

DESIGNING FOR RESILIENCE AND SUSTAINABILITY – CASE STUDIES FROM HIGH SPEED TWO FLOODPLAIN VIADUCTS

ABSTRACT High Speed Two (HS2) is Great Britain’s new high-speed railway and will provide zero-carbon journeys between Birmingham and London.

The design life of HS2 is 120 years. This means the railway infrastructure has to be designed to deliver resilient and reliable travel for the next 120 years without major disruptions. To achieve this, a “whole lifecycle” approach has been embedded in the design of HS2 structures. This paper will discuss how this design life will be achieved, with case studies taken from the design and construction of two low-lying viaducts crossing two adjacent floodplains on the outskirts of Solihull.

River Blythe Viaduct is a 500 metre long viaduct crossing River Blythe while Marsh Farm Viaduct is much shorter at 140 metres crossing Bayleys Brook. River Blythe is a lowland river on clay passing through a high active floodplain and its valley is a designated Site of Special Scientific Interest (SSSI). Bayleys Brook is a tributary of River Blythe located within a minor valley with very broad, flat alluvial valley bottom with areas of poorly drained ground. The choice of the type of structure for each location, the materials specified for the viaducts, their construction methodology and future maintenance arrangements were largely influenced by durability and sustainability considerations. The paper shows how the prevailing design standards were challenged, how innovation through the use of digital tools was used for collaboration, and how the HS2 Design Vision was used to develop and integrate multi-disciplinary design solutions that were fit for purpose and sensitive to the context and immediate and wider surroundings. Through these two case studies the authors will demonstrate how the design and construction of HS2 infrastructure will help deliver HS2’s Sustainability Strategy goal of providing resilient infrastructure and net zero carbon transport for the next 120 years and beyond.