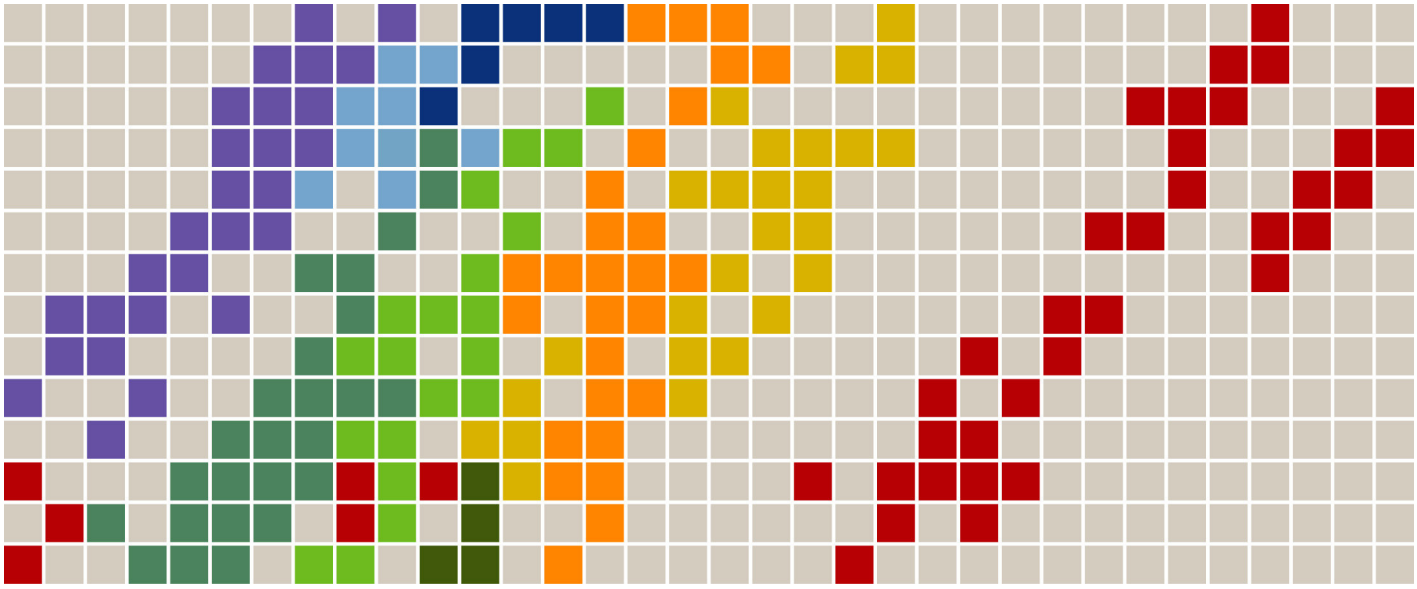


St Ilan School, Pontygwindy Road, Caerphilly

SB53

Flood Consequences Assessment

Caerphilly County Borough Council

February 2009

WSP

QM

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks				
Date	19 February 2009			
Prepared by	Sohan Ghimire			
Signature				
Checked by	Richard Allan			
Signature				
Authorised by	Richard Allan			
Signature				
Project number	11280164			
File reference	U:\Cardiff\Projects\11280164 - St Ilan School Caerphilly\TEXT\REPORTS			

WSP Development and Transportation
Fairway House
Paramount Business Park
St Mellons
Cardiff
CF3 0LW

Tel: +44(0)29 2036 6344
Fax: +44(0)29 2036 6399
http://www.wspgroup.com

Contents

Executive Summary

WSP have been commissioned by Caerphilly County Borough Council (CCBC) to undertake a Flood Consequence Assessment (FCA) of the site located at St Ilans School, Pontgwindy Road, Caerphilly, South Wales. CCBC is considering a redevelopment of the site, with residential use being the preferred option.

The purpose of the FCA is to assess the flood risks affecting the site and propose mitigation to deal with the risks in line with guidance provided by Technical Advice Note 15, Development and Flood Risk (TAN15), and the Environment Agency Wales. The FCA will be used to support the promotion of this site within the emerging LDF for Caerphilly CBC.

A 2D hydraulic model (Tuflow) has been developed in order to assess the mechanism of flooding. Based upon the results from the model together with information obtained from the EA, it has been assessed that a part of the development site is within the 1 in 1000 year floodplain. The depth of flooding, however, is small (less than 0.15m). The site gets benefit from robust flood defences and is safe from 1 in 100 year flooding. When considering the effects of climate change, a small strip of land will be under flooding but with a negligible depth. Safe access is available from the site to areas outside the 1 in 1,000 year flood plain. Previous correspondence with the EA has confirmed that the site will be treated as a zone C1 site.

Drainage strategy appropriate for the area will be considered ensuring that there will be no risk of flooding elsewhere. As application of SUDS, storm water attenuation techniques will be considered to suit local condition.

In terms of flood risk, the entire site (except a very small area affected by the 1% defended event) is suitable to support a wide range of development uses including highly vulnerable residential development.

1 Introduction

1.1 INTRODUCTION

1.1.1 WSP have been commissioned by Caerphilly County Borough Council (CCBC) to undertake a Flood Consequence Assessment (FCA) of the site located at St Ilans School, Pontgwindy Road, Caerphilly, South Wales (ST 154 877). CCBC is considering an initial proposal to sell the site to an appropriate developer. Residential development may be the preferred end use for this site. This FCA assumes that highly vulnerable development (eg. residential) is proposed.

1.1.2 This FCA will examine flood risks affecting the site and propose mitigation to deal with the risks in line with guidance provided by Technical Advice Note 15, Development and Flood Risk (TAN15), and the Environment Agency Wales

1.1.3 If this document is to be used by third parties, written approval will be required from WSP Development and Transportation

2 Background

2.1 SITE LOCATION

2.1.1 The site is located on the area of an existing school adjacent to Pontygwindy Road, South Wales (ST 234 912). Refer to Site Location Plan in Appendix A

2.1.2 Part of the site is indicated to lie within Zone C2 on the TAN15 Development Advice Map (DAM) with potential flood risk to the site from Nant yr Aber. Zone C2 defines areas at risk of the 1 in 1000 year return period event and without the benefit of significant flood defences. TAN15 Map of the site is given in Appendix B.

2.1.3 It is noted that EAW flood mapping shows that the area benefits from existing flood defences. Clarification was sought with EAW over the flood zone classification of the site and it was agreed that the site should be reclassified as zone C1. Refer to EAW correspondence in Appendix E.

2.2 TAN15 AND EXISTING FLOOD RISK

2.2.1 The Government's sustainable development strategy makes it a requirement to assess appropriate forms of development for areas at risk of flooding. This is to avoid any unnecessary increase in the requirement for flood defences. Section 6 of TAN15 defines the justification criteria as follows:

- "*Its location in Zone C is necessary to assist, or be part of , a local authority regeneration scheme initiative or a local authority strategy required to sustain an existing settlement;* ***or****,*
- *Its location in Zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;*

and,

- *It concurs with the aims of Planning Policy Wales (PPW) and meets the definition of previously developed land; and,*
- *The potential consequences of a flooding event for the particular type of development have been considered in terms of criteria contained in section 5 and 7 and Appendix 1 found in the TAN 15 document.*"

2.2.2 A requirement of Technical Advice Note 15: Development and Flood Risk is that developers making planning applications on sites that are potentially at risk of flooding should consult with the Environment Agency regarding their proposals.

2.2.3 The Environment Agency's "Policy and Practice for the Protection of Floodplains" (1997) provides guidance to local authorities on the control of development. In addition, the National Assembly of Wales has published TAN 15 Development and Flood Risk: Development Advice Maps (DAM's) which show areas potentially at risk from flood events of a 0.1% annual probability for river, tidal or coastal areas.

2.2.4 This report considers the 0.1% probability fluvial flood risk envelope in accordance with the TAN 15 requirements.

2.2.5 It should be noted that the source of flood risk in this is area is fluvial.

3 Accessing Flood Consequences

3.1 HYDRAULIC MODEL – BASE FLOOD DATA

3.1.1 A 2D hydraulic model (Tuflow) has been developed in order to assess the consequences of floods incorporating best available information. The updated model has been submitted to the EA in January 2009.

3.1.2 The model is based upon the up-to-date information including hydrology and flood defences. In particular, new hydrology predicted by the EA (EAW 2008) has been utilised in the model. In addition, as recommended by the EA the model incorporates the 1985 flood defence scheme along Morgan Jones Park which has been considered a vital part of the local flood defence system.

3.1.3 Details on hydrology and the model are given in the January 2009 report (St Ilans School, Second Addendum to Hydraulic Modelling Report).

3.2 ASSESSMENT OF FLOOD CONSEQUENCES

3.2.1 The most likely mechanism of flooding to the site is an overtopping of the channel banks upstream of the Mills Road Bridge located in the southwest of the site. In the extreme events such as 1 in 1000 year event, the banks are overtopped, as a result, the flood water extends through the Celyn Avenue bringing a part of the low land area of the site under flooding. A part of the flood from the Mill Road Bridge diverts towards the Mill Road bringing a large existing residential area under flooding.

3.2.2 There is a wall adjacent to the Bridge running parallel with the Mill Road which ends at the point where the 1985 flood defence wall starts. There is an open gate on the wall immediately right of the Bridge which provides access to the land in the south of the Bridge. In an extreme event, the water overflows towards the Mill Road through the open gate before the Bridge gets overtopped. As a significant part of the flood is redirected towards the Mill Road, less water is diverted towards the proposed development site. Photograph showing the gate opening is given in Appendix D.

3.2.3 While lowland area of the site in the south is under flooding, most of the site in the north is outside the extreme flood extent.

3.2.4 In case of flood events with a chance of 1 in 100, the whole site remains free from flooding under a defended condition. However, a narrow strip of lowland comes under flooding when the effects of climate change are taken into account (refer to flood extent maps in Appendix C.

3.2.5 Site access is provided from the Pontygwindy Road which runs adjacent to the site in the east. During the extreme event of 1 in 1000, the model shows a part of the access road under flooding, however, maximum flood depth is negligible (less than 10 cm). Safe access is available from the site during the 100 year and 100 year + 20% event as no part of the Road falls within the flood.

3.2.6 In terms of depth and speed of floodwater entering the site, maximum depth of flooding for the 1 in 1000 event is 0.15m. However, most of the area has a flood depth less than 0.10 m. Peak flood speed varies from 0.10 to 0.80 m/s, with an average speed of 0.40 m/s for the majority of the flood area.

3.2.7 For the 1 in 100 event considering climate change, depth of flooding is negligibly small (less than 0.02m), with an average velocity of 0.30 m/s, and only occurs in a very small area within the site boundary.

3.2.8 Flood maps showing flood extents, depths and velocity for a range of events are included in Appendix C.

3.3 ACCEPTABILITY FOR FLOODING CONSEQUENCES

3.3.1 Section A1.14 and 1.15 of TAN15 define the acceptability criteria for considering a site for development. In terms of annual probability of occurrence, the frequency threshold for a residential development is 1% (fluvial).

3.3.2 Beyond the threshold frequency proposed development would be expected to flood under extreme conditions. A1.15 provides tolerable conditions for different types of developments. For residential use, allowable maximum depth of flooding is 0.60m. Maximum allowable velocity of floodwater is 0.30m/s.

3.3.3 The vast majority of the site is flood free during the 1% event.

3.3.4 This means that the site can be considered safe from the perspectives of flooding and the proposed residential use is possible within the site.

3.3.5 In order to satisfy the criteria outlined in the Section A1.14, mitigation plans are proposed which are described in Chapter 4.

4 Flood Mitigation Plans

4.1 FLOOD RESPONSE PLAN

4.1.1 As the site is safe from the 1% flood event, no structural measures are required.

4.1.2 A Flood Response Plan shall be established at the site to manage residual risks from the extreme 1000 year event (e.g. breach of existing flood defences) which will inform the residents of potential risks.

4.1.3 The Environment Agency has an established flood warning service. It is expected that the site is eligible for registration to receive automated Floodline Warnings by telephone, mobile, fax or pager in the case of potential flooding events

5 Surface Drainage Strategy

5.1 INTRODUCTION

5.1.1 The Environment Agency Wales requires that all Flood Consequences Assessments should include a Surface Water Drainage Strategy to ensure that the impact to the catchment is limited.

5.2 EXISTING SURFACE WATER DRAINAGE

5.2.1 The purpose of the FCA at this stage is to support the promotion of the site within the emerging LDF. So detailed drainage strategy appropriate for the area will fully be considered during the development of future proposals (Masterplans) ensuring that there will be no risk of flooding elsewhere.

5.2.2 The EA have confirmed that there is no requirement for surface water restriction into the Nant Yr Aber at this location (see Appendix E).

5.2.3 Existing drainage system being used by the St Ilans School will be utilised to discharge surface water into the river. It will be ensured that surface water runoff is adequately managed to avoid the problems of localised flooding.

5.2.4 As application of SUDS, if required, storm water attenuation techniques will be considered to suit the local condition.

6 Conclusions

6.1 SUMMARY OF FLOOD RISK

6.1.1 Based upon the up-to-date hydraulic model developed for the site together with information obtained from the EA, it has been assessed that:

- A part of the development site is within the 1 in 1000 year floodplain. The depth of flooding, however, is small (less than 0.15m).
- The site gets benefit from robust flood defences and is safe from 1 in 100 year flooding. When considering the effects of climate change, a small strip of land will be under flooding but with a negligible depth.
- Safe access is available from the site to areas outside the 1 in 1,000 year flood plain.
- There are no sources of flooding other than fluvial from the Nant Yr Aber.

6.2 MITIGATION MEASURES

6.2.1 A Flood Response Plan shall be established at the site to manage residual risks from the extreme 1000 year event (e.g. breach of existing flood defences) which will inform the residents of potential risks.

6.2.2 Drainage strategy appropriate for the area will be considered ensuring that there will be no risk of flooding elsewhere. As application of SUDS, storm water attenuation techniques, if required, will be considered to suit local condition

6.3 CONCLUSION

6.3.1 In terms of flood risk, the entire site (except a very small area affected by the 1% defended flood) is suitable to support a wide range of development uses including highly vulnerable residential development.

Appendices, Figures & Tables

Appendix A Site Location Plan

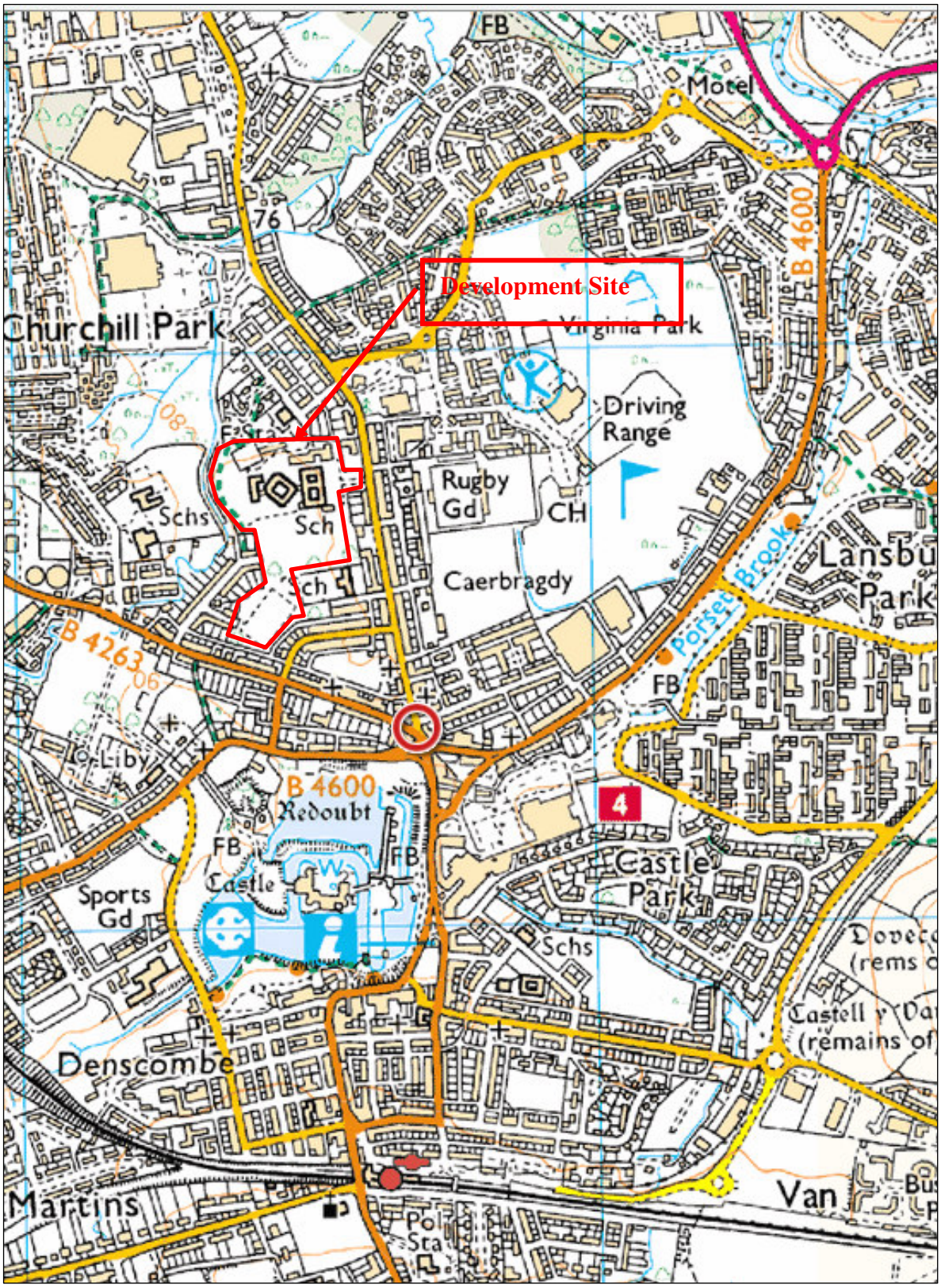
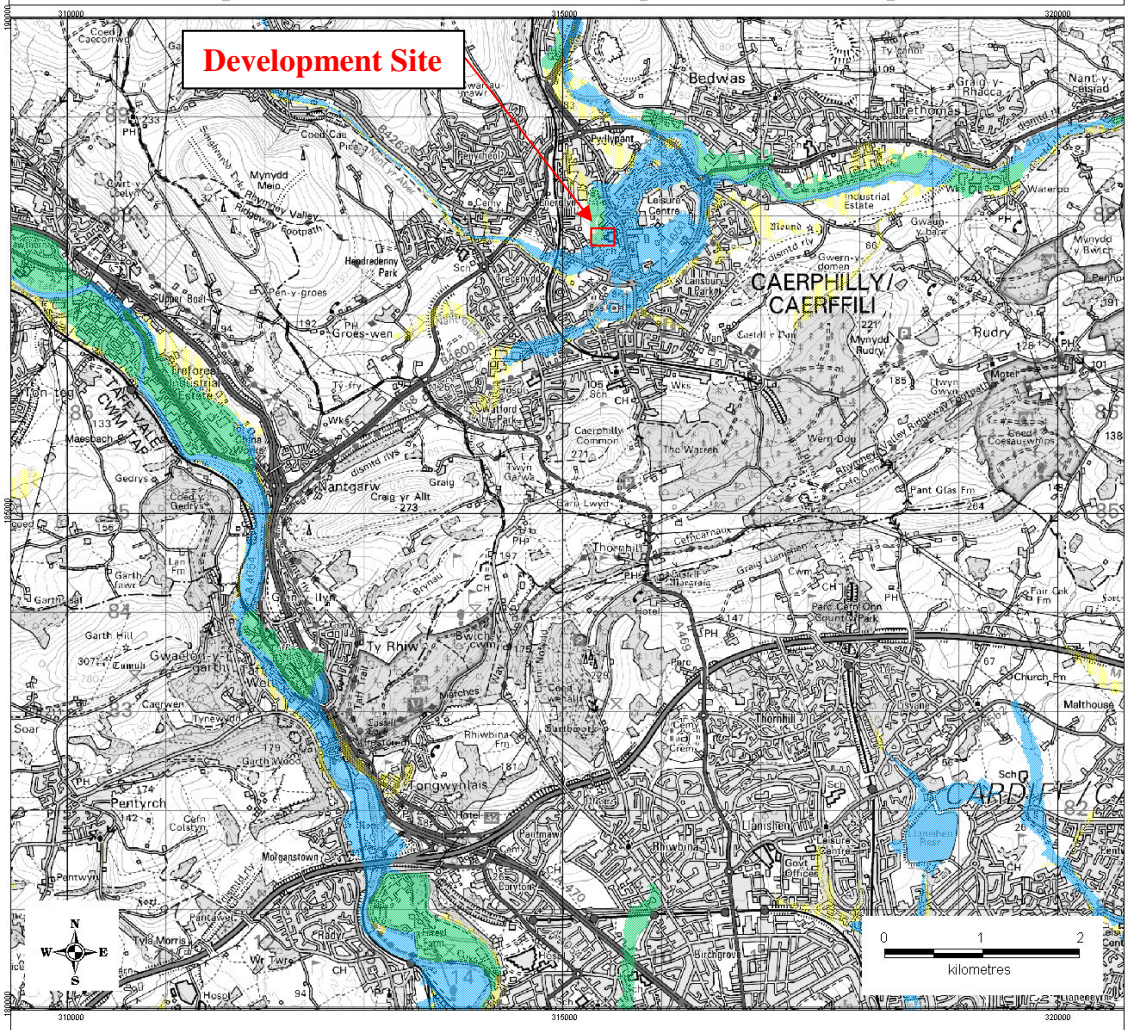


Figure: Location Map of Proposed Development (St Ilans School, Caerphilly).

Appendix B Development Advice Map

TAN15 Development and Flood Risk:Development Advice Map ST18

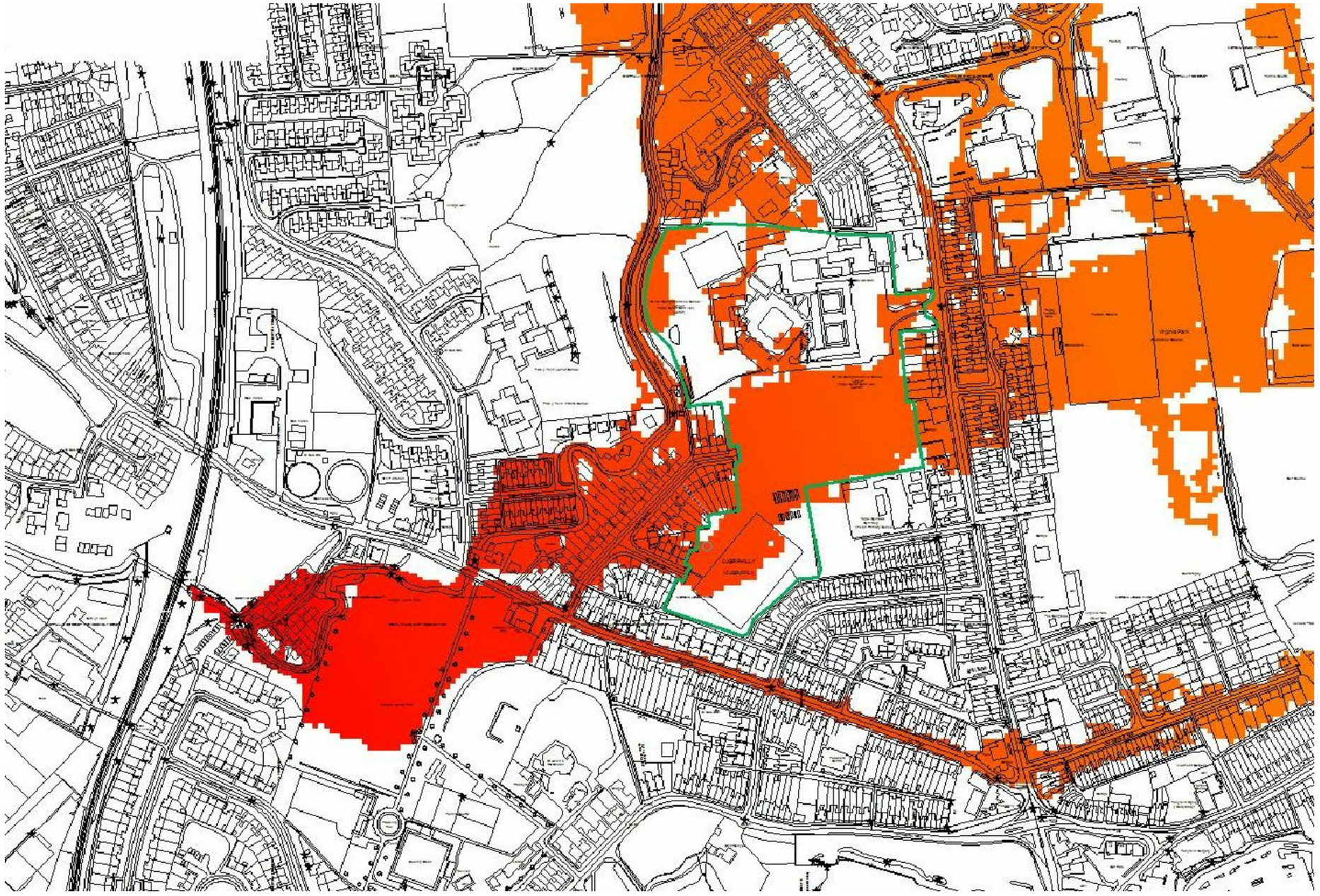


- Zone A: Considered to be at little or no risk of fluvial or tidal/coastal flooding
- Zone B: Areas known to have been flooded in the past
- Zone C1: Served by significant infrastructure, including flood defences
- Zone C2: Without significant flood defence infrastructure

Zones C1 & C2 based on Environment Agency's Extreme Flood Outline (>= 0.1% - River, Tidal or Coastal)

Cartographics / Cartografeg

Appendix C Flood Plain Extent Maps



DO NOT SCALE

KEY

APPROXIMATE SITE BOUNDARY

REV	DATE	BY	DESCRIPTION	CHK	APD
A	NIT ISSUED	JW	FIRST ISSUE	MI	BC

DRAWING STATUS:
FOR INFORMATION ONLY

WSP
Mountbatten House, Basing View, Basingstoke, Hampshire RG21 4HJ
Tel: +44 (0)1256 318800 Fax: +44 (0)1256 318700
http://www.wspgroup.com

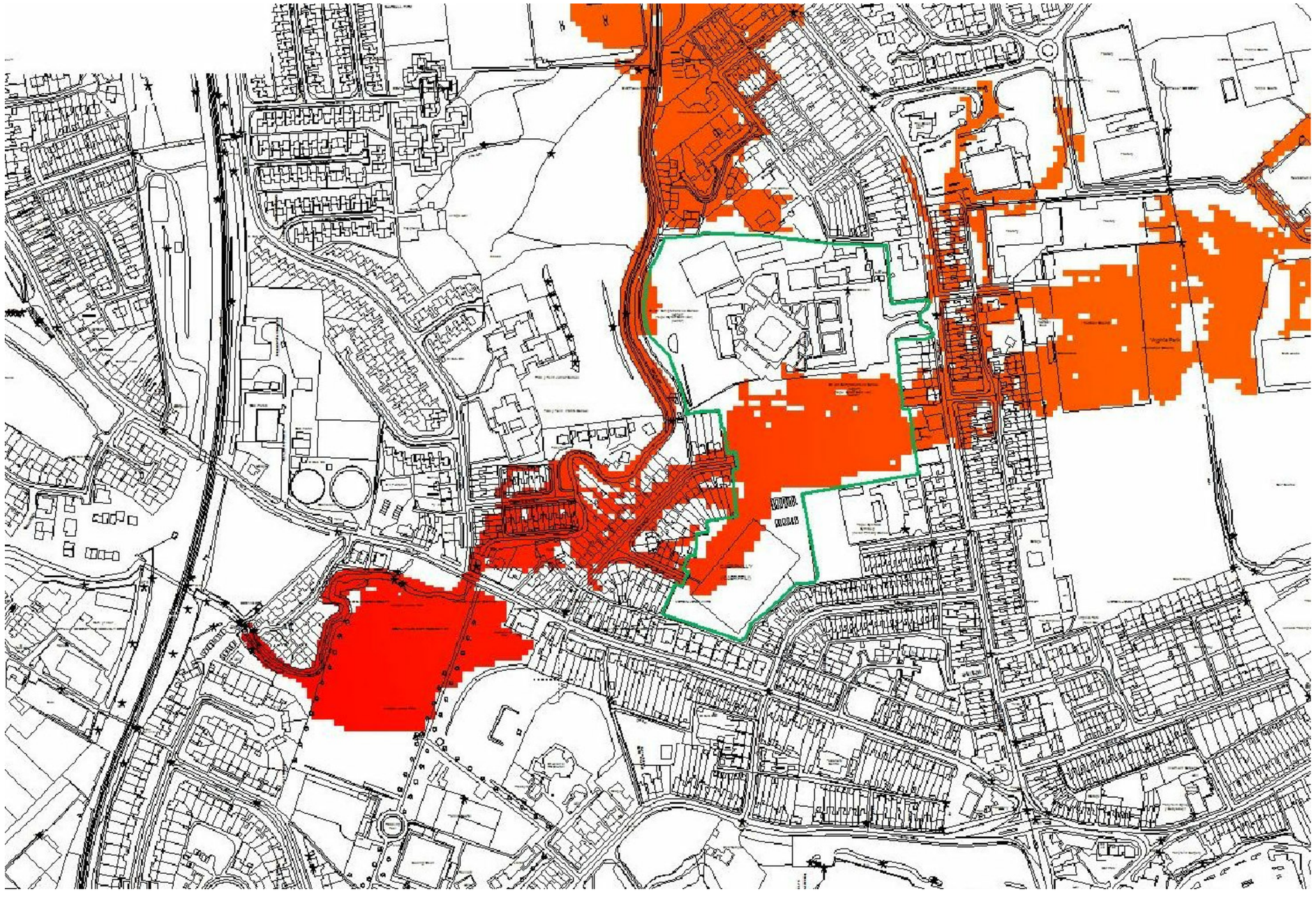
CLIENT:
CAERPHILLY COUNTY BOROUGH COUNCIL CARDIFF

ARCHITECT:

PROJECT:
St ILANS, SCHOOL SITE
CARDIFF

TITLE:
PEAK FLOOD EXTENT
1 IN 1000 YEAR EVENT
DEFENDED SCENARIO

SCALE @ A3:	CHECKED:	APPROVED:
N.T.S	MI	BC
CAD FILE:	DESIGN-DRAWN:	DATE:
0164-FLD-02	JW	January 2009
PROJECT No:	DRAWING No:	REV:
11280164	0164/FLD/02	A



DO NOT SCALE

KEY

APPROXIMATE SITE BOUNDARY

REV	DATE	BY	DESCRIPTION	CHK	APD
A	NOT ISSUED	JW	FIRST ISSUE	MI	BC

DRAWING STATUS:
FOR INFORMATION ONLY

WSP
Mountbatten House, Basing View, Basingstoke, Hampshire RG21 4HJ
Tel: +44 (0)1256 318800 Fax: +44 (0)1256 318700
http://www.wspgroup.com

CLIENT:
CAERPHILLY COUNTY BOROUGH COUNCIL CARDIFF

ARCHITECT:

PROJECT:
St ILANS, SCHOOL SITE
CARDIFF

TITLE:
PEAK FLOOD EXTENT
1 IN 100 YEAR EVENT + 20% CLIMATE CHANGE
DEFENDED SCENARIO

SCALE @ A3:	CHECKED:	APPROVED:
N.T.S	MI	BC
CAD FILE:	DESIGN-DRAWN:	DATE:
0164-FLD-22	JW	January 2009

PROJECT No:	DRAWING No:	REV:
11280164	0164/FLD/22	A

Appendix D Site Photographs

St Ilans School, the proposed development site

Flood defences adjacent to the School

An open gate adjacent to the Mill Road Bridge

The channel of Nant yr Aber flowing across the area.

Appendix E Correspondence With The EA

creu lle gwell
creating a better place

Asiantaeth yr Amgylchedd Cymru
Environment Agency Wales

Mr David Westwater
WSP Development and Transportation
2 Ty-Nant Court
Morganstown
Cardiff
South Glamorgan
CF15 8LW

Our ref: SE/2006/100095/01-L01
Your ref: 0164/St Ilan/DCW/EA002

Date: 23 November 2006

Dear Mr Westwater

St Ilans Flood Zone Classification St Ilan School, Pontygwindy Road, Caerphilly

I refer to your letter dated 7th November 2006, which was forwarded to me by Darren Jones in our External Relations team.

We note that there appears to be an anomaly with the extents of the C1 zone for this site, which does not currently extend to the edge of the 0.1% extreme flood outline. Although the site will remain partially within zones C1 and C2, until the Assembly Government releases future revisions of the Development Advice Maps (DAMs), we will treat this site as if it were within zone C1.

You should be aware that only the Welsh Assembly Government is able to change the description of a zone i.e.C1 to C2 etc.

Therefore, taking the above into consideration, the following applies:

Section 6 of TAN15 requires your Authority to determine whether the development at this location is justified. As part of this justification, the applicant must undertake and submit a flood consequence assessment (FCA) prior to determination of the application. This will ensure that all parties are aware of the risks to and from the development, and ensure that if practicable, appropriate conditions can be incorporated in a planning permission.

If you have any queries regarding the above, please do not hesitate to contact me.

Environment Agency
St Mellons Business Park, Fortran Road,, St Mellons,, Cardiff, CF03 0EY.
Customer services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk
Cont/d..

Yours sincerely

Kayna Tregay

Miss Kayna Tregay
Planning Liaison Officer

Direct dial 02920 245235
Direct fax 02920 362920
Direct e-mail kayna.tregay@environment-agency.gov.uk

End