

A1 in Northumberland: Morpeth to Ellingham

Scheme Number: TR010059

Annex B - Flood Risk Assessment Addendum

APFP Regulation Rule 8(1)(b)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009

Infrastructure Planning

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**The Infrastructure Planning
(Applications: Prescribed Forms
and Procedure) Regulations 2009**

**The A1 in Northumberland: Morpeth to
Ellingham**

Development Consent Order 20[xx]

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Author:	A1 in Northumberland: Morpeth to Ellingham Project Team, Highways England

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APPENDIX A: DRAWINGS

1 OVERVIEW

- 1.1.1. The proposed bridge over the River Coquet would include two piers that sit on either bank of the River Coquet as detailed in the July 2020 DCO submission and assessed in the accompanying Flood Risk Assessment (FRA) (**Appendix 10.1: Flood Risk Assessment Part A [APP-254]**). Both piers were assessed to be located outside of the channel normal water level but potentially sit within the area at risk of flooding during more extreme flood events.

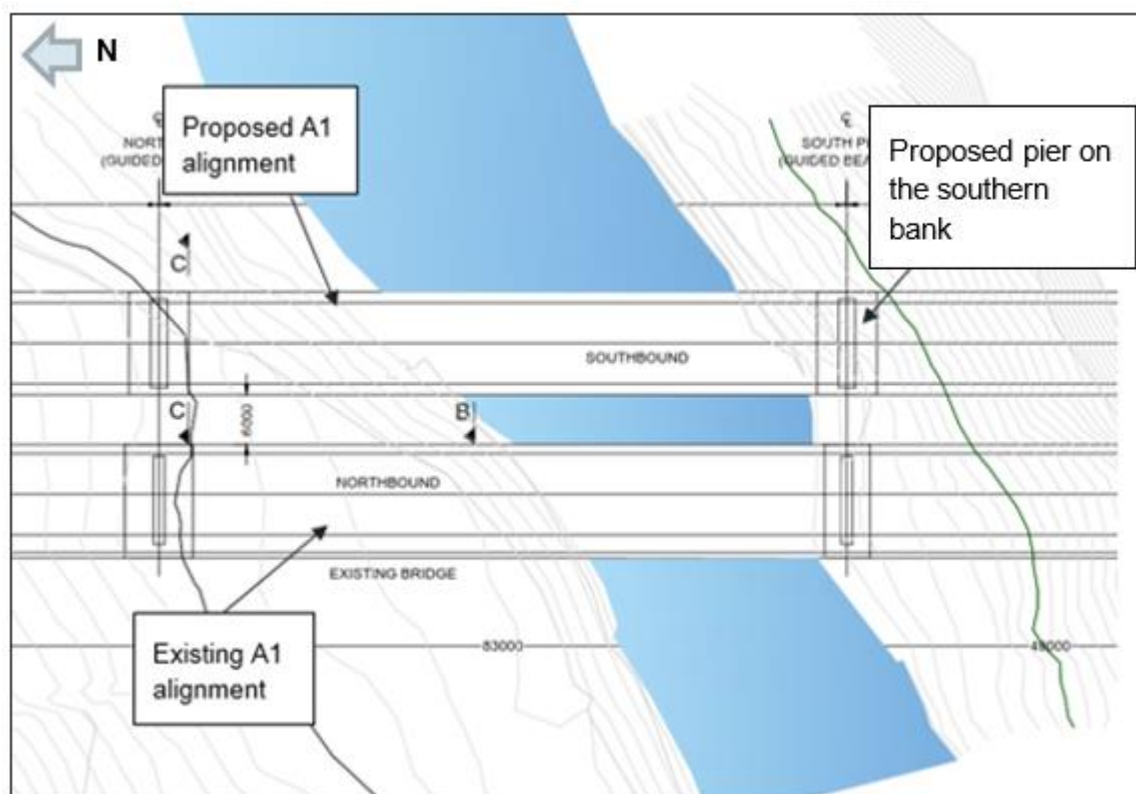


Figure 1 - Overview of original proposals on the River Coquet

- 1.1.2. The FRA (**Appendix 10.1: Flood Risk Assessment Part A [APP-254]**) investigated the potential impacts of the new piers on water levels using a Manning's assessment. The Manning's Equation calculates flow velocity and flow area within an open watercourse channel, and in turn can be used to determine changes in flood depth as a result of changes in cross sectional width. The assessment was undertaken using an indicative water level estimated to be equivalent to the 1 in 1000 year event. The assessment indicated that only the southern pier would interact with this flood extent.
- 1.1.3. The power of deviation contained in the draft Development Consent Order results in the potential for the piers to be offset from the locations assessed within the FRA as outlined in Parameter 10. The potential range of locations is illustrated in **Appendix A** and detailed below:
- The northern pier could move up to 6 m to the north (from the current proposed location) with an allowance to move the pier by a further 2 m in any other direction. This is equivalent to a movement range of between 0 m and 6 m to the north of its current location.

- The southern pier could move up to 2 m to the north (from the current proposed location) with an allowance to move the pier by a further 2 m in any other direction. This is equivalent to a movement range of between 0 m and 2 m to the north of its current location.

1.1.4. This Annex summarises the potential impact that these changes would have on water levels and hence the findings of the FRA for Part A. The updated assessment uses the same methodology as used in the FRA.

2 UPDATED ASSESSMENT

- 2.1.1. The proposed movement of the northern pier would take this structure further away from the predicted 1 in 1000 year flood extent than currently proposed. **Figure 2** below shows the predicted 1 in 1000 year flood extent in relation to the available 1 m LiDAR data. The original location was assessed to be outside the 1 in 1000 year flood extent and as such the proposed new location would also be outside of this extent. As such no further consideration of this pier with respect to flood risk is required.
- 2.1.2. The potential movement of the southern pier would take this structure further towards the river channel and potentially within the estimated 1 in 1000 year flood extent. Assuming the location is moved the maximum 2 m to the north, the adjusted location of the pier would move the base of the pier to a minimum elevation of approximately 33.1 m AOD at its upstream end. It is assumed that the pier would extend onto higher ground at its downstream face as previously proposed and therefore follow a similar alignment to the existing pier as illustrated in **Figure 1**. This in effect could potentially block flood flows through the southern extent of the floodplain from 33.1 m AOD.
- 2.1.3. A repeat of the assessment undertaken in the FRA has been completed to understand the implications of a change in the southern pier location. Full details of the previous assessment are included in the FRA.
- 2.1.4. The original baseline assessment for the Manning's calculation for a cross section excluding the new piers is unchanged and as a result the baseline conditions determined in the FRA remain valid. This assessment indicated an estimated baseline peak water level in a 1 in 1000 year flood event of 36.7 m AOD.
- 2.1.5. Removing the right bank area of the cross section from 33.1 m AOD and again completing a Manning's calculation indicates a revised peak water level of 36.95 m AOD in a 1 in 1000 year flood event; 0.25 m higher than the baseline peak water level estimated above.
- 2.1.6. An increase in water levels of 0.25 m is a slight increase on the previously estimated increase of 0.1 m as presented in the FRA.
- 2.1.7. Since the piers would be an additional obstruction to flood water, the consequence, if any, would be a rise in flood water upstream. The nearest vulnerable flood risk receptors are Shothaugh Farm High Cottage and Otter House located approximately 800 m upstream of the River Coquet bridge at an estimated elevation of 44.4 m AOD. The analysis presented above indicates that this receptor remains 7.45 m above the estimated 1 in 1000 year event peak water level.
- 2.1.8. Review of 1 m LiDAR data, as shown in **Figure 2** below, indicates that an increase of 0.25 m would remain several metres below the top of the river valley on either side (with an estimated elevation of c.59.8 m AOD at this location) and therefore does not impact any identified flood risk receptors. The estimated increase of 0.25 m is expected to be a localised increase that would not extend a significant distance upstream of the proposed structure.

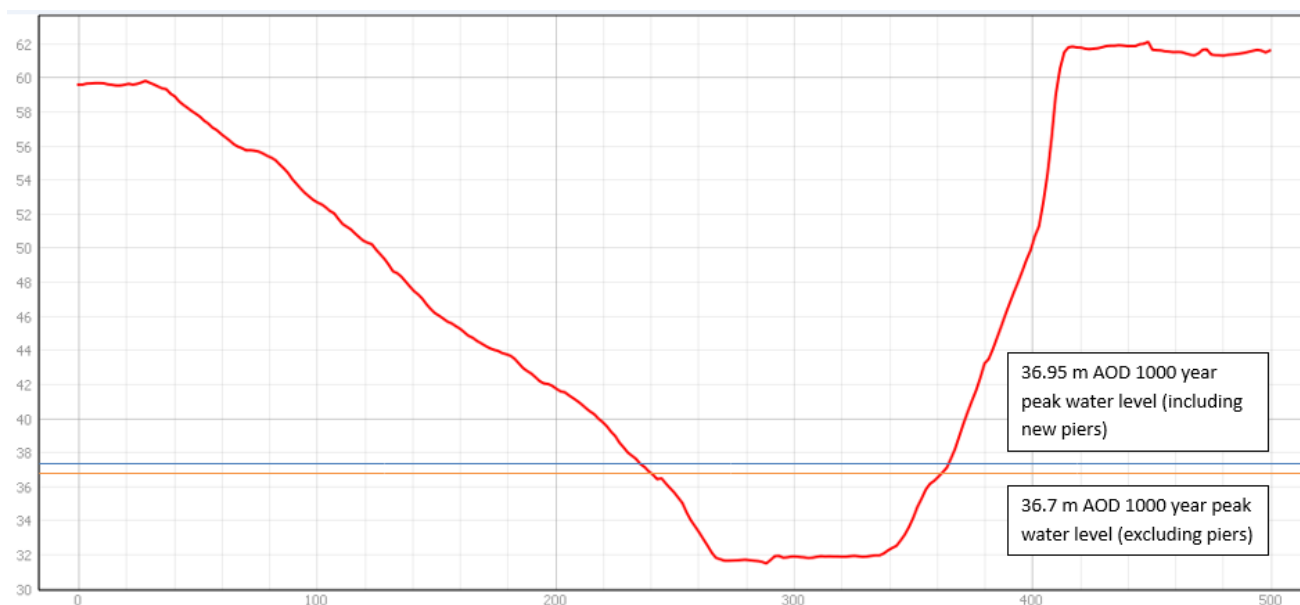


Figure 2 - Cross-section of River Coquet at bridge location based on 1 m LiDAR

- 2.1.9. Although there would be some loss of channel width if the new southern pier moved, it would be insignificant in comparison to the overall channel width. The width of the channel during the 1 in 1000 year flood event is approximately 120 m, as estimated from 1 m LiDAR data. A potential movement of up to 2 m from the original proposals for the southern pier would therefore decrease the overall channel width to approximately 118 m during the 1 in 1000 year flood event. The minor loss in channel is not expected to increase flood risk downstream.
- 2.1.10. The updated assessment demonstrates that a change in the alignment of the piers along the River Coquet would still have a localised effect that is not considered to extend a notable distance upstream or downstream of the proposed piers and is not predicted to increase flood risk to identified receptors. On this basis it is concluded that the findings of the FRA (**Appendix 10.1: Flood Risk Assessment Part A [APP-254]**) submitted to support the DCO with respect to flood risk from the proposed works on the River Coquet have not changed and remain valid.

Appendix A

DRAWINGS

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A1inNorthumberland@highwaysengland.co.uk

or call **0300 470 4580***.