Green Structural Engineering

Toddington Lane

Littlehampton, BN17 7PN

Flood Risk Assessment

for

Worthing Homes

20240453

October 2024

Green Structural Engineering

Toddington Lane

Flood Risk Assessment

for

Worthing Homes

Revision	Date of issue	Notes	Compiled By	Checked By
0	04/10/24	Preliminary Issue	TS	GG

Appendices

1.0 Introduction

1.1 This Flood Risk Assessment (FRA) report has been produced by Green Structural Engineering (GSE) on behalf of the Worthing Homes Ltd to support a planning application for the redevelopment of the existing land, for a new residential development at the site, Toddington Lane, Littlehampton, BN17 7PN. Figure 1 below shows the location of the site.

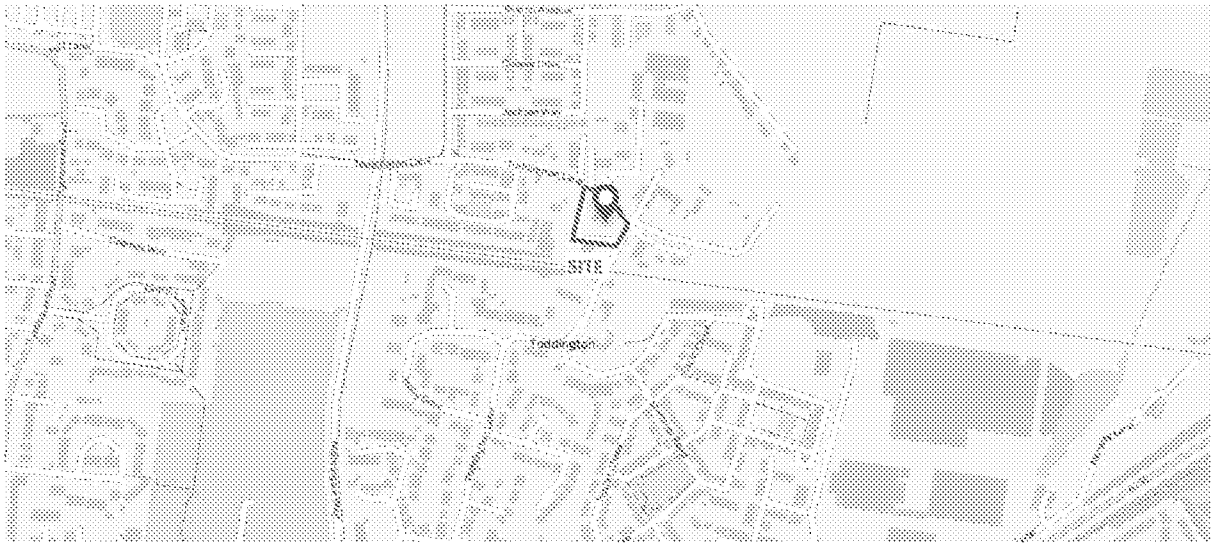

Figure 1 – Site Location Plan

1.2 This FRA had been prepared in accordance with the requirements of the National Planning Policy Framework (NPPF) and its planning practice guidance, national design standards and local policies, to demonstrate that the proposed development will have no detrimental impact to the site and surrounding area in exacerbating flood risk.

1.3 This report should be read in conjunction with the site-specific Drainage Strategy produced by GSE in October 2024 reference 20240453- R01- rev P0- DS.

1.4 Key objectives that will be explored in this FRA are:

- Provide an assessment of the site using information on the Environment Agencies Website and the District specific Strategic Flood Risk Assessment (SFRA), which will assess the risk of flooding from all sources, including fluvial, surface water, groundwater and sewers.
- Review local and national policies for site requirements that need to be addressed in relation to flood risk.
- Recommend and provide details of any mitigation measures and management regimes required to minimise flood risk, if required.

2.0 Site Parameters

Site Description

2.1 The site is located along Toddington Lane, Littlehampton, BN17 7PN, it lies approximately 560m to a watercourse noted as the Black Ditch, at its closest point. The existing site is currently occupied by a barn structure, with an access road leading on to Toddington Lane to the east, with a mixture of tarmac, concrete, skalpings, thistles and dense vegetation occupying the remainder of the site.

Site Topography

2.2 A topographical survey of the site and adjacent areas is included in Appendix A. The survey shows the site to be elevated above the surrounding highways, with high elevations of approximately 7m AOD, sloping down to 5m AOD towards the northern boundary and 3.6m AOD, where the access road meets Toddington Lane to the east.

Site Geology

2.3 Intrusive investigations were undertaken on site, that are detailed further in report 20240453-R01- rev P0- DS. The investigation found that beneath the made ground, layers of sandy gravelly clay, gravelly sand and structureless chalk were found. A summary of the soils encountered on site is shown on Table 1 below:

Depth (m)	Thickness (m)	Soil Type	Description
0.00-0.40/2.80	0.40-2.80	MADE GROUND	Brown clayey silty sandy GRAVEL with patches of gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint and varying anthropogenic materials such as brick, concrete, plastic bottle, rubber tyre, metal bars and slate roof tile fragments.
0.40/1.00-2.60/3.00	1.20-1.30	Sandy gravelly CLAY	Brown silty sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded flint and occasional chalk.
2.80-3.80 (TP2 only)	Unproven	Gravelly SAND	Greenish yellow very clayey gravelly SAND. Gravel is fine to coarse subrounded flints.
2.60-3.00m (TP3 only)	Unproven	Structureless Chalk	Recovered as: Structureless chalk comprising off white and yellowish brown clayey gravelly SILT. Gravel is fine to coarse medium density chalk and occasional flint.

Table 1 – Summary of site Geology

Development Proposals

2.4 The proposals will see the erection of a new 10-unit residential development, featuring a mixture of 2- and 3-bedroom units, some semi-detached and some terraced. Associated access roads and parking facilities are also proposed to serve the development. A copy of the proposed site plan is included in Appendix B.

3.0 Flood Risk

Fluvial/Tidal Flooding

3.1 The National Planning Policy Framework identify the Flood Zones as follows:

- Zone 1: 'Low Probability' This zone comprises land assessed as having a less than a 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year.
- Zone 2: 'Medium Probability' – This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5%-0.1%) in any year.
- Zone 3a: 'High Probability' – This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
- Zone 3b: 'The Functional Floodplain' – This zone comprises land where water has to flow or be stored in times of flood. SFRAs should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes).

3.2 Figure 2 below has been extracted from the Environment Agencies (EA's) flood map for planning and shows the various flood zone extents in the area around the site.

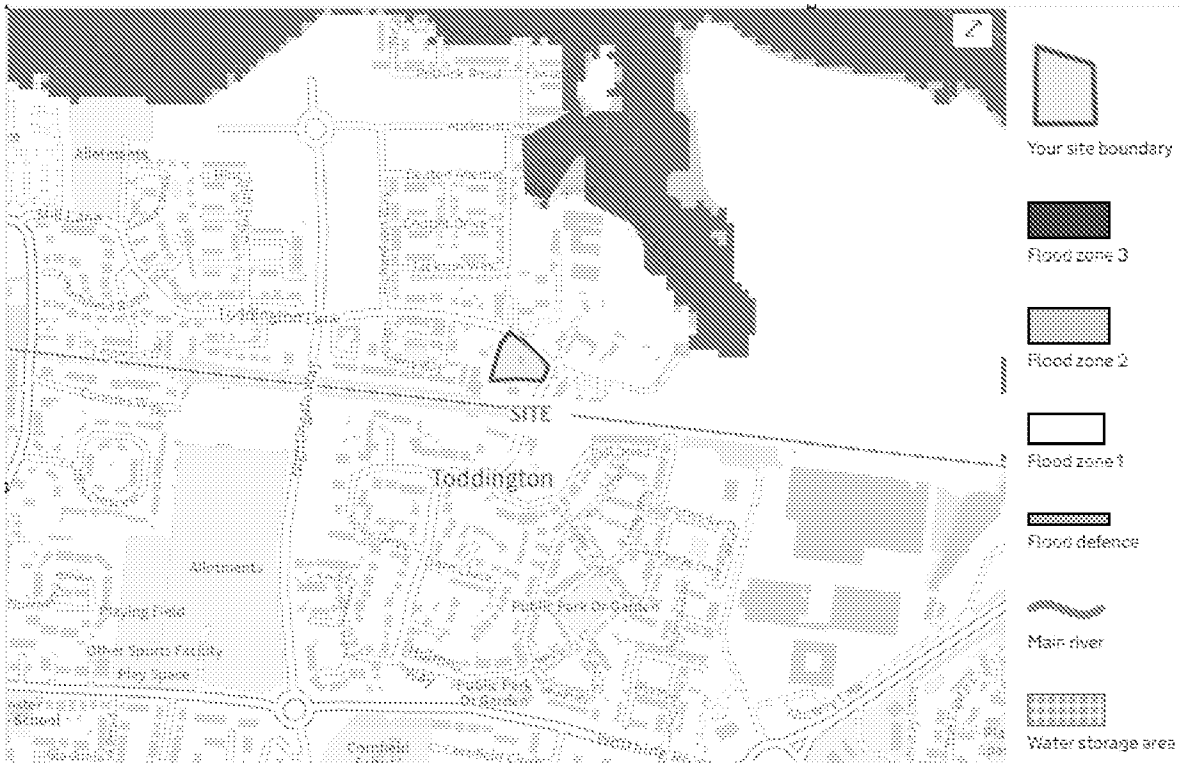

Figure 2 – EA Flood Map for Planning

3.3 As can be seen the site is located in Flood Zone 1, with the closest extents of Flood Zones 2 & 3 located approximately 250m to the northeast of the site, emanating from the Black Ditch.

Surface Water Flooding

3.4 At the time of writing, surface water flood mapping has been paused on the EAs website, as they await new data, however, a Level 1 Strategic Flood Risk Assessment, and associated mapping, was produced by JBA Consulting, for Arun District Council in August 2016.

3.5 Figure 3 below, has been extracted from mapping, and shows a small area, to the front of the site, where it meets Toddington Lane, is within the 1,000-year event extent. This information correlates with the topographical survey, included in Appendix A, where the bottom of access road is at a low level topographically.

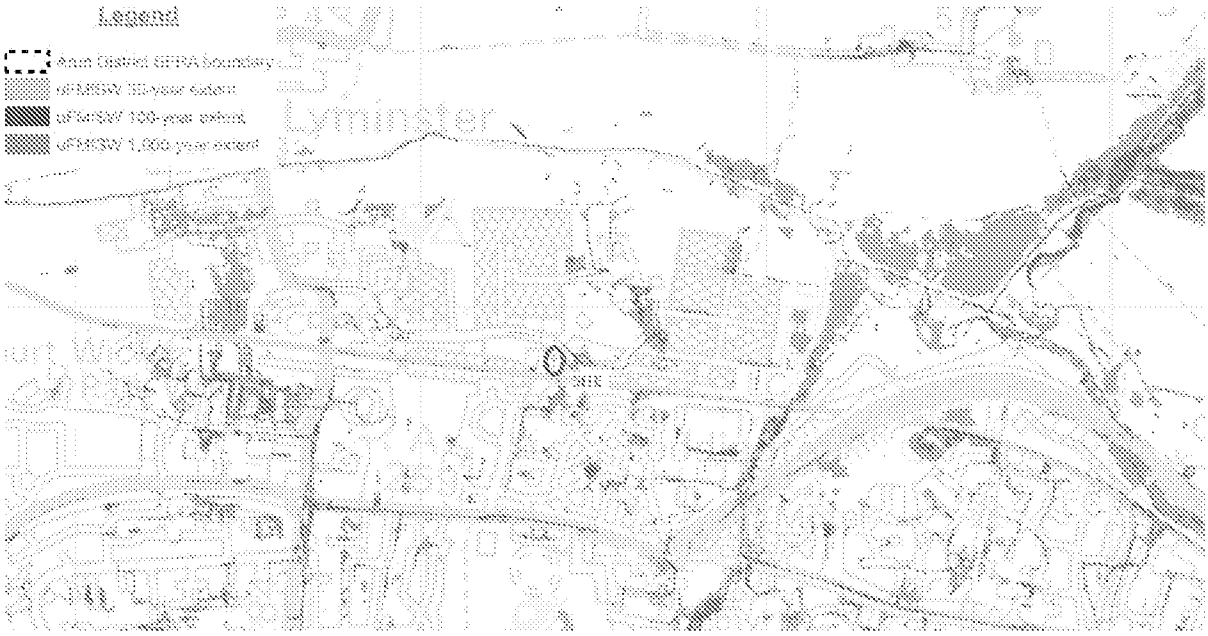

Figure 3 – Arun District Council Surface Water Flood Map

3.6 The surface water flood maps provided, take into account topography and do not consider positive drainage system. Any areas of higher surface water flood risk can therefore not be assessed without detailed interrogation of the local highway drainage networks. There are however proposals in place to provide upgrades to the surface water drainage, in this area of Toddington Lane, which is detailed further report 20240453- R01- rev P0- DS, which will assist in alleviating this apparent surface water flood risk.

Groundwater Flooding

3.7 Figure 4 below has been extracted from the mapping within the Level 1 Strategic Flood Risk Assessment, produced by JBA Consulting, for Arun District Council in August 2016. As can be seen the site has been identified as having between a 25 and 50% of groundwater flooding, the 2nd lowest category. The site investigation works, where exploratory holes were excavated to depths of 3m, noted there was no presence of groundwater.

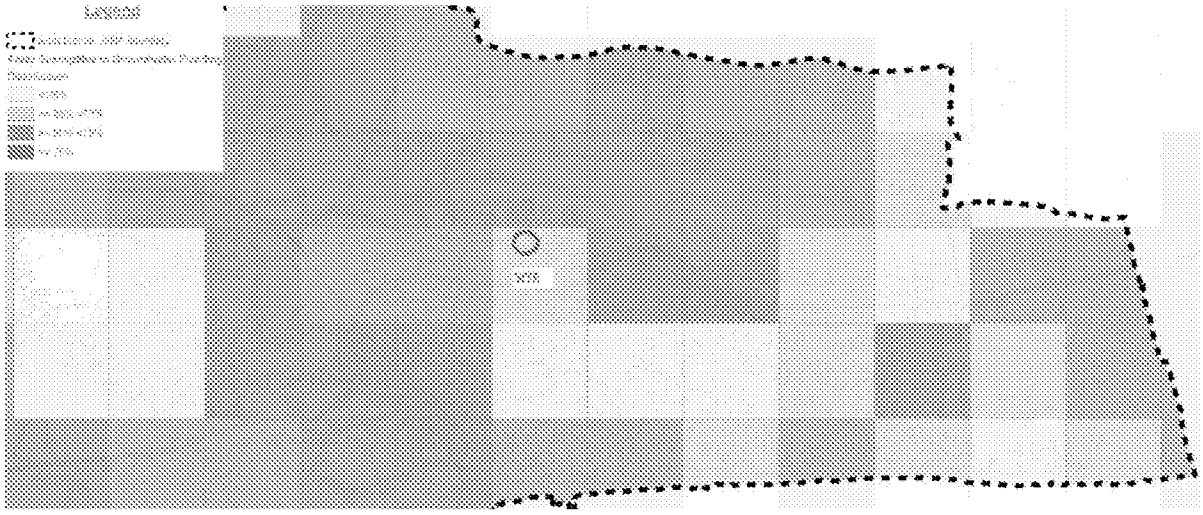

Figure 4 – Arun District Council Groundwater Flooding Classification

Historical Flooding

3.8 Historical flood mapping was also produced for the SFRA, which shows locations of recorded incidents from sources including fluvial, coastal, tidal, surface water, failure and unknown. Figure 5 has been extracted from this, which shows no recorded events to have affected the area around the site, with the closest being a surface water flood, approximately 500m to the west of the site.

Figure 5 – Arun District Historical Flood Events

Sequential Test

3.9 A document titled Chichester District Council Level 1 SFRA – Methodology in support of Performing the Sequential Test, was produced by JBA Consulting for Chichester District Council, who's policies align with Arun District Council, who are both governed under the West Sussex County Council Lead Local Flood Authority.

3.10 Page 7 of this document relates to surface water flood risk and states *'It is not anticipated that the Sequential Test for surface water would normally require the consideration of alternative sites at lower risk, as the widespread and dendritic nature of surface water flood risk is conceptually very different to river and sea flood risk, but in some circumstances for relatively small sites that are potentially substantially affected it is possible that alternatives should be considered (as these could potentially not satisfy the flood risk requirements when assessed under the Exception Test)'.*

3.11 As the area noted of potential surface water flood risk is confined to the sites entrance, at a low point topographically, and accounts for a very small percentage, in line with the guidance issued by JBA Consulting, it is not considered appropriate that alternative sites be reviewed in the application of the Sequential Test.

3.12 It should also be noted that the site has been included on the Arun District Council's Brownfield Land Register, identified as 'suitable for development', viewable here as site 1, identified as LU18A Toddington Farm (Land North & West of 1-3 Toddington Farm Cottages), shown in Figure 6 below: https://www.arun.gov.uk/helaa-brownfield-land-self-build-registers

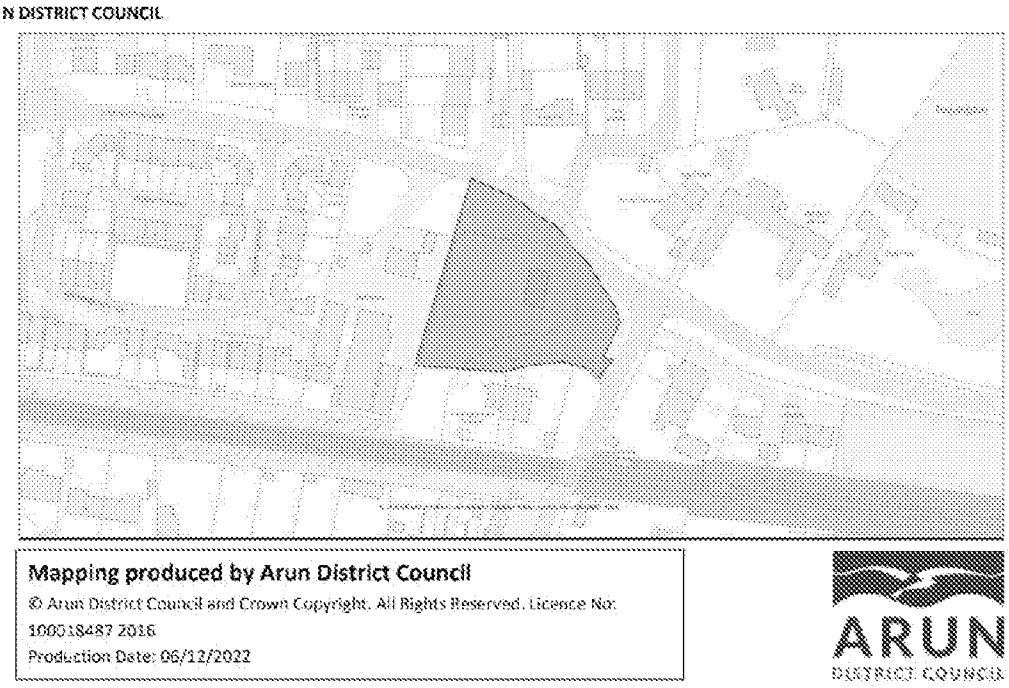

Figure 6 – Arun District Council Brownfield Land Register LU18A Toddington Farm (Land North & West of 1-3 Toddington Farm Cottages)

3.13 Paragraph: 027 Reference ID: 7-027-20220825 of the National Planning Practice Guidance states that:

The Sequential Test should be applied to 'Major' and 'Non-major development' proposed in areas at risk of flooding, but it will ***not be required where****: The site has been allocated for development and subject to the test at the plan making stage (provided the proposed development is consistent with the use for which the site was allocated and provided there have been no significant changes to the known level of flood risk to the site, now or in the future which would have affected the outcome of the test).*

3.14 For the reasons stated above, it is therefore considered that application of the Sequential Test to the development site is not appropriate.

Exception Test/Flood Mitigation

3.15 As detailed within this section, all risks of flooding associated with the site are low to negligible, with a small area along the eastern boundary shown to be within the surface water flooding extent. As detailed in report 20240453- R01- rev P0- DS, off-site works are proposed to alleviate this flood risk, in the form of upgrades to the local highways network drainage.

The following on-site principles will be adopted to provide additional mitigation:

1. Proposed house levels will be set several metres higher than the road level, which is currently shown to be within the surface water flood extent.
2. The surface water drainage for the development will be sized to cater for all storms up to and including the 100-year event, including 45% allowance for climate change (refer to Section 7 for further details).
3. Safe pedestrian access and egress can be sought to the north of the site, to an elevated position of Toddington Lane, away from the surface water flood risk extent.

4.0 Planning Policy Context

National Planning Policy Framework and Planning Practice Guidance

4.1 The National Planning Policy Framework (NPPF), originally published in 2012, was reissued in December 2023. The NPPF includes policies on flood risk and minimising the effect of flooding. The NPPF requires local authorities to adopt proactive strategies to mitigate and adapt to climate change, taking account of flood risk, coastal change and water supply and demand considerations.

4.2 Section 14 of this document list when a Flood Risk Assessment is required:

- All development within Flood Zones 2 (Medium Risk) and 3 (High Risk);

4.3 In Flood Zone 1 an assessment should accompany all proposals involving:

- Sites of 1ha or more;
- Land identified by the Environment Agency as having critical drainage problems;
- Land identified in a Strategic Flood Risk Assessment as being at increased flood risk in future; or
- Land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.'

4.4 The NPPF goes on to state '*When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood risk assessment. Development should only be allowed in areas at risk of flooding where, in light of this assessment (and the sequential and exceptions tests, as applicable), it can be demonstrated that:*

a) Within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) The development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;

c) It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) Any residual risk can be safely managed; and

e) Safe access and escape routes are included, where appropriate, as part of an agreed emergency plan'.

Adoption Arun Local Plan 2011-2031 (July 2018)

4.5 The Arun Local Plan covers the period between 2011 and 2031 and was produced in July 2018. This document was produced to provide key policies in promoting sustainable development.

4.6 Section 18 of this document relates to water and provides policies on drainage and flood risk.

4.7 Policy W DM2 is specific to flood risk and states:

Development in areas at risk from flooding, identified on the latest Environment Agency flood risk maps and the Council's Strategic Flood Risk Assessment (SFRA) , will only be permitted where all of the following criteria have been satisfied:

a) The sequential test in accordance with the National Planning Policy Guidance has been met.

b) A site specific Flood Risk Assessment demonstrates that the development will be safe, including access and egress, without increasing flood risk elsewhere and reduce flood risk overall.

c) The sustainability benefits to the wider community are clearly identified.

d) The scheme identifies adaptation and mitigation measures.

e) Appropriate flood warning and evacuation plans are in place; and

f) New site drainage systems are designed to take account of events which exceed the normal design standard i.e. consideration of flood flow routing and utilising temporary storage areas.

The reports prepared as part of the criteria above must take into account contingency allowances, taking climate change into account as set out in Flood Risk Assessments:climate change allowances section of the NPPG.

In locations where strategic flood defence or resilient and resistant construction measures are necessary within the site itself, proposals will be required to demonstrate how measures have been incorporated as an intrinsic part of the scheme in a manner which is compatible with the latest Strategic Flood Risk Assessment.

All development proposals must take account of relevant Surface Water Management Plans, Catchment Flood Management Plans and related Flood Defence Plans and strategies such as the Lower Tidal River Arun Strategy. The council may require financial contributions from development on sites where measures to address flood risk or to improve the environmental quality of watercourses have been identified by these Plans and Strategies.

Policy analysis

4.8 As can be seen from the various planning policies, the main requirements are that developments should not result in additional flood risk to the site and surrounding area. The policies stipulate that more vulnerable use classes should be located outside areas of greater flood risk, and that developments should be flood resilient, residual risk should be managed correctly and safe access and egress will be needed.

5.0 Summary/Conclusion

5.1 This report has been produced to assess the risk of flooding the proposed development at Toddington Lane, Littlehampton, BN17 7PN. The development proposals will see the erection of a new 10-unit residential development, featuring a mixture of 2- and 3-bedroom units, some semi-detached and some terraced. Associated access roads and parking facilities are also proposed to serve the development.

5.2 The site is located within Flood Zone 1, land assessed as having less than a 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year. The risk of flooding affecting the site from, ground water and other sources is considered low to negligible, with the exception of surface water, where a small section of the site is shown within the surface water flood extents, where the access road meets Toddington Lane, at a low point topographically.

5.3 The perceived area of surface water flood risk is soon to be alleviated, in the form of upgrades to the surrounding highways drainage networks, which will form part of the works of a future neighbouring development. Mitigation against flood risk will be provided on site by having buildings raised several metres above the existing area of surface water flood risk, safe pedestrian access and egress to the northern elevated part of Toddington Lane, and the proposed surface water drainage network.

5.4 The Drainage Strategy produced by GSE in October 2024 reference 20240453- R01- rev P0- DS outlines how sustainable drainage will be implemented on site, to serve the development for all events up to and including an 100-year storm, including a 45% allowance for climate change.

APPENDIX A – Topographical Survey

FERNY BANKS

Ridge 15.45

Eave 11.00

HOLLYACRE

THE OLD FARMHOUSE

OLD BYRE HOUSE

TODDINGTON LANE

Tarmac

Grass

Brick Paving

Overhead Cable

Limited Access Due To Dense Brambles

Skalpings/Thistles/Tarmac/Concrete

Dense Brambles

Skalpings Track

Bushes/Brambles

B A R N

Ridge 12.64

Eave 11.39

Ridge 13.17

Eave 11.01

Ridge 11.77

Eave 9.23

Ridge 10.55

Eave 5.45

Ridge 11.09

Ridge 10.21

Eave 6.64

Ridge 10.04

Eave 6.46

Ridge 12.45

Eave 8.89

Ridge 10.40

Eave 7.19

Ridge 11.02

Eave 8.02

Rubble Fencing

Barriet

Gate

Wall 0.9

Hedge 2.0

CBF 1.8

CED 0.50/1T 15/ Sp12

RWN 0.10/3T 5/ Sp6

HAW 0.15/3T 4/ Sp4

SPU 0.20/1T 5/ Sp4

FIR 0.25/1T 4/ Sp4

SYC 0.10/5T 5/ Sp4

SYC 0.20/1T 10/ Sp6

FIR 0.20/1T 14/ Sp5

BTTC CL 5.48

BTTC CL 3.86

BTTC CL 3.43

T4 E(X)=502337.570 N(Y)=1058597.998 H(Z)=5.169

T5 E(X)=502405.124 N(Y)=1058453.172 H(Z)=4.427

T6 E(X)=502436.688 N(Y)=1058433.006 H(Z)=3.663

T7 E(X)=502456.663 N(Y)=1058509.449 H(Z)=2.500

KO 5.24

CI/T 5.38

PIT CL 4.96

PIT CL 4.93

SPC 4.91

PIT CL 4.92

SC 4.85

PIT CL 5.19

PIT CL 5.37

PIT CL 5.41

SC 6.84

SC 6.58

SV 3.60

SV 3.59

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ARGYLL DISTRICT COUNCIL LU24/249L

APPENDIX B – Proposed Site Plan

Notes

1. This drawing is the copyright of MH Architects Ltd
2. Do not scale this drawing except for Local Authority planning purposes
3. All dimensions must be checked on site by the contractor prior to commencement of the works.

Client Approval

A - Approved

B - Approved with comments

C - Do not use

Rev.	Revision Note/Purpose of Issue	Drw By	Date	Chk By	Date

SCHEDULE OF ACCOMMODATION

UNIT	ACCOMMODATION	Internal Area	
01	5 person 3 Bed house	93.2 sq. m	affordable rent
02	5 person 3 Bed house	93.2 sq. m	affordable rent
03	4 person 3 Bed house	80.0 sq. m	affordable rent
04	4 person 2 Bed house	80.0 sq. m	affordable rent
05	5 person 3 Bed house	93.2 sq. m	affordable rent
06	5 person 3 Bed house	93.2 sq. m	affordable rent
07	4 person 2 Bed house	79.0 sq. m	affordable rent
08	4 person 2 Bed house	79.0 sq. m	affordable rent
09	4 person 2 Bed house	79.0 sq. m	affordable rent
10	4 person 2 Bed house	79.0 sq. m	affordable rent

TOTALS:-

4 person 2 Bed house	= 6 units
5 person 3 Bed house	= 4 units

Development Site	0.35 Ha
Site Density	28.5 Units/Ha
Car Parking	TOTAL = 21 spaces on site
	2 spaces for each 2 bed house
	2 spaces for each 3 bed house
	1 visitors space
Cycle Parking:	2 secure cycle space per house in private gardens (see plans)
Refuse & recycling :	House bins integrated into rear garden (access is near to roadside)

Hollyacre

Holly Co

The Old Farmhouse

The Old Farmhouse

TODDINGTON LANE

AA

BB

CC

FFL 6550

FFL 6550

FFL 5690

Retaining wall

bank regraded
to enable road
widening

Rumble strip

Approx car park position

Homes permitted under application ref

Toddington Farm Cottages

WORK IN PROGRESS

Plans 1:200 @ A1

N

2 0 2 4 6 8 10 12 14 16 18m

1:200

Client

Worthing Homes

Job title

Land at Toddington Lane
Toddington
West Sussex

Drawing title

Site Plan

Drawn	Date	Checked	Date	Scale at A1
MD	07/01/22			1:200

Job No.	Pro.	Org.	Zone	Level	Type	Role	No.	Rev.
21-097	TDL	MHA	00	ZZ	DR	A	003	P07

Purpose of Issue

PRELIMINARY

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