

A1 in Northumberland: Morpeth to Ellingham

Scheme Number: TR010059

Flood Risk Outside Order Limits

Rule 8(1)(c)

Planning Act 2008

Infrastructure Planning (Examination Procedure) Rules 2010

Infrastructure Planning

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**The Infrastructure Planning
(Examination Procedure) Rules
2010**

**The A1 in Northumberland: Morpeth to
Ellingham**
Development Consent Order 20[xx]

Flood Risk Outside Order Limits

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1 OVERVIEW

- 1.1.1. This technical note summarises the mapped flood risk extents for the present-day baseline condition and the post development with-scheme scenario for both Part A and Part B of the Scheme. This technical note has been produced in response to paragraph A99 of the Relevant Representation made by the Environment Agency (**7.9.1 Appendix A Response to RR-04 Environment Agency [REP1-064]**). The flood risk analysis completed to inform the figures included in the document is the same as the analysis presented within the **Appendix 10.1: Flood Risk Assessment Part A [APP-254]** and **Appendix 10.1 Flood Risk Assessment Part B [APP-311]** submitted for the DCO application. The analysis and the results have not changed and no new analysis has been undertaken to support this technical note. The only change to the figures included in this document is to include the Order Limits for the Scheme, noting that the Order Limits are not shown on the figures included in **Appendix 10.1: Flood Risk Assessment Part A [APP-254]** or **Appendix 10.1 Flood Risk Assessment Part B [APP-311]**.
- 1.1.2. The figures were informed by a short 1D model of the Cotting Burn, River Lyne, Fenrother Burn, Earsdon Burn and Longdike Burn (Part A) and Denwick Burn, White House Burn, the tributaries of Kittycarter Burn and Shipperton Burn (Part B). This approach was agreed with the Environment Agency and Northumberland County Council in January 2018. The quality of the maps produced is dependent on the availability of local ground level data, noting that LiDAR data was not available for any of the watercourses in Part B. This is discussed further in the respective sections for Part A and Part B below.
- 1.1.3. Furthermore, the outputs of the 1D modelling does not provide mapped flood extents and instead the mapping provided in the figures below is based on cross sectional information that is extracted from the 1D model and 'stitched' together in comparison with available ground level data to create an indicative flood extent.
- 1.1.4. This is an acceptable and appropriate approach for the size of the watercourses that have been assessed, but the limitations of this approach as set out above should be noted. The approach to hydraulic modelling for both Part A and Part B were agreed during a consultation meeting with the Environment Agency and Northumberland County Council (NCC) in January and November 2018. The meeting minutes are included in **Appendix 4.2: Environmental Consultation 1 of 2 [APP-193]** and **Appendix 4.2: Environmental Consultation 2 of 2 [APP-194]**.

2 PART A – MORPETH TO FELTON

- 2.1.1. **Figures 1 to 5** show the modelled change in local flood risk along the Cotting Burn, River Lyne, Fenrother Burn, Earsdon Burn and Longdike Burn respectively. The analysis is based on the modelled 1 in 100 year event with a 25% allowance in peak river flow to account for climate change effects. As stated above, this is the same analysis as presented in **Appendix 10.1: Flood Risk Assessment Part A [APP-254]**.
- 2.1.2. For Part A, topographic survey data and 1m resolution LiDAR data was used for Earsdon Burn and Longdike Burn. No LiDAR was available for the Cotting Burn, River Lyne and Fenrother Burn, therefore the model for these locations is based on the topographic survey spot levels. This is discussed in paragraph 4.2.4 of **Appendix 10.1: Flood Risk Assessment Part A [APP-254]** and the approach to hydraulic modelling was agreed during a consultation meeting with the Environment Agency and NCC in January 2018. The meeting minutes are included in **Appendix 4.2: Environmental Consultation 1 of 2 [APP-193]**.
- 2.1.3. The figures indicate a slight increase in flood extents outside of the Order Limits for the Cotting Burn, River Lyne, Earsdon Burn and Longdike Burn. These extents are however considered minimal and would not affect the use of the surrounding land or pose increased risk to users of the land, including livestock. The effect to the land is considered negligible based on the extent of change predicted (discussed in paragraph 10.10.35 and Table 10-18 in **Chapter 10: Road Drainage and the Water Environment Part A [APP-050]**).
- 2.1.4. For clarification, **Figures 1 to 5** indicate that Part A, the existing A1 alignment and minor access roads that cross the modelled watercourses would flood during the modelled flood event. However, this is product of the method by which the maps have been produced (i.e. based on cross sections that are stitched together) and is not a true reflection of the risk. The 1D modelling of these watercourses indicates that none of these roads would overtop during the flood event during the existing baseline scenario of the proposed with-scheme scenario (discussed in Section 5 Post Development Flood Risk of **Appendix 10.1: Flood Risk Assessment Part A [APP-254]**).

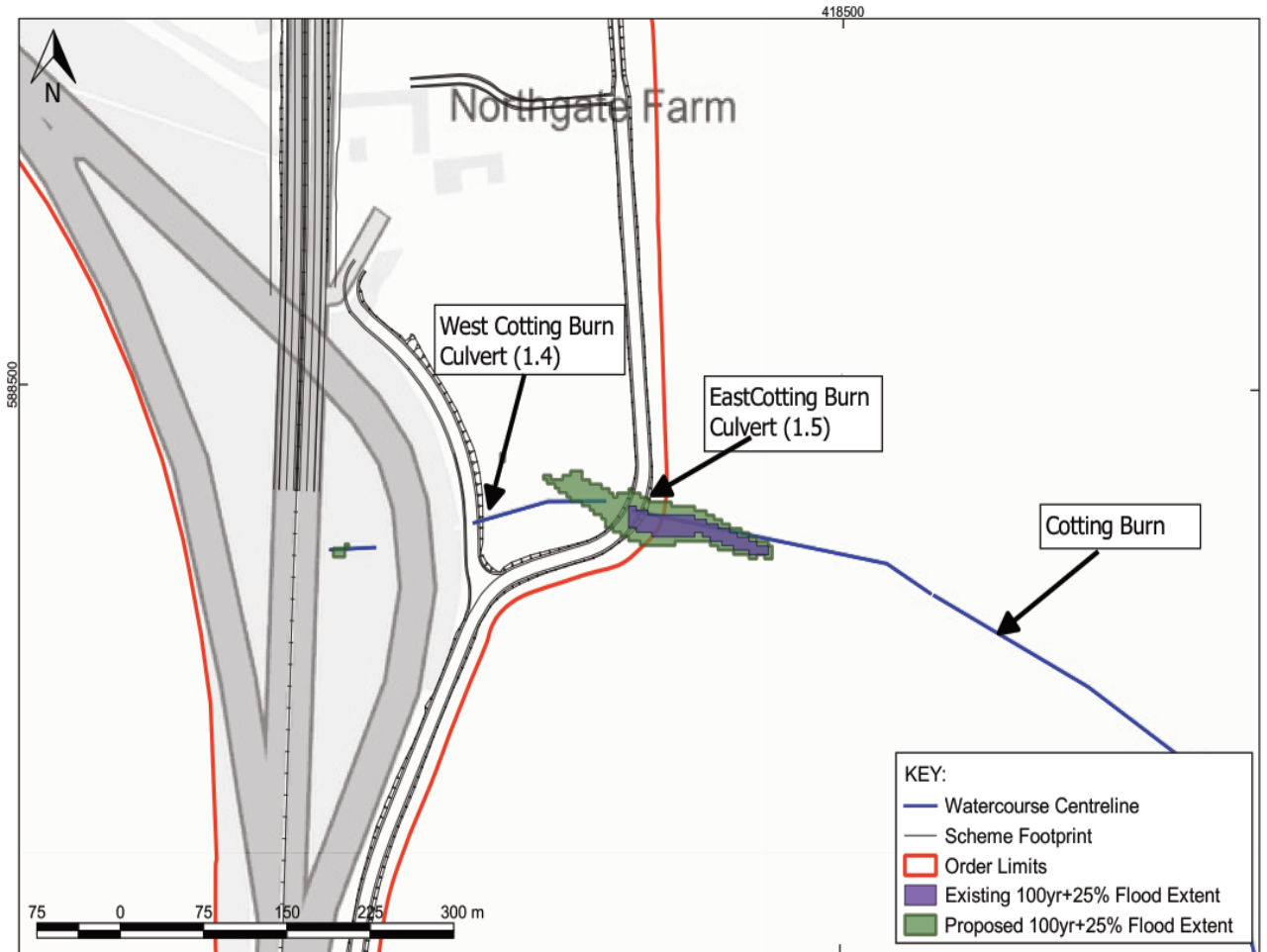


Figure 1 - Flood Extents for the Existing and Proposed Scenarios for Cotting Burn

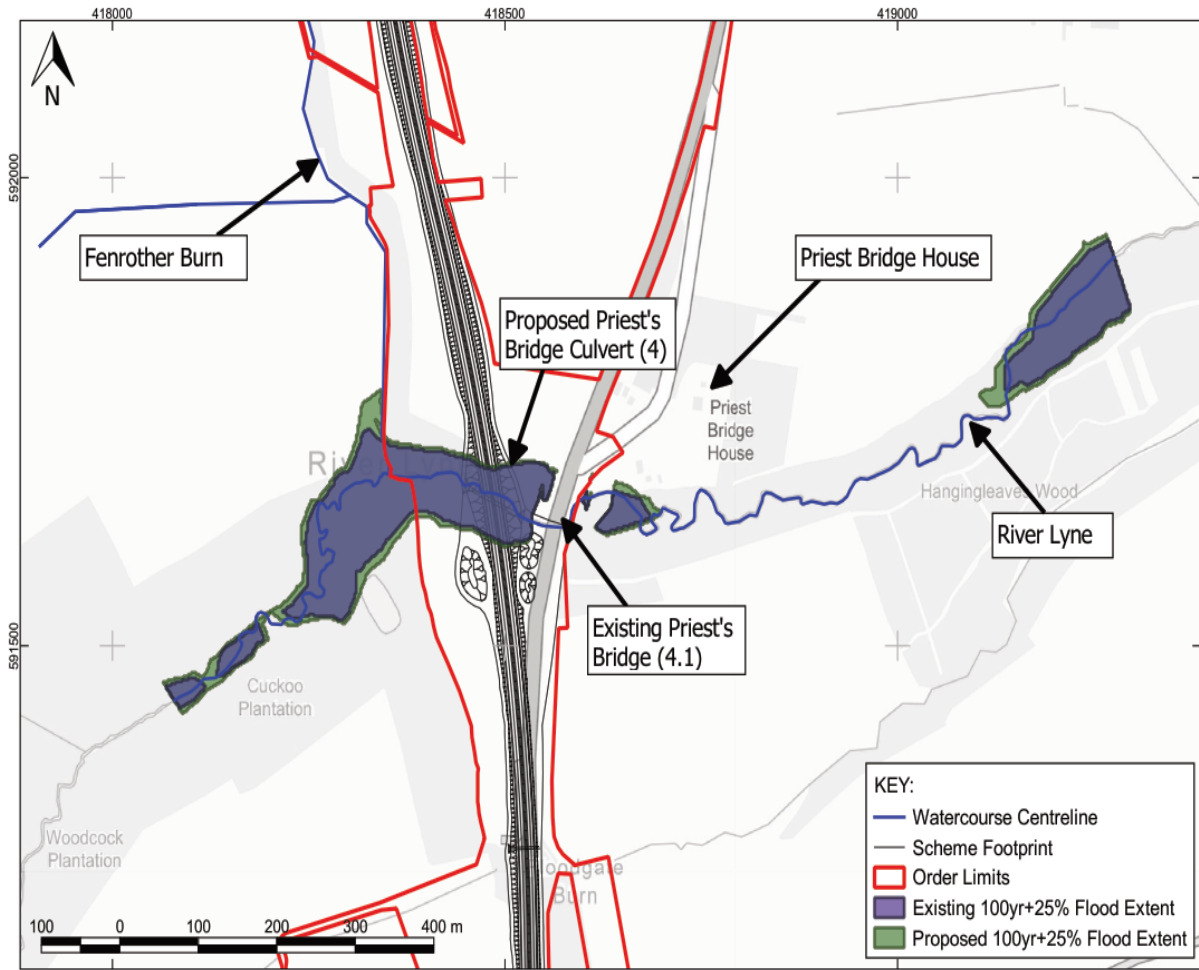


Figure 2 - Flood Extents for the Existing and Proposed Scenarios for the River Lyne

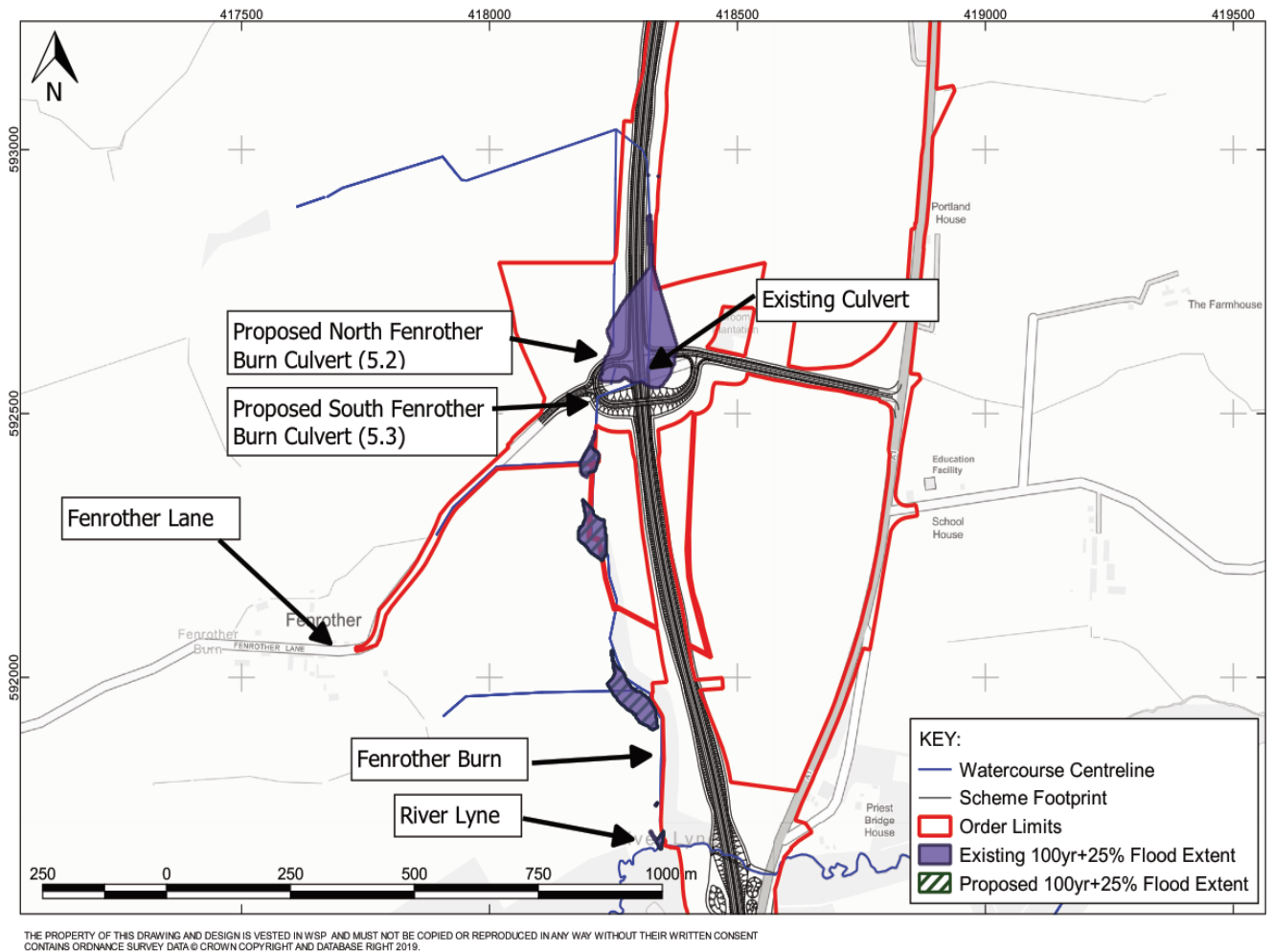


Figure 3 - Flood Extents for the Existing and Proposed Scenarios for Fenrother Burn

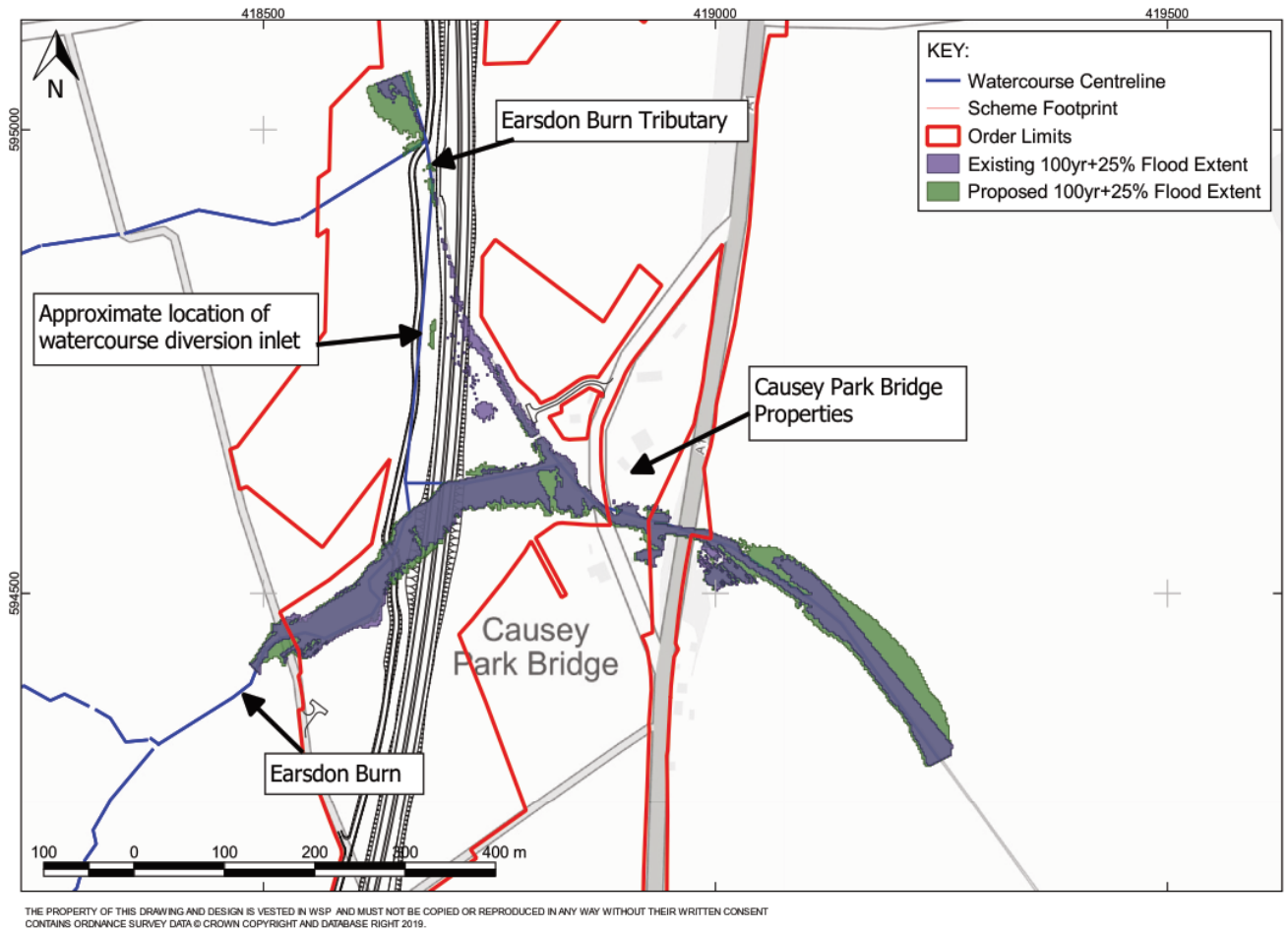


Figure 4 - Flood Extents for the Existing and Proposed Scenarios for Earsdon Burn

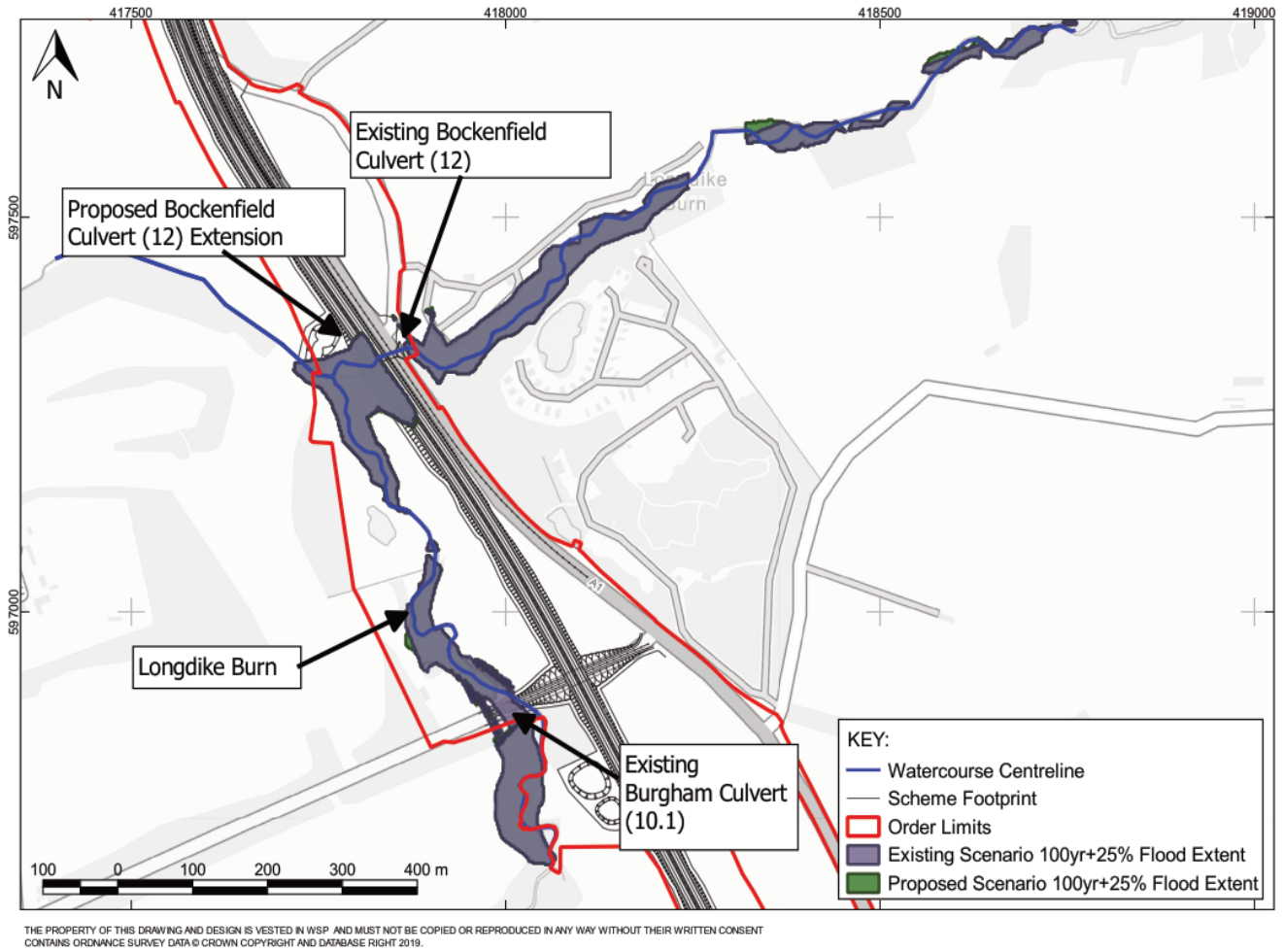


Figure 5 - Flood Extents for the Existing and Proposed Scenarios for Longdike Burn

3 PART B – ALNWICK TO ELLINGHAM

- 3.1.1. **Figures 6 to 9** show the modelled change in local flood risk along the Denwick Burn, White House Burn, the tributaries of Kittycarter Burn and Shipperton Burn respectively. The analysis is based on the modelled 1 in 100 year event with a 25% allowance in peak river flow to account for climate change effects. As stated above, this is the same analysis as presented in **Appendix 10.1: Flood Risk Assessment Part B [APP-311]**.
- 3.1.2. LiDAR data was not available for any of the watercourses along Part B. Topographic survey data and unfiltered 2m photogrammetry Digital Surface Model (DSM) data was used for Denwick Burn, White House Burn, the tributaries of Kittycarter Burn and Shipperton Burn. The photogrammetry data has been compared to survey data and adjusted where necessary, however where dense vegetation is present the channel and floodplain may not be represented accurately. This is discussed in paragraph 4.2.6 of **Appendix 10.1: Flood Risk Assessment Part B [APP-311]** and the approach to hydraulic modelling was agreed during a consultation meeting with the Environment Agency and NCC in November 2018. The meeting minutes are included in **Appendix 4.2: Environmental Consultation 2 of 2 [APP-194]**.
- 3.1.3. The figures indicate no increased flood risk outside of the Order Limits along Denwick Burn, White House Burn or the tributaries of Kittycarter Burn and Shipperton Burn.
- 3.1.4. For clarification, **Figure 8** indicates that the B6347 that crosses the modelled watercourse would flood during the modelled flood event. However, this is product of the method by which the map has been produced (i.e. based on cross sections that are stitched together) and is not a true reflection of the risk. The 1D modelling of all watercourses in Part B indicates that none of the roads in the figures below would overtop during the flood event during the existing baseline scenario of the proposed with-scheme scenario (discussed in Section 5 Post Development Flood Risk of **Appendix 10.1: Flood Risk Assessment Part B [APP-311]**).



Figure 6 - Flood Extents for the Existing and Proposed Scenarios for Denwick Burn

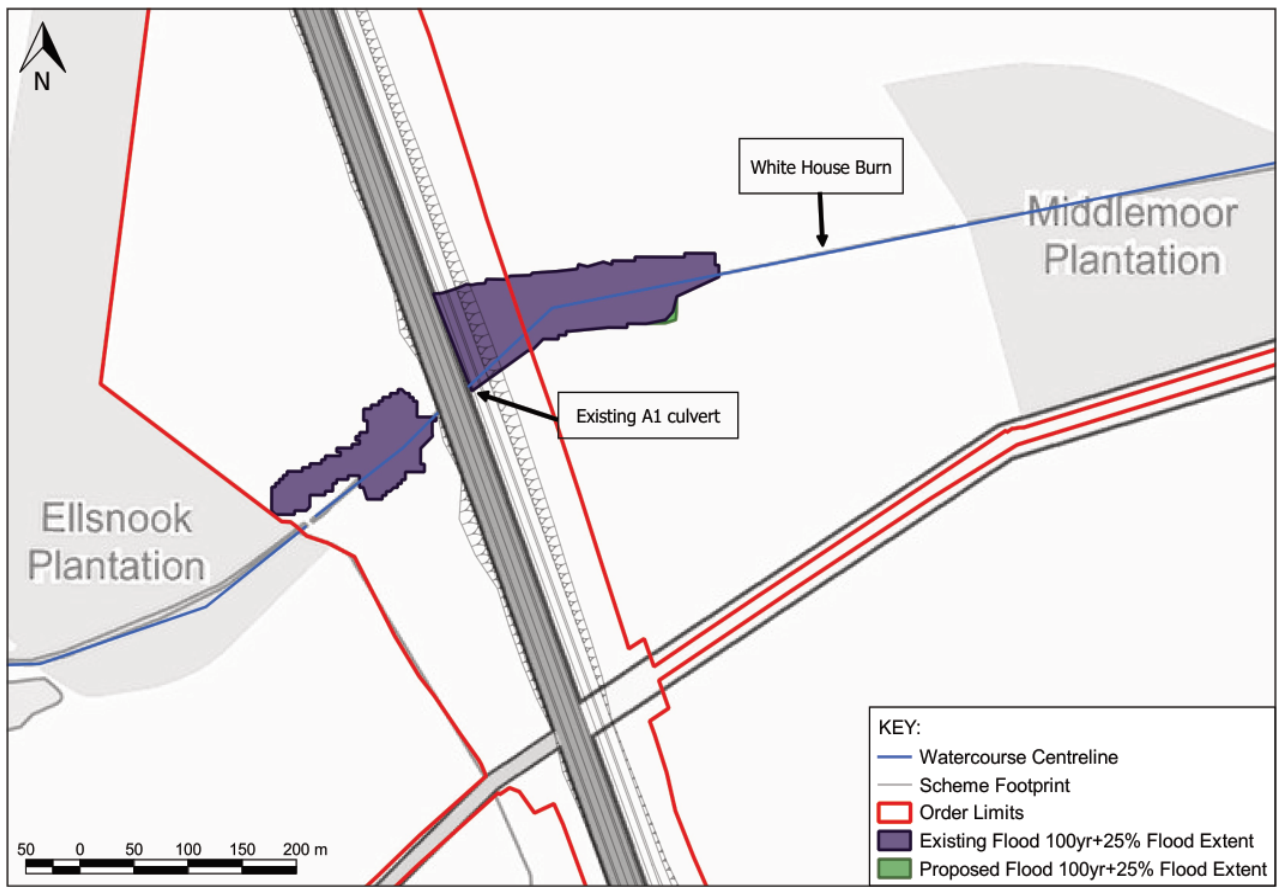
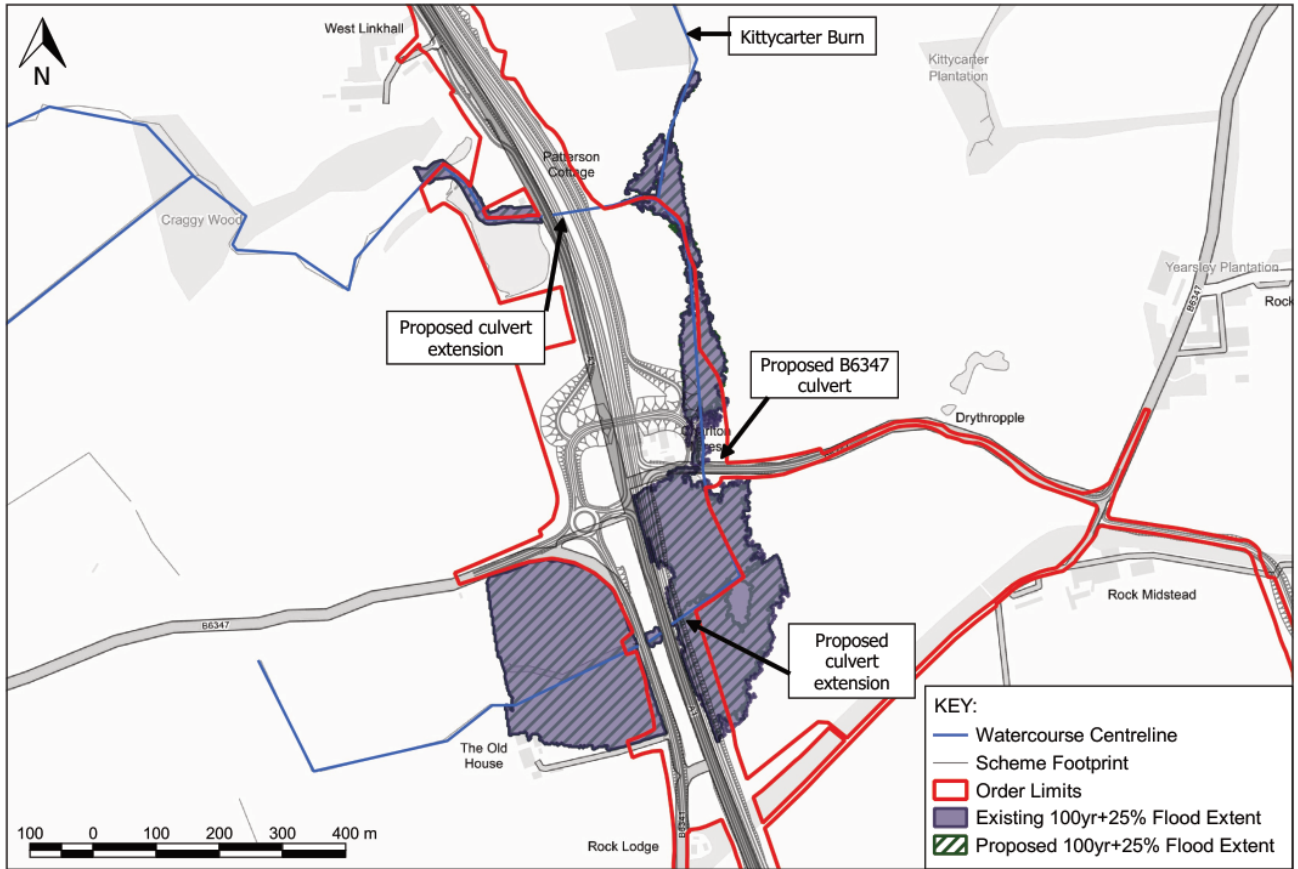


Figure 7 - Flood Extents for the Existing and Proposed Scenarios for White House Burn



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Figure 8 - Flood extents for the existing and proposed scenarios for the tributaries of Kitty Carter Burn

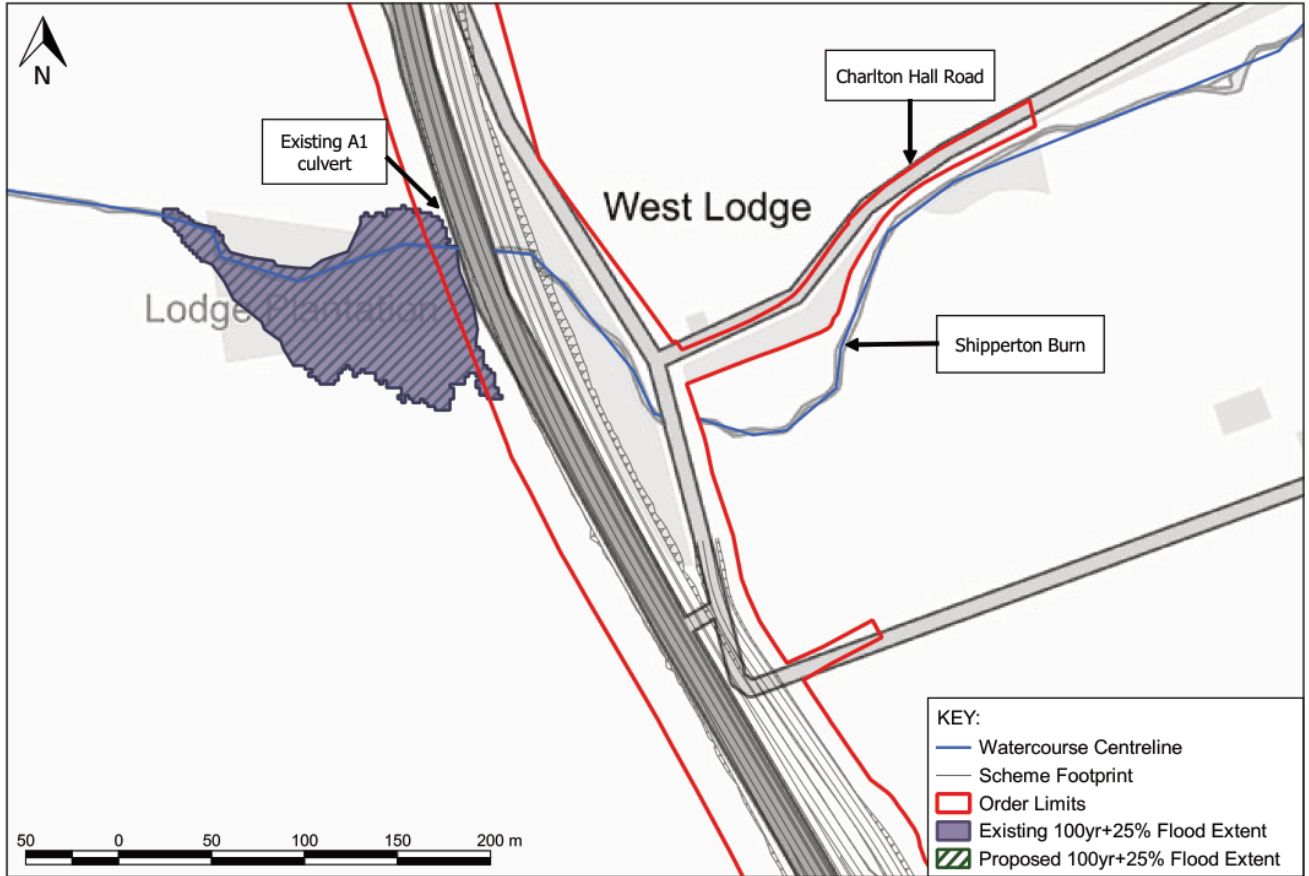


Figure 9 - Flood Extents for the Existing and Proposed Scenarios for Shipperton Burn

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