PATRICK PARSONS

CREATING PLACES FOR FUTURE GENERATIONS TO THRIVE

Flood Risk Assessment

Squirrels Estate – Block C

Viveash Cl, Hayes UB3 4RZ

for

Mackenzie Homes Ltd

10235

October 2022

Flood Risk Assessment

Squirrels Estate – Block C

for

Mackenzie Homes Ltd

Revision	Date of issue	Comments	Prepared By	Checked By
0	21.10.2022	First Issue	MK	RGM
1	26.10.2022	First Amendment, appendix B to latest version of topo survey provided	RGM	AD
2	28.10.2022	Amended client name and appendix D	RGM	AD

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PATRICK PARSONS

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1.0 Introduction

1.1 Mackenzie Homes Ltd is planning a proposed development on the site at Squirrels Estate – Block C, Viveash Cl, Hayes.

1.2 Patrick Parsons has been instructed by Mackenzie Homes Ltd, to produce a Flood Risk Assessment under National Planning Policy Framework (NPPF) to support the Planning Application.

1.3 This report aims to demonstrate whether the development is at risk of any form of flooding.

1.4 The general limitations of this assessment are that:

- Several data sources have been used in compiling this report. Whilst Patrick Parsons believe them to be trustworthy; it is unable to guarantee the accuracy of the information that has been provided by others.
- This report is based on information available at the time of preparation. There is potential for further information to become available, which may create a need to modify conclusions drawn in this report.

2.0 Location of Site

2.1 The site is within the larger Squirrels estate as part of an industrial zone in the Hayes and Harlington area bounded by factories to the west, surviving workshops in the vicinity and residential areas of low height housing to the south.

2.2 Block C development is constructed upon a brownfield site as part of a wider series of developments within the industrial estate, some completed and some proposed for the future.

2.3 The Local Authority is the London Borough of Hillingdon. A location plan is enclosed in Appendix A.

3.0 Site Description

3.1 Existing Site

3.1.1 The existing site is Squirrels Estate – Block C. A topographical survey has been commissioned for the site and can be found in **Appendix B**.

3.2 Existing Geology

3.2.1 The geology of the site has been ascertained by reference to the 1:50,000 British Geological Survey website. The data provided on the website indicates the bedrock and superficial drift geology for the site.

3.2.2 The strata of the site (bedrock geology) comprises of London Clay formation, described as follows:

- *"London Clay Formation - Clay, Silt and Sand. Sedimentary Bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period. Local environment previously dominated by deep seas. These sedimentary rocks are marine in origin. They are detrital and comprise coarse- to fine-grained slurries of debris from the continental shelf flowing into a deep-sea environment, forming distinctively graded beds. "*

3.2.3 The strata of the site (superficial drift) comprises of Kempton Park Gravel formation, described as follows:

- *"Lynch Hill Gravel Member - Sand and Gravel. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by rivers (U). These sedimentary deposits are fluvial in origin. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting). "*

3.3 Hydrogeology Setting

3.3.1 The Environment Agency (EA) mapping service, as provided by Magic Map, indicates the aquifer designation for the bedrock and superficial drift geology and the groundwater vulnerability in the area. The mapping, as included at **Appendix C**, provide the following information for the site:

Geology Map	Site Description
Aquifer Designation (Bedrock)	Unproductive
Aquifer Designation (Superficial Drift)	Principal
Groundwater Vulnerability	Medium / Low
Groundwater Source Protection Zone	None

Table 1 Hydrogeology Setting

4.0 Proposed Development

4.1 Block C is to comprise approximately 120 residential flats over 11 floors with some underground facilities and exterior landscaping, gardens and paving. Only a small number of parking bays are proposed.

4.2 A proposed site layout is attached in **Appendix D**.

5.0 Flooding Information

5.1 As set out in the National Planning Policy Framework (NPPF), inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. For these purposes:

- "areas at risk of flooding" means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems, and which has been notified to the local planning authority by the Environment Agency;
- "flood risk" means risk from all sources of flooding - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

5.2 Flooding information for Planning from the Environment Agency (EA) has indicated the site is located within Flood Zone 1, as found in the map at **Appendix E**.

5.3 As the site is within Flood Zone 1, no further data was required from the Environment Agency.

5.4 As part of the data capture, data and mapping from the Hillingdon Strategic Flood Risk Assessment (SFRA) was sought. This will be included and references in the relevant sections below.

6.0 Flood Risk

6.1 The data on the EA's website in their updated mapping, shows the site has a "medium" risk of flooding.

6.2 The EA confirmed that the proposed development site is located in Flood Zone 1 for Planning.

6.3 According to Table 2 of National Planning Policy Framework (NPPF), the development, being mixed use including residential, is classed as 'more vulnerable'.

6.4 According to NPPF Table 3 'Flood Risk Vulnerability and Flood Zone Compatibility', the development should be permitted.

Table 3: Flood risk vulnerability and flood zone 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

Key: ✓ Development is appropriate.
× Development should not be permitted.

Table 2 Flood Risk Vulnerability and Flood Zone 'Compatibility'

6.5 Sequential Test

6.5.1 Local Planning Authorities (LPA) are encouraged to take a risk-based approach to proposals for development in or affecting flood risk areas through the application of the Sequential Test and the objectives of this test are to steer new development away from high risk areas towards those at lower risk of flooding.

6.5.2 However, in some areas where developable land is in short supply, there can be an overriding need to build in areas that are at risk of flooding. In such circumstances, the application of the Sequential Test is used to ensure that the lower risk sites are developed before the higher risk ones.

6.5.3 NPPF (PPG25) states that the Sequential Test should be applied at all stages of the planning process and the starting point is generally the Environment Agency's flood zone maps.

6.5.4 These maps and the associated information are intended for guidance and cannot provide details for individual properties. They do not consider other considerations such as existing flood defences, alternative flooding mechanisms and detailed site-based surveys. They do, however, provide high level information on the type and likelihood of flood risk in any area of the country.

6.5.5 The site is within Flood Zone 1 and so does not require a sequential test assessment.

6.6 Exception Test

6.6.1 The Exception Test is an additional test to be applied by decision-makers following application of the Sequential Test. The Exception Test has two elements as shown below, both of which must be satisfied for development in a flood risk area to be considered acceptable.

6.6.2 The Exception Test is only appropriate for use when there are large areas in Flood Zones 2 and 3, where the Sequential Test alone cannot deliver acceptable sites, but where some continuing development is needed for wider sustainable development reasons, considering the need to avoid social or economic blight and the need for essential civil infrastructure to remain operational during floods.

6.6.3 For the Exception Test to be passed:

a. It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA; and,
b. A site-specific FRA must demonstrate that the development will be safe for its lifetime, without increasing flood risk elsewhere and, where possible, reducing flood risk overall.

6.6.4 The site does not require an exception test in accordance with NPPF.

6.7 **Fluvial Flooding Risk**

6.7.1 The Environment Agency flood information indicates no risk from fluvial sources on the site.

6.8 **Historic Flood Data**

6.8.1 The Environment Agency have no information indicating that the site was flooded historically from fluvial sources.

6.8.2 The Hillingdon SFRA (West London SFRA ArcGIS Mapping System) does not indicate any risk or historic flooding from fluvial sources.

6.9 **Groundwater**

6.9.1 Groundwater flooding is caused by the emergence of water originating from sub-surface permeable strata. A ground water flood event results from a rise in ground water level, sufficient for the water table to intersect the ground surface and inundate low lying land. Groundwater floods may emerge from either a single point or diffuse locations.

6.9.2 The underlying strata throughout the area and investigations into the SFRA geology data suggest that there is a risk of groundwater emergence which is likely to relate to the geology of the area. However, groundwater flooding risks are often highly localised, and dependent upon geological interfaces between permeable and impermeable subsoils. Therefore, sustainable construction techniques for surfacing will minimise any potential groundwater risk.

6.9.3 The Hillingdon SFRA indicates that the site is within an area with a high susceptibility to groundwater flooding. Likely due to the presence of clay on the site.

6.9.4 The Hillingdon SFRA indicates that the site is within an area with increased potential for elevated groundwater (permeable superficial).

6.9.5 Given the existing and proposed schemes, the potential for groundwater emergence should be relatively low and mitigated with a considered drainage strategy.

6.10 **Flooding from Sewers**

6.10.1 Flooding from sewers can occur because of different reasons; if sewers are blocked during heavy rainfalls, or if a sewer cannot provide adequate capacity, then flooding can cause a large amount of damage.

6.10.2 The Hillingdon SFRA has no records of sewer flooding in the area based on the Thames 2017 GIS map.

6.11 Flooding from Reservoirs

6.11.1 Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the Environment Agency ensures that reservoirs are inspected regularly, and essential safety work is carried out.

6.11.2 However, in the unlikely event that a reservoir dam failed, a large volume of water would escape at once and flooding could happen with little or no warning. If the site is within a risk area, plans should be made for safe evacuation and escape. Residents may need to evacuate immediately, know the safest route to safety, and be ready to follow the advice of emergency services.

6.11.3 The EA data indicates that the site is at no risk from reservoir flooding.

6.12 Surface Water Flooding

6.12.1 Overland flow / surface water flooding typically arise because of intense rainfall, often in short duration, that is unable to soak into the ground or enter drainage systems. It can run quickly off land and result in localised flooding.

6.12.2 The Environment Agency has produced illustrative mapping (Flood Map for Surface Water) relating to flooding risks from surface water. They are classified as Flood Hazard Maps for the purpose of the Flood Risk Regulations 2009. These maps are the next generation on from the previous “Area Susceptible to Surface Water Flooding” maps, which are contained within the SFRA.

6.12.3 The EA maps show high resolution image and indicative flow paths for pluvial events. The maps are based on coarse level data and indicate ridges, valleys and flat spots where water would collect. Typically, the flow paths follow valleys, rivers and watercourses.

6.12.4 The surface water maps and the associated information are intended for guidance only and cannot provide details for individual properties. They do, however, provide high level information and indicate areas in which surface water flooding issues should be investigated further. The risk categories are classified as follows:

- Very low probability of flooding – This zone is assessed as having less than a 1 in 1000 annual probability of surface water flooding.
- Low probability of flooding – This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of surface water flooding.
- Medium probability of flooding - This zone comprises land assessed as having between a 1 in 30 and 1 in 100 annual probability of surface water flooding.
- High probability of flooding – This zone is assessed as having greater than a 1 in 30 annual probability of surface water flooding.

6.12.5 A review of the EA mapping indicates there is no risk of surface water flooding to the site.

7.0 Route of Escape

7.1 In an extreme storm event, it is unlikely there will be flood water on site and so safe escape can be achieved via the main access.

7.2 It is not envisaged that there would be any problem for access of emergency vehicles in an extreme storm event as there is no flood depth unless the extreme storm scenario occurs. Emergency vehicles may operate in depths of 0.5m with velocity of 5 metres per second (with some operating at depths of 1m).

7.3 The Planning Authority must be in consultation with the emergency services as to the appropriate access and safe routes for the site during an extreme storm event, in accordance with Section 13.S3.3 of the FRA Guidance for New Developments. Emergency Response Plans for the local area are available on the council website and would require updating for the proposed residence. It is not envisaged that there will be any additional burden on emergency services during a flood event.

7.4 General Evacuation Advice:

- Avoid walking or driving through flood water, as only 150mm of fast flowing flood water is able to knock a person over and 600mm is able to float a car. Flooding can cause manhole covers to come off, leaving hidden dangers.
- Do not walk on sea defences or riverbanks.
- Take care or avoid crossing bridges when water levels are high.
- Take care crossing culverts as they are dangerous when flooded.
- Look out for other hazards such as fallen power lines and trees.
- Keep Children away from flood water.
- Wash hands thoroughly if you come into contact with flood water as it may be contaminated with sewage.
- Always follow the advice provided at the time by the Emergency Services. The Emergency Services may direct you to a Local Authority Evacuation Centre, which has been specially prepared for people being evacuated from their homes. Free food and bedding is provided, however spare clothing should be taken, essential medication and any baby care products should an infant be involved in the evacuation.

8.0 Flood Compensation

The site is not within a Flood Zone for planning so there is no statutory requirement to assess the requirement for flood compensation.

9.0 Summary and Conclusions

9.1 Mackenzie Homes Ltd is planning a proposed development on the site at Squirrels Estate – Block C, Viveash Cl, Hayes.

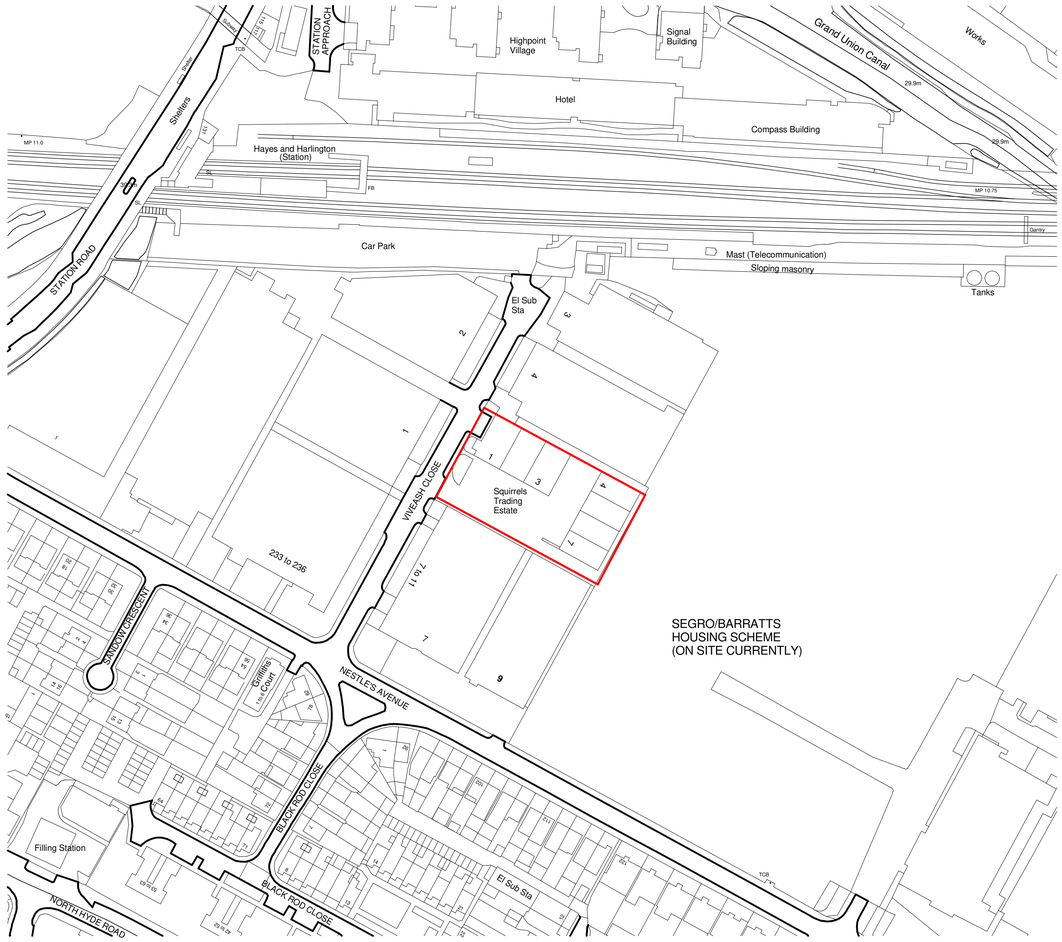
9.2 Patrick Parsons has been instructed by Mackenzie Homes Ltd, to produce a Flood Risk Assessment under National Planning Policy Framework (NPPF) to support the Planning Application.

9.3 The Environment Agency mapping indicates that the site is within Flood Zone 1 and has a very low risk of fluvial flooding.

9.4 All other sources of flooding for the site have been investigated and shown to be of minimal or no risk.

9.5 The proposed development is appropriate and sustainable in the terms as set out in NPPF.

APPENDIX A – SITE LOCATION PLAN



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Rev	Description	Date	Checked
02	Issued for Planning	09/09/22	DJ

Project
Squirrels Estate

Drawing
Existing Location Plan

Status
For Planning

Scale 1 : 1250 | **Drawn** MK | **Checked** JK | **Date** 07/04/22

Client
Mackenzie (South West) Homes Ltd

Project no. 15489 | **Drg** A - EX-PL-(02) - 100 | **Revision** 02

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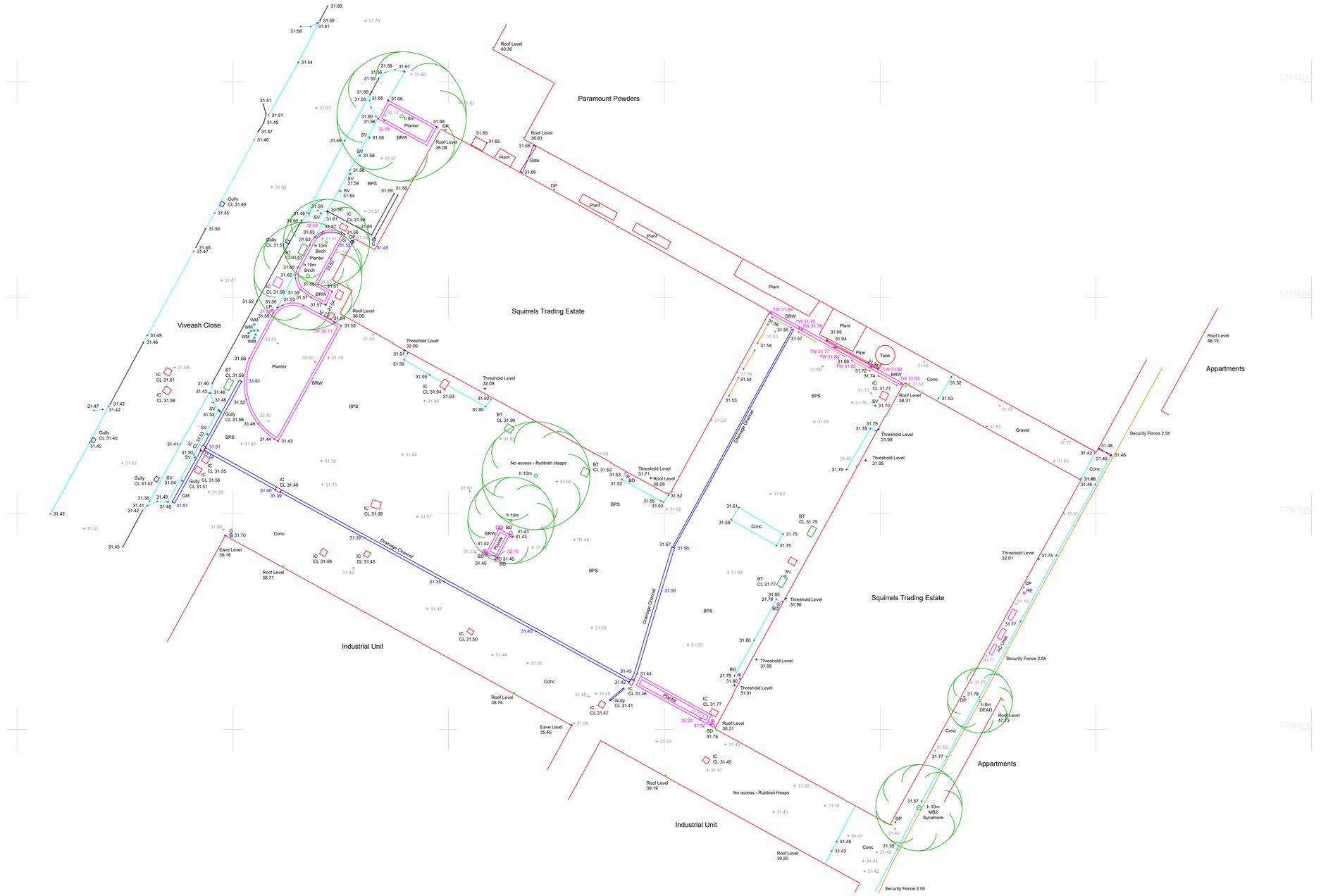
APPENDIX B – TOPOGRAPHICAL SURVEY



Drawing Number Geo21-197

LEGEND

AV	Air Valve	ME	Manhole Electricity
BB	Belisha Beacon	MF	Manhole Foul
BI	Illum.Bollard	MH	Manhole General
BL	Bollard	MK	Marker Post
BM	Bench Mark	MRF	Metal Railing Fence
BP	Brick Pillar	MS	Manhole Surface Water
BPS	Block Paving Slabs	MW	Water Supply/Meter
BRK	Brick	NB	Notice Board
BS	Bus Stop/Shelter	OHC	Over Head Cable
BW	Brick Wall	P	Post
BWF	Barbed Wire Fence	PB	Post Box
BRW	Brick Retaining Wall	PI	Pipe
CB	Telephone Box	RE	Rodding Eye
CBF	Close Boarded Fence	RG	Road Gulley
CC	CCTV Camera	RN	Road Name Plate
Ce	Cats Eye	RP	Reflector Post
CL	Cover Level	PRF	Post & Rail Fence
CLF	Chain Link Fence	RS	Road Sign
CONC	Concrete	PWF	Post & Wire Fence
CPS	Concrete Paving Slabs	Sap	Sapling
CPF	Chestnut Paling Fence	SMP	Sheet Metal Piling
CW	Concrete Wall	SL	Soffit Level
CRW	Concrete Ret. Wall	Stu	Stump
DK	Drop Kerb	SP	Sign Post
EB	Electricity Box	SV	Stop Valve
EP	Electricity Pole	SW	Stay Wire
FB	Flower Bed	TH	Threshold Level
FH	Fire Hydrant	TL	Traffic Light
FL	Flood Light	TP	Telegraph Pole
FS	Flag Staff	TPS	Tactile Paving
FP	Footpath	TSR	Tubular Steel Railings
G	Gully	TV	Cable TV Point
HW	Headwall	TC	Traffic Camera
IC	Inspection Cover	TW	Top of wall
IL	Invert Level	VP	Vent
IRF	Iron Railing Fence	WL	Water level
KW	Kerb Weir Inlet	WMF	Wire Mesh Fence
LB	Litter Bin	WO	Washout
LP	Lamp Post	WPR	Wooden Post & Rail
MB	Manhole Telecom		
MC	Manhole Cable		

NOTES

1. The Grid is OSGB 36 using OSTN15 & OSGB15 on the OS Active Network
2. All levels are related to OS Datum (Newlyn)

Rev	Date	Description	Checked

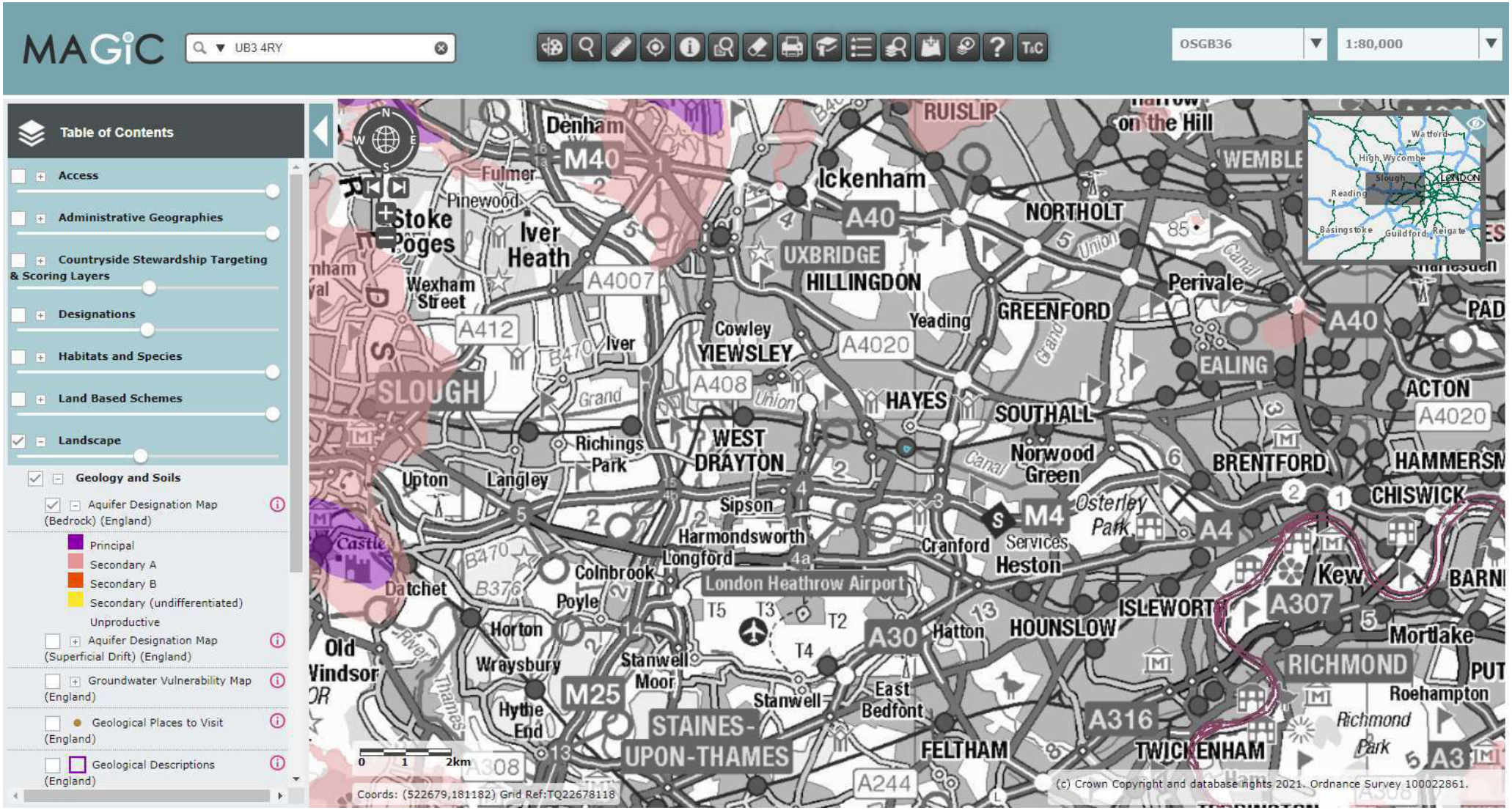
geopoint.
Geospatial Engineering & Surveying

Client	McKensie Homes
Project	Squirrels Trading Estate, Hayes
Title	Topographical Survey
Drawing No.	Geo21-197

Scale	1:200@ A1		Date	28/12/21	
Drawn	AS	Checked	DGK	Approved	AS

Geopoint Ltd.
Unit 8
Jupiter House
Calleva Park
Aldermaston
Reading

APPENDIX C – MAGIC MAP GEOLOGY INFORMATION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Wexham Street
Iver
Cowley
YIEWSLEY
SLOUGH
Richings Park
WEST DRAYTON
Upton
Langley
Sipson
Harmondsworth
Longford
Colnbrook
Poyle
Datchet
Horton
Wraysbury
Stanwell Moor
Stanwell
Hythe End
STAINES-UPON-THAMES
Old Windsor
Ickenham
RUISLIP
NORTHOLT
UXBRIDGE
HILLINGDON
Yeading
HAYES
GREENFORD
Perivale
EALING
SOUTHALL
Norwood Green
Osterley Park
Cranford
Heston
London Heathrow Airport
Hatton
HOUNSLOW
ISLEWORTH
BRENTFORD
ACTON
CHISWICK
Kew
Mortlake
RICHMOND
Roehampton
Richmond Park
TWICKENHAM
FELTHAM
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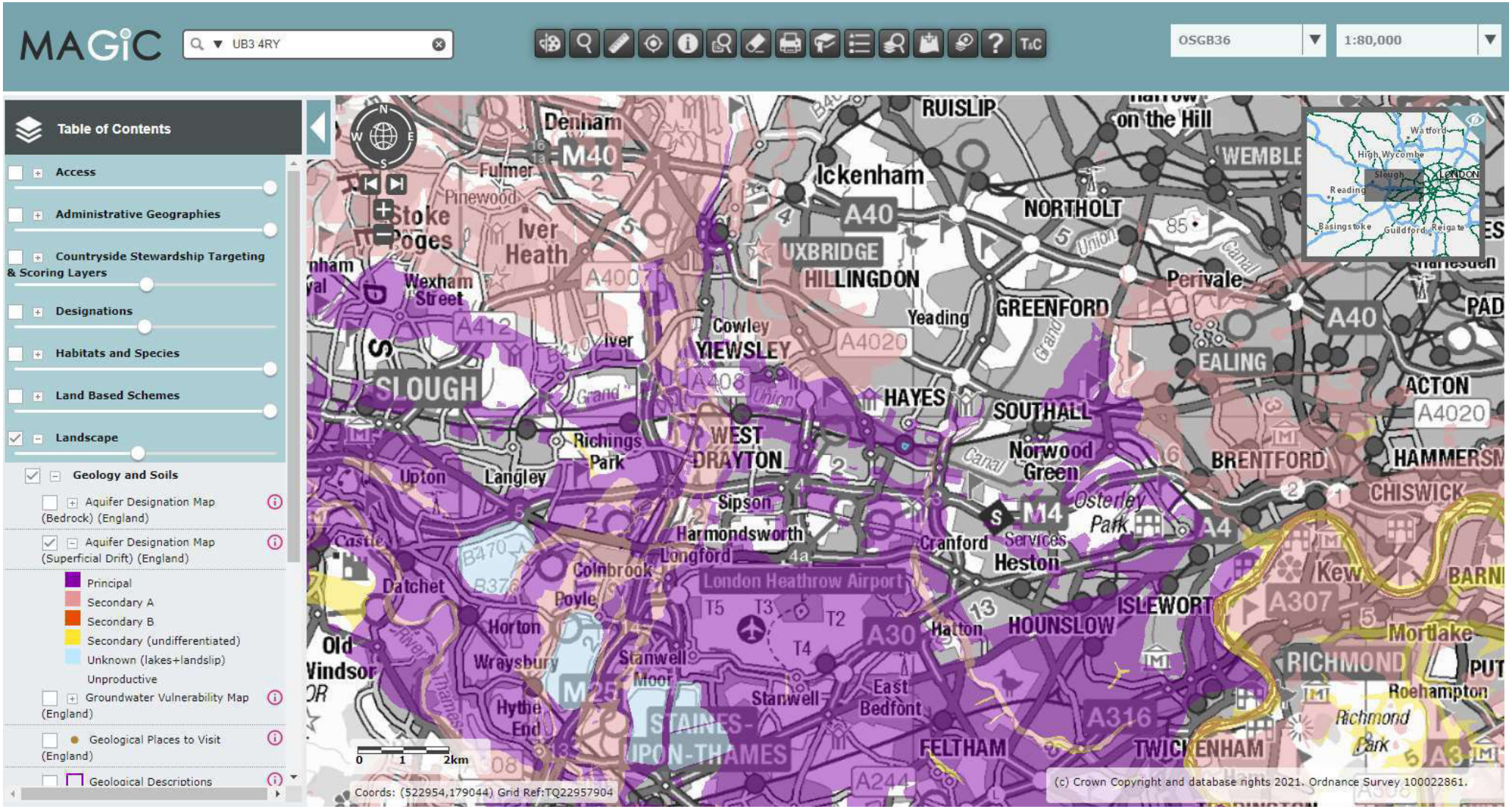
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Wexham Street
Iver
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Cowley
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WEST DRAYTON
Richings Park
Upton
Langley
Sipson
Harmondsworth
Longford
Colnbrook
Poyle
Datchet
Horton
Wraysbury
Stanwell Moor
Stanwell
Hythe End
Old Windsor
STAINES-UPON-THAMES
Ickenham
RUISLIP
NORTHOLT
UXBRIDGE
HILLINGDON
Yeading
GREENFORD
HAYES
SOUTHALL
Norwood Green
Cranford
Heston
London Heathrow Airport
Hatton
HOUNSLOW
East Bedfont
FELTHAM
Perivale
EALING
ACTON
BRENTFORD
CHISWICK
Kew
ISLEWORTH
RICHMOND
Mortlake
Roehampton
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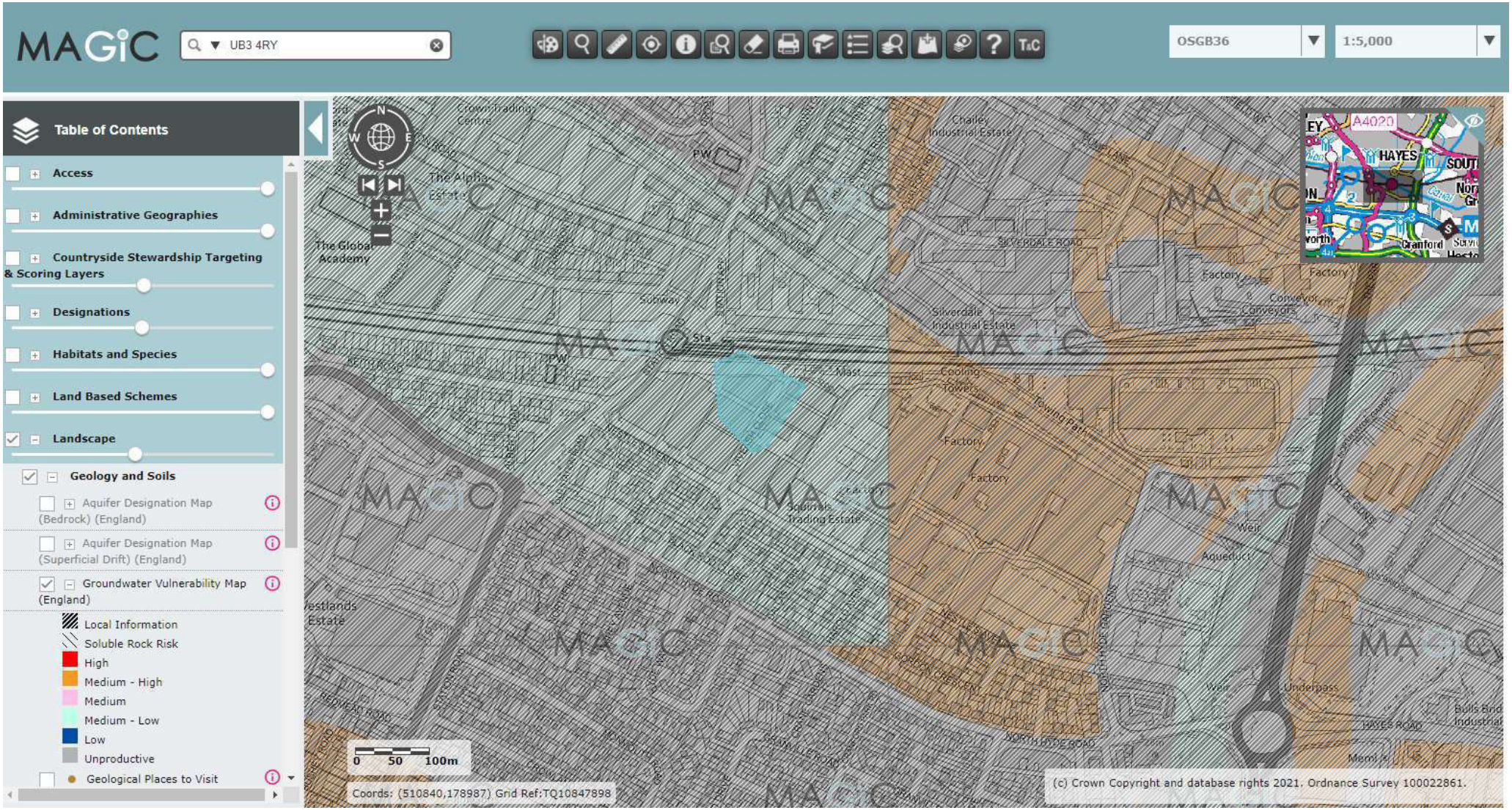
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Aquifer Designation Map (Superficial Drift) (England)
Groundwater Vulnerability Map (England)
Local Information
Soluble Rock Risk
High
Medium - High
Medium
Medium - Low
Low
Unproductive
Geological Places to Visit
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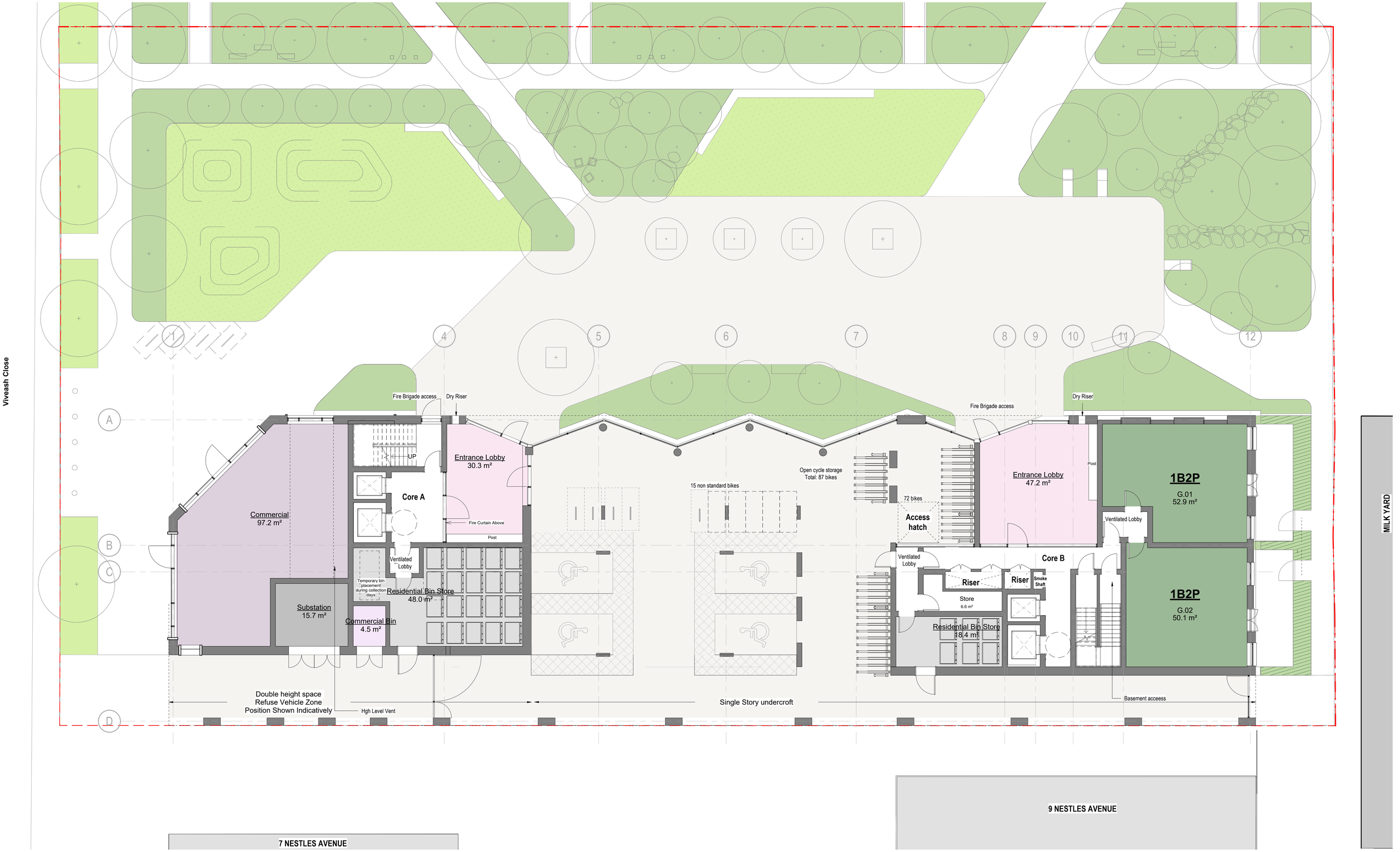
APPENDIX D – SITE PLAN



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Rev	Description	Date	Checked
014	Issue for Planning	26/11/22	DJ

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Project
Squirrels Estate

Drawing
Proposed Ground Floor

Client
Mackenzie (South West) Homes

Project no.	Scale	Drawn	Checked	North
15489	1 : 100 @ A1	MK	DJ	

Status
For Planning

Drg **A-PL-(03) - 100**

Revision **014**

TateHindle

APPENDIX E - ENVIRONMENT AGENCY FLOOD MAP (FOR PLANNING)

Flood map for planning

Your reference	Location (easting/northing)	Created
EA Flood Map	**509856/179281**	**21 Oct 2022 16:52**

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

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

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/

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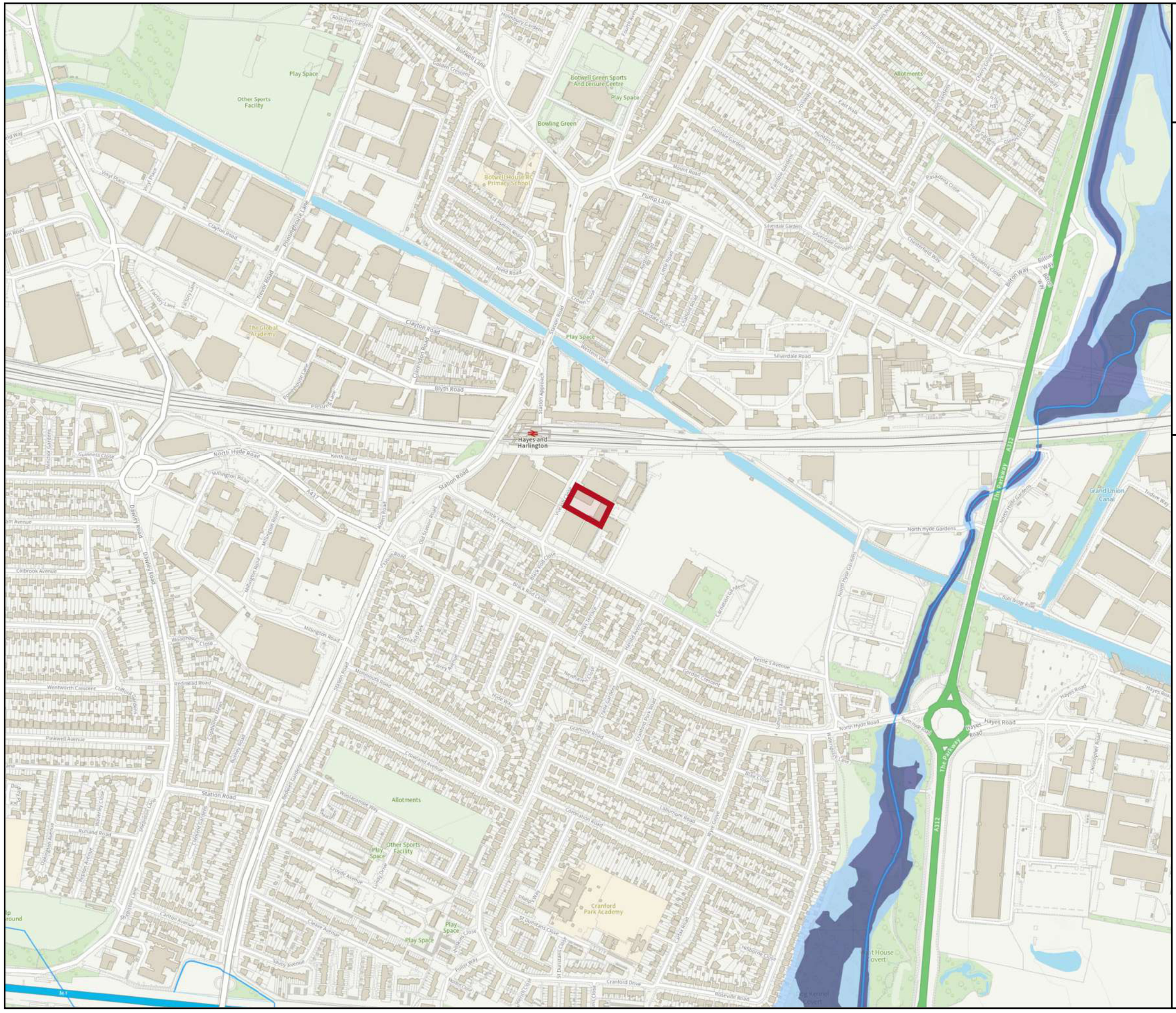

Environment Agency

Flood map for planning

Your reference
EA Flood Map

Location (easting/northing)
509856/179281

Scale
1:10000

Created
21 Oct 2022 16:52

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

0 100 200 300m

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CREATING PLACES FOR FUTURE GENERATIONS TO THRIVE

UK Locations

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