

M54 to M6 Link Road

TR010054

Volume 6

6.1 Environmental Statement

Chapter 2 – The Scheme

Regulation 5(2)(a)

Planning Act 2008

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

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Infrastructure Planning

Planning Act 2008

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

**M54 to M6 Link Road
Development Consent Order 202[]**

**6.1 Environmental Statement
Chapter 2 The Scheme**

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2 The Scheme

2.1 Need for the Scheme

- 2.1.1 In 2001 the West Midlands Area Multi Modal Study (Ref 2.1) recommended the construction of a link road between the M54 and M6 to provide a strategic network link between the M54 and the M6 northbound. The government formerly committed to the delivery of the Scheme in 2014 in the Road Investment Strategy: 2015 to 2020 (Ref 2.2), which sets out the long term approach to improve England's motorways and major roads.
- 2.1.2 The M54 eastbound merges into the M6 southbound at Junction 10a. There is no strategic route from the M54 to the M6 northbound or the M6 Toll. There is also no strategic route between the M6 southbound and the M54 westbound (refer to Plate 1.1 in Chapter 1 of this Environmental Statement (ES)). Traffic wishing to make these movements has to leave the motorway network and use the regional/local road network including the A449, A5 and A460. The routes used are heavily congested, particularly during peak periods, and have relatively high accident rates (refer to the Transport Assessment Report [TR010054/APP/7.4] for further details).
- 2.1.3 The signed route between the M54 westbound and the M6 northbound is via two trunk roads; the A449, which is a dual carriageway that is subject to the national speed limit, and the A5 that is subject to a 50 mph speed limit travelling between M54 Junction 2 and M6 Junction 12.
- 2.1.4 The existing A460 Cannock Road between M54 Junction 1 and M6 Junction 11 is a single carriageway road approximately 10 m wide with no physical separation between the flows of traffic in each direction. The existing A460 is predominantly subject to a 40 mph speed limit, but is also subject to a 30 mph speed limit from the M54 Junction 1 to approximately 140 m after the junction with the A460 and Monument Drive, a total distance of approximately 840 m. In addition, the existing A460 is subject to a 50 mph speed limit south of the M6 Junction 11 for approximately 500 m. The existing A460 has eight minor roads and numerous private accesses joining it between the M54 and the M6, requiring six 'give way' priority junctions and one traffic signal signalised crossroads. These provide access to Featherstone, Shareshill, Hilton, Hilton Hall and other isolated properties. These priority junctions and accesses mean that right turning traffic is required to cross on-coming traffic to exit and enter the junctions. The A460 was not designed for the amount and type of traffic currently using it, resulting in delays.
- 2.1.5 The existing road network is not adequate to cope with the high volumes of traffic, often consisting of heavy goods vehicles (HGVs). There is a need to deliver a link road to address the current levels of congestion and its impacts on local residents and motorists. Investment in additional capacity will support local economic growth for Telford, Shrewsbury, Wolverhampton, Cannock and Tamworth by improving traffic flow and enhanced east-west and north-south routes.

2.2 Scheme objectives

2.2.1 The primary objectives for the Scheme are:

- Relieve traffic congestion on the A460, A449 and A5, this will provide more reliable journey times.
- Keep the right traffic on the right roads and improve safety by separating local community traffic from long distance and business traffic.
- Reduce volumes of through-traffic in villages, improving local community access.
- Support local economic growth for Telford, Shrewsbury, Wolverhampton, Cannock and Tamworth by improving traffic flow and enhancing access to east-west and north-south routes.

2.3 Scheme location

2.3.1 The Development Consent Order (DCO) boundary (hereafter referred to 'the Order limits') incorporates land required temporarily and permanently for the construction, operation and maintenance of the Scheme (refer to Figure 2.8 [TR010054/APP/6.2]). The Order limits include the boundary of the main works (herein referred to as 'the Scheme boundary' and a number of isolated pockets of land required to update existing highway signs only.

2.3.2 The majority of the Order limits for the Scheme would be located within the county of Staffordshire between the national and regional routes, the M54, M6 and the existing A460 (see Figure 2.8 [TR010054/APP/6.2]). The Scheme is within the administrative boundary of local authorities Staffordshire County Council (SCC) and South Staffordshire Council (SSC) with a very small area of the Order limits within the City of Wolverhampton Council (CWC). The Scheme would be located in the Green Belt, in a predominantly rural area consisting mainly of mixed agricultural land and scattered woodland. South of Hilton Lane is an area of historic park land associated with Hilton Hall.

2.3.3 The nearest residential areas include the villages of Shareshill to the north-west, Featherstone and Hilton to the west and the hamlet of Little Saredon to the north-west of the Scheme boundary. The residential area of Bushbury, a suburb of Wolverhampton is located to the south of M54 Junction 2. There are also a number of more isolated residential properties and farm holdings in the vicinity of the Scheme, for example a farm and a small group of residential properties at Laney Green, north of M6 Junction 11, Brookfield Farm south of M6 Junction 11 and Tower House Farm north-east of M54 Junction 1.

2.4 Baseline scenarios

Existing baseline scenario

2.4.1 The existing baseline scenario refers to the conditions that currently exist in the area within which the Scheme would be implemented. The annual average daily traffic (AADT) flows for the existing A460 Cannock Road, a single carriageway road, between M54 Junction 1 and the M6 Junction 11 is up to approximately 27,700

vehicles (based on a 2017 baseline). The A449 north of the M54 is the current signed route between the M54 eastbound to the M6 northbound (and M6 southbound to M54 westbound), this route experiences AADT of approximately 18,800 vehicles. The A5 also provides a key east to west route, the A5 (west of the M6) currently experiences AADT of approximately 15,500 vehicles. These traffic flows result in congestion and unreliable journey times for vehicles using this route.

2.4.2 The existing conditions within the Scheme boundary and surrounding area applicable to each of the technical chapters, is reported in Chapters 5 to 14 under 'Baseline Conditions'. Key environmental constraints include but are not limited to:

- Residential properties in Featherstone, Shareshill and Hilton.
- Grade I listed Hilton Hall and four associated Grade I and II listed buildings within the setting of a non-designated historic parkland.
- Two local wildlife sites, Lower Pool Site of Biological Importance (SBI) east of Hilton and Brookfield Farm SBI, south of M6 Junction 11.
- Two areas of ancient woodland - Whitgreaves Wood (also referred to as Oxdon Leasow) south of the M54 and an area of woodland within Brookfield Farm SBI – and a number of veteran trees – east of Lower Pool SBI.
- Six watercourses that cross the Scheme boundary and their associated flood plains.

2.4.3 Key environmental constraints and receptors are illustrated in figures associated with each topic chapter (Chapters 5 to 14) in Volume 2 of the ES [TR010054/APP/6.2]. For further details of the existing baseline conditions refer to Chapters 5 to 14 of the ES.

Future baseline scenarios

2.4.4 How the existing baseline conditions would change and evolve without the implementation of the Scheme has been assessed as part of the Environmental Impact Assessment (EIA) and is referred to as the future baseline. Changes to the existing baseline conditions may occur due to a combination of natural (e.g. changes in weather patterns) and human influences (e.g. new developments and changes in land use). The future baseline scenarios considered in the ES are defined in Chapter 4: Environmental Assessment Methodology, paragraph 4.2.9 and a list of developments included as part of the future baseline is provided in Appendix 15.1 [TR010054/APP/6.3].

2.4.5 Without improvement, the current congestion and journey reliability problems experienced on local roads and in particularly the existing A460 Cannock Road around Featherstone, Shareshill and Hilton are expected to persist and worsen over time (refer to the Transport Assessment Report [TR010054/APP/7.4]). The AADT on the A460 Cannock Road, A449 Stafford Road (north of the M54) and the A5 (west of the M6) is expected to increase without the Scheme. By 2039 AADT for these routes are expected to increase to approximately 29,400 (A460), 25,800 (A449) and 17,920 (A5) vehicles (refer to the Transport Assessment Report [TR010054/APP/7.4]). This is due in part to the planned future development of the surrounding area including developments such as the West Midlands Interchange,

Four Ashes Business Park, i54 Business Park as well as a number of proposed residential, retail and mix-used developments.

- 2.4.6 Information concerning other future planned developments, other major schemes identified through consultation with relevant local authorities and development allocations identified in planning policy that are likely to change the baseline conditions in the vicinity of the Scheme are presented in Chapter 15: Assessment of Cumulative Effects.
- 2.4.7 Wider environmental changes are also predicted to occur over time as a consequence of factors such as climate change, which could increase the risk and intensity of flood events affecting the road network. The future baseline for climate is based on 2018 UK Climate Projections and the assessment of flood risk takes into account an allowance for climate change (+50%).
- 2.4.8 Further details of how the current baseline conditions may alter in the future, both with and without the Scheme, is introduced in Chapter 4: Environmental Assessment Methodology and presented in more detail in Chapters 5 to 14.

2.5 Scheme description

- 2.5.1 The preferred route for the Scheme was announced in September 2018. Since then the Scheme design has been developed through an iterative process in parallel with the environmental assessment. The development of the Scheme design has been informed by knowledge of environmental constraints, the environmental assessment of emerging design proposals and engagement with stakeholders (including the responses received during statutory consultation).
- 2.5.2 The General Arrangement Plans [TR010054/APP/2.5] illustrate the preliminary design of the Scheme and identify its key components and features. The Engineering Drawings and Sections [TR010054/APP/2.10] of the DCO application present further Scheme design information.
- 2.5.3 The following section provides a description of the Scheme from south to north.
- ### **M54 Junction 1**
- 2.5.4 The existing eastbound diverge at M54 Junction 1 would be upgraded from its current single lane drop arrangement to a ghost island (separation of the slip road and mainline using chevrons) lane drop arrangement. The existing westbound merge slip road at the M54 Junction 1 would be upgraded from a single lane gain, to a ghost island merge with two diverging lanes. The slip roads at M54 Junction 1 would also be realigned slightly.
- 2.5.5 The existing M54 Junction 1 roundabout would be removed and the junction rebuilt in a new arrangement. The total footprint of the proposed M54 Junction 1 arrangement would be approximately 13 ha.
- 2.5.6 The new junction arrangement would provide free flow links from the eastbound carriageway of the M54 to the northbound carriageway of the link road and from the southbound carriageway of the link road to the M54 westbound. The free flow links would pass underneath the new Junction 1 arrangement (Featherstone bridge). The southbound free flow link would then pass underneath the existing M54 (which is on

embankment at this location) at approximately existing ground level to merge with the westbound carriageway of the M54. The free flow links through M54 Junction 1 would be an extension of the M54 therefore would be subject to motorway regulations with a speed limit of 70 mph. The motorway regulations end at the point where the slip road from the western roundabout joins the carriageway in the northbound direction and where the slip road to the eastern roundabout leaves the carriageway in the southbound direction. Beyond this point the scheme would be constructed to a dual carriageway standard.

- 2.5.7 In order to maintain local connections, the new junction would also consist of three smaller roundabouts, one to the south of the M54 carriageway (southern roundabout) and two to the north of the M54 carriageway in a dumbbell arrangement to the east (eastern roundabout) and west (western roundabout – the smaller of these two) of the new link road. The existing access to the A460 (north) from M54 Junction 1 would be closed.
- 2.5.8 The southern roundabout would provide access to and from the westbound carriageway of the M54 and the A460 (south). The southern roundabout would be at approximately existing ground level.
- 2.5.9 A new short section of dual carriageway approximately 370 m in length would provide a link between the southern roundabout and the eastern roundabout which would cross under the M54.
- 2.5.10 The eastern roundabout would provide access to the eastbound carriageway of the M54 and would be accessible from the southbound carriageway of the Scheme. Two access roads would be provided off the eastern roundabout to maintain access to Tower House Farm and Hilton Park which are approximately 100 m and 400 m in length respectively. The eastern roundabout would be approximately 3.9 m above existing ground level. The new entry slip road to the M54 eastbound would result in the loss of a pond at Tower House Farm.
- 2.5.11 The eastern roundabout would also be connected to the western roundabout by a short section of dual carriageway approximately 90 m in length which would cross over the Scheme mainline on Featherstone bridge.
- 2.5.12 The western roundabout would provide access to and from the existing A460 (north) for local traffic. This roundabout would also provide access to the northbound carriageway of the mainline of the Scheme and would be accessible from the eastbound carriageway of the M54. The western roundabout would be approximately 6.2 m above existing ground level.
- 2.5.13 The speed limit of the connecting dual carriageway links between the roundabouts would be 40 mph.

The existing A460 (between M54 Junction 1 and M6 Junction 11)

- 2.5.14 The existing A460 would be realigned to connect into the western roundabout of the new M54 Junction 1. The realigned A460 would be gradually raised on an embankment to tie into the western roundabout of the M54 Junction 1 at approximately 6.2 m above existing ground level. A new priority T junction would be provided between the existing A460 and the realigned A460 to maintain access to

The Avenue. Two new entry and egress points would be provided for the petrol station and local businesses along the existing A460 affected by the realignment of the road.

- 2.5.15 The speed limit of the realigned existing A460 at M54 Junction 1 would be 30 mph.

The mainline

- 2.5.16 The mainline of the Scheme would be a dual carriageway road approximately 2.5 km (1.6 miles) in length, with a direct free flow link to the M54 and entry and exit slip roads to the M54 Junction 1. The new road would have a 70 mph speed limit.
- 2.5.17 The mainline would pass through M54 Junction 1 in a cutting, passing under Featherstone bridge with a headroom clearance of 5.3 m. The mainline would extend northwards from the M54 Junction 1 across greenfield land which is located to the east of Featherstone and Hilton. The mainline of the Scheme would pass to the west of Hilton Hall through part of Lower Pool (a large ornamental pool) and Lower Pool SBI. The Scheme would be roughly at existing ground level, as it passes to the east of Dark Lane. The distance between the edge of the new carriageway (back of verge) and the closest property (façade) on Dark Lane is approximately 46 m. Dark Lane would be stopped up between the final property along Dark Lane to the west and the existing junction with Hilton Lane to the east. In order to maintain connectivity for walkers and cyclists a new bridleway connection is proposed between the point at which Dark Lane is stopped up and Hilton Lane.
- 2.5.18 Continuing north, the Scheme would cross under the existing Hilton Lane at approximately 6.0 m below existing ground level. A section of Hilton Lane would be rebuilt on a new bridge (Hilton Lane overbridge) over the mainline of the Scheme to maintain access across the Scheme. Approximately 500 m of Hilton Lane would be reconstructed to build the new bridge on a similar alignment to the existing road (within the limits of deviation). The carriageway of the road would be raised by approximately 1.7 m in height at the highest point of the bridge. The speed limit of Hilton Lane would be reduced from the national speed limit to 30 mph to address safety issues, limit the amount of landtake required with a steeper vertical alignment, reducing tree loss and may provide some reduction in noise impacts.
- 2.5.19 The mainline of the Scheme would then continue to the east of Brookfield Farm resulting in the total loss of one pond and partial loss of a second pond, before continuing north. Due to the undulating nature of the existing ground in this location the mainline transitions from cutting at Hilton Lane, to a short section of embankment to the south of Brookfield Farm with a height of approximately 3.5 m then immediately back to cutting to the east of Brookfield Farm with a depth of approximately 5.5 m.
- 2.5.20 An accommodation bridge wide enough to carry a single lane access track for farm vehicles would be provided to the south of Brookfield Farm across the mainline of the Scheme. This accommodation bridge is required to retain access to severed land to the east of the Scheme and maintain a public right of way (PRoW) over the Scheme. The accommodation bridge would be approximately up to 4.0 m above existing ground level at its highest point.

2.5.21 South of the M6 Junction 11 the Scheme would start to rise on an embankment to link into the junction, passing over Latherford Brook and through Brookfield Farm SBI. At this point the northbound and southbound carriageway start to diverge away from one another to connect into M6 Junction 11. At the highest point the Scheme would be approximately 8.5 m above existing ground level which is around Latherford Brook.

M6 Junction 11

2.5.22 Junction improvements are proposed at M6 Junction 11. These improvements would consist of an enlargement of the M6 Junction 11 roundabout to provide additional capacity and accommodate a connection to the new link road. Two new structures would be required over the M6 which would increase the capacity of the junction, increasing the number of lanes of traffic from two lanes to four. The structures would be designed to be built offline to the north and south of the existing structures to avoid undue disruption during the construction period. The existing structures would be demolished once the new junction arrangement is operational. Improvements to Junction 11 of the M6 would raise the roundabout level by approximately 1.5 m in height to approximately 5.5 m above ground level.

2.5.23 The connection to the existing A460 (south) from the M6 Junction 11 would be realigned to the west to accommodate the mainline of the Scheme. New entry and exit slip roads to and from the M6 would be constructed offline to maintain access to the junction where possible during construction. The A460 (north) would be widened northbound and southbound. The southbound carriageway would be widened from 2 lanes to 3 lanes to connect into the new junction. The northbound carriageway would be widened to three lanes to exit the roundabout, this would taper down to two lanes before passing over the M6 Toll. The A462 would also be aligned locally to tie into the roundabout. Minor alterations to the access and egress to Wolverhampton Road are required as part of the realignment of the existing A460 and A462.

Land take

2.5.24 The rights to compulsorily acquire the land required to deliver the Scheme are being sought by Highways England through the DCO application.

2.5.25 Temporary and permanent land take requirements have been identified through a combination of the design-development and environmental assessment, and through engagement with landowners that would be affected by the Scheme. These are defined by the Order limits within the DCO application illustrated in the Land Plans [TR010054/APP/2.2]. All areas of land within the Order limits are located within the administrative boundary of SCC, SSC and CWC.

2.5.26 The Order limits include land which would be taken permanently to accommodate the engineering, drainage and environmental components of the Scheme. Land has also been identified within the Order limits that would be acquired temporarily to facilitate construction of the Scheme. This temporarily acquired land would be required for utilities diversion, construction site compounds, vehicular access, haul routes, construction working areas, the temporary storage of materials and for

environmental purposes e.g. temporary noise barriers, the temporary realignment of a watercourse.

- 2.5.27 In addition to the permanent land acquisition, permanent rights over land are being sought within the DCO application to enable the Applicant to undertake actions such as utility diversions, and retain utilities on the land, secure future maintenance access for works and rights of way.
- 2.5.28 The Statement of Reasons [TR010054/APP/4.1], which accompanies the Book of Reference [TR010054/APP/4.3], sets out the justification for why each of the land parcels is to be acquired either permanently or temporarily, or where permanent rights are sought.

Limits of Deviation

- 2.5.29 The assessments included within this ES are based on the design of the Scheme described herein (Chapter 2: The Scheme) presented in Figure 2.1 [TR010054/APP/6.2], and based on the works described in Schedule 1 of in the draft DCO [TR010054/APP/3.1] (indicated principally on the Work Plans [TR010054/APP/2.4] and the General Arrangement Scheme Layout Plans [TR010054/APP/2.5] and the maximum area of land anticipated as likely to be required, taking into account the proposed limits of deviation for the Scheme.
- 2.5.30 Limits of deviation have been incorporated within the Order limits to allow minor modifications to be made to the Scheme during the detailed design and construction stages. Such flexibility is required, for example, to enable the construction contractor to alter their working procedures or make minor adjustments to the position of certain infrastructure in response (for example) to unforeseen ground conditions.
- 2.5.31 The limits of deviation have been determined based on the design, construction and buildability factors, and have been taken into consideration as part of the EIA as reported in this ES.
- 2.5.32 The limits of deviation have been defined using lateral limits of deviation for all infrastructure elements within the Scheme, and vertical limits of deviation for all the road elements. The extents of the lateral limits of deviation have been used to identify the amount of land to be acquired permanently as part of the Scheme and are indicated on the Work Plans [TR010054/APP/2.4].
- 2.5.33 The vertical limits of deviation are referenced against the vertical profile levels indicated on the Engineering Section Drawings [TR010054/APP/2.10]. The vertical limit of deviation for the Scheme is 0.5 m.
- 2.5.34 The new carriageway would not deviate horizontally by more than 3.0 m. In no case would the Scheme extend beyond the defined Order limits.
- 2.5.35 Surface water outfalls would not deviate horizontally by more than 20m.
- 2.5.36 The design of Hilton Park access road, Tower House access road and Mill Lane tie in would not deviate horizontally more than 10 m, and vertically by 0.5 m.
- 2.5.37 The height of noise barriers as proposed in Chapter 11: Noise and Vibration paragraph 11.8.16 would not deviate more than +/-1 m.

2.5.38 The limits of deviation for the main utilities diversions required for the Scheme are detailed below:

- The limits of deviation for the diversion of a high-pressure gas main crossing under the Scheme and to the west of the new M54 Junction 1 would have a horizontal limit of deviation of 15 m. The exception to this is the area to the north-west of M54 Junction 1 which would deviate by up to 40 m to allow for flexibility. The requirement for land will be reduced, if possible, by re-locating the asset adjacent to the Scheme.
- The diversion of the services currently surrounding the existing roundabout at Junction 1 of the M54 would not deviate horizontally by more than 50 m, this is to allow flexibility in the location of the new ducts under the M54 to avoid clashes with any other assets.
- The diversion of services located within Hilton Lane would not deviate horizontally by more than 3 m where they run parallel to the east of the mainline to allow for the deviation of the mainline. Where the diversion passes under the mainline, they would not deviate horizontally by more than 30 m, this is to allow flexibility in the location of the new ducts to avoid clashes with any other assets.
- The diversion of an overhead electrical cable to be buried underground to the south of Brookfield Farm would not deviate horizontally by more than 20 m, this is to allow flexibility in the location of the new ducts under the mainline to avoid clashes with any other asset.

2.5.39 The environmental assessment conclusions regarding likely significant effects as presented within this ES related to the Scheme as detailed in General Arrangement Plans [TR010054/APP/2.5], have taken into account and assessed the limits of deviation as set out in the Works Plans [TR010054/APP/2.4] and Article 6 of the draft DCO [TR010054/APP/3.1].

Highway design

2.5.40 The following highway design principles have been applied in the development of the Scheme. These comprise:

- The design is based on good practice, as embodied in the Design Manual for Roads and Bridges (DMRB) and associated Interim Advice Notes (IAN).
- An 'earthworks balance' is sought to minimise importing or exporting earthworks materials to and from the site.
- Roadside features such as lighting would be minimised to reduce visual impacts, whilst remaining consistent with safety requirements.
- Coordination of proposed utility diversions to provide safe access for maintenance.
- Consideration of construction operations in the design process to ensure that construction can be undertaken as safely as possible whilst minimising disruption during construction.

- Consideration of maintenance operations in the design process (including provision of maintenance hardstanding areas and accesses) to improve safety for road users and maintenance operatives during maintenance works and to minimise disruption.
- Consideration of operational safety in the design of the Scheme to make the Scheme more understandable for road users to improve safety.

2.5.41 The mainline of the Scheme would be a dual carriageway, formed of two lanes, in each direction, from the M54 Junction 1 in the south, to the M6 Junction 11 in the north (each lane comprising 3.65 m wide running lanes and a 1 m hard strip), with typically a 2.5 m verge. The verge width would be increased as required to provide the appropriate unobstructed visibility around curves. Further localised increases in verge width to accommodate highway features such as signs, vehicle restraint systems, and gantries have been included where required.

2.5.42 The central reserve width would be 2.5 m as a minimum, although this would be increased as required to provide the appropriate visibility around curves. A rigid concrete barrier approximately 0.9 m in height would be installed in the central reserve along the mainline of the Scheme between Featherstone overbridge to M6 Junction 11 in accordance with the current standards. Outside of these areas the central reserve barrier would be corrugated steel barrier.

2.5.43 Low noise surfacing would be used across the Scheme to minimise noise levels from traffic, with the exception of short sections at the approaches to junctions where high friction surfacing would be used. Low noise surfacing results in lower levels of noise generation than a standard hot rolled asphalt surface. The use of low noise thin surfacing can reduce noise levels by 3.0 dB at speeds of ≥ 75 km/hr.

Earthworks and landform

2.5.44 The Scheme would require a number of embankments and cuttings to be formed to accommodate the horizontal and vertical alignment as shown in Figures 2.1 to 2.7 [TR010054/APP/6.2]. To minimise landscape and visual impacts, reduce noise impacts and preserve the openness of the Green Belt where possible, the mainline of the Scheme has been designed to be positioned below ground level in a cutting for the majority of its length. The following provides a summary of the earthworks for the mainline of the Scheme from south to north:

- Through M54 Junction 1, the mainline of the Scheme would be in cutting for approximately 690 m, passing under Featherstone bridge. The cutting would be up to 5.2 m below existing ground level.
- Continuing north the mainline would be at approximately existing ground level for 350 m as the Scheme passes through Lower Pool SBI to Dark Lane. The Scheme has been designed to be at ground level to limit the footprint of the Scheme in this location, minimising habitat loss and limiting the impact to Watercourse 3 and Lower Pool.
- From Dark Lane the mainline continues north in a cutting for approximately 695 m to the south of Brookfield Farm. The depth of the cutting would be approximately 6.8 m below existing ground level.

- Continuing north on an embankment for 130 m, the mainline would be a height of approximately 2.5 m above ground level. The embankment would pass through and result in the loss of an existing pond and possible partial loss of a second pond near Brookfield Farm.
- From Brookfield Farm the mainline continues north in a cutting for 345 m. The cutting would be up to 5.6 m below existing ground level.
- Continuing north the Scheme would raise up on an embankment for 260 m to connect the mainline of the Scheme into the new M6 Junction 11. The embankment would be up to 8.6 m above existing ground level in places, as the Scheme passes through Brookfield Farm SBI in a small valley to the south of Junction 11.

2.5.45 Earthwork slopes have been designed to a gradient of 1:3 (1 m vertically for every 3 m horizontally) to achieve the required earthwork stability, and to soften their appearance in the local landscape.

2.5.46 Earth retaining structures would be required in the form of embedded retaining walls or reinforced structures. Retaining walls are proposed along the M54 westbound and eastbound carriageway at Junction 1 in order to accommodate widening of the merge and diverge within the existing highways boundary. Retaining walls would be constructed in this location to prevent the direct loss of ancient woodland to the south of the M54 and allow retention of the existing noise bund and tree border to the north of M54, which provides screening for residential properties in Featherstone.

Lighting, gantries and signage

Lighting

2.5.47 A lighting strategy has been developed in consultation with SCC, and the Midlands Asset Area Delivery team (Highways England, Area 9). Lighting would be required at the two junctions, M54 Junction 1 and M6 Junction 11. The lighting used would be appropriate for the Scheme, these would be approximately 15 m high columns at M6 Junction 11 and 12 m high columns on M54 Junction 1, slip roads and mainline of the Scheme up to and through Junction 1. The strategy promotes the Highways England Sustainable Development Plan by reducing CO₂ emissions by using more energy efficient lighting in the form of Light Emitting Diodes (LED). LEDs are more energy efficient than conventional luminaires and also reduce light spill into adjacent areas. It is proposed that the new lighting system shall be capable of being dimmed, trimmed and monitored remotely by a central management system.

2.5.48 The majority of the mainline of the Scheme (1.7 km) would be unlit to reduce adverse impacts on nocturnal species (such as bats), landscape and visual receptors and impacts on the setting of listed buildings and the associated historic parkland reduce minimise visual intrusion upon nearby residents.

Signage

2.5.49 A signing strategy has been developed in consultation with SCC, West Midlands Asset Delivery Team (Highways England, Area 9), Highways England Operations Directorate, Highways England Major Projects, Highways England Safety, Engineering and Standards and the CWC. The proposed signing strategy seeks to

integrate the Scheme into the existing road network. This would be achieved by providing consistency and continuity of signing across local authority boundaries and on the mainline of the Scheme. The proposed signing strategy also supports the Scheme's objectives of reducing accidents and congestion by transferring strategic traffic from the local road network onto the new dual carriageway. The achievement of these objectives would be facilitated by providing clear routing that makes the best use of the existing highway network, eliminating conflicting signs and improving driver information.

- 2.5.50 In some instances, the most appropriate signing arrangement would be to provide gantry mounted direction signs. Signing on the eastbound carriageway of the M54 between Junction 2 and 1 would be updated from three verge mounted signs to four cantilever mounted gantry signs and two verge mounted tiger-tail signs to provide safe and clear signing for the new junction arrangement. Five portal gantries are proposed on the M6 Junction 11 to provide clear signing for the new larger junction arrangement. All gantry signs would be lit and constructed of reflective material in accordance with design standards. The height of the gantries, including the sign faces would be approximately 12 m above ground level.
- 2.5.51 The use of signs has been minimised along the mainline of the Scheme to reduce sign clutter and minimise landscape and visual intrusion
- 2.5.52 No signs are proposed between the M54 Junction 1 northern dumbbell roundabouts due to the short distance between the roundabout. The main local access to the existing A460 would be signed using white backs signed for local destinations to further deter use by long distance traffic and HGVs.
- 2.5.53 The Order limits includes rectangles of land along the M54 and the M6 to allow for the replacement of sign faces to ensure the Scheme is appropriately signed from the existing network.

Fencing and boundary treatments

- 2.5.54 New and improved sections of road would be fenced with wooden post and rail fencing. Additional measures, such as guide fencing to direct mammals to the locations of mammal tunnels beneath the mainline link road, would also be installed as part of the ecological mitigation measures incorporated into the design of the Scheme.
- 2.5.55 Fencing would be installed along existing and new boundary lines to separate the road from adjacent land, and would incorporate a narrow strip of land between the fencing and the outer edge of cutting or embankment slopes for maintenance access. Access to off-carriageway assets such as landscaping and drainage infrastructure would be provided via gated access points.
- 2.5.56 Part of the existing wall along the southbound carriageway of the A460 (locally referred to as Mile Wall) would be demolished. The Applicant is in discussions with the Parish Council about the nature of this demolition and the potential for a future wall along the realigned A460.

Watercourse crossings

- 2.5.57 There are six watercourses within the Scheme boundary, four of which would be crossed by the Scheme. The locations of the watercourses are shown on Figure 13.1 [TR010054/APP/6.2]. To minimise impacts to the watercourse five new crossing structures would be required.
- 2.5.58 Watercourse 2 would be severed by the mainline of the Scheme and the realignment of the M54 Junction 1. To allow the watercourse to pass under the Scheme two structures would be required. This includes:
- A 1.2 m x 2 m box culvert, 182 m in length to allow Watercourse 2 to pass under new arrangement of M54 Junction 1. The culvert would be buried 0.35 m below the bed level. The culvert would be designed to allow daylight to enter the culvert from above where possible.
 - A 1.2 m x 2 m box culvert, 58 m in length to allow Watercourse 2 to pass under the M54 entry slip road.
- 2.5.59 Watercourse 3 passes through Lower Pool (an ornamental pond). The pond would be partially lost to accommodate the Scheme and the watercourse would be severed. The watercourse would be realigned east of the mainline, parallel with the southbound carriageway and would pass under the Scheme in a 60 m length of culvert. The culvert would have an internal diameter of 1.2 m.
- 2.5.60 Watercourse 4 is located south-east of Brookfield Farm. The watercourse would be realigned in a culvert to pass under the Scheme. The culvert would have an internal diameter of 1.2 m and length of 55 m.
- 2.5.61 Latherford Brook (Watercourse 5) is located south of M6 Junction 11 within Brookfield Farm SBI. A 10 m wide single span structure is proposed to carry the mainline of the Scheme over the watercourse, limiting the impact on the watercourse. The structure would be 78 m in length. Mammal ledges would be built into the design of this structure.
- 2.5.62 All new culverts would be set a minimum of 300 mm below the bed level of the watercourse. No works are proposed to any of the existing culverts within the Scheme boundary.
- 2.5.63 Mammal tunnels would be constructed adjacent to the culverts described above to allow the movement of protected species and fauna across the Scheme.

Overview of the drainage design

- 2.5.64 The drainage design has been developed in accordance with Highways England's design standards. The requirements of the National Policy Statement for National Networks (NPSNN) (Ref 2.5) and the National Planning Policy Framework (NPPF) (Ref 2.6) have also been considered in the design process, alongside advice from environmental practitioners responsible for undertaking water related assessments reported in Chapter 13: Road Drainage and the Water Environment, with regards to minimising:

- effects on water quality, through the use of natural storage, treatment and discharge solutions where appropriate to manage drainage during the construction and operational phases of the Scheme;
- changes to watercourse and ditch alignments, by incorporating solutions into the design of the Scheme that would not result in changes to hydromorphology; and
- land take within areas identified as being at risk of flooding, by directing development away from such areas where possible.

2.5.65 The Drainage Strategy is provided in Appendix 13.2 [TR010054/APP/6.3]. Existing discharge rates would be maintained to all existing outfalls and discharge rates to new outfalls would be reduced to existing greenfield runoff rates (refer to Appendix 13.2 [TR010054/APP/6.3] for details). The highway drainage design includes the provisions as follows:

- five attenuation ponds situated throughout the Scheme;
- attenuation using oversized pipes;
- attenuation using ditches;
- narrow filter drains;
- combined kerb drainage units;
- trapped gully pots;
- surface water channels; and
- hydrodynamic separators at outfalls as applicable.

2.5.66 The location of attenuation ponds is illustrated on the Environmental Masterplans, Figure 2.1 to 2.7 [TR010054/APP/6.2]. Outfalls would be provided to local watercourses, with flow rates limited in accordance with Environment Agency and Lead Local Flood Authority (LLFA) requirements.

2.5.67 The Scheme drainage design includes an allowance for the effects of climate change (refer to Appendix 13.2 [TR010054/APP/6.3]). Attenuation has been provided for up to and including 100 years plus 40% climate change allowance, through sustainable urban drainage system (SuDs) features described above.

Public rights of way and accommodation works

2.5.68 In undertaking the design of the proposed walking, cycling and horse-riding (WCH) facilities, the requirements of the Equality Act 2010 have been considered where required in order to take appropriate account of the needs of disabled users. PRow have been realigned as close to their original alignment as practical to avoid extending WCH routes where possible.

2.5.69 Impacts to existing PRow are identified and assessed in Chapter 12: Population and Human Health). The Scheme design includes the following provisions for WCH:

- Featherstone Bridleway (BW) 3 would be realigned approximately 10 m to the south of the existing alignment, along the bottom of the M54 entry slip road embankment.
- A new shared footway and cycleway would be provided alongside the new M54 Junction 1 arrangement.
- A new shared footway and cycleway would be provided parallel to the Scheme linking Dark Lane and Hilton Lane.
- New footway provided adjacent to the eastbound carriageway of Hilton Lane.
- Shareshill Footpath (FP) 5 to the west of the Scheme would be closed with users diverted south, parallel to the Scheme on the eastern side. The footpath would link into the new footway on Hilton Lane to maintain the existing level of access.
- Shareshill BW1 would be realigned over the Scheme on a new accommodation bridge located to the south-east of Brookfield Farm. The bridge would be designed to accommodate equestrians and farm vehicles.
- Saredon FP 8 would be realigned approximately 40 m to the east along the bottom of the embankment of the Scheme with access provided to the road level of M6 Junction 11 via a ramped access.
- Saredon FP1R/2214 would be closed as this short section of footpath is no longer required to link into the WCH routes at the M6 Junction 11.

Climate change adaptation

- 2.5.70 To ensure that the strategic road network can meet the challenge of changing climate, the Scheme design has taken into account the potential effects of climate change. At this preliminary design stage, the main climate change considerations are related to material deterioration, flood risk and drainage systems.
- 2.5.71 Section 10(3)(a) of the Planning Act (as amended) requires the Secretary of State to have regard to the desirability of mitigating, and adapting to, climate change in designating National Policy Statements. Within the NPSNN, the responsibilities of the applicant are set out in paragraphs 4.40 – 4.47 and are summarised as follows (for further details refer to the Case for the Scheme and NPSNN Accordance Table [TR010054/APP/7.2]):
- Applicants are required to consider the impacts of climate change when planning location, design, build and operation and the ES should set out how the proposed development will take account of the projected impacts of climate change.
 - For transport infrastructure with safety-critical elements and a design life of the asset is 60 years or greater, as with the Scheme, the applicant is required to apply the UK Climate Projections 2009 (UKCP09) high emissions scenario (high impact, low likelihood) against the 2080 projections at the 50% probability level.

- The application is required to take into account the potential impacts of climate change using the latest UK Climate Projections available at the time and ensure that the ES that is prepared identifies appropriate mitigation or adaptation measures for the estimated lifetime of the new infrastructure.
- The applicant is required to demonstrate that there are no critical features of the design which may be seriously affected by more radical changes to the climate beyond that projected in the latest set of UK climate projections.

2.5.72 The applicant is required to base any adaptation measures on the latest set of UK Climate Projections, the Government's national Climate Change Risk Assessment and consultation with statutory consultation bodies and assess any measures in the ES, which should set out how and where such measures are proposed to be secured.

2.5.73 Each of these requirements has been addressed and an assessment is included within Chapter 14: Climate.

Traffic flows

2.5.74 The operation of the Scheme is predicted to alter the speed, flow and routing of vehicles using both the local and strategic road networks. Traffic flows have been generated using computer modelling, for scenarios both with and without the Scheme, to predict the changes in traffic flows as a result of the Scheme. The traffic forecasts are based on simulations of the existing traffic conditions on the road network and account for changes that could result from vehicle movements associated with future planned development sites, growth in employment and wealth and population increases.

2.5.75 The Transport Assessment Report [TR010054/APP/7.4] provides details of the modelled traffic conditions that would occur at different years in the future, both with and without the Scheme in place. In summary, the Scheme would:

- Reduce travel times along the existing A460 for local residents' journeys.
- Reduce the times for strategic east-west journeys.
- Attract trips onto the Scheme's new dual carriageway road that would otherwise travel on less suitable roads.
- Improve the environment for walkers and cyclists on the existing A460.
- Increase the capacity of the strategic road network to absorb the forecast traffic growth.
- Save a predicted 330 personal injury collisions over a period of 60 years.
- Provide a net present value benefit to the economy.
- Represent value for money.
- Improve the reliability of journeys.
- Improve the resilience of the road network.
- Facilitate regional development and employment growth.

- Deliver an improvement identified in the Road Investment Strategy: for the 2015/16 – 2019/20 Road Period (Ref 2.2).

2.5.76 Further information regarding the benefits (including the monetised benefits) and the need for the Scheme are provided in the Case for the Scheme [TR010054/APP/7.2].

Environmental masterplans and securing mitigation

2.5.77 For the purpose of this report environmental mitigation has been split into two categories:

- embedded mitigation: project design principles adopted to avoid or prevent adverse environmental effects; and
- essential mitigation: measures required to reduce and if possible offset likely significant adverse environmental effects, in support of the reported significance of effects in the environmental assessment.

2.5.78 Embedded mitigation designed as part of the Scheme is described in this Chapter, under the sub-headings above. Essential mitigation is listed in each of the relevant technical chapters.

2.5.79 The Environmental Masterplan presented in Figures 2.1 to 2.7 [TR010054/APP/6.2] shows both embedded and essential mitigation measures as integral elements of the Scheme design, including landscape planting, noise barriers, flood storage areas and PRow diversions as described above.

2.5.80 The mitigation measures shown on the Environmental Masterplan have been factored into the assessment of significant effects presented in the ES topic chapters (Chapters 5 to 14). These mitigation measures are also described in the Outline Environmental Management Plan (OEMP) [TR010054/APP/6.11] and the Environmental Mitigation Schedule (EMS) presented at Appendix 2.1 [TR010054/APP/6.3]. The EMS lists out each mitigation measure which is not already covered in the OEMP and how it is secured.

2.5.81 The Environmental Masterplan includes measures that would:

- assist with integrating the Scheme into the surrounding landscape;
- reduce visual impact by screening and filtering views of the Scheme;
- reduce noise impacts associated with the Scheme (e.g. noise barriers);
- mitigate for the loss of existing vegetation;
- create new areas of ecological habitat as part of the Highways England policy objective of achieving “no net loss” in biodiversity across the Scheme;
- ensure the connectivity of PRow and other routes used by pedestrians and cyclists are maintained; and
- provide for the storage, treatment and discharge of road runoff, and provide features for the mitigation of flooding risks.

- 2.5.82 These measures can be secured by requirements in the draft DCO, which would ensure that the Scheme is undertaken in accordance with the following:
- The Scheme design (as illustrated on the plans submitted within the DCO application [TR010054/APP/2.5]).
 - The OEMP (which contains details of all standard mitigation measures that would be implemented during construction of the Scheme [TR010054/APP/6.11]).
 - The Register of Environmental Actions and Commitments (REAC) which contains details of all essential mitigation measures (including their objectives and functions of these measures) is included in the OEMP [TR010054/APP/6.11].
 - Other essential mitigation obligations relating to key topic areas such as archaeology, landscaping and drainage.
- 2.5.83 These measures will be secured by Highways England by placing a contractual responsibility on the appointed contractor and subcontractors to comply with the DCO requirements.

2.6 Construction

Construction Activities

- 2.6.1 The approach to construction described below is indicative and subject to change during detailed design but it is representative of the likely approach to be adopted and has been defined taking advice from the appointed buildability advisors for the Scheme.
- 2.6.2 Further provisions in relation to the management of Scheme construction phase environmental effects would be provided in a Construction Environmental Management Plan (CEMP), which would be developed and implemented by the construction contractor. The CEMP would be based on the OEMP included in this Application [TR010054/APP/6.11] and which would be a certified document approved as part of the making of the DCO.
- 2.6.3 It is anticipated that the majority of the Scheme will be constructed offline including the link road and the majority of M54 Junction 1 with access from the existing road network. Once construction of the offline section of the Scheme is complete the connections to the existing network at M54 Junction 1 and M6 Junction 11 will be constructed. This phasing seeks to complete sections of road works and open to traffic as soon as is practical, so that customers can benefit from the Scheme as early as possible.
- 2.6.4 Scheme construction activities are anticipated to require the following activities: installation and use of temporary offices and welfare facilities, construction compounds, vehicle parking, material storage areas and worksites; installation and use of temporary accesses and haul routes; demolition of existing structures, removal of existing infrastructure; vegetation clearance and soil removal; ground and excavation works; piling; infrastructure construction activities, routing of services and utilities.

2.6.5 The Scheme boundary is shown in Figure 2.8 [TR010054/APP/6.2] allows for temporary traffic management areas, temporary working and storage areas, material stockpiles, haul roads, and provision for site compounds to be used during the construction of the Scheme.

Construction Programme

2.6.6 Preliminary works are planned to start in Autumn 2021, with the main construction works following in Spring 2022. The Scheme is due to open to traffic in 2024.

2.6.7 The construction programme assumes that the works would be split into three zones, M54 Junction 1 (Zone 1), the mainline of the Scheme (Zone 2) and M6 Junction 11 (Zone 3). Work would occur in all three zones simultaneously, although it is anticipated that the programme would be split into a number of different phases within each of the zones to coordinate the works in a manner that would, where possible, enable effective materials re-use and minimise disruption.

Table 2.1: Key milestones and target dates

Milestone	Target date
Secretary of State DCO Decision	July 2021
Land entry affected	Autumn 2021, dependent on powers in DCO
Start of DCO preliminary works	Autumn 2021
Start of main works	Spring 2022
Full Scheme open to traffic	2024

2.6.8 The preliminary works delivered under the DCO would consist of archaeological and ecological survey/ mitigation works, remedial work in respect of any contamination or other adverse ground conditions, erection of temporary fencing, diversion and laying of underground apparatus, utilities works, site clearance and establishment of compounds – further details are provided in Table 2.2.

Table 2.2: List of proposed preliminary works

Preliminary works	Anticipated activities
Utilities	Utilities surveys together with advance utilities diversion and utilities clearance works
Pre-construction water quality monitoring	A programme of water quality monitoring will be undertaken prior to and during construction to ensure that no detrimental effect of the water environment occurs, and to allow any pollution incidents to be identified and remedied (refer to ES Chapter 13: Road Drainage and the Water Environment).
Ecology surveys and ecological advance works	Undertaking of ecological pre-construction surveys and where applicable ecological advanced works (e.g. ecological clearance, invasive weed treatments or ecological mitigation in advance of the main construction works).
Advanced archaeological works	Measures to protect archaeological remains in situ and to record archaeological remains through investigation, prior to the construction of the Scheme (refer to Chapter 6: Cultural Heritage).

Preliminary works	Anticipated activities
Site clearance	The clearance of vegetation required to construct the Scheme would be undertaken outside of the bird breeding season where possible to avoid adverse ecological effects (refer to Chapter 8: Biodiversity).
Construction of haul roads	Works to construct the main haul road within the footprint of the proposed mainline of the Scheme.
Mobilisation to site and the establishment of compound area	Works to enable the establishment of the main compounds north-west of M6 Junction 11 and east of the A460 at Featherstone (refer to ES Figure 2.9 [TR010054/APP/6.2]).

2.6.9 The planned preliminary works (refer to Table 2.2) would be undertaken by the main construction works contractor. The mitigation measures described in Section 3 of the OEMP [TR010054/APP/6.11] cover the planned preliminary works and the main construction works.

2.6.10 The construction plan would be refined during the detailed design of the Scheme with appropriate regard to reducing the potential for environmental impacts during the construction phase.

Working hours

2.6.11 During the construction phase, the core working hours are defined in Table 2.3.

Table 2.3: Core working hours

Works	Core working hours
All works including earthworks	08:00 – 18:00 Monday to Friday 08:00 – 13:00 Saturdays with no working on Sundays and Bank Holidays Exceptions to these core working hours are detailed in the paragraphs below.

2.6.12 To maximise productivity, a period of up to one hour before and up to one hour after normal working hours would be used for start-up and close down of activities, excepting Saturday afternoons where all works would cease at 13.00. Some activities with limited durations would be undertaken outside of the core working hours, these would include:

- M54 Junction 1 bridge works.
- M6 Junction 11 bridge works.
- Junction and slip road tie-in work.
- Overnight traffic management measures; as agreed with the highway authority in advance.
- Any emergency works.
- Works associated with traffic management and signal changes.

2.6.13 Any other work carried out outside the core working hours, or any extension to the core hours, will be undertaken with the prior agreement of the local highway authority provided that the effects of such activities are not materially worse than the effects identified within this ES.

Construction compounds and access

- 2.6.14 The main construction compound would be situated to the west of the M6 Junction 11. Access to this compound would be gained from Mill Lane, off the existing A460. Due to the intensity of work at the M54 Junction 1 a secondary site compound is considered necessary to service these works. The compound would be located east of the existing A460 and south of Hilton. The compound would be positioned as far away from the existing A460 as possible to minimise any potential nuisance to the residents of Featherstone and Hilton. Access to this compound would be gained from the existing A460 Cannock Road. An access onto the alignment of the Scheme would be formed to allow direct access to the works. The approximate location of the site compounds are indicated on Figure 2.9 [TR010054/APP/6.2].
- 2.6.15 The site compounds would include temporary site offices and welfare facilities which would include meeting rooms, reception area, toilets, showers and changing facilities, drying room, first aid room, prayer room, ICT server / print room, canteen and restroom, CCTV room, stores, filing room and a suitable training facility for inductions and on-site training. The compounds would also include sufficient parking for staff, workforce and visitors, materials lay down area and stores, traffic management compound, HGV parking and topsoil storage areas. The compounds would be provided with appropriate security fencing and temporary lighting.
- 2.6.16 In addition to the two main compound areas, additional locations have been identified for small scale satellite office and welfare facilities. These would be located close to work areas within the Scheme boundary, sited on the roundabout at the M54 Junction 1 and along the mainline of the Scheme to service the construction of Hilton Lane bridge and the accommodation bridge east of Brookfield Farm. Satellite compounds would be lit with temporary lighting, with security measures in place. Plant and equipment would be stored at the satellite compound during the works.

Material storage and stockpiles

- 2.6.17 Various stockpile areas would be required for topsoil and other materials needed to be retained on site for re-use within the works. These would be located along the Scheme within the Scheme boundary. The topsoil stockpiles would generally be located at the perimeter of working areas so that they would also screen the works from the public. The stockpiles would be approximately 2 m to 3 m in height and may be sown with grass seed to reduce their visual impact. The footprint of the stockpiles would generally be returned to their former use. Refer to Figure 2.9 [TR010054/APP/6.2] for the assumed location of soil storage areas.
- 2.6.18 A borrow pit would be located to the field to the north of Park Road. The borrow pit would be required to minimise the requirement to import and export material off-site reducing the number of deliveries to site and from the Scheme, and therefore minimising disruption to the network and the local community. The area of the borrow pit is shown on Figure 2.9 [TR010054/APP/6.2] and includes a buffer zone of 50 m from Watercourse 3 and 30 m from the linear corridor of trees along Hilton Lane and the existing A460 Cannock Road. The maximum depth of the borrow pit would be 10 m. The borrow pit would be backfilled and landscaped with surplus materials from the works deemed unsuitable for engineering fill.

Construction traffic (off-site)

- 2.6.19 Appropriate access routes to site compounds for people, plant and material will be evaluated with the local Highways Authority to ensure that movements are restricted to appropriate routes to minimise local disruption.
- 2.6.20 Earthworks material would be retained and re-used within the Scheme boundary where practical, however there is likely to be quantities of contaminated material that would need to be transported to licensed waste management facilities.
- 2.6.21 Other construction traffic would consist of vehicles delivering the products required for the construction of the Scheme, including concrete, bitumen, aggregates, pipes and steel. Some deliveries would arrive as abnormal loads, such as large construction plant. HGV deliveries of construction materials would be made in a 12 hour period between 07:00 and 19:00 on weekdays and between 07:00 and 13:00 on Saturdays, other than in exceptional circumstances.
- 2.6.22 Traffic management would be carried out in a manner which minimises the need for traffic to divert on to alternative routes, minimises the impact on the local community and minimises delays and disruptions to existing traffic.
- 2.6.23 A detailed Traffic Management Plan (TMP) would be prepared and implemented by the construction contractor and would define those measures to be used by the contractor to reduce the impacts from construction traffic. The construction contractor's detailed TMP would be based upon the outline TMP for the Scheme included as application document [TR010054/APP/7.5].

Haul routes (on-site)

- 2.6.24 Generally, construction plant would travel along the Scheme alignment using the footprint of the proposed embankments and cutting. A haul road for earthmoving equipment such as dump trucks would be required for the entire length of the Scheme from the M54 Junction 1 to the M6 Junction 11. This would follow the alignment of the mainline of the Scheme to avoid the need for additional site clearance. Haul road maintenance and dust control measures would be adopted.

Construction methods

- 2.6.25 The construction of the Scheme would use typical construction techniques associated with major infrastructure projects, including site clearance, excavations and rotary bored piling.
- 2.6.26 Earthworks, including cuttings and embankments, would be required to new junctions and link road. Embankments would be constructed using site-won materials where possible. The pavement construction would use relatively standard techniques, including (where appropriate) capping layer, sub-base, base and surface courses.

Plant and equipment

- 2.6.27 Construction of the Scheme would require a large quantity of plant and equipment. The high volume of earth to be moved would require large excavators, dump trucks, bulldozers, compactors and stabilising plant. Indicative construction plant requirements have been defined taking advice from the Highways England's

appointed buildability advisors for the Scheme – such information has been used during the EIA e.g. to estimate potential noise effects (refer to Chapter 11: Noise and Vibration).

Workforce

2.6.28 Taking advice from Highways England's appointed buildability advisors, the maximum workforce during the Scheme construction phase has been estimated to be approximately 325 staff members, 250 of which would be in the operational workforce.

Utilities

2.6.29 Construction of the Scheme would require the diversion, relocation or protection of a number of existing utility assets including drinking water, waste water, gas, electricity and telecommunications. Utilities work has been investigated and forms part of the Scheme construction works as assessed within this ES. All services are proposed below ground. The main utilities work required for the construction of the Scheme would include:

- diversion of a high pressure gas main crossing under the Scheme and to the west of the new M54 Junction 1;
- diversion of electrical and telecommunication services currently surrounding the existing roundabout at Junction 1 of the M54;
- diversion of a foul sewer, 24 inch potable water main and 1 no. telecommunications service located within Hilton Lane, to allow for the closure of Dark Lane and construction of the new Hilton Lane bridge. These are to run to the east of the Scheme alignment south of Hilton Lane and pass under the Scheme at the end of the severed Dark Lane;
- diversion of 1 no. telecommunications service to cross the proposed Hilton Lane bridge, with a duct proposed at either side of the bridge crossing; and
- diversion of an overhead electrical cable to underground to the south of Brookfield Farm.

2.6.30 These utilities diversions would be further investigated and planned in detail by the construction contractor, in association with the appropriate utility companies, as part of the detailed design of the Scheme.

2.6.31 The construction site compounds would require new temporary utility connections or stand-alone provisions where direct connections are not viable, for the provision of water, sewerage disposal, electricity and telecommunications.

2.6.32 The limits of deviation for each diversion have been determined based on discussions with individual statutory undertakers and allow for temporary works to construct the proposed diversion whilst maintaining the existing services.

Demolitions

2.6.33 The Scheme would require the demolition of the existing bridges at M6 Junction 11. The works at Junction 11 would also require the demolition of a stable/ storage

building to the west of the junction. No other demolitions are anticipated to be required to construct the Scheme.

- 2.6.34 It is currently anticipated that the existing structures at M54 Junction 1, that would be redundant upon completion of the Scheme, would be left in place and backfilled to avoid the need for future maintenance activities.

Excavated materials

- 2.6.35 Construction of the Scheme would require excavation in places to form cuttings (where the road would be below existing ground level) for the highway and where possible, this material would then be used to form embankments. Table 2.4 provides details of predicted cut and fill volumes and estimates of material re-use and materials landfilling during the Scheme construction phase.

Table 2.4: Estimated cut and fill balance and predicted material re-use

Scheme Aspect	Material (m ³)		
	Cut	Fill	Balance
Scheme Design	702,332	578,137	124,195
Drainage Ponds	28,000	13,500	14,500
Total	730,332	591,637	138,695

- 2.6.36 It is the intention that as much of the reusable cut material would be reused on site as feasible. Re-use of excavated material would minimise the need to transport this material on the highway network for re-use or disposing it off-site. This would reduce the environmental impacts associated with the construction of the Scheme, particularly in relation to the air quality and noise impacts of construction traffic on people and communities living along excavated materials re-use and disposal routes. This strategy would also help reduce greenhouse gas emissions during the Scheme construction phase.
- 2.6.37 Should any such materials not be re-used on site, the construction contractor would seek to re-use material elsewhere, although some materials may require off-site disposal. The approach to materials and waste management is considered further in Chapter 10: Material Assets and Waste.

Environmental Management Plan

- 2.6.38 Measures to mitigate the impacts of the Scheme during construction, operation and maintenance of the Scheme are outlined in the OEMP. These measures have been developed alongside the design of the Scheme and have been informed by the technical assessments presented in this ES. The residual effects as reported within this ES have taken account of the mitigation measures outlined in the OEMP. The OEMP is provided in DCO application document [TR010054/APP/6.11] and would be secured by Requirement 4 in Schedule 2 of the draft DCO [TR010054/APP/3.1].
- 2.6.39 The construction of the Scheme would be subject to measures and procedures defined within a CEMP which would be developed and implemented by the construction contractor. The CEMP would be produced by the contractor prior to works commencing based on the requirements outlined in the OEMP

[TR010054/APP/6.11]. This would include the implementation of industry standard practice and control measures for environmental impacts arising during construction, such as the control of dust and the approach to waste management on-site.

2.7 Operation and long term maintenance

- 2.7.1 Once completed and operational, the long term management (including maintenance requirements) of the Scheme would be absorbed as part of 'the network' as defined within the Highways England Licence. It is Highways England's responsibility to ensure the maintenance, resilience, renewal, and replacement of the network as documented in the Maintenance and Repair Strategy Statement.
- 2.7.2 Maintenance is defined as actions needed to inspect, repair, adjust, alter, remove, replace or reconstruct all aspects that relate to the Scheme. Typical maintenance activities include: the inspection and repair of safety barriers; signage; drainage infrastructure; lighting; environmental barriers; structures; repairs to the carriageway surface; renewal of road markings; maintenance of highway verges and boundaries; management of the soft estate; and the inspection and clearance of road drains.
- 2.7.3 The Scheme has been designed in a way that minimises the frequency of future interventions through the incorporation of low maintenance materials, equipment and features that reduce the number of repairs required. Examples include the appropriate location of equipment to facilitate access for routine inspections. Accordingly, no significant maintenance activities are likely to be required within the first five years of the Scheme being operational.
- 2.7.4 Landscape planting would require maintenance in accordance with any overarching plan developed for the long-term management of the soft estate, including grass strimming, watering and weed control. Maintenance would be more intensive during the first three to five years after Scheme opening to ensure the successful establishment of any planting. Maintenance operations would then reduce to a three to six month cycle following this period. A detailed landscape specification and maintenance schedule will be produced at the detailed design stage.
- 2.7.5 Scheme maintenance activities would be as required by the granting of the DCO. As outlined in the OEMP [TR010054/APP/6.11], on completion of the construction phase of the Scheme the CEMP would be converted into a Handover Environmental Management Plan (HEMP) which will detail the requirements for ongoing maintenance works. The HEMP must be submitted to the Secretary of State for approval within 28 days of the opening of the Scheme for public use, after which the Scheme would be maintained in accordance with the HEMP.
- 2.7.6 Maintenance operations would be undertaken by the Highways England Area 9 maintaining authority. Such maintenance activities would, wherever feasible, be programmed in a way that enables their combination with other planned operations to reduce disruption to road users associated with lane closures and diversions.
- 2.7.7 Long-term maintenance and asset repairs (including the decommissioning of particular elements such as lighting columns) would be undertaken as required to maintain the appropriate standards for the strategic road network. Should any particular elements of the Scheme need to be dismantled or replaced, such maintenance works would be undertaken by the Area 9 maintaining authority

(Highways England) in accordance with the HEMP. Assuming the appropriate good practice is applied to the management of environmental impacts during maintenance works (including dismantling and replacing Scheme elements in accordance with the HEMP), no likely significant effects are predicted.

- 2.7.8 Should activities be required that do not form part of Scheme maintenance activities as required by the granting of the DCO, the Area 9 maintaining authority would consider the potential for such activities to impact upon the prevailing environment and define any associated consenting requirements (e.g. whether such activities require a statutory EIA). Such maintenance works would only be undertaken following the identification of environmental sensitive receptors, potential significant effects, any appropriate environmental mitigation requirements and following the appropriate consenting approvals. All such works would be screened in accordance with the environmental procedures and protocols as detailed in the DMRB Volume 11 (Ref 2.3) and associated Interim Advice Notes (IANs). Adherence to such established procedures would ensure that environmental effects are identified and appropriately managed.

2.8 Decommissioning

- 2.8.1 It is highly unlikely that the Scheme would be demolished after its design life as the road is likely to have become an integral part of nationally important infrastructure. In the unlikely event that Scheme would require decommissioning, this would conform to relevant statutory process at that time, including EIA as appropriate. Decommissioning or demolition of the Scheme is not assessed further in this ES. This approach was confirmed as appropriate for a scheme of this nature by the Inspectorate in the Scoping Opinion (Ref 2.4).

2.9 References

- Ref 2.1 Government Office for the West Midlands (2001) *West Midlands Area Multi Modal Study*. Available online at: <https://www.gov.uk/government/publications/west-midlands-area-multi-modal-study>
- Ref 2.2 Department for Transport (2015) *Road Investment Strategy 2015 to 2020*
- Ref 2.3 Highways Agency (1993 to date) *Design Manual for Roads and Bridges, Volume 11*.
- Ref 2.4 The Planning Inspectorate (2019) *Scoping Opinion: M54 to M6/ M6 Toll Link Road*. Available online at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010054/TR010054-000029-53J6%20-%20Scoping%20Opinion.pdf>
- Ref 2.5 Department for Transport (2014) *National Policy Statement for National Networks*. Available online at: www.gov.uk/government/publications
- Ref 2.6 Secretary of State for Ministry of Housing, Communities and Local Government (2019) *National Planning Policy Framework*