

# HIGH SPEED UK : CONSTRUCTION IMPACTS ON MOTORWAY INTERCHANGES

## Introduction

Massive road traffic disruption and associated major construction difficulties at motorway interchanges have always been cited as one of the key arguments against any proposed high speed rail route aligned along the M1 corridor. Whilst no study has ever been published to substantiate this claim, it has gained general acceptance as a primary reason for rejecting the M1 corridor in favour of the selected route for HS2 through the Chilterns.

Development of detailed horizontal and vertical alignment designs for the M1-aligned High Speed UK proposals now allows the assertion of insuperable difficulties at interchanges to be rigorously tested. This paper reviews the proposed HSUK alignments at all of the 21 M1 interchanges and 5 service areas between London and Lutterworth, to determine the nature and extent of the asserted difficulties.

## Information Considered

1:25,000 scale plans have been developed to cover the full extent (circa 1,000km) of proposed HSUK new build route, from London to Liverpool and Glasgow. This has allowed both horizontal and vertical alignments to be designed for the proposed high speed line. Extracts from this mapping are presented below, in the case studies relating to each interchange.

## Technical Challenges presented at Motorway Interchanges

The M1 was constructed along the primary national transport corridor, followed by Romans (Watling Street), canal builders (Grand Union Canal) and railway builders (London & Birmingham Railway, now West Coast Main Line) alike. In terms of the topography encountered en route, it is by far the most favourable route between London and the Midlands (this contrasts sharply with the Chiltern-aligned M40, constructed in much more difficult terrain). Consequently, it was possible to build the M1 to a relatively straight alignment, with few severe curves in either the horizontal or vertical sense.

The route of the M1 runs close to major communities, in particular Watford, Luton, Milton Keynes and Northampton, and although it has stimulated major growth at all these locations, it has also had the side-effect of creating such local environmental intrusion (both noise and air pollution) that a clear corridor has generally been established alongside the motorway with no residential development. Given the usually straight motorway alignment, this corridor would appear to be ideal for the construction of a new high speed railway. The only major exception to this rule is at Luton, where the alignment of the motorway is tortuous, squeezed between Luton to the east and Dunstable to the west. Here, a tunnel is the only option for new railway construction.

This then leaves motorway interchanges as the primary obstacle to any high speed railway closely aligned with the M1. The easiest strategy is simply to align the new railway clear of the interchange, but this tends often to compromise the 'minimum intrusion' ethic of close adherence to the motorway, and also tends to threaten adjacent communities.

Hence the strategy generally adopted in the design of HSUK is for the new railway to follow the vertical alignment of the motorway, and thus similarly pass either above or below the interchange roundabout. In this case there is no direct conflict with the motorway, only with the slip roads. It is of course necessary to consider how the proposed works will be constructed, with either viaduct spans needing to be installed above the interchange roundabout, or short tunnels to be installed through the embankment fill below the roundabout (dependent upon local topography).

Motorway service areas generally comprise a lesser obstacle. Unlike an interchange, they cannot be considered critical infrastructure, and it is generally possible to rebuild and remodel around the route of the new high speed line without causing undue disruption and inconvenience to motorway users.

## Results of Study

The study found no 'showstopper' obstacles to construction of a high speed line along the M1 corridor at any of the 26 locations considered in this study.

The most serious problems would appear to exist at the remodelled M1/M6 interchange at Junction 19, which has been designed, and is now being constructed, without any specific consideration of the need for a high speed railway following the M1 corridor. However, the general principle, of the motorway facilitating a parallel alignment for a high speed line, is still applicable. A detailed study will be necessary, and would seem likely to demonstrate that such a strategy remains viable, requiring only the realignment of certain slip roads, and possible small compromises on railway curvature and permissible speed. Alternatively, it should be possible either to pass below the interchange in tunnel, or to divert around it on the west side.

In other cases, the most serious issues exist where the interchange roundabout is located above the motorway. Here it is necessary to tunnel below the roundabout using thrust boring, or other established technique, to construct a passage for the new railway, whilst keeping the road above open for traffic, albeit with speed

restrictions, at most if not all times. It may also be necessary to temporarily realign the slip roads.

Where the motorway and high speed line pass over the interchange roundabout, the problems are generally less severe, with it being possible to construct the necessary viaduct either by craning bridge beams into place during short night-time closures, or alternatively ‘launching’ the superstructure from the abutments at either end across the newly-constructed piers.

The assessed outcomes of the study are tabulated below:

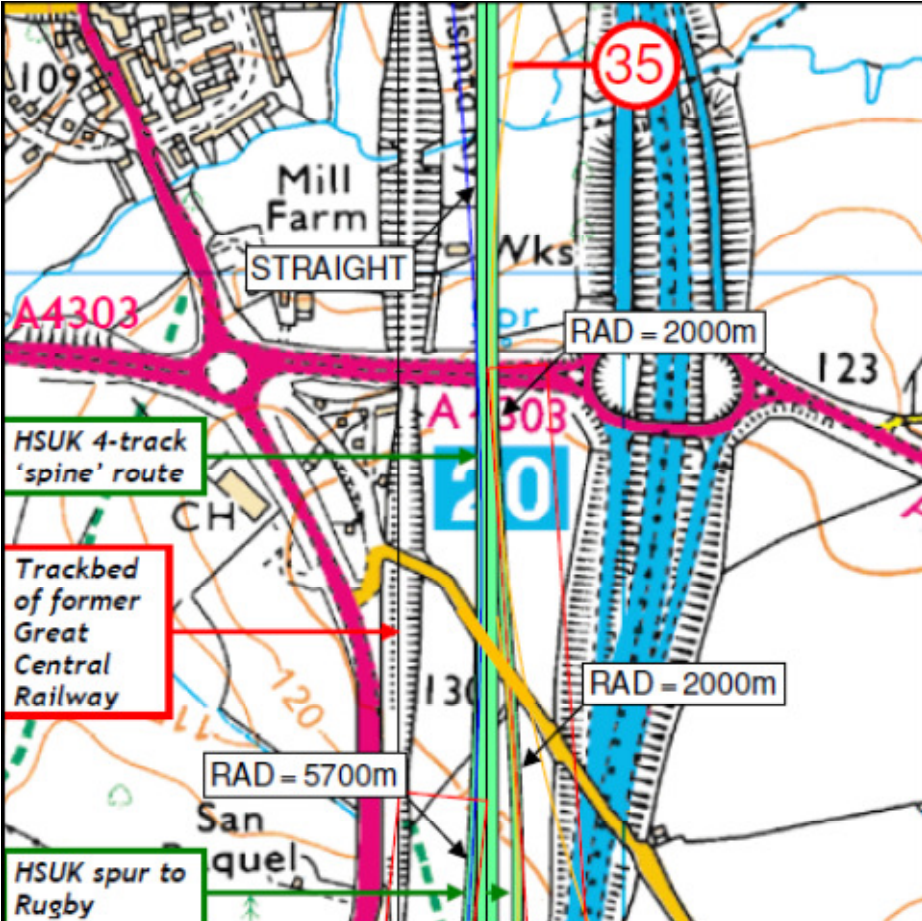
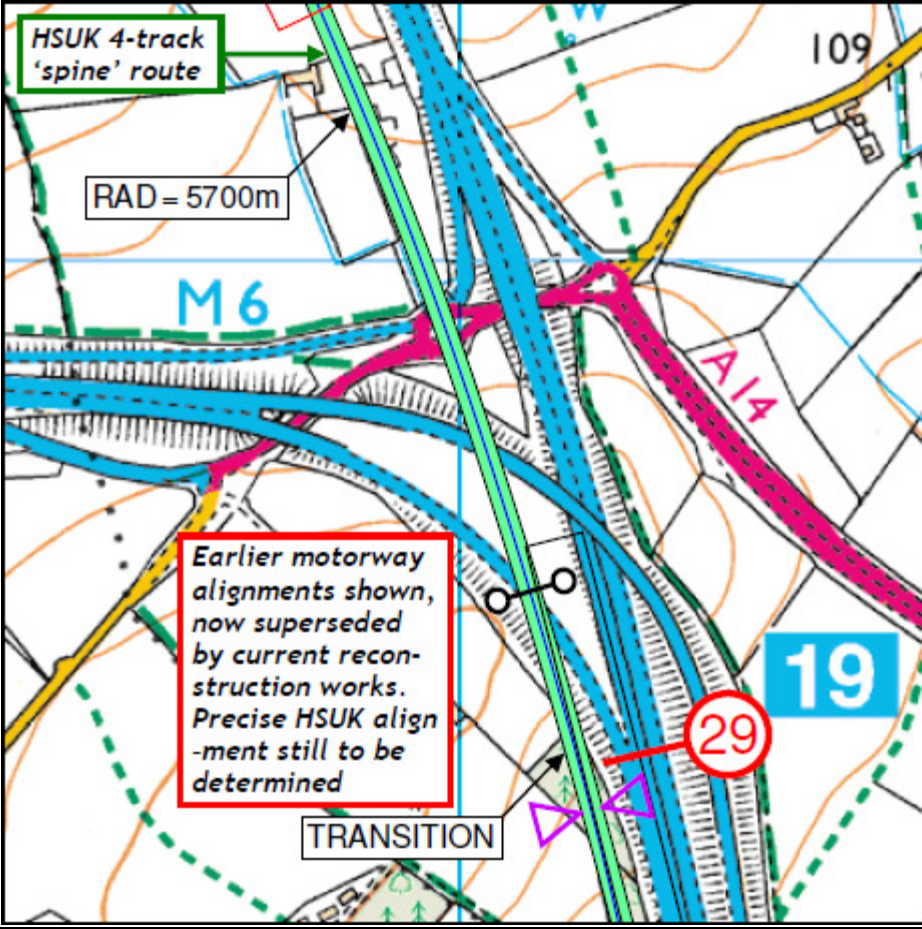
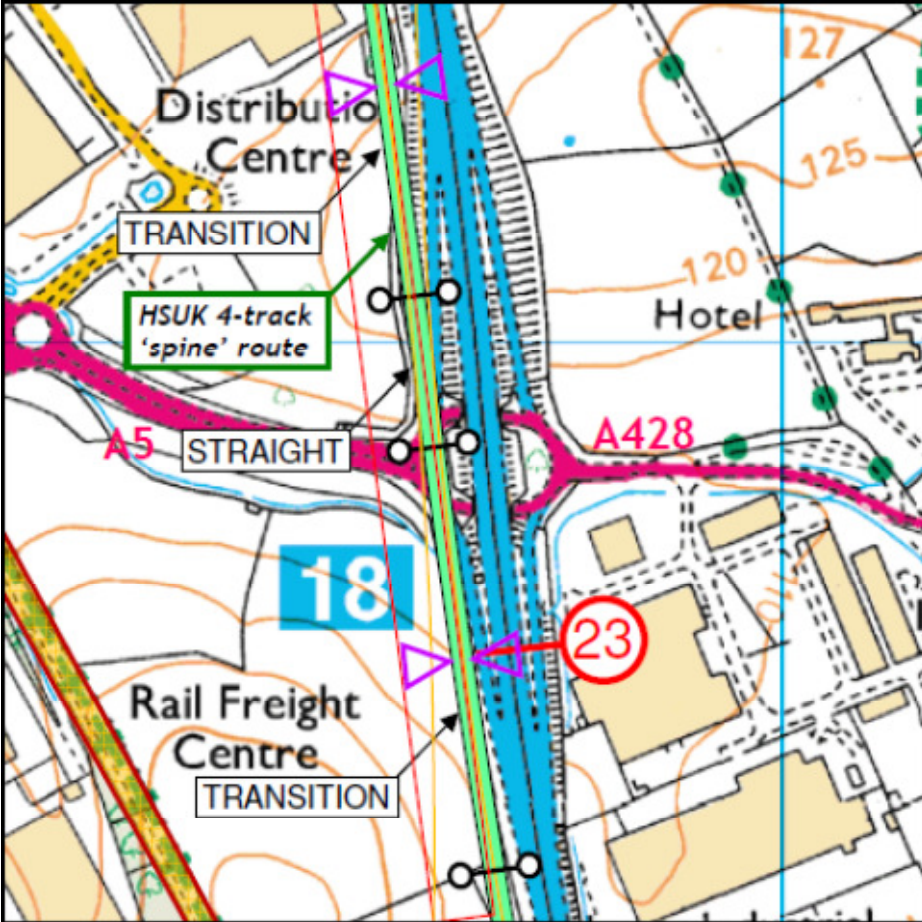
Junction/ <i>Services</i>	New Railway OVER, UNDER, CLEAR of or AVOIDS interchange?	SMALL, MEDIUM or LARGE challenge?
J1	OVER/UNDER on existing railway alignment	SMALL
J2	CLEAR	N/A
J3	J3 does not exist	N/A
<b>London Gateway</b>	<i>CLEAR</i>	N/A
J4	AVOID by tunnelling below	SMALL
J5	UNDER	LARGE
J6	OVER	MEDIUM
J6a	OVER	LARGE
J7	CLEAR (but link to MML crosses motorway)	LARGE
J8	UNDER	LARGE
J9	OVER	MEDIUM
J10	CLEAR	N/A
J11	AVOID by tunnelling below	N/A
<b>Toddington</b>	<i>CLEAR</i>	N/A
J12	CLEAR	SMALL
J13	CLEAR	SMALL
J14	UNDER	LARGE
<b>Newport Pagnell</b>	<i>Service area to be remodelled</i>	MEDIUM
J15	UNDER	LARGE
J15A	CLEAR	N/A
<b>Northampton</b>	<i>CLEAR</i>	N/A
J16	UNDER	LARGE
<b>Watford Gap</b>	<i>CLEAR</i>	N/A
J17	OVER	SMALL
J18	OVER	MEDIUM
J19	OVER/UNDER – <i>to be determined</i>	LARGE
J20	CLEAR	N/A

### Conclusion

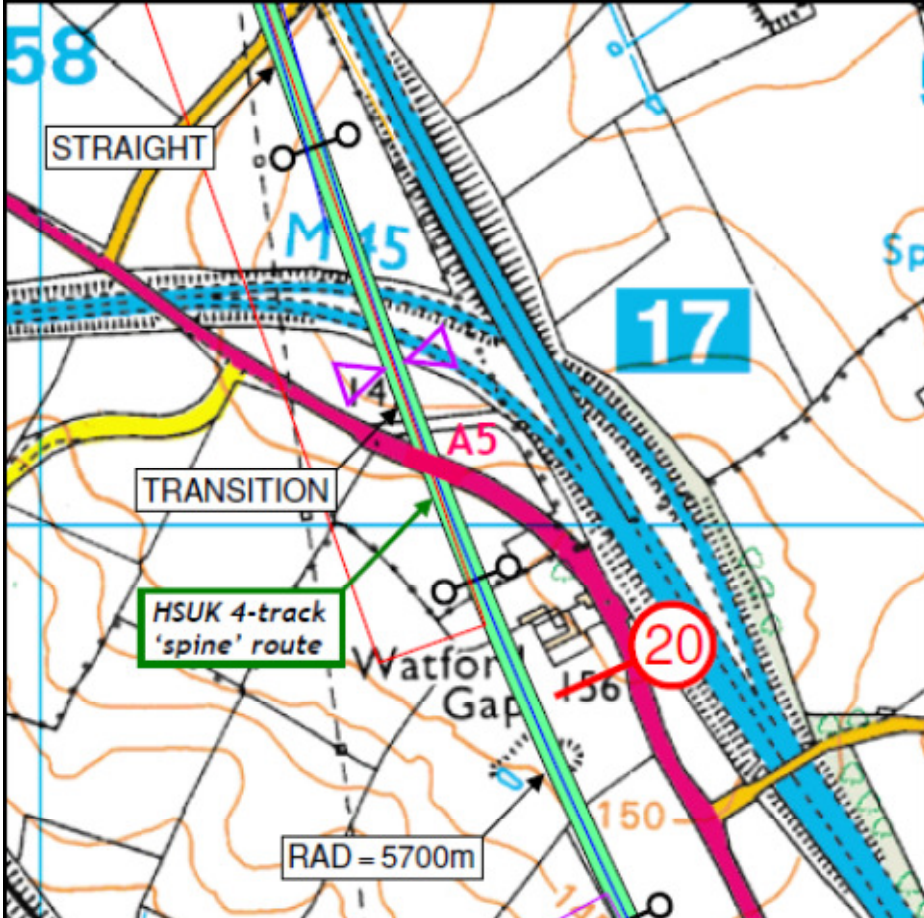

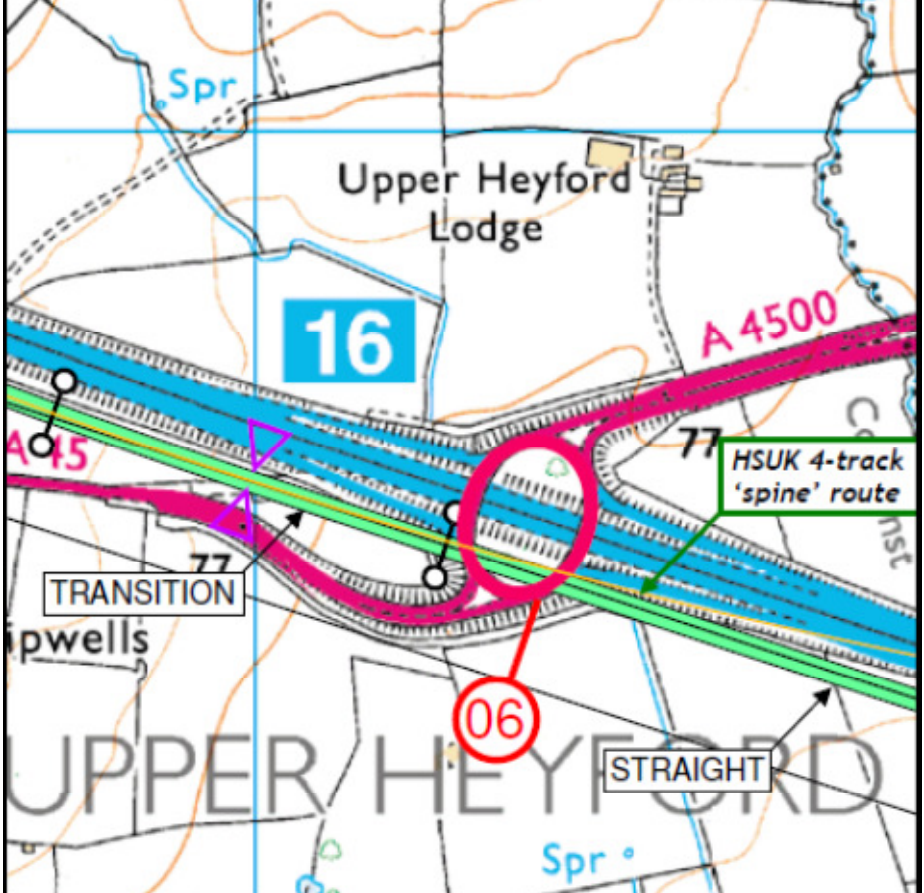
This study has demonstrated that although the routeing of a high speed railway through existing motorway interchanges will inevitably pose significant challenges, they are always manageable and achievable. As set out in the case studies on the following pages, any local community impacts are generally compensated by the major connectivity gains that will be experienced all along the M1 corridor.

When contrasted with the apparently far greater challenges of constructing the proposed HS2 route through highly sensitive and unspoilt countryside, with around 45km of tunnel between London and Birmingham, the challenges of routeing of a high speed railway through existing motorway interchanges seem very small. Thus the concerns expressed by many as to the difficulties of establishing a high speed railway alongside the M1 appear at the least to be disproportionate, and it would seem reasonable to question both the provenance and the motivation of these concerns.

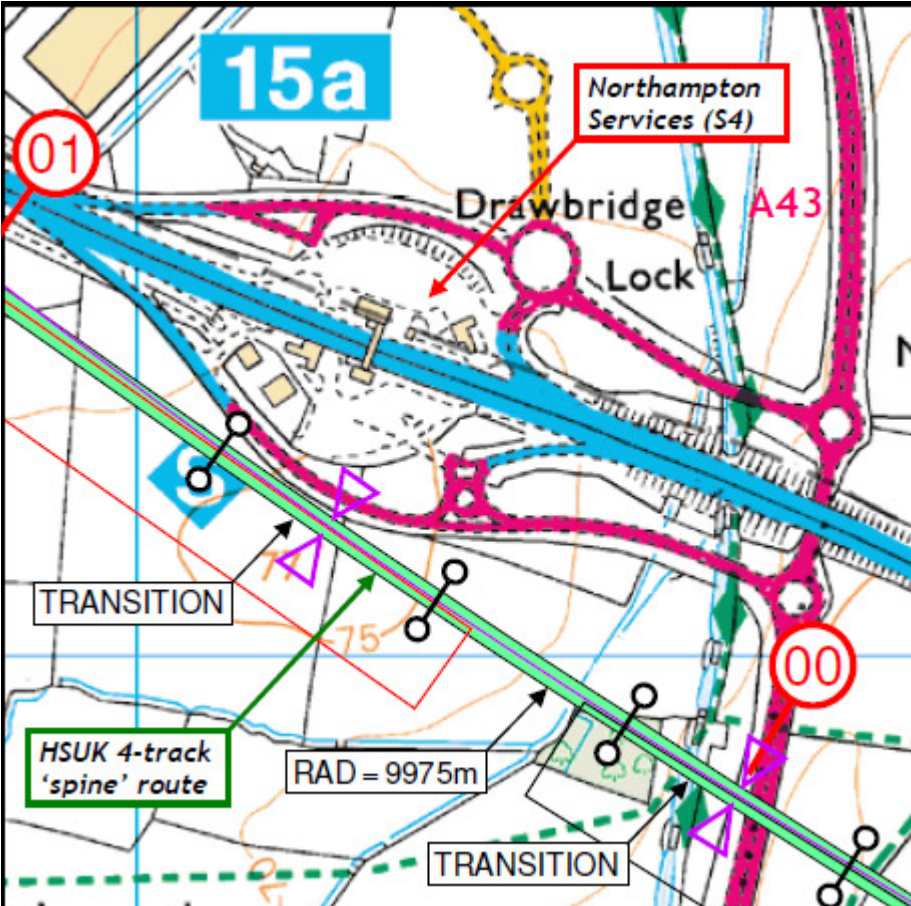
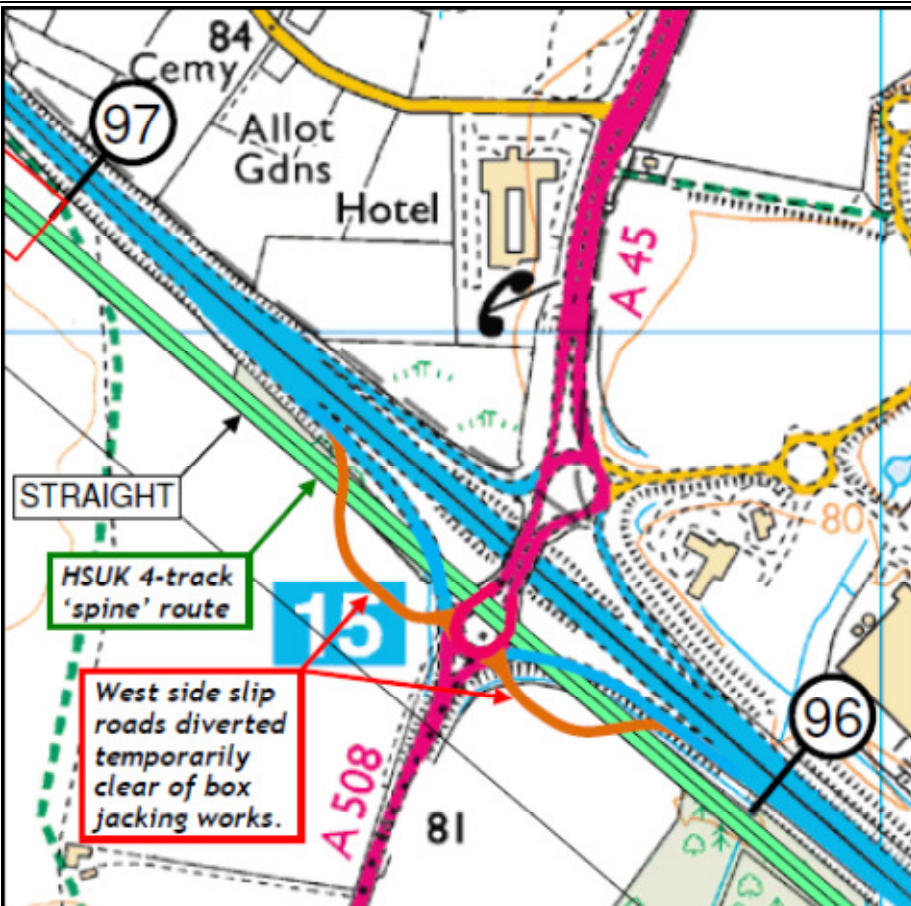
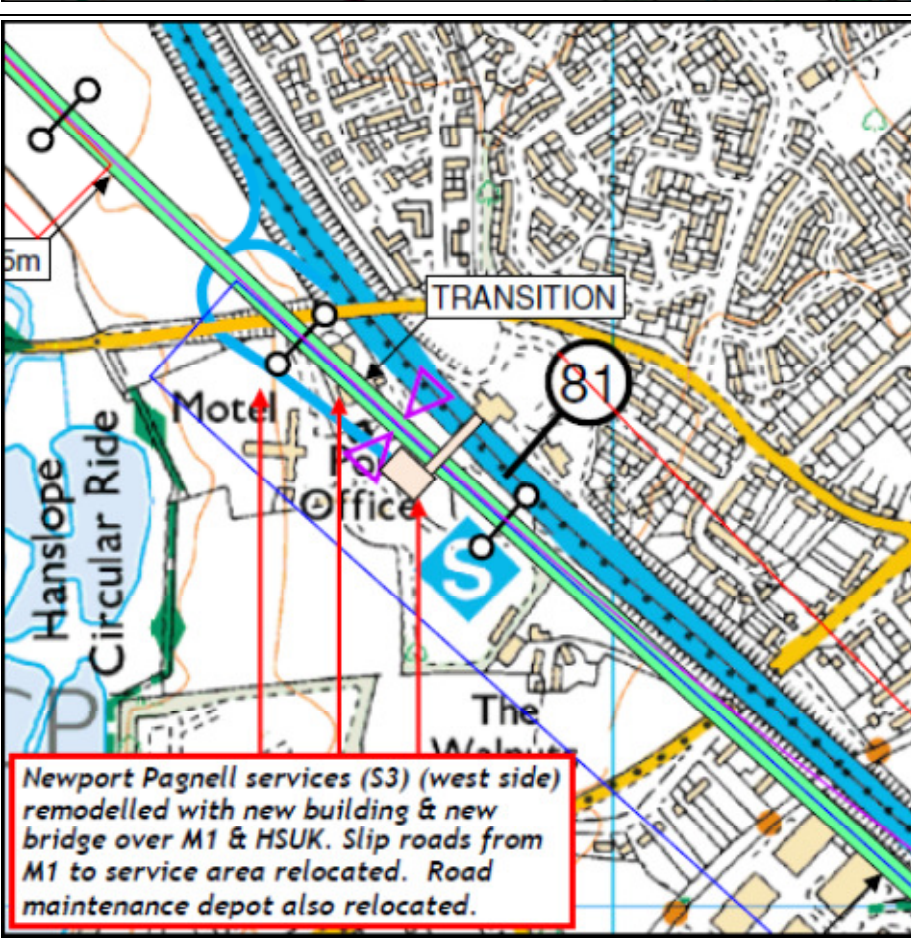


J20		<p><b>Junction 20 : M1 interchange with A4303</b>  <b>HSUK chainage : 134.7km</b></p> <p>Junction 20 is located in the valley of the River Swift to the east of Lutterworth. Here the M1 both dips sharply into the valley, and also swings locally to the east. This has the effect of eliminating any conflict with the much straighter alignment of HSUK, which crosses over the A4303 significantly to the west.</p> <p>Indeed, at this location the alignment of HSUK adheres much more closely to that of the former Great Central Railway, just to the west.</p> <p><b>Disruption Impact : Minimal impact on A4303, with a single night-time road closure required to install bridge girders.</b></p> <p><b>Community Impact : Negligible</b></p> <p><b>Community Benefit : Significant, arising from new local services to Lutterworth along Leicester-Rugby-Coventry-Birmingham axis</b></p>
J19		<p><b>Junction 19 : M1 interchange with M6/A14</b>  <b>HSUK chainage : 129.3km</b></p> <p>The M1/M6 interchange is currently under reconstruction, and insufficient information is available to determine a definitive alignment here. However, it would appear that the north-south route of the M1 through the interchange will create a clear path for an adjacent railway, passing above the new east-west dual carriageway road linking the A14/M6. (Neither this road nor the new east-to-north slip roads are shown on the map, see left).</p> <p>The challenge appears to be of similar magnitude to that of threading HS1 through the approach spans of the Dartford Bridge. Only relatively minor impact on slip roads is anticipated, along with the possibility of minor compromises on railway alignment and hence achievable speed.</p> <p><b>Disruption Impact : Significant</b></p> <p><b>Community Impact : Minimal</b></p> <p><b>Community Benefit : N/A</b></p>
J18		<p><b>Junction 18 : M1 interchange with A5/A428</b>  <b>HSUK chainage : 123.1km</b></p> <p>Junction 18 aka the 'Crick interchange' comprises the historic northern termination point of the first section of the M1, when opened in 1958. With Daventry International Rail Freight Terminal and other logistics centres located close by, it remains a highly important M1 interchange for which any closures will have significant impact.</p> <p>With the interchange located in a dip at the foot of the Cotswolds escarpment, HSUK's more onerous vertical alignment will naturally pass on a viaduct well above the interchange roundabout and the foot of the slip roads. Given the disruption sensitivities of the surrounding logistics businesses, it may be most appropriate to 'launch' the viaduct superstructure into place rather than erect by crane.</p> <p><b>Disruption Impact : Minor impact on operation of interchange, largely confined to imposition of speed restrictions.</b></p> <p><b>Community Impact : Minimal</b></p> <p><b>Community Benefit : Minor</b></p>

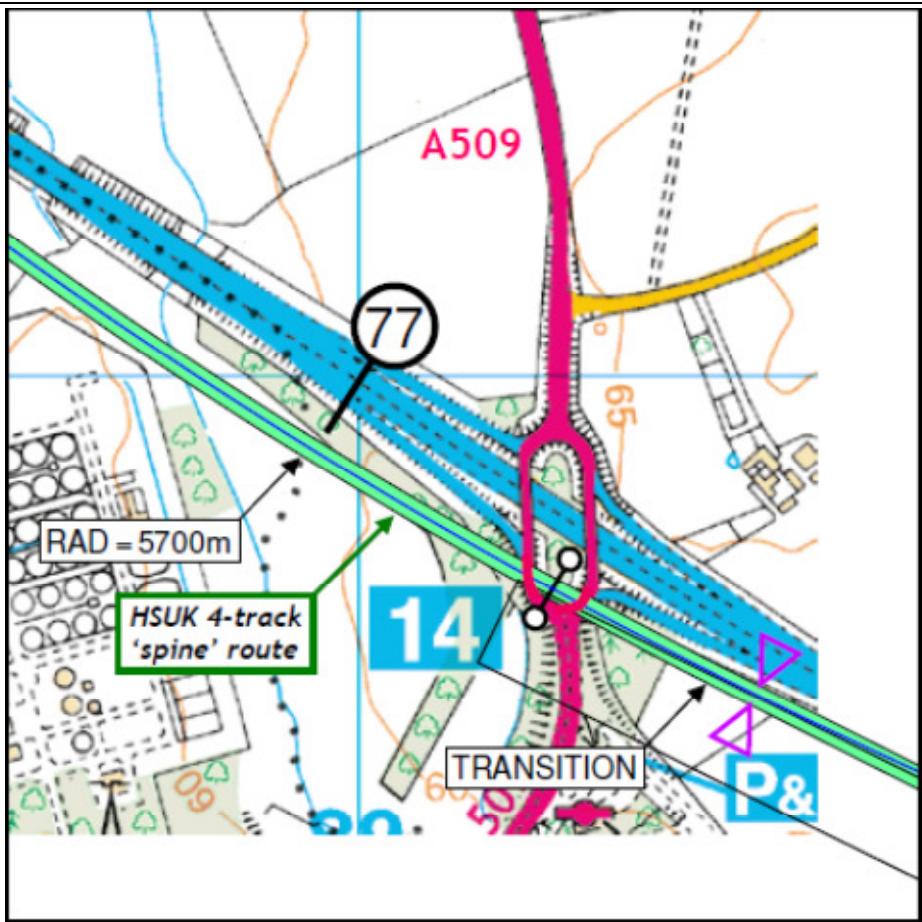
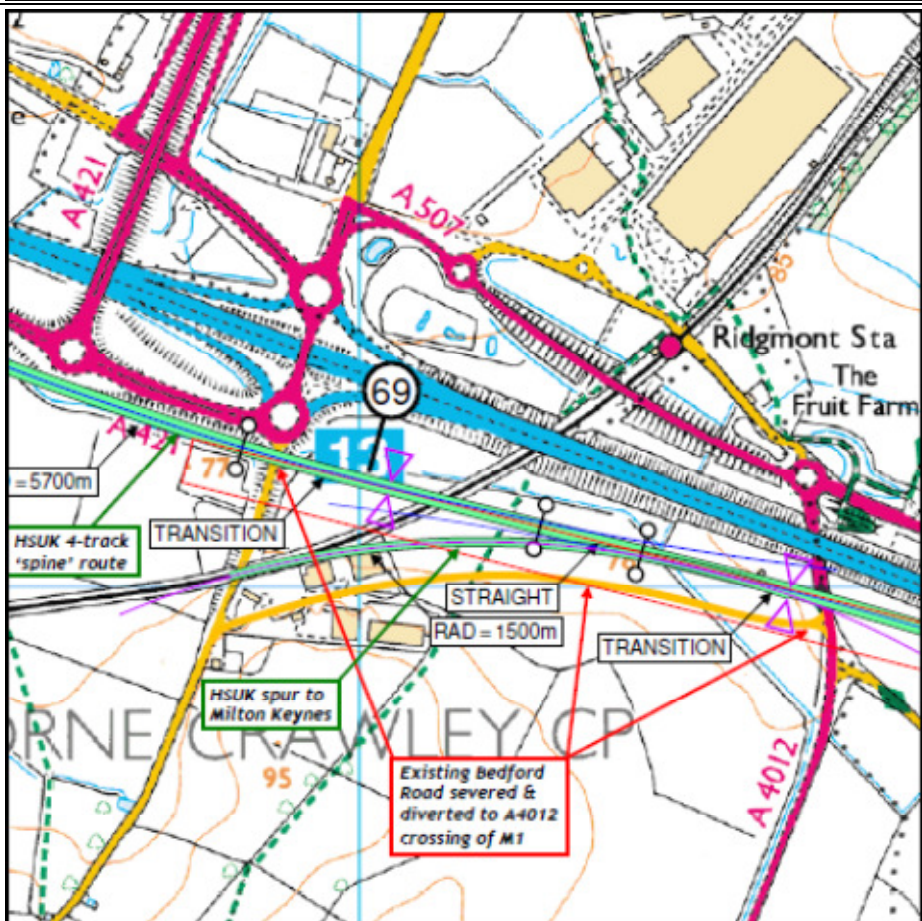
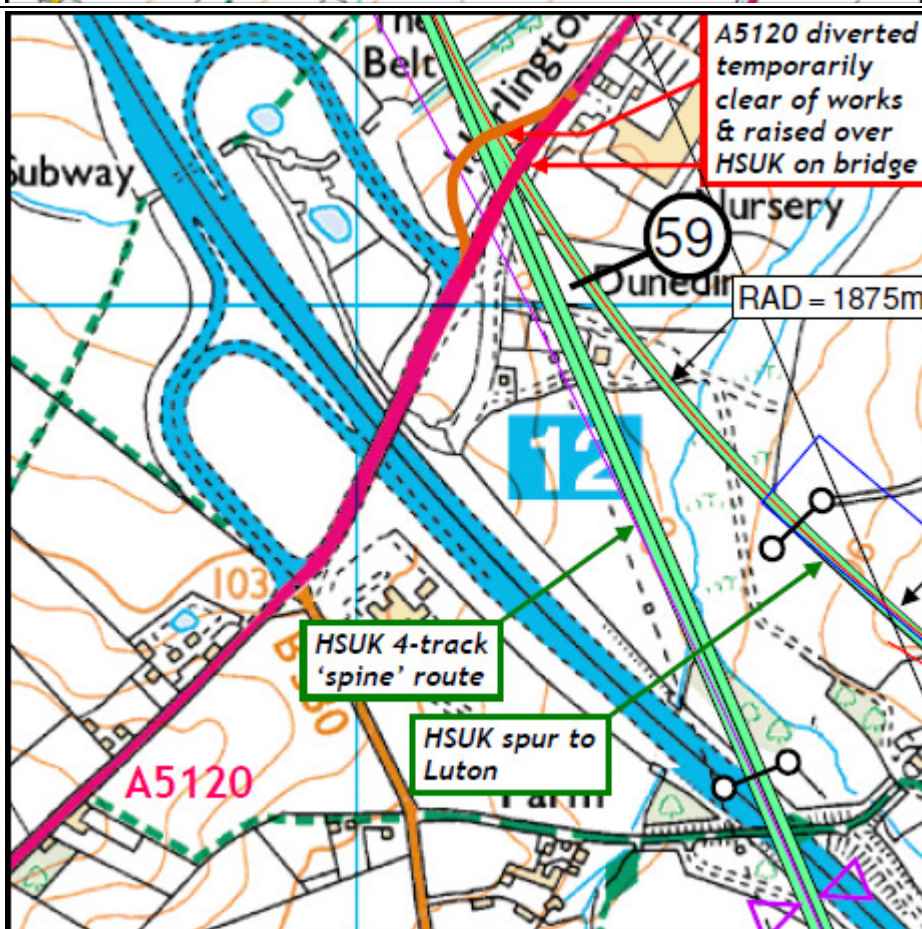


J17		<p><b>Junction 17 : M1 interchange with M45</b>  <b>HSUK chainage : 120.4km</b></p> <p>Junction 17 is the divergence point of the M45 from the M1. With the opening of the 'Midlands Link' section of the M6 from Birmingham to the M1, the M45 has been relegated to a link of relatively minor strategic importance.</p> <p>HSUK will pass approx 100m to the west of the interchange, where the merging M45 is located significantly below ground level, to pass below the M1. This presents no significant obstacle to the vertical alignment of HSUK, which is significantly 'humped' to pass over the M45 – but will require the nearby A5 to be realigned to pass over HSUK.</p> <p><b>Disruption Impact : <i>Minor impact on M45 for installation of bridge girders.</i></b>  <b>Community Impact : <i>Minimal</i></b>  <b>Community Benefit : <i>N/A</i></b></p>
S5		<p><b>S5 : Watford Gap services</b>  <b>HSUK chainage : 118.0km</b></p> <p>At the location of Watford Gap services, HSUK has deviated approximately 600m from the line of the M1, and instead is following the A5 more closely. Hence HSUK should have no adverse effect upon Watford Gap services.</p> <p><b>Disruption Impact : <i>Minimal in general, Watford Gap services unaffected.</i></b>  <b>Community Impact : <i>Minimal</i></b>  <b>Community Benefit : <i>N/A</i></b></p>
J16		<p><b>Junction 16 : M1 interchange with A45/A4500</b>  <b>HSUK chainage : 106.0km</b></p> <p>Junction 16 is the northern access from the M1 to Northampton (210,000 population). As such it is one of the M1's more critical interchanges, and disruption during construction must be kept to an absolute minimum.</p> <p>HSUK will closely follow the vertical alignment of the M1, and it will similarly pass under the roundabout of the interchange. A thrust boring technique appears most appropriate, with precast concrete multi-cell boxes jacked through the earth fill embankments. Road plating will be required to minimise disturbance to the road surface. The west side slip roads will run close to the jacking works and will require protection.</p> <p><b>Disruption Impact : <i>Minor impact on operation of interchange, largely confined to imposition of speed restrictions.</i></b>  <b>Community Impact : <i>Minor</i></b>  <b>Community Benefit : <i>Significant, from HSUK's transformation of intercity links to Northampton</i></b></p>



<p>J15a /S4</p>		<p><b>Junction 15A : M1 interchange with A43</b>  <b>S4 : Northampton Services (fka Rothersthorpe)</b>  <b>HSUK chainage : 100.5km</b></p> <p>Junction 15A was established in 1991, many years after the original opening of the M1, to provide an interchange with the upgraded A43 Northampton-Oxford road and an onward link to the South Coast at Southampton via the A34. Junction 15A surrounds the Northampton Service Area, and thus occupies a much greater plan area than a typical motorway interchange.</p> <p>Fortuitously, Junction 15A is located at a significant 'elbow' in the alignment of the M1, and the natural routing of HSUK runs clear of the enlarged interchange, with only minor 'reverse curving' required.</p> <p><b>Disruption Impact : None</b>  <b>Community Impact : Minimal</b>  <b>Community Benefit : Significant, arising from HSUK's transformation of intercity links to Northampton</b></p>
<p>J15</p>		<p><b>Junction 15 : M1 interchange with A45/A508</b>  <b>HSUK chainage : 96.3km</b></p> <p>Junction 15 is the primary access from the M1 to Northampton (210,000 population). As such it is one of the M1's more critical interchanges, and disruption during construction must be kept to an absolute minimum.</p> <p>HSUK will closely follow the vertical alignment of the M1, hence it will pass under the roundabout of the interchange. A thrust boring technique appears most appropriate, with precast concrete multi-cell boxes jacked through the earth fill embankments. Road plating will be required to minimise disturbance to the road surface. The west side slip roads will be temporarily diverted clear of the jacking works.</p> <p><b>Disruption Impact : Minor impact on operation of interchange, largely confined to imposition of speed restrictions.</b>  <b>Community Impact : Minor</b>  <b>Community Benefit : Significant, arising from HSUK's transformation of intercity links to Northampton</b></p>
<p>S3</p>		<p><b>S3 : Newport Pagnell Services</b>  <b>HSUK chainage : 81.0km</b></p> <p>Newport Pagnell service area is located on the fringes of the Milton Keynes conurbation.</p> <p>The designed alignment of HSUK passes through the existing west side buildings and cuts across the slip roads. This will provide an opportunity to renew the 50+ year old facilities at Milton Keynes, and will require the relocation of the slip roads further north. It will also be necessary to relocate the motorway maintenance depot.</p> <p><b>Disruption Impact : Significant, requiring relocation of slip roads, reconstruction of main building and motorway overbridge and relocation of maintenance depot.</b>  <b>Community Impact : Minor</b>  <b>Community Benefit : Significant, arising from HSUK's transformation of intercity links to Milton Keynes</b></p>



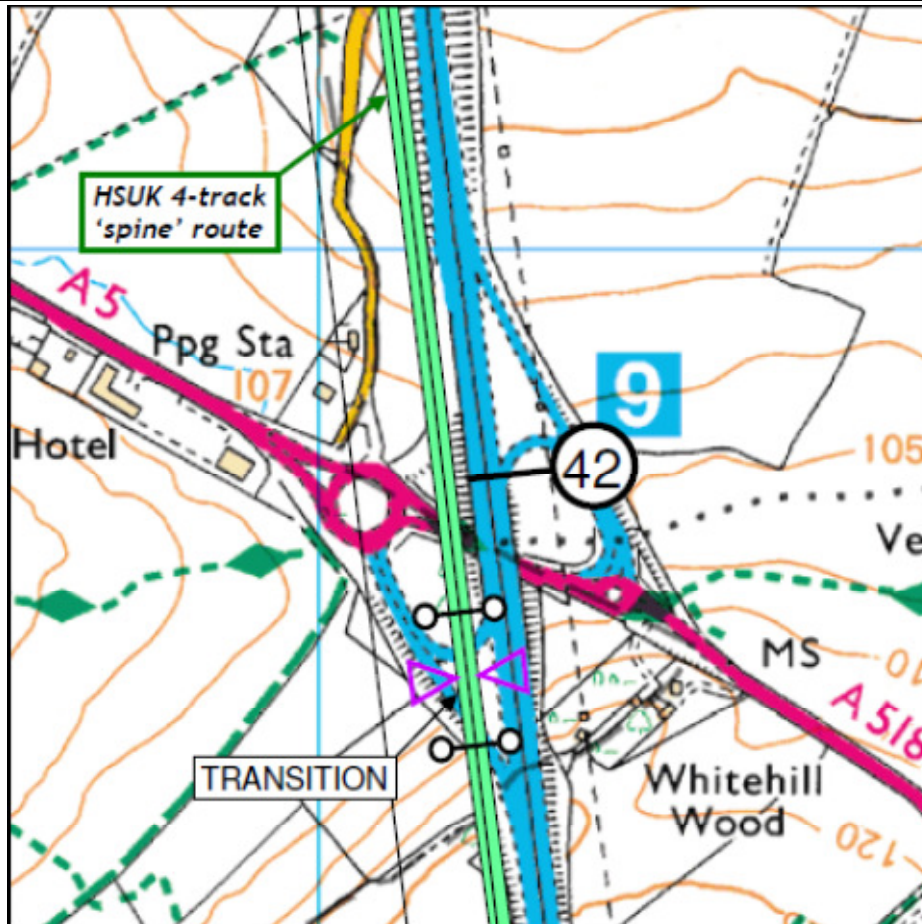
J14		<p><b>Junction 14 : M1 interchange with A509</b>  <b>HSUK chainage : 76.7km</b></p> <p>Junction 14 is the primary access from the M1 to Milton Keynes (256,000 population). As such it is one of the M1's more critical interchanges, and disruption during construction must be kept to an absolute minimum.</p> <p>HSUK will closely follow the vertical alignment of the M1, and it will similarly pass under the roundabout of the interchange. A thrust boring technique appears most appropriate, with precast concrete multi-cell boxes jacked through the earth fill embankments. Road plating will be required to minimise disturbance to the road surface.</p> <p><b>Disruption Impact : <i>Minor impact on operation of interchange, largely confined to imposition of speed restrictions.</i></b></p> <p><b>Community Impact : <i>Minor</i></b></p> <p><b>Community Benefit : <i>Significant, arising from HSUK's transformation of intercity links to Milton Keynes</i></b></p>
J13		<p><b>Junction 13 : M1 interchange with A421/A507</b>  <b>HSUK chainage : 69.0km</b></p> <p>Junction 13 has recently been rebuilt to accommodate a major upgrade of the A421 MK-Bedford road. This has in turn necessitated an amendment of earlier HSUK alignments, to run to the rear of the interchange. HSUK vertical alignment is dictated by proximity of Bedford-Bletchley line (East-West rail) and will require diversion of Bedford Road to adjacent A4012 crossing of M1.</p> <p><b>Disruption Impact : <i>No impact on interchange, subject to diversion of Bedford Road clear of HSUK and the link to the East-West route</i></b></p> <p><b>Community Impact : <i>Minor</i></b></p> <p><b>Community Benefit : <i>Significant, arising from HSUK's transformation of intercity links to nearby Milton Keynes and Luton</i></b></p>
J12		<p><b>Junction 12 : M1 interchange with A5120</b>  <b>HSUK chainage : 59.0km</b></p> <p>Junction 12, just north of Toddington Services, is situated within a major blip in the otherwise relatively straight alignment of the M1. This has necessitated bridged crossings to north and south to accommodate the much straighter HSUK. The interchange's recent major reconstruction has significantly increased its physical 'footprint', but is still clear of the proposed HSUK alignment and the junction with the HSUK spur to the Midland Main Line to access Luton.</p> <p>Temporary local diversions of the A5120 will be required to allow construction of a new bridge over HSUK and the diverging Luton spur. This may require some alterations to the junction with the east side slip road.</p> <p><b>Disruption Impact : <i>Minor impact on interchange and on A5120</i></b></p> <p><b>Community Impact : <i>Minor</i></b></p> <p><b>Community Benefit : <i>Significant, arising from proximity to new intercity links delivered by HSUK to Luton and surrounding areas</i></b></p>



S2		<p><b>S2 : Toddington Services</b>  <b>HSUK chainage : 57.5km</b></p> <p>Toddington service area is located just south of Junction 12.</p> <p>The designed alignment of HSUK passes significantly to the west of the service area, while the 'Luton spur' to the Midland Main Line passes just to the east. No significant disruption is anticipated.</p> <p><b>Disruption Impact : <i>Minimal</i></b>  <b>Community Impact : <i>Mininmal</i></b>  <b>Community Benefit : <i>Significant, arising from HSUK's transformation of intercity links to Luton and surrounding areas</i></b></p>
J11		<p><b>Junction 11 : M1 interchange with A505</b>  <b>HSUK chainage : 51.0km</b></p> <p>Junction 11 is located within the Luton/Dunstable conurbation which lies in a major gap in the Chiltern Hills. The surrounding urban development and the tortuous alignment of the M1 (in both vertical and horizontal senses) make Luton the one location where a close parallel alignment between high speed line and motorway cannot practicably be achieved. Instead, a 4.5km long tunnel is proposed, for HSUK to pass under the built-up area.</p> <p>Tunnelling under Luton will eliminate all HSUK's permanent impacts. Normal mitigations to control settlement arising from tunnelling below urban areas will be required.</p> <p><b>Disruption Impact : <i>No impact on motorway</i></b>  <b>Community Impact : <i>Minor, arising from potential settlement effects of tunnelling</i></b>  <b>Community Benefit : <i>Major, arising from proximity to new intercity links delivered by HSUK to Luton and surrounding areas</i></b></p>
J10		<p><b>Junction 10 : M1 interchange with M1 branch to Junction 10A &amp; A1081 to Luton airport</b>  <b>HSUK chainage : 45.6km</b></p> <p>Junction 10 is located at a significant 'elbow' in the alignment of the M1, and the natural alignment of HSUK in accommodating this change of direction takes the new railway well clear of the motorway junction.</p> <p>However, there will be some impacts on the adjacent community of Slip End, especially the hamlet of Pepperstock to the south-east of the village. Here, the local topography dictates that the line will be located well below existing ground level, and it is proposed to construct a short length of 'green tunnel'.</p> <p><b>Disruption Impact : <i>No impact on motorway</i></b>  <b>Community Impact : <i>Significant, mostly mitigated by 'green tunnel'</i></b>  <b>Community Benefit : <i>Significant, arising from proximity to new intercity links delivered by HSUK to Luton and surrounding areas</i></b></p>



J9



### Junction 9 : M1 interchange with A5/A518

**HSUK chainage : 42.0km**

The A5/A518 runs transverse to the alignment of the M1 in a dry Chiltern valley. The M1 drops steeply into the valley on either side, and the interchange itself comprises an overpass, with 'trumpet' slip roads to access the motorway.

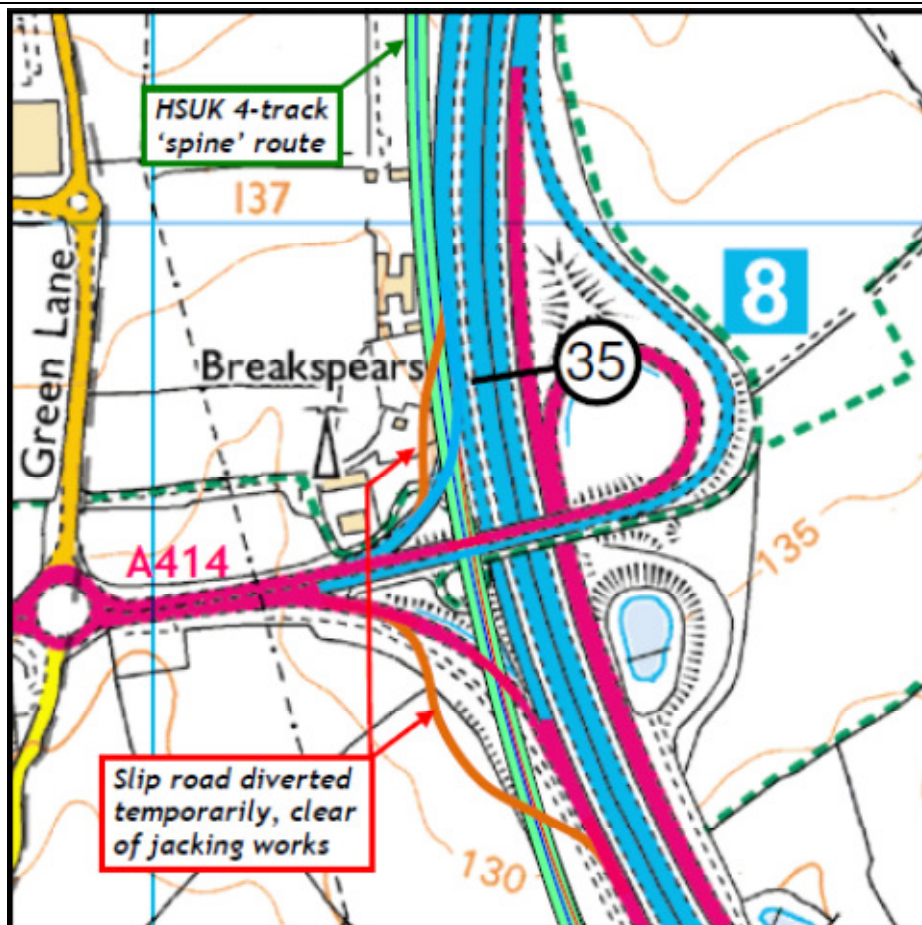
The more exacting gradient and vertical curvature requirements applicable to a high speed line mean that HSUK must pass on a viaduct above the valley at a significantly greater height than the motorway, and will pass above the A5/A518 and the west side slip roads, with no need for permanent realignment. Piers will be constructed clear of existing roads, and the viaduct spans will be installed either by launching, or by craning into position during short night-time blockages.

**Disruption Impact : Low**

**Community Impact : Minor**

**Community Benefit : Significant, arising from proximity to new intercity links delivered by HSUK to Luton and surrounding areas**

J8



### Junction 8 : M1 interchange with A414

**HSUK chainage : 34.9km**

Junction 8 is the primary access from the M1 to Hemel Hempstead. As such it is one of the M1's more critical interchanges, and disruption during construction must be kept to an absolute minimum.

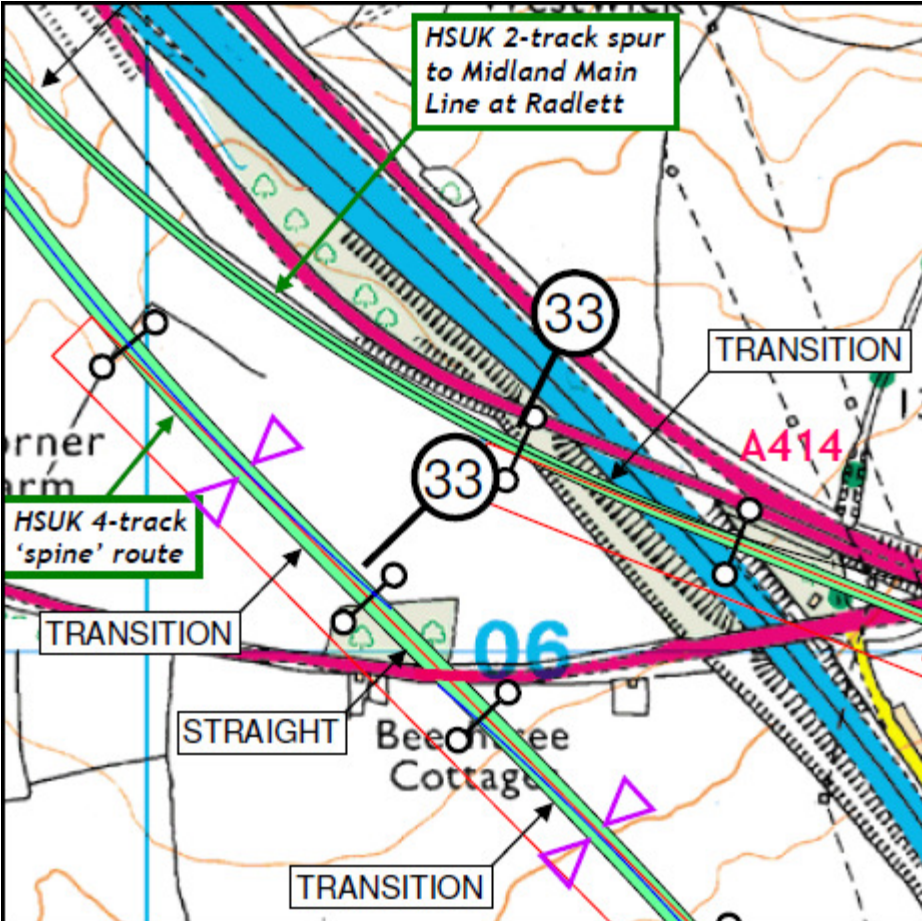
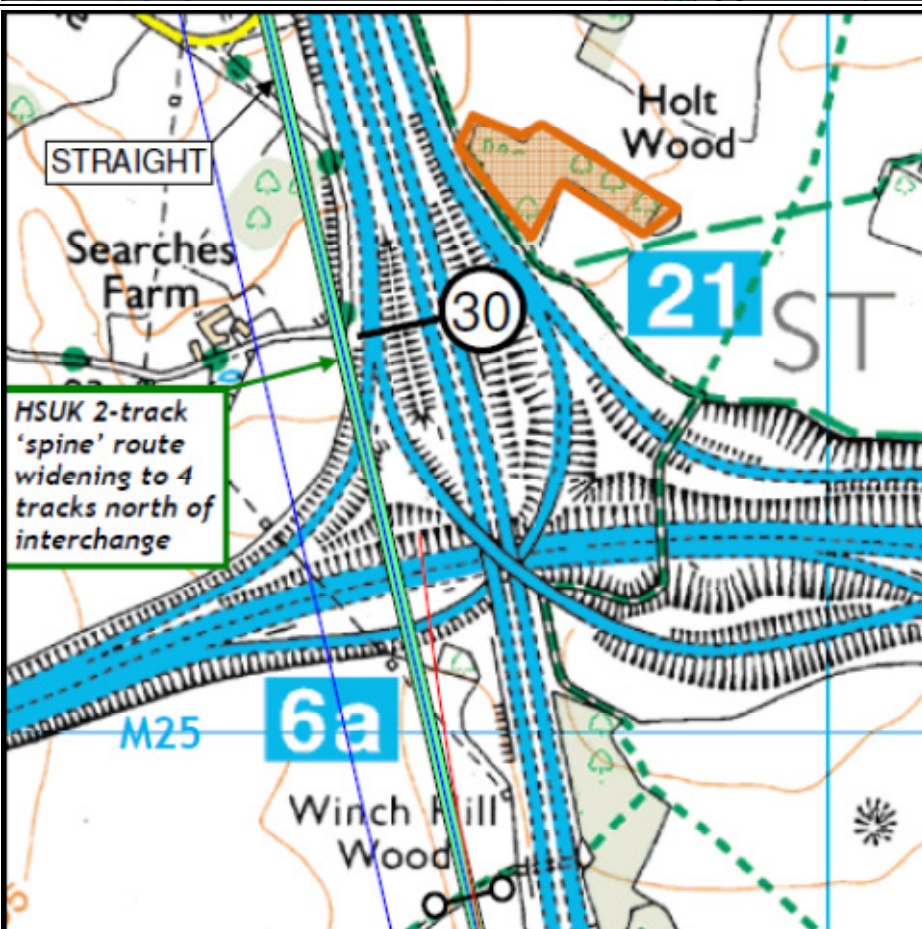
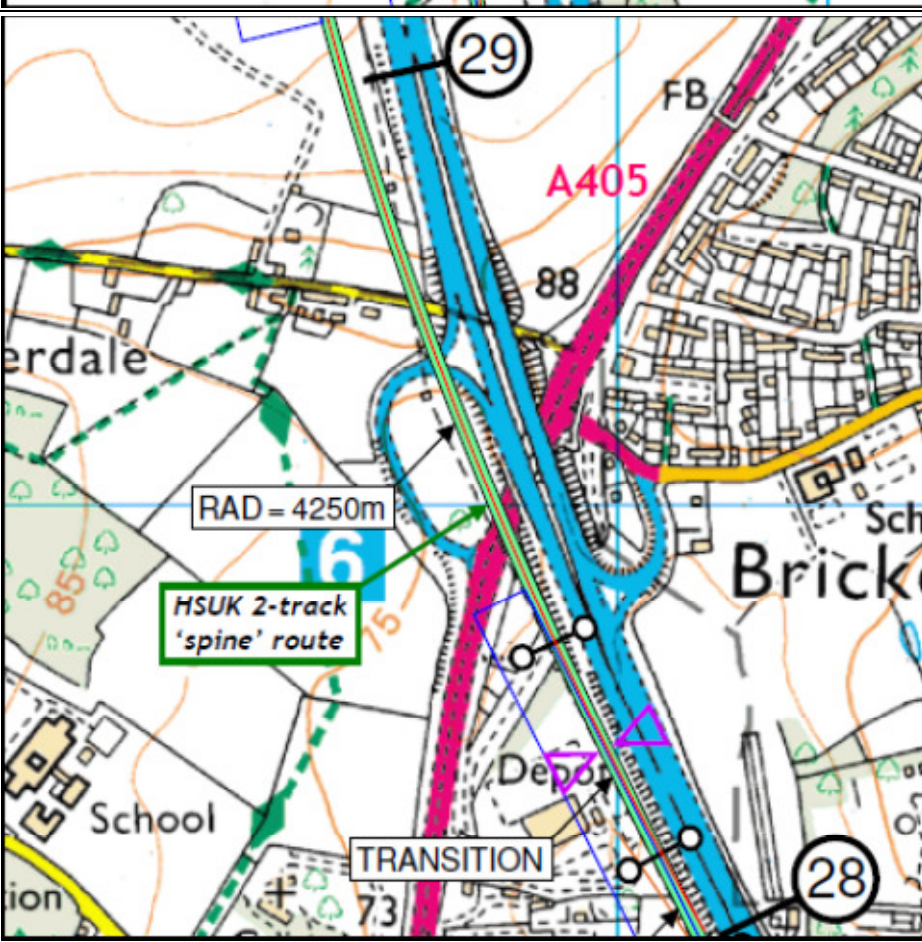
HSUK will closely follow the vertical alignment of the M1, and it will similarly pass under the roundabout of the interchange. A thrust boring technique appears most appropriate, with precast concrete multi-cell boxes jacked through the earth fill embankments. Road plating will be required to minimise disturbance to the road surface. The west side slip roads will run close to the jacking works and will require protection.

**Disruption Impact : Minor impact on operation of interchange, largely confined to imposition of speed restrictions and diversion of slip roads.**

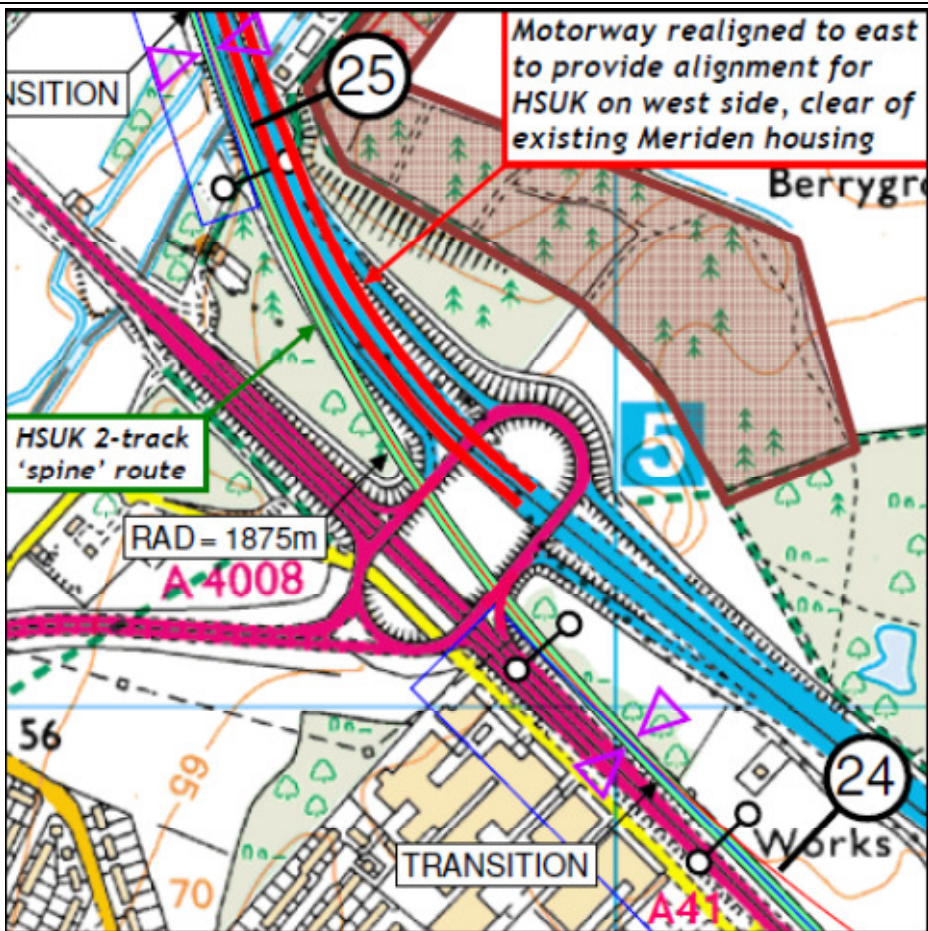
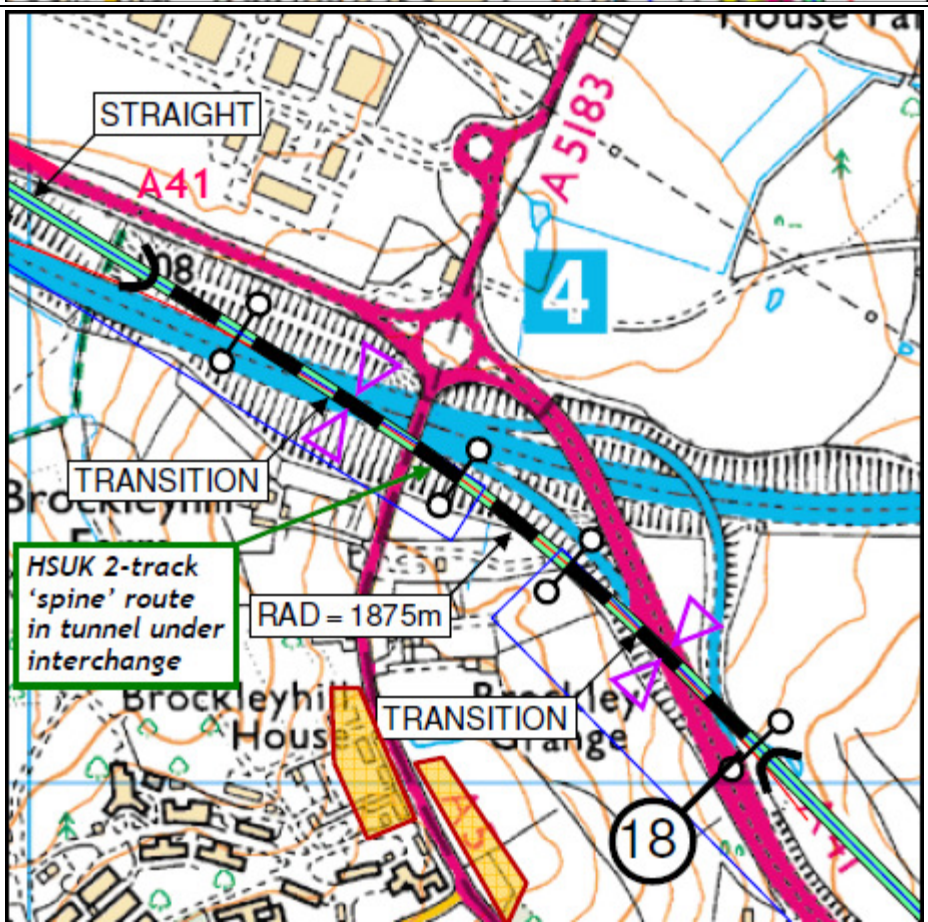
**Community Impact : Minor**

**Community Benefit : Commuter services to London improved through diversion to Crossrail. Better links to HSUK network at Milton Keynes**

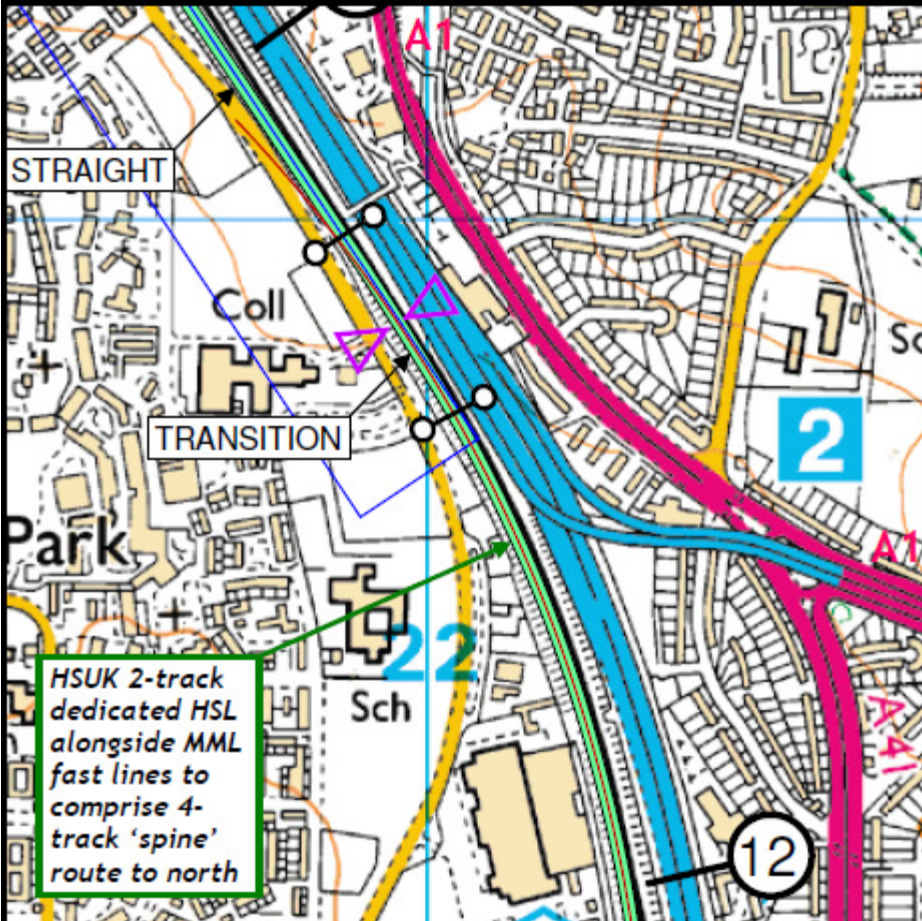
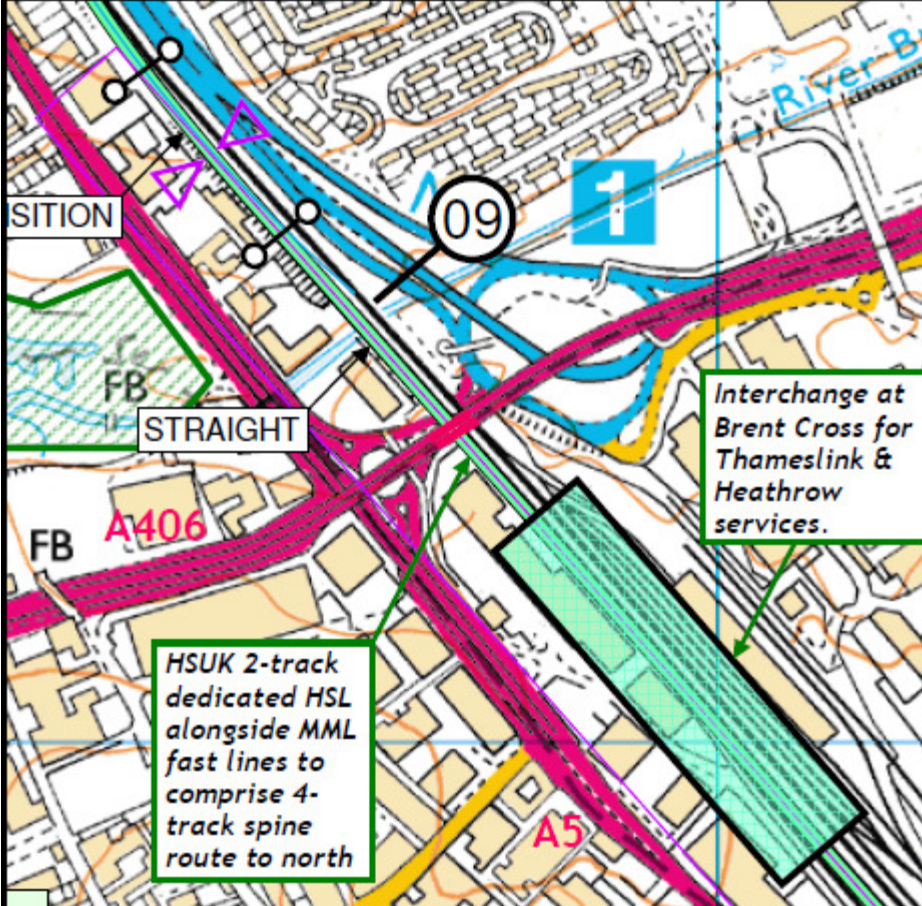


J7		<p><b>Junction 7 : M1 interchange with A414</b>  <b>HSUK chainage : 33.0km</b></p> <p>Junction 7 is the former limited access interchange to the M10, now reclassified as the A414.</p> <p>Owing to tight curvatures on the M1, the HSUK trunk route is located at least 200m clear of the interchange roads, and thus would have no disruptive effect.</p> <p>However, a subsidiary route is also planned to follow the route of the A414, to join the Midland Main Line near Radlett, and thus provide HSUK with effective 4-track capability towards London (ie 2 tracks of dedicated high speed line and 2 tracks of Midland Main Line fast lines). This route requires the construction of a major viaduct across the M1, just south of the interchange; this will demand specialist launching techniques and perhaps a 24-hour closure of the motorway.</p> <p><b>Disruption Impact : Significant, but of limited duration</b>  <b>Community Impact : Minimal</b>  <b>Community Benefit : N/A</b></p>
J6A		<p><b>Junction 6A : M1 interchange with M25</b>  <b>HSUK chainage : 29.8km</b></p> <p>Junction 6A is the interchange between the M1 and the M25 and as such is one of the primary nodes of the national motorway network. Hence disruption during construction must be kept to an absolute minimum.</p> <p>HSUK's proposed alignment to the west of the M1 passes over two slip roads and the M25 itself. All are located at a level substantially below that of HSUK, and sufficient land exists between the roadways to construct the necessary viaduct piers. This will pose significant access challenges in delivering the necessary materials, but this can be mitigated by establishing temporary access bridges. The best option to install the viaduct superstructure would appear to be by 'launching' from the south side abutment.</p> <p><b>Disruption Impact : Minor on operation of interchange from construction of viaduct piers and launching of superstructure</b>  <b>Community Impact : None</b>  <b>Community Benefit : N/A</b></p>
J6		<p><b>Junction 6 : M1 interchange with A405</b>  <b>HSUK chainage : 28.6km</b></p> <p>Junction 6 comprises an overpass junction, with the slip roads arranged in 'trumpet' format. With the M1/M25 Junction 6A immediately to the north not offering 'interior' connections (ie from south to east and west), this function is instead performed by Junction 6 on the M1, and the adjacent Junction 21A on the M25.</p> <p>The slip roads are of course level with the motorway, and this necessitates placing HSUK one level higher on a viaduct. Sufficient accessible land exists for the construction of viaduct piers.</p> <p><b>Disruption Impact : Minor impact on operation of interchange, largely confined to imposition of speed restrictions.</b>  <b>Community Impact : Minor</b>  <b>Community Benefit : Minor</b></p>



J5		<p><b>Junction 5 : M1 interchange with A41/A4008</b> <b>HSUK chainage : 24.5km</b></p> <p>Junction 5 is the primary access from the M1 to Watford, accessing both the A41 Watford Bypass and also the A4008 linking to central Watford. As such it is one of the M1's more critical interchanges, and disruption during construction must be kept to an absolute minimum.</p> <p>In this location, HSUK is closely aligned with the A41 in horizontal terms, but substantially below its vertical alignment. This enables it to pass well below the roundabout of the interchange. A thrust boring technique appears most appropriate, with precast concrete multi-cell boxes jacked through the earth fill embankments. Road plating may be required to minimise disturbance to the road surface.</p> <p><b>Disruption Impact : <i>Minor impact on operation of interchange, largely confined to imposition of speed restrictions.</i></b></p> <p><b>Community Impact : <i>Minor</i></b> <b>Community Benefit : <i>Minor</i></b></p>
J4		<p><b>Junction 4 : M1 interchange with A41</b> <b>HSUK chainage : 18.5km</b></p> <p>Junction 4 is a limited access interchange allowing M1 traffic to access the A41. Junction 4 is located on the crest of a hill overlooking <b>Edgware</b>.</p> <p>In this locality, the M1 is steeply graded to match the topography. This necessitates a tunnelled routing for HSUK. Hence the high speed line will pass below the interchange with, aside from normal precautions against settlement, no disruption caused.</p> <p><b>Disruption Impact : <i>Minor impact on operation of motorway, arising from tunnelling settlement and construction of ground retention works on approach earthworks.</i></b></p> <p><b>Community Impact : <i>Minimal</i></b> <b>Community Benefit : <i>None, aside from proximity to proposed HSUK interchange at Brent Cross</i></b></p>
J3	(this junction does not exist)	
S1	(London Gateway services are more than 1km from the proposed route of High Speed UK)	<p><b>London Gateway Services (fka Scratchwood)</b> <b>HSUK chainage : N/A</b></p> <p>London Gateway services are more than 1km from the proposed route of High Speed UK, hence no impact is anticipated.</p> <p><b>Disruption Impact : <i>None</i></b> <b>Community Impact : <i>None</i></b> <b>Community Benefit : <i>Significant, arising from HSUK's proposed Brent Cross Interchange on the nearby Cricklewood railway lands</i></b></p>



<p>J2</p>		<p><b>Junction 2 : M1 interchange with A1</b>  <b>HSUK chainage : 12.4km</b></p> <p>Junction 2 is a limited access interchange diverging to the east to connect the M1 to the A1. This interchange is located close on the east side of the Midland Main Line (MML). As HSUK is located on the west side of the MML, no impact on Junction 2 is anticipated.</p> <p><b>Disruption Impact : None</b>  <b>Community Impact : None</b>  <b>Community Benefit : Major, arising from HSUK's proposed Brent Cross Interchange on the nearby Cricklewood railway lands</b></p>
<p>J1</p>		<p><b>Junction 1 : M1 interchange with A406 North Circular Road (Staples Corner)</b>  <b>HSUK chainage : 8.9km</b></p> <p>Junction 1 comprises the M1's termination at the A406 North Circular Road. This is a multi-level interchange, in which the through North Circular passes over the Midland Main Line while the slip roads pass beneath.</p> <p>HSUK avoids any significant disruption to Staples Corner by following the existing Midland Main Line alignment in both horizontal and vertical senses.</p> <p><b>Disruption Impact : Minimal</b>  <b>Community Impact : Minimal</b>  <b>Community Benefit : Major, arising from HSUK's proposed Brent Cross Interchange on the adjacent Cricklewood railway lands</b></p>