MetroWest

METROWEST PHASE 1

Outline Business Case

Appendix 2.4

Distributional Impact Assessment Report

December 2017

travelwest

Bath & North East Somerset, Bristol, North Somerset and South Gloucestershire councils working together to improve your local transport

MetroWest Phase 1 Distributional Impact Assessment Report

Prepared for

West of England Councils

December 2017

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MetroWest Phase 1
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FINAL REPORT

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3.0	20th December 2017	FINAL	MW/LG/GW	HS/GW	HS

Acronyms and Abbreviations

AQMA	Air Quality Management Area
B&NES	Bath and North-East Somerset Council
BCC	Bristol City Council
BRITES	Bristol Integrated Transport and Environment Study
CP5	Control Period 5
CRD	City Region Deal
DCO	Development Consent Order
DfT	Department for Transport
EAST	Early Assessment Summary Tool
GLT	Guided Light Transit
GRIP	Governance for Railway Infrastructure Projects
GVA	Gross Value Added
GWR	Great Western Railway
JLTP	Joint Local Transport Plan
JSP	Joint Spatial Plan
JTB	Joint Transport Board
JTS	Joint Transport Study
LEP	Local Enterprise Partnership
LTPP	Long Term Planning Process
NCN	National Cycle Network
NMU	Non-Motorised User
NR	Network Rail
NSC	North Somerset Council
OAR	Option Assessment Report
OBC	Outline Business Case
PBC	Preliminary Business Case
PEIR	Preliminary Environmental Impact Report
RUS	Route Utilisation Strategy
SEP	Strategic Economic Plan
SGC	South Gloucestershire Council
TAG	Transport Appraisal Guidance
TQEZ	Temple Quay Enterprise Zone
WoE	West of England

SECTION 1

Introduction

1.1 Background

CH2M has been appointed to prepare a Distributional Impact Assessment Report for MetroWest Phase 1. This forms part of the Department for Transport's (DfT) Transport Appraisal Process, as part of the development of an Outline Business Case (OBC). The OBC is being prepared in support of a submission to the Large Major Scheme fund in December 2017.

1.2 The MetroWest Programme

The West of England (WoE) councils are progressing plans to invest in the local rail network over the next ten years through the MetroWest programme. The MetroWest programme comprises:

- The MetroWest Phase 1 project
- The MetroWest Phase 2 project
- A range of station re-opening/new station projects
- Smaller scale enhancements projects for the WoE local rail network

MetroWest is being jointly promoted and developed by the four WoE councils: Bath & North-East Somerset Council (B&NES), Bristol City Council (BCC), North Somerset Council (NSC) and South Gloucestershire Council (SGC). The MetroWest programme will address the core issue of transport network resilience, through targeted investment to increase both the capacity and accessibility of the local rail network. The MetroWest concept is to deliver an enhanced local rail offer for the sub-region, comprising:

- Existing and disused rail corridors feeding into Bristol
- Increased service frequency; cross-Bristol service patterns (e.g. Bath to Severn Beach)
- A Metro-type service appropriate for a city region

The MetroWest programme will complement the investment being made by Network Rail (NR) and extend the benefits of projects such as the electrification of the Great Western main line. The programme is to be delivered over the next five to ten years during Network Rail Control Period 5 (2014 to 2019) and Control Period 6 (2019 to 2024).

1.3 MetroWest Phase 1

The MetroWest Phase 1 project includes the delivery of infrastructure and passenger train operations to provide:

- Half hourly service for the Severn Beach Line as far as Avonmouth (hourly for St. Andrews Road and Severn Beach stations);
- Half hourly service for the Keynsham and Oldfield Park local stations on the Bath Spa to Bristol Line; and
- Hourly service (or an hourly service plus) for a reopened Portishead Line, with new stations at Portishead and Pill.

The whole of MetroWest Phase 1 will be operational in 2021. Enhanced services on the Severn Beach line could begin in 2020 and re-opening of the Portishead line will follow in 2021.

For the Portishead Line either an hourly or an hourly plus passenger train service is proposed. The difference between an hourly service and an hourly service plus is:

- Hourly service – Passenger trains operating hourly all day between Portishead and Bristol Temple Meads, calling at Pill, Parson Street, and Bedminster. Providing up to 18 trains in each direction per day (Mon-Sat), and up to 10 trains on Sundays, utilising one train set all day.
- Hourly service plus – trains operating every 45 minutes during the am and pm peak and hourly off peak, between Portishead and Bristol Temple Meads, calling at Pill, Parson Street, and Bedminster. Providing up to 20 trains in each direction per day (Mon-Sat), and up to 10 trains on Sundays, utilising one train set all day and an additional set during the am and pm peaks.

Note though that, while the infrastructure required to deliver the 'hourly service plus' on the Portishead line is identical to that required for an hourly service, it has not been appraised as part of the OBC. Only the hourly service has been considered at this stage, because analysis to confirm the shape of an 'hourly service plus' is still on-going. Note also that, although infrastructure for an hourly service (or hourly service plus) is being provided at this stage, it remains the aspiration of the promoting authorities to develop a 30 minute service in the future.

Figure 1.1 shows the proposed MetroWest Phase 1 passenger network with a more harmonised service frequency, providing the foundation for 'Metro' local rail network.

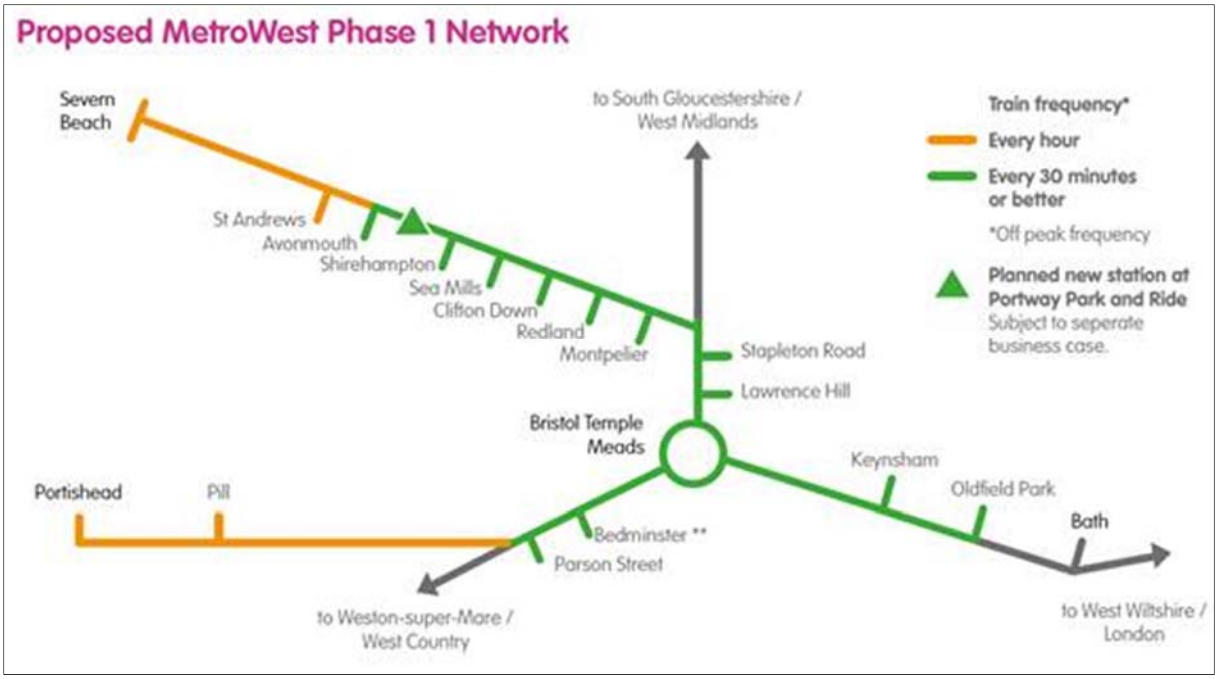

Figure 1-1: MetroWest Phase 1 network

1.4 Summary of Scheme Impacts

MetroWest Phase 1 will have the following benefits:

- Increase the local economy by generating £264M of Gross Value Added (GVA) in first ten years from opening) and creating 514 net new permanent jobs;
- Enhance rail capacity by delivering over 600 additional seats per hour for the local rail network, which in turn will extend the benefits of Network Rail's Western Route Modernisation Programme;
- Deliver a reliable and more frequent public transport service, directly benefitting 180,000 people within 1km of 16 existing stations, with enhanced train service frequency;
- Increase the number of people living within 30 minutes travel time of key employment areas, such as TQEZ;

- Reduce highway congestion on arterial corridors, including A369 between Portishead and Bristol, significantly improving network resilience;
- Provide competitive journey times from Portishead and Pill to Bristol Temple Meads;
- Improve accessibility to sites for new homes and employment development in proximity to the rail corridors and bring an additional 50,000+ people within the immediate catchment of the rail network with new stations at Portishead and Pill;
- Reduce overall environmental impact, resulting in improved air quality, on key arterial highway routes;
- Provide attractive mode choice and capacity for journeys to work (alternatives to single occupancy car-based travel) addressing long-term car dependency; and
- Provide wide ranging social/health benefits.

The MetroWest Phase 1 OBC Forecasting Report and Economic Assessment Report provides details of forecasting and modelling work undertaken to assess the proposed MetroWest Phase 1 OBC scheme.

1.5 Overview of Distributional Impact Appraisal Approach

Distributional impacts (DI) consider the variance of transport intervention impacts across different social groups. The appraisal considers both beneficial and adverse impacts on the different social groups that might be affected, against the following indicators:

- User Benefits;
- Noise;
- Air Quality;
- Accidents;
- Security;
- Severance;
- Accessibility; and
- Affordability.

The appraisal has been undertaken in accordance with WebTAG Unit A4.2: Distributional Impact Appraisal. The appraisal process consists of 3 major steps:

- Screening Process – identification of likely impacts for each indicator;
- Assessment – identification of impact area, social groups and amenities; and
- Appraisal of Impacts – analysis of impacts, full appraisal and input into Appraisal Summary Table.

1.6 Structure of this Report

The structure of this report reflects the stages in the WebTAG guidance:

- Chapter 2 goes on to outline the first step in the analysis – Screening;
- Chapter 3 sets out the second step – Assessment;
- Chapter 4 details the third step – Appraisal; and
- Chapter 5 summarises the assessment.

SECTION 2

Step 1: Screening Process

2.1 Introduction

The first step in the process involves undertaking initial screening to identify the likely impacts of MetroWest Phase 1 against the key indicators specified in WebTAG Guidance Unit A4.2.

2.2 Approach

Each indicator has been assessed individually using the WebTAG screening proforma. The output of this assessment determines whether the intervention needs to be appraised further. Consideration has been given to:

- Whether there might be positive or negative impacts on different social groups
- If changes to scheme design elements can mitigate any potential negative impacts
- How dispersed the impact is likely to be, to understand if the scale of the impact is disproportionate to the potential impact

The completed screening proforma for the indicators is included in Appendix A. At this stage of MetroWest Phase 1, previously anticipated impacts have been used to determine whether the indicator should be progressed to Step 2: Appraisal. The screening considered extent and dispersion of the likely impact across social group and geographical area, to determine the next step.

A summary of the outcomes and decision on whether to progress to the next step is included in Table 2.1.

Table 2.1: Initial Screening Outcomes

Impact Area	Conclusion	Next Step
User Benefits	Commuting, non-business and business benefits. Benefits to rail and motorised users in relation to journey time. The scheme will connect to TQEZ and support J21 Enterprise Area (Weston -Super-Mare) and Avonmouth Severnside Enterprise Area. The scheme was considered likely to have a large beneficial impact.	Progress to Step 2
Noise	Some positive noise improvements where traffic is taken off the road network, particularly in Bristol, but moderate adverse impacts from rail traffic on reinstated line, especially for new developments in Portishead that did not exist when the line previously operated. The scheme as considered likely to have a neutral impact.	Progress to Step 2
Air Quality	Scheme operation is likely to have beneficial impacts due to the modal shift from road to rail, but disadvantages for those immediately adjacent to the line. On balance, it was envisaged that the scheme will have a neutral air quality impact.	Progress to Step 2
Accidents	The new rail link would result in a reduction of vehicle-kms travelled on the highway network and therefore reduce the number of accidents. However, more traffic could be expected near new stations. NMU safety is impacted by access and egress at the new railway stations. The new rail line will operate on a wholly segregated alignment and will not conflict with other modes. The scheme is likely to have a slight beneficial impact.	Progress to Step 2
Security	New rail stations will enhance the security of urban locations by providing additional footfall, CCTV, emergency contact points and improved lighting. While there is a general improvement in security of the area, rail stations can also attract crime. The scheme was therefore envisaged to have a neutral impact on security.	Do not progress to Step 2

Table 2.1: Initial Screening Outcomes

Impact Area	Conclusion	Next Step
Severance	Due to the strict controls on movement on and across the railway line within the scheme area, the impacts of severance will be limited. One informal pedestrian route is likely to be closed, causing inconvenience for a small number of people. For this reason, the scheme was considered likely to have a neutral or slightly adverse impact on severance.	Progress to Step 2
Accessibility	The scheme will change the choice and availability, and hence accessibility, of transport services in the study area. The reopened railway line will provide certainty to travel options. The scheme was considered likely to have a beneficial impact.	Progress to Step 2
Affordability	A bus service already operates between Portishead and Bristol, diminishing the benefits of rail travel on affordability. However, compared to bus and car travel, the journey time savings by rail (Portishead to Bristol) are considerable. This can have a positive knock-on effect in terms of the value attributed to time and the 'real' value of time savings (e.g. a reduction in child care costs). The scheme was considered likely to have a slight beneficial impact.	Progress to Step 2

SECTION 3

Step 2: Assessment

3.1 Introduction

The broad impact areas of the transport intervention are identified in Step 1. Step 2 investigates these impacts in more detail to confirm where both spatial impacts will be experienced, and socio-economic, social and demographic characteristics need to be further considered.

3.2 Step 2a: Areas impacted by the intervention

MetroWest Phase 1 is a strategic project that covers a large area itself, and has the further potential to provide opportunities for travel changes across the West of England sub-region. This section sets out some of the assumptions relating to geographic areas that impacts of MetroWest Phase 1 have been modelled and assessed.

As different tools have been used to assess impact of MetroWest Phase 1, different areas of impact have also been assumed. The areas impacted are shown graphically in Figures 3.1-3.3.

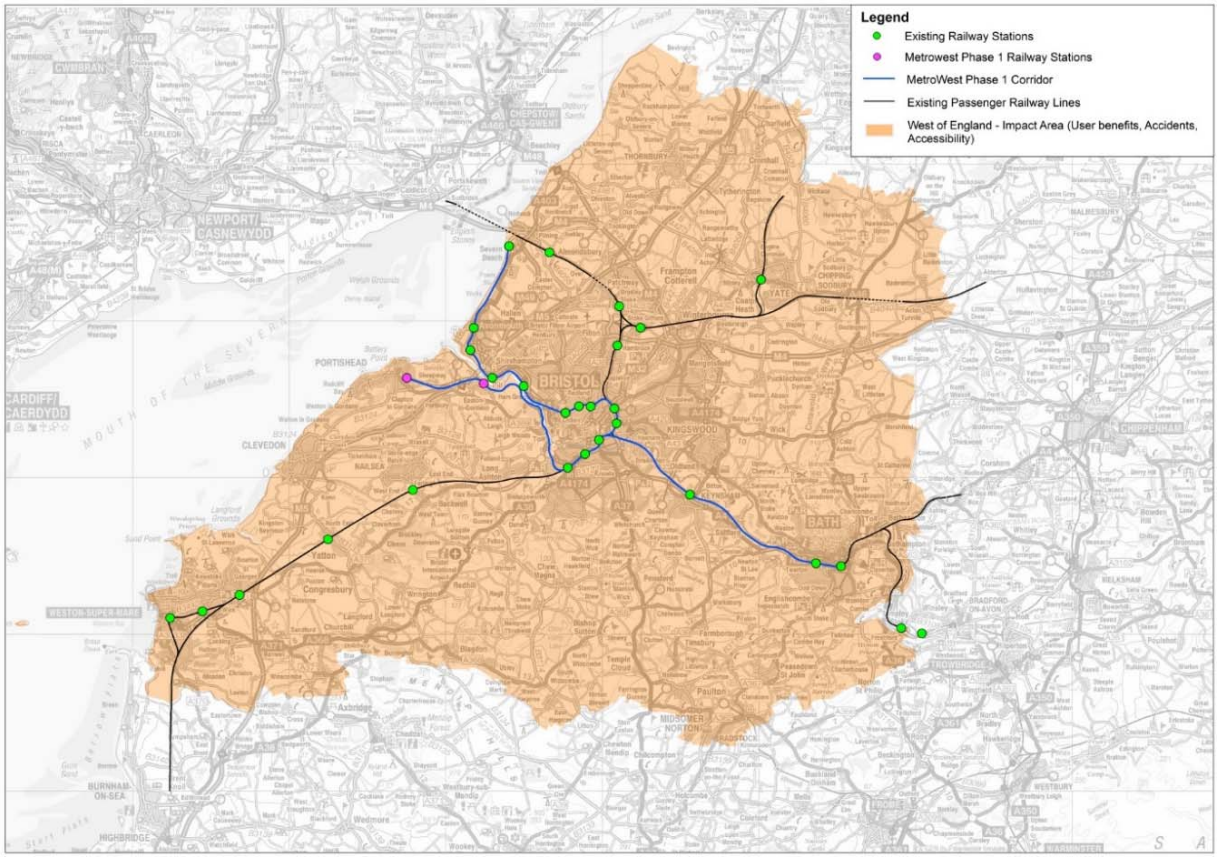

Figure 3-1: Initial impact area for user benefits, accidents and accessibility (WoE area)

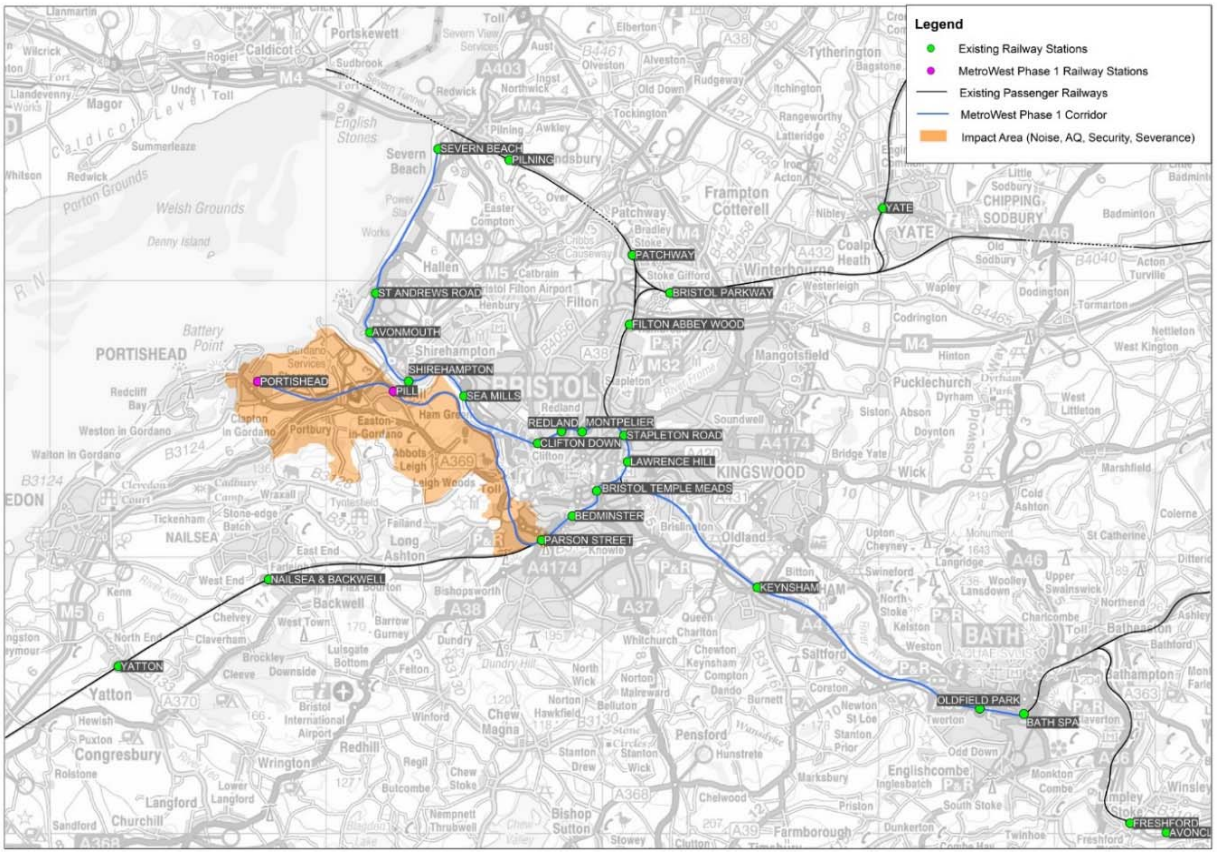

Figure 3-2: Impact area (LSOA) identified for noise, air quality, security and severance

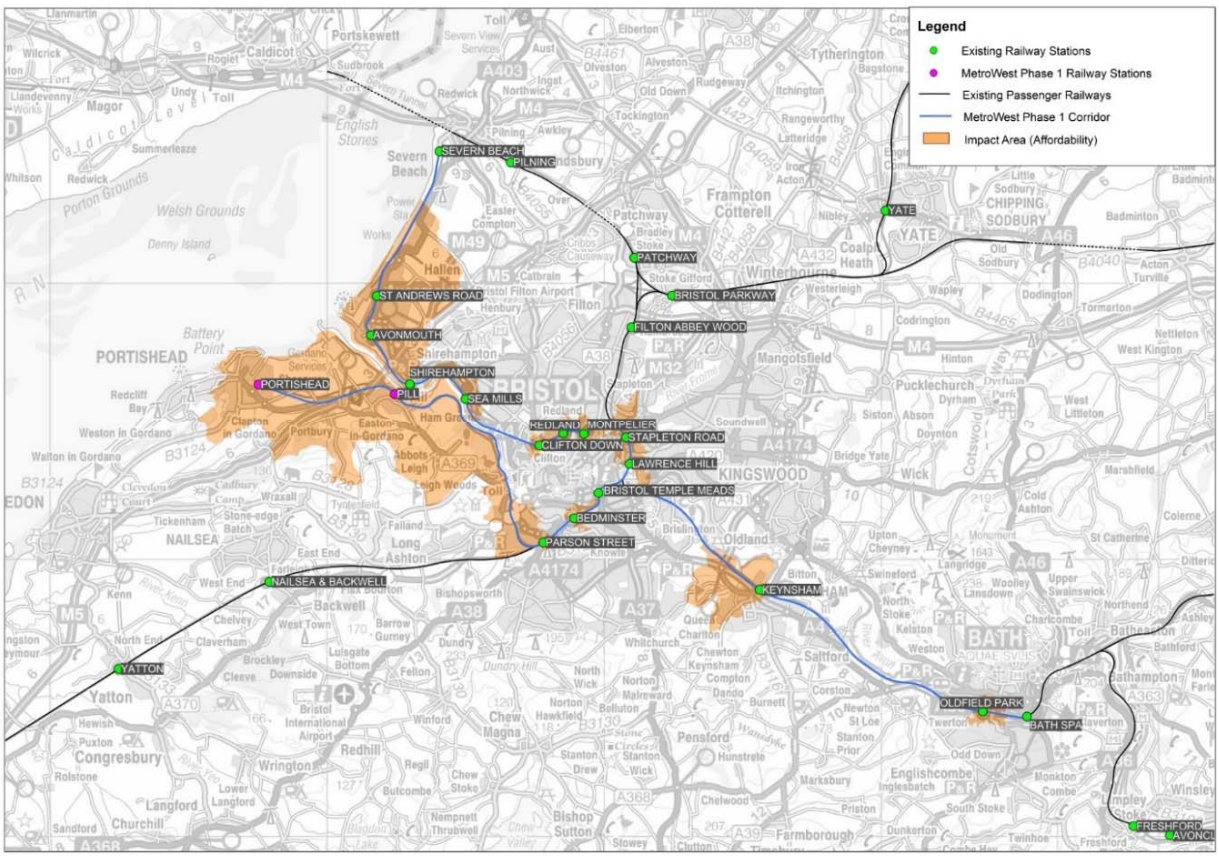

Figure 3-3: Impact area (LSOA) identified for affordability

3.2.1 User benefits, accessibility & accidents

MetroWest Phase 1 is anticipated to have an impact across the WoE transport networks (Figure 3.1), which is manifest in improvements in accessibility and generation of user benefits, as well as accident benefits across the highway network.

A detailed modelling exercise has been undertaken to determine user benefits, using a combination of rail demand forecasts from MOIRA and bespoke spreadsheet models, as well as highway impacts assessed using the GBATS4 transport model and TUBA. This has enabled the changes in costs of travel for users, in terms of time-based costs and financial costs across the network, to be identified. Movements have been screened to eliminate inappropriate benefits from the total. Demand effects have also fed into assessment of highway accidents.

3.2.2 Noise, air quality & severance

Noise, air quality and severance have been considered for distributional impacts for an area surrounding the DCO scheme (the re-opening of the line to Portishead for passenger trains), as this is the area where most impacts are felt (Figure 3.2).

Noise appraisal has been undertaken using a combination of measured baseline noise levels the results from the noise model that was used for the completion of the DCO PEIR.

During operation, potential air quality impacts will be due to changes in traffic and rail movements on the roads and tracks. This will give rise to a change in the nature and location of vehicle and train emissions, with consequent impacts on local air quality.

The focus for this stage was a light touch appraisal of severance on specific locations. There was a need to assess the impact of the closure of the 'informal' railway crossing upon locations of vulnerable users and the key facilities and destinations surrounding the crossing.

3.2.3 Affordability

Assessment of affordability impacts focused on locations close to stations affected by MetroWest Phase 1 (Figure 3.3). A light touch appraisal was required to understand the impact areas affected through the introduction of the scheme and potential impact upon the existing bus service.

3.3 Step 2b: Social Groups in the Impact Area

This section provides an assessment of the social groups affected by the proposals, based on the potential impacts identified in the screening assessment in Step 1, and the ‘affected areas’ identified in Step 2a. As per the guidance, analysis has been undertaken of the socio-economic, social and demographic characteristics of the following groups:

- The transport users that will experience changes in travel generalised costs resulting from the intervention;
- The people living in areas who may experience impacts of the intervention even if they are not users; and
- The people travelling in areas identified as likely to be affected by the intervention.

The social groups considered in relation to each impact follow the guidance provided in WebTAG Unit A4.2, which for ease of reference is shown in Table 3.1.

Table 3.1: Impacts to Social Group
WebTAG A4.2 Table 2

Dataset/Social Group	User Benefits	Noise	Air Quality	Accidents	Security	Severance	Accessibility	Affordability
Income Distribution	✓	✓	✓				✓	✓
Children (under 16)		✓	✓	✓	✓	✓	✓	
Young Adults (16-25)				✓			✓	
Older People (70+)				✓	✓	✓	✓	
Disabled People (% of population)					✓	✓	✓	
Black or Minority Ethnic origin (% of population)					✓		✓	
No Car or Van (% of households)						✓	✓	
Carers (% of households with dependent children)							✓	

The socio-demographic characteristics of the population in the impact areas has been considered by looking at Government statistical data and social data, such as Indices of Deprivation 2010 and Census 2011 data.

Table 3.2 summarises the identification of social groups in the area, with respect to impacts.

3.4 Step 2c: Identification of Amenities in the Impact Area

The area of impact is large, and encompasses most of the urban areas of the West of England. The full range of amenities (including schools/nurseries, playgrounds, parks and open spaces, hospitals, care homes/day centres and community centre) are available in a number of locations across the study areas. As such, these have not been explicitly mapped, or explicitly included in accessibility assessments in detail.

3.5 Output Summary

Table 3.2 summarises the social groups in the area and the amenities found in the region, against the indicators.

Table 3.2: Step 2 Output Summary

Social group and amenities indicators			User Benefits	Noise	Air quality	Accidents	Security	Severance	Accessibility	Affordability	Local Authority	England
Resident population in impact area	Income distribution quintiles	0-20%	14%	0%	0%				14%	13%	14%	20%
		20-40%	19%	19%	19%				19%	27%	19%	20%
		40-60%	18%	16%	16%				18%	9%	18%	20%
		60-80%	22%	24%	24%				22%	16%	22%	20%
		80-100%	28%	42%	42%				28%	36%	28%	20%
	Children (<16)			19%	19%	18%	19%	19%	18%		18%	19%
	Young adults (16-24)					15%			15%		15%	13%
	Older people (70+)			13%		12%	13%	13%	12%		12%	12%
	People with a disability						16%	16%	17%		17%	18%
	Black Minority Ethnic						4%		9%		9%	15%
	No car households							17%	22%		22%	26%
	Households with dependent children								27%		27%	29%
	Indicator population in the impact area		1,069,583	26,651	26,651	1,069,583	26,651	26,651	1,069,583	96,485	1,069,583	53,012,456
Amenities present within impact area	Schools/nurseries			✓	✓	✓	✓	✓	✓	✓		
	Playgrounds			✓	✓	✓	✓	✓	✓	✓		
	Parks and open spaces			✓	✓	✓	✓	✓	✓	✓		
	Hospitals			✓	✓	✓	✓	✓	✓	✓		
	Care homes/day centres			✓	✓	✓	✓	✓	✓	✓		
	Community centre			✓	✓	✓	✓	✓	✓	✓		

3.6 GIS Mapping

Figures 3.4 to 3.19 show population distributions mapped in GIS, with two scales for each set of data, the first including the whole of the WoE area, and the second covering a zoomed-in area more closely linked to MetroWest Phase 1 rail lines. Mapping is based on Lower Super Output Area (LSOA) level disaggregation of 2011 Census and other National Statistics data. For the purposes of comparison, LSOA data values are compared against the corresponding West of England Authority value, with the exception of income domain, in which ranking is based on the national profile.

The figures include:

- Figure 3 4: Income LSOA: English Indices of Deprivation (2015) Income Domain – WoE
- Figure 3 5: Income LSOA: English Indices of Deprivation (2015) Income Domain – MWP1
- Figure 3 6: Children (under 16) LSOA: Census 2011 – WoE
- Figure 3 7: Children (under 16) LSOA: Census 2011 – MWP1
- Figure 3 8: Young Adults (16 to 25) LSOA: Census 2011 – WoE
- Figure 3 9: Young Adults (16 to 25) LSOA: Census 2011 – MWP1
- Figure 3 10: Older People (70+) LSOA: Census 2011 – WoE
- Figure 3 11: Older People (70+) LSOA: Census 2011 – MWP1
- Figure 3 12: Disabled People (Day to Day Activities Limited) LSOA: Census 2011 – WoE
- Figure 3 13: Disabled People (Day to Day Activities Limited) LSOA: Census 2011 – MWP1
- Figure 3 14: BME Population LSOA: Census 2011 – WoE
- Figure 3 15: BME Population LSOA: Census 2011 – MWP1
- Figure 3 16: Households with No Access to Car or Van LSOA: Census 2011 – WoE
- Figure 3 17: Households with No Access to Car or Van LSOA: Census 2011 – MWP1
- Figure 3 18: Households with Dependent Children LSOA: Census 2011 – WoE
- Figure 3 19: Households with Dependent Children LSOA: Census 2011 – MWP1

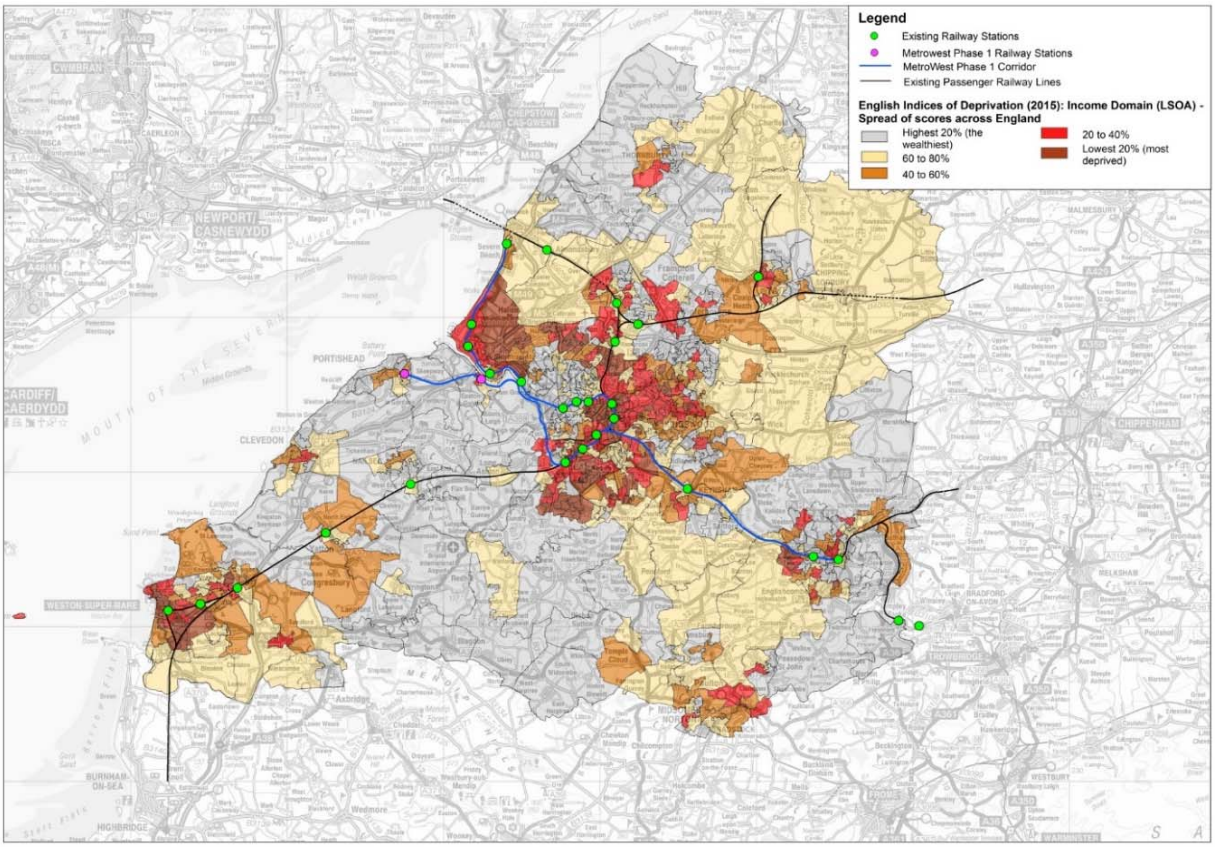

Figure 3-4: Income LSOA: English Indices of Deprivation (2015) Income Domain – WoE

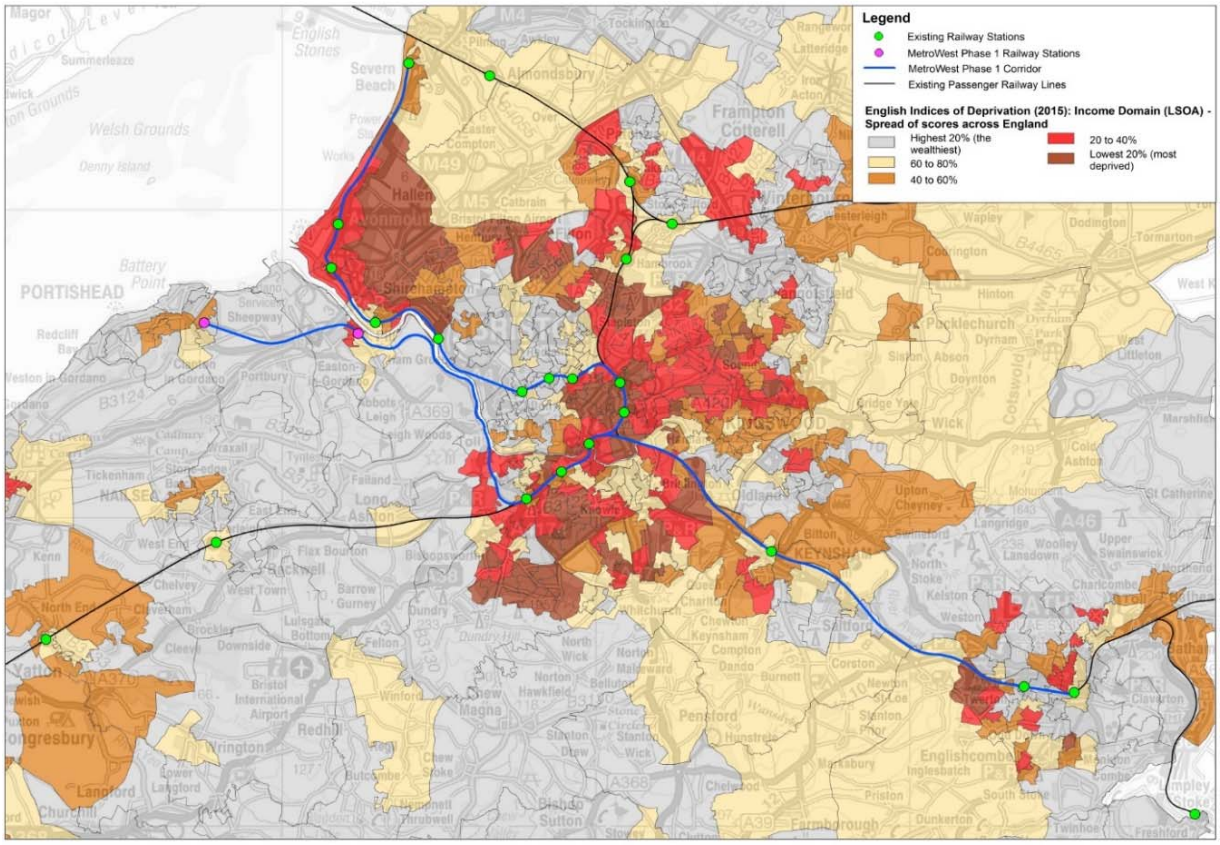

Figure 3-5: Income LSOA: English Indices of Deprivation (2015) Income Domain – MWP1

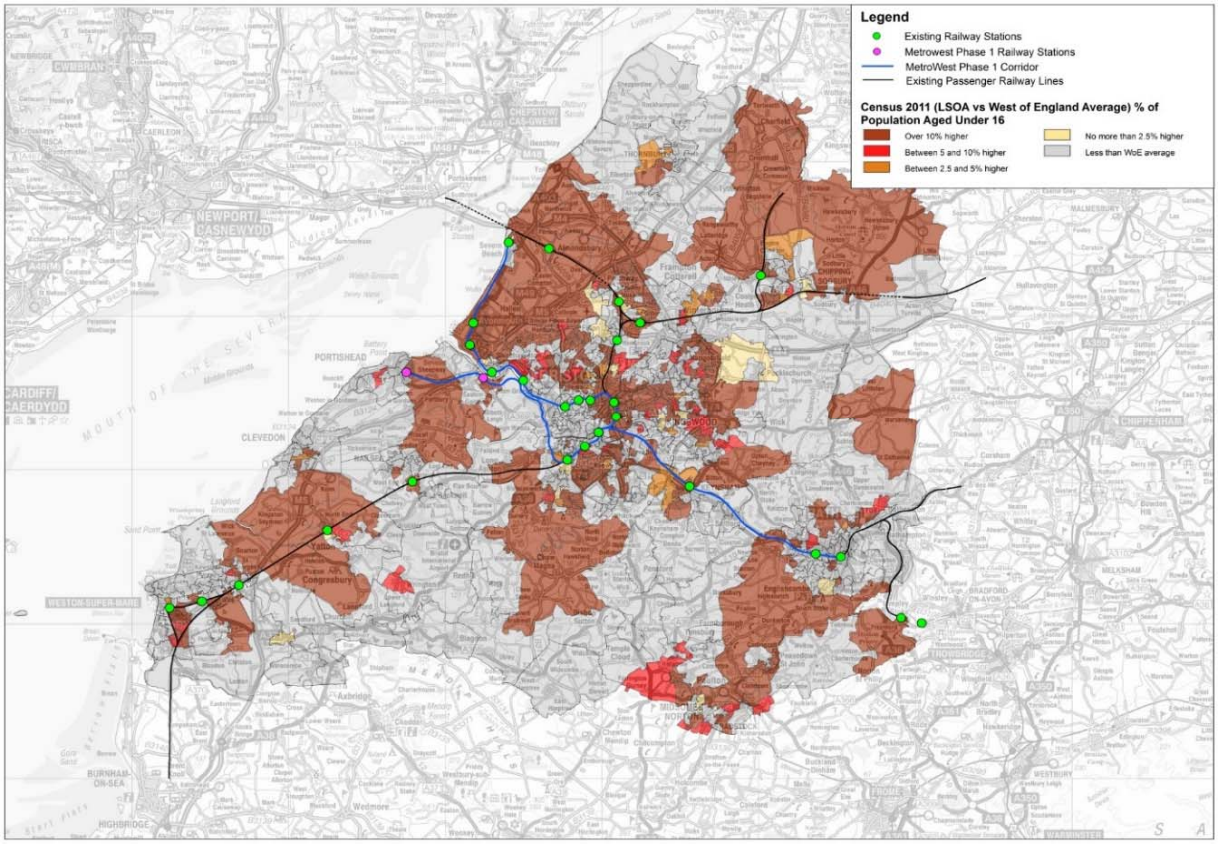

Figure 3-6: Children (under 16) LSOA: Census 2011 – WoE

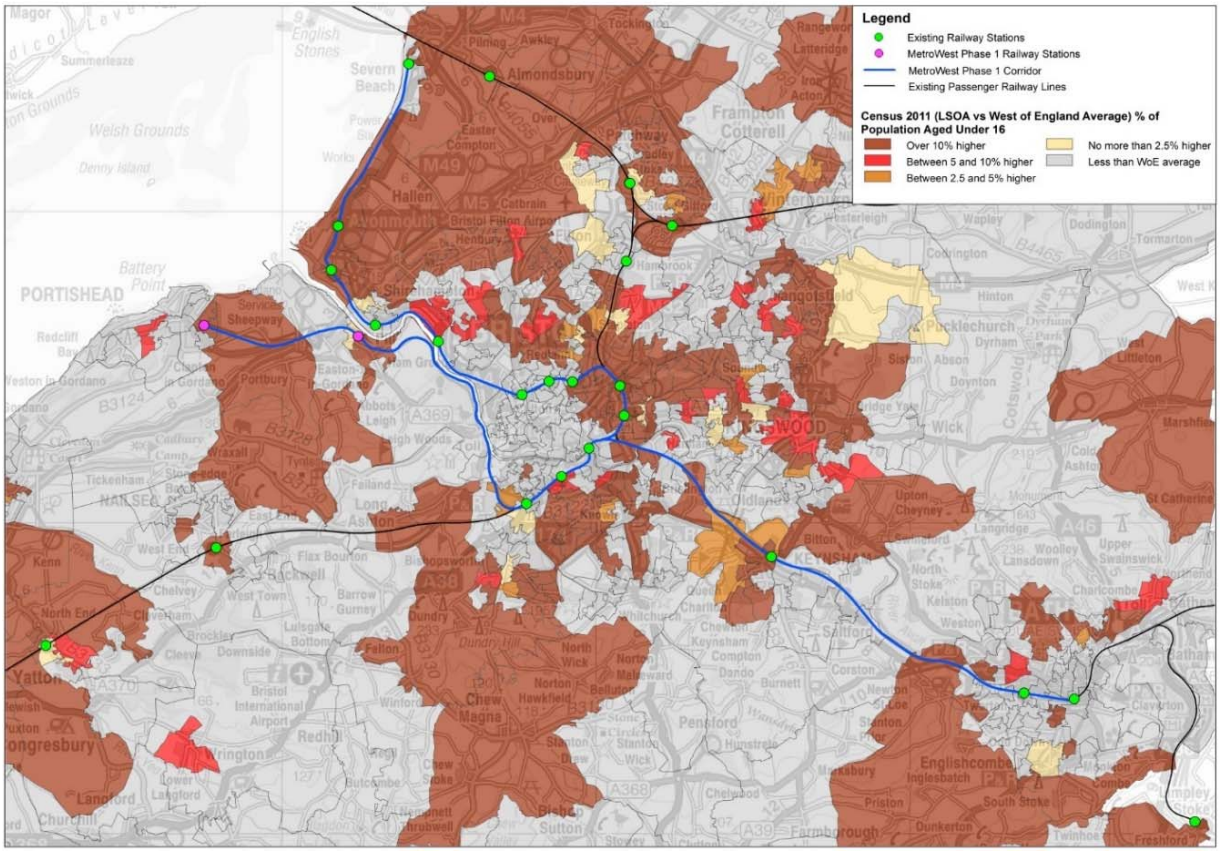

Figure 3-7: Children (under 16) LSOA: Census 2011 – MWP1

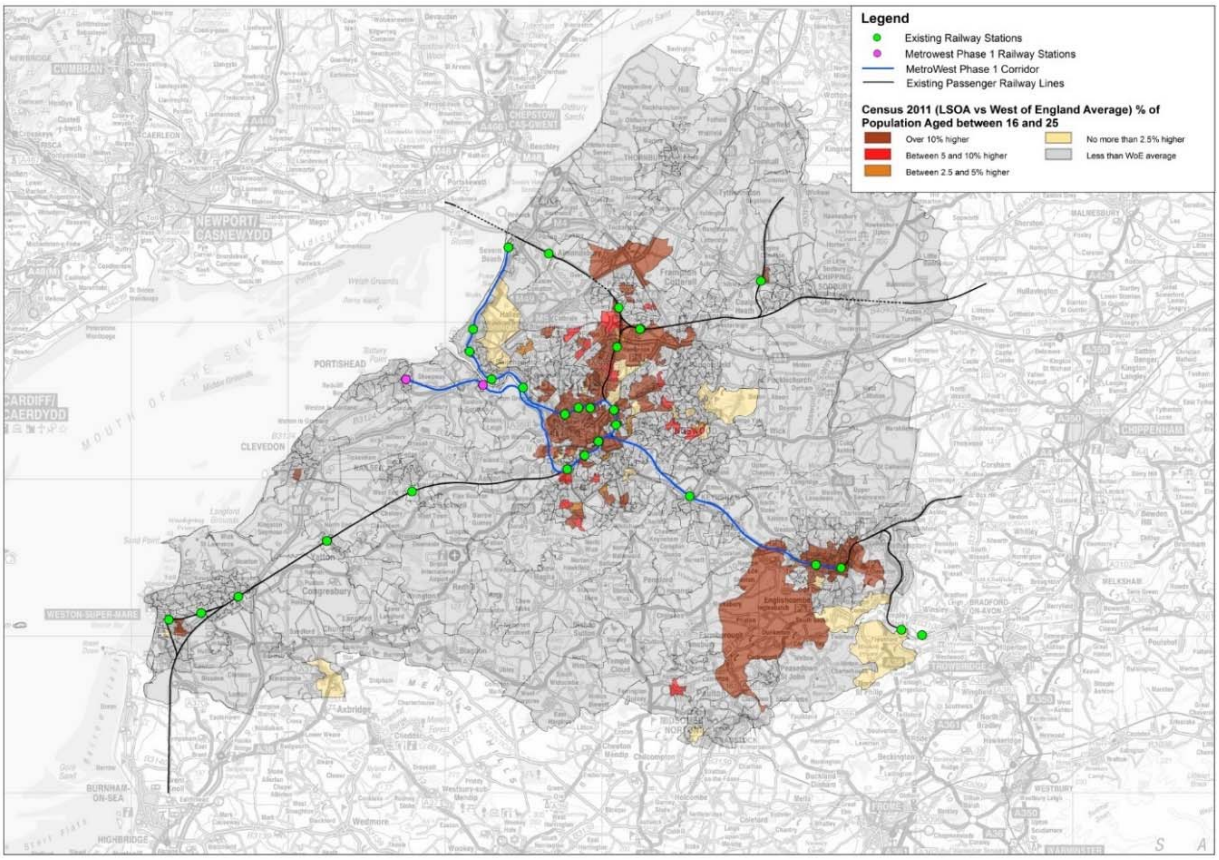

Figure 3-8: Young Adults (16 to 25) LSOA: Census 2011 – WoE

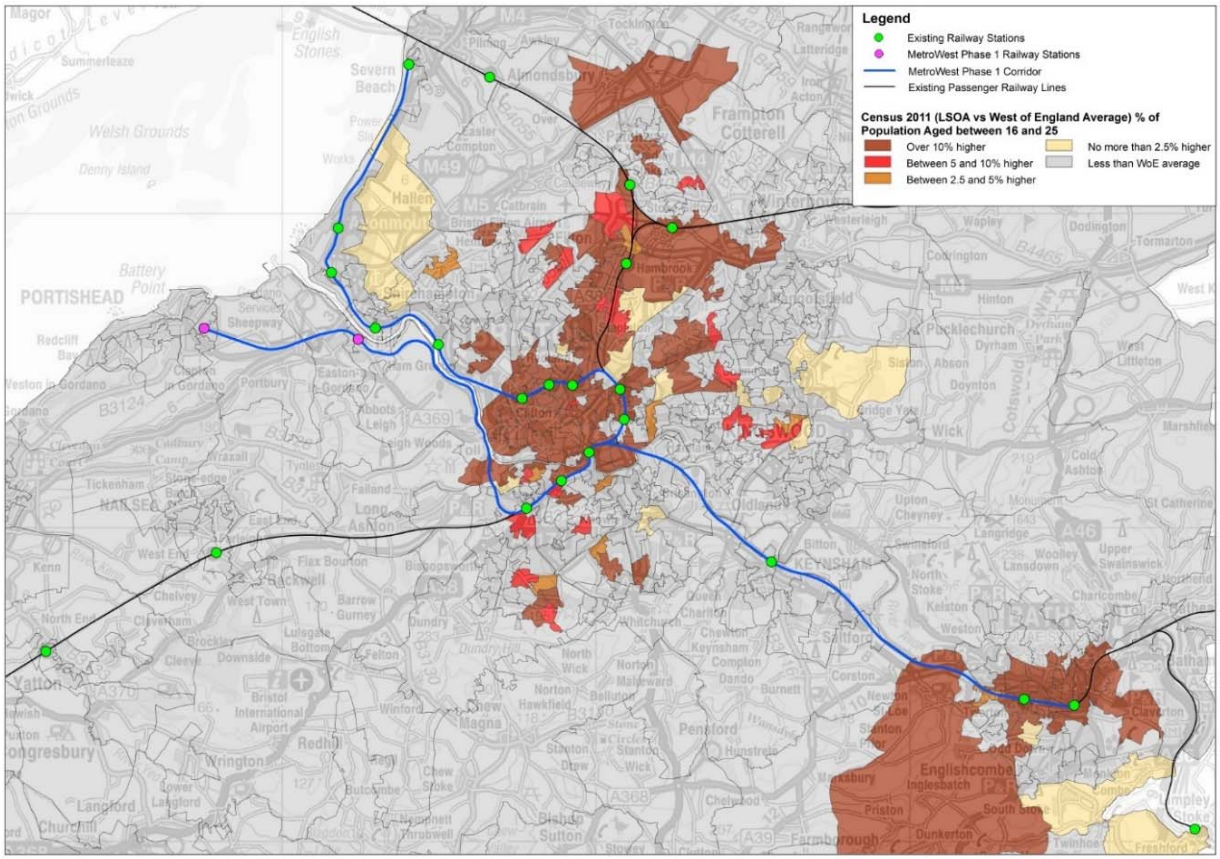

Figure 3-9: Young Adults (16 to 25) LSOA: Census 2011 – MWP1

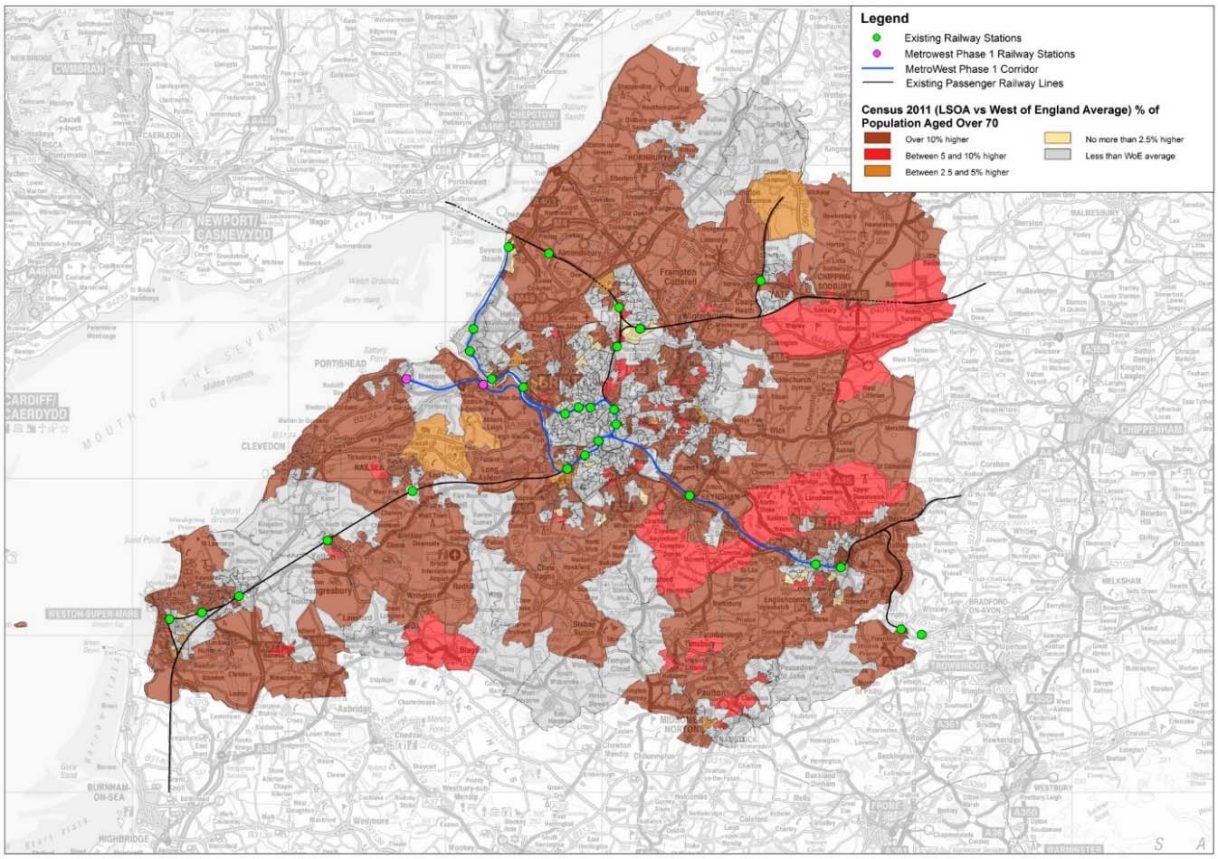

Figure 3-10: Older People (70+) LSOA: Census 2011 – WoE

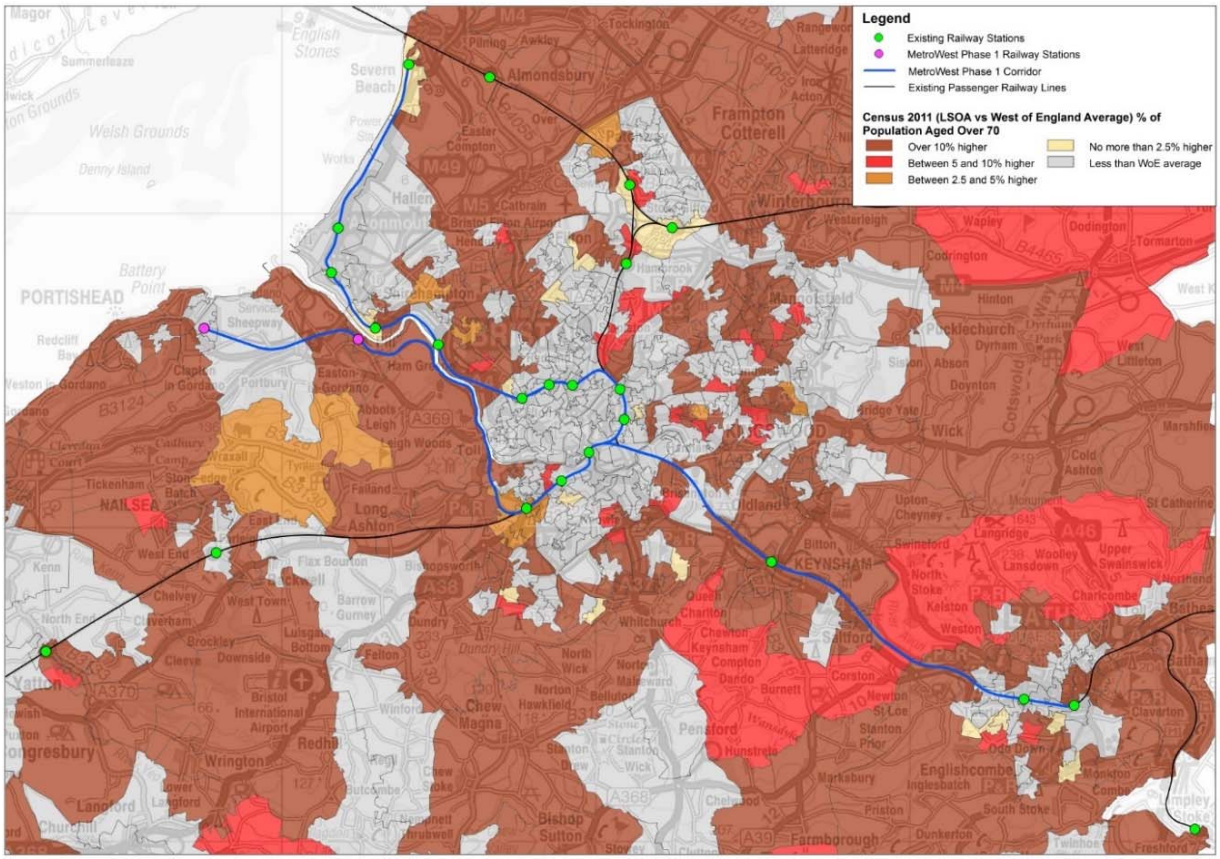

Figure 3-11: Older People (70+) LSOA: Census 2011 – MWP1

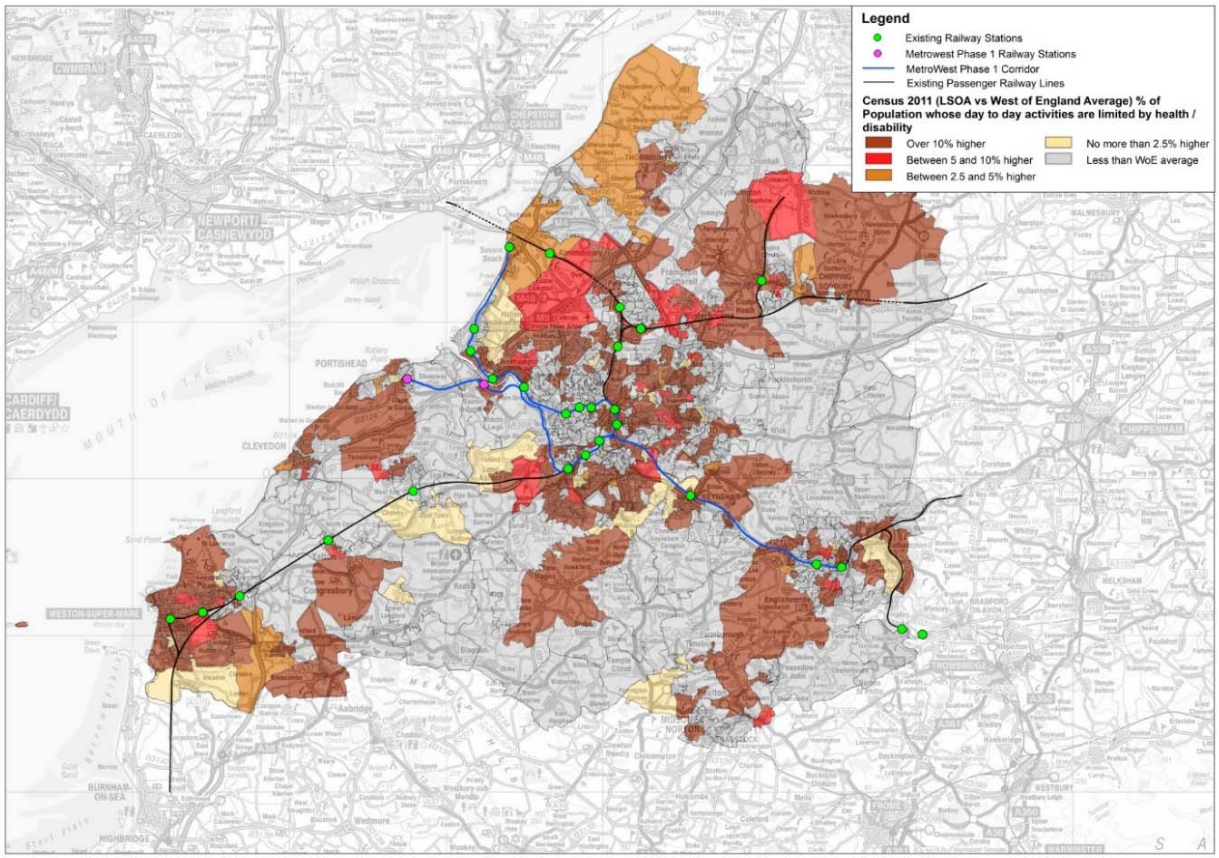

Figure 3-12: Disabled People (Day to Day Activities Limited) LSOA: Census 2011 – WoE

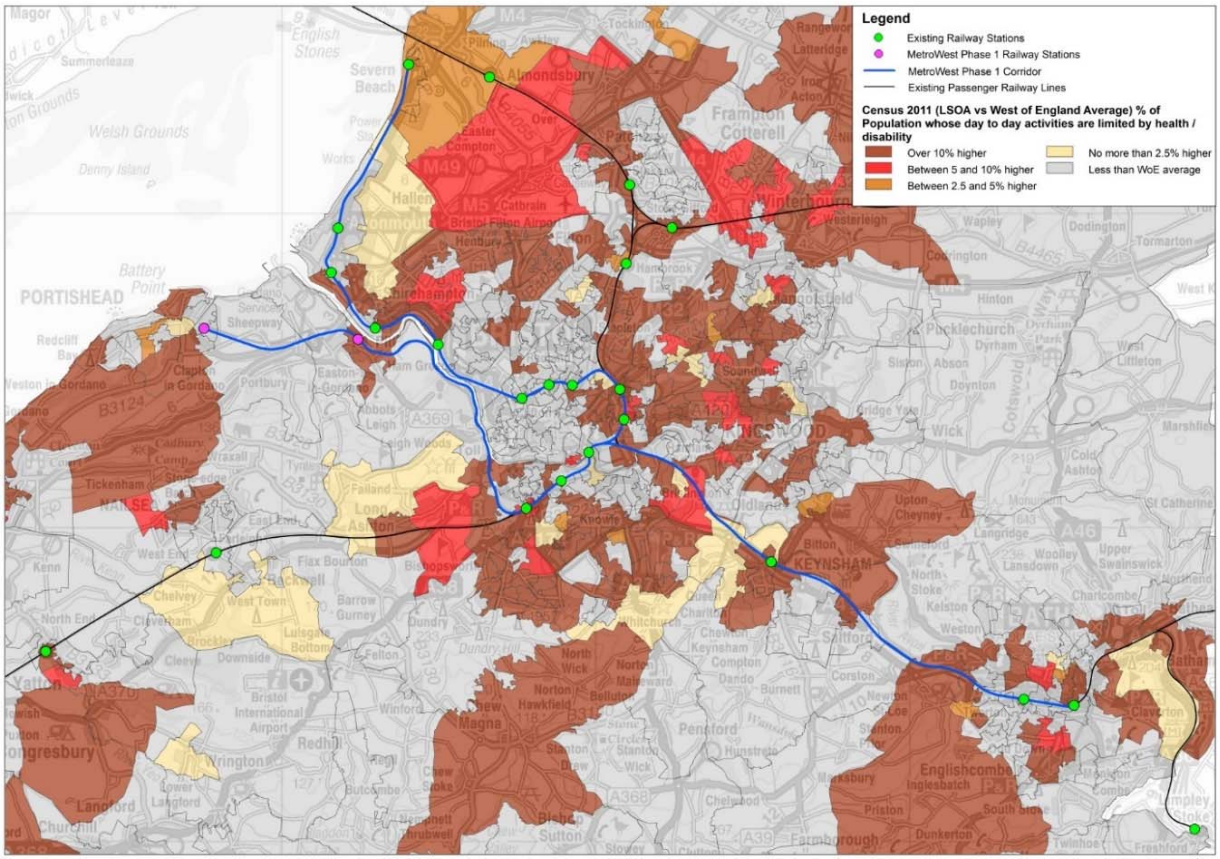

Figure 3-13: Disabled People (Day to Day Activities Limited) LSOA: Census 2011 – MWP1

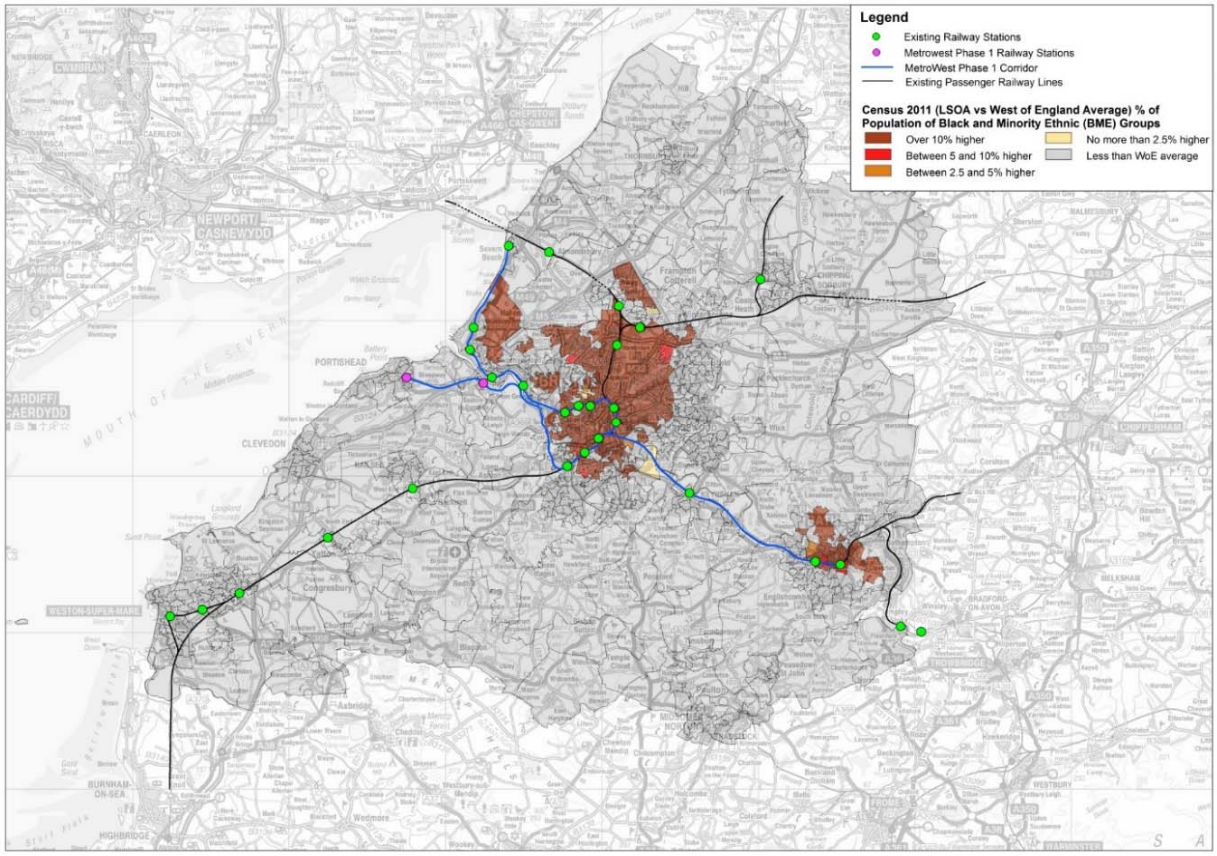

Figure 3-14: BME Population LSOA: Census 2011 – WoE

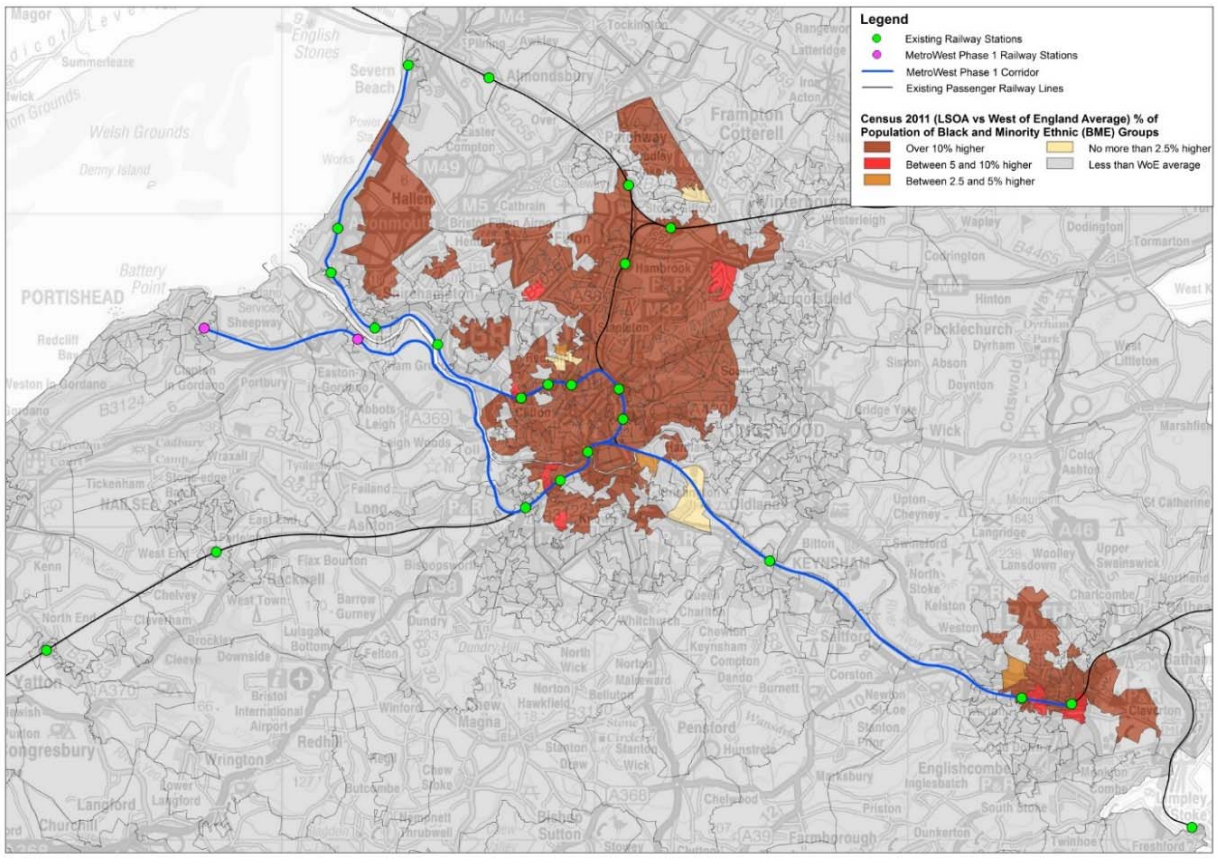

Figure 3-15: BME Population LSOA: Census 2011 – MWP1

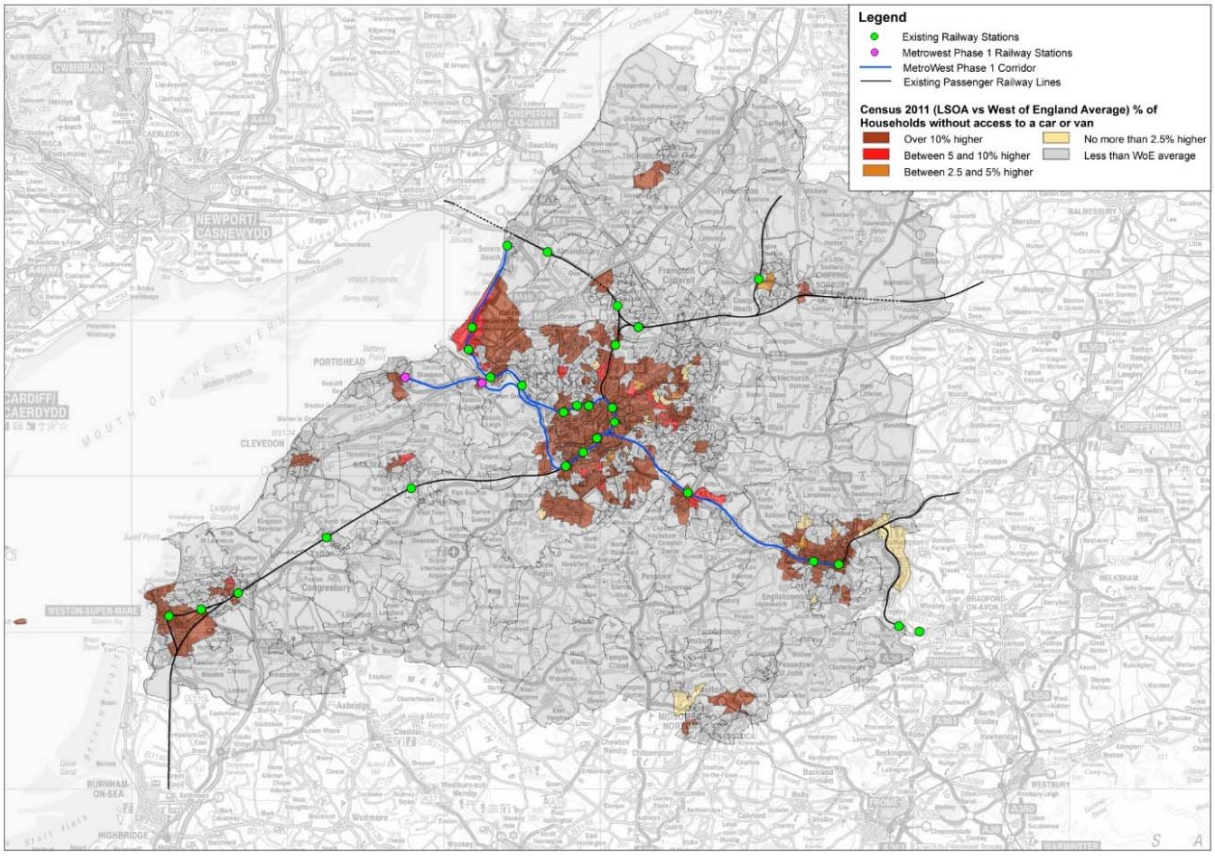

Figure 3-16: Households with No Access to Car or Van LSOA: Census 2011 – WoE

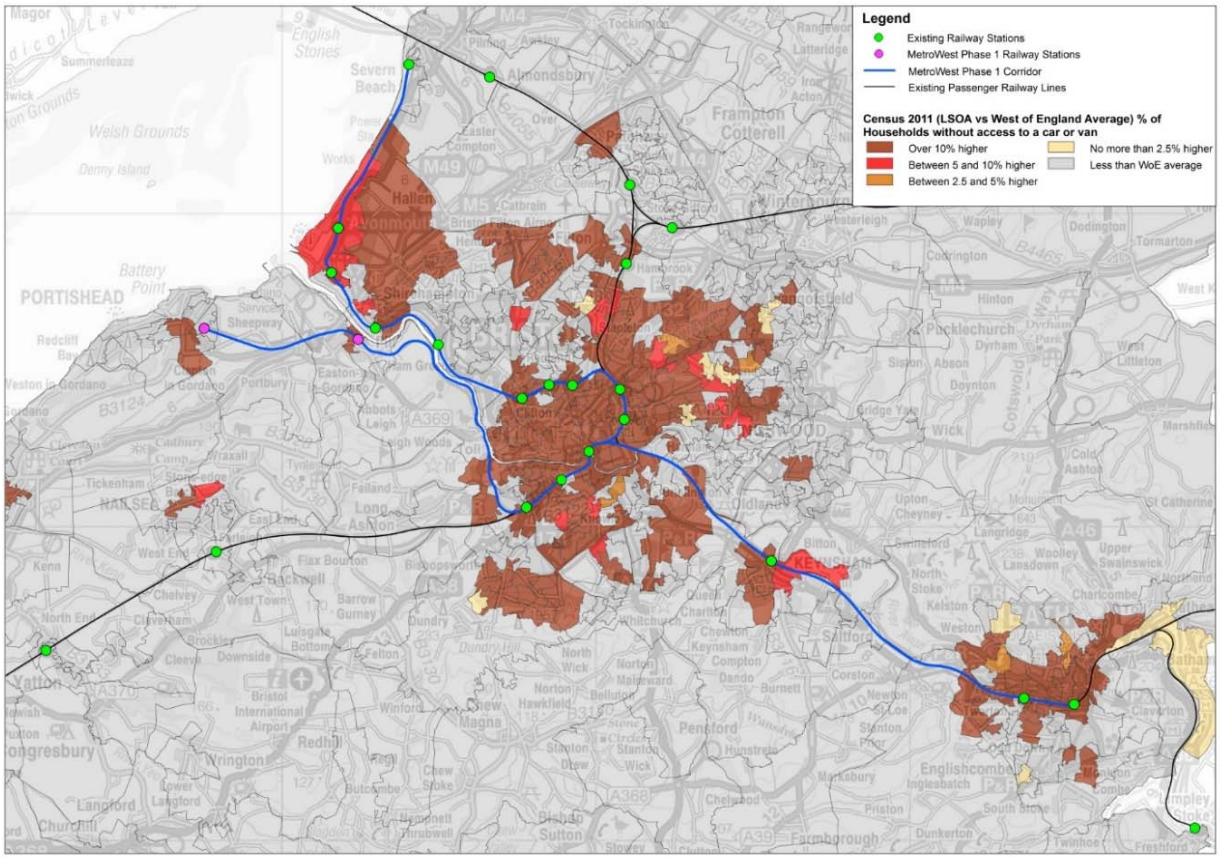

Figure 3-17: Households with No Access to Car or Van LSOA: Census 2011 – MWP1

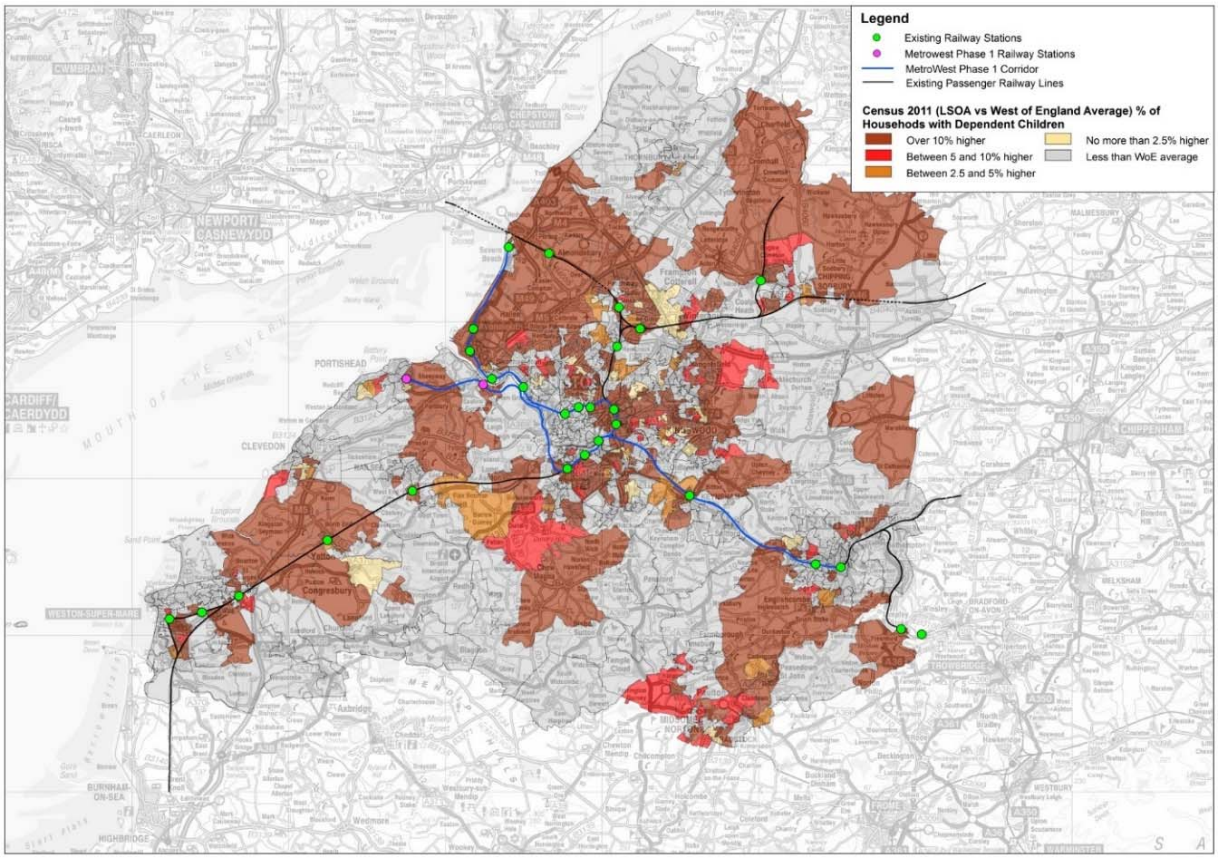

Figure 3-18: Households with Dependent Children LSOA: Census 2011 – WoE

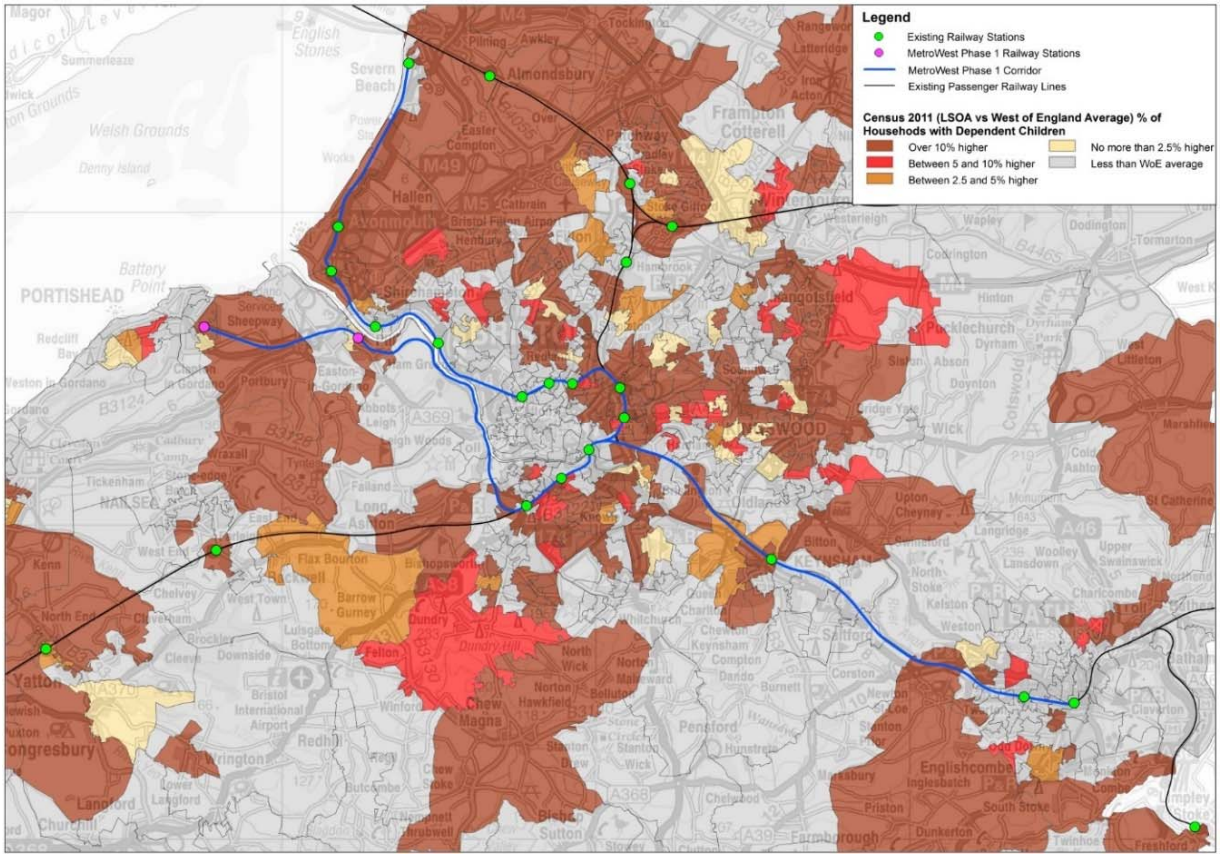

Figure 3-19: Households with Dependent Children LSOA: Census 2011 – MWP1

Step 3: Appraisal of Impacts

4.1 Introduction

The purpose of this section is to assess whether the impact areas identified in Step 2a are likely to significantly affect the social groups/establishment set out in Step 2b and 2c, and as such determine whether a full appraisal is necessary for each impact.

4.2 User Benefits

As outlined in Section 3 (Step 2), the area affected by user benefits has been defined as the West of England (WoE) region. User benefits were calculated for rail users and non-users (highways). Rail users' benefits were calculated from first principles, with highway benefits calculated using TUBA. Methodology and results of the assessment of user benefits are set out in the MetroWest Phase 1 OBC 'Forecasting Report' and 'Economic Assessment Report'.

To consider the distributional impacts, benefit (or disbenefit) values are combined across the impact region of all analysed time periods. Benefits are directionally assessed as follows:

- AM Peak: Origin's LSOA has 100% of Commuters' and 50% of Other benefits (disbenefits) allocated to it, while Destination's LSOA has the remaining 50% of Other values,
- Inter Peak: Origin's LSOA has 50% of Commuters' and 50% of Other benefits (disbenefits) allocated to it, while Destination's LSOA has the remaining 50% of Commuter and Other values,
- PM Peak: Destination's LSOA has 100% of Commuters' and 50% of Other benefits (disbenefits) allocated to it, while Origin's LSOA has the remaining 50% of Other values,
- Off Peak: the same pattern as in the Inter Peak applied,
- Weekends and Bank Holidays: the same pattern as in the Inter Peak applied.

Results are summarised in Tables 4.1 for rail users' benefits, Table 4.2 for car users' benefits and Table 4.3 brings together total users benefits. Figure 4.1 presents the spatial distribution of highway benefits from the scheme based on trip origins, with similar information for rail user benefits in Figure 4.2. Both figures are consistent with the areas expected to benefit from MetroWest Phase 1.

Table 4.1: Distributional Impacts: User Benefits – Rail users.

	IMD Income Domains £m					Total
	Most deprived areas ← → Least deprived areas					
	0%<20%	20%<40%	40%<60%	60%<80%	80%<100%	
Total benefits (∑LSOAs)	£9,573,511	£30,349,462	£57,716,227	£40,862,350	£44,907,863	£183,409,413
Total disbenefits (∑LSOAs)	-	-	-	-	-	-
Share of user benefits	5%	17%	31%	22%	24%	100%
Share of user disbenefits	-	-	-	-	-	-
Share of population in the impact area	14%	19%	18%	22%	28%	100%
Assessment	✓✓	✓✓	✓✓✓	✓✓	✓✓	

Table 4.2: Distributional Impacts: User Benefits – Car users.

	IMD Income Domains £m					Total
	Most deprived areas ← → Least deprived areas					
	0%<20%	20%<40%	40%<60%	60%<80%	80%<100%	
Total benefits (∑LSOAs)	£3,386,663	£3,215,763	£2,610,688	£3,549,452	£6,842,296	£19,604,864
Total disbenefits (∑LSOAs)	-	-£51,781	-£39,511	-£82,224	-£93,131	-£266,647
Share of user benefits	17%	16%	13%	18%	35%	100%
Share of user disbenefits	0%	19%	15%	31%	35%	100%
Share of population in the impact area	14%	19%	18%	22%	28%	100%
Assessment	✓✓	✓✓	✓✓	✓	✓✓	

Table 4.3: Distributional Impacts: User Benefits – All users (Rail and Car combined).

	IMD Income Domains £m					Total
	Most deprived areas ← → Least deprived areas					
	0%<20%	20%<40%	40%<60%	60%<80%	80%<100%	
Total benefits (∑LSOAs)	£12,960,174	£33,565,225	£60,326,915	£44,411,803	£51,750,160	£203,014,277
Total disbenefits (∑LSOAs)	-	-£51,781	-£39,511	-£82,224	-£93,131.	-£266,647
Share of user benefits	6%	17%	30%	22%	25%	100%
Share of user disbenefits	0%	19%	15%	31%	35%	100%
Share of population in the impact area	14%	19%	18%	22%	28%	100%
Assessment	✓	✓✓	✓✓✓	✓✓	✓✓	

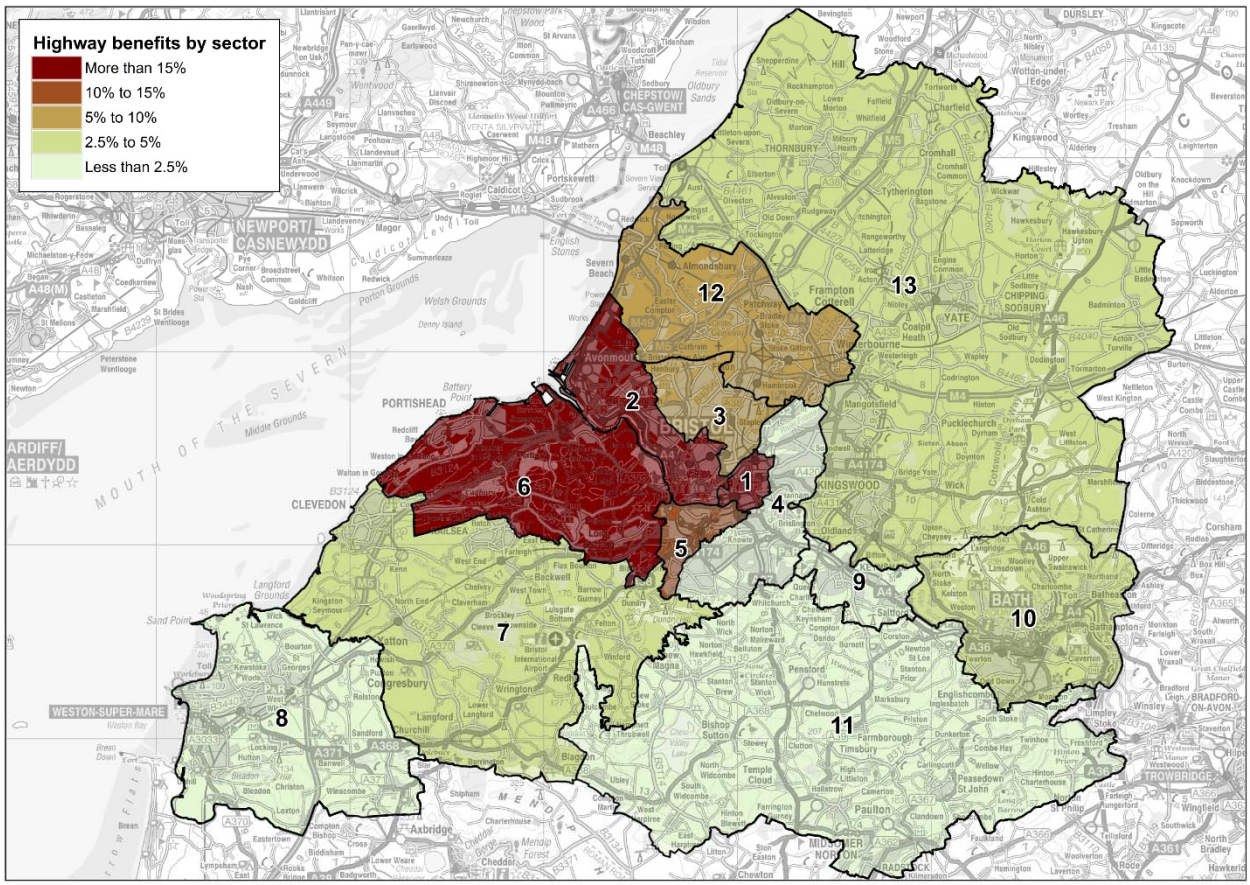

Figure 4-1: Spatial distribution of highway benefits – based on origin sector

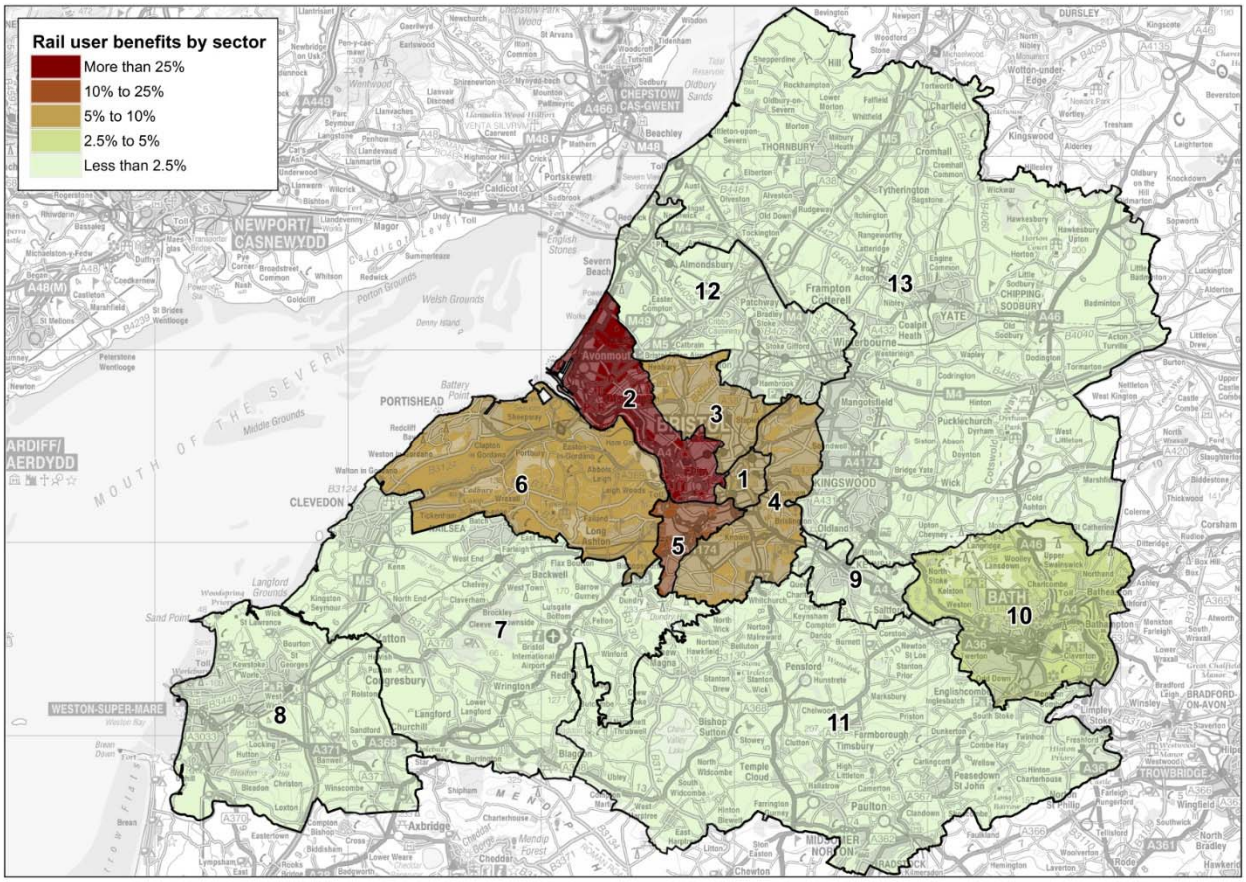

Figure 4-2: Spatial distribution of rail user benefits – based on origin sector

Table 4.1 shows a big share of user benefits falling in 40%-60% income regions dispersed around the analysis area. The lowest share of benefits can be observed around the most deprived regions (lowest 20% income quintile) – mainly focused around the central Bristol area. This is to be expected as people living in the city are likely to find workplaces, schools, shops and other facilities in the city itself. Thus, they are not likely to be highly dependent on rail or car, as amenities are available in walking or cycling distance. The remaining benefits are relatively evenly distributed between 3 other income domains.

Table 4.2 shows benefits to car users are substantially smaller than rail benefits. The biggest impact can be observed on the users living in the wealthiest areas of the West of England. The remaining benefits are relatively evenly distributed between 4 other income quintiles. Observed disbenefits are small in comparison to the benefit values and affect mainly two of the wealthiest groups in the area, hence having no significant impact on the analysis' results.

The 'all users' benefits in Table 4.3 show the same pattern of results as in Table 4.1, rail user benefits. This is because rail benefits are substantially higher than car benefits.

It is concluded that MetroWest Phase 1 will result in a **Large Beneficial** overall distributional impact in respect of user benefits.

4.3 Noise

The noise appraisal has been undertaken using a combination of measured baseline noise levels and the results from the noise model that was used for the completion of the DCO PEIR. Inputs for the noise model are a combination of estimated MetroWest Phase 1 trains and traffic data from the GBATS4 model. The measured noise levels are from surveys undertaken in 2015 and 2016 and are assumed to provide an accurate representation of the noise levels on scheme opening. The noise model includes agreed and embedded mitigation.

The will be minor increases in noise at many locations along the route, mainly at locations close to the proposed route in Portishead and Pill, where there is currently no passenger railway and background noise is low. There are 523 households predicted to experience an increase in daytime noise. For the majority of these locations the change is less than 1dB, which is negligible. Some households have changes more than 1 dB, but none of these are significant impacts. For the majority of households within 600m of the route there is predicted to be no change in noise. Therefore, it is assumed that the distribution of noise impacts will be in line with population, shown in Table 4.4.

Table 4.4: Distributional Impacts: Noise

	IMD Income Domains £m					Total
	Most deprived areas ← → Least deprived areas					
	0%<20%	20%<40%	40%<60%	60%<80%	80%<100%	
Total benefits (∑LSOAs)	-	-	-	-	-	-
Total disbenefits (∑LSOAs)	-	-£97.137	-£81,800-	-£122,700-	-£214,724-	-£511,247
Share of user benefits	-	-	-	-	-	-
Share of user disbenefits	0%	19%	16%	24%	42%	100%
Share of population in the impact area	0%	19%	16%	24%	42%	100%
Assessment	-	✖	✖	✖	✖	

At the Trinity Anglican Methodist Primary School in Portishead there is predicted to be a **minor adverse** impact due to the noise from the railway. The overall distributional impact on noise is concluded to be **minor adverse**.

4.4 Air Quality

The regional assessment assumed NOx and PM10 concentrations, with and without the Project, will be the same between the opening year and forecast year. Based on the DMRB criteria, no road links were screened into the assessment. Therefore, only rail links have been considered.

Negative monetised values were calculated, as increased use of diesel trains is expected to lead to an increase in NOx and PM10 emissions, and an adverse impacts at receptors closest to the rail line, though not predicted to result in any exceedances of the annual mean AQS objective. Distribution of NOx and PM10 emissions are shown in Tables 4.5 and 4.6.

Table 4.5: Distributional Impacts: Air quality – NOx

	IMD Income Domains £m					Total
	Most deprived areas ← → Least deprived areas					
	0%<20%	20%<40%	40%<60%	60%<80%	80%<100%	
Total benefits (∑LSOAs)	-	-	-	-	-	-
Total disbenefits (∑LSOAs)	-	-£305,010	-£88,574	-£2.429	-£140,433	-£536,446
Share of user benefits	-	-	-	-	-	-
Share of user disbenefits	0%	57%	16.5%	0.5%	26%	100%
Share of population in the impact area	0%	19%	16%	24%	42%	100%
Assessment	-	✘✘	✘	✘	✘	

Table 4.6: Distributional Impacts: Air quality – PM10

	IMD Income Domains £m					Total
	Most deprived areas ← → Least deprived areas					
	0%<20%	20%<40%	40%<60%	60%<80%	80%<100%	
Total benefits (∑LSOAs)	-	-	-	-	-	-
Total disbenefits (∑LSOAs)	-	-£823	-£310	-	-£349	-£1,482
Share of user benefits	-	-	-	-	-	-
Share of user disbenefits	0%	55.5%	21%	0%	23.5%	100%
Share of population in the impact area	0%	19%	16%	24%	42%	100%
Assessment	-	✘✘	✘	-	✘	

The distribution of air quality impacts is based on the receptor locations used in the analysis, cross-referenced with LSOAs and population/deprivation data accordingly. There is an imbalance between the distribution of impacts and income quintiles, with a greater proportion of impact in the 20%-40% quintile compared to population. Equally though, there are no impacts in areas in the 0%-20% quintile and very limited (or zero) impacts in the 60%-80% quintile, and the overall impacts are small (especially PM10). As such, the overall distributional impact on air quality is concluded to be **minor adverse**.

4.5 Accidents

The impact of the MetroWest Phase 1 scheme on road traffic accidents has been analysed using COBA-LT software. The transport intervention in this case does not relate to any road network changes, so impact on accident cost benefits is looked at from the perspective of mode changing from car to rail.

Accident analysis has been performed on an individual links, resulting in the identification of a benefit or disbenefit on each link of the highway network. The outputs have been presented on a thematic map, cross-referencing the benefit/disbenefit against clusters of social groups. Figures 4.1-4.3 show the accidents against population clusters for children, young adults and older people.

As presented on the GIS maps, the clusters for three of the vulnerable groups were identified in the vicinity of the planned scheme corridor. COBA-LT forecasted accidents' benefits within the region can be considered positive as the links associated with it (blue) outnumber the links that see a disbenefit (highlighted in red).

Forecast changes are small (and largely beneficial), and there is a wide geographical spread of forecast accidents, so as such it is concluded that MetroWest Phase 1 will result in a **Slight Beneficial** distributional impact in respect of accidents.

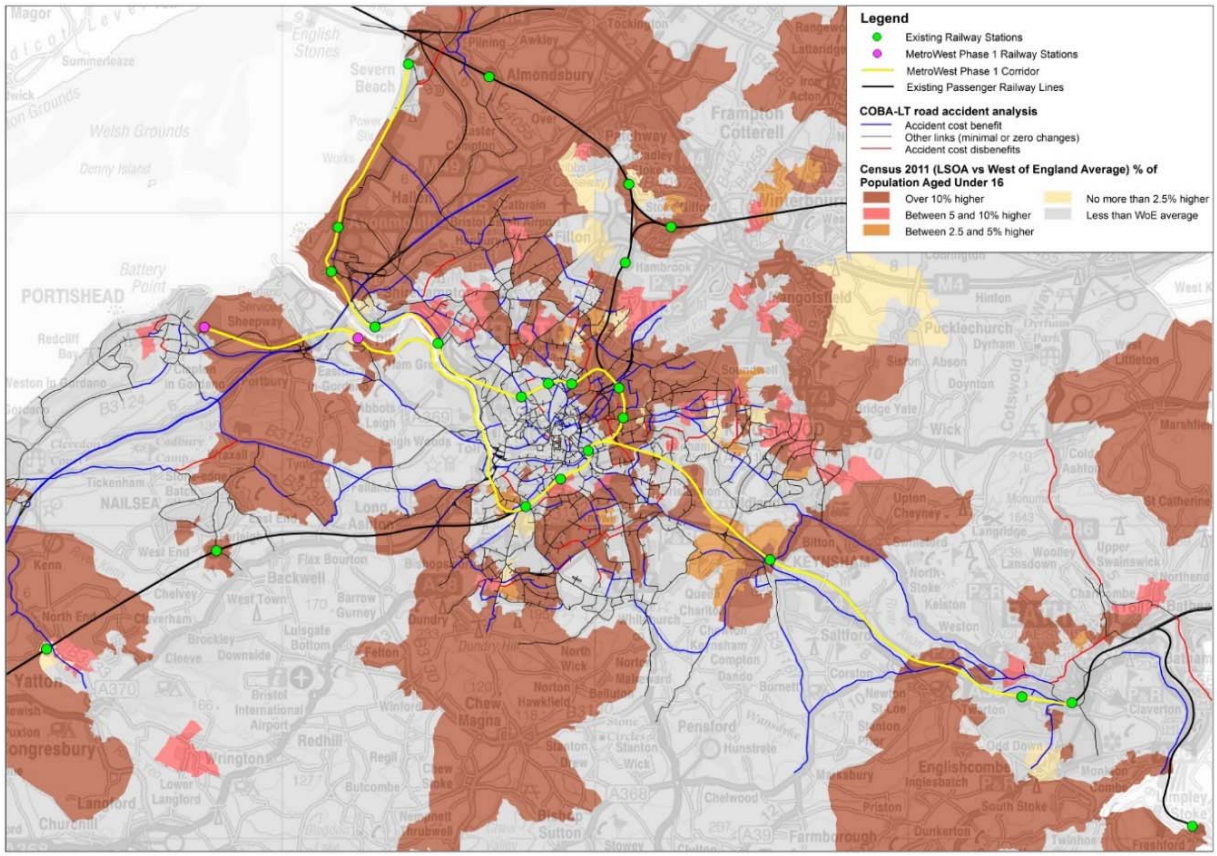

Figure 4-3: Children population (< 16 years old) – cross-referenced against COBA-LT results

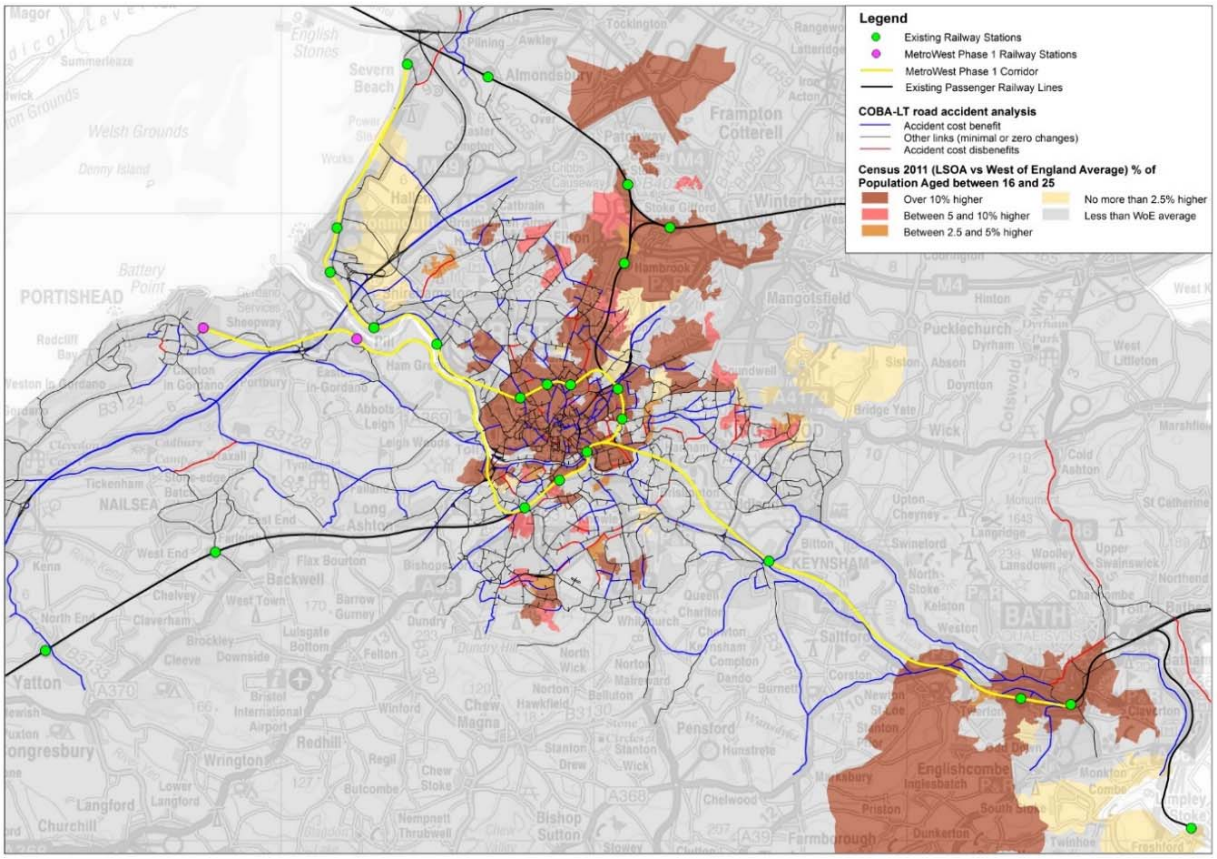

Figure 4-4: Young adults population (16 – 25 years old) – cross-referenced against COBA-LT results

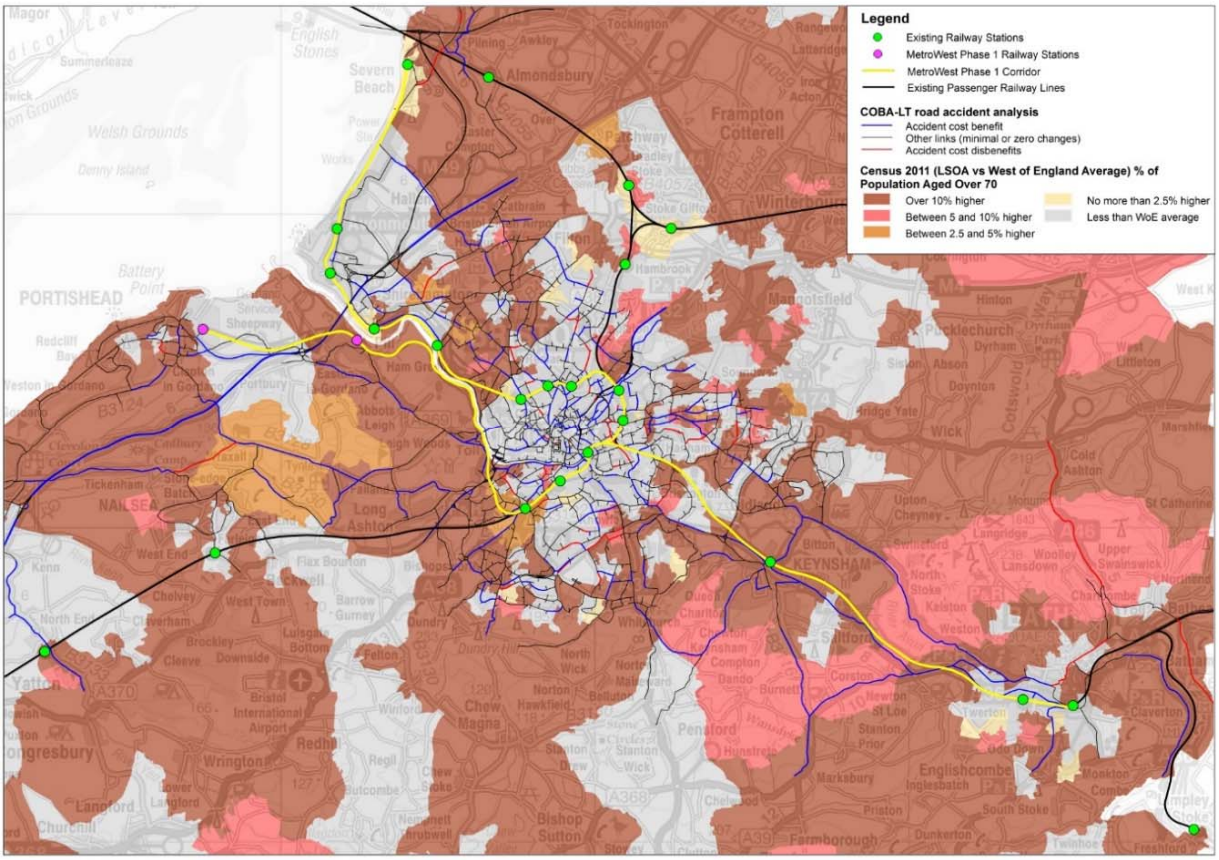

Figure 4-5: Older population (70+ years old) – cross-referenced against COBA-LT results

4.6 Severance

The reinstatement of the disused railway between Portishead and Pill has potential to cause severance to existing farm operations and influence planning developments. Severance impacts should be mitigated during the construction phase, in such a way as to mitigate the effects during both construction and operational stages of the Scheme.

The improvement works proposed along the Portbury Freight Line between Pill and Parson Street Junction are associated with operational railways, so there will be no new severance. This is with the exception of the Barons Close crossing closure (precipitated by MetroBus development, and unlikely to re-open, though not specifically attributed to MetroWest). However, some land will be required for emergency access to the tunnels, which includes agricultural land at Pill.

Overall the scheme has a neutral impact on severance, though some minor negative impacts are expected at the various at-grade crossing points affected by the Scheme, as a result of increased journey times opposed to blocking routes or impaired safety (such as a footbridge replacing a current informal crossing near Trinity School in Portishead).

Overall therefore, distributional impact of severity is considered to be neutral, with minor adverse impacts for vulnerable social groups as a result of increased journey times at Trinity School.

4.7 Accessibility

MetroWest Phase 1 will not provide wholly new accessibility for areas where there is no public transport at present, as it is a combination of enhanced services on existing rail lines and a new rail service to places currently only served by bus. It will therefore generally enhance the public transport offer across the area served, albeit more substantially enhance the public transport offer in Portishead and Pill.

The area served by MetroWest Phase 1 covers much of the WoE, and improves services at 15 existing stations, as well as introducing two new stations to the rail network. The rail network provides linkages to key facilities across the WoE, including employment (in particular Bristol and Bath city centres, Temple Quarter Enterprise Zone and Avonmouth/Severnside), health facilities (notably the hospitals in central Bristol), education (several stations are located near schools, and existing Severn Beach line trains are already well-used by scholars) and retail areas (Clifton Down, Portishead, central Bristol).

The opening of two new stations represents a more specific benefit to two communities, with more than 40,000 people in and around Portishead and Pill being brought into the catchment of the rail network. As noted earlier though, as there are already bus services in these areas, so accessibility improvements are manifest in journey time and opportunity improvements. This is illustrated in Figures 4.6 and 4.7, that show journey time contours for trips to the vicinity of Bristol Temple Meads (Temple Quarter Enterprise Zone). In the example, there is an increase in the area covered by lower journey time contours. Further examples are set out in the MetroWest Phase 1 Outline Business Case 'Social Impacts Appraisal Report'.

MetroWest Phase 1 will generally enhance the public transport offer in area served, particularly around locations near existing stations, thus improving links to key services. There is a more substantial enhancement to the public transport offer in Portishead and Pill. Overall, MetroWest Phase 1 is assessed to have a slight beneficial on access to services. In distributional terms, as a result of the large area of coverage of services in MetroWest Phase 1, coupled with a widespread linkages to key locations (such as employment, education, medical services and food shopping), there is no particular benefit or disbenefits to target facilities or social groups. As such, distributional impact of MetroWest Phase 1 is assessed as slight beneficial.

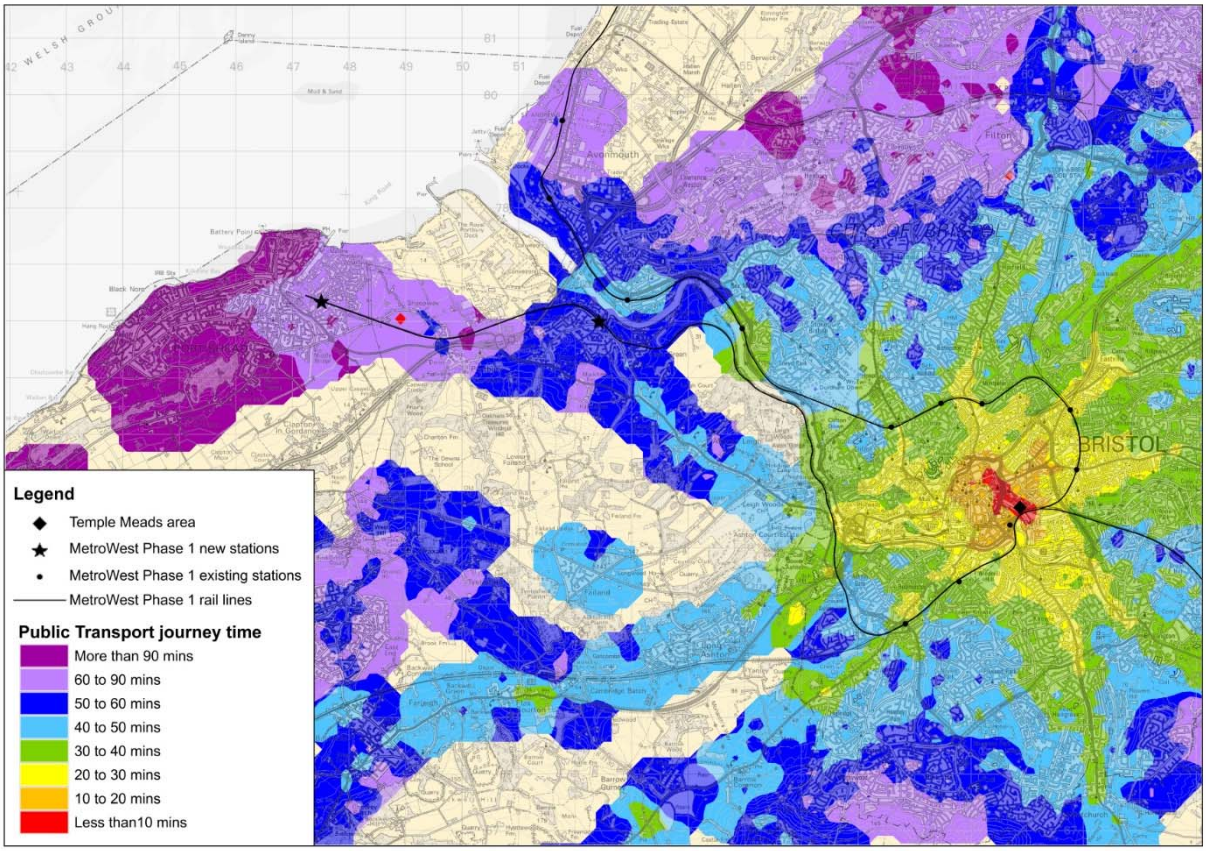

Figure 4-6: Accessibility to Temple Meads area – existing public transport (AM peak)

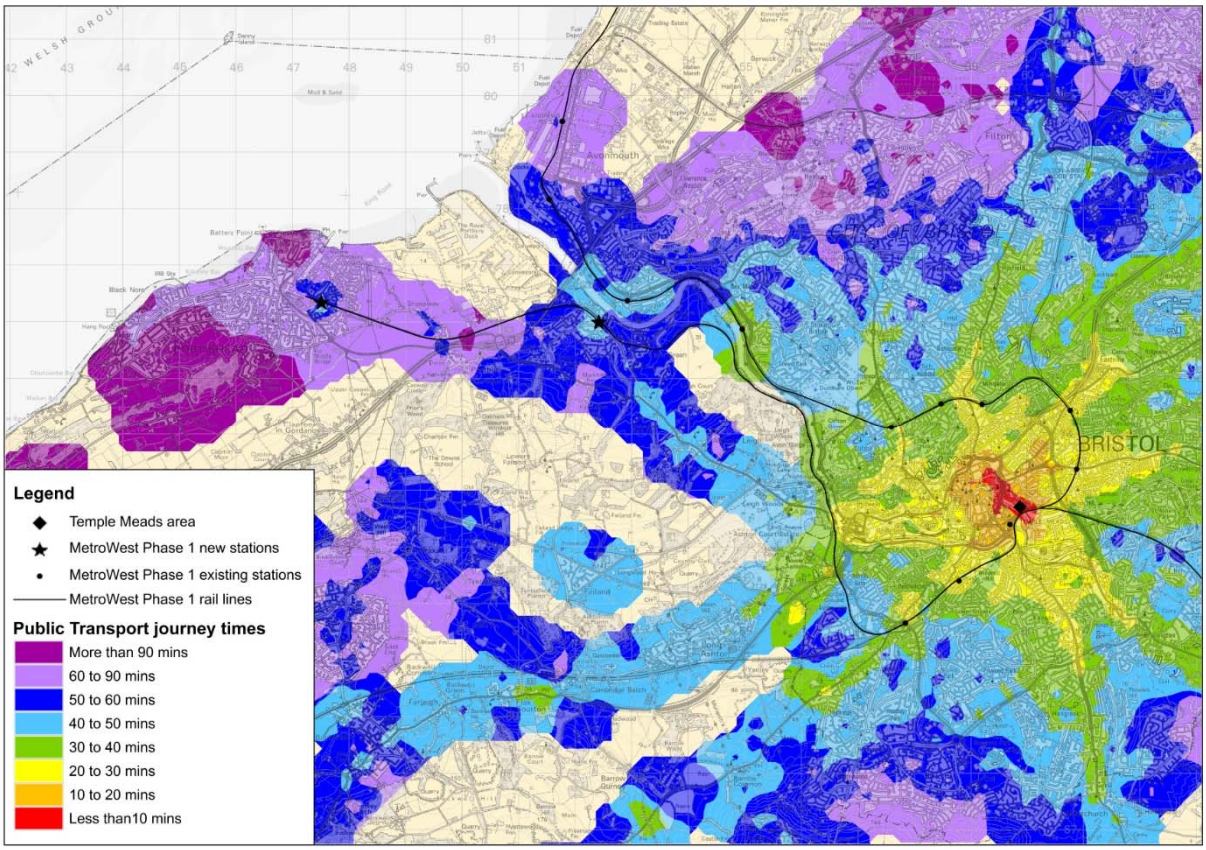

Figure 4-7: Accessibility to Temple Meads area – with MetroWest Phase 1 (AM peak)

4.8 Affordability

The analysis of relative affordability, based on Index of Multiple Deprivation (IMD) (2015) assessment, indicates that personal affordability is less of an issue in Portishead and Pill where MetroWest Phase 1 is likely to have its greatest impact. The assessment indicates personal affordability and deprivation are greater in areas where the Scheme will have the least impact.

The assessment against several factors indicates there will be beneficial affordability impacts from reduced fuel costs, shorter journeys and reduced congestion. However, this needs to be set against the additional costs of rail fares and car parking charges (if travelling to the stations by car).

Improved frequencies are expected to increase the numbers travelling by rail, but there may be some extraction from existing public transport provision which could impact on affordability. Based on the evidence, it is concluded in the AST that MetroWest Phase 1 will result in a **neutral impact** in respect of personal affordability.

The distribution of affordability benefits across the study area is considered very even. Indeed, the same basic impacts were appraised at each station covered by MetroWest Phase 1. As summarised in Table 4.7. As such, the distributional impact is also considered to be **neutral**.

Table 4.7: Affordability Impacts:

Mode	Monetary Modal Cost Change	Description of main impact	Impactst
Car	Car fuel and non-fuel cost	Reduction in costs arising from (1) Change of mode from vehicle to train (2) Shorter vehicle journeys (3) Reduction in congestion	Minor beneficial impact
	Public Parking	The stations at Pill and Portishead will have parking charges	Minor adverse impact
	Residents only parking permits	Requirement for residents only parking zones will incur additional annual related costs for residents and businesses	Minor adverse impact
Public Transport	Bus Fares	Impact on commercial bus services may result in an increase in bus fares	Minor adverse impact
	Rail Fares	New costs arising from rail fares	Minor adverse impact
	Concessionary Fares	Impact on commercial bus services may result in reduced frequencies and less opportunity to use bus passes	Minor adverse impact
Active Mode	Walking	No monetary impacts	No impact
	Cycling	No monetary impacts	No impact

SECTION 5

Summary and Conclusions

The Matrix of Distributional Impacts is presented in Table 5.1.

Table 5.1: Distributional Impacts: Appraisal Matrix

	Distributional impact of income deprivation					Are the impacts distributed evenly?	Key impacts - Qualitative statements
	0-20%	20-40%	40-60%	60-80%	80-100%		
User benefits	✓	✓✓	✓✓✓	✓✓	✓✓	Yes	There are a high level of user benefits and they are distributed relatively evenly between all income groups.
Noise	-	✘	✘	✘	✘	Yes	The area in the immediate vicinity of scheme which will see increases in noise contain very few income-deprived communities (none in 0%-20% quintile).
Air quality	-	✘✘	✘	✘	✘	No	The area near the scheme which will see minor air quality disbenefits contain very few income-deprived communities (none in 0%-20% quintile).
Affordability	-	-	-	-	-	Yes	Affordability impacts are neutral, and considered the same at each station affected, and are thus evenly distributed across income groups.
Accessibility	✓	✓	✓	✓	✓	Yes	Impacts sufficiently widespread that all income groups will stand to benefit on a relatively equal basis.

AST entry	Social groups						User groups				Qualitative statement (including any impact on residential population AND identified amenities)
Impact	Children & young people	Older people	Carers	Women	Disabled	BME	Pedestrians	Cyclists	Motor-cyclists	Young male drivers	
Noise	-										Some adverse impacts to properties near to the scheme, but no significant concentrations of children in the areas affected.
Air Quality	-										Some adverse impacts to properties near to the scheme, but no significant concentrations of children in the areas affected.
Accidents	✓	✓					✓	✓	✓	✓	Slight overall decrease in accidents is spread across the network, to all road users and vulnerable groups, though there are no specific benefits for vulnerable groups.
Severance	-/✘	-/✘	-/✘		-/✘						Overall severance impacts are neutral. New footbridge near Trinity School will increase journey times at a current informal crossing.
Accessibility	✓	✓	✓	✓	✓	✓					Impacts are considered to be sufficiently widespread that all groups will stand to benefit on a relatively equal basis.

Appendix A
Distributional Impact Appraisal Screening Proforma (from ASR)

Distributional Impact Appraisal Screening Proforma

Originally contained in the MetroWest Phase 1 Appraisal Specification Report, September 2017

What is MetroWest Phase 1?

MetroWest is a programme that will transform the provision of local rail services across the West of England. MetroWest comprises of a range of projects from relatively large major schemes, entailing both infrastructure and service enhancement, to smaller scale projects. MetroWest is being jointly promoted and developed by the four West of England councils (Bath & North East Somerset, Bristol City, North Somerset and South Gloucestershire Councils).

The MetroWest programme will address the core issue of transport network resilience, through targeted investment to increase both the capacity and accessibility of the local rail network. The MetroWest concept is to deliver an enhanced local rail offer for the sub-region comprising:

- Existing and disused rail corridors feeding into Bristol
- Broadly half-hourly service frequency (with some variations possible)
- Cross-Bristol service patterns (i.e. Bath to Severn Beach)
- A Metro-type service appropriate for a city region of 1 million population

MetroWest Phase 1 offers a half-hourly local service for the Severn Beach line, Bath to Bristol line and a reopened Portishead line with stations at Portishead and Pill.

Objectives

- To support economic growth, through enhancing the transport links to the Temple Quay Enterprise Zone (TQEZ) and into and across Bristol city centre, from the Portishead, Bath and Avonmouth and Severn Beach arterial corridors
- To deliver a more resilient transport offer, providing more attractive and guaranteed (future-proofed) journey times for commuters, business and residents into and across Bristol, through better utilisation of strategic heavy rail corridors from Portishead, Bath and Avonmouth, and Severn Beach
- To improve accessibility to the rail network with new and reopened rail stations and reduce the cost (generalised cost) of travel for commuters, business and residents
- To make a positive contribution to social well-being, life opportunities and improving quality of life, across the three arterial corridors

The MetroWest Phase 1 supporting objectives are:

- To contribute to reducing traffic congestion on the Portishead, Bath and Avonmouth, and Severn Beach arterial corridors
- To contribute to enhancing the capacity of the local rail network, in terms of seats per hour in the AM and PM peak.
- To contribute to reducing the overall environmental impact of the transport network

Distributional Impact Appraisal Screening Proforma

Indicator	(a) Appraisal output criteria	(b) Potential impact (yes / no, positive/negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
User benefits	The TUBA user benefit analysis software or an equivalent process has been used in the appraisal; and/or the value of user benefits Transport Economic Efficiency (TEE) table is non-zero.	Yes, positive.	Total benefits between £185-£228 million (dependent on scenario). Of this £134 - £158 million relate to commuting benefits, £34-£50 million non business other and £16-£20 million business benefits. Revenue and operator costs net £0 set to 100% government. See Table 3.5, Preliminary Business Case Report (Sept 2014). Benefits to rail and motorised users in relation to journey time benefits. The scheme will also connect to Temple Quarter Enterprise Zone and support the J21 Enterprise Area (Weston -Super-Mare) and Avonmouth Severnside Enterprise Area.	Yes. Analysis needs to be undertaken to determine the spread of user benefits amongst income deprivation quintiles.
Noise	Any change in alignment of transport corridor or any links with significant changes (>25% or <-20%) in vehicle flow, speed or %HDV content. Also note comment in TAG Unit A3.	Yes, negative (slightly adverse).	Desktop, site visit and noise measurement surveys undertaken. There will be some positive noise improvements where traffic is taken off the road network, particularly in Bristol, but moderate adverse impacts from rail traffic on reinstated line, especially for new developments in Portishead that did not exist when the line previously operated. Construction activities are likely to increase noise levels temporarily.	Yes. Need to examine the noise assessments to ascertain the distribution of noise impacts across income groups and children in the area. Assessment to see if any locations where children are likely to spend any time (schools, parks, playgrounds, etc.) are affected.
Air quality	Any change in alignment of transport corridor or any links with significant changes in vehicle flow, speed or %HDV content: • Change in 24 hour AADT of 1000 vehicles or more • Change in 24 hour AADT of HDV of 200 HDV vehicles or more • Change in daily average speed of 10kph or more • Change in peak hour speed of 20kph or more • Change in road alignment of 5m or more	Yes, positive (slightly beneficial / neutral)	There will be some benefits to air quality through reduced road traffic however potentially some negative impact during the construction and operational phases (to those who live in areas newly developed that did not exist when the line was previously in operation). There are two designated sites located within 1 km of the Portishead to Pill line, which could be sensitive to change in nitrogen deposition associated with the scheme. The scheme operation is likely to have beneficial impacts due to the modal shift from road to rail but disadvantages for those immediately adjacent to the line. On balance, it is envisaged that the scheme will have a slight beneficial or neutral air quality impact	Yes. Need to examine the outputs from the air quality assessments to ascertain the distribution of impacts across income groups and children in the area. Using Indices of Deprivation 2010 and Census 2011 data.

Distributional Impact Appraisal Screening Proforma

Indicator	(a) Appraisal output criteria	(b) Potential impact (yes / no, positive/negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
Accidents	Any change in alignment of transport corridor (or road layout) that may have positive or negative safety impacts, or any links with significant changes in vehicle flow, speed, %HGV content or any significant change (>10%) in the number of pedestrians, cyclists or motorcyclists using road network.	Yes, positive (slightly beneficial)	The new rail link would result in a reduction of vehicle-kms travelled on the highway network andtherefore reduce the number of accidents. However, more traffic could be expected in the vicinity of thenew stations which could result in more collisions, albeit less severe given the low speed environments.Pedestrian safety is impacted by access and egress at the new railway stations. However, the design willtake into account safe movement of pedestrians (and cyclists) to create a safe environment for all modesin this constrained area where activity will be high.The new rail line will operate on a wholly segregated alignment and will not conflict with other modes.The scheme will be compliant with HMRI (Her Majesty's Rail Inspectorate) safety standards to ensure thehighest possible operational safety so, in comparison to transport alternatives, it is envisaged to have a slight beneficial impact to accidents.	Yes As this is largely a rail scheme accident analysis should be made for those that occur on stations. In addition the impact area(s) should include areas that are forecasted to have increased demand for walk and cycle users. Analysis should be undertaken by for defined areas of deprivation and for defined vulnerable groups.
Security	Any change in public transport waiting/interchange facilities including pedestrian access expected to affect user perceptions of personal security.	No, neutral.	New rail stations will enhance the security of urban locations by providing additional footfall, CCTV, emergency contact points and improved lighting. While there is a general improvement in security of the area, rail stations can also attract crime. The scheme is therefore envisaged to have a neutral impact on security.	No
Severance	Introduction or removal of barriers to pedestrian movement, either through changes to road crossing provision, or through introduction of new public transport or road corridors. Any areas with significant changes (>10%) in vehicle flow, speed, %HGV content.	Yes, negative (slightly adverse).	Due to the strict controls on movement on and across the railway line within the scheme area, the impacts of severance will be limited. However, it is envisaged one informal pedestrian route would be closed, causing inconvenience for a small number of people. For this reason, the scheme is likely to have a slight adverse impact on severance.	Yes Further work is required to assess the closure of the 'informal' crossing the impact of this, if any, upon locations of vulnerable users and the key facilities and destinations surrounding the crossing.

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Accessibility	Changes in routings or timings of current public transport services, any changes to public transport provision, including routing, frequencies, waiting facilities (bus stops / rail stations) and rolling stock, or any indirect impacts on accessibility to services (e.g. demolition & re-location of a school).	Yes, positive.	As the appraised scheme will introduce passenger train services to an area (Portishead) not currently served by thismode, providing access to jobs and key services within the City Centre (Bristol) The scheme will substantially change the availability of transport services in the study area.The reopened railway line will provide certainty to travel options when other (or usual) modes are notavailable. It has been predicted that the scheme will connect approximately 35,000 additional people to the railway network.	Yes. Further work is required to understand the full accessibility impact of the scheme on vulnerable groups. Particularly on how the scheme can overcome barriers to accessing defined town centres, major employment areas, hospitals, centres of higher and further education and secondary schools. Comparisons should be made between the proportions of the population in each area from the selected social groups with the local authority average, and highlight where there are significant concentrations of these groups.Reference should be made to existing local policy documents (Joint Local Transport Plan).
Affordability	In cases where the following charges would occur; Parking charges (including where changes in the allocation of free or reduced fee spaces may occur); Car fuel and non-fuel operating costs (where, for example, rerouting or changes in journey speeds and congestion occur resulting in changes in costs); Road user charges (including discounts and exemptions for different groups of travellers); Public transport fare changes (where, for example premium fares are set on new or existing modes or where multi-modal discounted travel tickets become available due to new ticketing technologies); or Public transport concession availability (where, for example concession arrangements vary as a result of a move in service provision from bus to light rail or heavy rail, where such concession entitlement is not maintained by the local authority[1]).	Yes, positive.	A bus servicedoes already operate between Portishead and Bristol, diminishing the benefits of rail travel onaffordability. However, compared to bus and car travel, the journey time savings by rail (Portishead toBristol) are considerable. This can have positive knock-on effect in terms of the value attributed to timebut also the 'real' value of time savings (for example, a reduction in child care costs).The scheme is envisaged to have a slight beneficial impact to affordability.	Yes. Further work is required to understand the impact areas affected (positively) through the introduction of the scheme. Further work is also required to understand if the new scheme would impact upon the existing bus service, and if so the impact that would have on vulnerable groups (who could be negatively impacted by increased costs associated with rail as opposed to bus). Analysis should be undertaken for impacts to income groups and across indices of deprivation banding (using 2010 data).