

FLOOD RISK ASSESSMENT

Updated with EA's 2020 Site Specific Data
Response to EA Letter Ref: HA/2020/121939/02-L01

Existing property at edge of Tidal FZ3

Change part of ground floor and upper levels to
residential

NPPF (Paragraph: 041 Ref ID: 7-041-20140306)
Official "Residual Risk": operation appropriate

- Suitable Evacuation to Flood Zone 1
- Evacuation addressed for a range of flood events
 - No increase in impermeable areas
- **REDUCE FLOOD RISK OVERALL:** flood resilience and resistance to address surface water and tidal future risk as a precaution
- **Results in better protected and flood future-proofed structure than is existing**

at:

Gratwicke House, 10 East Street,
Littlehampton BN17 6AW

May 2020

ARK Ltd

Table of Contents

1.0	Scope	3
2.0	Executive Summary	3
3.0	Introduction	4
4.0	Purpose of the Report	4
5.0	Report Information Sources	4
6.0	Consultation	4
7.0	Overview of British Legislation	5
7.1	National Planning Policy	5
8.0	Site Status and Environmental Setting	5
8.1	Site Location and Status	5
8.2	Existing Flood Risk	6
	SFRA Mapping	8
	EA 2020 Tidal Data Product 4 & 8 Data	10
	EA 2020 Surface Water Hazard	12
9.0	DESIGN RESPONSE: Ground floor flats are appropriate	13
9.1	Site Specific Breach Modelling	13
9.2	How to address?	13
10.	Assessment of Proposed Development	14
10.1	Proposed Development	14
10.2	Sustainable Drainage Systems (SUDS)	16
10.3	Flood Resilience	17
10.4	Refuge and Evacuation	18
10.5	Annual Monitoring	19
10.6	Flood Response Management	19
10.7	Surface Water Runoff – Flood Risk from the Development	19
10.8	Climate Change: including new allowances	19
10.9	Sequential Test	20
10.10	Flood Risk Vulnerability	20
10.11	Exception Test	21
10.0	Conclusion	22
10.1	Appendices	22

1.0 Scope

This report contains the details of a Flood Risk Assessment carried out by Ark Environmental Consultancy Limited (“ARK Ltd”) for Gratwicke House, 10 East Street, Littlehampton BN17 6AW, henceforth referred to as “the site” in this report.

This report has been prepared for Wilson Properties and must not be relied upon by any other party without the explicit written permission of ARK Ltd. All parties to this report do not intend any of the terms of the Contracts (Right of Third Parties Act 1999) to apply to this report.

Please note 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 of the report has been read. Other sections of the report may contain information which puts into context the findings noted within the Executive Summary.

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2.0 Executive Summary

This FRA has been carried out in accordance with the National Planning Policy Framework (NPPF) 2019 & NPPG 2018. 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 proposed development comprises change of use of the part offices to residential dwellings; no increase in impermeable areas; site is located on the edge of Environment Agency Flood Zone 3 tidal partly defended:

- **In EA official VERY LOW – LOW Hazard**
- Change of use: sequential test not applicable
- NPPF (Paragraph: 041 Ref ID: 7-041-20140306): Official “Residual Risk”: operation appropriate
- No increase in footprint in the floodplain: no compensation required
- Considered appropriate given the site-specific assessed flood setting / hazard
 - Not within any modelled breach extents but there is a defence protecting to the 1 in 300 year based on EA correspondence
 - Site specific breach assessment (especially for tidal influence) is not considered commensurate with the scale and sensitivity of the scheme
 - Not in rapid inundation zone
- Bedrooms and self-contained dwellings at ground level considered appropriate given the flood setting
 - Additional raising for ground floor is not considered necessary nor is it feasible
- Precautionary only: in emergency: all site users could access the first floor at least
- Evacuation appropriate for lifetime of the scheme: does not go through any higher flood risk areas to reach unrestricted FZ1
- **REDUCES FLOOD RISK OVERALL: new modern flood resilience / resistance**
- **Results in better protected and flood future-proofed structure than is existing**

Scheme is categorized as “More Vulnerable” development in FZ3, in accordance with the NPPF classifications the NPPF Exception test does need to be passed. Given the residual risk flood setting, the level, extent and depth of flooding on the site can be managed in terms of resilient measures, the EA Tidal Flood warning and easy and safe evacuation to areas in Flood Zone 1 for the lifetime of the development. Compliant with council Policies: site can operate safely in the unlikely event of a flood reaching the site & scheme addresses residual risk of flooding, as per NPPF / PPG & local policy.

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

3.0 Introduction

The FRA combined a desktop study, review of available information, consultations and an assessment of all sources of flooding posed to and from the site and proposed development, in accordance with National Planning Policy Framework (NPPF) & PPG. 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.

5.0 Report Information Sources

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

- British Geological Survey Website & iGeology App
- EA Website & Data
- Arun District Council Strategic Flood Risk Assessment (2016 update)
- West Sussex County Council (WSCC) as the Lead Local Flood Authority (LLFA) SUDS Policies and Surface Water Management Plan (Joint)
- Internet mapping and searches.

6.0 Consultation

The EA have been consulted; the report follows the recommendations of previously approved similar reports for Arun and West Sussex.

7.0 Overview of British Legislation

7.1 National Planning Policy

Note: where this report references NPPF, this also covers PPG.

The National Planning Policy Framework (NPPF) and PPG supercede all Planning Policy Statements (PPS's) and remaining Planning Policy Guidance (PPG'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 Tables 2 and 3 to assist with flood risk vulnerability classifications and development suitability.

The NPPG technical guidance was updated in to a new PPG for Flood Risk and Coastal Change; this report is compliant with these new guidelines (very similar to previous NPPF technical guidance NPPG) including how to address residual risks such as surface water flooding (when not also a critical flood source).

7.2 Local Policy

Local Authorities (as amended) consider flood risk through relevant environmental and climate change policies which enforce the requirements of the NPPF and PPG.

The Strategic Flood Risk Assessment (SFRA) and Preliminary Flood Risk Assessment (PFRA) are key sources of flood risk specific information for the area. These 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 is provided in the report where appropriate.

Key policies relevant are:

- FRA to demonstrate no risks posed to or from the scheme (NPPF compliance)
- Appropriate evacuation in different flood scenarios (standard EA requirement)

8.0 Site Status and Environmental Setting

8.1 Site Location and Status

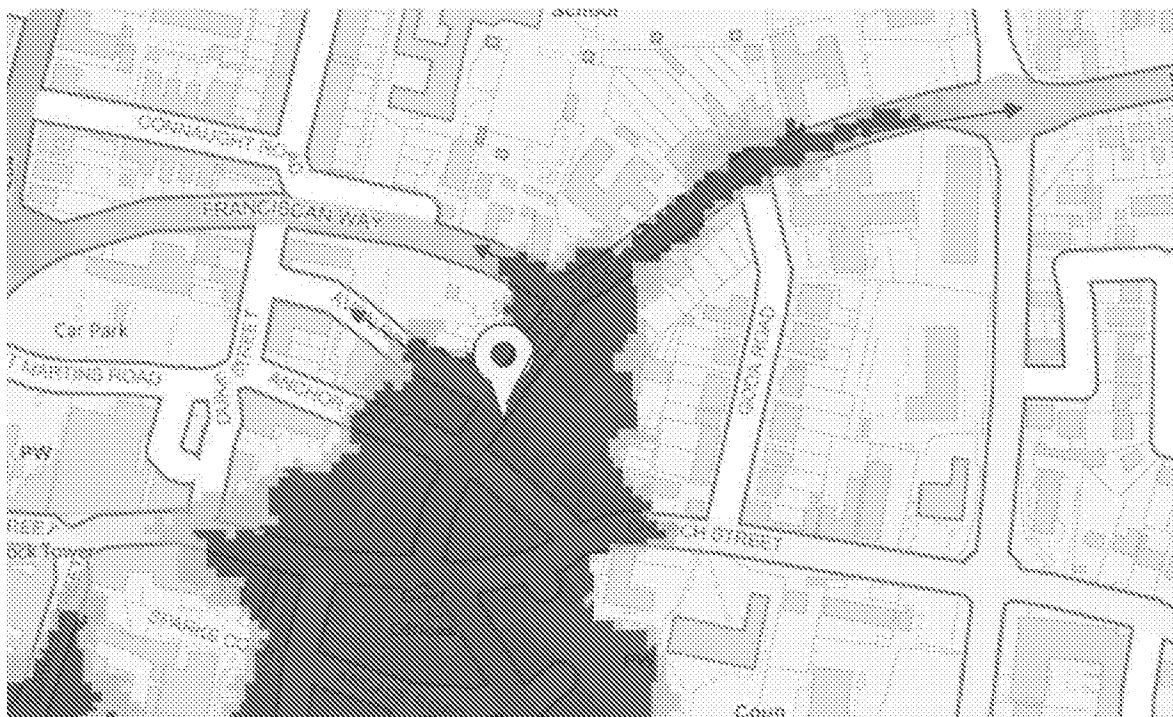
The site is c. 0.02 hectares and located on the junction of East Street and Church Street. The site is an existing office block that also has part conversions to residential. See Appendix A for Location & Existing Layout.

Site is at the far extent of the partly defended tidal floodplain.

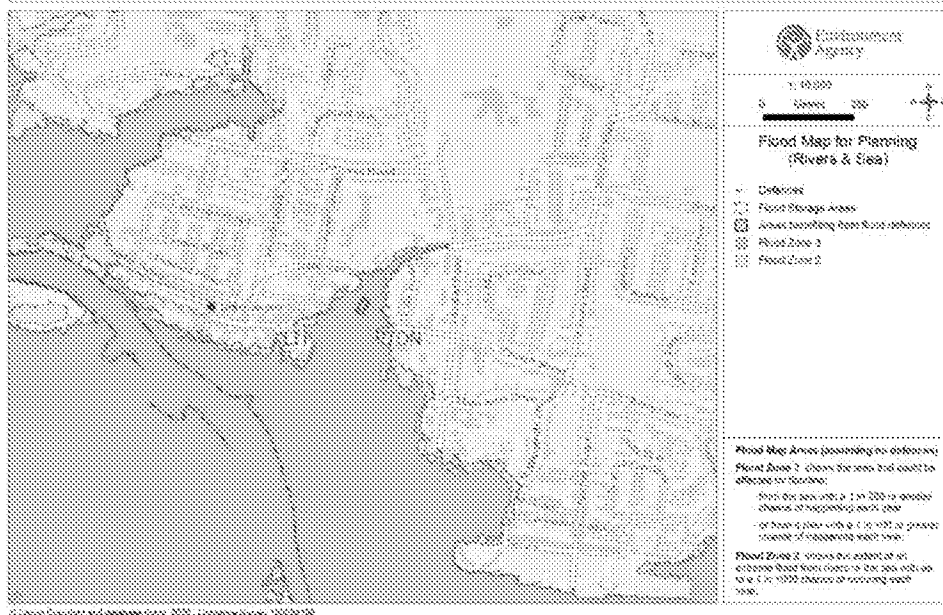
8.2 Existing Flood Risk

Flood Sources	Site Status	Comment on flood risk posed to / from the development
Fluvial / Tidal	Site is on the edge of Flood Zone FZ3 River Arun part defended Tidal floodplain EASY ACCESS TO FZ1 in LOW / VERY LOW hazard; FULLY UNRESTRICTED SAFE NO HAZARD FZ1 Not in EA breach flood extent NPPF: High Annual Probability	Scheme is to change the offices use to residential dwellings Self-contained ground floor flats are considered appropriate Given distance from source: not within a breach flood extent Not in rapid inundation zone Any inundation would be appropriately slow and shallow Access / egress in LOW hazard No increase in impermeable areas All evacuation to areas above extreme event for the lifetime of the scheme Maximise flood resilience and resistance Scheme results in better protected and flood future-proofed property than existing
Groundwater	SFRA mapping indicates site not in area of groundwater flooding.	The proposed development will not increase the risk of groundwater flooding Low Risk
Artificial Sources	No artificial sources within 250m NOT within reservoir flooding extent: (noted in the SFRA 2018) This flood extent only extends to the west of Cossington Road and does not extend to the evacuation route	Low Risk
Surface Water / Sewer Flooding	Site is located within a surface water risk zone ACCESS & EGRESS IS IN NO - LOW HAZARD Condition, depth and location of surrounding infrastructure uncertain	No increase in impermeable areas; scheme is defined by footprint of the existing building New modern flood resilience / resistance Development will utilise existing connection to sewers, gravity drainage and non-return valves Development will not increase the peak flow or volume of discharge from the site: Low Risk: No further drainage assessment required as part of the FRA
Climate Change & new allowances	Included in the flood modelling extents Site not within climate change flood extent area	Development will not significantly increase the peak flow and volume of discharge from the site Low risk posed to and from the development



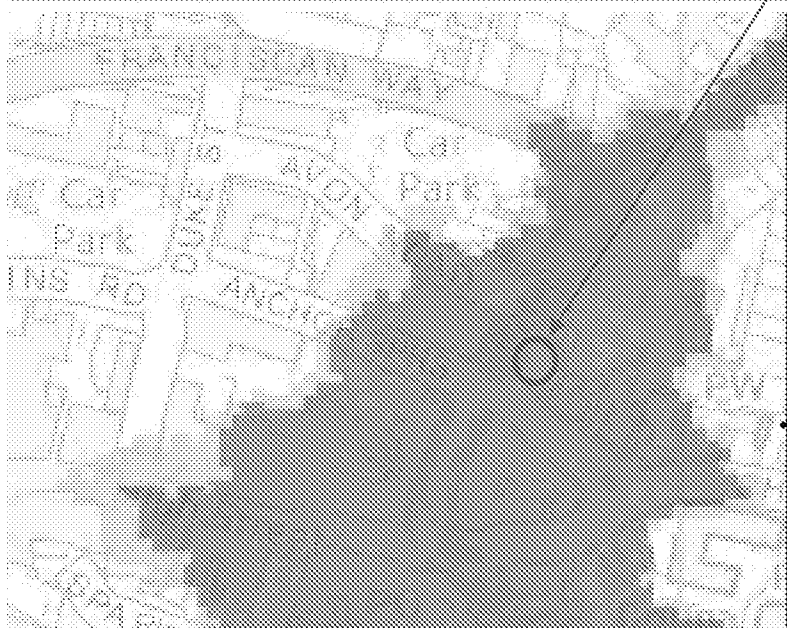
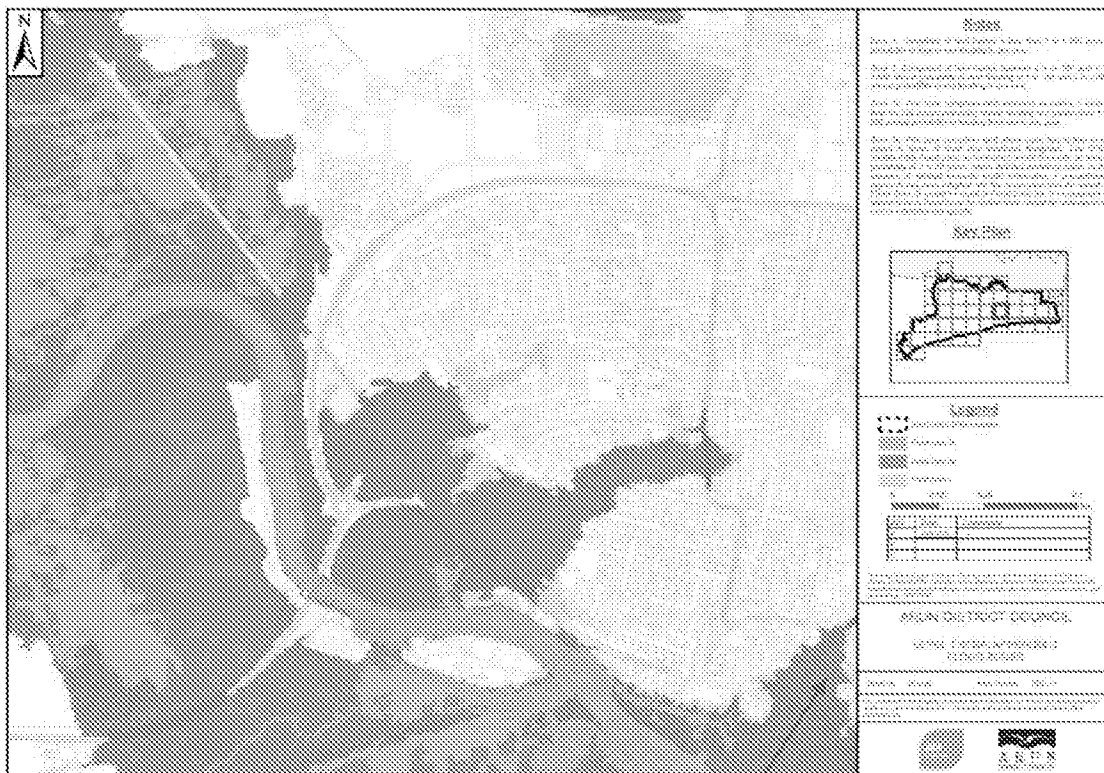


Flood Map for Planning (Rivers and Sea). Centred BN17 6AW. Created 12/03/2020.



SFRA Mapping

- The mapping and data confirm the more up to date EA mapping
 - Note: the site is just on the edge of Tile 25 & 26
 - We use Tile 25 for the fluvial / tidal context
 - We use Tile 26 for the council SFRA climate change context: to show the extents
- No other sources of flooding noted



EA 2020 Tidal Data Product 4 & 8 Data

- Refer to Appendix B
- The site is at the far extent of the Tidal floodplain
- Partly defended floodplain
- **The EA mapping indicates the site is in EA LOW - VERY LOW flood risk: this is unequivocal and does not mean the site is not in the undefended scenarios**
 - **The EA mapping can state LOW hazard even if the undefended scenarios suggests 1.35metres of depth during the present day 1in200year without defences; this is a fact**
- **It is in EA LOW – VERY LOW hazard because of the nature of the flood setting being an inundation only in an extreme future tidal event: i.e. as demonstrated by the modelling for undefended and for Tidal extents**
- Distance of site from River Arun is c. 490m through dense urban area
 - Not in rapid inundation zone

The site is unlikely to flood, except in an extreme event of overtopping, and any potential surcharging at the culvert points near to the site.

Site-specific EA Nodes and Data

See Appendix B

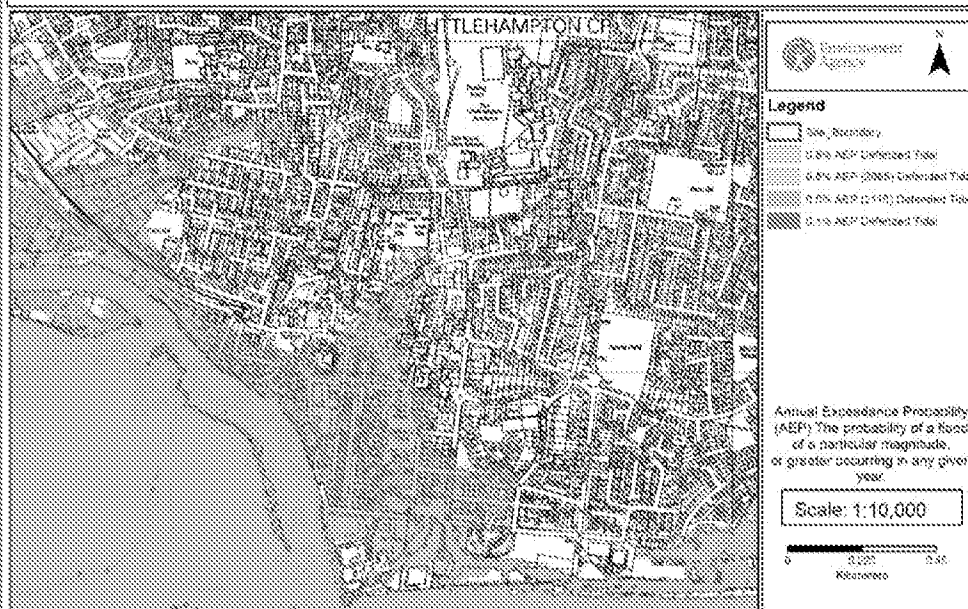
- Node 1 is at the site
- Site is not within the defended extreme tidal extent for present day or by Year 2070
- Site is within the Year 2115 defended extreme tidal extent
- Site is within the undefended scenarios
 - Present day 1in200year: suggests 1.36metre depths (3.74mAOD) at the site during the present day if there were no defences in place
 - 2115 1in200year: suggests 2.56metre depths (4.94mAOD)
- 1in1000year data are irrelevant if the EA are suggesting the undefended scenarios should be used for design / suitability
- It must come down to the assessment of risk: magnitude / likelihood and impact.

Given the residual tidal flood risk, the assessment concentrates on the hazard rating, design response and flood response management including suitability of evacuation. In the critical lower probability flood events, flood waters are not likely to reach the site, regardless, evacuation would be feasible and the preferred option.

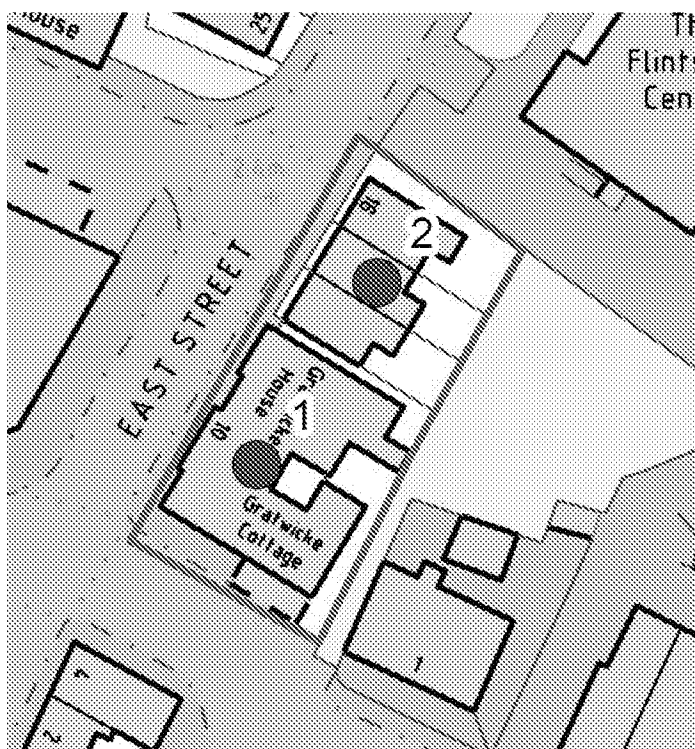
The site is within the EA Flood Warning area.

Note: the EA data are stated as not including the new climate change allowances, but given the tidal modelling uplift of over 1.0metre, whether this would be 1.1metre or over 5.0 metres is irrelevant given the suitability of 1.0metre depths in the first instance.

Modelled Flood Outlines (Defended Tidal), Centred BN17 6AW. Created 12/03/2020.



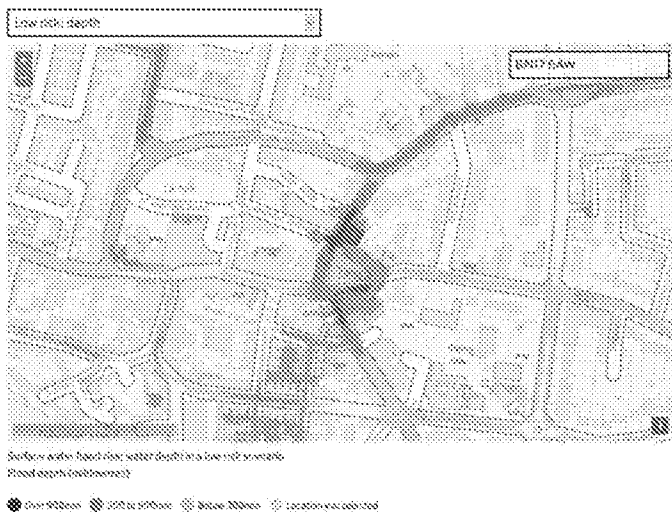
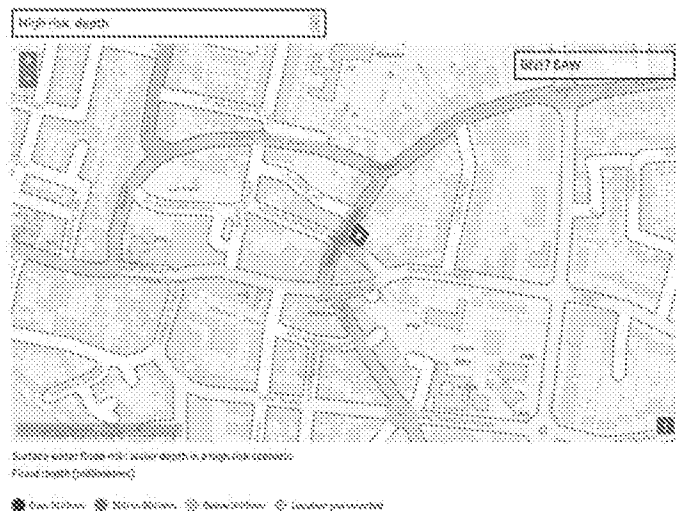
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See Appendix B for the Nodes Flood Levels and Depths tables for the scenarios provided by the EA

EA 2020 Surface Water Hazard

- Critical: Site itself remains in NO hazard and flood free in EA high risk scenario, hence evacuation is safe and appropriate
 - Adjacent to site is in LOW hazard: below 300mm
- In LOW risk scenario, adjacent to site / part site is inundated and in part Medium hazard
 - Precautionary assume 600mm
 - **Correct approach given existing building: flood resilience and resistance** to result in better protected and flood future-proofed building than existing
- Refer to mapping extract below:



9.0 DESIGN RESPONSE: Ground floor flats are appropriate

The presence of defences or not does not have a bearing on the assessment.

- a) Existing ground floor already at c. 225mm (3 brick heights) above external ground / pavement levels (see streetview extract below in Section 10.0)
- b) the NO - LOW hazard in EA surface water risk scenarios
- c) the change of use scheme which means a raised ground floor is not feasible but neither is it necessary

However: the correct approach is:

1. Robust flood resilience for the whole of the ground floor in order to flood future proof the property
 - Incorporate additional 600mm height of resilience
 - This is in total 825mm height of resilience (existing raised 225mm + 600mm)
2. If feasible: additional precaution:
 - Robust flood resistance: additional floodgates at 600mm height (maximum height advisable) or water proof door systems
 - This is 825mm height resistance

9.1 Site Specific Breach Modelling

It has been stated before, and is backed by the NPPF / PPG guidance, that for this site and scheme, given the site is at the edge of the floodplain, ground FFL already raised, easy access to FZ1 and the scheme is a change of use, to undertake expensive modelling including breach modelling of the Arun would not be an approach commensurate with the scale and sensitivity of the site or scheme; it is not required based on this assessment.

- Given this is a change of use, the scheme can provide flood resilience / resistance to a further 600mm above this level, hence a 825mm height pragmatic approach to address future climate change and the extreme events

9.2 How to address?

As per the NPPF (Paragraph: 041 Ref ID: 7-041-20140306), breach events are categorised unequivocally as representing a “residual risk”.

If there were to be over 2.5metre depths of flooding at this far extent of the floodplain, this would be caused by an extreme tidal surge; this would not happen without warning and not without a catastrophe warning for the whole of the south and south east coast a number of days before the event happening: this is because the warning system is meteorological

The breach event at this extreme can only occur, as per breach assessment methodologies, when the hydraulic pressure on the defences is at a certain high point; this cannot occur without a well advanced warning. This is also a tidal breach event: as per the report, this cannot occur without meteorological advanced warning: tidal surges do not occur without prior warning of likely a number of days.

Based on site specific, scheme specific and data specific assessment: the scheme can operate safely on this site.

10. Assessment of Proposed Development

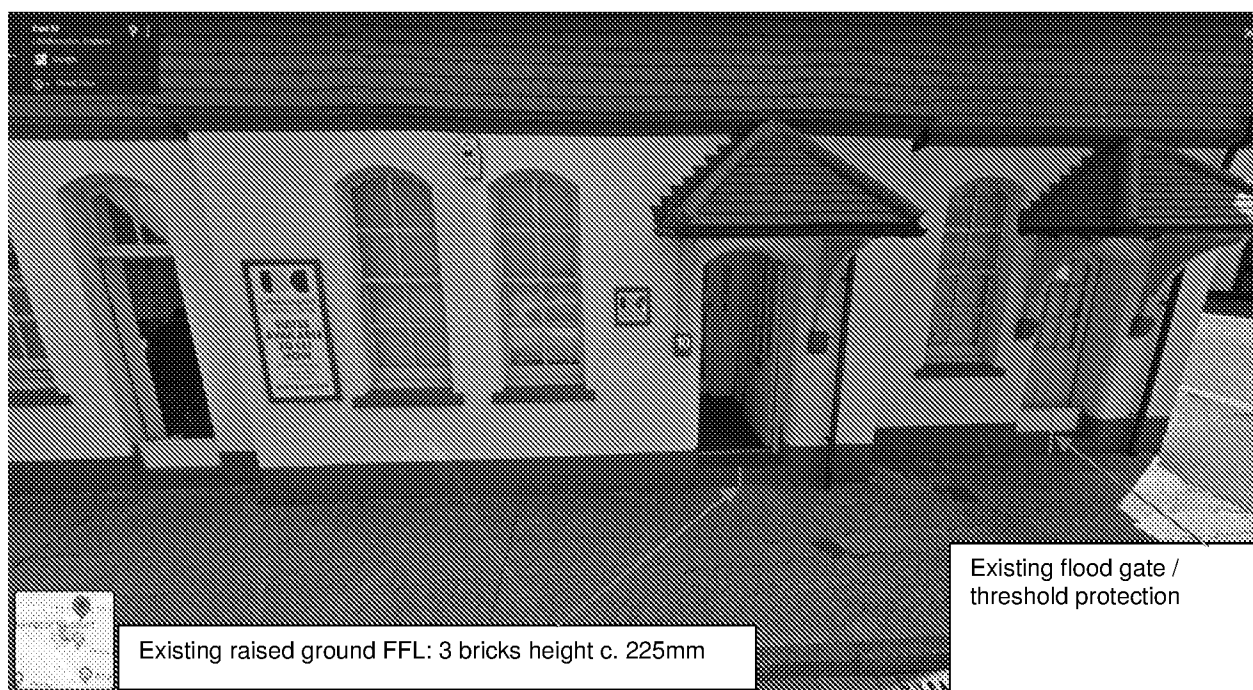
10.1 Proposed Development

The proposed development comprises (see Appendix A):

- Change offices to residential dwellings (flats / apartments)
- Given flood setting and site and property specifics:
 - Site is appropriate for ground floor self-contained dwelling
 - Ground FFL already 225mm above ground level at edge of floodplain
- Site is in official EA LOW - VERY LOW hazard
- Tidal principal hazard means meteorological advanced warning
 - Bedrooms on ground floor are appropriate

To address residual risk but not that of greater than 2.0m depths of extreme undefended scenarios

- Incorporate 600mm height of resilience: see recommended suitable resilience
 - This is in total 825mm height of resilience
- Subject to agreement: additional 600mm height floodgates on access points or water proof door systems
 - This is 825mm height resistance



REDUCES FLOOD RISK OVERALL:

- New flood resilient measures
- No increase in impermeable areas
- REDUCE FLOOD RISK OVERALL: Resilient and resistant measures (see later sections) i.e. waterproofing to industry standards
- No formal SUDs required given size, no increase in impermeable areas and change of

use within existing footprint

- SUDS policy compliant
- Non-return valves where new drainage required

Given the flood hazard setting and tidal risk, raised floor levels are not considered necessary.

Additional Mitigation

Tidal: not within breach

- Flood resilience and resistance as incorporated
- no additional design mitigation is required for tidal flooding
- formal flood evacuation and response management plan as included in this report

Surface Water

- Precautionary only (not necessary):
 - Not required but: all entrances to have 600mm flood gates on entrance where feasible would be a sensible approach to address residual surface water hazard for this scheme

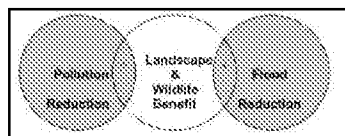
Drainage

- The existing connections will be retained.

10.2 Sustainable Drainage Systems (SUDS)

Concept SUDS Strategy

The following diagram indicates the philosophy behind the proposed SUDS strategy, and is taken from the EA's SUDS guidance:



(Source: Environment Agency, 2009)

The Table below indicates the SUDS Hierarchy Appraisal for the site and proposed development:

Site Specific SUDS Appraisal

SUDS Hierarchy	SUDS Technique	Potential Benefits			Site Specific	
		Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit	?	Scheme Specific SUDS Suitability Appraisal and Comment
Most Sustainable ↑ ↓ Least Sustainable	Living Roofs	•	•	•	X	Not likely feasible given nature of existing structure & roof construction. (Blue, Green and Brown roofs)
	Ponds / Basins	•	•	•	X	Not likely suitable given site constraints and scheme is change of use confined to existing footprint and impermeable areas. No increase in impermeable areas
	Swales	•	•	•	X	Not likely suitable given site constraints and scheme is change of use confined to existing footprint and impermeable areas. No increase in impermeable areas
	Infiltration Techniques	•	•		X	Not likely suitable given site constraints and scheme is change of use confined to existing footprint and impermeable areas. No increase in impermeable areas
	Permeable Surfaces / underground storage	•	•		X	Not likely suitable given site constraints and scheme is change of use confined to existing footprint and impermeable areas. No increase in impermeable areas
	Tanked Systems	•			X	Not likely suitable given site constraints and scheme is change of use confined to existing footprint and impermeable areas. No increase in impermeable areas

Key:

Potentially suitable at the site: *

Incorporated in the scheme: ✓

Not suitable / possible at the site: X

10.3 Flood Resilience

The proposed development will utilize the flood resilient techniques recommended in the NPPF Technical Guidance where appropriate and also the recommendations that have previously been issued by various councils.

As per previous correspondence with planning officers and as agreed:

The FRA provides the recommended resilient measures that can be incorporated; because the scheme is a change of use within the curtilage of the existing footprint, it will depend on the construction team as to what construction will actually need to be undertaken and tied in to the existing structures.

The ground floor as part of the proposed works as standard will have all new flood resistant and resilient standards.

This does not invalidate the points and recommendations of this FRA. The FRA cannot simply specify the exact measures that need to be changed or the exact specifications of products to be used, especially as technology changes rapidly; they are not required of planning.

BUT:

If any of these elements are required to be newly installed for the change of use as part of the scheme they will be constructed following the resilience guidance as is mandatory:

In addition to the standard flood resilient measures and if feasible: 600mm high floodgates:

The following are to be applied / used:

- Non-return valves as standard for ground floor connections
- Waterproofing to be installed above ground level as appropriate
- Plasterboards will be installed in horizontal sheets rather than conventional vertical installation methods to minimise the amount of plasterboard that could be damaged in a flood event
- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property
- Any wood fixings will be robust and/or protected by suitable coatings in order to minimise damage during a flood event
- Airbricks will be raised to as high as is feasible and practicable
- Any new Damp Proof Membrane and ground waterproofing will be installed above the main ground floor slab (as existing or new if required) and tied in to the walls where appropriate, to reduce the turnaround time for returning the property to full operation after a flood event.

10.4 Refuge and Evacuation

Based on the likely flood risk (EA / SFRA data) and associated warning time that is feasible and the low residual risk, it is considered likely that there would be sufficient time to evacuate in normal flood warning situations from all types of flood events.

The site is not within the flood extent in the unlikely event of a present day breach in the defences, hence this fastest type of flooding does not need to be considered.

However a precautionary approach has been taken in the following evacuation response management.

- **Tidal principal hazard means meteorological advanced warning**
 - Suitable to address council SFRA future climate change extents

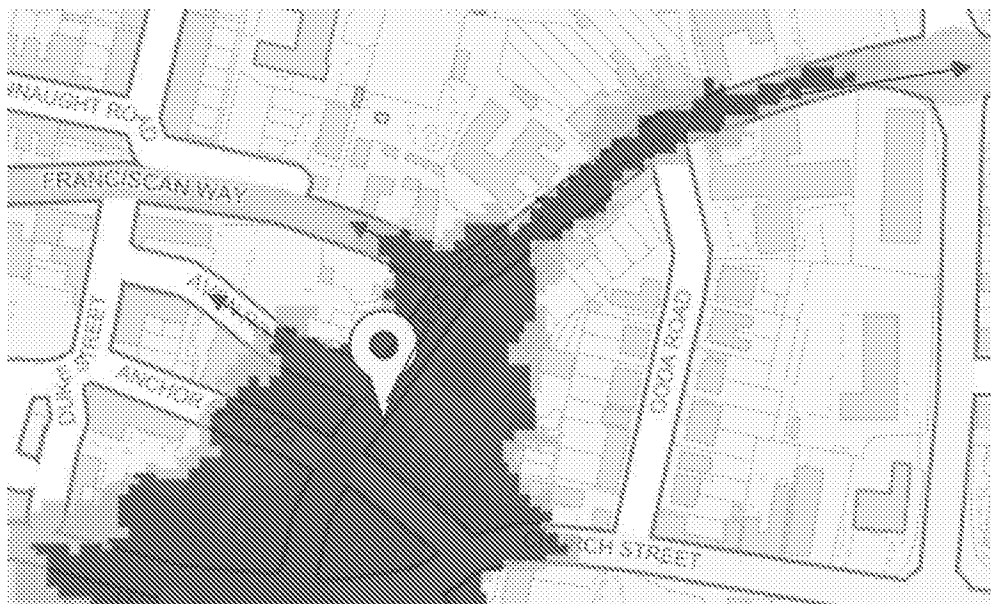
Early Tidal Flood Warning – Evacuation

If upon EA early warning of a potential overtopping is provided, the preferred evacuation route should be:

Note: site already on the edge of FZ3 / adjacent FZ2 and FZ1

- Exit onto East Street and immediately opposite Avon Road: into unrestricted FZ1
- North on East Street: away from flood source in VERY LOW – LOW hazard
- Options to take then Franciscan Way west: into unrestricted FZ1
- Or continue northeast on East Street: unrestricted FZ1

This route does go through lower residual hazard areas as identified in the EA data / SFRA and not through any higher risk flood extents.



10.5 Annual Monitoring

It is recommended that future site users should contact the EA on an annual basis to confirm the flood status of the property.

If the flood status has changed, the evacuation and refuge plan should be reviewed and updated by suitable flood risk consultants as appropriate.

10.6 Flood Response Management

It is recommended that the future users understand and sign up to the EA Flood Warning scheme.

Precautionary evacuation is the preferred approach for the flats but given building is at edge of the FZ3 and ground raised by 225mm with integrate flood resistance: likely all users will remain dry even during an extreme flood.

Flood Safety Pack

Occupants should ensure a flood safety evacuation pack is kept in a safe and easily accessible place. This should include as a minimum:

- First aid kit
- Torch
- Warm clothing or blanket
- List of appropriate contact numbers
- Bottled water
- Waterproofs / Wellington boots
- Non-perishable food

10.7 Surface Water Runoff – Flood Risk from the Development

In accordance with the NPPF, this FRA also considers the risks posed from the development to surrounding areas. Given there will be no increase in impermeable areas it is considered there will be no significant increase in discharge from the site; the proposed development will also continue to use existing / have new connections to the existing sewers.

Guidance

Scheme is change of use and no increase in impermeable areas.

The proposals will incorporate new low-water demand devices where necessary and such that there will not be an increase in peak flows or volume of flows.

Given the small scale of the proposed development it is considered likely that the development will have no impact on surrounding infrastructure. There will not be any significant increase in overland flow from the site.

10.8 Climate Change: including new allowances

The impact of climate change in accordance with the NPPF is likely to be an increase in the rainfall intensity in the future, which will increase peak storm flows to sewer. The proposed

development will incorporate low flush and reduced water demand showers and toilets, such that the combined flows to sewer are likely to have a negligible impact. It is considered therefore that flows in the future are not likely to have a significant impact, even with an allowance for climate change.

The site is on the far extent of FZ3: given change of use and no site specific flood levels: no further accommodation for new climate change allowances is considered feasible or necessary. If the EA write a letter of objection using new climate change allowances, it suggests they have not read this report or understood their own flood settings and guidance.

The 225mm + 600mm flood resistance freeboard combined with additional resilience / provides additional inherent protection: this is considered appropriate as a precautionary measure for this site and flood setting.

There is unlikely to be an impact on the receiving sewers owing to the small scale of the development with no increase in impermeable areas.

10.9 Sequential Test

The scheme is a change of use and is not a NPPF/PPF flood defined “minor development” (different to local planning definition of minor development): in accordance with the NPPF / PPG, the sequential test does not apply.

“The Sequential Test does not need to be applied for individual developments on sites which have been allocated in development plans through the Sequential Test, or for applications for minor development or change of use (except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site).”

10.10 Flood Risk Vulnerability

According to the NPPF/PPG retained Flood Risk Vulnerability Classification, the new dwelling would be classified as “More Vulnerable.”

The residential use is categorized as “More Vulnerable”.

The NPPF also retained Flood Risk Vulnerability and Flood Zone “Compatibility” Classification; this states that a “More Vulnerable” development in Flood Zone 3 is appropriate if the Exception Test can be passed.

10.11 Exception Test

The Table below provides the likely response to the 2 key criteria of the Exception Test. This FRA provides the second element required of NPPF to satisfy the Exception Test.

This report considers the test to be passed.

Exception Test Criteria	Proposed Development
It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared.	Planners to confirm. The scheme will not increase impermeable areas. Ground floor dwellings are appropriate in this flood setting as not in rapid inundation zone and not in breach and at far extent of FZ3 Ground FFL is already 225mm above existing ground levels with existing floodgate / threshold protection Results in better protected and flood future-proofed structure than is existing Scheme can operate safely even in the extreme event Appropriate mitigation is flood resilient and resistant measures
A FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere, and, where possible will reduce flood risk overall.	Pass. Suitable evacuation timing and route for tidal and surface water. Site in FZ3 part defended. Tidal: EA low hazard with defences hence suitable scheme for this flood setting Undefended scenarios are extreme future catastrophe with advanced warning: not a reason to object to schemes with ground floor flats • Safe, NO - LOW hazard • Access / Egress is appropriate • REDUCES FLOOD RISK OVERALL: new modern flood resilience / resistance • Results in better protected and flood future-proofed structure than is existing All site users also have emergency access to upper levels above any extreme event for the lifetime of the scheme. As long as the flood resilient measures are incorporated, and the future occupiers sign up to the EA flood warning and understand the flood response required, it is considered likely 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.

Based on the data reviewed to date, the flood risk assessment recommends the property could be constructed and operated safely in flood risk terms without increasing flood risk elsewhere.

10.0 Conclusion

The site is considered to be generally at a low risk from all sources of flooding except the potential future extreme overtopping event / residual surface water hazard.

The proposed development is categorised as “Highly & More Vulnerable” in accordance with the NPPF; it is therefore an appropriate type of development within Flood Zone 3 part defended. The presence of defences or not does not have a bearing on the assessment.

It is considered that the Exception Test can be passed.

- Operation of the site is feasible: only inundated in catastrophe with number of days advanced warning: NPPF residual risk
- Evacuation appropriate for lifetime of the scheme: does not go through any higher flood risk areas to reach unrestricted FZ1
- REDUCES FLOOD RISK OVERALL: new modern flood resilience / resistance
- **Results in better protected and flood future-proofed structure than is existing**

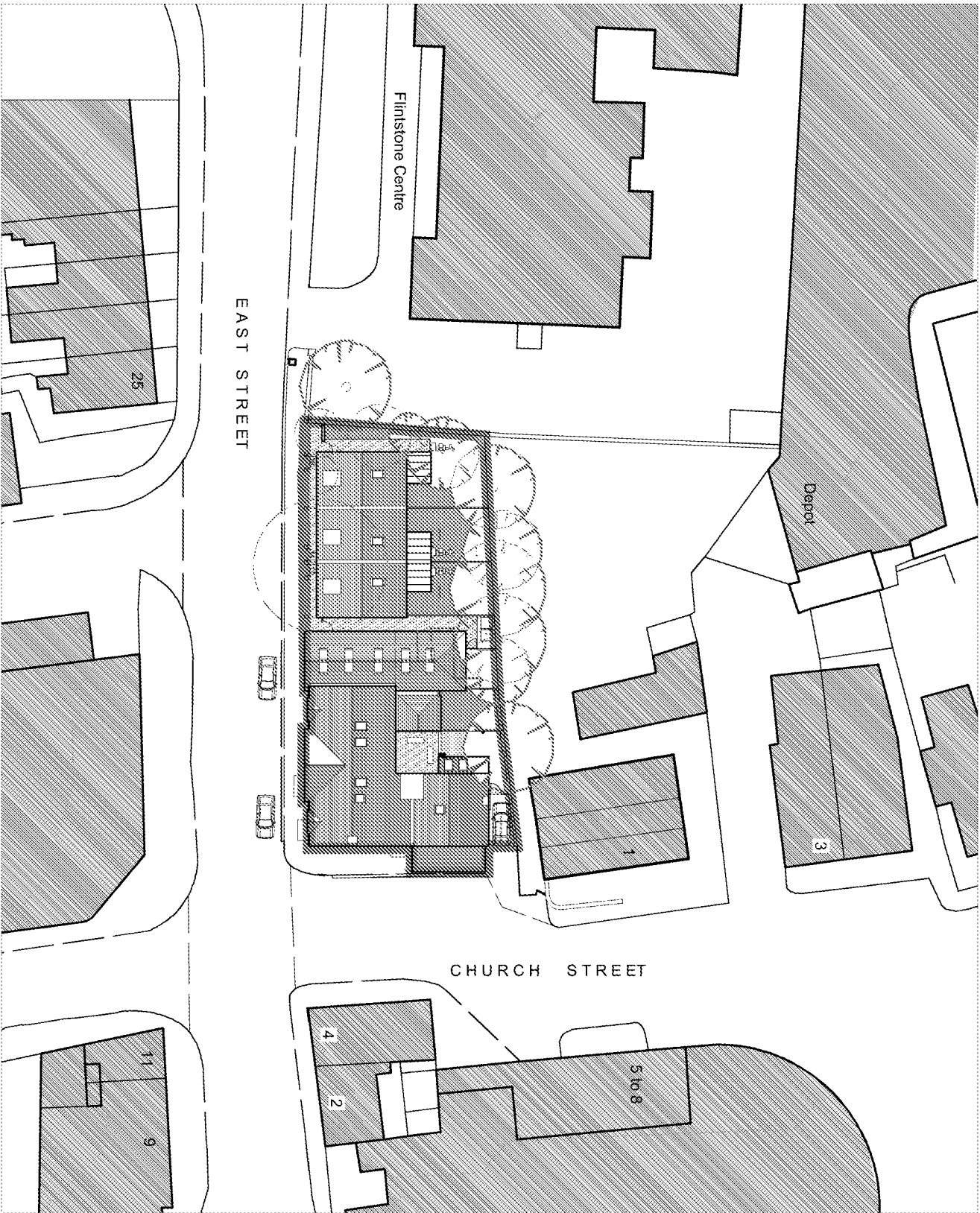
The proposed scheme can incorporate suitable flood resilient measures and safe evacuation is feasible.

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.

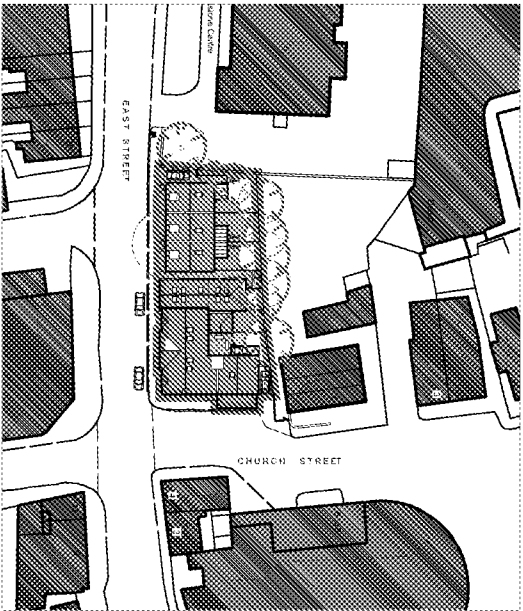
10.1 Appendices

- A. Location and Layout and Floor Plans
- B. EA Data

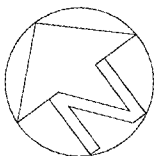
Appendix A



Proposed block plan 1:500@A3



Existing site location plan 1:1250@A3



Prior Approval

X 101219 Project number updated

rev.	date
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client

Mr M. Wilson

project
Gratwicke Arms, East Street
Littlehampton, West Sussex

drawing

Block & Site Location Plan

scale
Shown@A3 date Dec 2019

19a Wilbury Avenue
Hove, East Sussex
BN3 6HS
tel: 01273 203230
fax: 01273 321687
email: info@laarchitects.co.uk

Turner Associates
Architects and Planning Consultants

TA 1224 / 01 X

Flood Defence Locations. Centred BN17 6AW. Created 12/03/2020.

Legend

Please see page 2 for asset
symbology



1: 10,000

0 250

Metres



Structures

-  Control Gate
-  Draw Off Tower
-  Fish Pass
-  Hydrobrake
-  In Channel Stoplogs
-  Inspection Chamber
-  Jetty
-  Outfall
-  Screen
-  Spillway
-  Stilling Basin
-  Weir

Beach Structures

-  Breakwater
-  Ramp
-  Slipway
-  Steps
-  Groyne

Instruments

-  Active Monitoring
-  Passive Monitoring

Channel Crossings

-  Bridge
-  Utility Services

Aids to Navigation

-  Beacon
-  Buoy
-  Dolphin
-  Signage
-  Signal

Building Assets

-  Pump House

Major Civils

-  Abutment
-  Central Pier

Defences

-  Embankment
-  Wall
-  Flood Gate
-  Demountable defence
-  Bridge abutment
-  High Ground
-  Beach
-  Barrier Beach
-  Promenade
-  Quay
-  Cliff
-  Dunes

Channels

-  Open channel
-  Simple culvert
-  Complex culvert

Land

-  Mudflats
-  Saltmarsh
-  Washland

Sites

-  Amenity
-  Control Structure
-  Erosion Protection
-  General
-  Harbour
-  Monitoring
-  Navigation Lock
-  Pumping Station
-  Reservoir
-  Tidal Barrier



Environment
Agency

N



Legend

●

Site_Nodes

□

Site_Boundary

Scale: 1:1,000

00.02250.045

Kilometers



Product 4 Flood Risk Data Requested by: Ark Environmental Consultancy Ltd

Site: Gratwicke House, 10 East Street, Littlehampton, BN17 6AW

Table 1: Water Levels: Tidal Undefended

Node Ref	NGR		Modelled Flood Levels in Metres AOD			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			0.5%	0.5% (2070)*	0.5% (2115)*	0.1%
1	502942	102173	3.74	4.35	4.94	4.05
2	502953	102189	3.74	4.35	4.94	4.05

Table 2: Water Levels: Tidal Defended

Node Ref	NGR		Modelled Flood Levels in Metres AOD			
	Eastings	Northings	Defended Annual Exceedance Probability			
			0.5%	0.5% (2070)*	0.5% (2115)*	0.1%
1	502942	102173	-	-	3.91	-
2	502953	102189	-	-	3.92	-

Table 3: Water Depths: Tidal Undefended

Node Ref	NGR		Modelled Flood Depths in Metres			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			0.5%	0.5% (2070)*	0.5% (2115)*	0.1%
1	502942	102173	1.36	1.97	2.56	1.67
2	502953	102189	1.26	1.86	2.45	1.57

Table 4: Water Depths: Tidal Defended

Node Ref	NGR		Modelled Flood Depths in Metres			
	Eastings	Northings	Defended Annual Exceedance Probability			
			0.5%	0.5% (2070)*	0.5% (2115)*	0.1%
1	502942	102173	-	-	1.57	-
2	502953	102189	-	-	1.20	-

Office Address: Guildbourne House, Chatsworth Road, Worthing BN11 1LD.

All levels taken from: Arun Coastal Modelling (2012) with updated defended modelling (2017)

Produced on: 13/03/2020

*** The flood risk data provided is based on existing EA hydraulic models for existing 0.5% annual probability events with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 17 December 2019.**

You should refer to 'Flood risk assessments: climate change allowances' for the most up to date allowances. You will need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.

Office Address: Guildbourne House, Chatsworth Road, Worthing BN11 1LD.

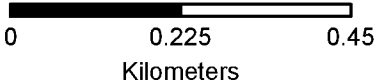


Legend

-  Site_Boundary
-  0.5% AEP Defended Tidal
-  0.5% AEP (2065) Defended Tidal
-  0.5% AEP (2115) Defended Tidal
-  0.1% AEP Defended Tidal

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



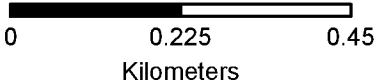


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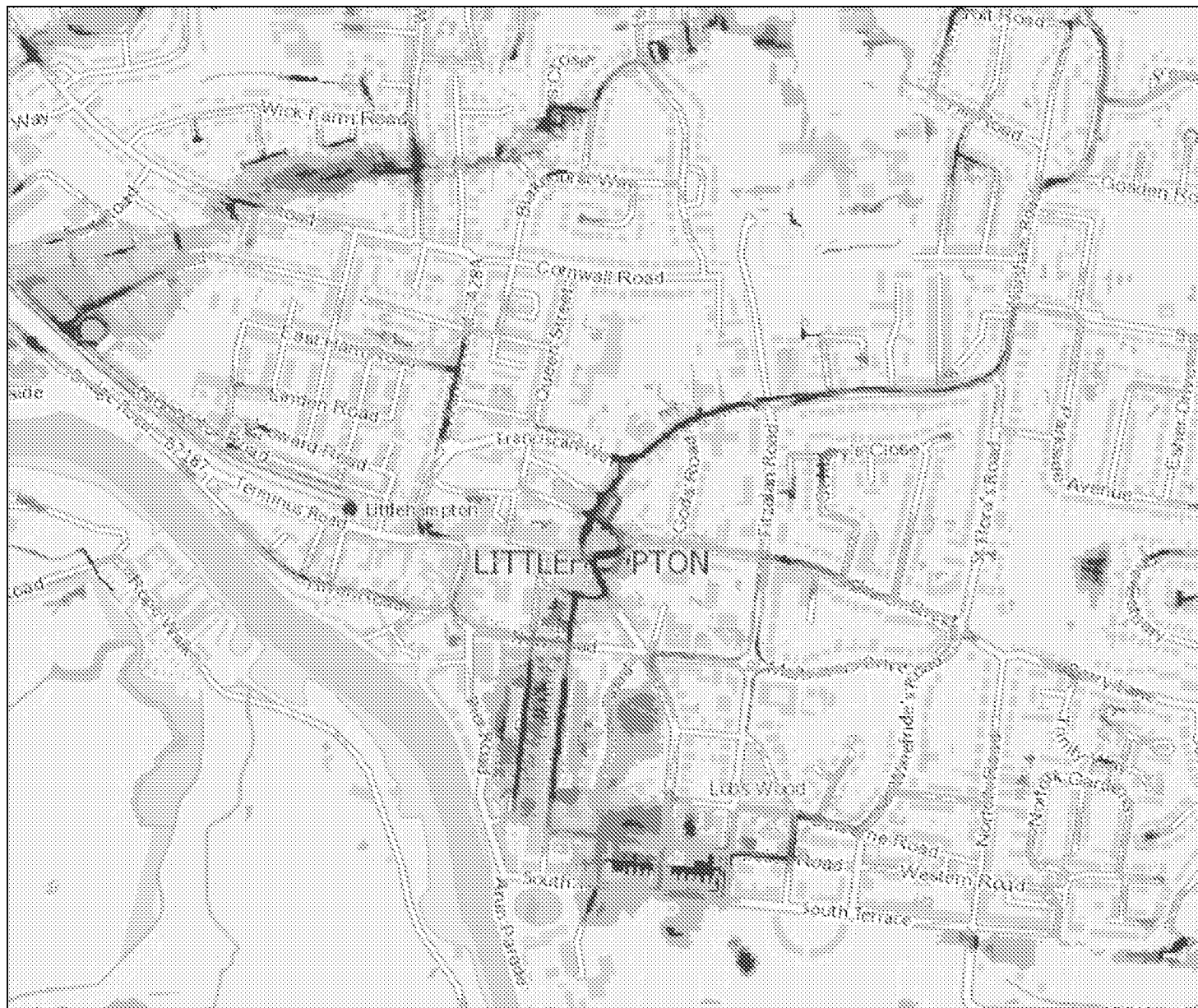
-  Site_Boundary
-  0.5% AEP (2012) (Undefended)
-  0.5% AEP (2070) (Undefended)
-  0.5% AEP (2115) (Undefended)
-  0.1% AEP (2012) (Undefended)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



Risk of flooding from Surface Water. Centred BN17 6AW. Created 12/03/2020.



1: 10,000

0 Metres 250



Likelihood of flooding from Surface Water

- High ($\geq 3.3\%$)
- Medium (3.3% - 1%)
- Low (1% - 0.1%)
- Very Low

Likelihood of flooding from Surface Water

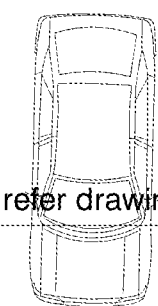
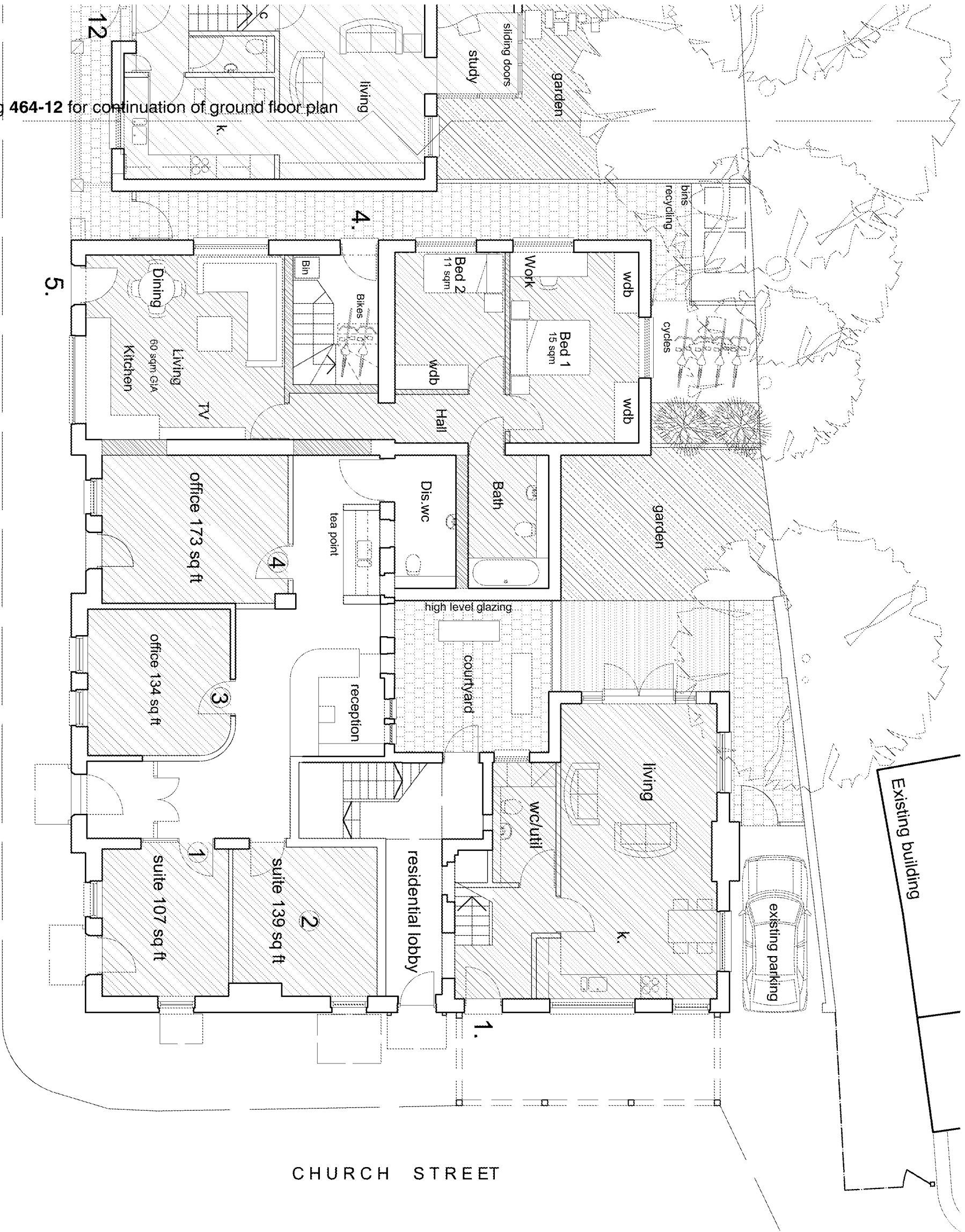
- High:** Greater than or equal to 3.3% (1 in 30) chance in any given year
- Medium:** Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) chance in any given year
- Low:** Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance in any given year
- Very Low:** Less than 0.1% (1 in 1,000) chance in any given year

This information is shown on the Risk of Flooding from Surface Water map on GOV.UK.

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). E-mail: enquires@environment-agency.gov.uk

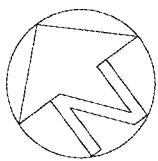
Appendix B



refer drawing 464-12 for continuation of ground floor plan

EAST STREET

CHURCH STREET



schedule of areas

- suite 1 - office
- suite 2 - office
- unit 3 - office
- unit 4 - office
- unit 1 - 3 bed apartment
- unit 2 - 2 bed apartment
- unit 3 - 2 bed apartment
- unit 4 - 2 bed apartment
- unit 5 - 2 bed apartment

Prior Approval

- F 101219 Internal layout change
- E 021219 Internal layout change
- D 021219 Internal layout change
- C 211119 2 x 2 bed flat scheme added

rev.	date

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client

Mr M. Wilson

project

Gratwicke Arms, East Street
Littlehampton, West Sussex

drawing

Conversion - Ground Floor Plan

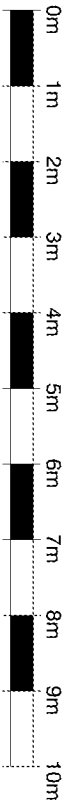
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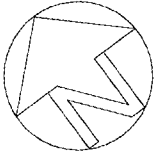
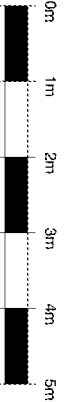
19a Wilbury Avenue
Hove, East Sussex
BN3 6HS
tel: 01273 203230
fax: 01273 321687
email: info@taarchitects.co.uk

Turner Associates
Architects and Planning Consultants

TA 1224 / 14 F

Proposed conversion - ground floor plan 1:100@A3





schedule of areas

- suite 1 - office
- suite 2 - office
- unit 3 - office
- unit 4 - office
- unit 1 - 3 bed apartment
- unit 2 - 2 bed apartment
- unit 3 - 2 bed apartment
- unit 4 - 2 bed apartment
- unit 5 - 2 bed apartment

Prior Approval

- C 101219 Internal layout change
- B 021219 schedule of areas revised
- A 211119 schedule of areas revised

rev.	date
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client

Mr M. Wilson

project

Gratwicke Arms, East Street
Littlehampton, West Sussex

drawing

Conversion - First Floor Plan

scale	1:100@A3	date	Dec 2009
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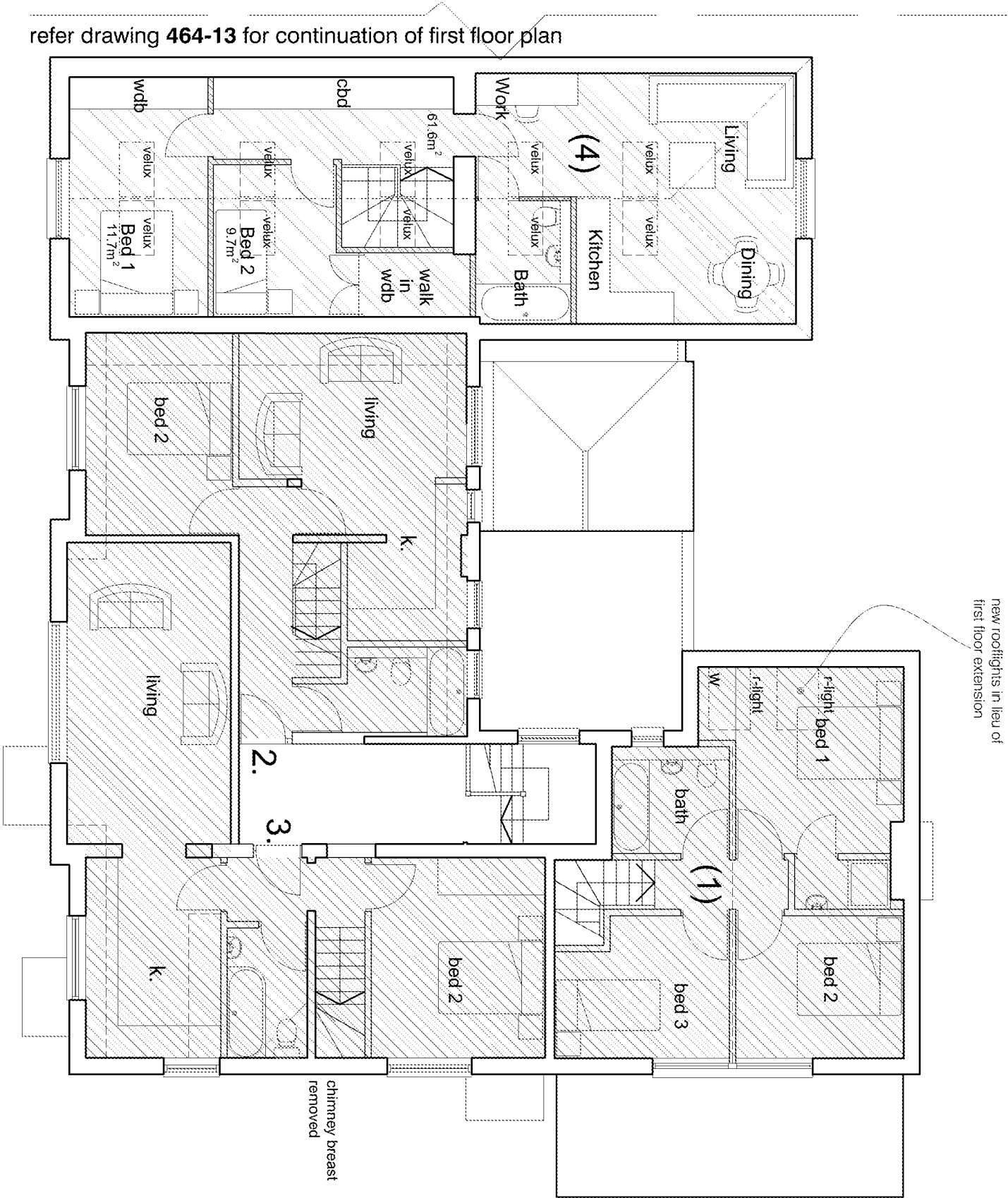
19a Wilbury Avenue
Hove, East Sussex
BN3 6HS
tel: 01273 203230
fax: 01273 321687
email: info@tarchitects.co.uk

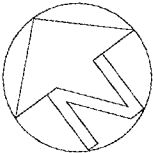


TA 1224 / 15

rev. C

proposed conversion - first floor plan 1:100@A3

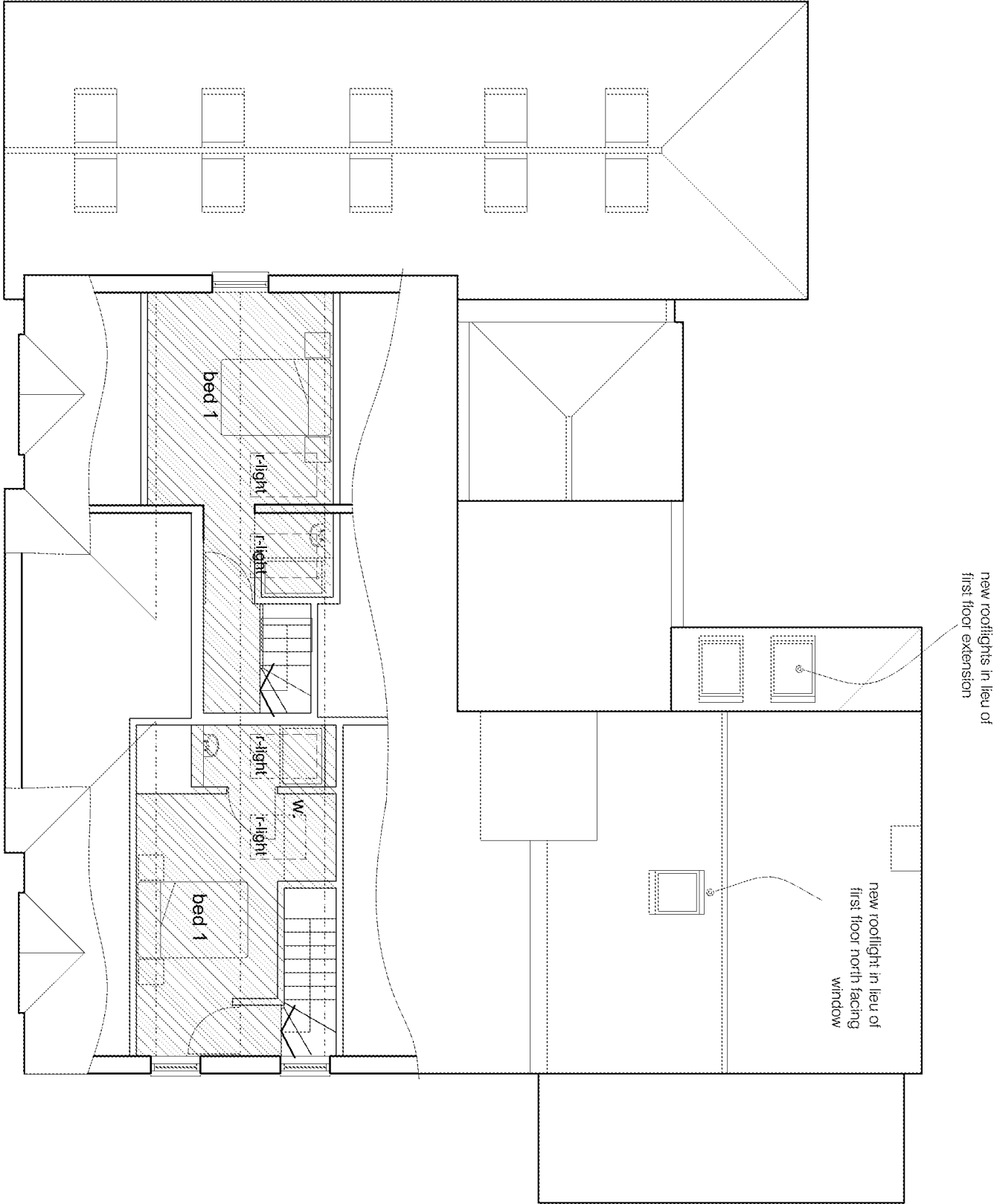




schedule of areas

- suite 1 - office
- suite 2 - office
- unit 3 - office
- unit 4 - office
- unit 1 - 3 bed apartment
- unit 2 - 2 bed apartment
- unit 3 - 2 bed apartment
- unit 4 - 2 bed apartment
- unit 5 - 2 bed apartment

refer drawing 464-13 for continuation of first floor plan



proposed conversion - second floor plan 1:100@A3

Prior Approval

- G 101219 schedule of areas revised
- F 021219 schedule of areas revised
- E 211119 schedule of areas revised

rev.	date

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client

Mr M. Wilson
Gratwicke Arms, East Street
Littlehampton, West Sussex

project
Conversion - Second Floor Plan

scale 1:100@A3 date Dec 2009

19a Wilbury Avenue
Hove, East Sussex
BN3 6HS
tel: 01273 203230
fax: 01273 321687
email: info@taarchitects.co.uk

Turner Associates
Architects and Planning Consultants