



Elmsleigh Centre Flood Risk Assessment



April 2007



THE ELMSLEIGH CENTRE, STAINES FLOOD RISK ASSESSMENT

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APPENDIX A: ENVIRONMENT AGENCY CORRESPONDENCE

APPENDIX B: DRAWINGS

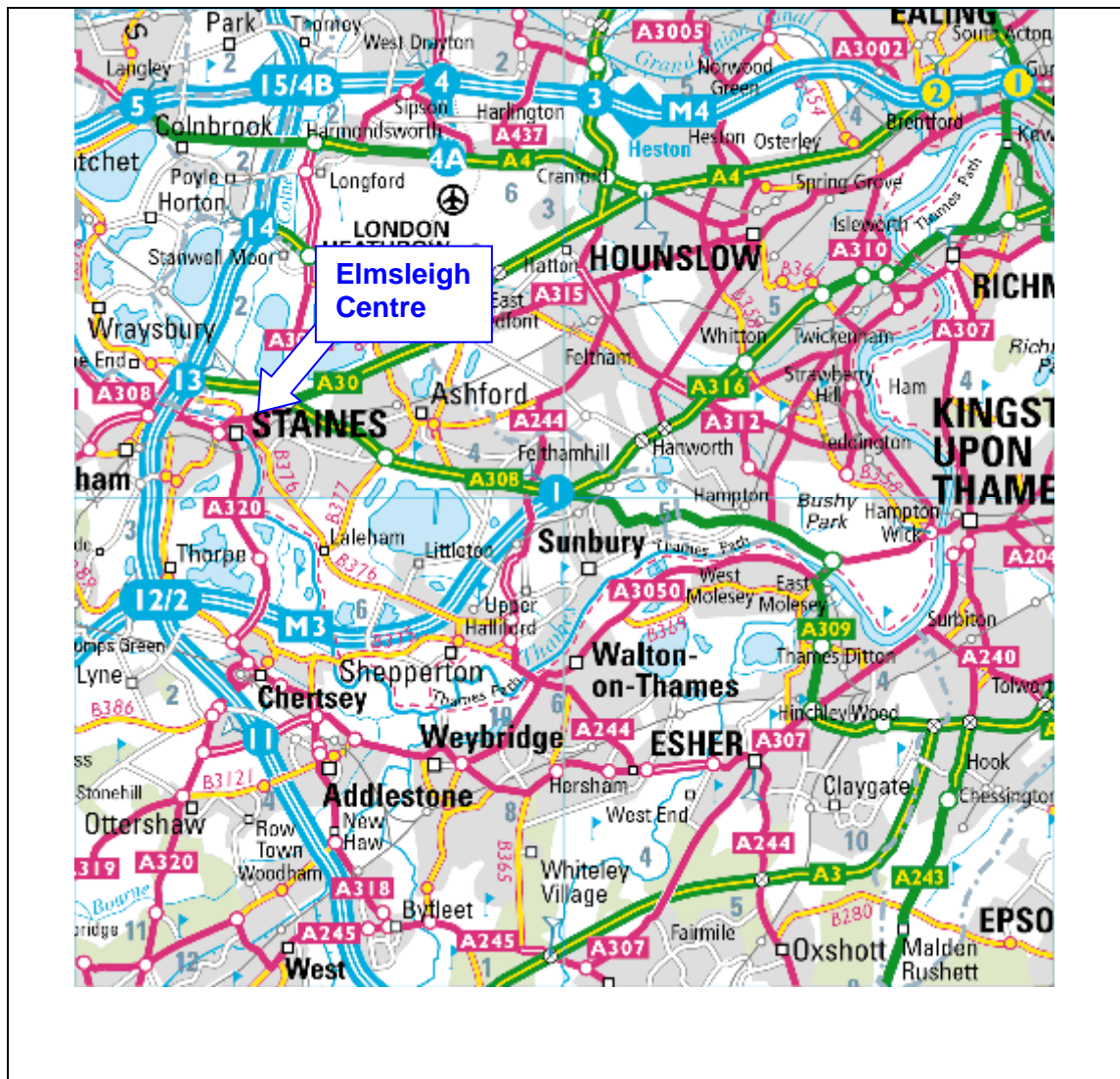
APPENDIX C: ENVIRONMENT AGENCY FLOOD MAP

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1. INTRODUCTION

- 1.1 Black & Veatch Ltd have been commissioned by Spelthorne Borough Council to prepare a flood risk assessment of the Elmsleigh Centre in Staines (OS grid reference TQ 036 715). The site is presently a shopping centre with a bus station and car park and is situated 100 metres to the west of the River Thames, enclosed by the A308 and the railway line. (Refer to Figure 1 Location Plan).
- 1.2 The River Thames flows from north east to south west past the site. Just upstream of the site lies the confluence of the River Colne which conveys flow from a catchment that extends as far north as Watford.
- 1.3 As part of this flood risk study information has been obtained from the Environment Agency on predicted flood levels and flood extents. It should be noted that this predicted data is constantly being reviewed by the Agency and as a result is subject to change. The information provided in this report is based on data provided in April 2005. Any subsequent review or application should include a verification of these predicted flood levels.



2. DEVELOPMENT PROPOSAL

- 2.1 The development proposal is still in its early stages and consequently there are no firm building outlines to present with this report. It is Spelthorne BC's intention to examine a number of opportunities for the site but they recognise the importance of ensuring the development meets the requirements of PPG 25 and as such want to be able to agree the flood risk strategy for the site in principle before embarking on finalising their proposals.
- 2.2 PPG25 is due to be replaced by PPS 25 in the summer of 2006 and a draft is currently undergoing a consultation phase. The draft has been developed to reflect the general direction set out in *Making Space for Water* (published by DEFRA in 2004) the evolving new strategy to shape flood risk management policy over the next 10-20 years. The new guideline is not expected to impact on the conclusions drawn into this study but will need to be referred to directly in future more detailed flood risk assessments of the site.
- 2.3 A figure titled 'Planning Brief Sites and its Sub-parts – Plan 2' in Appendix B shows the proposed development boundary. The principle of the development is to extend the existing Elmsleigh Centre building into an area known as the 'Western Extension Area' at the western end of the site and into the South Street Bus Station.
- 2.4 It is intended that the extension into the Western Extension Area would comprise a mixture of commercial and administrative buildings with penthouse style residential units. The size of the development footprint is estimated to be 9,950m². This area is presently occupied by two large buildings, a club and a Masonic Hall and by various back yards and access points for the Elmsleigh Centre shops.
- 2.5 The extension at the Bus Station Area would comprise bringing a part of the Elmsleigh Centre frontage forward to occupy a rectangular footprint of approximately 1,750m². The outline is yet to be defined but there are no existing buildings within this proposed site.



Plate 1: View towards bus station and Communication House



Plate 2: Escape route along Thames Street



Plate 3: Hall in Western extension area




Plate 4: Raised ramp to car park

3. FLOOD RISK INFORMATION

- 3.1 The Environment Agency have provided flood maps for the site based on the results of their mathematical hydraulic model of this part of the River Thames called the 'Lower Thames Flood Risk Model' (LTFRM). These maps are included in Appendix C. They indicate that considerable parts of Staines are at risk from flooding from a 1 in 100 year flood event (a 1% chance of happening each year). Indeed the proposed development site lies partly within the predicted 1 in 100 year flood envelope. The maps also show the extent of the 1947 flood level and the south west of the site is shown to have been partially flooded in that event, though this can still only be taken as indicative due to subsequent development of the River Thames corridor.
- 3.2 The River Thames is the main source of flood risk to the site with a quoted 1 in 100 year flood level of 15.59 mOD. Including a 20% allowance for climate change this figure rises to 15.92 mOD. (Refer Appendix A Environment Agency Correspondence).
- 3.3 The flooding pattern indicates that the River Thames overtops both left and right banks downstream of Staines Bridge. The Thames Street approach acts as a barrier to flood flow on the left bank in all flood events but those approaching the 1 in 100 yr event and above. This high ground partially protects the Elmsleigh site. Flooding on the right bank is more extensive where there is less restriction to floodplain flow.
- 3.4 The River Colne is also shown to flood parts of the central and eastern parts of Staines in a 1 in 100 year event, although the joint probability of the peak occurring at the same time as the River Thames peak would be rare. For instance, during the January 2003 event the peak flow in the River Colne occurred on 2nd January whilst the River Thames flow did not peak until the 6th January. In this event the peak flow in the River Colne was 24.4 m³/s but had dropped to 17.4m³/s by the time the River Thames peak occurred.



Figure 2 Environment Agency Indicative Flood Plain Map (Lower Thames Flood Risk Model)

 Extent of 1 in 100 yr flood plain

4. **FLOOD LEVELS**

- 4.1 The site was levelled by Capital Surveys Ltd. on the 31st May 2005 using EA benchmarks and elevation levels to establish the datum. The site levels range from 14.57 mOD in the Western Extension Area to 17.00 mOD at the rear of the South Street car park to the east of the site. (*Refer Drg. 120297-1000-0001 in Appendix B Drawings*)
- 4.2 The Western Extension Area contains two large buildings and also a ramped access to the Elmsleigh Centre. Levels vary from 14.57m OD in the centre of the service area to 17.10mOD at the perimeter of this area adjacent to the High Street.
- 4.3 The proposed development in the South Street Bus Station is flat with levels ranging from 15.10mOD to 15.25mOD.
- 4.4 The flood levels for the site, as obtained from the Environment Agency's Lower Thames Flood Study Model (*Refer Appendix A*), are as follows:

Table 4.1 Flood Levels (EA Node 21.061)

Return Period (yrs)	Flood Level (mOD)
1 in 5	-
1 in 20	-
1 in 50	15.25
1 in 100	15.59
1 in 100 (+20%)	15.92

- 4.3 A comparison has been made between the flood levels quoted above and the ground contours using a ground model of the site. Areas below the 1 in 50 yr flood level are shown shaded as are the areas below the 1 in 100 yr flood level and the 1 in 100 yr (+20%) flood level. From this data it would appear that the development site would be partly flooded in a 1 in 50 year event and above. It is noticeable that in this event it would probably be as a result of floodwater backing up the drainage system as there is no direct connectivity with the 1 in 50 yr flood plain outside of the development area. (*Refer Drg. 120297-1000-0001 in Appendix B Drawings*).
- 4.4 A 1 in 100 yr flood would extend the area of flooding but not to the extent that the whole site is inundated. There is a significant area, presently occupied by the South Street Car Park which is indeed above the 1 in 100 yr (+20%) level and would not flood in even this extreme event.

5. **SITE FLOOD ZONE CHARACTERISATION**

- 5.1 The site has been assessed as partially lying within a Zone 3a 'Developed Area' and partially in Zone 2 .
- 5.2 Zone 3 is defined in PPG 25 as 'an area where the annual probability of flooding is 1.0% (i.e. a 1 in 100 chance) or greater'. Zone 3a, is defined by Table 1 in PPG 25 is an area that may be suitable for commercial, residential and industrial development provided the appropriate minimum standard of flood defence (including suitable warning and evacuation procedures) can be maintained for the lifetime of the development .
- 5.3 Zone 2 is those areas which are at risk of flooding from a 1 in 1000 yr event or greater.

6. **COMPENSATORY STORAGE**

- 6.1 The high ground in the South Street Car Park provides an obvious opportunity for flood storage compensation. It is Spelthorne BC's intention that any future proposal will aim to provide more storage if at all possible and with an area of 12,400m² available this should provide ample opportunity to do so.
- 6.2 The Western Extension Area development contains building footprints equating to 1,330 m² in area. If the development were to proceed then the volume of these buildings would be offset against that required for the extended footprint.
- 6.3 An assessment has been carried out of the total available compensatory storage incorporating the high ground at South Street and the existing buildings in the Western Extension Area. This has been tabulated in bands of 0.2m depth in order to investigate the impact on storage for rising flood levels up to the 1 in 100yr event. (*Refer Table 6.1 below*).

Table 6.1 Volumes presently occupied within floodplain

Band depths (m)	Volume presently occupied (m ³)		
	Car Park	Buildings in Western Extension Area	Totals
14.59 – 14.79	2,468	-	2,468
14.79 – 14.99	2,468	65	2,533
14.99 – 15.19	2,468	199	2,667
15.19 – 15.39	2,468	266	2,734
15.39 – 15.59	2,468	266	2,734
Total volume	12,340	796	13,136

- 6.6 An assessment has also been made using the ground model to calculate the volume that would be occupied by the extensions within the Western Extension Area and the Bus Station. These are listed in Table 6.2 and compared with the potential compensation volumes calculated above.

Table 6.2 Comparison of volumes occupied by the proposals and available compensatory storage

Band depths (m)	Volumes required by extensions (m ³)			Available Compensatory Storage (m ³)	Surplus Compensatory Storage (m ³)
	W Ext. Area	Bus station	Total		
14.59 – 14.79	55	0	55	2,468	2,413
14.79 – 14.99	379	0	379	2,533	2,154
14.99 – 15.19	752	158	910	2,667	1,757
15.19 – 15.39	1,248	350	1,598	2,734	1,136
15.39 – 15.59	1,461	350	1,811	2,734	923
Total volume	3,895	858	4,753	13,136	8,383

- 6.8 From the figures in Table 6.2 it can be seen that the available volume of compensatory storage will not only provide adequate to deal with the potential volumes occupied by the proposed

extensions but does so through each band with considerable surplus. This demonstrates that the development site has the capacity to develop the areas under consideration without impacting on the overall flood storage of the area.

7. DRY ESCAPE

- 7.1 It is intended that the new development introduces residential development within the site. It is therefore important that a dry escape route is identified that allows residents to evacuate the flood plain.
- 7.2 As explained previously the site lies partly in the indicative flood plain and much of Staines is inundated in a 1 in 100 yr event. However, the ground levels measured along Thames Street and Clarence Street to Staines Bridge indicate there is a line of high ground that can be used as a dry escape route.
- 7.3 Previous studies in the area by Black & Veatch have proven that a dry escape route exists from Staines Bridge along the Causeway to the M25. The route is shown on Drgs 120297-1000-0002 & 0003 and verification by the Environment Agency that this is a valid dry escape route is included in Appendix A.
- 7.4 Any future development will ensure there is dry direct access from the occupied parts of the development to Thames Street .
- 7.5 It is considered that such a dry escape meets the requirements of PPG 25.

8. FLOOD WARNING

- 8.1 The site lies within the Flood Warning Area 'River Thames, Bell Weir Lock to Shepperton Lock'.
- 8.2 The Environment Agency operates on Automated Voice Messaging (AVM) system which is available to all residential and commercial properties located within the flood plain. This system will be incorporated into a Flood Management Plan for any future development and though there is unlikely to be any accommodation at ground level it will be used to ensure any cars parked at ground level are moved to higher ground safely.

9. OTHER ISSUES REQUIRED TO BE ADDRESSED BY PPG 25, APPENDIX F

9.1 Existing Flood Defences

- 9.1.1 There are no existing flood defences on the present site.

9.2 Speed of Water

- 9.2.1 The site is situated down stream of the Staines Bridge but, due to the protection afforded by the high ground levels on Thames Street, is unlikely to sit within a fast moving part of the flood plain flow.

9.3 Social, Economic and Environmental Impacts

- 9.3.1 Spelthorne BC will consider the social, economic and environmental impacts at the time of any future planning application though considering the present use of the site; any impacts are unlikely to be significant. During the construction phase care will be taken to avoid unnecessary polluted run-off entering local drains and sewers.

9.4 Assessment of hydraulics of Drains/Sewers During Floods

- 9.4.1 This has not been addressed at this stage though it is likely that the foul drainage from the site will need to be in a sealed pumped system.

9.5 Impact on fluvial morphology, long term stability and sustainability

- 9.5.1 There are none.

9.6 Residual Risk Assessment

- 9.6.1 PPG 25 requires consideration of the long term effects of global warming and suggests in the Thames Valley area flows could increase by 20% for any given return period. The Environment Agency have provided a predicted level of 15.92mOD for this degree of increase and the additional extent of flooding that this represents is shown on Drg 120297-1000-0001. It is recommended that this level is combined with a sensible freeboard to set the threshold level of any new properties within the study area.

10. CONCLUSION

- The existing use of the site lies within the flood plain and is predicted to start being inundated above the 1 in 50 yr return period. The site is consequently classified as Zone 3a.
- The proposed development will not reduce flood plain storage and has the capacity to provide more.
- Dry access is available to a dry escape route along Clarence Street and then over Staines Bridge and along the Causeway. This access will be provided from the ground level which will be set above the 1 in 100 year level.
- A Flood Management Plan should be produced that makes use of existing flood warning measures to ensure safe removal of cars from any car park during a flood event.
- Any future more detailed applications for this site should make reference to the conditions included in the Environment Agency's letter dated 20th March and 5th March 2007 included in Appendix A

I K Simpson, April 2007

For Black & Veatch (ref 120297)

APPENDIX A: ENVIRONMENT AGENCY CORRESPONDENCE

Our Ref: SL/2006/008259/01-L01
Your Ref: IKS/120197-T/MW



Environment
Agency

Date: 20 March 2007

Mr. Kevin Simpson
Black & Veatch Ltd
Grove House
100 High Street
Hampton
Middlesex
TW12 2ST

Dear Kevin,

SUBMISSION OF FRA.

ELMSLEIGH CENTRE, STAINES, MIDDLESEX, TW18 4QA.

Further to the email from my colleague Lindsay Newton please find below our formal response accepting the principles of this development in terms of flood risk.

On full submission of the Flood Risk Assessment cross sections should be submitted showing areas allocated for level for level flood storage compensation. At planning application stage we would ask for the following conditions:

Planning Conditions:

Condition 1:

Floor levels should be set at least 300mm above the 100 year +20% (climate change) flood level of 15.92metres above Ordnance Datum.

Reason:

To protect the development from flooding.

Condition 2:

There shall be no raising of existing ground levels on the site.

Reason:

To prevent the increased risk of flooding due to impedance of flood flows and reduction of flood storage capacity.

Condition 3:

No spoil or materials shall be deposited or stored on that part of the site lying within the area of land liable to flood.

Reason:

To prevent the increased risk of flooding due to impedance of flood flows and reduction of flood storage capacity.

Condition 4:

Compensatory flood storage works shall be carried out in accordance with details which will be submitted in full to and approved in writing by the Planning Authority

Environment Agency, 10. Albert Embankment, London, SE1 7SP

Telephone number: 020 7091 4015, Fax number: 020 7091 4090

Team email: planning.se@environment-agency.gov.uk
Website: www.environment-agency.gov.uk/developers

before the development commences.

Reason:

To alleviate the increased risk of flooding that would otherwise be caused by a reduction in flood storage capacity.

Condition 5:

No development approved by this permission shall be commenced until a scheme for the provision of surface water drainage works has been submitted to and approved in writing by the Local Planning Authority. The drainage works shall be completed in accordance with the details and timetable agreed.

Reason:

To prevent the increased risk of flooding by ensuring the provision of a satisfactory means of surface water disposal.

Condition 6:

Flood warning notices shall be erected in numbers, positions and with wording all to be agreed with the Local Planning Authority. The notices shall be kept legible and clear of obstruction.

Reason:

To ensure that owners and occupiers of premises are aware that the land is at risk of flooding.

We would ask to be consulted on any details submitted in compliance with these conditions.

I trust this is satisfactory but if you have any questions please contact me.

Yours sincerely,

LORRAINE MURPHY

Planning Liaison Officer

Tel: 020 7091 4012

Fax: 020 7091 4090

Email: lorraine.murphy@environment-agency.gov.uk

Environment Agency, 10 Albert Embankment, London, SE1 7SP

Telephone number: 020 7091 4015, Fax number: 020 7091 4090

Team email: planning.se@environment-agency.gov.uk

Website: www.environment-agency.gov.uk/developers

Simpson, Kevin (IK)

From: Lindsay Newton [newtol.Frimley1.TH@environment-agency.gov.uk]
Sent: 05 March 2007 17:22
To: Simpson, Kevin (IK)
Cc: Lorraine Murphy
Subject: Elmsleigh Centre FRA Response

Kevin,

Please find below the response from Development Control at the Environment Agency. This concerns flood risk only. Planning Liason will send out a formal response shortly.

Regards,

Lindsay NEWTON

EA Development Control
tel: 01276 454329

RESPONSE:

The Environment Agency has no objections with the development proposals in principle subject to the following conditions:

CONDITION Floor levels should be set at least 300mm above the 100 year +20% (climate change) flood level of 15.92metres above Ordnance Datum.
REASON To protect the development from flooding.

CONDITION: There shall be no raising of existing ground levels on the site.

REASON: To prevent the increased risk of flooding due to impedance of flood flows and reduction of flood storage capacity.

CONDITION: No spoil or materials shall be deposited or stored on that part of the site lying within the area of land liable to flood. **REASON:** To prevent the increased risk of flooding due to impedance of flood flows and reduction of flood storage capacity.

CONDITION: Compensatory flood storage works shall be carried out in accordance with details which will be submitted in full to and approved in writing by the Planning Authority before the development commences.
REASON: To alleviate the increased risk of flooding that would otherwise be caused by a reduction in flood storage capacity. (Note: The Environment Agency asks to be consulted on any details submitted in compliance with this condition).

On full submission of the FRA cross sections should be submitted showing areas allocated for level for level flood storage compensation.

CONDITION No development approved by this permission shall be commenced until a scheme for the provision of surface water drainage works has been submitted to and approved in writing by the Local Planning Authority. The drainage works shall be completed in accordance with the details and timetable agreed.

REASON To prevent the increased risk of flooding by ensuring the provision of a satisfactory means of surface water disposal.

CONDITION Flood warning notices shall be erected in numbers, positions and with wording all to be agreed with the Local Planning Authority. The notices shall be kept legible and clear of obstruction.

REASON To ensure that owners and occupiers of premises are aware that the land is at risk of flooding.

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Our ref: SE3896
creating a better place
Your ref: Mr. Kevin Simpson



Environment
Agency

Please reply to: Irene Biggs on 01276 454345

Date: Thursday 14 July 2005

Mr. Kevin Simpson,
Black & Veatch Ltd
Grove House
100 High Street
Hampton
Middlesex
TW12 2ST

18 JUL 2005

IKS
Ac

[Handwritten signature]

Dear Mr. Simpson,

RE: Lower Thames Flood Risk Mapping- updated levels.

*Can you compare
these levels please.
with original.*

Thank you for your enquiry regarding updated flood levels. Please find below the information your require.

*ES
21/07/05*

Flood Levels.

The Environment Agency is able to provide the following levels demonstrated on the map, which are taken from the modelled 1 in 100 Floodplain of Lower Thames Flood Risk MAPPING (LTFRM) project. In accordance with the government document PPG25, 1 in 100 year levels with a 20% increase in flow to allow for the effect of climate change are also given. Levels provided in metres Above Ordnance Datum (Newlyn).

		1 in 50 year flood level	1 in 100 year flood level	1 in 100 +20% Climate Change
SE3426 Kingston Road	14.49	14.79	15.53	
SE3425 Council Offices, Knowle Green	15.09	15.25	15.26	15.53
SE3424 Elmsleigh Centre	15.25	15.59	15.92	

The Information provided is based on that currently available to the Environment Agency. The Environment Agency and its officers accept no liability whatsoever for any loss or damage arising from the interpretation or use of the information.

Cont/d..

Environment Agency
Frimley Office, Swift House, Frimley Business Park, Camberley, Surrey, GU16 5SQ
Tel: 08707 506 506/01276 454345/01276 454301/Fax: 01276 454301



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You should note that this information is based on that currently available to the agency as of the date of this letter. The Agency and its officers accept no liability whatsoever for any loss or damage arising from interpretation or use of this information. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact the Agency after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Irene Biggs', with a stylized flourish at the end.

Irene Biggs
External Relations Officer.

Enc: Notice
Flood Levels.

The Environment Agency is able to provide the following levels demonstrated on the map, which are taken from the modelled 1 in 100 Floodplain of the Lower Thames Flood Risk Mapping (LTFRM) project. In accordance with the government document PPG25, 1 in 100 year levels with a 20% increase in flow to allow for the effects of climate change are also given. Levels provided in metres Above Ordnance Datum (Newlyn).

	1 in 50 year flood level	1 in 100 year flood level	1 in 100 + 20% Climate Change
SE 3424 Elmsleigh Centre	15.25	15.59	15.92

Disclaimer

The information provided is based on that currently available to the Agency. The Agency and its officers accept no liability whatsoever for any loss or damage arising from the interpretation or use of the information.

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Environment
Agency

Our ref: NE6409
Your ref: IKS/902914-0015

I K Simpson
Black & Veatch
Grove House
100 High Street
Hampton
TW12 2ST



29 April, 2005

Dear Sir or Madam

PUBLIC REGISTER: ELMSLEIGH CENTRE, STAINES

Thank you for your letter regarding information held by the Environment Agency for the above named site. I understand my colleagues in our Thames South East area office have already supplied you with rest of the data, and the modelling for the River Thames.

With regards to the river Colne, please find enclosed a disk containing a spreadsheet with relevant nodes for the Lower Colne modelling in the area. Also attached is image of node locations and the 100yr with allowance for climate change outline, and image of Flood Zone 3 (hard copies of the maps are also enclosed).

In terms of the risks associated with this site, the higher levels will be from the Thames. This would therefore need to be included in any Flood Risk Assessment. The applicant is strongly advised to contact our Development Control team prior to carrying out an assessment of the flood risks for the site. They will need to refer to Appendix E of PPG25 if the site is greater than 1 hectare.

The information is supplied without prejudice to the Environment Agency Thames Regions position and no responsibility can be accepted by the Agency for any negligence, omission or error on behalf of the Agency in the supplying of the above information, and you are advised to make further enquiries over and above this information as is felt necessary.

I hope this information is of use to you, should you require any further details on any of the information provided please do not hesitate to contact me. Should my colleagues or I be unable to assist you with your query you will be passed to the relevant technical section.

Yours sincerely

JENNY SAMPSON
EXTERNAL RELATIONS OFFICER
01707 632301

The Environment Agency, Apollo Court, 2 Bishop Square Business Park, St Albans Road West, Hatfield,
Hertfordshire AL10 9EX
Tel: 08708 506 506 Fax: 01709 312820



Our ref: SE 3424
Your ref: KCS/902914-0015



Environment
Agency

Please reply to: Rebecca Thompson on 01276 454427

Date: 29 April 2005

Mr I K Simpson
Black & Veatch Ltd
Grove House
100 High Street
Hampton
Middlesex
TW12 2ST

Dear Mr Simpson

RE: Elmsleigh Centre, Staines.



Thank you for your letter dated 7 April 2005. The Environment Agency has the following comments:

Flooding and Land Drainage

River Colne data – This part of the enquiry is being covered by our Hatfield office. External Relations team at Hatfield will reply to you direct.

The site lies inside Flood Zones 2 and 3. Please see the enclosed Flood Zone map.

As of the 1st July 2004 Flood Zones replaced the Indicative Floodplain Map (IFM) as the main constraint map to inform Local Planning Authorities when to consult the Environment Agency on flood risk in development control decisions. Flood Zones will only be used for planning consultation purposes.

Flood Zones support the implementation of Government planning policy (PPG25 in England and TAN15 in Wales) by planning authorities. Flood Zones have replaced the IFM as the main constraint map underpinning the new Standing Advice on Development and Flood Risk.

Flood Zones are divided areas of the natural floodplain presented in map format. They divide the floodplain into three areas or zones and do not show or take into account the presence of flood defences. The Zones are shown as shaded areas on a map and referred to as 1, 2, 3 in PPG25 (England) and A, B, C in TAN 15 (Wales) (although these are not direct equivalents).

PPG25 defines the Flood Zones as: -

Cont/d..

Environment Agency
Frimley Office, Swift House, Frimley Business Park, Camberley, Surrey, GU16 7SQ
Tel: 08708 506 506/01276 454345 Fax: 01276 454301



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- Zone 1 – little or no risk with an annual probability of flooding from rivers and the sea of less than 0.1%
- Zone 2 – low to medium risk with an annual probability of flooding of 0.1-1.0% from rivers and 0.1-0.5% from the sea.
- Zone 3 – high risk with an annual probability of flooding of 1.0% or greater from rivers, and 0.5% or greater from the sea.

Flood Zones are based on annual probabilities of flooding. It is unlikely, but possible, that a flood with, for example, an annual probability of 1% will occur two years running. Flood Zones show the flooding that would occur without the presence of flood defences.

Flood Zones are to be used as a planning consultation tool, and not to make an absolute judgement of flood risk. Flood Zones represent a more consistent, national data set and have replaced the IFM as a planning constraint map. However, where detailed information exists, either from historic flooding, or from modelling taking into account flood defences, then this information should also be used to inform planning responses. This information is available to developers producing appropriate flood risk assessments to accompany their planning applications.

In accordance with Planning Policy Guidance Note 25 'Development and Flood Risk' (PPG25), all submitted planning applications for proposed developments within Flood Zone 3 or 2 must be accompanied by a Flood Risk Assessment.

The site was partially flooded during the 1947 flood event of River Ash (estimated return period - 1 in 60 year event).

Please see enclosed information and maps concerning the Lower Thames Flood Risk Mapping project.

We have provided a level of 15.33 m AOD(N) from the River Thames flood event (1947). Please see the enclosed map.

Flood Defence

There are no flood defences in the vicinity of the site, although this is under review with the Lower Thames Study.

Hydrometry

Hydrometric sites in the vicinity of the site:

River Thames (Contact Frimley office for further information)

2901 River Thames at Penton Hook Lock

TQ 0430 6950

Levels from 1994

Cont/d...

2902 River Thames at Chertsey Lock
TQ 0540 6680
Level from 1994

2900 River Thames at Staines
TQ 0348 7133
Level and flow from 1990

River Colne (Contact Hatfield office for further information)

3115 River Ash (Middlesex) at Knowle Green
TQ 0470 7130
Levels

3110 River Ash (Middlesex) at Staines
TQ 0331 7231
Level and flow from 1995

2898 River Colne at Staines
TQ 0340 7180
Level and flow from 1999

2899a River Colne at Hythe End Weir
TQ 0190 7250
Level from 1995

2894 Colne Brook at Hythe End
TQ 0191 7226
Level and flow from 1991

Survey

Please find enclosed survey data.

Flood Warning

There are no records of internal flooding occurring at the Elmsleigh Centre.

The flood warning area for Staines is as follows:

Cont/d..

Bell Weir Lock to Shepperton Lock.

The gauging stations most relevant to Staines are located at Bell Weir Lock and Penton Hook Lock.

I have included their alarm trigger levels in the table below:

ID	Station Name	Standby m AOD	Bankfull m AOD	Flood Plain m AOD	Property m AOD
2702	Bell Weir Lock	3.630	3.730	3.830	4.670
2901	Penton Hook Lock	3.580	3.680	3.780	4.650

The criteria for the alarm settings above are as follows:

1. Standby – the river is at a high level and could risk further
2. Bankfull – the river has reached the top of its banks
3. Floodplain – the river has overtopped its banks and is flowing over its floodplain
4. Property – the river has reached the threshold of nearby property

(Please note values for bankfull, floodplain and property are set just below actual levels).
Alarm levels are subject to review following every flood event.

A Flood Watch would be issued for the River Thames (flood warning area Bell Weir Lock to Shepperton Lock) when water levels along the river are forecast to overtop the banks and in general is when river levels are approaching the bankfull alarm level.

A Flood Warning is issued when the Environment Agency anticipates flooding to property from the River Thames. In general this will be when river levels are forecast to exceed the property alarm level.

Nationally, the Environment Agency aims to give a two-hour warning service in advance of any flooding taking place. However in certain cases this may not always be possible due to the flashy nature of some catchments and rainfall events.

The trigger for issue of a Severe Flood Warning is dependent on a number of factors, but is essentially used when there is thought to be imminent danger to life. This is a decision that would be made on the basis of forecast river levels, large numbers of properties affected, response required by emergency services and local authorities, likely impact on major infrastructure etc.

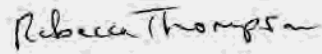
You should note that this information is based on that currently available to the agency as of the date of this letter. The Agency and its officers accept no liability whatsoever for any loss or damage arising from interpretation or use of this information. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/improvements have been made. Should you re-contact the Agency after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

Please accept this letter as confirmation that the Agency has received your cheque for £50.00 for the above information.

Cont/d..

Yours sincerely

A handwritten signature in black ink that reads "Rebecca Thompson". The script is cursive and fluid.

Rebecca Thompson
External Relations Officer

Enc: Notice
Flood Zone map
Historic flood event maps/level (1947)
Lower Thames Flood Risk Mapping project maps and levels
Survey data

The Environment Agency is able to provide the following levels demonstrated on the map, which are taken from the modelled 1 in 100 Floodplain of the Lower Thames Flood Risk Mapping (LTFRM) project. In accordance with the government document PPG25, 1 in 100 year levels with a 20% increase in flow to allow for the effects of climate change are also given. Levels provided in metres Above Ordnance Datum (Newlyn).

Nodal Reference	1 in 5 year flood level	1 in 20 year flood level	1 in 50 year flood level	1 in 100 year flood level	1 in 100 + 20% Climate Change
21.061	14.648	15.210	15.488	15.682	16.017

Disclaimer

The data provided from the Lower Thames Flood Risk Mapping (LTFRM) project is Revised DRAFT (Aug 04) in status. Further development of the model is currently underway and this may cause certain flood levels and / or flows to rise or fall, and / or flood maps to alter. FINAL LTFRM modelled data will supersede Aug 04 DRAFT upon completion of the LTFRM project. The Environment Agency anticipates that the detailed modelling for this area will be completed in Spring 2005.

The information provided is based on that currently available to the Agency. The Agency and its officers accept no liability whatsoever for any loss or damage arising from the interpretation or use of the information.

Our Ref: IKS/902914-0015

7th April 2005

Irene Biggs
External Relations
Environment Agency
Swift House
Frimley Business Park
Camberley
Surrey, GU16 7SQ

Dear Irene,

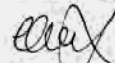
Customer Contact Search for Elmsleigh Centre, Staines

We are carrying out a Flood Risk Assessment for the above site, see attached plan. We would be grateful if you could carry out a Customer Contact Search and provide the following information for use in the Flood Risk Assessment:

1. Historical, and if available, modelled flood water levels and their return periods, floodplain mapping and model reports for the River Thames and the River Colne, and any future modelling proposals.
2. The name of the flood warning area, the location of the gauging station used within this flood warning area and the trigger level for each warning status.
3. Information regarding local EA GPS stations that we can use for site levelling and any survey data.
4. Information regarding how the Indicative Floodplain was plotted.
5. Site proximity to flood defence structures.
6. Proximity to hydrometric sites.
7. Any other information relevant to the Flood Risk Assessment

We enclose a cheque for £50 for carrying out this search. If you have any queries on this information please do not hesitate to get in contact.

Yours sincerely,

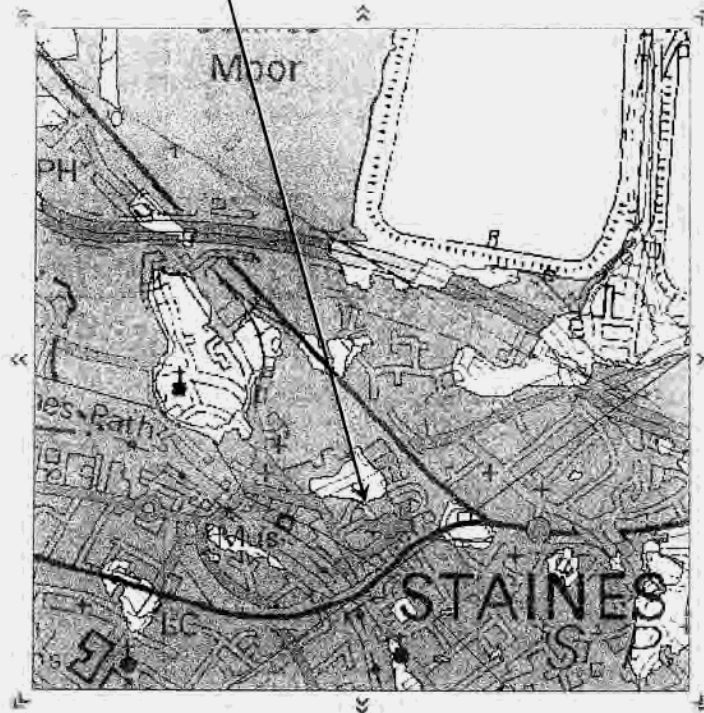


I K Simpson
for Black & Veatch Ltd

encls: Location plan of site

cc: Mr D Phillips

Location Plan of Elmsleigh Centre Staines
(OS Ref 503750,171750)



Reproduced from the Environment Agency website gazetteer

APPENDIX B: DRAWINGS

Note: The limits, including the height and depth of the flood, shown in this drawing are for information only and do not constitute a guarantee of the accuracy of the information shown.

1. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM.
2. SURVEY CARRIED OUT BY CAPITAL SURVEYS LTD ON 31/05/05.

KEY:

AREA LOWER THAN 1 IN 50YR FLOOD LEVEL (15.250)

AREA LOWER THAN 1 IN 100YR FLOOD LEVEL (15.500)

AREA LOWER THAN 1 IN 100-200YR FLOOD LEVEL (15.520)

LEVELS PROVIDED BY EA 20/04/05.

STUDY AREA

PA	MD	AC	KKS	AUG05	FLOOD LEVELS MERGED.
PJ	JJC	AC	KKS	JUN05	PRELIMINARY ISSUE
Rev	Drawn	Checked	Reviewed	Date	Description

Designed by:	AC	Date:	JUN05
Drawn by:	JJC	Date:	JUN05
Checked by:	AC	Date:	JUN05
Reviewed by:	KKS	Date:	JUN05

Client

SPELTHORNE BOROUGH COUNCIL

Client drawing No.	Revision
--------------------	----------

BLACK & VEATCH

Black & Veatch Consulting Limited

Gower House, 68 London Road, Ramhill, Surrey, RH11 1TD, United Kingdom

Project

ELMSLEIGH SHOPPING CENTRE

FLOOD RISK ASSESSMENT

Drawing title

PLAN OF SITE SHOWING AREAS AT RISK FROM FLOODING

Approved by:	Date:
Drawing scale:	1:1000
Sheet size:	A1
Drawing No.	120297 — 1000 — 0001
Revision	PA

I:\00001\CAD\CURRENT\FIG-00.V0 > FIG-00.V1 (XXX.DD.MM.YY)

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Note: The heights, including the heights and depths of the works shown in this drawing are not to be taken as implying an obligation of the contractor to verify the accuracy of the data.

- KEY:
- 1 IN 5 YEARS MODELLED FPL

1 IN 20 YEARS MODELLED FPL

1 IN 50 YEARS MODELLED FPL

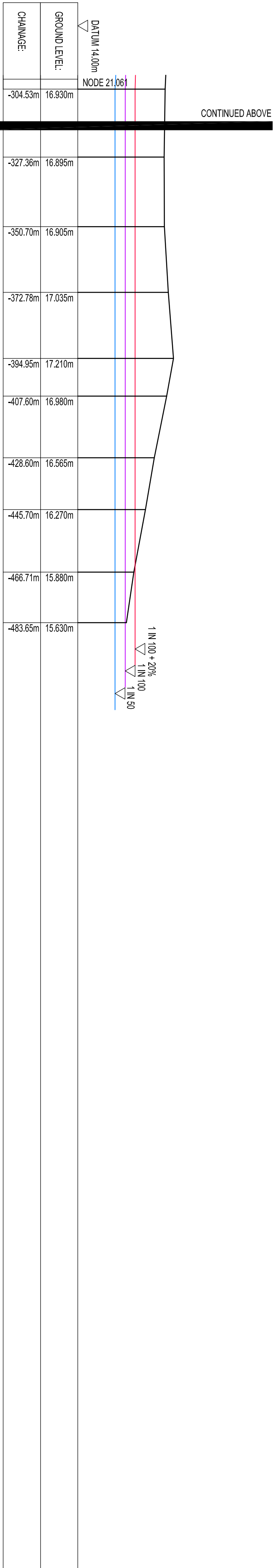
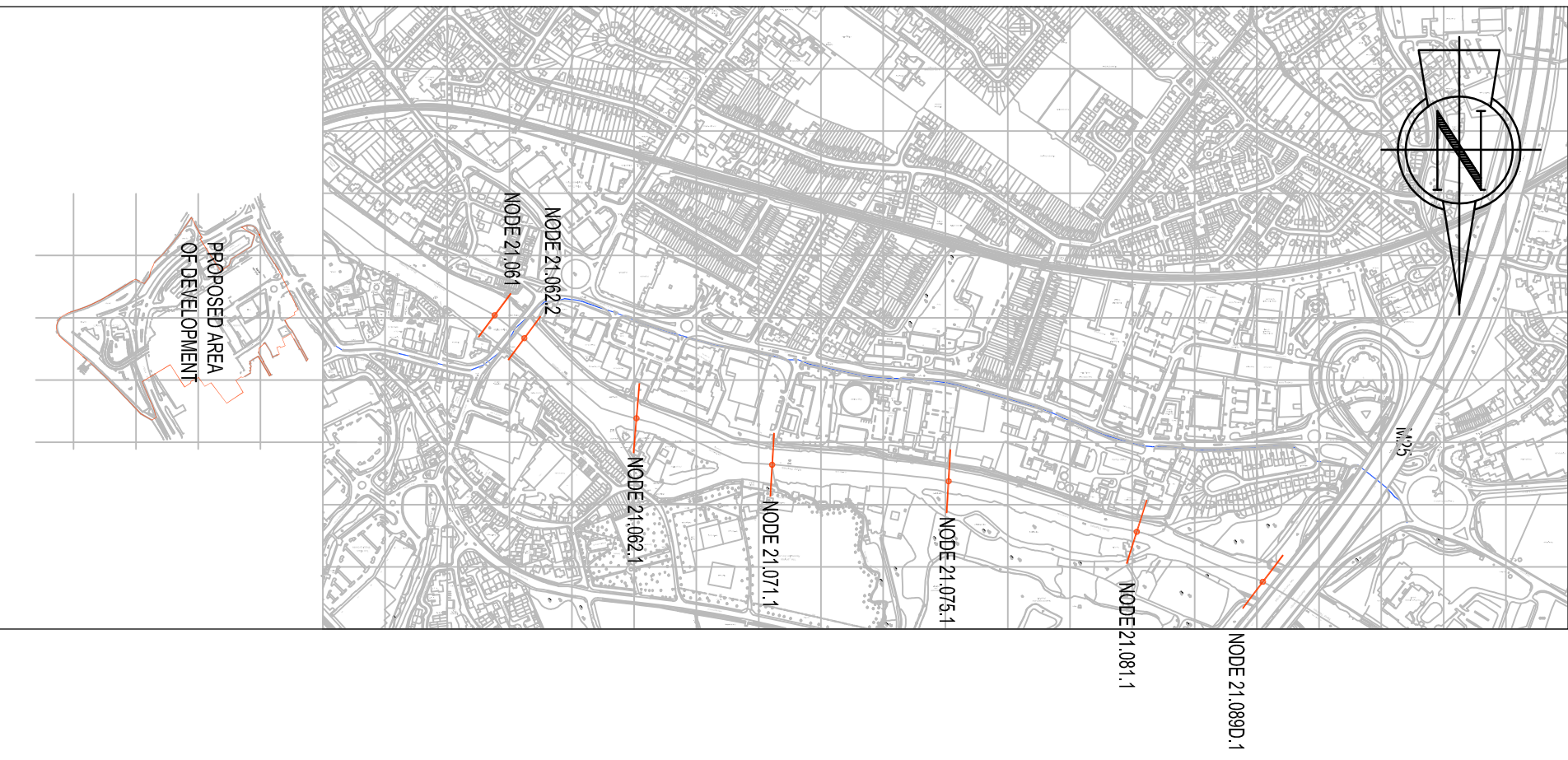
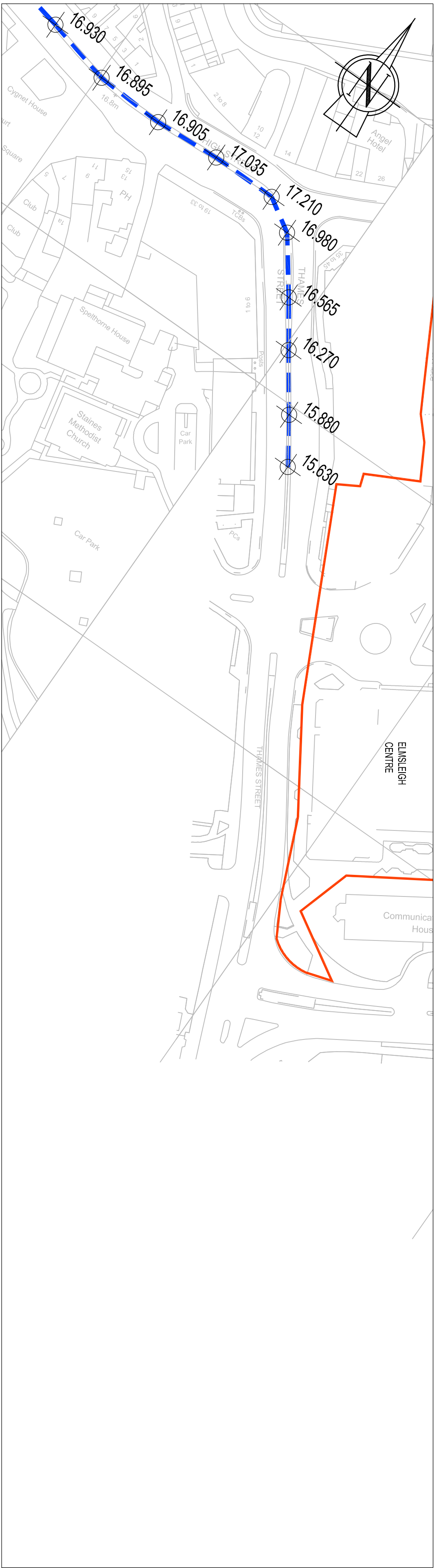
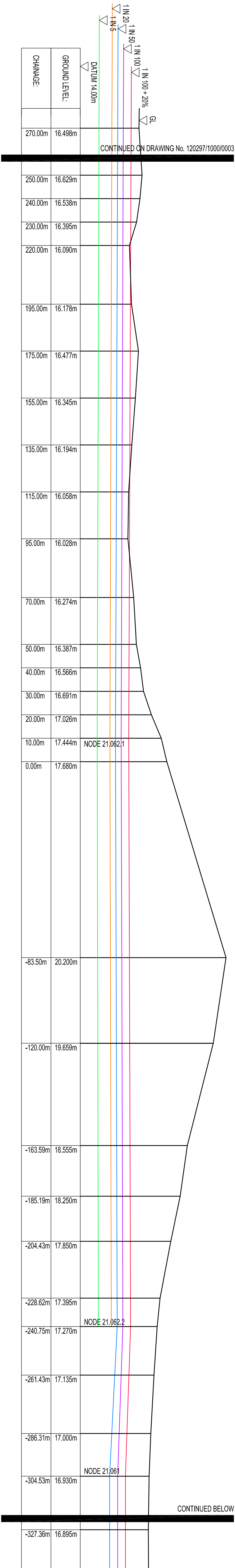
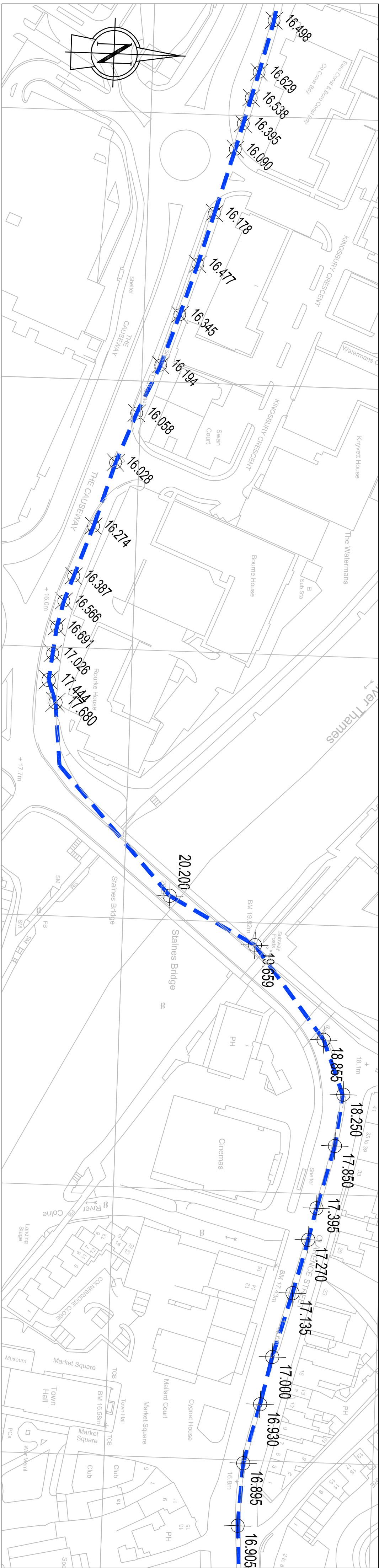
1 IN 100 YEARS MODELLED FPL

1 IN 100 YEARS MODELLED FPL + 20% FOR CLIMATE CHANGE

PROPOSED AREA OF DEVELOPMENT

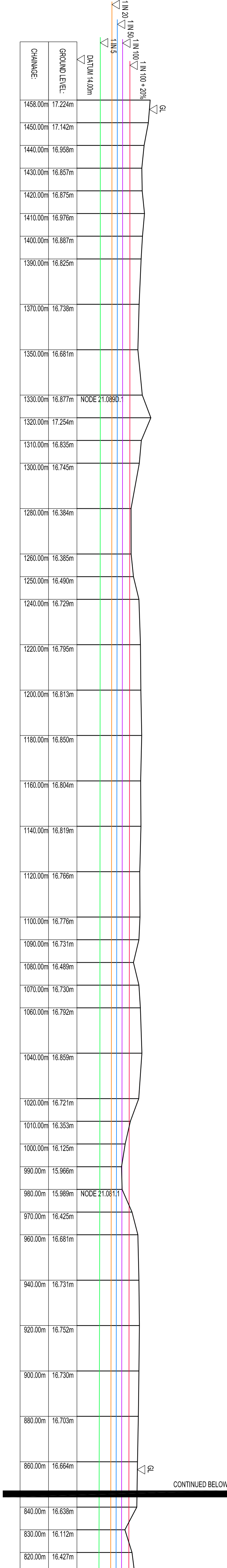
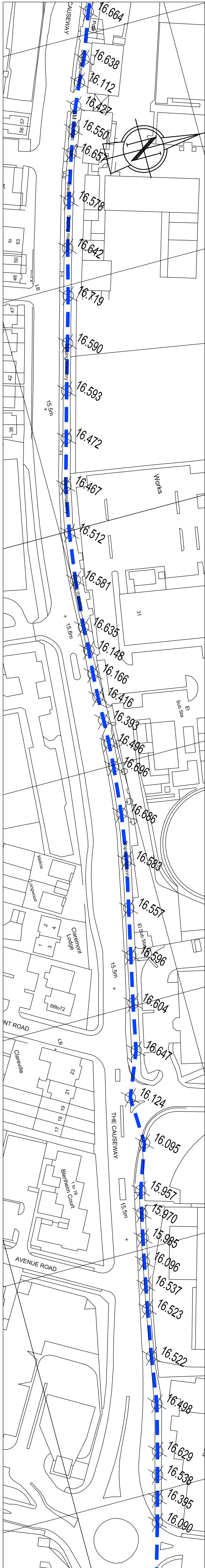
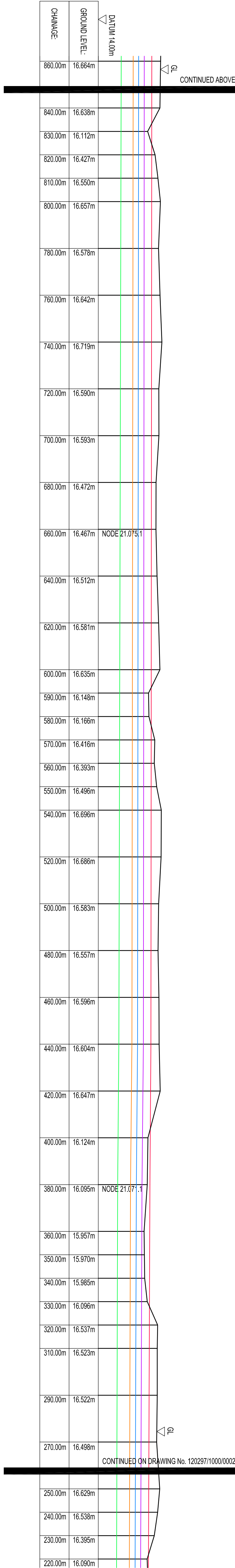
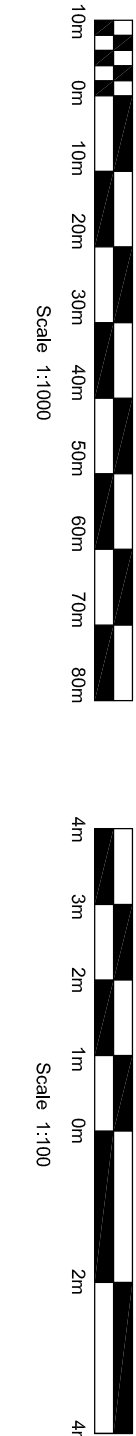
ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM.

FLOOD LEVELS					
NODE	1 IN 5	1 IN 20	1 IN 50	1 IN 100	1 IN 100 + 20%
21080.1	15.0	15.5	15.8	16.0	16.3
21081.1	15.0	15.5	15.7	16.0	16.3
21073.1	14.9	15.4	15.7	15.9	16.2
21071.1	14.8	15.4	15.6	15.8	16.2
21062.1	14.7	15.3	15.5	15.8	16.2
21062.2	14.7	15.3	15.5	15.8	16.2
21061	-	15.3	15.2	15.6	15.9



REPRODUCED FROM ORIGINATOR
SHEET SUPERSEDED DATA
CROWN COPYRIGHT 2004
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Drawing No.	120297-1000-0003	Client Ref	P0		
Note:	The limits, including the height and depth of the flood, shown in this drawing are for information only and do not constitute a guarantee of the accuracy of the information shown.				
KEY:	1 IN 5 YEARS MODELLED FUL 1 IN 20 YEARS MODELLED FUL 1 IN 50 YEARS MODELLED FUL 1 IN 100 YEARS MODELLED FUL 1 IN 100 YEARS MODELLED FUL - 20% FOR CLIMATE CHANGE				
PROPOSED AREA OF DEVELOPMENT	_____				
ALL LEVELS ARE IN METRES ABOVE ORIGINATOR DATUM					
FLOOD LEVELS	NODE 1 IN 5 1 IN 20 1 IN 50 1 IN 100 1 IN 100 + 20%				
21.080	15.0	15.5	15.8	16.0	16.3
21.081	15.0	15.5	15.7	16.0	16.3
21.082	14.9	15.4	15.7	15.9	16.2
21.083	14.9	15.4	15.6	15.9	16.2
21.084	14.9	15.4	15.6	15.9	16.2
21.085	14.7	15.3	15.6	15.9	16.1

Client drawing No.

Revision

Client

Spelthorne Borough Council

Designed by:

AC

Date:

02/02/06

Drawn by:

JR

Date:

02/02/06

Checked by:

Date:

Reviewed by:

Date:

Project

Black & Veatch Limited
Elmsleigh Centre
Flood Risk Assessment

Drawing title

LOCATION PLAN AND LONG SECTION
ELMSLEIGH TO BRIDGE STREET JUNCTION
SHEET 2 OF 2

Approved by:

Date:

Drawing scale:

H=1:1000 V=1:100

Sheet size:

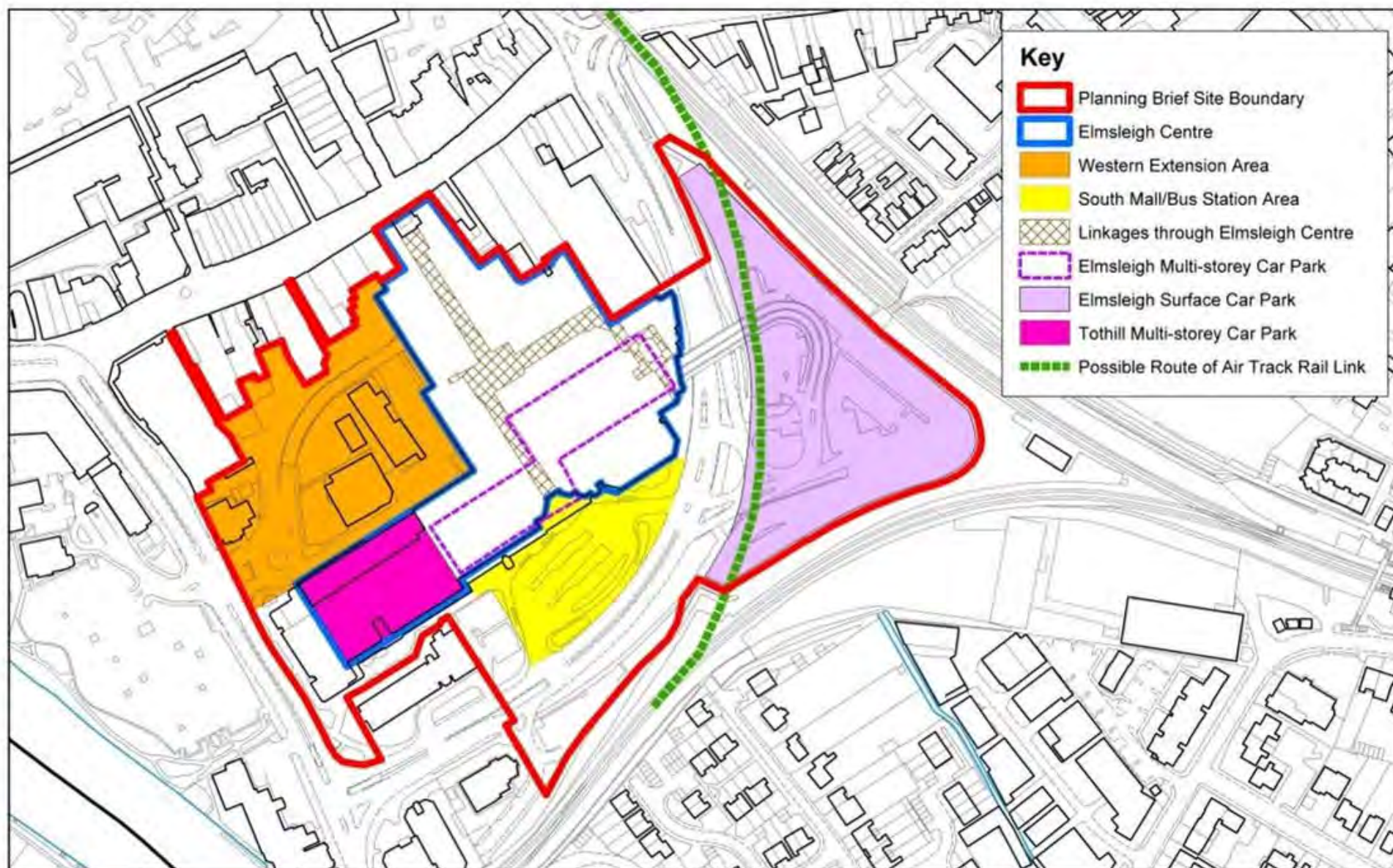
A1

Drawing No.

120297 — 1000 — 0003

Revision






P0



APPENDIX C: ENVIRONMENT AGENCY FLOOD MAP

A Map to Show the Extent of Flood Zones 3 & 2.

Legend

-  Flood Zone 3
-  Flood Zone 2
-  Main River
-  Ordinary Watercourse
-  Your Site

Reference No: SE 3424 M1

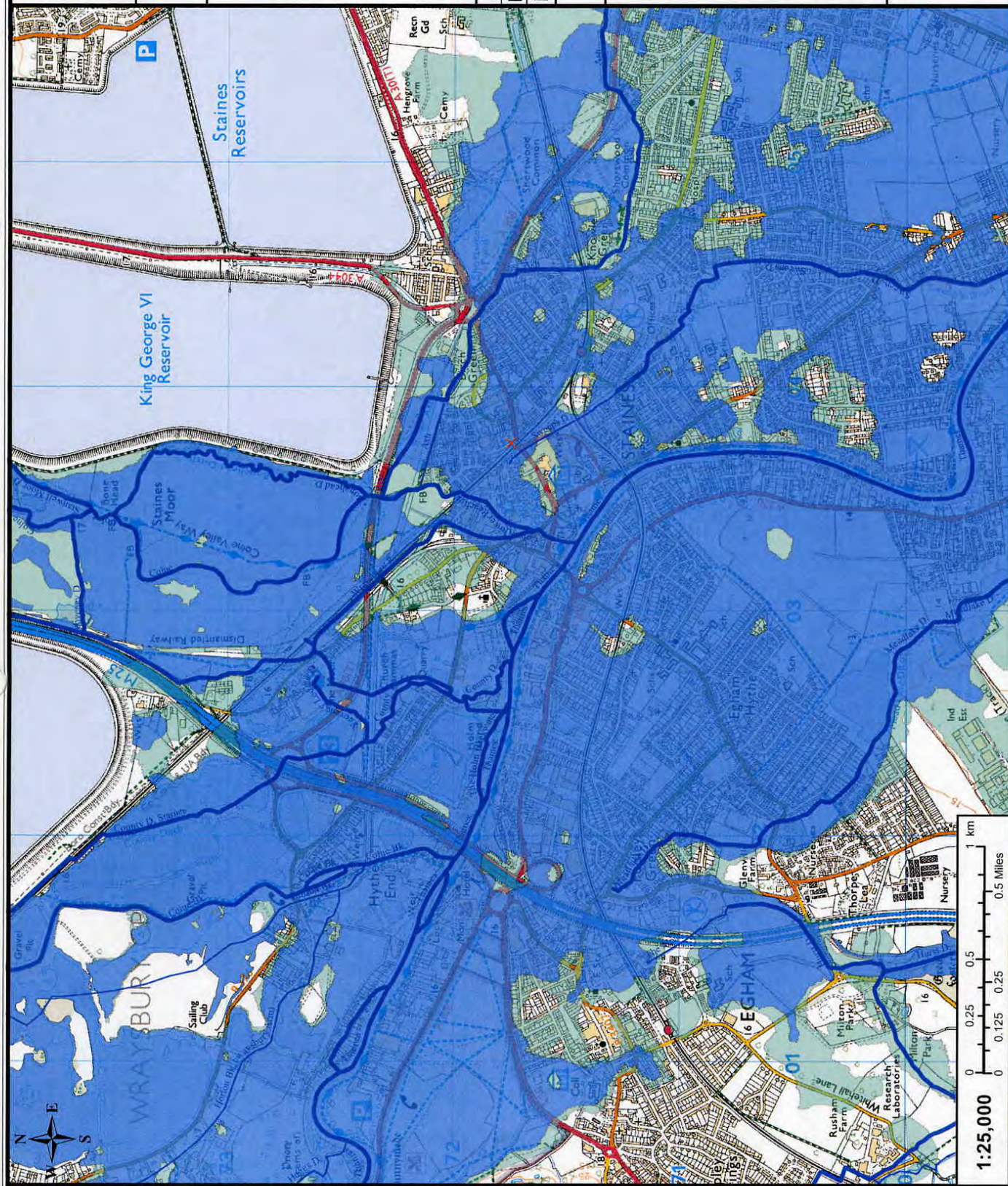
Date Produced: Apr 2005

Produced by: PJ

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Environment Agency, 100026380, (2004).





**A Map to Show the Extent
of the 1947 Flood Incident.**

Legend

-  Historic Flood Incident 1947
-  Main River
-  Ordinary Watercourse
-  Your Site

Reference No: SE 3424 M2

Date Produced: Apr 2005

Produced by: PJ

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Environment Agency, 100026380, (2004).

