# Trent-Sow Parklands and Cannock Chase AONB: Design Principles for HS2

Prepared by LUC for the Trent-Sow Parklands and Cannock Chase AONB HS2 Group

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## **Document control**

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View across Rawbones Meadow SSSI



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## **1** Introduction

#### 1.1 Background

1.1.1 High Speed 2 (HS2) Phase 2a (West Midlands to Crewe), passes through and close to a notable collection of nationally and locally important landscapes in Staffordshire. These include the washlands at the confluence of the rivers Trent and Sow; the historic designed landscapes of Shugborough, Ingestre and Tixall; 18th and 19th century transport infrastructure; the Conservation Areas of The Trent & Mersey Canal, Staffordshire & Worcestershire Canal, Ingestre, Tixall, Great Haywood and Shugborough, and Colwich and Little Haywood; together with numerous listed buildings and environmental designations. Part of this landscape is within or in the setting of the Cannock Chase Area of Outstanding Natural Beauty (AONB).

#### 1.2 Aims and Purpose

1.2.1 The integration of HS2 within this special landscape requires careful consideration through design to mitigate the scheme and its effects. A high standard of design, elegance and excellence is required, especially for substantial structures such as the Great Haywood Viaduct, and mitigation measures which seek the sympathetic integration of the railway within the wider historic landscape.

1.2.2 The overall aim of this commission is to develop a Trent-Sow Parklands and Cannock Chase AONB Design and Environmental Enhancement Plan comprising the following elements:

- Stage 1: Design Principles both general and detailed principles, for works across the project area
- Stage 2: Environmental Enhancement Plan for enhancement projects located outside the Act Limits

1.2.3 The purpose of the Design and Environmental Enhancement Plan is to inform the design of key railway infrastructure in this area, namely the Great Haywood Viaduct and Ingestre Green Overbridge, as well as landscape, earthworks and planting design. It is also intended to help identify environmental enhancement measures that can be implemented alongside the construction and subsequent operation of HS2, integrating the railway in this special landscape.

1.2.4 Whilst the Plan will be delivered in two separate reports, it will be developed in a holistic manner, with the Enhancement Projects building on the Design Principles established in the first stage, reflecting the deep understanding of the project area.

#### **Review Group**

1.2.5 The Trent-Sow Parklands and Cannock Chase AONB HS2 Group, 'the Review Group', was established in 2018 during the passage of the HS2 Phase 2a Bill through Parliament. The Review Group was formed to assist the nominated undertaker in achieving a high standard of design for key design elements and mitigation measures, in response to the reported impacts of the HS2 Phase 2a Scheme, 'the Scheme', on an area of high historic interest, landscape value and environmental sensitivity.

1.2.6 The Review Group comprises the following members:

- Canal and River Trust (CRT)
- Cannock Chase AONB Partnership
- Historic England (HE)
- HS2
- Inland Waterways Association (IWA)
- National Trust (NT)
- Natural England (NE)
- Sandwell Borough Council (SBC)
- Staffordshire County Council (SCC)
- Staffordshire Wildlife Trust
- The Landmark Trust

1.2.7 Stafford Borough Council have attended a number of meetings and provided comments on this guide, mindful of the Council's position as a qualifying authority.

1.2.8 The purpose of the Review Group is to develop a set of general and detailed design principles that would be used as guidance by HS2 and its contractors to inform the general and detailed design of the Scheme in order to create a locally responsive, high quality design through this important and environmentally sensitive landscape. To inform the Review Group's design principles, HS2 developed the 'Phase 2a Great Haywood Illustrative Design Plan' (see **Figure 1.2**), which sets out HS2 design principles for the area at the Project's current design stage. The Terms of Reference (ToR) of the Review Group recognise that HS2 will have due regard to the outputs of the Design Principles as far as is reasonably practical, providing they:

- do not impact the timely, economic and safe delivery, or operation, of the railway;
- be consistent with HS2 Phase 2a Environmental Minimum Requirements; and
- be relevant to the grounds on which the relevant planning authority would be entitled to refuse approval under Schedule 17 to the Act.

1.2.9 Following the completion of the design principles the Review Group will review the nominated

undertaker's emerging designs for the railway, providing advice and response to the nominated undertaker on the design of the key railway infrastructure in this area, namely:

- the Great Haywood Viaduct
- the Ingestre Green Overbridge
- Iandscape earthworks
- the design of balancing ponds/ attenuation features
- planting design

1.2.10 The Review Group also has the responsibility to develop and propose a package of environmental enhancements, which go beyond the mitigation measures provided as part of the Scheme. These will be outside Act limits but within the Project Area. A budget of up to £1.5m has been made available for the Review Group to spend on enhancement projects.

1.2.11 In undertaking this task Land Use Consultants (LUC), working on behalf of the Review Group, has identified natural overlap between design principles and enhancement projects. This is a product of good design and an iterative design approach that seeks to achieve maximum value. It is recognised and accepted that any proposals outside of the powers of the Act would need to be considered for consent separately by the relevant authorities, secure separate landowner agreements and potentially form part of the enhancements projects, to be funded by the £1.5m budget.

#### **Project Area**

1.2.12 The project area (see **Figure 1.1**) has been developed in collaboration with the Review Group to provide a focus for both the Design Principles and the Enhancements Projects.

1.2.13 This area covers just over 3,500ha, extending approximately 3.0km north and south from the HS2 centre line in order to cover issues that might affect the important landscapes surrounding the route.

1.2.14 The Detailed Design Principles focus on the direct above ground impacts resulting from 7.2km of HS2 between Trent Walk Underbridge (ch.209+814) in the west to Colwich Bridleway 23 Accommodation Green Overbridge (ch.202+600) in the east of the project area.

| 04



<sup>| 05</sup> 

# **Great Haywood Illustrative Design Plan**



#### Legend

Hixon

Water

Proposed path route

Existing woodland

Proposed woodland planting

Proposed grassland planting

Proposed wetland planting

(6) Landscape earthworks and proposed planting

Colwich Bridleway 58 Accommodation Underbridge

Colwich Bridleway 35 Accommodation\_ Overbridge

Little Haywood

■AYWOOD ◎ HS2 (May 2018), Extract taken from C861-ARP-EV-REP-000-123838

250 125

250 Meters

#### Audience for this Guide

1.2.15 This Guide is aimed at HS2's contractors and their design teams who will be producing proposals for submission to HS2. While not part of the Schedule 17 process, the Design Principles may be a useful tool for the local planning authority. In both cases it assumes a reasonable degree of skill and knowledge in both relevant professions and of the environmental context of the proposals. The various roles and process is shown in **Diagram 1.1** opposite.

1.2.16 The use of direct referencing of the General Design Principles aims to facilitate this process. So too does the document structure by providing high level information in the initial section, and detailed guidance on different functional elements under Section 5, which includes illustrations of how both can be brought together in key locations in the project area.

1.2.17 Key documents that should be referred to are set out in Section 2.1.

#### Within Act Limits

1.2.18 Act Limits have been taken from the 2019 HS2 documents, which include land needed to build and operate the railway. This Guide assumes that land not required for the operation or mitigation of the railway will be restored to a scheme agreed with the planning authority and/ or landowner as appropriate, which could include enhancement by means of making good or opportunities for improved design of permanent features, such as attenuation facilities in line with the ToR.

#### **Outside Act Limits and Enhancement Projects**

1.2.19 This Design Guide forms one part of a commission that also includes the identification of Enhancement Projects. These Enhancement Projects will be funded separately from a £1.5m budget to be used for integration or enhancement works/ initiatives in the project area but outside of Act Limits. These are covered in The Environmental Enhancement Plan as a separate linked document.



Diagram 1.1 - Roles and Process \_\_\_\_\_

1.3.1 This Design Guide sets out the protection of important features and integration of the HS2 scheme into its surroundings, as well as enhancement to the project area, and is intended to guide detailed design and delivery of the project vision for the area. This Guide therefore presents:

- area The Vision
- The General Design Principles

#### **1.3 Document structure**

An overview of the spatial context of the project

The Detailed Design Principles for each of the major elements of the Scheme

1.3.2 The Spatial Index in Section 5 illustrates in key locations how the Detailed Design Principles could be manifested in the project area.

#### Context 2





View south from Staffordshire & Worcestershire Canal towards **River Sow** 

#### **Project Scope** 2.1

2.1.1 The extent of the project area and its special character was a subject of considerable discussion by the Review Group. It was agreed that there are five character themes and that an understanding of these characteristics is central to achieving integration of the railway into this landscape. This chapter briefly describes the context of the project area by each of the five themes:

- Communities
- Access, Enjoyment and Connectivity
- Landscape
- Historic Environment
- Ecology and Hydrology

2.1.2 Their description is not intended to be exhaustive. The purpose of this chapter is to give an overview of the context of the project area as a whole. It is not intended to set a baseline for the project area, nor replace the baseline reported in the HS2 Phase 2a Environmental Statement.

2.1.3 The themed characteristics lie at the heart of this document informing directly the overarching Vision for the project, the General Design Principles (GDPs), set out in Chapter 4 which are also grouped by theme, and Chapter 5 Detailed Design Principles (DDPs) which reference each theme where relevant.

View south over floodplain grazing

#### **Key Reference Documents**

- National Planning Policy Framework, February 2019
- National Design Guide, MHCLG, 2019
- Planning Practice Guidance
- UK Forestry Standard
- The Plan for Stafford Borough 2011-2031
- Staffordshire County Council's Planning for Landscape Change SPG: Volume 3 Landscape Descriptions
- Canal and River Trust Design Principles for Waterway Crossings
- Cannock Chase AONB Management Plan
- Cannock Chase Forest Plan
- Review of Landscape Character Framework for Cannock Chase AONB (2017)
- Conservation Area Appraisals for Colwich and Little Haywood, Great Haywood and Shugborough, Ingestre, Staffordshire & Worcestershire Canal, Tixall and Trent & Mersev Canal
- Stafford County Council Historic Environment Record for historic assets in the area
- Staffordshire SPD, Planning for Landscape Change, Volume 3
- Staffordshire Historic Landscape Character (HLC)
- Guidelines for the Selection of Local Wildlife Sites in Staffordshire 2017
- HS2 Design Vision
- HS2 Green Corridor More than a Railway
- HS2 SES2 and AP2, Volume 5: Technical
- Appendices, CA2 (LV-001-002), February 2019
- HS2 Phase 2a CT05 and CT06 Mapping

Tixall Lock ©AnneAndrews

- HS2 Phase 2a Environmental Statement (Community Area 2)
- HS2 Community Engagement Strategy
- HS2 Landscape Design Approach
- HS2 Phase 2a Information Papers, including E28: Green Infrastructure and the Green Corridor
- HS2 Phase 2a Habitat Management Strategies, e.g. Ancient Woodland Strategy
- HS2 Phase 2a Technical Standards
- HS2 Phase 2a Environmental Minimum Requirements:
  - General Principles
  - Code of Construction Practice (CoCP)
- Heritage memorandum
- Environmental memorandum
- HS2 Guidance on Rural Planting Design
- HS2 Design Guidance Historic Rural Roads and Routeways
- Phase 2a Great Haywood Illustrative Design Plan (see Figure 1.2)

#### 2.2 HS2 Phase 2a Scheme

2.2.1 HS2 Ltd recognises that the Scheme will have lasting impacts on the landscape character. experience and visual amenity of this area through the presence of the Great Haywood viaduct over the Trent & Mersey Canal, the River Trent Valley and associated embankments, and the Brancote cutting at Ingestre and Tixall. The effects of the scheme are reported in the Phase 2a Environmental Statement.

area.

2.2.2 This document uses both general and detailed design principles in line with the HS2 Design Vision, to focus on people, place and time, and the HS2 Landscape Design Approach (LDA). It builds on the Great Haywood Illustrative Design Plan which highlights the landscape, historic, and ecological elements of the Great Haywood area, that together contribute to the value and sensitivity in this location. Drawing them together, this document uses illustrative examples of how the proposed mitigation, design and enhancement opportunities will respond to and complement the surrounding environment.



River Trent with mature riverside trees

#### 2.3 Communities

2.3.1 The project area supports a variety of communities and interest groups including residents, farms, businesses and shops, and those visiting the area to enjoy its scenic beauty and recreation opportunities. Figure 2.1 provides an illustrative overview of the communities, services and facilities that are described in this section.

2.3.2 The area includes the villages of Great Haywood, Little Haywood and Colwich (collectively known as The Haywoods) as well as Ingestre and Tixall. Hixon, Weston, Milford and part of Stafford (Baswich and Beaconside) are located on the edges of the project

2.3.3 The Office for National Statistics 2017 population estimates for the project area and surrounds are coarse, grouping estimated numbers of people by

combined parishes, as follows:

- Salt and Enson, Sandon and Burston, Gayton, Stowe-by-Chartley and Weston - 2,009
- Hixon 1.906
- Hopton and Coton, Ingestre, Tixall and Berkswich -4,963
- Colwich 4,614
- Brocton 1,061

2.3.4 Population figures can be further understood by referring to the Stafford Borough Council, New Local Plan Settlement Assessment, July 2018, Appendix B Settlement Profiles. This document sets out the approximate number of dwellings for Great Haywood, Ingestre, Little Haywood and Colwich as 2,000 which could equate to a population of approximately 5,000.

2.3.5 There are numerous businesses and community facilities in the villages, including post offices, shops, pubs, pharmacies and doctor's surgeries, as well as the marina and farm shop at Great Haywood. The area also supports a number of social and religious groups.

2.3.6 The area provides a host of recreational activities used by residents, local visitors and tourists from home and abroad. The rural landscape includes farm communities with landowners and workers, as well as the parklands of Ingestre Park Golf Course. Shugborough Park's tranquillity and beauty is enjoyed by 250,000 visitors per year, alongside residential estate workers, staff and volunteers.

2.3.7 Cannock Chase AONB is a popular visitor and recreation resource, with most visitors enjoying the local landscape close to home, with easy access, attractive scenery and wildlife. In addition to widespread walking and cycling opportunities, there is horse riding and stables at Ingestre, golf at Ingestre Park Golf Club, canal boating with 200 moorings at Great Haywood Marina, boat hire base, and boating at other locations on both canals. There are more unusual facilities such as hot air ballooning at Shugborough Park attracting around 150 people per year. All of these activities contribute to the local economy, with access to the local landscape contributing to the health and well-being of communities.

2.3.8 The breadth of activities and involvement indicate a network of communities that are established and strong. Whilst the construction and, to a lesser extent, the operation of HS2 will provide a series of challenges, these communities can provide significant help in meeting them. It can do this in a number of ways, including provision of invaluable and detailed local knowledge, feedback on proposals and the generation of ideas. This role will be of equal use to the development of designs for HS2 under the Detailed Design Principles, and through the shaping, implementation and management of many of the Enhancement Projects. Meaningful engagement by HS2 and its contractors and designers, and by bodies such as the Review Group will be required in both aspects.



Figure 2.1 - Communities

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# 2.4 Access, Enjoyment and Connectivity

2.4.1 The eastern part of the project area benefits from a dense network of footpaths and occasional bridleways. This network provides connectivity between settlements of Great Haywood and Little Haywood, and enjoyment of the surrounding countryside and river valley. The western side of the project area, through the parishes of Tixall and Ingestre, has limited connectivity which is a result of the historic estate parklands.

2.4.2 The long distance Way for the Millennium (61km) runs along the Trent & Mersey and Staffordshire & Worcestershire Canals through the project area and spans the width of Staffordshire, passing through or close to Stafford, Colwich, Rugeley, Yoxall and Barton Under Needwood, providing connectivity to the wider area. The Staffordshire Way is 152km long connecting Worcestershire and Cheshire, running through the project area across Shugborough Park and along the River Trent.

2.4.3 The Trent and Sow rivers play an important part in recreation in the area, allowing access via towpaths and the waterways. There is a history of using the Trent and Sow combined with the canals to create circular canoe touring routes, many of which use the area around Great Haywood to transfer from river to canal. These recreational opportunities provide useful socioeconomic benefits which could be further promoted and developed.

2.4.4 Shugborough Park, owned by the National Trust, connects to the Cannock Chase Forest and Country Park which is Open Access Land to the south. Access to Shugborough Park is provided by the National Trust. There are also a number of small public parks, recreation and play facilities located within the larger settlements, often connected by footpaths.

2.4.5 Connectivity and recreational areas are shown on **Figure 2.2** opposite.



Figure 2.2 - Access, Enjoyment and Connectivity

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Sandstone Estatelands LCT from Trent Walk looking north west

#### Landscape 2.5

2.5.1 The Design Principles have been developed to respond to landscape character, including the Special Qualities of the Cannock Chase Area of Outstanding Natural Beauty (AONB). The diverse landscape of the project area is represented by four Landscape Character Types (LCTs) which are shown on Figure **2.3**, taken from the Staffordshire SPD, Planning for Landscape Change, Volume 3, which includes descriptions of landscape character sub-types. A summary of key landscape characteristics of each LCT is provided below. Key views identified in the CA Appraisals are shown on Figure 2.3, and 2.4 shows representative views assessed in the HS2 Phase 2a ES.

#### Sandstone Estatelands LCT

2.5.2 Gently rolling, open, lowland farmlands with acid sands and sandy brown soils over Triassic sandstones and sparse dispersed settlement often between straight roads. Vegetation comprising remnant silver birch woodlands, heathland and intact well-treed stream corridors, and degraded lost and fragmented hedgerows with trees.

#### **Riparian Alluvial Lowlands LCT**

2.5.3 Flat river valley with alluvial soils and occasional peat overlie alluvial drift and Triassic mudstones with pastoral floodplain farming. Little settlement and small, narrow lanes resulting in a rural landscape of quiet, peaceful character. A large scale landscape with boundaries of fencing and hedges with trees. Views



Riparian Alluvial Lowlands LCT from Mill Lane bridge looking north east over River Trent

across the landscape are framed by woodland blocks and contained by surrounding well wooded valley slopes. Watercourses are well wooded.

#### Settled Farmlands LCT

2.5.4 Strongly rounded lowlands and hills with steeper slopes and narrow stream valleys draining the plateau with non-calcareous loamy brown soils overlying Triassic mudstones. An arable, varied irregular pattern of small to medium sized hedged fields and the scatter of small woodlands (often ancient) contrasts with distinctive historic designed parklands with parkland trees and increased woodland cover.

#### Sandstone Hills and Heaths LCT

2.5.5 An undulating landscape with steep sided hills and dissected plateaus with acid sands and sandy brown soils over Triassic sandstones. Dispersed settlement linked by sunken and winding lanes. Large regular fields in lower, flatter areas allowing expansive views across small fields on the steep valley sides bound by hedgerows with mature oak trees. Broadleaved woodlands (often ancient), copses and heathland typically lie in clusters and along ridgetops.

#### Cannock Chase AONB

2.5.6 The Cannock Chase AONB is located in the south of the project area. Further information on the AONB can be found in the Cannock Chase AONB Management Plan 2019-2024 (Cannock Chase AONB, 2019). A summary of the relevant Special Qualities of



Settled Farmlands LCT Pasturefields Lane railway footbridge looking north east

the AONB is provided below, arranged in factors that contribute to natural beauty.

#### Landscape Quality

A largely intact landscape of heathland and wood pasture, providing a historical and spatial continuity of scale, openness, semi-natural land cover, public ownership and access.

#### Scenic Quality

- A scenic and varied landscape of heathland, woodland, wood pasture, parkland, mixed pastoral and arable farmland, and traditional farmsteads.
- Domed plateau landform particularly influenced by the River Trent to the north.
- Inspiring views both to the elevated plateau of the Chase from surrounding areas and from the high ground of the Chase across the farmed vales.

#### Relative wildness and tranguillity

A haven of tranquillity and wildness, providing popular spaces for informal recreation.

#### **Natural Heritage Features**

- Extensive areas of lowland heathland and associated habitats of EU importance.
- Rivers, wetlands and waterways including the Trent and Sow rivers, the Staffordshire & Worcestershire Canal and Trent & Mersey Canal.
- Ancient broadleaved woodland and wood pastures

#### **Cultural Heritage**

#### **Connectivity and Community**

2.5.7 In addition to the typical contributing factors to natural beauty, there is deep public understanding and enjoyment of the Chase which makes it special. There is a strong network of local communities and interest groups who cherish and help care for the Chase and its designated status. There is a network of well-maintained rides and paths through woodland and heathland, providing opportunities for stimulating exercise and exploration.



Sandstone Hills and Heaths LCT from Shugborough Park ©Cookson&Tickner

containing veteran oak trees, woodland flowers, birds, bats and insects.

 Wildlife that is nationally rare, protected and/ or strongly associated with the Chase.

A rich history, including historic houses and parkland, historic field patterns, the Staffordshire & Worcestershire Canal and Trent & Mersey Canal. Historic parkland, ornamental landscapes, and the relationships between them, often associated with fine houses and estates such as Ingestre, Shugborough and Tixall.

Common land which has an ancient history providing grazing for local farms and smallholdings.

#### **Key views**

#### Important views identified in the Staffordshire & Worcestershire Canal CA Appraisal

- 1. View to Tixall Farm
- 2. View over meadows
- 3. View over The Broad Water to Tixall Gatehouse

#### Positive views identified in the Trent & Mersey Canal **CA** Appraisal

- 4. Views to Haywood Mill from the canal and towpaths
- 5. Views north and south along the Trent & Mersey Canal
- 6. Views over the aqueduct

#### Positive views identified in the Tixall CA Appraisal

- 7. View to Bottle Lodge
- 8. View from drive north of Tixall Farm

#### Positive views identified in the Colwich and Little Haywood CA Appraisal

9. Views to Cannock Chase from Colwich

#### Positive views identified in the Great Haywood and Shugborough CA Appraisal/ Shugborough Park Management Plan

- 10. Sequential views along Trent Lane to Shugborough Estate and Essex Bridge
- 11. Sequential views of the Trent & Mersey canal open out to expansive views of the River Trent
- 12. Sequential views along canal
- 13. Long, extensive views of the River Trent, Shugborough Hall, parkland and Cannock Chase
- 14. Vistas from Shugborough Hall over parkland, the ruin, river Sow and countryside beyond
- 15. View to Shugborough Hall
- 16. View from the Triumphal Arch over the park and wider landscape setting
- 17. Vista from historic woodland path over the park and wider landscape setting
- 18. Vista to the north from Stafford drive approach and sequential views along Stafford Drive

#### Positive views identified in the Ingestre CA Appraisal

- 19. View from near Lion Lodges to Hoo Mill
- 20. View to well wooded Little Ingestre
- 21. Vista over open countryside towards Trent Walk
- 22. Looking down the avenue of trees from the grounds of Ingestre Hall
- 23. View from Trent Walk over Ingestre Parkland



Figure 2.3 - Landscape and Views 1

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#### Representative views assessed in HS2 Phase 2a ES

- 008-03-001 View south from Moreton Lane, Colwich Bridleway 22
- 008-03-002 View south west from Moreton Barn Farm, Colwich Bridleway 22
- 008-03-003 View from Colwich Footpath 29, Swansmoor Farm
- 008-03-004 View west from Gorse House, Colwich Footpath 30
- 008-02-005 View south west from Tolldish Lane
- 008-03-006 View north east from Far Coley Farm, Colwich Footpath 36
- 008-02-007 View north along Coley Lane
- 008-04-016 View north east along A51 Lichfield Road
- 008-02-017 View north from Main road to A51 Lichfield Road Junction
- 008-03-019 View north-west from Haywood Approach, Shugborough
- 008-03-020 View north from Colwich Bridleway 58
- 009-03-002 View south along Trent and Mersey Canal towpath
- 009-03-003 View south from Bridge No. 76, Trent and Mersey Canal
- 009-03-007 View north along Trent and Mersey Canal towpath
- 009-03-008 View north along Trent and Mersey Canal towpath
- 009-03-009 View north from Trent and Mersey Canal aqueduct
- 009-03-010 View north across Staffordshire and Worcestershire Canal
- 009-03-011 View north from Haywood Bridge at Haywood Junction
- 009-03-013 View north from Triumphal Arch, Shugborough Hall
- 009-02-015 View north along Great Haywood Road
- 009-02-016 View south-west along Ingestre Park Road
- 009-03-019 View north-west along Tixall Road
- 009-03-021 View south-west along Trent and Mersey Canal towpath
- 009-02-022 View north-east at Lion Lodges, Ingestre Park Road
- 009-02-024 View north-east along Mill Lane
- 009-03-026 View from Berkswich Bridleway 0.1629, Broc Hill
- 010-03-005 View south-west from Tixall Bridleway 0.1628
- 010-04-007 View west along Hanyards Lane
- 010-03-009 View south from Tixall Bridleway 0.1628
- 010-03-010 View south from Hixon Footpath 6 Pasturefields Bridge
- 010-03-014 View south-east from Ingestre Hall entrance
- 011-03-002 View south-west from Hopton and Coton Bridleway 19



Figure 2.4 - Landscape and Views 2

km

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#### Historic Environment 2.6

2.6.1 The Design Principles have been developed in consideration of the rich historic environment within the project area. This section provides an overview of the key elements that should be referred to and considered in any design process. Figure 2.5 opposite illustrates the historic environment designations. Staffordshire Historic Landscape Character (HLC) studies should be referred to.

2.6.2 The three estate parklands of Tixall, Ingestre, and Shugborough in the project area are a reflection of the powerful local families and institutions once living here. In the early C16th the Tixall estate was owned by the Aston family, who had a long history in the area, claiming the office of the 'Mastership of the Game and Rule of the Cankewodde' from the middle ages, a claim which brought them into frequent disputes with the Bishops of Coventry and Lichfield, and other local families. Tixall Gatehouse, built for Walter Aston in c.1575 still stands, and elements of the rest of the estate still survive. The whole estate was sold to the Chetwynd-Talbots in 1845, who owned the adjacent Ingestre estate.

2.6.3 The Chetwynds acquired Ingestre in the thirteenth century and Walter Chetwynd built the magnificent house at Ingestre c.1613 and the church of St Mary between 1673-6, widely accepted to be Christopher Wren's only church outside London. Walter Chetwynd became Viscount Chetwynd in 1717, but the estates passed to a daughter who married John Talbot, Earl of Shrewsbury. In 1786 the son of Catherine Chetwynd and John Talbot became Earl Talbot and the family took the name Chetwynd-Talbot. In 1858 the third Earl Talbot became Earl of Shrewsbury. Lancelot 'Capability' Brown worked on the grounds in 1756, and Nash worked on the house between 1808-10, reflecting the wealth and status of the family.

2.6.4 The Ansons of Shugborough bought the moated manor house in 1624. In 1720 Thomas Anson demolished the old medieval house and started the process of development in this far corner of Cannock Chase. It was when his brother George had the good fortune to capture a Spanish treasure ship that the remarkable park started to take shape, with groundbreaking monuments and follies in the Chinese, Rococo and Greek Revival styles, including some of James 'Athenian' Stuart's earliest work in this country. Subsequently, the estate was at the forefront of early C19th innovations in agriculture and horticulture, reflected in the two Model Farms and the innovative Walled Garden designed by Samuel Wyatt for Thomas Anson II.

2.6.5 Given the location of these estates where the Trent and Sow valleys meet, it was inevitable that the transport revolution would play a part in the transformation of the landscape. Components of



Figure 2.5 - Historic Environment

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A View of Shugborough and the Park from the East. Nicholas Thomas Dall, circa 1768 – 1769 ©National Trust, collection ref NT1271044



Extensive view of Shugborough Park and Monuments. Nicholas Thomas Dall circa 1768. ©National Trust NT1270616

transport infrastructure had already been constructed in the area in the form of Essex Bridge, a fourteen-arched packhorse bridge, which is now a scheduled monument.

2.6.6 The Trent & Mersey Canal in this area was completed in 1770, along the Trent valley to provide a connection to the potteries. It was ultimately completed in 1777, five years after its greatest engineer, James Brindley, had died. His ambition of a national canal system came closer to completion with the construction of the Staffordshire & Worcestershire Canal in 1772, which left the Trent & Mersey Canal at the Haywood Junction and utilised the Sow valley to connect ultimately with the River Severn. The Broad Water at Tixall Wide is a section of the canal that widens out adjacent to the Tixall estate. It is generally accepted that this was designed to give the impression of a natural landscape feature.

2.6.7 The railways came next, the Trent Valley Railway bought the London and Birmingham line in 1845. The railway went through Shugborough, and its architect John Livock designed the tunnel portals (now listed), and the over bridges (one is listed). The North Staffordshire Railway followed, running roughly parallel to the Trent & Mersey canal, with the Trent Lane railway bridge now listed.

2.6.8 In an area where the designed landscapes were almost contiguous, but where the geography was such that transport infrastructure was bound to pass through, each period has offered a complementary architectural response to the landscape. Those responses are now considered worthy of protection through designation. It is an aspiration to continue this tradition of imaginative architectural responses to this historic landscape.

#### Assets on the National Heritage List

2.6.9 There are nine Grade I, ten Grade II\* and 73 Grade II Listed Buildings within the project area, the majority of these are concentrated in the south east. There are four Scheduled Monuments in the south of the area associated with the Rivers Sow and Trent.

2.6.10 Shugborough is a historic parkland and garden of exceptional significance. It represents a diverse, palimpsest landscape of complex character and multiple uses and interest. The fundamental significance of the designed landscape, reflected in its inclusion at Grade I in the English Heritage Register of Parks and Gardens of Special Historic Interest, derives from two clear phases of historic design: Thomas Anson's mid-late C18th addition of cutting-edge Chinese, Rococo and Greek Revival monuments, and the extensive early C19th redevelopment of the park by Thomas Anson II to accommodate a new innovative model farm at the centre of an expansive and accomplished Landscape Park. Shugborough is virtually unique as a park, sitting at the forefront of innovation in two separate eras and having the results of both still surviving today.

2.6.11 Ingestre Estate Parklands and Tixall Estate Parklands are not on the National Heritage List, although their importance is explained in the preceding section.

#### **Conservation Areas**

2.6.12 There are six Conservation Areas (CAs) in the project area which are shown on Figure 2.5. Full details of these CAs are contained in their respective Appraisals, which can be found on Stafford Borough Council's website. Appraisals set out the key positive characteristics, protection and future management. and therefore should be consulted to inform any proposals. Summaries of the CAs Special Interest are provided below.

2.6.13 Colwich & Little Haywood CA: A relatively well-preserved street pattern, with ancient lanes and a green way remaining with a collection of building types from the C13th Church of St Michael and All Angels, C16th and C17th cottages; C19th farms, railway architecture; and Victorian houses, reflecting strong time-depth and agricultural roots of the villages. The villages host a wealth of mature trees and historic boundaries of holly hedges, stone walls and contrasting orange brick walls. There are dramatic, unspoilt views of Cannock Chase.

2.6.14 Great Haywood & Shugborough CA: Great Haywood - a linear village comprising historic buildings and well preserved stone walls with a variety of building types and architectural styles, including a wealth of surviving classical features, lending elegance to the village. There is a strong connection between the village and Shugborough estate, as a result of the estate cottages designed by Samuel Wyatt as part of his early C19th work for Thomas Anson II and preserved historic routes into Shugborough. There are countryside views from the Trent & Mersey Canal tow path.

2.6.15 Shugborough - a breath-taking parkland with an overarching classical style and an abundance of mature trees, Grade I registered Shugborough Park and C17th Shugborough Hall, many Scheduled Monuments and structures listed at Grade I and II\*, and

2.6.16 **Ingestre CA:** A complete country estate including Hall, Church, stables, historic gardens, estate cottages, walled garden and pavilion, reflecting its built historic development from the early C17th to the early C20th, with little loss or alteration to buildings and plan form. Historic assets are of an exceptionally high quality, including the Grade I St Mary's Church, the sole church by Sir Christopher Wren outside of London; Grade II\* Ingestre Hall with phases of development by Nicholas Hawksmoor 1688, Nash 1808-1810, and John Birch 1882: a Grade II Orangery thought to be by Samuel and Joseph Wyatt; and the landscaped gardens including elements of a Lancelot 'Capability' Brown design and the Grade II listed Ingestre Pavilion.

CA: An area of outstanding industrial archaeological significance, both nationally and locally. An early narrow canal completed in 1772, forming part of a national network of navigations following the natural contours of the landscape with hardly any embankments or cuttings. It retains a C18th narrow pound lock and lock keepers cottage at Tixall and numerous single-span brick road and accommodation bridges with stone and brick copings, ironwork features, sandstone steps and

striking landmark bridges, reflecting the development of the railways, the canal network and the historical relationship between village and estate. The presence of two well-preserved Model Farms demonstrate the development in agriculture during the C19th. The River Trent, River Sow and Trent & Mersey Canal meandering through the parkland create a peaceful character, creating picturesque views and vistas of the surrounding parkland and pastures.

#### 2.6.17 Staffordshire & Worcestershire Canal

copings, and historic surfaces. The surviving mill and wharf at Great Haywood reflects the importance of the canal for industry.

2.6.18 The canal has a predominantly rural setting, characterised by long reaching views out over rolling countryside, water meadows, and historic landscaped parkland. The canal forms a distinctive part of the setting of the historic buildings and landscape of the Tixall CA. and includes a section of canal. Tixall Broad. attributed to Lancelot 'Capability' Brown, Canal-side trees and hedgerows form boundaries to give an enclosed setting to the canal in parts. There are strong visual elements of industrial transportation heritage due to the close proximity of the railway and navigations of the River Sow.

2.6.19 **Tixall CA:** Long associated with the parkland and estate of the former Tixall Hall (demolished in the 1920s), between Ingestre Estate to the north and the Shugborough Estate to the south. The village remains unaffected by unsympathetic modern development and retains unspoiled character. There is a collection of listed buildings, monuments and structures reflecting the history of the Tixall Estate and village. The Grade I listed C16th Tudor Tixall Gatehouse, the former C16th and later C18th Tixall Hall, and purpose built C19th model farm survive as landmarks.

2.6.20 There is a strong visual harmony and estate identity created through the use of local vernacular building materials of Tixall Stone and Staffordshire red brick. The former designed parkland attributed to Lancelot 'Capability' Brown, provides breathtaking views and vistas of open countryside and the Staffordshire and Worcestershire Canal. There are a series of long and short vistas along the winding country road through the village and significant areas of woodland define spaces and frame views.

2.6.21 Trent & Mersey Canal CA: An outstanding area of industrial archaeological importance. both nationally and locally. An early narrow canal completed in 1777, forming part of a national network of navigations, following the natural contours of the landscape with hardly any embankments or cuttings, with changes in level being negotiated by simple pound locks or series of locks. There is a wealth of surviving single-span brick road and accommodation bridges with stone copings, sandstone steps, historic paving surfaces, and narrow pound locks with gates, beams, pounds, sluices, weirs and culverts, many original to the canal and listed, with the bridge at Great Haywood a Scheduled Monument. There are early C19th cast iron mileposts and other canal ironwork features such as bridge plates and strapping posts. Groups of industrial buildings, wharfs and boatyards strategically located close to the canal, such as Sandon lime kiln and the mill and wharf at Great Haywood, reflect the importance of the canal for industry. The canal has a predominantly rural setting with surviving trees, hedgerows and water meadows.

#### **Scheduled Monuments**

2.6.22 Located in the west of the project area, St Thomas' Priory survives with both standing masonry, earthwork and buried remains. The site is relatively complete and retains both the core buildings and many typical features of the monastic outer court. St Thomas' Priory represents a well-documented example of an Augustinian monastery with historical records dating from its construction during the C12th through to its dissolution in the C16th.

2.6.23 Situated 160m south west of St Michael and All Angels' Church in Colwich, the moated site at Church Farm is in a good state of preservation and includes upstanding earthwork remains on the island. Moated sites are medieval monuments often indicating wealth and status in the countryside. This Scheduled Monument is located in the south east of the project area.

2.6.24 Great Havwood Canal Bridge 109 is a single span canal bridge situated at the junction of the Staffordshire & Worcestershire Canal with the Trent & Mersey Canal at Great Haywood. It is built of red brick with a wide elliptical arch and low stone-coped parapets. It was designed by the engineer James Brindley as part of his Grand Cross scheme linking the ports of Hull, Liverpool, Bristol and London by connecting the rivers Mersey, Trent, Severn and Thames. The monument is also a Grade II listed building.

2.6.25 Essex Bridge is a multi-span bridge over the River Trent to the west of Great Haywood and at the east end of the Shugborough Hall estate. The structure has over 14 segmental arches with cut waters to both sides, spanning a length of 100m and up to 2m wide between the two parapets. The bridge is also a Grade I listed building, located within the Grade I Registered Shudborough Historic Park and Garden.

#### Historic Landscape and Archaeology

2.6.26 The medieval landscape of the Trent-Sow area has a distinctive confluence of the Washlands in the area now known as the Great Haywood junction. To the east of the River Trent the land was generally enclosed, characterised by strip fields, piecemeal and rectilinear enclosure. In contrast, the west of the project area was typically unenclosed, with the exception of a Deer Park at Tixall.

2.6.27 Post-medieval historic landscapes of the Trent-Sow area largely reflect the landscape structure and pattern found today. Significant portions of ornamental gardens and parklands are found surrounding Shugborough, Ingestre and Tixall. The settlement pattern found in this period can be largely seen today. A scattering of woodland blocks and a variety of fieldscapes dominates the remainder of the project area. More information can be found at the Staffordshire Historic Environment Record.

2.6.28 Survey work completed within the Staffordshire National Mapping Programme has identified numerous Bronze Age Round Barrow sites within the project area, as well as several Iron Age Square Barrows, with Little Ingestre being noted for a number of sites. Additionally, there is significant evidence of ridge and furrow, with the majority dating back to medieval times.





Great Haywood Canal Bridge 109 Scheduled Monument, with surviving historic materials to the bridge and surfaces



View along the Staffordshire and Worcestershire Canal with historic buildings associated with the canal

Grade I listed Tixall Gatehouse, part of the Tixall Conservation Area © AnneAndrews



View across Tixall Broad on the Staffordshire and Worcestershire Canal with waterside trees

Grade II\* listed Ingestre Hall, part of the Ingestre Conservation Area © FelixPepler



## 2.7 Ecology and Hydrology

2.7.1 The project area is a rich, biodiverse landscape, including the natural watercourses; River Trent and Sow and associated tributaries, as well as the Staffordshire & Worcestershire Canal and Trent & Mersey Canal. Rare saltmarsh and floodplain habitats are associated with watercourses. Ancient woodland, acid grassland and heathland are further important habitats associated with Cannock Chase. All of these offer opportunities for enhancement and greater connectivity.

2.7.2 The corridors along the River Trent and Sow are identified primarily as Flood Zone 3, with a high annual probability (1:100 or greater) of river flooding. There are some small areas in Flood Zone 2, also located along the river corridors. These broadly align with the flood plain grazing marsh shown on Figure 2.6 opposite.

2.7.3 Cannock Chase Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) (1) lies on the southern edge of the project area, acting as an important link in the wider ecological network. There is an aim for the wider Cannock Chase area to address structural issues in the heathland and wood pasture, which will address the unfavourable habitat conditions.

2.7.4 Rawbones Meadow SSSI (2) is located in the southern part of the project area, immediately adjacent to the Broad Water on the Staffordshire & Worcestershire Canal. It comprises 20ha of neutral grassland on permanently moist alluvium and is special due to the presence of species-rich rush pasture. This plant community comprises wet grassland and swamp, which supports regionally significant numbers of breeding snipe.

2.7.5 Pasturefields Salt Marsh SSSI and SAC (3) is a modified remnant of the former saltmarshes of the Trent Valley and is one of only two known extant brine spring marshes in the country. It is an extremely rare and vulnerable habitat. Baswich Meadows SSSI (4) is an agriculturally unimproved, semi-natural permanent wet pasture supporting waders.

2.7.6 There are eleven Local Wildlife Sites, Sites of Biological Importance and Biodiversity Alert Sites, namely Wolseley Bridge (5), Colwich Brickworks and Colwich Brickworks (land adjacent to) (6), Bishton (north of) (7), Shirleywich Fields and Canal Towpath (8), Tixall Park Pool (9), Tixall Broad Water (10) and Shugborough Hall (11). There is also salt marsh at Lionlodge Covert (12) and Shirleywich Farm (west of) (13). There are a number of UK BAP Priority Habitats including a wealth of ancient and veteran trees, and a range of wetland and woodland habitats. The area also supports protected species such as otter, bird and bat species, and nationally-scarce grass-wrack pondweed.

2.7.7 There are six Ancient Woodlands (ancient and semi-natural) in the project area; Tithebarn Covert (14), Ingestre Wood (15), Town Field Plantation (16), Flushing Covert (17), Brocton Coppice (18) covering approximately 86ha, and Lambert's Coppice (19). There are numerous notable, ancient and veteran trees, most of which are concentrated in Shugborough Park.



Figure 2.6 - Ecology and Hydrology

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## 3 Vision

'Conserving and enhancing the area's special character and qualities to provide lasting benefit for its communities'



## **4** General Design Principles

#### 4.1 Introduction

4.1.1 The GDPs provide overall guidance for delivery of the Vision. This guidance applies irrespective of whether proposed initiatives lie within the Act Limits or the wider project area.

4.1.2 These design principles both supplement and provide a partial mechanism for delivery at a local level, of the HS2 Design Vision: 'to enhance the lives of future generations of people in Britain by designing a transformational rail system that is admired around the world', which sets three core design principles of people, place and time:

- People: Design for everyone to benefit and enjoy
- Place: Design for a sense of place
- Time: Design to stand the test of time

4.1.3 The three core design principles taken from the HS2 Design Vision have influenced the development of these Design Principles, as follows:

- People: Local and national stakeholders have fed into this document, which sets a framework for future engagement and defines the aspiration for meeting the needs of the communities with interest in the project area.
- Place: Reflect and celebrate the special context of the project area and demonstrate commitment to its rich natural and built environment through appropriate design responses.
- Time: Build on the local tradition of imaginative architectural responses to the landscape, creating an innovative and lasting contribution for future generations to enjoy.

4.1.4 The principles have evolved from early work undertaken as part of the Great Haywood Illustrative Design Plan (May 2010) and finalised by the Review Group in Summer 2019. The GDPs are arranged into five themes with an overarching principle of Quality. The five GDP themes are:

- Communities
- Access, Enjoyment and Connectivity
- Landscape
- Historic Environment
- Ecology and Hydrology

4.1.5 Each of these five GDPs relate to different aspects of integration with the area's special character and qualities. These GDPs aim to ensure that proposals are appropriate to this special character.

#### 4.2 Quality

4.2.1 Quality is an attribute in its own right irrespective of its appropriateness. Proposals need to demonstrate both attributes. Appropriateness without quality is insufficient.

4.2.2 Quality can be experienced through the choice of materials, design, construction and after-care. In each case quality should relate to items such as purpose and lifespan. Appropriateness and response to context will affect the expression of this quality. Quality has particular relevance to HS2 with its stated design life of 120 years and very strict limitations on maintenance and repairs on many elements over that lifespan.

4.2.3 Robustness, reliability and changes in appearance over this lifespan are important considerations for all designers.

4.2.4 Equally so are considerations of anticipated and potential change - climatic, environmental or societal. Designs should forecast conditions and context, building in adaptive capacity.

4.2.5 Above all, designs shall be of high quality and be appropriate to the context. Both set piece elements, such as the Great Haywood Viaduct and the smaller details of culverts, fencing, noise barriers and making good will have individual and collective impacts. The project area has numerous examples of where previous infrastructure projects have left a legacy that contributes positively to the area's special character. The quality of the next layer of infrastructure must become tomorrow's legacy.

### 4.3 Application

4.3.1 Both Quality and the five GDPs apply to all proposals connected with HS2 and the Enhancement Projects outside Act Limits.

4.3.2 Some GDPs and their noted sub-principles are more applicable to works within Act Limits and others to Enhancement Projects outside Act Limits and some are applicable to both. This is noted under each separate GDP with a number in brackets.

4.3.3 The GDPs and the Detailed Design Principles (DDPs) are aimed at HS2's contractors and their design teams. The high level aim is to achieve awareness of the special character of the project area and buy in to the production of landscape led solutions; at the next level, an awareness of the challenges and opportunities

## **4.5 Enhancement Projects**

4.5.1 The GDPs and to a lesser extent DDPs apply equally to Enhancement Projects. Quality and landscape fit are equally important on either side of the Act Limits line. The Enhancement Projects are covered in a separate document (Part 2).

## 4.6 Synergy

4.6.1 Whether between GDPs concerning different elements, between DDPs and components, or spanning Act Limits, maximising synergy is essential. Proposals that are holistically based consider all the GDPs and provide added value, increased resilience and lower risk.

## 4.7 The Five General Design **Principles**

4.7.1 The five GDPs relate to the same groups of characteristics identified in Chapter 2. These principles apply to:



associated with quality and the GDPs; and at the elemental level how this approach may be used on the design of different elements of the proposals.

Within Act Limits (1) Outside Act Limits (2)



#### Aspiration

4.8.2 Supporting the residential, commercial and recreational communities and rural areas affected by HS2 (1 and 2), engaging them in the development of the Enhancement Plan and user-led ideas for potential Enhancement Projects to create a lasting legacy, and foster a sense of local ownership. (2)

#### **General Design Principles**

- Understand the visual, physical and cultural importance of the area to communities and stakeholders, seeking opportunities to address their needs and aspirations, as well as provide wider social, economic and environmental benefits. (1 and 2)
- Integrate and support community benefits, local economies and promote sustainability, health and well-being, culture, biodiversity and art. (1 and 2)
- Encourage communities and stakeholders to take an active part in developing and implementing the Enhancement Plan including establishment of community led Enhancement Projects. (2)
- Provide opportunities for the community to better connect to the natural and historic environment, increasing awareness of the area, heritage, landscape and biodiversity. (2)
- Consider the needs of communities in the analysis and evaluation of Enhancement Projects to support community led schemes, including improvements to footpaths and tow paths. (2)
- Support the enhancement of visitor facilities and attractions to support communities affected by HS2. (2)



Walking in Shugborough Park ©ChristineHarding

'A diverse and engaged residential, commercial and recreational community' (2) Ac

## Access, Enjoyment and Connectivity

#### Aspiration

4.8.3 A connected landscape minimising severance for people between settlements, providing Green Infrastructure links and connectivity along the waterway networks of the Staffordshire & Worcestershire, Trent & Mersey Canals and the River Trent. People in the local settlements are able to access the local environment and landscape and its historic elements both physically and perceptually. (1 and 2)

#### **General Design Principles**

- Protect and enhance existing rights of way and permissive routes and positively promote new circular routes to replace routes that have been severed and link into the established linear routes. (1 and 2)
- Respect existing public rights of way and recreational areas, including views, in the design of environmental mitigation and enhancement projects. (1 and 2)
- Promote quiet, slow enjoyment of the area on land and water, exploring opportunities to create attractive traffic free routes and dedicated places for angling. (2)
- Improve and enhance access to allow for multiuser connections including connections to the National Cycle Network. (2)
- Create east-west links between Stafford, settlements in the study area and the wider Trent valley to connect with this special and valued landscape. (2)
- Provide access to and understanding or interpretation of key historic landscape assets and elements e.g. through the use of boards, 'apps' and/ or postcards. (2)
- Promote recreational use of the waterway corridors and where possible enhance and establish routes, access points and associated facilities to support use of the rivers and canals. (2)
- Improve way finding and interpretation on existing and promoted routes. (2)
- Provide new and enhanced access to the landscape, heritage and wildlife of the area, which could include the use of community walking routes and interpretation 'apps'. (2)
- Protect and enhance the waterway corridor routes and facilities for powered boating and paddle sports. (2)



Canoeing on the River Trent ©ChristineHarding

*'Physically and perceptually well connected countryside, waterways and historic assets'* 



#### Aspiration

4.8.4 A slow, secluded and tranquil landscape, reinforcing and protecting the strong sense of place, maintaining local diversity and contrast between the distinctive elevated Chase to the south, valleys, open agricultural and wooded historic landscapes. A conserved, managed and restored network of canals and rivers, streams, wetlands, floodplain and water meadows, hedgerows, woodland, wood pasture, heathland and designed parkland landscapes. (1 and 2)

4.8.5 A multi-functional landscape providing benefits for farming and food production, nature, flood control, carbon storage, soil, air and water quality, recreation, access, enjoyment, health and well-being. (2)

#### **General Design Principles**

- Respect the open valley landscape and open, long views, maintaining the contrast and visual connection between open valley bottom and wooded hills. (1 and 2)
- Re-connect existing patterns of vegetation to integrate HS2 including the network of ancient woodland, species-rich hedgerows, flood meadows and water meadows, wood pasture and heathland, reinforcing a sense of place. (1 and 2)
- New structures to respond sympathetically to their context and setting, including form, scale and massing, layout and materiality using innovative design and techniques. (1)
- Landscape earthworks and planting to integrate HS2 into the surroundings, considering the wider landscape character and the scale and form of new landscape elements, including grading the viaduct embankments allowing planting to tie into the wider vegetation pattern, where possible. (1 and 2)
- Conserve the tranquil and secluded character through appropriate visual and noise mitigation. (1)
- Relate new woodland planting to the landscape character, interpreting where there is a precedent for woodland and tree planting (including natural regeneration) to restore landscape integrity, to filter and channel views and reduce perceived linearity of the alignment. (1 and 2)
- Respond positively to existing landscape function and habitat e.g. wetland enhancement which complements the pattern of water meadows on the valley floor, and wood pasture or heathland restoration and enhancement to link into wider initiatives on the Chase. (2)
- Recognise the unique landscape character of the canal corridors through the landscape, considering the balance and importance of openness and enclosure. (1 and 2)
- Seek opportunities to provide multi-user connections and improvements to tow paths along the canals. (2)



Birds eye view over the landscape of the project area

'A slow, secluded and tranquil landscape with a strong sense of place'



#### Aspiration

4.8.6 Celebration and enjoyment of the rich historic fabric through conservation, restoration, enhancement and management of historic assets including canals and agricultural heritage and the designed landscape. An enhanced setting emphasising key viewpoints and improved access provides interpretation and promotion of history. (1 and 2)

#### Historic Environment: General Design Principles

- Conserve and enhance natural and built features of historic interest in the landscape. Promote wider understanding and access to areas of historic interest. (2)
- Promote and provide interpretation of historic assets. (2)
- Interpret the historic pattern of ancient woodlands, parkland trees, wood pasture, tree groups and linear belts to inform appropriate locations for woodland creation to help integrate HS2. (1 and 2)
- Use selective tree planting, consolidation and felling to filter views and emphasise positive historic views, allowing the significance of the asset to be appreciated. (1 and 2)
- Consider and conserve the setting of natural and built features of historic interest. (1 and 2)
- Conserve, restore, enhance and manage the canal network and associated vernacular buildings and features. (2)



View over Tixall Broad towards Tixall Gatehouse ©AnneAndrews

*'Rich historic fabric with deep agricultural, estate and transport connections'* 

**5** Ecology and Hydrology

#### Aspiration

4.8.7 An enhanced, re-created and re-connected mosaic of habitats incorporating the existing ecological priorities and landscape pattern of the area, in line with the 'more, bigger, better and joined' Lawton Principles. Enhanced habitat and biodiversity through careful species selection, reflecting local species compositions and habitats, creating resilience to pest, disease and climate change. (1 and 2)

#### **General Design Principles**

- Conserve, restore, re-connect and re-create habitats to reflect the historic pattern, including wetland, water meadows and floodplain meadows, ponds, saline habitats, restoration of natural river channel features, connected ancient woodland, heathland and wood pasture. (1 and 2)
- Create broadleaved woodland and restore speciesrich hedgerows using local species composition to connect habitat and provide visual integration to mitigate the new railway and enhance the wider landscape. (1 and 2)
- Integrate balancing ponds and drainage into the landscape, respecting the existing drainage pattern through creating new and enhanced habitats with marginal, woodland and hedgerow planting including natural regeneration to reduce flood risk. (1 and 2)
- Seek opportunity to identify and treat invasive nonnative species. (1 and 2)
- Respect mature and veteran trees, managing them to provide increased biodiversity. (1 and 2)
- Provide a diverse age and species structure to increase longevity and resilience to pests, diseases and climate change in planting specifications for new planting. (1 and 2)
- Create opportunities for connectivity and habitat for all species, specifically protected and notable ones, including otter and bats, to mitigate habitat severance across the wider landscape. (1 and 2)



Meandering River Sow and floodplain

'A biodiverse landscape closely interlinked to the rivers Trent and Sow, and the canals'

## **5** Detailed Design Principles

#### 5.1 Purpose

5.1.1 This chapter examines each of the elements that make up the railway, its supporting infrastructure and its surrounding context. It provides guidance to designers and reviewers of designs submitted for approval. It is also partly applicable to Enhancement Projects funded by the group outside of Act limits.

5.1.2 Each element is addressed in a broadly similar manner which considers likely issues and opportunities, and then shows how these could be best addressed. It is accepted that each element will invariably have numerous associated technical and operational requirements which are taken as a given. HS2 also have a legal framework of Assurances and Undertakings that apply to the Scheme. It is assumed that designers will follow these requirements.

5.1.3 It is similarly assumed that designers are familiar with relevant HS2 design guidance. This will range from high level documents such as the HS2 Design Vision, HS2 Landscape Design Approach, and HS2 Common Design Elements to detailed technical requirements. The following guidance aims to supplement these documents offering advice on how to maximise the integration of the railway with its special and particular landscape context. There are opportunities for high quality design, as per local historic examples of ornamental and decorative structures which are still fit for purpose today, a lasting testimony to the advances of technology, travel and engineering.

5.1.4 Designers are strongly advised to reference the considerable and increasing amount of design work associated with HS2 (see Section 2), and with other high speed railways. As always these solutions need to be considered in the context of the project area. It is the preference of the Review Group that 3D virtual models are presented to it when reviewing emergent designs. Proposals should demonstrate how they have responded to this guidance.

5.1.5 Each element notes General Design Principles (GDPs) that particularly apply to that element showing the numbers of these GDPs at the top right of the first page of each element. General guidance is supplemented by location-specific guidance where this is considered useful. Illustrations and photographs are included as examples of solutions elsewhere which are considered potentially useful for designers in their own design process.

## **5.2 Spatial Index**

5.2.1 Figure 5.1 overleaf shows the distribution of the Detailed Design Principles (DDPs) along the alignment, together with potential Enhancement Projects (EPs). The plan shows diagrammatically the main locations and potential synergies between the DDPs and EPs. Designers should look to maximise such synergy at the same time as reflecting the local landscape character.

5.2.2 A shortlist of potential projects for inclusion in the group's ensuing second publication: the Environmental Enhancement Plan referred to in section 1.2.2. has been generated through consultation. It consists of six major projects and nine minor projects.

5.2.3 Major projects can be summarised as follows:

- Shugborough Parkland Wood Pasture Restoration: The creation and restoration of 125ha of wood pasture, a BAP Priority Habitat, by introducing grazing management and reverting coniferous plantation to broadleaved woodland. This project, led by the National Trust, would link the wood pasture of Shugborough Park with Brocton Coppice in the AONB, enhancing habitat connectivity.
- **Shugborough Chinese House and Cats** Monument: Restoring the historic setting of the Grade I listed Chinese House and Grade II Cats Monument by re-establishing historic planting patterns and garden features. Commissioning the research necessary to appropriately conserve, present and interpret these structures.
- **Connecting Towpaths:** Led by the Canal and River Trust. Scheme 1 would see 3.75km of towpath improvements creating a multi user path between Great Haywood and Milford Bridge, along the Staffordshire & Worcestershire Canal, including wavfinding and interpretation. Scheme 2 would involve a further 600m of improvements between Haywood Junction and Essex Bridge, along the Trent & Mersey Canal.
- Ingestre Heritage Hub: A multi-faceted project led by the Friends of Ingestre Orangery, including the restoration of the apple store on the Ingestre Hall Estate to act as a local heritage hub. The project would also include training and activities to engage people with their local history.
- **Trent-Sow Washlands:** Led by Staffordshire Wildlife Trust, this project will create a thriving ecological network of new, enhanced and restored priority habitat along the Sow and Trent River; restoring 80ha of floodplain meadow and 2.5km of waterways, creating new wetlands and wet woodlands, enhancing and connecting existing

designated wildlife sites including rare inland saltmarsh.

Ingestre Access Connections: The creation of two circular walks of roughly 6km and 15km in length which would navigate through some of the most significant landscapes of the Trent Sow Area, enabling public access to historic and natural points of interest. It is envisaged that the project will create a new visitor destination, whilst encouraging a more connected landscape.

5.2.4 Minor projects deliver a variety of local initiatives. potentially including: access improvements; community woodland planting; garden restoration; and local history projects.



Tixall Obelisk dated 1776 marking the road between Milford and Tixall ©AnneAndrews



Figure 5.1 Spatial Index of DPs and potential EPs

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#### Selected existing assets



HS2 Alignment & Act Limits Project area Detailed area sketchplans

Existing woodland

Existing water

#### **Detailed Design Principles**

Making good after construction Α В Bridges C Great Haywood Viaduct D Green Bridges E Noise Barriers & Fencing F Auto-transformer Stations G Ponds (balancing and ecological mitigation) H **Ecological Corridors** ່ງ Vegetation

Location specific paragraph reference to Detailed Design Principle in Chapter 5

#### **Potential Enhancement Projects**

(x.xx

Large Projects			
AC	Ingestre Access Connections		
СТ	Connecting Towpaths		
ΗН	Ingestre Heritage Hub		
SE	Shugborough Chinese House and Cats Monument		
W	Trent Sow Washlands		
WP	Shugborough Wood Pasture Restoration		
Smal	l Projects		
<b>S1</b>	Community woodland		
<b>S2</b>	Parks and Gardens Training (not mapped)		
<b>S</b> 3	Tixall Icehouse		
<b>S</b> 4	Nesting birds		
<b>S</b> 5	Wolseley-Colwich walk & interpretation		
<b>S6</b>	Ingestre Long Walk restoration		
<b>S</b> 7	Minor access improvements		
<b>S</b> 8	Coalpit Lane		
<b>S</b> 9	A51 Farley Corner meadow creation		

## Making good after construction



#### Introduction

5.A.1 Act Limits prescribe the maximum amount of land that can be used by HS2 for construction of the railway, access and associated work such as the diversion of services. Act Limits in the study area are extensive, particularly adjacent to the Great Haywood Viaduct, stretching to 800m of land adjoining the A51 Lichfield Road. This is proposed for use by compounds, plant, materials transfer and stockpiles. The other very extensive area of Act Limits concerns land that may be used for the provision of replacement golf facilities, not construction, and is not covered by this guidance.

#### **The Aim**

5.A.2 The overriding aim of making good after construction is that of a full and lasting restoration of land and other assets affected by its temporary use for construction. It excludes by definition land that is permanently and deliberately changed to form the railway and its supporting works.

#### Guidance

5.A.3 Whilst many construction activities do not require approval under Schedule 17, it is hoped that this document is useful in further mitigating impacts and helping deliver optimal restoration.

Assurances, Undertakings and Agreements: Areas covered by Act Limits have been the subject of considerable consultation with landowners. Designers need to be fully aware of the details of such assurances and agreements. This should

fundamentally influence their designs for both temporary and restoration works.

- Construction needs: Whilst these are paramount and optimal working should always be the aim, there are often equally suitable approaches/ designs. In such cases those that are more environmentally sensitive should be preferred.
- Effective construction: Impacts should be minimised through the choice of construction method and effective protection of assets outside the working zone. The working zone should be minimised in order to limit the impacts of construction (note the working zone should not necessarily be considered the same as Act Limits).
- Screening: Effective visual and acoustic screening should be considered even if not specifically required by the Environmental Minimum Requirements (EMRs). Careful placing of mediumterm stockpiles is an example of how to provide this (refer to HS2 documentation).
- Advanced works: Where possible, designers should facilitate early implementation of permanent works, either to help screen construction works or to achieve accelerated establishment of mitigation proposals.
- Standards: Advanced permanent works should be designed and executed to appropriate best practice and adjusted to respond to local conditions, issues and expectations.
- **Restoration works/ making good:** Should be realistic and effective, making proper assessment of the likely damage and producing proposals for making good that address all relevant issues. Particular attention is required to de-compaction,

soil placement and conditioning, rectifying impeded drainage, and soft landscape works. These making good works require a similar level of design and specification to other works directly associated with the new railway and its integration.

- Continuity of community life: Business and community life should continue as normal during and after construction. Contractors should work closely with those affected to ensure this.
- Future use: Land affected by construction will likely affect the character of the area through the loss of features such as hedgerows, trees and woodland, or narrow winding roads. The guidance within this document therefore presents opportunities to improve proposed design within and enhance areas outside Act Limits, through reinstating and reinforcing features that influence character. This might, for instance, include the creation of new habitats or landscape features to form ecology corridors. Specifications and designs, and their delivery, should ensure that this is achieved.
- Decommissioning: Full and effective decommissioning should avoid unwanted urbanising effects that are detrimental to local landscape character and contrary to the effective integration of railway and landscape. Special attention needs to paid to roads, which is set out on the following page.

5.A.4 Experience of early construction work on HS2 in the Chilterns and Colne Valley has shown that contractors and their designers appreciate the need for locally sensitive design of construction works and see this as part of their positive community outreach.

EMRs and Schedule 17.

5.A.5 The Canal and River Trust entered into a legal agreement with the Secretary of State for Transport on the 31 May 2019, for HS2 Phase 2a. This agreement refers to requirements for making good, reinstatement, mitigation planting, removal of temporary works and structures on and around the canal network affected by HS2 Phase 2a within the project area, and should be referred to.

5.A.6 Documents relevant to temporary works and mitigation can be accessed using the following links:

- Undertakings and Assurances: https://www.gov.uk/ government/publications/hs2-phase-2a-register-ofundertakings-and-assurances

#### Roads and their impact on landscape setting

5.A.7 Roads within the project area contribute to its rural character and feel. They are also important as they are often the way people experience the landscape. Typically they are narrow winding lanes enclosed by hedgerows with narrow and sloping grass verges, with varying numbers of mature hedgerow trees. They have

# GDP

This attitude should be encouraged for this phase of HS2 within the project area, subject to the scope of the

- EMRs: https://www.gov.uk/government/
  - publications/environmental-minimum-requirementsfor-hs2-phase-2a
- Planning Forum Notes: https://www.gov.uk/
  - government/publications/hs2-phase-2a-planningforum-notes-for-local-authorities

few urban features such as kerbs, lighting, signage and hard surfaced footpaths, which increases the rural feel.

5.A.8 Construction access and road diversions are potentially critical issues through the use of standardsdriven design that threatens the character and rural context of the local public highways and rights of way networks. Particular attention to road design, including avoiding the introduction of urbanising features such as lighting and signage, will ensure this is avoided.

5.A.9 Construction access will require temporary highways improvements in several locations, including within and on the boundary of Cannock Chase AONB.

5.A.10 The design of temporary highways works should be influenced by an awareness of the area's special landscape qualities and an overall intention of integrating even temporary works with this landscape, given the potential for the permanent adoption of some elements of temporary works.

5.A.11 Proposals for reinstatement following the removal of temporary construction access, as well as for permanent road diversions, should respond to the surrounding local landscape character. This requires sensitive design and mitigation but could also provide opportunities for ecological connectivity, SuDS implementation and landscape enhancement.

#### **Issues & Opportunities**

5.A.12 Issues include:

- Erosion of character and visual disturbance
- The introduction of alien or urbanising elements in the landscape
- Design of roads in keeping with character of existing landscape on either side
- Impacts on users and wildlife of routes affected
- The potential for temporary works to become permanent

5.A.13 Opportunities:

- Design quality in the landscape
- Landscape integration and potential enhancement of rural character
- Potential enhancement to habitat quality and connectivity
- Dual use functionality and enhanced connectivity
- Maximised tree retention through tree survey informed design development of alignments

5.A.14 These opportunities are likely to be restricted to within Act Limits and this guidance is therefore primarily directed at HS2 and its contractors and designers.

5.A.15 Designs should be in accordance with the Design Manual for Roads and Bridges (DMRB), British Horse Society (BHS) standards and where appropriate, HS2 Design Guidance - Historic Rural Roads and Routeways.

#### **General advice**

5.A.16 Ensure carriageways are not significantly wider than the existing road; avoid the use of upstand kerbs

and other urban elements if possible. Provide continuity of surface material except where widening is required to create passing places, in which case complementary surface materials may be preferable. Ensure design speed standards do not exceed that of the existing road and consider the use of appropriate speed reduction mechanisms such as single carriageway, without detriment to safety. It is expected that proposals will include grass verges, native species hedgerows and appropriate hedgerow tree planting as a minimum.

#### Location specific advice

5.A.17 Bishton Lane: This forms part of the Bishton Biodiversity Alert Site. Designers should aim to replicate (and where appropriate, enhance) the existing habitat as far as possible. The focus should be on providing continuity of native species hedgerow and verges, with hedgerow trees as individuals or in clusters.

5.A.18 Tolldish Lane (Photo 1 opposite): Explore the potential for reflecting the existing winding nature of the lane in the proposed alignment as a mechanism for reducing traffic speeds and providing continuity of character; hedgerows and associated verge flora must connect to existing features. There is opportunity for tree planting to increase age diversity of trees along the northern side of the lane, maintaining continuity of hedgerow trees in the landscape; and creation of connection with proposed woodland planting along the viaduct embankment to the south. The approach to, and the junction with the A51 Lichfield Road should be carefully considered, balancing safety needs against continuity of landscape character.

5.A.19 A51 Lichfield Road (2): Attention must be paid to reinstating the road corridor following removal of construction roads and junctions. Further opportunities for increasing diversity of the habitat should be explored to enhance the road corridor, through species rich grass seeding and the inclusion of vegetated SuDS solutions.

5.A.20 Hoomill Lane (3): Provide hedgerows with regularly spaced hedgerow trees to connect to the existing Millennium Avenue containing memorial trees planted by Parish residents. This will require special consideration in dialogue with the Parish Council.

5.A.21 Tixall Road (4): Care must be taken to provide continuity of boundary treatments along this road, with opportunities taken to 'gap up' existing hedgerows. There is opportunity and sufficient space in the verge to provide a bridleway along the northern side of the road, between the junction with Tixall Mews (5) and Bottle Lodge, as part of the Enhancement Projects. Should this project be taken forward as part of wider bridleway connections, designers should provide an appropriate crossing closer to Bottle Lodge to provide a safe crossing point. As part of this enhancement, designers should explore improving the northern boundary to reflect the character of Tixall historic parkland.

5.A.21 Hanyards Lane (6): Needs to be designed to tie in with the existing pattern of hedgerow and verge features.

(1) Tolldish Lane - well maintained hedgerows on small banks enclosing narrow, single track lane, interspersed with mature hedgerow trees, allowing views across the landscape





(3) Hoomill Lane - managed hedgerows enclosing a single track lane with part characterised by an existing avenue of hedgerow trees.



(5) Tixall Road at junction with Tixall Mews - tight bend in road with pavement and verge on northern side (left) and narrow verge and wall to Church on southern side (right). Presence of pavements and upstand kerbs are urban road features at village edge

(6) Hanyards Lane - a narrow single track with well maintained, short hedgerows and few hedgerow trees, presenting a more open landscape with views to adjacent wooded hills



(2) A51 Lichfield Road looking towards location of temporary construction access roundabout and road - wide two lane road with generous grass verges on both sides allowing footpath connections, bound by hedgerows with occasional hedgerow



(4) Tixall Road - narrow two lane road with historic parkland to north (left) with mixed fencing types, and ornamental hedgerows to south (right) highlighting village edge, later transitioning to native species hedgerow. Road signs are infrequent but intrusive within the landscape







Trent Walk Underbridge

Tixall Bridleway and Footpath Accommodation Overbridge - see 5.D Underbridge Overbridge

#### Indestre culvert

Lionlodge

Great Haywood A51 Lichfield Viaduct - see 5.C Road Underbridge

Tolldish Colwich Bridleway

culvert 58 Accommodation Underbridge

#### Introduction

5.B.1 There are a number of under and overbridges within the study area at locations as follows:

- Colwich Bridleway 23 Accommodation Green Overbridge (Ch 203.600)
- Colwich Bridleway 35 Accommodation Overbridge (Ch 203.400)
- Colwich Bridleway 58 Accommodation Underbridge (Ch 204.600)
- Tolldish Culvert (Ch 204.700)
- A51 Lichfield Road Underbridge (Ch 205.200)
- Great Haywood Viaduct (Ch 205.400 206.700)
- Lionbridge culvert (Ch 206.700)
- Ingestre Underbridge (Ch 207.050)
- Ingestre Green Overbridge (Ch 207.750)
- Tixall Bridleway and Footpath Accommodation Overbridge (Ch 208.500)
- Trent Walk Underbridge (Ch 209.800)

5.B.2 This section covers all of the above with the exception of Great Haywood Viaduct (Section 5.C) and the Green bridges (Section 5.D).

#### 5.B.3 Bridge designs should seek to:

- Maximise landscape integration through consideration of both bridges, ancillary elements and their setting.
- Consider various key elements such as bridge decks, parapets, abutments and approaches.
- Be of high quality and locally sensitive.

#### Significance

5.B.4 Although considerably smaller than the Great Haywood Viaduct, other bridges in the study area still have the potential to influence the landscape setting in the way explained in Section 5.C. Overbridges also provide important elevated viewpoints along the alignment.

#### **Issues & Opportunities**

Indestre Green

5.B.5 Issues include:

- Visual disturbance and blocking of views
- The introduction of alien or urbanising elements in the landscape
- Resolution of bridges and approaches with character of existing landscape on either side
- Impacts on users of routes affected
- Significant construction impact

#### 5.B.6 Opportunities:

- Design guality and statement in the landscape
- Landscape integration into embankments and cuttings
- Dual use functionality and enhanced connectivity

5.B.7 These opportunities are likely to be restricted to within Act Limits and this guidance is therefore directed at HS2 and its contractors and designers.

#### Landscape Strategy

5.B.8 Bridges may be comprised of CDEs produced to HS2 Bridge Design Guidance. Where an under/ overbridge has a bridleway and public road, HS2 will design in accordance with the HS2 Rural Roads Design Criteria and British Horse Society (BHS) standards. Where there is no bridleway HS2 will design to DMRB standards or HS2's technical standards where there is no public access. As such, there will be limited opportunity to affect bridge design, particularly safety and functional requirements and structural materiality. Effort should be focused on maximising integration of these elements with their landscape setting by the:

- Adoption of simple and elegant design solutions that are appropriate to function, location and settina
- Careful design of ancillary works that are essential to bridges (e.g. abutments, approach roads, etc.)
- Maintaining of openness

#### **Design and Structural Elegance**

5.B.9 Advice provided for the Great Haywood Viaduct (Section 5.C) applies to all bridges.

#### Integrated design

5.B.10 Designers should consider all elements as part of a holistic design approach. Ideally, 3D models and visualisations should be produced from key viewpoints

#### Bridges and their impact on landscape setting

5.B.12 Embankments should be married sensitively into the landscape, both in form and surface cover, following HS2 guidance: Landscape Earthworks Design Guidance (HS2-HS2-EV-STD-000-00021). Designers are encouraged to consider how these elements can maximise the integration of bridge and landscape.

#### Works bridges

5.B.13 There are two works bridges to be constructed over the Trent & Mersey Canal that are likely to be in situ for a considerable length of time. The design and operation of these bridges will be in accordance with the Agreement between Canal and River Trust and the Secretary of State for Transport.

Colwich Bridleway 35 Accommodation Overbridge

Colwich Bridleway 23 Accommodation Green Overbridge - see 5.D

showing bridge approach, railway and surroundings. These models could be used pro-actively as part of the design process, including, where possible, to aid the review group in its role in responding to emergent designs. These could include visualisations of noise barrier and fencing associated with the bridge.

5.B.11 The location and functional requirements of all bridges is broadly fixed. However, the potential impact of each bridge is still, in part, dependant on the design of ancillary works - abutments, their interface with embankments/ cuttings, approach roads and tying in with existing routes and landscape features.

#### **Overbridges**

5.B.14 Overbridges present potentially critical issues of separation in terms of how standard-driven design integrates with the existing road and public right of way network, and their surrounding rural context. Particular attention to the following elements will ensure this is avoided.

5.B.15 Bridge deck: Ensure carriageway is not significantly wider than the existing road/ path (1); avoid the use of upstand kerbs and other urban elements if possible. Provide continuity of surface material. Ensure design speed standards do not exceed that of the existing road and consider the use of appropriate speed reduction mechanisms, such as a single carriageway over the bridge deck, without detriment to safety.

5.B.16 Bridge parapet: Safety requirements will dictate heights and extent of parapets. Ensure elegant transition between different heights. Vehicle barriers on the approach to the bridge should be integrated with landscape elements by the use of hedges and grass verges.

5.B.17 Ancillary elements: Avoid the use of lighting, excessive signage and road markings that will cause unwanted urbanisation, without detriment to safety.

5.B.18 Approach road: The above approach should extend to the design of new roads (widths, curvature, and any required embankments) and their careful tying in with existing retained roads or tracks. Where appropriate soften embankment side slopes, especially where these sit above cuttings, to provide adequate bridge clearance (2). This combination of circumstances has potential to be very intrusive.

5.B.19 Relationship with lineside cuttings: To maintain openness and views along the rail alignment assume open span bridges with set back below deck splays with appropriate hard surfacing.

#### Underbridges

5.B.20 Portal: Minimum height and shape will be determined by functional requirements. Design should be fully integrated with abutments and any required fencing, especially noise barriers, if required.

5.B.21 Abutments: These will be experienced at close range by users of the bridge. Consider appropriate material and scale of surface treatment, including the soffits of underbridges. Assume the use of splayed abutments with raked tops so that the abutment matches the angle of the adjacent embankment.

#### Location specific advice

5.B.22 Colwich Bridleway 35 Accommodation Overbridge (Ch 203.400): Headroom in cutting, therefore a low embankment is required to approach track on north side of alignment. Consider easing embankment grade using material from adjacent temporary material stockpile. Extend hedgerow treatment along both embankment slopes.

5.B.23 Colwich Bridleway 58 Underbridge (ch 204.600): Designers must resolve junction of eased embankment and diverted approach track on northeast side of bridge; junctions between bridge and embankments on both sides of the alignment; use splayed retaining structures of minimum length and vary embankment grades locally.

5.B.24 Tolldish Culvert (Ch 204.700) and Lionlodge Culvert (Ch 206.700): Designers should explore the creation of a two stage channel profile to facilitate use as fauna underpass, satisfactorily and elegantly resolve and integrate protective grilles to prevent use by humans, design appropriate and integrated wingwalls and consider alignment and treatment of diverted ditches. This requires a considered and holistic design solution.

5.B.25 A51 Lichfield Road Underbridge (Ch

205.200): This is an important opportunity involving a major road and a 125m long sequence of cuttings and bridge with a bridge deck over 20m wide and a 5.3m minimum opening height. Noise barriers are required on both sides. Designers must consider the bridge, abutments, fencing and road corridor as part of a road user's experience and potential dateway element to Great Haywood (3). Consideration should be given to increased opening height and/ or other special treatment of the portal/ abutment design; the introduction of avenue and hedge planting on either side of the bridge; and enhancement of pedestrian/ cycle provision both within and outside Act Limits. There is major potential for positive place-making and landscape integration.

5.B.26 Ingestre Underbridge (Ch 207.050): Minimum dimensions and well screened by proposed woodland on both sides of the alignment.

#### 5.B.27 Tixall Bridleway and Footpath

Accommodation Overbridge (Ch 208.500): Surface treatment of bridge deck and approaches to be informal but suitable for horses. Complex embankments to north of alignment to be eased and broad verges provided to avoid the need for safety fencing. Bridge to be designed to accommodate long farm vehicles and timber lorries accessing Ingestre Wood and the fields beyond, requiring appropriate design of the bridge deck and approaches.

#### 5.B.28 Trent Walk Underbridge (ch 209.800):

Multi-functional use for access and drainage. Designs to facilitate use of drainage link by fauna and avoid need for separation fencing; two stage channel to be considered and extended on both sides of the bridges as a broad swale. Junction between alignment, embankment and access route cutting to be resolved without the use of structures.



©Klauswithk



3/ Railway bridge over Trent Lane creates a gateway into Great Haywood ©BritishListedBuildings



1/ Scherkondetal railway viaduct near Weimar, Germany. Slender piers are elegant and piers at regular intervals allow reduced bridge deck. ©NormanHallermann

2/ Single span overbridge with distinctive piers and planting to visually break up bulk and integrate with adjacent planting.





### The proposed Great Haywood Viaduct is the largest and most significant proposed element within the study area



#### Summary of proposals

- Great Haywood Viaduct approximately 780m long and up to 15.4m (±3m Limits of Deviation (LOD)) in height
- Crosses Trent & Mersey Canal, the River Trent, the Macclesfield to Colwich railway and the Mill Lane/ Great Haywood Road/ Ingestre Road junction
- Passes in proximity to Great Haywood Marina
- Trent South embankment approximately 1.2km long and up to 15m (±3m LOD) in height
- Trent North embankment approximately 1.1km long and up to 12m (±3m LOD) in height
- A51 Lichfield Road underbridge to maintain vehicular and pedestrian access beneath the Trent South embankment close to the East Abutment
- Very extensive adjacent areas required for construction

#### Significance

5.C.1 The significance of the viaduct lies in its potential impacts per se, and as a focus for public opinion of HS2 through this most visible element. The viaduct will therefore attract considerable public interest in all stages of its existence – design, construction and operation. Added to this is the established public interest in bridges and their symbolism. As a result public opinion on the viaduct is likely to reflect that of HS2 as a whole, and vice versa.

#### **Issues & Opportunities**

- 5.C.2 Issues include:
- Visual disturbance and blocking of views along the river and canal corridors
- Noise and loss of tranquillity
- Changes in landscape character (alien associations, changes in landscape scale)
- Noise and visual impacts on marina and canal activities
- Significant construction impact
- 5.C.3 Opportunities:
- High quality design and appropriate setting, refer to HS2 Landscape Design Approach and Bridge Design Requirements
- Environmental performance (particularly noise and visual mitigation)
- River and canal corridor enhancements through post-construction making good (landscape and ecology)
- Selective adaptation of construction related initiatives

5.C.4 These opportunities should be realised mainly through the design and construction of the viaduct by HS2 and its contractors, and to a lesser extent by selected Enhancement Projects.

#### Landscape Strategy

- Achieving design excellence of the viaduct
- Integrating its embankments with their landscape context
- Controlling views to aid integration (screening) neither possible nor advisable)
- Maintaining landscape openness especially views along the river corridor
- Maximising all round environmental enhancements involving all five General Design Principles and integration with other Detailed Design Principles

#### **Design and Structural Elegance**

5.C.5 Designers are assumed to reference all relevant HS2 Design Guidance and other Best Practice design approaches to viaducts (both specific to Great Haywood and general). This guidance relates to a range of requirements, including construction and operational needs as well as appearance. Many operational and safety needs are both stringent and non-negotiable with consequent implications on structures, materials and design. Visual and acoustic considerations must work within these set parameters and produce design and structural elegance. Designers should also investigate options for both arched, and post and beam solutions.

- following:
- Rhythm

- Materials
- Parapet
- Deck soffit
- Integrated noise barriers
- Overhead Line Equipment (OLE) and their

- Facilities for emergency evacuation of a train on the viaduct



View north from Triumphal Arch, Shugborough Park (Viewpoint 009-03-013 from LV-01-526) ©HS2

- 5.C.6 Special attention should be paid to the
- Exceptional spans, including pier positions and
  - orientation
- Slenderness
- Pier to ground junction
- Pier to deck junction
- Abutments and embankments
  - integration with the overall design
- Landscape treatments
- Integrated approach to the drainage of the
  - structure and utilities

#### **Great Haywood Viaduct: Particular** challenges

5.C.7 Colour and materiality: Colour and materials are important in determining the degree of visibility of the structure in the landscape and the apparent mass and bulk of the viaduct in closer range views.

5.C.8 Reference to the visualisation from the Triumphal Arch in Shugborough Park demonstrates that at that distance colour will be the most important aspect of the viaduct's design, particularly as the rhythm of piers and spans will be partly obscured by intervening trees. Much of this visibility will be caused by noise barriers.

5.C.9 Closer range views and the need to reduce the parent bulk of the bridge deck could suggest consideration of the use of a different, darker coloured weathering steel beam structure set well back from the overhanging and profiled deck. This is proposed on the Chilterns viaducts (see illustration opposite). Profiling is an excellent way of creating light and shade (colour by other means). Texture can be used to further accentuate these differences, especially in close range views.

5.C.10 **Pier/ span rhythm**: The Great Haywood Viaduct will be a long, low structure with a deep deck to cater for the extreme dynamic loads associated with High Speed trains, in particular their containment in case of a derailment. Added to this will be noise barriers. The principal issue will be how to achieve an elegance of form given these requirements; followed by the structure's rhythm given the erratic spacing of river/canal and railway it crosses. Regular rhythm is preferred, however, if this is not achievable then regular spans should cross the canal.

5.C.11 Designers are encouraged to reference other viaducts on HS2 Phase 1 currently in more advanced design. Those in the Chilterns (Wendover Dean and Small Dean) and the Colne Valley Viaduct are particularly relevant. All are long and low structures in a landscape context.

5.C.12 Wendover Dean demonstrates an elegance of rhythm achieved with equal spans and supports.

5.C.13 Small Dean uses a structural solution similar to Wendover Dean, but includes a large skewed central span to negotiate an existing trunk road and railway.

5.C.14 The Colne Valley Viaduct uses far longer spans, many of which are over lakes with piers rising from both water and land.



Weathering steel can form a positive elements to pedestrian environments ©CRT



Texture and shadow gaps mask joints and reduce mass of structures ©CRT

![](_page_31_Picture_13.jpeg)

Well detailed, uniform concrete creates a high quality environment

![](_page_31_Picture_15.jpeg)

Illustration of Wendover Dean Viaduct, HS2 Phase I ©HS2

![](_page_31_Picture_17.jpeg)

View south west along Trent Mersey Canal towpath towards proposed Great Haywood Viaduct (Viewpoint 009.03.021 from LV-01-658) ©HS2

![](_page_31_Picture_19.jpeg)

![](_page_31_Picture_21.jpeg)

Exposed dark coloured exposed aggregate concrete

5.C.15 **Depth of deck**: Deck depths are inevitably massive irrespective of span lengths and pier spacing. Designers need to consider carefully how to break up this mass through its profile, texture and colour. There are many examples as to how appropriate modelling of the profile can introduce shadow lines to reduce apparent bulk. Examples are shown opposite. The deck soffit will be particularly visible from the canal, towpath and marina, and should consider profile and texture to provide interest. Special care should be taken in the alignment of daywork and structural joints. The soffit needs to be free from opportunities for wildlife to perch, nest or roost.

5.C.16 **Piers**: Short piers present real problems of proportion given that the cross section of each pier is driven more by the dynamic load of the trains and the deck above than their height. Particular attention is required to the profile of the pier and means of reducing apparent bulk. Pier modelling and finish should consider proximity to any adjacent public access. Track drainage must be incorporated as part of the overall pier design, using appropriate drainage pipes.

5.C.17 **Pier junctions**: The pier/ deck junction is critical, both technically (movement joints and their access requirements) and aesthetically (the creation of a 'clean' and slender junction). The pier/ ground junction should aim for the same simplicity through the avoidance of any fenced surround and surrounding landscape treatments taken right up to the pier with no visible hint of foundations or break in ground profile. Loosely compacted granular fill should be used around pier bases where low light and water levels are anticipated. This will naturally re-vegetate over time. The towpath underneath the viaduct needs to be hard paved as a minimum to facilitate access and maintenance.

5.C.18 Abutments: Given the height of embankments and the likely prominence of abutments, particularly at the western end of the viaduct, care should be taken to produce designs that are elegant and appropriate to local landscape character. Designs should be in accordance with HS2 (2016). Landscape Earthworks Design Guidance (HS2-HS2-EV-STD-000-00021), paying special attention to the treatment of the sloped abutment under the viaduct soffit, its junction with the embankments on either side, required access for inspection and maintenance of viaduct bearings, and the satisfactory integration of any lineside fencing.

![](_page_32_Picture_4.jpeg)

Elegant arched viaduct solution, Colne Valley Viaduct ©Knight Architects

![](_page_32_Picture_6.jpeg)

Slim, well proportioned piers and visually reduced deck depth, Wendover Dean Viaduct ©HS2

![](_page_32_Picture_8.jpeg)

Piers should spring seamlessly from the ground ©CRT

![](_page_32_Picture_10.jpeg)

Ribbed bridge soffit, Kings Cross - texture and shadow visually reduce bulk of soffit ©KnightArchitects

![](_page_32_Picture_12.jpeg)

Shadow and materials create visually reduced deck depth ©HS2 Well detailed pier junction ©HS2

![](_page_32_Picture_14.jpeg)

Well detailed sloped abutment with concrete rip-rap and well aligned bridge deck joints

![](_page_32_Picture_18.jpeg)

Depth of deck visually broken up by rhythm of arched piers Colne Valley Viaduct ©Knight Architects

![](_page_32_Picture_20.jpeg)

![](_page_32_Figure_22.jpeg)

Drainage pipework integrated into deck and pier design, recessed into pier face behind removable cover plates | 033 ©Grimshaw/ HS2-HS2-BR-STD-000-000004

5.C.19 Noise barriers and visual bulk: Noise barriers requirements are directly related to mitigation related to predicted noise levels. Their effectiveness is predominantly related to their height, proximity to the noise source, and their design and materiality. On viaducts there is a reduced number of variations because of the need to minimise the viaduct's width (and therefore proximity of barrier to source) and an overriding need to ensure full integration of the barrier with the viaduct structure. Height of noise barrier is often a given as a result; and this height can effectively double the apparent mass of the viaduct structure. The design should consider the desirability of limiting opportunities for birds to roost on the structure.

5.C.20 Considerable work has been done on the Colne Valley Viaduct to advance an innovation which uses transparent panels as part of the noise barrier. Although introduced to provide a view from the train over the 2.5km viaduct, it will also reduce the apparent bulk of each span. The design solution includes a constant height upstand along almost all the viaduct, with the materiality of the upstand varying dependent on the level of noise attenuation required. (The transparent Perspex viewing infill performs less well than the solid louvered panels). Contractors should consider this approach when resolving the issue to meet the required noise attenuation at the same time as maintaining visual openness. Consideration should also be given to the effects of glint and glare in the landscape and investigate how to reduce this should this option be detailed.

5.C.21 This is of particular concern in the vicinity of the canal and marina. HS2 will carry out noise modelling and mitigation to determine the likely noise climate in the marina and the extent to which the viaduct structure will shield noise transmission to receptors close by. Existing trees along the southern edge of the viaduct must be retained as screening and to obscure what are likely to be solid panels to a noise barrier which could transition to transparent panels over the majority of the valley. The transition between different types and heights of panels should be carefully thought through.

5.C.22 It is understood that transparent noise barrier panels have not been used to date in the UK. Schedule 17 submissions are due in late 2019, therefore the details of their design are not yet in the public domain.

![](_page_33_Picture_4.jpeg)

View north along Trent & Mersey Canal Towpath adjcaent to marina. (LV-01-524) ©HS2

Use of transparent panels can reduce visual intrusion but can cause glare © Huanyu

![](_page_33_Picture_7.jpeg)

Use of transparent panels for noise barriers, integrated with parapet ©Boscoltalia

			- /

![](_page_33_Picture_11.jpeg)

Illustrative example noise barrier height transition over approx. 36m distance to meet parapet height

![](_page_33_Picture_13.jpeg)

5.C.23 Fully integrated design: All design elements need to be fully integrated, irrespective of delivery package. Overhead line equipment and its spacing for instance needs to be coordinated with spans, the deck upstand and noise barrier panels, even though they are delivered by a separate and later contract and not subject to Schedule 17.

5.C.24 **Canal crossing:** The effect of noise barrier requirements will become most visually evident in the crossing of the canal.

5.C.25 A combination of public towpath passing directly under the viaduct and flanking trees require great care. Designers are advised to consider the following:

- Use of an appropriate length span to create a regular rhythm
- Piers set immediately behind towpath with equal offset opposite ensuring canal is centred on the span
- Use of special piers to highlight canal crossing
- Take maximum advantage of reduced deck thickness resulting from shorter canal span and accentuate through use of materials and profiling to create light and shade and 'A Special Span'.
- Pay particular attention to bridge soffit, profile of upstand and the junction between the two. Modelling of soffit should produce an interesting and relevant 'ceiling' for users of the canal and towpath.

5.C.26 Marina: The interface between the marina and the viaduct is important for both the users of the marina and the towpath opposite. Noise barrier requirements are likely to be at their greatest (with noise barriers at their highest) as will be the visual disturbance of trains at close range. Retention of existing trees between the viaduct and marina/ canal is therefore critical. Act Limits are drawn tight to the span presumably for this reason. Designers should consider the benefits of retaining trees on the visual environment and local character.

![](_page_34_Picture_9.jpeg)

Chamfered parapet reducing bulk. Wendover ©HS2

![](_page_34_Picture_11.jpeg)

![](_page_34_Picture_13.jpeg)

Carefully shaped piers accentuate rhythm. Deck soffit colour and shadow reduces depth ©HS2

![](_page_34_Picture_15.jpeg)

Canal and River Trust indicative view north along Trent & Mersey Canal Towpath adjacent to marina showing landscape and visual impact of viaduct without retaining existing trees inside and outside Act Limits ©CRT

![](_page_34_Picture_17.jpeg)

Well proportioned and regular rhythm to low viaduct across the Colne Valley ©Knight Architects

![](_page_34_Picture_19.jpeg)

#### **Canal and River Trust, Design Principles** for Waterway Crossings

5.C.27 This document relates to waterway crossings on HS2. It is directly relevant to the design development for the whole length of the Great Haywood Viaduct. It should be an essential reference point for the designers of the viaduct.

5.C.28 Whilst issues such as the viaduct height are broadly fixed as part of the horizontal and vertical alignment of the approved proposals under the Act (and need to be delivered), other principles have been embedded in this document and should inform detailed aspects of the design not considered to date under the Act.

5.C.29 This page highlights the most relevant principles using illustrations from the Design Principles for Waterway Crossings document. Illustrations from this document have also been incorporated in other sections of the detailed design principles, where relevant. For further information the document can be found in the Canal and River Trust document library, accessed in two parts at:

- Part 1: https://canalrivertrust.org.uk/media/ original/6524.pdf?v=a023db
- Part 2: https://canalrivertrust.org.uk/media/ original/6525.pdf?v=ca416f

![](_page_35_Picture_6.jpeg)

Use of special piers mark the canal crossing ©CRT

![](_page_35_Picture_8.jpeg)

Reduced spans result in reduced structural depths ©CRT

![](_page_35_Picture_11.jpeg)

Multiple spans permit views through connecting to wider landscape

![](_page_35_Picture_13.jpeg)

Permit natural regeneration to soften structures

![](_page_35_Picture_16.jpeg)

Visually open piers respond to canal environment ©CRT

![](_page_35_Picture_18.jpeg)

Strategic offline planting frames views ©CRT

![](_page_35_Picture_20.jpeg)

Chamfered edge condition to parapet creates slender appearance ©CRT

![](_page_35_Picture_22.jpeg)

Sloped abutments with tapered textured materials blend into landscape and soft treatment to top of embankments blend well into skyline ©CRT

## Trent Valley landscape and ecology opportunities

5.C.30 The illustrative plan adjacent shows a series of opportunities to enhance the landscape and ecological setting of the viaduct. These are:

- Copses: a programme of creating a series of small copses dotted around the valley floor. These will provide a loose network of foreground and middle ground tree groups which will help break up the apparent length and continuity of the viaduct in views from most parts of the valley floor. It will achieve this without reducing the openness of the valley. Copses would be best located in field corners or other locations where they will not interfere with agriculture. Their specific locations are mostly non-critical and land owner approval will be required. Suitable native species for copses in wet areas should be used and block sizes kept small.
- Woodlands: these are all as current HS2 proposals and would consist of larger scale and denser woodland, their purpose being to frame views of the viaduct, obscure the massive flanking embankments and provide habitat. Locally native woodland species appropriate for drier sloping locations could be used.
- Hedgerow reinforcement: a programme of hedgerow gapping up, reinforcement and creation should use locally native species to provide an additional layer of filtering views, particularly adjacent to public highways and selected footpaths across the valley floor. Care is needed to avoid loss of openness through management of hedgerow heights.
- Gateway Approach: designers should explore the opportunities of a dual-purpose landscape treatment of the west side of the A51 Lichfield Road. This should allow perforated views to the river valley and viaduct between widely spaced specimen tree planting at the same time as creating an approach to the underbridge below the rail alignment. As noted in Section 5.B, this bridge should have a special design treatment.
- Wetland habitats: HS2 proposals already include substantial wetland habitat creation as part of ecological mitigation. This habitat should include a broad range of habitats including standing and ephemeral water, scrapes, water meadow and wet woodland. This should be designed to ensure that this reinforces the visual foiling provided by copses. Opportunities to extend this to both the north and the south should also be explored with landowners, both as alternative making good following construction access and as Enhancement Projects outside of Act Limits.

5.C.31 Other access opportunities such as towpath improvements and cycle ways are being explored through the Enhancements Projects.

![](_page_36_Picture_8.jpeg)

#### Selected existing assets

![](_page_36_Figure_10.jpeg)

Act Limits Woodland/ hedgerow Water Ditch Road/ track

Railway

Principal buildings

\*Memorial avenue along Hoomill Lane planted by parish residents will require special consideration

#### Proposals within Act Limits Woodland

$\bigcirc$

Scrub/ woodland

Grassland habitat

creation Wetland creation

Balancing pond & ditch

Hedgerow

#### Detailed Design Principles

![](_page_36_Picture_23.jpeg)

Bridges

- Auto-transformers
- Balancing ponds
- Ecological corridors

#### Landscape opportunities

![](_page_36_Picture_29.jpeg)

Strengthening of existing trees Additional woodland

Copses

Additional hedgerows

Gateway approach with tree planting

Potential Enhancement Project

Trent Sow Washlands

Ingestre Access Connections (extent not shown)

Viewpoints

- 1. Mill Lane
- 2. Great Haywood Road
- 3-5. Trent & Mersey Canal
- 6. A51 Pasturefields overbridge

![](_page_37_Picture_0.jpeg)

#### Introduction

5.D.1 This section should be read in conjunction with Section 5.2 B Bridges. Guidance provided in that section is relevant to all other aspects of green bridges including their deck, parapet, abutments and approaches.

5.D.2 Two green bridges are proposed within the study area:

- Colwich Bridleway 23 Green Overbridge (Ch 203.400)
- Ingestre green overbridge (Ch 207.750)

5.D.3 These bridges are an important part of the proposed ecological mitigation.

#### Summary of proposals

5.D.4 The proposals suggest general and location specific means of ensuring delivery of expected ecological mitigation, increased landscape fit and access improvements for fauna and flora.

#### Significance

5.D.5 Green bridges have an important role in providing both meaningful mitigation - in particular against severance - and improved landscape connectivity. The location, configuration and width of these bridges is broadly fixed by the approved plans under the Act.

#### **Issues & Opportunities**

5.D.6 There are a number of general points common to all green bridges. These include:

- The effective and cost effective means of creating suitable habitat on the bridge deck
- Avoidance of extreme loadings and consequent impact on structure and appearance
- Ensuring maximum use by targeted species (if any)
- Effective and unobtrusive use of fencing for protection and guiding movement, particularly humans or larger species, with associated safety issues
- Enhanced connectivity through a network of ecological corridors

#### Guidance

5.D.7 Designers should refer to an established set of precedents and literature on green bridges. Particularly relevant are:

- Natural England (2015). Green Bridges: A literature 5.D.11 We recommend that designers investigate the review (NECR181)
- Landscape Institute (2015). Green Bridges Technical Guidance Note 09/2015
- Iuell, Bjørn et al (2003). Wildlife and Traffic: A European Handbook for Identifying Conflicts and **Designing Solutions**
- HS2 (2016). Landscape Design Approach (HS2-HS2-EV-STR-000-000010)
- HS2 (2015). Ecology Technical Standard: Green Bridge Design (HS2-HS2-EV-STD-000-000017)

5.D.9 Two documents specific to the study area are essential reading - the HS2 Phase 2a Great Haywood Illustrative Design Plan (May 2018) and C861 HS2 Green Overbridges: Part 2. The first sets out the design approach for the Ingestre Green Overbridge and the second provides additional detail on both proposed bridges. Designers should follow this guidance unless it is varied or amplified as set out below.

#### **Green Bridges - Aims**

- Respond to ecological requirements to provide habitat connectivity and mitigation
- Reconnect communities. cultural/ historic landscapes and facilitate permeability
- Integrated and aesthetic design through responding to and enhancing local landscape character

#### **Green Bridges - Performance Indicators**

- To maintain safe movement and dispersal of animals and plants from one side of the railway to the other
- To provide clear connectivity across the route for the target species
- To achieve healthy plants and vegetation communities that are not unduly water-stressed
- The establishment of viable vegetation communities and provision of long-term habitat connectivity

#### **Contractor requirements**

5.D.10 The contractor shall develop detailed proposals based on the above and a thorough understanding of site context and location-specific requirements (specific to bats, wider ecology, landscape and access). This will require demonstrable input from appropriate specialists. The overall intention must be to maximise lasting multifunctional gains across a broad spectrum of fauna, flora and habitat connectivity, and landscape and access.

following variations:

- Placing hedges on low bunds (to provide adequate soil profiles without variations in the depth of the bridge deck, to enhance immediate effect, to reference typical hedge-bank features local to the area, and to provide added variation in microhabitat)
- Location of security/ safety fencing within these hedges and reduction of the need for heightened bridge parapets
- Maintenance access and locations of gates in fences. Fences to return to connect with perimeter lineside fences and would deter access to all but very small fauna
- Placing bridleway or footpath within the hedge corridor
- Tying in of security/ safety fencing on bridge deck with that along top of cutting and inclusion of solid barrier to 1m height and 0.3m below ground level for 100m on either side of the entrance to the bridge (to funnel fauna towards bridge)
- Provision of hedgerows and trees connecting with adjacent existing/proposed hedgerows/ecological corridors set out to funnel fauna towards bridge
- Hedge and grassland species to match adjacent local hedge and grassland assemblies established by ecological survey
- Consideration of the use of translocated established hedgerow coppice and/ or grassland removed as part of the local works
- Avoidance of lighting. Bat specialist to advise on the necessity for screening given likely traffic volumes at Colwich and, if required, designers to consider innovative alternatives (substantially increased locally native evergreen content to hedge/use of dipped headlights etc)
- Avoidance of clutter through the use of intuitive design and avoidance of signage

5.D.12 Users of the green bridge should be as far as possible unaware of the railway below.

#### Review group responding to emergent designs

5.D.13 Designers should demonstrate to the group clearly their integrated design intent and how this meets the key objectives and key performance indicators.

![](_page_37_Picture_52.jpeg)

![](_page_37_Picture_53.jpeg)

![](_page_37_Picture_54.jpeg)

Well vegetated ecoduct, France ©LauriKlein

![](_page_37_Picture_56.jpeg)

Grassland ecoduct, A50 Netherlands ©HenriCormont

#### Location specific advice

#### Colwich Green Bridge

5.D.14 The bridge is multi-use, combining green features, accommodation access to Moreton House and Farm, and diverted Bridleway 23. Current proposals indicate a 21.5m wide bridge split between access (8.5m) and green bridge (13.0m) broadly as illustrated on page 5 of C861 Green Overbridges: Part 2. See sketch plan for local considerations.

![](_page_38_Figure_3.jpeg)

- 1. 1.8m height parapet
- 2. Footway
- 3. 5.5m wide carriageway

**Illustrative Cross Section** 

- 4. 1m wide green verge
- 5. 1.8m height security fence
- 6. Semi-mature hedge planting on 0.75m high berm managed at approx. 4m height to suit ecological function and safety requirements
- 7. Meadow grass
- Optional perimeter drain/ swale 8.
- 9. Standard height parapet

![](_page_38_Figure_13.jpeg)

#### **Opportunities Plan - Colwich Green Bridge**

- 1. Hedgerow network funnelling fauna towards bridge 2. Solid fauna barrier incorporated into safety fence
- 3. Woodland planting
- Ecological mitigation ponds
  Scrub/ grassland/ scrape mosaic

3

3

- 7. Access track/ bridleway

#### Location specific advice

#### Ingestre Green Bridge

5.D.15 The overall functional requirement of the bridge is to provide a precautionary approach to bat assemblages and shall be fit for purpose. There are however, significant benefits if the design can be adapted to allow use as a footpath or bridleway link in addition to the required ecological corridor.

5.D.17 Further survey and research will determine the bridge location, alignment, width and key performance requirements, as well as additional visual enhancement, requirements for landscape earthworks to aid integration and reinforce historic boundaries.

5.D.18 Failure to provide for such access and improvements will result in the inevitable exclusion of larger fauna from using the bridge, as well as a large lost opportunity for extending the local public access network. Such access can easily be accommodated within the double hedge corridor, would require no hard paving and would not be detrimental to ecology. Security fencing should be incorporated within the hedgerows, allowing lower edge parapets to the bridge. See sketch plan for local considerations.

5.D.19 Any footpaths provided will be subject to all necessary consents and must be compliant with HS2 Ecology Technical Standards. Footpaths shall not be surfaced with hard materials, artificially lit, or more than 4m in width.

#### **Illustrative Cross Section**

![](_page_39_Picture_7.jpeg)

- 1. Standard height parapet
- 2. Edge drain/mini-swale
- 1.8m height security fence 3.
- Semi mature hedge, 0.75m height berm managed at 4. 4m height
- Meadow grass 5.
- 6. Potential for footpath (unsurfaced)

![](_page_39_Picture_14.jpeg)

#### **Opportunities Plan - Ingestre Green Bridge**

8. Potential footpath connections

![](_page_40_Picture_0.jpeg)

#### Introduction

5.E.1 This section provides suggestions on how the visual impact of barriers can be improved, the selection of barriers and their siting and screening. In all cases barriers must be considered as an integral part of the design of the railway and its successful landscape integration. Barriers are proposed in the following locations:

- Moreton Cutting south lineside (Ch 203.114 203.153)
- Moreton Cutting north lineside (Ch 204.000 204.175)
- Trent South Embankment north lineside (Ch 204.175 - 205.387)
- Trent South Embankment south lineside (Ch 204.300 - 205.387)
- Great Haywood Viaduct (Ch 205.400 206.700)
- Trent North Embankment north lineside (Ch 206.184 - 207.400)

#### **Significance**

5.E.2 Noise barriers provide essential mitigation for expected and unwanted noise effects. Their acoustic performance is a given and should not be in any way reduced. This section relates to the appearance of noise fence barriers, parapets and barriers on viaducts.

#### **Issues & Opportunities**

5.E.3 Issues:

- There is potential for considerable visual impact, especially where sited on top of embankments and bridges
- Potential for visual intrusion and significant added bulk where sited on overbridges/ viaducts
- Can appear as alien elements contrary to landscape character
- Can accentuate linearity of the alignment (visual severance)
- Possible issues of glint/ glare and inappropriate colour and materiality
- Design life and maintenance considerations limit materiality of inner (rail facing) elevation
- Siting is invariably mandatory and dictated by maximising effectiveness (i.e. closest to noise source)
- 5.E.4 Opportunities:
- Materials, colour, scale and texture can reduce apparent mass and intrusion, as well as aid landscape integration
- Landscape screening can reduce visibility.

#### Guidance

5.E.5 Noise barriers are likely to be Common Design Elements with a suite of models using different materials and colours. Designers should review this range of models and select suitable options dependant on the technical and aesthetic requirements relevant to location. Aesthetic requirements should be guided by local landscape character, in particular colour, texture and scale. Noise barriers on underbridges and viaducts will require bespoke solutions that relate to the overall design of the bridge.

#### Noise barriers in cuttings

5.E.6 Given local topography and the absence of many significant cross-valley views, trackside barriers at the base of cuttings will be invariably screened by the landform of the cutting itself. Where the top of barrier may be visible over a relatively low cutting, consider hedge planting along the top cutting. Use the same approach on flat land.

#### Noise barriers on embankments

5.E.7 These barriers are likely to be intrusive and will often be seen in silhouette rather than against a landscape backdrop. Screening can be achieved by foreground planting which extends as far as possible up the embankment. Vegetation should be locally native, proven to be compatible with the stability of the embankment, easily maintained, and not pose issues of leaf drop with unwanted operational effects on trains. Where possible, embankment grades should be modified to provide non-structural easier slopes capable of planting and/ or a wider flat 'verge' between the noise barrier and top of embankment slope.

5.E.8 Where total screening is not possible, the intention should be to break up long stretches of noise barrier seen in silhouette using informal groups of trees planted on lower slopes of the embankment or offset within Act Limits.

5.E.9 Even allowing for screening, barriers on embankments need to use recessive natural colours, include a degree of texture (either actual or through shadow lines on a ribbed surface), and have rhythm expressed through differentiation between panels and supporting uprights.

#### Noise barriers on bridge structures

5.E.10 Noise barriers can easily result in even a welldesigned bridge form appearing bulky and overbearing. The Great Haywood Viaduct and Lichfield Road

underbridge provide the greatest challenges with a number of close-range viewpoints. Designers must:

- Seek to minimise visual bulk through selection of optimum product, while not compromising the noise attenuation.
- Prepare fully integrated designs where the noise barrier is considered part of the overall bridge.
- Consider, in particular, the materiality, colour, texture, massing and rhythm of the barrier, and its relation to the bridge structure and balustrade.
- Consider maintenance and replacement requirements.
- Consider carefully the transition between different heights of barriers and where barriers stop or transition. Transitions should use gently stepped or tapered panels over the maximum possible length available.

5.E.11 Designers are encouraged to reference designs produced for the Colne Valley and Chilterns viaducts. See also Section 5.C, Great Haywood viaduct.

#### Fencing

5.E.12 The extensive fencing that will form part of the proposals will include - security fencing that surrounds the operational areas of the railway, and boundary fencing for various types of access control. The selection of the type and height of fencing and gates should be informed by a clear understanding of its purpose, tempered by the aim to maximise its integration with the local landscape and avoid unwanted 'urbanisation', amongst other things.

5.E.13 Designers should reference HS2's Landscape Design Approach and pay particular attention to the alignment and location (avoiding 'sky lining'), the use of local fencing styles and materials (noting differences between agricultural and parkland areas), potential effects on fauna movement (generally and specifically regarding green bridges/ ecology corridors), and considering augmentation with hedges (to screen).

![](_page_40_Picture_43.jpeg)

![](_page_40_Picture_45.jpeg)

![](_page_40_Picture_46.jpeg)

Gently curved ribbed timber barrier gives natural and textured appearance ©Wijma

![](_page_40_Picture_48.jpeg)

Integrated parapet and noise barrier system © Boscoltalia

![](_page_40_Picture_50.jpeg)

Green noise barriers © BAMWegen

![](_page_41_Picture_0.jpeg)

![](_page_41_Picture_1.jpeg)

![](_page_41_Picture_2.jpeg)

Intrusive Auto-transformer Station with harsh materials and fencing ©WJPServices

Typical appearance of Auto-transformer Station ©RailTechnologyMagazine

#### Summary of proposals

5.F.1 Auto-transformer Stations (ATS) are an essential component of the railway regulating and boosting the electrical current that is delivered by the overhead line equipment. Each station consists of a collection of large transformers and electrical equipment, enclosing security fencing and access track. They are the epitome of alien development in the countryside, located at approximately 5km intervals along the route of HS2.

5.F.2 There is one ATS within the project area located to the north of the Trent North Embankment, immediately west of the Great Haywood Viaduct and accessed from Mill Lane.

#### Significance

5.F.3 Auto-transformer Stations are 'alien' elements within the landscape. Emphasis should therefore be given to maximising localised screening, reducing clutter and using recessive colour to integrate the facility with its landscape backdrop.

#### **Issues & Opportunities**

5.F.4 Issues include:

- Lack of control over exact siting, reducing opportunities to mitigate impacts
- Introduction of 'alien' built form/ structures in a predominantly open landscape and the negative effect on local landscape character caused by the facility
- Visual intrusion from security fencing, CCTV, lighting, signage (clutter) within the landscape
- Stringent technical and operational requirements reducing opportunity to influence location and design
- Further unwanted urbanisation caused by maintenance access track from Mill Lane, fencing, signage and possible lighting
- Although proposals include woodland to screen unwanted views from Mill Lane, the effectiveness of this screening is likely to be significantly diminished by sightlines for the entrance and the need to accommodate a new drainage ditch close by

5.F.5 The facility is currently proposed at a minimum of 15m from Mill Lane and will almost certainly be visible from the public highway. This will be visually intrusive and will also compromise the presentation of the viaduct and its northern abutment.

5.F.6 Opportunities:

- Limited by technical and safety requirements.
- Use of fencing types to balance requirements for security and safety against visual intrusion.

![](_page_41_Picture_22.jpeg)

Station located in the open landsca ©ABB

# GDP

Station located in the open landscape could be screened by vegetation or landform or both

#### Suggested design modifications

5.F.7 Designers should investigate the following (numbers in brackets reference to the sketch plan):

- Move the auto-transformer station westwards by approx. 35m by adjusting proposed landscape earthworks (1). The alignment of the access track could remain unchanged (2).
- Site the station low down in the landscape.
- Realigning the proposal ditch (3).
- Increasing the width of the woodland screen and potentially vary additional landform (4).
- Provide additional hedge and woodland screening between the auto-transformer and adjacent existing Lionlodge Covert (5).

5.F.8 This would provide effective screening of views from Mill Lane without adversely affecting the setting of Lionlodge Covert.

5.F.9 The maintenance access track should be of minimum width, with a carefully considered entrance and well set back access gate, visibility splays kept to a minimum and large vehicle overruns surfaced with cellular reinforced grass system or similar. The access route and carriageway should mimic an agricultural track, avoiding the use of kerbs, using stone surfacing and limiting simple dense bitumen macadam to the bell mouth. Access should be secured with an agricultural field gate or similar and discrete signage. The secure line should envelope the facility and be compliant with HS2 security requirements. Any fixed lighting should be manually controlled and used only at times of maintenance access. Associated service elements and clutter should be kept to a minimum to reduce urbanisation of the surroundings.

5.F.10 These changes should ensure that awareness of the facility is significantly reduced.

![](_page_42_Figure_10.jpeg)

Mill Lane ATS, Illustrative sketch plan showing potential for improving location to reduce visual intrusion

## **Ponds - balancing and ecological mitigation**

#### Introduction

5.G.1 The project area includes proposals for four balancing ponds and 13 ecological mitigation ponds associated with the alignment within Act Limits but outside of Operational Limits. New ecological mitigation ponds are also proposed in the extension to Ingestre Golf Course on the north side of Ingestre Road. Many kilometres of ditches will collect and discharge water from the track. The balancing ponds in particular are large elements (> 1ha). Collectively these elements have significant potential effect on landscape character, trees, ecology and the successful integration of HS2 and the landscape. Designers should refer to SuDS Manual 2015; Ponds, a priority habitat: Best Practice Guidelines 2013: and Guidance for Freshwater Habitats: for best practice guidance.

#### **Issues and opportunities**

5.G.2 These features have the ability to be harmful in a similar way to auto-transformers - through their direct impact and through their supporting infrastructure such as access and fencing - with a combined result of unwanted, but avoidable, urbanisation. The fact that effective drainage and attenuation are essential to an operational railway and that ecological ponds provide mitigation should not be at the detriment of landscape character and landscape integration.

5.G.3 Careful and location-specific design can avoid these negative landscape impacts and even provide additional ecological benefits. Locations of ponds/ drainage features should be adjusted to avoid nondesignated heritage assets and any impacts.

#### **Balancing ponds**

5.G.4 Designers should:

- Obtain a clear understanding of the engineering requirements of the facility (its purpose, volume, return period, freeboard and intake/ discharge systems).
- Obtain an equally clear understanding of the 'art of the possible' with regard to potential ecological mitigation and landscape fit (whether planting or over-deepening to create standing water is permissible, maximum slope gradients etc.).
- Have preference for ponds that are mainly excavated with raised containment berms kept to the minimum (to aid landscape fit and ecological benefit). If this is not possible, consider two or more linked ponds.
- Use shallow (>1:7) outer faces of berm that are 'feathered' into existing ground profiles.
- Use steeper inner faces generally with cut faces up to 1:3.
- Use two or more multiple stage inner slopes to

avoid the need for safety fences.

- Use these stepped slopes as the basis for ecological mitigation in possible combination with different soil profiles and/or planting and seed mixes.
- Exercise extreme care in the design and location of engineering elements such as inlet/ outlet pipes, headwalls, grilles etc. keeping them to the minimum to reduce visual clutter.
- Use suitable, locally styled timber post and rail or stock fence if access is to be deterred. Ensure style of fencing has a positive response to context and is sensitively located.
- Treat with care all required access tracks, bell mouths etc. ensuring these are kept to the minimum (see Section 5.F, Auto-transformer station for further guidance on accesses)
- Shape and footprint: Footprint considerations contain a trade-off between efficiency and complexity (with a simple circular pond being the most space-efficient). If space and assurances permit, more complex forms can be used, especially where landscape fit is a consideration and/ or ecological mitigation can be introduced (slacker slopes, islands etc.). Naturalistic forms echoing the local landscape would be the default approach, but there may be opportunity to consider more stylised 'land art' approaches.

#### **Ecological mitigation ponds**

5.G.5 Much of the above applies to ecological mitigation ponds which are generally much smaller and have no direct hydrological function. Designers must:

- Be fully aware of the mitigation required/ included in the Environmental Minimum Requirements (general, habitat, species specific, etc.).
- Understand the management requirements and arrangements for the proposals.
- Set clear ecological objectives based on the above.
- Design to meet these objectives.
- Consider water supply/ discharge context (ditch, ground water, scrape).
- Avoid the use of butyl/ synthetic liners.
- Avoid any potential safety issues through the use of stepped edge profiles and side slope gradients.
- Use local style timber or stock fence if access is to be restricted.
- Reference local pond features in design of footprint and shape.
- Determine approach to achieve vegetation cover (natural colonisation/ starter kit of limited planting/ seeding/ full completion on day one)

5.G.6 These ponds must be considered as part of the wider ecological habitat, whether existing, enhanced or proposed. See Section 5.H Ecological corridors.

![](_page_43_Picture_33.jpeg)

Well vegetated informal two stage channel/ ditch ©Susdrain

Attenuation pond and meander at Batheaston, River Avon. Ecological features include scrapes, wetland and scrub mosaic. The feature takes run off from the A4 Batheaston Bypass. ©2019 Google

![](_page_43_Picture_36.jpeg)

Well integrated mitigation pond ©Susdrain

![](_page_43_Picture_38.jpeg)

![](_page_43_Picture_39.jpeg)

Ecological mitigation ponds providing habitat and amenity value at Attenborough Nature Reserve ©RichardRogers

![](_page_43_Picture_41.jpeg)

![](_page_43_Picture_42.jpeg)

![](_page_43_Picture_43.jpeg)

Well integrated attenuation pond, Wetherby Services

#### **Drainage ditches**

5.G.7 Standard V or ticked shaped section ditches are assumed, sized in accordance with estimated flows, which will allow for water retention in dry periods. Large ditches and/ or ones with variable flows should use two stage channel sections. Side slope gradients and maintenance access requirements should meet local requirements. Ditches can offer enhanced ecological connectivity and landscape enhancement, including associated hedge planting.

5.G.8 Footpath crossings, piped inlets, grilles etc. should be designed carefully, keeping infrastructure to the minimum, siting sensitively and using elements and materials that are appropriate to their landscape context.

#### Location specific guidance

5.G.9 Balancing pond south of Trent South Embankment (Ch 205.250): Fed by >1.5km ditches draining extensive embankment slopes, ditches are therefore likely to be of considerable size. The ecological potential of this ditch corridor should be exploited. The pond outflow needs to be resolved. The relationship of the pond to the surrounding proposed woodland needs resolution and the permissibility of creating wet woodland within the pond investigated, likewise the ecological possibilities for the pond sides and base. The access track (>300m length) requires careful handling and treatment as an agricultural track.

![](_page_44_Figure_6.jpeg)

![](_page_44_Figure_7.jpeg)

![](_page_44_Figure_8.jpeg)

- 2. Meadow grass
- Two stage ditch/ channel 3.
- Semi-mature hedge 4.

5.G.10 Balancing ponds north and south of western end of Great Haywood Viaduct (Ch206.250): Both ponds have considerable potential for significantly increased landscape fit and provision of landscape and ecological amenity. This should include consideration of their shape, visual and physical access, proposed surrounding woodland and maintenance access arrangements.

5.G.11 Balancing pond south of Hopton embankment (Ch 209.700): Designers should consider carefully the relationship of the pond and the nearby Trent Walk so that it can provide visible landscape and ecological amenity.

![](_page_44_Figure_14.jpeg)

![](_page_45_Picture_0.jpeg)

#### Introduction

5.H.1 Chapters 2 and 4 set out the ecological baseline condition and the Ecology General Design Principle (GDP) respectively. This section provides guidance on how this GDP can be delivered.

5.H.2 The ecology of the project area is rich and varied, but still capable and deserving of significant enhancement, so issues and opportunities arise from protection, conservation and enhancement to the creation of new habitats.

#### **Act Limits**

5.H.3 Ecology knows no boundaries. This guidance applies equally to areas within and beyond Act Limits. It has an overarching principle of maximising connectivity.

#### **Five Levels of Connectivity**

5.H.4 Designers are encouraged to consider all five levels of connectivity to ensure that ecological provision is effective and that synergies are maximised.

5.H.5 **Level 1 - Agreed ecological mitigation:** Current proposals include extensive ecological provision to achieve a position of 'No Net Loss'. These include creation of a variety of habitats – woodland, grassland, wetland and others – and are shown on HS2 proposals drawings. Designers need to maximise the effectiveness of these proposals by:

- Developing designs through reference to local conditions established by ecological surveys of each site's context. This will ensure optimal match with local species and assemblies, and improved chance of successful establishment.
- Understanding management responsibilities and agreeing regimes and proposals that are appropriate, achievable and mutually supportive.

5.H.6 Level 2 - Effective and connected assemblies: Designers should look beyond the measurement-based provision of mitigation under Level 1. The location of and interface between the same area (m2) of the same mitigation can yield significantly different results. Designs should be holistic and consider in particular movement corridors and connections of fauna, flora and water. Maximising the amount of 'edge' between habitats and the micro-design of this edge (intricacy, aspect and variation) will significantly improve the quality of mitigation. 5.H.7 Level 3 - Added ecological value of other HS2 proposals: Most of the detailed design principles in this chapter refer to engineering and railway-based elements. This does not preclude the inclusion of ecological considerations in their design solutions and construction, provided this is not detrimental to its primary function. Guidance under Section 5.G Ponds is a prime example.

5.H.8 **Level 4 - Making good after construction:** Section 5.A provides specific guidance on this very extensive operation. In ecological terms it raises important questions of both alternative means and endpoints of 'making good'. Returning to previous conditions should not necessarily be the default position, particularly for ecology where relatively minor changes could reap substantial ecological benefits.

5.H.9 **Level 5 - Extending beyond Act Limits:** Act Limits are an arbitrary line determined by the assumed extent of land required during construction which will be invisible provided making good after construction is appropriate and effective. For all the effectiveness of Levels 1 – 4 above, real benefit lies in connecting to and enhancing existing ecological assets outside Act Limits. This is one of the key opportunities for Part 2 of this project – Enhancement Projects. The above strategies and guidance should be applied.

#### Landowner agreement

5.H.10 Ecological corridors are particularly dependent on the agreement of respective landowners, their anticipated future use of the land, and their ability and willingness to co-operate with and/ or deliver appropriate land management. Establishing individual positions will take time and opinions may change. Ecological corridors need therefore to be robust by:

- Proposing a network of routes with some degree of inbuilt redundancy – this will reduce the chances of harmful gaps.
- Connecting to known existing areas of ecological value/ management.
- Focusing on elements where HS2 has control (drainage ditches, access track corridors, balancing ponds etc.) to maximise ecological gains.
- Adjusting proposals to known attitudes of landowners ('pushing on the open door').
- Developing a strategy that can be delivered over time as funds and conditions permit.
- Reinforcing investment and grasping opportunities set up by HS2 proposals, notably the two green bridges and the Great Haywood Viaduct.

![](_page_45_Picture_23.jpeg)

The European Greenbelt forms an 12,500 kilometre Pan-European ecological corridor from Finland to Greece located in the former Iron Curtain ©Lifegate

# **Vegetation including lineside slopes**

#### Introduction

5.J.1 This section refers to vegetation both inside and outside of Operational Limits. Vegetation refers to material that is either planted or sown, and ranges from woodland to grassland, including scrub, heathland, wetland and hedgerows.

5.J.2 The scale of planting varies from large scale mitigation for habitats lost through construction, to small-scale landscape treatments within Act Limits and outside, as Enhancement Projects.

5.J.3 Chapters 2 and 4 describe the baseline condition and relevant General Design Principles. The project area contains landscape and habitats of value with existing vegetation contributing significantly.

#### Significance

5.J.4 Vegetation proposed is crucial to integrating the scheme into the surrounding landscape, reducing the overall severance, visually and perceptually. Vegetation anchors and integrates, connects and rehabilitates habitats, screens views, and enhances landscape character and time-depth.

5.J.5 Habitat creation requires careful design, planning, implementation and management to establish successful habitats. Woodland is typically the most difficult to establish and comprises more than tree planting alone.

5.J.6 Heathland is a priority habitat in the project area and its creation should be explored in suitable areas.

#### **Issues & Opportunities**

5.J.7 Potential issues include:

- Inappropriate planting (out of keeping with local landscape character/ enclosure of the open valley landscape)
- Inappropriate/ inadequate management
- Poor establishment (incorrect species and/ or poor implementation)
- Failure to establish promised mitigation
- Drawing attention to HS2 (exaggeration of linear expression of scheme in the landscape)

**Opportunities:** 

5.J.8 After structures and landform, vegetation presents the greatest opportunity to influence perception of the railway and its integration into the local landscape.

- Habitat connectivity
- Enhanced quality

- Improved or focused setting to historic features
- Framing of key views across the landscape
- Increased resilience to pest, disease and climate change

#### Guidance

5.J.9 Effective integration will be dependent on a seamless join with its landscape context. This in turn will be dependent on an excellent understanding of local landscape character and in particular its vegetation. Designers should:

- Familiarise themselves with local landscape character (study of relevant landscape character assessments and personal knowledge of the immediate context of the line).
- Where appropriate undertake detailed site assessments to understand species, assemblies and local idioms, whether designed or semi natural (e.g. adjacent to proposed green bridges, on ecological corridors and site-specific design opportunities such as the A51 underbridge 'Gateway').
- Make use of the considerable local embedded knowledge, including from the National Trust, and particularly in relation to the SSSI, nature reserves, rivers and waterways, as well as industry standards such as UK Forestry Standard which sets principles for design and management of woodland, copse and hedgerows.
- Understand Local Wildlife Sites of similar habitat and species composition locally to inform new habitat creation. Semi-natural habitat creation should seek to attain priority habitat quality. Guidelines for the Selection of Local Wildlife Sites in Staffordshire (2017) should be referred to for local guidance on habitat structure and species mixes.
- Anticipate environmental change caused by HS2 (changes in drainage patterns, site conditions after making good etc.)
- Ensure effective delivery of mitigation included in HS2 proposals by reference to the Environmental Statement, Assurances and relevant documents. This applies equally to screening, replacement of lost landscape features, ecology or making good construction access.
- Understand the ability and willingness of landowners to provide or organise subsequent land management.
- Choose techniques and species/ mixes that are both locally appropriate and have good chances of rapid and effective establishment. Base choices on good site knowledge (soils, slopes, aspect and

![](_page_46_Picture_33.jpeg)

Mixed native hedgerow used to define boundaries, screen/ foil structures and fencing and connect habitats

![](_page_46_Picture_36.jpeg)

Radford Meadows Nature Reserve. Restoration scheme included scrapes to help retain flood waters in the River Penk floodplain. ©StaffordshireWildlifeTrust

![](_page_46_Picture_38.jpeg)

Allimore Green SSSI, traditionally managed wet grassland ©StaffordshireWildlifeTrust

# GDP

![](_page_46_Picture_41.jpeg)

Native locally sourced planting integrating new equestrian overbridge on the A34 Chieveley/ M4 Junction 13 within the North Wessex Downs AONB. New planting linked into existing adjacent woodland and downland, in keeping with landscape character. ©Google

drainage) and suitable implementation techniques. Reference local knowledge/ experience; observation of local species and varieties; and consider field trials.

- Local origin: HS2 guidance applies and should guide where and how local provenance material is used. Local donor matched seed should be used close to designated wildlife sites and other sites that are flora-sensitive.
- Use of local wildflower mixes on embankments, with benefits for pollinators

5.J.10 HS2 documents should be referenced where appropriate and augmented by local investigations as noted above.

#### Lineside slopes

5.J.11 Lineside slopes include cuttings, embankments and other land within Operational Limits. All such areas are controlled by obligatory technical and operational requirements of the railway. Technical requirements include slope stability and erosion control. Operational requirements include an overriding assumption on minimum maintenance and zero impact on the railway's operation (caused by either the maintenance operation itself or other impacts such as leaf blow).

5.J.12 Designers should reference HS2 technical guidance including the Landscape Design Approach earthworks design library and evolve solutions that are appropriate to local landscape character (HS2 (2016). Landscape Earthworks Design Guidance (HS2-HS2-EV-STD-000-00021).

5.J.13 Cuttings will have the greater technical restrictions resulting in a likely land cover of grassland, the species mix of which should relate to local semiimproved grassland or meadow species compositions.

5.J.14 Embankments provide greater need for screening (especially of embankment-top noise barriers) and greater opportunities. Many of the embankments in the project area consist of steep-sided engineering landforms completely or partly overlaid by shallower landscape fill. Designers need to establish and work to the restrictions on planting materials in both of these conditions. Landscape fill should be married into the surrounding landform in order to create a seamless integration of the earthworks. Considerations should also include the risks of vegetation and root damage, wind-blow, and leaf fall; poor establishment and subsequent management; and poor landscape fit.

5.J.15 Lineside slopes can contribute positively towards the integration of railway and landscape and should follow other guidance provided above. Care should be taken to avoid accentuating awareness of the railway's presence through screening that emphasises its visual severance (i.e. extensive narrow and even width planting strips parallel with the alignment). With

the exception of noise barriers – where hedges are likely to be the most appropriate - visibility of the railway should be generally reduced by creating a series of planted buffers placed in depth within and beyond Act Limits. This 'foiling' rather than 'screening' is more appropriate to the multiple viewpoints and local landscape character of the project area.

5.J.16 Lineside grassland might become attractive to hunting fauna such as Barn Owl which might then cause bird strike. Specialist advice should be taken as to risks and deterrents.

#### Parkland trees

5.J.17 The project area, particularly west of the River Trent, contains numerous excellent specimen parkland trees, many of which are at their height of maturity. They make significant contribution to local landscape character and are landscape assets in their own right. Proposals within and outside of Act Limits should respect the setting of these trees. Proposals should also consider production of a strategy for their conservation and interpretation, including proposals for next generation planting. Designers should distinguish between woodland and parkland planting, observe the species, grouping, location and setting of the latter, and avoid the temptation to over-provide replacements and cause visual clutter. If planting is based on historic locations, reference should be made to the 1st edition OS plans to ensure accuracy.

![](_page_47_Figure_14.jpeg)

A fully integrated landscape approach with gently contoured topography ©HS1

![](_page_47_Figure_16.jpeg)

![](_page_47_Picture_17.jpeg)

Careful slope gradients marrying into existing land form, with landscape and ecological planting in the Devil's Punch Bowl SSSI for the A3 Hindhead ©Natural England

![](_page_47_Picture_19.jpeg)

Blakeshall Common - restoration of 19ha lowland heath ©NationalTrust

![](_page_47_Picture_21.jpeg)

Mature specimen trees make a significant contribution

## 6 Glossary

Term	Definition
Abutment	A point where two structures meet, which support or anchor the end of a bridge.
Accommodation bridge	A bridge under or over the route of the Proposed Scheme that serves an area of land or residential property and is not considered a public highway.
Alluvial soils	Natural materials deposited within and adjacent to rivers.
Amenity	The benefits of enjoyment and well-being that are gained from a resource in line with its intended function. Amenity may be affected by a combination of factors quality; traffic/ congestion; and landscape/ visual impacts.
Ancient woodland	Land that has been continually wooded since at least 1600 AD.
Ancillary works	Activities which may take place prior to work under the main construction contract. This could include: demolition, site clearance and the diversion and upgrade
Area of Outstanding Natural Beauty	An area designated under section 82(1) of the Countryside and Rights of Way Act 2000 for the purpose of conserving and enhancing its natural beauty.
Auto-transformer station	An installation that accommodates switchgear and associated equipment. Auto-transformer stations are located in the railway corridor at approximately 5km (3r auto-transformer feeder stations to be increased.
Balancing pond	Part of a drainage system that is used to temporarily store, and thereby attenuate, the flow of surface water run-off.
Baseline	Existing environmental conditions present on, or near a site, against which future changes can be measured or predicted.
Biodiversity	The variety of life in the world or in a particular habitat or ecosystem.
<b>Biodiversity Action Plan (BAP)</b>	A nationally established programme that seeks to protect and restore threatened species, habitats and biological systems.
Bridge deck	The road, railway or pedestrian walkway that forms the surface of a bridge.
Bridge soffit	The underside of a bridge.
Bridleway	A public right of way used for walking, riding a horse and cycling.
British Horse Society	A charity that seeks to protect the interests of horses (including their welfare) and horse riders (equestrians), for example, through increasing bridleway access.
Bund	An embankment that acts as a visual or noise screen, or as a barrier to control the spillage of fluids.
Cantilever	A structure supported or fixed at one end only.
Code of construction practice	A document setting out the measures and standards to which a developer or contractor must adhere in order to provide effective planning, management and co communities and the environment during construction.
Community area	Defined areas along the proposed HS2 Phase 2a route. They are used as a geographical basis for reporting local community and environmental impacts and e
Connectivity (ecology)	A measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by b
Conservation	The preservation or enhancement of a species or building/ structure.
Conservation area	An area designated under Section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990 as being of special architectural or historic interest ar desirable to preserve or enhance.
Construction	The works necessary to build a proposed development.
Culvert	A large pipe or small underbridge carrying a watercourse under a road or railway.
Cutting	A linear excavation of soil or rock to make way for a new railway or road. Cuttings help reduce the noise and/or visual impact of passing trains or road vehicles.
Deck beam	A horizontal structural support element that is capable of withstanding a vertical load.
Design development	Process in which technical specialists (e.g. engineering, environmental, socio- economic, community and health specialists) collaboratively refine the design for
Design life	The life expectancy of a proposed development.
Detailed design	The process in which the finer details of the design of a proposed development are developed.
Earthworks	The removal or placement of soils and rocks such as in cuttings, embankments and environmental mitigation, including the in-situ improvement of soils/rocks to
Ecological Ponds	A small natural or artificial area containing shallow water with associated plants and animals.
Embankment	Artificially raised ground, commonly made of rock or compacted soil, on which a new railway or road is constructed.
Environmental statement	A suite of documents produced as part of an environmental impact assessment. It must include all information that is reasonably required to assess the likely si development.
Fill	Material used to artificially raise existing ground levels.
Floodplain	Land adjacent to a watercourse that is subject to flooding.

s such as: sound, noise and vibration; dust/ air

e of utilities.

Bmile) intervals. They allow the distance between

ontrol of potential impacts on individuals,

effects in the environmental statement. bats to travel between roosts whilst foraging.

nd with a character or appearance which is

the various elements of HS2 Phase 2a.

achieve desired properties.

significant environmental effects of a proposed

Term	Definition
Flood Zones 1, 2 and 3	A system devised by the Environment Agency for classifying flood zone areas. The zones are:
	Flood Zone 1: land outside the floodplain. There is little or no risk of flooding in this zone;
	Flood Zone 2: the area of the floodplain where there is a low to medium flood risk; and
	Flood Zone 3: the area of the floodplain where there is a high risk of flooding.
Footpath	A public right of way that the public can travel on by foot. These are often unpaved waymarked paths running through the countryside.
Footway	A path that runs alongside a road that the public can travel on by foot, often paved in more urban areas, but can also include unpaved routes on roadside grass
Fragmentation (ecology)	The breaking-up of a habitat, ecosystem or land-use type into smaller parcels.
Green bridge	A specific type of bridge that may be partially or fully covered in vegetation to benefit ecology.
Habitat	The living place of an organism characterised by its physical or biotic properties.
Heritage asset	A building, monument, site, place, area or landscape of heritage interest.
High Speed Two	Proposed high speed rail line between London and the West Midlands (Phase One) and on to Manchester and Leeds (Phase Two). Phase 2a is the section be
Historic Environment Record	A record of all known archaeological finds and features and historic buildings and historic/ landscape features, relating to all periods from the earliest human ac
Historic Landscape Character	A method of identifying and interpreting an area's historic character, looking beyond just the heritage assets but understanding the landscape and the townscap connections by classifying the landscape into repeating Historic Landscape Characterisation Types.
Landscape	Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/ or human factors. It reflects the interple of our surroundings and the way that people perceive these interactions. Different combinations of these elements create the distinctive character of landscape
Landscape character area	Areas of landscape that have a broadly consistent pattern of topography, land use and vegetation cover.
Limits of Deviation (LOD)	Vertical limits of deviation permit a deviation of 3 metres upwards and to any extent downwards from the level shown on the Parliamentary sections (in many ca a practical possibility and where it is possible this has been assessed in the Environmental Statement). Certain major structures will have maximum heights wh
Listed building	A building of special architectural or historic interest. Listed buildings are graded I, II* or II, with Grade I being the highest. Listing includes the interior, exterior a
Local Wildlife Site	A non-statutory site of nature conservation value that has been designated 'locally'. These sites are referred to differently between counties. Common terms inc
	conservation, county wildlife site, site of biological importance, site of local importance and sites of metropolitan importance.
Mitigation	The proposed means to avoid, prevent or reduce the likely adverse effects of development on the environment.
Noise barrier	A solid construction that reduces unwanted sound. It may take many forms including: engineering cutting; retaining wall; noise fence barrier; landscape earthwo
No win stad on dentalisa	Viaduct; or any combination of these measures.
	The petienel menning agency for Britein
	A bridge greening ever a transport certifier such as a railway line
Overbridge	A bridge clossing over a transport control such as a failway life.
Overnead line equipment	A low well clong the edge of a structure (e.g. a bridge) to protect people from falling
Parapets Bormissivo path	A note that is not a public right of way, but which the landowner permits the public to use. The landowner can close the path for periods of time.
	A pair that is not a public right of way, but which the landowner permits the public to use. The landowner can close the patrior periods of time.
r hase one	Scotland. Phase One includes stations at London Euston, Old Oak Common (West London), Birmingham Interchange (near the National Exhibition Centre and (Birmingham city centre).
Phase Two	Phase Two of the proposed HS2 network extends the high speed railway beyond the West Midlands to Manchester and Leeds with connections to conventional Coast main lines.
Public Right(s) of Way	A highway where the public has the right to walk; and, depending on its class, use for other modes of travel. It can be a footpath (used for walking only), a bridle cycling), a restricted byway (as a bridleway, but use by non-motorised vehicles also permitted) or a byway that is open to all traffic (include motor vehicles).
Register of Historic Parks and Gardens	Historic England's non-statutory register which identifies over 1,600 sites of historic interest in England assessed to be of national importance. Its purpose is to greater understanding of their significance.
Restoration (ecology)	The re-establishment of a damaged or degraded system or habitat to a level similar to its original condition.
Restoration (ground)	The works delivered following completion of excavation, including regrading of excavations, the placement and preparation of soils, and landscape treatment.
Review Group	The Trent-Sow Parklands and Cannock Chase AONB HS2 Group, formed to assist the nominated undertaker in achieving a high standard of design for key deresponse to the reported impacts of the HS2 Phase 2a Scheme.
Riparian area	The interface between land and a river or stream.
Scheduled monument	Nationally significant heritage assets protected by the Ancient Monuments and Archaeological Areas Act 1979.
Setting (cultural heritage)	The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setti to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.

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ing may make a positive or negative contribution

Term	Definition
Severance	A change in ease of access for non-motorised users due to, for example, a change in travel distance or travel time or a change in traffic levels on a route that m it (traffic related severance). A reference to severance does not necessarily imply that a route is closed to access.
Site of Biological Importance	A non-statutory designation used by some local planning authorities to protect locally valued sites of biological diversity described as local wildlife sites by the U
Site of Special Scientific Interest	Area of land notified by Natural England under Section 28 of the Wildlife and Countryside Act 1981 as being of special interest due to its flora, fauna or geologic
Span	The horizontal distance between two supports of a structure (e.g. piers of a bridge or viaduct).
Stockpile	An area where materials excavated during construction of the scheme will be stored temporarily before being reused, or where construction plant and machiner
Tranquility	A state of calm or quiet.
Translocation	The transporting and release of species or habitats from one location to another. For example, if an area of land is required permanently for a new development suitable alternative location.
Underbridge	A bridge crossing under a transport corridor such as a railway line.
Veteran tree	A tree which shows 'ancient characteristics'. The tree may be of great age; great age relative to others of the same species; existing in an ancient stage of life o interest. Physical characteristics include crown retrenchment and signs of decay in the trunk, branches or roots.
Viaduct	A type of bridge composed of a series of spans, used to carry roads and railways across valleys or other infrastructure.
Viewpoint	A place from which something can be viewed.
Visual amenity	The enjoyment or benefit that people derive from a particular view or area in terms of what is seen.
Well-being	A general term for the condition of an individual or group, for example their social, economic, psychological, spiritual or medical state. High well-being means the experience is positive, while low well-being is associated with negative conditions.

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IK Government.

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![](_page_51_Picture_0.jpeg)