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HS2

High Speed Rail (Crewe – Manchester) Environmental Statement

Volume 5: Appendix TR-005-00000_Report 1

Traffic and transport

Transport Assessment Part 4 and Annex A - Report 1 of 2

M295

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Department for Transport

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19.1.3 An off-route assessment of those aspects of the construction and operation of the Proposed Scheme that have the potential to generate substantial transport impacts in locations remote to the route corridor (i.e. 'off-route') has also been undertaken.

19.1.4 Off-route impacts are defined as those that may occur at locations beyond the Proposed Scheme's route corridor and its associated local environment and which are not covered within the spatial scope of the individual community area (CA) assessments (reported in Transport Assessment Parts 2 and 3, Volume 5 Appendices: TR-002 and TR-003).

19.1.5 This assessment also considers route-wide and off-route cumulative impacts in relation to HS2 Phase One and Phase 2a.

19.1.6 This section sets out the potential route-wide and off-route impacts of the Proposed Scheme in both construction and operation.

20 Route-wide assessment

20.1 Introduction and baseline

20.1.1 The geographical extent of the Proposed Scheme is such that there is the potential for traffic and transport impacts at a route-wide level due to activities or changes in travel patterns. This assessment considers those impacts. Traffic and transport impacts at a local scale are assessed and considered within the relevant assessments in TA Part 2 and Part 3 (see Volume 5, Appendices TR-002 and TR-003).

20.1.2 An initial review of the range of potential impacts was undertaken to identify aspects that might have the potential to have route-wide impacts. It was considered the potential route-wide impacts might arise during construction and operation as a result of:

- construction:
  - impacts on the Strategic Road Network (SRN) during construction; and
  - impacts on the wider conventional rail network during construction;
- operation:
  - changes to wider travel opportunities due to the introduction of HS2 services; and
  - changes in the levels of transport demand by mode and in particular the use of HS2 services and the conventional rail network due to both the introduction of HS2 services and consequential changes to conventional rail services.

20.1.3 The Proposed Scheme comprises the route from Crewe to Manchester (and connections onto the West Coast Main Line (WCML)). Details of the traffic and transport environmental baseline are reported in TA Part 2 in Volume 5, Appendices TR-002. In transport terms, the baseline includes the WCML as well as the SRN including the M6, the M56, M62, M60, M602 and A556.

20.1.4 Sections of the SRN around the route of the Proposed Scheme are generally busy during peak hours and delays can be experienced.

20.1.5 The current fastest journey times by rail from London and Birmingham to stations that might be affected by the Proposed Scheme are set out in Table 20-1.

Table 20-1: Current fastest journey times

Train origin/ destination	Train destination/origin	Current fastest standard hour journey time by conventional rail (hours:minutes)
London	Manchester Piccadilly	2:07
	Preston	2:08
	Liverpool Lime Street	2:14
	Glasgow Central	4:30
	Edinburgh (Waverley)	4:22
Birmingham	Liverpool Lime Street	1:34

Train origin/ destination	Train destination/origin	Current fastest standard hour journey time by conventional rail (hours:minutes)
	Manchester Piccadilly	1:28
	Glasgow Central	4:02
	Edinburgh (Waverley)	4:07

20.2 Route-wide construction assessment

Impacts on the strategic highway network during construction

20.2.1 The cumulative impacts of construction vehicles from all construction activities along the Proposed Scheme route have been assessed in the other relevant Volume 5 appendices. These have considered the impact of traffic generated by the Proposed Scheme not only immediately adjacent to the route, but as far as necessary to identify impacts along construction traffic routes or as a result of road closures and diversions.

20.2.2 The impacts of construction traffic are primarily focused on the road network close to the Proposed Scheme, which includes the principal corridors for movement of excavated material. The use of the SRN by HS2 construction vehicles within the area of the Proposed Scheme will be substantial and the cumulative impact is considered within the relevant CA assessment sections of this TA. These assessments also consider the impact of construction activity on roads extending from the Proposed Scheme to the SRN. Impacts beyond the community areas on a route-wide level are not considered likely.

20.2.3 As part of the construction of the Proposed Scheme, excavated material will be reused where suitable and reasonably practicable, which will reduce potential construction traffic. Where reasonably practicable, material will be moved along the HS2 route using site haul roads. Where reasonably practicable, rail will be used during construction to transport bulk materials (including excavated material, ballast, rails and sleepers); this will help to reduce wider traffic impacts of such movements.

20.2.4 A number of further measures have been included within the Proposed Scheme that help to reduce construction traffic movements which include the use of borrow pits which will reduce the impact of construction traffic on the local and strategic road network. Four borrow pits are proposed, three on-route along the trace in MA01 and MA02 for cohesive fill material (borrow pits A, B and C) and one some six kilometres from the route of the Proposed Scheme in MA02 for granular fill material (borrow pit D).

20.2.5 The use of borrow pits will enable construction material to be obtained locally. Without borrow pits A, B and C, materials would need to be transported from quarries remote from

the Proposed Scheme[1]. These would use the strategic and local road network as far as transfer nodes, where materials would be transferred to site-based dump trucks. Without borrow pit D, the total number of heavy goods vehicles (HGV) using the public road network would not change but the distance travelled by each HGV would increase substantially. Following excavation of construction material, the borrow pits will be backfilled with materials generated from the construction of the Proposed Scheme, thereby reducing the wider potential impacts on the road network of disposal of surplus excavated material. Table 20-2 shows that the use of borrow pits, compared to the alternative of moving materials from quarries, reduces the number and journey length of HGV on the road network.

Table 20-2: Reduction of potential route-wide HGV movements from borrow pits

Borrow pits	Potential routes benefiting from reduction in traffic	Impact on HGV movements (loaded and unloaded)
Borrow pit A	SRN to Junction 16 of the M6, A500 A51 and A530 to transfer node 2 (Crewe Rolling Stock Depot North Satellite Compound)	64,000 reduction
Borrow pit B	SRN to Junction 16 of the M6, A500 A51 and A530 to transfer node 2	49,412 reduction
Borrow pit C	SRN to Junction 18 of the M6, A54 Middlewich Road to transfer node 3 (A533 Bostock Road Satellite Compound) SRN to M6 Junction 19, A556 to transfer node 3 and 4 (Gad Brook Viaduct South Satellite Compound)	52,706 reduction
Borrow pit D	Quarries in Buxton area: routes near Congleton and A54 routes approaching M6 Junction 18 from the east Quarries in Stoke area local roads, access from the A500 at M6 Junction 16 Quarries in the Ellesmere area: A495, A49 A534 and A530 to transfer node 2	207,000 substantial reduction in distance travelled
Total HGV movements removed		**116,118**

Impacts on the railway network during construction

20.2.6 The construction of the Proposed Scheme will result in two types of potential impacts, works to construct the Proposed Scheme and the impact on train paths in terms of possessions and blockades. The design of the Proposed Scheme aims to avoid operational disruption to the conventional rail network during construction, insofar as reasonably practicable. Where it is safe to do so, works to the Proposed Scheme will be undertaken while conventional train services are still running. Where this would not be safe, works will have to be undertaken when trains are not running by the use of possessions or blockades.

[1] Analysis undertaken for borrow pits has identified a number of quarries with an average distance of around 67km from the Proposed Scheme.

20.2.7 Many of these works will be undertaken in the standard night-time maintenance possessions in order to reduce disruption to passenger and freight services. However, for certain major works that cannot be accommodated within these maintenance periods, weekend closures of one day's duration or longer will be required. These are referred to as weekend possessions. Where the works are particularly complex and require more time than a normal or bank holiday weekend, durations longer than a weekend will be required and are referred to as blockades.

20.2.8 Possessions are a standard technique widely used for the maintenance and renewal of the conventional railway. The possessions to accommodate and deliver the construction of the Proposed Scheme will be consistent with those adopted for current Network Rail working practices. HS2 Ltd will work with Network Rail to co-ordinate possessions with existing planned maintenance and renewals where reasonably practicable to reduce overall disruption to the travelling public and to ensure that the disruption impact of the Proposed Scheme is not substantial.

20.2.9 The assessment of impacts to conventional rail services during construction has been based on a review of the proposed works either on or near the national rail network. From this review the likely number, location, duration and nature of works, as well as how they will be carried out, has been established, although the possession plan is preliminary and final details will be developed by the construction contractor. These factors have been used to assess the potential levels of disruption to passenger services on the conventional rail network.

Analysis of impacts

20.2.10 The Proposed Scheme works will be undertaken in compliance with the measures set out in the draft Code of Construction Practice (CoCP) (see Volume 5 Appendix CT-002-00000) and the Network Rail Rule Book to ensure that disruption to travelling passengers and freight is reduced as far as reasonably practicable.

20.2.11 These measures include: carefully programming the Proposed Scheme works to coincide with possessions that are required and planned for the general maintenance of the railway; planning the required works so that they can be undertaken in short overnight stages when passenger services are not disrupted; and programming longer closures at the weekend and on bank holidays to reduce the number of passengers affected.

20.2.12 The potential scale of impact from works on or near the national rail network will depend on a number of factors including the type and complexity of interaction, duration of interaction, level of use of the rail line affected and timing of the interaction. For example, railheads and rail sidings will not have a direct impact on the operation of the conventional rail network as they can be implemented without the need for disruption to the railway and delay to passenger journeys. However, major track re-modelling has greater potential to affect

services. While most railway works will be undertaken overnight[2] or during weekend possessions (and thus will have limited impacts in isolation), a long programme of works across a route could, over a period of time, cause disruption to the travelling public and freight services.

20.2.13 The type and number of possessions required for the Proposed Scheme on existing railway lines are summarised in Table 20-3. These are spread over the period 2024 to 2034 with most occurring between 2024 and 2030.

Table 20-3: Summary of likely route-wide possession and blockade requirements

	27-hour	54-hour	72-hour	100-hour	Blockades
Proposed Scheme excluding off-route stations and depots	46	79	3	0	7
Preston Station (off-route)	1	18	0	0	1
Carlisle Station (off-route)	1	14	0	2	1
Annandale depot (off-route)	2	4	6	1	0
Total Proposed Scheme including off-route and depot stations and depots	**50**	**115**	**9**	**3**	**9**
(of which, possessions and blockades affecting WCML users and freight)	41	93	8	3	8

20.2.14 The possessions planning process includes consultation with the wider railway industry, including passenger and freight operators, to ensure that the relevant information is provided, that the possessions are considered in the context of wider railway operations, and that appropriate mitigation measures are put in place, such as diversionary routes.

20.2.15 The movement of trains to and from the sidings/railhead on the conventional rail network during construction will utilise available train paths and will comprise a very small percentage of total train movements on the conventional rail network. No substantial impacts associated with train movements to and from the railhead during the construction of the Proposed Scheme are therefore expected.

20.2.16 As most of these works are relatively localised and short-term in duration and are generally not expected to have substantial route-wide impacts, they have been addressed in the assessment of the relevant community areas. However, there are a number of works proposed that are of sufficient scale that they could potentially create route-wide disruption and delay to rail passenger and freight services on the WCML. These are outlined below:

- blockades on the WCML Crewe North Junction to Winsford South Junction in the MA01 Hough to Walley's Green area associated with the Crewe North Connection comprising three nine-day blockades plus a series of associated 27-hour and 54-hour weekend possessions;

[2] These are known as Rules of the Route and comprise some 2,019 possessions over the construction period.

- weekend possessions over 27 and 54 hours on the WCML Crewe North Junction to Winsford South Junction in the MA01 Hough to Walley's Green area associated with Crewe Northern Connection, WCML reception tracks, the extension of the existing Parkers Road Overbridge, Parkers Road temporary footbridge, Footpath Crewe 29/1 accommodation overbridge and Footpath Minshull Vernon 8/1 accommodation overbridge;
- connections to the WCML south of Wigan via the Golborne link requiring possessions and blockades on the WCML Crewe to Carlisle between Golborne junction and Springs Bank junction in the MA05 Risley to Bamfurlong area. These works comprise: three blockades of between four and six days duration plus a series of associated 27, 54 and 72-hour weekend possessions;
- Preston Station modifications comprising one nine-day Christmas blockade, together with 27 and 54-hour weekend possessions associated with construction of Proposed Scheme elements including the extension, widening and reinstatement of platforms, the provision of a new footbridge link and track alignment/renewal works;
- Carlisle Station modifications comprising: one nine-day Christmas blockade and a series of 27, 54 and 100-hour possessions associated with the construction of platform 0, the installation of a new footbridge and the alterations of tracks; and
- construction of Annandale depot comprising a series of 27, 54 and 72-hour weekend possessions.

20.2.17 There may be opportunities to reduce impacts by carrying out works simultaneously, including combining longer-term blockades. These could, however, result in less convenient alternative arrangements, including rail replacement services.

20.2.18 In addition to the impacts on the WCML and services operating on it, blockades associated with the Crewe North Junction to Winsford South Junction would affect services to Liverpool and would require rail replacement services. Longer distance Anglo-Scottish services could also be diverted via Manchester and Bolton.

20.2.19 Whilst rail passenger impacts can be mitigated by rail replacement services, it is more difficult to mitigate impacts on freight in the event of blockades closing the WCML in this area, and if no diversionary routes are available or suitable.

20.2.20 Although in isolation each of these have limited impacts that are addressed in the assessment of the relevant community areas, taken together and recognising the substantial number and extended duration of the possessions and blockades that will affect users of the WCML, will lead to a substantial impact on rail passengers and freight.

20.2.21 HS2 Ltd will work with Network Rail to co-ordinate possessions with existing planned maintenance to, where reasonably practicable, reduce disruption to the travelling public and to ensure that the disruption impacts of the works are not substantial and will be managed and limited through good planning and communication. HS2 Ltd will also coordinate possessions at a route-wide level which will reduce the frequency of potential disruption.

20.3 Route-wide operation assessment

Introduction

20.3.1 The introduction of the Proposed Scheme will provide improved journey times and build on the already substantial benefits of HS2 Phase One and Phase 2a, which were reported respectively in the HS2 Phase One and Phase 2a Environmental Statements. This section considers the incremental impacts of the Proposed Scheme where HS2 Phase One and Phase 2a are included in the future baseline and then considers the cumulative impacts of HS2 Phase One, Phase 2a and the Proposed Scheme. The assessment also considers impacts on the conventional rail network.

20.3.2 The operation of HS2 services, together with the timetable, service and infrastructure changes on the conventional rail network have been assessed, including:

- potential journey time benefits that will be achieved by the introduction of the Proposed Scheme;
- changes in passenger demand including the extent of changes in mode share;
- changes in vehicle and passenger kilometres by mode; and
- any impact of released conventional rail capacity.

20.3.3 The PLANET Framework Model (PFM)[3] has been used to estimate travel on the Proposed Scheme, other rail services and other transport modes. It provides mode share information for car, rail and air modes both without and with the Proposed Scheme.

20.3.4 Forecasts show increased demands for long distance rail travel in the future. Without the Proposed Scheme, the WCML will become increasingly congested. With the Proposed Scheme, new capacity will be introduced with accompanying reductions in journey times, enhanced passenger experience and reduced congestion and passenger crowding on the classic rail network.

20.3.5 HS2 will be built in phases. The hybrid Bill for Phase One of the HS2 network, between London and the West Midlands, received Royal Assent in February 2017. The main works on Phase One commenced in April 2020. The hybrid Bill for Phase 2a of the HS2 network, between the West Midlands and Crewe, received Royal Assent in February 2021.

20.3.6 The full Phase 2b scheme comprises the route from:

[3] The PLANET Framework Model (PFM) is the Department for Transport forecasting model which has been used to develop rail demand forecasts for the Proposed Scheme. PFM has been developed by HS2 Ltd from a suite of models originally developed by the Strategic Rail Authority (SRA). PFM is the most appropriate modelling tool to be used in terms of forecasting the demand impacts of the Proposed Scheme given its strategic capability, covering all long-distance rail, car and air movements across England, Scotland and Wales. PFM has evolved over a number of years and builds on existing model components.

- Crewe to Manchester (approximately 85km (52 miles) in length), with a connection onto the West Coast Main Line (WCML) (referred to as the 'Phase 2b Western Leg'); and
- the West Midlands to Leeds via the East Midlands and South Yorkshire (referred to as the 'Phase 2b Eastern Leg'). The Phase 2b Eastern Leg is not the subject of the Bill for the Proposed Scheme.

20.3.7 The Proposed Scheme comprises:

- the HS2 Western Leg from Crewe to Manchester, including:
  - new stations at Manchester Airport and Manchester Piccadilly;
  - a depot north of Crewe;
  - maintenance facilities north of Crewe and at Ashley; and
  - a connection onto the WCML near Bamfurlong;
- the Crewe Northern Connection, connecting the route of the Proposed Scheme with the WCML and enabling future NPR services to connect with HS2;
- provision for the NPR London to Liverpool, Manchester to Liverpool, and Manchester to Leeds junctions, to enable these future NPR routes to connect with HS2; and
- a number of works at locations beyond the Western Leg route corridor, referred to as 'off-route works' which include:
  - works to enable HS2 trains to call at existing stations further north on the WCML; and
  - construction of depots to provide overnight stabling for HS2 trains serving the north of England and Scotland.

20.3.8 The Proposed Scheme will connect with Phase 2a at Hough, to the south of Crewe.

20.3.9 Construction of the Proposed Scheme is assumed to commence in 2025, with operation assumed to start in 2038.

Changes in passenger demand

20.3.10 The increased capacity and improved journey times that will result from the Proposed Scheme and the additional services provided to take advantage of released capacity will provide the capability to accommodate forecast growth in demand for rail travel. The Proposed Scheme will provide an attractive substitute for many users of the long distance rail services that would operate in the absence of the Proposed Scheme. The improvements will generate new trips and also encourage changes in mode share from car and potentially air trips. PFM has been used to forecast demand for rail, car and air and to establish the extent of changes in mode share. Forecasts for 2038 and 2046 have been considered for the base case and for the Proposed Scheme scenarios.

20.3.11 PFM has been used to identify both flows at stations served by HS2 and changes in footfall at other stations, known as off-route stations; the latter are covered under off-route stations in operation. Table 20-4 sets out the daily boardings and alightings onto and off HS2 trains at all stations served by HS2. This demonstrates the substantial flows into and out of London and

highlights large flows at all HS2 stations on the main route. Other stations with notable HS2 boarders and alighters are Glasgow, Edinburgh and Preston.

Table 20-4: HS2 boardings and alightings by station, all phases, 2038 and 2046

HS2 station	Total boarders 2038	Total alighters 2038	Total boarders 2046	Total alighters 2046
Manchester Airport High Speed station	8,783	8,791	9,354	9,355
Manchester Piccadilly High Speed station	17,573	17,589	18,694	18,696
Euston	53,018	54,736	55,864	57,692
Old Oak Common	33,525	32,556	35,342	34,315
Birmingham Interchange	14,865	15,124	15,689	15,950
Birmingham Curzon Street	22,614	22,175	23,932	23,466
Stafford	1,783	2,010	1,883	2,125
Stoke-On-Trent	1,058	1,060	1,121	1,122
Crewe	7,572	6,728	7,893	7,020
Macclesfield	594	618	628	653
Runcorn	3,371	3,301	3,498	3,426
Warrington Bank Quay	1,413	1,365	1,492	1,438
Liverpool Lime Street High Level	5,403	5,529	5,645	5,782
Wigan North Western	2,331	2,484	2,464	2,623
Preston	11,779	11,570	12,335	12,121
Lancaster	2,259	2,281	2,371	2,392
Oxenholme Lake District	809	817	837	843
Penrith	561	566	583	590
Carlisle	4,154	4,003	4,340	4,180
Lockerbie	419	446	429	456
Motherwell	96	80	101	84
Glasgow Central	7,335	7,505	7,756	7,933
Edinburgh Waverley	9,150	9,137	9,693	9,679
Total	**210,465**	**210,471**	**221,944**	**221,941**

Impact of journey time savings during operation

20.3.12 Substantial journey time benefits will be provided by the Proposed Scheme with the biggest proportionate benefits achieved where the service uses just the HS2 route. Journey time savings from London and Birmingham to stations on the Proposed Scheme are set out in Table 20-5.

20.3.13 When combined with Phase One and Phase 2a, the Proposed Scheme will reduce overall journey times between London and Manchester Piccadilly by 56 minutes (a 44% reduction), Preston by 50 minutes (39%) and Glasgow Central by 42 minutes (16%). Comparable journey time reductions to and from Birmingham will be 48 minutes to Manchester Piccadilly (30%)

and 44 minutes to Glasgow Central (18%). The resultant combined travel time savings for the Proposed Scheme with Phase One and Phase 2a represents a substantial benefit to rail passengers.

20.3.14 When compared to a baseline containing both Phase One and Phase 2a, the incremental journey time reductions of the Proposed Scheme between London Euston and Manchester Piccadilly will be 19 minutes (21%) and between London Euston and Preston will be 12 minutes (13%). Incremental journey time reductions between Birmingham Curzon Street and Manchester Piccadilly will be 48 minutes (30%), between Birmingham Curzon Street and Glasgow Central will be 44 minutes (18%) and between Birmingham Curzon Street and Edinburgh (Waverley or Haymarket) will be 51 minutes (20%). The savings from Birmingham to Manchester Piccadilly and Scotland will be the same as those for the Proposed Scheme in-combination with Phase One and Phase 2a because the majority of journey time improvements for these routes are a result of the Proposed Scheme.

Table 20-5: Journey times between key destinations 'without' and 'with' the Proposed Scheme in operation

Train origin/ destination	Train destination/origin	Current fastest standard hour journey time by conventional rail (hours:minutes)	Fastest standard hour journey time with HS2 Phase One and 2a (hours:minutes)	Fastest standard hour journey time with the Proposed Scheme (including Phase One and Phase 2a) (hours:minutes)
London Euston	Manchester Airport	2:24 (to existing conventional rail station)	1:47 via Manchester Piccadilly station	1:03 (to Manchester Airport High Speed station)
	Manchester Piccadilly	2:07	1:30	1:11
	Preston	2:08	1:30	1:18
	Liverpool Lime Street	2:14	1:34	1:34
	Glasgow Central	4:30	3:48	3:46
	Edinburgh Waverley	4:20	4:20	3:42
Birmingham	Liverpool Lime Street	1:39	1:39	1:09
	Manchester	1:28	1:28	0:41
	Glasgow Central	4:02	4:02	3:23
	Edinburgh Waverley	4:07	4.07	3:20

Released capacity

20.3.15 The transfer of long-distance passengers from the conventional rail network to the Proposed Scheme will create the opportunity to provide additional services and to stop services at more locations on the conventional rail network. A released capacity timetable specification has been developed by the Department for Transport (DfT) to represent how these opportunities may be utilised. While it is too early to set the timetable and make final decisions on stopping patterns, the released capacity train service specificaion (TSS) for the

Proposed Scheme sets out assumptions regarding the train services that are likely to run, based on the best information available at the time of assessment.

20.3.16 The general principles underpinning the assumptions for the use of the released capacity have been to increase capacity in corridors with high demand and to address some of the reliability and overcrowding issues that currently exist and that are otherwise forecast to intensify as a result of increased demand for rail travel. With the introduction of the new long-distance high speed services for the Proposed Scheme, the general approach will be to reduce limited stop long distance services and replace them with enhanced services on medium distance and local commuter routes.

20.3.17 These assumptions should not be regarded as final, as it is likely that further changes will be made over the coming years in light of emerging information on demographics, demand for rail services and other relevant factors. The introduction of HS2 services will have a substantial impact on the railway as a whole and will necessitate a recast of the timetable to ensure that available capacity is used in a way that maximises benefit for both passengers and freight.

20.3.18 Overall, the use of the released long-distance train paths by medium distance and local services, coupled with diversion of long-distance passengers to HS2 services from the WCML will increase capacity and reduce congestion and passenger crowding.

Impact on modal share

20.3.19 The increased capacity and improved journey times that will result from the Proposed Scheme and the additional services provided to take advantage of released capacity will generate increased demand for rail travel. The Proposed Scheme will provide an attractive substitute for users of the long-distance rail services that would operate in the absence of HS2. The improvements will also encourage changes in mode share from car and potentially air, as well as generating new rail trips.

20.3.20 Forecast demand for rail, car and air travel and the extent of changes in mode share for 2038 and 2046 have been considered for the future baseline cases and for the Proposed Scheme scenarios.

20.3.21 The daily and annual forecast numbers of HS2 passenger trips for 2038 and 2046, the numbers of generated new trips and, for the remainder, the mode of travel that they will have transferred from for Phase One, Phase 2a and the Proposed Scheme are set out in Table 20-6 and Table 20-7 on a daily and annual basis respectively.

Table 20-6: Number and mode share of HS2 passenger trips – daily (2038 and 2046)

Source of HS2 demand	2038 Phase One and Phase 2a	2038 Phase One, Phase 2a and Proposed Scheme	2046 Phase One and Phase 2a	2046 Phase One, Phase 2a and Proposed Scheme
Total HS2 trips, of which:	**157,082**	**205,611**	**164,520**	**216,751**
From conventional rail	114,242	141,119	118,574	147,074

Source of HS2 demand	2038 Phase One and Phase 2a	2038 Phase One, Phase 2a and Proposed Scheme	2046 Phase One and Phase 2a	2046 Phase One, Phase 2a and Proposed Scheme
From car	4,109	6,705	4,451	7,274
From air	1,138	2,756	1,270	3,098
Newly generated by HS2	37,594	55,031	40,224	59,306

Table 20-7: Number and mode share of HS2 passenger trips – annual (millions) (2038 and 2046)

Source of HS2 demand	2038 Phase One and Phase 2a	2038 Phase One, Phase 2a and Proposed Scheme	2046 Phase One and Phase 2a	2046 Phase One, Phase 2a and Proposed Scheme
Total HS2 trips, of which:	**50.0**	**70.0**	**52.4**	**70.6**
From conventional rail	36.9	46.8	38.4	48.9
From car	1.3	2.1	1.4	2.2
From air	0.4	0.9	0.4	1.0
Newly generated by HS2	11.5	17.2	12.3	18.5

20.3.22 Table 20-7 shows that the combined HS2 Phase One, 2a and Proposed Scheme will attract 70.6 million users per annum by 2046, with the Proposed Scheme in isolation increasing use of HS2 services by 18.2 million passenger trips per annum (35%) when compared with HS2 Phase One and Phase 2a. With the Proposed Scheme in combination with Phase One and Phase 2a, 26% of the total demand is newly generated, compared to 24% for Phase One and Phase 2a, due to new journey opportunities, reduced travel times and higher frequencies. The percentage of HS2 demand abstracted from conventional rail reduces with each phase of HS2, from 73% for Phase One and Phase 2a to 70% for the Proposed Scheme in combination with Phase One and Phase 2a, corresponding to the increase in newly generated demand. The proportion from car and air remain constant over time, at around 3% and 1% respectively.

20.3.23 The overall change in rail travel, with a proportion of HS2 trips being generated as new travel, demonstrates the levels of travel suppressed by capacity constraints and journey times. The overall change in rail travel shows the substantial travel opportunities and aspirations that the Proposed Scheme and the released capacity services would realise.

20.3.24 The transfer of passengers from the conventional rail network and from mode transfer from car will result in benefits through reducing forecast congestion on both the SRN and the conventional rail network. The extent of reduction in annual vehicle kilometres as a result of the Proposed Scheme is shown in Table 20-8 which shows that the incremental impact of the Proposed Scheme will be a reduction in annual vehicle travel by car on strategic long-distance routes of approximately 106 million kilometres by 2046. The in-combination impact of HS2 Phase One, Phase 2a and the Proposed Scheme will be a reduction in annual vehicle travel by car on strategic long-distance routes of approximately 239 million kilometres by 2046.

20.3.25 In incremental terms, the Proposed Scheme contributes approximately 44% of the in combination total vehicle kilometre savings of HS2 Phase One, Phase 2a and the Proposed Scheme.

Table 20-8: Reduction in vehicle kilometres (millions) resulting from mode shift

	Long distance highway vehicle kilometres by Phase (millions)	Incremental reduction in highway vehicle kilometres (millions)	Total reduction in highway vehicle kilometres (millions)
2038 future baseline	115,697	-	-
2038 Phase One and Phase 2a	115,569	128	-
2038 Proposed Scheme	115,473	96	224
2046 future baseline	119,200	-	-
2046 Phase One and 2a	119,067	134	-
2046 Proposed Scheme	118,961	106	239

Summary of impacts

20.3.26 The main route-wide impacts of the Proposed Scheme in operation can be summarised as:

- improved journey times between Manchester, the north of England and Scotland and the Midlands and the south of England;
- increases to rail capacity, reduced pressure and lower crowding on the conventional rail network enabling the running of additional services and stopping services at more stations; and
- reductions in highway vehicle kilometres due to modal shift from highways to rail.

20.3.27 The Proposed Scheme is shown to increase demand for rail travel and provide beneficial relief to the conventional rail network as well as beneficial reductions in long distance travel by car. These impacts both for the Proposed Scheme in isolation and when combined with those provided by Phase One and Phase 2a are considered to provide substational benefits.

21 Off-route assessment

21.1 Introduction

21.1.1 This section provides an assessment of the off-route impacts of the Proposed Scheme, in relation to:

- works at off-route railway stations and for stabling facilities;
- modifications to the rail network;
- changes to the operation of off-route stations that will experience substantial modifications; and
- changes in footfall at off-route stations during operations resulting from the Proposed Scheme.

21.2 Off-route construction assessment

21.2.1 Off-route works include:

- railway stations – construction of improvements, alterations and adaptations at the existing Preston and Carlisle Stations that will be served by HS2 trains;
- depots – construction works associated with overnight stabling facilities at Annandale; and
- construction impacts of modifications to the conventional railway network.

21.2.2 In addition, minor works are to be undertaken at Polmadie in order to complement those to be undertaken at Phase One which have been assessed. However, it is not considered that further assessment is required due to the minor nature of the works and their consequent impact on the wider transport networks .

Off-route railway stations – improvements, alterations and adaptations at existing stations

21.2.3 This section considers the changes at Preston and Carlisle stations to accommodate HS2 services.

Preston

21.2.4 The Proposed Scheme in the Preston Station area will comprise works to the existing Preston Station. These works will include the extension of two existing platforms and reinstatement of a platform not currently used for passenger trains in order to allow HS2 trains to call at the station. The Proposed Scheme at Preston Station will be on land within Network Rail ownership.

21.2.5 The Proposed Scheme at Preston Station will include the refurbishment and reopening of the luggage and passenger subways to provide lift and stair access for the public to platform 0 and provision of a new footbridge between platform 1 and platform 0.

21.2.6 Users of all the platforms, including the reinstated platform 0, will use the existing station entrances, ticket hall and concourse.

21.2.7 In addition, there will be modifications to the track layout, signalling, overhead line equipment and other railway systems within the Preston Station area to facilitate the Proposed Scheme (see Volume 4 Map Book, map CT-06-801, D6 and map CT-06-802, A6 to F5).

Environmental baseline

21.2.8 Preston Station is situated within Preston city centre, south of the A59 Ring Way, west of Butler Street and east of Christian Road and West Cliff. Fishergate Shopping Centre and the shopping centre car park are immediately adjacent to Preston Station to the east and there are depots operated by Network Rail and Royal Mail Group to the west. The Station car park and car park associated with the Network Rail Technical Support Depot are located to the east of Preston Station and parking associated with Network Rail offices at North Union House is located to the west.

21.2.9 Vehicular access to Preston Station is off Fishergate and Butler Street. Fishergate provides access to 'kiss-and-ride' and taxi pick up/drop off facilities. Butler Street provides access to the short stay car park, with a one-way loop at the station frontage, and also the main station car park. Butler Street is accessed off Fishergate and Corporation Street via an underpass (entry only). Corporation Street provides the link between Fishergate/Fishergate Hill and the A59 Ring Way to the north. To the east of Corporation Street, Fishergate is one way westbound. Fishergate transitions into Fishergate Hill west of Stanley Place and connects to the A5072 Strand Road, Liverpool Road and Broadgate to the west.

21.2.10 Surveys were undertaken to understand the use of highways and car parks within the study area. The survey types and locations are shown in the Background Information and Data (BID)[4], (see BID TR-004-00001: Transport Assessment policy and data).

21.2.11 Traffic surveys, comprising junction turning counts (JTC), manual classified counts (MCC), queue length surveys (QLS), automatic traffic counts (ATC) and car park and pick-up/drop-off surveys, were undertaken in March 2017, October 2017, November 2017, March 2019 and July 2019. The car park and pick-up/drop-off surveys undertaken in March 2017 recorded 307 vehicle movements to/from the station in the morning peak hour, and 412 in the evening peak hour.

[4] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*, BID TR-004-00001. Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

21.2.12 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 7% by 2028 compared to a baseline year of 2019 and by 20% in the morning peak hour and 18% in the evening peak hour between 2017 and 2046.

21.2.13 In the future baseline of 2046, it is forecast that the station will attract 368 vehicle movements in the morning peak hour and 487 vehicle movements in the evening peak hour.

21.2.14 The local roads that could be impacted by the Proposed Scheme include: A582 Flensburg Way/Penwortham Way/Farington Road/Golden Way, A6 London Road, A59 Liverpool Road/Leyland Road/Guild Way New Hall Lane/Preston New Road/Stanley Street/Ring Way, A5072 Strand Road, Corporation Street, Fishergate Hill, Fishergate, Bow Lane, Butler Street, Christian Road.

21.2.15 The local road network in this area generally operates well although some localised delays can be experienced, particularly at peak times.

Proposed Scheme construction description

Introduction

21.2.16 Construction of the Proposed Scheme is expected to commence in 2026 with construction activity continuing to 2028. Construction activities have been assessed against 2028 baseline traffic flows, irrespective of when they occur during the construction period.

Construction activities and phasing

21.2.17 Details of the main construction works and the time periods when each compound will be operational are summarised in the indicative construction programme. For the construction programme for Preston Station refer to Volume 4, Off-route effects, Section 3.

21.2.18 A complete description of the works associated with the Proposed Scheme in the Preston Station area is provided in Volume 4, Section 3. The construction works will be carried out throughout the site for the majority of the construction period. The overall programme has been outlined on a year by year basis. The key construction activities, along with their start dates, are provided in Table 21-1. This excludes advance works such as utility works and demolition activities.

Table 21-1: Preston Station key construction activities

Activity	Start date
Site preparation and setup	2026 Q3
Station works	2026 Q4
Rail systems installation	2026 Q4
Site reinstatement	2028 Q1

Compounds and construction sites

21.2.19 The Proposed Scheme will be constructed from compounds. This will comprise the Parcel Sidings main compound, which will manage and coordinate the work from the Butler Street satellite compound.

21.2.20 Table 21-2 summarises the expected average and peak workforce (site workers plus staff) at each construction compound in the Preston Station area.

Table 21-2: Assumed workforce at construction sites

Compound type	Compound name	Number of site workers (peak)	Number of staff (peak)	Total workforce (site plus staff)	
				Average	Peak
Main	Parcel Sidings main compound	60	15	55	75
Satellite	Butler Street satellite compound	65	15	68	80

21.2.21 Table 21-3 provides details of the compound set up date and the duration of active use. The duration of active use excludes any period where there are no substantial workforce trips or movement of materials to and from the compound.

21.2.22 Table 21-3 also provides a summary of the HGV and car/light goods vehicle (LGV) access trips at each compound in the peak month of activity and during the busy period. For each compound, the peak month of activity is the month within which HGV traffic is at its highest for that compound. The busy period is the period during which HGV traffic serving that compound will be greater than 50% of the HGV traffic in the peak month. The average daily combined two-way vehicle trips[5] for the busy period is the lower end of the range shown in Table 21-3 and the average daily combined two-way vehicle trips for the peak month is the upper end of the range shown. The estimated duration of busy period is also provided.

Table 21-3: Typical vehicle trip generation for construction site compounds in the Preston Station area

Compound type	Compound name	Indicative start/set up date (years/ quarter)	Estimated duration of active use (years/ months)	Average daily combined two–way car/LGV trips during busy period and within peak month of activity	Average daily combined two–way HGV trips during busy period and within peak month of activity	Estimated duration of busy period (months)
Main	Parcel Sidings main compound	2026 Q3	2 years	59–78	10-12	10

[5] Two-way trips refer to the total number of vehicle movements in both directions (i.e. with 200 westbound (or arriving) vehicles and 100 eastbound (or departing), there would be 300 two-way trips).

Compound type	Compound name	Indicative start/set up date (years/ quarter)	Estimated duration of active use (years/ months)	Average daily combined two–way car/LGV trips during busy period and within peak month of activity	Average daily combined two–way HGV trips during busy period and within peak month of activity	Estimated duration of busy period (months)
Satellite	Butler Street satellite compound	2026 Q3	2 years	63–108	11-16	19

21.2.23 Table 21-4 summarises the access routes to and from each compound to the main road network.

21.2.24 The average daily combined two-way vehicle trips reported in Table 21-3 represent the total number of vehicle movements to and from each compound during the busy period and in the peak month of activity on all of the available construction routes combined.

Table 21-4: Construction routes for construction compounds in the Preston Station area

Compound name(s)	Access routes to / from compound(s) to main road network
Parcel Sidings main compound	Christian Road, Fishergate, Fishergate Hill and the A59 Liverpool Road
Butler Street satellite compound	Butler Street, Fishergate, Fishergate Hill and the A59 Liverpool Road

Overview of impacts - construction

21.2.25 The traffic and transport impacts during the construction period within the Preston Station area will include:

- construction and workforce vehicle movements to and from the various construction compounds;
- possessions and blockades on the conventional rail network;
- impacts on the existing Preston Station due to construction work which could affect users of the station and users of the adjacent highway network; and
- loss of some station and Network Rail office and compound car parking.

21.2.26 Construction vehicle movements required to construct the Proposed Scheme will include the delivery of plant and materials and site worker trips.

21.2.27 Due to the limited scope of the works, the number of two-way vehicle movements to compounds is expected to be low during peak periods. The daily maximum flow is predicted to be 90 two-way vehicle movements to the Parcel Sidings main compound and 124 two-way vehicle movements to the Butler Street satellite compound. The majority of these vehicle movements will be worker trips or LGV movements and are expected to occur outside the local road network peak periods. The daily maximum HGV flow is expected to be 12 two-way movements to the Parcel Sidings main compound and 16 two-way vehicle movements to the

Butler Street satellite compound. Recognising the low level of additional traffic due to the Proposed Scheme, no further assessment of potential traffic impacts has been undertaken.

21.2.28 The construction of the Proposed Scheme is expected to require a number of rail possessions and blockades over a period of up to two years in this area. This will include one possession of up to 27 hours and 18 possessions of up to 52 hours on specific lines. In addition, there will be one blockade, of up to nine days in duration, comprising a full station closure. The possessions and blockades will be required to enable the construction of Proposed Scheme elements including the: extension, widening and reinstatement of platforms, the provision of a new footbridge link and track alignment/renewal works. Disruption to rail users will be reduced by limiting possessions, where reasonably practicable, to existing maintenance periods. Possessions and blockades will affect users of the WCML and branch lines from Colne, Ormskirk and Blackpool and will be managed through a combination of measures, which could include rail service diversions and replacement bus services, which will reduce the disruption to the travelling public.

Carlisle

21.2.29 The Proposed Scheme in the Carlisle Station area will comprise works to the existing Carlisle Station. These works will include the extension of two existing platforms, infilling of a platform, and construction of a new platform, in order to allow HS2 trains to call at the station and for HS2 trains to split in to two trains, for onward journeys to Glasgow and Edinburgh or to join to form one train for onward journeys to the south. The Proposed Scheme at Carlisle Station will be on land within Network Rail ownership.

21.2.30 A new platform (platform 0) will be provided to accommodate the Cumbrian Coast Line services displaced from bay platform 2, which will be infilled. A new footbridge will provide access for passengers to the new platform 0. There will be an extension of platform 3 on the southern side of the station to accommodate HS2 services; and the existing station canopy over platforms 1 and 3 will be extended to protect the increased length of platforms.

21.2.31 Users of all the platforms, including the new platform 0, will use the existing station entrances, ticket hall and concourse.

21.2.32 In addition, there will be modifications to the track layout, signalling, overhead line equipment and other railway systems within the Carlisle Station area to facilitate the Proposed Scheme (see Volume 4 Map Book, map CT-06-803).

Environmental baseline

21.2.33 Carlisle Station is situated within Carlisle city centre, to the south of Victoria Viaduct and English Street, west of the A6 Botchergate and east of James Street. Carlisle Station is a Grade II* listed station building, which also includes a Grade II listed wall within the main station complex.

21.2.34 The principal vehicular access to Carlisle Station is off Court Square Brow, to the east of the station, and provides access to a car park and taxi pick up/drop off. Court Square Brow

connects with A6 English Street, which forms part of the gyratory road network within Carlisle town centre. There is no formal taxi rank at the station frontage. The nearest bus stops to the station are located on English Street.

21.2.35 The car park to the east of the station is operated by Avanti Trains and provides short stay and long stay parking. A second long stay car park, also operated by Avanti Trains, is located on the western side of the station and is accessed via South George Street. The Water Street Station Car Park is also located on the western side of the station and is privately operated. General car parking is located at the Victoria Viaduct Estate to the north of the station.

21.2.36 Surveys were undertaken to understand the use of highways and car parks within the study area. The survey types and locations are shown in the BID report.

21.2.37 Traffic surveys, comprising JTC, MCC, QLS, ATC, car park surveys and pick up/drop off surveys were undertaken in October 2017, November 2017, March 2019 and July 2019. Car park pick-up and drop-off surveys were undertaken in July 2019 at the station car parks to the east of the station and at the Upper Viaduct car park accessed from Viaduct Estate Road. The surveys recorded 302 vehicle movements to/from the station in the morning peak hour, and 289 in the evening peak hour.

21.2.38 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 6% by 2028 compared to a baseline year of 2019 and by an average of 17% in the morning peak hour and 17% in the evening peak hour between 2019 and 2046.

21.2.39 In the future baseline of 2046, it is forecast that the station will attract 354 vehicle movements in the morning peak hour and 337 in the evening peak hour.

21.2.40 The local roads that could be impacted by the Proposed Scheme include: the A6 Roman Road/Carleton Road/London Road/Botchergate; A69 Rotary Way/Warwick Road/Victoria Place; A7 Spencer Street/Georgian Way/Victoria Place/Lowther Street; the A595 Bridge Street/Castle Way; the A595 Castle Way; and the B5299 Shaddongate.

21.2.41 The local road network in this area generally operates well, although some localised delays can be experienced, particularly at peak times.

Proposed Scheme construction description

Introduction

21.2.42 Construction of the Proposed Scheme is expected to commence in 2026 with construction activity continuing to 2028. Construction activities have been assessed against 2028 baseline traffic flows, irrespective of when they occur during the construction period.

Construction activities and phasing

21.2.43 Details of the main construction works and the time periods when each compound will be operational are summarised in the indicative construction programme. For the construction programme for Carlisle Station refer to Volume 4, Off-route effects, Section 4.

21.2.44 A complete description of the works associated with the Proposed Scheme in the Carlisle Station area is provided in Volume 4, Section 4. The construction works will be carried out throughout the site for the majority of the construction period. The overall programme has been outlined on a year by year basis. The key construction activities, along with their start dates, are provided in Table 21-5. This excludes advance works such as utility works and demolition activities.

Table 21-5: Carlisle Station key construction activities

Activity	Start date
Site preparation and setup	2026 Q4
Station works	2027 Q1
Rail systems installation	2027 Q1
Site reinstatement	2028 Q1

Compounds and construction sites

21.2.45 The Proposed Scheme will be constructed from compounds. This will comprise the South George Street main compound, which will manage and coordinate the work from the High Wapping Sidings satellite compound.

21.2.46 Table 21-6 summarises the expected average and peak workforce (site workers plus staff) at each construction compound in Carlisle Station area.

Table 21-6: Assumed workforce at construction sites

Compound type	Compound name	Number of site workers (peak)	Number of staff (peak)	Total workforce (site plus staff)	
				Average	Peak
Main	South George Street main compound	70	15	65	85
Satellite	High Wapping Sidings satellite compound	65	15	72	80

21.2.47 Table 21-7 provides details of the compound set up date and the duration of active use. The duration of active use excludes any period where there are no substantial workforce trips or movement of materials to and from the compound.

21.2.48 Table 21-7 also provides a summary of the HGV and LGV access trips at each compound in the peak month of activity and during the busy period. For each compound, the peak month of activity is the month within which HGV traffic is at its highest for that compound. The busy period is the period during which HGV traffic serving that compound will be greater than 50% of the HGV traffic in the peak month. The average daily combined two-way vehicle trips for the busy period is the lower end of the range shown in Table 21-7 and the average daily combined two-way vehicle trips for the peak month is the upper end of the range shown. The estimated duration of busy period is also provided.

Table 21-7: Typical vehicle trip generation for construction site compounds in the Carlisle Station area

Compound type	Compound name	Indicative start/set up date (years/ quarter)	Estimated duration of active use (years/ months)	Average daily combined two–way car/LGV trips during busy period and within peak month of activity	Average daily combined two–way HGV trips during busy period and within peak month of activity	Estimated duration of busy period (months)
Main	South George Street main compound	2026/Q4	1 year 9 months	72–88	14-20	17
Satellite	High Wapping Sidings satellite compound	2026/Q4	1 year 9 months	55–108	18-20	4

21.2.49 Table 21-8 summarises the access routes to and from each compound to the main road network. The average daily combined two-way vehicle trips reported in Table 21-7 represent the total number of vehicle movements to and from each compound during the busy period and in the peak month of activity on all of the available construction routes combined.

Table 21-8: Construction routes for construction compounds in the Carlisle Station area

Compound name(s)	Access routes to / from compound(s) to main road network
South George Street main compound	South George Street, Water Street, Currock Street, Robert Street, Crown Street, and A6 Botchergate
High Wapping Sidings satellite compound	Crown Street, Currock Street and A6 Botchergate

Overview of impacts - construction

21.2.50 The traffic and transport impacts during the construction period within the Carlisle area will include:

- construction and workforce vehicle movements to and from the various construction compounds;
- possessions and blockades on the conventional rail network;
- impacts on the existing Carlisle Station due to construction work which could affect users of the station and users of the adjacent highway network; and
- loss of car parking.

21.2.51 Due to the limited scope of the works, the number of two-way vehicle movements to compounds is expected to be low during peak periods. The daily maximum flow is predicted to be 108 two-way vehicle movements to the South George Street main compound and 128 two-way vehicle movements to the High Wapping Sidings satellite compound. The majority of these vehicle movements will be worker trips or LGV movements and are expected to

occur outside the local road network peak periods. The daily maximum HGV flow is expected to be 20 two-way movements to the South George Street main compound and 20 two-way vehicle movements to the High Wapping Sidings satellite compound. Recognising the low level of additional traffic due to the Proposed Scheme, no further assessment of potential traffic impacts has been undertaken.

21.2.52 The construction of the Proposed Scheme is expected to require a number of rail possessions and blockades over a period of up to two years in this area. This will include one possession of 27 hours, 11 possessions of 54 hours and one possession of 100 hours. One blockade of up to nine days will be required, comprising a full station closure, and a long-term possession of the northbound Cumbrian Coast Line and sidings 1, 2 and 3 will be required for up to one year. The works include the construction of platform 0, the installation of a new footbridge and the alterations of tracks. Disruption to rail users will be reduced by limiting possessions, where reasonably practicable, to existing maintenance periods. Possessions and blockades will affect users of the WCML, the Cumbrian Coast Line and the Newcastle Line and will be managed through a combination of measures, which could include rail service diversions and replacement bus services, which will reduce the disruption to the travelling public.

Off-route depot facilities

21.2.53 HS2 trains serving the north of England and Scotland will need overnight stabling and light maintenance facilities near to the stations where they would finish service, as it is operationally impracticable for them to be returned to the proposed HS2 stabling facilities. Accordingly, there is a need for stabling and depot facilities at Annandale depot.

21.2.54 This section considers the works to accommodate HS2 services.

Annandale

21.2.55 The Proposed Scheme in the Annandale area (between Gretna Green and Kirkpatrick-Fleming) will comprise the Annandale depot, located north of the B7076 and off the existing WCML, approximately 3km north-west of Gretna Green and approximately 2km south-east of Kirkpatrick-Fleming. The Annandale depot will provide stabling and light maintenance facilities and accommodate up to 28 200m HS2 trains that will serve destinations on the WCML, including Carlisle, Glasgow and Edinburgh.

21.2.56 The Proposed Scheme at the Annandale depot will include a site access from the B7076, connecting with an internal road network leading to main buildings and car parking. A stabling area where trains will be cleaned and stabled overnight will comprise 14 sidings up to 400m long, each able to hold two 200m train sets. A four-track maintenance shed for the servicing, cleaning and maintenance of passenger rolling stock, carriage washing plant and automatic vehicle inspection, and an accommodation building comprising a workshop, offices and stores, and a staff car park, with approximately 120 car spaces will be provided.

Environmental baseline

21.2.57 Surveys were undertaken to understand the use of highways within the study area. The survey types and locations are shown in the BID report (see BID TR-004-00001).

21.2.58 Traffic surveys, comprising JTC, MCC, QLS and ATC, were undertaken in November 2020. Where possible, ATC data were gathered for a two-week period. In total 21 traffic surveys have been undertaken in Annandale area.

21.2.59 To ascertain the likely impact of COVID-19 travel restrictions on traffic volumes in the Annandale area, data provided by Transport Scotland from permanent monitoring sites located on the A74(M) for 2019 and 2020 was analysed. This demonstrated that traffic flows have been impacted by the COVID-19 and were still substantially below pre COVID-19 levels at the time of HS2 Ltd traffic surveys in November 2020.

21.2.60 Consequently, adjustment factors have been derived from the Transport Scotland data and applied to the HS2 Ltd traffic survey data to uplift the observed traffic flows to 'non-COVID' equivalent traffic levels, referred to as a 'COVID-adjusted 2020 baseline'. Table 21-9 outlines the average percentage difference and uplift factors that were applied to the observed survey data, to provide the COVID-adjusted 2020 baseline.

Table 21-9: Recommended uplift factors by time period

	AM Peak (08:00-09:00)	PM Peak (17:00-18:00)	Average Weekday Traffic	Average Daily Traffic
Average percentage difference (2019 v 2020)	-28%	-27%	-31%	-35%
Uplift factors	1.39	1.37	1.45	1.54

21.2.61 Future baseline turning movements and link flows are derived by applying TEMPro growth factors to the 'COVID-adjusted 2020 baseline' flows.

21.2.62 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 4% by 2028 compared to the baseline year of 2020. Future baseline traffic volumes in the peak hours are forecast to grow by an average of 8% by 2038 compared to the baseline year of 2020. Future baseline traffic volumes in the peak hours are forecast to grow by an average of 11% by 2046 compared to the baseline year of 2020.

21.2.63 The A74(M) is the only strategic route that passes through the area. The strategic road network in and around the Annandale area is generally free flowing at peak times.

21.2.64 The local roads that could be affected by the Proposed Scheme include: the B7076; the B6357; and the Gretna Green motorway services access road. The local road network in this area generally operates well and is generally free flowing at peak times.

21.2.65 No accident clusters were identified within the Annandale area.

21.2.66 There is one bus service, route 382, that operates on the B7076 adjacent to the land required for the operation of the Proposed Scheme. There are also bus stops primarily located to serve the built-up areas of Annandale and Kirkpatrick-Fleming. Where bus routes and stops are expected to be affected by either the construction or operation of the Proposed Scheme, these are referred to in the relevant assessment sections.

21.2.67 Local rail services are accessible via Gretna Green Station, which provides access to services to Glasgow, Carlisle, Dumfries and Newcastle.

21.2.68 There is no parking or loading identified within the Annandale area that is expected to be impacted by the Proposed Scheme. Consequently, this topic is not considered further in this assessment.

21.2.69 There are footways adjacent to many of the roads in the built-up areas of Gretna and Kirkpatrick-Fleming. Roadside footways vary in width and condition within these areas. Where there is no formal footway provision adjacent to a road, non-motorised user numbers are generally low.

21.2.70 National Routes 7 and 74 (part of the National Cycle Network) connecting Glasgow with Gretna and Carlisle, pass through the Annandale area.

21.2.71 There are no navigable waterways within the Annandale area potentially affected by the Proposed Scheme. Consequently, this topic is not considered further in this assessment.

21.2.72 There is no relevant air transport within the Annandale area. Consequently, this topic is not considered further in this assessment.

Proposed Scheme construction description

Introduction

21.2.73 Construction of the Proposed Scheme is expected to commence in 2025 with construction activity continuing to 2031. Construction activities have been assessed against 2028 baseline traffic flows, irrespective of when they occur during the construction period.

Construction activities and phasing

21.2.74 Details of the main construction works and the time periods when each compound will be operational are summarised in the indicative construction programme. For the construction programme for Annandale depot refer to Volume 4, Off-route effects, Section 6.

21.2.75 A complete description of the works associated with the Proposed Scheme in the Annandale area is provided in Volume 4, Section 6. The construction works will be carried out throughout the site for the majority of the construction period. The overall programme has been outlined on a year by year basis. The key construction activities, along with their start dates, are provided in Table 21-10 this excludes advance works such as utility works and demolition activities.

Table 21-10: Annandale depot key construction activities

Activity	Start date
Area advance works	2025 Q2
Site Preparation and Setup	2027 Q2
Annandale depot works	2027 Q4
Rail systems installation (depot)	2027 Q4
Rail systems installation (depot connections to WCML)	2030 Q2
Site Reinstatement	2031 Q3

Compounds and construction sites

21.2.76 The Proposed Scheme will be constructed from compounds. This will comprise the Annandale depot main compound, which will manage and coordinate the work from three satellite compounds at Quintinshill Sidings, Cranberry Farm accommodation overbridge and Cove Crossing.

21.2.77 Table 21-11 summarises the expected average and peak workforce (site workers plus staff) at each construction compound in Annandale area.

Table 21-11: Assumed workforce at construction sites

Compound type	Compound name	Number of site workers (peak)	Number of staff (peak)	Total workforce (site plus staff)	
				Average	Peak
Satellite	Quintinshill Sidings satellite compound	65	15	67	80
Satellite	Cranberry Farm accommodation overbridge satellite compound	95	24	86	119
Main	Annandale depot main compound	260	85	258	345
Satellite	Cove Crossing satellite compound	65	15	67	80

21.2.78 Table 21-12 provides details of the compound set up date and the duration of active use. The duration of active use excludes any period where there are no substantial workforce trips or movement of materials to and from the compound.

21.2.79 Table 21-12 also provides a summary of the HGV and LGV access trips at each compound in the peak month of activity and during the busy period. For each compound, the peak month of activity is the month within which HGV traffic is at its highest for that compound. The busy period is the period during which HGV traffic serving that compound will be greater than 50% of the HGV traffic in the peak month. The average daily combined two-way vehicle trips for the busy period is the lower end of the range shown in Table 21-12 and the average daily combined two-way vehicle trips for the peak month is the upper end of the range shown. The estimated duration of busy period is also provided.

Table 21-12: Typical vehicle trip generation for construction site compounds in the Annandale area

Compound type	Compound name	Indicative start/set up date (years/ quarter)	Estimated duration active of use (years/ months)	Average daily combined two-way car/LGV trips during busy period and within peak month of activity	Average daily combined two – way HGV trips during busy period and within peak month of activity	Estimated duration of busy period (months)
Rail systems	Quintinshill Sidings satellite compound	2030 Q2	9 months	147–147	4–4	6
Satellite	Cranberry Farm accommodation overbridge satellite compound	2027 Q3	3 years	84–94	13–16	9
Main	Annandale depot main compound	2027 Q2	4 years 6 months	218–386	405–424	16
Rail systems	Cove Crossing satellite compound	2030 Q2	9 months	147–148	4–4	6

21.2.80 The indicative construction programme in Volume 4, Section 6 illustrates how the phasing of activities at different compounds will generally be staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 21-12.

21.2.81 Table 21-13 summarises the access routes to and from each compound to the main road network. For some compounds, Table 21-13 includes multiple construction routes. This is because the construction route varies depending on the origin/destination of the trip.

21.2.82 The average daily combined two-way vehicle trips reported in Table 21-12 represent the total number of vehicle movements to and from each compound during the busy period and in the peak month of activity on all of the available construction routes combined. Where multiple routes are shown in Table 21-13, the split of construction traffic between the available routes will vary based on the point in the construction programme and the origin/destination of the traffic.

Table 21-13: Construction routes for construction compounds in the Annandale depot area

Compound name(s)	Access routes to / from compound(s) to main road network
Quintinshill Sidings satellite compound	Unnamed road serving Quintinshill, B7076, Gretna Green motorway services access road and A74(M)
Cranberry Farm accommodation overbridge satellite compound Annandale depot main compound	Route to/from the south: B7076 and A74(M) junction 21 Route to/from the north: B7076, Gretna Green motorway services access road and A74(M)
Cove Crossing satellite compound	Unnamed road serving Cove Crossing, B7076, B6357 and A74(M) junction 21

Overview of impacts - construction

21.2.83 The traffic and transport impacts during the construction period within the Annandale area will include:

- construction and workforce vehicle movements to and from the various construction compounds; and
- possessions on the conventional rail network resulting in impacts on users of the adjacent rail networks.

21.2.84 Construction vehicle movements required to construct the Proposed Scheme will include the delivery of plant and materials, movement of excavated materials and site workforce trips. Works will include utility works diversions, earthworks, and the construction of underpasses, viaducts, bridges and highways.

21.2.85 HGV have been routed, where reasonably practicable, along the strategic or primary road network, although some access locations will be via secondary roads. Where reasonably practicable, the use of the local road network has been limited to site set up, access for environmental surveys and ongoing servicing (including refuse collection and general deliveries).

21.2.86 Table 21-14 summarises the peak daily HS2 construction traffic flow, both in HGV and total vehicles, on roads within the Annandale area that form part of construction routes. In the Annandale area, the main construction traffic routes from the SRN are:

- B7076 (between unnamed road serving Quintinshill and unnamed road serving Cove Crossing);
- B6357 (between the A74(M) junction 21 and the B7076);
- unnamed road serving Quintinshill;
- unnamed road serving Cove Crossing; and
- A74(M) Gretna Green motorway services access road.

Table 21-14: Annandale peak daily construction traffic flow

Location	Direction*	Daily peak HGV vehicles	Daily peak all vehicles
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	2	76
	SB	2	76
B7076 (between Gretna Green service station access and Annandale depot site access)	NB	109	191
	SB	109	191
B7076 (between Annandale depot site access and A74(M) junction 21 south-facing slip roads)	NB	109	191
	SB	109	191
B7076 (between A74(M) junction 21 south-facing slip roads and B6357)	NB	1	38
	SB	1	38

Location	Direction*	Daily peak HGV vehicles	Daily peak all vehicles
B6357 (between B7076 and A74(M) junction 21 north-facing slip roads)	NB	1	38
	SB	1	38

** NB = northbound; SB = southbound; EB = eastbound; and WB = westbound*

21.2.87 Access to the facility will be provided via a new access road off the B7076, leading to the main buildings and car parking. The Proposed Scheme will require the realignment of the existing B7076 to provide a new priority-controlled (ghost-island) T-junction. A surface car park, with approximately 120 spaces will be provided.

Strategic and local road network traffic flows

21.2.88 During the construction period a number of roads will be affected by the construction of the Proposed Scheme. An assessment of the impact of construction related vehicle movements and temporary diversions has been undertaken and is detailed below. The flows outlined in the following sections will not necessarily occur concurrently, as impacts on different parts of the network will occur at different times.

21.2.89 Table 21-15 and Table 21-16 set out the traffic flows for the 2028 future baseline and the Proposed Scheme on the roads most affected by construction of the Proposed Scheme for the AM and PM peak hour. In both time periods, the percentage changes in HGV flows are generally higher than the percentage changes in all traffic flows as a result of the relatively low number of HGV movements in the future baseline.

21.2.90 Traffic flows on all other roads are either unaffected from the future baseline or there are only small changes in traffic flows (HGV or all vehicles of less than 10%) compared to the future baseline daily flow.

21.2.91 It should be noted that, unless identified in the next section of this report relating to junction impacts, these increases in traffic will not result in material increases in congestion or delay.

Table 21-15: 2030 future baseline and Proposed Scheme construction traffic (vehicles) - AM peak hour (08:00-09:00)

Location	Direction	2030 baseline flows		2030 Proposed Scheme flows[6]		Proposed Scheme actual flow change from 2030 baseline		Proposed Scheme % change from 2030 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
B7076 (between Annandale depot site access and B6357)	NB	158	14	212	15	54	1	26%	7%
	SB	125	22	179	23	54	1	30%	4%
B7076 (between A74(M) NB off-slip and A74(M) SB on-slip)	NB	302	24	566	133	264	109	47%	82%
	SB	269	33	533	142	264	109	50%	77%
B7076(between Annandale depot site access andA74(M) Junction 21 SB On-Slip)	NB	302	24	566	133	264	109	47%	82%
	SB	269	33	533	142	264	109	50%	77%
B7076 (between Cranberry Farm satellite compound site access and Gretna Green service station)	NB	114	27	232	136	118	109	51%	80%
	SB	67	21	185	130	118	109	64%	84%
B6357 (between A74(M) NB on slip and A74 (M) SB off-slip)	NB	91	0	107	1	16	1	15%	100%
	SB	95	0	111	1	16	1	14%	100%
B6357 (B7076 roundabout junction and A74(M) NB on slip)	NB	91	0	107	1	16	1	15%	100%
	SB	95	0	111	1	16	1	14%	100%
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	102	0	126	2	24	2	19%	100%
	SB	56	0	80	2	24	2	30%	100%
B7076 (between Annandale depot site access and B6357)	NB	158	14	212	15	54	1	26%	7%
	SB	125	22	179	23	54	1	30%	4%
B7076 (between A74(M) NB off-slip and A74(M) SB on-slip)	NB	302	24	566	133	264	109	47%	82%
	SB	269	33	533	142	264	109	50%	77%

[6] For all tables that reference the Proposed Scheme flows these are the baseline flows plus the equivalent Proposed Scheme flows.

Location	Direction	2030 baseline flows		2030 Proposed Scheme flows[6]		Proposed Scheme actual flow change from 2030 baseline		Proposed Scheme % change from 2030 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
B7076(between Annandale depot site access andA74(M) Junction 21 SB On-Slip)	NB	302	24	566	133	264	109	47%	82%
	SB	269	33	533	142	264	109	50%	77%
B7076 (between Cranberry Farm satellite compound site access and Gretna Green service station)	NB	114	27	232	136	118	109	51%	80%
	SB	67	21	185	130	118	109	64%	84%
B6357 (between A74(M) NB on slip and A74 (M) SB off-slip)	NB	91	0	107	1	16	1	15%	100%
	SB	95	0	111	1	16	1	14%	100%
B6357 (B7076 roundabout junction and A74(M) NB on slip)	NB	91	0	107	1	16	1	15%	100%
	SB	95	0	111	1	16	1	14%	100%
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	102	0	126	2	24	2	19%	100%
	SB	56	0	80	2	24	2	30%	100%

Table 21-16: 2030 future baseline and with the Proposed Scheme construction traffic (vehicles) - PM peak hour (17:00-18:00)

Location	Direction	2030 baseline flows		2030 Proposed Scheme flows[7]		Proposed Scheme actual flow change from 2030 baseline		Proposed Scheme % change from 2030 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
B7076 (between Annandale depot site access and B6357)	NB	114	9	168	10	54	1	32%	10%
	SB	136	12	190	13	54	1	28%	8%
B7076 (between A74(M) NB off-slip and A74(M) SB on-slip)	NB	258	19	522	128	264	109	51%	85%
	SB	281	23	545	132	264	109	48%	83%

[7] For all tables that reference the Proposed Scheme flows these are the baseline flows plus the equivalent Proposed Scheme flows.

Location	Direction	2030 baseline flows		2030 Proposed Scheme flows[7]		Proposed Scheme actual flow change from 2030 baseline		Proposed Scheme % change from 2030 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
B7076 (between Annandale depot site access andA74(M) Junction 21 SB On-Slip)	NB	258	19	522	128	264	109	51%	85%
	SB	280	23	544	132	264	109	49%	83%
B7076 (between Cranberry Farm satellite compound site access and Gretna Green service station)	NB	111	24	229	133	118	109	51%	82%
	SB	64	15	182	124	118	109	65%	88%
B6357 (between A74(M) NB on slip and A74 (M) SB off-slip)	NB	68	0	84	1	16	1	19%	100%
	SB	83	0	99	1	16	1	16%	100%
B6357 (B7076 roundabout junction and A74(M) NB on slip)	NB	68	0	84	1	16	1	19%	100%
	SB	83	0	99	1	16	1	16%	100%
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	100	14	124	16	24	2	19%	13%
	SB	53	4	77	6	24	2	31%	33%

Junction performance

21.2.92 Junction capacity analysis has been undertaken for the AM and PM peak hours comparing junction operation in the 2028 future baseline scenario with the Proposed Scheme.

21.2.93 Junctions which experience an impact as a result of the Proposed Scheme, but where the layout is not changed are generally identified using the following criteria:

- the Ratio of Flow to Capacity (RFC), Degree of Saturation (DoS) or Volume over Capacity (VoC) for an approach arm increases to over 87% during the construction of the Proposed Scheme; and
- the RFC, DoS or VoC for an approach arm increases by 2% or more from the baseline.

21.2.94 The changes in traffic during construction of the Proposed Scheme will not result in material increases in congestion or delay at any junction within the study area.

21.2.95 The following table and commentary sets out the performance of the proposed B7076 / Annandale depot site access, which is a new junction and will be used for access to the Proposed Scheme during the construction period.

B7076 / Annandale depot site access

21.2.96 This junction will be a three-arm priority controlled (give-way) T-junction with no signal controlled pedestrian crossing facilities. The operation of the junction has been assessed using Junctions 9 software. Table 21-17 summarises the results of the changes to the performance of the junction as a result of the Proposed Scheme.

Table 21-17: B7076 / depot site access junction 2028 future baseline and with the Proposed Scheme junction capacity assessment results

Approach	Flow, PCU/hr	RFC	Q, PCU
08:00-09:00	**2028 Proposed Scheme Stage 1**		
B7076 (west) (ahead and left)	174	-	-
Main Compound (left)	26	0.04	0
Main Compound (right)	26	0.05	0
B7076 (east) (ahead and right)	74	0.05	0
17:00-18:00	**2028 Proposed Scheme Stage 1**		
B7076 (west) (ahead and left)	70	-	-
Main Compound (left)	29	0.05	0
Main Compound (right)	101	0.10	0
B7076 (east) (ahead and right)	60	0.04	0

21.2.97 The assessment shows that the junction operates within capacity in the AM and PM peak hour with the Proposed Scheme.

Public transport

Bus network

21.2.98 No local bus routes will be affected by the operation of the Proposed Scheme.

Rail network

21.2.99 The construction of the Proposed Scheme, in particular the tie-in with the WCML, is expected to require a number of rail possessions over a period of up to eight months in this area. This will include six possessions of 27 hours, four possessions of 54 hours, and one possession of 72 hours, affecting all lines. The works will include track works, overhead line wiring and commissioning.

21.2.100 HS2 Ltd will work with Network Rail and the train operating companies and freight operating companies to ensure that disruption to passengers and freight is minimised as far as reasonably practicable and that any need for additional possessions can be reduced with good planning and communication (including appropriate advance notice). This includes measures such as:

- careful programming of works to coincide with possessions that are planned for the general maintenance of the existing railway;
- planning works so that they will be undertaken in short, overnight stages when passenger services will not be disrupted; and
- programming longer closures at weekends or bank holidays to minimise the number of passengers affected.

21.2.101 There are interfaces with the existing rail network in this area, in particular on the operation of the WMCL and its passengers and if relevant rail freight services. These are, however, expected to have little or no impact on the operation of rail services as they will be relatively minor localised works, such as work on and adjacent to track when not in use. In addition, where rail possessions are required, interventions will be combined where practicable to reduce the frequency of potential disruption.

Public transport interchanges

21.2.102 There are no public transport interchange facilities in the Annandale area and no committed proposals for public transport interchange facilities in this area.

Non-motorised users

21.2.103 The construction works associated with the Proposed Scheme will not require the temporary closure or diversion/realignment of PRoW, core paths or roads.

21.3 Off-route operation assessment

21.3.1 This section considers off-route stations followed by off-route depots

Off-route stations

21.3.2 In addition to the operational impact of changes to off-route stations to accommodate HS2 services, this section of the report identifies the off-route railway stations across the conventional railway network where operation of the Proposed Scheme, and the consequent release of capacity elsewhere, will result in changes to passenger numbers. HS2 Phase One stations are included within the assessment. Any change in passengers will lead to changes in the number of access journeys, including, potentially, by car, taxi, walking, cycle, bus and tram. These do not necessarily require any physical works to the station or surrounding area.

21.3.3 At Preston and Carlisle, physical works are proposed to accommodate increased passenger numbers. However, the proposed changes to the station layout at both stations are not expected to result in substantial impacts on existing station users. Access to all platforms will be provided via an existing lift, connecting with the existing subway to maintain step-free access for persons with reduced mobility. As the impacts of these works have no material impacts in operation they are not considered further.

Methodology for assessment of passenger demand

21.3.4 Stations where the operation of the Proposed Scheme, including the use of released capacity on the conventional railway network, will result in an increase in passenger numbers have been identified using PFM. This section of the report explains how such stations are identified and assessed.

21.3.5 The off-route assessment for the Proposed Scheme follows the same approach as used for HS2 Phase One and Phase 2a. The assessment identifies off-route stations where an increase in passenger numbers is forecast to occur and assesses the potential for this to result in incremental impacts as a consequence of the Proposed Scheme where HS2 Phase One and Phase 2a are included in the baseline), and of HS2 Phase One, Phase 2a and the Proposed Scheme in combination.

21.3.6 Off-route stations identified for assessment include stations on the conventional rail network which are subject to changes in passenger demand that meet the criteria set out below, conventional rail stations served by HS2 trains and HS2 Phase One stations. Passenger demand at HS2 stations on the Proposed Scheme are covered in the TA Part 2 and Part 3.

21.3.7 The identification of stations for assessment of off-route impacts during operation is based upon the Environmental Impact Assessment Scope and Methodology Report (SMR) (see Volume 5, Appendix CT-001-00001) criteria for traffic and transport impacts and takes into

account the potential for air quality; community; socio-economics; sound, noise and vibration; and any other relevant environmental topics. The impacts that are a consequence of the Proposed Scheme in combination with HS2 Phase One and Phase 2a (referred to as the 'Proposed Scheme in combination' in this section) relate solely to changes in passenger numbers at these stations.

21.3.8 In terms of assessing traffic and transport impacts, the focus is primarily on changes to the number of cars and taxis accessing stations as a result of the operation of the Proposed Scheme in combination, as this has a greater potential to give rise to impacts compared to bus use, walking and cycling. In particular, bus operators determine the frequency of bus services and can be expected to make adjustments to accommodate any changes in passenger demand when planning future services.

21.3.9 The identification of which off-route stations should be assessed in detail was based on the following criteria:

- an increase of 10% or more in the use of a station and its facilities and impacts on walking, cycling and public transport; and
- the potential impact in use of the road network, in particular congestion and the thresholds set in the context of the potential impacts on air quality and sound, noise and vibration.

21.3.10 The first stage was to undertake a high level sift to establish which off-route stations would materially be impacted by the operation of the Proposed Scheme, in terms of a change in passenger numbers and which might experience transport impacts.

21.3.11 The identification of stations for assessment of off-route impacts is based upon defined criteria for traffic and transport impacts. In this context it is considered that more than a 10% change in use (measured in this context in terms of station footfall) is an appropriate threshold for when impacts on transport infrastructure could become substantial and when changes in traffic might affect pedestrian and cyclist severance. Below this level of change it is not considered likely that there would be substantial impacts on transport infrastructure.

21.3.12 However, a lower threshold is appropriate in considering congestion and delays, which needs to recognise the capacity of station access routes. A minimum change in likely highway use of 5% has been adopted for this and this has been factored up to an equivalent daily change in rail passengers. If the station is served by a busy urban single carriageway road, then a threshold of a change of 700 users per day is considered appropriate. A higher threshold of 1,400 users per day has been used if higher capacity dual carriageway access is available. Below these thresholds, it is considered that the potential impact on congestion, air quality and sound, noise and vibration would be negligible.

21.3.13 These passenger thresholds were based on the following conservative assumptions:

- a car mode share of 60% (i.e. 60 car trips (car/taxi) per 100 rail passengers);
- 20% of the daily passengers would arrive and depart in the peak hour; and

- a two way single carriageway road link capacity of 1,500 to 1,900 vehicles per hour (and a capacity of 4,000 to 5,000 vehicles per hour for a dual carriageway) with a 5% change in traffic flows representing some 75 to 95 trips in the peak hour per direction for a single carriageway road or some 150 to 190 trips in the peak hour per direction for a dual carriageway road.

21.3.14 Using the above criteria to convert rail passengers into traffic flows, indicates that for a single carriageway access road a daily change in rail passenger numbers of approximately 600 to 800 would result in a 5% change in traffic flows on the local road network in the peak hour, with a threshold of approximately 1,400 to 1,600 for a dual carriageway access road. For sifting purposes, an average increase of 700 and 1,400 vehicles/day was used as the passenger threshold for a single carriageway and dual carriageway road respectively.

21.3.15 These represent a reasonable worst case initial sift as the forecast growth in passenger numbers will be dispersed over the road network and diluted by background traffic flows on the local highway network.

Forecast changes in passenger demand

21.3.16 The operation of the Proposed Scheme, and the consequent use of released rail capacity elsewhere, will result in changes to passenger numbers at off-route railway stations across the conventional railway network. This includes HS2 Phase One stations.

21.3.17 The forecast change in passengers as a result of HS2 Phase One, Phase 2a and the Proposed Scheme at both HS2 and off-route stations has been provided from PFM which has been periodically updated by HS2 Ltd during the course of the development of HS2. Consequently, different versions of the model have been used for the assessment of Phase One (PFM4.2), Phase 2a (PFMv7.1) and the Proposed Scheme (PFMv8).

21.3.18 Changes to PFM made during for this assessment include:

- inclusion of Phase One, Phase 2a and the Proposed Scheme;
- revisions to proposed conventional railway and HS2 service patterns;
- changes to official forecasts for the growth of the UK economy and other drivers of transport demand. Continued growth in demand is forecast for long-distance rail travel to 2029-2033 when HS2 Phase One is scheduled to open, 2038 when the Proposed Scheme opens and beyond. However, the forecasts used in the assessment have been produced prior to the development of a full understanding of the likely impact of COVID-19 on economic growth and travel behaviour. The full impact of COVID-19 is not yet known but is considered likely to result in lower travel demand than the forecasts used in the assessment for background traffic and rail, including HS2;
- updated forecasts of the growth in travel, building on the latest evidence of current patterns of rail travel (including updating the base model); and
- updates to assumptions relating to committed transport investment.

Sifting of stations

21.3.19 The criteria and demand forecasts described above have been used to identify stations where changes in passenger use arising from the Proposed Scheme in isolation, and in combination with HS2 Phase One and Phase 2a, could give rise to substantial impacts on other transport networks.

21.3.20 Phase One stations (London Euston, Old Oak Common, Birmingham Interchange and Birmingham Curzon Street) were assessed for Phase 2b operations as part of the HS2 Phase One assessment, as reported in Volume 4 of the HS2 Phase One ES[8]. However, the Phase One assessment was based on PFM4.2 (Full 'Y' network) forecasts for 2037 while the Proposed Scheme has been assessed using 2039 PFM9.6 (Western Leg) forecasts. Checks were undertaken to ensure that the passenger demand forecasts at these stations had not changed materially between the different versions of PFM. This analysis is reported in Table 21-18. As the Phase One assessment was based on the Full 'Y' network serving both the Western and Eastern Legs, the comparison with the Proposed Scheme demonstrates large reductions in footfall, approximately 37% for the London stations and 16% for the Birmingham stations. Indeed, when the 2037 Phase One PFM4.2 forecasts are compared with a 2039 Full 'Y' network run of PM9.6, the total flows between the two versions of PFM into and out of Birmingham and London were within 2%.

21.3.21 For these reasons, it was concluded that, as the demand used in the analysis undertaken for HS2 Phase One ES at the London and Birmingham HS2 stations was substantially higher than that used for the Proposed Scheme, any potential issues arising from increases in use of the stations due to HS2 were appropriately addressed by the Phase One assessment.

Table 21-18: Phase 2b operations at Phase One stations: PFMv4.2 (Full 'Y' network) v PFMv9.6 (Western Leg)

Station	Increase in footfall Proposed Scheme PFMv4.2 (2037) Full 'Y' network	Increase in footfall Proposed Scheme PFMv9.6 (2039)	Net difference	Increase in footfall Proposed Scheme PFMv9.6 (2039) Full 'Y' network	Net difference
London Euston[9]	80,436	42,183		81,970	
Old Oak Common	86,053	63,246		86,313	
London total	**166,489**	**105,429**	**-61,060 (-37%)**	**168,283**	**+1,794 (+1%)**

[8] High Speed Two Ltd (2013), *London-West Midlands Environmental Statement, Volume 4: Off-route effects*. Available online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/259489/Volume_4_Off-route_effects.pdf.

[9] Footfall numbers for Phase One London stations are tabulated from PFM. However, detailed modelling for south east England was undertaken using TfLs Railplan model with total HS2 and long-distance rail numbers entering and leaving the south east taken from PFM. Railplan provides a more detailed representation of route choice than PFM.

Station	Increase in footfall Proposed Scheme PFMv4.2 (2037) Full 'Y' network	Increase in footfall Proposed Scheme PFMv9.6 (2039)	Net difference	Increase in footfall Proposed Scheme PFMv9.6 (2039) Full 'Y' network	Net difference
HS Birmingham Interchange	29,916	28,662		30,921	
HS Birmingham Central	43,640	32,856		40,937	
West Midlands total	**73,556**	**61,518**	**-12,083 (-16%)**	**71,859**	**-1,698 (-2%)**

21.3.22 The stations where the predicted change in footfall meets the criteria of a daily increase in footfall of 10% or 700/1,400 trips either as a result of the Proposed Scheme or due to Phase One, Phase 2a and the Proposed Scheme is combination, are set out in Table 21-19, which outlines both the in-combination change (of Phase One, Phase 2a and the Proposed Scheme) and the Proposed Scheme in isolation.

Table 21-19: Increase in passenger demand greater than 5% or 700 trips/day, off-route stations, PFM9.6

Station	Change in daily passenger demand due to HS2 Phase One, 2a and the Proposed Scheme together (2046)	Percentage change in daily passenger demand due to HS2 Phase One, 2a and the Proposed Scheme together (2046)	Incremental change in daily passenger demand due to the Proposed Scheme compared with HS2 Phase One and 2a (2046)	Percentage incremental change in daily passenger demand due to the Proposed Scheme compared with HS2 Phase One and 2a (2046)
Milton Keynes Central	4,448	10%	1,005	3%
Crewe	2,554	10%	348	1%
Preston	3,518	16%	1,757	7%
Lancaster	1,276	15%	275	3%
Carlisle	1,682	20%	1,105	12%
Glasgow Central	4,854	6%	2,735	2%

21.3.23 Six stations are forecast to experience an increase in daily passenger demand greater than 10% or 700/1,400 users as a consequence of the Proposed Scheme in combination with Phase One and 2a. Of these, only Carlisle experiences an incremental increase greater than 10% as a consequence of the Proposed Scheme in isolation with three further stations experiencing an increase in daily passenger demand greater than 700/1,400 users. No station is identified that only exceeds the thresholds for the Proposed Scheme in isolation and consequently, the six stations that experience an increase as a consequence of the Proposed Scheme in combination with Phase One and 2a have been considered further since the impacts are always greater than the incremental impacts of the Proposed Scheme.

21.3.24 A number of stations with an increase greater than 10% or 700 trips/day for all phases of HS2 were scoped out either because the Proposed Scheme has a limited impact in its own

right and has therefore already been considered under the Phase One and 2a assessments, or there is high rail to rail interchange with limited changes in footfall into and out of the station. This is set out for each station below:

- Edinburgh – mode share information indicates less than 10% access by car and taxi combined;
- Stafford – main impacts in Phase One and 2a with low impact with Proposed Scheme;
- Slough – main impacts in Phase One and 2a with low impact with Proposed Scheme; and
- Watford Junction – high rail-rail interchange and dual carriageway highway access.

21.3.25 There are a number of stations which are forecast to experience a reduction in footfall with the Proposed Scheme in combination with Phase One and 2a or the incremental change resulting from the Proposed Scheme. These are shown in Table 21-20.

Table 21-20: Decrease in passenger demand greater than 5% or 700 trips/day, off-route stations, PFM

Station	Change in daily passenger demand due to HS2 Phase One, 2a and the Proposed Scheme together (2046)	Percentage change in daily passenger demand due to HS2 Phase One, 2a and the Proposed Scheme together (2046)	Incremental change in daily passenger demand due to the Proposed Scheme compared with HS2 Phase One and 2a (2046)	Percentage incremental change in daily passenger demand due to the Proposed Scheme compared with HS2 Phase One and 2a (2046)
London Paddington	-124,515	-50%	1,323	1%
London Kings Cross	-6,719	-7%	<500	<5%
London Marylebone	-7,095	-11%	-493	-1%
Coventry	-4,215	-11%	1,265	3%
Nuneaton	-847	-8%	362	4%
Birmingham International	-7,356	-20%	989	3%
Birmingham New Street	-19,172	-11%	-4,426	-3%
Lichfield Trent Valley	-751	-6%	<500	<5%
Warrington Bank Quay	-794	-9%	-1,307	-14%
Manchester Airport	-1,382	-7%	<500	<5%
Stockport	-7,503	-14%	<500	<5%

21.3.26 Eleven stations are forecast to experience a decrease in daily passenger demand greater than 10% or 700/1,400 users due to the Proposed Scheme in combination with Phase One and 2a, with cumulative reductions up to 50%. These stations are generally directly impacted

by alternative faster HS2 services. Consequently, it is expected that a number of passengers would divert to more convenient, faster Proposed Scheme services. This will have the benefit of releasing capacity on the existing rail network, as well as on the traffic and transport network local to the off-route stations. Those stations which experience either an increase in footfall or a decrease in footfall of less than 500 trips or 5% as a result of the incremental impact of the Proposed Scheme are stations where the majority of the impact is a result of other phases of HS2 rather than the Proposed Scheme.

21.3.27 The largest changes in passenger demand due to the Proposed Scheme in combination with Phase One and 2a are at London and Birmingham stations, most notably London Paddington and Birmingham New Street stations. For Paddington, the reduction is a result of Phase One with the introduction of interchange at Old Oak Common between the Great Western Main Line (GWML) fast services, Crossrail and HS2 services. In effect, these are passengers who in the future baseline would have interchanged between GWML (fast) services and Crossrail at Paddington. However, with HS2 Phase One, these passengers make the same interchange at Old Oak Common. The reductions at Birmingham New Street Station reflect the proximity to the HS2 station at Birmingham Curzon Street. There are smaller reductions in demand as a result of the Proposed Scheme in combination with Phase One and 2a at London Kings Cross and Marylebone and Birmingham International stations reflecting diversion to HS2 services at adjacent HS2 stations.

Stage 2 – analysis of impacts

21.3.28 In terms of transport impacts, an important focus is the changes to the number of cars and taxis accessing the station as a result of the operation of the Proposed Scheme. Such increases in use have the potential to give rise to more substantial impacts on the operation of the local transport network compared to bus use, walking and cycling, for which changes in use can generally more easily be accommodated. Existing bus operators determine the frequency of bus services and will be expected to account for any changes in passenger demand when planning future services.

Methodology

21.3.29 The following methodology was applied for each off-route station that met the peak hour threshold trip generation criteria of vehicle movements.

21.3.30 Existing conditions at the off-route stations that met the sifting criteria were established through site visits, specially commissioned traffic surveys and data from local authorities and Network Rail. The traffic surveys were generally undertaken in May, June and early July 2019 avoiding bank holidays and school holidays and comprised:

- junction turning counts;
- automatic traffic counts;
- car park demand surveys; and
- drop-off/pick-up surveys.

21.3.31 For the purpose of analysis, the highway peak hours were taken as 08:00-09:00 and 17:00-18:00.

21.3.32 The existing vehicular trip generation at each off-route station was established from the traffic surveys and the future baseline for the year of assessment, 2046, was estimated by applying growth in line with the DfT's TEMPro.

21.3.33 The following process was used to establish the vehicle trips generated by the operation of HS2 Phase One, Phase 2a and the Proposed Scheme in combination at the identified off-route stations:

- existing baseline survey traffic flows at each station were uplifted to 2046 flows using TEMPro to align with the PFM forecast year;
- the 2046 trip generation was increased in line with the forecast percentage growth in passengers derived from PFM due to the cumulative impact of HS2 Phase One and the Proposed Scheme; and
- the 2046 future baseline traffic flows were deducted from the 'with the Proposed Scheme' traffic flows, to give the trips generated by HS2 Phase One and the Proposed Scheme cumulatively.

21.3.34 The following process was used to establish the impacts on the local road network:

- the HS2 Phase One/Phase 2a and the Proposed Scheme generated trips were distributed onto the road network based on the existing turning movements/proportions recorded in the station traffic surveys;
- the trips generated by HS2 Phase One/2a and the Proposed Scheme cumulatively were added to the 2046 future baseline traffic flows to establish 2046 with Proposed Scheme traffic flows; and
- a comparison of the future baseline and 'with the Proposed Scheme' traffic flows was carried out to establish whether the cumulative impact of HS2 Phase One/2a and the Proposed Scheme or the Proposed Scheme in isolation would have a substantial impact on the local road network.

Summary of impact of changes in demand at off-route stations

Milton Keynes Central Station

Introduction

21.3.35 The introduction of HS2 services and the use of resulting released capacity on the conventional network will provide potential for service improvements and reduced crowding on trains for passengers who use Milton Keynes Central Station, which is expected to result in increased passenger demand. It is forecast that by 2046, passenger demand at Milton Keynes Central Station will increase by approximately 10%, equivalent to 4,450 additional passengers per day, as a result of the Proposed Scheme in combination with Phase One and 2a.

Environmental baseline

21.3.36 Milton Keynes Central Station is located on Elder Gate, at the western end of central Milton Keynes. To the west of the station, the rail line runs parallel with the A5.

21.3.37 Milton Keynes is built on a grid system. Elder Gate is a wide single carriageway road running broadly north-west to south-east. Parallel to Elder Gate to the east is V6 Grafton Street which is a wide, three-lane dual carriageway. Perpendicular to Elder Gate and V6 Grafton Street are Silbury Boulevard, Midsummer Boulevard and Avebury Boulevard. Footway access to the station is via segregated pedestrian underpasses which separate vehicular traffic on the main roads from pedestrians.

21.3.38 Vehicular access to Milton Keynes Central Station is via Elder Gate. There is extensive long- and short-stay parking close to the station and within Milton Keynes town centre. A series of dual carriageway boulevards provide access to the station from the A509, the A5 and other routes. As a result, the higher threshold of 1,400 users per day has initially been applied. However, given the alternative high-capacity routes available, it is considered that a much higher overall level of traffic could be accommodated without material impact on congestion. In addition, there is a bus interchange at the station, and with a substantial proportion of the increased usage forecast to be local trips, it is expected that there will be a substantial use of public transport use for accessing the station.

21.3.39 The car park and drop off surveys undertaken in May 2019 recorded 1,485 vehicle movements to/from the station in the morning peak hour, and 1,611 in the evening peak hour.

21.3.40 Future baseline traffic volumes are forecast to grow by around 25% in the morning peak hour and 24% in the evening peak hour by 2046 compared to 2019. As a result, in the future baseline of 2046, it is predicted that the station will attract 1,860 vehicle movements in the morning peak hour and 2,000 in the evening peak hour.

Passenger impacts

21.3.41 It is predicted that in 2046, the Proposed Scheme in combination with HS2 Phase One and Phase 2a, will generate an additional 191 vehicular trips in the morning peak hour and an additional 205 trips in the evening peak hour. When this demand is distributed across the network, it is predicted that the highest impact will occur on Elder Gate between Midsummer Boulevard and Avebury Boulevard, where it is predicted that the proposed scheme in combination will generate an additional 75 vehicular trips in the morning peak hour and an additional 69 trips in the evening peak hour.

21.3.42 The peak hour generation on Avebury Boulevard west of South Elder Roundabout is predicted to result in an increase of around 10% in the two-way traffic flow in the morning and evening peak periods. The annual average daily traffic (AADT) flow on this link is forecast to increase by 586 vehicles per day.

21.3.43 The additional trips generated by the Proposed Scheme will not impact on link or junction operation. However, there may be an increase in parking demand and use of drop-off

facilities as a result of the increased passenger numbers using the station. The station owner/operator and the local highways authorities may need to give consideration to measures to address any shortfall in parking.

21.3.44 There may also be a requirement for additional cycle parking provision but it is not considered that the increase in demand would adversely impact walk routes or bus facilities. Bus operators determine the frequency of bus services and can be expected to make adjustments to accommodate any changes in passenger demand when planning future services.

21.3.45 No further mitigation measures are considered necessary during operation of the Proposed Scheme based on the outcome of this assessment.

Crewe Station

Introduction

21.3.46 The introduction of HS2 services calling at Crewe Station is expected to result in increased passenger demand entering and leaving the station. It is forecast that by 2046, passenger demand at Crewe Station will increase by approximately 10%, equivalent to 2,554 additional passengers per day, as a result of the Proposed Scheme in combination with Phase One and 2a.

Environmental baseline

21.3.47 Crewe Station is located on Nantwich Road, approximately 1km south of Crewe town centre. The station is bordered by Nantwich Road to the north, Weston Road to the east, and rail lines to the west and south. The rail corridor runs north to south.

21.3.48 Vehicular access to Crewe Station is on Nantwich road where the station frontage provides a pick-up and drop-off area for cars and taxis, and two parking bays for disabled rail users. There is no formal taxi rank at the station frontage. The nearest bus stops are located outside the station frontage on Nantwich Road. A short stay car park is located on Pedley Street, while long stay car parks are located on Pedley Street and Weston Road.

21.3.49 The car park and drop off surveys recorded 304 vehicle movements to/from the station in the morning peak hour, and 360 in the evening peak hour.

21.3.50 Future baseline traffic volumes are forecast to grow by around 17% in the morning peak hour and 16% in the evening peak hour between 2017 and 2046. As a result, in the 2046 future baseline, it is predicted that the station will attract 356 vehicle movements in the morning peak hour and 418 in the evening peak hour.

Passenger impacts

21.3.51 It is predicted that in 2046, the Proposed Scheme in combination with HS2 Phase One and Phase 2a, will generate an additional 36 vehicular trips in the morning peak hour and an

additional 42 trips in the evening peak hour at Crewe Station. This is below the level likely to impact on link or junction operation or vehicle-related severance.

21.3.52 There may be an increase in parking demand and use of drop-off facilities as a result of the increased passenger numbers using the station. The station owner/operator and the local highways authorities may need to give consideration to measures to address any shortfall in parking.

21.3.53 There may also be a requirement for additional cycle parking provision but it is not considered that the increase in demand would adversely impact walk routes or bus facilities. Bus operators determine the frequency of bus services and can be expected to make adjustments to accommodate any changes in passenger demand when planning future services.

21.3.54 No further mitigation measures are considered necessary during operation of the Proposed Scheme based on the outcome of this assessment.

Preston Station

21.3.55 The introduction of HS2 services calling at Preston Station is expected to result in increased passenger demand entering and leaving the station. It is forecast that by 2046, passenger demand at Preston Station will increase by approximately 16%, equivalent to 3,518 additional passengers per day, as a result of the Proposed Scheme in combination with Phase One and 2a.

Environmental baseline

21.3.56 Preston Station is situated within Preston city centre, south of the A59 Ring Way, west of Butler Street and east of Christian Road and West Cliff. The station car park, Fishergate Shopping Centre and the shopping centre car park are immediately adjacent to Preston Station to the east and there are depots operated by Network Rail and Royal Mail Group to the west.

21.3.57 Vehicular access to Preston Station is off Fishergate and Butler Street. Fishergate provides access to car and taxi pick up/drop off facilities. Butler Street provides access to the main station car park and the short stay car park, with a one-way loop at the station frontage. Butler Street is accessed off Fishergate and Corporation Street via an underpass (entry only). Corporation Street provides the link between Fishergate and the A59 Ring Way to the north. Fishergate connects to the A5072 Strand Road, Liverpool Road and Broadgate to the west, and to the east of Corporation Street is one way westbound.

21.3.58 Due to availability of data, surveys undertaken in March 2017 were utilised for Preston. The car park and drop off surveys recorded 307 vehicle movements to/from the station in the morning peak hour, and 412 in the evening peak hour.

21.3.59 Future baseline traffic volumes are forecast to grow by around 20% in the morning peak hour and 18% in the evening peak hour by 2046 compared to 2017. In the future baseline of

2046, it is forecast that the station will attract 368 vehicle movements in the morning peak hour and 487 in the evening peak hour.

Passenger impacts

21.3.60 It is predicted that in 2046, the Proposed Scheme in combination with HS2 Phase One and Phase 2a will generate 57 additional vehicular trips in the morning peak hour and 75 additional trips in the evening peak hour at Preston Station, which is close to the level likely to impact on link or junction operation. However, Preston station is accessed via two roads; Fishergate provides access to car and taxi pick up/drop off facilities with Butler Street providing access to the main station car park and the short stay car park, with a one-way loop outside the entrance. For this reason, the additional 75 trips generated by the Proposed Scheme in the evening peak hour are considered to have a negligible impact on traffic congestion and delays.

21.3.61 In addition to increased demand associated with passengers, there will be a requirement for 123 daily operation staff including drivers, managers, cleaners and customer service staff at Preston station. However, these jobs will be arranged across four shifts and the consequential impact on the highway network during peak hours is expected to be negligible.

21.3.62 The peak hour generation on Fishergate Hill between Preston Station and Butler Street is predicted to result in an increase of 7.8% in the two-way traffic flow in the morning peak period and 4.6% in the evening peak period which is below the level considered to have the potential to impact on traffic-related severance.

21.3.63 There may be an increase in parking demand and use of drop-off facilities as a result of a combination of increased passenger demand and operational staff at Preston Station with the potential for insufficient car parking available for all users. The station owner/operator and the local highways authorities may need to give consideration to measures to address any shortfall in parking.

21.3.64 There may also be a requirement for additional cycle parking provision but it is not considered that the increase in demand would adversely impact walk routes or bus facilities. Bus operators determine the frequency of bus services and can be expected to make adjustments to accommodate any changes in passenger demand when planning future services.

21.3.65 No further mitigation measures are considered necessary during operation of the Proposed Scheme based on the outcome of this assessment.

Lancaster Station

Introduction

21.3.66 The introduction of HS2 services calling at Lancaster Station is expected to result in increased passenger demand entering and leaving the station. It is forecast that by 2046,

passenger demand at Lancaster Station will increase by approximately 15%, equivalent to 1,275 additional passengers per day, as a result of the Proposed Scheme in combination with Phase One and 2a.

Environmental baseline

21.3.67 Lancaster Station is located on Station Road, approximately 250m west of Lancaster city centre. The station is bordered by Station Road to the west, Westbourne Road to the south, and West Road cycle route to the north. To the east of the station, is the Lancaster Quaker Meeting House and a residential development on Castle Park Mews. The rail corridor runs north to south at a low level relative to the surrounding areas.

21.3.68 Vehicular access to Lancaster Station is on Station Road to the western side of the station, and via Westbourne Road to the eastern side. Both sides provide pick-up and drop-off facilities for cars and taxis, short stay parking for all users and dedicated spaces for disabled badge holders. A long-stay car park is located south of Westbourne Road, close to Station Road. Bus stops for the station are located on Westbourne Road and at the western entrance on Station Road.

21.3.69 The car park and drop off surveys undertaken in July 2019 recorded 304 vehicle movements to/from the station in the morning peak hour, and 281 in the evening peak hour.

21.3.70 Future baseline traffic volumes are forecast to grow by around 19% in the morning peak hour and 14% in the evening peak hour between 2019 and 2046.

21.3.71 As a result, in the 2046 future baseline, it is predicted that the station will attract 413 vehicle movements in the morning peak hour and 372 in the evening peak hour.

Passenger impacts

21.3.72 It is predicted that in 2046, the Proposed Scheme in combination with HS2 Phase One and Phase 2a, will generate an additional 53 vehicular trips in the morning peak hour and an additional 47 trips in the evening peak hour at Lancaster Station. This is below the level likely to impact on link or junction operation.

21.3.73 There may be an increase in parking demand and use of drop-off facilities as a result of the increased passenger numbers using the station. The station owner/operator and the local highways authorities may need to give consideration to measures to address any shortfall in parking.

21.3.74 There may also be a requirement for additional cycle parking provision but it is not considered that the increase in demand would adversely impact walk routes or bus facilities. Bus operators determine the frequency of bus services and can be expected to make adjustments to accommodate any changes in passenger demand when planning future services.

21.3.75 No further mitigation measures are considered necessary during operation of the Proposed Scheme based on the outcome of this assessment.

Carlisle Station

21.3.76 The introduction of HS2 services calling at Carlisle Station is expected to result in increased passenger demand entering and leaving the station. It is forecast that by 2046, passenger demand at Carlisle Station will increase by approximately 20%, equivalent to 1,682 additional passengers per day, as a result of the Proposed Scheme in combination with Phase One and 2a.

Environmental baseline

21.3.77 Carlisle Station is located to the south-western edge of the city centre. The station is bordered by Borough Street and Court Square Brow to the north, Collier Lane and Crown Street to the east and Victoria Viaduct to the west. The rail corridor runs north-west to south east forming the southern edge of the station.

21.3.78 Vehicular access to Carlisle Station is at Court Square Brow, which provides a drop off area and several parking bays for the station operators and disabled rail users. There is no formal taxi rank at the station frontage. The nearest bus stops to the station are located on English Street. A short stay car park is located at Court Square, while the station is served by two long stay car parks located at the station and at the Victoria Viaduct Estate. Court Square Brow connects with English Street, which forms part of the gyratory road network within Carlisle town centre.

21.3.79 The car park and drop off surveys undertaken in July 2019 recorded 302 vehicle movements to/from the station in the morning peak hour, and 289 in the evening peak hour.

21.3.80 Future baseline traffic volumes are forecast to grow by around 17% in both the morning and evening peak hours by 2046 compared to 2019. As a result, in the future baseline of 2046, it is predicted that the station will attract 354 vehicle movements in the morning peak hour and 337 in the evening peak hour.

Passenger impacts

21.3.81 It is predicted that in 2046, the Proposed Scheme in combination with HS2 Phase One and Phase 2a, will generate an additional 69 vehicular trips in the morning peak hour and an additional 66 trips in the evening peak hour at Carlisle Station. This is below the level likely to impact on link or junction operation.

21.3.82 In addition to increased demand associated with passengers, there will be a requirement for 163 daily operation staff including drivers, managers, cleaners and customer service staff at Carlisle Station. However, these jobs will be arranged across four shifts and the consequential impact on the highway network during peak hours is expected to be negligible.

21.3.83 The additional trips generated by the Proposed Scheme will not impact on link or junction operation. However, there may be an increase in parking demand and use of drop-off facilities as a result of the increased passenger numbers using the station. The station

owner/operator and the local highways authorities may need to give consideration to measures to address any shortfall in parking.

21.3.84 There may also be a requirement for additional cycle parking provision but it is not considered that the increase in demand would adversely impact walk routes or bus facilities. Bus operators determine the frequency of bus services and can be expected to make adjustments to accommodate any changes in passenger demand when planning future services.

21.3.85 No further mitigation measures are considered necessary during operation of the Proposed Scheme based on the outcome of this assessment.

Glasgow Central Station

Introduction

21.3.86 The introduction of HS2 services calling at Glasgow Central Station is expected to result in increased passenger demand entering and leaving the station. It is forecast that by 2046, passenger demand at Glasgow Station will increase by approximately 6%, equivalent to 4,854 additional passengers per day, as a result of the Proposed Scheme in combination with Phase One and 2a.

Environmental baseline

21.3.87 Glasgow Central Station is located within Glasgow City Centre. The station is bordered by Hope Street to the west, Gordon Street to the north, Union Street to the east and Broomielaw to the south. Midland Street and Argyle Street pass under the station, which is at an elevated level.

21.3.88 The primary access location for vehicle pick-up and drop-off at the station is on Gordon Street, which provides a taxi rank and drop-off area for around four vehicles. There are further taxi ranks on Union Street and Hope Street close to station access points. There are bus stops serving the station on Hope Street, Union Street and Argyle Street. There is no dedicated long-stay or short-stay associated with the station. However, there are a large number of short-stay car parking spaces available on-street and within commercial car parks in Glasgow City Centre.

21.3.89 The pick-up and drop-off surveys undertaken in May 2019 recorded 273 vehicle movements to/from the station in the morning peak hour, and 279 in the evening peak hour.

21.3.90 Future baseline traffic volumes are forecast to grow by around 24% in the morning peak and 18% in the evening peak by 2046 compared to 2019. As a result, in the future baseline of 2046, it is predicted that the station will attract 338 vehicle movements in the morning peak hour and 331 in the evening peak hour.

Passenger impacts

21.3.91 It is predicted that in 2046, the Proposed Scheme in combination with HS2 Phase One and Phase 2a, will generate an additional 20 vehicular trips in the morning peak hour and an additional 20 trips in the evening peak hour at Glasgow Central Station. The increase in vehicles is less than 10% so is considered not to have an impact on the highway network.

21.3.92 The peak hour generation on Gordon Street is predicted to result in an increase of 5% in the two-way traffic flow in the morning peak period and 4% in the evening peak period.

21.3.93 The overall change in use of the station of 6% is not at a level that would be likely to result in impacts on other station facilities, including cycle parking, the local walk network or local bus services.

21.3.94 No further mitigation measures are considered necessary during operation of the Proposed Scheme based on the outcome of this assessment.

Off-route depot facilities

21.3.95 Off-route stabling facilities will be used for the overnight stabling and servicing, such as cleaning and maintenance of HS2 trains.

21.3.96 Maintenance activities will include:

- train stabling overnight;
- internal overnight cleaning;
- periodic heavy cleaning;
- emptying and replenishing of train toilets;
- external washing;
- light maintenance (inspections, minor component changes etc.);
- training and meetings facilities; and
- storage of spare equipment.

21.3.97 These activities will take place outside of the usual operating hours of the HS2 train service and will include work during the night and at weekends. The stabling, cleaning and maintenance activities that are undertaken at train depots will require trains to be moved around the depots during these periods to allow the efficient use of fixed equipment and facilities.

Summary of off-route stabling facilities impacts in operation

Annandale depot

Introduction

21.3.98 Stabling and light maintenance facilities are required in the Annandale area to accommodate HS2 trains, that serve destinations on the WCML terminating in Carlisle, Glasgow and Edinburgh.

Overview of impacts - operation

21.3.99 The Proposed Scheme will require the permanent widening of the B7076 to accommodate the site access.

21.3.100 The proposed Annandale depot will generate additional vehicle movements due to staff, servicing and operational traffic. The weekday peak hour trip generation is expected to be low, as the depot is expected to operate on a shift pattern, with the busiest shift changeovers occurring outside of the morning and evening peak periods on the local road network. However, some depot related traffic will be generated during the peak hours, leading to flow changes on the highway network.

Highway network

21.3.101 Table 21-21 summarises the permanent new junction required to accommodate the Proposed Scheme, which is assessed under junction performance.

Table 21-21: Annandale area permanent highway diversion/closure/amendment

Highway name/junction	Description	Change/alteration
B7076 / Site access	The B7076 carriageway will be widened to provide a new dedicated traffic lane for right turning traffic in the centre of the carriageway (ghost island) to provide access to the Proposed Scheme	New junction

21.3.102 The highway change set out above together with changes in traffic flows arising from the operation of the Proposed Scheme will result in changes to travel patterns in the area.

Strategic and local road network traffic flows

21.3.103 Table 21-22 and Table 21-23 set out the traffic flows on highway links affected by operation of the Proposed Scheme for the AM peak (08:00-09:00) for 2038 and 2046 respectively.

21.3.104 Table 21-24 and 21-25 cover the PM peak (16:00-19:00) hour for 2038 and 2046 respectively. Traffic flows on all other links are either unaffected from the future baseline or result in small changes. The changes in traffic are all relatively small, but due to the low future baseline traffic levels, this result in large percentage increases in some locations.

Table 21-22: Fourteen impacted links (2038 AM peak)

Location	Direction	2038 baseline flows		2038 Proposed Scheme flows		Proposed Scheme actual flow change from 2038 baseline		With Proposed Scheme % change from 2038 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
B7076 (between Annandale depot site access and B6357)	NB	118	14	139	14	21	0	15%	0%
	SB	83	22	83	22	0	0	0%	0%
B7076 (between A74(M) NB off-slip and A74(M) SB on-slip)	NB	118	14	178	20	60	6	34%	30%
	SB	83	22	83	28	0	6	0%	21%
B7076 (between Annandale depot site access and A74(M) Junction 21 SB On-Slip)	NB	118	14	178	20	60	6	34%	30%
	SB	83	22	83	28	0	6	0%	21%
B7076 (between Cranberry Farm satellite compound site access and Gretna Green service station)	NB	97	16	97	16	0	0	0%	0%
	SB	48	11	64	11	16	0	25%	0%
B6357 (between A74(M) NB on slip and A74(M) SB off-slip)	NB	77	11	84	11	7	0	9%	0%
	SB	80	27	80	27	0	0	0%	0%
B6357 (B7076 roundabout junction and A74(M) NB on slip)	NB	77	11	84	11	7	0	9%	0%
	SB	80	27	80	27	0	0	0%	0%
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	97	16	97	16	0	0	0%	0%
	SB	48	11	64	11	16	0	25%	0%
B7076 (between Annandale depot site access and B6357)	NB	118	14	139	14	21	0	15%	0%
	SB	83	22	83	22	0	0	0%	0%
B7076 (between A74(M) NB off-slip and A74(M) SB on-slip)	NB	118	14	178	20	60	6	34%	30%
	SB	83	22	83	28	0	6	0%	21%
B7076 (between Annandale depot site access and A74(M) Junction 21 SB On-Slip)	NB	118	14	178	20	60	6	34%	30%
	SB	83	22	83	28	0	6	0%	21%

Location	Direction	2038 baseline flows		2038 Proposed Scheme flows		Proposed Scheme actual flow change from 2038 baseline		With Proposed Scheme % change from 2038 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
B7076 (between Cranberry Farm satellite compound site access and Gretna Green service station)	NB	97	16	97	16	0	0	0%	0%
	SB	48	11	64	11	16	0	25%	0%
B6357 (between A74(M) NB on slip and A74(M) SB off-slip)	NB	77	11	84	11	7	0	9%	0%
	SB	80	27	80	27	0	0	0%	0%
B6357 (B7076 roundabout junction and A74(M) NB on slip)	NB	77	11	84	11	7	0	9%	0%
	SB	80	27	80	27	0	0	0%	0%
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	97	16	97	16	0	0	0%	0%
	SB	48	11	64	11	16	0	25%	0%

Table 21-23: Fourteen impacted links (2046 AM peak)

Location	Direction	2046 baseline flows		2046 Proposed Scheme flows		Proposed Scheme actual flow change from 2046 baseline		With Proposed Scheme % change from 2046 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
B7076 (between Annandale depot site access and B6357)	NB	122	14	143	14	21	0	15%	0%
	SB	86	22	86	22	0	0	0%	0%
B7076 (between A74(M) NB off-slip and A74(M) SB on-slip)	NB	122	14	182	20	60	6	33%	30%
	SB	86	22	86	28	0	6	0%	21%
B7076 (between Annandale depot site access and A74(M) Junction 21 SB On-Slip)	NB	122	14	182	20	60	6	33%	30%
	SB	86	22	86	28	0	6	0%	21%
B7076 (between Cranberry Farm satellite	NB	100	16	100	16	0	0	0%	0%

Location	Direction	2046 baseline flows		2046 Proposed Scheme flows		Proposed Scheme actual flow change from 2046 baseline		With Proposed Scheme % change from 2046 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
compound site access and Gretna Green service station)	SB	50	11	66	11	16	0	24%	0%
B6357 (between A74(M) NB on slip and A74(M) SB off-slip)	NB	79	11	87	11	7	0	9%	0%
	SB	82	28	82	28	0	0	0%	0%
B6357 (B7076 roundabout junction and A74(M) NB on slip)	NB	79	11	87	11	7	0	9%	0%
	SB	82	28	82	28	0	0	0%	0%
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	100	16	100	16	0	0	0%	0%
	SB	50	11	66	11	16	0	24%	0%
B7076 (between Annandale depot site access and B6357)	NB	122	14	143	14	21	0	15%	0%
	SB	86	22	86	22	0	0	0%	0%
B7076 (between A74(M) NB off-slip and A74(M) SB on-slip)	NB	122	14	182	20	60	6	33%	30%
	SB	86	22	86	28	0	6	0%	21%
B7076 (between Annandale depot site access and A74(M) Junction 21 SB On-Slip)	NB	122	14	182	20	60	6	33%	30%
	SB	86	22	86	28	0	6	0%	21%
B7076 (between Cranberry Farm satellite compound site access and Gretna Green service station)	NB	100	16	100	16	0	0	0%	0%
	SB	50	11	66	11	16	0	24%	0%
B6357 (between A74(M) NB on slip and A74(M) SB off-slip)	NB	79	11	87	11	7	0	9%	0%
	SB	82	28	82	28	0	0	0%	0%
B6357 (B7076 roundabout junction and A74(M) NB on slip)	NB	79	11	87	11	7	0	9%	0%
	SB	82	28	82	28	0	0	0%	0%
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	100	16	100	16	0	0	0%	0%
	SB	50	11	66	11	16	0	24%	0%

Table 21-24: Fourteen impacted links (2038 PM peak)

Location	Direction	2038 baseline flows		2038 Proposed Scheme flows		Proposed Scheme actual flow change from 2038 baseline		With Proposed Scheme % change from 2038 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
B7076 (between Annandale depot site access and B6357)	NB	72	9	93	9	21	0	23%	0%
	SB	94	12	94	12	0	0	0%	0%
B7076 (between A74(M) NB off-slip and A74(M) SB on-slip)	NB	72	9	132	15	60	6	46%	41%
	SB	94	12	94	18	0	6	0%	33%
B7076 (between Annandale depot site access and A74(M) Junction 21 SB On-Slip)	NB	72	9	132	15	60	6	46%	41%
	SB	94	12	94	18	0	6	0%	33%
B7076 (between Cranberry Farm satellite compound site access and Gretna Green service station)	NB	94	14	94	14	0	0	0%	0%
	SB	45	4	61	4	16	0	26%	0%
B6357 (between A74(M) NB on slip and A74(M) SB off-slip)	NB	52	9	60	9	7	0	13%	0%
	SB	68	11	68	11	0	0	0%	0%
B6357 (B7076 roundabout junction and A74(M) NB on slip)	NB	52	9	60	9	7	0	13%	0%
	SB	68	11	68	11	0	0	0%	0%
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	94	14	94	14	0	0	0%	0%
	SB	45	4	61	4	16	0	26%	0%
B7076 (between Annandale depot site access and B6357)	NB	72	9	93	9	21	0	23%	0%
	SB	94	12	94	12	0	0	0%	0%
B7076 (between A74(M) NB off-slip and A74(M) SB on-slip)	NB	72	9	132	15	60	6	46%	41%
	SB	94	12	94	18	0	6	0%	33%
B7076 (between Annandale depot site access and A74(M) Junction 21 SB On-Slip)	NB	72	9	132	15	60	6	46%	41%
	SB	94	12	94	18	0	6	0%	33%
B7076 (between Cranberry Farm satellite compound site access and Gretna Green service station)	NB	94	14	94	14	0	0	0%	0%
	SB	45	4	61	4	16	0	26%	0%

Location	Direction	2038 baseline flows		2038 Proposed Scheme flows		Proposed Scheme actual flow change from 2038 baseline		With Proposed Scheme % change from 2038 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
B6357 (between A74(M) NB on slip and A74(M) SB off-slip)	NB	52	9	60	9	7	0	13%	0%
	SB	68	11	68	11	0	0	0%	0%
B6357 (B7076 roundabout junction and A74(M) NB on slip)	NB	52	9	60	9	7	0	13%	0%
	SB	68	11	68	11	0	0	0%	0%
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	94	14	94	14	0	0	0%	0%
	SB	45	4	61	4	16	0	26%	0%

Table 21-25: Fourteen impacted links (2046 PM peak)

Location	Direction	2046 baseline flows		2046 Proposed Scheme flows		Proposed Scheme actual flow change from 2046 baseline		With Proposed Scheme % change from 2046 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
B7076 (between Annandale depot site access and B6357)	NB	73	9	95	9	21	0	23%	0%
	SB	97	12	97	12	0	0	0%	0%
B7076 (between A74(M) NB off-slip and A74(M) SB on-slip)	NB	73	9	134	15	60	6	45%	41%
	SB	97	12	97	18	0	6	0%	33%
B7076 (between Annandale depot site access and A74(M) Junction 21 SB On-Slip)	NB	73	9	134	15	60	6	45%	41%
	SB	97	12	97	18	0	6	0%	33%
B7076 (between Cranberry Farm satellite compound site access and Gretna Green service station)	NB	96	14	96	14	0	0	0%	0%
	SB	46	4	62	4	16	0	26%	0%
B6357 (between A74(M) NB on slip and A74(M) SB off-slip)	NB	54	9	61	9	7	0	12%	0%
	SB	69	11	69	11	0	0	0%	0%

Location	Direction	2046 baseline flows		2046 Proposed Scheme flows		Proposed Scheme actual flow change from 2046 baseline		With Proposed Scheme % change from 2046 baseline	
		All vehicles	HGV	All vehicles	HGV	All vehicles	HGV	All vehicles	HGV
B6357 (B7076 roundabout junction and A74(M) NB on slip)	NB	54	9	61	9	7	0	12%	0%
	SB	69	11	69	11	0	0	0%	0%
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	96	14	96	14	0	0	0%	0%
	SB	46	4	62	4	16	0	26%	0%
B7076 (between Annandale depot site access and B6357)	NB	73	9	95	9	21	0	23%	0%
	SB	97	12	97	12	0	0	0%	0%
B7076 (between A74(M) NB off-slip and A74(M) SB on-slip)	NB	73	9	134	15	60	6	45%	41%
	SB	97	12	97	18	0	6	0%	33%
B7076 (between Annandale depot site access and A74(M) Junction 21 SB On-Slip)	NB	73	9	134	15	60	6	45%	41%
	SB	97	12	97	18	0	6	0%	33%
B7076 (between Cranberry Farm satellite compound site access and Gretna Green service station)	NB	96	14	96	14	0	0	0%	0%
	SB	46	4	62	4	16	0	26%	0%
B6357 (between A74(M) NB on slip and A74(M) SB off-slip)	NB	54	9	61	9	7	0	12%	0%
	SB	69	11	69	11	0	0	0%	0%
B6357 (B7076 roundabout junction and A74(M) NB on slip)	NB	54	9	61	9	7	0	12%	0%
	SB	69	11	69	11	0	0	0%	0%
B7076 (between Gretna service station access and Quintinshill sidings satellite compound site access)	NB	96	14	96	14	0	0	0%	0%
	SB	46	4	62	4	16	0	26%	0%

Junction performance

21.3.105 Junction capacity analysis has been undertaken for the AM and PM peak periods comparing junction operation in the 2038 and 2046 future baseline with 2038 and 2046 with HS2.

21.3.106 The following table and commentary set out the performance the new junction introduced as part of the Proposed Scheme. The changes in traffic at other junctions are such that no material impacts are expected.

21.3.107 The 2038 and 2046 future baseline results are included for comparison. The models developed to assess the existing and future baseline have been used, except where otherwise stated.

B7076 / Annandale depot site access

21.3.108 Table 21-26 summarises the results of the changes to the junction as a result of the Proposed Scheme in both 2038 and 2046.

Table 21-26: B7076 / depot site access junction 2038 and 2046 future baseline and Proposed Scheme junction capacity assessment

Approach	Flow, PCU/hr	RFC	Q, PCU	Flow, PCU/hr	RFC	Q, PCU
08:00-09:00	**2038 with the Proposed Scheme**			**2046 with the Proposed Scheme**		
B7076 (west) (ahead and left)	140	-	-	150	-	-
Main Compound (left)	0	0.00	0	0	0.00	0
Main Compound (right)	0	0.00	0	0	0.00	0
B7076 (east) (ahead and right)	65	0.03	0	71	0.03	0
17:00-18:00	**2038 with the Proposed Scheme**			**2046 with the Proposed Scheme**		
B7076 (west) (ahead and left)	47	-	-	51	-	-
Main Compound (left)	16	0.03	0	16	0.03	0
Main Compound (right)	61	0.11	0	61	0.11	0
B7076 (east) (ahead and right)	36	0.00	0	40	0.00	0

21.3.109 The assessment shows that the junction operates well within capacity in 2038 and 2046 with the Proposed Scheme.

Accidents and safety

21.3.110 The baseline safety analysis identified no locations which had experienced an accident cluster over a three-year period.

21.3.111 Whilst there are locations in the Annandale area where there are substantial forecast increases in traffic flows due to the operation of the Proposed Scheme, these will not affect known safety concerns.

21.3.112 New highway links and junctions will be constructed to current standards and/or in keeping with the existing infrastructure. The Proposed Scheme is unlikely to create any new safety concerns.

Public transport

21.3.113 No local bus routes or rail services will be affected by the operation of the Proposed Scheme.

Pedestrian, cyclist and equestrian

21.3.114 No PRoW or core paths will be affected by the operation of the Proposed Scheme.

Annex A: Framework travel plan

High Speed Rail (Crewe – Manchester)

Environmental Statement

Transport Assessment
Framework travel plan

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1 Introduction

1.1 Purpose and context of this document

1.1.1 This document sets out a 'framework' for developing travel plans (TP) to help reduce the impact of the travel demands of the construction sites, compounds, stabling facilities and operational stations associated with the Proposed Scheme. Framework travel plans (FTP) were produced for High Speed Two (HS2) Phase One[1] and Phase 2a[2]. This document builds upon the previous FTP for HS2 and is consistent with them.

1.1.2 Travel plans can help reduce vehicle movements and therefore adverse impacts, such as congestion, traffic related severance and associated impacts. For worksites they contribute to the efficiency of site operations and to the health and safety of the workforce and the travelling public. Station travel plans are valuable to the rail industry because they help to address 'door to door' journeys. The convenience of access to and from the station for the 'first and last mile' can be a critical factor in the decision to travel by rail or another mode.

1.1.3 This FTP sets out the steps required to create a travel plan. It covers the expected content and suggestions about measures that can be introduced.

1.1.4 The Proposed Scheme is being delivered by HS2 Ltd, the company set up by the Government to develop proposals for a new high-speed railway line between London and the West Midlands and northern England. Powers to construct and operate the Proposed Scheme will be granted through the hybrid Bill process. Responsibilities for construction will be discharged by the nominated undertaker appointed to implement the powers of the hybrid Bill. The nominated undertaker is the body appointed by the Secretary of State responsible for delivering the scheme.

1.1.5 HS2 Ltd is committed to delivering practical travel plans covering both construction and operational sites and will ensure this is achieved through contractual obligations between the nominated undertaker and the relevant contractors and operators. It is noted that the 'contractual obligation' for Phase 2a is already established in the Route Wide Traffic

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[1] High Speed Two Ltd (2013), High Speed Rail (London – West Midlands), Environmental Statement, Volume 5: Technical appendices, Transport Assessment (TR-001-000), *Annex A: Framework travel plan*. Available online at: https://webarchive.nationalarchives.gov.uk/ukgwa/20140810181550/http://assets.dft.gov.uk/hs2-environmental-statement/volume-5/traffic/Vol5_TA_%28Annex_A%29_Framework_Travel_Plan_Part11.pdf.

[2] High Speed Two Ltd (2017), High Speed Rail (West Midlands – Crewe), Environmental Statement, Volume 5: Technical appendices, Transport Assessment (TR-001-000), Part 2, *Annex A: Framework travel plan*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627122/E62-B_TR-001-000_Part_2_WEB.pdf.

Management Plan (RTMP). It would be the intention that, subject to the relevant CoCP, the version for Phase One and 2a will extend to cover the Proposed Scheme.

1.1.6 As an entirely new scheme, HS2 Ltd has the opportunity to set the highest standards for sustainable transport during construction and operation.

1.2 The Proposed Scheme

1.2.1 HS2 is a new high speed railway proposed by Government to connect major cities in Britain. When completed, it will provide a new link between London, the Midlands and the North. It will increase the capacity of the rail network to meet future demand and bring people and businesses closer together.

1.2.2 HS2 will be built in phases. The hybrid Bill for Phase One of the HS2 network, between London and the West Midlands, received Royal Assent in February 2017. The main works on Phase One commenced in April 2020. The hybrid Bill for Phase 2a of the HS2 network, between the West Midlands and Crewe, received Royal Assent in February 2021.

1.2.3 The full Phase 2b scheme comprises the route from:

- Crewe to Manchester (approximately 85km (52 miles) in length), with a connection onto the West Coast Main Line (WCML) (referred to as the 'Phase 2b Western Leg'); and
- the West Midlands to Leeds via the East Midlands and South Yorkshire (referred to as the 'Phase 2b Eastern Leg'). The Phase 2b Eastern Leg is not the subject of the Bill for the Proposed Scheme.

1.2.4 The Proposed Scheme comprises:

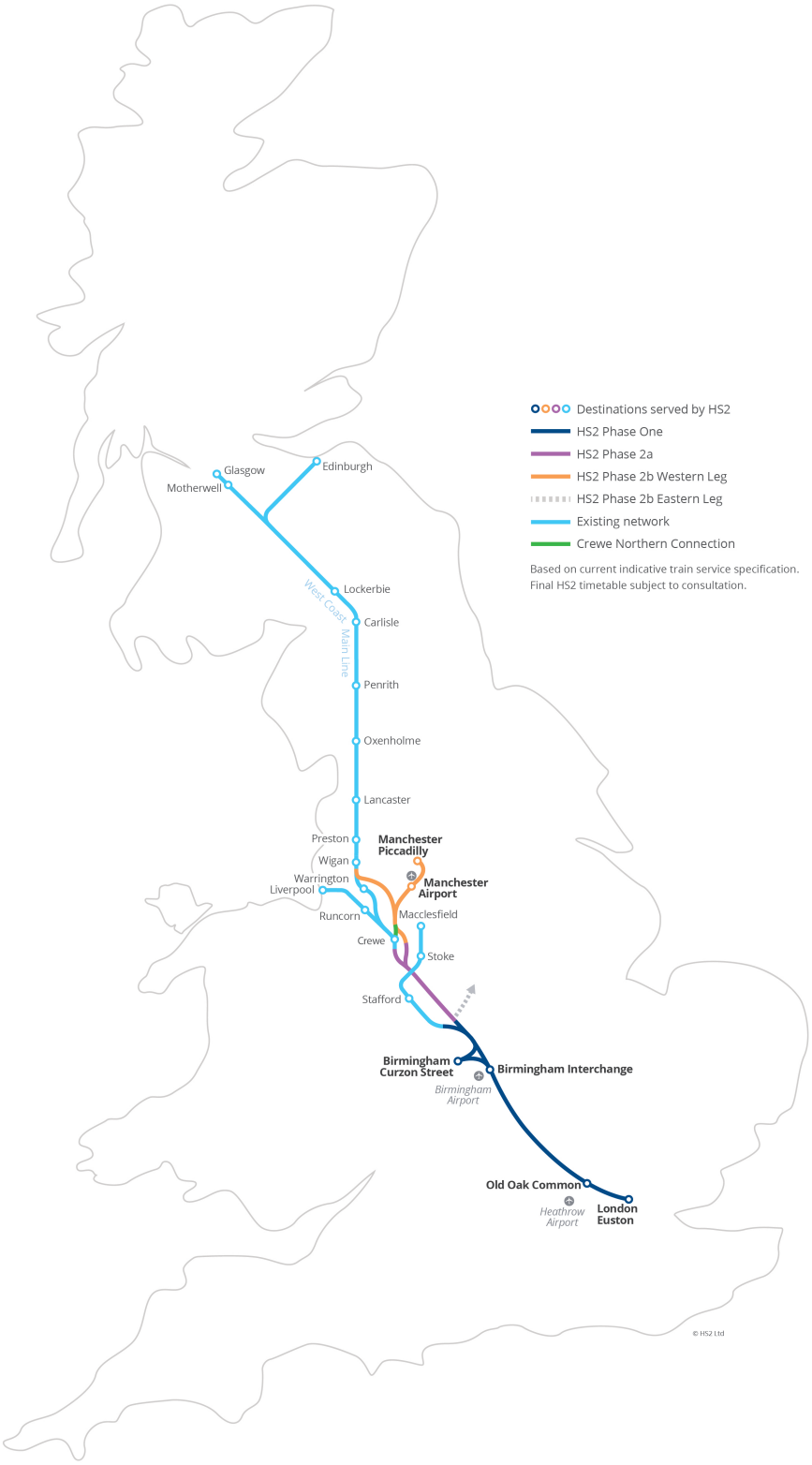
- the HS2 Western Leg from Crewe to Manchester, including:
  - new stations at Manchester Airport and Manchester Piccadilly;
  - a depot north of Crewe;
  - maintenance facilities north of Crewe and at Ashley; and
  - a connection onto the WCML near Bamfurlong;
- the Crewe Northern Connection, connecting the route of the Proposed Scheme with the WCML and enabling future NPR services to connect with HS2;
- provision for the NPR London to Liverpool, Manchester to Liverpool, and Manchester to Leeds junctions, to enable these future NPR routes to connect with HS2; and
- a number of works at locations beyond the Western Leg route corridor, referred to as 'off-route works' which include:
  - works to enable HS2 trains to call at existing stations further north on the WCML; and
  - construction of depots to provide overnight stabling for HS2 trains serving the north of England and Scotland.

1.2.5 The Proposed Scheme will connect with Phase 2a at Hough, to the south of Crewe.

1.2.6 Construction of the Proposed Scheme is assumed to commence in 2025, with operation assumed to start in 2038.

1.2.7 This FTP covers the requirements associated with the construction and operation of the Proposed Scheme which comprises the Proposed Scheme. The proposed HS2 network and connections to existing rail lines are shown in Figure 1.

Figure 1: The HS2 Network and Crewe Northern Connection



1.3 Construction phase

1.3.1 Construction of the Proposed Scheme is expected to commence in 2025 with construction activity continuing to 2038 (although activity in 2038 will be limited to testing and commissioning).

1.3.2 The Proposed Scheme will be constructed from a series of compound sites, ranging from large main sites where stations, depots or other major works would be constructed, to satellite sites covering more specific activities such as retaining wall construction, track works or bridge construction.

1.3.3 The duration of use for different compound sites will vary significantly between sites, lasting up to several years.

1.3.4 HS2 Ltd will endeavour to make best use of rail to transport materials and waste from the sites. The intention, for example, is to make best use of designated rail transfer nodes to maximise the materials and waste that can be transported by rail.

1.3.5 Further details of the compound sites and the predicted workforce and construction trip generation are provided within the Transport Assessment (TA) Parts 1, 2, 3 and 4 (see Volume 5 Appendices: TR-001 to TR-003 and TR-005).

1.4 Operational phase

1.4.1 Two stations are proposed:

- Manchester Piccadilly High Speed station will mark the terminus of the route of the Proposed Scheme located adjacent to the existing Manchester Piccadilly Station in MA08, It will comprise two main levels. two concourses and six platforms and will provide a fully integrated transport hub allowing passengers to transfer between HS2, Manchester Metrolink and local rail services. The Manchester Piccadilly High Speed station will offer opportunities to regenerate the area around the station and act as a catalyst for further economic growth. Provides provision for NPR services at a later date; and
- Manchester Airport High Speed station will be an intermediate station, located in MA06 to the west of both the M56, between junctions 5 and 6, and Manchester Airport and north of the A538 Hale Road. It will be a new intermodal station located west of the M56. The station will comprise a central concourse, up to 11m above existing ground level, to provide access to all transport modes waiting areas, passenger information and ticketing facilities.

1.4.2 In addition, the following rolling stock depot (RSD) and infrastructure maintenance base – rail (IMB-R) and stabling facilities are proposed:

- Crewe North RSD and Crewe North IMB-R will be provided on land between the route of the Proposed Scheme and the WCML where they diverge to the east of Wally's Green.

The RSD will serve as an operational and maintenance hub for HS2 rolling stock. The IMB-R will be a maintenance facility and storage area for the Proposed Scheme; and

- construction of stabling facilities for HS2 trains serving the north of England and Scotland at Annandale depot (near Gretna in southern Scotland).

1.5 The framework travel plan

1.5.1 The FTP sets out how TP will be used along with a range of potential measures to mitigate the impact of transport associated with construction, maintenance and operation of the Proposed Scheme.

1.5.2 As the Proposed Scheme is of national importance it should be noted that national policy has been used to provide the overarching principles for the development of the FTP. The Department for Transport (DfT) defines TP generally as 'long-term management strategies for integrating proposals for sustainable travel into the planning process. They are based on evidence of the anticipated transport impacts of development and 5 set measures to promote and encourage sustainable travel (such as promoting walking and cycling)'[3].

1.5.3 In relation to the construction workforce TP requirements, this FTP has been prepared using the information reported in the ES and in the associated draft Code of Construction Practice (CoCP)[4].

1.5.4 As far as reasonably practicable, consistency with local guidance has been considered, especially where these facilities are located. Particular consideration has been given to policy from Transport for the North; Cheshire East Council; Cheshire West and Chester Council; Warrington Borough Council; St. Helens Council; Trafford Council; Salford City Council; Wigan Metropolitan Borough Council; Manchester City Council; Transport for Greater Manchester; Oldham Metropolitan Borough Council; Lancashire County Council; Preston City Council; Cumbria County Council; Carlisle City Council; Dumfries and Galloway County Council.

1.5.5 In addition, cognisance has been taken of good practice set out in Network Rail (NR) and Association of Train Operating Companies (ATOC) guidance on station travel plans. Where applicable, existing station travel plans are taken into account.

1.5.6 The scope of the FTP includes:

- all construction workforce travel - the framework aims to inform specific plans which the lead contractors will be required to produce;
- operation of new depots and stations (Manchester Airport High Speed station, Manchester Piccadilly High Speed station, Crewe North Rolling Stock Depot (RSD) and Crewe North Infrastructure Maintenance Base-Rail (IMB-R) and the Annandale stabling

[3] What are Travel Plans? Available online at: https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements.

[4] Draft Code of Construction Practice, Volume 5: Appendix CT-002-00000

facility) - the framework provides guidance on the expected contents of a station or depot specific travel plan which will be the responsibility of the station or depot operators;

- details of the proposals for setting targets for encouraging sustainable travel; and
- consideration of occasional maintenance activities.

1.5.7 Alongside the TP, consideration will be given to how delivery and servicing will operate at stations and depots, as well as car parking management plans.

2 Planning background and policy

2.1 Overview

2.1.1 TP form a key part of the Government's drive for an environmentally conscious and responsible transport policy. They are regarded as a critical implementation tool for delivering sustainable travel patterns and encouraging sustainable travel behaviour and form a standard planning requirement. This is also reflected in the approach taken by local planning authorities in relation to the need for TPs to support the delivery of innovative transport solutions to meet local transport objectives.

2.1.2 National, regional and local policy and guidance documents should be considered when contractors and operators develop their site-specific TP.

2.1.3 The following is a summary of the current policy and guidance, which is deemed relevant for review. This summary should be taken as a guide and it is essential that a full policy review is conducted by each contractor and operator at the time of producing a site-specific TP. Due to the strategic importance of the Proposed Scheme, it is expected that national policy and guidance will take precedence.

2.2 National government policy

National Planning Policy Framework (2019)[5]

2.2.1 The Ministry of Housing, Communities and Local Government updated the NPPF[6] in February 2019, replacing the March 2012 and July 2018 versions of the NPPF. The NPPF promotes active management of patterns of growth to focus significant development in locations which are or can be made sustainable, together with the early consideration of transport issues to enable opportunities from existing and proposed transport infrastructure to be realised and to allow opportunities to promote walking, cycling and public transport to be identified and pursued.

2.2.2 With specific reference to transport, the NPPF indicates that developments should:

[5] At the time of the assessment, the February 2019 version of National Planning Policy Framework was the latest available. Whist this was updated in July 2021, the changes made do not materially affect the approach to or measures and recommendations contained within this framework travel plan.

[6] Ministry of Housing, Communities and Local Government (2019), *National Planning Policy Framework.* Available online at: https://webarchive.nationalarchives.gov.uk/20210708211349/https://www.gov.uk/government/publications/national-planning-policy-framework--2.

- give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second, so far as possible, to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;
- address the needs of people with disabilities and reduced mobility in relation to all modes of transport;
- create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;
- allow for the efficient delivery of goods, and access by service and emergency vehicles; and
- be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.

2.2.3 The NPPF (Paragraph 111) states that 'All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed.'

National Planning Practice Guidance

2.2.4 In March 2014, the Department for Communities and Local Government (DCLG) published guidance on Travel Plans, Transport Assessments and Statements[7], including when they are required and what they should contain, as part of the National Planning Practice Guidance[8] .

2.2.5 This lays down overarching principles for TP, and how they interact with TA and contribute positively to key Government transport policy objectives of:

- 'encouraging sustainable travel;
- lessening traffic generation and its detrimental impacts;
- reducing carbon emissions and climate impacts;
- creating accessible, connected, inclusive communities;
- improving health outcomes and quality of life;
- improving road safety; and
- reducing the need for new development to increase existing road capacity or provide new roads'.

[7] Ministry of Housing, Communities and Local Government (2014), Travel Plans, Transport Assessments and Statements https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements.

[8] Department for Communities and Local Government (DCLG) (2014), *National Planning Practice Guidance.*

2.2.6 However, whilst the guidance contains relevant commentary on the overarching principles of these documents, and a high-level overview of what information should be included, the guidance does not contain definitive guidance on structure and methodology to be adopted in a TP. To this end, whilst this TP has been produced in accordance with these guiding principles, the DfT 'Good Practice Guidelines: Delivering Travel Plans through the Planning Process' in April 2009 has also been used as best practice guidance. This document sets out the actions that can be taken in producing high quality TP. The guidelines aim to help those creating and implementing TP understand the process involved and outlines good practice steps for achieving successful and sustainable TP.

2.3 Regional policy

Transport for Greater Manchester (TfGM)

2.3.1 Greater Manchester's transport policies are set by the Greater Manchester Combined Authority (GMCA) and the Greater Manchester Transport Committee (GMTC). GMCA comprises the ten Greater Manchester councils: Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford and Wigan. Transport for Greater Manchester (TfGM) is the local government body responsible for delivering Greater Manchester's transport strategy and commitments and for implementing the decisions made by GMCA and GMTC. The Greater Manchester Transport Strategy 2040[9] (January 2021) aims for a transport network that supports long-term, sustainable economic growth and access opportunity for all. HS2 is integral to the strategy and is identified as a priority transformational investment for the region.

2.3.2 The strategy notes that 'Access to public transport is vital to the quality of life for those who do not have access to a car. Various studies have shown that lack of transport can be a barrier to taking up work, while transport problems can lead to missed health appointments. At the same time, good access to public transport is also essential if we are to reduce car traffic in neighbourhoods.'

2.3.3 Specifically, the strategy states that 'the development of station travel plans can maximise access by sustainable modes and raise awareness of the station locally. The work of Community Rail Partnerships and 'Friends of Stations' groups is also important in this respect and greatly valued.'

2.3.4 Transport for Greater Manchester also provides a Travel Plan Toolkit which 'helps developer, consultants, businesses and local authorities in Greater Manchester to create, review and implement effective, sustainable Travel Plans as part of the planning process for an

[9] Transport for Greater Manchester (2017), *Greater Manchester Transport Strategy to 2040*.

employment site. The toolkit explains what travel plans are, provides a search facility and information on resources, as well as a process for Travel Plan users.'[10]

Transport for the North

2.3.5 Transport for the North (TfN) is the statutory, sub-national transport body (SNTB) established in 2018 and responsible for making the case for pan-Northern strategic transport improvements which are needed to support transformational economic growth, to enable the North to increase its productivity, create more job opportunities and make a greater contribution to the UK economy.

2.3.6 The TfN Strategic Transport Plan sets the vision and pan-Northern Transport Objectives for transport in the north of England. The plan strongly supports the implementation of HS2 and aims to deliver transport improvements which integrate with and build on the benefits of HS2. The Strategic Transport Plan was created to drive major improvements in strategic connectivity throughout the north, encouraging trade and inward investment by improving links to the ports and airports, and faster links between the economic assets that they serve.

2.3.7 TfN recognises that successfully delivering inclusive, healthy, and sustainable growth is dependent upon protecting and renewing the high-quality environment in the North. Making the best use of existing transport infrastructure and encouraging sustainable modes, including walking and cycling (for example, by providing secure cycle storage at public transport interchanges and ensuring routes are safe), will help to reduce the environmental impacts of travel and can provide public health benefits. In addition, building new developments where there is good access to public transport and services will reduce the need to drive, and therefore reduce emissions. Road and rail networks must also be used as efficiently as possible.

2.4 HS2 sustainability policy

2.4.1 The ES sets out the measures by which the environmental impact of construction and operation of the Proposed Scheme will be reduced. With regard to transport this includes:

- measures to reduce the impact of construction traffic including traffic management plans, construction workplace travel plan (CWTP), traffic management processes, potential for on-site accommodation for construction workers;
- where roads require temporary closures, alternative routes for buses (including temporary bus stop infrastructure) and traffic diversions will be put in place, along with diversion and/or traffic management measures to accommodate usage by pedestrians, cyclists and equestrians;

[10] Transport for Greater Manchester Travel Plan Toolkit. Available online at: https://travelplantoolkit.tfgm.com/.

- new or realigned highways crossing the route of the Proposed Scheme will generally be built 'offline', so that they can be completed prior to the closure of an existing road;
- where Public Rights of Way (PRoW) require temporary closure during construction, the affected PRoW will usually be diverted to another available PRoW (or road if suitable), or diverted onto a safe route around a construction site prior to closure of the existing route. All diversions will have appropriate signing and will remain in place until the PRoW is either re-established or a permanent diversion is completed; and
- where site haul routes, created adjacent to the route of the Proposed Scheme, cross the existing road or PRoW networks, traffic control measures will be implemented and could include provision of temporary signals or roundabouts, or active control measures to manage the safety of PRoW users (which could include staffed crossings, provision of temporary gates or signals), all of which would be removed on completion of the works.

2.4.2 The land required permanently for the Proposed Scheme will include the operational rail corridor. Some roads and PRoW will be permanently diverted. Land will also be required temporarily for construction site compounds, temporary diversion of roads, PRoW and private access routes, watercourses, utilities and borrow pits.

2.5 HS2 draft CoCP policy on traffic and transport

2.5.1 The draft CoCP for the Proposed Scheme sets out the proposed measures for reducing the environmental effects of the project, for construction sites.

Traffic management – general provisions

2.5.2 During construction work, the nominated undertaker will require that the impacts from construction traffic on the local community (including all local residents and businesses and their customers, visitors to the area, and users of the surrounding transport network) be minimised by its contractors where reasonably practicable.

2.5.3 For construction traffic, the impact of road-based construction traffic will be reduced by identifying clear controls on vehicle types, hours of site operation, and routes for HGVs. Highway works required to accommodate construction traffic will be identified. Investigations will continue, where appropriate, to seek further ways to reduce impacts such as increased use of rail for transportation of construction materials.

2.5.4 The Draft CoCP outlines the core anticipated working hours for the majority of the workforce as 08:00-18:00 on weekdays, excluding bank holidays, and 08:00-13:00 on Saturdays). The nominated undertaker will require contractors to adhere to these core hours as far as reasonably practicable. It should be noted that some construction activities will fall outside of these working hours, including 24-hour working, assumed to be, but not constrained to, three shifts: 07:00-15:00, 15:00-23:00 and 23:00-07:00.

2.5.5 For the workforce, where reasonably practicable, the number of private vehicle trips to and from the site (both workforce and visitors) will be reduced by encouraging alternative modes of transport or vehicle sharing.

3 Construction workforce travel plans

3.1 Scope

3.1.1 CWTP for the delivery of construction projects such as HS2 are significantly different to traditional travel plans. The Principal Contractor will be responsible for developing CWTP. These will need to ensure that people can get to and from work in urban, suburban and rural areas so that The Proposed Scheme can be delivered on time.

3.1.2 The travel plans will also be significantly different to a traditional travel plan in that:

- the workforce will vary throughout the construction period according to the activities taking place;
- working hours (and hence times of arrival and departure) will follow the approvals for working hours provided by the relevant local authority and reflect practises within the construction industry as a whole and will be bound into the construction contracts;
- the workforce on-site will not work for The Nominated Undertaker, but is managed by the various Principal Contractors and therefore a number of possible initiatives which will normally be delivered by an employer such as financial or other incentive schemes cannot be utilised; and
- the travel plan will need to ensure that HS2 is an attractive project to work on and is accessible, given the various projects competing for the same workforce – and in particular skilled workforce – who often have little or no constraints on means of access by private vehicle to other construction projects.

3.1.3 HS2 CWTP will therefore need to be:

- more dynamic – necessitating frequent travel-to-work surveys and evaluation and delivery of fairly short-term solutions based on projections;
- more focused – reducing the overall travel demand will not be tackled, but improving access and travel choice will be promoted; and
- less target-driven – due to a changing workforce, with different working patterns and without a fixed residency.

3.2 Aims and objectives

3.2.1 It is anticipated that the overall construction phase could last for thirteen years, although activity at individual locations is often of a much shorter duration. All the construction compound sites identified in the ES will have site-specific Local Environmental Management Plan (LEMP) produced. A number of these sites will be significant hubs of local on-site employment during the construction phase (and some will include worker accommodation) as well as being associated with movements of plant, equipment, excavation and construction.

3.2.2 Lead contractors will be required to produce local traffic management plans (LTMP) that will aim to:

- reduce the impact of freight movements associated with construction activities; and
- reduce any severance, disruption, diversion and damage to local roads, footpaths and other rights of way during construction.

3.2.3 This FTP will sit alongside the LEMP and LTMP, providing guidance on the requirements for CWTP, specifically how to reduce the impact of worker travel to construction sites including the general impact of construction traffic on the highway network and any temporary car parking arrangements to minimise the impact on local residents and businesses.

3.2.4 Measures to support these aims in relation to worker travel to sites will include:

- effective management of construction worker traffic to minimise damage to the environment, impact on the surrounding road network, danger to road users and disturbance to neighbouring properties; and
- the introduction of measures to reduce single occupancy car journeys by staff working on construction sites through the encouragement of car-sharing, public transport, cycling and walking to work where reasonably practicable.

3.2.5 Early and Enabling Works Contractors may be given scope for works such as clearance of sites. Where early/enabling works contractors need to write a travel plan, these should be included as a chapter in the relevant LTMP.

3.2.6 Main Civils Works Contractors will provide a single TP document to cover a number of compound worksites if this is appropriate, rather than duplicating documents. This will comprise an interim CWTP identifying initial measures to be put in place at the commencement of construction including any measures required by HS2 Ltd Undertakings and Assurances. Full TP will then be prepared, following the initial travel to work surveys.

3.2.7 CWTP documents will be produced by each lead contractor, which will encourage the use of sustainable modes of transport to reduce the impact of workforce travel. The plans will follow the guidance provided in the FTP and include details of the:

- identification of a Travel Plan Coordinator (TPC) and a description of their responsibilities;
- key issues to consider for each compound/ construction site or group of sites;
- site activities and surrounding transport network, including relevant context plans;
- anticipated workforce trip generation and how it may change during the construction process;
- travel mitigation measures that will be introduced to reduce the impact of the construction workforce on the transport network and services;
- measures to control on-site parking provision and promoting travel by public transport where available;
- targeting to reduce individual car journeys by the construction workforce;

- methods for surveying workforce travel patterns;
- the process for monitoring, reviewing and where necessary updating the CWTP; and
- proposals as appropriate for transport of construction workforce; and
- measures to ensure safe access to and from site.

3.3 Implementation: appointment of a travel plan coordinator

3.3.1 Main Civils Works and Station Works Principal Contractors will need to appoint a TPC to lead the development and implementation of the travel plan. The TPC will act as a single point of contact for all internal and external stakeholders, from construction companies through to local planning and transport authority staff, so that concerns can be quickly raised and acted upon.

3.3.2 Where appropriated a single TPC will be responsible for a series of compound worksites on behalf of the same contractor. The TPC is critical to the success of the TP, and their role is covered in more detail in the section below on operational TP.

3.4 Site evaluation

3.4.1 The CWTP should include an indication of the anticipated workforce levels throughout the construction period and related site operation issues relevant to the contract area, local area or site-specific construction sites and other facilities which require regular work trips.

3.4.2 Any specific local issues raised by consultation processes will also need to be noted and addressed if they are relevant to the construction workforce travel plan which can reasonably be managed through the CWTP.

3.5 Audit of site and surrounding network

3.5.1 The CWTP will include a description of the site and the boundaries and duration and/or phases of construction works pertaining to a particular construction compound. This will include a location plan showing the local context of the site and a more detailed plan showing the road network directly serving the site. The description should include:

- public transport services - nearest stops/stations, timetables and principal destinations served;
- non-motorised user routes - existing footways, road crossings, other rights of way (bridleways, footpaths, canal towpaths), cycle lanes and cycle tracks; and
- any constraints or traffic-sensitive locations on the local highways network, e.g. peak congestion 'hotspots', locations of schools, nurseries, hospitals etc.

3.5.2 Much of this information will be readily available from the TA, although this may need to be updated using local highway authority source information (and Highways England, if the strategic road network is affected).

3.6 Site travel requirements

3.6.1 The CWTP will set out the anticipated workforce travel that will be generated by the site. The nature of construction site activities changes over time and has different implications for travel and traffic generation. The travel plan will relate to the key milestones in the construction process and phasing of works from site clearance and preparation through to completion.

3.7 Workforce travel mitigation measures

3.7.1 It is proposed that some of the compound workforce construction sites will include on-site accommodation, which will assist with reducing the impact of daily workforce travel on the transport network. Details on the number of trips this reduces, and likely times and volumes of journeys by accommodation users at the start and end of their periods on site, will be included within the site-specific TP.

3.7.2 The workforce that travel directly to the site daily, or to stay in the accommodation, can benefit from some of the standard approaches that apply to travel planning in any workplace including:

- gathering of information on travel habits to understand origin locations of workforce to enable targeted interventions on car-sharing, public transport or special staff buses – either to or from transport nodes or other collection points;
- pre-construction review of anticipated capacity of bus and rail services and rail stations with anticipated workforce numbers and mode share, to ensure that sufficient capacity will be available for all users and, as necessary, measures to mitigate impacts are identified and implemented;
- provision of on-site services, such as catering, to reduce the requirement to travel off site during the working day;
- where appropriate, encouragement of car-sharing by awareness raising measures and help with finding partners with similar journeys (this may include signing up to car-share schemes operated by the local authority and existing travel plan partners, or by commercial providers, to enable access to a wider local pool of people travelling within an area);
- potential provision of mini-bus services to assist with travel to sites and between sites to reduce traffic entering the site or travelling between construction sites pick up points will need to be agreed with the relevant highway authorities;

- provision of good quality and accurate information on local public transport services where relevant – including potential for real time bus and rail service information at workforce exits and/or via internal websites;
- encouragement of the use of public transport through raising awareness of local services, where appropriate offering discounted season tickets or loans for season ticket purchase;
- encouragement of cycling through awareness of local routes and discounted tax-free cycle purchase scheme or interest-free loans for cycle purchase and provision of secure cycle parking on site commensurate with demand (and any site-specific safety measures);
- as appropriate, cycle training and bicycle safety checks; measures to limit or manage car parking on site to ensure safe access and to discourage parking in nearby settlements where this might adversely impact local residents or businesses;
- provision of safe and well-lit walking routes from nearby bus stops, car parking areas, or rail stations to welfare facilities within the site (including liaison with highway authorities regarding maintaining street lighting, cutting back overhanging foliage, street cleansing etc.); and
- an on-going commitment to promote safe and sustainable transport to the workforce through events and publicity such as campaigns and travel information posters.

3.8 Targets and monitoring

3.8.1 The TPC will engage with the relevant local planning authority on appropriate monitoring arrangements. This might include:

- initial assumptions and measures within an interim travel plan developed by the main works and stations civils contractors details of worker home locations once known, so travel choices can be identified;
- worker travel surveys to enable the actual mode share information for each site to be better determined and provide a sound basis on which to develop and set bespoke targets as appropriate;
- monitoring of other supporting activities such as membership of car-share schemes, take up of employee cycle loans; and
- a review of similar compound worksites (such as HS2 Phase One and Phase 2a construction compound sites) undertaking the same types of work activities, to identify lessons learned, which can inform the travel plan arrangement for new compound sites.

3.8.2 Monitoring should be undertaken on an annual basis, until the number of construction workers on any particular site reaches peak numbers.

3.9 On-going implementation and legacy

3.9.1 The TPC will remain responsive to changing circumstances during the construction period for sites with long construction periods and different phases of activity. The TPC should also continue to liaise with the relevant local authority and public transport operators to ensure that employees can take advantage of any improvements to local services or local funding opportunities for sustainable transport.

3.9.2 Some construction sites will eventually become an operational stations, stabling facilities and IMB-R. While further detail on how a full TP will operate in these instances is provided in the next chapter, early preparation will be useful.

3.9.3 The TPC will therefore need to work with the nominated undertaker's design team and the relevant local authority to ensure that future sustainable travel measures identified in outline design discussions are delivered in the final schemes, and that any changes to designs due to unforeseen site issues will not unduly prejudice long-term sustainable travel options. This could include:

- where bus services operate, checking bus facilities are convenient and stops are accessible to site entrances;
- ensuring that levels of cycle parking are sufficient to meet anticipated mode shares; and
- ensuring that walking routes are safe, direct and well-lit.

3.9.4 The final iteration of the CWTP at such sites should provide the basis for a handover to the operator to help with development of a full TP for the operational phase of this site.

4 Operational phase travel plans

4.1 Types of operational travel plans

4.1.1 There are different purposes for travel during the operations of the Proposed Scheme, some of which require a different type of travel plan. The main reasons for travel include:

- passengers to/from stations;
- staff to/from stations and depots; and
- deliveries to/from stations and depots.

4.1.2 There will also be maintenance requirements along the route at remote locations (i.e. vent shafts), which do not require a TP as trips will be small in number.

4.1.3 Station travel plans (STP) will provide guidance for passenger and staff trips to HS2 stations. Maintenance depot travel plans will similarly be required for staff for HS2 depots. Alongside these will be delivery and servicing plans and, as appropriate, car park management plans.

Station travel plans (STP)

4.1.4 Each TP should be based on the guidance on Station travel plans (STP) provided by NR and ATOC, as well as guidance on travel planning for workplaces and new developments provided by relevant local transport authorities (references are appended in section 7).

4.1.5 An integral part of all good travel planning is the close cooperation with the local planning authority and travel awareness teams as partners in defining the exact scope of the travel plan and in its implementation and monitoring arrangements. The depot or station operator will be required to appoint a TPC for each location, who will work closely to develop links with delivery partners. Suggested references to assist travel plan coordinators in preparing depot and station travel plans are listed at the end of this document.

Maintenance depot travel plans (DTP)

4.1.6 The proposed facilities at Crewe North RSD and Crewe North IMB-R and the Annandale depot should seek to operate under the same principles as the stations as far as is reasonably practicable in relation to workforce. These principles are outlined in the sections below.

4.2 Definition, aims and objectives

4.2.1 The ATOC document 'Guidance on the implementation of Station Travel Plans: Station Travel Plans Toolkit'[11] (2013) defines a station travel plan as 'a management tool for improving access to and from a station and mitigating local transport and parking problems, supporting sustainable growth in rail patronage and the strategic objectives of the rail industry. The STP is jointly agreed and delivered by the rail industry, LA, other stakeholders and the local community working in partnership'.

4.2.2 In this document any travel associated with construction of the station sites is covered in the CWTP set out in section 3. The scope of the STP is for the operational phase of HS2 and covers:

- access and egress to the station for passenger travel; and
- employee travel, including rail staff and others working on the site such as retail staff, security/policing and cleansing contractors.

4.2.3 Further guidance is available in the Community Rail Network's Connected stations: 'A guide to community-led station travel planning: linking rail with sustainable transport' (2020)[12]. This toolkit can be used by any community group, town or parish council, or local authority wanting to connect their station to its community by walking, cycling and public transport, whether already involved in the community or not. It states that the key benefits of STP are:

- they bring together partners to maximise resources and expertise;
- they prioritise sustainable and healthy transport modes, which benefit wellbeing and are more inclusive;
- they can combine changes in infrastructure with awareness raising, promotion and engagement;
- they are evidence-based and require an agreed plan and coordination between partners to achieve common goals;
- they can provide a basis for pooling resources and bidding for funding, including collaboration with the development industry; and
- they provide a framework for coordination between transport plans and strategies, while engaging local people in positive change.

4.2.4 The aim of the STP is therefore to reduce any adverse impacts of travel to and from the station while at the same time facilitating access to rail services.

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[11] Station Travel Plans Toolkit. Available online at: https://www.researchgate.net/publication/273259008_Guidance_on_the_implementation_of_Station_Travel_Plans.

[12] Association of Community Rail Partnerships (2020), *A guide to community-led station travel planning: linking rail with sustainable transport*. Available online at: https://communityrail.org.uk/wp-content/uploads/2020/02/ACoRP-STP-toolkit-final-version.pdf.

4.2.5 This is supported by a number of objectives:

- to encourage access by walking, cycling and public transport;
- to provide facilities and infrastructure that supports access by walking, cycling and public transport to reach the site from its surrounding area, and to accommodate cycle parking within the site;
- to use promotional activities and incentives – such as preferential or discounted ticketing, media campaigns, on-site events and provision of information on internal and external websites and noticeboards to encourage sustainable travel and car-sharing; and
- to work in partnership with the local authority and other stakeholders when developing measures and promotional strategies to encourage sustainable travel.

4.2.6 The individual STP and DTP may include other specific objectives that reflect local transport priorities or concerns.

4.3 Service and operating characteristics

Stations

4.3.1 Station sites for the Proposed Scheme will be Manchester Airport High Speed station and Manchester Piccadilly High Speed station. Both stations include links to local bus services, with Manchester Piccadilly High Speed station including direct links to Network rail services and Metrolink.

Services

4.3.2 Services are likely to operate from 05:00-24:00 from Monday to Saturday and from 08:00-24:00 on Sunday. Maintenance and engineering works would normally take place outside of these operational hours, unless the works can be fully separated to enable them to be undertaken during the day with trains operating at the same time.

4.3.3 Once operational, it is expected that the Proposed Scheme would operate up to six HS2 trains per hour per direction to Manchester Airport High Speed station and Manchester Piccadilly High Speed station.

4.4 Site evaluation

4.4.1 The STP and DTP should include a summary of the key local transport and site operation relevant to the Proposed Scheme. Much of this information can be found within the TA for the present situation and future baseline within the vicinity of the site but will need to be updated for the operational phase. Any specific local issues raised by the consultation process should also be noted and addressed if they are relevant to the TP.

4.4.2 Local transport is evolving and changing around all the station sites at present, with rapid growth of cycling in Manchester city centre, and the growth and redevelopment around

Manchester Airport. The STP will set out the local context for both of the station sites. Where sites have been operating as construction sites, the information should be available from the CWTP. The CWTP will also include an update on local policies and programmes for sustainable travel.

4.5 Audit of site and surrounding network

4.5.1 The STP and DTP will include a description of the site. This will include a location plan showing the local context of the site and a more detailed plan showing the road network directly serving the site. The description will include:

- public transport services – nearest stops/stations, timetables and principal destinations served;
- non-motorised user routes – existing footways, road crossings, other rights of way (bridleways, footpaths, canal towpaths), cycle lanes and cycle tracks that can be used to access the site;
- a note of local road infrastructure – speed limits, traffic flows and congestion hot spots;
- a review of online public transport timetable information and ticket options; and
- wayfinding information to, from and within the station.

4.5.2 Much of this information is included in the TA, but this may need to be updated in consultation with the relevant local planning and transport authority and Highways England. Where sites have been operating as construction sites, the information should be available from the CWTP.

4.6 Implementation: appointment of a TPC

4.6.1 A TPC will be appointed for each station and depot. The TPC will have overall responsibility for the TP and act as the single point of contact for local authority and other stakeholders. The TPC should be employed by the depot or station operator(s) and work with NR.

4.6.2 The coordinator is vital to the TP. Their responsibilities include to:

- promote and encourage the use of travel modes other than the car;
- provide a point of contact and travel information for employees and visitors;
- manage and monitor the TP document;
- develop and disseminate appropriate TP marketing information and to ensure that all relevant and up to date material is clearly displayed on TP notice boards and websites;
- arrange for travel surveys to be undertaken and analysed when necessary;
- identify key milestones, deliverables and a programme to oversee the development and implementation of specific measures and initiatives;

- provide a point of contact with transport operators and officers of the local planning and transport authorities and work with other local businesses to pursue joint plans and initiatives;
- establish a site user group (passengers and staff), and a steering or review group (with local authorities and others such as rail and bus operators), as required, along with a regular reporting programme; and
- ensure alignment with servicing/delivery and car parking management strategies.

4.7 Evaluation of requirements

4.7.1 It will be important to establish who is using each station and where they are travelling to and from to help create a package of measures that will meet the needs of all staff and travellers. The TPC could make use of the following information:

- the TA which include estimations of travel demand, peak times, modes of access, public transport service provision and traffic congestion hotspots;
- market research for HS2 Ltd which will include similar information to the above;
- passenger data from the LENNON database, ticket sales, ticket machines and season ticket holders and from car park machines;
- data from other related surveys such as local household travel surveys, the census, the National Passenger Survey, car parking data and traffic counts that may be conducted by the local authority or other agencies and give an indication of local travel trends; and
- staff travel surveys.

4.7.2 There is detailed coverage of the type of information that can be collected and what it can be used for in the ATOC 'Guidance on the implementation of Station Travel Plans: Station Travel Plans Toolkit'. This will be used to support the development of each STP.

4.8 Working in partnership

4.8.1 The STP Toolkit identifies working in partnership as an important process in the success of implementing STP. The key partners for the stations are Transport for Greater Manchester, MAG, Manchester City Council, Trafford Council, Network Rail and Highways England.

4.8.2 The local authority for the Crewe North RSD and Crewe North IMB-R is Cheshire East Council. Cheshire East Council provide Travel Plan thresholds and further guidance and information[13].

[13] Cheshire East Council, Cheshire East Travel Plan Guidance. Available online at: https://www.cheshireeast.gov.uk/public_transport/travel_plans/travel_plans.aspx.

4.8.3 For the Annandale stabling facility, the local authority is Dumfries and Galloway Council. Dumfries and Galloway Councils SPD Travel Plan: a guide for developers sets out guidance on suggested content and assessment criteria[14].

4.8.4 The TPC will work closely with the local planning and transport authorities to develop the travel plans for each site and to work on joint initiatives such as links to cycle routes and cycle hire, bus interchange and promotional activities. These partnerships should evolve from the current engagement into active co-operation and coordination of activities during the operational stage.

4.8.5 Other partners that may be helpful in supporting the travel plan will include:

- NR, Train Operating Companies and TfGM (Metrolink);
- businesses operating within the station (including supply chain providers);
- Local Chambers of Commerce and large businesses / significant local trip generators;
- bus operators for joint ticketing and promotions;
- passenger groups, neighbourhood forums and community groups including Passenger Focus, local cycling and disability groups to help address any access issues from a user perspective; and
- British Transport Police and TRANSEC (Transport Security and Contingencies Directorate).

4.8.6 Travel plan guidance recommends that the TPC sets up user and review groups to involve partners in the development and implementation of the travel plan.

4.9 Measures to encourage sustainable travel

4.9.1 One of the key roles of the TPC is to get a better understanding of the 'door to door' journeys being made by staff and rail passengers, as well as to develop initiatives that make this journey convenient. Quite often services are available, but staff and visitors may be unaware that they exist.

4.9.2 The TPC may use the following promotional strategies:

- online information about sustainable access to the Proposed Scheme;
- postcode maps for staff and events to help them match up for car-sharing or taxi sharing;
- season ticket loans or discounts and tax-free bicycle purchase scheme for staff;
- publicity for multi-modal, advance purchase and/or discounted tickets;
- promotional events in partnership with the local authority such as national Bike Week and Active Travel promotions to encourage cycling and walking;

[14] Dumfries and Galloway Council (2014), Local Development Plan, Supplementary Guidance, *Travel Plans: a guide for developers*. Available online at: https://www.dumgal.gov.uk/media/11737/Travel-Plans/pdf/Travel_Plans_(2).pdf?m=636592298185630000.

- posters and public transport and cycle route maps;
- leaflets to help staff, visitors and travellers with advance information about sustainable access choices prior to their employment or visits; and
- staff training so that they are knowledgeable about onward travel for visitors as well as their own travel.

Physical measures

4.9.3 The design process for Proposed Scheme is already incorporating many measures to facilitate sustainable travel. It is important however that when delivered in the final scheme these are complemented by a programme of publicity and promotion. Physical measures which could facilitate sustainable travel include:

- safe, secure and attractive well-lit walking routes from the stations to the adjacent streets and connecting stations;
- direct links to the surrounding cycle route network;
- wayfinding/signage improvements on key routes to and from the station;
- secure cycle parking sufficient to meet station staff and visitor demand;
- cycle hire and maintenance hubs at stations including, as appropriate, electric bikes;
- at appropriate locations safe 'kiss and ride' and parking facilities away from main pedestrian thoroughfares;
- direct interchange to local buses, light rail and suburban rail services with clear real-time information on timetables, platforms and stops and coherent physical links from HS2 stations; and
- comfortable, sheltered waiting areas for bus and taxi services.

4.9.4 Some of this will require off-site improvements to be delivered by the local transport authorities or other agencies and will require close working with local transport authorities and bus operators to secure.

4.10 Targets and monitoring

4.10.1 It can be difficult to set mode share targets prior to operations commencing that will accurately reflect how staff and visitors will react to different interventions. For example, restrictions on car parking may not reduce car travel, but create 'kiss and ride' drop-off activity and informal parking off site, which may have a negative impact on traffic and the environment.

4.10.2 It is also difficult to disaggregate the effect of individual interventions, when a whole suite of activities may be taking place, for example is it cycle parking that stimulates cycling, or the provision of route maps or discounted cycles, or exceptionally good weather.

4.10.3 It is more important therefore to set out 'SMART' targets that relate to the timescales for introduction of the TP and its measures, and to regularly re-evaluate the STP and DTP following the analysis of annual monitoring reports. In the context of TP, this means:

- specific – solutions proposed to the identified gaps in provision or problems;
- measurable – linked to a quantifiable indicator that can be repeatedly and cost-effectively monitored, to assess whether or not they are being achieved;
- achievable – take account of likely availability of funding, approval processes, practical constraints, deliverability;
- relevant support the wider strategic aims of stakeholders, the policies of the local authority, and meet the needs of passengers; and
- time-bound – consider timescales for delivery, timescales of different partners' processes (e.g. annual updates, changes in phases of operation etc.).

4.10.4 Following an initial baseline survey within the first six months of operation, monitoring and updating of the Proposed Scheme will be undertaken on an annual basis for a period of five years. The monitoring should seek to establish the mode share for access to the TP by staff and visitors, and also include questions that help identify improvements and interventions that would further encourage sustainable travel.

4.10.5 All targets will be established in consultation with the relevant local authorities once the site-specific travel characteristics are fully appreciated and the initial set of staff survey data has been collected for verification. This will allow the actual mode share information for the Proposed Scheme to be better determined and will provide a sound basis on which to develop and set bespoke targets as appropriate.

4.10.6 The principles for establishing targets must be relevant to the specific location but will generally aim to reduce single occupancy car trips and increase walk, cycle and public transport mode shares.

4.10.7 The TPC for each site will commission staff and visitor travel surveys within the first six months of operation and two-yearly thereafter, to understand where staff and visitors are travelling from, what times they are travelling and typical shift patterns etc. This should include non-rail staff such as retailers and other businesses within the station. The TPC will work with other agencies to establish the most appropriate approach to conducting passenger surveys.

4.10.8 The requirement for monitoring will include:

- rates of trip-making by staff and visitors;
- mode share and change in mode share over time; and
- the effectiveness of the TP measures in respect of the Stations and depots together with the timetable for implementing any revised or enhanced measures.

4.10.9 As a living document, there will be the need to update the TP as required. This requirement should be borne out of the monitoring exercises undertaken for the stations and depots

during the operational phase, with particular importance given to the first survey undertaken, where the targets set prior to opening can be tested and the initial set of mitigation measures put in place to support sustainable travel options be revised.

5 Framework travel plan review and funding

5.1 Review

5.1.1 It is expected that this FTP will become the responsibility of the nominated undertaker, who will ensure the requirements of this framework are delivered by the lead contractors (in the case of CWTP), and by the station/train operator when establishing the site-specific operational TP.

5.1.2 To facilitate this process and to ensure the site-specific TP are implemented appropriately, the nominated undertaker will identify a route-wide Travel Plan Manager.

5.2 Funding

5.2.1 The responsibility for funding the co-ordination and implementation of full TP is as follows:

- for the FTP – the nominated undertaker;
- for the CWTP – the lead contractors; and
- for the STP and DTP – the Operator(s).

6 Action Plan

6.1.1 As set out in Table 1, Main Civils Works and Station Works Principal Contractors will be required to prepare an interim travel plan for single or suitable groups of construction sites, identifying initial measures to be put in place at the commencement of construction, including any measures required by Undertakings and Assurances. Full TP will then be prepared, following the first travel to work surveys. Full TP are to be prepared between six and 12 months following commencement of main civils works and utilise travel survey data to forecast mode share and impacts on transport networks at peak employment on-site (or sites). Enabling works contractors and later railway/network contractors set out travel plan proposals within their relevant LTMP.

6.1.2 Table 2, and Table 3 provide an indicative outline action plan for each TP document. This structure will be followed and expanded upon by the site-specific TP documents that will be produced prior to construction and operation. Further mode or site-specific actions will, as necessary, be detailed in the CWTP and STP/DTP documents.

Table 1: Framework travel plan - expected actions

Mode	Measure	Action	Responsibility	Potential dates
All	FTP	This FTP submitted as part of the hybrid Bill process.	HS2 Ltd	Summer 2021.
All	Route-wide TP manager	Appoint a route-wide TP manager.	Nominated undertaker	Prior to construction.
All	Review group	Set up FTP steering/review group and arrange first meeting.	TP manager	Prior to construction.
All	FTP monitoring, review and feedback	Monitoring, review and feedback to local authorities, stakeholders and FTP steering/review group.	TP manager	Frequency to be established in consultation with relevant local authorities.

6.1.3 Main Civils Works and Station Works Principal Contractors will be required to prepare an interim travel plan for single or suitable groups of construction sites, identifying initial measures to be put in place at the commencement of construction, including any measures required by Undertakings and Assurances. Full TP will then be prepared, following the first travel to work surveys. Full TP are to be prepared between six and 12 months following commencement of main civils works and utilise travel survey data to forecast mode share and impacts on transport networks at peak employment on-site (or sites). Enabling works contractors and later railway/network contractors set out travel plan proposals within their relevant LTMP.

Table 2: Construction workforce travel plan - expected actions

Mode	Measure	Action	Responsibility	Potential dates
All	Interim CWTP	CWTP submitted for approval.	Lead contractor(s)	Prior to construction.
All	TPC	Appoint a TPC.	Lead contractor(s)	Prior to compound site being in use.
All	Review group and user forum	Set up TP steering/review group and arrange first meeting. Establish users' forum and establish process for obtaining feedback on the TP from users.	TPC	Within three months of compound site being in use.
All	Travel to work surveys	Travel to work surveys.	Lead contractor(s)	Between six and 12 months following commencement of main civils works.
All	CWTP - monitoring, review feedback and update	Monitoring (including annual repeat of travel to work surveys), review and feedback to local authorities, stakeholders and TP steering/review group. Interim CWTP to be updated to full CWTP.	TPC	Annually, until maximum workforce reached on the basis that once at peak, all necessary measures implemented.

Table 3: Station and depot travel plans - expected actions

Mode	Measure	Action	Responsibility	Potential dates
All	STPs and DTPs	Station or depot travel plan submitted for approval.	Station or depot operator(s)	Prior to station or depot being in use.
All	TP Coordinator	Employ a TP coordinator.	Station or depot operator(s)	Prior to station or depot being in use.
All	Review group and user forum	Set up TP review group and arrange first meeting. Establish user forum and establish process for obtaining feedback on the travel plan from users.	TP coordinator	Within 3 months of station or depot being in use.
All	STP and DTP monitoring, review and feedback	Monitoring, review and feedback to local authorities, stakeholders and TP Review Group.	TP coordinator	Frequency to be established in consultation with relevant local authorities.
All	Update TPs	Review and update TPs following initial monitoring exercise and approval with planning authorities.	TP coordinator	Following monitoring and feedback process.

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