PUBLIC INQUIRY

IN THE MATTER OF THE HIGHWAYS ACT 1980

AND THE ACQUISITION OF LAND ACT 1981

AND IN THE MATTER OF:

THE M4 MOTORWAY (JUNCTION 23 (EAST OF MAGOR) TO WEST OF JUNCTION 29 (CASTLETON) AND CONNECTING ROADS) AND THE M48 MOTORWAY (JUNCTION 23 (EAST OF MAGOR) CONNECTING ROAD) AND THE LONDON TO FISHGUARD TRUNK ROAD (EAST OF MAGOR TO CASTLETON)) COMPULSORY PURCHASE ORDER 201-

-and-

THE M4 MOTORWAY (JUNCTION 23 (EAST OF MAGOR) TO WEST OF JUNCTION 29 (CASTLETON) AND CONNECTING ROADS) AND THE M48 MOTORWAY (JUNCTION 23 (EAST OF MAGOR) CONNECTING ROAD) SCHEME 201-

-and-

THE M4 MOTORWAY (WEST OF MAGOR TO EAST OF CASTLETON) AND THE A48(M) MOTORWAY (WEST OF CASTLETON TO ST MELLONS) (VARIATION OF VARIOUS SCHEMES) SCHEME 201-

-and-

THE LONDON TO FISHGUARD TRUNK ROAD (EAST OF MAGOR TO CASTLETON) ORDER 201-

-and-

THE M4 MOTORWAY (JUNCTION 23 (EAST OF MAGOR) TO WEST OF JUNCTION 29 (CASTLETON) AND CONNECTING ROADS) AND THE M48 MOTORWAY (JUNCTION 23 (EAST OF MAGOR) CONNECTING ROAD) AND THE LONDON TO FISHGUARD TRUNK ROAD (EAST OF MAGOR TO CASTLETON) (SIDE ROADS) ORDER 201-

(‘THE M4 CORRIDOR AROUND NEWPORT SCHEME’)

SUMMARY PROOF OF EVIDENCE ON FLOOD RISK

OF

GARY PURNELL

FOR THE NATURAL RESOURCES BODY FOR WALES
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1. INTRODUCTION

1.1. My name is Gary Purnell. I am a Technical Specialist in the Flood Risk Analysis Team of Natural Resources Wales (‘NRW’). I have been employed by NRW since it was created, in April 2013. Prior to this, I was employed by a predecessor authority to NRW, Environment Agency Wales, for 14 years. I hold a Batchelor of Science (B.Sc.) Honours Degree in Civil Engineering and have been a Graduate Member of the Institution of Civil Engineers for 11 years.

1.2. My proof of evidence relies upon the information submitted within the various reports produced to date with particular emphasis on tidal flood risk.

2. RELEVANT BACKGROUND

2.1. Welsh Assembly Governments’ Technical Advice Note 15 (TAN15) “Development and Flood Risk” (July 2004) (TAN 15) applies to the flood risk assessment of the M4 Corridor around Newport scheme. This provides technical guidance which supplement the policy set out in Planning Policy Wales (PPW) in relation to development and flooding.

The general approach of PPW, supported by this TAN, is to advise caution in respect of new development in areas at high risk of flooding by setting out a precautionary framework to guide planning decisions. The precautionary framework should be used for both forward planning and development control purposes.

Specific criteria are identified within Section 7 and Appendix 1 of TAN 15, with particular reference to A1.12, A1.14 and A1.15, which should be satisfied for development to be considered acceptable.

Within A1.2 the prime objectives of a Flood Consequence Assessment (FCA) is to gain a fully appreciation of:

- The consequences of flooding on the development.
• The consequences (i.e. the overall impacts) of the development on flood risk elsewhere within the catchment.

• Whether appropriate mitigation measures can be incorporated within the design of the development to ensure that development minimises risk to life, damage to property and disruption to people living and working on the site or elsewhere in the floodplain.

3. SITE CONTEXT

3.1. Tidal flooding

3.1.1. The proposed route of the M4 corridor would cross the Caldicot and Wentlooge Levels on a raised embankment. These areas lie below the high tidal levels and encompass a significant area of tidal floodplain (albeit currently defended to a varying standard of protection) within the Severn Estuary. The sea defences mainly comprise earth embankments and, in some areas, in combination with wave return walls and engineered revetments.

3.1.2. The majority of the existing sea defences are presently constructed to a level that provides the requisite standard of protection (SoP) in respect of their crest levels i.e. 0.5% (1 in 200 year) Annual Event Probability (AEP). However, there are some sections of sea defences which have a lower SoP which can be as low as 20% (1 in 5 year) AEP. These areas have either been recently upgraded, or are currently at a feasibility stage for improvements in the future.

3.1.3. If no further improvements are made to upgrade the sea defences (in line with current climate change predictions), the SoP would decrease to and, by 2110 the sea defences would lose their structural integrity and result in frequent flooding, including significant inundation of the defended areas they protect, which includes the proposed M4 Corridor.
3.1.4. The proposed M4 scheme would increase tidal flooding elsewhere, to properties south of the new motorway corridor, whilst creating a flood risk benefit for properties to the north.

3.1.5. The acceptability criteria in Section 9 of TAN 15 (see: TAN 15, section 7 and Appendix 1) states “no flooding elsewhere”. Further, section A1.9 of TAN 15 states “particular attention should be paid to the impact of the development on flood risk elsewhere on the flood plain”. Accordingly, NRW considers that the outcomes, in terms of flood risk of the proposed M4 Corridor around Newport scheme, are non-compliant with TAN 15.

3.1.6. The proposed mitigation for tidal flood risk relies on the deliverables contained within the Severn Estuary Flood Risk Management Strategy (SEFRMS) and the accompanying Strategic Appraisal Report (StAR). This primarily focusses on future improvements to the existing coastal defences within the Gwent Levels to mitigate the negative flood risk impacts of the M4 project over its lifetime.

3.2. Other Flooding

3.2.1. NRW’s view is that the flood risks from pluvial (surface water) and groundwater sources as a result of the scheme would be in line with the requirements of TAN 15.

4. ISSUES

4.1. Tidal flooding

4.1.1. The construction of a raised embankment across the defended tidal floodplain comprising the Caldicot and Wentlooge Levels would intercept overland tidal flood flows and, prevent these from dispersing further inland in a northerly direction. This would have a corresponding detrimental impact on tidal flood risk elsewhere and is particularly relevant, in this case, for the Caldicot Levels as opposed the Wentlooge Levels. This is due to
the extents and encroachment of the proposed embankment within the Caldicot Levels area which would essentially confine tidal floodwaters to the south of its alignment.

4.1.2. If no improvements to the existing sea defences beyond 2030 are carried out, the consequences of constructing a raised embankment would result in an increase in flood depths to properties already situated within the flood risk area, south of the proposed M4 alignment.

4.1.3. The number of additional properties i.e. not currently affected by tidal flooding, will increase by 49 and 63 within the Caldicot and Wentlooge Levels respectively. Some of these properties will experience depths of flooding up to 0.6 metres in some places.

4.1.4. It is contended within the FCA provided with the ES that it is inconceivable that the SEFRMS will not be implemented.

4.1.5. NRW considers that the proposals to manage tidal flood risk within the SEFRMS have not been guaranteed over the lifetime of this project.

4.1.6. NRW’s position is that, following TAN 15, the proposal to manage tidal flood risk over the next 100 years will need to be supported by a strong commitment by government, with the necessary assurances of funding and robust plans being put in place to implement any of the future works identified.

4.1.7. NRW’s study ‘Caldicot and Wentlooge Levels Coastal Modelling’ results in greater flooding within the footprint of the proposed M4 during both the 0.5% and 0.1% AEP events (with existing defences and wave overtopping). This is generally within the eastern and western areas of the Caldicot Levels. However, with climate change predictions applied to these events, the flood risk significantly increases with the majority of the M4 footprint being affected.
4.1.8. Furthermore, the proposed scheme would also fail the design threshold requirements of A1.14 of TAN 15. This is on the basis that the above depth of flooding is unlikely to diminish by at least a corresponding level for the 0.5% (1 in 200 year) tidal event with climate change.

4.1.9. Information in the supplement to the ES published in September 2016 confirms the following flood risk impacts in terms of detriment to third parties as a result of the project. They have been established from the 0.1% (1 in 1000 year) tidal flood event with 100 years of climate change plus the Upper Bound Confidence Limit, without the implementation of the flood risk measures within the SEFRMS beyond 2030.

Caldicot Levels – 1076 properties

Wentlooge Levels – 676 properties

**Overall number affected by detriment is 1,752 properties**

4.1.10. NRW recognises that, in terms of tidal flooding, there would be flood risk benefits arising to 6643 properties from the M4 Corridor around Newport scheme.

4.1.11. NRW is not aware of recent examples of projects or schemes comparable to the M4 Corridor around Newport scheme where the delivery of flood mitigation has been committed to and/or subject to implementation over a long term period.

5. CONCLUSIONS

5.1. The construction of a raised embankment across the Caldicot and Wentlooge Levels will have a significant impact, especially within the Caldicot Levels, with regards increased tidal flood risk to property and regionally significant infrastructure.
5.2. The flooding detriment established to those properties already established to be at tidal risk amounts to 1027 and 613 in the Caldicot and Wentlooge Levels area respectively.

5.3. There will be an additional 112 properties overall in these areas subject to ‘new’ tidal flood risk i.e. they are currently not affected or indeed within the existing tidal flood outlines of the Severn Estuary.

5.4. NRW considers that the measures proposed to manage tidal flood risk in terms of a satisfactory funding commitment cannot be guaranteed over the lifetime of the M4 Corridor around Newport scheme.

5.5. The proposals are contrary to TAN 15 (see Section 4.1.15 above) which forms the basis for NRW’s objection to the M4 Corridor around Newport scheme on flood risk grounds.

DECLARATION

I confirm that the facts and matters referred to in this summary proof of evidence are true to the best of my knowledge and belief. The opinions I have expressed represent my true and complete professional opinions on the matters to which they refer.

Signed:

Dated: 7 February 2017