

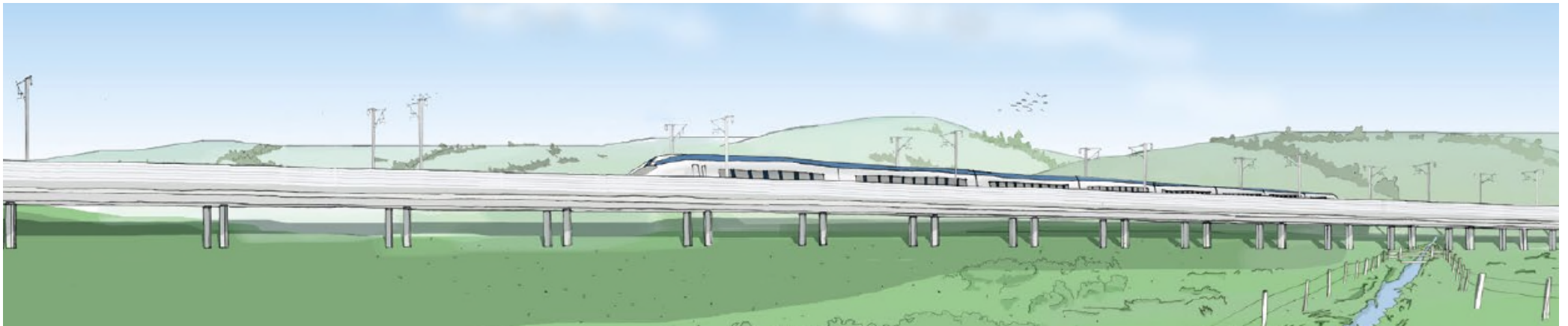
# HS2

## Phase 2a - Scheme Components

May 2018

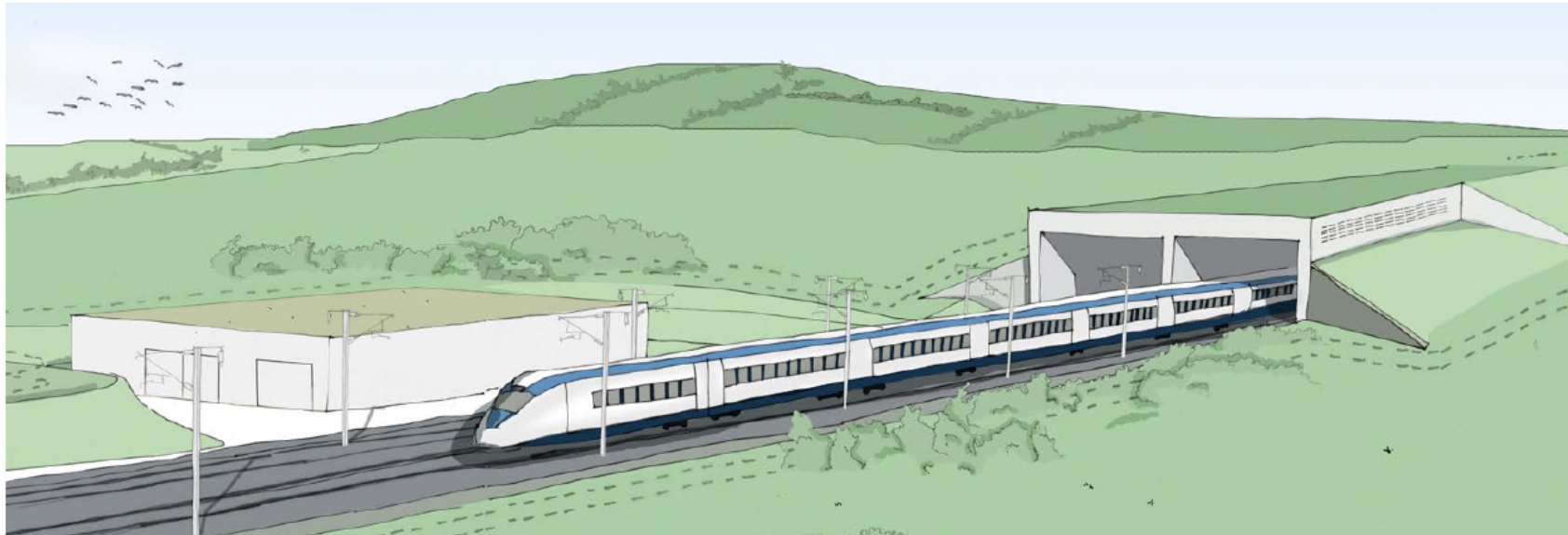
# Bridges and viaducts

- Used to cross existing features: existing railways, roads, public rights of way, rivers, floodplains.
- Viaducts are constructed where embankments would not be a practicable or effective solution.
- The height of the bridges and viaducts is determined by the route alignment, surrounding ground levels and the feature being crossed.



# Tunnels

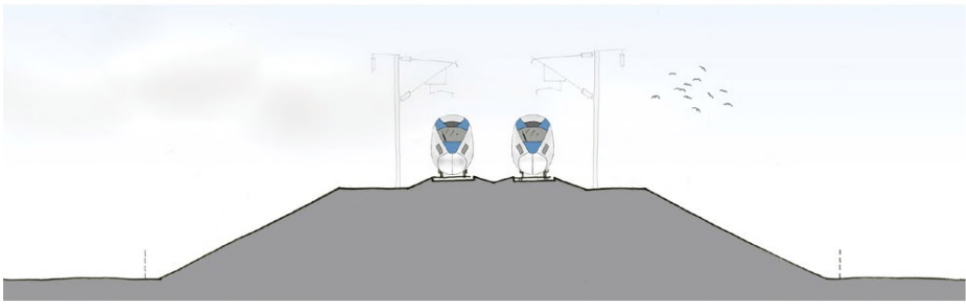
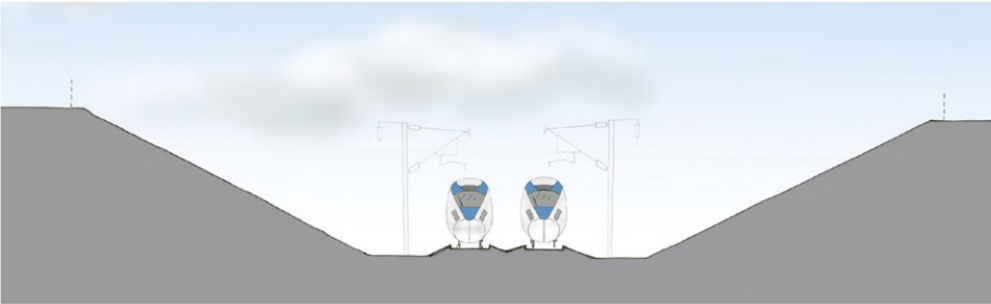
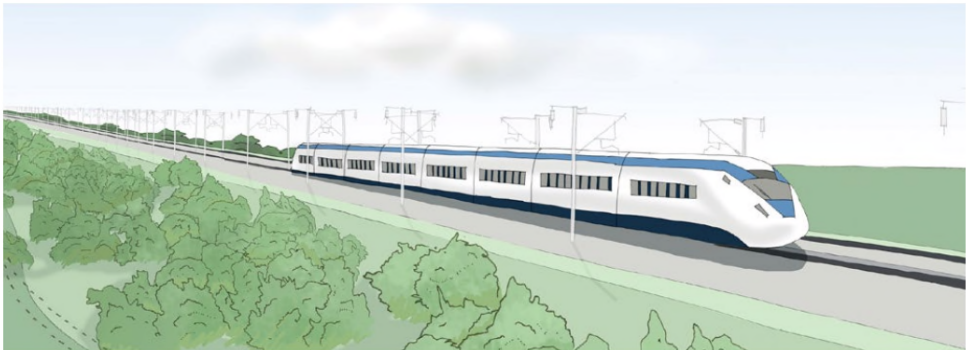
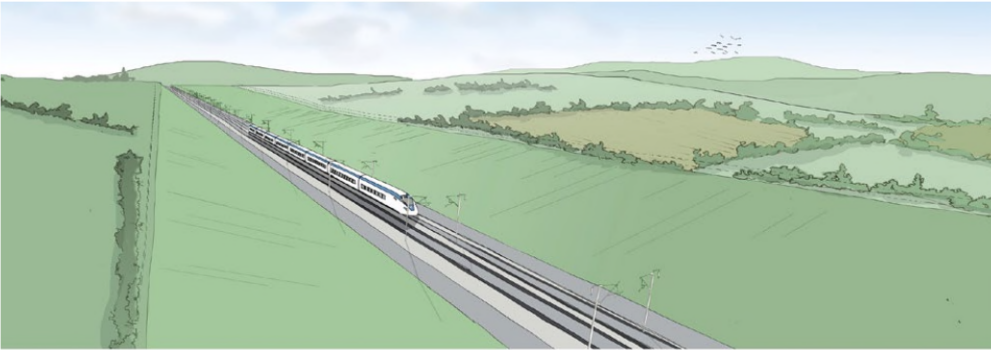
Tunnels will be provided at Whitmore Heath and Madeley. Tunnels are designed with porous portals.



# Cuttings and embankments

- The Proposed Scheme has being designed without tight curves or steep gradients so that higher speeds can be achieved. To facilitate this sections of the route will be in cutting or on a raised embankment.
- Cuttings are sections of the route where material has been excavated to create a space for the railway, and to maintain the rail level below the existing ground level.
- In some locations retaining walls are proposed on one or both sides of a cutting to reduce the amount of land required for the permanent railway.
- False cuttings are formed through the creation of earth bunds on one or both sides of the railway to screen and integrate it into the landscape. False cuttings also provide noise attenuation.
- Embankments are sections of the route where the rail level is to be constructed above the existing ground level using compacted soils or rock as a fill material to raise the rail level.

# Examples of cuttings and embankments



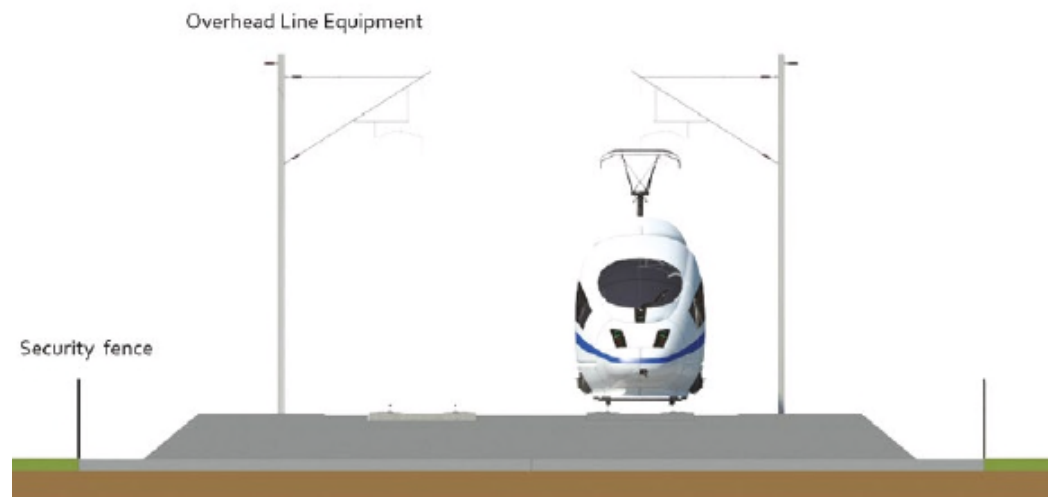
# Track

- The track form will be slab track.
- Slab track comprises pre-cast concrete slabs supported on a continuous structural layer.



# Power Supply

- Power will be transmitted to trains through overhead line equipment. An example is shown on the illustration.



- The Proposed Scheme will be powered via an auto-transformer feeder station to be located at Newlands Lane, Colton.
- Smaller rail traction 'auto-transformer stations', supplied from the Newlands Lane auto-transformer feeder station, will be provided at approximately 3 mile (5km) intervals along the route.
- An express feeder auto-transformer station will be located approximately 18km north of the Newlands Lane auto-transformer station at Yarlet.

# Train control and telecommunications

- HS2's train control and telecommunications system will be operated from HS2's route-wide network control centre at Washwood Heath in East Birmingham.
- The HS2 network control centre will control the operation of the railway.
- The Proposed Scheme's operations and train control system requires radio antennae to be installed at fixed locations along the route.





# Permanent Maintenance Facility (Infrastructure Maintenance Base – Rail)

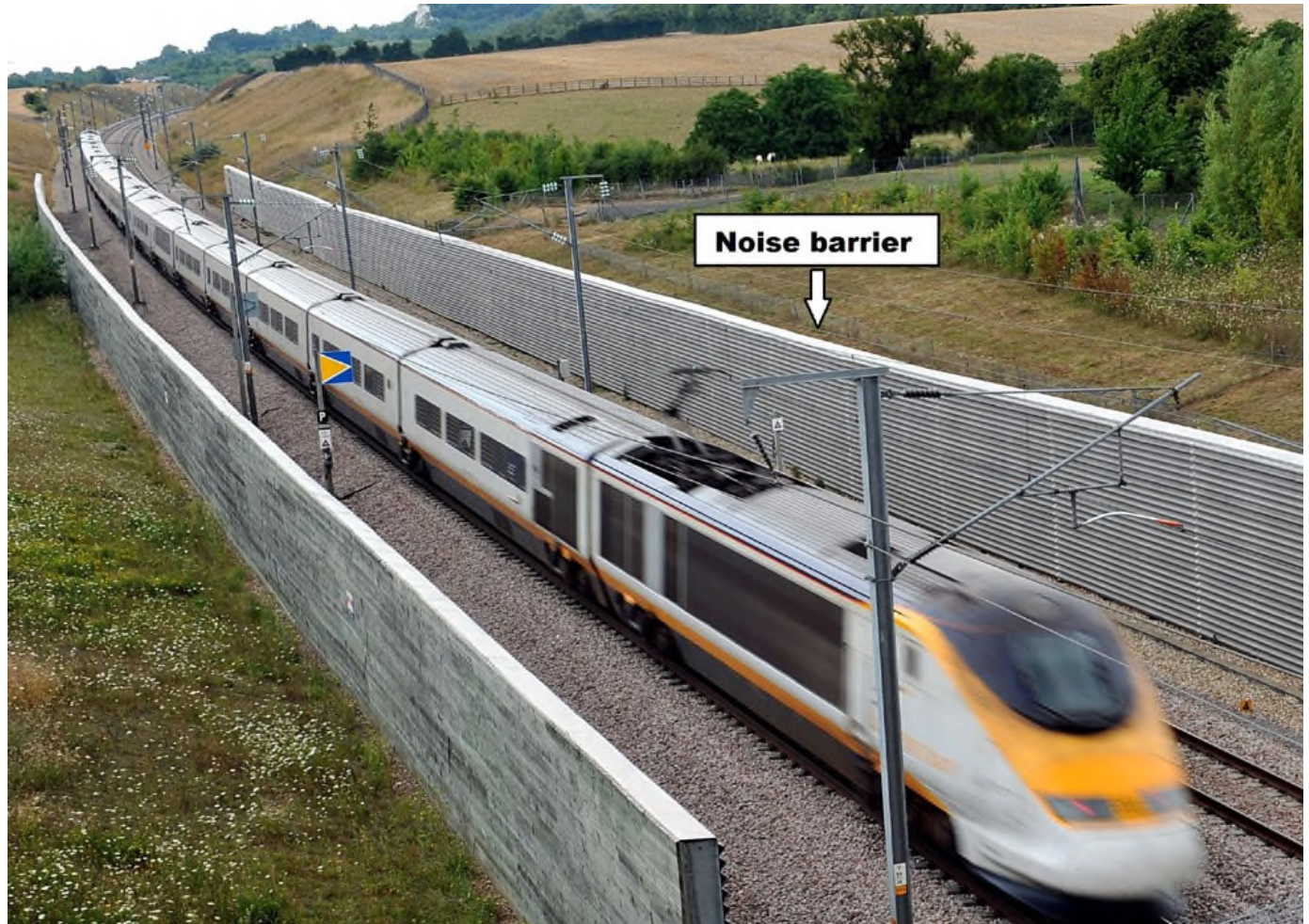
- The Proposed Scheme includes an Infrastructure Maintenance Base-Rail, a permanent maintenance facility, near Stone.
- The maintenance facility will be located on the site of the Stone construction railhead.
- The maintenance facility will support maintenance of the Phase 2a railway until 2033, and the full western section of Phase Two once operational from that date.
- Rail access to the maintenance facility from the national railway network will be provided via the Norton Bridge to Stone Railway.
- Road access to the maintenance facility will be provided via dedicated sliproads on to the M6 motorway southbound.
- Yarnfield Lane will provide local road access to the maintenance facility.

# Road, public right of way, utility and watercourse diversions

- Roads, public rights of way and utilities that need to be diverted or realigned will normally follow the shortest practicable route, taking into account safety, pedestrian, cyclists and equestrian flows, motorised traffic flows, construction duration and local environmental effects.
- The nature and timing of any road diversions will be planned in consultation with the relevant highway authority.
- Where new roads, bridges and public rights of way are required to cross the route they will be constructed in advance and offline, so far as reasonably practicable, in order to allow the existing route to continue in use until its replacement is ready to be brought into public use.
- Where watercourses require diversion, channel flow will be designed and maintained in consultation with the relevant regulatory authority.

# Noise barriers

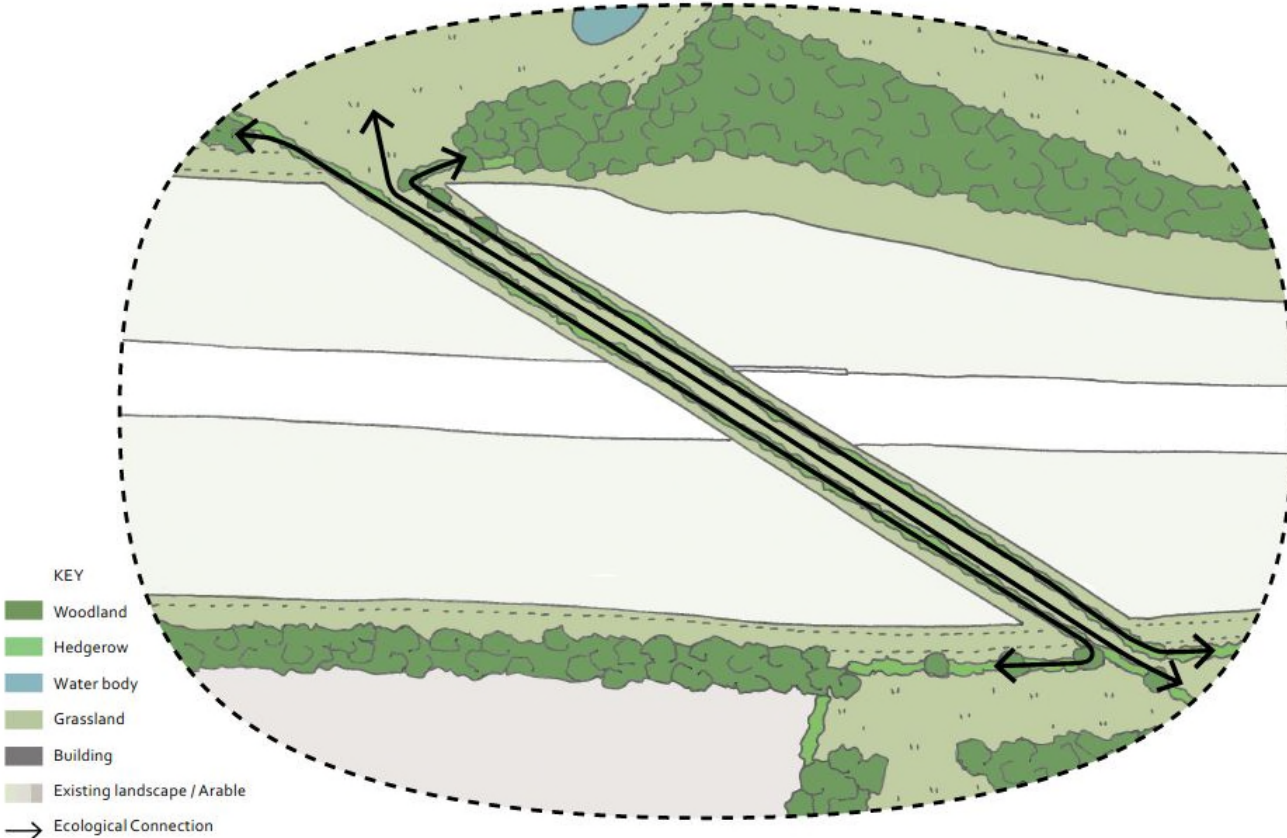
- The Proposed Scheme design includes noise barriers where appropriate.
- Noise barriers include:
  - landscape earthworks (cuttings and embankments);
  - noise fence barriers and parapets;
  - barriers on viaducts.



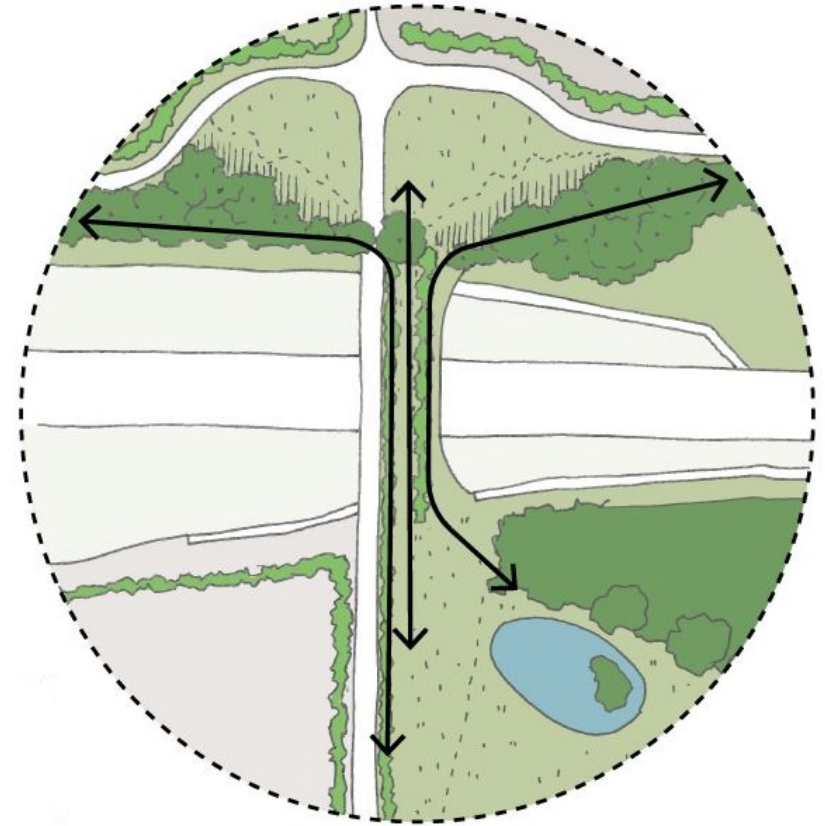
# Green bridges

- Green bridges are included in the design of the Proposed Scheme in order to maintain wildlife connectivity typically through the provision of one or two hedgerows comprising a range of local or native species planted along the bridge.
- Green bridges are designed also to accommodate public and private rights of way.
- Some underbridges will also provide ecological connectivity through their design and planting approach.

# Green bridges



Ingestre Green Overbridge



Colwich Bridleway 23 Accommodation Green Overbridge

- KEY
- Woodland
  - Hedgerow
  - Water body
  - Grassland
  - Building
  - Existing landscape / Arable
  - Ecological Connection