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Bromford Tunnel Extension Environmental Impact Assessment Screening Report | Appendices

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Structure of the High Speed Rail (London – West Midlands) Bromford Tunnel Extension Environmental Impact Assessment Screening Report

This document is part of the suite of documents that make up the Bromford Tunnel Extension Environmental Impact Assessment (EIA) Screening Report, as described below:

- Executive Summary. This provides a summary, in non-technical language, of the report findings.
- Screening Report. This introduces the report, provides a description of Bromford Tunnel Extension and an overview of the area in which it is located, and sets out the corresponding EIA screening assessment.
- Appendices. These contain supporting environmental information.
- Map Book. This contains supporting maps, including a plan sufficient to identify the land relating to Bromford Tunnel Extension (Site Location Plan), and plans showing the Bromford Tunnel Extension proposals.

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Appendix 5.1 Air Quality Standards

Table 5.1.1 Air Quality standards

Pollutant	Averaging period	Air quality objective and limit values		Attainment date
		Concentration	Allowance	
Nitrogen dioxide (NO_2)	1-hour	200µg/m^3	18 per calendar year[(d)]	31 December 2005[(a)] 1 January 2010[(b)]
	Annual	40 µg/m^3	-	31 December 2005[(a)] 1 January 2010[(b)]
Particulates (PM_{10})	24-hour	50 µg/m^3	35 per calendar year[(e)]	31 December 2004[(a)] 1 January 2005[(b)]
	Annual	40 µg/m^3	-	31 December 2004[(a)] 1 January 2005[(b)]
Particulates ($PM_{2.5}$)	Annual	25 µg/m^3	-	1st January 2015[(a)]
		20 µg/m^3	-	1st January 2020[(b)]

Notes:

[(a)] Air Quality (England) Regulations 2000 as amended.

[(b)] EU Directive 2008/50/EEC on ambient air quality and cleaner air for Europe and The Air Quality Standards Regulations 2010. Derogations (time extensions) have been agreed by the EU for meeting the NO_2 limit values in some zones/agglomerations.

[(c)] Can be expressed as the 99.79th percentile of 1-hour means.

[(d)] Can be expressed as the 90.41st percentile of 24-hour means.

Appendix 5.2 Relevant Representative Human Health and Ecological Air Quality Receptors

Table 5.2.1 Relevant Representative Receptors

Receptor	OS Grid coordinates
25-1	410039, 290007
25-2	411305, 290299
25-3	411402, 290449
25-4	411506, 290455
25-5	412281, 289789
25-6	412827, 289949
25-7	413817, 290779
25-8	413912, 290742
25-9	413888, 290663
25-10	414491, 290067
25-11	415193, 290307
25-12	415956, 290616
25-13	416926, 290393
25-14	413685, 289682
25-15	415986, 290420
25-16	413556, 291272
RR1	412602, 290991
RR2	412035, 290784
RR3	416301, 290636
RR4	414539, 289795
19-1	420156, 286859
19-2	420021, 287230
19-3	419706, 288592
19-4	419584, 289032
19-5	419385, 290273

Receptor	OS Grid coordinates
19-6	418142, 290951
19-7	417572, 291176
19-8	418609, 292158
19-9	416754, 290936
20-1	418891, 292730
Langley Wood Ancient Woodland	415103, 290447

Appendix 12.1 Landscape and Visual Effects

Summaries of the landscape and visual effects of the Phase One scheme are provided in Table 12.1.1 and Table 12.1.2, below. The landscape and visual effects of the Proposed Development are set out in Table 12.1.3 and Table 12.1.4, below:

Table 12.1.1 Summary of Phase One scheme landscape effects

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
Cole Valley LCA	The construction activity will be located across the central and northern section of the LCA, from Green Lane to the River Tame and east of Water Orton. Construction activities will include the formation of large scale embankments, construction of numerous viaducts and the realignment of the River Cole. Additionally, the removal of hedgerows and vegetation along the River Cole and The Belt woodland will lead to the severance of fields and increased openness. A number of historic and listed buildings at and near Coleshill Hall Farm and the modern phase 2 building at Coleshill Manor Office Campus will be demolished. The presence of construction traffic on existing roads and haul routes crossing fields will introduce additional built form, lighting and general activity within the agricultural landscape. The construction phase will also relocate National Grid overhead power lines. The scale and extent of construction activity will reduce the tranquillity locally. The partial loss and alteration to the agricultural character of the area and the removal of vegetation will result in a medium magnitude of change. The medium magnitude of change, assessed alongside the medium sensitivity of the character area, will result in a moderate adverse effect. The Supplementary Environmental Statement and Additional Provision 2 Environmental Statement	The Phase One scheme will be located across the central and northern sections of this LCA, from Green Lane to the River Tame and east of Water Orton. The track and track bed will mainly be elevated on embankments or viaducts with extensive earthworks creating false cuttings. In certain locations, where the Phase One scheme will cross existing motorways, the approach embankments will rise to approximately 14m above existing ground levels. Landscape impacts of the Phase One scheme will include: the introduction of a new transport corridor with new viaducts crossing the River Cole and the River Tame, the motorways and secondary roads across the LCA, that will form prominent elements but be largely characteristic of the existing infrastructure setting; the introduction of large scale embankments across the existing landform of gently undulating terrain; the introduction of noise fence barriers, overhead line equipment and National Grid power line realignment, that will form prominent elements but are largely characteristic of the existing infrastructure setting; the realignment of the River Cole with adjacent new	By year 15 the planting along the route will have stablished, reducing the mass and scale of the new River Tame viaduct and integrate and soften the Langley Hill embankment profiles sides. This planting will begin to reflect the existing character of woodland blocks and that alongside the motorways. Therefore, the magnitude of change is considered to be low. The low magnitude of change assessed alongside the medium sensitivity of the character area will result in a minor adverse effect.	By year 60, the planting will have matured and further replicate the woodland character and that of the vegetation alongside the motorways. However due to the height and scale of the embankments and viaducts, the Phase One scheme is considered to remain a minor alteration to the gently undulating landform. Therefore, the magnitude of change is considered to remain low. The low magnitude of change assessed alongside the medium sensitivity of the character area will result in a minor adverse effect. Refer to operation year 1 regarding assessment conclusions set out in Supplementary

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
	reported that scheme amendments considered therein will require different areas for the same construction activities in the area, due to the realignment of Manor Drive, the new junction design, and the reduction and relocation of woodland planting areas. The required construction activities in the LCA will remain the same, including formation of large scale embankments and structures and the partial loss of characteristic landscape features such as hedgerows, woodland and riverside vegetation. The amendments will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES. The Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement reported that Whilst the replacement Water Orton Primary School will lead to additional construction activity within the Cole Valley LCA and limited further loss of hedgerows and trees, this will not result in new or different significant effects and will not change the level of significance of the effects reported in the main ES.	woodland and shrub planting, which will be a substantial alteration; the introduction of balancing ponds and access tracks, which will be largely inconspicuous elements within the mainly agricultural setting; the introduction of the new built form of Gilson Road auto-transformer station; realignments of Manor Drive, Attleboro Lane and the B4117 Gilson Road; and realignments of several PRoW including PRoW M77, M54, M43 and M60, which are a minor alteration to the existing PRoW network. Given the context of existing major infrastructure, the operation of the Phase One scheme through this LCA will not noticeably alter tranquillity. Therefore, due to the Phase One scheme introducing prominent elements that are either largely characteristic of the existing infrastructure setting or will result in a partial loss to the landscape character, the magnitude of change is considered to be medium in year 1 of operation. The medium magnitude of change, assessed alongside the medium sensitivity of the character area, will result in a moderate adverse effect in year 1 of operation.	Refer to operation year 1 regarding assessment conclusions set out in Supplementary Environmental Statement and Additional Provision 2 Environmental Statement. The Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement reported that by year 15 of operation, new landscape planting within the replacement Water Orton Primary School site will have established and matured. Overall, this different effect will not change the level of significance of the effect reported in the main ES.	Environmental Statement and Additional Provision 2 Environmental Statement. Refer to operation year 15 regarding assessment conclusions set out in Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement.

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
		The Supplementary Environmental Statement and Additional Provision 2 Environmental Statement reported that scheme amendments considered therein will alter the arrangement of landscape elements, however, this will not give rise to a new or different significant landscape effect and will not change the level of significance of the effects reported in the main ES. The Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement reported that at year 1 of operation, the proposed relocation of Water Orton Primary School will result in a small amount of new built form within the LCA which is in keeping with the LCA, but will be a different significant effect. Overall, this different effect will not change the level of significance of the effect reported in the main ES.		

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
River Tame Flood Plain LCA	Construction activities will include the temporary realignment of B4118 Birmingham Road over the Phase One scheme, the partial removal of ancient woodland within Park Hall nature reserve, the partial removal of Langley Hill Wood and Parkhill Wood and areas of vegetation to the north of the railway, the construction of the 18m deep Water Orton cutting adjacent to the B4118 Birmingham Road, the realignment of the River Tame, the construction of bridges and viaduct including the River Tame viaduct, Plants Brook underbridge and Dunlop Carrier Channel culvert, alterations to an existing bridge structure over the River Tame, construction of a balancing pond and replacement floodplain storage areas, and utility diversions including the relocation of pylons and overhead power lines. The realignment of the River Tame will result in a large loss of grassland, ponds and wetland habitats and severance of land within Park Hall nature reserve. The construction of the Phase One scheme will also result in the partial removal of ancient woodland at Parkhall Wood and also mature vegetation to the north of the Birmingham and Derby line. The character of the area will also be affected by the presence of large scale earthworks which will introduce temporary stockpiles into the landscape and construction plant by introducing elements that will be discordant with the rural setting. Construction will temporarily introduce a range of intensive construction activities and vehicles, fencing, satellite compounds (River Tame viaduct satellite compound,	The route will enter the LCA at B4118 Birmingham Road, east to west, in Water Orton cutting, to an approximate depth of 18m, before proceeding to the River Tame viaduct for 775m. The route will then continue to follow the route of the Birmingham and Derby line on an embankment. Landscape effects of the Phase One scheme will include: the engineered Water Orton cutting to an approximate depth of 18m from B4118 Birmingham Road through an existing steep scarp slope within Park Hall nature reserve; permanent loss of an area of Park Hall ancient woodland and permanent loss of vegetation within parts of Langley Hill Wood, Parkhill Wood and to the north of the Birmingham and Derby line reducing enclosure; the realignment of the River Tame within Park Hall nature reserve will permanently alter the route of the river; permanent loss of vegetation to facilitate the introduction of a balancing pond to the north of the existing Birmingham and Derby line and flood storage areas, which will reduce the degree of enclosure along the railways; relocation of existing pylons to a more prominent position on sloping ground within Parkhill Wood and Langley Hill	By year 15, the magnitude of change will remain unchanged. The medium magnitude of change, assessed alongside the high sensitivity of the character area, will result in a moderate adverse effect in year 15 of operation. Refer to operation year 1 regarding assessment conclusions set out in Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement.	By year 60, the magnitude of change will remain unchanged. The medium magnitude of change, assessed alongside the high sensitivity of the character area, will result in a moderate adverse effect in year 60 of operation. Refer to operation year 1 regarding assessment conclusions set out in Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement.

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
	Plants Brook underbridge satellite compound and Dunlop Carrier Channel culvert satellite compound) and associated lighting reducing tranquillity. The magnitude of change is, therefore, considered to be high. The high magnitude of change, assessed alongside the high sensitivity of the character area, will result in a major adverse effect. The Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement reported that given the nature of the major adverse effect reported in the main ES, the amendment to the overhead line diversion at Park Hall nature reserve will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.	Wood to the south of the diverted River Tame; introduction of the River Tame viaduct, Plants Brook underbridge and Dunlop Carrier Channel culvert; and introduction of overhead line equipment, communication masts, signage and trains on embankment, which although already present within the adjacent Birmingham and Derby line corridor, introduces additional infrastructure within a largely rural context. There will be a localised reduction in tranquillity within Park Hall nature reserve where the route diverts from the existing Birmingham and Derby line. Overall, tranquillity will remain medium. There are limited opportunities to integrate the Phase One scheme into the landscape within Park Hall nature reserve due to the requirement to create flood compensation areas and planting restrictions within these proposed areas. Additionally, there are spatial constraints to introduce planting or earthworks between the River Tame viaduct and the existing Birmingham and Derby line. Therefore, due to the changes in the character of the area, the magnitude of change is considered to be medium in year 1 of operation. The		

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
		medium magnitude of change, assessed alongside the high sensitivity of the character area, will result in a moderate adverse effect in year 1 of operation. The Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement concluded that the amendment to the overhead line diversion at Park Hall nature reserve will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.		
Farnborough Road Paddock and Open Space LCA	Part of the temporary working area is within this LCA, incorporating Plants Brook and an area of open space to the rear of houses along Blenheim Way. Vegetation to the rear of residential properties along Blenheim Way will be removed to enable the construction of a balancing pond and a site access point along Javelin Avenue. The setting of the Farnborough Road Paddock and Open Space LCA will be indirectly impacted by construction activity within the neighbouring River Tame Floodplain. Adverse impacts associated with this LCA include the presence and movement of cranes, the removal of areas of woodland, the addition of temporary features, such as satellite compounds (River Tame viaduct satellite compound, Plants Brook underbridge satellite compound and Dunlop Carrier Channel culvert satellite compound) and associated	Minor change to a small part of the setting of the LCA arising from the partial removal of vegetation adjacent to Plants Brook will result in minor adverse effects.	The significance of operational effects will reduce from minor adverse to negligible because of the change in character and setting arising from the maturity of the Phase One scheme planting.	No change to LCA or setting.

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
	lighting, and fencing, utility diversions, including the relocation of pylons and overhead power lines, the construction of the River Tame viaduct, Plants Brook underbridge and Dunlop Carrier Channel culvert and the construction of the Phase One scheme on embankment. Although construction will temporarily introduce fencing, hoardings and construction traffic into a localised area of the LCA, construction traffic along Javelin Avenue and Farnborough Road will reduce the tranquillity within the wider LCA due to increased traffic on local roads. Vegetation losses at the interface with River Tame Floodplain LCA will reduce enclosure. The widespread construction activity within the adjacent LCA will further contribute to a reduction in tranquillity from medium to low. The magnitude of change is considered to be high. The high magnitude of change, assessed alongside the medium sensitivity of the character area, will result in a moderate adverse effect.			

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
Castle Bromwich Business Park LCA	Construction activities will include the construction of Water Orton cutting for the Phase One scheme as it descends to the Bromford tunnel, the partial removal of vegetation to the south of the Birmingham and Derby line, the demolition of industrial buildings, the construction of Bromford tunnel and portal approximately 250m east of the A452 Chester Road, the construction of Castle Bromwich auto-transformer station and utilities diversions to the east of A452 Chester Road bridge within the business park. Construction will temporarily introduce vehicles, fencing enclosure, construction compounds (Bromford tunnel east portal (east) main compound, Bromford tunnel east portal (west) satellite compound and Castle Bromwich auto-transformer station satellite compound), cranes and other plant equipment and construction activity into the LCA. In addition, there will be increased traffic on Tameside Drive, Orton Way and the A452 Chester Road due to construction vehicles. The tranquillity of the LCA will reduce further, but will remain low during construction. Overall, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the low sensitivity of the character area, will result in a moderate adverse effect.	Minor change to a small part of the setting of the LCA arising from the partial removal of vegetation adjacent to the Birmingham and Derby line will result in minor adverse effects.	The significance of operational effects will reduce from minor adverse to negligible because of the change in character and setting arising from the maturity of the Phase One scheme planting.	No change to LCA or setting.

Table 12.1.2 Summary of Phase One scheme visual effects

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
313.2.002 View south-west from residences along Attleboro Lane	The construction hoarding, the construction of a balancing pond and the new alignment of Attleboro Lane will be visible in the foreground of the view. The demolition of properties along Attleboro Lane, the formation of embankments, construction of Attleboro Lane overbridge and Attleboro flyover, including cranes will be visible in the middle ground of the view. As this activity will be within the direct frame of view the magnitude of change is high. The high magnitude of change assessed alongside the high sensitivity of the receptor will result in a major adverse effect.	The balancing pond, new planting, the realigned Attleboro Lane and the Attleboro Lane pumping station and access road will be visible in the foreground of the view. The embankments of the Attleboro Lane overbridge, Attleboro flyover and earthworks of Marsh Lane embankment will be visible in the middle ground of the view. Vegetation along Attleboro Lane will partially filter views and therefore the magnitude of change is medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect in the winter of year 1 of operation.	In summer of year 1, views of the elevated sections of the Phase One scheme will remain as per winter. Therefore the magnitude of change is considered to remain medium, meaning the overall effect will be unchanged.	By year 15, the planting will have established, however not sufficiently to filter views of the elevated sections of the Phase One scheme. Therefore the magnitude of change is considered to remain medium, meaning the overall effect will be unchanged in summer of year 15 of operation.	By year 60 the planting will have matured and will almost entirely obscure views of the Phase One scheme. Therefore, the magnitude of change will be negligible. The negligible magnitude of change, assessed with the high sensitivity of the receptor, will result in a negligible effect.
313.2.004 View south from residences on the Birmingham Road and Plank Lane	The upper sections of cranes constructing the Attleboro Lane overbridge and Attleboro flyover will be visible in background views above the intervening field vegetation. This activity is considered to be a minor alteration to existing views. Therefore the magnitude of change is considered to be low. The low magnitude of change	Intervening vegetation will largely screen views of the Phase One scheme. Therefore the magnitude of change is low. The low magnitude of change, assessed with the high sensitivity of the receptor, will result in a minor adverse effect. The Supplementary Environmental Statement 3 and	Intervening vegetation will almost entirely screen views of the Phase One scheme. Therefore the magnitude of change is negligible. The negligible magnitude of change assessed alongside the high sensitivity of the	No further assessment required. Refer to operation year 1 regarding assessment conclusions set out in Supplementary Environmental Statement 3 and	No further assessment required. Refer to operation year 1 regarding assessment conclusions set out in Supplementary Environmental Statement 3 and Additional Provision 4.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	assessed alongside the high sensitivity of the receptor will result in a minor adverse effect. The Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement reported that the proposed relocation of Water Orton Primary School does not generate any new or different significant effects upon this viewpoint due to intervening vegetation which will prevent views into the replacement school site.	Additional Provision 4 Environmental Statement reported that the proposed relocation of Water Orton Primary School does not generate any new or different significant effects upon this viewpoint due to intervening vegetation which will prevent views into the replacement school site.	receptor will result in negligible effect. Refer to operation year 1 regarding assessment conclusions set out in Supplementary Environmental Statement 3 and Additional Provision 4.	Additional Provision 4.	
370.6.001 View north-west from Water Orton Road adjacent to Park Hall College	With the exception of the new road bridge, the construction activities will be filtered and partially obscured by the intervening vegetation alongside the M6 in the middle ground. There will be substantial changes to the view in the foreground as a result of the proposed Water Orton Road bridge. Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the low sensitivity of the receptor will result in a minor adverse effect.	The Phase One scheme will be predominantly hidden from view in a deep cutting (Water Orton cutting). Therefore, the magnitude of change is considered to be negligible, giving rise to a negligible effect.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
370.3.004 View north from the footpath through the open space overlooking the M6 corridor	The existing topography and intervening vegetation obscure views of the works to divert the River Tame through Park Hall nature reserve. In the middle ground the re-positioning of the National Grid overhead power lines and transmission towers together with the construction of the River Tame viaduct will be visible. These views will be filtered and partially obscured by intervening vegetation. Therefore the magnitude of change is considered to be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.	No further assessment required.	No further assessment required.	No further assessment required.	No further assessment required.
370.2.006 Views north from residences on Park View	The construction equipment used to build the new Water Orton Road bridge over the A452, M6 and the Phase One scheme will be visible in the background of the view above the intervening vegetation. The repositioning of the National Grid overhead power lines and transmission towers will also be visible on the horizon but this will be a temporary activity. Therefore the magnitude of change is considered to be low.	No further assessment required.	No further assessment required.	No further assessment required.	No further assessment required.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	The low magnitude of change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.				
370.2.007 Partial view north-east from residences on Chadshunt Close	The majority of construction activities will be obscured by intervening topography and vegetation in the middle ground of the view. However, the re-positioning of National Grid overhead power lines and transmission towers and potentially the tops of cranes utilised to build the River Tame viaduct passing through Park Hall nature reserve will be visible above the vegetation. Therefore the magnitude of change is considered to be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.	No further assessment required.	No further assessment required.	No further assessment required.	No further assessment required.
371.2.001 Views west and south from residences on the B4118 Birmingham Road	Looking west, the construction of the proposed B4118 Water Orton Road overbridge and associated clearance of existing vegetation will be visible approximately 200m in the background of the view. Construction plant and cranes constructing the River Tame viaduct within Park Hall nature	Looking west, the Phase One scheme will be predominantly hidden from view in a deep cutting (Water Orton cutting) with only the Water Orton over bridge and boundary fencing visible through intervening vegetation. Therefore, the magnitude of change is considered to be low, giving rise	Looking west, the Phase One scheme will be predominantly hidden from view in a deep cutting (Water Orton cutting) with only the Water Orton over bridge and boundary fencing partially visible through intervening vegetation.	Looking west, there will be no change to the assessment during the summer of year 15. Looking south, by year 15 the new planting and intervening vegetation will result in no perceptible	There will be no change to the assessment during the summer of year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	reserve, together with the activity associated with the removal and relocation of the pylons 10m to 50m south of their existing position in a more elevated location will be visible above the vegetation in the background. Construction activities will introduce a degree of urbanisation that will conflict with the current rural setting. Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect. Given the presence of existing lighting along the B4118, effects at night will be non-significant and no further assessment is required. Looking south, the construction plant on the B4118 Birmingham Road/Water Orton Road will be visible in the foreground. This is considered to reflect the character of existing traffic. The temporary construction hoarding and the construction plant on the haul roads will be visible in the middle ground of the view. Also within the middle ground of	to a minor adverse effect. Looking south, the Phase One scheme will be located in middle ground views and largely filtered by intervening vegetation. Therefore the magnitude of change is low. The low magnitude of change assessed against the high sensitivity of the receptor will result in a minor adverse effect.	Therefore, the magnitude of change is considered to be negligible, giving rise to a negligible effect. Looking south during summer, due to the extent of the Proposed Scheme within the view, the magnitude of change is considered to remain as per winter, and the effect unchanged.	improvement or deterioration in the view. Therefore, the magnitude of change will be negligible. The negligible magnitude of change, assessed with the high sensitivity of the receptor will result in a negligible effect.	

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	the view, but viewed obliquely, will be the B4118 Water Orton Road overbridge satellite compound and the construction of the Water Orton Road overbridge. This activity is considered to represent a substantial change compared to views of fields, which will be partially filtered by existing vegetation. Therefore the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect. At night, the continuous lighting of the B4118 Water Orton road overbridge satellite compound will be located within the middle ground of the view. This will be discernible alongside lighting from vehicles on the B4118 Birmingham Road/Water Orton Road and viewed at an oblique angle. Therefore the magnitude of change is low and the effect minor adverse.				
372.3.001 View north-west from the footpath near Pikehorne	The existing topography and intervening vegetation will filter and partially obscure views of the works to divert the River	The River Tame viaduct and Langley Hill embankment of the Phase One scheme will pass through the middle ground of	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
Croft overlooking the M6	Tame through Park Hall nature reserve. The construction of the River Tame viaduct and Langley Hill embankment with retaining wall on its northern side of the Phase One scheme will pass through the middle ground of the view at an elevation 10m higher than existing ground levels and existing Birmingham and Derby line. The Phase One scheme will be visible above the intervening trees and A452/M6 road corridor. In the middle ground, the re-positioning of the National Grid overhead power lines and transmission towers together with the construction of the River Tame viaduct will be visible. These views will be filtered and partially obscured by intervening vegetation. Any working during winter season will potentially involve lighting to construction sites but this is unlikely to raise existing light levels in this view due to the proliferation of lighting in the foreground, middle ground and background. Therefore, the magnitude of change is considered to be low. The low magnitude of change assessed	the view above existing ground levels and existing Derby to Birmingham line. It will be glimpsed through the intervening trees and A452/M6 road corridor. Therefore the magnitude of change is considered to be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.		summer operation year 15.	

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	alongside the high sensitivity of the receptor will result in a minor adverse effect.				
372.2.002 Partial view north-west from residences on Blewitt Close through intervening vegetation	The construction activities will be heavily filtered by the existing mature vegetation in the foreground. However, there may be glimpsed views of the re-positioning of transmission towers and the construction of the River Tame viaduct through and over the trees and vegetation. These views will be filtered and partially obscured by intervening vegetation. Any working during winter season will potentially involve lighting to construction sites but this is unlikely to raise existing light levels in this view due to the proliferation of lighting in the foreground, middle ground and background. Therefore, the magnitude of change is considered to be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.	Views of the Phase One scheme in the background will be heavily filtered by the existing mature vegetation in the foreground. Potential glimpsed views will be possible through and over the trees and vegetation of the train and associated overhead line equipment on the River Tame viaduct and Langley Hill embankment adjacent to the Birmingham and Derby to Birmingham line. Therefore the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible effects.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.
372.2.003 View north from residences at	The majority of construction activities will be obscured by intervening topography and vegetation in the middle ground	No further assessment required.	No further assessment required.	No further assessment required.	No further assessment required.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
Musborough Close	of the view. However, the re-positioning of the National Grid overhead power lines and transmission towers and possibly the tops of cranes utilised to build the River Tame viaduct passing through Park Hall nature reserve will be visible above the vegetation. Therefore the magnitude of change is considered to be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.				
372.3.004 View north-west from PRoW off Parkfield Drive overlooking M6 corridor	The majority of construction activities will be obscured by intervening topography and vegetation in the middle ground of the view. However, the re-positioning of the National Grid overhead power lines and transmission towers and possibly the tops of cranes utilised to build the River Tame viaduct passing through Park Hall nature reserve and the tunnel portal retained cutting (Castle Bromwich retained cut) within Castle Bromwich Business Park will be visible above the vegetation. Therefore the magnitude of change is	Views of the Phase One scheme will be heavily filtered by the existing mature vegetation in the foreground and middle ground. Potential glimpsed views will be possible through and over the trees and vegetation of the train and associated overhead line equipment on the River Tame viaduct and Langley Hill embankment adjacent to the Birmingham and Derby line. Therefore the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	considered to be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.	the receptor will result in negligible effects.			
373.3.001 View south from Castle Vale Nature Conservation Area (Farnborough Fields)	The construction equipment and cranes that will be required to build the River Tame viaduct, up to 10m above existing ground levels, together with the re-positioning of existing pylons and overhead power lines located approximately 10m to 50m south of their existing position in a more elevated location will be visible cutting across the middle ground of the view passing from Parkhall Wood into Park Hall nature reserve and the River Tame valley, approximately 300m from the receptor. The works to divert the River Tame will be obscured from view by intervening vegetation, but the viaduct will be approximately 10m higher than existing ground level and the associated overhead line equipment will be visible through and above the tops of intervening vegetation. Therefore, the magnitude of change is considered to be	The River Tame viaduct will be glimpsed through existing vegetation cutting across the middle ground of the view passing from Parkhall Wood on the left into Park Hall nature reserve and the River Tame valley on the right. Although the River Tame viaduct will be up to 10m above the existing Birmingham and Derby rail line, the associated catenary and overhead line equipment will be largely obscured by intervening vegetation. Therefore, the magnitude of change is considered to be low, giving rise to a minor adverse effect.	During summer the leaves of mature trees in the foreground and middle ground of the view will further obscure views towards the route. Therefore, the magnitude of change is considered to be low, giving rise to a minor adverse effect.	During summer, the vegetation in the middle ground will have matured and will further obscure views towards the Phase One scheme. Therefore, the magnitude of change is considered to be negligible, giving rise to a negligible effect.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect. Night-time effects: Construction during winter will potentially require lighting to construction sites which will illuminate parts of Park Hall nature reserve that are currently dark. However, this will be viewed in context of occasionally floodlit sports pitches and the back-drop of the M6 and the A452 on the horizon and is considered to be non-significant and there will be no magnitude of change. The Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement reported that during construction, the nature of effects associated with the amendment to the overhead line diversion at Park Hall nature reserve will largely be as described for the original scheme. Therefore, the amendment will not give rise to a new or different significant effect and will not change the level of				

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	significance of the effects reported in the main ES.				
373.2.002 View south-east from residences on Javelin Avenue across open space	The construction of the proposed B4118 Water Orton Road overbridge, the formation of the Water Orton cutting and the associated clearance of existing vegetation will be visible on the skyline in the background of the view. The removal and relocation of pylons and overhead power lines approximately 10m to 50m southwards in a more elevated location and the construction equipment and cranes that will be required to construct the River Tame viaduct and Langley Wood embankment, up to 10m above existing ground levels, including a retaining wall on its northern side through Park Hall nature reserve will be visible through and above the existing trees and vegetation in the middle ground, approximately 300m from the receptor. Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a	The Phase One scheme will be visible at a distance through and above the intervening vegetation in the middle ground alongside the Plants Brook and existing Birmingham and Derby line. Therefore the magnitude of change is considered to be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.	During summer, mature trees in the middle ground of the view will further obscure views towards the Phase One scheme. Therefore, the magnitude of change is considered to be negligible, giving rise to a negligible effect.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	moderate adverse effect. Night-time effects: Construction during winter will require lighting to construction sites which will illuminate parts of Park Hall nature reserve that are currently dark. However, this will be viewed in context of floodlit sports pitches and the back-drop of the M6 and A452 Chester Road on the horizon. Therefore the magnitude of change is considered to be negligible, which assessed alongside the high sensitivity of the receptor will result in a negligible effect.				
373.3.003 View south from the north-western boundary of Farnborough Road Open Space	The construction of the Phase One scheme will be visible through and above the intervening vegetation in the middle ground alongside Plants Brook and the existing Birmingham and Derby line. The re-positioning of pylons and overhead power lines approximately 10m to 50m southwards in a more elevated location and the construction equipment and cranes that will be required to construct the River Tame viaduct and Langley Wood embankment, up to 10m above existing ground levels,	The Phase One scheme will be visible at a distance through and above the intervening vegetation in the middle ground alongside the Plants Brook and existing Birmingham and Derby line. Therefore the magnitude of change is considered to be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.	There will be no change to the assessment during summer operation year 1.	During summer, the vegetation in the middle ground will have matured and will further obscure views towards the Phase One scheme. Therefore, the magnitude of change is considered to be negligible, giving rise to a negligible effect.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	including a retaining wall on its northern side through Park Hall nature reserve will be visible through and over the tops of the existing trees and vegetation in the middle ground, approximately 400m from the receptor. Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect.				
373.2.004 View south-east from residences on Farnborough Road near Rawlins Croft	The construction of the proposed B4118 Water Orton Road overbridge, the formation of the Water Orton cutting and the associated clearance of existing vegetation will be visible on the skyline in the background of the view. The removal and relocation of pylons and overhead power lines approximately 10m to 50m southwards in a more elevated location and the construction equipment and cranes that will be required to construct the River Tame viaduct and Langley Wood embankment, up to 10m above existing ground levels,	The Phase One scheme will be visible at a distance through and above the intervening vegetation in the middle ground alongside the Plants Brook and existing Birmingham and Derby line. Therefore the magnitude of change is considered to be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.	During summer, mature trees in the middle ground of the view will further obscure views towards the Phase One scheme. Therefore, the magnitude of change is considered to be negligible, giving rise to a negligible effect.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	including a retaining wall on its northern side through Park Hall nature reserve will be visible through and above the existing trees and vegetation in the middle ground, approximately 300m from the receptor. Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect. Night-time effects: Construction during winter will require lighting to construction sites which will illuminate parts of Park Hall nature reserve that are currently dark. However, this will be viewed in context of occasionally floodlit sports pitches and the back-drop of the M6 and A452 Chester Road on the horizon. Therefore the magnitude of change is considered to be negligible, which assessed alongside the high sensitivity of the receptor will result in a negligible effect.				
373.3.006 View south-east from public open	The construction activities associated with the River Tame viaduct passing through Park	No further assessment required.	No further assessment required.	No further assessment required.	No further assessment required.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
space off Park Lane, Castle Vale	Hall nature reserve may be visible above the roof tops of the large warehouse buildings of Midpoint Park and the trees along the Birmingham and Derby line. The background of the view is heavily vegetated and includes distant views of Castle Bromwich. The route of the Phase One scheme will lie behind the middle ground, but views of this area are obscured by intervening vegetation and buildings. Minor adverse effect.				
373.4.007 View from the Derby and Birmingham train across Park Hall nature reserve	There will be sequential views from passing trains of construction activities in the immediate foreground. This will include construction compounds, construction of the River Tame viaduct and Langley Wood embankment, the realignment of the River Tame, the excavation of the flood storage areas, the re-positioning of existing pylons and overhead power lines and the removal of vegetation across the embankment to the M6. The construction activities will result in a substantial change to the views across the Park Hall nature reserve and floodplain. Therefore, the magnitude of	As trains on the Birmingham and Derby line pass through Park Hall nature reserve, there will be glimpsed views of the River Tame viaduct and Langley Wood embankment with retaining wall on its northern side and the diverted River Tame. In the first year of operation, the reinstated components of the Park Hall nature reserve, together with the changes in landform and river channel, will still be relatively newly formed and immature. Therefore, the magnitude of change is considered to be high. The high magnitude of change assessed	There will be no change to the assessment during summer operation year 1. Refer to operation year 1 regarding assessment conclusions set out in Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement.	There will be no change to the assessment during summer operation year 15. Refer to operation year 1 regarding assessment conclusions set out in Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement.	There will be no change to the assessment during summer operation year 60. Refer to operation year 1 regarding assessment conclusions set out in Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	change is considered to be high. The high magnitude of change assessed alongside the low sensitivity of the receptor will result in a moderate adverse effect. The Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement reported that during construction, the nature of effects associated with the amendment to the overhead line diversion at Park Hall nature reserve will largely be as described for the original scheme. Therefore, the amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.	alongside the low sensitivity of the receptor will result in a moderate adverse effect in the winter of year 1 of operation. The Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement reported that The magnitude of change in the view resulting from the amendment to the overhead line diversion at Park Hall nature reserve, including the increased height (approximately 9m) of the pylons, would not be greater than that assessed in the main ES. Therefore, the amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.			
373.7.008 View south from The Vale Sports Club pitches	The construction of the River Tame viaduct will be visible cutting across the middle ground of the view passing from Park Hall Wood on the left into Park Hall nature reserve and the River Tame valley on the right. The works to divert the River Tame will be obscured from view by intervening vegetation, but the	The Phase One scheme will be visible at close proximity through and above the intervening vegetation in the middle ground alongside the Plants Brook and existing Birmingham and Derby line. Therefore the magnitude of change is considered to be medium.	During summer, mature trees in the middle ground of the view will further obscure views towards the Phase One scheme. Therefore, the magnitude of change is considered to be low, giving rise to a negligible effect.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	River Tame viaduct will be 10m higher than existing ground level and will be visible through and above the tops of intervening vegetation. Any working during winter season will potentially involve lighting to construction sites which will illuminate parts of Park Hall nature reserve that are currently dark, however, this will be viewed in context of occasionally floodlit sports pitches and the back-drop of the M6/A452 on the horizon. Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the low sensitivity of the receptor will result in a minor adverse effect.	The medium magnitude of change assessed alongside the low sensitivity of the receptor will result in minor adverse effects.			
375.2.001 Indirect views / direct views south from residences on Cadbury Drive	Views of construction activities will be filtered by the intervening vegetation in the foreground of the view. However, there will be views of the demolition of buildings on the Castle Bromwich Business Park, the construction of a Bromford tunnel east portal (west) satellite compound and the construction of the tunnel portal approximately 80m from the	Visibility will be restricted to overhead line equipment associated with the Phase One scheme heavily filtered by mature vegetation alongside the existing Birmingham and Derby line as the train enters a cutting (Castle Bromwich retained cut) on the approach to the tunnel portal. Therefore the magnitude of change is considered to be low. The low magnitude of	During summer, the mature vegetation alongside the existing Birmingham and Derby line in the foreground of the view will further obscure views towards the Phase One scheme. Therefore, the magnitude of change is considered to be negligible, giving rise to a negligible effect.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	receptor. There will also be some removal of vegetation beyond the existing Birmingham and Derby line to facilitate the construction of the Phase One scheme, thereby opening up views of demolition and construction within Castle Bromwich Business Park. Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect. Night-time effects: Works to the tunnel portal and tunnel itself will be 24 hour and lit during the hours of darkness. This will appear against the backdrop of the existing well lit Castle Bromwich Business Park. Given the presence of existing lighting, effects at night will be non-significant and no further assessment of night-time effects is required.	change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.			
375.2.002 Indirect views / direct views south from residences on	As above.	As above.	As above.	As above.	As above.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
Clayton Walk off Cadbury Drive					
375.2.004 View south from residences on Javelin Avenue in front of residential properties	The existing overhead power lines and pylons in the middle ground will be removed and replaced by pylons located approximately 10m and 50m to the south of their present positions in a more elevated position. The River Tame will be diverted to a channel located further south within Park Hall nature reserve. The River Tame viaduct and Langley Wood embankment with a retaining wall will be constructed across the nature reserve from Parkhall Wood in the east to the Birmingham and Derby line, approximately 150m from the receptor. Existing vegetation in the foreground and middle ground will be retained, effectively screening low level construction activities. Cranes and larger plant will occasionally be visible above the intervening vegetation, especially those used in the construction of the River Tame viaduct and Langley Wood embankment with a retaining wall. Therefore, the magnitude of change is considered to be	The route will be visible through and above the existing vegetation in the middle ground of the view. The River Tame viaduct and Langley Wood embankment with retaining wall on its northern side will be up to 10m above the existing railway and will be prominent in the view, albeit partly screened by intervening existing vegetation. Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect in the winter of year 1 of operation.	During summer, mature trees in the middle ground of the view will further obscure views towards the route. Therefore, the magnitude of change is considered to be low, giving rise to a minor adverse effect.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect. Night-time effects: Although there is existing lighting along the M6 and the A452 Chester Road corridor in the distance, and localised street lighting in the foreground, the construction activities will result in additional lighting in the middle ground of the view, which is an area that is currently not lit at night. Any working during winter season will potentially involve lighting to construction sites which will illuminate the public open spaces and parts of Park Hall nature reserve that are currently dark. However, given the presence of existing lighting along the M6 and the A452 corridor and in the foreground of the view, overall the magnitude of change is considered to be negligible. Assessed alongside the high sensitivity of the receptor this will give rise to a negligible effect.				

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
375.6.005 Channelled view south from Chivenor Primary School down Cadbury Drive	The main construction works associated with construction of the Phase One scheme and diverting the River Tame will be obscured from view by the intervening buildings and vegetation. There may be glimpsed views down Cadbury Drive of the demolition of existing buildings on the Castle Bromwich Business Park and the construction of the route of the Phase One scheme adjacent to the existing Birmingham and Derby line. The re-positioning of the National Grid overhead power lines and transmission towers will be visible in the background above the intervening buildings and trees but will be a short-term, temporary effect. Therefore the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the low sensitivity of the receptor will result in negligible effects.	Visibility will be restricted to a framed view along Cadbury Drive of overhead line equipment associated with the Phase One scheme. The overhead line equipment will be heavily filtered by mature vegetation alongside the existing Birmingham and Derby line as the train enters a cutting (Castle Bromwich retained cut) on the approach to the tunnel portal. The visibility of the Phase One scheme will occupy a small part of the total view. Therefore the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the low sensitivity of the receptor will result in negligible effects.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.
375.2.006 View south-east from residences on Farnborough	The construction of the proposed B4118 Water Orton Road overbridge, the formation of the Water Orton cutting for the Phase One scheme and	The Phase One scheme will be visible at a distance through and above the intervening vegetation in the middle ground alongside the Plants Brook and	During summer, mature trees in the middle ground of the view will further obscure views towards the Phase One	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
Road across the open space	associated clearance of existing vegetation will be visible on the skyline in the background of the view. The re-positioning of pylons and the construction of the River Tame viaduct through Park Hall nature reserve will be visible through and above the existing trees and vegetation in the middle ground, approximately 450m from the receptor. Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect.	existing Birmingham and Derby line. Therefore the magnitude of change is considered to be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in minor adverse effects.	scheme. Therefore, the magnitude of change is considered to be negligible, giving rise to a negligible effect.		

Table 12.1.3 Landscape effects resulting from incorporation of the Proposed Development

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
Cole Valley LCA	Construction activities will include realignment of the River Cole and the formation of large-scale embankments, together with construction of numerous viaducts, Bromford tunnel east portal, portal buildings, an auto-transformer station and a new substation. Additionally, the removal of hedgerows and vegetation along the River Cole and	The track and track bed will mainly be elevated on embankments or viaducts with extensive earthworks creating false cuttings. In certain locations, where the railway will cross existing motorways, the approach embankments will rise to	By year 15 the planting along the route will have stablished, reducing the mass and scale of viaducts and buildings/structures, together with softening	By year 60, the planting will have matured and further replicate the woodland character and that of the vegetation alongside the motorways.

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
	The Belt woodland will lead to the severance of fields and increased openness. A number of historic and listed buildings at and near Coleshill Hall Farm and the modern phase 2 building at Coleshill Manor Office Campus will be demolished. The presence of construction traffic on existing roads and haul routes crossing fields will introduce additional built form, lighting and general activity within the agricultural landscape. The construction phase will also relocate National Grid overhead power lines. The scale and extent of construction activity will reduce the tranquillity locally. The partial loss and alteration to the agricultural character of the area and the removal of vegetation will result in a medium magnitude of change. The medium magnitude of change, assessed alongside the medium sensitivity of the character area, will result in a moderate adverse effect - **significant**.	approximately 14m above existing ground levels. Landscape impacts will include: the introduction of a new transport corridor with new viaducts crossing the River Cole (in the west of the character area) and the River Tame (in the north of the character area), the motorways and secondary roads across the LCA, that will form prominent elements but be largely characteristic of the existing infrastructure setting; the introduction of Bromford Tunnel east portal, with portal buildings, an auto-transformer station and a new substation, that will constitute new built form but within the context of existing infrastructure and settlement in the landscape; the introduction of large scale embankments across the existing landform of gently undulating terrain; the introduction of noise fence barriers, overhead line equipment and National Grid power line realignment, that will form prominent elements but are largely characteristic of the existing infrastructure setting; the realignment of the River Cole with adjacent new woodland and shrub planting, which will be a substantial	embankment profiles. This planting will begin to reflect the existing character of woodland blocks and that alongside the motorways. New landscape planting within the replacement Water Orton Primary School site will also have established and matured. Therefore, the magnitude of change is considered to be low. The low magnitude of change assessed alongside the medium sensitivity of the character area will result in a minor adverse effect - **not significant**.	However due to the height and scale of embankments, viaducts and buildings/structures, there would remain a minor alteration to the landscape. Therefore, the magnitude of change is considered to remain low. The low magnitude of change assessed alongside the medium sensitivity of the character area will result in a minor adverse effect - **not significant**.

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
		alteration; the introduction of balancing ponds and access tracks, which will be largely inconspicuous elements within the mainly agricultural setting; the introduction of the new built form of Gilson Road auto-transformer station; the relocation of Water Orton Primary School, constituting small-scale development, in keeping with the LCA; realignments of Manor Drive, Attleboro Lane and the B4117 Gilson Road; and realignments of several PRoW including PRoW M77, M54, M43 and M60, which are a minor alteration to the existing PRoW network. Given the context of existing major infrastructure, the operation of the railway through this LCA will not noticeably alter tranquillity. Therefore, due to the introduction of prominent elements that are either largely characteristic of the existing infrastructure setting or will result in a partial loss to the landscape character, the magnitude of change is considered to be medium in year 1 of operation. The medium magnitude of change, assessed alongside the medium sensitivity of the character area, will		

Landscape Character Area (LCA)	Construction	Operation – Year 1	Operation – Year 15	Operation – Year 60
		result in a moderate adverse effect in year 1 of operation - **significant**.		
River Tame Flood Plain LCA	Construction will temporarily introduce a range of activities, including access with corresponding vehicle and plant movements, ground monitoring works at locations along the route of Bromford Tunnel, and a compound (off Water Orton Road). However, these activities would result in partial change to the landscape character of the area. The magnitude of change is, therefore, considered to be medium. The medium magnitude of change, assessed alongside the high sensitivity of the character area, will result in a moderate adverse effect - **significant**.	The route will enter the LCA at B4118 Birmingham Road, east to west, in Bromford Tunnel, and will remain in Bromford Tunnel before exiting this character are at Castle Bromwich Business Park. Upon restoration of temporary construction working areas and compounds, the magnitude of change is considered to be negligible in year 1 of operation. The negligible magnitude of change, assessed alongside the high sensitivity of the character area, will result in a negligible adverse effect in year 1 of operation – **not significant**.	By year 15, there would be no change to the character of the LCA or its setting.	By year 60, there would be no change to the character of the LCA or its setting.
Farnborough Road Paddock and Open Space LCA	There would be no change to the character of the LCA or its setting.	There would be no change to the character of the LCA or its setting.	There would be no change to the character of the LCA or its setting.	There would be no change to the character of the LCA or its setting.
Castle Bromwich Business Park LCA	Construction activities include the demolition of industrial buildings together with construction of Bromford Tunnel Shaft and shaft building (headhouse). Overall, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the low sensitivity of the character area, will result in a moderate adverse effect - **significant**.	The character of Castle Bromwich Business Park will remain intact and therefore there would be no change to character of the LCA or its setting.	There would be no change to the character of the LCA or its setting.	There would be no change to the character of the LCA or its setting.

Table 12.1.4 Visual effects resulting from incorporation of the Proposed Development

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
313.2.002 View south-west from residences along Attleboro Lane	The construction hoarding, new alignment of Attleboro Lane and proposed substation will be visible in the foreground of the view. Demolition of properties along Attleboro Lane, the formation of embankments, construction of Attleboro Lane overbridge and Attleboro flyover, including cranes, will be visible in the middle ground of the view. The construction of Bromford Tunnel east portal, with portal buildings and an auto-transformer station, will be visible in the background of the view. As this activity will be within the direct frame of view the magnitude of change is high. The high magnitude of change assessed alongside the high sensitivity of the receptor will result in a major adverse effect - **significant**.	New planting, the realigned Attleboro Lane and the proposed substation will be visible in the foreground of the view. The embankments of the Attleboro Lane overbridge, Attleboro flyover and earthworks of Marsh Lane embankment will be visible in the middle ground of the view. Bromford Tunnel east portal buildings and auto-transformer station will be visible in the background. Vegetation along Attleboro Lane will partially filter views and therefore the magnitude of change is medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect in the winter of year 1 of operation - **significant**.	In summer of year 1, views will remain as per winter, therefore the magnitude of change is considered to remain medium, meaning the overall effect will be unchanged.	By year 15, the planting will have established, however not sufficiently to filter views of the elevated sections of the Proposed Development. Therefore the magnitude of change is considered to remain medium, meaning the overall effect will be unchanged in summer of year 15 of operation.	By year 60 the planting will have matured and will almost entirely obscure views of the Proposed Development. Therefore, the magnitude of change will be negligible. The negligible magnitude of change, assessed with the high sensitivity of the receptor, will result in a negligible effect.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	Night-time effects: Given the presence of existing lighting along Attleboro Lane, in the foreground, and along the M6/A452 in the background, the effect at night will be **not significant**, and no further assessment is required.				
313.2.004 View south from residences on the Birmingham Road and Plank Lane	The upper sections of cranes constructing the Attleboro Lane overbridge and Attleboro flyover will be visible in background views above the intervening field vegetation. This activity is considered to be a minor alteration to existing views. Therefore the magnitude of change is considered to be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in a minor adverse effect - **not significant**.	Intervening vegetation will largely screen views of the Proposed Development, therefore the magnitude of change is low. The low magnitude of change, assessed with the high sensitivity of the receptor, will result in a minor adverse effect - **not significant**.	Intervening vegetation will almost entirely screen views of the Proposed Development. Therefore the magnitude of change is negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible effect - **not significant**.	Intervening vegetation will screen views of the Proposed Development. Therefore no further assessment is required.	Intervening vegetation will screen views of the Proposed Development. Therefore no further assessment is required.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
370.6.001 View north-west from Water Orton Road adjacent to Park Hall College	Construction activities will be filtered and partially obscured by the intervening vegetation alongside the M6 in the middle ground. Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the low sensitivity of the receptor will result in a minor adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.
370.3.004 View north from the footpath through the open space overlooking the M6 corridor	Intervening vegetation will filter and largely obscure views of construction activities. Therefore the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in a negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
370.2.006 Views north from residences on Park View	Intervening vegetation will filter and largely obscure views of construction activities. Therefore the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in a negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.
370.2.007 Partial view north-east from residences on Chadshunt Close	Intervening vegetation will filter and largely obscure views of construction activities. Therefore the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
371.2.001 Views west and south from residences on the B4118 Birmingham Road	Looking west, the compound off Water Orton Road will be visible, partially filtered by vegetation. Therefore the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect - **significant**. Looking south, temporary construction hoarding, the slurry treatment area and the construction plant on the haul roads will be visible in the middle ground of the view. Also within the middle ground of the view, but viewed obliquely will be the compound off Water Orton Road. This activity is considered to represent a substantial change compared to views of fields, however this will be partially filtered by existing vegetation.	Looking west and south, the Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
	Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the high sensitivity of the receptor will result in a moderate adverse effect - **significant**. Given the presence of existing lighting along the B4118 in views looking west and south, the magnitude of impact at night will be low. The low magnitude of change assessed alongside the high sensitivity of the receptor will result in a minor adverse effect - **not significant**.				
372.3.001 View north-west from the footpath near Pikehorne Croft overlooking the M6	Construction activities will be filtered and partially obscured by the intervening vegetation alongside the M6 in the middle ground. Therefore, the magnitude of change is considered to be medium. The medium magnitude of change assessed alongside the low sensitivity of the receptor will result in a minor adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
372.2.002 Partial view north-west from residences on Blewitt Close through intervening vegetation	Intervening vegetation will filter and largely obscure views of construction activities. Therefore, the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.
372.2.003 View north from residences at Musborough Close	Intervening vegetation will filter and largely obscure views of construction activities. Therefore, the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
372.3.004 View north-west from PRoW off Parkfield Drive overlooking M6 corridor	Intervening vegetation will filter and largely obscure views of construction activities. Therefore, the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.
373.3.001 View south from Castle Vale Nature Conservation Area (Farnborough Fields)	Intervening vegetation will filter and largely obscure views of construction activities. Therefore, the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
373.2.002 View south-east from residences on Javelin Avenue across open space	Intervening vegetation will filter and largely obscure views of construction activities. Therefore, the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.
373.3.003 View south from the north-western boundary of Farnborough Road Open Space	Intervening vegetation will filter and largely obscure views of construction activities. Therefore, the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
373.2.004 View south-east from residences on Farnborough Road near Rawlins Croft	Intervening vegetation will filter and largely obscure views of construction activities. Therefore, the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.
373.3.006 View south-east from public open space off Park Lane, Castle Vale	Intervening vegetation will filter and largely obscure views of construction activities. Therefore, the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
373.4.007 View from the Derby and Birmingham train across Park Hall nature reserve	Intervening vegetation will filter and largely obscure views of construction activities. Therefore, the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.
373.7.008 View south from The Vale Sports Club pitches	Intervening vegetation will filter and largely obscure views of construction activities. Therefore, the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
375.2.001 Indirect views / direct views south from residences on Cadbury Drive	Views of construction activities will be filtered by intervening vegetation in the foreground of the view, allowing only glimpsed views of the demolition of buildings on Castle Bromwich Business Park together with construction activities associated with Bromford Tunnel shaft and building (headhouse). The magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in a negligible adverse effect - **not significant**. Night-time effects: Works will be 24 hour and lit during the hours of darkness. This will appear against the backdrop of the existing well-lit Castle Bromwich Business Park. Given the presence of existing lighting, the effect at night will be **not significant** and no further assessment of night-time effects is required.	Visibility will be restricted to glimpses of the shaft building (headhouse) with views heavily filtered by mature vegetation alongside the existing Birmingham and Derby line. The magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
375.2.002 Indirect views / direct views south from residences on Clayton Walk off Cadbury Drive	Intervening vegetation will filter and largely obscure views of construction activities. Therefore the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**. Night-time effects: Works will be 24 hour and lit during the hours of darkness. This will appear against the backdrop of the existing well-lit Castle Bromwich Business Park. Given the presence of existing lighting, the effect at night will be **not significant** and no further assessment of night-time effects is required.	Visibility will be restricted to glimpses of the shaft building (headhouse) with views heavily filtered by mature vegetation alongside the existing Birmingham and Derby line. The magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.
375.2.004 View south from residences on Javelin Avenue in front of residential properties	Intervening vegetation will filter and largely obscure views of construction activities. Therefore the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in a negligible adverse effect – **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Viewpoint	Construction	Operation – Year 1, Winter	Operation – Year 1, Summer	Operation – Year 15, Summer	Operation – Year 60, Summer
375.6.005 Channelled view south from Chivenor Primary School down Cadbury Drive	Views along Cadbury Drive towards construction activities beyond the Birmingham and Derby Line will be filtered by vegetation along the railway line, allowing only glimpsed views of the demolition of buildings on the Castle Bromwich Business Park together with construction activity associated with Bromford Tunnel shaft and building (headhouse). The magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the low sensitivity of the receptor will result in negligible effect - **not significant**.	Visibility will be restricted to glimpses of the shaft building (headhouse) with views heavily filtered by mature vegetation alongside the existing Birmingham and Derby line. The magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the low sensitivity of the receptor will result in negligible adverse effect - **not significant**.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.
375.2.006 View south-east from residences on Farnborough Road across the open space	Intervening vegetation will filter and largely obscure views of construction activities. Therefore the magnitude of change is considered to be negligible. The negligible magnitude of change assessed alongside the high sensitivity of the receptor will result in negligible adverse effect - **not significant**.	The Proposed Development will be hidden from view in tunnel (Bromford Tunnel). Therefore, no further assessment is required.	There will be no change to the assessment during summer operation year 1.	There will be no change to the assessment during summer operation year 15.	There will be no change to the assessment during summer operation year 60.

Appendix 13.1 Environmental risk record for major accidents and disasters

Table 13.1.1 Environmental Risk Record for Major Accidents and Natural Disasters

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
Construction Phase									
C1	Tunnel Collapse	Tunnelling (bored tunnels)	Phase One CDM risk register	Ground settlement reaches surface resulting in subsidence and structural damage to buildings immediately above	• Agriculture, Forestry and soils; • Community; • Cultural heritage; • Health; and • Landscape and visual	Managed via CDM: tunnel design and construction methods include risk assessment for overlying structures and monitoring or mitigation if required. Stakeholder engagement/community consultation will elaborate where works are occurring and what	No	Yes	The main concern related to this risk is harm to construction workers, which is managed elsewhere. The worst consequence of this risk to in scope receptors does not comprise a major accident as no catastrophic collapse

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						stakeholders can do if they have a grievance. A mechanism is in place to address any grievances raised.			
C2	Offline train derailment / collision on Network Rail (NR) Birmingham to Derby Line (BDL)	Working on or adjacent to existing railway causes a train derailment Failing objects cause train accident or derailment	Phase One CDM risk register	Network Rail (NR) train derails off-track and outside the boundary	• Agriculture, Forestry and soils; • Community; • Cultural heritage; • Ecology • Health; and • Socio-economics	Risks managed via CDM: risks assessed and managed as part of construction planning; risk management options may include speed restrictions in work areas, lifting plans etc. Consultation with NR and rail service providers. CoCP states that emergency procedures for works on the existing railway network will be produced in accordance with	Yes	Yes	Rules for working adjacent to existing railway are very strict. Possessions or speed restrictions will be required. Properties adjacent to BDL have a benchmark risk level. Risks to construction workers are not in scope.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						established industry procedures.			
C3	Major road traffic accident	Working over or adjacent to existing highways Realignment of existing roads and bridges during construction Movement of construction vehicles along public roads and adjacent to public rights of way Debris striking	Phase One CDM risk register HS2 Ltd's System Safety Hazard Record	Death and/or injury to a member of the public Delays and congestion in surrounding area	• Community; • Health; • Socio-economics; and • Traffic and transport.	Risks identified and managed via CDM, construction planning, CoCP and method statements etc. Road realignments designed in accordance with design codes and in consultation with Highways England (HE) and local authorities etc. Risk to public road users addressed via consultation on design with HE, through design and in construction method statements etc.	Yes	Yes	Traffic and transport sections of the 2013 ES in Volume 2 and 5 evaluates and mitigates risks to all public road users associated with the construction works (including road works and use of public roads by heavy goods vehicles (HGVs)). Principle of mitigation is to not increase the baseline accident risk to the public using existing roads. Mitigation is reflected in the design of road realignments, construction planning and in the CoCP.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		traffic/member of public				Risks to public road users assessed and managed in the 2013 ES, as amended, and then as part of construction planning. Overarching controls addressed via CoCP and implemented through method statements, traffic management plan etc. There will be a construction workforce travel plan. Examples of temporary traffic management measures include speed restrictions and diversions etc. Whenever reasonably practicable priority will be given to the use of the main road			

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						network and on site haul to minimise the impact on local road network and local communities. Geometric constraints on construction routes have been identified and mitigation measures will be implemented including localised widening and junction improvements etc. All new infrastructure designed would be subject to detailed design and safety audit processes to seek to minimise the risk of accidents. Further detail is provided in the Traffic			

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						and Transport sections of the 2013 ES, available in Volumes 2 and 5, as amended.			
C4	Physical damage or contamination of the aquifer or borehole	Construction through existing contaminated sites and presence of water abstraction boreholes along route	Phase One CDM risk register	Loss of drinking water supply	• Health; • Socio-economics; and • Water resources and flood risk.	Risks managed via CDM: risks assessed and managed as part of construction site selection and construction planning. Construction planning for activities in/through contaminated sites will be informed by site investigation (to understand contamination risks) and risk assessment. Mitigation also includes liaison with Infrastructure Providers (Severn	No	Yes	Risk are assessed and addressed in the land quality and water resources and flood risk sections of the ES, Volumes 2 and 5. Minor leaks and spills are specifically addressed in water resources and flood risk. No major accident scenario associated with this risk.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						Trent) to minimise risk to supply.			
C5	Spillage or longer-term seepage of pollutants into watercourse	Working over or adjacent to water courses	Phase One CDM risk register	Damage to natural habitat or sensitive water course Groundwater - then to drinking water	• Health; • Ecology; • Land Quality; • Socio-economics; and • Water resources and flood risk	Risks of leaks and spills addressed in water resources and flood risk sections of the ES, Volume 2 and 5. Risks managed via CoCP and Local Environmental Management Plans.	No	Yes	No major accident associated with this risk, mainly because volumes of pollutants are small. Mitigation is in place
C6	Fire and/or Explosion or release of harmful gas	Presence of former landfill sites along route Presence of unexploded ordnance	Phase One CDM risk register HS2 Ltd's System Safety Hazard Record	Fire and/or explosion affects neighbouring property and/or members of the public	• Agricultural, forestry and soils; • Air quality; • Community; • Ecology; • Health; • Land quality;	Risks managed via CDM (e.g. site searches, geotech investigations, consultation with utility providers, construction planning, construction siting) and via CoCP.	Yes	Yes	Greatest risk is to construction workforce. Appropriate measures must be in place (emergency response plans etc.).

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		Presence of natural gas transmission pipelines along route (route crossings) Fuel storage at construction sites Wildfire			• Landscape and visual; and • Water resources and food risk	Good permanent works design to control long term ground related risks like ground gases. Environmental Management Plans which guide and govern maintenance and management of risks			Wildfire does not present an increase of risk compared to the baseline, as there are no significant volumes of flammable materials and these will be appropriately managed.
C7	Release of asbestos during demolition of buildings and structures	Presence of asbestos in buildings to be demolished	Phase One CDM risk register	Accident during demolition results in uncontrolled release of asbestos containing material and exposure of public to asbestos	• Health	Risks managed via legislation governing the handling and disposal of asbestos containing materials, CDM and resulting construction planning associated with demolition of properties with potential asbestos containing materials, and CoCP which	No	Yes	The greatest risk is to construction workers (not in scope). Planned demolition works and management of asbestos waste addressed in waste section of the 2013 ES, as amended.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
				containing material		specifies: - measures to control risks associated with asbestos dust; and - pre-demolition asbestos surveys- asbestos containing materials to be removed by suitability licensed contractors and in accordance with relevant statutory controls governing its disposal).			Risk of asbestosis derives from longer term exposure to asbestos dust. If accident occurred, quantity of asbestos and period of exposure to members of public would not be great enough to constitute a major accident.
C8	Extreme weather (flood)	Presence of construction materials, equipment and potential contaminants	Phase One CDM risk register	Loss of equipment and release of contaminants onto land outside construction site Loss of topsoil	• Agriculture, Forestry and soils • Ecology • Land quality • Socio-economics; and • Water resources	CoCP (Section 5) includes measures for contractors to manage risks of pollution due to severe weather events, to inform themselves of the potential for severe weather and put in place contingency plans to ensure the	Yes	Yes	CoCP deals with stockpile management and weather adequately. Loss of a short-term stockpile is not within the scope of a major accident. It does, however, need to be appropriately managed.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
				stockpiles (for restoration of temporary use agricultural land)	and flood risk.	resilience of other mitigation required in CoCP in the event of severe weather. CoCP advises on location of stockpiles considering predominant wind direction relative to sensitive receptors, away from flood zones and sensitive watercourses where practicable, and covered where necessary. Long term stockpiles to be vegetated.			
C9	Collapse/damage to structures	Earthquake Construction activities adjacent to existing structures	Phase One CDM risk register HS2 Ltd's System Safety	Falling debris or collapse of infrastructure affecting a public right of way / public area	• Community; • Health; • Landscape and visual; • Socio-economics;	Construction works adjacent t / over public rights of way or to public property are managed via CDM and construction planning. Tunnel design and construction methods	Yes	Yes	Seismic design basis will be produced for the Proposed Development. No new risk to existing infrastructure arising.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		(piling, construction vehicle impact) Tunnelling	Hazard Record	Collapse of structure leads to harm to members of public Implications for flood risk, for example, flooding due to collapse of tunnel and inundation of flood waters	• Traffic and Transport; and • Water resources and flood risks.	includes risk assessment for overlying structures and monitoring or mitigation if required. Stakeholder engagement/community consultation will elaborate where works are occurring and what stakeholders can do if they have a grievance. A mechanism is in place to address any grievances raised.			
Operation and maintenance phase									
OM1A	Train derailment or collision (HS2)	Interface with existing railway Object on the line	Phase One CDM risk register HS2 Ltd's System	Off-track and outside boundary derailment	• Agriculture, forestry and soils; • Community • Ecology • Health;	Measures will be in place as required by legislation, to manage all train accident risks, in accordance with the Common Safety Method - Risk	Yes	Yes	System is designed both to reduce the likelihood of a derailment, and manage the impact. The risk to any in scope receptors will

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		(unauthorised 3rd party access, animals, vehicle incursion, falling trees, failure to provide a secure boundary, landslide material,, overbridge or other structure damage due to earthquake or bridge strike) Vandalism and terrorism Failure of safety critical functions and systems	Safety Hazard Record	Severe disruption to rail transportation, major accident causing harm to staff, passengers and adjacent receptors	• Socio-economics • Traffic and Transport.	Assessment (CSMRA)[1]. Measures have to be accepted by the regulator to manage risks to be ALARP in order for licence to be granted. Comply with standards and where necessary demonstrate other means of mitigating risk from hazard. Good asset information practice. Training to be provided, sufficient resources to be in place. Operation and maintenance (O&M) manuals to be communicated early, robust, maintained, complete etc.			be lower than the risk to train passengers and staff, and this latter risk has to be ALARP. If risks to passengers and staff related to train accidents are managed to be ALARP, there is no plausible major accident scenario that can only affect the in scope environmental receptors. Disruption, due for example to emergency response to an unexpected event, does not constitute a major accident.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		(control systems etc.), including cyber terrorism, leading to train failure, signal failure, runaway train, failure in controlling the train service, high winds Human factors including driver error leading to train travelling at wrong speed, signal error, error in controlling the train				Safe system of working. Design to appropriate environmental parameters (wind, water etc.), including designed in consideration of climate change. Appropriate human factors considerations. Appropriate back up procedures. Interface with classic network must be timely and of high integrity, the interface is defined, and all issues should be addressed. Design of line side features (bridge supports, etc.) in line with code of practice.			Wilful trespassers (including suicide) have been excluded as receptors, however, the measures in place to provide a secure boundary will mitigate the indirect risk of a train incident related to trespass or suicide. There is a secondary risk that the incident/emergency management plans in place to mitigate these risks ALARP have a temporary or local impact on communities or other receptors. This is covered separately in OM17.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		service, bright lights from vehicles on access track leads to unsafe decision, points wrongly set Rolling stock failure Electrical infrastructure failure (including due to lightning or high winds) Structural movement of underbridge				Use of derailment containment measures where reasonably practicable. High integrity of safety critical functions required in reference and detailed design. High integrity of configuration control, data links and protocols. Limit track gradients in accordance with Technical Specifications for interoperability (TSI)[1], manage vegetation in accordance with TSI maintenance requirements.			

[1] Commission regulation (EU) 1299/2014 of 18 November 2014 on the *technical specifications for interoperability relating to the 'infrastructure' subsystem of the rail system in the European Union 2014*, Official Journal of the European Union

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		or viaduct leads to track problems (due to poor quality of materials, scour, poor design/construction, third party bridge strike, earthquake) Ground collapse and/or settlement leads to track problems Track defects (including due to vandalism or inadequate drainage)				O&M manual and safe system of working to consider cyber-crime and viruses. Rolling stock design standards, resilient to object incursion at HS2 speeds. Real time monitoring and integrated communication for rolling stock. Minimise use of switches and crossings. Use of single, unified and modern signalling system on HS2 network. Suite of design considerations related to monitoring and control of electrical infrastructure. Adequate braking specifications as			

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		Insufficient adherence (or other poor wheel rail interface) Points freezing				requirement/design consideration. Include requirement for provision of adequate barriers/protection of overbridges and parallel roads; requirement for design to be adequate to protect railway from incursion by objects or vehicles. Provision of a secure boundary (see Risk OM8 for full list of measures). Design for clearance, signage, bollards to mitigate bridge strike. Ensure integrity of safety related power systems Any safety critical system must have a Safety Integrity-Level.			

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						Real time monitoring and integrated communication takes account of speed, headway conditions and performance and safety requirements. Ensure integrity of monitoring systems. Monitor electrical infrastructure and manage asset information. Models and simulations in design. Integrity of communications and processes. Earthing and bonding at sub-stations and other at risk locations (lightning risk assessment).			

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
OM1B	Train derailment or collision (maintenance trains)	Interface with existing railway Runaway vehicles and trains (maintenance) Presence of diesel fuel on maintenance trains	Phase One CDM risk register HS2 Ltd's System Safety Hazard Record	Off-track and outside boundary derailment involving single train travelling at low speed, but potentially carrying flammable fuel. No passengers. Diesel spillage contamination	• Health • Socio-economics; and • Water resources and flood risks.	Mitigation measures listed for risk OM1A are relevant here. Additionally and specifically: • buffer stop risk assessment; • engineering trains require visual inspection before release on to main line; • training to be provided, sufficient resources to be in place; • O&M manuals to be communicated early, robust, maintained, complete etc.; • safe system of working; • appropriate human factors	No	Yes	The potential for a maintenance train to cause an impact on an environmental receptor is limited to fire which is covered under a separate item. Maintenance trains and passenger trains do not use the line at the same time.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						considerations; and • limit track gradients in accordance with TSI12, manage vegetation in accordance with TSI maintenance requirements			
OM2	Train derailment or collision (BDL)	Interface with existing railway Unauthorised 3rd party access to rail line (including animal) Signal error or failure	Phase One CDM risk register	Off-track and outside boundary derailment Severe disruption to rail transportation Spillage of pollutants	• Agriculture, Forestry and soils • Community • Ecology • Health • Socio-economics • Traffic and Transport: and • Water resources	Overall management of derailment and collision risk to be ALARP is defined for risk OM1A. Interface with the existing railway is included in the CSM-RA. Measures will be in place, as required by legislation, to manage all train accident risks, in accordance with the CSMRA. Measures have to be accepted	Yes	Yes	This risk relates to the interface with the conventional railway, and HS2 trains using NR tracks, joining tracks etc. The risks and mitigations are similar to risk OM1, but merit separate documentation as the interface and the use of infrastructure owned and maintained by others presents a different risk. In terms of

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		Vandalism and terrorism Earthquake Flooding Ground collapse Settlement HS2 trains using conventional network not compatible Driver error in transition from HS2 to conventional rail			and flood risk	by the regulator to manage risks to be ALARP in order for licence to be granted. Must comply with Railway Group Standards to be allowed on the conventional network specify appropriate characteristics on conventional network and check for compatibility. Human factors studies checks and processes to prevent driver error Co-ordination between HS2 and the conventional network must be timely and have high integrity.			impact on environmental receptors, this is not different.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		Presence of new infrastructure (e.g. new junctions, alignments, cuttings etc.)							
OM3	Major road traffic accident	Presence of new infrastructure (e.g. new junctions, alignments, cuttings etc.)	Phase One CDM risk register	Major road traffic accident resulting in death or permanent injury to members of public Severe congestion and delays Spillage of pollutants	• Health • Socio-economics • Traffic and transport; • Water resources and flood risk.	The traffic and transport sections in the 2013 ES, Volumes 2 and 5, describe the baseline assessment. Traffic surveys are undertaken for all roads with the potential to be affected by the Proposed Development supplemented by other available data. The transport assessment (Volume 5: Appendix TR000-001) also considers public transport	Yes	Yes	No new risk to road traffic compared to baseline assuming bridge and road are designed to standards.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						(buses) and non-motorised users on public rights of way and cycle paths. Accident clusters are identified, and there are no locations during operation where there are existing safety issues. Road realignments designed in accordance with design codes and in consultation with HE and local authorities etc. Risk to public road users addressed via consultation on design with HE, through design and in construction method statements etc.			

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						All new infrastructure designed would be subject to detailed design and safety audit processes to seek to minimise the risk of accidents. An operational work force travel plan will be implemented to manage travel demand. Further detail is provided in traffic and transport section of the ES, Volumes 3 and 5.			
OM4	Collapse of structures leading to non-train incident	Bridge strike by train Bridge strike by road traffic	Phase One CDM risk register HS2 Ltd's System	Death or injury to members of public (pedestrians, cyclists or	• Community; • Health • Landscape and visual	Design for clearance, signage, bollards to mitigate bridge strike. Structures designed and maintained in	Yes	Yes	New structures will be designed for impact and operational responses to bridge strike will be in place.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		Vandalism and terrorism Earthquake Inadequate design of new structures Poor quality of materials (lack of maintenance) Scour failure caused by high winds	Safety Hazard Record	road users etc.) Road traffic accident	• Socio-economics; and • Traffic and Transport	accordance with standards. Seismic basis of design will be in place for the Proposed Development materials and design to be of sufficient quality for HS2 operating conditions (including monitoring and maintenance) Ensure structures are designed in consideration of environmental conditions including climate change Incident response for bridge strike.			Note that collapse of structures leading to train incident is covered in risk item OM1.
OM5	Collapse of	Extreme weather (rain/flood)	Phase One CDM risk register	Breach of embankment and rapid	• Agriculture, forestry and soils;	Rail infrastructure designed to accommodate 1 in	No	Yes	This event is leading to a train derailment is covered by risk

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
	embankments	Blockage of siphons or culverts	HS2 Ltd's System Safety Hazard Record	inundation of land on other side of railway	• Ecology; • Health; • Landscape and visual; • Socio-economics • Water resources and flood risk	100 (1%) annual probability flood plus climate change and remain safe during a 1:1000 (0.1%) annual probability flood. New road alignments etc. designed in accordance with design manual for highways and streets and local authority requirements. Drainage design including track drainage to comply with standards which includes climate change. Water resources and flood risk operation and maintenance plan for water / drainage infrastructure includes			OM1, this risk refers to other impacts of an embankment failure, i.e. failed material impacting on adjacent land; these would not constitute a major accident. Embankment design will include an allowance for extreme weather and climate change.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						provision for blockage removal and maintenance.			
OM6	Fire and/or explosion, either direct or indirect harm	Overheating of tunnels Maintenance activities Depot activities Wildfire Electrical fault on train Unexploded ordnance (UXO)	Phase One CDM risk register HS2 Ltd's System Safety Hazard Record	Contamination of aquifer / drinking water supply resulting from run off of fire water Drift of fire from HS2 facility (e.g. depot) into public property (e.g. properties or arable land) with resulting damage to property	• Agriculture, forestry and soils; • Air Quality; • Ecology; • Health; • Land quality; • Landscape and visual; • Socio-economics; and • Water Resources and flood risk	A fire risk assessment must be carried out under legislation, to ensure the safety of the occupants of the tunnel and those in the immediate vicinity who are at risk. A fire management strategy will be drawn up in line with the Technical Specifications for Interoperability - Safety in Railway Tunnels (TSI - SRT)[2]. The fire safety objectives of the project include the	Yes	Yes	Air quality impacts would be temporary and localised. Mitigation of likelihood of fire in place. Impacts associated with fire water runoff is localised and there is no potential to trigger significant effects on receptors. Reference to Fire Strategies for tunnels which describes the processes for management.

[2] European Railway Agency. Multiple Technical Specifications for Interoperability (TSI). Available online at: http://www.era.europa.eu/Core-Activities/Interoperability/Pages/TechnicalSpecifications.aspx

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		adjacent to route Transformer explosion explosive gases within drainage system Fire causes degradation to track/ infrastructure - secondary effect		and/or loss of crops.		protection of the environment. Any drainage contaminated by firefighting operations will be discharged into an attenuation pond and discharged safely in agreement with the Environment Agency. The point of discharge for the attenuation ponds into the wider water environment would be agreed with the Environment Agency, local water company and local authority and any other relevant stakeholder. Fire policy – tunnels.			Contaminants in firewater are unlikely to cause a major accident. Incident response plans to include consideration of local community and receptors, see Risk OM17.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						Electric trains (except maintenance). Fire water should go into drainage and attenuation ponds, no direct pathway for it to reach sensitive receptors. Ensure processes are in place through reference and detailed design. Maintenance trains are diesel, but do not carry flammable materials. Low speed and do not share track with the passenger trains at the same time. The CSM-RA will demonstrate adequate mitigation of the risk of fire to be ALARP No significant			

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						quantities of fuel etc. stored in maintenance depots. Fire and emergency response equipment and systems. Design consideration to include detection and inspection for degradation. Ensure HS2 Ltd is a statutory consultee on neighbouring activities. Comply with standards where applicable. Assess need for firefighting provision and provide facilities on-site if necessary			

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						(emergency procedures). IMB-R design to ensure access for emergency services. Safe system of working to cover adequate isolation of power. Assessment of heating/cooling requirements in tunnels as requirement/design consideration. The railway shall not carry hazardous (combustible/explosive) freight. Heating, ventilation, and air conditioning			

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						equipment to be designed for appropriate environmental conditions. Tunnel vent to be designed for appropriate range of conditions inspection and maintenance of drainage.			
OM7	Extreme weather (flood)	Presence of embankments leads to alteration of flood patterns Extreme weather Flooding of underpasses or subways	Technical discussion and water resource and flood risk sections of the 2013 ES, as amended.	Extension/change of flood risk profile impacts property/land Flooding of underpasses or subways	• Agriculture, forestry and soils; • Community; • Cultural heritage • Ecology; • Landscape and Visual • Socio-economics;	Rivers and watercourse crossings i.e. viaducts, bridges and culverts are designed to accommodate 1 in 100 (1%) annual probability flood plus climate change to post 2080. For a flood with an annual probability in excess of 1 in 100 (1%) plus climate change allowance,	The impacts do not meet the criteria, but an extreme flood event in itself does	Yes	The difference between 1:100 year plus climate change (where flood events will be mitigated) will not be significant. Important to consider this compared to the baseline without the Proposed Development, which would have the potential to be

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
					• Traffic and transport • Water resources and flood risk	modelling work indicates that the Proposed Development will result in only minor localised alterations in the distribution of floodwaters relative to the baseline. The track is designed to remain safe during a 1 in 1,000 (0.1%) annual probability flood. The drainage infrastructure is designed to ensure that no increases in surface water runoff occur from the footprint of the Proposed Development, including an allowance for increases in peak rainfall intensity predicted to occur due			classified as a national emergency anyway. The presence of the railway and the requirement for it to remain safe is a potential benefit, as much of the transport system would not perform as well. While this does not constitute a major accident, 1 in 1000 year flood could potentially be a natural disaster over a wider area, therefore important to understand the management and mitigation of this related to the Proposed Development.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						to climate change post 2080. All river, watercourse crossings and drainage infrastructure will be operated and maintained in accordance with the procedures outlined in 2013 ES, Volume 5: Water Resources.			Flooding of underpass or subway not a major accident in itself.
OM8	Accidental drowning	Presence of balancing and attenuation ponds Unauthorised 3rd party access to ponds (trespass, vandalism) Failure to provide a	Phase One CDM risk register HS2 Ltd's System Safety Hazard Record	Member of public accidentally falls into attenuation pond and drowns	• Community; and • Health	Addressed under other legislation: inclusion, design and monitoring of fences/barriers and signage around ponds to prevent access. To provide a secure boundary, HS2 Ltd will put in place the following mitigation measures:	Yes	Yes	Wilful trespassers are outside scope, therefore with signage, fences, monitoring etc. the risk of accidental access is managed to be ALARP.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		secure boundary				• secure fences in place; • risk assessment by location; • tunnelling where appropriate; • passive protection (line side security); • identify and remove the desire to cross the railway; • defensive planting; • active protection; • awareness education; • proactive security where appropriate; and • active monitoring (CCTV, electrified fencing).			

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
OM9	Pedestrians /equestrians falling/jumping from overbridges	Falling from height due to presence of bridges, viaducts, cuttings etc. Electric shock Overhead line equipment (OHLE) Failure to provide a secure boundary	Phase One CDM risk register HS2 Ltd's System Safety Hazard Record	Injury or fatality of member of public	• Community; and • Health	Addressed under other legislation: • design of bridges (including fencing and barriers) will meet regulatory requirements for safety of pedestrians; • crossings must be compliant with standards; and • provide appropriate and easy to use crossings.	Yes	Yes	Wilful trespassers are outside scope.
OM10	Vehicle falling from overbridge or adjacent road	Presence of overbridges Steep gradient downhill on approach to	Phase One CDM risk register HS2 Ltd's System Safety	Injury or fatality to pedestrians/ cyclists or motorists	• Health; • Socio-economics; and • Traffic and transport.	Crossings must be designed and built to be fit for purpose and compliant with standards. Sufficient barrier/protection	Yes	Yes	Vehicle incursion cause of train derailment is covered in risk OM1. This risk deals with harm to motorists. The access road risk relates mainly to

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		HS2 in cutting (only maintenance vehicles using this) Combined HS2 access with public rights of way	Hazard Record			proportional to the risk. Allowance has been made for vehicle restraint system (VRS) between track and access roads where roads are adjacent. Spatial provision in other areas of the site left for VRS protection. Provide VRS at the bottom of slopes. Only trained rail staff will be using the access. Slow speed access roads. Provide adequate VRS.			maintenance workers which is out of scope.
OM11	Traffic incident involving pedestrian	Changes to public rights of way,	Phase One CDM risk register	Injury or fatality to pedestrians/cyclists/horse	• Community; • Health; and	New crossings and road layout to be designed and built to be fit for purpose and	Yes	Yes	This risk relates to the potential for shared access between HS2 maintenance vehicles

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
	s/cyclists/equestrian	including shared use Combined HS2 access and accommodation access with public rights of way Pedestrian and maintenance vehicle proximity Inappropriate exposure of members of public to depot activities	HS2 Ltd's System Safety Hazard Record	riders and motorists	• Traffic and Transport.	compliant with standards. Drivers using road vehicles for maintenance activities. Travel time and distance to be limited, training, procedures and licencing to be in place. Design depot to ensure segregation is appropriate crossings under the railway to be shown designed and built to be fit for purpose and shown to be compliant with standards.			and members of public using existing rights of way, particularly around the IMB-R. Mitigation relies on appropriate design and construction, and driver training and protocols.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
OM12	Crime/risk to personal safety of member of public	New infrastructure, e.g. bridges and underpasses Assault	Phase One CDM risk register HS2 Ltd's System Safety Hazard Record	Injury to member of public	• Community; and • Health	Minimum dimensions for public rights of way (headroom / width) will be complied with and are usually exceeded as in all cases identified at present, underpasses are combined public rights of way / accommodation access which have greater clearance requirements: • the underpasses are shown as straight with no hidden niches. (designing out hiding places); • consideration at detailed design stage of measures to avoid blind corners e.g. mirrors,	No	Yes	Assault on trains or in station is not in scope of this assessment.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						orientation of wing walls etc.; • consideration at detailed design stage of reducing the length to the minimum required for track / drainage requirements; and • consider lighting where required.			
OM13	Injury to member of public; pedestrians, equestrians	Changes to public rights of way, including shared use underpasses Struck by object falling from railway infrastructure or object	Phase One CDM risk register HS2 Ltd's System Safety Hazard Record	Injury to pedestrians/cyclists/horse riders	• Community; and • Health	Maintain structural integrity due to fatigue, corrosion etc. Provide safe environment for passengers, staff and neighbours For low-speed minor and access roads provide at grade crossing in combination with	No	Yes	Member of public access to the track is managed by provision of a secure boundary plus active and passive security measures. This risk covers pedestrians, equestrians and cyclists sharing access

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		falling off train (including during high winds)				appropriate signage for further caution, sufficient lighting to be provided on roads. Design and maintenance of infrastructure and trains. Design structures for high winds.			with other vehicles due to changes to public rights of way, or being struck by object when using crossings or underbridges, related to risks OM9 and OM11.
OM15	Emergency response impacts on environmental receptors	Incident management plans focus on the safe evacuation of passengers and staff and have the potential to have an adverse effect on local receptors	Phase One CDM risk register HS2 Ltd's System Safety Hazard Record	Harm to environmental receptor	• Agriculture, and forestry, soils; • Community • Water resources and flood risk	Robust studies carried out at an early stage to provide incident management plans. Incident management plans should be developed and communicated sufficiently early enough to influence design.	Yes	Yes	Any Impact would be local, temporary and reversible and as such is unlikely to be considered significant against the criteria used in the ES. However for good practice and a robust approach, it is recommended that incident management plans consider the local environmental receptors and are shared with the

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
						Ensure plans are maintained, audited etc. Integrity of communications and processes in event of fire or other incident.			community where appropriate.
OM16	Exposure to live conductor / arcing etc	Inadvertent contact with live conductor (both workers and 3rd party) OHLE collapse in extreme weather event Hazard to emergency services using	Phase One CDM risk register HS2 Ltd's System Safety Hazard Record	Injury or fatality to member of public	• Community; • Cultural heritage; and • Health	Earthing and bonding undertaken in line with industry standards. Supervisory control and data acquisition (SCADA) system. Isolation and earthing procedures. Provision of a secure barrier. OHLE designed to appropriate parameters including climate change.	Yes	Yes	Electric shock resulting from train derailment is part of risk OM1, member of public falls/jumps from overbridge (leading to exposure to OHLE) is risk OM12. This risk is to ensure any other potential pathways where a source of high voltage electricity could reach a member of pubic are captured.

ID	Risk	Hazard Sources and Pathways	Source Document	Reasonable worst consequence if event did occur	Topic	Embedded mitigation	Could this constitute a major accident or natural disaster?	Is this ALARP with existing mitigation	Clarification
		water to fight fire				OHLE to have sufficient protection from flashover.			

Appendix 16.1 Traffic Data

Table 16.1.1 Construction Traffic Data (Phase One Scheme Months 30 and 35) – Community Forum Area 25

Road ID	Link Description	Without Scheme			With Phase One Scheme - Month 30						With Phase One Scheme - Month 35					
					With Phase One Scheme			Change (from Without Scheme)			With Phase One Scheme			Change (from Without Scheme)		
		AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)
54	Tyburn Road (west of Wheelright Road)	51276	5283	64	51161	5423	64	-115	140	0	51276	5538	64	0	255	0
56	Tyburn Road (east of Quilter Road)	40662	4189	64	40707	4260	64	45	71	0	40629	4181	64	-33	-8	0
61	Kingsbury Road	31563	3252	64	31655	3329	64	92	77	0	31577	3250	64	14	-2	0
24	Chester Road (South of A452 Junction)	46451	4786	64	46617	4870	64	166	84	0	46539	4792	64	88	6	0
25	Chester Road (South of Spitfire Island)	64137	6608	64	64289	6786	64	152	178	0	64381	6877	64	244	269	0
323	Tameside Drive	2670	187	48	2887	357	48	217	170	0	2877	347	48	207	160	0
26	A452 East of M6 Junction 5	24884	2564	48	24898	2561	48	14	-3	0	24898	2561	48	14	-3	0
331	Water Orton Road (South of Parkfield Drive)	15602	1607	48	15606	1611	48	4	4	0	15610	1615	48	8	8	0
338	M6 east of Junction 5	171601	52656	80	172646	53520	80	1045	864	0	172646	53520	80	1045	864	0
60	Fort Parkway (east of A47 junction)	31098	3204	64	31046	3293	64	-52	89	0	31216	3463	64	118	259	0

Road ID	Link Description	Without Scheme			With Phase One Scheme - Month 30						With Phase One Scheme - Month 35					
					With Phase One Scheme			Change (from Without Scheme)			With Phase One Scheme			Change (from Without Scheme)		
		AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)
58	Fort Parkway (west of A47 junction)	25583	2636	64	25531	2725	64	-52	89	0	25701	2895	64	118	259	0
51	Bromford Lane	38263	3942	64	37342	3922	64	-921	-20	0	37535	4116	64	-728	174	0
103A	M6 Junction 5 westbound off slip	17861	3026	80	17861	3103	80	0	77	0	17971	3213	80	110	187	0
103B	M6 Junction 5 eastbound on slip	14670	2485	80	14663	2562	80	-7	77	0	14773	2672	80	103	187	0
57	Kingsbury Road	39407	4060	64	39349	4052	64	-58	-8	0	39349	4052	64	-58	-8	0
330	Parkfield Drive	3895	273	36	3938	273	36	43	0	0	3938	273	36	43	0	0
N/A	Newport Road between A452 and B4114 Bradford Road	29236	824	No Data	29240	828	No Data	4	4	No Data	29244	832	No Data	8	8	No Data
N/A	B4114 Bradford Road between Newport Road and B4118 Hall Road	No Data	No Data	No Data	No Data	No Data	No Data	4	4	No Data	No Data	No Data	No Data	8	8	No Data

Table16.1.2 Construction Traffic Data (Phase One Scheme Month 44)– Community Forum Area 25

Road ID	Link Description	Without Scheme			With Phase One Scheme - Month 44					
					With Phase One Scheme			Change (from Without Scheme)		
		AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)
54	Tyburn Road (west of Wheelright Road)	51276	5283	64	50975	5237	64	-301	-46	0
56	Tyburn Road (east of Quilter Road)	40662	4189	64	40623	4175	64	-39	-14	0
61	Kingsbury Road	31563	3252	64	31571	3245	64	8	-7	0
24	Chester Road (South of A452 Junction)	46451	4786	64	46533	4786	64	82	0	0
25	Chester Road (South of Spitfire Island)	64137	6608	64	64467	6963	64	330	355	0
323	Tameside Drive	2670	187	48	2872	342	48	202	155	0
26	A452 east of M6 Junction 5	24884	2564	48	24898	2561	48	14	-3	0
331	Water Orton Road (South of Parkfield Drive)	15602	1607	48	15635	1639	48	33	32	0
338	M6 east of Junction 5	171601	52656	80	172646	53520	80	1045	864	0
60	Fort Parkway (east of A47 junction)	31098	3204	64	31308	3555	64	210	351	0
58	Fort Parkway (west of A47 junction)	25583	2636	64	25793	2987	64	210	351	0
51	Bromford Lane	38263	3942	64	37233	3821	64	-1030	-121	0

Road ID	Link Description	Without Scheme			With Phase One Scheme - Month 44					
					With Phase One Scheme			Change (from Without Scheme)		
		AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)
103A	M6 Junction 5 westbound off slip	17861	3026	80	18043	3285	80	182	259	0
103B	M6 Junction 5 eastbound on slip	14670	2485	80	14845	2744	80	175	259	0
57	Kingsbury Road	39407	4060	64	39349	4052	64	-58	-8	0
330	Parkfield Drive	3895	273	36	3938	273	36	43	0	0
N/A	Newport Road between A452 and B4114 Bradford Road	29236	824	No Data	29269	856	No Data	33	32	No Data
N/A	B4114 Bradford Road between Newport Road and B4118 Hall Road	No Data	No Data	No Data	No Data	No Data	No Data	33	32	No Data

Table 16.1.3 Construction Traffic Data (With Proposed Development Change from Phase One Scheme) – Community Forum Area 25

Road ID	Link Description	With Proposed Development Change from With Phase One Scheme – Before Motorway Access Opens				With Proposed Development Change from With Phase One Scheme – After Motorway Access Opens			
		Busy Period (Maximum Change)		Peak Month (Maximum Change)		Busy Period (Maximum Change)		Peak Month (Maximum Change)	
		AADT	HDVs	AADT	HDVs	AADT	HDVs	AADT	HDVs
54	Tyburn Road (west of Wheelright Road)	24	-149	-11	-185	4	-169	-31	-205
56	Tyburn Road (east of Quilter Road)	-89	-89	-125	-125	-109	-109	-145	-145
61	Kingsbury Road	-89	-89	-125	-125	-109	-109	-145	-145
24	Chester Road (South of A452 Junction)	-94	-89	-138	-125	-114	-109	-158	-145
25	Chester Road (South of Spitfire Island)	18	-149	-24	-185	-2	-169	-44	-205
323	Tameside Drive	-178	-173	-290	-250	-178	-173	-290	-250
26	A452 east of M6 Junction 5	284	-45	306	-45	284	-45	306	-45
331	Water Orton Road (South of Parkfield Drive)	8	8	8	8	-8	-8	4	4
338	M6 east of Junction 5	-106	-253	-155	-295	201	55	158	18
60	Fort Parkway (east of A47 junction)	113	-60	114	-60	113	-60	114	-60
58	Fort Parkway (west of A47 junction)	113	-60	114	-60	113	-60	114	-60
51	Bromford Lane	113	-60	114	-60	113	-60	114	-60
103A	M6 Junction 5 westbound off slip	-80	-126	-107	-148	74	27	50	9
103B	M6 Junction 5 eastbound on slip	-81	-171	-103	-193	72	-17	53	-36

Road ID	Link Description	With Proposed Development Change from With Phase One Scheme – Before Motorway Access Opens				With Proposed Development Change from With Phase One Scheme – After Motorway Access Opens			
		Busy Period (Maximum Change)		Peak Month (Maximum Change)		Busy Period (Maximum Change)		Peak Month (Maximum Change)	
		AADT	HDVs	AADT	HDVs	AADT	HDVs	AADT	HDVs
57	Kingsbury Road	-5	0	-13	0	-5	0	-13	0
330	Parkfield Drive	338	0	361	0	338	0	361	0
N/A	Newport Road between A452 and B4114 Bradford Road	-19	-19	-20	-20	-35	-35	-24	-24
N/A	B4114 Bradford Road between Newport Road and B4118 Hall Road	-19	-19	-20	-20	-35	-35	-24	-24

Table 16.1.4 Construction Traffic Data (Phase One Scheme) – Community Forum Area 19

Road ID	Link Description	Without Scheme			With Phase One Scheme					
					With Phase One Scheme			Change (from Without Scheme)		
		AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)
N/A	A446 Lichfield Road south of Coleshill Heath Road	21658	2437	61	24401	5182	61	2743	2745	0
N/A	A446 between Coleshill Heath Road and Hall Walk, Coleshill	28166	2422	113	29919	4099	113	1753	1677	0
N/A	A446 Hall Walk, Coleshill and B4114 Birmingham Road	29764	2619	113	31518	4286	113	1754	1667	0
N/A	A446 Lichfield Road between B4114 Birmingham Road and B4117	26547	2522	113	27654	3457	113	1107	935	0
N/A	A446 north of B4117 Gilson Road (assumed between Gilson Road and Watton Lane)	21657	2447	61	23184	3964	61	1527	1517	0

N/A	A446 Lichfield Road between B4118 Marsh Lane junction and the B4117 Watton Lane	22412	2409	61	25061	4842	61	2649	2433	0
N/A	B4117 between B4118 Marsh Lane and Gypsy Lane	3317	140	No Data	3386	175	No Data	69	35	No Data
N/A	B4117 between Gypsy Lane and A446 Lichfield Road	3317	140	No Data	4166	510	No Data	849	370	No Data
N/A	B4118 between B4117 Birmigham Road and A446 Lichfield Road	4435	160	No Data	4482	160	No Data	47	0	No Data
N/A	B4118 Water Orton Road east of Parkfield Drive	7397	155	No Data	7473	187	No Data	76	32	No Data
N/A	B4118 Birmingham Road west of B4117 Birmingham Road	7397	155	No Data	7513	190	No Data	116	35	No Data

Table 16.1.5 Construction Traffic Data (With Proposed Development Change from Phase One Scheme) – Community Forum Area 19

Road ID	Link Description	With Proposed Development Change from With Phase One Scheme – Before Motorway Access Opens				With Proposed Development Change from With Phase One Scheme – After Motorway Access Opens			
		Busy Period (Maximum Change)		Peak Month (Maximum Change)		Busy Period (Maximum Change)		Peak Month (Maximum Change)	
		AADT	HDVs	AADT	HDVs	AADT	HDVs	AADT	HDVs
N/A	A446 Lichfield Road south of Coleshill Heath Road	130	0	137	0	130	0	137	0
N/A	A446 between Coleshill Heath Road and Hall Walk, Coleshill	130	0	137	0	130	0	137	0
N/A	A446 Hall Walk, Coleshill and B4114 Birmingham Road	130	0	137	0	130	0	137	0
N/A	A446 Lichfield Road between B4114 Birmingham Road and B4117	130	0	137	0	130	0	137	0

Road ID	Link Description	With Proposed Development Change from With Phase One Scheme – Before Motorway Access Opens				With Proposed Development Change from With Phase One Scheme – After Motorway Access Opens			
		Busy Period (Maximum Change)		Peak Month (Maximum Change)		Busy Period (Maximum Change)		Peak Month (Maximum Change)	
		AADT	HDVs	AADT	HDVs	AADT	HDVs	AADT	HDVs
N/A	A446 north of B4117 Gilson Road (assumed between Gilson Road and Watton Lane)	130	0	137	0	130	0	137	0
N/A	A446 Lichfield Road between B4118 Marsh Lane junction and the B4117 Watton Lane	20	20	5	5	4	4	1	1
N/A	B4117 between B4118 Marsh Lane and Gypsy Lane	135	5	142	5	119	-11	138	1
N/A	B4117 between Gypsy Lane and A446 Lichfield Road	135	5	142	5	119	-11	138	1
N/A	B4118 between B4117 Birmingham Road and A446 Lichfield Road	180	0	189	0	180	0	189	0
N/A	B4118 Water Orton Road east of Parkfield Drive	346	8	369	8	330	-8	365	4
N/A	B4118 Birmingham Road west of B4117 Birmingham Road	315	5	331	5	299	-11	327	1

Table 16.1.6 Construction Traffic Data (Phase One Scheme) – Community Forum Area 20

Road ID	Link Description	Without Scheme			With Phase One Scheme					
					With Phase One Scheme			Change (from Without Scheme)		
		AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)	AADT	HDVs	Speed (kph)
N/A	A446 Lichfield Road between B4118 Marsh Lane and Faraday Avenue	25199	4838	61	26635	5630	61	1436	792	0
N/A	A446 between Faraday Avenue and Junction 9 of the M42 Motorway	25235	4845	48	27195	6173	48	1960	1328	0
N/A	A446 Lichfield Road between J9 M42 motorway and the A4091 roundabout	25902	3315	113	27762	4747	113	1860	1432	0

Table 16.1.7 Construction Traffic Data (With Proposed Development Change from Phase One Scheme) – Community Forum Area 20

Road ID	Link Description	With Proposed Development Change from With Phase One Scheme – Before Motorway Access Opens				With Proposed Development Change from With Phase One Scheme – After Motorway Access Opens			
		Busy Period (Maximum Change)		Peak Month (Maximum Change)		Busy Period (Maximum Change)		Peak Month (Maximum Change)	
		AADT	HDVs	AADT	HDVs	AADT	HDVs	AADT	HDVs
N/A	A446 Lichfield Road between B4118 Marsh Lane and Faraday Avenue	200	20	194	5	184	4	190	1
N/A	A446 between Faraday Avenue and Junction 9 of the M42 Motorway	200	20	194	5	184	4	190	1
N/A	A446 Lichfield Road between J9 M42 motorway and the A4091 roundabout	70	0	74	0	70	0	74	0

Appendix 16.2 Junction Forecast Data

Table 16.2.1 B4118/B4117 Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
B4118 West	363	36%	371	37%	361	36%
B4118 North	342	51%	344	52%	366	63%
B4117 East	213	21%	237	21%	266	21%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
B4118 West	492	126%	511	128%	481	125%
B4118 North	483	125%	484	127%	484	127%
B4117 East	491	56%	497	56%	510	56%

Table 16.2.2 A446/M6 Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1452	72%	1688	97%	1688	97%
M6 East	896	89%	939	103%	955	108%
A446 South	1424	44%	1574	57%	1574	57%
M6 West	1552	53%	1595	71%	1595	71%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1286	58%	1466	77%	1458	76%
M6 East	628	56%	643	63%	643	63%
A446 South	2283	77%	2433	94%	2433	94%
M6 West	1057	43%	1072	71%	1072	71%

Table 16.2.3 A446/B4117 Watton Lane Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1463	76%	1579	83%	1592	84%
A446 South	918	59%	1118	72%	1134	73%
B4117 West	235	73%	319	75%	309	75%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1057	52%	1203	65%	1216	66%
A446 South	1298	75%	1498	87%	1498	87%
B4117 West	201	78%	255	79%	236	79%

Table 16.2.4 A446/B4117 Gilson Road Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1240	50%	1440	58%	1440	58%
B4117 East	265	58%	265	75%	265	75%
A446 South	1084	44%	1309	53%	1325	54%
B4117 West	289	45%	310	57%	310	57%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1024	39%	1220	47%	1212	47%
B4117 East	316	53%	316	64%	316	64%
A446 South	1232	50%	1428	58%	1428	58%
B4117 West	151	23%	182	33%	182	33%

Table 16.2.5 A446/B4114 Birmingham Road Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1522	83%	1722	95%	1722	95%
B4117 East	749	66%	749	77%	749	77%
A446 South	1201	70%	1415	85%	1431	86%
B4117 West	768	73%	899	92%	899	92%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1279	69%	1498	82%	1490	82%
M6 East	599	62%	599	50%	599	50%
A446 South	1116	61%	1263	71%	1263	71%
M6 West	863	79%	1014	98%	1014	98%

Table 16.2.6 A446/Gorsey Lane Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1632	71%	1832	76%	1832	76%
Gorsey Lane	348	80%	348	81%	348	81%
A446 South Ahead	709	47%	909	54%	925	55%
A446 South Right Turn	380	76%	380	81%	380	81%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1065	52%	1265	63%	1257	63%
Gorsey Lane	739	85%	739	90%	739	90%
A446 South Ahead	844	42%	1044	48%	1044	48%
A446 South Right Turn	127	85%	127	77%	127	77%

Table 16.2.7 A446/B4118 Marsh Lane Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1538	90%	1738	90%	1773	92%
A446 South	874	60%	1074	69%	1064	68%
B4118 West	257	73%	173	67%	173	67%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1199	69%	1399	73%	1412	74%
A446 South	1202	85%	1402	93%	1392	92%
B4118 West	324	83%	270	88%	258	84%

Table 16.2.8 A446/Coleshill Heath Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1849	82%	1885	88%	1885	88%
A446 South	1498	49%	1723	55%	1739	55%
Coleshill Heath Road	531	71%	720	88%	720	88%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1274	56%	1297	59%	1289	58%
A446 South	1634	49%	1813	54%	1813	54%
Coleshill Heath Road	565	71%	721	91%	721	91%

Table 16.2.9 A446/Coventry Road Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1262	-	1462	-	1462	-
A446 South right turn only	326	58%	326	61%	326	61%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1010	-	1210	-	1201	-
A446 South right turn only	465	80%	465	85%	465	85%

Table 16.2.10 A446/Faraday Avenue Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1907	76%	2158	87%	2193	89%
Faraday Avenue	532	34%	634	45%	634	45%
A446 South	1045	42%	1185	48%	1175	48%
Marsh Lane	272	32%	278	36%	278	36%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A446 North	1249	48%	1426	56%	1439	57%
Faraday Avenue	1080	61%	1178	70%	1178	70%
A446 South	1383	62%	1637	73%	1615	72%
Marsh Lane	123	24%	125	31%	125	31%

Table 16.2.11 A446/A4097/M42 Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
M42 North	481	44%	536	50%	557	52%
A4097 East	643	58%	716	65%	716	65%
A446 South	752	82%	834	91%	824	90%
M42 South	1246	71%	1388	73%	1394	73%
A4097 West	674	73%	750	82%	750	82%
A446 North	1399	75%	1492	84%	1495	84%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
M42 North	293	27%	328	30%	334	31%
A4097 East	350	32%	393	36%	393	36%
A446 South	1343	88%	1506	92%	1484	91%
M42 South	2011	87%	2254	92%	2260	92%
A4097 West	68	74%	768	83%	768	83%
A446 North	771	74%	864	83%	864	83%

Table 16.2.12 A446/A4091 Tamworth Road Junction without HS2, with HS2 and with Proposed Development (calculated) AM and PM

	2021 Baseline		2021 With HS2 Phase 1		2021 With Proposed Development (calculated)	
0800-0900						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A4091	642	59%	682	68%	682	68%
A446 South	1278	69%	1619	87%	1619	87%
M6 Toll	135	11%	135	14%	150	16%
A446 North	1244	81%	1431	98%	1431	98%
1700-1800						
Approach (from)	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**	**Flow (All PCU)**	**Flow / capacity %**
A4091	321	24%	403	32%	403	32%
A446 South	1687	89%	1864	98%	1864	98%
M6 Toll	51	5%	51	6%	51	6%
A446 North	915	62%	1157	76%	1157	76%

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