RIDA
FLOOD RISK ASSESSMENTS & DRAINAGE STRATEGIES

FLOOD RISK ASSESSMENT

24 Grasmere Avenue, HA4 7PJ

Reference: 0164 - FRA- 002

Sep-20

www.rida-reports.co.uk

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Introduction 1

Purpose of this report

1.1 RIDA Reports Ltd has been appointed by the owner of 24 Grasmere Avenue to undertake a Level 1 Screening Flood Risk Assessment for a development located at HA4 7PJ.

Objectives

1.2 The objectives of this FRA are to demostrate the following:

* Whether the proposed development is likely to be affected by current or future flooding.
* Whether the proposed development will increase flood risk elsewhere.
* Whether the flood risks associated with the proposed development can be satisfactorily managed.
* Whether the measures proposed to deal with the flood risk are sustainable.

Documents Consulted

1.3 To achieve these objectives the following documents have been consulted and/or referenced:

The National Planning Policy Framework (NPPF)
CIRIA C753 document The SuDS Manual, 2015
Local Flood Risk Management Strategy (LFRMS)
Level 1 Strategic Flood Risk Assessment (SFRA)
Aerial photographs and topographical survey of the site
British Geological Society Records
Environment Agency flood maps
The CIRIA publication 'C635 Designing for exceedance in urban drainage— Good practice'

Site Development Assessment 2

Development Site and Location

2.1 The site is located at Grasmere Avenue, London. The nearest post code is HA4 7PJ. Refer to appendix A for site location plan.

2.2 The current use of the site is the garden of the dwelling. The current use vulnerability clasification of the site is Water compatible. The site is located in the River Flood Zone 2. Refer to Appendix B for more details.

Development Proposals

2.3 The proposed development includes the extension of the current house to provide more internal space. The size of this extension is 10sqm. Refer to Appendix B for layout of the proposed development.

2.4 The vulnerability classification of the proposed development is More vulnerable with an estimated lifetime between 50 and 100 years.

Site Hydrology and Hydrogeology

Surface Water 2.5 The River Pinn is approximately 10 m away from the development.

Aquifer 2.6 The development is located within a secondary aquifer type A. Aquifers type A consist of permeable layers capable of supporting water supplies at a local rather than strategic scale. They are generally aquifers formerly classified as minor aquifers.

Source Protection Zone 2.7 The site is located within the source protection zone 2. This zone is defined by a 400 day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 metres around the source.

Ground Water Levels 2.8 The ground water levels for this site are unknown. However it is likely that the water table is high.

Site Geology

Bedrock 2.9 The British Geological Society records of the site show that it is located within the Clay, Silt and Sand .

Superficial Deposits 2.10 The British Geological Society records show that the superficial deposits are Clay, Silt, Sand and gravel .

Contaminated Land 2.11 The contaminated land register has not been consulted. The owner suggested that the site is not contaminated

National and Local Planning Policy 3

National Planning Policy Framework (NPPF)

3.1 The NPPF and its technical guidance is a set of planning policies with the key objective to contribute to the achievement of sustainable development. As part of it, they ensure that flood risk and sustainability are taken into account during the planning process. This ensures that developments are not located in flood risk areas and directs developments to lower risk areas. The NPPF applies a sequential risk-based approach to determining the suitability of land for development in flood risk areas. The NPPF also encourages developers to seek opportunities to reduce the overall level of flood risk through the layout of the development and the application of Sustainable Drainage Systems (SuDS). Adoption of these principles at early stages of the project can ensure that the developments take into account appropriate mitigation which is included within the detailed design of the schemes.

The Flood and Water Management Act (2010)

3.2 The Flood and Water Management Act aims to reduce the flood risk associated with extreme weather events. It provides a robust management of flood risk for people, homes and businesses and also encourages the use of SuDS for developments. A robust SuDS strategy should take into account the recommendations given in this Flood Risk Assessment. The drainage strategy should incorporate SuDS within the design and also attenuate all flows to either the greenfield or brownfield run off and take into account the risk from other sources as necessary.

Level 1 Strategic Flood Risk Assessment (SFRA)

3.3 The SFRA Level 1 identifies flood risk constraints in the local Area. It gives procedures that should be followed in planning to tackle flood risk during any development.

Level 2 Strategic Flood Risk Assessment (SFRA)

3.4 The SFRA Level 2 provides more information on the area identified in the SFRA Level 1, in order to show whether the Exception Test can be passed.

Assessment and Mitigation of Flood Risk 4

4.1 The flood risks were determined by identifying the sources of flooding and assessing their possible impact and likelihood to the development.

Fluvial Flood Risk - Assessment

4.2 Fluvial flood risk was assessed using the Environment Agency Flood Zone Maps and the standing advice approach recommended in the NPPF guidelines. The standing advice takes into account the size of the development and the flood risk vulnerability of land uses.

Standing Advice Applicability

Step 1
Development Size

4.3 The proposed development falls within the remit of the standing advice as it is a minor extension of a household with a floor space of no more than 250 square metres.

Step 2
Sequential test

4.4 The proposed development does not require a sequential test. The site is not in an area with increased flood risk as a result of multiple minor extensions.

Fluvial Flood Risk - Flood Levels

4.5 The 1% AEP level for this site is unknown and climate change levels are unknown.

4.6 The Climate Change allowances for the site is likely to be a central allowance of 500mm. This allowance is to be agreed with the environment agency.

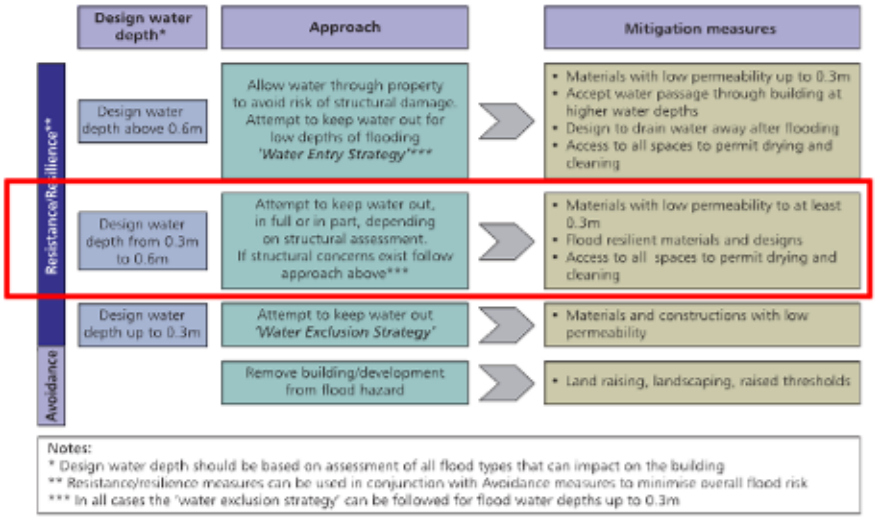
Fluvial Flood Risk - Resistance and Resilience Plan

4.7 The final floor level of the building has been set as per the existing building's ground levels. This level is no lower than existing levels and therefore the following flood proofing has been incorporated.

4.8 The flood resilience strategy for the development has been based on the CLG 2007 Improving the Flood Performance of New Buildings. See figure 1 below. The strategy is based on the water level within the proximity to the building.

4.9 Since the design water depth is unknown. It has been assumed that it is between 300mm and 600mm above the level of the ground level of the building. The water entry strategy approach has been used with a water exclusion strategy for up to 300mm depth flows.

Figure 1: Rationale for flood resilient and/or resistant design strategies.



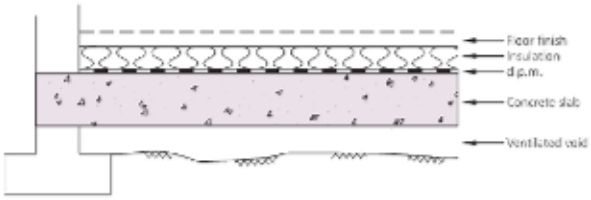
4.10 The building should utilise building materials that are suitable for a 'water exclusion strategy'. Materials classified as "Good" (highlighted in red) in Figure 2 shall be used for construction of the new building.

Figure 2: Flood resilience characteristics of building materials (based on laboratory testing)

Material	Resilience characteristics*		
	Water penetration	Drying ability	Retention of pre-flood dimensions, integrity
Bricks			
Engineering bricks (Classes A and B)	Good	Good	Good
Facing bricks (pressed)	Medium	Medium	Good
Facing bricks (handmade)	Poor	Poor	Poor
Blocks			
Concrete (3.5N, 7N)	Poor	Medium	Good
Aircrete	Medium	Poor	Good
Timber board			
OSB2, 11mm thick	Medium	Poor	Poor
OSB3, 18mm thick	Medium	Poor	Poor
Gypsum plasterboard			
Gypsum Plasterboard, 9mm thick	Poor	Not assessed	Poor
Mortars			
Below d.p.c. 1:3(cement:sand)	Good	Good	Good
Above d.p.c. 1:6(cement:sand)	Good	Good	Good

* Resilience characteristics are related to the testing carried out and exclude aspects such as ability to withstand freeze/thaw cycles, cleanability and mould growth

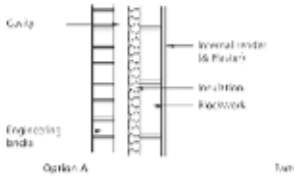
4.11 Foundations: Suspended concrete floor slabs at least 150mm thick is the preferred option. There should be a minimum space of 150mm ventilated void between the ground level and the bottom of the floor slab. Damp proof membranes should be included in the design. Floor insulation should be of the closed-cell type. Under floor services using ferrous materials should be avoided. Ceramic/concrete-based floor tiles, sitting on a bed of sand, cement render and water resistant grout can be used. See typical detail below:



- Reinforced concrete slab at least 150mm thick and complying with structural requirements for uplift forces
- Damp proof membrane of polythene at least 1200 gauge
- Insulation as rigid closed-cell material
- Ceramic tiles or stone floor finishes and including skirting boards.

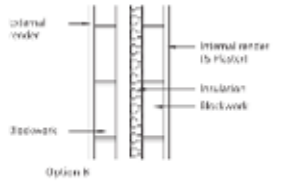
4.12 Concrete blocks used in foundations should be sealed with an impermeable material or encased in concrete to prevent water movement from the ground to the wall construction.

4.13 External Walls: Good quality facing bricks can be used for external face. External renders should not be used. External insulation is better than cavity insulation. See typical options below.



Part-filled cavity – Option A

- External face consisting of engineering bricks up to required level for flood protection (up to 0.6m maximum above floor level plus one course). Other external facing materials can be used above this level, but ensure interface is watertight.
- Rigid insulation.
- Internal face consisting of blocks.
- Internal cement based render, preferably with lime content. Composition depends on masonry; the following mix is effective:
  1 cement : 6 sand: 1 lime on Aircrete.
- Ensure stainless steel wall ties are used to minimise corrosion and consequent staining.
- Sacrificial plasterboard can be used, but it needs to be removed between ground floor and flood level. The board should be fitted horizontally to make removal easier. In some cases a dado rail can be used to cover the joint.



Part-filled cavity – Option B

- External cement based render, preferably with lime content. Composition depends on masonry; the following mix is effective:
  1 cement : 6 sand: ½ lime on concrete blockwork
  1 cement : 6 sand: 1 lime on Aircrete.
- External face consisting of blocks.
- Rigid insulation.
- Internal face consisting of blocks.
- Internal cement based render, preferably with lime content. Composition depends on masonry; the following mix is effective for flood resilience:
  1 cement : 6 sand: 1 lime on Aircrete.
- Ensure stainless steel wall ties are used to minimise corrosion and consequent staining.

4.14 Services and fittings (communications wiring, hearing systems, electrical services, water, electricity and gas meters) should be placed at above the flood level. Where possible, all service entries should be sealed (e.g. with expanding foam or similar closed cell material). Closed cell insulation should be used for pipes.

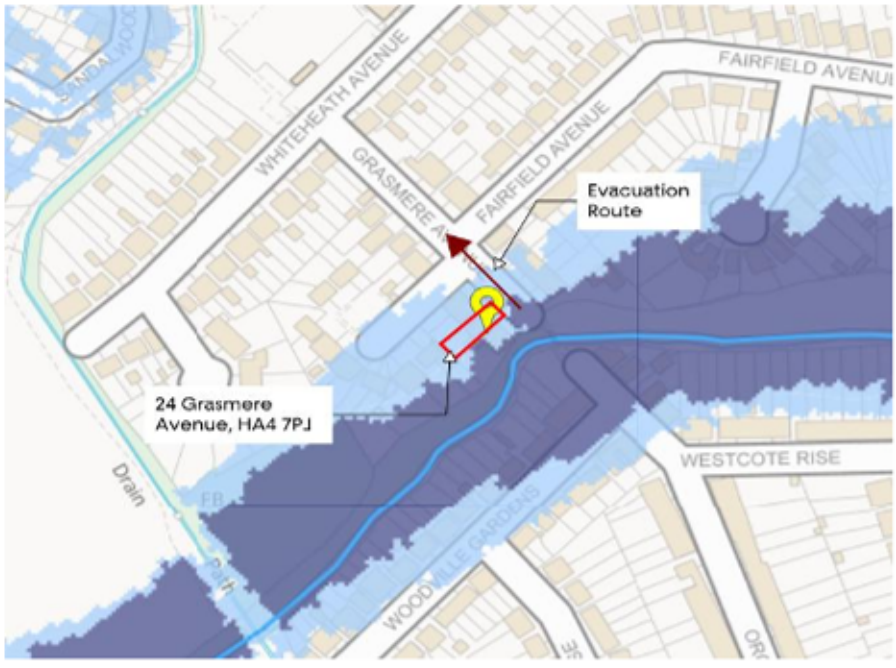
4.15 Fittings should be designed to be replaced after a flood, it is advisable to specify durable fittings that are not appreciably affected by water and can be easily cleaned (e.g. use of plastic materials or stainless steel). The cost of these units may need to be balanced against the predicted frequency of flooding. Avoid wood fibre based carcases and use easily removable solid wood doors and drawers.

Fluvial Flood Risk - Access and Evacuation

4.16 Safe egress is achievable by following Grasmere Avenue towards Fairfield Avenue, which is shown to be beyond the extent of flooding. See figure 3 below for details.

4.17 The site is within an Environment Agency Flood Warning Area. The occupants of the site are encouraged to sign up to the alerts and should use these to form an appropriate Evacuation Plan prior to occupation of the site.

Figure 3: General evacuation route



Fluvial Flood Risk - Surface Water Management

4.18 The surface water run-off will be disposed using SuDS techniques. The aim is to provide a sustainable design that accommodates the proposed attenuation volume and replicated the existing drainage regime using the SuDS hierarchy is shown in the figure 4 below.

4.19 The SuDS techniques highlighted in red below can be used on site. This assessment is based on the ground conditions and the potential discharge points available.

Figure 4: The SuDS Hierarchy (Source:EA Thames region, SuDS a practical guide)

	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
Most Sustainable	**Living roofs**	✔	✔	✔
	Basins and ponds - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	✔	✔	✔
	Filter strips and swales	✔	✔	✔
	Infiltration devices - soakaways - infiltration trenches and basins	✔	✔	✔
	Permeable surfaces and filter drains - gravelled areas - solid paving blocks - porous paviors	✔	✔	
Least Sustainable	**Tanked systems** - over-sized pipes/tanks - storms cells	✔		

4.20 These SuDS techniques should be implemented and sized during the detailed design of the project

Fluvial Flood Risk - Working next to a main river

4.21 The new extension is more that 8m away front the main river.

Surface water (overland flows) flood risk

4.22 The Environment Agency maps show that the flood risk from surface water is very low. A residual risk of localised ponding remains unlikely.

Flooding from drainage systems in adjacent areas

4.23 There are no records of sewer flooding within the site

Reservoirs Risks

4.24 The Reservoir Flood Map (RFM) produced by the Environment Agency do not show the risk to individual properties of dam breach flooding. The maps do not indicate or relate to any particular probability of dam breach flooding. The maps were prepared for emergency planning purposes and can be used to help reservoir owners produce on-site plans and the Local Resilience Forum produce off-site plans, and to prioritise areas for evacuation/early warning in the event of a potential dam failure. The RFM shows that the development could be within the possible dam breach flooding path. It is recommended that the Local Resilience Forum is contacted during detailed design. See Appendix C.

Groundwater flood risk

4.25 The risk from ground water is considered low. No mitigation required.

Conclusions 5

5.1 The development fully complies with the NPPF as it has been designed for water entry and be safe for use. The drainage principles should be used in the detailed design of the surface water systems.

5.2 This report demonstrates that the proposal will be safe, in terms of flood risk, for its design life and will not increase the flood risk elsewhere.

Appendix A

Scale: 1:1250, paper size: A4

120205/01

LOCATION PLAN

plans ahead by emapsite

Appendix B

SCALE BAR 1:500 @ A4

:PROPOSED EXTENSION

:PROPOSED LOFT CONVERSION

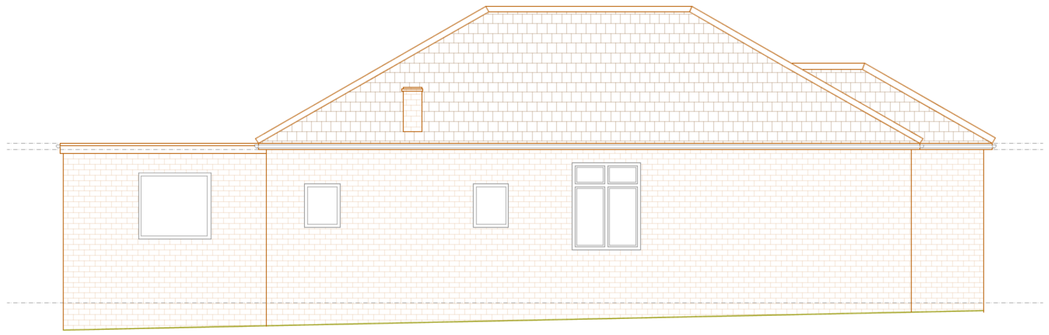
PROPOSED SITE BLOCK PLAN
SCALE BAR 1:500 @ A4

Greenfields Architectural Services

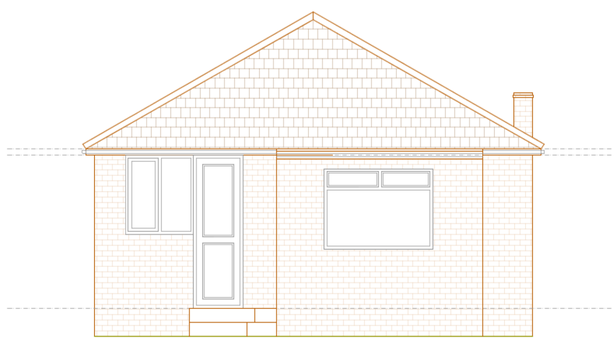
0m 1m 2m 3m 4m 5m 6m

SCALE BAR 1:50 @ A1

EXISTING SIDE ELEVATION 1
SCALE BAR 1:50 @ A1

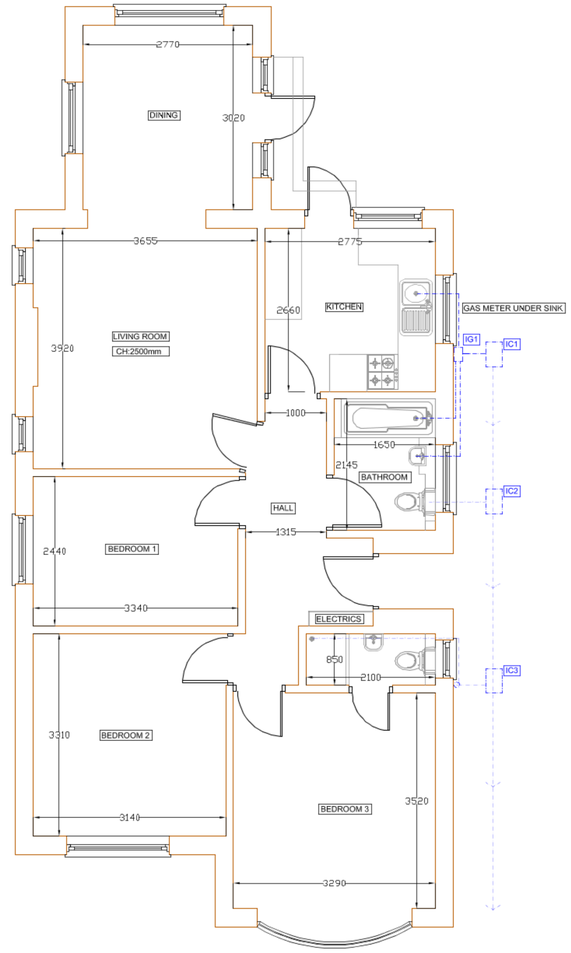


EXISTING SIDE ELEVATION 2
SCALE BAR 1:50 @ A1



EXISTING REAR ELEVATION
SCALE BAR 1:50 @ A1

EXISTING FRONT ELEVATION
SCALE BAR 1:50 @ A1



EXISTING GROUND FLOOR PLAN
SCALE BAR 1:50 @ A1

REVISION	DESCRIPTION	DATE	BY
A	DRAINAGE ADDED	23.07.20	BG

Greenfields Architectural Services

London Office: 113 Dawes Road, Fulham, London, SW6 7DU
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Email: enquiries@greenfieldsarchitecturalservices.co.uk
Website: www.greenfieldsarchitecturalservices.co.uk

DRAWING TITLE: EXISTING FLOOR PLANS AND ELEVATIONS

SITE ADDRESS: 24 GRASMERE

SCALE: 1:50 @ A1 | DRAWN BY: BG

DATE: 12.07.20

DRAWING NO: GRASMERE/01 REVISION A

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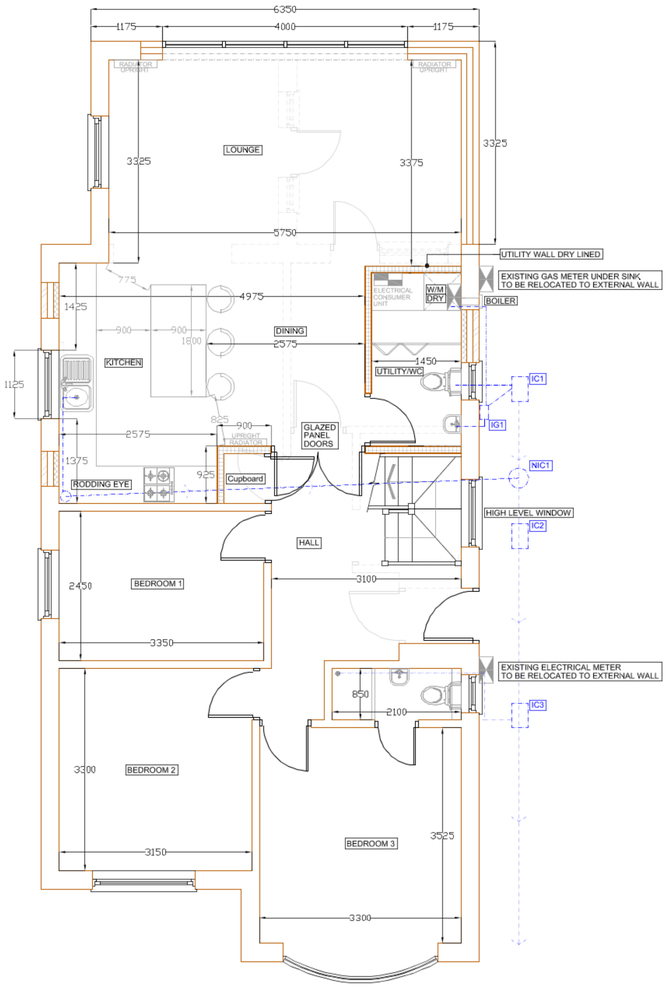
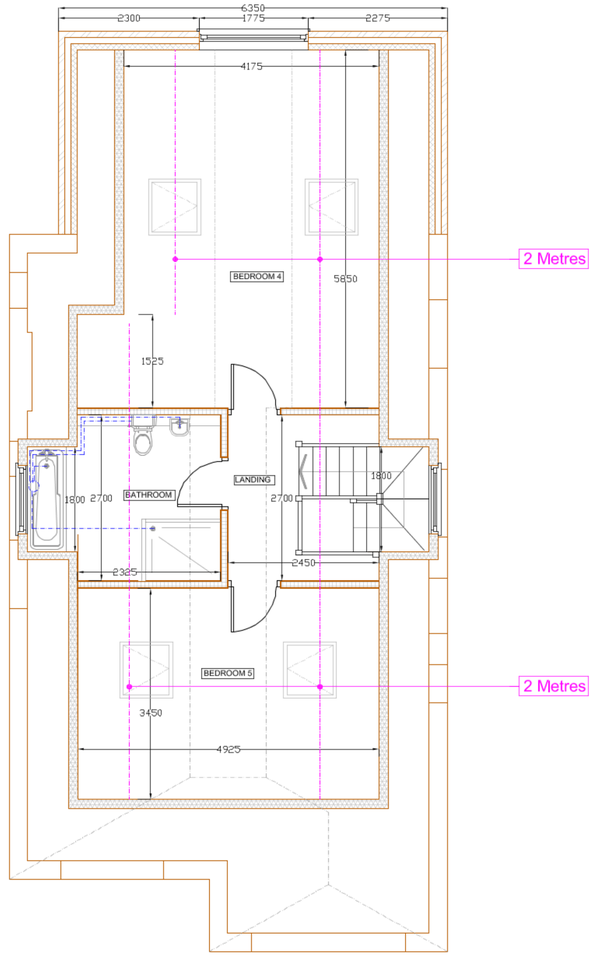
SCALE BAR 1:50 @ A1



PROPOSED GROUND FLOOR PLAN
SCALE BAR 1:50 @ A1



PROPOSED LOFT FLOOR PLAN
SCALE BAR 1:50 @ A1

REVISION	DESCRIPTION	DATE	BY
D	PLANS REVISED FOLLOWING CLIENTS COMMENTS	04.08.20	BG
C	PLANS REVISED FOLLOWING CLIENTS COMMENTS	04.08.20	BG
B	PLANS REVISED FOLLOWING CLIENTS COMMENTS	31.07.20	BG
A	PLANS REVISED FOLLOWING CLIENTS COMMENTS	23.07.20	BG

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Website: www.greenfieldsarchitecturalservices.co.uk

DRAWING TITLE: PROPOSED FLOOR PLANS

SITE ADDRESS: 24 GRASMERE

SCALE: 1:50 @ A1 | DRAWN BY: BG

DATE: 12.07.20

DRAWING NO: GRASMERE/02 REVISION D

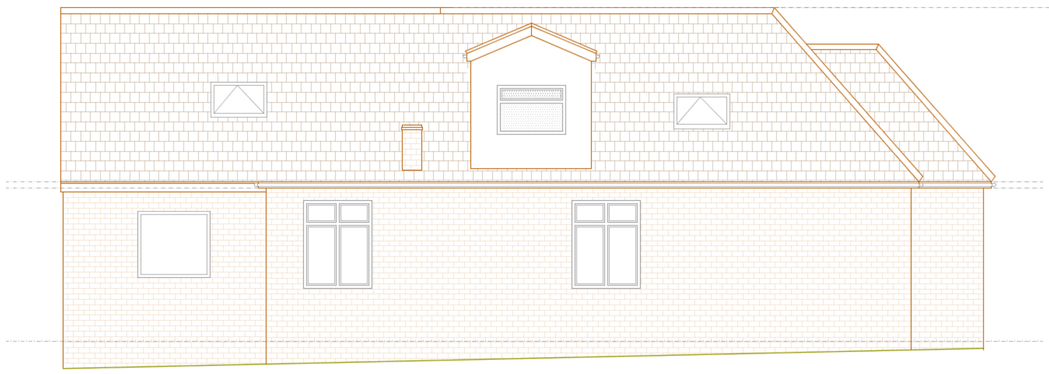
0m 1m 2m 3m 4m 5m 6m

SCALE BAR 1:50 @ A1

Ridge height to match no 22 Grasmere

PROPOSED SIDE ELEVATION 1
SCALE BAR 1:50 @ A1

Ridge height to match no 22 Grasmere



PROPOSED SIDE ELEVATION 2
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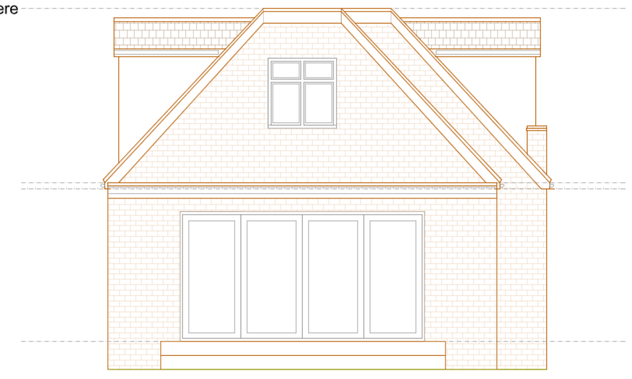
Ridge height to match no 22 Grasmere



PROPOSED REAR ELEVATION
SCALE BAR 1:50 @ A1

Ridge height to match no 22 Grasmere

PROPOSED FRONT ELEVATION
SCALE BAR 1:50 @ A1

REVISION	DESCRIPTION	DATE	BY
D	PLANS REVISED FOLLOWING CLIENTS COMMENTS	04.08.20	BG
C	PLANS REVISED FOLLOWING CLIENTS COMMENTS	04.08.20	BG
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Website: www.greenfieldsarchitecturalservices.co.uk

DRAWING TITLE: PROPOSED ELEVATIONS

SITE ADDRESS: 24 GRASMERE

SCALE: 1:50 @ A1 | DRAWN BY: BG

DATE: 12.07.20

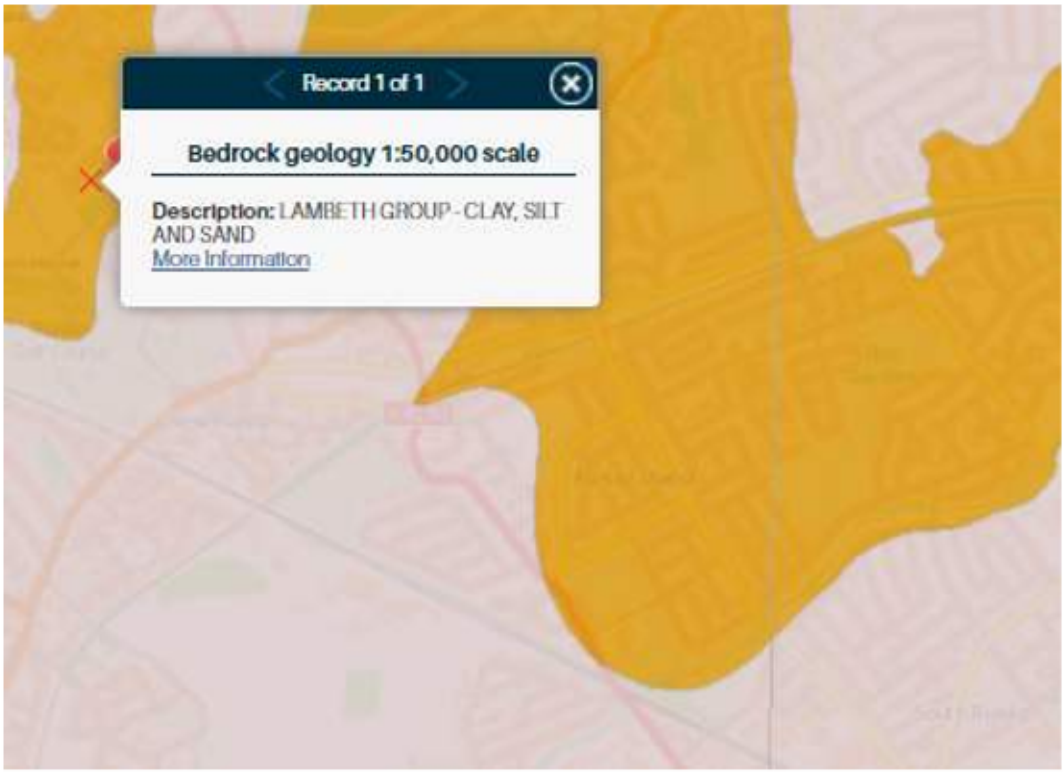
DRAWING NO: GRASMERE/03 REVISION D

Appendix C

SITE GEOLOGY

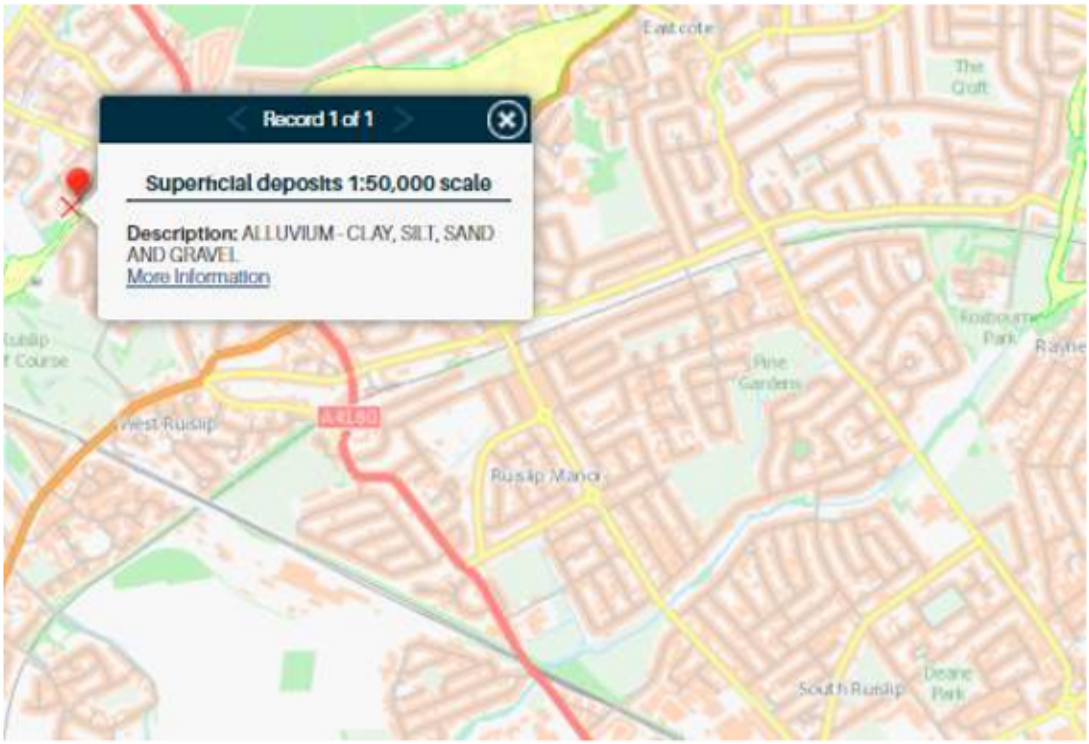
GEOINDEX ONSHORE

GEOLOGY - BEDROCK - CLAY SILT AND SAND

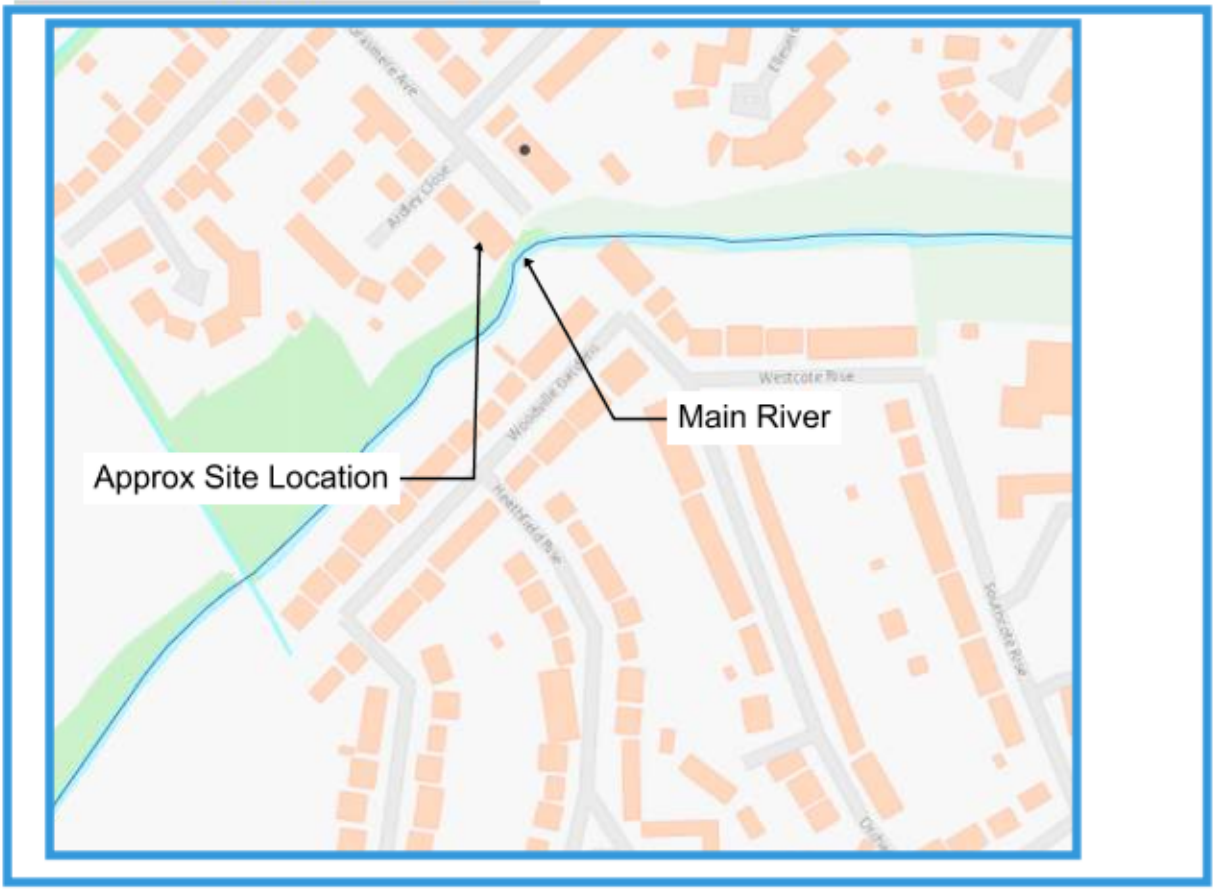


GEOINDEX ONSHORE

GEOLOGY - SUPERFICIAL DEPOSITS - CLAY-SILT-SAND-GRAVEL



Environment Agency Main River Map

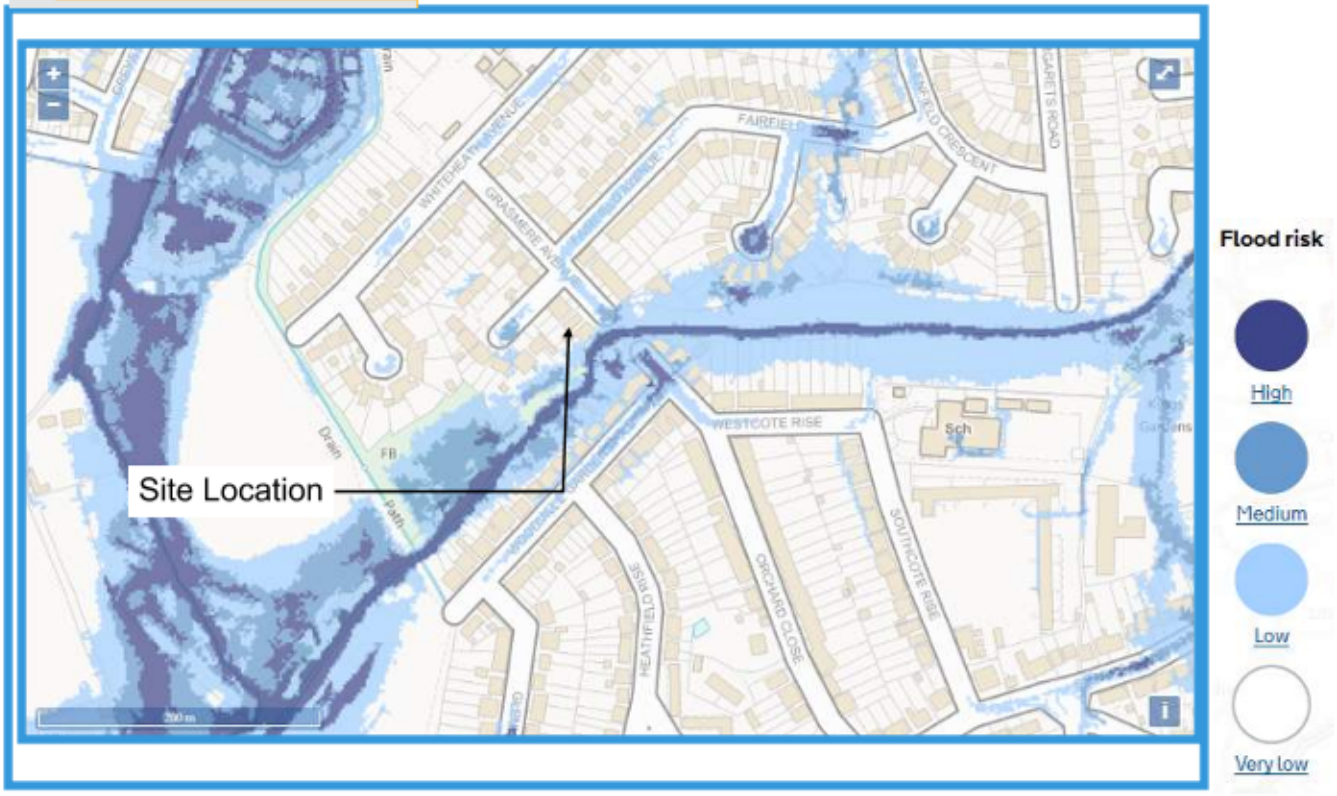


SITE FLOOD RISK

Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.

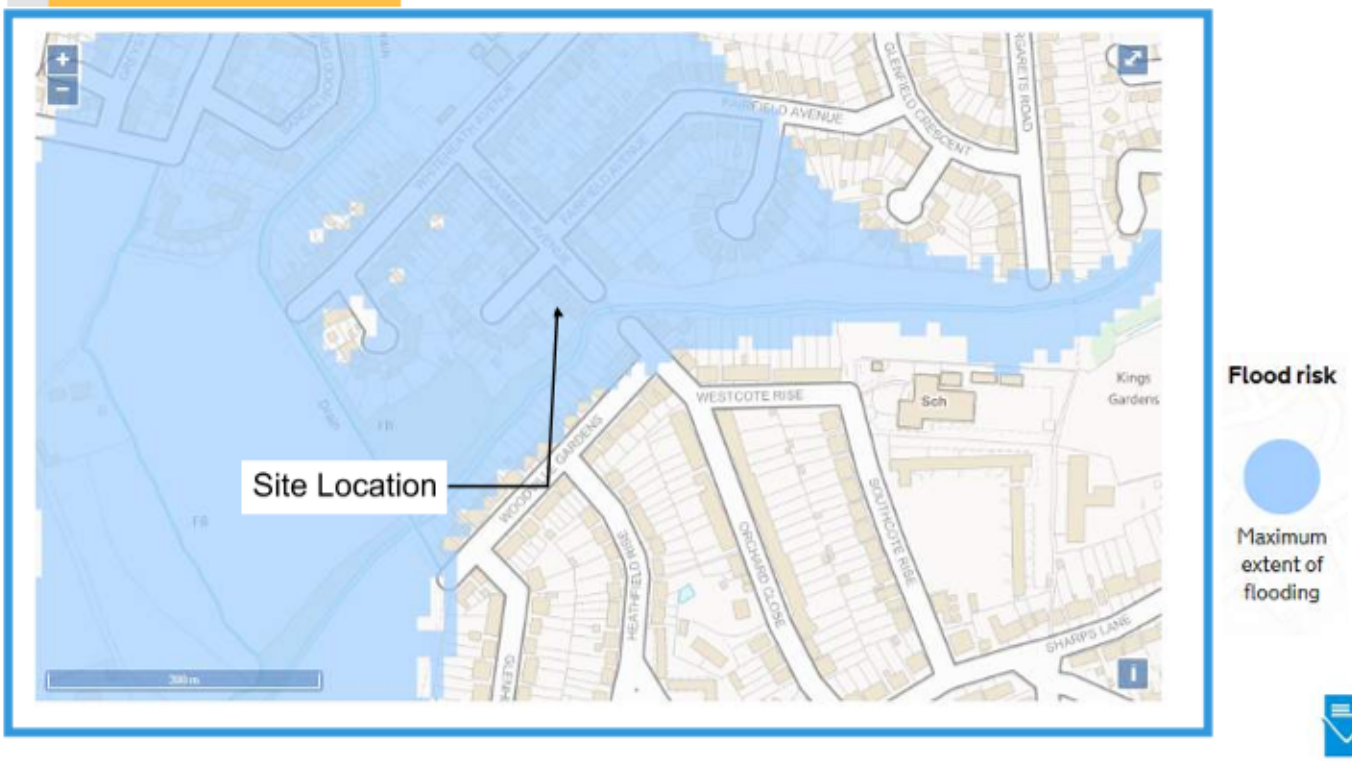
Flood risk from surface water

Extent of flooding



Flood risk from reservoirs

Extent of flooding



Environment Agency

Flood map for planning

Your reference	Location (easting/northing)	Created
24Grasmere	**508300/187782**	**28 Nov 2020 21:49**

Your selected location is in flood zone 2, an area with a medium probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

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.

Environment Agency

Flood map for planning

Your reference
24Grasmere

Location (easting/northing)
508300/187782

Scale
1:2500

Created
28 Nov 2020 21:49

- 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