



degadea

Flood risk, water and environment

Flood Risk Assessment AEG3288_DA11_Gravesham_01

Site Address: 7 Wrotham Road

Gravesend

Gravesham

DA11 0PD

UK Experts in Flood Modelling, Flood Risk
Assessments, and Surface Water Drainage Strategies

degadea

Flood risk, water and environment

Document Issue Record

Project: Flood Risk Assessment

Prepared for: Forma Property

Reference: AEG3288_DA11_Gravesham_01

Site Location: 7 Wrotham Road, Gravesend, Gravesham, DA11 0PD

Consultant		Date	Signature
Author	Daniel Cunningham	19/10/2023	
Document Check	Nick Darling-Drewett	20/10/2023	
Authorisation	Daniel Cook	24/10/2023	
Rev A	Nick Darling-Drewett	04/12/2023	

Please Note:

This report has been prepared for the exclusive use of the commissioning party and may not be reproduced without prior written permission from Aegaea Limited. All work has been carried out within the terms of the brief using all reasonable skill, care, and diligence. No liability is accepted by Aegaea Limited for the accuracy of data or opinions provided by others in the preparation of this report, or for any use of this report other than for the purpose for which it was produced. Where reference has been made to probability events, or risk probability, it does not ensure that there is no risk or that there is no residual risk from an extreme, unlikely or unforeseen flood event over the lifetime of the development.

Table of Contents

Summary.....	1
1. Introduction	4
Site Overview.....	4
Planning Policy and Guidance.....	6
2. Planning Policy	7
National Planning Policy Framework (NPPF)	7
Local Plan	10
Sequential and Exception Tests	10
Summary.....	11
3. Sources of Information	12
Documents and Online Mapping	12
4. Sources of Flood Risk	14
Fluvial	14
Tidal.....	15
Canals.....	16
Pluvial	16
Reservoirs	22
Groundwater.....	23
Sewers	24
5. Flood Risk Mitigation	26
Fluvial	26
Pluvial	26
Tidal, Canals, Reservoirs, Groundwater and Sewers	26
Increase to Flood Risk Elsewhere	26
Flood and Weather Warnings.....	26

6. Conclusions 28

Appendix A - Development Proposals..... 30

Summary

Development Description	Existing	Proposed
Development Type	Commercial premises	Conversion of basement, ground floor, first floor and second floor from commercial to residential 13 apartments, (including an additional storey)
EA Vulnerability Classification	Less Vulnerable	More Vulnerable and Highly Vulnerable (basement dwelling)
Ground Floor Level	EA 1m LiDAR data shows the ground elevation of the site varies between approximately 18.57m AOD and 20.32m AOD.	No change as the proposed development is a change of use from commercial use to residential apartments. Not proposed to raise the FFLs as site in Flood Zone 1 and unaffected in modelled 1:1000 year pluvial event.
Level of Sleeping Accommodation	N/A ²	Basement, ground floor, first floor and second floor
Impermeable Surface Area	Entire development area considered impermeable due to existing hardstanding and footprint.	No change – development is change of use of existing building.
Surface Water Drainage	N/A ¹	Runoff to be discharged via existing system given that proposal is an internal change of use of existing footprint.
Site Size	Approximately 580m ²	No change
Risk to Development	Summary	Comment
EA Flood Zone	Flood Zone 1	The whole of the site is within Flood Zone 1
Flood Source	Pluvial. The site itself is unaffected for all modelled events up to and including the 1:1000 year event but the adjacent highway could be affected.	

SFRA Available	Kent Thameside Strategic Flood Risk Assessment (2005)	
Management Measures	Summary	Comment
Ground floor level above extreme flood levels	Yes	Site in Flood Zone 1 and unaffected in modelled 1:1000 year pluvial event.
Safe Access/Egress Route	Yes	See analysis in Section 4. Access and egress could be affected in the 'Low' and 'Medium' risk events, with flood depth reaching 150mm to 300mm on the road at the main entrance. However, using the main entrance and traveling west (away from the flooding) safe access/egress may still be able to be possible in the design 'Medium' risk event due to the low hazard ratings on the western road. In the 'Low' risk event safe access/egress may not be able to be achieved due to the high hazard rating present at the site entrance. If safe access/egress is not possible due to depths exceeding 25cm on the highway, the occupants should remain on site and refuge should be taken at the highest possible floor.
Flood Resilient Design	No	Site in Flood Zone 1 and unaffected in modelled 1:1000 year pluvial event. Proposed development considered to be at low risk from all reviewed sources.
Site Drainage Plan	No	Runoff to be discharged via existing system given that proposal is an internal change of use of existing footprint.
Flood Warning and Evacuation Plan	N/A	Recommended that owners and occupants monitor Met Office

		Weather Warnings for extreme weather events.
Offsite Impacts	Summary	Comment
Displacement of floodwater	No	Development is a change of use with no increase in built footprint.
Increase in surface run-off generation	No	Runoff to be discharged via existing system given that proposal is an internal change of use of existing footprint.
Impact on hydraulic performance of channels	No	Distance from nearest mapped watercourse is approximately 532m

¹ not required for this assessment

² data not available.

1. Introduction

- 1.1. Aegaea were commissioned by Forma Property to undertake a Flood Risk Assessment (FRA) to facilitate a planning application for the proposed development. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.
- 1.2. This FRA is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Site Overview

- 1.3. The site of the proposed development is 7 Wrotham Road, Gravesend, Gravesham, DA11 0PD (Figure 1). The site is currently in commercial use.

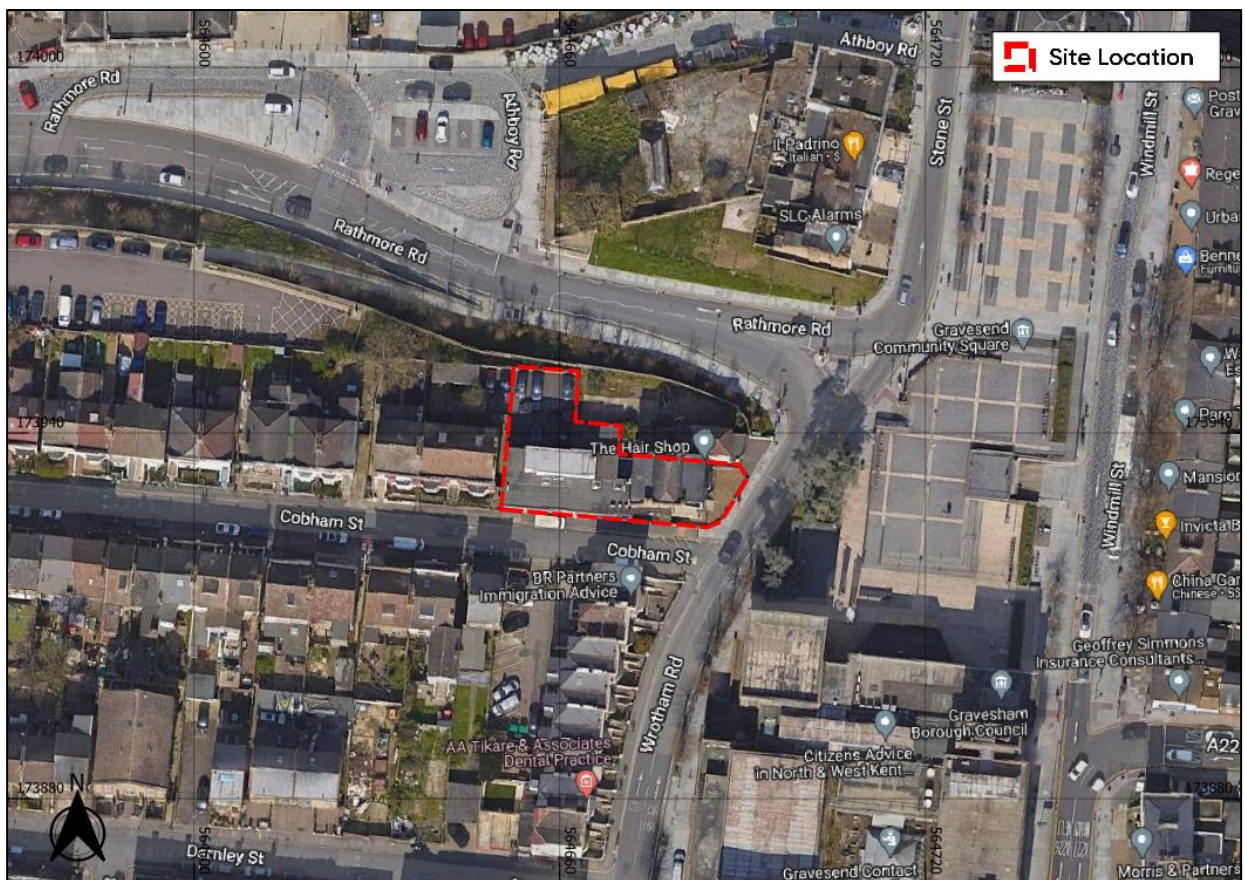


Figure 1: Site Location (Base map Google Hybrid ©)

- 1.4. The proposed development is for a change of use from commercial use to 13 residential apartments (including an additional storey).

-
- This topographic map displays the site location, marked by a red square. The map features 1m contour lines and a color-coded elevation scale ranging from 7m AOD (green) to 30m AOD (brown). The site is situated in a valley, with a road (A226) running horizontally across the middle. The map also shows various landmarks, including a shopping centre, a railway station, and a river. A north arrow is located in the bottom left corner.

degadea
Flood risk, water and environment

1.6. Gravesham Borough Council is the Local Planning Authority (LPA) for the site, and Kent County Council is the designated Lead Local Flood Authority (LLFA). The site sits within the Environment Agency's Kent South London and East Sussex region.

Planning Policy and Guidance

1.7. UK government planning guidance states¹ that an FRA is required for developments which are:

- *in flood zone 2 or 3 including minor development and change of use*
- *more than 1 hectare (ha) in flood zone 1*
- *less than 1 ha in flood zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs)*
- *in an area within flood zone 1 which has critical drainage problems as notified by the Environment Agency*

1.8. The site is located within Flood Zone 1. However, the adjacent highway is at risk of surface water flooding which may affected safe access/ egress and thus this FRA has been produced to assess this in more detail.

1.9. The objective of this FRA is to demonstrate that the proposals are acceptable in terms of flood risk. This report summarises the findings of the study and specifically addresses the following issues in the context of the current legislative regime:

- Fluvial/ tidal flood risk
- Surface water flood risk
- Risk of flooding from other sources

¹<https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-an-assessment>

2. Planning Policy

- 2.1. Inappropriate development in a flood risk area could pose significant risk in terms of personal safety and damage to property for the occupiers of the development or for people elsewhere. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional, and local planning policy and associated guidance. This section summarises the key policies and guidance relevant to the proposed development.

National Planning Policy Framework (NPPF)

- 2.2. The National Planning Policy Framework² (NPPF) (DLUHC, 2023) which includes UK Government policy on development and flood risk states:

159. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

167. 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 the light of this assessment (and the sequential and exception 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;*

²<https://www.gov.uk/guidance/national-planning-policy-framework>, last updated Sept 2023

- 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.*

168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55.

2.3. Footnote 55 of the NPPF states:

A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been 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.

2.4. Flood Zones in England are defined as follows:

Table 1: Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having less than 1 in 1,000 annual probability of river or sea flooding (all land outside Zones 2 and 3).
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.
Zone 3b The Functional Floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

- 2.5. An FRA should be appropriate to the scale, nature, and location of the development. It should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.
- 2.6. An assessment of hydrological impacts should be undertaken, including to surface water runoff and impacts to drainage networks in order to demonstrate how flood risk to others will be managed following development and taking climate change into account.

Local Plan

- 2.7. The Local Plan prepared by the Local Planning Authority, Gravesham Borough Council, sets out the policies for development in the local area.
- 2.8. Policy CS18 of the Gravesham Local Plan Core Strategy (2014) states:

Policy CS18: Climate Change

Flood Risk

5.14.36 With the exception of the previously developed sites along the Thames Riverside (see Policies CS03, CS04 and CS05) and those other regeneration sites which have already been evaluated in accordance with the sequential and exception tests at the application stage, development will be directed sequentially to those areas at least risk of flooding.

5.14.37 Proposals in areas at risk of flooding must be accompanied by a Flood Risk Assessment (in accordance with national policy and Environment Agency standing guidance as appropriate) and a Flood Risk Management Plan (if required) to demonstrate that they are adequately defended and safe over their lifetime. Planning permission will be refused for schemes which do not pass the sequential and exception tests.

5.14.38 The Council will prioritise the maintenance, improvement or replacement of flood defence infrastructure over other land uses where relevant. In addition to meeting their own flood defence and management needs, the Council will expect new development to take advantage of opportunities to reduce the causes and impacts of flooding from all sources where it is technically and financially feasible.

Sequential and Exception Tests

- 2.9. The Sequential and Exception Tests are applied in specific cases defined by UK Government policy. Their purpose is to drive development to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.
- 2.10. Under the NPPF all new planning applications should undergo a Sequential Test accordance with paragraph 168 and footnotes 55 and 56. This test should be implemented by local planning

authorities with a view to location particularly vulnerable new developments outside of the floodplain.

2.11. Paragraph 168 of the NPPF states:

*"168. Applications for some minor development and **changes of use** should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55."*

2.12. As such, a site-specific Sequential Test and Exception Test for the proposed developments is not considered necessary in line with the NPPF given that the proposal is for a change of use.

Summary

2.13. This flood risk assessment has been prepared with due consideration to the above local and national policy.

3. Sources of Information

Documents and Online Mapping

- 3.1. Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below. For the purposes of this FRA, these documents have been reviewed for relevant information and any relevant data is discussed within the appropriate sub heading of this report.
- 3.2. The following sources of information have been reviewed for this assessment:
- Flood Map for Planning on the Environment Agency website <https://flood-map-for-planning.service.gov.uk/>
 - Long Term Flood Risk Information on the Environment Agency website <https://www.gov.uk/check-long-term-flood-risk>
 - National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023)
 - Planning Practice Guidance - Flood Risk and Coastal Change (Department for Levelling Up, Housing and Communities, 2022)
 - Geoindex Onshore (British Geological Survey, 2023)
 - Gravesham Local Plan Core Strategy³ (Gravesham Borough Council, 2014)
 - Kent Thameside Strategic Flood Risk Assessment⁴ (2005)

Strategic Flood Risk Assessment (SFRA)

- 3.3. The SFRA provides the evidence base for the Local Planning Authority Gravesham Borough Council Local Plan and guidance for consideration when determining planning applications. The SFRA seeks to place new development into areas of lower flood risk taking into account current

³ <https://drive.google.com/file/d/1bJTgQLmhbzjqZFibl-5Wfb2tbvixXpLk/view>

⁴ <http://windmz.dartford.gov.uk/media/Eb53%20SFRAReport.pdf>

flood risk, future flood risk, and the effect a proposed development would have on the risk of flooding.

- 3.4. The SFRA mapping provided by Gravesham Borough Council has been used throughout production of this report as a source of information, particularly pertaining to historical flood incidents.

4. Sources of Flood Risk

Fluvial

- 4.1. Flooding from watercourses arises when flows exceed the capacity of the channel, or where a restrictive structure is encountered, resulting in water overtopping the banks into the floodplain.
- 4.2. The site is located in Flood Zone 1 (Figure 3). Flood Zone 1 denotes a risk of flooding from fluvial and tidal sources less than 1 in 1,000 (0.1%) probability.



Figure 3: EA Flood Map for Planning (Base map Google Hybrid © Contains public sector information licensed under the Open Government Licence v3.0)

Main Rivers

- 4.3. There are no main rivers in the vicinity of the site. The River Thames is the closest mapped river to the site and is approximately 532m to the north of the site.

Ordinary Watercourses

- 4.4. There are no other mapped watercourses in the vicinity of the site.

Historical Fluvial Flooding

- 4.5. Based on the EA Recorded and Historical Flood Outlines dataset there are no records of historical fluvial flooding on-site (Figure 4).

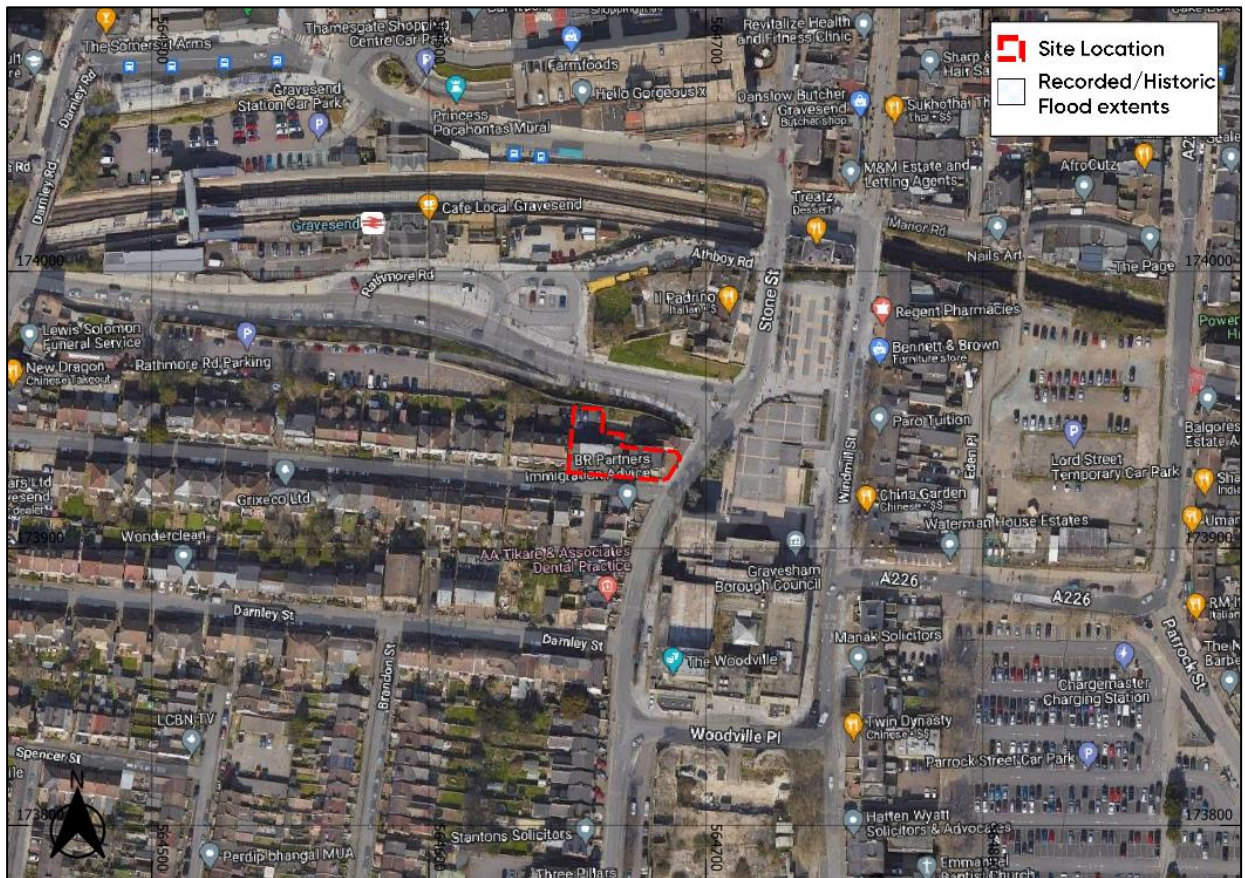


Figure 4: EA Historic Flood Mapping (Base map Google Hybrid © Contains public sector information licensed under the Open Government Licence v3.0)

- 4.6. Based on the data reviewed above the risk of fluvial flooding to the site is considered to be low.

Tidal

- 4.7. Tidal flooding occurs when a high tide and high winds combine to elevate sea levels. An area behind coastal flood defences can still flood if waves overtop the defences or break through them. Tidal flooding can also occur a long way from the coast by raising river levels. Water may overtop the river bank or river defences when tide levels are high.

4.8. The site is a significant distance from any tidal source and above the anticipated extreme tidal levels, even when considering the impacts of climate change. The risk of flooding from tidal sources is considered low.

Canals

4.9. The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders, and boreholes and manages water levels by transferring it within the canal system.

4.10. No canals were detected within 1km of the site.

4.11. The risk of flooding to this site from canals is considered to be low.

Pluvial

4.12. Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.

4.13. Annual surface water flood risk is labelled by the EA as:

- 'High Risk'; >3.3% AEP (annual probability greater than 1 in 30).
- 'Medium Risk'; 1.1% to 3.3% AEP (annual probability between 1 in 100 and 1 in 30).
- 'Low Risk'; 0.1% to 1% AEP (annual probability between 1 in 1000 and 1 in 100).
- 'Very Low Risk'; <0.1% AEP (annual probability less than 1 in 1000).

4.14. Examination of the EA's Flood Risk from Surface Water mapping for High Risk, Medium Risk, and Low Risk AEP flood events shows the road surrounding the site is at risk of flooding in 'Medium' and 'Low' risk surface water flood events but the site itself is unaffected in all modelled events (Figure 5).



Figure 5: EA Surface Water Flood Risk Mapping (Base map from Google hybrid © Contains public sector information licensed under the Open Government Licence v3.0)

4.15. As can be seen in Figure 6, during the modelled 1 in 30 year probability event, surface water flooding depths could reach 600mm to 900mm at the buildings to the south of the site. The site itself is not affected and, due to the road surrounding the site not being flooded, safe access/egress should be possible in this event.



Figure 6: EA Surface Water Flood Risk Mapping 1 in 30 year depth (Base map Google Hybrid © Contains public sector information licensed under the Open Government Licence v3.0)

- 4.16. As can be seen in Figure 7, during the modelled 1 in 100 year probability event, surface water flooding depths could reach 150mm to 300mm on the road to the east of the site. Due to the east of the site being the location for the main entrance and exit of the site, safe access/egress could be affected. Figure 8 shows that the hazard rating for the 1 in 100 event is <0.75 (low) in the road to the east of the site, so by using the main entrance and traveling west (away from the flooding) safe access/egress should still be possible in this event.
- 4.17. If safe access/egress cannot be achieved due to flood depths exceeding 250mm, then occupants should remain on site and refuge should be taken at the highest possible floor.



Figure 7: EA Surface Water Flood Risk Mapping 1 in 100 year depth (Base map Google Hybrid © Contains public sector information licensed under the Open Government Licence v3.0)

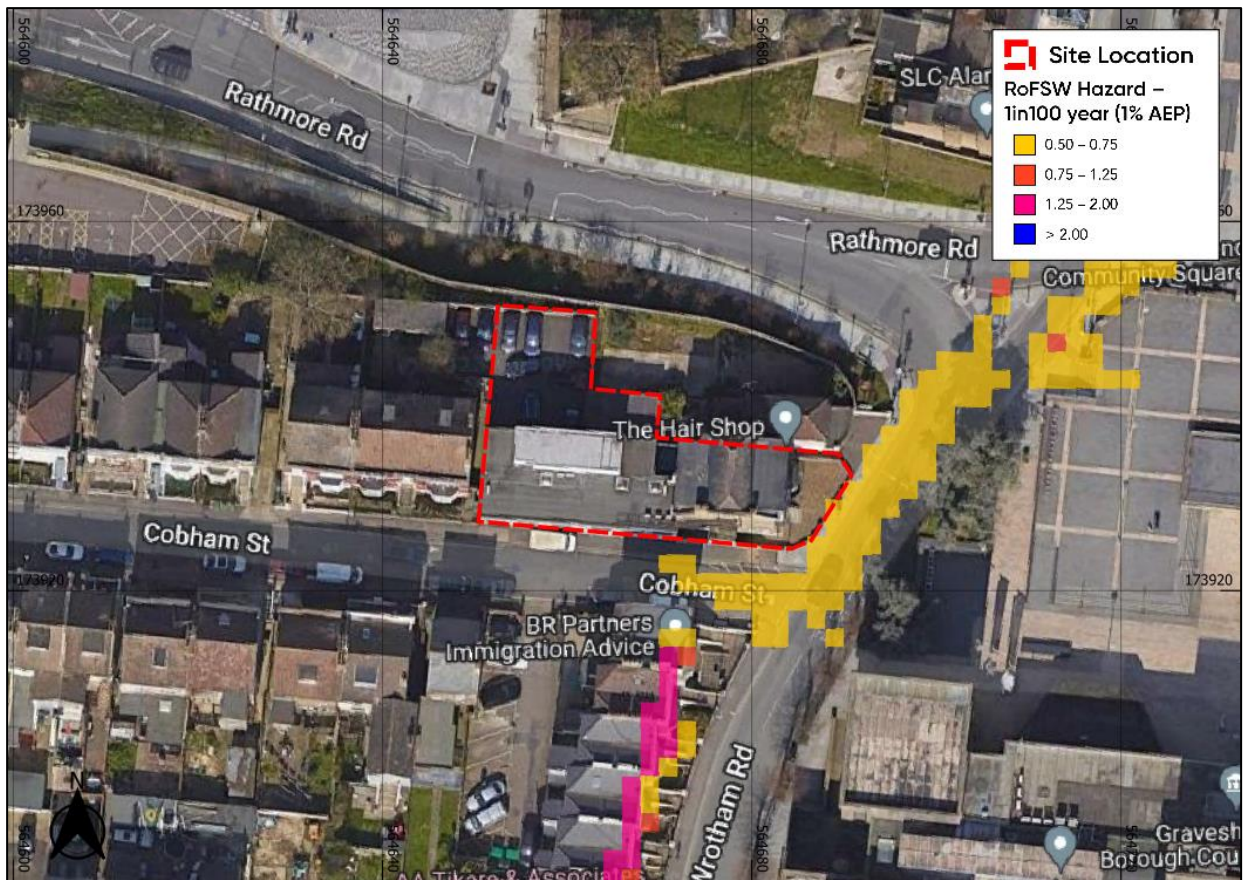


Figure 8: EA Surface Water Flood Risk Mapping 1 in 100 year hazard (Base map Google Hybrid © Contains public sector information licensed under the Open Government Licence v3.0)

- 4.18. As can be seen in Figure 9, during the modelled 1 in 1000 year probability event, surface water flooding depths could reach 150mm to 300mm on the roads to the east of the site and 300mm to 600mm on the road to the south. Due to the east of the site being the location for the main entrance and exit of the site, safe access/egress could be affected. Figure 10 shows that the hazard rating for the 1 in 1000 event could reach 1.25-2.00 (Danger for Most) in the road to the east of the site, so safe access/ egress via the main entrance may not be possible in this event.
- 4.19. In this event safe access/egress may not be possible therefore, if flood depths at the adjacent highway/ site entrance exceed 250mm, occupants should remain on site and refuge should be taken at the highest possible floor.

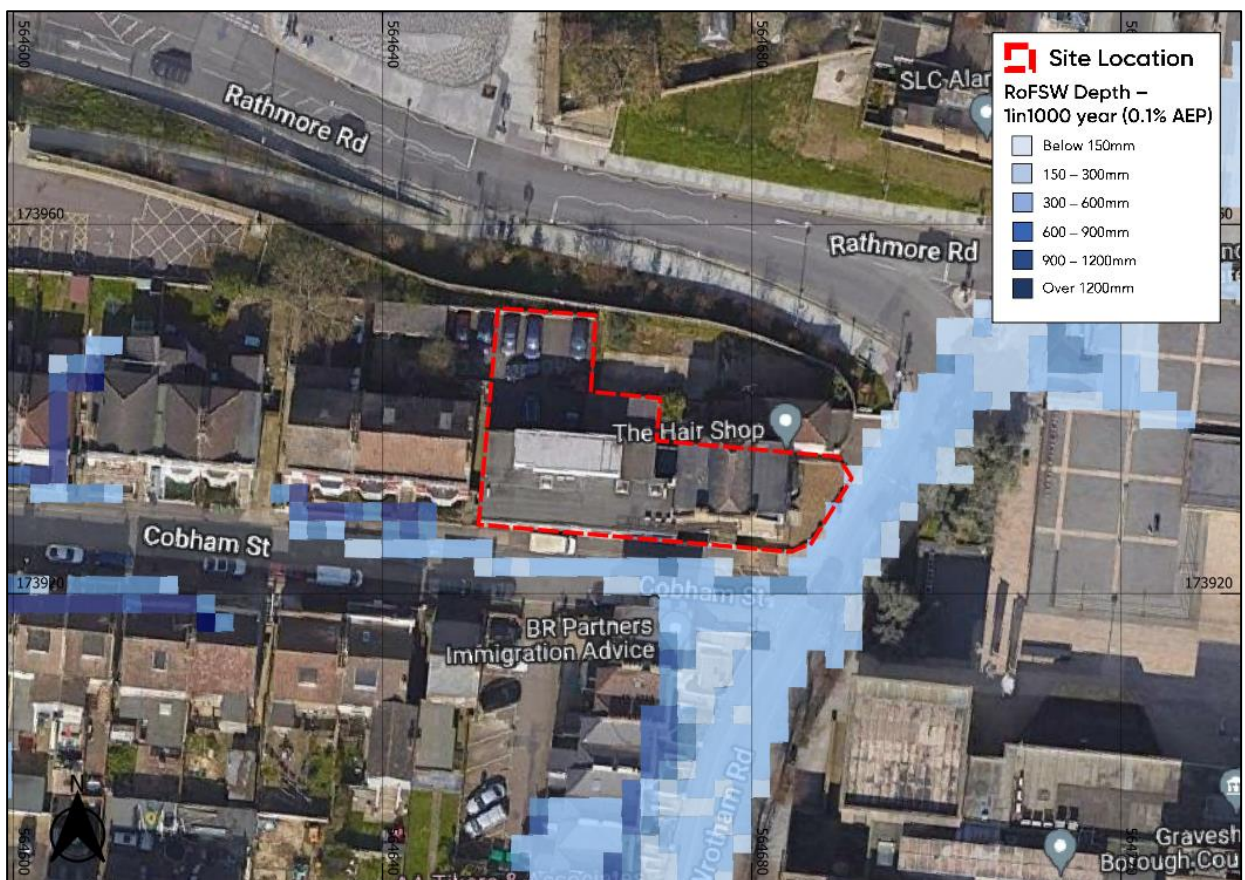


Figure 9: EA Surface Water Flood Risk Mapping 1 in 30 year depth (Base map Google Hybrid © Contains public sector information licensed under the Open Government Licence v3.0)

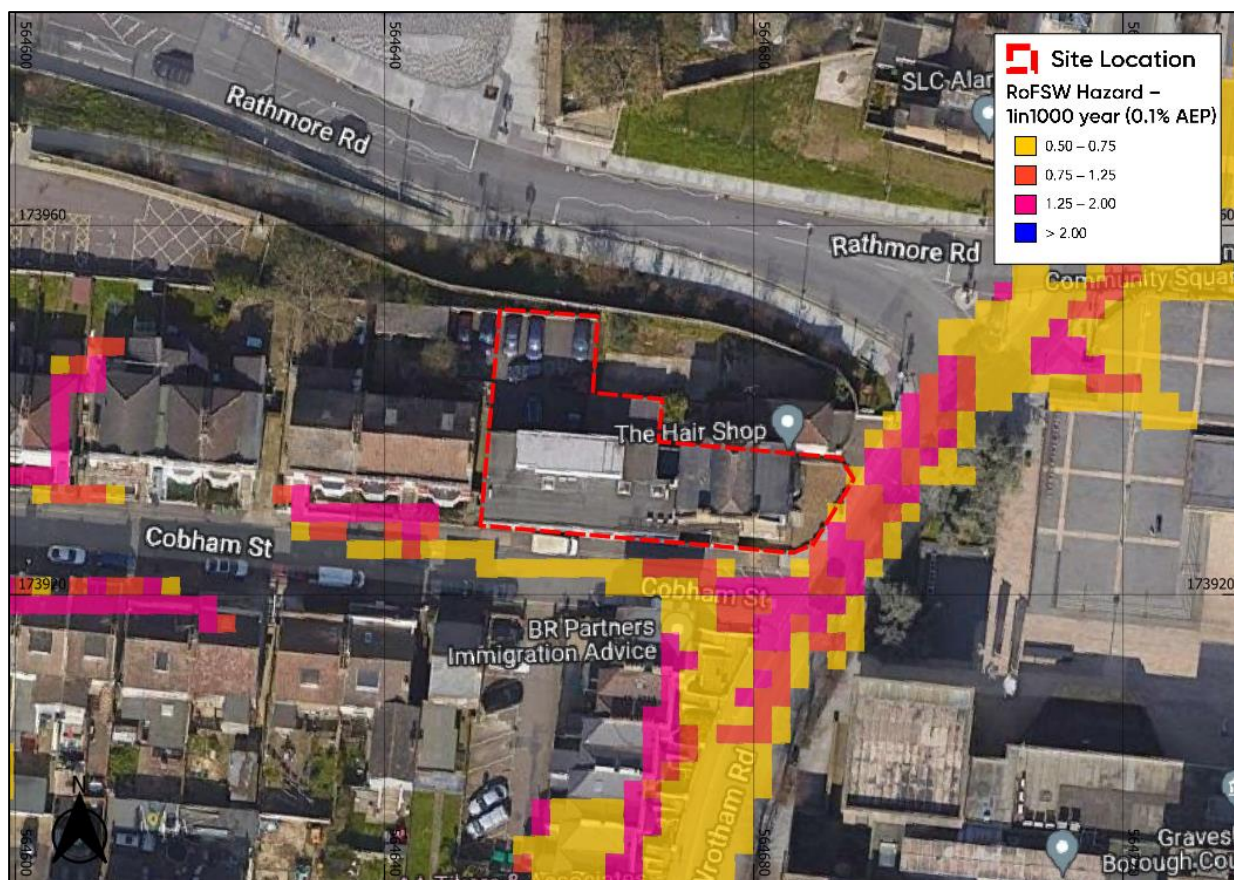


Figure 10: EA Surface Water Flood Risk Mapping 1 in 1000 year hazard (Base map Google Hybrid © Contains public sector information licensed under the Open Government Licence v3.0)

- 4.20. The risk to the site can be considered low as in the modelled 'Low', 'Medium' and 'High' risk events the site does not show any surface water flooding.
- 4.21. Safe access/ egress should be possible in the modelled 'Low' and 'Medium' risk events, using the main entrance and traveling west (away from the flooding) due to the low hazard ratings on the route. In the modelled 'Low' risk event safe access/egress may not be able to be achieved due to the Danger for Most hazard rating present on the route. If flood depths at the adjacent highway/ site entrance exceed 250mm, occupants should remain on site and refuge should be taken at the highest possible floor.

Reservoirs

- 4.22. Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain floodwater. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.

4.23. According to the EA's Flood Risk from Reservoirs mapping the site is outside modelled flood extents in the event of reservoir flooding (Figure 11).

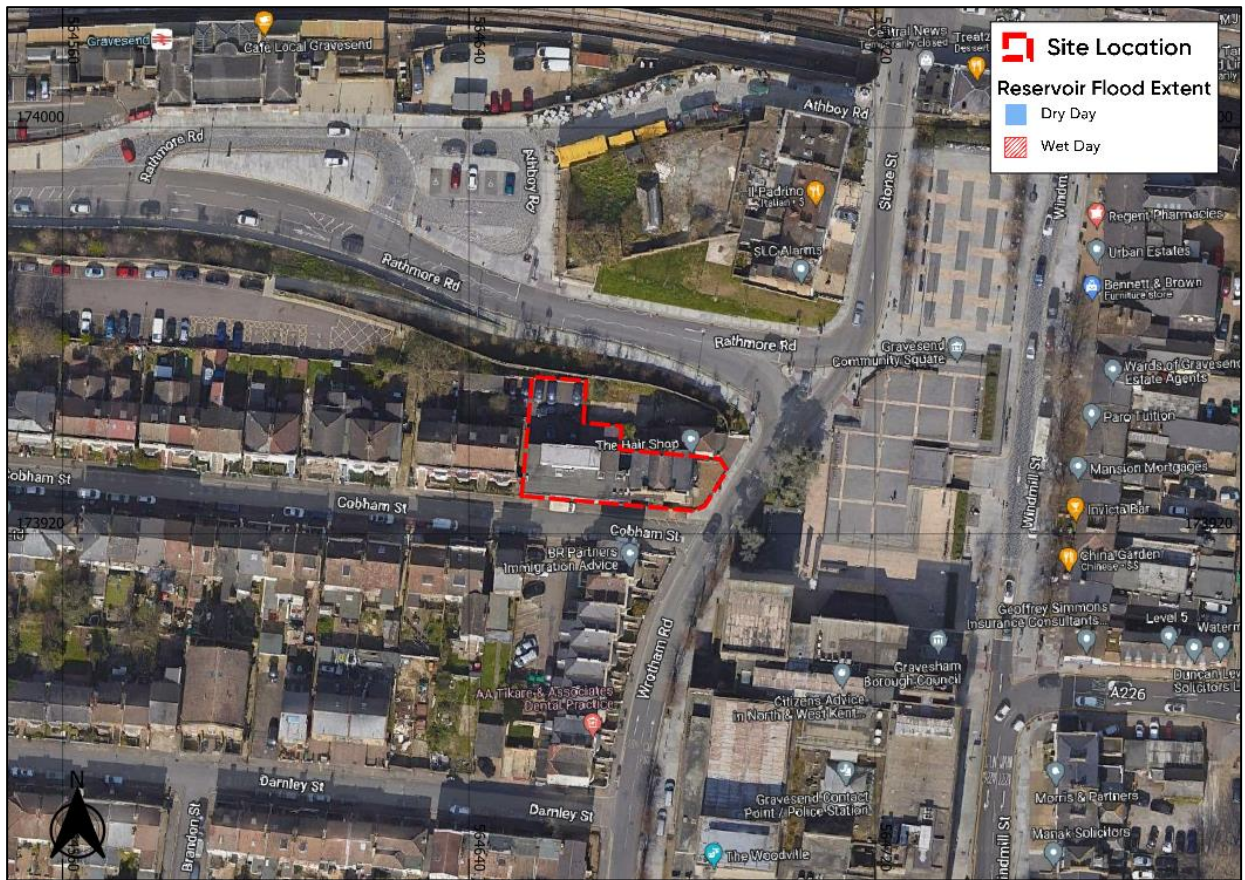


Figure 11: EA Reservoir Flood Risk Mapping (Base map Google Hybrid © Contains public sector information licensed under the Open Government Licence v3.0)

4.24. The site has not been flagged as being at risk of flooding following a reservoir failure.

Groundwater

4.25. Groundwater flooding occurs in areas where underlying geology is permeable and water can rise within the strata sufficiently to breach the surface.

4.26. The British Geological Survey's (BGS) mapping shows no recorded superficial deposits underlying the site. The bedrock underlying the site is Thanet Formation comprised of Sand.

4.27. Historical BGS boreholes within the vicinity of the site confirms that the site is underlain by grey silty fine sand and identifies the presence fissured chalk. The closest borehole TQ67SW327 was approximately 266m from the site and was bored to a depth of 10m and no groundwater was encountered.

4.28. The SFRA presents the EA's areas at risk of groundwater flooding mapping. Figure 12 shows that the site is not located in an area considered to be at risk of groundwater flooding.

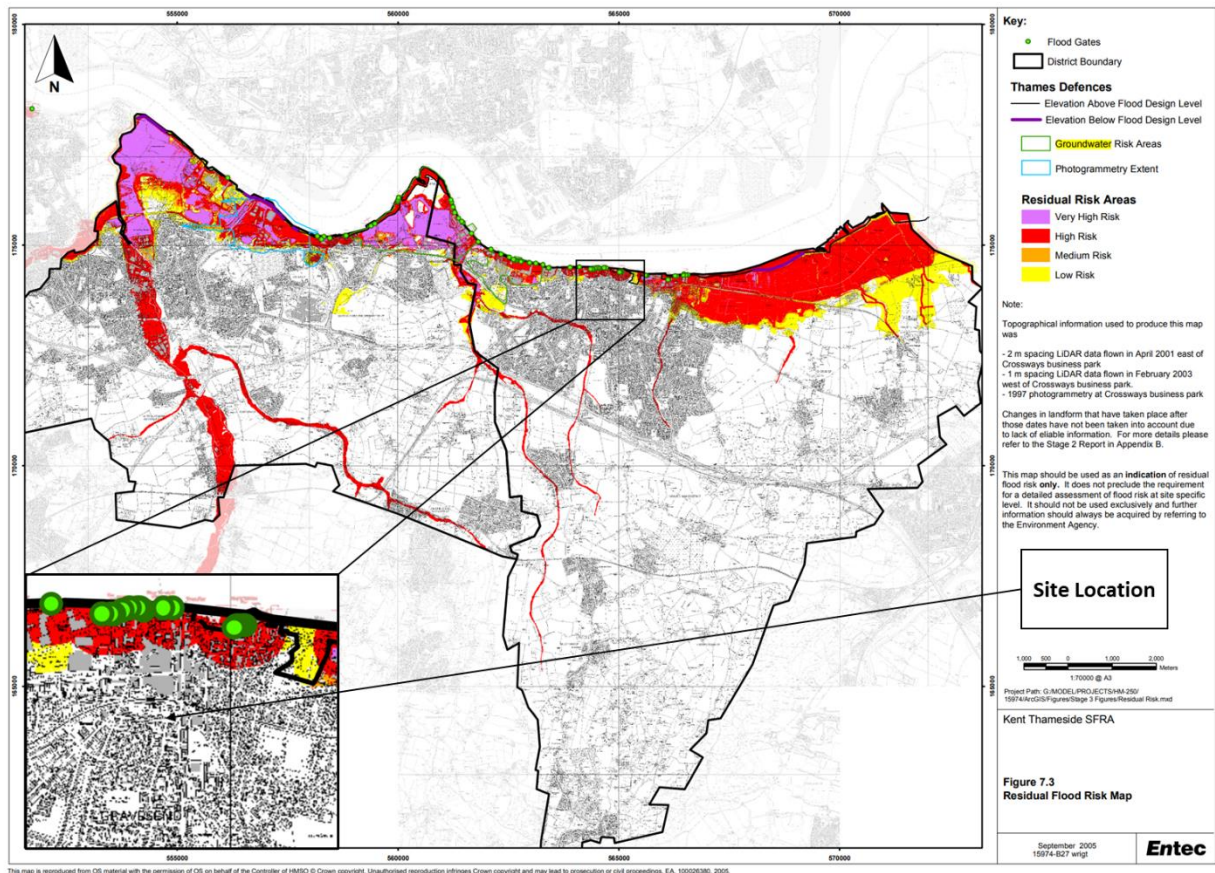


Figure 12: EA Areas at Risk of Groundwater Flooding (<http://windmz.dartford.gov.uk/media/Eb53%20SFRAReport.pdf>)

4.29. The risk from groundwater to the proposed development is considered to be low.

4.30. As a conservative measure, it is recommended that the basement level is adequately tanked (if not already) to limit the potential for groundwater ingress, if possible.

Sewers

4.31. Foul or surface water sewers can be a cause of flooding if the drainage network becomes overwhelmed, either by blockage or due to local development beyond the designed capabilities of the drainage system.

4.32. The SFRA contains of historical sewer flood incident records kept by Southern Water. Only 1 count of sewer flooding was recorded in the region and was not in the vicinity of the site.

4.33. Local policy documentation does not identify the site as being in a Critical Drainage Area.

4.34. The development is therefore considered to be at low risk of flooding from sewers.

5. Flood Risk Mitigation

Fluvial

- 5.1. Due to site being within Flood Zone 1 no mitigation is required and flood risk is considered to be low.

Pluvial

- 5.2. The site itself is not affected by pluvial flooding in any of the modelled events in the RoFSW dataset and thus the risk to the proposed development is considered low.
- 5.3. Safe access/ egress should be possible in the modelled 'Low' and 'Medium' risk events, using the main entrance and traveling west (away from the flooding) due to the low hazard ratings on the route. In the modelled 'Low' risk event safe access/egress may not be able to be achieved due to the Danger for Most hazard rating present on the route. If flood depths at the adjacent highway/ site entrance exceed 250mm, occupants should remain on site and refuge should be taken at the highest possible floor.

Tidal, Canals, Reservoirs, Groundwater and Sewers

- 5.4. Flood risk from these sources is considered to be low, therefore mitigation is not required.
- 5.5. As a conservative measure, it is recommended that the basement level is adequately tanked (if not already) to limit the potential for groundwater ingress, if possible.

Increase to Flood Risk Elsewhere

- 5.6. It is understood that the proposed development is for the conversion of the building from commercial use to 13 residential apartments.
- 5.7. As the proposal will not increase footprint on site, it should not increase flood risk elsewhere through displacement of flood water.

Flood and Weather Warnings

- 5.8. As the site is the site is in Flood Zone 1 it is not covered by an EA Flood Warning or Alert Service Area.

- 5.9. However, due to the pluvial risk to the adjacent highway, it is recommended that occupants and site users monitor local weather reports.
- 5.10. The Met Office issues weather warnings up to 5 days in advance, through the National Severe Weather Warning Service, when severe weather has the potential to bring impacts to the UK. It is also possible to stay up to date with weather warnings through the Met Office app (available on both android and apple), social media (twitter, Facebook) or email alerts.
- 5.11. During periods of bad weather, site users should monitor local weather reports and sign up for the Met Office UK weather warnings. Warnings can be monitored through an Apple/Android app, X (formerly Twitter) or directly via emails.

6. Conclusions

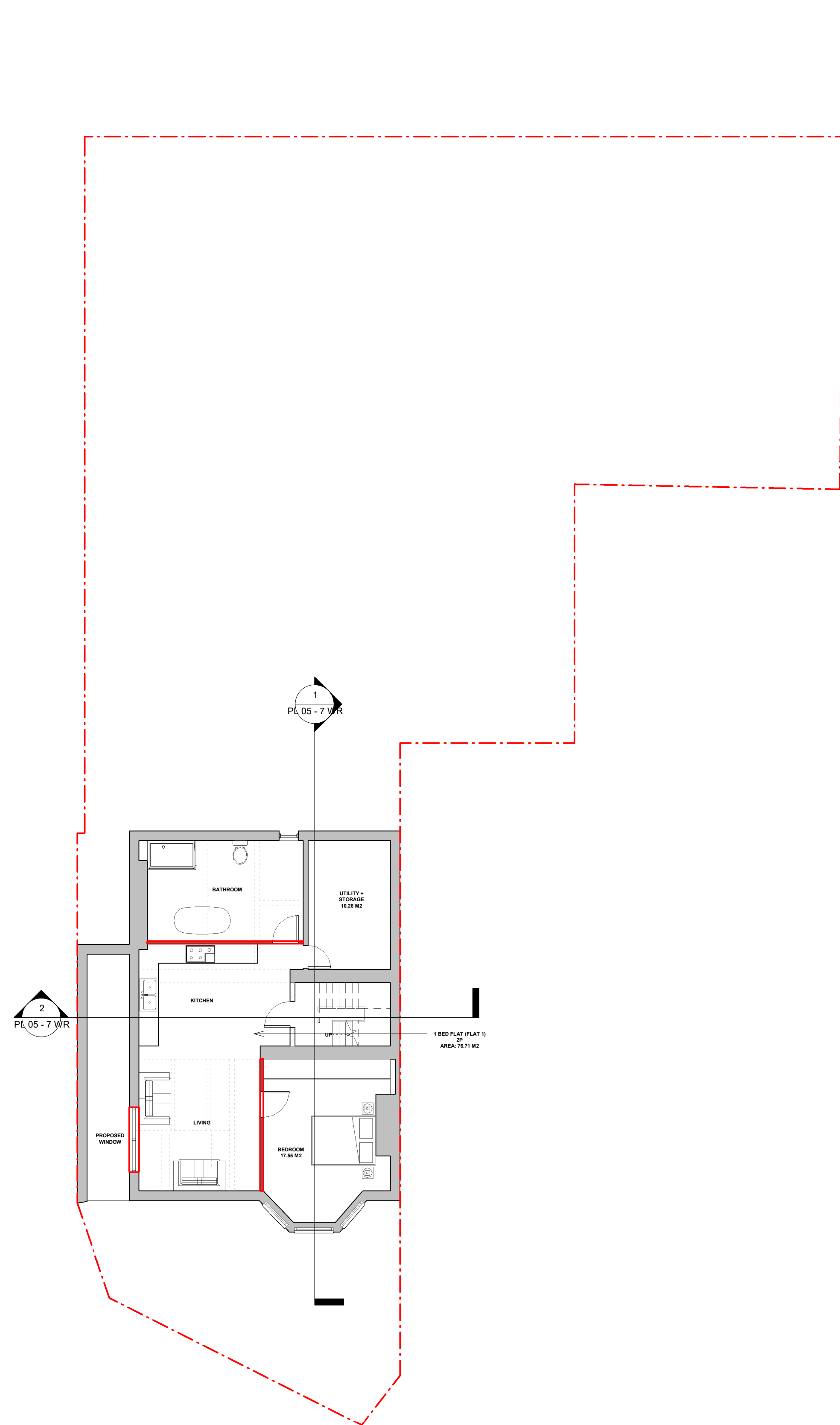
- 6.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at 7 Wrotham Road, Gravesend, Gravesham, DA11 0PD. It has been written to support a planning application and has been prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.
- 6.2. An assessment of the risk of flooding from all sources has been undertaken and is summarised in the table below:

Source of Flooding	Flood Risk Summary
Fluvial	The site is located in Flood Zone 1 so is considered to be at a low risk from fluvial sources.
Pluvial	The site itself is not affected by pluvial flooding in any of the modelled events in the RoFSW dataset and thus the risk to the proposed development is considered low. Safe access/ egress should be possible in the modelled 'Low' and 'Medium' risk events, using the main entrance and traveling west (away from the flooding) due to the low hazard ratings on the route. In the modelled 'Low' risk event safe access/egress may not be able to be achieved due to the Danger for Most hazard rating present on the route. If flood depths at the adjacent highway/ site entrance exceed 250mm, occupants should remain on site and refuge should be taken at the highest possible floor.
Tidal Reservoirs Groundwater Sewers Canals	The site is considered to be at low risk from these sources. As a conservative measure, it is recommended that the basement level is adequately tanked (if not already) to limit the potential for groundwater ingress, if possible.

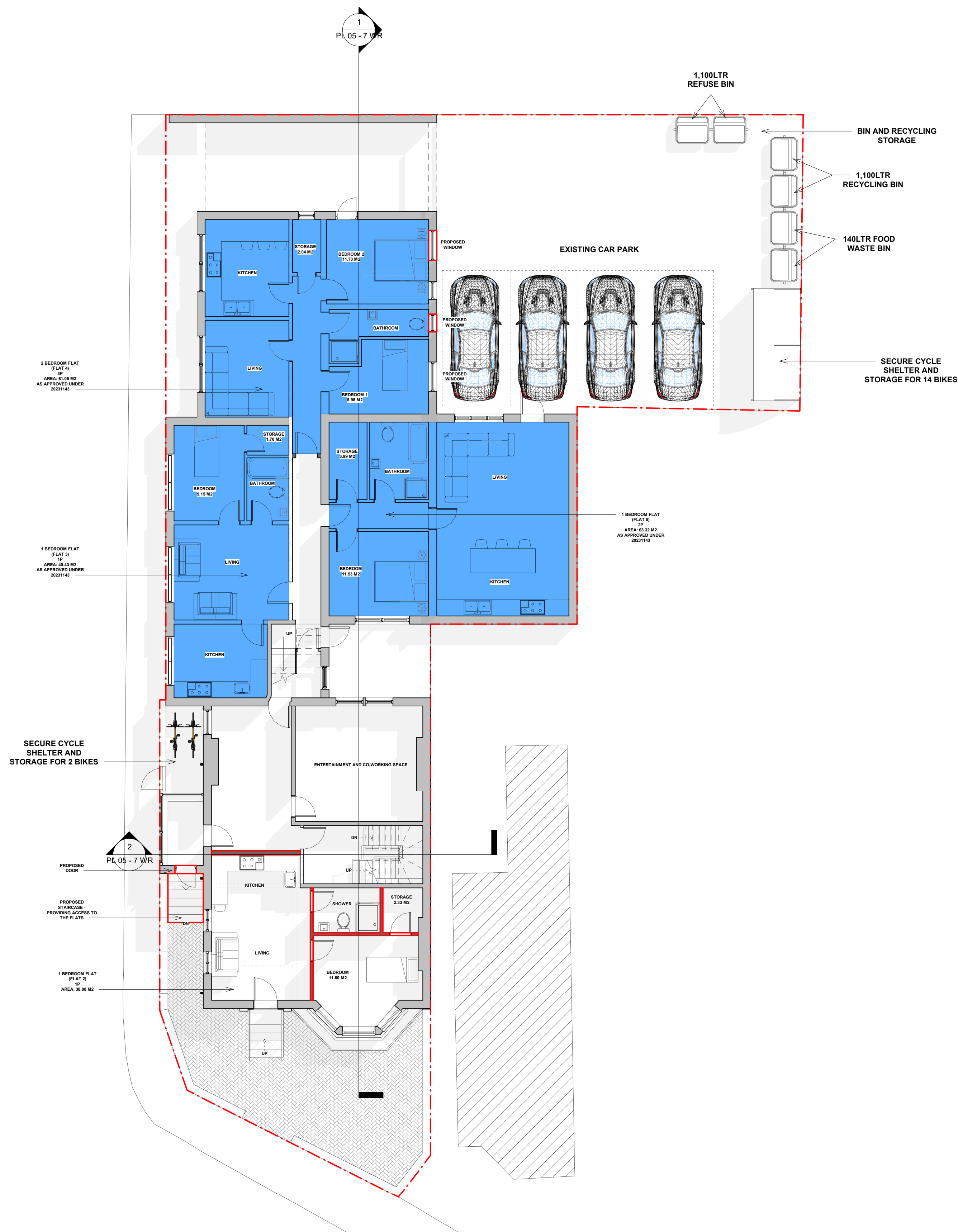
- 6.3. The FRA supports the planning application and demonstrates that there is an acceptable level of flood risk to the site if the mitigation strategies recommended are implemented in the scheme. The development does not increase flood risk off site or to the wider area.

- 6.4. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

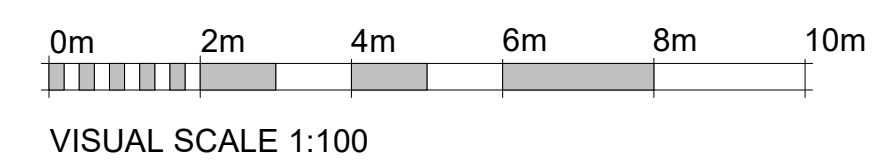
Appendix A - Development Proposals



1 Proposed Basement
1 : 100



2 Proposed Ground Floor
1 : 100



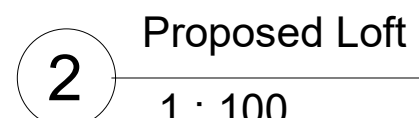
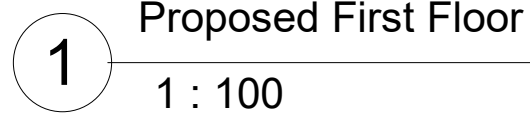
KEY

RED: PROPOSED NEW
DEVELOPMENT - WALLS,
WINDOWS, DOOR AND STAIRCASE

BLUE SHADING: APPROVED FLAT
LAYOUTS UNDER PERMITTED
DEVELOPMENT (REF. 20231143)

EXISTING WALL	PROPOSED WALL
BOUNDARY LINE	
F/C	FLOOR TO CEILING HEIGHT
PROJECT Alterations to Facade, Ground Floor and First Floor Extension, Flat Conversion and Internal Reconfiguration	
ADDRESS 7 Wrotham Rd, Gravesend DA11 0PD	
CLIENT NAME	
PROJECT STATUS Planning	
SHEET N PL 01 - 7 WR	DRAWING TITLE Proposed Basement & Ground Floor Plans
DESIGNED BY: GOPLANS	DRAWN BY: SD
DATE: 15/01/2024	CHECKED BY: GOPLANS
SCALE As Indicated @ A1	
All dimensions to be cross-checked on site prior to completing drawings for a party wall process, ordering and/or structural purposes.	





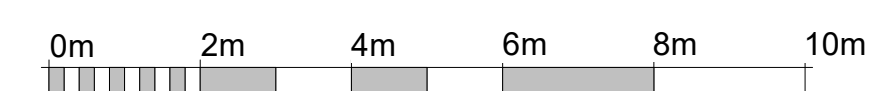
KEY

RED: PROPOSED NEW
DEVELOPMENT - WALLS,
WINDOWS, DOOR AND STAIRCASE

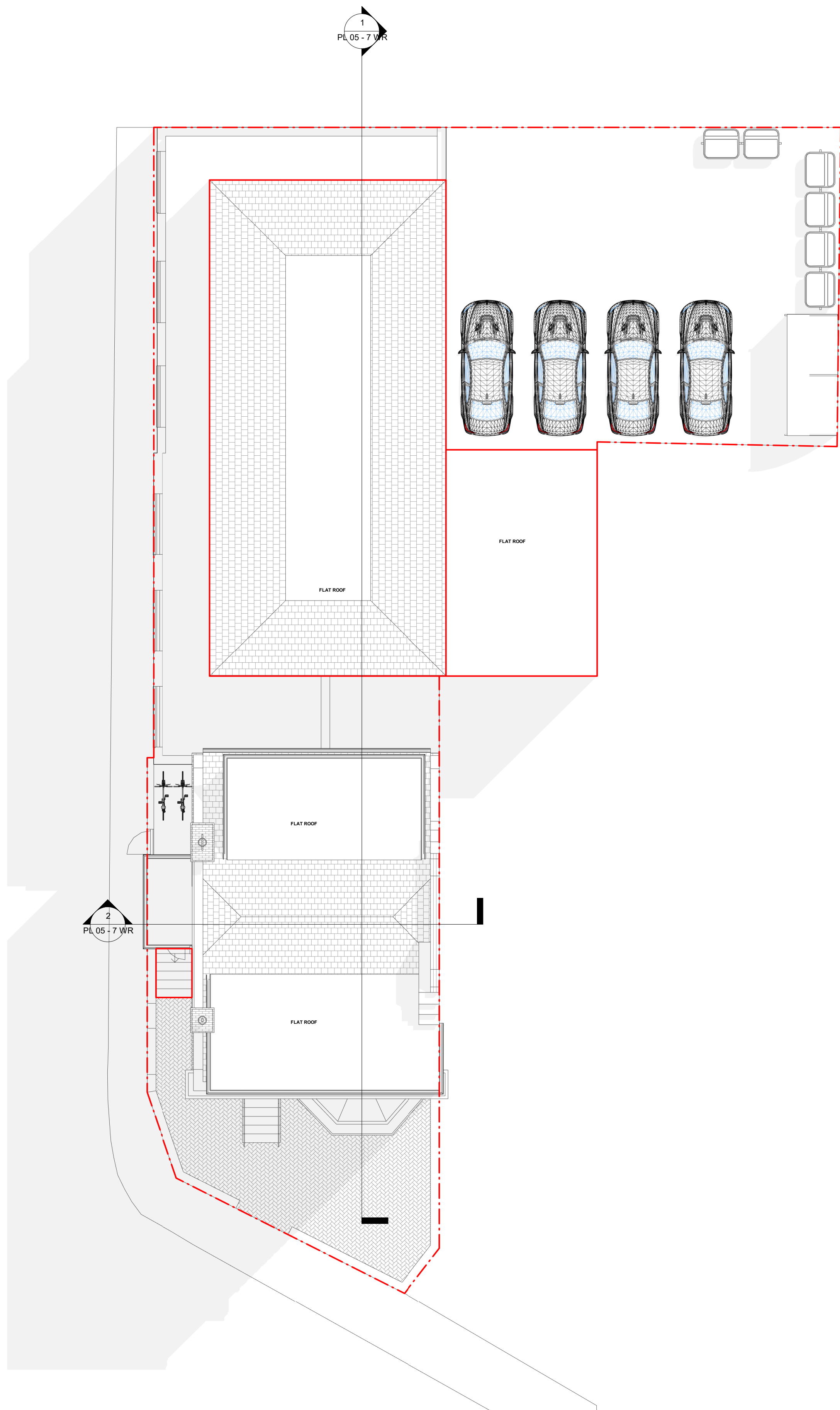
BLUE SHADING: APPROVED FLAT LAYOUTS UNDER PERMITTED DEVELOPMENT (REF. 20231143)

	EXISTING WALL		PROPOSED WALL
BOUNDARY LINE			
FLOOR TO CEILING HEIGHT			
PROJECT			
Alterations to Facade, Ground Floor and First Floor Extension, Flat Conversion and Internal Reconfiguration			
ADDRESS			
7 Wrotham Rd, Westend DA11 0PD			
CLIENT NAME			
PROJECT STATUS			
Planning			
SHEET N.		DRAWING TITLE	
PL 02 - 7 WR		Proposed First Floor & Loft Plans	
DESIGNED BY:		CHECKED BY:	
GOPLANS		GOPLANS	
DATE:		SCALE	
15/01/2024		As Indicated @ A1	

All dimensions to be cross-checked on site prior to completing drawings for a party wall process, ordering and/or structural purposes.



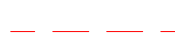
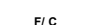
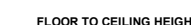
VISUAL SCALE 1:100



KEY

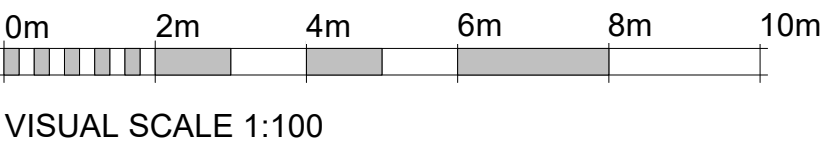
RED: PROPOSED NEW
DEVELOPMENT - WALLS,
WINDOWS, DOOR AND STAIRCASE

BLUE SHADING: APPROVED FLAT
LAYOUTS UNDER PERMITTED
DEVELOPMENT (REF. 20231143)

	EXISTING WALL		PROPOSED WALL
			
BOUNDARY LINE			
			
F/C		FLOOR TO CEILING HEIGHT	
PROJECT			
Alterations to Facade, Ground Floor and First Floor Extension, Flat Conversion and Internal Reconfiguration			
ADDRESS			
7 Wrotham Rd, Gravesend DA11 0PD			
CLIENT NAME			
PROJECT STATUS			
Planning			
SHEET N		DRAWING TITLE	
PL 03 - 7 WR		Proposed Roof Plan	
DESIGNED BY:		DRAWN BY:	CHECKED BY:
GOPLANS		SD	GOPLANS
DATE:		SCALE:	
15/01/2024		As Indicated @ A1	
All dimensions to be cross-checked on site prior to completing drawings for a party wall process, ordering and/or structural purposes.			



1 Proposed Roof
1 : 100

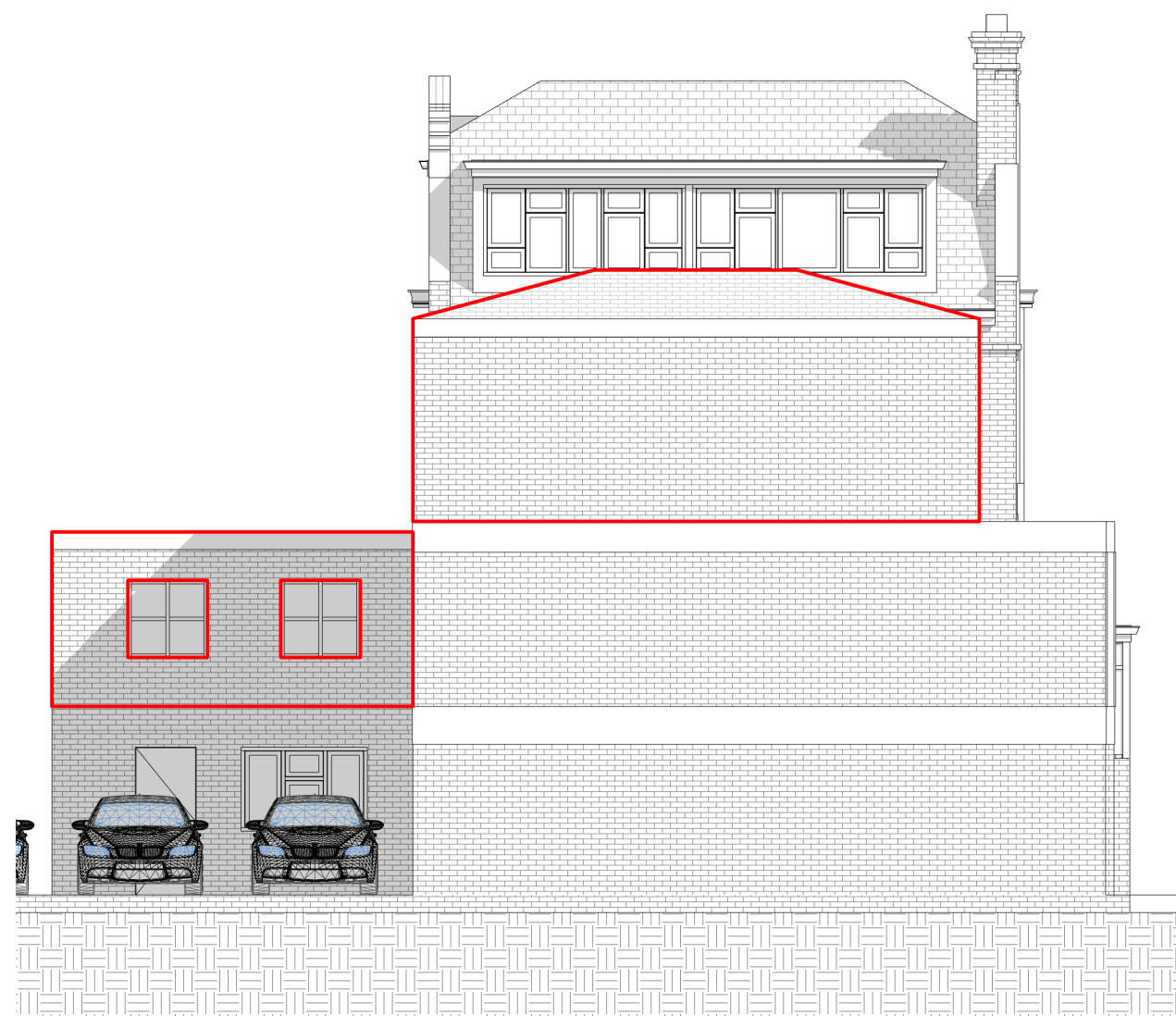




1 Proposed Front Elevation
1 : 100



3 Proposed Left Side Elevation
1 : 100



2 Proposed Rear Elevation
1 : 100

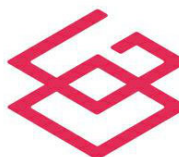


4 Proposed Right Side Elevation
1 : 100

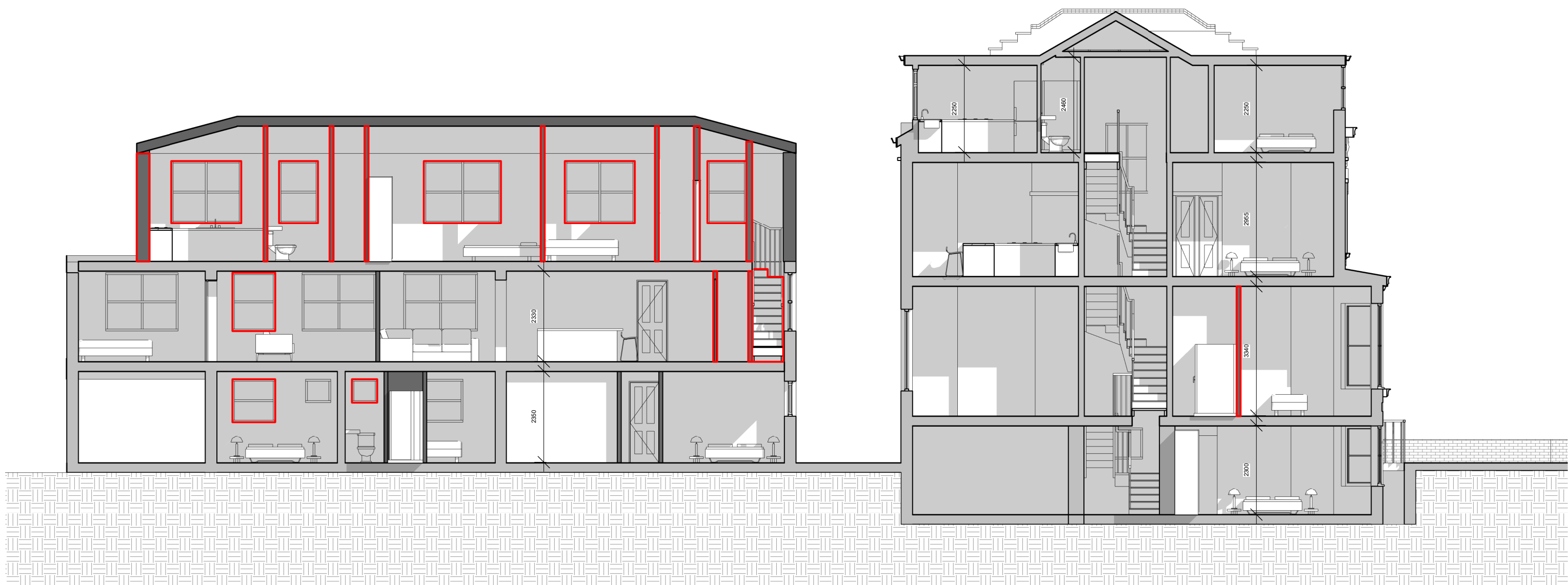
KEY

RED: PROPOSED NEW
DEVELOPMENT - WALLS,
WINDOWS, DOOR AND STAIRCASE

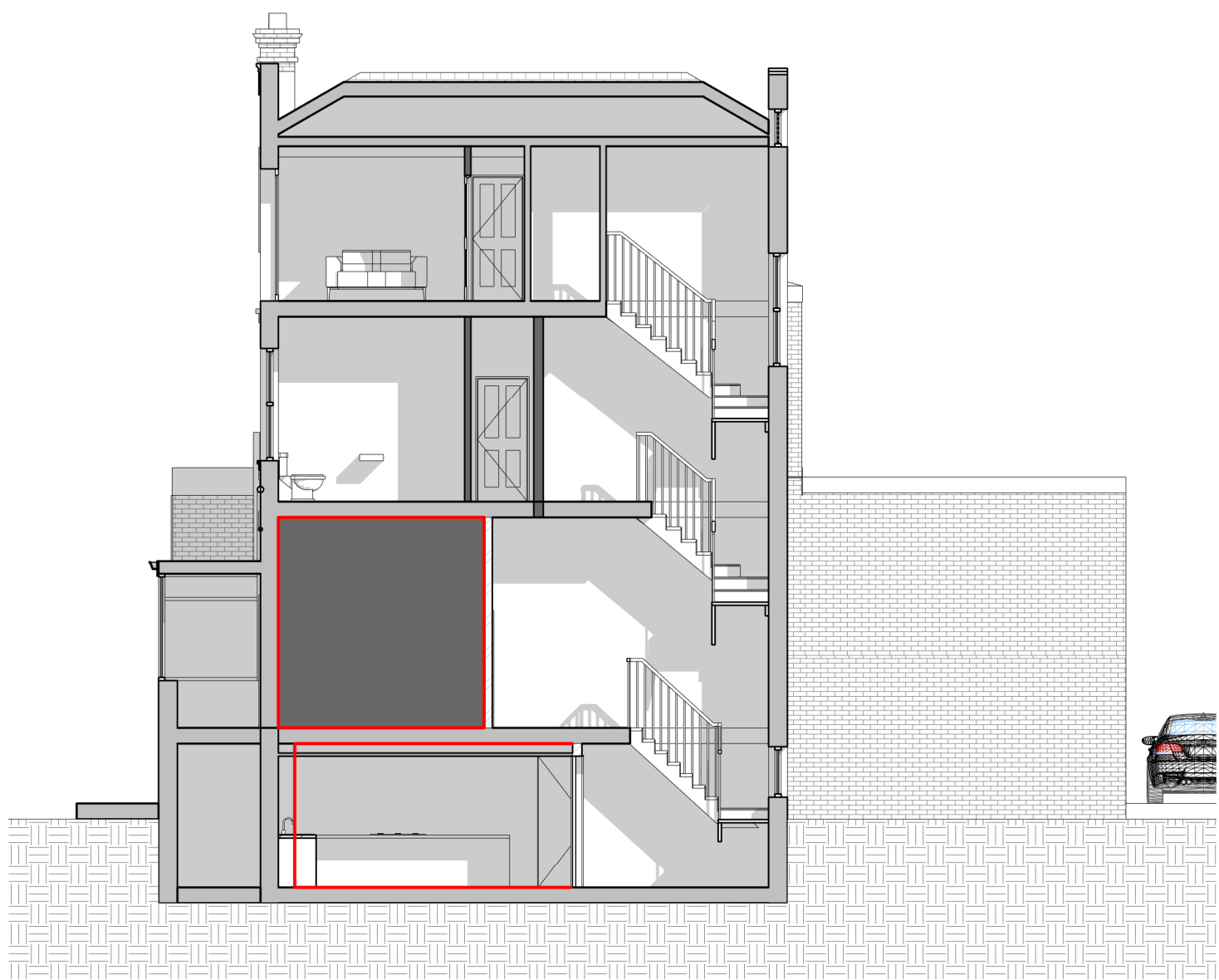
BLUE SHADING: APPROVED FLAT
LAYOUTS UNDER PERMITTED
DEVELOPMENT (REF. 20231143)

		EXISTING WALL				PROPOSED WALL	
- - - - -		BOUNDARY LINE					
F/G		FLOOR TO CEILING HEIGHT					
PROJECT							
Alterations to Facade, Ground Floor and First Floor Extension, Flat Conversion and Internal Reconfiguration							
ADDRESS							
7 Wrotham Rd, Gravesend DA11 0PD							
CLIENT NAME							
PROJECT STATUS							
Planning							
SHEET N.		DRAWING TITLE					
PL 04 - 7 WR		Proposed Elevations					
DESIGNED BY:		DRAWN BY:		CHECKED BY:			
GOPLANS		SD		GOPLANS			
DATE		SCALE					
15/01/2024		As Indicated @ A1					
All dimensions to be cross-checked on site prior to completing drawings for a party wall process, ordering and/or structural purposes.							
 goplans							

0m 2m 4m 6m 8m 10m
VISUAL SCALE 1:100



1 Proposed Section AA'
1 : 100



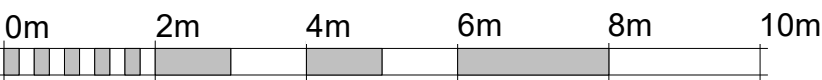
2 Proposed Section BB
1 : 100

KEY

RED: PROPOSED NEW
DEVELOPMENT - WALLS,
WINDOWS, DOOR AND STAIRCASE

BLUE SHADING: APPROVED FLAT
LAYOUTS UNDER PERMITTED
DEVELOPMENT (REF. 20231143)

	EXISTING WALL		PROPOSED WALL
		BOUNDARY LINE	
		FLOOR TO CEILING HEIGHT	
PROJECT Alterations to Facade, Ground Floor and First Floor Extension, Flat Conversion and Internal Reconfiguration			
ADDRESS 7 Wrotham Rd, Gravesend DA11 0PD			
CLIENT NAME			
PROJECT STATUS Planning			
SHEET N PL 05 - 7 WR		DRAWING TITLE Proposed Sections	
DESIGNED BY: GOPLANS		DRAWN BY: SD	CHECKED BY: GOPLANS
DATE: 15/01/2024		SCALE: As Indicated @ A1	
All dimensions to be cross-checked on site prior to completing drawings for a party wall process, ordering and/or structural purposes.			



VISUAL SCALE 1:100