

FLOOD RISK ASSESSMENT

GROUND FLOOR REAR EXTENSION, PART FIRST FLOOR REAR EXTENSION AND ALTERATIONS TO SIDE ELEVATION

Extension floor level no lower than existing

At

16 Shireoak Road

Manchester

M20 4NY

January 2023

Doc No. 00230/23/DOC/GEN/001 Rev 0.

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1.0 Scope

This report contains the details of a Flood Risk Assessment carried out for 16 Shireoak Road, Manchester M20 4NY, henceforth referred to as “the site” in this report. This report has been prepared for Mr. and Mrs. Joshi, the owners and must not be relied upon by any other third party without the explicit written permission of NCES Limited.

This report does not purport to provide definitive legal advice nor can it be used to demonstrate that the site will never flood in the future.

The Executive Summary contains an overview of key findings and conclusions. However, no reliance should be placed on the Executive Summary until the whole document has been read.

Other sections of the report may contain information which puts into context the findings noted within the Executive Summary.

2.0 Executive Summary

This Flood Risk Assessment (FRA) has been carried out in accordance with the National Planning Policy Framework (NPPF) & Planning Policy Guidance (PPG) note. It is to be used to assist the Local Planning Authority (LPA) and Environmental Agency (EA) when considering the flooding issues of the proposed development as part of a planning application.

The proposed development comprises a ground floor rear extension, part upper extension above the proposed ground floor extension, changes to existing South elevation and internal changes to an existing dwelling to increase the existing living space; **no change to site operation or sensitivity.**

This is categorized as a “More Vulnerable” landuse in accordance with the NPPF classification, the site is located in EA FZ3 as seen in. Hence it is considered appropriate development in accordance with NPPF with a need to pass the Exception Test. However, as the site is classified as minor extension of less than 250 square and the further risk assessment suggests the development can deemed to satisfy to pass the exception test.

The site is within council and EA surface water risk area; it is not possible to refuse or object to the scheme of the grounds of the surface water hazard because it is an existing dwelling and the scheme results in betterment regardless.

The correct approach has been followed by the scheme:

- Ground extension floor level no lower than existing; no additional raising of floor levels is necessary
- Modern flood resilience required for ground floor extension
 - ➔ Use the likely surface water depths to set the level of flood resilience.

Results in better protected and flood future-proofed property than existing.

No additional formal Sustainable Drainage System (SuDS) are considered necessary to still be compliant with policy.

Given the residual risk flood setting, the level, extent and depth of flooding on the site can be managed in terms of continued refuge for all site users for the lifetime of the development.

Based on the likely flooding risk, it is considered that the proposed development can be constructed and operated safely in flood risk terms, without increasing flood risk elsewhere and is therefore appropriate development in accordance with the NPPF.

3.0 Introduction

The site boundary is provided in the location plan in Appendix A.

The FRA combined a desktop study is Flood Risk Assessment (FRA) has been carried out in accordance with the NPPF guidance. Appropriate flood mitigation measures were then considered, either as already incorporated within the scheme or recommended for inclusion at detailed design stage. The suitability of the proposed development was also reviewed in the context of the NPPF and the technical guidance accompanying the NPPF.

4.0 Purpose of the Report

This FRA has been carried out in accordance with National Planning Policy Framework (NPPF). It is to be used to assist the Local Planning Authority (LPA) and Environment Agency (EA) when considering the flooding issues of the proposed development as part of a planning application.

The report provides the following information:

- An assessment of the flood risk posed to the site based on flood information and mapping provide by the EA and Strategic Flood Risk Assessment (SFRA);
- An assessment of the proposed development in terms of surface water run-off; and
- Proposals for measures to mitigate the flood risks posed to and from the development where appropriate.
- Local authorities consider flood risk through relevant environmental and climate change policies which enforce the requirements of the NPPF. The Strategic Flood Risk Assessment (SFRA) is a key source of flood risk specific information for the area. The SFRA provides a more detailed review of flood risks and recommendations for ensuring developments can be constructed and operated safely in accordance with the NPPF. Greater details of the SFRA is provided in the report policy CS26 and Flood Risk SPD (Supplementary Planning Document, April 2007).

4.1 Overview of British Legislation

The National Planning Policy Framework (NPPF) and Planning Policy Guidance (PPG) supercede all the Planning Policy Statements (PPS's). Flood risk is retained as a key development consideration.

The Sequential and Exception Tests are retained as part of the NPPF. The accompanying NPPF Technical Guidance also includes Table 2 and 3 to assist with flood risk vulnerability classifications and development suitability. This report provides the flood risk assessment element of both tests where appropriate. It is the decision of the planning authority as to whether the tests can be fully passed.

Manchester County Council Lead Local Flood Authority (LLFA) SuDS requirements.

4.2 Local Policy

Local Authorities consider flood risk through relevant environmental and climate change policies which enforce the requirements of the NPPF.

The Strategic Flood Risk Assessment (SFRA) is a key source of flood risk specific information for the area. The SFRA provides a more detailed review of flood risks and recommendations for ensuring developments can be constructed and operated safely in accordance with the NPPF. Greater detail of the SFRA is provided in the report.

5.0 References

The information source used to undertake this FRA has been collected from the following sources:

- EA Website and Data
- The National Planning Policy Framework (NPPF)
- CIRIA C753 document The SuDS Manual, 2015
- Local Flood Risk Management Strategy (LFRMS), March 2014
- Level 1 Strategic Flood Risk Assessment (SFRA)
- Topographic Survey of the Site.
- British Geological Society Records.
- The CIRIA publication, 'C635 Designing for exceedance in urban drainage – Good Practice', 2006.
- Internet mapping and searches.
- Environmental Agency – Improving the flood performance of new buildings – Flood resilient construction. CIRIA May 2007

6.0 The Site Description

6.1 Site Location

The site comprises an existing dwelling, a three-bed semi-detached house situated at 393084N and 385638E in accordance ordinance survey map. The site is associated with concrete imprinted grade slab in the front which is used as parking space. The rear patio area is also built with similar impermeable make-up of imprinted concrete grade slab. A major part of the rear garden is soft landscaping. The site is in EA FZ3. The location plan can be seen in Appendix A.

6.2 Site Geology

Bedrock: The British Geological Society records of the site show that it is located within Chester Formation – Sandstone. Sedimentary bedrock formed between 250 and 247.1 million years ago during the Triassic period.

Superficial Deposits: Till, Devensian – Diamicton. Sedimentary superficial deposit formed between 116 and 11.8 thousand years ago during the Quaternary period.

Contaminated Land: The Homescreen report survey reference – 22333216 (Grid reference – 385638 393084) specify no significant concerns have been identified as a result of the contaminated land searches. The Contaminated Land Liability, Past Land Use, Waste and Landfill, Current and Recent Industrial tests has been deemed as passed.

6.3 Site Details and Flood Risks

The flood risk in the area connected to the dwelling is summarised in **Table 1**. The flood risks map are shown from **Figure 1** to **Figure 5**.

Table 1: Flood Risk centred on Shireoak Road, Withington, M20 4NY

Flood Sources	Site Status	Comment on flood risk posed to / from the development
Fluvial / Tidal	Site is in FZ3 fluvial; undefended or defended. Cringle Brook is c. 800m to the North of the site Immediate access to FZ1 to the east in lowest hazard flood extents which is c.275m from the site.	No highly vulnerable uses No change to site operations or sensitivity No flood compensation required for FZ3 All site users continue to have access to upper floors above the extreme event for the lifetime of the scheme
Groundwater	SFRA indicates site is not in an area of groundwater flooding / incidents.	The proposed development will not increase the risk of groundwater flooding. Low Risk
Artificial Sources The	Site is within extensive general EA Reservoir Flood Warning area that would otherwise result from river flooding: managed and maintained to appropriate standards No other artificial sources with likely flood flow paths that could reach the site	Low Risk Not relevant to the scheme as residential use at the site is not in question
Surface Water / Sewer Flooding e	Site is not located in a Critical Drainage Area but within surface water flood extents from the council and the EA Condition, depth and location of surrounding infrastructure uncertain	No increase in impermeable areas Scheme in fact reduces impermeable areas overall No additional drainage assessment required Results in better protected and flood future- proofed property than existing. Low Risk
Climate Change: new allowances	Included in the flood modelling extents	Development will not increase the peak flow and volume of discharge from the site Climate change incorporated in the EA / SFRA modelling Low risk posed to and from the development
Historic Flooding	Included in the EA / council data where appropriate	Site is not in an area of historic flooding based on available data

The defended and undefended flood levels as obtained from EA are illustrated in **Table 2** to **Table 8**. The predicted flood level at various stages and the finished ground floor level of dwelling are described in **Table 9**.

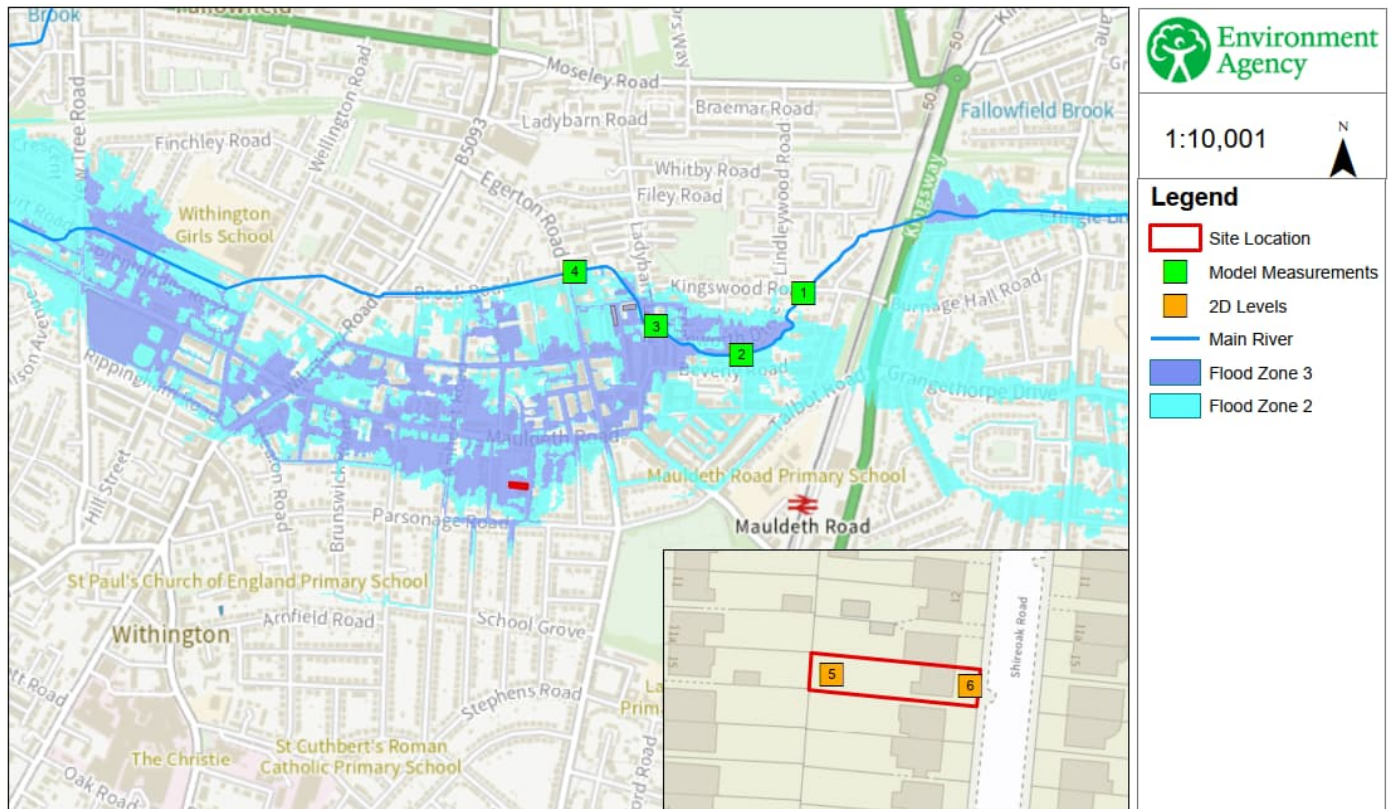


Figure 1 : Detailed Flood Map Centred on Shireoak Road, Withington, M20 4NY (Created on 09/02/2023 by EA)

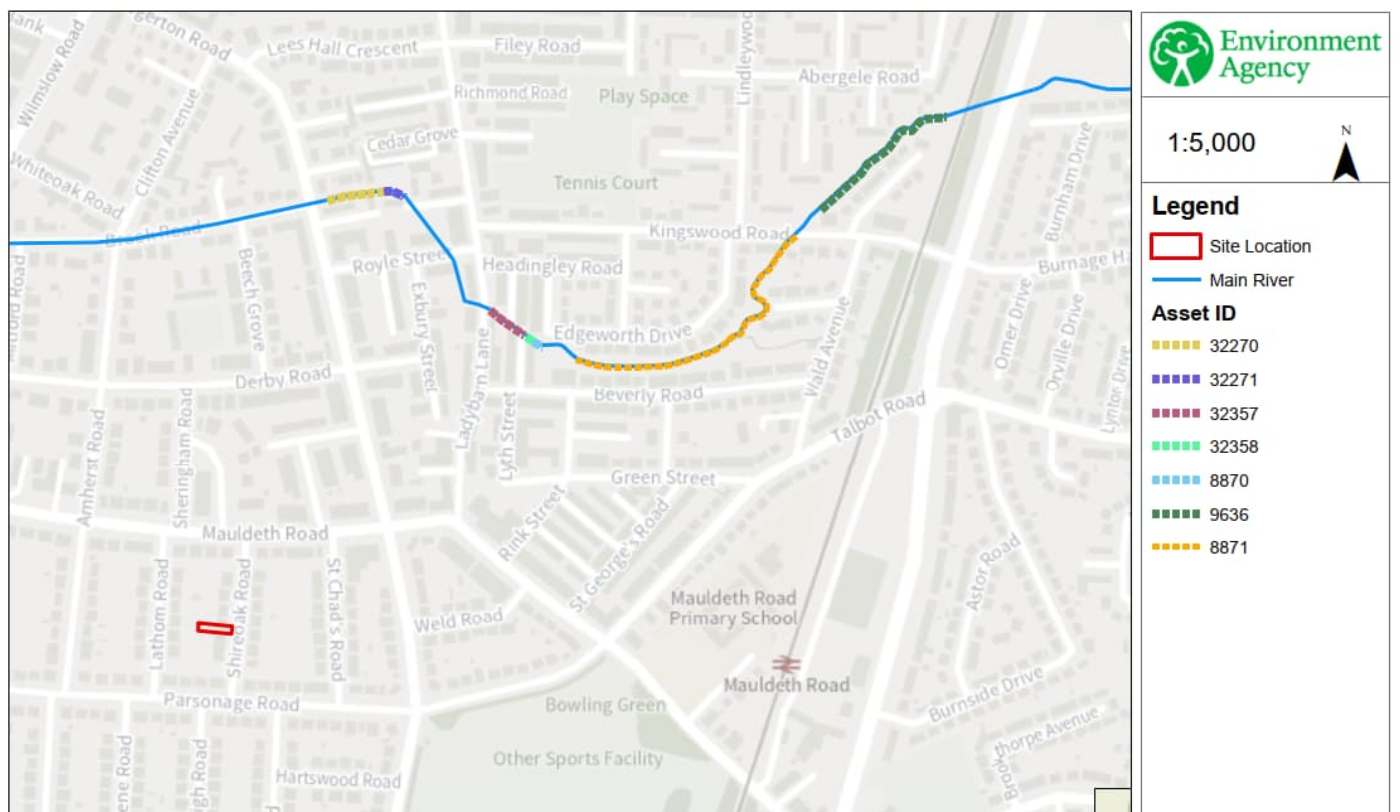


Figure 2 : Flood Defences Map Centred on Shireoak Road, Withington, M20 4NY (Created on 09/02/2023 by EA)

Table 2: Defended and Undefended Flood Levels in Withington, Manchester and Modelled Flood Levels at 16 Shireoak Road, M20 4NY contd..

Map Ref.	Model Node Reference	Easting	Northing	Data	Undefended				
					50% AEP (1 in 2 year)	20% AEP (1 in 5 year)	10% AEP (1 in 10 year)	5% AEP (1 in 20 year)	5% AEP (1 in 25 year)
1	Ea13_0238_CRIN01_2210d	386228	393488	Modelled Water Level (maodN)	40.27	40.40	40.56	40.63	40.64
				Modelled Flow (cumecs)	2.15	2.72	3.47	3.80	3.86
2	ea013_0238_CRIN01_1991	386097	393344	Modelled Water Level (maodN)	39.77	39.87	39.99	40.04	40.05
				Modelled Flow (cumecs)	3.03	3.70	4.57	5.07	5.17
3	ea013_0238_CRIN01_1791u	385915	393422	Modelled Water Level (maodN)	38.46	38.77	39.31	39.33	39.34
				Modelled Flow (cumecs)	3.03	3.69	4.28	4.39	4.38
4	ea013_0238_CRIN01_1551u	385747	393525	Modelled Water Level (maodN)	37.83	38.02	38.43	38.45	38.45
				Modelled Flow (cumecs)	3.03	3.69	4.27	4.37	4.38
Map Ref.	Model Node Reference	Easting	Northing	Data	Undefended				
					5% AEP (1in 20 year)	2% AEP (1in 50 year)	1.33% AEP (1in 75 year)	1% AEP (1in 100 year)	1% AEP (1in 100 year) + 30% increase in flow
5	2D Levels	385618	393086		37.01	37.20	37.24	37.26	37.29
6		385647	393084		37.50	37.52	37.53	37.53	37.54

Table 3: Defended and Undefended Flood Levels in Withington, Manchester and Modelled Flood Levels at 16 Shireoak Road, M20 4NY contd..

Map Ref.	Model Node Reference	Easting	Northing	Data	Undefended				
					2% AEP (1 in 50 year)	1.33% AEP (1 in 75 year)	1% AEP (1 in 100 year)	1% AEP (1 in 100 year) + 30% increase in flow	1% AEP (1 in 100 year) + 35% increase in flow
1	Ea13_0238_CRIN01_2210d	386228	393488	Modelled Water Level (maodN)	40.68	40.70	40.71	40.75	40.76
				Modelled Flow (cumecs)	4.11	4.29	4.37	4.73	4.79
2	ea013_0238_CRIN01_1991	386097	393344	Modelled Water Level (maodN)	40.09	40.11	40.12	40.17	40.18
				Modelled Flow (cumecs)	5.54	5.71	5.81	6.37	6.46
3	ea013_0238_CRIN01_1791_u	385915	393422	Modelled Water Level (maodN)	39.35	39.36	39.36	39.37	39.38
				Modelled Flow (cumecs)	4.40	4.41	4.42	4.44	4.44
4	ea013_0238_CRIN01_1551_u	385747	393525	Modelled Water Level (maodN)	38.47	38.47	38.47	38.49	38.50
				Modelled Flow (cumecs)	4.40	4.41	4.42	4.44	4.44
Map Ref.	Model Node Reference	Easting	Northing	Data	Undefended				
					1% AEP (1 in 100 year) + 35% increase in flow	1% AEP (1 in 100 year) + 70% increase in flow	0.5% AEP (1 in 200 year)	0.1% AEP (1 in 1000 year)	0.1% AEP (1 in 1000 year) + 30% increase in flow
5	2D Levels	385618	393086		37.30	37.32	37.28	37.39	37.44
6		385647	393084		37.54	37.54	37.53	37.58	37.62

Table 4: Defended and Undefended Flood Levels in Withington, Manchester and Modelled Flood Levels at 16 Shireoak Road, M20 4NY contd..

Map Ref.	Model Node Reference	Easting	Northing	Data	Undefended			
					1% AEP (1 in 100 year) + 70% increase in flow	0.5% AEP (1 in 200 year)	0.1% AEP (1 in 1000 year)	0.1% AEP (1 in 1000 year) + 30% increase in flow
1	Ea13_0238_CRIN01_2210d	386228	393488	Modelled Water Level (maodN)	40.79	40.74	40.84	40.88
				Modelled Flow (cumecs)	5.06	4.57	5.54	5.78
2	ea013_0238_CRIN01_1991	386097	393344	Modelled Water Level (maodN)	40.23	40.16	40.29	40.31
				Modelled Flow (cumecs)	7.27	6.16	9.19	10.58
3	ea013_0238_CRIN01_1791 u	385915	393422	Modelled Water Level (maodN)	39.39	39.37	39.43	39.46
				Modelled Flow (cumecs)	4.49	4.44	4.48	4.51
4	ea013_0238_CRIN01_1551 u	385747	393525	Modelled Water Level (maodN)	38.53	38.48	38.56	38.61
				Modelled Flow (cumecs)	4.44	4.43	4.47	4.49
Map Ref.	Model Node Reference	Easting	Northing	Data				
5	2D Levels	385618	393086					
6		385647	393084					

Table 5: Defended and Undefended Flood Levels in Withington, Manchester and Modelled Flood Levels at 16 Shireoak Road, M20 4NY contd..

Map Ref.	Model Node Reference	Easting	Northing	37.18Data	Defended				
					50% AEP (1 in 2 year)	20% AEP (1 in 5 year)	10% AEP (1 in 10 year)	5% AEP (1 in 20 year)	4% AEP (1 in 25 year)
1	Ea13_0238_CRIN01_2210d	386228	393488	Modelled Water Level (maodN)	40.27	40.40	40.56	40.63	40.64
				Modelled Flow (cumeCs)	2.15	2.72	3.47	3.80	3.86
2	ea013_0238_CRIN01_1991	386097	393344	Modelled Water Level (maodN)	39.77	39.87	39.99	40.04	40.05
				Modelled Flow (cumeCs)	3.03	3.70	4.57	5.07	5.17
3	ea013_0238_CRIN01_1791_u	385915	393422	Modelled Water Level (maodN)	38.46	38.77	39.31	39.33	39.34
				Modelled Flow (cumeCs)	3.03	3.69	4.28	4.39	4.38
4	ea013_0238_CRIN01_1551_u	385747	393525	Modelled Water Level (maodN)	37.83	38.02	38.43	38.45	38.45
				Modelled Flow (cumeCs)	3.03	3.69	4.27	4.37	4.38
Map Ref.	Model Node Reference	Easting	Northing	Data	Defended				
					5% AEP (1 in 20 year)	2% AEP (1 in 50 year)	1.33% AEP (1 in 75 year)	1% AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% increase in flow
5	2D Levels	385618	393086		36.99	37..1	37.18	37.22	37.27
6		385647	393084		37.47	37.51	37.52	37.52	37.53

Table 6: Defended and Undefended Flood Levels in Withington, Manchester and Modelled Flood Levels at 16 Shireoak Road, M20 4NY contd..

Map Ref.	Model Node Reference	Easting	Northing	37.18Data	Defended			
					2% AEP (1 in 50 year)	1.33% AEP (1 in 75 year)	1% AEP (1 in 100 year)	1% AEP (1 in 100 year) + 35% increase in flow
1	Ea13_0238_CRIN01_2210d	386228	393488	Modelled Water Level (maodN) Modelled Flow (cumeCs)	40.68 4.11	40.70 4.29	40.56 4.37	40.71 4.73
2	ea013_0238_CRIN01_1991	386097	393344	Modelled Water Level (maodN) Modelled Flow (cumeCs)	40.09 5.54	40.11 5.71	40.12 5.81	40.18 6.46
3	ea013_0238_CRIN01_1791 _u	385915	393422	Modelled Water Level (maodN) Modelled Flow (cumeCs)	39.35 4.40	39.36 4.41	39.36 4.42	39.38 4.44
4	ea013_0238_CRIN01_1551 _u	385747	393525	Modelled Water Level (maodN) Modelled Flow (cumeCs)	38.47 4.40	38.47 4.41	38.47 4.42	38.50 4.44
Map Ref.	Model Node Reference	Easting	Northing	Data	Defended			
					1 % AEP (1 in 100 year) + 35% increase in flow	1 % AEP (1 in 100 year) + 70% increase in flow	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year) + 30% increase in flow
5	2D Levels	385618	393086		37.28	37.30	37.26	36.43
6		385647	393084		37.53	37.54	37.53	37.61

Table 7: Defended and Undefended Flood Levels in Withington, Manchester and Modelled Flood Levels at 16 Shireoak Road, M20 4NY.

Map Ref.	Model Node Reference	Easting	Northing	37.18Data	61fended			
					1% AEP (1 in 100 year) + 70% increase in flow	0.5% AEP (1 in 200 year)	0.1% AEP (1 in 1000 year)	0.1% AEP (1 in 1000 year) + 30% increase in flow
1	Ea13_0238_CRIN01_2210d	386228	393488	Modelled Water Level (maodN)	40.79	40.74	40.84	40.88
				Modelled Flow (cumecs)	5.06	4.57	5.54	5.78
2	ea013_0238_CRIN01_1991	386097	393344	Modelled Water Level (maodN)	40.23	40.16	40.29	40.31
				Modelled Flow (cumecs)	7.27	6.16	9.19	10.58
3	ea013_0238_CRIN01_1791 u	385915	393422	Modelled Water Level (maodN)	39.39	39.37	39.43	39.46
				Modelled Flow (cumecs)	4.49	4.44	4.48	4.51
4	ea013_0238_CRIN01_1551 u	385747	393525	Modelled Water Level (maodN)	38.53	38.48	38.56	38.61
				Modelled Flow (cumecs)	4.44	4.43	4.47	4.49
Legends	Model data taken from Cringle Brook 2017 AEP – Annual Exceedance Probability M aodN – metres above ordnance datum Newlyn Cumecs – cubic metres per second							
Notes	*Climate Change Scenario – 30%, 35% and 70% increases in flow calculated for the 2080' s (2070-2115). Please see https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider and flood risk assessment.							

Table 8 : Flood Defences: (Reference: Figure 2)

Start Date	Asset Type	Asset ID	Standard of Protection	Upstream Actual Crest Level (m aod)	Downstream Actual Crest Level (m aod)
01/01/2004	Wall	32270	100	32.28	39.21
01/01/2004	Wall	32271	100	39.73	39.40
01/01/2004	Wall	32357	100	40.71	40.70
01/01/2004	Wall	8870	100	39.83	39.84
01/01/2004	Engineered High Ground	9636	100	41.26	43.83
01/01/2004	Natural High Ground	8871	100	41.17	39.56

7.0 Assessment of Proposed Development

7.1 Assessment and Mitigation of Flood Risk

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

7.1.1 Fluvial Flood Risk Assessment

Fluvial flood risk was assessed using the Environmental 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

- **Development Size:** 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 m².
- **Sequential Test:** 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.

7.1.2 Fluvial Flood Risk – Flood Levels

The Fluvial flood risk from rivers or sea is medium in accordance with SFRA guideline and as shown in **Figure 3**.

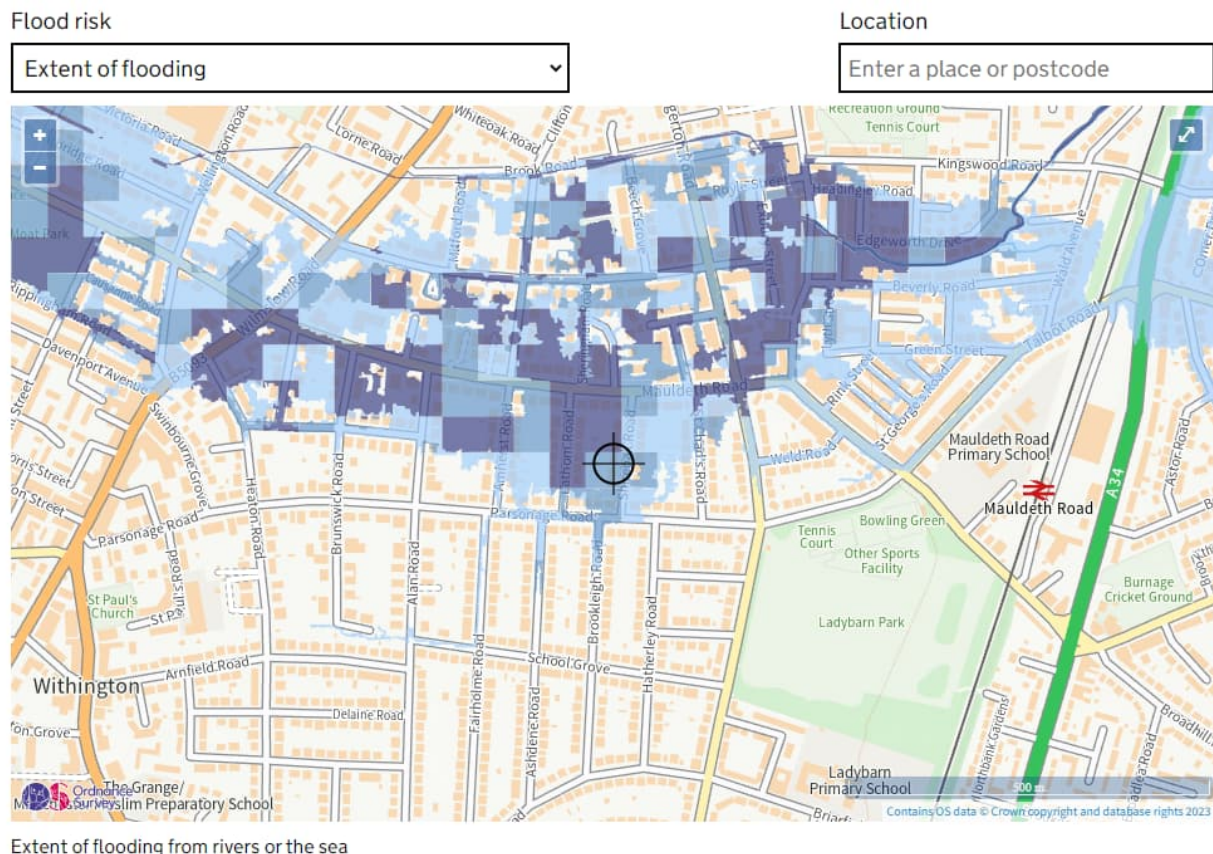


Figure 3: Extent of Flooding Risk from Rivers and Sea on 16 Shireoak Road, Withington, M20 4NY

The Fluvial flood risk from surface water flood is low as shown in **Figure 4** and the water depth at medium risk scenario is below 300mm as per **Figure 5**.

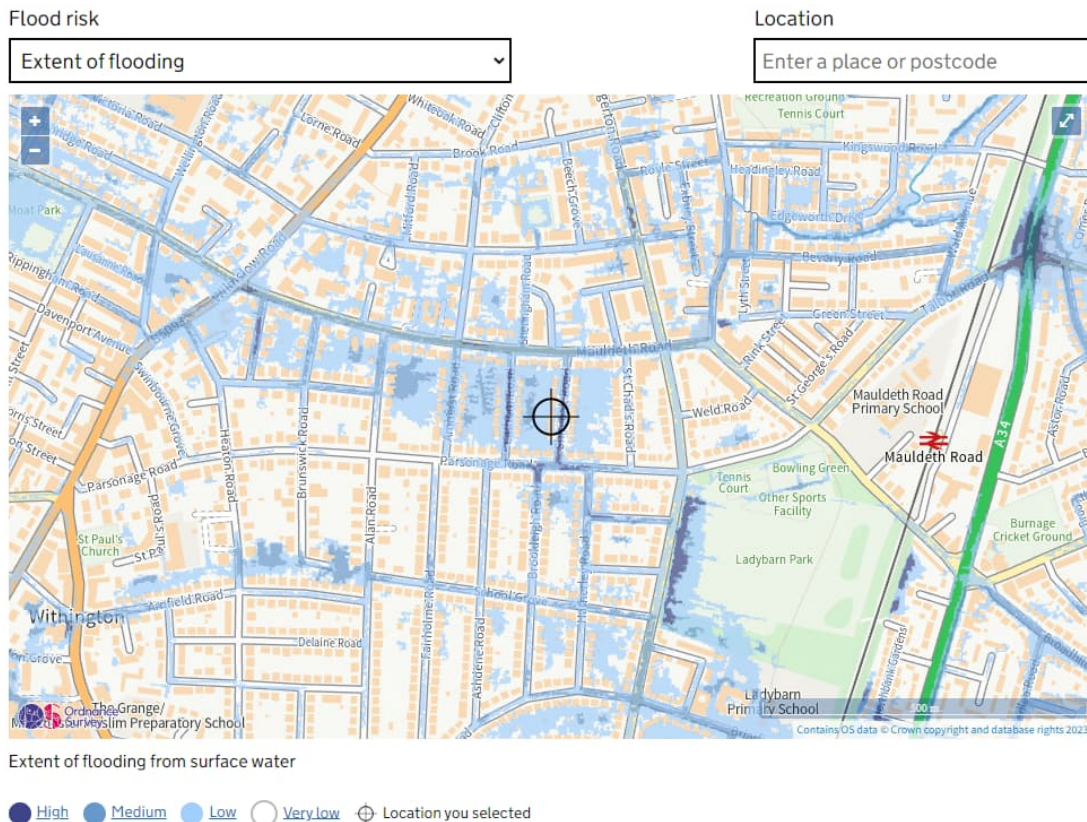


Figure 4: Extent of Flooding Risk from Surface Water on 16 Shireoak Road, Withington, M20 4NY

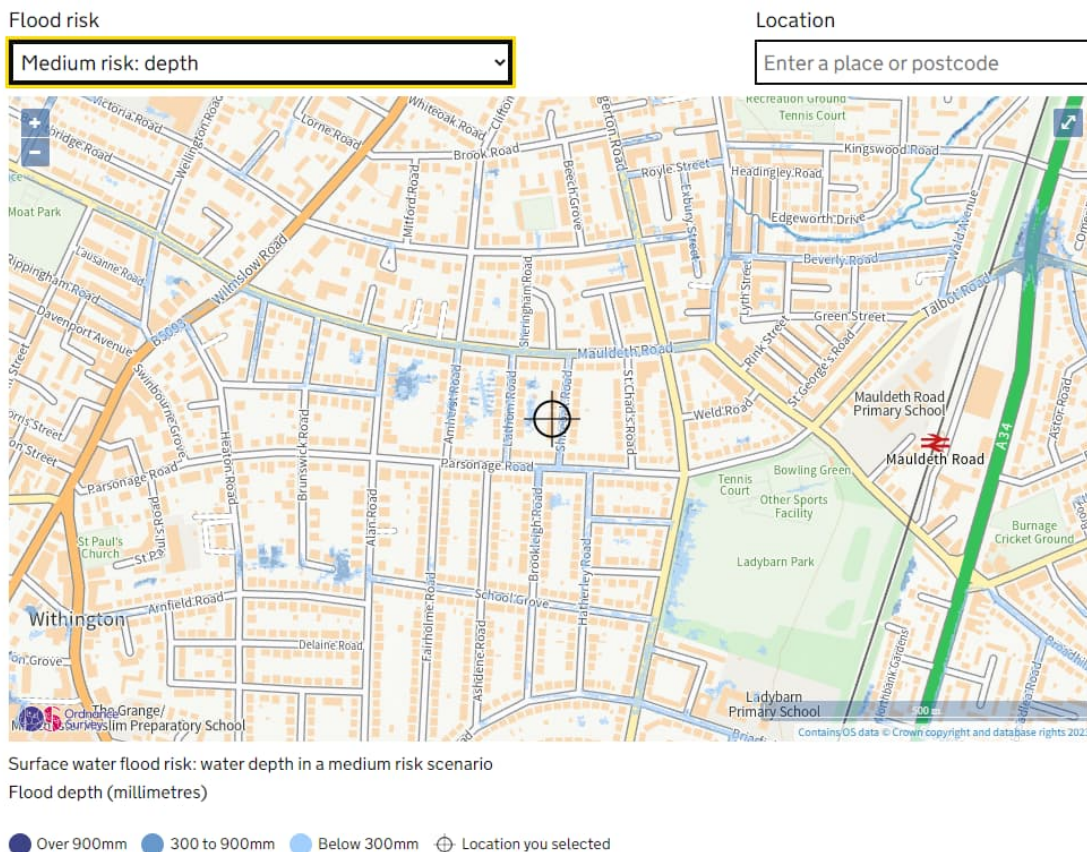


Figure 5: Extent of Flooding Risk from Surface Water on 16 Shireoak Road, Withington, M20 4NY

Although the flood defences are provided on Cringle Brook as shown in Figure 2, the site does not benefit as per Environmental Agency records (See Table 2 to Table 7). The various types of Flood Defence system are described in Table 8. The average ground level at the approach of the dwelling in the front, finished ground floor level and the flood levels at various scenarios is summarised in **Table 9**.

Table 9 : Design Data and Flood levels at dwelling no. 16 Shireoak Road

Description	Level in meters above Ordnance Datum	Protection
Ground Level	+37.68	-
Finished Level at Ground Floor of the Dwelling	+37.92	-
Water Level at 5% AEP (1 in 20 year)	+37.50	UNDEFENDED
Water Level at 2% AEP (1 in 50 year)	+37.52	
Water Level at 1% AEP (1 in 100 year)	+37.53	
Water Level at 1% AEP + 70% increase in flow (1 in 100 year)	+37.54	
Water Level at 2% AEP (1 in 50 year)	+37.51	DEFENDED
Water Level at 1% AEP (1 in 100 year)	+37.52	
Water Level at 1% AEP + 70% increase in flow (1 in 100 year)	+37.54	

The predicted flood level at 1% AEP level for this site is +37.53m above ordnance datum and at 1% AEP level plus 70% increase in flow for this site is +37.54m when the floods are undefended. There is not much difference in the predicted flood levels when they are defended.

The existing finished ground level is approximately 240mm from the ground level at the approach at the front of the property (See drawing no. 00230/23/PP/A-003 in Appendix - A). The finished ground floor level is calculated as + 37.92. The ground floor is 380mm above the worst predicted flood level.

The final floor level of the new extension 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.

7.1.3 Flood Resilience Strategy

The flood resilience strategy for the development has been based on the CLG2007 Improving the Flood Performance of New Buildings. See **Figure 6** below. The strategy is based on the water level within the proximity of the building.

Since the water depth is below 300mm risk from surface water. However, considering the medium risk of flooding from river and sea, it has been assumed that the water entry strategy approach used with a water exclusion strategy for up to 300mm depth flows.

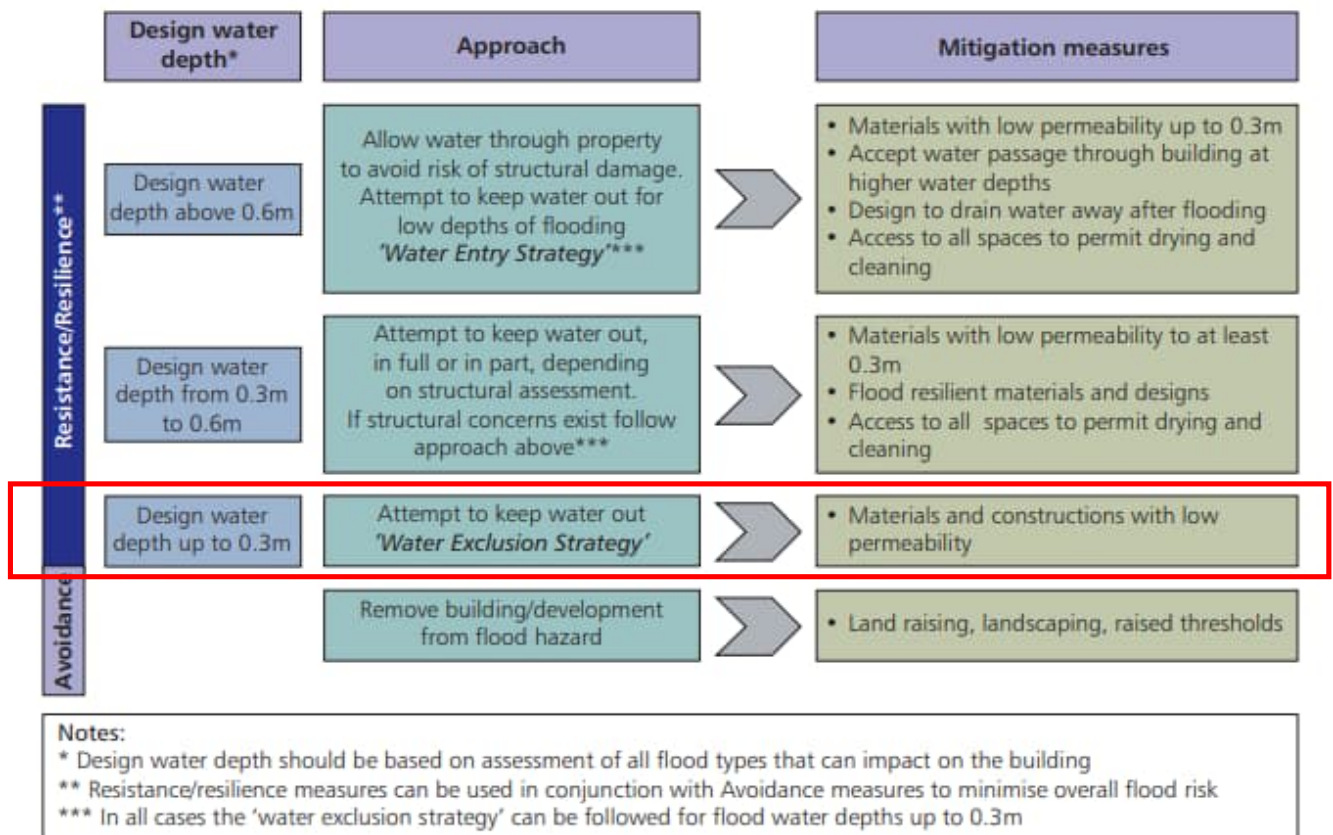


Figure 6: Rationale for flood resilient and/ or resistant design strategies

The building should utilize building materials that are suitable for a 'water exclusion strategy'. Materials classified as "Good" (highlighted in red) in **Figure 7** shall be used for construction of the new extension.

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

Figure 7: Flood resilience characteristics of building materials

Foundations: Suspended reinforced concrete floor slabs is the preferred option. However, a ground bearing slab with limiting crack width to prevent the ingress of water could also be used for the site. 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.

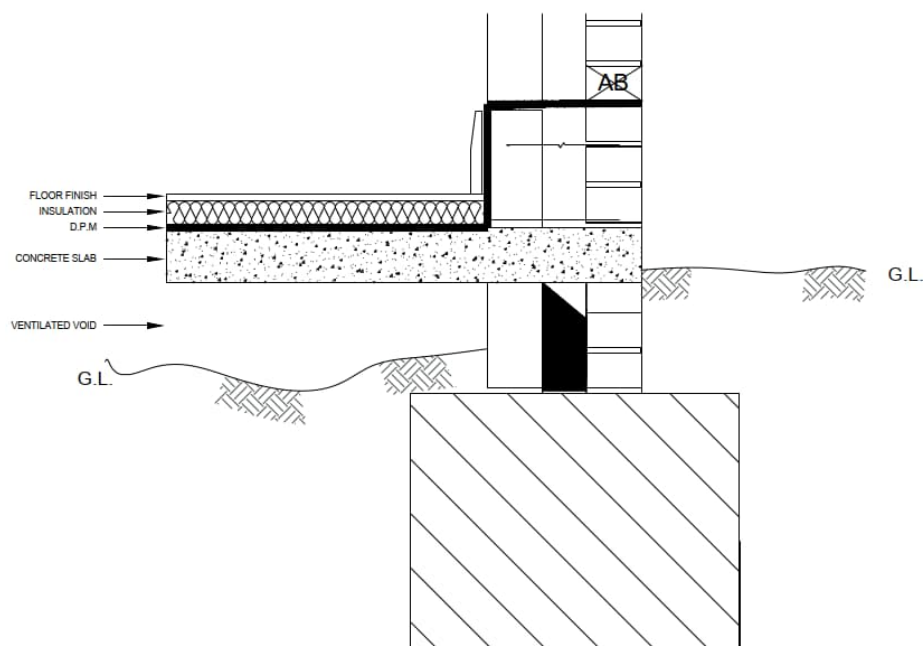


Figure 8: Flood resilience characteristics of building materials

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.

External Walls: Class B engineering bricks can be used for external face at lower ground level upto damp proof membrane. External wall can also be built as per options shown in **Figure 9** and above the brick line.

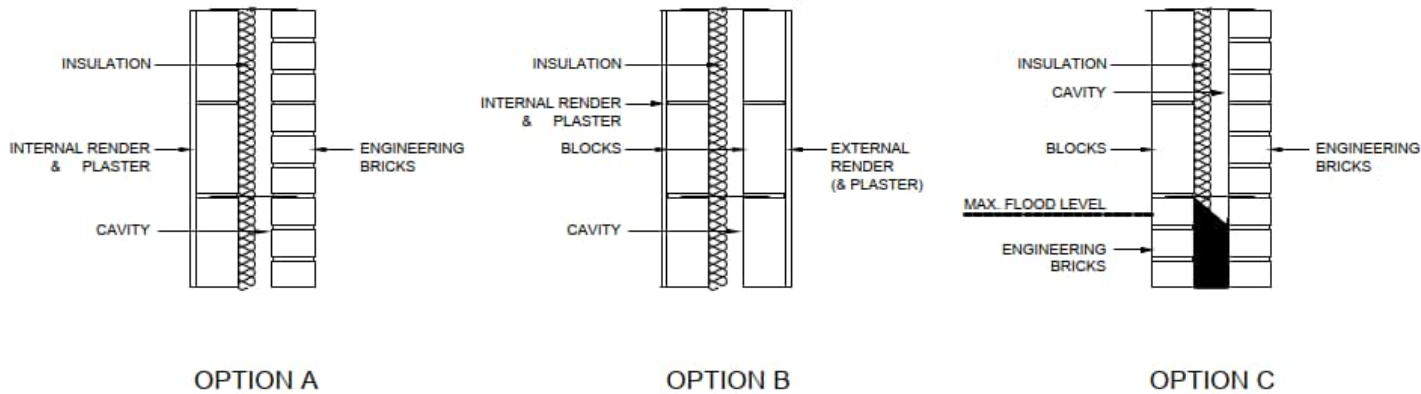


Figure 9: Flood resilience characteristics of building materials

Part filled cavity – Option A

- External face consisting of engineering bricks up to required level for flood protection (up to 0.30m 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 for flood resilience.
1 cement : 6 sand : 1 lime on aircrete.
- Ensure stainless steel wall ties are used to minimize 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 joints.

Part filled cavity – Option B

- External cement based render, preferably with lime content. Composition depends on masonry, the following mixes are effective.
1 Cement : 4 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 minimize corrosion and consequent staining.

Part filled cavity – Option C

- Same as Option A but the internal wall can also be built with engineering bricks and the cavity upto flood level filled with impermeable material such as lean concrete GEN 1 mix.

Services and fittings (communications wiring, heating 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 which are below the predicted flood level.

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 easily cleaned (e.g. use of plastic materials or stainless steel). The cost of these units may need to be balanced against the frequency of flooding. Avoid wood fibre based carcasses and use easily removable solid wood doors and drawers.

7.1.4 Fluvial Flood Risk – Access and Evacuation

Safe egress is achievable by following Shireoak road south towards Parsonage road at approximately 75 metres and further following East to reach Parrswood Road at approximately 200 metres. See figure below for details.

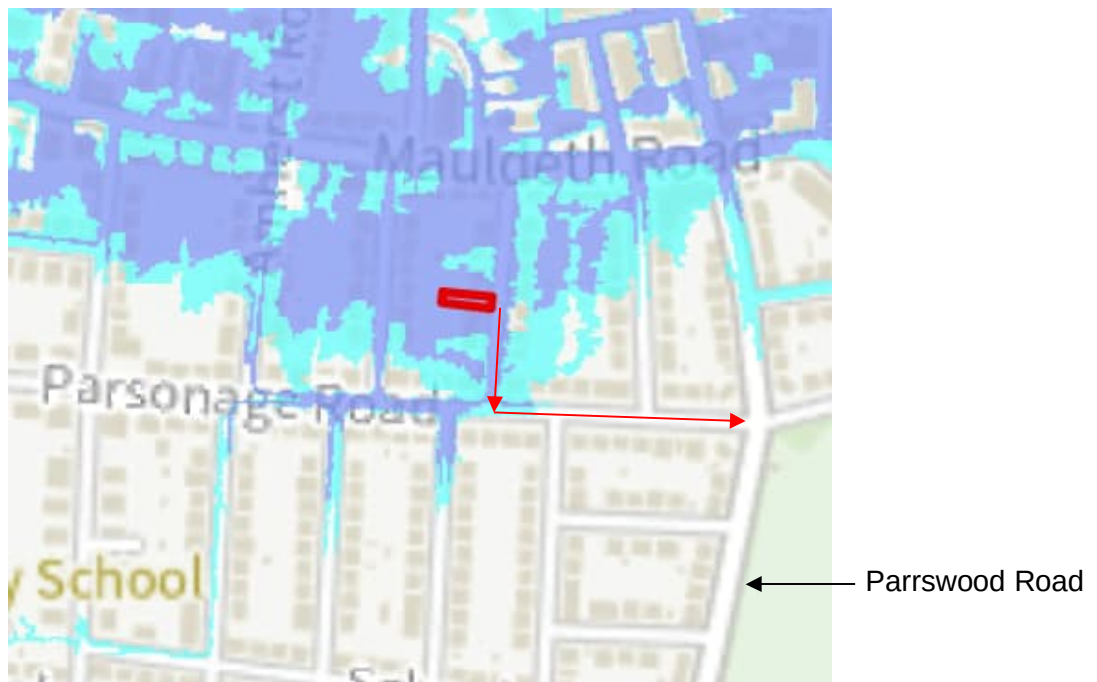


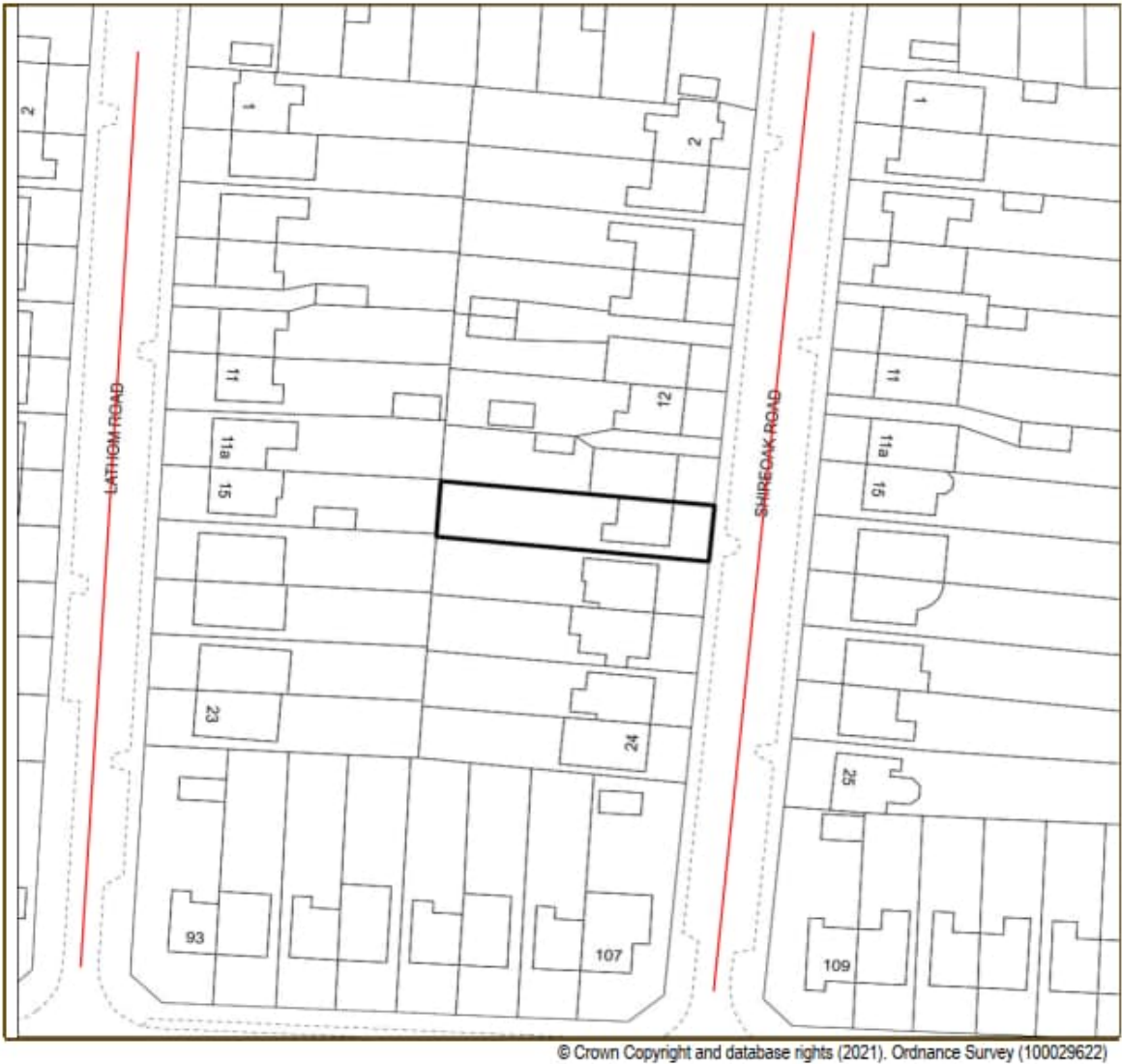
Figure 10: General Evacuation Route

7.1.5 Surface Water Overland Flows Flood Risks.

The site has no SuDS; the site currently drains 100% of roof and hardstanding to sewer. A site of this size would have a Greenfield equivalent average discharge rate (QBAR) of no greater than 0.10l/s. It is also not possible to restrict to 3 times the QBAR of ~0.30l/s.

This low figure is a simple function of the fact that the site is very small. It is not possible to restrict discharge to this low rate.

The Environmental Agency maps (See **Figure 4**) show that the flood risk from surface water is low. However, a residual risk of localized shallow ponding remains likely. The development has already higher FFL compared to likely flooding due to surface water and accommodates areas for free flow of runoff at either side of the new building.



Information in this map is taken from the Public Sewer Map and is provided for identification purposes only. The Water Companies offer no warranty to its accuracy. If you are considering any form of building works and pipes are shown in or near the boundary of the property, a surveyor should plot its exact position prior to purchase.

Sewer Key

Where a plan of the nearest public sewers has been included within the report, the colourkey is as below:

	Public Combined Sewer
	Public Surface Water Sewer
	Public Foul Sewer
	Sewer Publicly Maintained Under Section 24 Public Health Act 1936
	Abandoned Public Sewers
	Manhole (if applicable but not always displayed on the public sewer map)

Figure 11: Layout of Public Sewer in the area

7.1.6 Flooding from drainage system in adjacent areas.

There are no records of sewer flooding within the site.

7.1.7 Reservoir Risks.

The Reservoir Flood Map (RFM) produced by the EA do not show the risk to individual properties of dam breach flooding. The map shows flooding in the area due flooding from rivers which is explained in Section. 6.4.2.

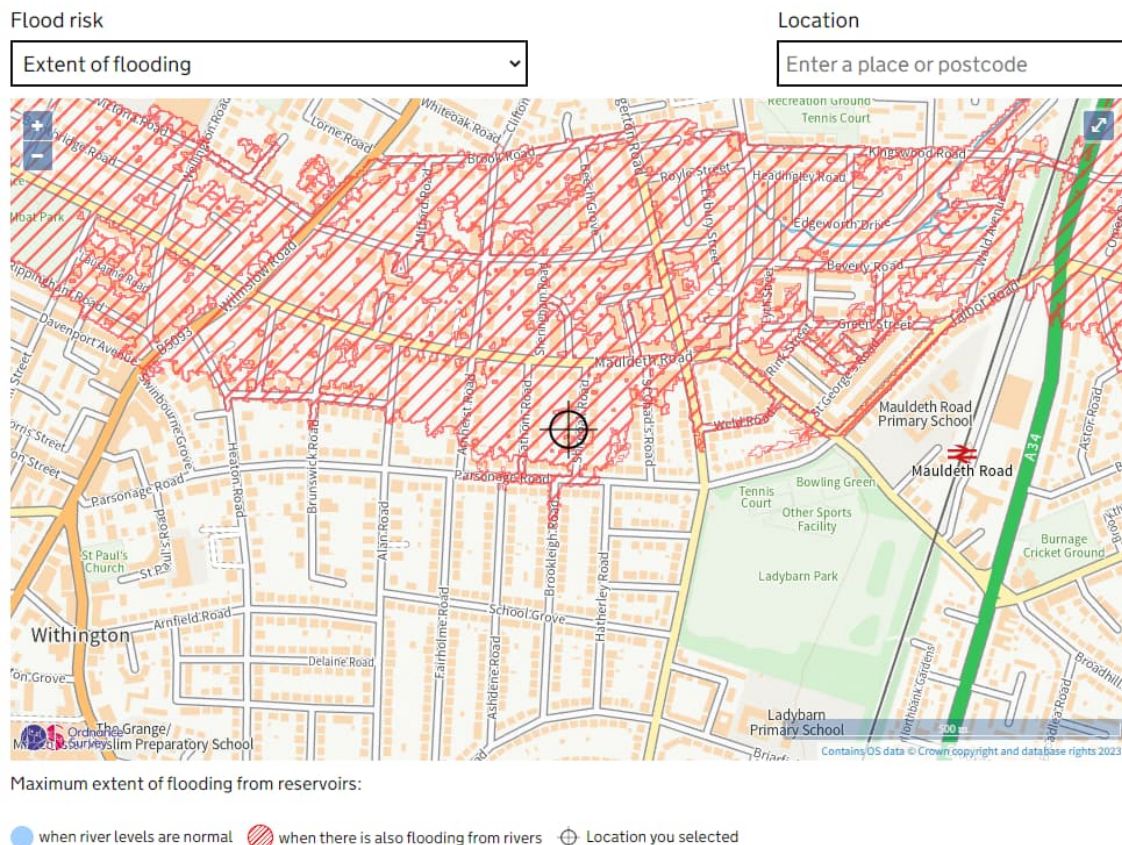


Figure 12: Flood Risks from Reservoirs (When there is flooding from rivers)

7.1.8 Groundwater flood risk.

SFRA indicates site is not in an area of groundwater flooding/ incidents. No mitigation is required.

8.0 Conclusion

The scheme comprises extension for an existing dwelling to increase the existing living space, no change to site operation or sensitivity.

The site is considered to be generally in FZ3 and according to the NPPF retained Flood Risk Vulnerability Classification, the proposed residential land use would be classified as “More Vulnerable”. The further risk assessment carried out in accordance with the NPPF guidance suggests that the development fully complies with its recommendations 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.

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

The modern methods and new design techniques used for the new construction will also results in better protected and flood future-proofed property than existing.

8.1 Recommendations

- Use EA guidance for constructing any new permeable paving areas.
- Follow recommendations for construction as described in Section 7.1.3.
- No formal evacuation plan is required. All site users can access upper refuge areas above the extreme event for the lifetime of the scheme.

If evacuation is deemed necessary

- ➔ Take Shireoak road south towards Parsonage Road for approximately 75 metres.
- ➔ Turn left follow East to reach Parrswood Road at approximately 200 metres. See **Figure 10** for details.

- With respect to maintenance, the proposed SuDS techniques should be maintained in accordance with appropriate regimes set out within the SuDS manual and will be the responsibility of the owner/ management company.

Given the SuDS required for this site are retaining the grass areas and if the new patio areas are included for them to have an extra subbase of granular material: no further maintenance or management measures are required given these are minimal intervention and no maintenance, for them to still operate as SuDS measures. The following SuDS hierarchy check shall be followed at all times.

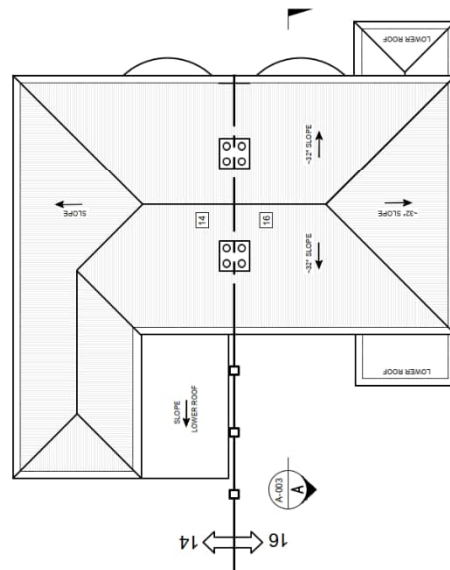
Site Specific SUDS Appraisal

SUDS Hierarchy	SUDS Technique	Potential Benefits			Site Specific			
		Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit	?	Scheme Specific Appraisal	SUDS Suitability	Comment
Most Sustainable ↑ ↓ Least Sustainable	Living Roofs	*	*	*	X	Not likely feasible given nature of roof construction. (Blue, Green and Brown roofs)		
	Ponds / Basins	*	*	*	X	Not suitable in this flood setting / size of site or scheme		
	Swales	*	*	*	X	Not suitable in this flood setting / size of site or scheme		
	Infiltration Techniques	*	*		X	Not required given no increase in impermeable areas and scale of scheme and London Clay; likely Kempton Gravels has water table not suitable for soakage		
	Porous grassed areas replacing concrete and Permeable Surfaces with granular subbase	*	*		✓	Included to meet council policy		
	Tanked Systems	*			X	Not required given no increase in impermeable areas and scale of scheme		
Key: Potentially suitable at the site: * Incorporated in the scheme: ✓ Not suitable / possible at the site: X								

Figure 13: SuDS Hierarchy

APPENDIX - A

Architectural Drawings



EXISTING ROOF PLAN
(SCALE 1:100)



	P2	FOR PLANNING PERMISSION	ND	21.10.2022
	P1	FOR PLANNING PERMISSION	RC	18/01/2022
	REV	DESCRIPTION	BY	DATE

GENERAL NOTES	
PROJECT NAME: TWO STOREY REAR EXTENSION 16 SHIREOAK ROAD, M20 4NY	
DRAWING TITLE: EXISTING PLANS	
DRAWN BY: R.A.C.	CHECKED BY: DND
APPROVED BY: NSD	DATE: 17/01/2023
CURT Mr. & Mrs. Joshi 16 SHIREOAK ROAD MANCHESTER M20 4NY CONTACT NO- E-MAIL:	
AGENCY/CONSULTING: NEEL CIVIL ENGINEERING SERVICES LIMITED SALE 77, HOPE ROAD, M33 3DU 01617700234 neelciv@btinternet.com	
PROJECT NO.: 00230	SCALE: 1:100 SHEET SIZE: A2
DRAWING NO.: 00230/23/PP/A-001	SHEET NO.: 1 OF 1
REVISION: P2	UNIT: mm/m

