Twickenham Riverside
Short Term Scheme

Flood Risk Assessment

April 2003

Prepared for:
London Borough of Richmond Upon Thames

4 Other Issues

PPG25 Sustainable Development

PPG25 emphasizes the Government's goal of sustainable development and acknowledges that brownfield sites may be in floodplains and may be suitable for redevelopment. PPG25 confirms redevelopment of sites within floodplains may be acceptable, on balance, as long as the risks of flooding have been taken into account.

PPG25 Sequential Test

PPG25 introduces a sequential risk-based approach to developing in areas at risk from flooding. The FRA confirms that the annual probability of flooding is greater than 0.1% for tidal flooding without flood defences. Using Table 1 of PPG25 the development can be classified as a Flood Zone 3 i.e. high-risk category. Developments within this category of the sequential test are allowed in developed areas where a minimum standard of defence is provided for the lifetime of the development, with preference given to sites in areas that are already defended. The proposed temporary development meets this criterion.

PPG25 also allows development in high-risk zones in the low-lying parts of eastern England where alternative sites are not available.

Land Drainage Consent

The Environment Agency (meeting notes 18 March 2003, see Appendix D) require a Land Drainage Consent for any works (permanent or temporary) within 16 m of the flood defence structure. Thus a Land Drainage Consent will be required for the proposed temporary development and this should be completed when detailed design drawings are available for structures.

Permanent Development

The Environment Agency (email 8 April 2003, see Appendix D) require another FRA for the permanent development of the site. The FRA would be for the life of that development. Flood defence levels may be changed depending on the results of future flood studies into flood defences beyond 2030 or guidance in effect then.

5 Conclusions

London Borough Of Richmond Upon Thames (the landowner) is applying for planning permission for a short-term development of part of the former Twickenham Baths site. The proposed development involves the demolition of the former pool building and its replacement with an open landscaped area facing the river and a secure park incorporating children's play areas at the upper level adjoining Wharf Lane.

The site of the proposed development is within the Environment Agency indicative flood plain, but these maps do not take into account the protection provided by flood defences. The proposed development is protected from flooding from the River Thames by the Thames Barrier and by local flood defence structures. Existing and proposed flood defence structures exceed the flood defence level of 6.02 m ODN.

The flood risk assessment has been focused on issues of interest to the Environment Agency (letter 27 February 2003, see Appendix D): no net loss of flood storage volume; continuous and effective flood defences to meet a minimum flood defence level; and the requirement for a land drainage consent for works affecting flood defences.

The flood risk assessment describes how the proposed scheme and will temporarily increase the flood storage. In this regard the applicant reserves the right to reinstate the flood defences to their present position when the site is permanently redeveloped. The flood risk assessment describes how the proposed scheme will provide a continuous and effective flood defence. Runoff from the proposed scheme does not have any adverse affect.

The requirement for a land drainage consent is acknowledged. As is the requirement for a flood risk assessment for the permanent development.

References

Dearle and Henderson. 1 April 2003. *Planning Statement, Twickenham Riverside – Short Term Scheme,* for London Borough Of Richmond Upon Thames.

Office of the Deputy Prime Minister. 2001. *Planning Policy Guidance Note 25: Development and Flood Risk.*

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Short Term Scheme

Flood Risk Assessment

April 2003

Version	Date	Description	Prepared	Checked	Approved
Draft	April 2003	Draft	T Fisher	D Dales	D Dales

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Contents

1 Introduction

London Borough Of Richmond Upon Thames (the landowner) is applying for planning permission for a short-term development of part of the former Twickenham Baths site. The proposed development involves the demolition of the former pool building and its replacement with an open landscaped area facing the river, and a secure park incorporating children's play area at the upper level adjoining Wharf Lane. The chief features of the scheme are (from *Planning Statement, London Borough Of Richmond Upon Thames, 1 April 2003*):

- a raised pathway on the Embankment area with seating, planted areas and hard landscaping features;
- the provision of hard landscaped steps linking the Embankment with a new children's playground at the Wharf Lane end of the site;
- fencing, gates and appropriate lighting throughout; and
- the introduction of access to the site for people with mobility difficulties.

The Council intends that the duration of this scheme be no more than five years and is pursuing wider redevelopment of the site in the long-term. The scheme is designed to put in place an interim facility to significantly improve the ambience of the Twickenham Riverside (from *Planning Statement, London Borough Of Richmond Upon Thames, 1 April 2003*).

The site is situated adjacent to north bank of the River Thames, opposite Eel Pie Island, in Twickenham, Richmond (see location map, Appendix D). The site is bounded on three sides by roads: The Embankment (south east) parallel to the Thames; Wharf Lane (south west) and a service road (north west). The remaining boundary to the northeast borders a private car park and Water Lane. The Thames at this location is tidal, as the site is downstream of the Teddington locks.

The site is within the Environment Agency's indicative floodplain as shown in Appendix A. These maps indicate the potential extend of tidal flooding (1 in 1000 year return period for the Thames region) and fluvial flooding (1 in 100 year). Therefore, a Flood Risk Assessment (FRA) is required by *Planning Policy Guidance Note 25* (PPG25). The indicative flood plain maps do not take into account the protection provided by flood defences. The Twickenham Riverside site is protected from Thames flooding primarily by the Thames Barrier and secondarily by flood defence walls.

The FRA focuses on issues of interest to the Environment Agency (letter 27 February 2003, see Appendix D) and these are: no net loss of flood storage volume; continuous and effective flood defences to meet a minimum flood defence level; and land drainage consent required for works affecting flood defences. The FRA describes how the proposed scheme will temporarily increase the flood storage. In this regard the developer reserves the right to reinstate the flood defences to their present position when the site is permanently redeveloped. The FRA describes how the redevelopment will provide a continuous and effective flood defence. Local drainage issues are also discussed.

2 Flood Risk Assessment Methodology

Architecture drawings including plans and cross-sections with elevation information was reviewed (see Appendix C).

A walkover survey was undertaken on 12 March 2003 to investigate the flood defences and take photographs (see Appendix B for photographs).

The flood risk issues were discussed with the Environment Agency in a meeting 18 March 2003 (see meeting notes Appendix D). The Environment Agency supplied drawings of flood defences for The Embankment, which include the former Twickenham Baths.

The Flood Risk Assessment was undertaken based on PPG25 (2001) *Appendix F – Guidance On Requirements For Undertaking A Flood Risk Assessment.*

3 Flood Risk Assessment

Existing Flood Alleviation Measures

The Thames Barrier protects the site from extreme storm surges and high tide events on the Thames. The Thames Barrier is designed for the 1 in 1000 year return period flood. It is the Environment Agency's policy to maintain that standard of defence. The Thames Barrier is owned, operated and maintained by the Environment Agency.

The river walls and the frontage of the former Twickenham Baths provide local flood protection. The flood defence level is 6.02 m ODN, based on criteria explained in the following section.

The river walls have an elevation of approximately 5m ODN. The walls are in fair condition with some damage due to roots (see photographs in Appendix B). The Twickenham Baths site is approximately 24 m landward of the river wall.

The Twickenham Baths site has two main areas. The upper level of the poolside, which is retained behind a retaining wall (that bisects the pool building), has a top elevation of approximately 8 m ODN. The lower area fronts the Embankment and consists of elevated gardens retained behind brick walls and part of the pool building. The brick retaining walls and the front wall of the pool building provide the existing flood defence.

The brick retaining wall on the corner of The Embankment and Wharf Lane rises from a ground level of 5.2 m ODN by 1.2 m to reach a top elevation of 6.4 m ODN, which exceeds the flood defence level. The wall is in fair condition (see photographs in Appendix B). The brick retaining wall connects to a concrete retaining wall along Wharf Lane and ties into ground levels in Wharf Lane that exceed the flood defence level.

The pool building continues the existing flood defence line (see photographs in Appendix B). The window sills are at 6.4 m ODN, which is 1.3m above the ground level of 5.1 m ODN. The main doors of the building are at ground level and some leakage of flood water into the pool building could be expected.

The flood defence line incorporates a second brick retaining wall (north east of pool building). The wall rises from a ground level of 5.0 m ODN by 1.2 m to reach a top elevation of 6.2 m ODN, which exceeds the flood defence level. The wall is in fair condition (see photographs in Appendix B). The brick retaining wall continues around the site, with breaks for access, and ties into ground levels in Water Lane.

The condition of the brick retaining walls is fair. There are signs of cracking and bulging, probably as a result of root spread from trees planted behind them. However, the brick retaining walls are sufficient as retaining structures for the temporary scheme and are certainly adequate for short term flood protection. This is especially so given that the proposed scheme will include measures for the repair and reinstatement of retaining walls which have become damaged.

The existing flood defence structures are continuous and effective and exceed the flood defence level

Proposed Flood Alleviation Measures

The proposed scheme involves demolition of the former pool building and its replacement with an open landscaped area facing the river (see plans in Appendix C). Hence the flood defence line will be modified. The new flood defence line will be provided by new planter boxes that have a top elevation of 6.1 m ODN and the existing retaining wall that has a top elevation of 8 m ODN. The elevations of the new flood defences exceed the flood defence level. The planter boxes connect existing brick retaining walls to maintain continuous flood defences.

In front of the new flood defence line a sloping pathway and garden rises to a flat area with seating that has elevation of 5.6 m ODN. The land behind the new flood defence lines is higher.

The proposed flood defence line is set back from the existing flood defence line, which increases the flood plain volume by approximately 150 m^3. The Environment Agency have advised that this volume will not be lost from any future site development if it was given up as flood plain storage as part of the temporary development (meeting notes 18 March 2003, see Appendix D). The landowner reserves the right to reclaim this volume and reinstate the flood defences to their present position when the site is permanently redeveloped as part of the long-term scheme.

The proposed scheme maintains the continuity and effectiveness of flood defence structures.

Sources of Potential Flooding

The major potential for flooding is from the River Thames to the south of the site.

The Environment Agency indicative floodplain maps (Appendix A) give the extent of flooding that could occur if there were no flood defences. However, the Thames Barrier provides flood protection to much of London including the Twickenham and greatly reduces the extent of flooding.

The Environment Agency has prescribed the minimum flood defence level as 6.02 m AOD (letter 27 February 2003, see Appendix D). The existing and proposed flood defences for the site exceed this level.

Local flooding is not considered to be an issue for the site as it is elevated above surrounding ground levels in Embankment, Wharf Lane, Water Lane and the service lane.

Previous Flooding Events

The Environment Agency has advised that flood history information is not required in this flood risk assessment (meeting notes 18 March 2003, see Appendix D).

Hydraulic Structures

The hydraulics structures – flood defence walls, river walls and the Thames Barrier – have been previously described.

Flood Probability

The Environment Agency has prescribed the minimum flood defence level as 6.02 m AOD without prescribing the probability.

Cross Section of Site

The Environment Agency cross sections show the existing flood defences exceed the flood defence level (Environment Agency 1995 drawings, in Appendix C).

The architecture plans and cross sections show that proposed structures exceed the flood defence levels (Dearle and Henderson 2003 drawings, in Appendix C). Thus the site is adequately defended from the River Thames.

Flood Speed, duration, depth and damage arising

The proposed sloping pathway and garden in front of the planter boxes and retaining wall will flood at a rate, depth and duration equal to flooding that already occurs along The Embankment. The maximum envisaged damage could be to plants in the garden, which would recover or be replaced. The sloping design of the raised garden allows for effective flood water run-off.

Drainage Effects

The upper area of the temporary development, shown as a playground, is currently paved and has soak-aways. Drainage for this area will use the same soak-aways or new soak-aways.

The pool house roof drains to a manhole and sewer adjacent to the pool. The sewer then drains under the pool house to a manhole on The Embankment. The proposed sloping pathway and garden in the lower area (to replace the pool house) will be impermeable or drain to impermeable areas. Excess stormwater will drain to the street stormwater system. The footpath surface material is under negotiation with the Richmond Council maintenance staff. Therefore, the load to the existing sewer will be reduced.

Site Run-off

The runoff volume from the site will decrease as the permeable area increases as discussed above.

Impact of run-off to adjacent properties

The proposed scheme will not displace additional flood water; in fact it will increase the floodplain storage.

The runoff from the proposed scheme will not affect adjacent properties.

Impact on coastal and fluvial morphology

The proposed scheme will have no impacts on the coastal or fluvial morphology. The site is not an active tidal or fluvial floodplain.

Climate Change

Flood defence levels supplied by the Environment Agency include an allowance for climate change and sea level rise.

Toong Cheah, Environment Agency, to confirm.

Residual Risks

There is not considered to be any residual risk, as the site is higher than flood defence levels.

Mitigation Measures

Although the risk to flooding is low there are mitigation measures, which can be used to reduce the risk of flooding, and to reduce the consequences of a flood event:

- Provision for maintenance and replacement of the flood defence walls. Existing retaining walls will be repair and maintained for the life of the project. New structures will be constructed and maintained as effective flood defence structures.
- Best practice design of stormwater drainage system as described earlier in the flood risk assessment.
- Providing flood warning. There is already a warning system for the River Thames, which would apply to this development.