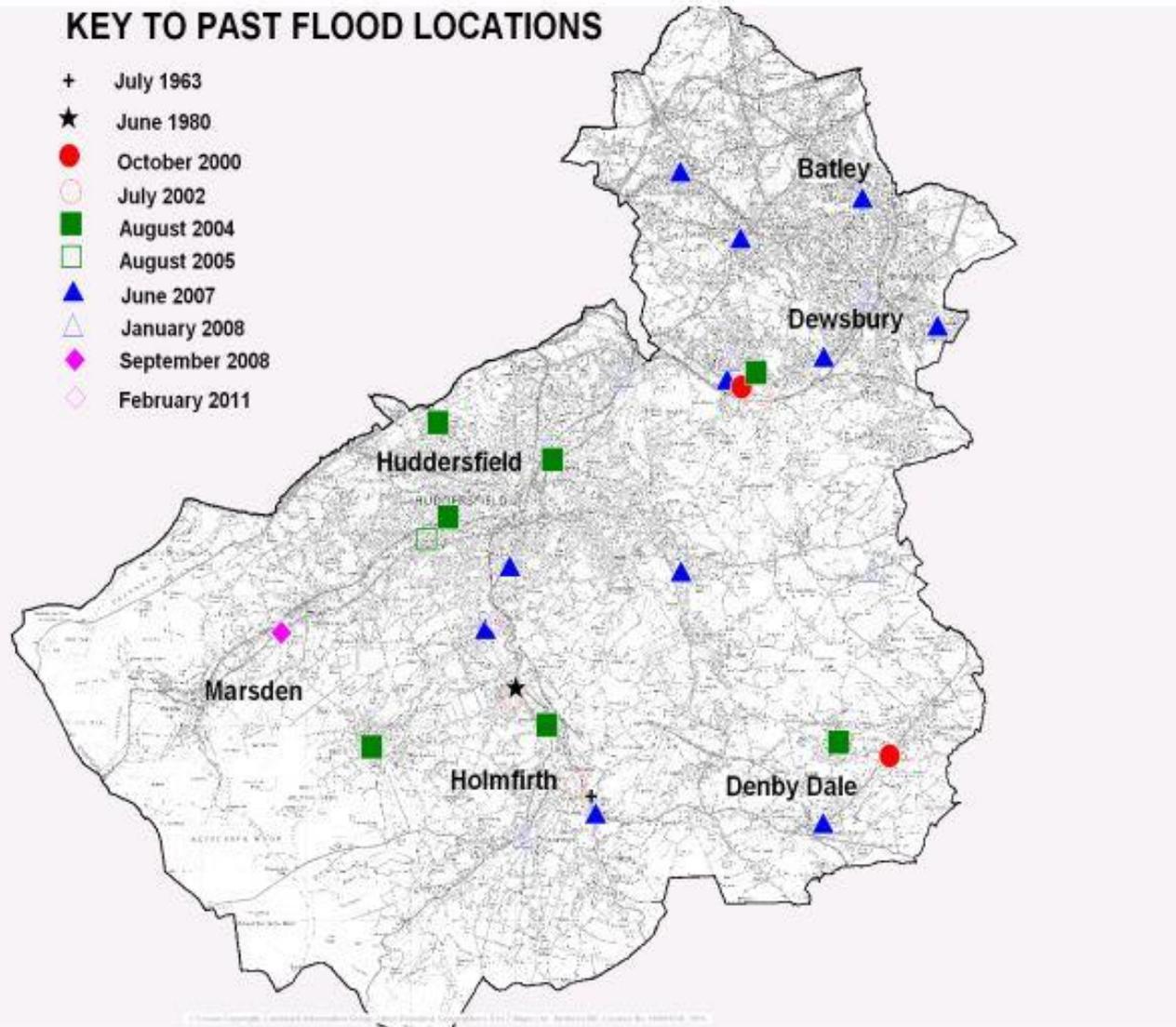


17.4.3 Recorded Historic Flooding

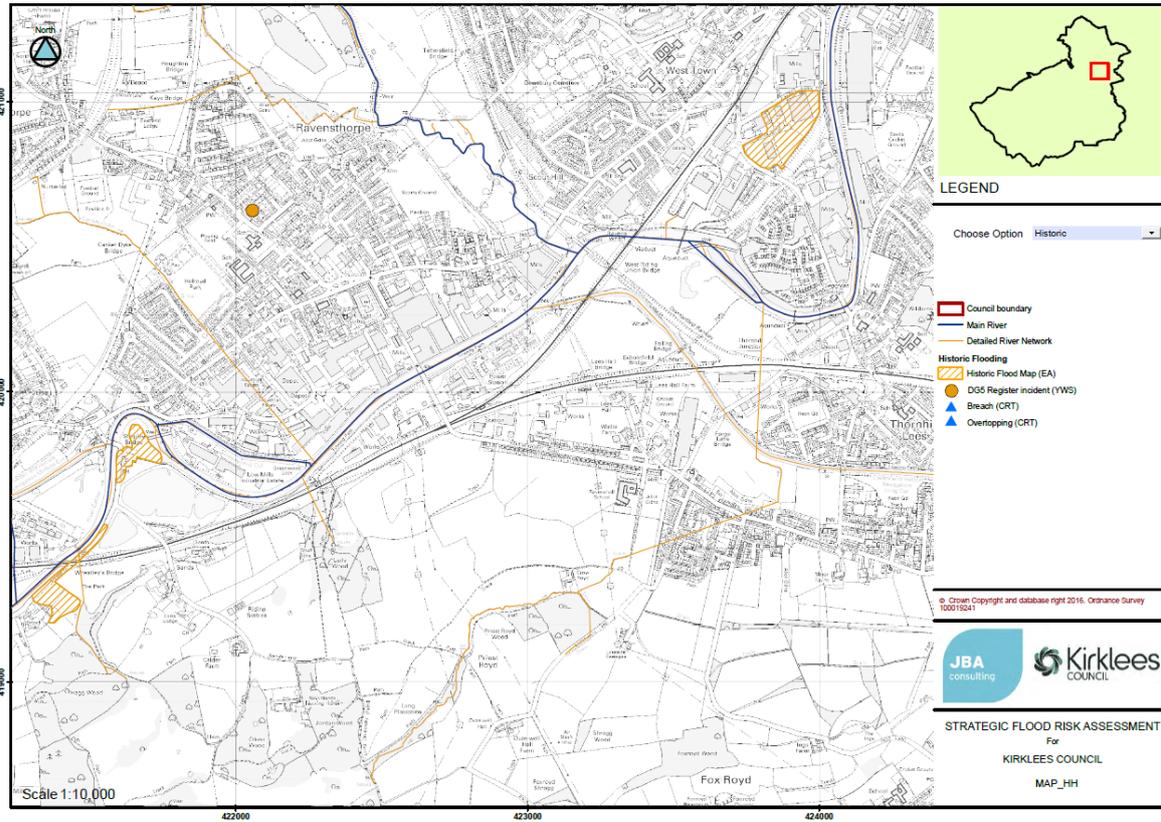
Flood Location	Date of Flooding	Description/Type of Flooding	Consequences of Flooding
New Mill	June 1963	Thunderstorm/Surface water	A616 blocked
Honley	June 1980	Thunderstorm/Surface water	Flooded homes + ambulance station
Mirfield and Dearne Valley	October 2000	2-week period of rain/Surface water	30 flooded properties
Mirfield and Holme Valley	July 2002	40mm in 12hrs/Surface water	Flooded homes
Milnsbridge	August 2005	Localised thunderstorm/Surface water	< 10 flooded homes
Kirklees (widespread across borough)	June 2007	Heavy rain in May and June/Surface water	Circa 400 flooded homes + road damage + roads closed
Armitage Bridge and Ravensthorpe	January 2008	Heavy rain through month/Surface water	10-30 properties
Slaithwaite	September 2008	Heavy rain/Watercourse	A62 blocked
Armitage Bridge	February 2011	Heavy rain/Watercourse	4 flooded homes

KEY TO PAST FLOOD LOCATIONS

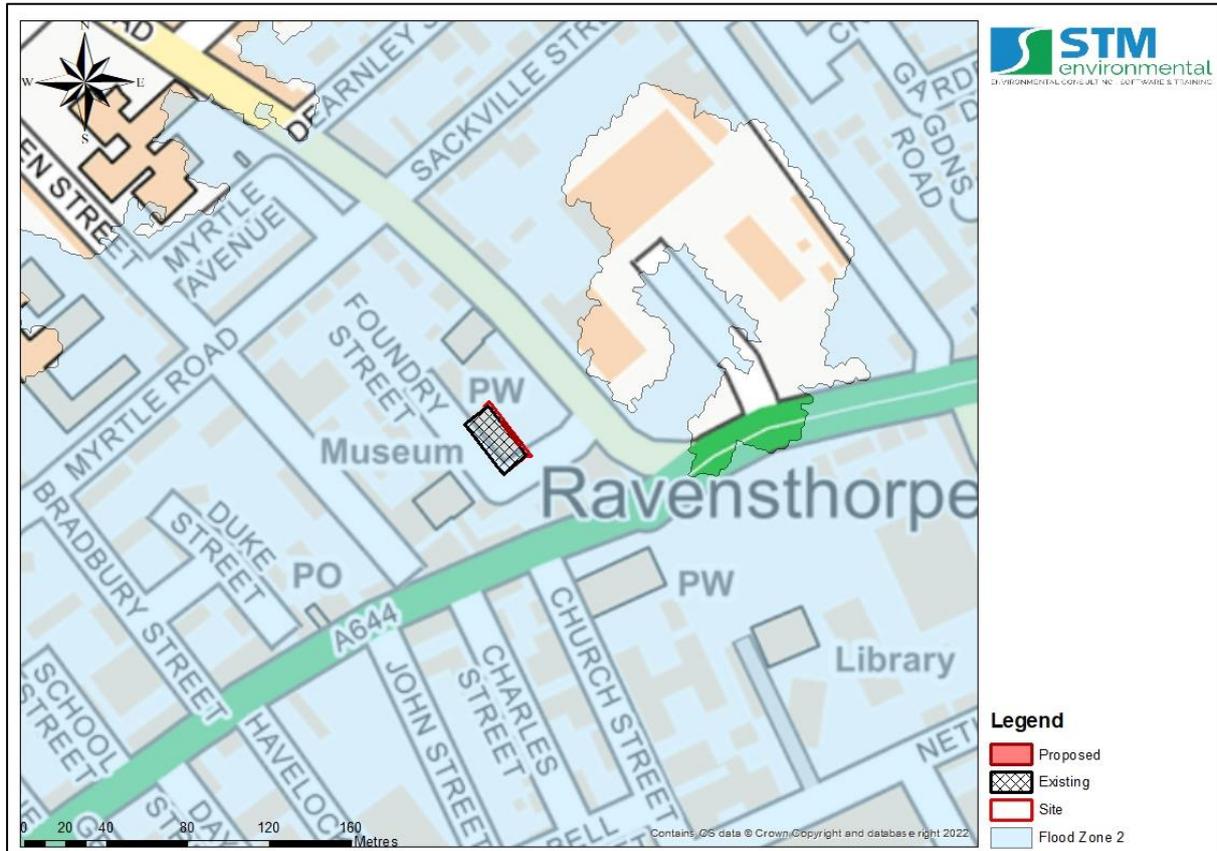
- + July 1963
- ★ June 1980
- October 2000
- July 2002
- August 2004
- August 2005
- ▲ June 2007
- △ January 2008
- ◆ September 2008
- ◇ February 2011



17.4.4 Map of Recorded Sewer Flooding

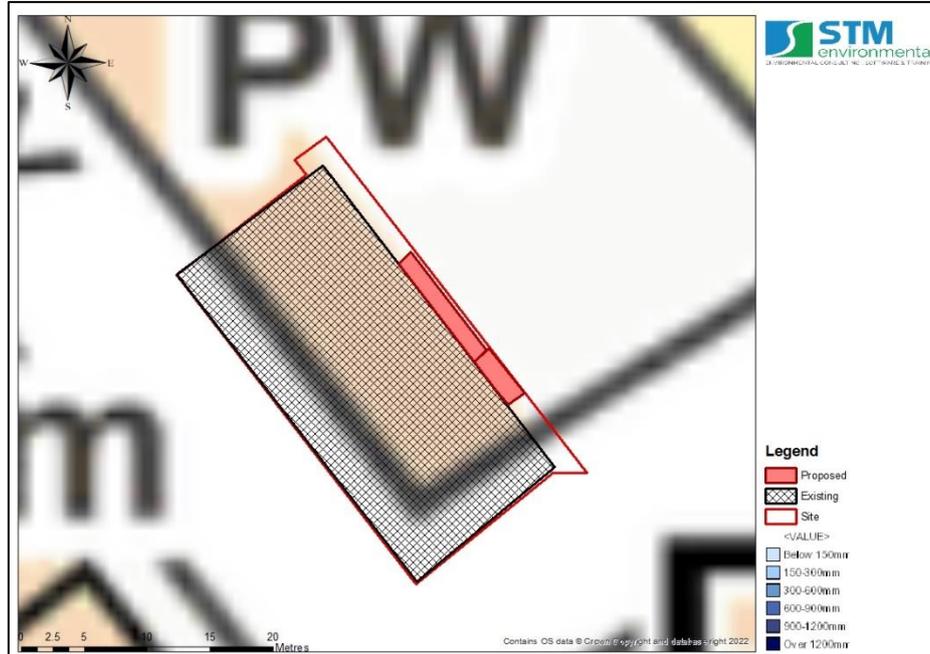


17.5 Appendix 5 - EA Flood Zone Map

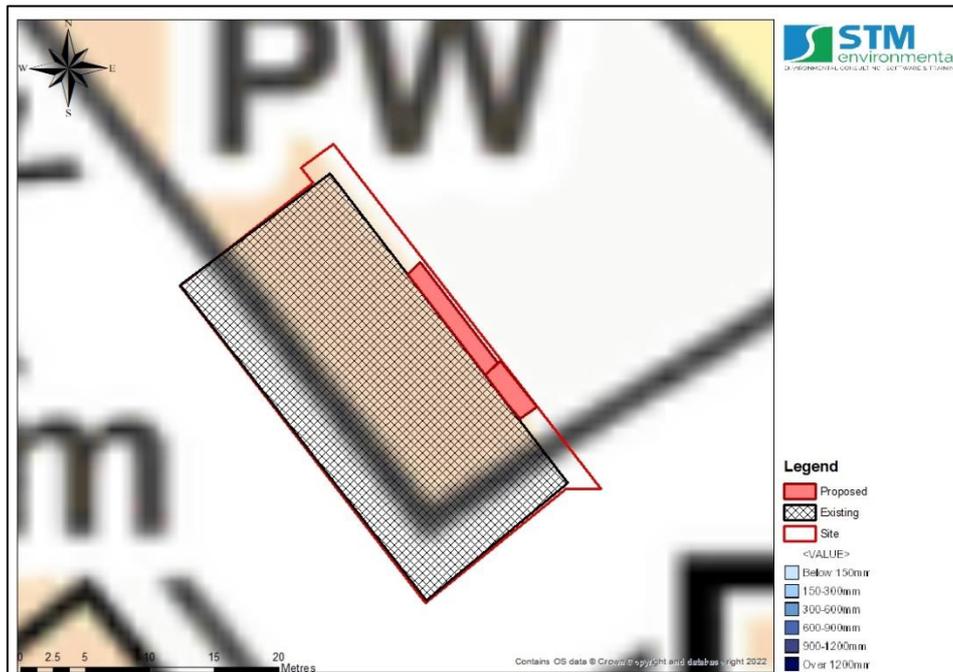


17.6 Appendix 6 – Surface Water Flood Extent and Depth Maps

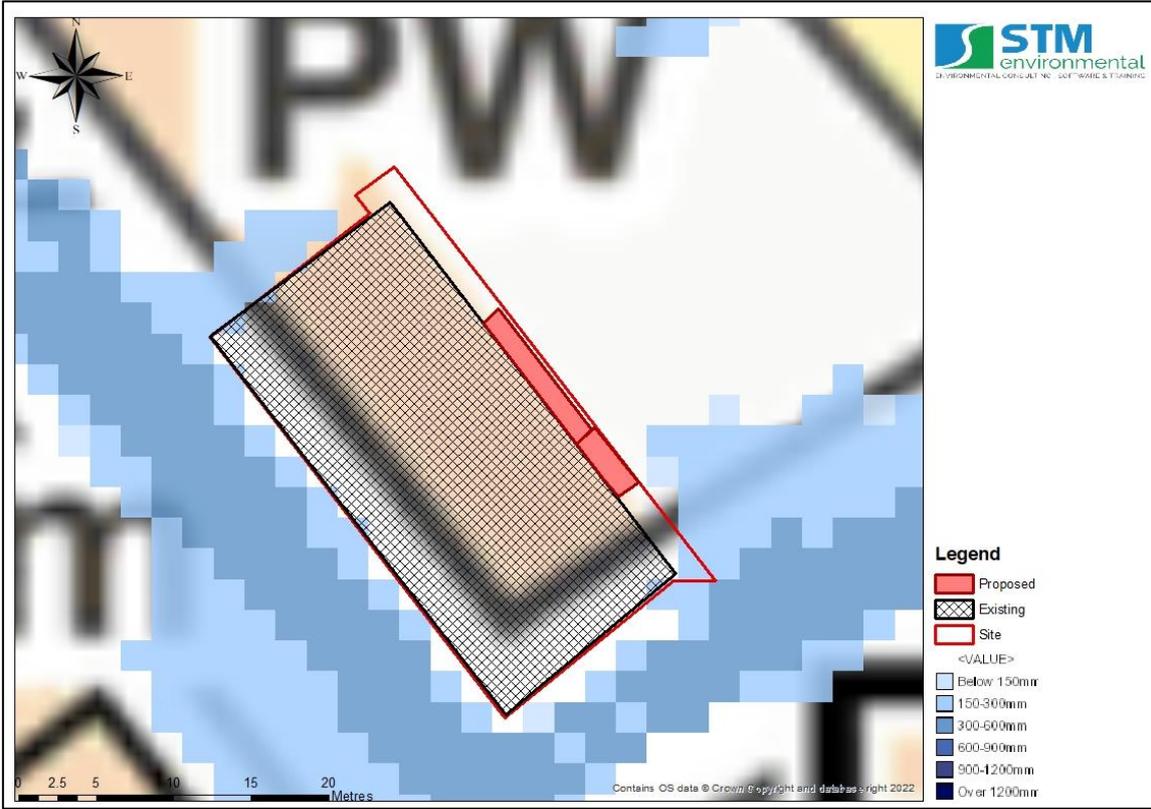
17.6.1 Predicted surface water flood depth for the 1 in 30-year return period (Source: EA, 2016).



17.6.2 Predicted surface water flood depth for the 1 in 100-year return period (Source: EA, 2016).



17.6.3 Predicted surface water flood depth for the 1 in 1000-year return period
(Source: EA, 2016).



17.7 Appendix 7 –Flood Defence and Reservoir Flood Risk Maps

17.7.1 EA flood defence map

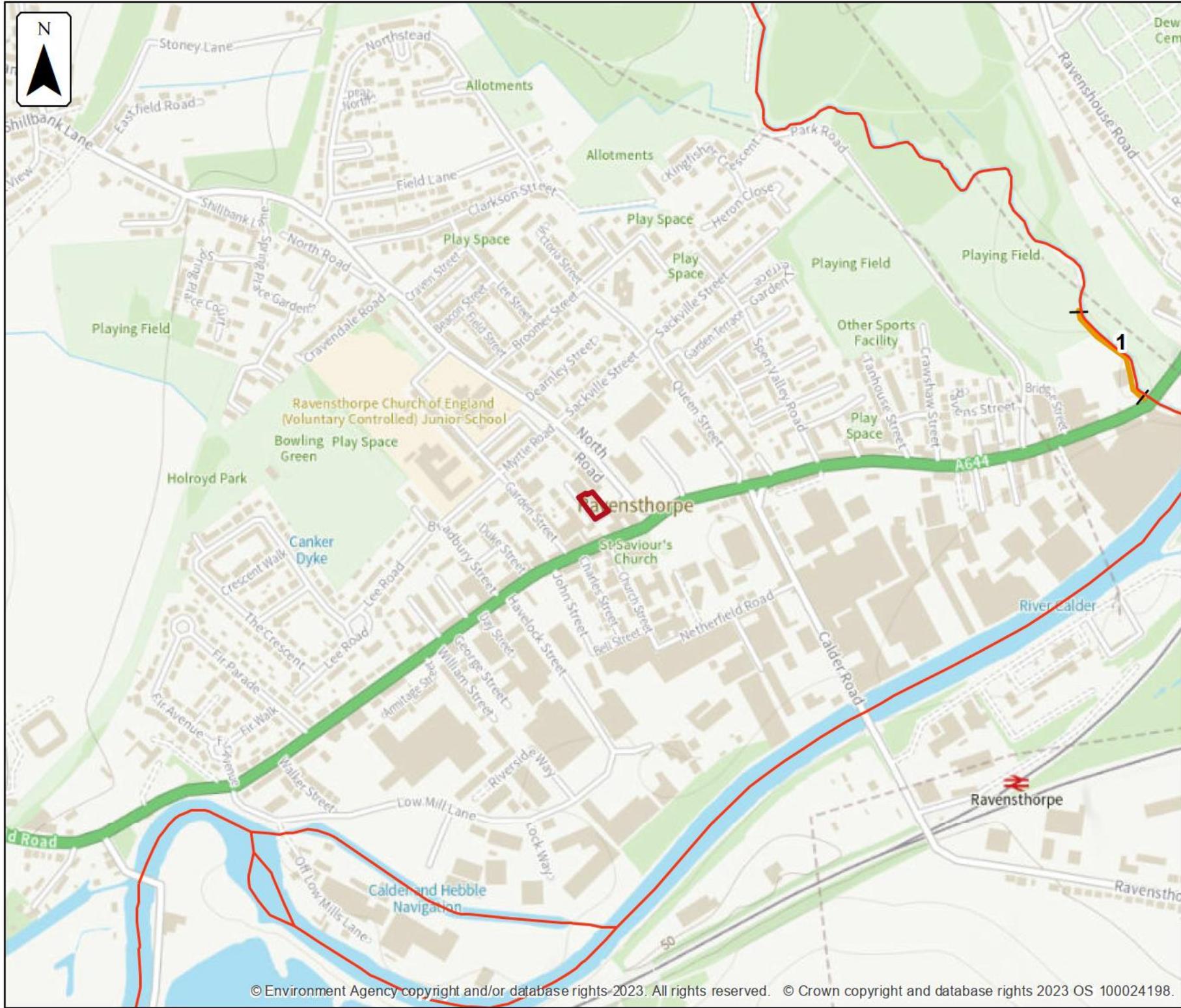


17.7.2 EA Product 4 Flood Defence Data

Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	28350	Wall	50	Good	40.69	40.43	

Any blank cells show where a particular value has not been recorded for an asset.



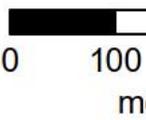
Flood defense

Location (eastings and northings)
422238/4203

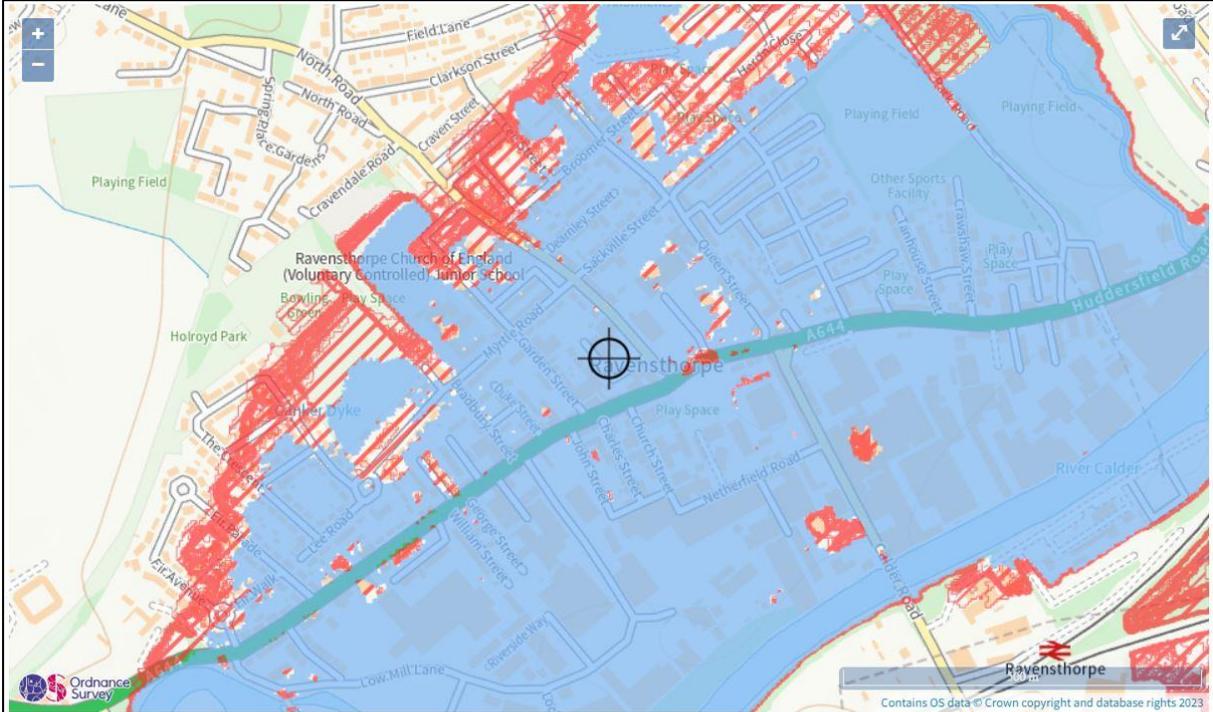
Scale
1:7,500

Created
15 Aug 2023

-  Selected area
-  Main river
-  Flood defense line



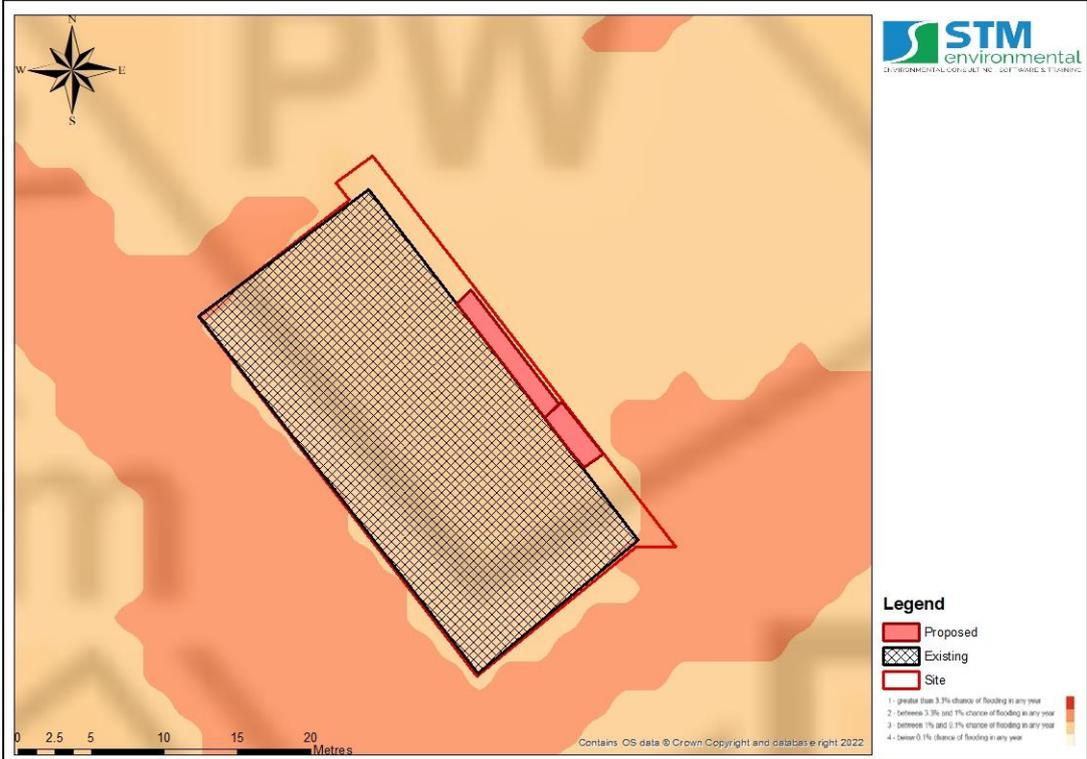
17.7.3 Reservoir Flood Risk Map



Maximum extent of flooding from reservoirs:

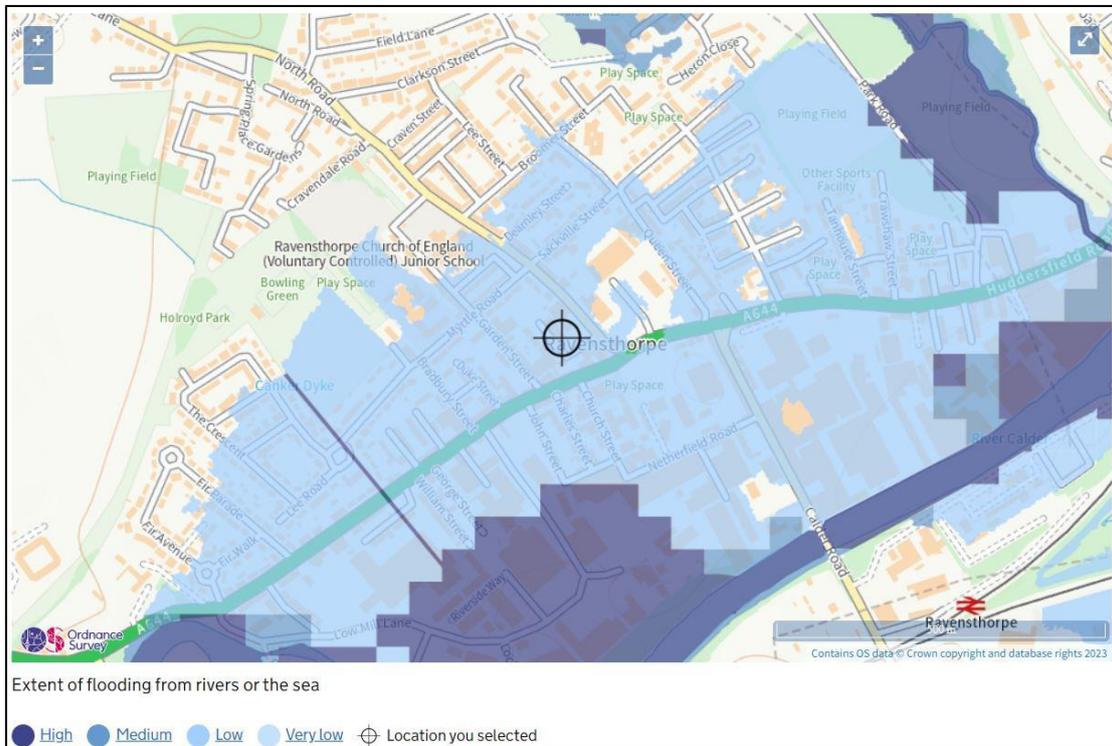
- when river levels are normal
- when there is also flooding from rivers
- ⊕ Location you selected

17.8 Appendix 8 – Risk of Flooding from Multiple Sources Map

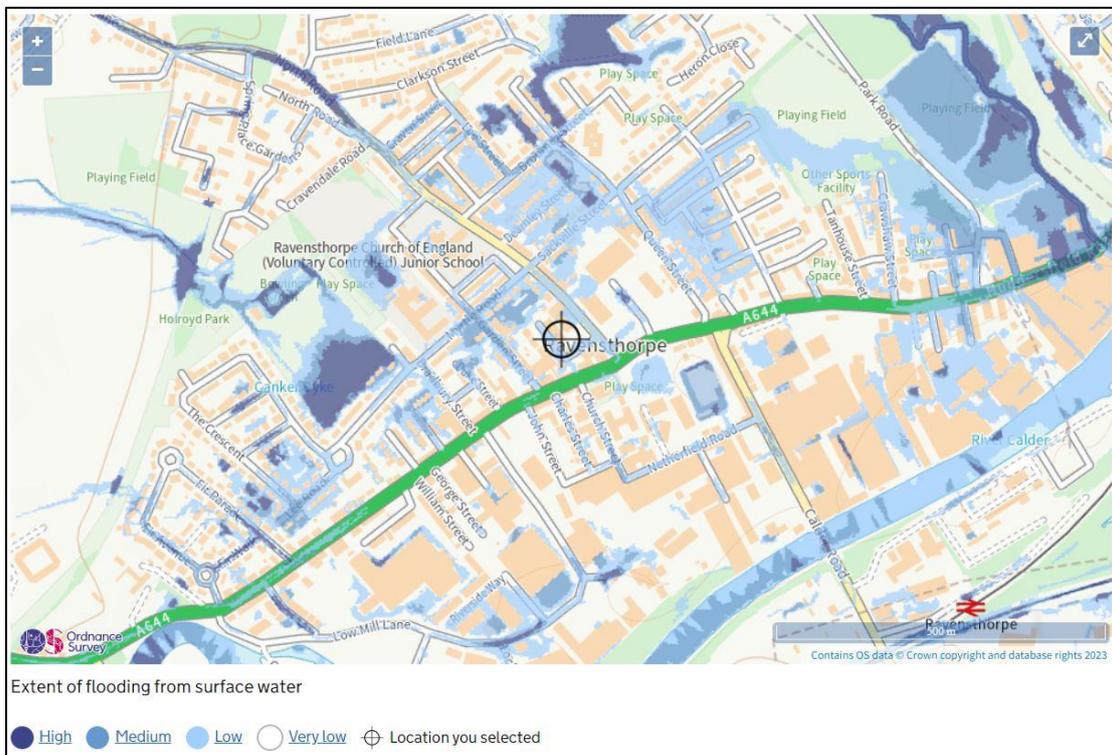


17.9 Appendix 9 – EA’s Long Term Flood Risk Maps

17.9.1 Long-term flooding from rivers or the sea

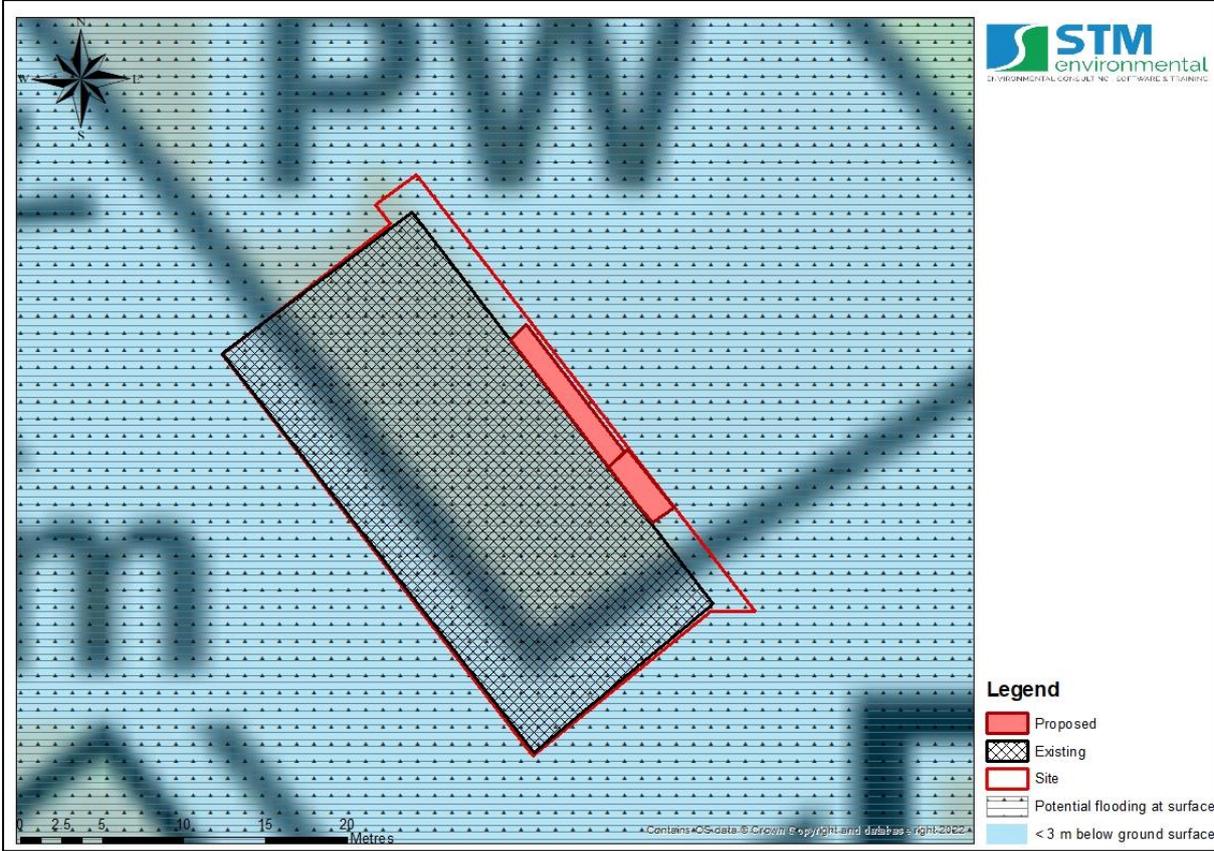


17.9.2 Long-term flooding from surface water



17.10 Appendix 10 – Groundwater Flood Maps

17.10.1 Groundwater Flooding (Susceptibility) Map (BGS) and Potential Depth to the Groundwater Water Map (BGS)

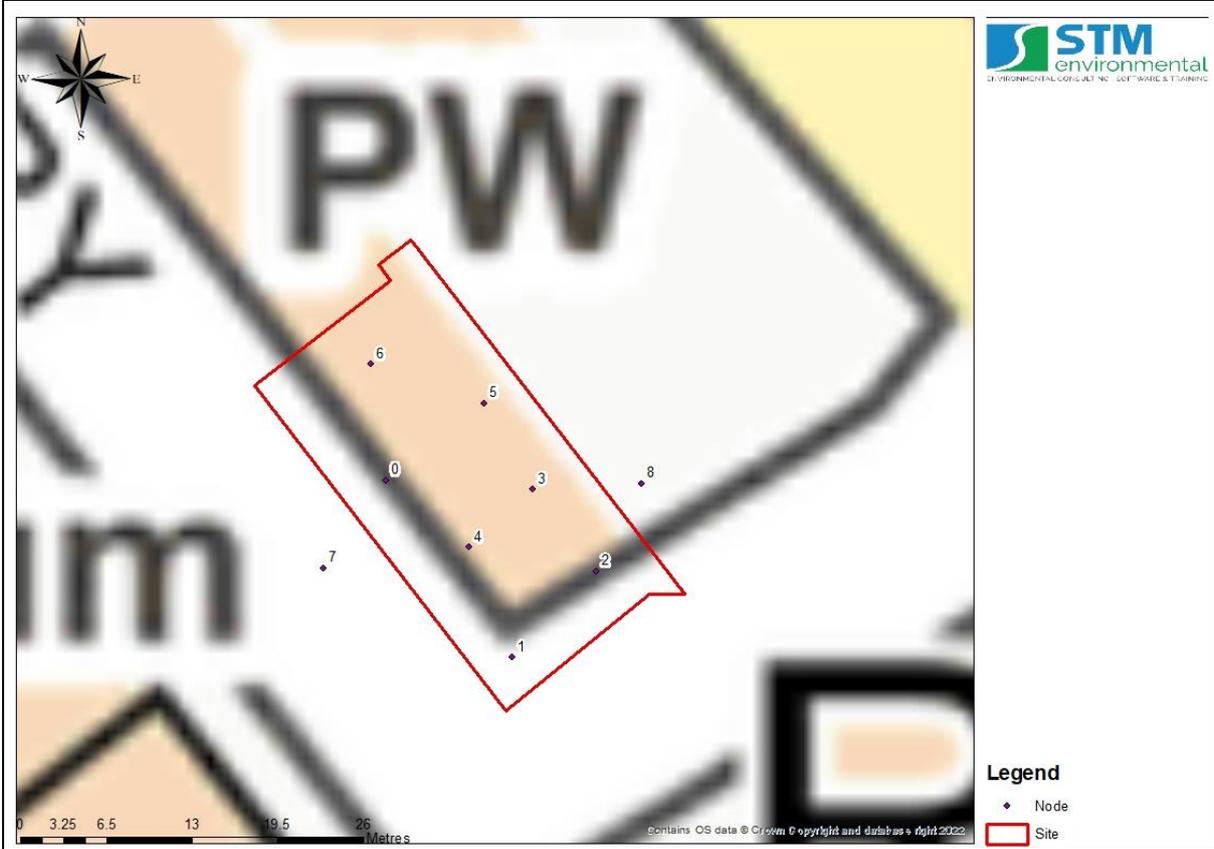


17.11 Appendix 11 - EA Product 6 (Detailed Flood Risk) Data

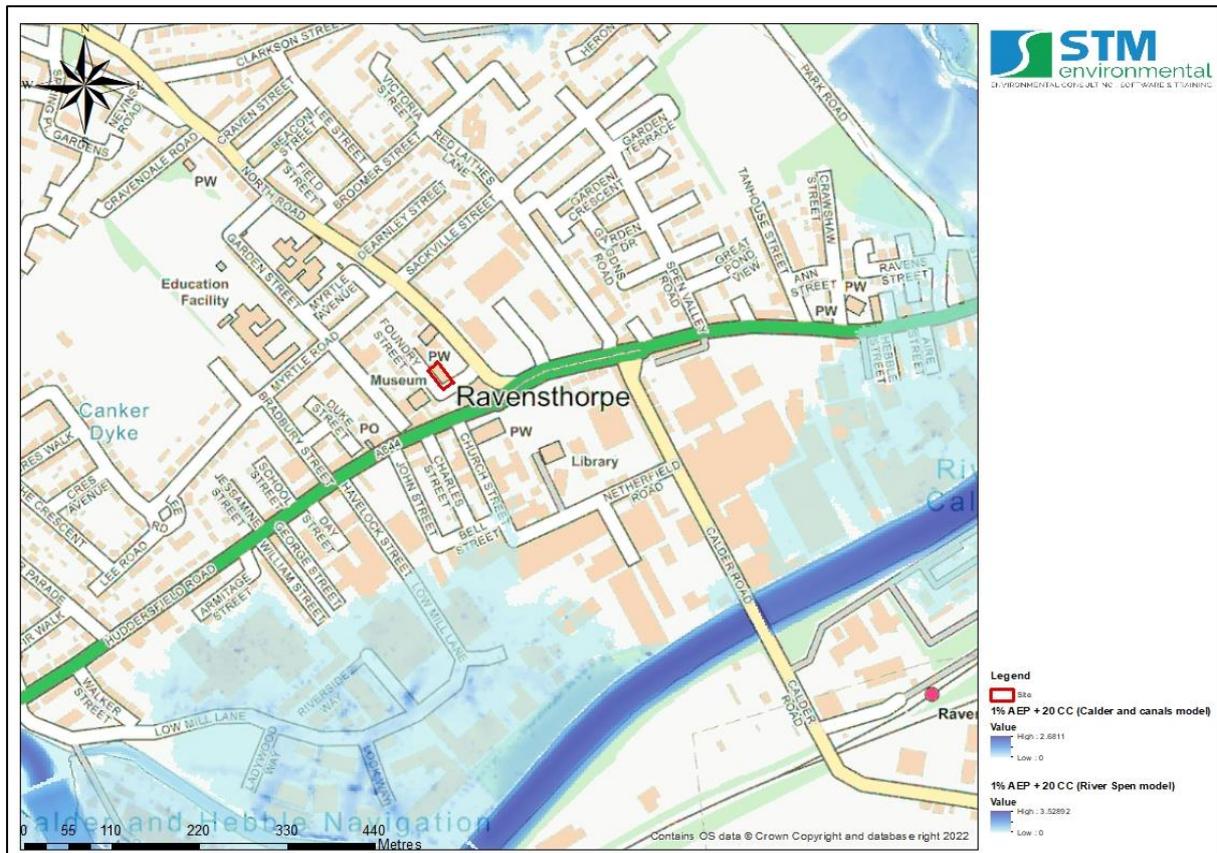
17.11.1 EA Climate Change Allowances for Peak River Flow

	Central	Higher	Upper
2020s	11%	15%	24%
2050s	13%	18%	31%
2080s	23%	31%	51%

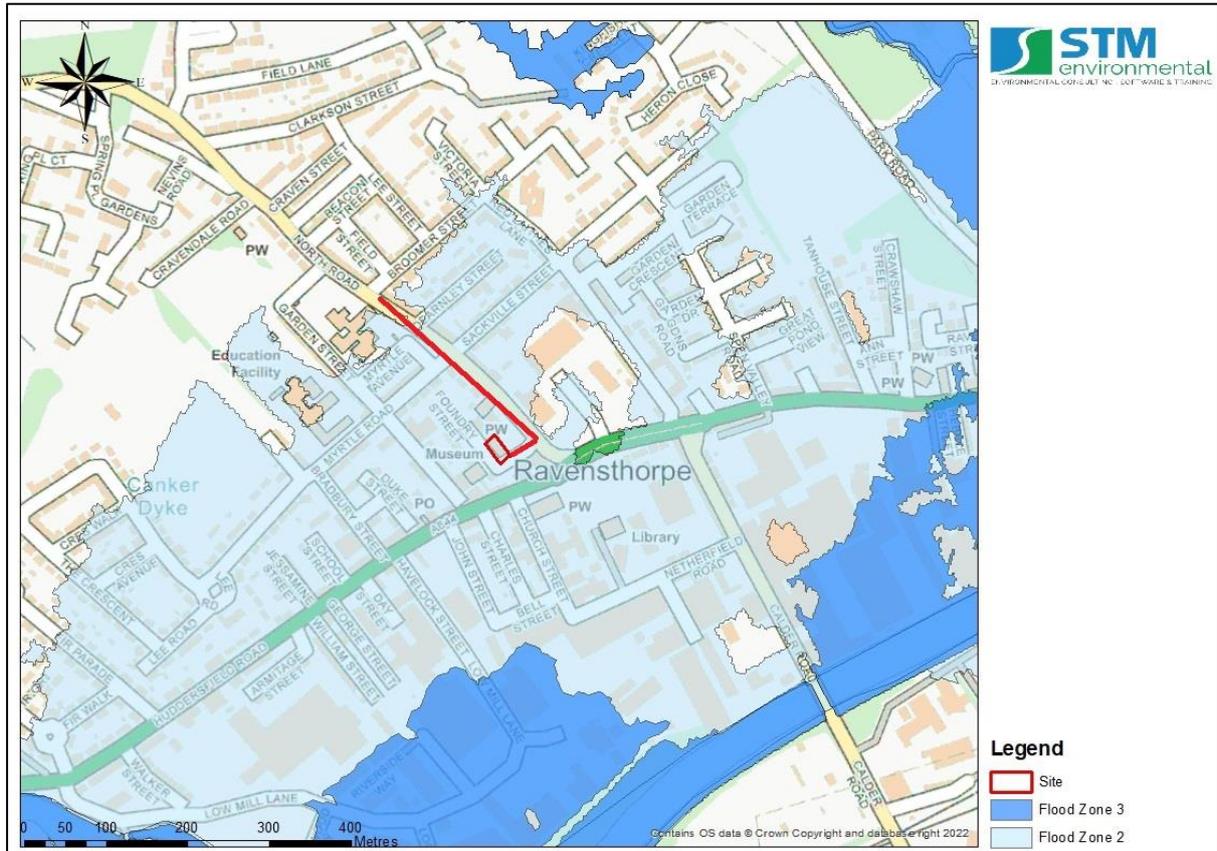
17.11.2 Node Map



17.11.3 Fluvial Flood Depths during the 1% AEP + 20% CC Scenario Map



17.12 Appendix 12 – Safe Egress to Flood Zone 1 Map



17.13 Appendix 13 – Calculation of Flood Hazard Rating

Flood Hazard Rating Scores – based on DF score of 0

Velocity	Depth									
	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.0	2.25	2.50
0.0	0.13	0.25	0.38	0.50	0.63	0.75	0.88	1.00	1.13	1.25
0.5	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50
1.0	0.38	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.75
1.5	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00
2.0	0.63	1.25	1.88	2.50	3.13	3.75	4.38	5.00	5.63	6.25
2.5	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50
3.0	0.88	1.75	2.63	3.50	4.38	5.25	6.13	7.00	7.88	8.75
3.5	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
4.0	1.13	2.25	3.38	4.50	5.63	6.75	7.88	9.00	10.13	11.25
4.5	1.25	2.50	3.75	5.00	6.25	7.50	8.75	10.00	11.25	12.50
5.0	1.38	2.75	4.13	5.50	6.88	8.25	9.63	11.00	12.38	13.75

Summary of Scores

	Score From	Score To	Flood Hazard	Description
	<0.75	0.75	Low	Exercise Caution
Class 1	0.75	1.5	Moderate	Danger for some
Class 2	1.5	2.5	Significant	Danger for most
Class 3	2.5	20.0	Extreme	Danger for all

Values for Debris Factor for different flood depths

Depths	Pasture/Arable Land	Woodland	Urban
0 to 0.25	0	0	0
0.25 to 0.75	0.5	1	1
d>0.75 and/or v > 2	0.5	1	1

-  The “danger to some” category includes vulnerable groups such as children, the elderly and infirm. “Danger: Flood zone with deep or fast flowing water”
-  The “danger to most” category includes the general public.

 The danger to all category includes the emergency services.

A flood emergency plan is considered to be an acceptable way of managing flood risk where the flood hazard has been given a “very low hazard” rating. In some instances, flood emergency plans may also be acceptable where the rating is “danger for some”. However, it is unlikely to be an acceptable way of managing residual flood risk where the hazard to people classification is “danger for most” or “danger for all”.