LANCASHIRE COUNTY COUNCIL

CALLED IN PLANNING APPLICATION FOR PROPOSED HEYSHAM TO M6 LINK ROAD

LAND TO THE NORTH OF LANCASTER BEGINNING AT THE END OF THE A683 HEYSHAM TO M6 LINK PHASE 1 AND RUNNING IN AN EASTERLY DIRECTION TO CONNECT WITH THE M6 AT JUNCTION 34 OF THE M6

Planning Inspectorate reference:
APP/Q2371/V/07/1200928 and
APP/Q2371/V/07/1200929

LPA reference:
01/05/1584

PROOF OF EVIDENCE

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Principal Engineer Halcrow Group Ltd

Flood Risk Assessment

June 2007

1. INTRODUCTION

1.1 I am Nicholas Pettitt, Principal Engineer employed by Halcrow Group Ltd, acting on behalf of the appellant for the purposes of this planning inquiry. I have a Bachelor of Engineering degree in Civil Engineering and am a Chartered Engineer and a Member of the Chartered Institution of Water and Environmental Management. I have seventeen years of civil engineering experience, the last ten of which have specialised in coastal and estuarine engineering and management.

2. HALTON FLOOD RISK ASSESSMENT

2.1 A flood risk assessment has been carried out on behalf of Lancashire County Council for the proposed Heysham to M6 Link road crossing the River Lune in Lancaster (Appendix B). The assessment has been completed in accordance with Appendix F of the Planning Policy Guidance Note 25 (PPG25), "Development and Flood Risk" (Appendix C).

2.2 The proposed link road includes the River Lune Bridge, which will cross the River Lune adjacent to the existing M6 bridge (Appendix A Figure 1). The bridge will have two piers in the channel of the River Lune: one adjacent to the right bank and one adjacent to the left bank.

2.3 The area adjacent to the bridge consists of a river corridor containing properties and recreational area on the right bank and the Lune cycleway and footpath on the left bank. The Environment Agency Zone 3 flood map (Appendix A Figure 2) indicates that the site floods in a 1 in 100 year fluvial and tidal event.

2.4 The flood risk assessment process uses iSIS modelling software. This one dimensional modelling programme was developed by Halcrow and HR Wallingford. A model of the River Lune between Halton weir and Skerton weir, a total distance of 3.7 kilometres, predicts the 1 in 100 year water levels in the river channel and flood plain for the existing situation and with the proposed bridge in place. A comparison of resulting levels determines whether the proposed bridge has an adverse effect on the flood plain.

2.5 The proposed bridge will be supported at two locations by a combination of plinths and piers (Appendix A Figure 3). The assessment considers three possible configurations of plinth and piers, and also the likely temporary works during the construction period.

2.6 During construction a temporary coffer dam will be erected using sheet piles offset 4 metres from the final bridge support location to provide a safe working area. The three options considered for the permanent works were a plinth forming a single large structure at each bridge support location, three individual piers at each bridge support location and a combination of three individual piers at each bridge support sitting on a plinth.

2.7 The analyses predict that, for a 1 in 100 year flood event, water levels increase by a small amount at the bridge location for all modelled scenarios. This increase diminishes in an upstream direction towards Halton. Maximum increases for the coffer dam were 124 millimetres at the bridge location and 62 millimetres at Halton. Corresponding figures for the plinth were 69 millimetres and 34 millimetres; for the piers 38 millimetres and 18 millimetres; for the plinth and piers 25 millimetres and 12 millimetres.

2.8 The predicted increases in water levels are considered to be within the acceptable inaccuracies of the iSIS model. In conclusion, therefore, when the modelling results are viewed in context with achievable modelling accuracy and model sensitivity, the impact of the proposed bridge is minimal.

2.9 Plots of the extent of the flooding in the 1 in 100 year flood event (Appendix A Figure 4) also show that the new bypass will lead to minimal enlargement of the area of flooded land, and a minimal loss of floodplain storage.

2.10 An assessment of likely scour around the support near the right bank has also been undertaken (Appendix D). Taking results from the iSIS modelling, the extent and magnitude of scour have been calculated and found to be within reasonable limits. Potential means of preventing scour have been investigated, and a number of methods including rip-rap (stone layers), gabion or flexible block mattresses, geobags, cellular geotextiles, and reed-beds have been found to be suitable to provide scour protection in this particular scenario, subject to detailed design during the design of the bridge.

3. TORRISHOLME FLOOD RISK ASSESSMENT

3.1 As part of this study, an assessment of the flood risk to the stretch of road at Torrisholme has also been produced (Appendix E).

3.2 The assessment has been based on drawings supplied by LCC showing the overall layout of the proposed road (Appendix A Figure 5), a long section showing road and ground levels. The new road is to extend approximately 4.5 km from just east of the existing A683 Northgate junction to a revised Junction 34 on the M6 motorway. The road levels at the western end are determined by the tie-in with the existing road.

3.3 The Environment Agency Zone indicative floodplain map (Appendix A Figure 6) indicates that part of the new road alignment will flood in a 1 in 100 year fluvial and tidal event.

3.4 River levels for extreme events have been taken from a modelling report produced during the development of the Lower Lune Flood Risk Management Strategy for the Environment Agency in 2005.

3.5 Existing ground levels along the alignment of the proposed road vary, with a minimum of 5.4 metres. On review of predicted river levels, this is equivalent to a flood event with a return period of less than 1 in 1 year.

3.6 The proposed road rises from west to east and is to be elevated above both the land adjacent to it, and the existing road, which it is replacing. This elevation varies from zero at the western end (chainage 0) to 7 metres at chainage 800. On review of the levels of the proposed road and predicted river levels, it is concluded that the low point of the road (chainage 400) will be flooded over a length of approximately 40 metres by tidal/fluvial flood events with a return period in the order in 1 in 10 years: This is an improvement on the existing road, which is at a level equivalent to a flood event with a return period of less than 1 in 1 year. Approximately 220 metres length of the new road (chainage 270 to 490) lies below the 1 in 200 year flood level. The remainder of the road is above the 1 in 200 year flood level.

4. CONCLUSIONS

4.1 The following conclusions are drawn from the flood risk assessment:

4.2 The piers of the River Lune Bridge will have no significant impact on water levels in the River Lune, or on the extent of the floodplain.

4.3 Scour around the piers will not be excessive, and can be mitigated against using a variety of scour protection measures which can be developed during detailed design of the bridge.

4.4 The proposed road at Torrisholme will be less susceptible to flooding than the existing road.