Phase 1 FLOOD RISK ASSESSMENT REPORT

PREPARED FOR: Edward Pearce LLP
REFERENCE #: 2209
DATE: March 2015
AMBIENTAL TECHNICAL SOLUTIONS LTD.

DOCUMENT ISSUE RECORD

PROJECT: PHASE 1 FLOOD RISK ASSESSMENT

LOCATION: 46 CLABON MEWS

PREPARED FOR: EDWARD PEARCE LLP

PROPOSED RESIDENTIAL EXTENSION

46 CLABON MEWS
BELGRAVIA
LONDON
GREATER LONDON
SW1X 0JL

PROJECT #: 2209

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
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<td>Edward Bouët</td>
<td>11/12/2013</td>
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<td>Document Check</td>
<td>Emma Jeffery</td>
<td>13/12/2013</td>
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<td>Authorisation</td>
<td>Emma Jeffery</td>
<td>03/03/2015</td>
</tr>
<tr>
<td>Amended</td>
<td>Daniel Cook</td>
<td>03/03/2015</td>
</tr>
</tbody>
</table>

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SUMMARY

This report presents the findings of a Flood Risk Assessment (FRA) that has been carried out for the proposed residential extension of 46 Clabon Mews, Belgravia, London, Greater London, SW1X 0JL. This FRA has been carried out using current best practices, and against the criteria set out in the National Planning Policy Framework (NPPF).

It is understood that the proposal is for alterations to the existing mews house including demolition of part of the mews house, and further excavation of the mews basement.

According to low detail, national-scale flood mapping created on behalf of the Environment Agency (EA), the entire site would appear to lie within Flood Zone 1, at low probability of fluvial or tidal flooding.

Under the NPPF, the proposed development is considered to be ‘more vulnerable’. The development site is located in Flood Zone 1, and the proposed development has an area of under 1ha. The NPPF does not normally require any planning application for new or re-development under 1 Ha to be accompanied by a FRA. However, the Local Authority has requested the application be accompanied by an FRA to demonstrate that the re-development can be achieved in a sustainable manner, with an overall reduction of flood risk to the site and surrounding area.

The impact to the development site from fluvial, groundwater and sewer flooding is considered to be not significant.

Based on the development plans provided, the development will not increase the impermeable surface coverage on site. As such, any change in surface water runoff generation will likely be negligible.

As such, and given that:

a) the site is located within an existing developed area and is for the extension an existing home, and;

b) there will be no increase in run-off post development;

c) the development is in accordance with The Royal Borough of Kensington and Chelsea draft supplementary planning document for basements;

d) the basement does not exceed 50% of the garden;

e) the basement does not comprise more than one storey;

f) the basement does not cause loss or damage or long term threat to trees;

g) the basement includes at least 1m of soil above the basement;

h) the basement will be protected from sewer flooding through the installation of a suitable pumped device;

following the guidelines contained within the NPPF, the proposed development is considered to be suitable, assuming appropriate mitigation can be maintained for the lifetime of the development.
<table>
<thead>
<tr>
<th>DEVELOPMENT DESCRIPTION</th>
<th>EXISTING</th>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development Type</td>
<td>Single residential property</td>
<td>Extension to single residential property, to include basement dig-out</td>
</tr>
<tr>
<td>(Number of Bedrooms)</td>
<td>N/A²</td>
<td>N/A²</td>
</tr>
<tr>
<td>EA Vulnerability Classification</td>
<td>More vulnerable</td>
<td>No change</td>
</tr>
<tr>
<td>Ground Level</td>
<td>Between 16.81mAOD-17.20mAOD</td>
<td>No change</td>
</tr>
<tr>
<td>Level of Sleeping Accommodation</td>
<td>First floor</td>
<td>No change</td>
</tr>
<tr>
<td>Impermeable Surface Area</td>
<td>N/A²</td>
<td>N/A²</td>
</tr>
<tr>
<td>Surface Water Drainage</td>
<td>N/A²</td>
<td>N/A²</td>
</tr>
<tr>
<td>Development Size</td>
<td>N/A²</td>
<td>N/A²</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RISK TO DEVELOPMENT</th>
<th>SUMMARY</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA Flood Zone</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Flood Source</td>
<td>Surface Water</td>
<td></td>
</tr>
<tr>
<td>Modelled 1:100 year fluvial/1:200 year tidal flood level</td>
<td>N/A¹</td>
<td></td>
</tr>
<tr>
<td>with climate change (+ 20%)</td>
<td>N/A¹</td>
<td></td>
</tr>
<tr>
<td>Modelled 1:1000 year flood level</td>
<td>N/A¹</td>
<td></td>
</tr>
<tr>
<td>with climate change (+ 20%)</td>
<td>N/A¹</td>
<td></td>
</tr>
<tr>
<td>Recorded Flood Events in Area</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Recorded Flood Events at Site</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>SFRA available</td>
<td>YES</td>
<td>Royal Borough of Kensington and Chelsea SFRA, August 2009</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FLOOD RISK MANAGEMENT MEASURES</th>
<th>SUMMARY</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground floor level above 1:100 year CC flood level?</td>
<td>N/A¹</td>
<td>Site outside area of fluvial/tidal risk</td>
</tr>
<tr>
<td>Safe Access/Egress Route?</td>
<td>N/A¹</td>
<td>No significant risk of tidal/fluvial flooding</td>
</tr>
<tr>
<td>Flood Resilient Design?</td>
<td>N/A¹</td>
<td>Given that the site is located in Flood Zone 1, the NPPF does not require specific protection measures, other than adequate site drainage.</td>
</tr>
<tr>
<td>Site Drainage Plan?</td>
<td>YES</td>
<td>No increase in run-off</td>
</tr>
<tr>
<td>Flood Warning &amp; Evacuation Plan?</td>
<td>N/A¹</td>
<td>Given that the development site is located in Flood Zone 1, there is no requirement under the NPPF for an evacuation route.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OFFSITE IMPACTS</th>
<th>SUMMARY</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displacement of floodwater</td>
<td>N/A¹</td>
<td>Site is located in Flood Zone 1</td>
</tr>
<tr>
<td>Impact on local geomorphology</td>
<td>N/A¹</td>
<td>Site is located in Flood Zone 1</td>
</tr>
<tr>
<td>Increase in surface run-off generation</td>
<td>None</td>
<td>Runoff attenuated to existing site runoff rate.</td>
</tr>
<tr>
<td>Impact on hydraulic performance of channels</td>
<td>N/A¹</td>
<td>Site is located in Flood Zone 1</td>
</tr>
</tbody>
</table>

Table S1: Summary of flood risks, impacts and proposed flood mitigation measures.
N/A¹ not required for this assessment
N/A² data not available
DEVELOPMENT DESCRIPTION AND LOCATION

PROPOSED DEVELOPMENT AND LOCATION

The proposed development site is located at 46 Clabon Mews, Belgravia, London, Greater London, SW1X 0JL (Figure 1).

It is understood that the proposal is for alterations to the existing mews house including demolition of part of the mews house, and further excavation of the mews basement.

Existing ground levels vary between 16.81mAOD and 17.20mAOD (Source: LiDAR).

VULNERABILITY CLASSIFICATION

Both the existing and proposed development is residential, and is therefore considered to be ‘more vulnerable’ under the NPPF.

SEQUENTIAL TEST/ EXCEPTION TEST

Under the NPPF, all new planning applications must undergo a Sequential Test. This test must be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g. residential, hospitals, mobile homes etc.) outside of the floodplain. The test refers to the EA Flood Zones described in Table 2. For reference, the NPPF Sequential Test: Flood Risk Vulnerability and Flood Zone ‘Compatibility’ Table is reproduced below:

<table>
<thead>
<tr>
<th>Flood Zone</th>
<th>Flood Risk Vulnerability Classification</th>
<th>Essential Infrastructure</th>
<th>Water Compatible</th>
<th>Highly Vulnerable</th>
<th>More Vulnerable</th>
<th>Less Vulnerable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 1</td>
<td>Essential Infrastructure</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Zone 2</td>
<td>Essential Infrastructure</td>
<td>✓</td>
<td>✓</td>
<td>Exception Test Required</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Zone 3a</td>
<td>Exception Test Required</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>Exception Test Required</td>
<td>✓</td>
</tr>
<tr>
<td>Zone 3b (functional floodplain)</td>
<td>Exception Test Required</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: The Sequential Test: Flood Risk Vulnerability and Flood Zone ‘Compatibility’ Table as specified by the NPPF. Please note: ✓ means development is appropriate; × means the development should not be permitted. (Source: NPPF)
Using the principles of the Sequential Test outlined above, the proposed development is ‘more vulnerable’ and has an area of under 1ha. The NPPF does not normally require any planning application for new or re-development under 1 Ha to be accompanied by a FRA. However, the Local Authority has requested the application be accompanied by an FRA to demonstrate that the extension can be achieved in a sustainable manner, with an overall reduction of flood risk to the site and surrounding area.

DEFINITION OF FLOOD HAZARD

SOURCES OF FLOODING TO THE SITE
Communication with the EA has identified the following potential sources of flooding to the site:

- **Fluvial:** N/A
- **Tidal:** N/A
- **Surface:** On site
- **Groundwater:** On site
- **Sewer:** Adjacent Road
- **Artificial sources:** N/A

MECHANISMS AND HISTORY OF FLOODING

**FLUVIAL/TIDAL**
According to the Environment Agency (EA) Flood Map (figure 2), the development site lies within Flood Zone 1 (Low Risk of flooding at the 1:1000 year level). The site lies over 1,275m from the nearest main River – the Thames. Detailed flood level information for extreme flood events may be available for this area, but given that the site resides within Zone 1 analysis of this information is not required as part of this FRA (Source: EA).

**SURFACE**
The EA hold no records suggesting that the site has been previously affected by surface water flooding.
As such, the risk to the site from surface water flooding is considered to be low.

**GROUNDWATER**
Communication with the EA has provided no records indicating the site has flooded in the past from groundwater flooding.
As such, the risk to the site from ground water flooding is considered to be low.

SEWER

At the time of writing, it is not known whether the local area or development site has flooded in the past via sewer surcharging (due to hydraulic overload) as this information is not available from the EA or Local Authority.

SURFACE WATER DRAINAGE STRATEGY

Based on the development plans provided, the development will not increase the impermeable surface coverage on site. As such, any change in surface water runoff generation will likely be negligible.

PROBABILITY OF FLOODING

FLOOD ZONE

Initial communication with the EA suggested that the proposed development site lies within an area with an annual risk of flooding (from fluvial/tidal sources) of below 1:1000 (i.e. EA Flood Zone 1).

This information is supported by the EA flood risk map (Figure 2) which has been produced using JFLOW/HYDRO-F – a relatively coarse, national scale flood modelling strategy. These maps indicate the potential spatial extent of a fluvial/tidal flood event which has a magnitude that is, on average, likely to occur once in every one/two hundred years (i.e. the 1:100/1:200 year fluvial/tidal floodplain). It is important to note that only the potential floodplain is shown; the mitigating effects of any flood defences currently in place are not considered. For reference, the definition of the NPPF flood risk zones is included below in Table 2.
### Description

| Zone 1          | **Low Probability.** This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%). |
| 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. SFRA’s 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 EA, including water conveyance routes). |

### Table 2: Definition of NPPF Flood Zones. *(Source: EA)*

**PROBABILITY OF THE SITE FLOODING**

According to the EA flood map, the annual probability of fluvial or tidal flooding at the site is less than 1:1000 or <0.1%.

**EXISTING RATES AND VOLUMES OF RUN-OFF GENERATED BY THE SITE**

Under the NPPF, following development, surface water runoff rates should be equivalent to (or below) the existing site run-off rate for all events up to the 1 in 100 year storm. As such, following development, in order to minimise the effect of the surface water run-off from the development, run-off from the development will be limited to the existing site run-off rates for all events up to the 1 in 100 year storm.

### CLIMATE CHANGE

**HOW WILL THE SITE BE AFFECTED BY CLIMATE CHANGE?**

According to the NPPF, climate change is likely to increase storm duration/intensity by 20% over the next 60 years. As such, the site may have an increased risk of surface water flooding.
DEVELOPMENT LAYOUT

It is understood that it is proposed to extend the building with a two story basement with plant room below to depth of 10-11m under existing garden.

Please see appendix A for development plans.

FLOOD RISK MANAGEMENT MEASURES

PROTECTION MEASURES

Given that the site is located in Flood Zone 1, the NPPF does not require specific protection measures, other than adequate site drainage.

However, in order to mitigate against potential surface water or groundwater flooding it is recommended that the developer use solid (i.e. concrete) floors. Given that the development site is located in Flood Zone 1, there is no requirement under the NPPF for an evacuation route.

In accordance with The Royal Borough of Kensington and Chelsea draft supplementary planning document for basements, the developer will protect the basement from sewer flooding through the installation of a suitable pumped device.

OFF SITE IMPACTS

IMPACT TO FLOOD RISK ELSEWHERE

Given that the site is located in Flood Zone 1, there is no offsetting of flood storage, and thus; under the NPPF no requirement to provide compensatory flood storage.

Following development the site run-off will be restricted to the existing site run-off rates for all events up to the 1 in 100 year storm. There will therefore be no impact on flood risk elsewhere.

GENERATION OF RUN-OFF

Based on the development plans provided, the development will not increase the impermeable surface coverage on site. As such, any change in surface water runoff generation will likely be negligible.
RESIDUAL RISKS

IDENTIFICATION OF RESIDUAL RISKS

Given that the site is located in Flood Zone 1, approximately 990m from the Thames, there is no residual risk of fluvial/tidal flooding. There is however a low residual risk to the site from surface water and sewer flooding in the event of a large storm (greater in magnitude than the 1:100 year with climate change), or failure of the attenuation measures incorporated.

CONCLUSIONS

This report has presented the findings of a FRA that has been carried out for the proposed extension of 46 Clabon Mews, Belgravia, London, Greater London, SW1X 0JL. It is understood that the proposal is for alterations to the existing house including demolition of part of the mews house, and further excavation of the mews basement.

The assessment has been carried out using current best practices and against the criteria set out in the NPPF.

As such, and following an analysis of EA flood risk maps, topographic and anecdotal information, it can be concluded that the risk and impact of flooding is currently low and would remain so following redevelopment.

As such, and given that:

a) the site is located within an existing developed area and is for the extension an existing home, and;

b) there will be no increase in run-off post development;

c) the development is in accordance with The Royal Borough of Kensington and Chelsea draft supplementary planning document for basements;

d) the basement does not exceed 50% of the garden;

e) the basement does not comprise more than one storey;

f) the basement does not cause loss or damage or long term threat to trees;

g) the basement includes at least 1m of soil above the basement;

h) the basement will be protected from sewer flooding through the installation of a suitable pumped device;
Therefore the proposed development type is considered to be suitable assuming appropriate mitigation (including adequate warning and evacuation procedures) can be maintained for the lifetime of the development, as it is in line with the guidelines contained within the NPPF.

The findings and recommendations of this report are for the use of the client who commissioned the assessment, and no responsibility or liability can be accepted for the use of the report or its findings by any other person or for any other purpose.

Dr. J. B. Butler  
B.Sc., M.Phil., PhD.  
Ambiental Technical Solutions Ltd.  
March 2015
APPENDIX A – SUPPORTING INFORMATION

- Figure 1: Wider Location Plan;
- Figure 2: EA Flood Risk Map;
- Development plans.
Figure 1: Wider Location Plan *(Source: Streetmap)*

Figure 2: EA Flood Risk Map *(Source: EA)*
GENERAL NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2. ALL DIMENSIONS SHALL BE VERIFIED ON SITE BEFORE PROCEEDING WITH THE WORK
3. KELLY HOPPEN INTERIORS SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES
4. ALL RIGHTS RESERVED. NO REPRODUCTION IN ANY MATERIAL FORM IS PERMITTED WITHOUT CONSENT.

WARNING: AN UNAUTHORISED ACT DONE TO COPYRIGHT WORK MAY GIVE RISE TO CIVIL AND CRIMINAL LIABILITY
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SPECIFIC NOTES:
REV. DATE: REASON FOR ISSUE: SIGNED BY

AA
1:100 @ A3
P2-015

PROJECT TITLE
DRAWING TITLE
DATE DRAWN
SCALE
PROJECT NUMBER
REVISION

CLABON MEWS
PROPOSED ROOF PLAN
02.02.15
AA
1:100 @ A3
P2-015
Mews House Front Elevation

- Proposed new mansard roof with grey slate finish to match 48 Clabon Mews
- Dentil brickwork
- Rendered head course
- Close boarded timber door with fixed glazed overpanel
- Raised roof height to match 48 Clabon Mews
- Proposed new white painted timber sash windows to match 48 Clabon Mews

Mews House Rear Elevation

- Proposed new white painted timber sash windows to match 48 Clabon Mews
- New mansard roof with grey slate finish
- Dormer window
- Raised roof height to match 48 Clabon Mews
- Bricks on both elevations
- Planned roof to match 48 Clabon Mews
- New white painted timber sash windows to match 48 Clabon Mews
- Partial close boarded timber door with fixed glazed overpanel

General Notes:
1. All dimensions are in millimetres unless noted otherwise
2. All dimensions shall be verified on site before proceeding with the work
3. Kelly Hoppen Interiors shall be notified in writing of any discrepancies
4. All rights reserved. No reproduction in any material form is permitted without consent.

Warning: An unauthorised act done to copyright work may give rise to civil and criminal liability
GENERAL NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
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SPECIFIC NOTES:

PLANNING APPLICATION

46 CLABON MEWS

PROPOSED SECTION AA'

02.02.15
AA
1:100 @ A3
P2-017
Level Datum = 45.00m

MEWS

IFL: +11270mm

CLABON MEWS

Scale: 1:100

SECTION CC'

019

MEWS

+49.59M

NEW STAIRCASE

2700

2356

FIRST FLOOR LEVEL RAISED

SECOND FLOOR LEVEL RAISED

PROPOSED NEW WINDOWS TO MATCH ADJACENT 48 CLABON MEWS

NEW SIDE DOOR

PROPOSED NEW MANSARD ROOF TO MATCH ADJACENT 48 CLABON MEWS

PROPOSED NEW BASEMENT EXTENSION

PROPOSED NEW WINDOWS TO MATCH ADJACENT 48 CLABON MEWS

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE

2. ALL DIMENSIONS SHALL BE VERIFIED ON SITE BEFORE PROCEEDING WITH THE WORK

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WARNING: AN UNAUTHORISED ACT DONE TO COPYRIGHT WORK MAY GIVE RISE TO CIVIL AND CRIMINAL LIABILITY

SPECIFIC NOTES:

KEY LOCATION PLAN

A3

REV. DATE: REASON FOR ISSUE:

DRAWN

02.02.15

46 CLABON MEWS

PROPOSED SECTION CC'

FIRST FLOOR

SECOND FLOOR

LEVEL RAISED

NEW STAIRCASE

PROPOSED NEW BASEMENT EXTENSION

NEW SIDE DOOR

PROPOSED NEW WINDOWS TO MATCH ADJACENT 48 CLABON MEWS

PROPOSED NEW WINDOWS TO MATCH ADJACENT 48 CLABON MEWS

0m 1m 2m 3m 4m 5m

PLANNING APPLICATION
GENERAL NOTE:

- NON-HISTORIC OVERLAID FLOOR FINISHES REPLACED WITH NEW OVERLAID FLOOR FINISHES.
- NEW SURFACE FIXED LIGHTING INSTALLED; NO RECESSED LIGHTING TO BE INSTALLED.
- CORNICES TO BE RETAINED UNLESS NOTED OTHERWISE.
- EXISTING CENTRAL HEATING SYSTEM REPLACED WITH NEW CENTRAL HEATING THROUGHOUT.

NOTE: FEATURES TO BE RETAINED
- D- DOORS.
- W- WINDOWS.
- A- ARCHITRAVES.
- S- SKIRTINGS.
- CL- CEILING AND ASSOCIATED PLASTER WORK.
- C- CORNICE.
- I- WINDOW IRON MONGERY.
- M- MOULDINGS.
- P- PICTURE RAIL.
GENERAL NOTE:
• NON-HISTORIC OVERLAID FLOOR FINISHES REPLACED WITH NEW OVERLAID FLOOR FINISHES.
• NEW SURFACE FIXED LIGHTING INSTALLED NO RECESSED LIGHTING TO BE INSTALLED.
• CORNICES TO BE RETAINED UNLESS NOTED OTHERWISE.
• EXISTING CENTRAL HEATING SYSTEM REPLACED WITH NEW CENTRAL HEATING THROUGHOUT.

NOTE: FEATURES TO BE RETAINED
D. DOORS
W. WINDOWS
A. ARCHITRAVES
S. SKIRTING
CL. CEILING AND ASSOCIATED PLASTER WORK
C. CORNICE
I. WINDOW IRONMONGERY
M. MOULDINGS
P. PICTURE RAIL

SPECIFIC NOTE:
• FIRE SURROUND RETAINED INSERT REPLACED.
• NON-ORIGINAL RECESSED LIGHTS TO BE REMOVED AND NOT REPLACED.

GENERAL NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
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SPECIFIC NOTES:

REAR ELEVATION

PLANNING APPLICATION

02.02.15

AA

00

36 CADOGAN SQUARE
PROPOSED REAR ELEVATION

FIRST WINDSOR CORPORATION

0m 1m 2m 3m 4m 5m
Level Datum = 45.00m

PROPOSED ELEVATION

RE-INSTATE ORIGINAL OPENING
TRADITIONAL TIMBER LEDGED AND BRACED DOOR WITH STRAP HINGES. DOORS KEPT FIXED SHUT
NEW FFL TO VAULTS.

GLAZED WALL PARTITION TO LIGHTWELL

LANDING STEPS AND BALUSTRADES TO HAVE TRADITIONALLY DETAILED FORGED IRON STRUCTURE AND RAILINGS

GENERAL NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2. ALL DIMENSIONS SHALL BE VERIFIED ON SITE BEFORE PROCEEDING WITH THE WORK
3. KELLY HOPPEN INTERIORS SHALL BE NOTIFIED IN WRITING OF ANY DISCREPANCIES
4. ALL RIGHTS RESERVED. NO REPRODUCTION IN ANY MATERIAL FORM IS PERMITTED WITHOUT CONSENT

WARNING: AN UNAUTHORISED ACT DONE TO COPYRIGHT WORK MAY GIVE RISE TO CIVIL AND CRIMINAL LIABILITY

SPECIFIC NOTES:

PLANNING APPLICATION
IFL: +6060mm
IFL: +10170mm
IFL: +14650mm
IFL: +18170mm
IFL: +18170mm
IFL: +24230mm
STORAGE HALL
CADOGAN SQUARE
+50.28M
LOBBY HALL
Scale: 1:100
SECTION FF
Level Datum = 45.00m
GLAZED ROOF
+47.75M
COURTYARD UTILITY HALL
FORMAL LIVING ROOM
MASTER BATHROOM
BEDROOM
ENSUITE
BEDROOM
MASTER BEDROOM
BEDROOM
ENSUITE
BEDROOM
MASTER BATHROOM
BEDROOM
ENSUITE
BEDROOM
MASTER BEDROOM

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SPECIFIC NOTES:
KEY LOCATION PLAN (NTS)
A3
REV. DATE: REASON FOR ISSUE:
PROJECT TITLE
DRAWING TITLE
DATE DRAWN
SCALE
PROJECT NUMBER
REVISION
DRAWN
A3
1:100
P2-106 00

36 CADOGAN SQUARE
PROPOSED SECTION- FF

02.02.15
00
FIRST WINDSOR CORPORATION

PLANNING APPLICATION
APPENDIX B – INFORMATION RELATING TO JFLOW
JFLOW and flood outlines (Source: EA)

Flood Zones have been produced using JFLOW, a nationally consistent model. JFLOW has been used to produce the 1% (1 in 100 year) and 0.1% (1 in 1000 year) flood outlines.

The flood outlines have been developed by applying flow and tide models to a 3D ground level map of England and Wales, known as a Digital Terrain Model (DTM). This is created by flying an aircraft over the whole of the country using radar to record and create a contoured model of the land. This DTM is used as the basis of a grid of cells which is used to estimate the extent of flooding in a flood of a given return period or probability.

The size of the flood event (1 in 100 or 1 in 100 year) is determined by the inflows to the JFLOW model, which are calculated using statistical techniques from the Flood Estimation Handbook. The technique used is based upon catchment descriptors and data transfer, the details of these can be found in the Flood Estimation Handbook volume 3. The Flood Estimation Handbook provides a consistent technique for estimating inflows to the national model and its methods are widely accepted.

The methodology is a raster-based approach, driven by an underlying Digital Elevation Model (DEM).

- Each cell has a ground level and water depth
- Water can move to any of surrounding 8 cells where the water level is lower
- Water will pond in low spots until the water level is high enough to spill
- The velocity of movement depends on water surface slope and surface roughness

The above points describe the basic principles of the model. The two underlying principles are:

- Mass conservation within each cell
- Calculation of the fluxes between the cells

Each grid cell is treated as a small storage area. Mass conservation is applied to each grid cell. The flux between cells is calculated using a form of the generalised weir equation.

Efficient coding is achieved by keeping a list of all currently wet cells and a list of newly wet cells. This avoids having to search through each cell in the ground grid.
For whole catchment modelling, the hydrographs used as inflow boundary conditions represent the whole hydrograph at that inflow location and a simple conceptual method has been derived to account for the amount of flow within the channel banks. A simple solution was therefore sought which would approximately account for the proportion of flow contained within the channel without requiring further information about the channel.

The simple conceptual method used involves two assumptions:

1. That bankfull flow ($Q_b$) is equal to QMED as calculated by the Flood Estimation Handbook (FEH) methods. QMED has a return period of 2 years. This assumption derives from the concept of dominant discharge in fluvial geomorphology (Wolman and Leopold, 1957; Wolman and Miller, 1960) where the cross-section shape is assumed to be formed by a discharge with a recurrence interval of 1-2 years.

2. That the additional channel flow ($Q_c$) scales with both $Q_b$ and depth above bankfull ($d$).

The basis of the current model is that each grid cell acts as a small flood cell and the links to each of the surrounding cells are automatically calculated. It is therefore capable of simulating the inundation extent at a level of detail equal to the underlying DEM. It is fundamentally volume conservative and so, in a given time period, will simulate the peak water levels across the floodplain depending on the volume of water that has entered the floodplain. This approach is a halfway house between the common 1D hydrodynamic models and a 2D hydrodynamic model.

**Limitations**

JFLOW was used to produce flood maps for the whole of England and Wales for all catchments greater than 3 sq km in a consistent manner. The method is therefore very generalised and therefore cannot take account of information that may be very significant locally. This might include:

1. Effects of bridges and other structures including flood defences are not taken into account.
2. Errors in the DTM, caused by trees and buildings for example.
3. The effect of reservoirs and urban drainage and other man made influences on the flow regime can only be taken into account in a very general sense in JFLOW.
4. The channel is assumed to be able to take the 2 year flow. This may not be true especially in those modified by man.
5. Hydraulic roughness is assumed to be the same everywhere in JFLOW, but of course it is not.

For these and many other reasons, the flood outlines produced by JFLOW can only be taken as a rough guide, showing where more detailed flood risk assessments are essential. Flood risk assessments should also be undertaken near small watercourses whose catchments are too small to have been included in the JFLOW modelling.
APPENDIX C – ADDITIONAL INFORMATION
<table>
<thead>
<tr>
<th>Significance</th>
<th>Risk of flooding of proposed development following completion</th>
<th>Impact of proposed development on both local and catchment hydrology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not significant</td>
<td>Proposed development is not located in a 1:100 year fluvial or 1:200 year tidal floodplain. Flooding as a result of the accumulation of surface runoff either on-site, or elsewhere in the catchment is highly unlikely.</td>
<td>Proposed development does not affect the quantity/quality of surface runoff and does not alter surface/groundwater flow locally or elsewhere within the catchment.</td>
</tr>
<tr>
<td>Low significance</td>
<td>Proposed development is located in a 1:100 year fluvial/1:200-year tidal floodplain, although no mitigation measures are required due to regional flood defences. Existing local drainage measures are sufficient to ensure that the accumulation of surface runoff does not result in flooding on-site or increase the risk of flooding elsewhere within the catchment.</td>
<td>Proposed development has a minor affect on the quantity/quality of surface runoff or surface/groundwater flow either locally or elsewhere within the catchment. Such changes may be sustainable without mitigation measures.</td>
</tr>
<tr>
<td>Moderately significant</td>
<td>Proposed development is located in a 1:100 year fluvial/1:200-year tidal floodplain and mitigation measures are required to reduce flood risk to an acceptable level. Surface runoff attenuation methods may be required to ensure that the accumulation of surface runoff does not result in flooding on-site or increase the risk of flooding elsewhere within the catchment.</td>
<td>Proposed development has a notable affect upon the quantity/quality of surface runoff and has a discernable impact upon surface/groundwater flow either locally or elsewhere within the catchment. Mitigation measures may be required in order for the development to be sustainable throughout the duration of its intended lifetime.</td>
</tr>
<tr>
<td>Moderate-high significance</td>
<td>Proposed development is located in a 1:100 year fluvial/1:200-year tidal floodplain and significant mitigation measures are required to reduce flood risk to an acceptable level. A range of surface runoff attenuation methods will be required to ensure that the accumulation of surface runoff does not result in flooding on-site or increase the risk of flooding elsewhere within the catchment.</td>
<td>Proposed development has a large affect on the quantity/quality of surface runoff and has a considerable impact upon surface/groundwater flow either locally or elsewhere within the catchment. A primary commitment to successful mitigation measures will be required in order for the development to be sustainable throughout the duration of its intended lifetime.</td>
</tr>
<tr>
<td>Highly significant</td>
<td>The proposed development is considered to be particularly susceptible to either tidal or fluvial flooding or a combination of both. Resultant changes in the rates of surface runoff as a result of the development will increase flood risk both on-site and elsewhere in the catchment. The incorporation of even a wide range of practicable mitigation measures may not ensure that the development remains sustainable in terms of flood risk for the duration of its intended lifetime.</td>
<td>Proposed development has a major affect on the quantity/quality of surface runoff and has a severe impact upon surface/groundwater flow locally or elsewhere within the catchment. The incorporation of even a wide range of practicable mitigation measures may not ensure that the development remains sustainable throughout the duration of its intended lifetime.</td>
</tr>
</tbody>
</table>

Table C1: Explanation of the levels of Significance used for the Flood Risk Assessment