Adran yr Economi a'r Seilwaith
Department for Economy and Infrastructure

Llywodraeth Cymru
Welsh Government

THE CHESTER TO BANGOR TRUNK ROAD (A55) (JUNCTIONS 16 AND 16A IMPROVEMENT REALIGNMENT AND SLIP ROADS) ORDER 202-

THE CHESTER TO BANGOR TRUNK ROAD (A55) (JUNCTIONS 16 AND 16A IMPROVEMENT REALIGNMENT AND SLIP ROADS) (SIDE ROADS) ORDER 202-

THE WELSH MINISTERS (THE CHESTER TO BANGOR TRUNK ROAD (A55) (JUNCTIONS 16 AND 16A IMPROVEMENT REALIGNMENT AND SLIP ROADS)) COMPULSORY PURCHASE ORDER 202-

SUMMARY PROOF OF EVIDENCE

Note: See Document Reference WG 1.11.02 for full evidence and referencing

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WELSH GOVERNMENT, WATER QUALITY AND FLOODING

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1. Author

1.1 I am Dr Steve Cox. I am a Chartered Scientist, Chartered Environmentalist and Fellow of the Chartered Institution of Water and Environmental Management.

1.2 I have 23 years of experience in environmental science. At this inquiry I am acting as an expert witness on matters relating to water quality and flooding

1.3 I provide a summary of the assessment of flooding and water quality impacts of the Junction 16 and 16A Improvement Scheme, highlighting the key issues and the proposed environmental mitigation. I also summarise relevant matters raised in the objections and give my response.

2. Summary of the Assessment of Flooding and Water Quality

Flood Risk

2.1 The A55 runs parallel with the sea at Conwy Bay. The land rises steeply from the coastline such that the majority of the Scheme is in a zone considered to be at little or no risk of flooding from the sea.

2.2 Approximately 1 km north-east of the existing Junction 16 roundabout the Afon Gyrach flows under the existing A55 and adjacent railway before discharging to Conwy Bay. Land adjacent to the Afon Gyrach is at risk of fluvial flooding (flooding from the river).

2.3 As part of the Scheme a new link road would cross the Afon Gyrach requiring a bridge structure. To determine whether the new structure would increase the risk of fluvial flooding, a hydraulic modelling exercise was carried out. This concluded that the structure should have an opening size (shape, width and height) the same as or larger than the existing A55 arch structure.

2.4 The modelling also concluded that there would be 130 mm increase in flood level in a 1 in 1000 year event but the increase would be limited to less than 30 m upstream of the proposed structure. Given that the land impacted is currently pasture and would become land acquired by Welsh Government, Natural Resources Wales (NRW) consider this increase acceptable.

2.5 In terms of flood risk to the A55 and the Scheme itself, no increase in flood risk has been identified.

Surface Water Flooding and Drainage

2.6 Runoff from the existing A55 and local roads drains to Conwy Bay via a series of sea outfalls. Runoff also drains to the Afon Gyrach and to an unnamed watercourse which passes under the A55 in a culvert approximately 425 m south-west of the Penmaen-bach tunnels. There is not believed to be any attenuation of flow rates prior to discharge.

2.7 NRW flood risk maps show part of a field between the Afon Gyrach and the Puffin Café to be at risk of ‘surface water flooding’. This is flooding that occurs when surface runoff from rainfall has not yet entered a watercourse or drainage system. The link road would pass through this area but would be raised above the original ground level on a low embankment such that the road would not be at risk of surface water flooding. A drainage system would be installed along the southern boundary of the link road to intercept surface water flows and convey these to the Afon Gyrach.

2.8 The fields adjacent to the unnamed watercourse are also shown to be at risk of surface water flooding. A realigned west-bound off-slip would cross this

area. The off-slip itself would be raised on embankment and not at risk of surface water flooding. A drainage system would be installed along the toe of the embankment.

2.9 The Scheme would result in a larger area of impermeable road surface which, without mitigation, could lead to increased surface water flooding. To prevent this, the Scheme would include systems such as oversize pipes and attenuation ponds to temporarily store runoff and discharge it at a rate no greater than existing.

Water Quality

2.10 Impacts on water quality from highway runoff can occur either as a result of traffic accidents which result in spillages, or as a result of routine runoff whereby rainfall removes contaminants from the road surface that originate from the wear of vehicles and of the road surface.

2.11 Water running off the A55 is currently discharged via outfalls to Conwy Bay, and to the Afon Gyrach and the unnamed watercourse both of which flow into Conwy Bay around 100 m downstream. There is no settlement or treatment to improve water quality. Within Conwy Bay there are areas designated for their habitat quality. Penmaenmawr is a designated bathing water.

2.12 It is normal for routine runoff to rely on a degree of dilution and dispersal in the receiving waterbody to achieve acceptable concentrations. The concentrations derive from collaborative research undertaken between Highways England and the Environment Agency. Assessment of the potential impact of the Scheme on the water quality of Conwy Bay concluded that only a small volume of seawater is required to dilute and disperse contaminants to acceptable concentrations.

2.13 The assessment for the Scheme also concluded that discharges to both the Afon Gyrach and the unnamed watercourse pass all aspects of the water quality assessment for routine runoff.

2.14 The assessment of spillage risk concluded that the annual probability of an incident would be approximately 1 in 600 years and therefore substantially better than the acceptable probability of in 1 in 200 years. Furthermore, a serious spillage near a slip-road junction is approximately 3.7 times less likely than at a roundabout such that removal of the existing Junction 16 roundabout would decrease the risk of spillage.

2.15 With respect to bathing water quality, flow attenuation within the drainage design would mitigate for the potential increase in turbidity such that there would be no detrimental effect on the status of the bathing water.

2.16 The Water Framework Directive (WFD) Assessment concluded that, with implementation of the mitigation measures, the proposed Scheme would not

result in deterioration of the adjacent coastal water bodies and is therefore in compliance with the WFD.

Construction Phase

2.17 As with all infrastructure works there is a risk to water quality from spillage of fuel and chemicals and from silt-laden runoff from exposed earthworks and compounds. Good construction management procedures would minimise such risks and would be set out in a Construction Environmental Management Plan (CEMP).

Mitigation

2.18 Mitigation would include:

a) Drainage systems designed and/or renewed in line with current standards;

b) Flow attenuation and, where space allows, pollution control measures; and

c) Management of construction works using the CEMP.

2.19 Monitoring and inspection during the construction phase would also be carried out to identify risks and prevent incidents.

3. Objections to the Scheme

Natural Resources Wales (NRW)

3.1 Following publication of the Environmental Statement, NRW raised some concerns related to flooding and water quality. We prepared a comprehensive response to clarify our assessments and address these concerns, including the submission of supplementary reports on water quality and updated hydrological calculations.

3.2 We have since received confirmation from NRW that that they are “satisfied with the approach taken” and we are awaiting any further comments on the supplementary reports.

Surface Water Flooding / Drainage

3.3 Objections were received relating to the potential for surface water flooding which could arise, or be made worse, if road drainage systems were inadequately sized or poorly maintained.

3.4 The drainage system for the Scheme has yet to be designed in detail but would be designed to current standards including consideration for higher intensity rainfall due to climate change.

3.5 Where a local road is realigned as part of the Scheme the drainage system associated with it would also be renewed in line with current standards and this may reduce the frequency and depth of surface water flooding experienced. However, if the location of existing surface water flooding issues is beyond the boundary of the Scheme then it is a separate matter for Conwy County Borough Council.

4. Conclusion and Declaration

4.1 My evidence includes facts which I regard as being relevant to the opinions which I have expressed.

4.2 In my opinion the water quality and flooding assessment has been carried out in accordance with legislation and professional guidance. The assessment concludes that, provided the mitigation outlined is implemented, the Scheme would not result in any significant effects on the water environment.

4.3 In my opinion the measures to mitigate the water quality and flooding impacts of the Scheme are effective, justifiable and achievable.

4.4 I believe the facts I have stated in this proof of evidence are true and that the opinions expressed are correct.

4.5 I understand my duty to the Inquiry to assist it with matters within my expertise and believe that I have complied with that duty.