LANMOR Consulting

Civil Engineers & Transport Planners

Kingston Bridge House

Flood Risk Assessment

November 2020

201345/FRA/JR/KBL/01

LANMOR Consulting

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FIGURES

APPENDICES

1 INTRODUCTION

1.1 Scope

1.1.1 Lanmor Consulting Ltd have been commissioned to prepare a site-specific Flood Risk Assessment for the proposed development at the site of Kingston Bridge House, Church Road, Hampton Wick, KT1 4AG. Figure 1.1 below shows the location of the proposed development.

Figure 1.1 – Location Plan

1.1.2 This report describes the existing and proposed development, the implications of flooding and the impact the development will have on the flood plain in accordance with the governments guidance document; National Planning Policy Framework (NPPF) and its planning practice guidance.

1.1.3 This report will consider the following:

- Location of the site;
- Development Proposals;
- Existing information on extents and depths of flood events or on flood predictions;
- Sources of flooding;
- The impact of flooding on site;
- An assessment of the run-off likely to be generated.

1.1.4 This Flood Risk Assessment has been prepared in accordance with the requirements of the National Planning Policy Framework and will demonstrate that the proposed development will be safe and will not increase the risk of flooding in the surrounding areas.

2 BASELINE PARAMETERS

2.1 Existing Site

2.1.1 The existing site is located with the Borough of Richmond upon Thames. The site is located at the junction of Church Grove and Hampton Court Road, opposite the Kings Field. The River Thames is located just east of the site, approximately 140m away.

2.1.2 Kingston Bridge House is currently occupied as student living accommodation which span over 7 floors. Drawings FLU.1191.2.02 – 09 in Appendix A show the plans for the existing development.

2.2 Proposed Development

2.2.1 The proposed development will see the conversion from the existing student living arrangement to make way for a total of 89 new residential units spread across 8 floors.

2.2.2 Drawings FLU.1191.2.10 – 17 show the proposed make-up of the development at Kingston Bridge House, these drawings can be found in Appendix A.

2.3 Existing Geology

2.3.1 The British Geological Survey indicates that the site has an underlying bedrock of London Clay Formation, which consists primarily of clay, silt and sand. Sedimentary bedrock formed between 56 and 47.8 million years ago during the Palaeogene period.

2.3.2 Superficial deposits have also been recorded at the site. The superficial geology consists of Kempton Park Gravel Member, which is made up of sand and gravel. These deposits were formed between 1.6 and 1.8 million years ago during the Quaternary period.

3 SOURCES OF FLOODING

3.1 Fluvial/Tidal Flooding

3.1.1 Detailed flood information was requested from the Environment Agency (EA) for this site. The information supplied included flood extent maps for different return periods. National Planning Policy Framework (NPPF) defines the Flood Zone 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).

3.1.2 The proposed site is shown to be partly within Flood Zone 2, which is land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding. Figure 3.1 below shows an extract from the Environment Agency Map for Flooding. The flood map below shows approximately half of the site is located in Flood Zone 2.

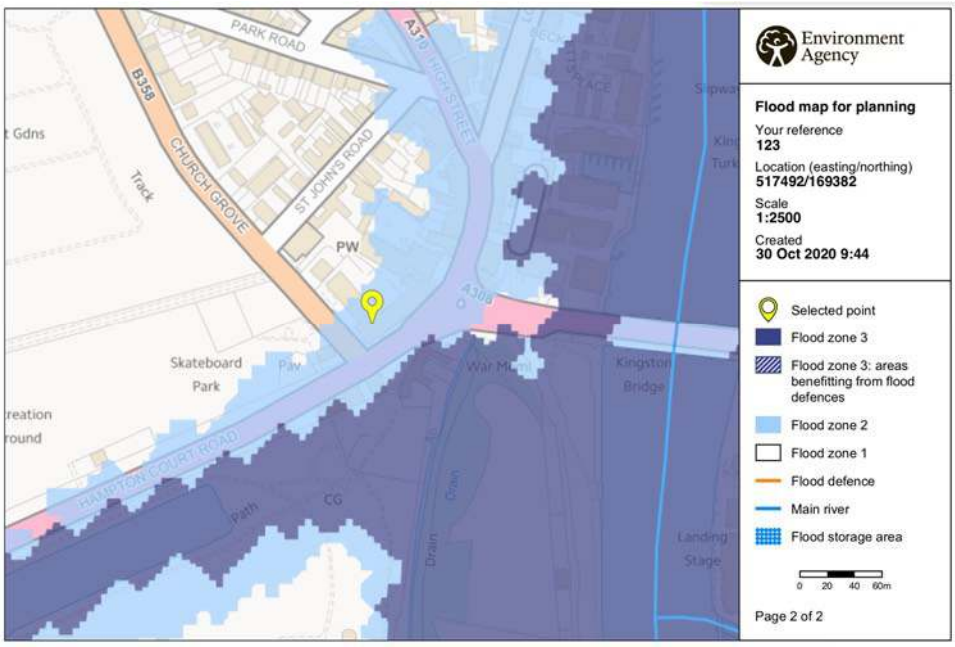


Figure 3.1 – EA Flood Map

3.2 Surface Water Flooding

3.2.1 The Environment Agency online mapping of the extent of surface water flooding in the local area shows that the site is at very low risk of surface water flooding. Figure 3.2 below indicates the areas prone to surface water flooding within the surrounding area.

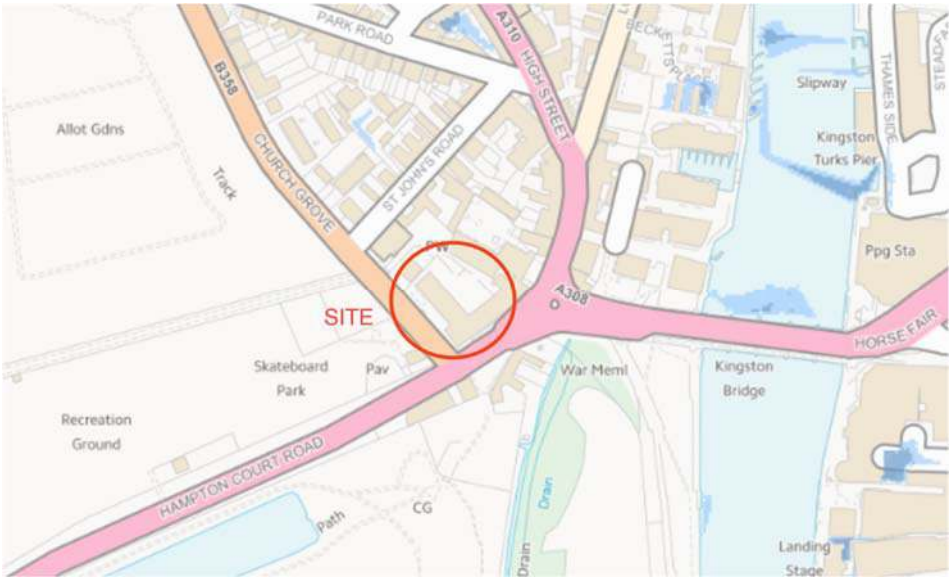


Figure 3.2 – Surface Water Flood Map

3.2.2 Richmond Borough Council completed a Strategic Flood Risk Assessment in September 2020. As part of the report, a drawing was produced to highlight areas which are susceptible to surface water flooding. The drawings show that the site will not be prone to surface water flooding.

3.2.3 Figure G from the SFRA can be found in Appendix B of this report.

3.3 Groundwater Flooding

3.3.1 The SFRA for Richmond Upon Thames provides mapping for potential groundwater flooding and also historical flood events involving groundwater flooding. The mapping provided, indicates that the site is within an area considered 'Potential of groundwater flooding of property situated below ground level'. The development has no basement so the risk of ground water flooding is considered very low.

3.3.2 Figure E from the SFRA for ground water flooding can be found in Appendix B of this report.

3.4 Sewer Flooding

3.4.1 As part of the SFRA, a drawing of sewer flooding incidents was produced to show the number of sewer flooding incidents based on DG5 data. The site is located within the 'KT1 4' area as shown on the drawing, this area has been listed as having 1-5 incidents records as per the DG5 data.

3.4.2 Figure I from the SFRA can be found in Appendix B of this report.

3.5 Reservoir Flooding

3.5.1 Mapping provided by the EA shows that the site is located within the 'maximum extent of flooding', meaning that if there were to be a reservoir failure, the probable flooding impact could affect the site.

3.5.2 Reservoirs in the UK have an extremely good safety record with no incidents resulting in the loss of life since 1925. Since that time reservoirs are more carefully maintained meaning reservoir flooding is very unlikely to happen. The Environment Agency is the enforcement authority for the Reservoirs Act 1975 in England and Wales. All large reservoirs must be inspected and supervised by reservoir panel engineers. It is assumed that these reservoirs are regularly inspected and essential safety work is carried out and therefore present a minimal risk.

Figure 3.3 below details the flood extent if the local reservoirs were to fail. The figure shows that the site is defined as having a high flooding probability with depth of flooding ranging from 0.3m to over 2m across the site.

Figure 3.3 – Reservoir Flood Map

3.6 Historical Flooding

3.6.1 As part of the SFRA, a drawing showing the historic flood event at the site was produced. The drawing relates to all of the following forms of potential flooding: River, Surface Water and Groundwater. The drawing shows that the site has not been subject to any form of flooding.

3.6.2 Figure K from the SFRA can be found in Appendix B of this report.

4 MODELLED FLOOD EVENTS AND CLIMATE CHANGE

4.1 Modelled Flood Levels

4.1.1 The principal source of flooding to the site comes from the River Thames, which is located approximately 140m away to the east of the site flowing from south to north. Part of the site is located within Flood Zone 2, whilst the rest is located in Flood Zone 1 as indicated in section 3 of this report.

4.1.2 An extract of EA map for modelled flood events is shown in Figure 4.1 below. This shows the flood extents for the 1.0%, 0.1% events and also the 1.0% event with a 20% allowance. The mapping shows part of the site could be subject to flooding with a probability of 0.1% or less.

Figure 4.1 – EA Modelled flood events

4.1.3 Table 4.1 below provides the in-channel flood levels for the node points on the River Thames. The map clearly shows the site is not in Flood Zone 3.

				Flood Levels (mAOD)			
Node label	Model	Easting	Northing	20% AEP	5% AEP	1% AEP	0.1% AEP
063TH01_MN_16.061U	Thames (Lower) Reach 4 2010	517730	169627	5.22	5.98	6.79	7.95
063TH01_MN_16.063	Thames (Lower) Reach 4 2010	517740	169548	5.27	6.05	6.86	8.06
063TH01_MN_16.065	Thames (Lower) Reach 4 2010	517731	169481	5.30	6.07	6.88	8.06
063TH01_MN_16.067U	Thames (Lower) Reach 4 2010	517716	169358	5.37	6.19	7.03	8.34
063TH01_MN_16.069	Thames (Lower) Reach 4 2010	517707	169144	5.38	6.19	7.02	8.31
063TH01_MN_16.077	Thames (Lower) Reach 4 2010	517766	168447	5.48	6.27	7.10	8.41

Table 4.1 – EA Flood Levels

4.2 Climate Change

4.2.1 Climate change allowances have been published by the Environment Agency. The allowance to be applied is based on the river basin district, flood zone and site vulnerability. The site lies within the Thames River Basin District. The site is located within Flood Zone 2 and is a More Vulnerable development. Based on this the Environment Agencies guidance suggests the central or higher central bands be used for climate change allowances.

4.2.2 Paragraph 26 of the Flood risk and coastal change Guidance published by the Department for Communities and Local Government on the 6th of March 2014 states that:

"Developers would be expected to justify why they have adopted a given lifetime for the development, for example, when they are preparing a site-specific flood risk assessment".

4.2.3 Given that the development is classed as More Vulnerable under the Nation Planning Policy Framework in Flood Zone 2 and has a proposed design life of 100 years, the climate change should be based on the higher central to upper end allowance category (35% and 70% respectively).

4.2.4 The rating discharge curve below shows the estimated flood level for the nearest river node MN_16.067U the estimated flows and calculated flood levels and flows for the climate change allowances are indicated in red in Tables 4.2 and 4.3.

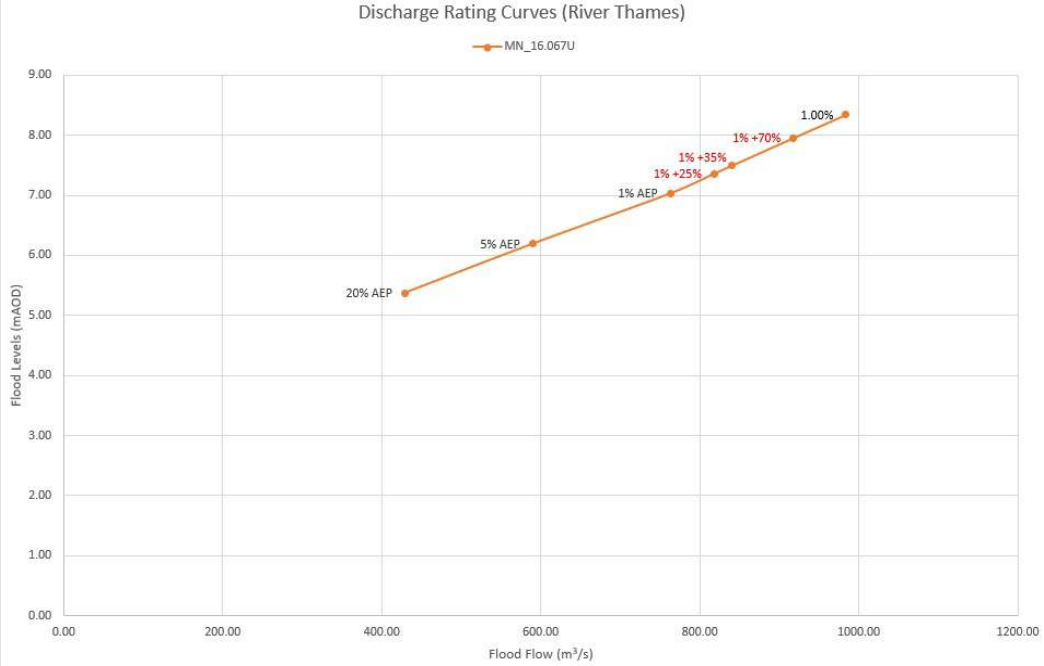


Figure 4.2 – Discharge Rating Curve

			Flood Level (mAOD)					
Flood Point	Eastings	Northings	20% AEP	1% AEP [FZ3]	1% AEP (+25%CC)	1% AEP (+35%CC)	1% AEP (+70%CC)	0.1% AEP [FZ2]
MN_16.067U	517716	169358	428.65	762.55	817.77	839.86	917.17	983.44

Table 4.2 – Flood Point Levels with Climate Change

			Flood Flows (m^3/s)					
Flood Point	Eastings	Northings	20% AEP	1% AEP [FZ3]	1% AEP (+25%CC)	1% AEP (+35%CC)	1% AEP (+70%CC)	0.1% AEP [FZ2]
MN_16.067U	517716	169358	5.37	7.03	7.36	7.49	7.95	8.34

Table 4.3 – Flood Flows with Climate Change

4.2.5 Once the extreme allowance is factored in the to the 1.0% flood event there would be no flooding of the application site. The highest predicted flood level of 7.95m AOD. The flood mapping shows the frontage of the building could be subject to flooding but the building is present so flooding would only reach the building and not extend around it. Drawing 201345/FRA/01 included in Appendix C shows the 1.0% and 0.1% flood extents on the existing site.

4.2.6 Drawing 201345/FRA/02 included in Appendix C shows the impact of climate change allowances on flood levels in relation to the proposed development.

5 IMPACT OF FLOODING

5.1 Impact on Flood Waters

5.1.1 The proposed development will see the conversion of the existing student block to residential units, both private and affordable. The proposed development will not change the external footprint of the building and therefore these proposals will not have any impact on the free flow of flood waters for an event with a probability of 1.0% including allowances for climate change.

5.2 Impact on Storage Volumes

5.2.1 The proposals will not increase the footprint of the existing building and therefore it will not result in the loss of storage volumes for an event with a probability of 1.0% including allowances for climate change.

5.3 Impact of Flooding on Development

5.3.1 The impact flooding will have on different return periods has been assessed and is indicated on drawing 201345/FRA/02. Flooding for an event with a probability of 1.0% plus CC could reach the front of the building. To ensure the property is safe from flooding the ground floor will be raised 300mm above the highest estimated flood level of 7.95m AOD. The proposed building will be free from flooding and therefore safe from flooding from an event with a probability of 1.0% +CC.

5.4 Access from Site

5.4.1 The site is located approximately 140m west of the nearest watercourse, the River Thames. Part of the site is shown to be in Flood Zone 2 and the estimated flood levels for an event with a probability of 1.0% +CC will reach the building along the frontage of the site adjoining Hampton Court Road. The remainder of the site will be free from flooding and therefore a safe access can be provided from the building on to Church Grove which is located in Flood Zone 1.

5.4.2 A safe access can therefore be provided at all times during an extreme flood event.

6 SUMMARY AND CONCLUSION

6.1.1 This Flood Risk Assessment has been prepared for the proposed conversion of the site at Kingston Bridge House, Church Grove, Kingston-upon-Thames, KT1 4AG. The report has considered all aspects of flooding in the area that might impact the proposed development.

6.1.2 The greatest risk of flooding comes from the River Thames, all other sources of flooding have been considered and are of very low risk to the development. The estimated flood levels for the River Thames adjacent to the site confirms that the site will not be subject to flooding with a probability of 0.1%. An assessment of the impact climate change will have on flood levels was completed and shows that only the southern boundary of the site could be subject to flooding from an extreme event.

6.1.3 A separate assessment of surface water flooding was also undertaken, and it concluded that there was very low risk of flooding resulting from the proposed development. The proposed development is a conversion / change of use and therefore the sequential test is not required. A safe, dry access will be available to and from the site at all times during a flood event on to Church Groove and ground floor levels will be raised 300mm above the estimated flood level to ensure the development is safe from flooding.

6.1.4 The development will not increase the size of the building footprint and therefore it will not restrict the flow of flood water or result in the loss of flood storage volumes for the 1% AEP storm plus climate change.

6.1.5 For the reasons set out above, the proposed site is considered suitable for development, as there will be no negative impact on the flood plain, flow paths or flood storage volumes, the development will be safe from flooding and a dry access can be provided to and from the property at all times.

APPENDIX A

Drawings FLU.1191.2.02 – 09 – Existing Floor Plans


Fairlight Mews
St John the Baptist Church
Fairlight
Hotel
1
4
8
1 to 3
TCB
Courts
7.6m
P
Pavilion
Play Area
7.6m
War Memori
Fern Glen

Rev	Date

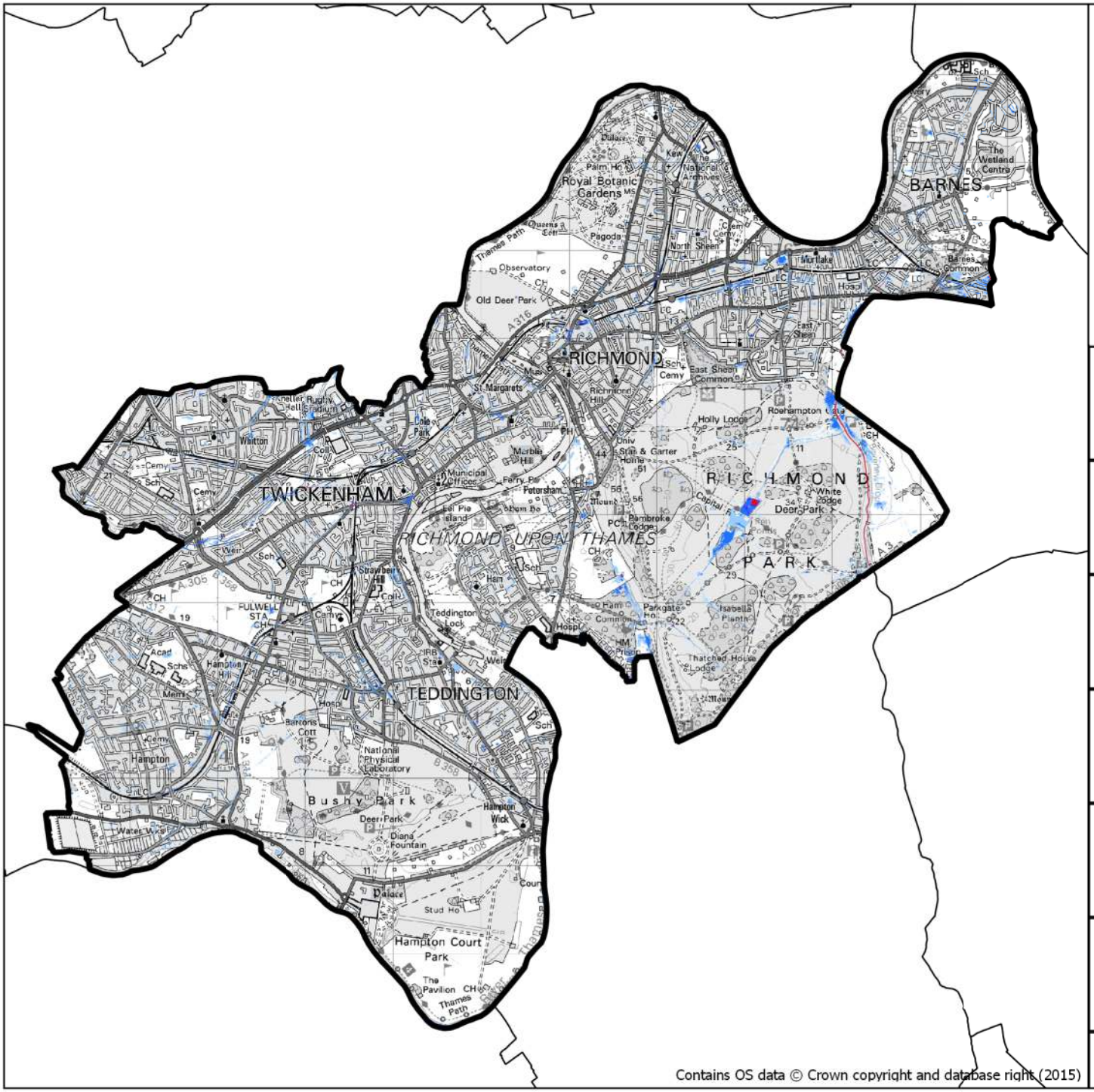
Drawings FLU.1191.2.10 – 17 – Proposed Floor Plan


John the Baptist Church
Fairlight
4
Hotel
1
5
Home Park
7.6m
1 to 3
TCB
7.6m
P
Pavilion
Play Area
7.6m
HOME PARK TERRACE
War Memorial
Fern Glen
The Gate Hou

Rev	Date

APPENDIX B

Figure G – Surface Water Flood Map



Legend

Borough Boundary

Predicted Surface Water Flood Depth (m)

- 0.00 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- 0.90 - 1.20
- > 1.20

in association with

Environment Agency

Metis Consultants Limited

METIS

Client

LONDON BOROUGH OF RICHMOND UPON THAMES

Project Title

London Borough of Richmond Upon Thames Strategic Flood Risk Assessment Level 1

Drawing Title

Updated Flood Map for Surface Water

1% chance of flooding in any one year

Drawing Number

FIGURE G

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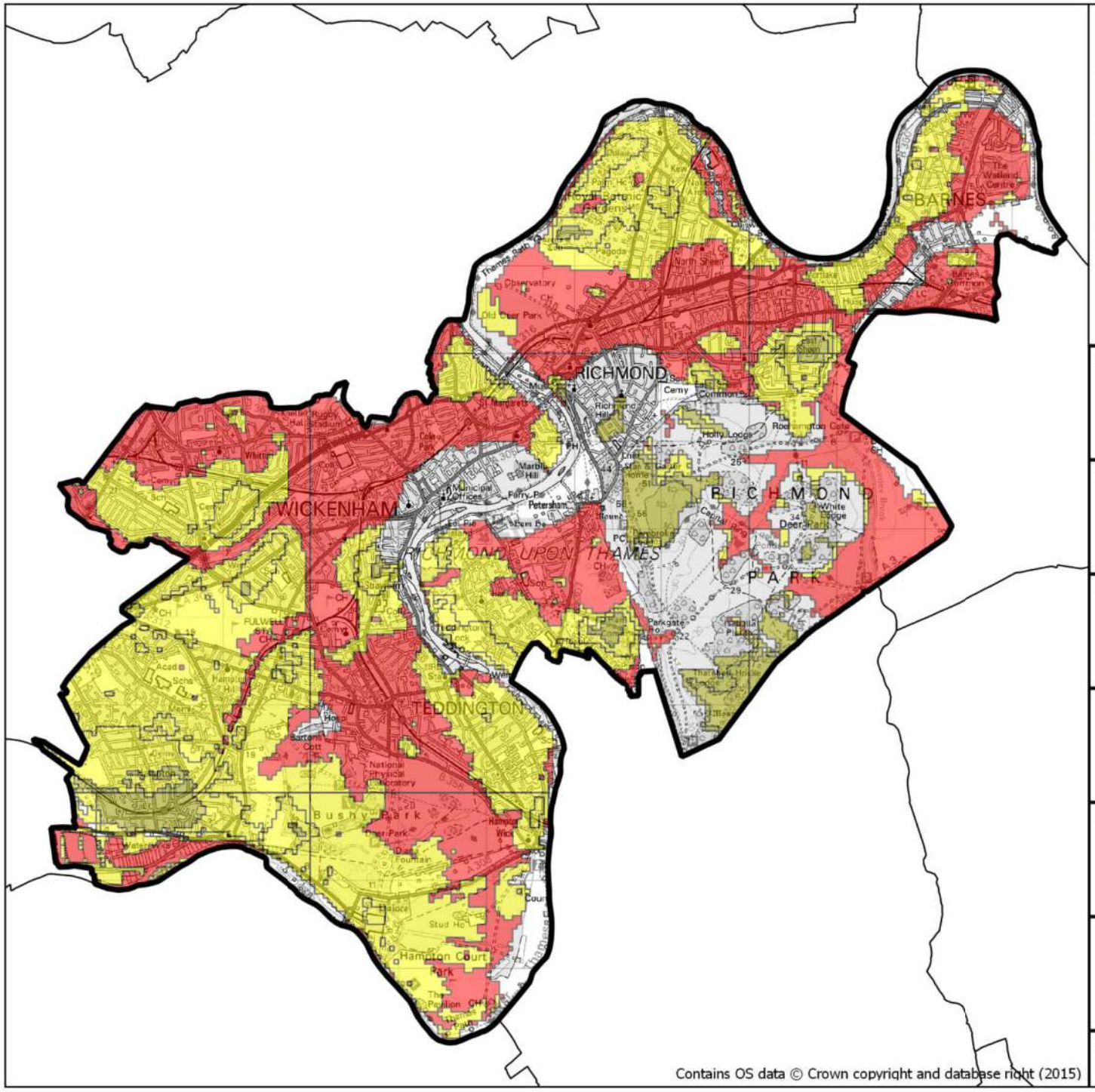
Figure E – Ground Water Flood Map



Legend

Borough Boundary

BGS Susceptibility to Groundwater Flooding

- Limited potential for groundwater flooding to occur
- Potential for groundwater flooding of property situated below ground level
- Potential for groundwater flooding to occur at surface

in association with

Environment Agency

Metis Consultants Limited

METIS

Client

LONDON BOROUGH OF RICHMOND UPON THAMES

Project Title

London Borough of Richmond Upon Thames Strategic Flood Risk Assessment Level 1

Drawing Title

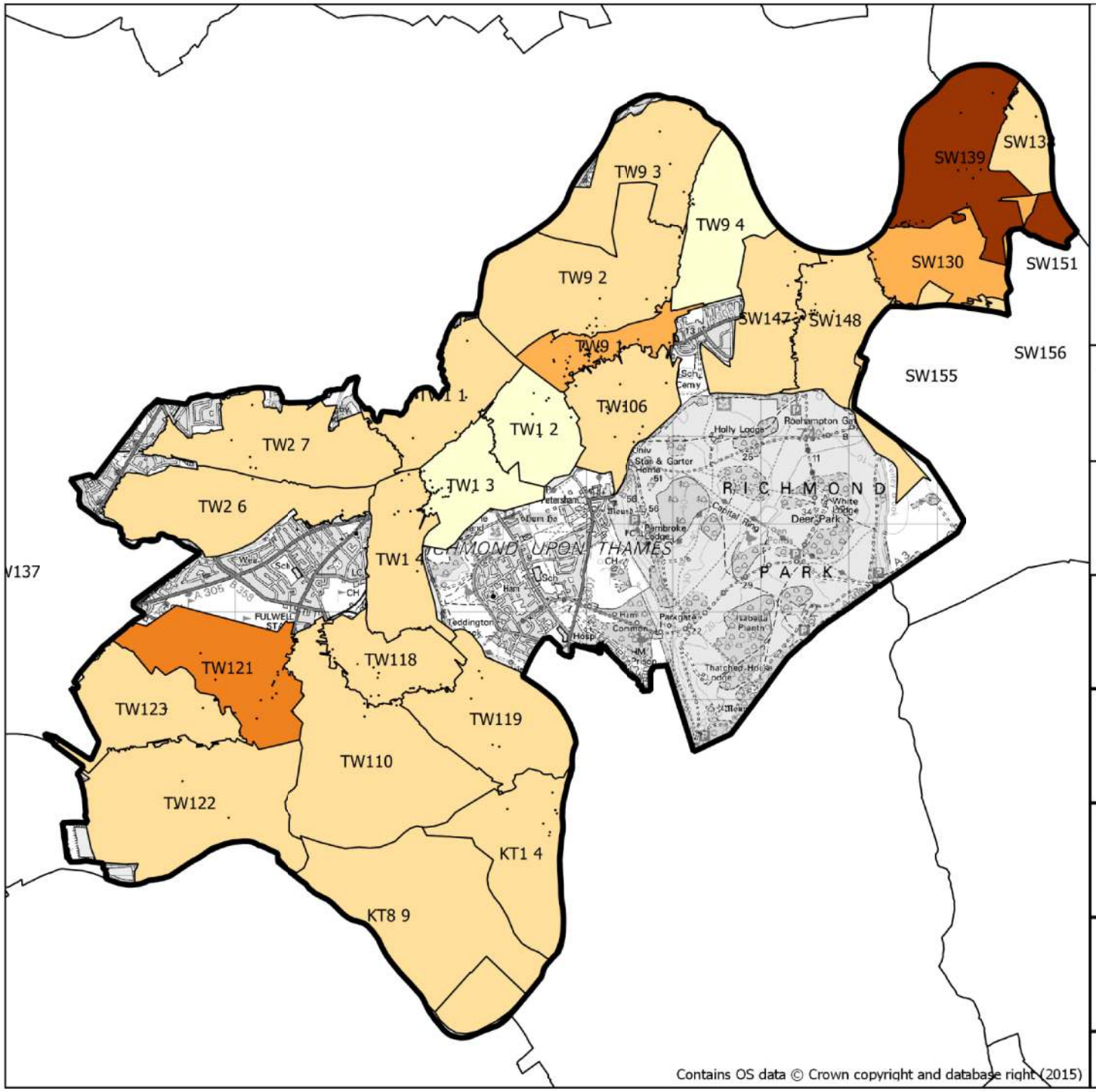
BGS Susceptibility to Groundwater Flooding

Drawing Number

FIGURE E

1:65,000

Figure I – Sewer Flood Map



Legend

Borough Boundary

Number of Sewer Flooding Incidents based on DG5 data

- 0
- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 25

in association with Thames Water

Metis Consultants Limited

METIS

Client

LONDON BOROUGH OF RICHMOND UPON THAMES

Project Title

London Borough of Richmond Upon Thames Strategic Flood Risk Assessment Level 1

Drawing Title

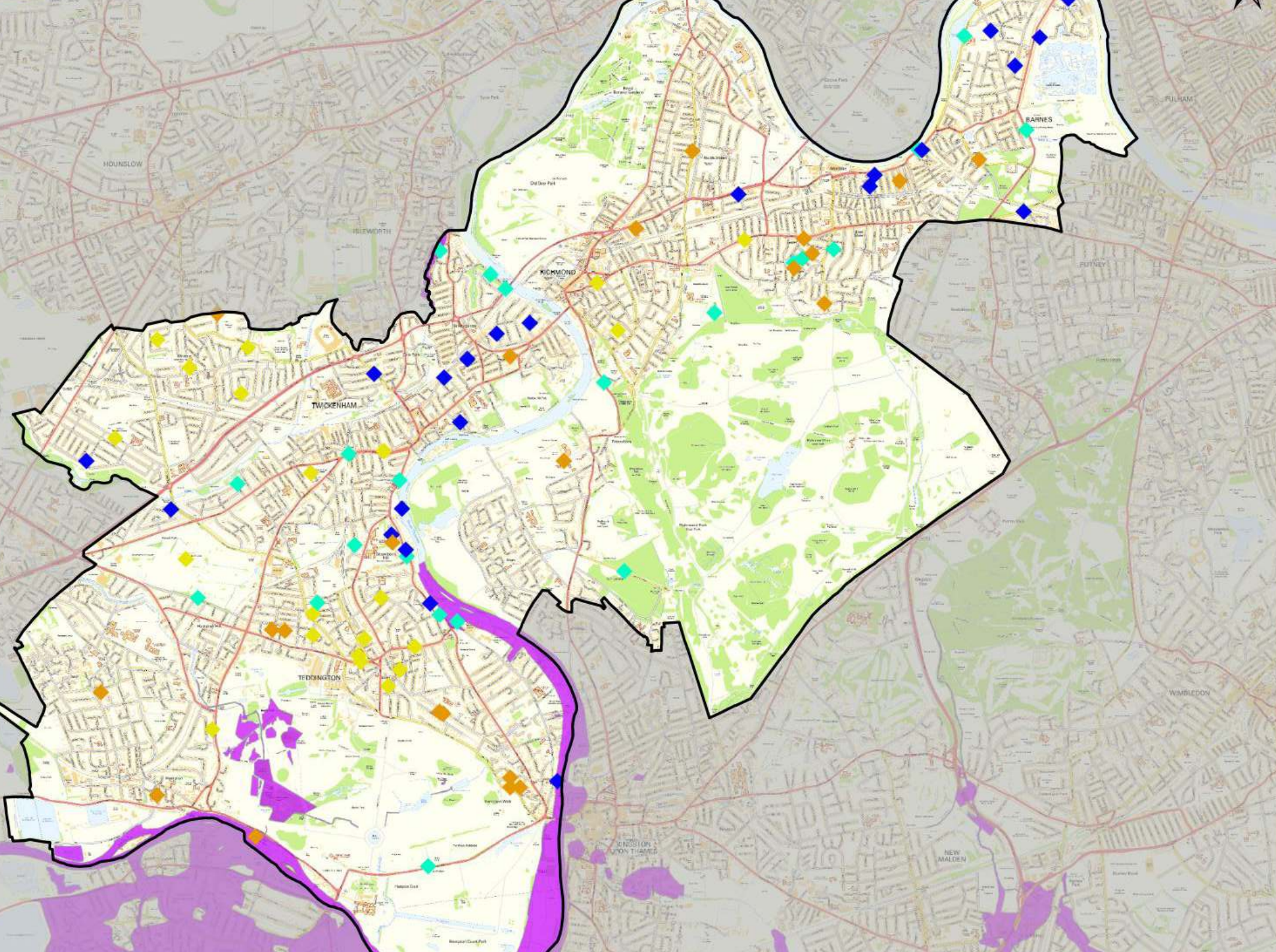
Sewer Flooding Incidents

Drawing Number

FIGURE I

1:65,000

Figure K – Historic Flood Map



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Drawing Title

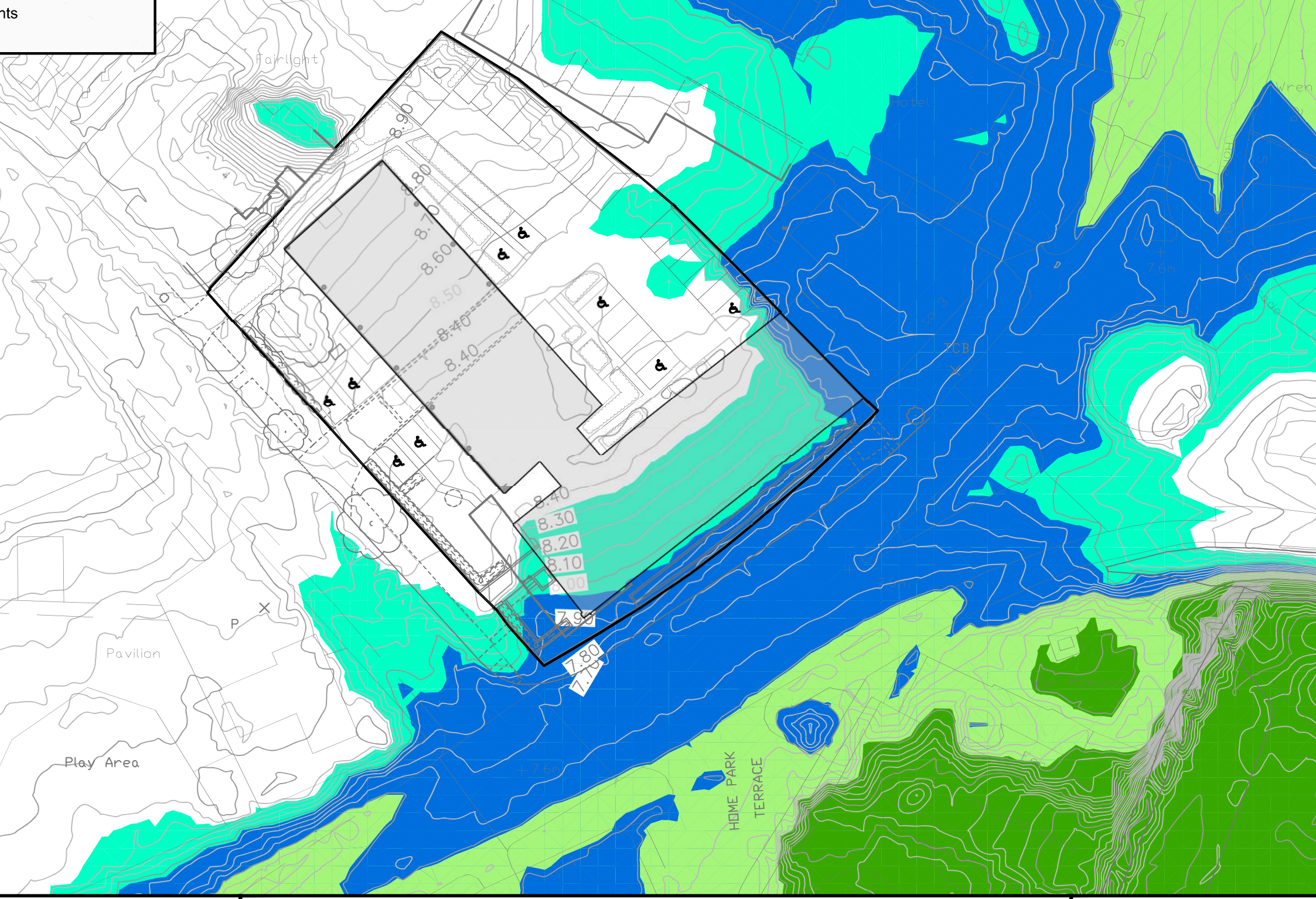
HIST

APPENDIX C

Drawing 201345/FRA/01 – Flood Extents


Fairlight
Hotel
Wren
Home Park Parade
7.6m
1 to 3
TCB
8.80
8.70
8.60
8.50
8.40
8.30
8.20
8.10
7.80
P
Pavilion
Play Area
7.6m
HOME PARK TERRACE
7.6m
War Memorial
Fern Glen
The Gate House
Home Park House

Drawing 201345/FRA/02 – Flood Extents Including Climate Change


Fairlight
Hotel
TCB
8.80
8.70
8.60
8.50
8.40
8.40
8.30
8.20
8.10
8.00
7.90
7.80
7.70
Pavilion
Play Area
HOME PARK
TERRACE
War Memorial