

ANNEX 2 – FLOOD RISK DEVELOPMENT BRIEF

PREFACE

“Where so much development is planned to about the floodplain it is critical that there should be no doubts about the information about flooding”

- Reigate & Banstead Borough Local Plan Proposed First Alteration Inquiry Inspector’s report, November 2001.

The Flood Risk Development Brief has been prepared to support Policy Hr 2A and applies to development proposals for the Horley area (see the map at Appendix A). Applicants and developers promoting proposals for this area would need to demonstrate compliance with the Brief’s requirements as well as with Development Plan and all other relevant policies.

National guidance and Regional, County and Local policies that have been considered in the production of this Brief are listed at Appendix B. Borough Local Plan 2005 Policy Hr 2A on the need for flooding and transportation modelling is set out at Appendix D; this Policy requires local flood modelling for the Neighbourhood now Framework Plans and proposals for about 50 units or more. The figure of 50 units will be generally applied by the Council but because proposals for fewer housing units could still have an impact on drainage patterns, the flexibility for the Council to require flood modelling for these smaller schemes is needed and is therefore allowed for by this Brief. Policy Ut 4 is also relevant

The allocation of land to accommodate 2,600 dwellings, mainly on two large sites to the north east and north west of Horley, is included within the Reigate and Banstead Borough Local Plan 2005 and satisfies the 1994 Surrey Structure Plan requirement. The choice of these two sites has been the subject of considerable concern and debate.

The main concern was the fear that developments in these locations could be at risk of flooding and could cause or worsen flooding elsewhere as the land subject to the allocations, especially on the north eastern side of Horley, is very flat and has a history of flooding. The Council has taken due regard to the concerns raised and intends that no development should take place there until further research is carried out to demonstrate that flood risk areas are avoided and, in turn, that flooding safeguards are included as part of any development.

The outputs and deliverables from the studies resulting from the Brief will be used to add to our knowledge of flood risk in the Horley area.

The bodies that form a Steering Group to consider the flooding implications of development proposals, and their contacts, are shown at Appendix C.

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1. INTRODUCTION

1.1 Preparation of the Brief

This Flood Risk Development Brief (FRDB) has been prepared jointly by Reigate & Banstead Borough Council, the Environment Agency and Thames Water Utilities. They have formed a Steering Group, the main function of which is to assess flood risk of any development proposals on land in the Horley area (see map at Appendix A).

1.2 Status of The Brief

This FRDB and the Steering Group's role apply to any development proposal requiring a Flood Risk Assessment (FRA) as required by Policy Hr 2A in the First Alteration to the Borough Local Plan 1994 (see Appendix D). The Environment Agency and Reigate and Banstead Borough Council (RBBC) should be consulted to determine if a development proposal requires a FRA. The requirements of this FRDB, which supplements the advice in PPG 25, must be submitted with or before a Planning Application before any relevant development will be considered.

1.3 Aims and Objectives of the Brief

The purpose of the FRDB is to ensure a holistic approach to flood risk management in the Horley area at the local level. The aim of the Brief is to provide the basis for which a FRA for any development should be undertaken in order to ensure that flood risk is avoided. In order to achieve the above aims, a FRA should be undertaken to:-

- Demonstrate that new developments will not increase flood risk on site and elsewhere including during all phases of their development;
- Provide a detailed assessment of potential flood risk from all sources such as fluvial, groundwater, sewers and surface run-off and a strategy to manage all such risks;
- Assess the potential impact of climate change, urbanisation and their inherent uncertainty;
- Update data upon and add to the understanding of flood risk in the Horley area;
- Take a strategic and integrated Best Practical Environmental Option (BPEO) to deal with drainage.

1.4 Available Data Sources

The following data sources should be used in the preparation of the FRA:-

Environment Agency:

- i. Horley Flood Study (HFS), January 2004;
- ii. Channel cross-section surveys and photogrammetry used in the HFS;
- iii. Information on historical flooding;
- iv. Drainage consents issued upstream;
- v. River Mole Flood Defence Strategy 2004;
- vi. Gatwick Stream Study 2004;

Thames Water

- vii. Records of the foul sewerage and surface water systems;
- viii. Strategic Study of Crawley/Horley/Burstow;

Reigate & Banstead Borough Council

- ix. Local Drainage and Flooding Information;

Other

- x. UKCIP Report - Climate Change Scenario for the United Kingdom, April 2002;
- xi. UKCIP Technical Report May 2003 - Climate adaptation: Risk, uncertainty and decision-making or the most up-to-date government guidance on climate change and updated UKCIP report;
- xii. Ordnance Survey maps of the area (various scales);
- xiii. CIRIA SuDS Best Practice Manual 2001 C523;
- xiv. CIRIA SuDS Design Manual for England and Wales 2000 C522; and
- xv. CIRIA SuDS Hydraulic, structural and water quality advice C609

2. KEY ASSUMPTIONS

Developments in the Horley area must be based on two key assumptions with regard to flood risk. The first is to follow a 'Precautionary Approach' and the second is to ensure 'No Detriment' to the level of flood risk to existing land and property. The implications of these two key assumptions are summarised below.

2.1 The Precautionary Approach - Uncertainty & Climate Change

The precautionary approach adopted is to assume that climate change will occur and that as a consequence it is reasonable to consider the 1 in 100 year plus 20% scenario when planning the development.

- i. No non-essential developments, including residential properties, will be allowed within the 1 in 100 year flood plain as specified by the HFS;
- ii. Developments will be planned with consideration also to more extreme events and the potential flow paths in areas outside the 1 in 100 year flood plain from all sources of flooding;
- iii. A minimum freeboard of 300mm should be included on all new development as a tolerance to reflect the modelling process and wave action. An additional freeboard allowance above the 1 in 100 + 20% flood plain level, to be determined in consultation with the Steering Group, should also be included to allow protection for any areas more prone to changes in flood levels as a result of climate change or blockage of bridges or culverts. This should inform the subsequent determination of the floor levels of new developments, including outside the 1 in 100 year flood plain level. The design solution for such areas should reflect the detailed levels and the retention of natural features in those areas and could include, for example, no habitable rooms on ground floors.

2.2 No Detriment - Drainage & Surface Water Runoff

- i. The surface water outfall discharge from a new development site should not exceed the lowest of the natural surface water run-off or the existing site surface water run-off. Surface water run-off from developments will have to be infiltrated and/or attenuated in storage facilities, which should be located outside the 1 in 100 year flood plain;
- ii. No loss of flood plain storage will be allowed within the 1 in 100 year or the 1 in 100 year + 20% flood plains. Any changes to the flood plain must be kept to the minimum. Any loss of flood storage capacity must be compensated for on a level for level basis and any obstruction to flow prevented;

- iii. The two new Development Areas (NW & NE) must not discharge their surface water into existing sewers;
- iv. Foul sewerage and surface water run-off must be drained by separate systems;
- v. All main sewers must be built to an adoptable standard in accordance with the current version of Sewers for Adoption, WRC, with a design return period (for surcharge not to exceed ground level) of not less than 1 in 30 years. Surcharging sewers, during events greater than the design return period, shall not cause flooding to houses or other buildings up to the 1 in 100 year (critical duration) storm event;
- vi. The drainage system of each new development must have the necessary spare capacity to serve future upstream development where it is known that it will have to connect to the same system;
- vii. The drainage system must allow for minor incremental development such as house extensions, garages and driveways etc, as well as for the new developments added later to an existing system without increasing peak flow downstream. An additional 5% reduction in peak flows should be provided where practicable.

3. REQUIREMENTS OF A FLOOD RISK ASSESSMENT IN HORLEY

3.1 . Components of the Flood Risk Assessment (FRA)

Applicants or developers seeking permission for any proposal in the Horley area must provide a detailed FRA as set out in this FRDB if requested to do so by the Steering Group. The requirements of a FRA will be in 3 stages. The Steering Group will assess the findings and deliverables after each stage before the next stage can be commenced. The 3 stages, required as part of any Planning Application for the area in question are:

Stage 1: Background

Stage 2: Proposals

Stage 3: Managing Risk

The objectives and requirements of each stage are set out in more detail below. (Bracketed item numbers correspond to those in PPG25 Appendix F3).

3.2. Stage 1: Background

3.2.1 Objectives

- i. To set out the basic site information;
- ii. To establish and take into account the implications of existing topography and levels on flood risk;
- iii. To use the detailed topographic information (item ii above) to determine the flood extent defined by the flood levels predicted by the HFS;
- iv. To assess the site's existing drainage function and characteristics;
- v. To identify and assess the flood risk from all potential sources of flooding.

3.2.2 Requirements

In accordance with PPG 25 Appendix F, Clause F3:

- i. A location plan at an appropriate scale that includes geographical features, street names and identifies all watercourses or other bodies of water in the vicinity. This should include drainage outfalls and, if necessary, cross-refer to their operational arrangements in the body of the report. (Item 1)

- ii. A plan of the site showing the current levels related to a GPS derived Ordnance Datum (Item 2);
- iii. A more detailed indication, if appropriate, of flood alleviation measures already in place, their state of maintenance and their performance (Item 3);
- iv. An assessment of the source of potential flooding including rivers, groundwater, surface flow or any combination of these (Item 4);
- v. A plan of the site showing any existing information on the extent and depth of flood events or on flood predictions. Information may be anecdotal, photographic, survey results or model estimates. The events should be identified with date/time, source of the data and supporting information provided on rainfall and/or return period, or probability of occurrence of the flood or storm surge event, or a combination. Recorded data is particularly valuable and, if available, should be highlighted along with evidence of any observed trends in flood occurrence. Any changes that have taken place since the last event should be identified (Item 5);
- vi. A plan and description of any structures that may influence local hydraulics. This will include bridges, pipes/ducts crossing the watercourse, culverts, screens, embankments or walls, overgrown or collapsing channels and their likelihood to choke with debris (Item 6);
- vii. An assessment of the probabilities and any observed trends and the extent and depth of floods for the location and in the catchment context and, if appropriate, routes and speed of water flow. At this stage best estimates, based on the most up-to-date findings, should also be made of climate change impacts on probabilities. The assessment should ensure that all proposals are acceptable for the design life of the development (Item 7);
- viii. An assessment of the hydraulics of any drains or sewers, existing or proposed, on or near the site during flood events. The methodology for assessment must be clearly stated (Item 10).

Other Requirements:

- i. An analysis of existing groundwater conditions and soil type;
- ii. A report on the condition of all existing on- and off-site sewers and drains potentially affected by or affecting the development. For example, using CCTV to check for rough sediment in existing sewers;
- iii. A report that identifies and assesses the existing and potential future sources of flood risk related to:-
 - o rivers, ditches & watercourses;

- sewers;
- groundwater;
- surface flow; and;
- any combination of the above.

3.3 Stage 2: Proposals

3.3.1 Objectives

- To demonstrate that new developments will not increase flood risk on site and elsewhere including during all phases of their development;
- To ensure that if flooding does occur in development areas, that it is designed for and managed so that any damage is minimal. Consideration must also be given to secondary flood paths.

3.3.2 Requirements

In accordance with PPG 25 Appendix F, Clause F3:

- i. A plan of the site showing levels related to Ordnance Datum for the planned development (Item 2);
- ii. A plan and cross-sections of the site showing finished floor levels, road levels or other relevant levels relative to the source of flooding and to anticipated water levels and associated flood risk probabilities following development (Item 8);
- iii. An assessment of the likely rate or speed with which flooding might occur, the order in which various parts of the location or site might flood, the likely duration of flood events and the economic, social and environmental consequences/impacts of flooding (Item 9);
- iv. An assessment of the hydraulics of any proposed drains or sewers on or near the site during flood events. The methodology for assessment must be clearly stated (Item 10);
- v. An estimate of the volume of water that would be displaced from the site for various flood levels following development of the site and of the run-off likely to be generated from the proposed development (Item 11);
- vi. An assessment of the likely impact of any displaced water on neighbouring or other locations that might be affected subsequent to development. This should address the potential for change of the flooding regime both upstream and downstream of the site due to ground raising or structures (Item 12);
- vii. An assessment of the potential impact of the development on fluvial morphology and the likely longer-term stability and sustainability (Item 13);

- viii. A strategic and integrated approach using the BPEO to deal with surface water run-off and drainage.

3.3.3 Other Requirements:

A single report - or reports - setting out:

- ix. How surface water flow will be infiltrated and attenuated before discharge from site to ensure that storage/infiltration facilities do not cause flooding of the site or elsewhere during the 1 in 100 year critical duration storm event;
- x. How any flood risk implications resulting from any future use or development in the 1 in 100 year flood plain are to be allowed for and managed; for example, new footpaths and roads;
- xi. How surface run-off from the site will be managed so as to prevent flooding during the construction phase;
- xii. An action plan to ensure continued satisfactory performance of existing sewer networks that might be affected by a proposed development;
- xiii. A hydraulic modelling report with detailed flood maps indicating the extent and depth of flooding. All river hydraulic modelling should be based on the latest approved model as compiled through the Horley Flood Study. This can be obtained from the Environment Agency (a charge may be raised for this data) and should be enhanced with additional channel cross-sections at approximately 20m intervals for a length appropriate to the development. Sufficient justification must be provided where additional cross-sections intervals are greater than 20m;
- xiv. Details of how the strategic and integrated sustainable drainage systems to be employed will be used to create amenity areas and new wildlife habitats.

3.4 Stage 3: Managing Risk

3.4.1 Objectives

- To allow and plan for the inherent uncertainties regarding drainage management and performance, climate change and modelling;
- To allow and plan for the impacts on flood risk during construction;
- To allow and plan for an increase in discharge of water from activities upstream of the site;
- To allow and plan for additional surface water runoff from future minor incremental development;

- o To outline the confidence limits of the local flood model.

3.4.2 Requirements

In accordance with PPG 25 Appendix F, Clause F3:

- i. An assessment of the residual risks after the construction of any necessary defences. Where new or modified flood defence arrangements are provided, consideration should be given to their behaviour in extreme events greater than those for which they are designed and information should be provided on the consideration given to minimising risks to life in such circumstances (Item 15).

Other Requirements:

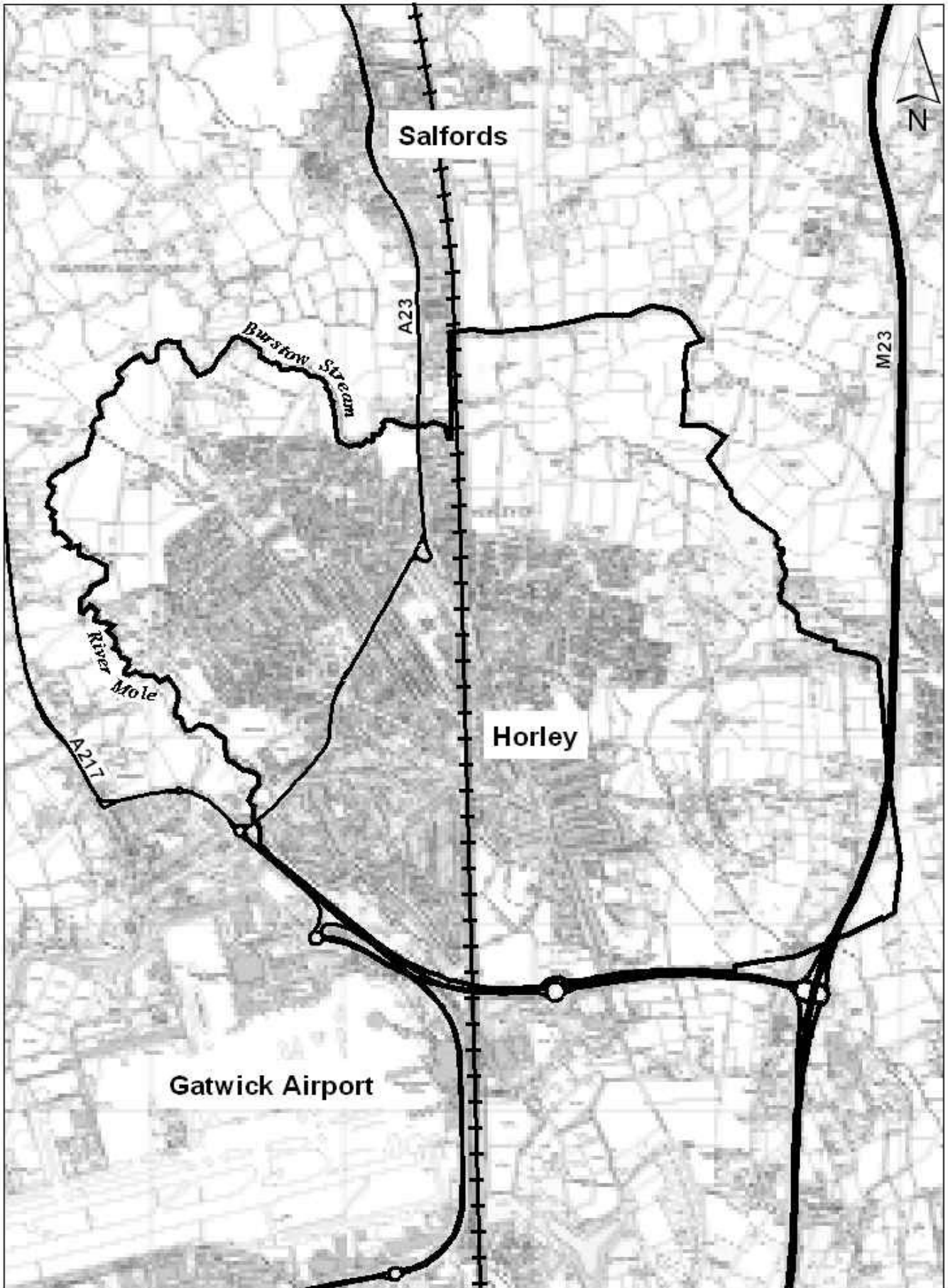
- ii. An assessment of the impact of uncertainties in flood estimation and expected climate change on flood defences in order to determine the required freeboard allowance.
- iii. A report assessing and addressing the likely impact of any future increase in discharge from upstream future developments, including changes in the riverine environment.
- iv. A 'desk-top' study of the potential change in the flooding regime both upstream and downstream of the site due to ground raising, landscaping, structures and changes to flood embankments. The study should also consider the impact on the flood regime as a result of the following developments:
 - i. Gatwick Airport, including any new drainage consents;
 - ii. Crawley urban extensions;
 - iii. Other significant Urbanisation and;
 - iv. Rural or agricultural developments.
- v. A proposed process to monitor the effects of a development and identify and remedy any adverse changes in the flow regime that might occur during construction or upon adoption of any drainage system.
- vi. A report outlining the limits, reliability, operating range and restrictions applicable to the flood model.
- vii. A report outlining the proposed Sustainable Urban Drainage System (SUDS) management regime.
- viii. A report and action plan detailing how the following are taken into account:-
 - i. the consequential impacts of climate change;
 - ii. the uncertainties in flood estimation;
 - iii. blockage of bridges/structures;

- iv. uncertainties associated with the hydraulic and hydrological modelling undertaken for the Horley Flood Study and in connection with the specific development.
- ix. A report detailing the mitigation measures employed to address the impact of flood events in excess of the 1 in 100 year flood event. The report should include:
 - a. a review and update of current information and guidance;
 - b. the management of residual flood risk;
 - c. flood routing to deal with residual flood risk and how drainage systems are to be built so that they can be incrementally adapted to accommodate uncertain flood magnitudes.

3.5 Updating EA Flood Maps

The outputs and deliverables from the studies resulting from the requirements of this Brief will be used to add to our knowledge of flood risk in the Horley area. The EA has prepared guidance to developers when using river modelling as part of a FRA, to ensure a suitable standard for inclusion into any mapping they publish. Please contact the Agency for further information.

Appendix A - The Horley Area



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APPENDIX B

NATIONAL, REGIONAL, COUNTY AND LOCAL POLICIES

NATIONAL POLICY

PLANNING POLICY GUIDANCE PPG 25 Development and Flood Risk, 2001

Draft PLANNING POLICY STATEMENT PPS 25, 2005

REGIONAL POLICY

RPG9: REGIONAL PLANNING GUIDANCE FOR THE SOUTH EAST, 2001

Policy INF1 Flooding

Policy INF2 The Water Cycle

Draft SOUTH EAST PLAN JULY 2005

COUNTY STRUCTURE PLAN POLICIES

SURREY STRUCTURE PLAN 2004

Policy SE 3 Flooding and Land Drainage

Policy SE 10 River Corridors and Waterways

LOCAL PLAN POLICIES

REIGATE & BANSTEAD BOROUGH LOCAL PLAN 2005

Policy Ut 4 Flooding

Policy Hr 2A Local Flooding and Transportation Modelling
Policy Hr 38 Riverside Green Chain

FLOOD STUDIES

Horley Flood Study, January 2004
River Mole Flood Defence Strategy
Gatwick Stream Study

APPENDIX C

STEERING GROUP CONTACTS

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APPENDIX D

POLICY Hr 2A of the Reigate & Banstead Borough Local Plan 1994 Proposed First Alteration 2000 Proposed Modifications 2004

Local Flooding and Transportation Models

14.29 Introduction:

The Horley Master Plan has been based on a number of technical studies including on flooding and transportation. The Borough Council has employed independent consultants to audit the flooding and transportation studies prepared by the Environment Agency and County Council, respectively. The Consultants have concluded that the studies are basically sound for the Deposit Draft stage in the development of the proposals. However, it will be important that further detailed work is carried out to model both flooding and transportation in the areas local to the proposed developments. This work will need to be undertaken by the developers as an integral part of their Framework Plans. Developers should consult the Environment Agency with regard to flood modelling work.

14.29A Purpose:

To ensure that there is detailed modelling of both flooding and transportation.

Policy Hr 2A

The Framework Plans must be based on suitable models of both flooding and transportation. A similar modelling requirement will apply to other allocated or unidentified housing sites for about 50 units or more.

Amplification

- (1) The Environment Agency has provided a current best estimate of the likely 1 in 100 year flood event as a wide area model. The developers should prepare a suitable local flooding model, which will determine the extent of the 1 in 100 year flood plain based on the criteria set out in the Flood Risk Development Brief for Horley, prepared by the Environment Agency, Thames Water Utilities Limited and Reigate and Banstead Borough Council. The model should include a detailed assessment of flooding from main rivers, ordinary watercourses, sewers and surface water run-off. The Brief also requires the assessment of the existing sewerage systems and an action plan to ensure continued satisfactory performance of existing sewer networks*

that might be affected by developments. The developers should also demonstrate that their new developments will not increase the risk of flooding at the site or elsewhere. The robustness of the model should be checked by sensitivity analysis.

- (2) The developers should prepare a suitable transportation model, which will include an assessment of local traffic impacts at particular locations, assess delays and capacities within the network and measures how effective are any network improvements. The robustness of the model should be checked by sensitivity analysis.*