

Flood Risk Assessment Bradley Masterplanning Bradley, Huddersfield



For



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13892L/D/GS

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Revision	Comments	Date
-	Initial issue	
A	Planning consultant comments	29.01.16

1 Introduction

Mason Clark Associates have been commissioned by O'Neill Associates to carry out a high level flood risk assessment on behalf of Kirklees Council for a proposed development site in Bradley, Huddersfield, West Yorkshire. A location plan is presented in Appendix I.

This flood risk assessment has been carried out in accordance with the National Planning Policy Framework (NPPF), the National Planning Practice Guidance (NPPG) for Flood Risk and Coastal Change and the Kirklees Council's Strategic Flood Risk Assessment (SFRA).

Paragraph 100 of the NPPF states that the Local Authority Planning Department in conjunction with the Environment Agency have to evaluate all developments in respect to flood risk. This flood risk assessment forms part of the necessary evaluation.

2 Site Information

2.1 Location

The site is situated to the north of the Bradley urbanisation with Bradley Road to the south and the M62 motorway to the north, with the western extremity being the A641 Huddersfield Road. The site currently forms part of a Golf Course (Bradley Park Golf Course and Driving Range). The most eastern part of the site is located approximately 460m away from the River Calder with three minor inland watercourses and 3 ponds within the site.

2.2 Site Description

The proposed development is currently in the early masterplanning concept stages and as such no definitive numbers of units and uses have been determined at this stage.

It is however proposed that the end use of the proposed development will be predominantly residential housing.

The site has existing accesses available from either the existing golf club entrance on the A6107 Bradley Road, or from the farm access off the A641 Huddersfield road, there is also access from the end of Tithe House Way at the Eastern end of the site. A range of alternative access arrangements have also been looked at within the transport assessment.

2.3 Site Topography

Lidar data has been used to establish the general topography of the site, which shows there is a general fall from southwest to northeast but this is undulating with local falls in all directions.

There is a significant level difference across the site with the high point being 167m AOD dropping to 93m AOD at the lowest point. Levels are based on LiDAR levels and have been taken at the eastern and western extremities of the site.

3 Flood Risk Criteria

The site under consideration is situated within Flood Zone 1 on the latest version of the Indicative Floodplain Map (IFM) produced by the Environment Agency.

Flood Zone 1 (Low Probability) is defined in the National Planning Practice Guidance for Flood Risk and Coastal Change as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%).

Generally there is no constraint to development, in terms of flood risk, within Flood Zone 1 although, to stay in line with Environment Agency Standing Advice, any development over 1 ha should be accompanied by a site-specific Flood Risk Assessment.

A copy of the Environment Agency Flood Maps are shown within this report and the Kirklees Council's Strategic Flood Risk Assessment flood map are presented in Appendix IV.

4 The Sequential Test and Exception Test

Both the NPPG and SFRA, require the 'sequential test' to be applied to ensure that proposed developments are carried out in areas that are at the least risk of flooding before considering development in areas that are at risk of flooding. The proposed land for future development is positioned within Flood Zone 1 (low probability) and therefore is classed as 'less vulnerable'. All uses of land are appropriate in this zone.

Based on Table 2 of the National Planning Practice Guidance for Flood Risk and Coastal Change the proposed development is classed as a 'more vulnerable' use of land due to the development being used for residential housing.

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

✓ Development is appropriate

x Development should not be permitted

From Table 3: Flood Risk Vulnerability and Flood Zone Compatibility in the National Planning Practice Guidance for Flood Risk and Coastal Change, the development is classed as 'more vulnerable' however it is within Zone 1 so no exception test is required.

5 Criteria for Assessment

There are a number of factors to be considered when carrying out a flood risk assessment. Reference to the Environment Agency flood maps and Kirklees Council's SFRA show that the primary source of flooding would be from surface water flows, due to the topography of the area but these areas are generally confined to the inland watercourse locations. Bradley is located in a hilly area with steep falls.

As with all proposed developments it must be demonstrated that the new site will not result in a net loss of floodplain storage, not impede floodwater flows and not increase the risk of flooding to off-site areas.

6 Flood History

According to the National Flood and Coastal Defence Database (NFCDD) there is no Flood History for this location.

Kirklees council have provided some history of flooding: two incidents of flooding on separate occasions were recorded at the rear of No. 314 Bradley Road, Bradley.

- March 2010 50mm of standing water within the garden was recorded which was attributed to overland flow from the golf course.
- December 2012 saw flooding to the garden and edge of the golf course which was attributed to groundwater.

7 Sources of Flooding and Risks to Development Site

7.1 Flooding from Rivers

The River Calder is located approximately 430m from the most eastern part of the site location, and the general embankment levels are approximately at 52m.

With the distance and level differences of the site being as they are, the effects of the River Calder flooding would be unlikely to affect this particular site.

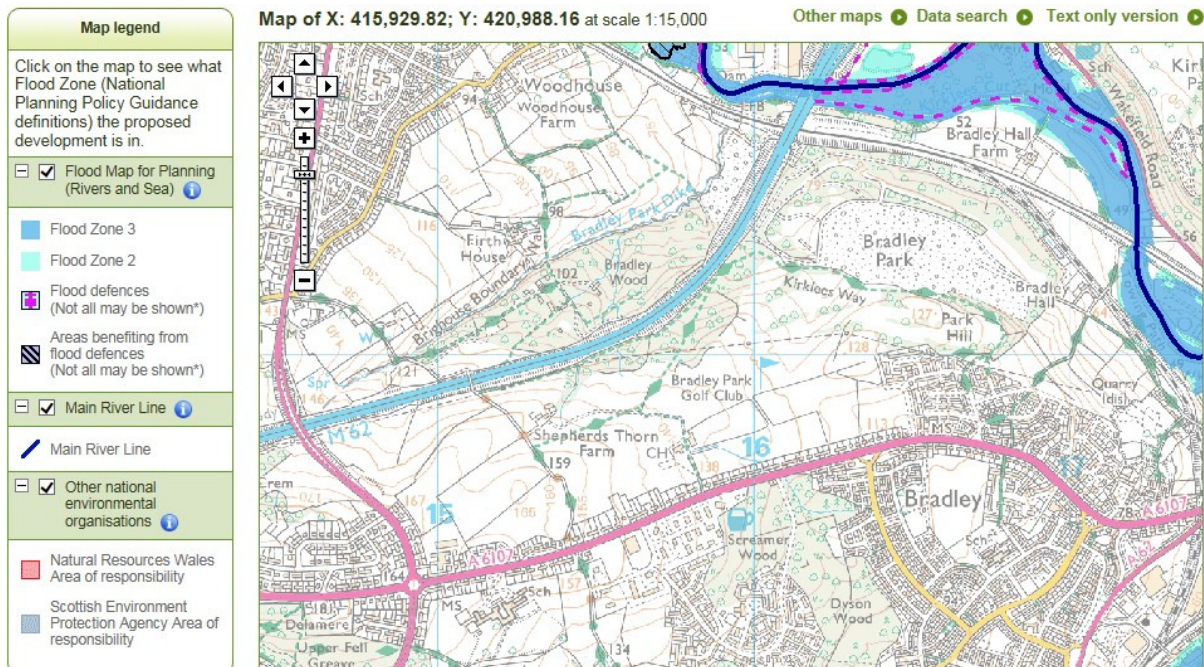


Figure 1 – Extract of the Interactive Rivers and Sea flood map from the Environment Agency website

7.2 Watercourses

The existing use of the site has three functioning watercourses serving the site, two of which are located to the north of the site and these combine before being culverted beneath the M62 motorway which leads to a named watercourse (Deep Dike). Deep Dike ultimately connects into the River Calder. The third is located to the south of the site and this leaves the site through a culverted section from the edge of the golf course between houses on Bradley Road, under the road, before it opening out again into an un-named watercourse in Screamer Wood. This watercourse then navigates through densely populated areas before eventually connecting to the River Colne.

A review of the EA surface water flood maps show a very low chance of flooding due to these water courses.

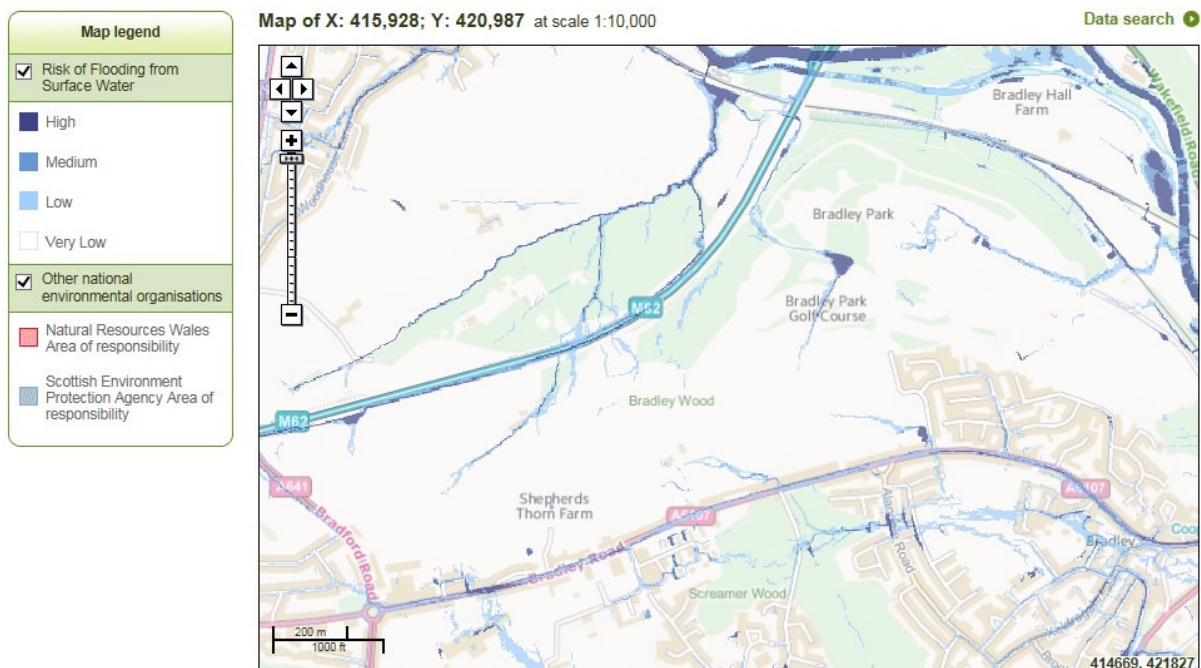


Figure 2 - Extract of the Interactive Surface Water flood map from the Environment Agency website

7.3 Flooding from Land (Rainwater)

An assessment of the Lidar data shows the general topography of the site to fall from southwest to northeast but this is undulating with local falls in all directions.

There is a significant level difference across the site however with the high point being 167m AOD dropping to 92m AOD at the lowest point.

As discussed in the flood history (section 6) above there has been an occasion where flooding has been attributed to run-off from the golf course but this was an isolated incident and no other records exist.

7.4 Flooding from Groundwater

Groundwater flooding occurs when water levels within the ground rise above surface elevations, particularly in low lying areas. Reference to the EAs groundwater flood map shows that the site is not located within a groundwater emergence zone.

Bradley, Kirklees at scale 1:15,000

Other maps Data search Text only version

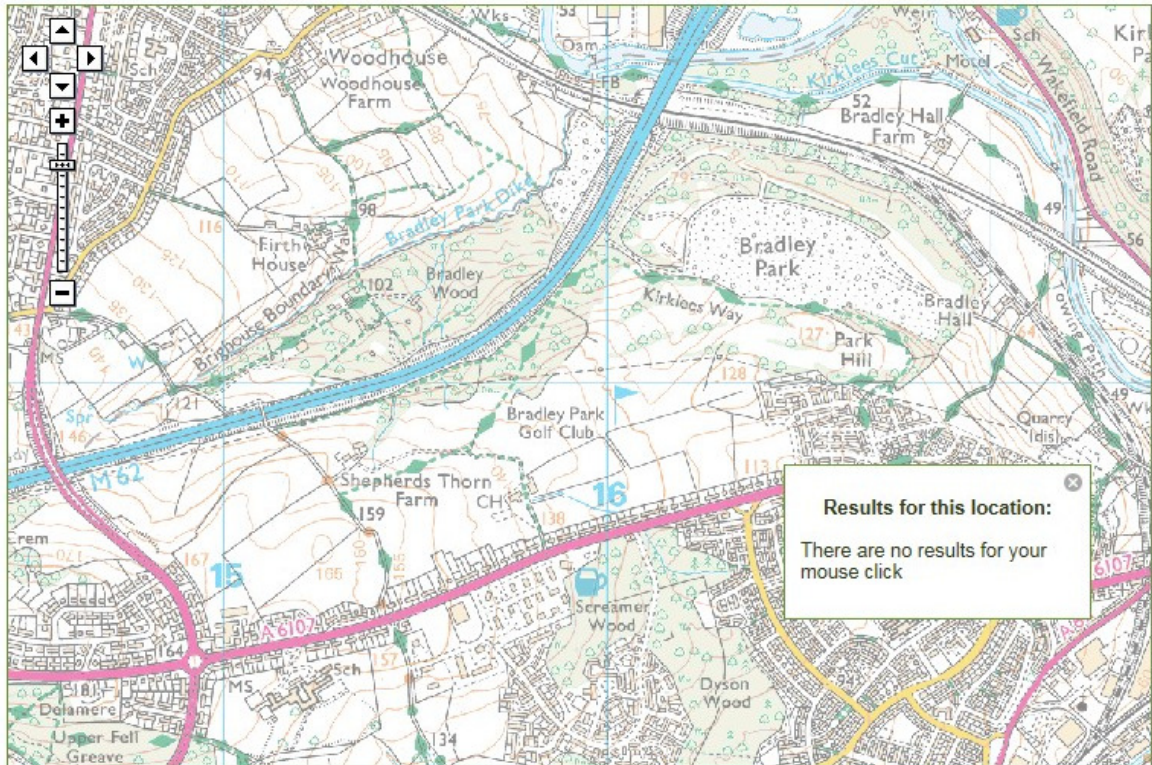


Figure 3 - Extract of the Interactive Groundwater flood map from the Environment Agency website

As discussed in the flood history (section 6) above there has been an occasion which saw flooding to the garden and edge of the golf course which was attributed to groundwater but this was an isolated incident and no other records exist.

8 Effects of the Development on Other Sites

Building Regulations (H3) states the priority for discharging surface water runoff from a development is as follows; firstly Infiltration into the ground, secondly discharge into a watercourse and lastly discharge into a sewer. An inspection of the 1:50,000 scale British Geological Survey (BGS) map shows the site is underlain with a Kirkburton Sandstone - Sandstone. Sedimentary Bedrock formed approximately 312 to 313 million years ago in the Carboniferous Period. Local environment previously dominated by swamps, estuaries and deltas. We recommend that a site investigation is carried which should include percolation tests.

The current proposals are for 2,042 residential dwellings in the local period and 294 dwellings beyond the plan. With the current high level option plans (Appendix III) being high level it is not currently known how the site will be drained throughout. However all aspects of SUDs should be explored in order to reduce the impacts of run-off from impermeable surfaces.

Provided the new development mimics existing drainage conditions it is not envisaged that the development will increase or cause flooding that would affect others.

Should infiltration not be a viable option, discussions with the inland water authorities should take place in order to determine an outfall to the inland watercourses within the constraints of the site.

Failing all the above a restricted discharge to a public sewer (if available) may be required.

9 Foul Water

Early engagement with the water authority (Yorkshire Water) should take place in order to determine whether there is capacity within the public sewers located in Bradley Road to receive the foul water generated from any proposed development. With over 2,000 dwellings proposed for the site this could have a significant implication to the existing infrastructure and Yorkshire Water would need to assess their network model in order to determine whether the existing infrastructure has capacity.

Residential properties have a right of connection to a public sewer for proposed dwellings covered by a planning application, there's no right of connection to a public sewer under S106 of The Water Industry Act until planning approval has been granted and any drainage conditions discharged.

In England and Wales, no objection can be made by a sewerage undertaker to a public sewer connection on the grounds of lack of capacity at the preferred point of connection. The only way of achieving a deferral of a developer's absolute right to connect to existing infrastructure, thereby giving the undertaker a reasonable opportunity to ensure that the sewer will accommodate the increased loading, is through the planning process. Consequently, local planning authorities must take steps to ensure that there is no development until the existing sewerage system can accommodate it.

10 Flood Level and Flood Proofing

As the proposed site is situated within flood zone 1 - no flood proofing or resilience techniques are required.

11 Conclusions

This assessment demonstrates that with preventative methods and flood risk management techniques the site can be developed within the proposed location.

- The proposed dwellings are situated within flood zone 1.
- Finished floor levels to properties should seek to be above adjacent roads to ensure water flows away from properties.
- The development has the opportunity to implement sustainable drainage systems.
- The development will not make flooding worse on adjacent sites provided at source techniques and management of SUDs are incorporated.

12 Recommendations

In order to minimise a residual risk of flooding to the new development, we recommend the following:

- Finished floor levels of proposed buildings is to be set a minimum 150mm above the adjacent road level.
- A SUDS solution to be incorporated into the surface water drainage system to attenuate flows generated from any proposed development and discharge via infiltration techniques where possible or to a watercourse.
- A further assessment should be carried out once a more detailed masterplan of the site is available.

13 Scope

This report has been commissioned by O'Neill Associates on behalf of Kirklees Council to assess the probability of flooding at the identified land for future development.

This report is based upon the data referred to and is an assessment of the likelihood of the site flooding from the various sources discussed. Owing to the variable nature of flooding, it is possible that future flooding scenarios will be different to past scenarios.

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Appendix I

Location Plan

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All dimensions are in millimetres unless noted otherwise

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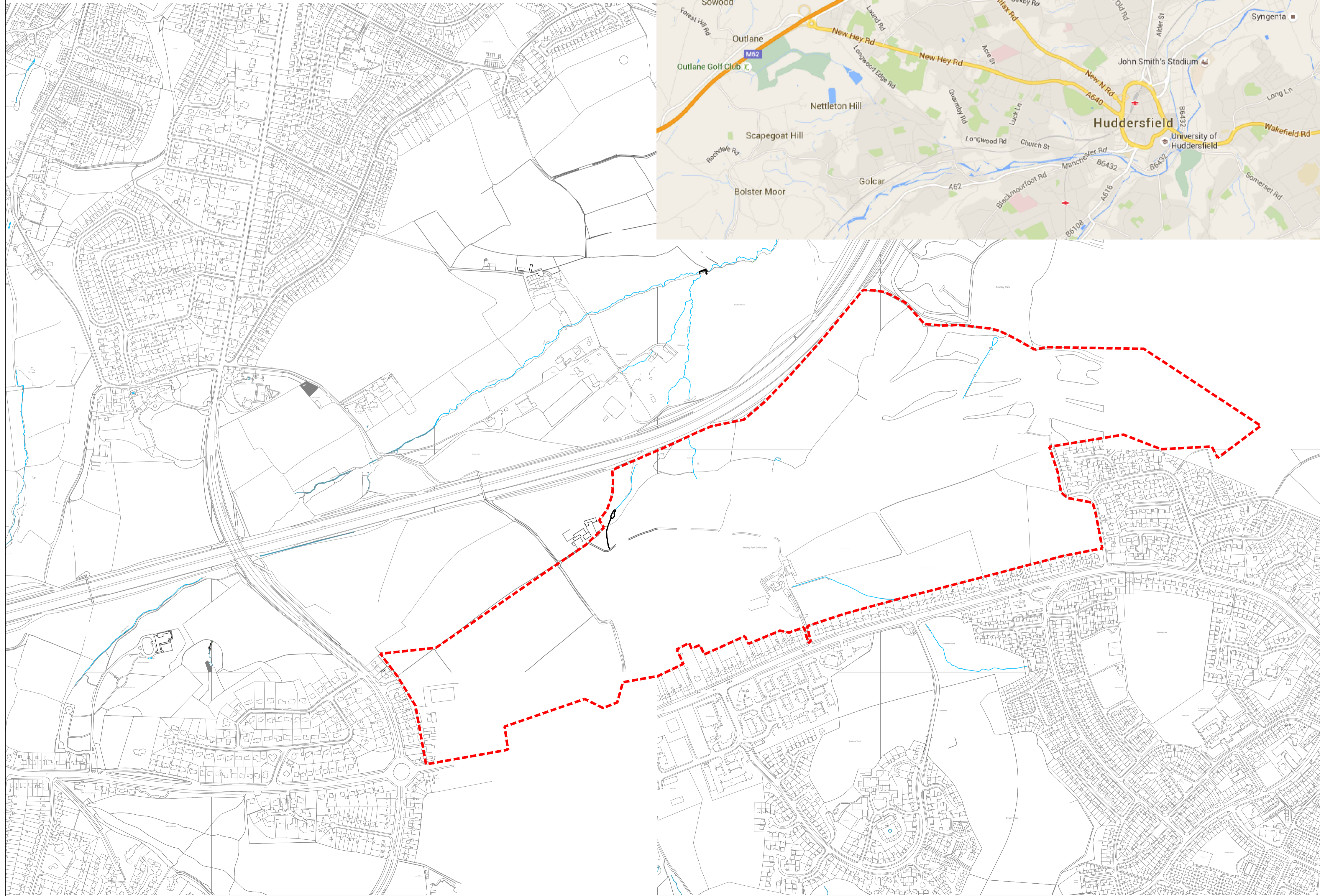
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All work shall be carried out in accordance with Local Authority, statutory authority, health & safety requirements and regulations.

The drawings shall be read in accordance with all other contract documents relevant at that time of issue and during the period of the contract.

The contractor must ensure the overall stability of the works is adequate at all stages of the construction.

No allowance has been made for cutouts, holes, notches, etc. for services. All of these are to be agreed prior to the start of the works.



Rev	Details	By	Date

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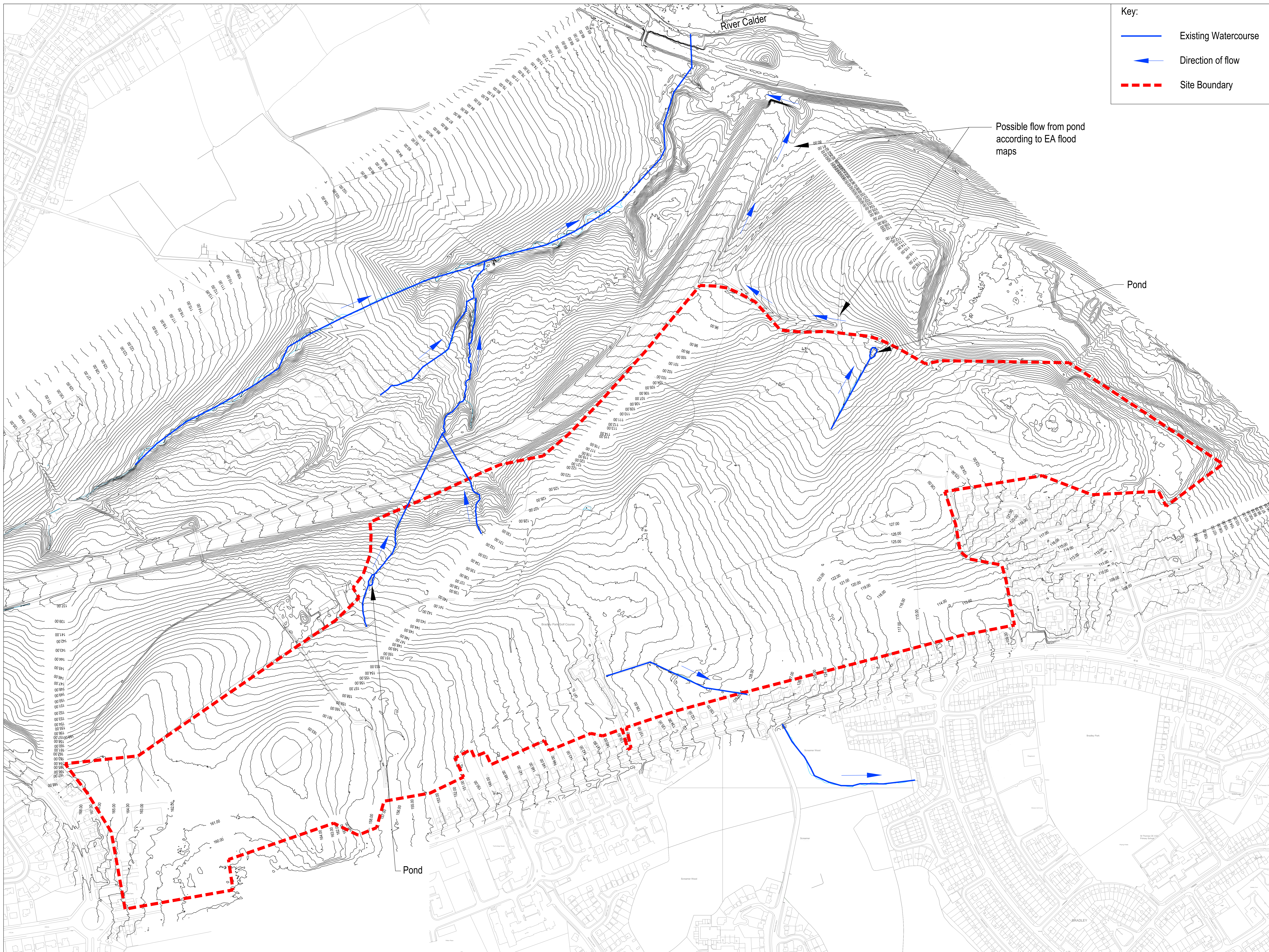
Project: Masterplanning
Bradley, Huddersfield

Title: Location Plan

Drawn: AB Checked: GS Date: Jan '16
Scale @ Size: 1:5000 @ A1
Drawing No: 13892L-001 Rev: P1

Appendix II

Site Contours and Watercourses



Key:

- Existing Watercourse
- ➔ Direction of flow
- - - Site Boundary

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Possible flow from pond according to EA flood maps

Pond

Pond

Rev	Details	By	Date

ma
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 civil and structural engineering consultants

Kirklees
 COUNCIL

Project:
 Masterplanning
 Bradley, Huddersfield

File:
 In Contours from Lidar
 & Existing Watercourses

Drawn: AB Checked: GS Date: Jan 16
 Scale @ Size: 1:2000 @ A0
 Drawing No: 13892L-SK001 Rev: P1

Appendix III

Architects Plans – High Level Options 1-4



50 100 150 200

NORTH PARK



Lower Eds
com

Middle Eds
D

Upper Eds
com

Juniors
Sec. Sch.

SOLF

Point

Point



50 100 150 200

ECO BOULEVARD

Sch

Schl.



high

Sports

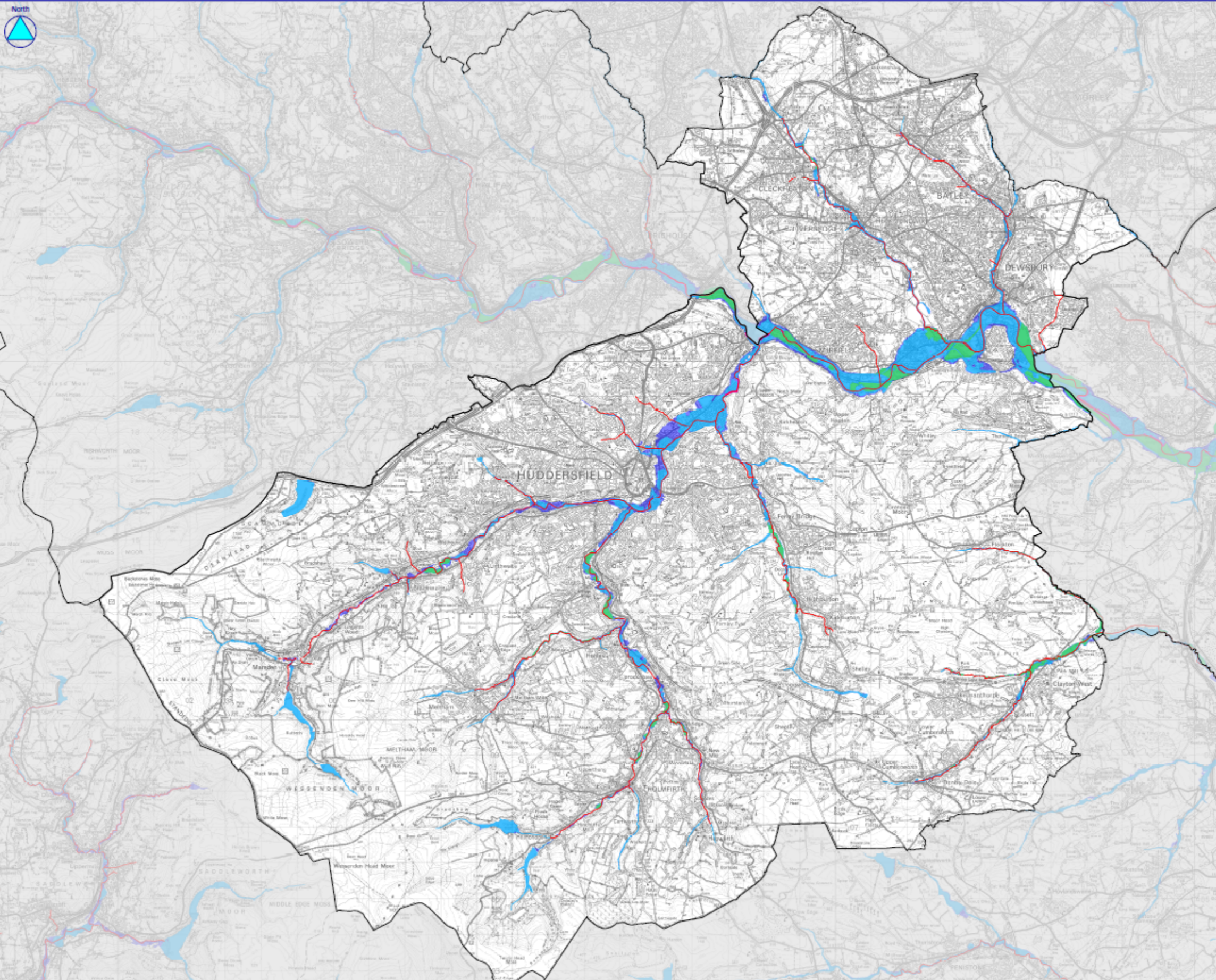
Central

wesside

CENTRAL PARK

Appendix IV

Kirklees Council SFRA Flood Maps



Location Plan



Legend

- Calderdale MDC Boundary
- Kirkstall MDC Boundary
- Wakefield MDC Boundary
- Main River Catchment
- NCDD
- EA AFDs (version 1.13)
- SRA Flood Zone 3a (Functional Floodplain, in SRA only)
- EA Flood Zone 2a (version 3.0)
- EA Flood Zone 2 (version 3.0)

How to use the SFRAs Maps

The flood zones are based on version 3.0 of the Environment Agency's Flood Maps. Therefore they refer to the probability of flooding from rivers, the sea and tidal estuaries (where appropriate) and ignore the presence of existing defences because these can be breached.

This key map should be used for the facilitating use of the Sequential Test by planners and developers according to PPS 25, as discussed in Section 6.3 of the SFRAs Report. The Map should also be used within Stage One of the Sequential Test Design Process outlined below and discussed within Section 6.3 of the SFRAs Report.



Flood Zone Descriptions

Flood Zone 1
PPS 25 considers areas within Flood Zone 1 to be at low risk of flooding. The annual probability of flooding within this zone is less than 0.1% or can be easily defined as areas within the District/Borough Council area located outside either Flood Zone 2 or 3.

Generally there is no constraint to development, in terms of flood risk, within Flood Zone 1 although it may be done with Environment Agency Standing Advice, any development over 1 ha should be accompanied by a site specific Flood Risk Assessment.

Areas vulnerable to Surface Water Flooding may also be considered for development within this zone. Groundwater drainage arrangements should be discussed and consideration of drainage needs to ensure that development will be safe and there will be no increase in flood risk elsewhere.

Flood Zone 2
The annual probability of flood flooding within this zone is between 0.1% and 1% (or between 0.1% and 0.1% for tidal flooding). In general, Flood Zone 2 is considered suitable for most development except highly vulnerable land uses where the Sequential Test is required, such as police stations, fire stations and ambulance stations.

A Flood Risk Assessment will be required for all development in this zone. The Flood Risk Assessment will need to assess the current level of flood risk as well as the level of flood risk following development. Development plans for the site will need demonstrate that flood risk can be effectively and safely managed without increasing flood risk elsewhere.

Flood Zone 3
PPS 25 considers areas within Flood Zone 3 to be at high risk of flooding. PPS 25 defines High Risk Flood Zone 3 as low subzones 3a and 3b, which are defined as:

- Flood Zone 3a: High Probability
- Flood Zone 3b: The Functional Floodplain

Developers should primarily focus on lower risk Flood Zones in preference to Flood Zone 3. Any proposals for development within Flood Zone 3 should have gone through the Sequential Test and Exemption Test where required. The site will also require developers to undertake a detailed Flood Risk Assessment.

Site	Date	Drawn	Checked	Approved

