



**The Fairfield - Land off Club Street,
Former AEU,
Openshaw,
Manchester**

Proposed Residential Development

Flood Risk Assessment & Drainage Strategy

For: KMM Homes

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1.0 INTRODUCTION

- 1.1 Integra Consulting has been commissioned by KMM Homes to undertake a Flood Risk Assessment & Drainage Strategy for the land at The Fairfield off Club Street, Openshaw, Manchester. This document has been prepared to accompany the full planning application for the proposed re-development of the former site of the AEU Club, remaining demolition, site clearance and construction of 51 No new residential dwellings (Use Class C3), with car parking, associated landscaping and infrastructure works. Of the 51 No dwellings, there will be 24 No apartments / cottage flats and 27 No houses at the subject site (refer to Appendix 5).
- 1.2 The objective of the Flood Risk Assessment & Drainage Strategy is to identify the proposed surface and foul water drainage strategies for the development site. Potential flooding issues are also considered as part of this report together with any consequent implications on the proposed site development.
- 1.3 The Flood Risk Assessment & Drainage Strategy has been undertaken in accordance with the pro-forma guidance contained in:
- Department for Communities and Local Government document 'National Planning Practice Guidance: Flood Risk and Coastal Change'
 - Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment - Level 1 SFRA prepared by JBA Consulting and dated March 2010
 - Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment - Level 2 SFRA prepared by JBA Consulting and dated March 2011

- DEFRA / Environment Agency publication SC030219 'Rainfall Runoff Management for Developments' dated October 2013.

1.4 To date, consultations have been undertaken with the Environment Agency (EA).

2.0 STANDARDS AND LIMITATIONS

This report has been prepared solely for use by KMM Homes.

It shall not be relied upon or transferred to any other party without the prior written authorisation of Integra Consulting.

The findings and opinions in the report are based on information derived from a variety of different sources. Integra Consulting do not accept any liability for the accuracy or otherwise of any information provided by third parties.

It should be noted that some of the aspects considered in this study may be subject to change with time. Therefore, if the development is delayed or postponed, consideration may need to be given to reviewing such issues to confirm that no changes have taken place, either at the site or within relevant legislation.

Further consultations with statutory bodies are likely as the scheme progresses. It should be noted that even where responses have been received from Regulators, these could be subject to change at a later date.

3.0 CURRENT SITUATION

3.1 Site Location and Description

The circa 0.87 hectare site is located approximately 1.5km east of the centre of Openshaw at National Grid reference 389912, 397434 as shown on the site location plan in Appendix 1.

The site is bounded by residential properties to the west, a builder's yard and school playing fields to the north, residential properties and adopted highways to the south and residential properties / St Annes Church Hall to the east (refer to the existing site plan in Appendix 1 and the topographical survey in Appendix 2).

Ashton Canal lies circa 450m north of the site whilst the Gorton Upper Reservoir system lies circa 600m to the south east of the site.

The site is generally flat with levels ranging from 87.5m AOD to 88.0m AOD over the site extent. The existing topographical survey can be found in Appendix 2.

The north western and eastern sections of the site are vegetated and a bowling green occupies the central section of the site. There is a hard landscaped area in the central section of the site comprising two buildings and associated areas of positively drained bitmacadam surfaced car park.

3.2 Flooding

Current Environment Agency flood data indicates the proposed development site to lie wholly in Flood Zone 1 (refer to Appendix 3 for details).

EA / DEFRA flood mapping indicates elevated surface water flooding, particularly in the low risk scenario (between 1 in 100 and 1 in 1000 annual probability) and, to some extent, in the medium risk scenario (1 in 30 to 1 in 100 annual probability). A review of the site and its immediate surroundings suggests that the main reasons for the current surface water flooding are the 'flat' nature of the site combined with poor existing drainage. Locally, surface water flooding is noted to numerous adopted highways, potentially due to a combination effect of 'flat' topography and sub-standard drainage.

In the post-development situation, new houses will be raised above site road levels in order that surface water will naturally drain towards the proposed on-site adopted highway. On the basis that it does not appear that the on-site surface water flooding is due to any third party impacts, the proposed site levels and drainage strategy will suitably mitigate post-development surface water flooding.

EA / DEFRA flood mapping does not indicate any areas of the proposed site at elevated risk of reservoir flooding.

3.3 Existing Sewers

The United Utilities sewer plan in Appendix 4 indicate the following adopted sewer infrastructure at and adjacent to the site:

- 225mm diameter combined sewer extending from north to south beneath Club Street
- 300mm diameter combined sewer extending from east to west beneath Backwell Street
- 225mm diameter combined sewer extending both north to south and east to west adjacent to the western site boundary
- 375mm diameter (becoming 450mm diameter) combined sewer extending from west to east beneath Ashton Old Road

4.0 PROPOSED DEVELOPMENT

4.1 Development Proposals

It is proposed to submit a full planning application for the proposed re-development of the former site of the AEU Club, remaining demolition, site clearance and construction of 51 No new residential dwellings (Use Class C3), with car parking, associated landscaping and infrastructure works. Of the 51 No dwellings, there will be 24 No apartments/cottage flats and 27 No houses at the subject site (refer to Appendix 5).

4.2 Surface Water Drainage

The issue of surface water drainage to the proposed development has been considered with reference to the hierarchy of surface water disposal as noted in the Building Regulations H3:

- i) Sustainable Urban Drainage Systems (SUDS)
- ii) Discharge of surface water off site direct to watercourse
- iii) Discharge to adopted sewer

SUDS are made up of one or more structures built to manage surface water runoff. They are used in conjunction with good management of the site to prevent flooding and pollution. There are four general methods of control:

- Filter strips and swales
- Filter drains and permeable surfaces
- Infiltration devices
- Basins and Ponds

A Phase 1 geo-environmental desk study (document ref: 42163R3 rev A dated Nov 2023) has been undertaken by Peak Environmental Solutions . The desk study indicates the site to be underlain by superficial deposits of Devensian Till which are in turn underlain at depth by Permian Collyhurst Sandstone Formation solid deposits. The nearest BGS borehole to the site lies circa 40m south west of the site and indicates a thin layer of made ground underlain by boulder clay deposits to the full 5m borehole depth.

Although no specific infiltration testing in line with BRE 365 has been undertaken, it is evident from the above noted borehole data / desk study data that the underlying soils at shallow depth beneath the site are likely to have a relatively low permeability and are therefore likely to preclude the use of post-development soakaway surface water drainage techniques at the site.

On the basis that the nearest watercourses to the site lie circa 450m north and circa 600m south east of the site through multiple third party land ownerships, it is therefore proposed to discharge suitably attenuated site surface water to the existing 225mm diameter adopted combined sewer that extends from north to south beneath Club Street (refer to Appendix 10). A survey of the existing private on-site sewer network has been undertaken and the results are provided in Appendix 6 of this report.

The site lies in a Critical Drainage Area and hence post-development flows would need to be limited to 50% of the existing brownfield runoff rate within the brownfield areas of the site. However, in betterment of the above noted requirement, it is proposed to limit post-development surface water runoff to greenfield runoff rates giving a proposed flow rate of 5.7 litres per second (refer to Appendix 7 for details).

On this basis, the estimated preliminary on site storage volume to cater for a 1 in 30 year event is circa 175m³ whilst on site storage to cater for a 1 in 100 year plus 50% climate change event is approximately 435 m³ (refer to Appendices 8, 9 and 10 for details). It is proposed that the 1 in 30 year stormwater is stored in below ground oversized pipes with the remainder (upto to the enhanced 1 in 100 year storm) in underground crate storage beneath the car parking area.

An overall change factor of 50% has been used on the basis of:

- i) Climate change allowance of 45%
- ii) Urban creep allowance of 10% but only applied to the area of the proposed properties (which gives a lower average than 10%)

Please note that these estimated figures are subject to finalisation of soil type following detailed ground investigation.

The post-development surface water drainage strategy will naturally need to be agreed in principle with both the LLFA and United Utilities. Discharge of post-development surface water into the adjacent adopted combined sewer system will also naturally require a formal S104 application to be made to United Utilities.

Ultimately the final design of the drainage system will be subject to the finalised site arrangement, further targeted site investigation and subsequent development of a detailed drainage scheme.

The post-development surface water drainage system will be designed to ensure that:

- There is no surcharge in the 1 in 1 year event:
- Surface water flows remain on site up to a 1 in 100 year + 50% climate change storm event.
- Sufficient surface water storage will be available to ensure there is no risk to property

With regard to surface water exceedance routes, indicative preliminary site levels have been developed for the site as covered in Appendices 10 & 11.

Whilst the final levels for the site will be subject to change to suit the detailed design, these levels have been developed to demonstrate how exceedance routes can be suitably managed on the site. Appendices 10 and 11 contains details of the exceedance routes associated with the schematic drainage and levels design.

In summary, the existing off-site road junction where Club Street meets Ashton Old Road sits at 87.90m AOD. The proposed on-site properties are set 'high' (88.10m to 88.30m AOD) above the proposed new central on-site spine road. Accordingly, during an extreme rainfall event, surface water will naturally flow away from the properties towards the lower on-site central spine road. Flood water will then build up within the spine road kerb lines to a maximum level of 87.90m AOD before overtopping and discharging in a south easterly direction towards Ashton Old Road.

4.3 National Planning Policy Framework and Technical Guidance

The residential site development proposals are classed as 'more vulnerable' in Table 2 of the Flood Risk and Coastal Change guidance.

'More vulnerable' developments in Flood Zone 1 are classed as appropriate according to Table 3 of the Flood Risk and Coastal Change guidance.

Proposed post-development levels will be engineered in order to protect the development and not provide any increased flood risk elsewhere.

Types of flooding that could affect the site are:

River - the site wholly lies in Flood Zone 1

Sea – there is no risk of flooding from the sea

Surface water – the main reasons for the current surface water flooding are the 'flat' nature of the site combined with poor existing drainage both of which will be rectified in the post-development situation

Groundwater – there are no springs or weep areas on the site

Sewers – there have been no local reports of sewer surcharge

4.4 Strategic Flood Risk Assessment & EA Mapping Review

From our review of the Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment - Level 2 SFRA prepared by JBA Consulting and dated March 2011, the site lies in the Conurbation Core Critical Drainage Area.

There are no groundwater protection zones in the vicinity of the site and there is negligible residual fluvial risk. The site is not noted to lie within a flood warning area.

4.5 Safe Access and Egress

Safe access / egress from the site in extreme conditions will be via the entrance on Club Street.

4.6 Foul Water Drainage

We would propose to discharge post-development foul drainage from the proposed residential development site to the existing 225mm diameter adopted combined sewer that extends from north to south beneath Club Street potentially using the existing site connection.

The foul drainage network will naturally comply with Building Regulations 2010 – Approved Document H1 and the calculations for post-development foul water discharge will be based on Sewers for Adoption 8th Edition.

5.0 SuDS DESIGN STATEMENT

5.1 SuDS Requirements

SuDS measures are required on the proposed development to comply with the National Planning Policy Framework (NPPF), DEFRA Non-Statutory Technical Standards for Sustainable Drainage Systems and the SuDS guidance in the Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment - Level 2 SFRA prepared by JBA Consulting and dated March 2011

The key conceptual SUDS design criteria for the development are covered in Non-Statutory Technical Standards for Sustainable Drainage under sections S1 to S9 based on the part brownfield / part greenfield nature of the development site.

Peak Flow Control

S2 of the DEFRA Technical Standards stipulates that for greenfield developments, the peak runoff from the development for the 1 in 1 year and 1 in 100 year rainfall events should never exceed the greenfield runoff rate for the same event.

S3 of the DEFRA Technical Standards stipulates that for brownfield developments, the peak runoff from the development for the 1 in 1 year and 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate for the same rainfall event but should never exceed the rate of discharge from the development prior to re-development for that event.

Volume Control

Requirement S4 stipulates that the runoff volume in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

Requirement S5 stipulates that the runoff volume in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event but should never exceed the runoff volume from the development site prior to development.

Flood Risk within the Development

S7 stipulates that the drainage system shall be designed such that no flooding shall occur on any part of the site during a 1 in 30 year storm event whilst the S8 requirement stipulates that, during a 1 in 100 year enhanced rainfall event, no flooding of any building shall occur.

S9 stipulates that site levels shall be designed such that flows which are as a result of rainfall events exceeding the 1 in 100 year enhanced rainfall event, are managed in exceedance routes that minimise the risks to people and property.

Water Quality

Water quality measures are generally considered with reference to CIRIA Report 'C753 – The SUDS Manual', specifically Chapters 4 and 26. In this instance, the hierarchy of surface water discharge has demonstrated that it is not feasible to discharge surface water flows to ground or to watercourse and hence the local existing adopted combined sewer system is the only viable discharge option. Accordingly, no further water quality treatment is considered appropriate.

5.2 Proposed SUDS Methodology & Drainage Design Principles

As detailed in section 4.2, discharge of surface water direct to the ground in the form of infiltration measures is deemed infeasible due to the low level permeability of the underlying natural strata. Accordingly, controlled discharge to the adjacent existing adopted combined sewerage network beneath Club Street is the proposed method of post-development surface water discharge.

Peak Flow Control

Post-development surface water flows from the proposed development site shall be limited to greenfield runoff rates (5.7 litres per second) which will provide a significant betterment in relation to the existing situation.

Volume Control

The proposed post-development discharge flow rate of 5.7 litres per second will apply for all flood events from the 1 in 1 year to the 1 in 100 year (enhanced) event. This is deemed to equate to a significant betterment over the development site.

Flood Risk within the Development

To cater for excess surface water runoff, the proposed method of attenuation on the site is to utilise underground storage beneath the site highway to accommodate 1 in 30 year storage with a downstream piped drainage system discharging attenuated site surface water into the existing adopted combined sewerage system beneath Club Street.

It is proposed that the 1 in 30 year stormwater is stored in below ground oversized pipes with the remainder (upto to the enhanced 1 in 100 year storm) in underground crate storage beneath the car parking area. Accordingly, this will ensure that criteria S7 and S8 are met.

The site is to discharge post-development surface water into underground storage within the 'red line' site boundary which in turn will discharge through a flow control chamber to limit the discharge to a runoff rate of 5.7 litres per second that equates to a significant betterment over the existing situation. Downstream of the storage / flow control chamber, the attenuated surface water flow will discharge to the adjacent adopted combined water sewerage system beneath Club Street.

5.3 Management and Maintenance of SuDS Drainage System

The management and maintenance of the above noted SuDS measures to serve the proposed development will be undertaken by a maintenance management company to be appointed for the project. The appointment of the maintenance and management company is to be confirmed at the completion of the build phase. All parts of the drainage network are to be accessible and are to be constructed from materials that are suitable and robust for the lifetime of the development.

The maintenance activities required for the drainage network are as follows:

5.3.1 Cellular Storage Structure

The maintenance for the cellular storage structure is as follows:

Operation	Frequency
Inspect and identify any areas that are not operating correctly and if required take remedial actions	Monthly for three months then six monthly intervals
Debris caused from catchment surface (where it may cause risk to performance)	Monthly
Where rainfall infiltration into cellular storage from above, check surface or filter for blockage or silt, algae or other matter by jetting	As required but at least twice a year
Remove sediment from upstream surface water network by jetting	Annually or as required
Repair / check all inlets, outlets, overflows and vents	As required
Inspect / check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually and after severe storms

5.3.2 Flow Control

The maintenance for the flow control is as follows:

Operation	Frequency
Inspect and identify any areas that are not operating correctly, if required take remedial actions	Monthly for three months then at six monthly intervals
Debris removal from catchment surface (where it may cause risk to performance)	Monthly
Check control chamber for blockage or silt, algae or other matter by jetting	As required, but at least four times a year
Remove sediment from upstream drainage network and sediment from within manhole by jetting	As required, but at least twice a year
Repair / check all inlets and control mechanics	As required
Inspect / check all inlets and control mechanics to ensure that they are operating as designed	Twice a year as a minimum and after severe storm events

5.3.3 Flow Control Chamber Design Criteria

In addition to the above maintenance methods, the flow control chamber will be designed so it works effectively throughout the lifespan of the development and will have precautionary features to ensure maintenance work can be carried out promptly and efficiently to ensure no control failure which may otherwise subsequently lead to flooding.

Details of the flow control chamber are as follows:

- High Water Level Alarm: Alarm installed and directed to site maintenance team
- Spares: Control spares to be kept on site for efficient maintenance

5.3.4 Flood Routes

A visual monthly inspection of flood routes should be made in order to check that routes are not blocked by new fences, walls, soil or other rubbish with removal undertaken as necessary.

5.3.5 Spillage – Emergency Action

Most spillages on development sites are of compounds that do not pose a serious risk to the environment as they enter the drainage system in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore, small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommend by the Environment Agency with residual spillage allowed to bio-remediate in the drainage system.

In the event of a serious spillage, either by volume or of unknown or toxic compounds, then the spillage should be isolated using soil, turf or fabric and outlet pipes from chambers downstream of the spillage blocked with bungs. Bungs for blocking pipes may be made by wrapping soil or turf in a plastic sheet or close woven fabric. The Environment Agency should be contacted immediately.

5.3.6 Linked and Further Maintenance

The maintenance of the drainage network and SuDS features is to be linked with the landscape maintenance plan for the proposed development.

5.3.7 Maintenance Activities

A log of all maintenance activities is to be kept and made available to the Local Planning Authority (LPA) and / or the Lead Local Flood Authority (LLFA) on request.

6.0 CONCLUSIONS

6.1 Flooding

Following review of the Environment Agency flood maps and data, it has been confirmed that the site lies wholly in Flood Zone 1.

There are to be no off site surface water flood routes generated by the development during an enhanced 1 in 100 year storm. All surface water run-off will remain on site in the 1 in 100 year + 50% climate change event.

6.2 Site Surface Water Drainage

It is proposed to discharge suitably attenuated post-development surface water into underground storage beneath the on-site highway (1 in 30 year stormwater) and underground crate storage beneath the car parking area (residual upto the 1 in 100 year enhanced storm event) prior to discharging through a flow control chamber to limit the flows to greenfield runoff rates (5.7 litres per second).

Downstream of the underground storage / flow control chamber, the attenuated surface water flow will discharge to the adjacent adopted combined water sewerage system beneath Club Street.

6.3 Site Foul Water Drainage

We would propose that post-development foul drainage discharges from the proposed residential development to the existing adjacent adopted combined sewerage system beneath Club Street to the south of the site.

6.4 Flood Risk Management Measures

There will be a site management Health and Safety document prepared in respect of the site.

6.5 Off Site Impacts

All roofed and paved areas are to be drained into the site surface water drainage system. The design of the site surface water system will ensure that no off site flood flows are generated by the proposed development in the 1% plus climate change event.

6.6 Residual Risk

With careful design of the drainage elements as described above, there will be no residual flood related risks remaining after the development has been completed.

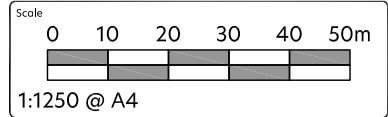
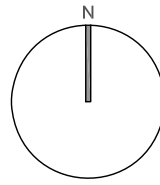
The proposed building envelopes will naturally fully lie in Flood Zone 1.

A post-development safe emergency access can be maintained at all times during a flood event with emergency access from Club Street.

APPENDIX

APPENDIX 1

SITE LOCATION PLAN / EXISTING SITE PLAN



Notes

Figured dimensions are to be used in all cases.

Dimensions should not be scaled from drawing unless for planning application purposes.

Land Registry and ownership boundaries are produced by Studio KMA using all reasonable endeavors. Studio KMA cannot be held responsible for scale discrepancies in plans supplied by others.

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This drawing is to be read in conjunction with all the relevant Mechanical and Electrical drawings.

This drawing is to be read in conjunction with the relevant Structural Engineer's drawings, structural calculations and recommendations.

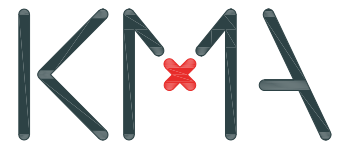
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Revision Notes

Rev	Date	Revision Description	Drawn	Checked
P3	05.02.24	Site boundary amendment	CTW	AT
P2	07.12.23	Site boundary amendment	CTW	AT
P1	20.10.23	Initial Issue	CTW	AT



Project Name

Openshaw
Club Street

Drawing Title

Location Plan

Drawing Number

OCS-KMA-XX-XX-DR-A-7000

Project Number

T1180

Status

A3
Planning

Revision

P3

Drawn by

CTW

Authorised by

AT

Date

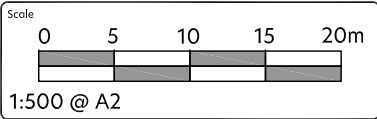
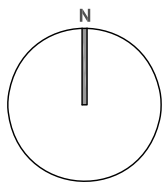
05.02.24

Studio KMA

Clarence Arcade | Stamford Street | Ashton-under-Lyne | OL6 7PT
T: 01457 873163

E: info@studiokma.co.uk www.studiokma.co.uk





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P1	20.10.23	Initial Issue	CTW	AT



Project Name

Openshaw Club Street

Drawing Title

Existing Site Plan

Drawing Number

OCS-KMA-XX-XX-DR-A-7001

Project Number

T1180

Station

A3 Planning

Revision

P3

Drawn by

CTW

Authorised by

AT

Date

05.02.24

Studio KMA

Clarence Arcade | Stamford Street | Ashton-under-Lyne | OL6 7PT
T: 01457 873163
E: info@studiokma.co.uk www.studiokma.co.uk

APPENDIX 2

TOPOGRAPHICAL SURVEY

APPENDIX 3

ENVIRONMENT AGENCY FLOOD MAPPING

Flood map for planning

Your reference
The Fairfield

Location (easting/northing)
389899/397420

Created
18 Jul 2021 20:46

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

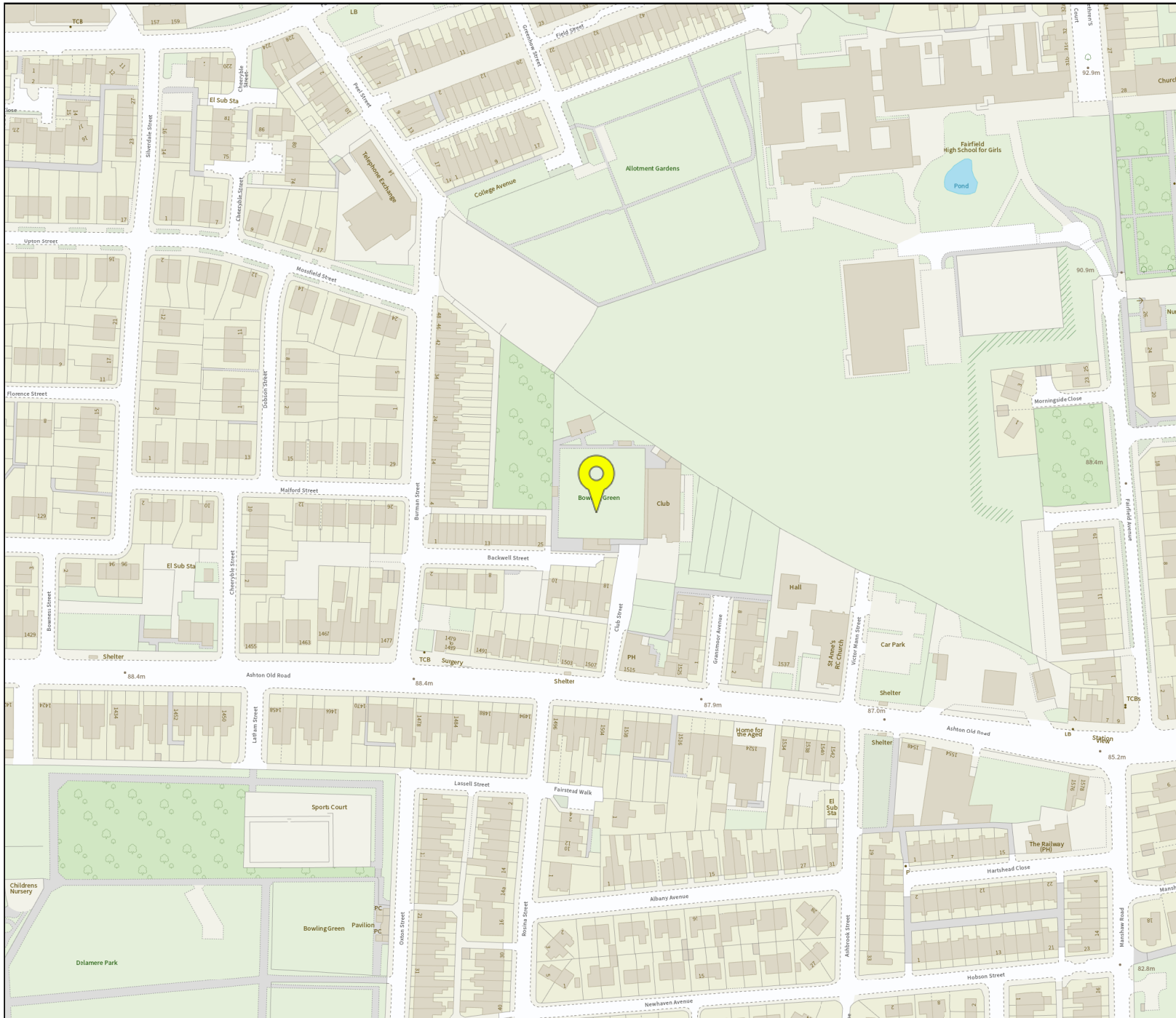
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2021 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
The Fairfield

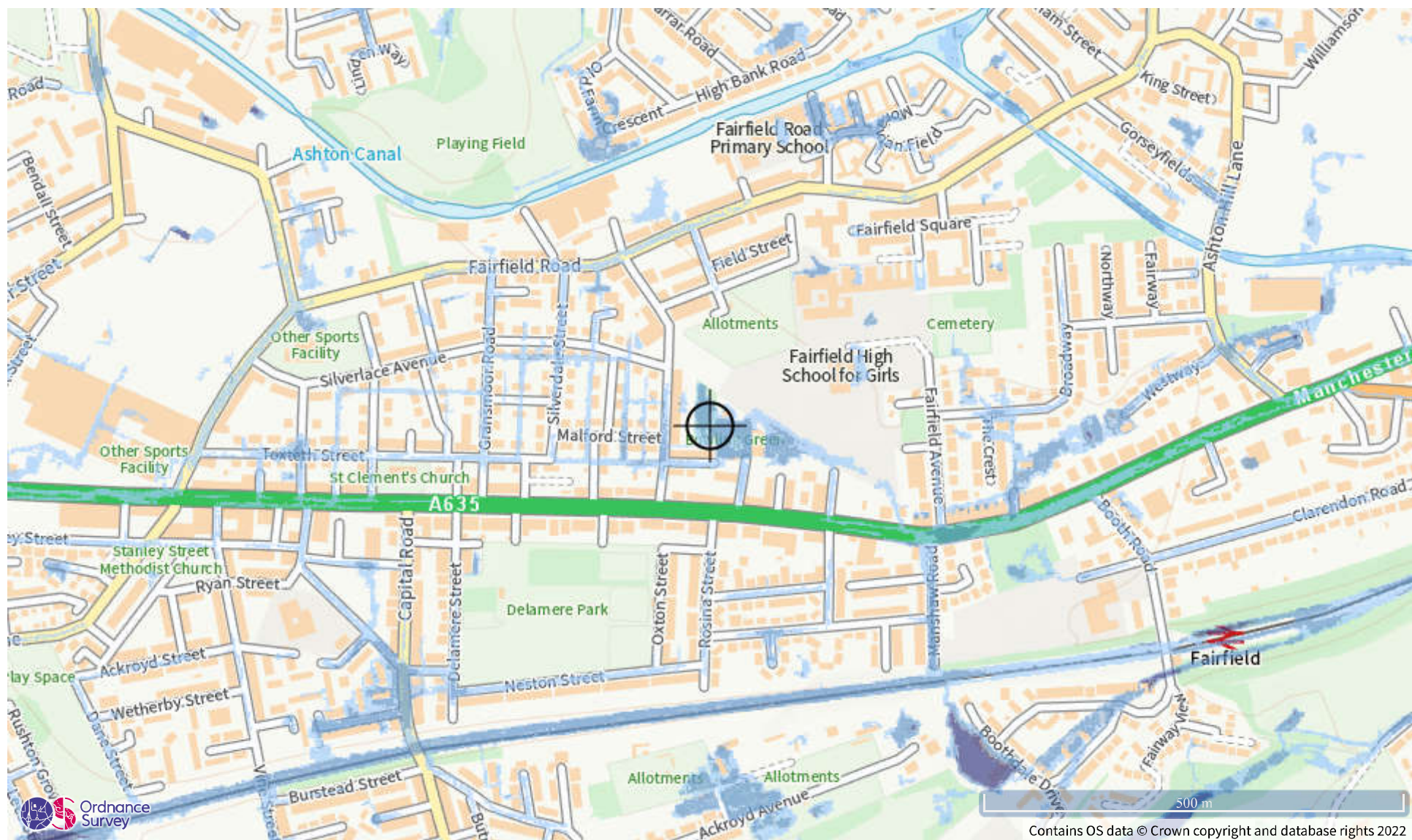
Location (easting/northing)
389899/397420

Scale
1:2500

Created
18 Jul 2021 20:46

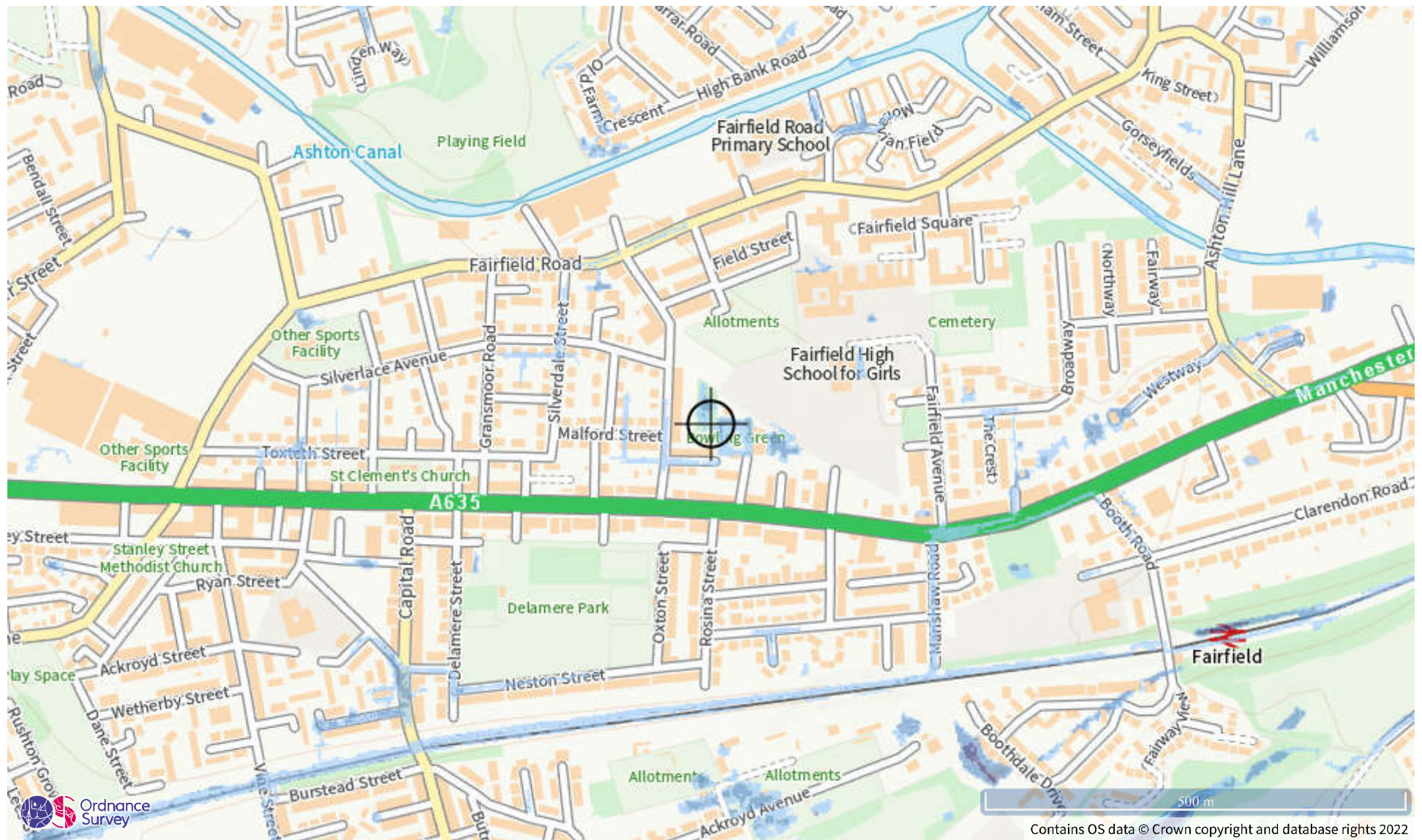
-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area


0 20 40 60m



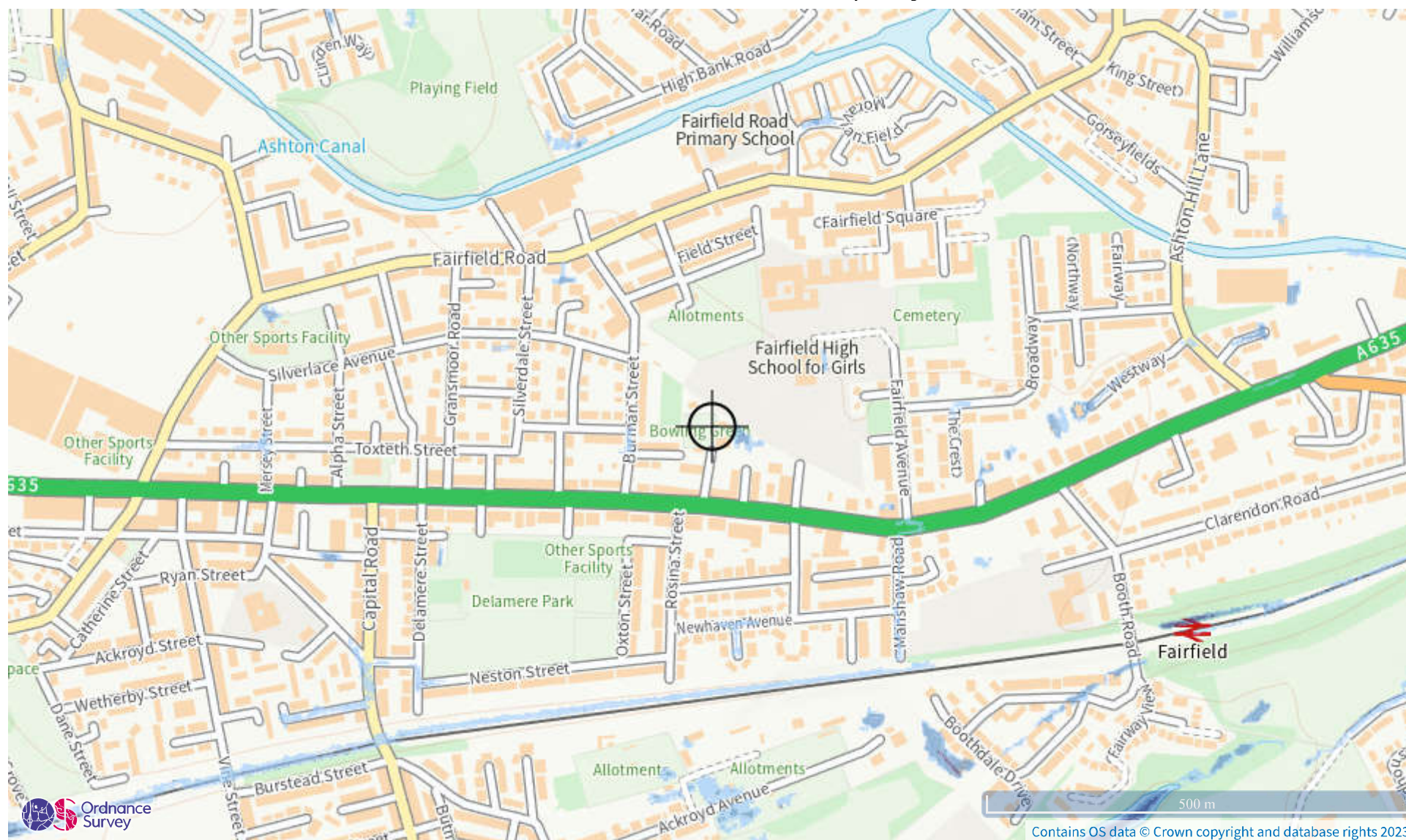
Surface water flood risk: water depth in a low risk scenario
Flood depth (millimetres)

Over 900mm
 300 to 900mm
 Below 300mm
 Location you selected



Surface water flood risk: water depth in a medium risk scenario
Flood depth (millimetres)

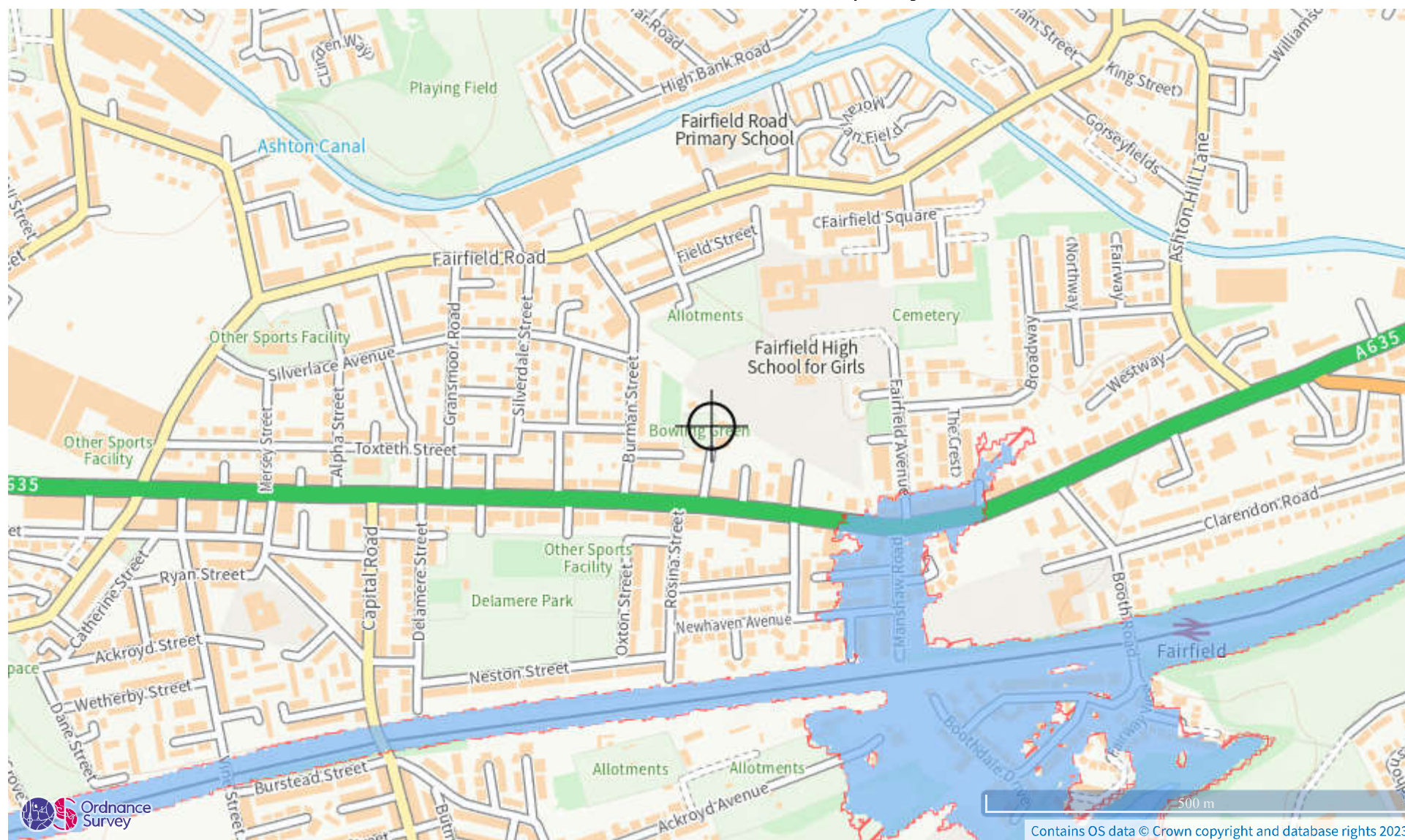
Over 900mm 300 to 900mm Below 300mm Location you selected



Surface water flood risk: water depth in a high risk scenario

Flood depth (millimetres)

● Over 900mm
 ● 300 to 900mm
 ● Below 300mm
 ⊕ Location you selected



Maximum extent of flooding from reservoirs:

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