

ANNEX C – ACCESSIBILITY ANALYSIS



SWINDON AND WILTSHIRE RAIL STUDY

ANNEX C – ACCESSIBILITY ANALYSIS

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1. ACCESSIBILITY ANALYSIS

1.1 Introduction

1.1.1 Within Annex A and B we have considered the nature of the rail service provided across Wiltshire and examined the shape of the economy and how the rail network could support this. Within this Annex we examine the quality of the service provided as part of an accessibility analysis to understand where there are strengths and weaknesses in service provision. The accessibility analysis looks at local, regional and strategic services as well as examining issues around access to the rail network from across Swindon and Wiltshire.

1.2 Interpreting Service Levels

1.2.1 As part of our assessment of accessibility we have examined the average speeds, service frequencies and number of interchanges required to complete journeys, as these represent the central components that passengers consider when choosing whether to make a rail journey. This analysis is based on average speeds rather than journey times, as this allows us to compare journeys to different locations in a standardised format.

1.2.2 To incorporate the impact of service quality factors such as frequency and interchange we have drawn on a metric known as **Generalised Speed**. Generalised Speed is a measure that assigns time-based weighting (expressed in minutes) to frequency and interchanges, which can then be added to point to point journey times to provide passenger perceived journey times. These can then be converted to speeds. This measure is used widely in the rail industry as part of demand forecasting processes, and also provides a useful metric for comparing relative accessibility.

1.2.3 When considering Generalised Speed it should be remembered that values will always be lower than point to point average speeds based only on journey times, as the addition of the service quality weightings can only increase perceived journey time and reduce speeds.

1.2.4 To allow benchmarking we have compared services against a definition of service quality contained within the 2013 Network Rail Long Distance Market Study. We have chosen to use a definition that covers services up to 100 miles¹, as the definitions that exist for journeys over 100 miles involve average speeds that would require investment in High Speed Rail, and in many cases the distances involve from Wiltshire to key centres such as London or Birmingham is less than 100 miles. Table 1 below shows the codes used for the typical average speeds for each service in the analysis in Section 2.

Table 1. Network Rail Service Definitions (up to 100 miles)

DEFINITION	AVERAGE SPEED (MPH)	COLOUR CODE
Best Possible	Above 60mph	
Best Current	45-60mph	
Good Current	Below 45mph	

¹ These definitions cover the 0-50 mile range, with discretion to extend this to 100 miles.

- 1.2.5 We have used the same colour coding to understand the average and generalised speeds to show the impact that interchange and frequency have on perceived journey times.
- 1.2.6 Our choice to use criteria for services under 100 miles sets a relatively low benchmark for the longer distance movements from Swindon and Wiltshire, where average speeds might be higher, and this should be considered in the analysis below.

2. STRATEGIC ACCESSIBILITY

- 2.1.1 As was highlighted in Annex A, the rail network in Swindon and Wiltshire is relatively well served by east-west main lines giving good links with London, the Thames Valley and other parts of the South West. Within this section we examine these strategic links in more detail.
- 2.1.2 In the tables below we present the average speeds and generalised speeds for movements from the five busiest Swindon and Wiltshire stations to a number of strategic locations across the UK.

Table 2. Average Speeds to Strategic Locations (mph)

	CHIPPENHAM	SALISBURY	SWINDON	WESTBURY	TROWBRIDGE
LONDON	75	56	77	71	54
BIRMINGHAM	36	47	40	48	49
READING	75	45	81	80	47
PLYMOUTH	48	42	47	56	47
MANCHESTER	58	50	44	52	52
LEEDS	50	51	49	45	46
NOTTINGHAM	41	41	40	37	42
NEWCASTLE	62	62	58	56	54
CAMBRIDGE	48	48	51	45	43

- 2.1.3 The table above presents a very mixed picture of long distance connectivity from Wiltshire. Looking firstly at average point to point speeds it can be seen that three of the five stations have a good quality service to London with average speeds in excess of 70mph. Trowbridge has a lower speed but this is driven by the need to interchange at either Bath, Chippenham or Westbury for much of the day. There are a small number of services operating directly to London via Salisbury (four trains per day), but with a lengthy journey time. Salisbury also has a low average speed, reflecting the lower average speed of services on the South West Mainline in general compared to the Great Western routes, and lower maximum speeds (90mph) of the Class 159 trains that operate this service compared to the IET trains on the Great Western which have a maximum speed of 125mph.
- 2.1.4 Average speeds towards Reading are also quite high from Swindon, Westbury and Chippenham, reflecting the strength of the service to London. As with London the links from Trowbridge and Salisbury to Reading are poorer, although in both cases interchange is required.

- 2.1.5 Beyond London and Reading average speeds generally fall well-below the 60mph “best-possible” criterion, itself a relatively unambitious target. The only links where average speed is above this are from Chippenham and Salisbury to Newcastle. This high average speed is actually a reflection of the high quality service on the East Coast Mainline where average speeds can typically be in excess of 90mph and in some cases above 100mph, rather than a reflection of good local connectivity.
- 2.1.6 There are a number of links where average speeds fall below the “good current” average speed of 45mph. All of these movements require interchange, which is, in itself, reflective of poor rail connectivity. The most notably poor average speeds are from Chippenham and Swindon towards Birmingham and from all stations towards. However it should be noted that even the “best current” average speeds, in the range of 45 to 60mph, are unambitious given the importance of these links.

Table 3. Generalised Speeds to Strategic Locations (mph)²

	CHIPPENHAM	SALISBURY	SWINDON	WESTBURY	TROWBRIDGE
LONDON	58	45	63	40	38
BIRMINGHAM	31	37	28	34	36
READING	52	29	54	40	31
PLYMOUTH	33	31	39	36	33
MANCHESTER	45	40	33	40	41
LEEDS	38	39	36	36	35
NOTTINGHAM	29	31	28	31	31
NEWCASTLE	46	46	43	42	41
CAMBRIDGE	32	31	30	30	26

- 2.1.7 The generalised speeds for strategic locations inevitably show a reduction in average speeds relative to the point to point average speeds. Only Swindon to London has a Generalised Speed in excess of 60 mph, reflecting a combination of the short journey time and the high service frequency on this route. Only seven flows remain in the “best current” range; Chippenham and Salisbury to London have a best current service by virtue of their two train per hour service to London. The need to interchange from Trowbridge is reflected in the reduction between average and generalised speeds³; at Westbury, the poor scores are caused by the very low service frequency, equating to one train every two hours.
- 2.1.8 The lowest generalised speeds of all are found between Swindon, Western Wiltshire, Salisbury and Birmingham with an average speed of between 28 - 37mph. Given that this movement links the largest economy in Swindon and Wiltshire with the second largest economy in the UK it is clear that an opportunity is being missed to further-develop the economy of Swindon. This particular flow is also very poorly served by road with a point to point journey time which is comparable with the existing rail journey time, meaning that

² This includes the interchange time and a weighting for the typical service frequency. Where multiple routes exist the quickest has been chosen where services operates on a regular pattern.

³ Although the time spent waiting at an interchange station is included in the average speed table, a further weighting is included in generalised speed to weight the dis-utility of interchange

journey time / frequency improvements could give rail a competitive advantage on this key corridor.

- 2.1.9 Overall the tables suggest that whilst strategic links towards London and the Thames Valley are generally of high quality, the area lacks broader connectivity to other parts of the country, with few direct services and a requirement to interchange. Access to the Midlands and North is especially poor, with passengers required to interchange and travel via Birmingham or interchange in London.

2.2 Benchmarking with London

- 2.2.1 Although connectivity from Swindon and Wiltshire towards London is relatively good, it is instructive to benchmark this against the services that other parts of the country enjoy. Table 4 below ranks speeds from Trowbridge, Swindon, Chippenham, Westbury, Trowbridge and Salisbury to London against the average and generalised speeds from a range of similar regional centres across the UK.

Table 4. Average and Generalised Speeds to London (Ranked by average speed)

STATION	AVERAGE SPEED (MPH)	GENERALISED SPEED (MPH)
Newcastle	94	83
York	94	79
Edinburgh	92	85
Glasgow	89	82
Manchester	88	64
Liverpool	88	75
Peterborough	88	65
Leeds	83	67
Birmingham	82	64
Carlisle	78	71
Swindon	77	63
Sheffield	76	61
Chippenham	75	58
Milton Keynes	74	54
Westbury	71	40
Bristol	71	58
Nottingham	71	58
Oxford	66	47
Norwich	61	50
Southampton	59	46
Salisbury	56	45
Trowbridge	54	38

2.2.2 The table shows that three of the Swindon and Wiltshire stations sit in the middle of the rankings of average speeds. This is a respectable result, as many of the cities higher up the ranking are much larger than towns like Swindon and Chippenham but are also further from London and therefore often have very fast services with a low density of stops helping to maintain high speeds. This is confirmed by the bottom half of the list which is dominated by locations like Nottingham, Norwich and Southampton which are closer to London and have slower services with more stops.

2.2.3 The outliers for Swindon and Wiltshire are Salisbury which has the lowest average speed of all at only 56 mph and Trowbridge. The fact that Southampton has the second lowest average speed indicates that the lower speeds from Salisbury is driven by the characteristics of the South West Mainline, which has over many decades been focussed on capacity and frequency rather than journey times.

2.3 Comparisons with Car Journey Times

2.3.1 As well as examining rail journey times, it is also useful to understand how rail relates to the private car, as the principal alternative mode. The table below presents average speeds by car for the origin – destination movements presented above. These are for centre to centre journey times in the off peak and are therefore directly comparable with rail. Table 6 presents the percentage difference relative to the average speeds by rail.

Table 5. Average Speed by Car using NR Average Speed colour coding (mph)

	CHIPPENHAM	SALISBURY	SWINDON	WESTBURY	TROWBRIDGE
LONDON	47	45	45	49	46
BIRMINGHAM	53	56	46	48	50
READING	55	47	45	48	48
PLYMOUTH	60	50	53	53	50
MANCHESTER	53	47	47	50	50
LEEDS	60	56	58	56	57
NOTTINGHAM	53	50	46	52	48
NEWCASTLE	59	56	58	55	56
CAMBRIDGE	54	51	41	53	51

Table 6. Rail Average Speeds Relative to Car Average Speeds

	CHIPPENHAM	SALISBURY	SWINDON	WESTBURY	TROWBRIDGE
LONDON	60%	24%	71%	45%	17%
BIRMINGHAM	-32%	-16%	-13%	0%	-2%
READING	36%	-4%	80%	67%	-2%
PLYMOUTH	-20%	-16%	-11%	6%	-6%
MANCHESTER	9%	6%	-6%	4%	4%
LEEDS	-17%	-9%	-16%	-20%	-19%
NOTTINGHAM	-23%	-18%	-13%	-29%	-13%
NEWCASTLE	5%	11%	0%	2%	-4%
CAMBRIDGE	-11%	-6%	24%	-15%	-16%

- 2.3.2 For the comparison in Table 6 above, average car speeds have been banded into the same groups as rail journeys. The majority of these journeys have an average speed of around 50mph, making them comparable with many of the rail average speeds. The percentage differences in speed between road and rail present an interesting pattern. Rail is shown to be faster for all London flows and most flows to Reading, Manchester and Newcastle. However rail is slower for the majority of journeys, but typically only by around 20%. In the peak period, when car trips are afflicted by road congestion but rail services maintain their journey times, car would be less competitive. In developing new services to address gaps in connectivity, aiming to equal or better car average speeds would be sensible to ensure that any new service is attractive. A further consideration, however, is that for longer distance journeys time spent on rail services is not waste, as tables and wi-fi facilities allow passengers to make use of their time for leisure or business, whereas for car travel the driver is fully occupied for at least the full duration of the journey.

2.4 Journey Times and the Economy

- 2.4.1 To help understand connectivity across the UK from the SWLEP area, we have estimated journey times from four stations (Swindon, Chippenham, Westbury and Salisbury) to all Local Authority areas across the UK. This was achieved by assessing unweighted journey times to the station with highest usage figures in each area.

The following maps show the results of this process with outputs grouped into time bands. We have also identified what proportion of the UK economy sits within each band.

Figure 1. Journey Time and GVA by time band (Swindon)

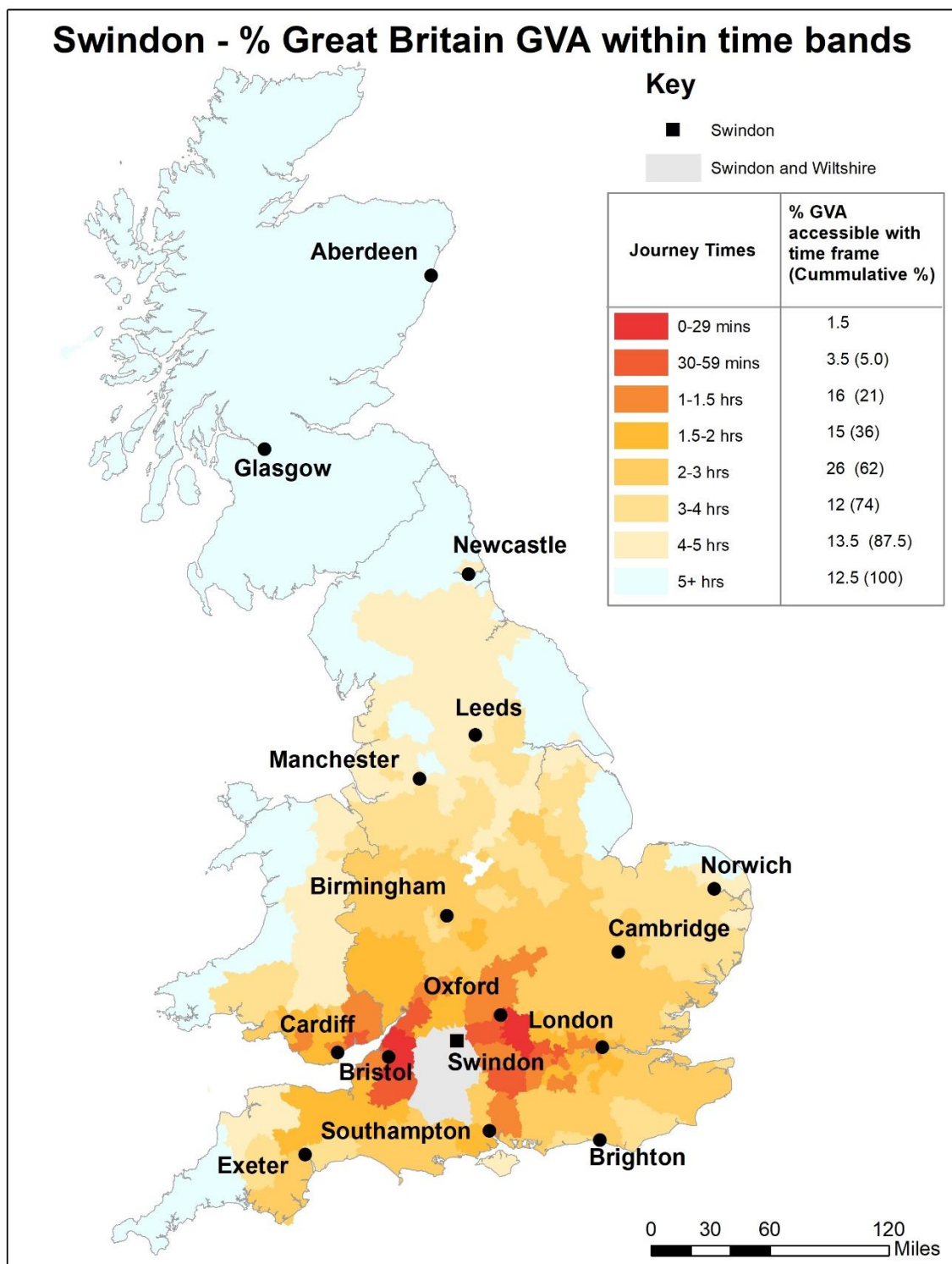


Figure 2. Journey Time and GVA by time band (Chippenham)

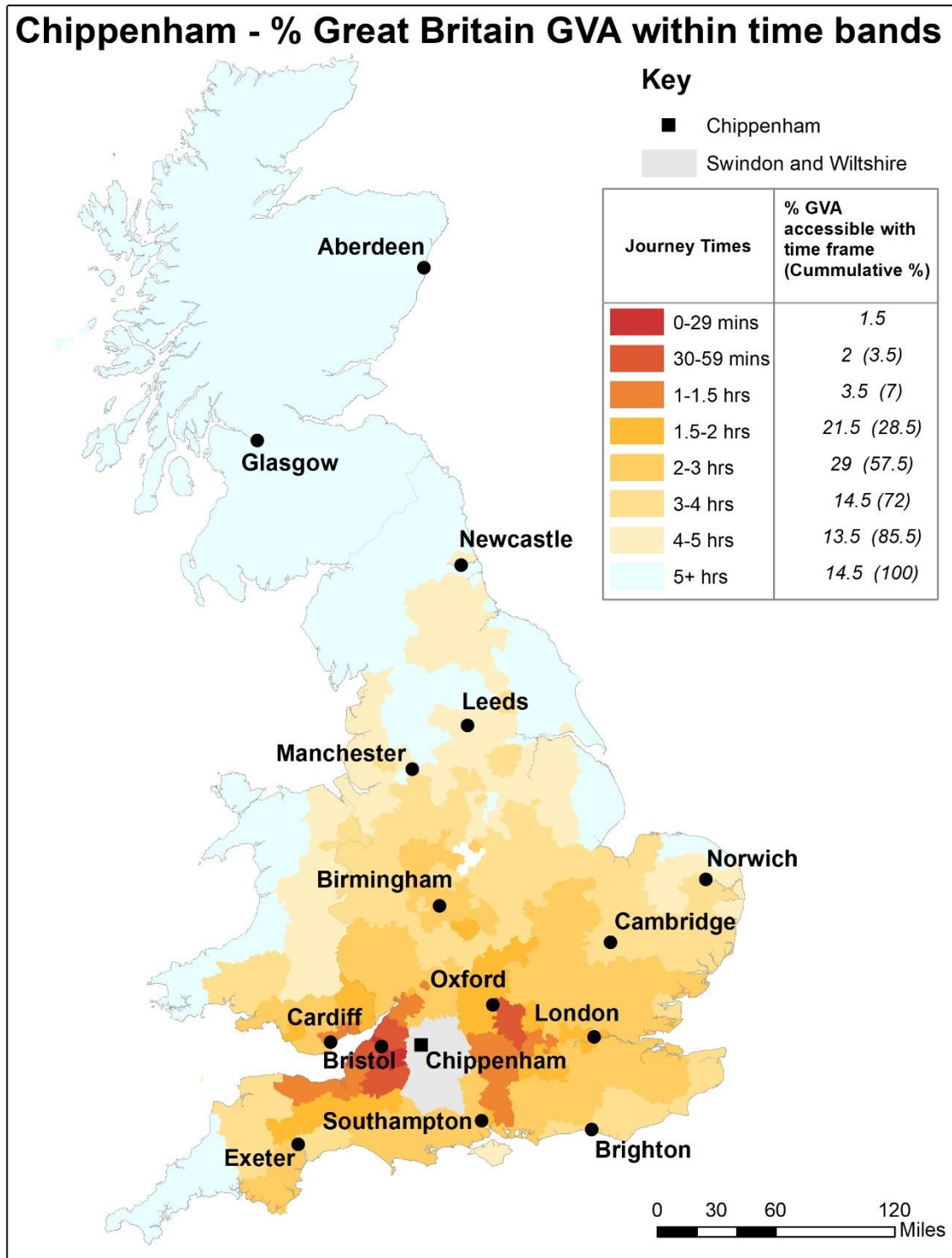


Figure 3. Journey Time and GVA by time band (Westbury)

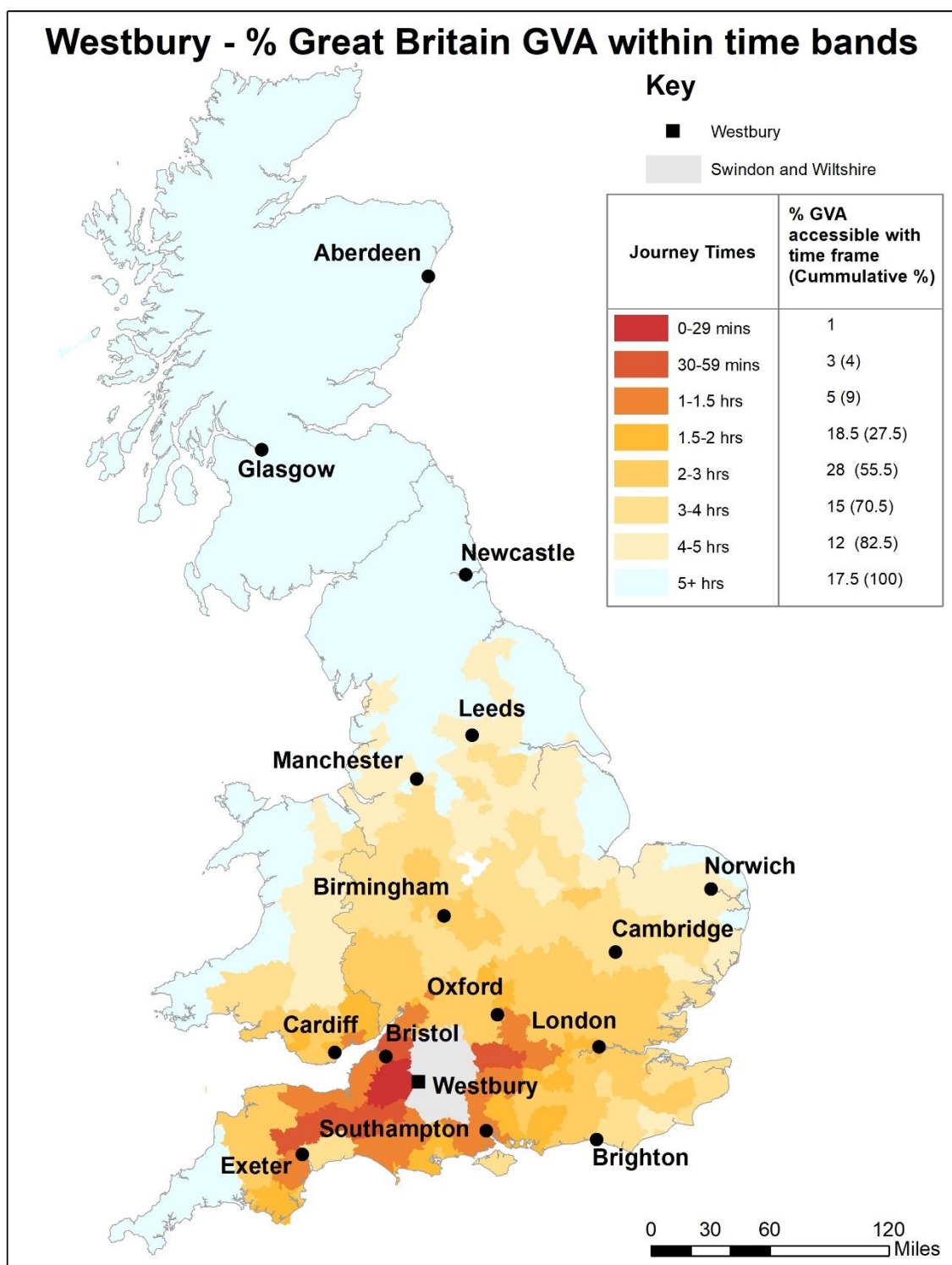
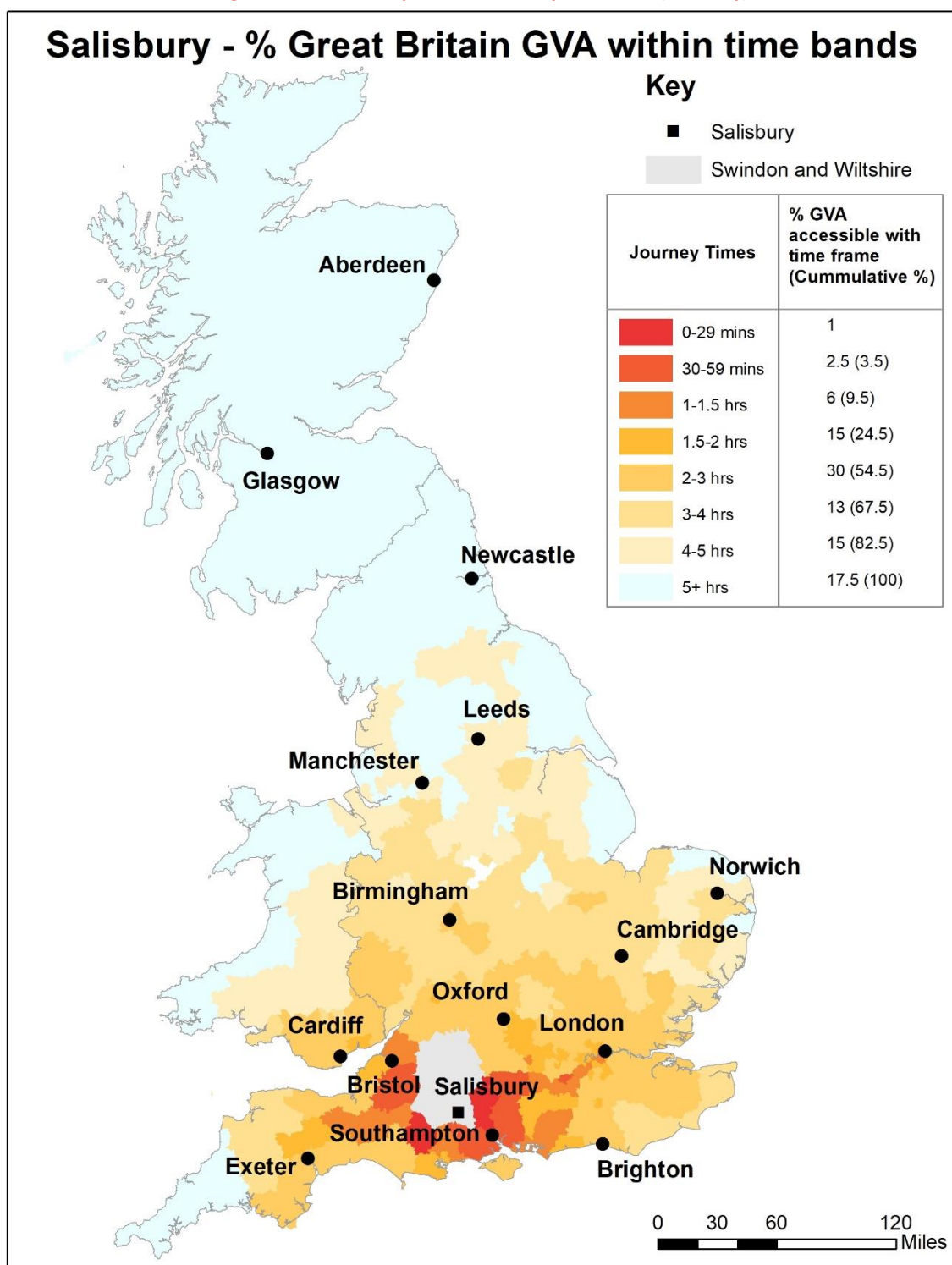


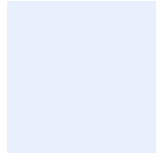
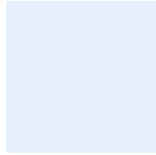
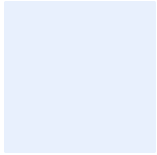
Figure 4. Journey Time and GVA by time band (Salisbury)



2.4.2 The maps for the four stations show a relatively consistent pattern; within the two hour journey time threshold (which is an important threshold for business travel), between 24% (Westbury) and 35% (Swindon) of the UK economy is accessible by rail. The catchment within

1.5 hours of the station is much lower than this. Swindon maintains a relatively high figure with 20% of the UK economy being included, as parts of London are accessible within this timeframe, however the figures fall to 10% or below for the other stations, as the majority of London is outside of this time band.

- 2.4.3 However it is also clear that the opportunity exists to significantly increase the proportion of the UK economy accessible within two hours. For example in the case of Swindon 60% of the economy is accessible within three hours, but only 35% within two hours. This significant proportion of the economy encompasses some parts of the outer (east and south part of London) but more significantly also include areas such as Birmingham and part of the West Midlands and the Oxford – Cambridge corridor. These are all areas where rail connectivity is currently poor, but where there is a realistic scope for improvement through investment.
- 2.4.4 More generally, whilst it may not be possible to improve services to all area, the maps do indicate that there may be some target locations to which access from parts of Swindon and Wiltshire can be improved, which would increase the proportion of the economy within two hours. These targets for improvements in access should include:
- Greater London; to ensure greater proportion of London is within the two hour time band.
 - West Midlands; this is the largest regional economy outside London
 - Central London; although it has a smaller absolute economy than the West Midlands or Greater London economies, it has a high number of high value jobs, forming a synergy with the Wiltshire economy.
 - Southampton and the Solent; improved links from the north of Wiltshire and Swindon would open up this large regional economy
 - Bristol and South Wales; improved links from the south of Wiltshire would likewise improve links to this large regional economy
 - Improved access to the South West peninsula (Exeter and Plymouth) from central and north Wiltshire.



3. REGIONAL ACCESSIBILITY

- 3.1.1 As was highlighted in Annex A, regional and local connectivity by rail in Swindon and Wiltshire is focussed on the Trans Wilts corridor, with the east – west mainlines supporting this within their broader role of providing strategic connectivity over long distances. Within the tables on the following pages we present average and generalised speeds from all stations within Swindon and Wiltshire to a number of regional and local destinations to provide an indication of the quality of the service provided. These have been categorised into the three Network Rail Market Study groups used in the analyses above.

Table 7. Regional Links - Average Speeds

	BRISTOL TM	CARDIFF CENTRAL	CHIPPENHAM	GLOUCESTER	OXFORD	SALISBURY	SOUTHAMPTON CENTRAL	SWINDON	WESTBURY
AVONCLIFF	32	32	18	36	40	27	33	29	32
BEDWYN	26	31	25	33	42	27	26	45	22
BRADFORD-ON- AVON	39	41	20	36	35	41	44	32	32
CHIPPENHAM	50	37		34	43	27	34	78	37
DEAN	32	32	25	29	36	42	37	29	29
MELKSHAM	24	29	40	28	39	26	32	49	38
PEWSEY	34	40	30	29	48	35	34	38	67
SALISBURY	45	43	35	30	42		42	36	52
SWINDON	56	47	78	42	45	34	53		48
TISBURY	35	36	27	29	38	52	35	31	29
TROWBRIDGE	39	40	21	36	34	44	43	45	34
WARMINSTER	39	30	26	28	33	55	50	35	38
WESTBURY	38	42	38	36	40	48	47	46	

Table 8. Regional Links - Generalised Speed:

	BRISTOL TM	CARDIFF CENTRAL	CHIPPENHAM	GLOUCESTER	OXFORD	SALISBURY	SOUTHAMPTON CENTRAL	SWINDON	WESTBURY
AVONCLIFF	18	21	10	27	21	16	21	17	11
BEDWYN	18	23	17	22	24	18	24	26	12
BRADFORD-ON- AVON	25	30	10	27	20	25	31	18	12
CHIPPENHAM	28	25		21	24	17	23	30	13
DEAN	21	23	15	21	24	12	17	18	10
MELKSHAM	14	20	6	18	18	14	19	18	10
PEWSEY	18	24	15	20	22	18	21	22	18
SALISBURY	34	34	20	22	28		25	24	29
SWINDON	36	35	33	26	23	21	32		25
TISBURY	22	25	15	17	26	17	19	18	17
TROWBRIDGE	24	30	9	28	20	25	30	16	10
WARMINSTER	26	25	13	20	19	23	32	19	10
WESTBURY	25	32	13	28	24	26	31	27	

NB – the generalised speed table uses a different key to the other tables within the report. Amber boxes relate to generalised speeds between 20 – 40 and red relates to speeds below 20. If the Network rail service definitions scale is used (as per table 1 in this Annex) then the whole table is categorised as red.

- 3.1.2 The tables above show that the majority of regional links have average speed well-below the 45 mph categorised as a “good current” level of service. This is not an unexpected result, especially as lot a of the origin-destination pairs are in some way dependent on services operating via the Trans Wilts Line, which has the lowest average speeds of the four routes serving Wiltshire. The only links where average speeds are high than 60mph are Chippenham – Swindon and Westbury – Pewsey, both of which are linked by long distance high speed services.
- 3.1.3 There are a group of links that have an average speed of between 45 and 60mph. This probably represents reasonable average speed for regional services. The links in this group are characterised as being served directly by long distance high speed services namely the Cardiff – Portsmouth service, or the Westbury – Swindon service. On the Trans Wilts Corridor only the section between Westbury and Salisbury , where trains usually only call at one station (Warminster) is in this category, with an average speed of 51mph. The unexpected inclusion in this group is Pewsey – Oxford; both Pewsey – Reading and Reading – Oxford are relatively high speed trips, and there are good connections between the services at Reading .
- 3.1.4 For the lowest-speed group, there is a relatively consistent pattern, with stations such as Freshford and Avoncliff which have poorer services also having some of the lower average speeds. The stations at Dilton Marsh, Freshford and Avoncliff in particular have relatively inconsistent service patterns with frequencies that vary across the day; whilst all have direct services to a diverse range of destinations, interchange is often needed at many times of day. A number of stations are also relatively isolated and only have direct services to small number of locations. For example:
- Bedwyn is only served by services towards Newbury, Reading and London, with the exception of a small number of peak services to / from Westbury and beyond.
 - Tisbury is only served by London Waterloo to Yeovil and Exeter services
 - Dean is only served by Salisbury to Southampton stopping services.
 - Melksham, although services have been greatly enhanced over recent years, the only direct all-day links are with Westbury, Chippenham and Swindon.
- 3.1.5 In the long run integrating these outlying stations into a broader Wiltshire network may be possible, however for many journeys from these stations it is likely that interchange will always be required, limiting the opportunities to greatly-improve current average speeds, although amendments to the timing of services would help reduce connection times.
- 3.1.6 The generalised speed results are all below 45mph, demonstrating the impact of the weighting for frequency and interchange. Therefore a new scale has been applied to the table with generalised speeds below 20mph coloured red and those between 20 – 40mph coloured amber. The worst-affected flows are those that are both short-distance and have a poor service frequency. Melksham and Trowbridge to Chippenham are both good examples of this, with a service frequency of broadly only one train every two hours.
- 3.1.7 Those links that are provided by long distance services, such as Swindon – Bristol, fare better. These flows enjoy direct services, high speeds and relatively high frequencies and thus have relatively high generalised speeds.

3.1.8 Services from Melksham, Tisbury and Dean all stand out as low generalised speeds to the key regional destinations, which reflects poor service frequency and the need to interchange to reach many destinations. While generalised speeds to Chippenham, Salisbury, Swindon and Westbury have broadly lower generalised speeds in part reflecting the geographical extremities of the area.

3.1.9 Overall the analysis of regional average speeds identifies a number of gaps:

- The impact of low frequencies via Melksham significantly reduces the benefits of the service for local users
- Relatively few average journey times are above 45mph; these could be improved further
- Average speeds to key regional centres close to Wiltshire notably Bristol and Southampton are relatively poor.
- Generalised speeds from across Wiltshire are relatively poor to Swindon, despite this being the largest centre in the LEP area.

3.2 Demand for Rail in Swindon & Wiltshire

3.2.1 In common with the UK trend, demand for rail across the SWLEP area has grown significantly over the last 20 years. In total demand for rail grew by 111% between 1997 and 2017 (from 5.1m trips to 10.9m trips) and by 45% within the 10 years from 2007 to 2017⁴. This aggregate figure masks some significant variations, with proportional increases in demand at a number of stations including Avoncliff, Dean, Melksham and Trowbridge far outstripping this.

3.2.2 The table below presents demand changes at SWLEP station overs the last 20 and 10 years.

Table 9. Office of Rail and Roads estimates of station usage 1997-98 to 2016-17

STATION NAME	1997/98 ENTRIES AND EXITS	2016/17 ENTRIES AND EXITS	PERCENTAGE INCREASE
Melksham	3,868	74,666	1830%
Dean	6,215	25,220	306%
Avoncliff	6,440	21,016	226%
Bradford-on-Avon	187,957	532,246	189%
Trowbridge	341,475	983,704	188%
Pewsey	89,662	238,904	166%
Westbury	227,932	578,269	154%
Bedwyn	56,750	120,534	112%
Chippenham	945,435	1,938,692	105%
Swindon	1,856,307	3,679,242	98%
Salisbury	1,102,884	2,075,866	88%
Warminster	206,409	384,846	86%
Dilton Marsh	10,144	18,132	79%
Tisbury	135,394	239,480	77%

⁴ Source: ORR Station Usage Data

Table 10. Office of Rail and Roads estimates of station usage 2006-07 to 2016-17

STATION NAME	2006/07 ENTRIES AND EXITS	2016/17 ENTRIES AND EXITS	PERCENTAGE INCREASE
Melksham	22,001	74,666	239%
Bradford-on-Avon	259,775	532,246	109%
Dean	12,103	25,220	108%
Westbury	317,627	578,269	82%
Trowbridge	584,777	983,704	68%
Bedwyn	77,048	120,534	56%
Avoncliff	13,888	21,016	51%
Swindon	2,515,492	3,679,242	46%
Pewsey	150,911	238,904	58%
Chippenham	1,414,824	1,938,692	37%
Warminster	301,447	384,846	28%
Salisbury	1,620,677	2,075,866	28%
Dilton Marsh	15,359	18,132	18%
Tisbury	208,785	239,480	15%

- 3.2.3 The overall rate of growth in SWLEP has, however, been lower than in both the South West Region and the UK as a whole. Part of the reason for this is that the total demand for rail travel in the SWLEP area is dominated by small number of bigger stations, notably Swindon, Chippenham and Salisbury, and the service from these stations has remained relatively stable over the last 20 years. Much of the growth at smaller station has been at least partly due to incremental improvements in service; Bradford-upon-Avon is a good example of this, where the introduction of calls in the Portsmouth – Cardiff service have stimulated a significant increase in demand.
- 3.2.4 The single greatest proportional increase in demand has been at Melksham, which has seen a number of changes to services over last 20 years, including periods with a very minimal service. The 239% increase within the last 10 years can be attributed almost entirely to introduction of an approximately two hourly service between Swindon and Westbury.

3.3 Trip Rates from Swindon and Wiltshire Stations

- 3.3.1 An alternative measure that considers the level of usage relative to the population of the area is to consider the rail trip rates of the population within the catchment of the stations. A crude method of achieving this, but one that allow comparability between stations, is to take the catchment population and divide by the number of trips being made. Such an approach does have some limitations, especially where a station is a trip attractor rather than a trip generator, but it never the less provides a useful comparative measure, adjusting changes in usage by changes in population size. Information contained within the Network Rail Regional Urban Market Study allows us to examine this issue. This contains estimated populations of the 1km, 3km and 5km catchments from railways stations based on the 2011 census and also provides the stations usage and volume of trips to a principal destination. This covers all

stations with the exception Tisbury, Dean and Bedwyn which are included in the London and South East Urban Market Study.

In the tables below we present trip rates by station including resident population up to 3km distant from the stations. As well as the original data for 2011 we have also updated it using current (2017-18) ORR Station Usage data and 2017 population estimates. These latter estimates are only available at local authority levels therefore a flat rate has been applied for all stations in each local authority area, which does mean that any non-marginal growth in population around a station will not be included.

Table 11. Trip Rate per resident estimates (3km Catchment) for 2011 and 2017 in rank order

STATION	2011 TRIP RATE	2017 TRIP RATE	% CHANGE
Chippenham	68	70.1	3%
Salisbury	57.1	58.8	3%
Bradford-upon-Avon	45.1	49.8	10%
Swindon	43.9	46.8	7%
Westbury	36	43.2	20%
Trowbridge	27.1	30.9	14%
Warminster	28.4	28.2	-1%
Melksham	0.8	4.7	527%
Avoncliff	1.9	2	7%
Dilton Marsh	1.3	1.5	16%

- 3.3.2 Based on the 2017 Trip Rates the stations for which data is available fall into three distinct groups.
- 3.3.3 The first group includes Chippenham, Salisbury, Bradford-upon-Avon, Swindon and Westbury with trip rates in excess of 40 single trips per annum per person. Chippenham has an exceptionally high trip rate of over 70 single trips per person per annum. This is likely to be driven by a combination of factors including local commuting to Bath, Bristol, Swindon, longer distance commuting to London and the role the station has as an informal Parkway for the wider catchment, being one of only two stations in the M4 Growth Zone. A similar situation exists at Salisbury, where the station is the only station available in the A303 Growth Zone, but in addition to this the station is also a destination station both for local trips but also for tourism trips.
- 3.3.4 Bradford-upon-Avon also has a relatively high trip rate; this is driven by high levels of commuting to Bath and Bristol. The trips rate at Swindon, whilst still relatively high, are lower than some key stations in Wiltshire. This is likely to be partly because of the number of jobs currently available locally within Swindon, limiting the need to commute, although the impact of the closure of the Honda car plant and the impact on its supply chain may change this in the long term. At Westbury the relatively high trip rate is likely to be driven by the station acting as a Parkway for the wider area and also reflects the wide range of direct destinations available.

- 3.3.5 The second group is formed of Trowbridge and Warminster which both have similar trip rates. Whilst Trowbridge has high levels of commuting (and a higher level of service), Warminster is likely to be driven by less regular trips from a wider catchment area. This may include military making trips from nearby barracks.
- 3.3.6 The third group is formed of Melksham, Avoncliff and Dilton Marsh. The trip rate at Melksham is low and it has a relatively poor service (compared to most other stations in the area) although the trip rate has grown considerably in recent years as a result of the increase in Swindon – Westbury services. Both Avoncliff and Dilton Marsh have comparatively poor services and this is reflected in their trips rates, although at Dilton Marsh the issue is compounded by the overlap with Westbury station, which many passengers would use in preference. While at Avoncliff the catchment overlaps with Bradford on Avon which has better links to the station.
- 3.3.7 It is useful to compare the trip rates for Wiltshire against other similar areas. The table below presents trips rates using the same approach, for stations between Cheltenham and Filton Abbey Wood, an area covered by the Gloucestershire and South Gloucestershire local authorities.

Table 12. Trip Rate per resident estimates (3km Catchment) for 2011 and 2017 for comparator stations

STATION	2011 TRIP RATE	2017 TRIP RATE	% CHANGE
Cheltenham Spa	29.4	37.05	26%
Gloucester	23.5	26.41	12%
Cam & Dursley	33.3	36.72	10%
Yate	11.1	13.67	23%
Bristol Parkway	51.3	47.85	-7%
Filton Abbey Wood	14.2	18.19	28%

- 3.3.8 The results of this comparator are interesting and suggest that rail use in the Swindon and Wiltshire area is relatively high in comparison to stations in Gloucestershire and South Gloucestershire. This is likely to reflect both the quality of rail services but also some combination of the relative accessibility of stations from within their local communities and also the use of certain stations as hubs for a much wider catchment, for example at Chippenham.

3.4 Travel to Work Data

- 3.4.1 The 2011 Census travel-to-work data provides some evidence around the importance of the rail network for commuting. At local authority level, the census shows that only 3% of workers in Wiltshire and 1% in Swindon commute by train, much lower than the national average of 10% but broadly in line with the average for the South West of 2%.
- 3.4.2 The table below shows the proportion of residents within the catchments for each station (excluding home workers) who commute by train for 1km, 3km and 5km catchment bands.

Table 13. 2011 Census Data Rail Mode Share by Station Catchment Band (%)

	1KM	1-3KM	3-5KM
Avoncliff	0%	6%	0%
Bedwyn	0%	0%	6%
Bradford-on-Avon	10%	0%	0%
Chippenham	7%	4%	4%
Dean	0%	0%	2%
Dilton Marsh	0%	0%	0%
Melksham	0%	1%	0%
Pewsey	5%	0%	0%
Salisbury	3%	2%	0%
Swindon	2%	2%	1%
Tisbury	7%	0%	0%
Trowbridge	5%	3%	0%
Warminster	3%	2%	4%
Westbury	4%	4%	0%

- 3.4.3 The station with the highest rail mode share is Bradford-on-Avon at 10%. This is a reflection of both the change in the structure of the economy in this area with a decline over time in manufacturing jobs, which have been replaced by commuting to Bath and Bristol, where parking charges are a high proportion of the total journey cost by car. It is notable that the 10% comes entirely from within a 1km catchment of the station at Bradford-on Avon, this may reflect local congestion in the town which limits the station catchment. The second highest rate is at Chippenham, which supports commuting towards Bath, Bristol, Swindon and London.
- 3.4.4 A number of the stations exhibit locally-high rail mode share in the 1 to 3km catchment, notably Avoncliff, Chippenham and Westbury. This may in part be a function of census geography, where the centre of MSOAs (Middle Super Output Areas) are over 1km away but parts of the MSOA are closer to the station. In the case of Avoncliff there is likely to be catchment overlap with both Freshford and Bradford-upon-Avon stations.
- 3.4.5 It is unsurprising that rail mode share is below the national average, as the national figure will be biased towards major cities. It is pleasing that the area is in line with the South West average, as this is an average of urban areas such as Bristol and more rural areas such as Cornwall. This fits with the relatively high trips rates for the area identified above, and also aligns with data below which suggests that the proportion of commuting trips as a proportion of all rail trips is broadly in line with the national average. This shows that where rail services are provided they are well used, again indicating that there may be an opportunity to grow the rail market by improving accessibility to the network.

3.5 Future Demand Growth

- 3.5.1 The 2015 Network Rail Western Route Study presents assumptions about anticipated future levels of demand growth. These are based on forecasts produced for Network Rail as part of the series of 2013 Market Studies. These forecasts are based on the a high growth scenario

known as “Prospering in Global Stability” and therefore represent the upper end of estimates of increases in demand. They suggest the demand for Regional Links in the area will increase by 47% by 2023 (from 2012) and by 111% by 2043, and Long Distance movements towards London from the Bristol area have forecast growth of 47% by 2023 and 118% by 2043.

The figures above represent a high-growth assessment; a range of other forecasts were produced, looking at different long term economic growth scenarios as below:

- Prospering in global stability
- Prospering in isolation
- Struggling in isolation
- Struggling in global turmoil

3.5.2 The table below presents the anticipated demand growth for services around Bristol to 2043.

Table 14. Network Rail Market Study Demand Forecasts 2012 to 2043

SCENARIO	REGIONAL GROWTH	BRISTOL AREA TO LONDON
Prospering in global stability	111%	118%
Prospering in isolation	52%	78%
Struggling in isolation	22%	39%
Struggling in global turmoil	64%	61%

3.5.3 The table indicates that even in the most pessimistic scenarios, demand will have increased by between 20% and 40% by 2043. Whilst the rate of demand increase represents a slowing relative to the increases over the last 20 year it does show a continuing trend in increases in absolute levels of rail use. To underline this, since the Market Studies were produced in 2013 (based on 2012 demand data), demand across all SWLEP rail stations has already increased by 15%.

3.5.4 To deliver such a level of growth, whilst maintaining or improving the quality of the service provided implies an increase in both the capacity of trains but also the capacity of infrastructure. Such interventions may also provide opportunities to develop new services and improve access to the rail network presenting the opportunity to break out from the existing pattern of services and introduce new services to meet potentially unfulfilled demand.

4. ACCESSIBILITY TO STATIONS

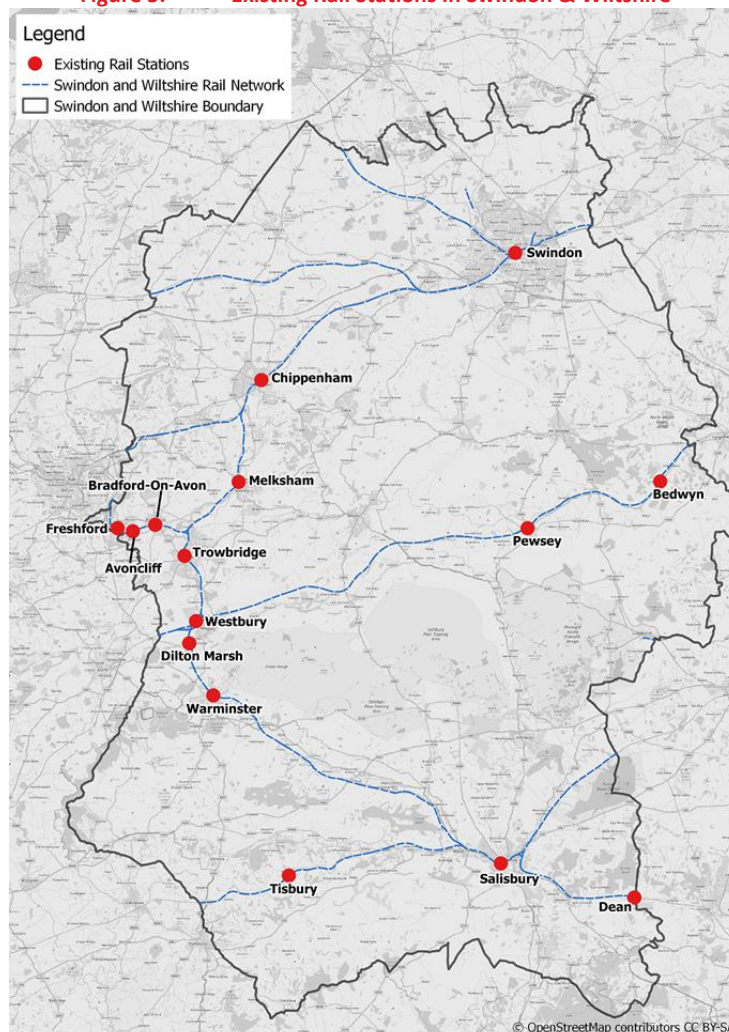
4.1.1 Within Sections 2 and 3 of this Annex we have focussed in the quality of the service provided between stations; in this final section, we instead look at issues around accessing the rail network.

4.2 The Existing Pattern of Stations

4.2.1 At the current time the Swindon and Wiltshire area is served only by 14 stations. As detailed in Annex A, these stations are mainly focussed on the Trans Wilts Corridor. Coverage is therefore relatively sparse in the north, east and south of the area, with the M4 Growth Zone only being served by two stations at Swindon and Chippenham and the A303 Growth Zone only being served by a station at Salisbury. With no stations between Westbury and Pewsey, the rural centre of the county is particularly poorly served, whilst the east is served only by Pewsey (which has a relatively poor service) and Bedwyn, which whilst enjoying good access to London wholly lacks connectivity to the rest of Wiltshire or the South West.

4.2.2 The map below illustrates the current position.

Figure 5. Existing Rail Stations in Swindon & Wiltshire



- 4.2.3 The pattern of stations across the area in part reflects the rural nature of much of the county, where historically there have been relatively few traffic centres for the railway to serve, which historically has led to rationalisation of stations especially on main lines, where stopping passenger trains were removed to allow capacity to be used for faster long-distance services. In some areas this is compounded by issues of physical geography; for example the Berks & Hants Line runs to the south of many of the potential traffic centres in the area such as Marlborough and Devizes.
- 4.2.4 To examine this issue in more detail we have assessed the proportion of the population and proportion of jobs in Swindon and Wiltshire that lie in catchment bands up to 5km from a station based on MSOA data.

Figure 6. Proportion of Population within distance bands from a rail station

	UPTO 1KM	UPTO 3KM	UPTO 5KM
Wiltshire	18%	47%	53%
Swindon	7%	46%	96%
Swindon & Wiltshire	15%	47%	66%
South West	20%	54%	68%
England & Wales	30%	72%	85%

Figure 7. Proportion of Jobs within distance bands from a rail station

	UPTO 1KM	UPTO 3KM	UPTO 5KM
Wiltshire	25%	52%	57%
Swindon	10%	52%	98%
Swindon & Wiltshire	20%	52%	72%
South West	30%	64%	74%
England & Wales	40%	79%	89%

- 4.2.5 The tables show that both Swindon and Wiltshire are below the South West average for the proportion of the population living within 1km of a rail station. For Wiltshire the theme persists through the three distance bands, although by the 5km band Swindon exceed the South West average, although this is a function of the constrained boundaries of Swindon rather than being a feature of good accessibility to the rail network.
- 4.2.6 When the two authorities are taken together it is clear that, with the exception of the 5km band, the two authorities have a lower than average level of accessibility to the rail network. In the long run as the area grows this lack of accessibility to the rail network will limit the opportunities to provide a sustainable transport network that supports economic growth for the LEP area. In addition those areas that lie outside of the 5km catchment, who may treat the existing stations as Parkways will incur additional journey times to access stations as the settlements around existing stations grow.

- 4.2.7 Whilst not a justification for intervention in itself, this relative lack of access to rail stations would suggest that there may be a case for developing new stations or otherwise improving access to the rail network where there is sufficient population or jobs to do so.

4.3 Car Availability

- 4.3.1 To understand issues around access to stations and the importance of non-car modes we have examined the levels of car availability across catchments in Wiltshire. The table below presents car availability for existing stations.

Table 15. Car Availability in Wiltshire Station catchments (2011 Census Data)

STATION	CAR AVAILABILITY
Swindon	80%
Salisbury	81%
Trowbridge	82%
Warminster	83%
Bradford-on-Avon	83%
Westbury	85%
Chippenham	85%
Melksham	86%
Pewsey	88%
Avoncliff	88%
Tisbury	89%
Dilton Marsh	90%
Bedwyn	90%
Dean	94%

- 4.3.2 The table generally shows a pattern of lower levels of car availability in the most urban areas, and higher availability in rural area, which is largely intuitive. The most interesting results are for Trowbridge, Warminster, Bradford and Westbury. These are a group of freestanding towns in a relatively rural wider setting but which have relatively low car availability. This suggests that rail may play an important role in providing access to either education or employment opportunities outside of the immediate vicinity of the town. This may also provide the foundation for the ongoing development of sustainable travel in the area.

- 4.3.3 The table examines car availability for a number of non-rail served centres across Wiltshire.

Table 16. Car Availability in Wiltshire Station catchments (2011 Census Data)

STATION	CAR AVAILABILITY
Royal Wootton Bassett	89%
Tidworth	88%
Amesbury	88%
Malmesbury	91%
Calne	87%
Ludgershall	87%
Devizes	86%
Corsham	87%
Marlborough	85%

- 4.3.4 The levels of car availability at non rail served locations, whilst slightly higher than rail served locations, is not significantly so. An increased level of car ownership is not unsurprising in these areas. The high levels of car ownership in settlements like Malmesbury or Royal Wootton Bassett may suggest that improving bus services as means of improving access to the rail network may have limited impact. Overall all areas assessed (with the exception of Swindon) have a higher level of car ownership than the national average which in 2011 was 80%.

4.4 Understanding Access to Stations

- 4.4.1 Within Section 4.2 we identified that a lower proportion of the population than the regional average live within 5km of a rail station. With this context it is useful to consider issues around access to stations across the area.
- 4.4.2 In the case of access to stations a useful starting point is to examine the capacity of station car parks. This is especially important in an area like Wiltshire, where a number of stations have large rural catchments from where car access is the only viable option. The table also includes the number of cycle spaces that are available at stations, as cycling can act as a suitable alternative station access mode to car.

Table 17. Car & Cycle Parking by Station

STATION	NO. PARKING SPACES	DAILY PARKING FEE	NO. CYCLE SPACES
Avoncliff	8	N/A	4
Bedwyn	25	N/A	4
Bradford-on-Avon	180	£5.00	28
Chippenham	640	£7.50	106
Dean	None although parking is provided for rail passengers at the village hall.	N/A	4
Dilton Marsh	None	N/A	8
Melksham	27	N/A	8
Pewsey	77	£6.80	20
Salisbury	291	£8.90	110
Swindon	578	£8.80	220
Tisbury	75	£4.20	10
Trowbridge	125	£5.40	70
Warminster	60	£3.60	16
Westbury	240	£3.60	68

4.4.3 The volume of parking spaces broadly reflects the demand for the different stations, although there are some anomalies. For example it is notable that Chippenham has more parking spaces than Swindon despite Swindon having 89% more passengers. This is partly because a higher proportion of Swindon journeys are people arriving at Swindon to visit the town, and Chippenham's status as a railhead for a large rural catchment area, but it is also linked to land availability with more space available for parking at Chippenham than at Swindon; this suggests that demand for rail travel from Swindon may be suppressed by lack of parking spaces.

4.4.4 At some locations such as Chippenham and Salisbury parking charges may have the effect of suppressing demand for regional trips where the car parking fee will represent a high proportion of the total price for the journey, this is likely to be less of an issue for long distance journeys and trips towards London where the rail fare will in any case be higher. There is also evidence from Wiltshire Council survey work that car parking costs influence the choice of parking location at Chippenham station with 35% of passengers arriving by car avoided the station car park with over half of these passengers citing cost as an issue.

Station Access Mode Share

4.4.5 Table 11 below shows the DfT National Rail Travel Survey data on mode share for station access for a combined sample of all Wiltshire stations; whilst this data is relatively old (dating

from 2004) it provides useful information on themes around station access. The table below presents a summary of access modes to stations for trips with an origin in Swindon and Wiltshire, with a summary of the cumulative proportion of trips made by distance band.

Table 18. Access Mode Share by Distance

DISTANCE (KM)	WALKED	BUS	CAR (PARKED)	CAR (DROPPED OFF)	BICYCLE	TAXI	CUMULATIVE TRIPS %
0.5	90%	0%	2%	6%	1%	1%	20%
1	85%	1%	3%	8%	1%	2%	39%
2	37%	9%	16%	23%	9%	10%	57%
5	11%	10%	38%	15%	8%	17%	76%
10	2%	3%	50%	14%	0%	31%	89%
15	8%	9%	61%	15%	1%	5%	95%

4.4.6 As would be expected the table shows that sustainable modes dominate access in low distance bands, with walking still representing 37% of trips at a 2km distance. Even as far as 5km from stations walking and cycling together represent 19% of trips. With increases in the level of cycling in recent years it is probable this figure will have increased further. Between 2km and 5km the mode share for car increases from 16% to 38%, this is an area where it may be possible to promote the greater use of cycling. This would have a number of benefits including improving the health of users, improving air quality, reducing carbon emissions, reducing congestion around stations or alternatively it would release car parking spaces that would allow a car trip from the wider station catchment to transfer to rail, also bringing congestions and environmental benefits.

4.4.7 In terms of the proportion of rail trips by distance band it is clear that the majority of trips (57%) originate from within 2km of a station and 76% are within 5km. This indicates that whilst stations in a rural area do perform a railhead function, this is still outweighed by local rail usage. This suggests that improving access to the rail network through new stations could result in a substantial increase in overall demand rather than simply moving customers to a nearer railhead.

Wiltshire Council Station Surveys

4.4.8 A survey was undertaken in 2013 by Wiltshire Council of rail passengers at seven stations in the SWLEP area. The table below presents the journey purposes from each of these stations.

Table 19. Journey Purposes from Survey Stations

	ALL TRIPS (%)							
JOURNEY PURPOSE	BEDWYN	BRADFORD-ON-AVON	CHIPPENHAM	PEWSEY	SALISBURY	TROWBRIDGE	WESTBURY	UK AVERAGE
Commuting	41%	38%	35%	48%	26%	43%	41%	43%
Business	18%	6%	27%	25%	21%	11%	19%	8%
Shopping	7%	6%	4%	0%	2%	9%	7%	49%
Leisure	11%	16%	12%	14%	20%	7%	10%	
Education	2%	14%	3%	1%	7%	10%	10%	
Visiting	8%	9%	10%	2%	14%	11%	9%	
Other	13%	10%	10%	9%	9%	8%	4%	
Missing	0%	1%	0%	0%	1%	1%	0%	0%
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%

4.4.9 The tables suggest that Bedwyn, Pewsey, Trowbridge and Westbury all have levels of commuting trips which are similar to the national average. Chippenham and Bradford-on-Avon have slightly lower levels, but only Salisbury has a significantly lower level of commuting, perhaps reflecting the distance from London, its status as a regional employment centre and the higher proportion of leisure trips due to its role as a tourist centre.

4.4.10 With the exception of Bradford-on-Avon and Trowbridge, all stations have a higher than average proportion of business trips. Given that commuting levels appear to be around the national average this would suggest that businesses in Wiltshire do have a reliance on the railway for making business trips, supporting the contention that the railway has a crucial role in supporting the economy.

4.4.11 The table below presents data on station access modes for the seven stations and provides an alternative source to the older NRTS data presented above.

Table 20. Wiltshire Stations Surveys: Access Mode Shares

	BEDWYN	BRADFORD-ON-AVON	CHIPPENHAM	PEWSEY	SALISBURY	TROWBRIDGE	WESTBURY
Driver	35%	6%	28%	43%	12%	11%	18%
Car passenger (share)	6%	1%	4%	4%	1%	4%	2%
Car passenger (lift)	21%	9%	18%	20%	14%	15%	20%
Bus	4%	1%	5%	0%	10%	2%	2%
Park and ride	0%	0%	0%	0%	1%	0%	0%
Motorcycle	0%	0%	1%	0%	0%	0%	0%
Bicycle	1%	4%	4%	10%	2%	3%	2%
Walk	28%	75%	34%	22%	33%	55%	20%
Taxi	2%	1%	2%	1%	5%	5%	2%
Other	1%	0%	2%	0%	1%	1%	0%
Unknown	1%	1%	1%	0%	3%	2%	2%
TOTAL	100%	100%	100%	100%	100%	100%	100%

- 4.4.12 Table 18 presents some interesting results. The stations at Chippenham, Pewsey and Bedwyn have the highest level of driving reflecting their large rural catchments. In contrast Salisbury, Trowbridge and notably Bradford-on-Avon have much lower levels of access by car. Access by bus to stations is below 5% in all cases with the notable exception of Salisbury where bus use is as high as 10%. Around 20% of bus use at Salisbury appears to be related to access to Stonehenge with the majority of the other trips coming from the local area. It is possible that the relative lack of parking spaces at Salisbury, coupled to a high quality bus service and road congestion around the station may make the travel by bus more attractive.
- 4.4.13 As would be expected, walking is also an important mode, Bradford-on-Avon has an exceptionally high rate at 75% as does Trowbridge at 55%. With the exception of Pewsey, however, cycling has a very low mode share. This is likely to be due to the character of the stations, with stations such as Trowbridge and Bradford-on-Avon having a catchment largely within walking distance, whilst stations such as Chippenham and Bedwyn have a broader catchment where passengers are more likely to drive to the station. There may also, however, be an issue of cycle access to stations on congested local roads suppressing demand for this mode.
- 4.4.14 The overall conclusion from this analysis is that, whilst walking is already a well-established station access mode, it is likely that there is a good opportunity to increase the use of sustainable modes further through relatively modest investments in infrastructure and promotion. There are also opportunities to increase accessibility from non rail towns such as Amesbury.

4.5 Access to the rail network from non-rail served towns

- 4.5.1 There are a number of settlements around Wiltshire that are not served by rail and which can only be accessed by car or bus services. It is useful to understand if there is scope for further improving access from these locations by bus to provide a more sustainable alternative to cars as a means of accessing the rail network.
- 4.5.2 The table below compares existing bus and car journey times from a range of settlements to their nearest rail station.

Table 21. Bus & Car Access Times to Stations

SETTLEMENT	RAIL STATION	BUS JT (MINS)	CAR JT (MINS)	DIFFERENCE (MINS)	BUS JT/CAR JT (%)
Calne	Chippenham	21	19	2	11%
Marlborough	Swindon	38	32	6	19%
Marlborough	Pewsey	19	16	3	19%
Durrington	Salisbury	36	30	6	20%
Downton	Salisbury	25	20	5	25%
RWB	Swindon	24	19	5	26%
Ludgershall	Andover	17	13	4	31%
Tidworth	Andover	26	18	8	44%
Bulford	Salisbury	44	28	16	57%
Devizes	Swindon	68	43	25	58%
Amesbury	Salisbury	34	21	13	62%
Mere	Gillingham	20	12	8	67%
Market Lavington	Swindon	92	50	42	84%
Devizes	Chippenham	56	30	26	87%
Malmesbury	Swindon	62	33	29	88%
Malmesbury	Chippenham	49	23	26	113%

- 4.5.3 The table indicates that there are a number of settlements where bus journey times to rail stations are relatively competitive with car journey times, good examples include Marlborough to Pewsey, or Calne to Chippenham the latter enjoying a bus every 20 minutes as well as a good journey time. The attraction of the link from Marlborough to Pewsey might be improved further by an improvement in the quality of the rail service at Pewsey rather than improvements in the quality of the bus service. There are however a number of location where bus services currently take more than 50% longer than the equivalent car journey, making access by bus unattractive. The most notable locations are Amesbury, Devizes and Malmesbury. Notably Malmesbury also had the highest level of car ownership of all locations assessed, suggesting that very substantial improvements in bus services would be required to improve rail services.

5. SUMMARY

5.1.1 Within this Annex we have examined the strategic, regional and local accessibility provided by rail services across Swindon & Wiltshire, and also examined issues around accessibility to stations.

5.1.2 From this we have identified an number of emerging themes:

- High quality access is provided from stations on the GWML and Berks & Hants routes towards the Thames Valley and London.
- Salisbury has a good service to/from London, but the average speed requires significant improvement for the region to be competitive with similar-sized communities elsewhere.
- Strategic connectivity with the Midlands, North and the Oxford-Cambridge “knowledge corridor” is very poor.
- Trip rates from stations in Swindon and Wiltshire are relatively high compared to other parts of the South West.
- Access to the network is relatively poor for most communities, with very few stations in the north, south and east of the county.
- The majority of the population lies outside of a 1km catchment area of a station - this will increase further as more development comes forward
- Where stations are provided they are well-used compared to similar stations elsewhere in the South West.
- There are opportunities to improve access to existing stations particularly by sustainable modes and potentially also by bus.
- There is an opportunity to develop the strengths of the existing network by increasing the number of stations to improve access to the network.

5.1.3 The content of this Accessibility Analysis feeds into the Gap Analysis in Annex D.

SYSTRA provides advice on transport, to central, regional and local government, agencies, developers, operators and financiers.

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