PLYMOUTH AND SOUTH WEST DEVON JOINT LOCAL PLAN - BASELINE TRANSPORT CONDITIONS REPORT

PUBLIC FEBRUARY 2017

WSP | PARSONS BRINCKERHOFF

PLYMOUTH AND SOUTH WEST DEVON JOINT LOCAL PLAN - BASELINE TRANSPORT CONDITIONS REPORT

Plymouth City Council

Type of document (version)
Public

Project no: 70026293
Date: February 2017

WSP | Parsons Brinckerhoff
The Forum
Barnfield Road
Exeter
Devon
EX1 1QR

Tel: +44 (0) 1392 229700
www.wspgroup.com
www.pbworld.com

QUALITY MANAGEMENT

Issue / Revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Draft for comments	Revised in line with PCC comments	Revised in line with TSWG comments	Revised in line with PCC comments
Date	1 July 2016	16 September 2016	November 2016	20 February 2017
Prepared by	CH, JP, MK	JP	JP	JP
Signature				
Checked by	JP	JP	JP	FR
Signature				
Authorised by	HR	MK	HR	HR
Signature				
Project number	70026293	70026293	70026293	70026293
Report number	2	2	2	2
File reference	\\uk.wspgroup.com\Central Data\Projects\700262xx\70026293 - Plymouth Framework - Plymouth & South West Devon Joint Local Plan Transport Support			

PRODUCTION TEAM

WSP | PARSONS BRINCKERHOFF

James Purkiss	Principal Consultant
Gwyn Jones	Assistant Consultant
Chris Hill	Assistant Consultant
Maria Kosma	Graduate Consultant

TABLE OF CONTENTS

1 INTRODUCTION 1
2 STRATEGIC TRANSPORT CONTEXT 4
3 ENVIRONMENTAL SETTING 7
4 TRAVEL PATTERNS 13
5 ROAD NETWORK & TRAFFIC 26
6 BUS & COACH TRAVEL 53
7 RAIL TRAVEL 63
8 ACTIVE TRAVEL NETWORKS & SUSTAINABLE TRANSPORT INITIATIVES 72
9 MARINE CONNECTIONS 82
10 PLYMOUTH CORRIDORS AND AREAS – STRATEGIES AND STUDIES 84
11 OVERVIEW OF OPPORTUNITIES AND CONSTRAINTS 88
12 SOURCES 91

TABLES

Table 3.1 – Environmental designations in the JLP area 7
Table 3.2 - Local authority CO_2 transport emissions estimates, 2014, by transport category 11
Table 3.3 - Local authority CO_2 transport emissions estimates, 2005-2014 11
Table 4.1 – Change in trip behaviour, 1995/97 to 2015 14
Table 4.2 – Net commuting flows by local authority 18
Table 4.3 – Key origins outside Plymouth with 20% or more commuters travelling into Plymouth and urban fringe 19
Table 4.4 – Key commuting destinations in Plymouth 19
Table 4.5 – Proportion of workforce from outside Plymouth authority area, Census 2011 20
Table 5.1 – Annual Average Weekday Traffic (AAWT) Flows in 2015 – A38 26
Table 5.2 – Annual Average Weekday Traffic Flows in 2015 – Other Strategic City Roads 27
Table 5.3 – Peak Hours and Peak Hour Flows, Plymouth Strategic City Roads, June 2015 31
Table 5.4 – Heavy Goods Vehicles as Percentage of All Traffic, June 2016 – A38(T) 32
Table 5.5 – Heavy Goods Vehicles as Percentage of All Traffic, June 2016 – Other Strategic City Roads in Plymouth 32
Table 5.6 – Changes in Traffic Levels On Selected Road Corridors in Plymouth, 2005 to 2015 33
Table 5.7 – A386 Cross-boundary Highway Capacity and Demand 37
Table 5.8 – Portion of classified roads where maintenance should be considered local highway authority, 2008/09 to 2014/15 41
Table 5.9 – Highway Assets in Plymouth 41
Table 5.10 – Asset Management Documents 42
Table 5.11 – Road casualty statistics by severity and road user, 2014 and 2015, Plymouth authority area 48
Table 5.12 – Weekday Parking Tariffs for Cars in Selected Car Parks – Plymouth City Centre and Waterfront 49
Table 5.13 – Weekday Parking Tariffs for Cars in Selected Car Parks – Rest of Plymouth 49
Table 6.1 – Weekday daytime combined bus frequencies on key city bus corridors 53
Table 6.2 – Bus passenger journeys per head of population, 2014/15 57
Table 6.3 – Percentage of non-frequent bus services running on time by authority, 2014/15 58
Table 6.4 – Bus journey times southbound on Tavistock Road, 2014 59
Table 7.1 – National Rail Stations in the JLP area 64
Table 7.2 – Entries and Exits at National Rail Stations in the JLP area and selected other local stations 65
Table 7.3 – National Rail Passenger Survey satisfaction, spring 2016 67
Table 7.4 – Delay Split by Operator for the 365 days to 17 September 2016 68
Table 8.1 – Average daily cyclist numbers at count locations in Plymouth, January to August 2016 inclusive 74
Table 8.2 – Average pedestrian footfall, July 2016 76

FIGURES

Figure 1.1 – The JLP area....2
Figure 3.1 – Air Quality Management Area declared for Plymouth and Noise Important Areas identified by Defra....10
Figure 4.1 – Trip purpose as proportion of average numbers of trips per year and distance travelled....14
Figure 4.2 – Trips by start time and purpose, Monday to Friday, 2011-2015....14
Figure 4.3 – Trip Destination / Purpose by Time of Day and Survey Location....15
Figure 4.4 – Commuting patterns of workers, according to the local authority of their usual residence....16
Figure 4.5 – Commuting patterns of workers, according to the local authority of their workplace....17
Figure 4.6 – Key commuting flows between neighbouring authorities, 2011....18
Figure 4.7 – 2011 Census: Method of travel to work by all residents aged 16-74 in employment, by authority....21
Figure 4.8 – Method of travel to work – proportion driving to work....22
Figure 4.9 – Method of travel to work – proportion travelling by bus....23
Figure 4.10 – Method of travel to work – proportion travelling on foot....24
Figure 5.1 – Annual Average Weekday Traffic on Selected Roads in Plymouth – 2015....28
Figure 5.2 – Average Weekday Flow Profile – Selected Locations on A386, June 2015....29
Figure 5.3 – Average Weekday Flow Profile – Selected Locations on A379, June 2015....29
Figure 5.4 – Average Weekday Flow Profile – A3064 St Budeaux Bypass, June 2015....30
Figure 5.5 – Year-on-year growth in motor vehicle traffic in Great Britain....33
Figure 5.6 – Junctions on Plymouth Road Network Prone to Congestion – 2016....35
Figure 5.7 – Major Highway Schemes With Approval or In Preparation, Plymouth and Urban Fringe....44
Figure 5.8 – Road casualty statistics for Plymouth authority area, 2000 to 2015....47
Figure 6.1 – Distance from dwellings to bus stops, Plymouth authority area....55
Figure 7.1 – National Rail Network serving the JLP area....63
Figure 7.2 – Passenger growth on local rail services....66
Figure 8.1 – Propensity to Cycle Map of Plymouth and urban fringe – '*Go Dutch*' Scenario....75
Figure 8.2 – Propensity to Cycle Map of Plymouth and urban fringe – E-Bikes Scenario....75

APPENDICES

APPENDIX A **DEVON COUNTY COUNCIL - BASELINE TRAFFIC REPORT**

APPENDIX B **MAPS ILLUSTRATING EXISTING DESIGNATIONS FOR 1) HERITAGE AND LANDSCAPE 2) ECOLOGY AND GEOLOGY AND 3) FLOOD RISK**

APPENDIX C **MIDDLE LAYER SUPER OUTPUT AREA BOUNDARIES IN THE JLP AREA**

APPENDIX D **PLYMOUTH PUBLIC TRANSPORT NETWORK MAP JANUARY 2016**

APPENDIX E **SOUTH HAMS PUBLIC TRANSPORT NETWORK MAP 29 MAY 2016**

APPENDIX F **WEST DEVON PUBLIC TRANSPORT NETWORK MAP 29 MAY 2016**

APPENDIX G **PLYMOUTH STRATEGIC CYCLE NETWORK 2009**

APPENDIX H **DEVON CYCLING AND MULTI-USE TRAIL PROGRAMME MAP 2015**

GLOSSARY

Acronym	Description
AADT / AADF	Annual Average Daily Traffic / Flow
AAWT	Annual Average Weekday Traffic
AAP	Area Action Plan
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
ATC	Automatic Traffic Counter
CO_2	Carbon Dioxide
CPZ	Controlled Parking Zone
CCTV	Closed Circuit Television
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DPD	Development Plan Document
FVLR	Forder Valley Link Road
GPS	Global Positioning System
HGV	Heavy Goods Vehicle (with a gross weight of over 3½ tonnes)
HMA	Housing Market Area
JLP	Joint Local Plan
LEP	Local Enterprise Partnership
LGV	Light Goods Vehicle (with a gross weight not exceeding 3½ tonnes)
LHA	Local Highway Authority
LPA	Local Planning Authority
LSOA	Lower Super Output Area, a statistical geography unit typically comprising 4-6 output areas and with an average population of 1,500
LSTF	Local Sustainable Transport Fund
LTB	Local Transport Board
LTP	Local Transport Plan
Marjon University	The University of St Mark & St John

Acronym	Description
Mbps	Megabits per second, a measure of data transfer speed
MSCP	Multi-Storey Car Park
MSOAs	Middle Layer Super Output Areas, a statistical geography unit with average population of 7,200
NO_2	Nitrogen Dioxide
ONS	Office for National Statistics
NCN	National Cycle Network
NIA	Noise Important Area
NPA	National Park Authority
NTS	National Travel Survey
P&R	Park & Ride
PCC	Plymouth City Council
PCT	Propensity to Cycle Tool
PIMTP	Plymouth International Medical & Technology Park
PROW	Public Rights of Way
PRTF	Peninsula Rail Task Force
PTP	Personalised Travel Planning
RIS	Road Investment Strategy
SCN	Strategic Cycle Network
SHDC	South Hams District Council
SHWD	South Hams & West Devon areas
SHWDC	South Hams District & West Devon Borough Councils
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
TOC	Train Operating Company
T	Trunk Road
TTWA	Travel to Work Area
WDBC	West Devon Borough Council
WSP | PB	WSP | Parsons Brinckerhoff

1 INTRODUCTION

1.1 BACKGROUND

1.1.1 Plymouth City Council (PCC), South Hams District & West Devon Borough Councils (SHWDC) have collectively agreed to prepare the *Plymouth & South West Devon Joint Local Plan* (JLP) as the statutory development plan for the three local planning authorities (LPA). This will cover a twenty year plan period from 2014 to 2034.

1.1.2 Collectively these authorities, along with a further LPA, Dartmoor National Park Authority (NPA) cover the Housing Market Area (HMA) for the area. However, by virtue of its special role and function Dartmoor NPA is preparing a separate local plan to cover the National Park and the area is excluded from the JLP. **Figure 1.1** overleaf shows the JLP area and the major settlements it contains.

1.2 THE JLP AREA

1.2.1 The City of Plymouth occupies a strategic maritime location, with its southern and western boundaries formed by Plymouth Sound, Hamoaze and the River Tamar, administered by a unitary authority, PCC. Plymouth shares its northern and eastern land boundary with South Hams District Council (SHDC). The unitary authority of Cornwall lies to the west of the River Tamar, who hold LPA and local highway authority (LHA) functions for the county.

1.2.2 South Hams district extends from the eastern edges of the City of Plymouth to the western edge of Torbay and from the English Channel to the southern parts of Dartmoor (which lie within the National Park). It borders West Devon borough to the north-west and Teignbridge district to the north-east. It borders the unitary authority of Torbay Council to the east. Its principal settlements are the four towns of Dartmouth, Ivybridge, Kingsbridge and Totnes. It also includes residential and employment areas on the fringes of Plymouth immediately adjacent to the city council boundary, such as:

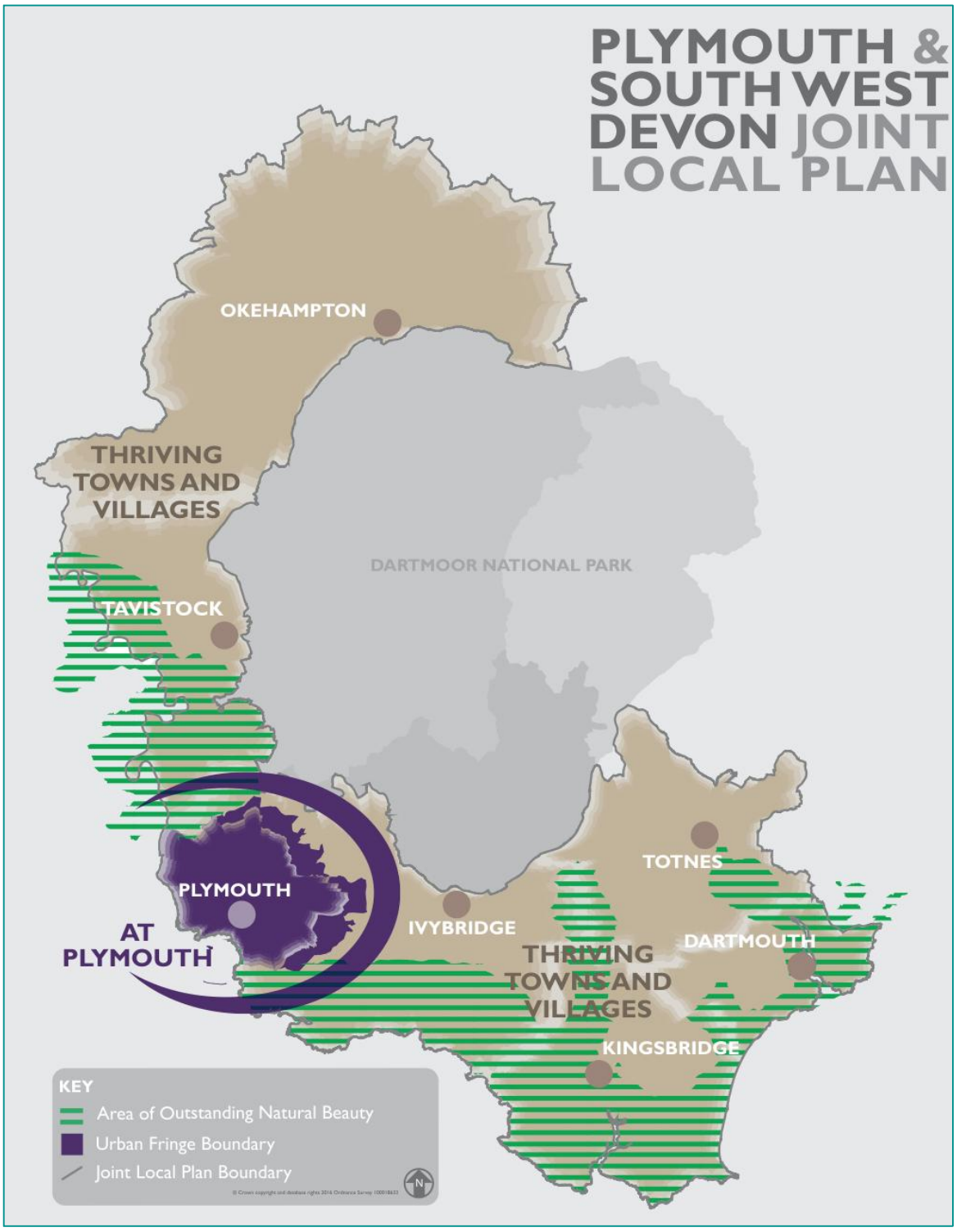
- To the north of the city:
  - Woolwell, the residential area east of A386;
  - Broadley Industrial Park, west of the A386; and
- To the east of the city:
  - Langage Industrial Estate and Science Park, east of Plympton and north of the A38; and
  - Sherford, the new settlement under construction south of the A38 and north of Plymstock.

1.2.3 West Devon borough is bounded by the River Tamar forming the Cornish border to the west, Torridge district to the north-west, Mid Devon district to the north-east, Teignbridge district to the east and South Hams district to the south and south-east. Less than 1 mile separates it from Plymouth's administrative area to the south. The principal towns are Okehampton and Tavistock, with Bere Alston, Hatherleigh, Lifton and North Tawton acting as important local centres. Almost half the Borough lies within Dartmoor National Park.

1.2.4 Devon County Council (DCC) is the LHA for SHWDC areas[1].

[1] DCC functions also cover the other six district councils in Devon (East Devon, Exeter, Mid Devon, North Devon, Teignbridge and Torridge)

Figure 1.1 – The JLP area



[PCC et al 2016]

1.3 PURPOSE OF THIS REPORT

1.3.1 WSP | Parsons Brinckerhoff (WSP | PB) has been commissioned by PCC to provide an overview of transport and travel patterns in the JLP area, along with a review of relevant studies into transport issues undertaken to date. This document brings together existing information and data on transport conditions, highlighting key issues and the locations where they occur. It concentrates on journeys to, from, or within Plymouth and its urban fringes.

1.3.2 The remaining chapters of this document are structured as follows:

2. Strategic Transport Context – outlines strategic road, rail, air and sea connections and key cross-boundary routes;
3. Environmental Setting – describes the key sites designated for their environmental importance, the relationship between transport and air quality, noise and carbon emissions, and the impact of flood risk and extreme weather on the transport network;
4. Travel Patterns – highlights key national trends in how people travel, along with data for the JLP area on trip purpose, commuting origins, mode of travel and car ownership;
5. Road Network & Traffic – this chapter describes traffic flows on main routes, traffic growth patterns, identifies key congestion locations and methods used to manage the traffic on the highway network. It also outlines the variety of highway assets to be maintained, the investment programme to improve the network, along with information on collisions, road safety and parking;
6. Bus and Coach Travel – provides context on the current bus network and service frequencies, dedicated infrastructure and interchange locations, levels of bus patronage, service quality and user satisfaction. This chapter also covers coach services and park and ride provision;
7. Rail Travel – describes the rail network and services, the train operating companies, service quality and user satisfaction, committed investment and the existing priorities for future rail investment;
8. Active Travel Networks & Sustainable Travel Initiatives – outlines the extent and quality of the walking and cycling network, committed investment, and measures to manage demand for motorised travel or reduce the need to travel;
9. Marine Connections – describing local ferry services and the port facilities and traffic using them;
10. Plymouth Corridors and Areas – Strategies and Studies – documenting previous studies which have focused on specific parts of the city and its fringes and their key recommendations;
11. Overview of Opportunities and Constraints – this section summarises the findings of the report.

1.3.3 DCC has prepared a **Baseline Traffic Report** which focuses on transport and travel issues in the main towns in the SHWDC area. This document forms **Appendix A**.

2 STRATEGIC TRANSPORT CONTEXT

2.1 INTRODUCTION

2.1.1 The South West Peninsula as a whole, has a relatively peripheral location in the UK and the region is some distance from key UK markets. Plymouth is one of only two UK cities with neither a motorway within ten miles nor an operational airport. As a consequence promoting excellent connectivity to the rest of the UK forms a key part of the region's transport strategy.

2.2 STRATEGIC ROAD CONNECTIONS

Within the JLP area the A38 and A30 are both trunk roads (T) and therefore form part of the UK's strategic road network (SRN), operated and managed by Highways England, a government-owned company. Both roads interchange with the southern end of the M5 south of Exeter and both therefore provide vital links to the rest of the country, as well as serving the areas through which they pass. The A30(T) runs to the north of Dartmoor, passing immediately to the south of Okehampton and entering Cornwall west of Lifton. The A38(T) follows the southern edge of Dartmoor through South Hams district, runs through the middle of Plymouth's administrative area, crosses into Cornwall via the Tamar Bridge, and reconnects with the A30(T) at Bodmin.

2.2.1 Key cross-boundary road / ferry connections from neighbouring authorities into Plymouth are as follows:

- à The A374 from Torpoint, across the Torpoint Ferry;
- à The A38, entering from Saltash in Cornwall across the Tamar Bridge;
- à The A386, the sole major road link from the north via Tavistock and Yelverton;
- à The A38, along the southern edge of Dartmoor, connecting to key settlements including Ivybridge and onwards to Exeter; and
- à The A379 from the direction of Modbury and Yealmpton.

The road network and its performance is considered in more detail in **Chapter 5**.

2.2.2 Each of the main road corridors referred to above are also used by the key inter-urban bus services and regional and national coach services. The bus and coach network is described more fully in **Chapter 6**.

2.3 STRATEGIC RAIL CONNECTIONS

2.3.1 The South West Peninsula (including the JLP area) is served by a single mainline spine between London Paddington and Penzance, with a number of local branch lines that connect at key nodes to allow interchange. In addition direct services operate into and out of the South West from the Midlands, North East and Scotland via Bristol and Birmingham.

2.3.2 As well as six stations within Plymouth urban area, there are a further six elsewhere in the JLP area:

- à Ivybridge and Totnes on the Great Western Mainline;
- à Bere Alston & Bere Ferrers on the Tamar Valley Line to Gunnislake; and
- à Okehampton & Sampford Courtenay on the branch line from Crediton (weekend tourist service only; potential to become a strategic link to Exeter in the future).

2.3.3 As a result of reliance on the single mainline and the disruption that has occurred to the network over the last five years (in particular the two-month closure of the line at Dawlish in 2014 following the cliff collapse and the washing away of the trackbed) the Peninsula Rail Task Force (PRTF) has been established. This comprises an association of the five councils of Cornwall, Plymouth, Torbay, Somerset and Devon and the two Local Enterprise Partnerships (LEPs) – Cornwall & Isles of Scilly LEP and Heart of the South West LEP. The PRTF has outlined its strategic aims and it focuses on the outcomes that it seeks to achieve rather than being prescriptive over the detail. The three aims are:

- à Resilience of the network;
- à Faster journey times with improved connectivity; and
- à Increased capacity and comfort.

2.3.4 The PRTF have commissioned several reports to highlight the importance of rail and to identify necessary improvements. The rail network, its services and the key rail issues are considered in more detail in **Chapter 7.**

2.4 STRATEGIC AIR CONNECTIONS

2.4.1 Plymouth City Airport is located to the east of A386 Tavistock Road and north of Derriford Hospital, with the terminal accessed from Plymbridge Lane. The airport ceased all operations in December 2011 and at present remains mothballed. Whilst the western end of the airfield has been developed for housing[2], the main runway and other airport facilities remain in place.

2.4.2 Passenger flights to domestic and European destinations are available at:

- à Exeter Airport, 40 miles to the north-east of Plymouth; and
- à Cornwall Airport Newquay, 45 miles to the west of the JLP area.

2.5 STRATEGIC SEA CONNECTIONS

Introduction

2.5.1 The Port of Plymouth is comprised of four separate harbour authorities – Cattewater, Sutton Harbour, Millbay and Devonport – and collectively they represent one of the South West's and UK's largest and most diverse ports. Whilst the harbour authorities act independently they do have inter-related roles which have a significant combined impact on local, regional and national economic development and transport and, in the case of Devonport, also on national defence capability.

International connections

2.5.2 International ferry services operate from Plymouth's Millbay Docks, with a one or two services per day to Roscoff in Northern France and a weekly service to Santander in Northern Spain. 449,000 ferry passengers travelled through Plymouth in 2015, making it the 8th most important passenger ferryport, with 2% of UK totals. This has declined from 603,000 in 2003 [DfT Statistics 2015c].

Cross-boundary connections: water

2.5.3 There are two cross-boundary ferry connections, as follows:

[2] Outline planning permission 08/01968 and subsequent reserved matters permissions

- The Torpoint Ferry (A374) from Torpoint to Devonport (vehicle ferries, with provision for buses and foot passengers); and
- Stonehouse to Cremyll in Cornwall (foot ferry).

2.6 SUMMARY FINDINGS

- A38 and A30, running through the JLP, form part of the national SRN;
- Paddington to Penzance mainline railway runs through the area, with connecting branch lines. Consequences for resilience of infrastructure to extreme weather or incidents as a result of single line into the region;
- Nearest air services available from Newquay and Exeter Airports whilst Plymouth Airport mothballed;
- International sea connections available from Plymouth to France and Spain with key cross-boundary ferry connections over the Tamar.

3 ENVIRONMENTAL SETTING

3.1 LANDSCAPE, MARINE ENVIRONMENT, BIODIVERSITY AND OPEN SPACE

3.1.1 There are a wide range of sites in the JLP designated for their landscape, heritage, ecological and geological quality. Selected examples are set out in **Table 3.1** below and **Appendix B** contains maps showing land and sites in the Plymouth and urban fringe area with statutory designations.

Table 3.1 – Environmental designations in the JLP area

Environment Theme	Examples in the JLP
Ecology & Geology	à 38 Sites of Special Scientific Interest (SSSI) wholly in the JLP area and a much larger number of County Wildlife Sites
Heritage	à Includes parts of the Cornwall and West Devon Mining Landscape World Heritage Site inscribed by the United Nations Educational, Scientific and Cultural Organisation in 2006; à Around 7,250 listed buildings, 92 conservation areas, 18 registered parks and gardens across the JLP
Landscape	Contains substantial parts of two Areas of Outstanding Natural Beauty (AONBs) – the Tamar Valley and South Devon AONBs, and in many places bordered by Dartmoor National Park
Marine	Tamar Estuary designated as European Marine Site and UK Marine Conservation Zone

[PCC 2015i, SHDC 2006, WDBC 2011a, Natural England 2016]

3.1.2 The relationship between designated environmental assets and transport infrastructure can be complex and can determine whether transport infrastructure can be delivered and / or what can be provided. Examples include:

- à Transport infrastructure assets which are themselves designated for their historic or architectural importance (e.g. Grade I listed New Bridge, connecting Tavistock to Callington across the Tamar and Grade I listed Royal Albert Bridge, carrying the railway into Cornwall);
- à Parts of the highway estate which have designations for the ecological or geological value (e.g. the cuttings near Ashburton, designated as SSSI);
- à Designated heritage assets whose setting includes the highway network (e.g. Charles Church or Crownhill Fort in Plymouth); and
- à Key road and rail links which lie in protected landscapes, including the Dartmoor National Park, including substantial parts of the A386 within Dartmoor National Park and major settlements which are situated within the AONBs, including Dartmouth and Salcombe.

The Countryside & Rights of Way Act 2000 places a statutory duty on public bodies, including local authorities, to have regard for the purpose of conserving and enhancing the natural beauty of the AONB when exercising or performing any functions affecting land in it. Similarly, the Natural Environment and Rural Communities Act 2006 places a duty on public authorities to have regard to conserving biodiversity when exercising their functions.

3.2 AIR QUALITY

3.2.1 PCC and SHWDC have duties under the Environment Act 1995 to monitor air quality within their areas, and where air quality standards or objectives are not being met, or are likely to fall below standards, then Air Quality Management Areas (AQMA) should be designated. Air quality in the JLP area is generally good; however, AQMAs have been declared in parts of Plymouth and South Hams, to cover all the locations where the annual average level of Nitrogen Dioxide (NO_2) has been recorded as exceeding the National Air Quality Strategy objective level [PCC 2014a, SHDC 2012].

3.2.2 The coverage of the AQMA in Plymouth is shown in **Figure 3.1**. It covers several key road corridors, including:

- à the A386 from Woolwell Roundabout to the city centre (Tavistock Road, Manadon Interchange, Outland Road, Alma Road & Saltash Road);
- à the B3250 from Manadon Interchange to the city centre (Mannamead Road, Mutley Plain and North Hill);
- à B3238 (Greenbank Road, Tothill Avenue, Tothill Road corridor);
- à B3396 (Albert Road, Devonport Road, Milehouse Road corridor through Stoke Village);
- à A374 (Park Avenue, Chapel Street, Cumberland Road, Devonport Hill, Edgcumbe Street, and Union Street through Devonport and Stonehouse);
- à The city centre ring road and Mayflower Street; and
- à Exeter Street, Embankment Road, Laira Bridge Road and Gydnia Way corridor in the East End.

3.2.3 In South Hams the District Council monitors NO_2, particulate matter and, to a lesser degree, sulphur dioxide. It has declared three AQMAs as a result of the levels of NO_2:

- à at Dean Prior (in 2005), relating to one property adjacent to the A38 Devon Expressway;
- à in Totnes (declared in 2009), for the length of the A385 through the town on both sides of the River Dart and including all properties immediately adjacent to it; and
- à in Ivybridge (declared in 2009), the entire length of B3213 Western Road [SHDC 2012].

3.2.4 In West Devon the Borough Council monitors air quality at several locations in Tavistock (including Brook Street, Abbey Bridge, Bedford Square, Vigo Bridge, Dolvin Road and Bishopmeads) and in Okehampton (including at the Charter Hall and the Police Station). No exceedances of air quality thresholds have been recorded and therefore no AQMAs have been declared. However, air quality is a growing issue in both Tavistock town centre, particularly along Dolvin Road and in Okehampton town centre, particularly around Charter Hall with concentrations close to the National Air Quality Strategy objective thresholds. In Okehampton, the historic, narrow street pattern is thought to contribute to the problem by confining emissions between the buildings [WDBC 2011].

3.3 NOISE

3.3.1 In common with the UK as a whole, the main source of ambient noise in the JLP area arises from transport, and in turn the greatest proportion of this is from road traffic. The Environmental Noise Directive covers noise from roads, rail, aviation and industry and Department for Environment, Food & Rural Affairs (Defra) has undertaken strategic noise mapping to understand the sources of environmental noise.

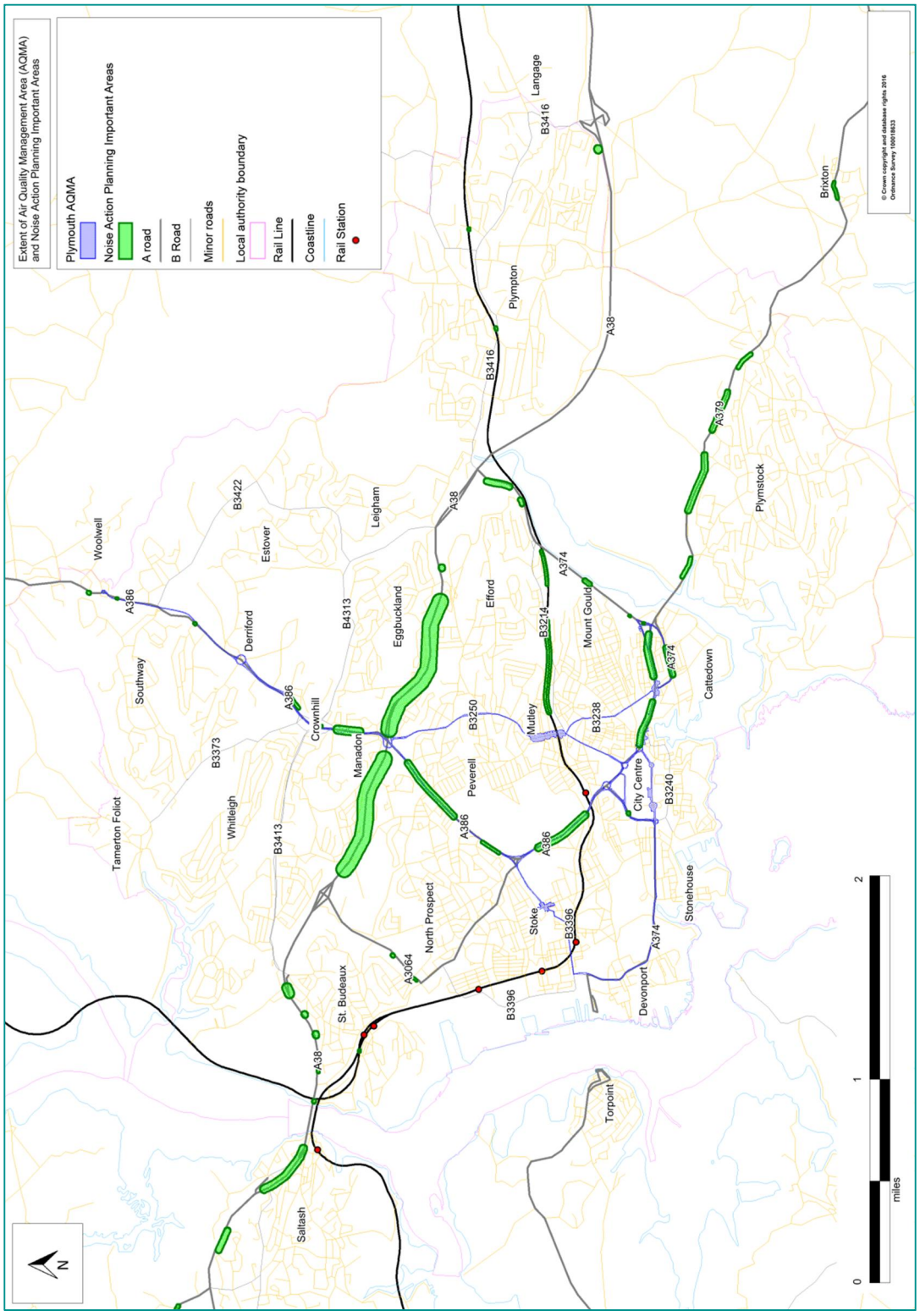
3.3.2 **Figure 3.1** identifies those parts of the Plymouth urban area where the population is affected by the highest levels of road or rail noise. These cover residential areas close to the mainline railway as it passes through Mutley, Lipson and Laira, as well as parts of St. Budeaux and Plympton. They also cover residential areas bordering, or close to, the busiest road corridors. The main areas with properties falling within Noise Important Areas caused by road noise are as follows:

- In St. Budeaux, Ernesettle, Honicknowle, Pennycross, Manadon, Hartley Vale and Eggbuckland close to the A38;
- In Manadon, Crownhill, Pennycross and Milehouse close to the A386 (Tavistock, Outland and Alma Roads);
- In Crabtree next to the A374 (Plymouth Road);
- In the East End, close to Exeter Street, Embankment Road, Laira Bridge Road and Gydnia Way; and
- In Pomphlett, Billacombe and Elburton alongside the A379.

3.3.3 In the rest of the JLP area noise mapping has identified that properties affected by the highest levels of noise arising from transport include:

- Those situated alongside the A38 dual carriageway (for example in southern Ivybridge, at Smithaleigh, Filham and Dean Prior, as well as more isolated rural properties);
- Along the A385 through Totnes; and
- In villages straddling busy main roads (Horrabridge on the A386, Brixton on the A379, and Harbertonford on the A381).

Figure 3.1 – Air Quality Management Area declared for Plymouth and Noise Important Areas identified by Defra



[Defra 2015, Defra 2016]

3.4 CARBON EMISSIONS

3.4.1 **Table 3.2** indicates that in the UK domestic transport emissions are estimated to account for around 42% of UK greenhouse gas emissions, with the estimated contribution of transport in each of the JLP authorities ranging from 30-42% [Department of Energy and Climate Change 2016]. Road transport comprises the majority of transport emissions. **Table 3.3** identifies that whilst total estimated annual carbon emissions have fallen by 25% between 2005 and 2014, non-transport sectors have contributed more to these reductions when compared with the transport sector, which reduced by 10%.

3.4.2 Decarbonising transport therefore remains an ongoing part of the JLP authorities' carbon reduction programmes, with emphasis on transitioning to active travel and low carbon travel modes.

Table 3.2 - Local authority CO_2 transport emissions estimates, 2014, by transport category

	Estimated emissions (Thousand tonnes CO_2)					
	Total emissions	Transport emissions				
		Road transport	Diesel railways	Transport other	Transport Total	Transport as % of total emissions
UK	403,796.9	118,899.8	2,191.0	2,199.9	123,290.6	42.0%
Plymouth	1,055.4	318.2	1.5	1.7	321.4	30.5%
South Hams	622.1	222.4	3.9	1.8	228.1	36.7%
West Devon	427.0	174.7	1.3	2.1	178.2	41.7%

[Department of Energy and Climate Change 2016]

Table 3.3 - Local authority CO_2 transport emissions estimates, 2005-2014

	Estimated emissions (Thousand tonnes CO_2)							
	2005		2008		2011		2014	
	Totals	Transport	Totals	Transport	Totals	Transport	Totals	Transport
Plymouth	1,477.0	364.7	1,421.0	359.2	1,213.8	330.6	1,055.4	321.4
South Hams	862.2	248.4	779.6	235.3	675.4	224.7	622.1	228.1
West Devon	506.1	181.9	498.0	194.6	438.4	184.0	427.0	178.2
UK	529,444.3	137,507.0	504,172.9	131,554.5	430,966.0	124,176.6	403,796.9	123,290.6

[Department of Energy and Climate Change 2016]

3.5 FLOOD RISK, EXTREME WEATHER AND INFRASTRUCTURE RESILIENCE

3.5.1 Key sections of transport infrastructure in the JLP – rail, road and off-road active travel networks – are at risk from a range of weather impacts. These include damage caused by heavy rainfall or high winds, inundation from rivers or sea flooding, landslips, or a combination of these events, and all of them have the potential to cause significant economic costs to the area.

3.5.2 In recent years, a series of storms and prolonged extreme weather has severely damaged transport infrastructure, and disrupted journeys over an extended period of time afterwards. The most prominent recent example of this was the Dawlish seawall collapse on 3rd February 2014. This led to the suspension of rail services from the South West Peninsula to the rest of the country for two months [DfT 2014a], with 7,500 services cancelled in part or in full [DCC 2014b]. However, there are many other examples across the JLP area, such as the damage to the seawall at Slapton Ley and subsequent closure of the A379, which also cut off communities. Analysis for the Exeter area, undertaken by the Met Office, reported that the current 1:100 year winter rainfall event will become a 1:35 year event by 2040 [ibid]. There is therefore a requirement for additional proactive interventions to protect transport infrastructure from these increasing risks.

3.5.3 In recent years parts of the A38 in Plymouth have been closed due to severe weather and the Tamar Bridge has been closed to high sided vehicles due to high winds [Cornwall Council et al 2014]. Gdynia Way, the key city centre access route from the east, was closed for parts of four days in winter 2012, with a further 122 flooding incidents occurring on Plymouth highways during November and December 2012 [ibid]. Flood risk mapping [Environment Agency 2016] indicates that the A374 Embankment Road, the Marsh Mills roundabout and several roads in Plympton fall within Flood Zone 3 (which have a 1 in 100 or greater annual probability of river flooding).

3.5.4 In the South Hams several sections of main A and B roads lie within Flood Zone 3. Examples include the A379 where it crosses the Rivers Yealm, Erme and Avon, the A381 where it crosses the Harbourne River in Harbertonford or where the A385 and A384 cross the Bidwell Brook in Dartington. In addition parts of major settlements, including Totnes, Kingsbridge and Modbury also fall into the same category of flood risk. Similarly sections of main roads in West Devon fall within Flood Zone 3, including the A386 where it passes over and near the River Tavy at Tavistock and the Rivers Torridge and Lew near Hatherleigh.

3.6 SUMMARY FINDINGS

- The JLP area contains a wide variety of sites and areas designated for their landscape, heritage, ecological and geological quality, many of which cover or are adjacent to transport infrastructure;
- The JLP contains areas which have poor air quality or have high noise levels which are attributable to road or rail transport, mostly adjacent to key road corridors in Plymouth, but also in other towns in the JLP;
- More than a third of the area's carbon emissions arise from domestic transport sources; and
- Many parts of the transport network are vulnerable to extreme weather events, as has been evidenced inter alia by the recent Dawlish seawall collapse.

4 TRAVEL PATTERNS

4.1 INTRODUCTION

4.1.1 The patterns of travel in and around the JLP area results in a complex series of interactions between a large number of people and different modes of transport. These choices are themselves influenced by many factors, some local and some national, including the cost, time, convenience, experience and availability of various modes of transport. Statistics from the census help to paint a picture of travel patterns in the area, with information reported at a local level covering small geographical areas, such as *output areas*[3]. Plymouth is composed of 32 middle layer super output areas (MSOAs), South Hams is covered by 12 MSOAs and West Devon by 7 MSOAs. A map of these MSOAs is included in **Appendix C.**

4.2 TRAVEL PATTERNS – NATIONAL PICTURE

National Travel Survey (NTS)

4.2.1 The NTS is a household survey designed to monitor long-term trends in personal travel. The NTS covers travel by people in all age groups, including children. Data is collected by the DfT, originally sampling residents of all Great Britain but from 2013 changing to England only. Approximately 16,000 individuals, in 7,000 households, participate in the NTS each year [DfT Statistics 2016a]. It consists of a face-to-face interview and a 7-day self-completed written travel diary, allowing travel patterns to be linked with individual characteristics.

4.2.2 Key statistics from the 2015 NTS include:

- à Each person made an average of 914 trips per year, with trip rates now being at the lowest levels since the dataset was begun in 1972/73, and with a 13% reduction since 2002 (137 fewer trips);
- à Average distance travelled has fallen by 7% since 2002 and time spent travelling has fallen by 4% over the same period;
- à Much of the reduction in trips over the last decade is attributable to fewer car and walking trips per person (see **Table 4.1**);
- à Trips for shopping, commuting and visiting friends have fallen consistently since 1995/97;
- à Shopping and personal business trips account for almost one fifth of all trips and are the most common trip purposes (see **Figure 4.1** overleaf);
- à Leisure accounts for 41% of distance travelled, such as visiting friends;
- à Rush hour peaks are largely attributable to travel to work and school (see **Figure 4.2** overleaf) - 62% of trips made between 7am-10am are travel to work, of which 88% are journeys direct from home to work ;
- à Women working part-time are more likely to trip chain than other groups - 26% of women working part-time travel via another destination on the way to work, as opposed to 9% of men working full-time; and
- à When trips to work are not direct, the main reason is to take a child to school.

[DfT Statistics 2014, DfT Statistics 2016i]

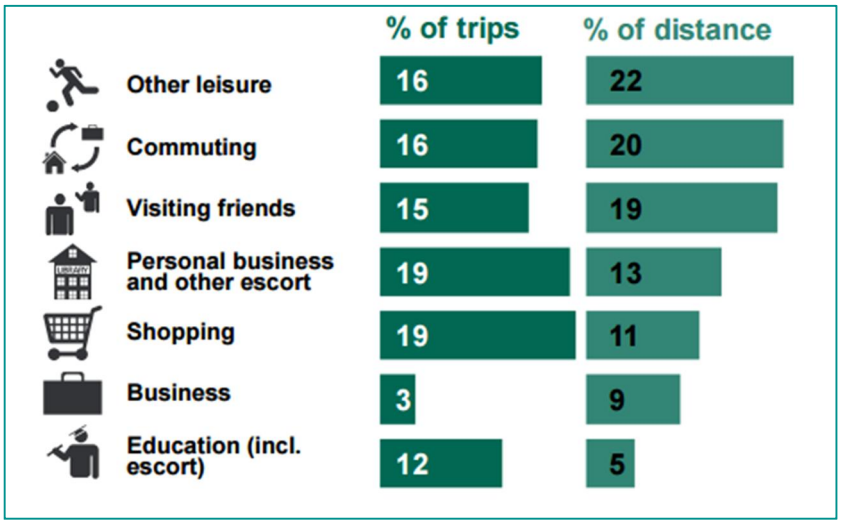
[3] output areas, with broadly the same number of households in each area, are created and used by Office of National Statistics (ONS) to help report statistics. Lower Layer Super Output Areas (LSOAs) are typically composed of 4-6 output areas and have an average population of 1,500, whilst Middle Layer Super Output Areas (MSOAs) are larger and have an average population of 7,200 [ONS undated2]

Table 4.1 – Change in trip behaviour, 1995/97 to 2015

Travel mode	1995/97	2015			Absolute change since 1995/97	% change since 1995/97	
	Trips per person	Trips per person	% of all trips	% of all distance travelled	Trips per person	Trips	Distance
Car (driver/ passenger)	671	584	64%	78%	-87	-12% (driver) -15% (passenger	-11% (driver) -8% (passenger)
Walking	292	200	22%	3%	-92	-32%	-7%
Cycling	20	17	2%	1%	-3	-14%	+16%
Bus	53	42	7%	5%	-11	-19%	0%
Surface rail	12	20	2%	9%	+8	+65%	+74%
All trips	1,094	914	100%	100%	-180		

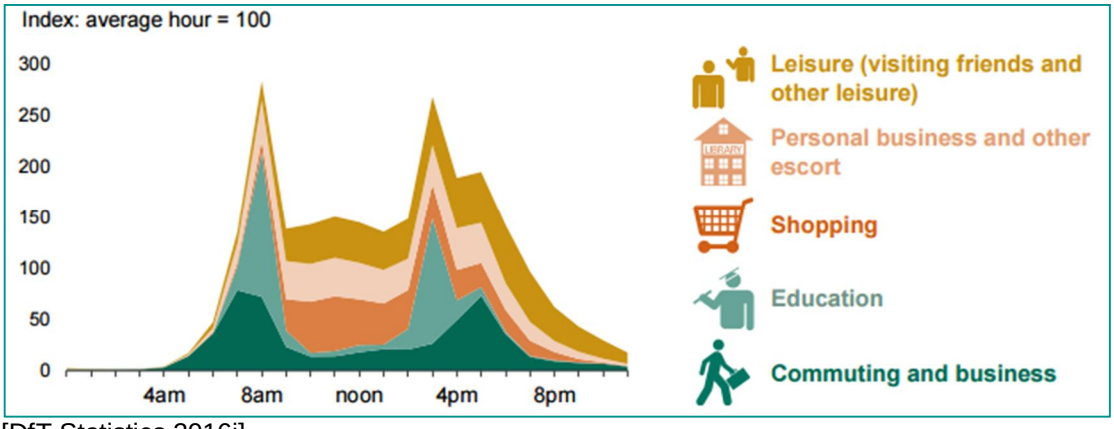
[DfT Statistics 2016i]

Figure 4.1 – Trip purpose as proportion of average numbers of trips per year and distance travelled



[DfT Statistics 2016i]

Figure 4.2 – Trips by start time and purpose, Monday to Friday, 2011-2015

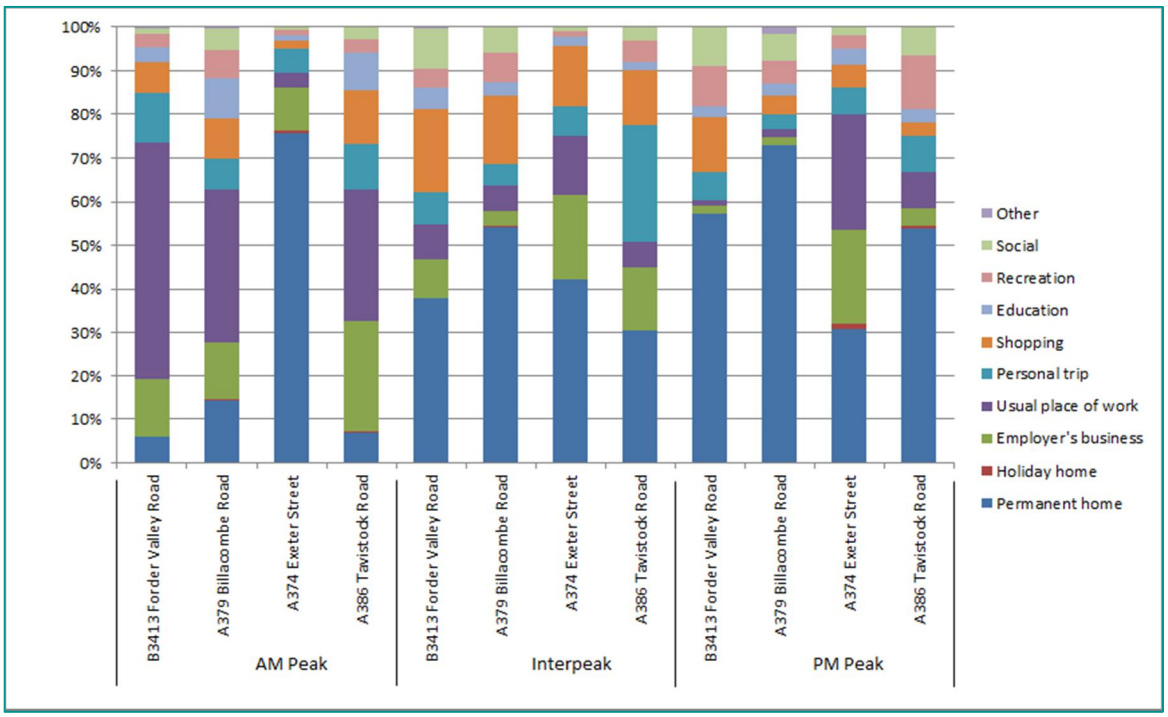


[DfT Statistics 2016i]

4.3 TRIP PURPOSE – PLYMOUTH

Data collected from roadside interviews in 2015 at four survey locations[4] [PCC 2016h] identified the trip purpose of travellers. This is illustrated in **Figure 4.3**. The chart highlights the dominance of return trips to travellers' permanent homes in the PM peak and the varied mix of journey purposes during the morning and interpeak period at all the surveyed sites.

Figure 4.3 – Trip Destination / Purpose by Time of Day and Survey Location



[PCC 2016h]

4.4 EMPLOYMENT CATCHMENT AND COMMUTING PATTERNS

Travel To Work Area (TTWA)

4.4.1 Travel To Work Areas (TTWA) are defined as areas in which at least 75% of the resident workforce work in the area and at least 75% of the people who work in the area also live in the area. The JLP is covered by five TTWAs, as follows:

- à Plymouth TTWA, covering the city as well as large parts of South Hams, including Ivybridge, large parts of West Devon, including Tavistock and west Dartmoor, and parts of Cornwall including the Rame Peninsula, Torpoint and Saltash;
- à Exeter TTWA, covering northern parts of West Devon, including Okehampton, and small parts of South Hams south-west of Newton Abbot;
- à Torquay and Paignton TTWA, which covers some eastern parts of South Hams, including Totnes, Marldon and Kingswear;
- à Kingsbridge and Dartmouth TTWA, covering the remaining parts of South Hams , south of Totnes and between the Dart & Erme estuaries; and
- à Launceston TTWA, covering some western parts of West Devon, including Lifton.

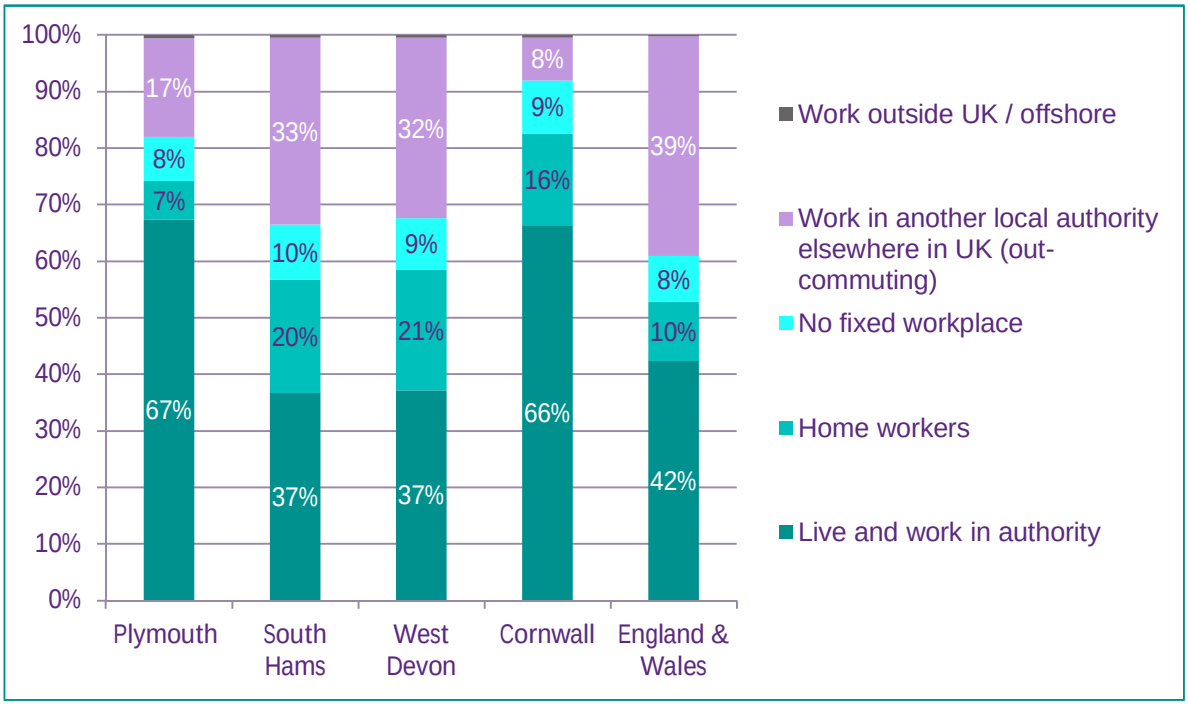
[4] B3413 Forder Valley Road, A374 Exeter Street, A379 Billacombe Road and A386 Tavistock Road

4.4.2 Between 2001 and 2011 the TTWAs have changed in geographical size, largely following the national trend towards a smaller number of TTWAs covering larger areas. This is exemplified by the merging of the formerly separate TTWAs identified in 2001 (Okehampton TTWA merging into the Exeter TTWA and the Paignton & Totnes and Torquay TTWAs merging to form a single TTWA in 2011). Conversely census data indicates that much of east Cornwall, formerly within Plymouth's TTWA, now forms its own TTWA based on Liskeard [ONS 2013b, ONS 2015].

Commuting patterns

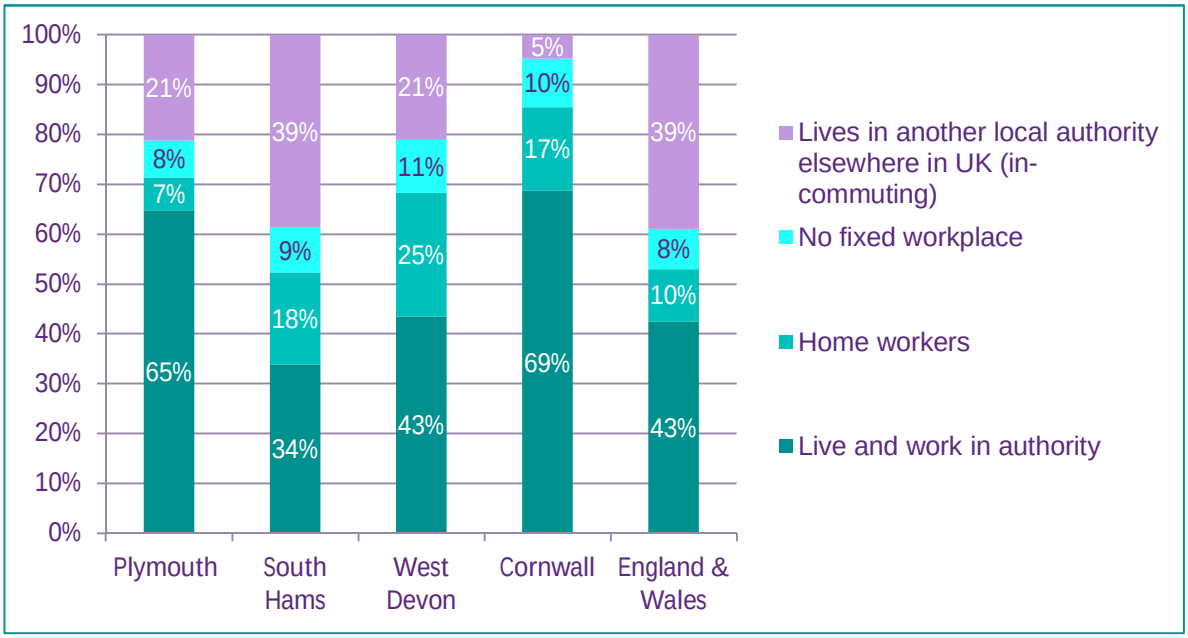
4.4.3 **Figure 4.4** and **Figure 4.5** outline some key statistics relating to commuting patterns at a local authority level for Plymouth, South Hams, West Devon and Cornwall.

Figure 4.4 – Commuting patterns of workers, according to the local authority of their usual residence



[ONS undated]

Figure 4.5 – Commuting patterns of workers, according to the local authority of their workplace



[ONS undated]

4.4.4 The data in the figures indicates that Plymouth is relatively self-contained in terms of employment, with 67% of all workers usually resident in the city also working there. This is a substantially higher proportion than in South Hams & West Devon (37%).

4.4.5 The proportion of workers with no fixed workplace is similar across all the neighbouring authorities (between 8-10%). Levels of home working varies quite considerably between authorities – from 7% of resident workers in Plymouth to the much higher levels of 16% in Cornwall, 20% in South Hams and 21% in West Devon.

4.4.6 A smaller proportion of workers regularly commuted in 2011, (81%), than 10 years previously (86%). This was influenced by the number of people who worked from home, which increased by a quarter, and the number of people who either had no fixed place of work, worked outside the UK or on offshore installations more than doubled [PCC 2014].

4.4.7 Approximately one third of the resident workforce of South Hams & West Devon commute out of the respective districts for work (13,355 and 8,175 employees respectively). Whilst the proportion of commuters travelling out of Plymouth is substantially lower at 17% it represents a more substantial number of workers (20,541) than in the neighbouring authorities.

Self-containment

4.4.8 There is variation in the levels of self-containment in different parts of Plymouth. Areas which are least reliant on employment in the city (less than 79% of residents commuting to jobs in the city) are either those on the urban fringes – Roborough (*Plymouth MSOA 001*), Plympton (*Plymouth MSOA 015*), Chaddlewood (*Plymouth MSOA 018*), Woodford (*Plymouth MSOA 019*) and St. Maurice (*Plymouth MSOA 022*) or in central areas such as Mutley (*Plymouth MSOA 023*) and the city centre (*Plymouth MSOA 027*). However, when account is taken of commuting to urban fringe employment sites (located in South Hams MSOA 001) then all parts of the city have at least four in every five residents working there.

Workforce Flows – Local Authority Level

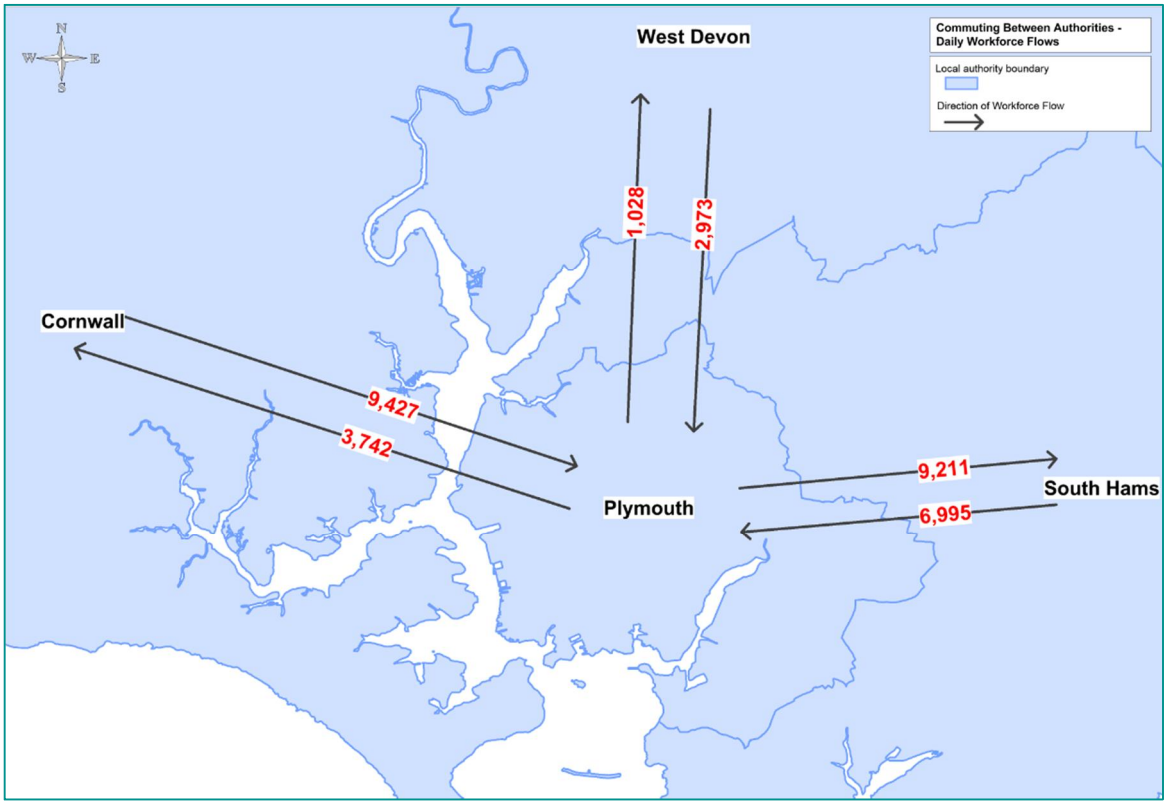
4.4.9 **Table 4.2** indicates the net commuting flows and **Figure 4.6** illustrates the key workforce flows into and out of Plymouth from neighbouring districts. The figures show that Plymouth and South Hams are net importers of employees, but this masks more complex flows, with almost as many people commuting from Plymouth to South Hams as commute into Plymouth from Cornwall.

Table 4.2 – Net commuting flows by local authority

	Plymouth	South Hams	West Devon	Cornwall
Number of commuters (net)	4,676	3,416	-3,685	-8,593

[ONS undated]

Figure 4.6 – Key commuting flows between neighbouring authorities, 2011



[ONS undated]

Commuting Patterns – Details

4.4.10 Plymouth's employment influence extends beyond the authority's borders in each direction and **Table 4.3** identifies those parts of Cornwall, West Devon and South Hams with 20% or more commuters travelling to work in Plymouth. As may be expected the proportion of residents commuting to Plymouth is closely related to the distance from the authority boundary and ease of travel to the city.

Table 4.3 – Key origins outside Plymouth with 20% or more commuters travelling into Plymouth and urban fringe

Area of residence	MSOA reference	% of commuters with place of work in Plymouth	% of commuters with workplace in Plymouth or South Hams 001
Bickleigh, Woolwell, Langage, Lee Mill	South Hams 001	59.5	*74.9*
Wembury, Newton Ferrers, Brixton	South Hams 009	58.4	*62.7*
Saltash East	Cornwall 026	47.8	*51.1*
Saltash West & Carkeel	Cornwall 022	45.4	*49.7*
Saltash Central	Cornwall 025	42.8	*46.1*
Yelverton & Bere Alston	West Devon 007	40.7	*43.3*
Torpoint	Cornwall 029	40.3	*42.9*
Ivybridge	South Hams 005	35.4	*40.4*
Rame Peninsula	Cornwall 034	35.2	*38.0*
Modbury & Yealmpton	South Hams 008	34.8	*38.4*
Seaton, St. Germans, St. Mellion, St. Dominic	Cornwall 023	33.5	*35.5*
Mary Tavy, Horrabridge & Dousland	West Devon 006	32.5	*35.3*
Calstock & Gunnislake	Cornwall 010	23.7	*25.0*
South Brent, Ugborough	South Hams 002	26.3	*28.4*
Tavistock	West Devon 005	22.8	*25.0*

[ONS 2014]

Employment Destinations

4.4.11 Employment commuting destinations are not spread evenly across Plymouth. **Table 4.4** identifies that 53% of all commuting to destinations in the city are made to five key MSOAs. The remaining 47% is distributed across 27 MSOAs.

Table 4.4 – Key commuting destinations in Plymouth

MSOA ref	Place of work	Number of workers travelling to place of work	% of Plymouth place of work commuters
Plymouth 027	City Centre	21,600	21
Plymouth 005	Derriford	14,670	14
Plymouth 029	Stonehouse	8,130	8
Plymouth 014	Keyham	5,833	6
Plymouth 026	Devonport	5,571	5
Sub-Total		***55,804***	***54***

[ONS 2014]

More than 75% of the Plymouth workforce who commute to work originate from home locations within the city [ONS 2014]; however as **Table 4.5** shows, the five most important commuting destinations are also the areas which rely most heavily on commuters who reside outside the city.

Table 4.5 – Proportion of workforce from outside Plymouth authority area, Census 2011

MSOA Ref	Area of city	% of workforce from outside Plymouth authority area
Plymouth 014	Keyham	46.4
Plymouth 005	Derriford	30.3
Plymouth 026	Devonport	26.6
Plymouth 029	Stonehouse	25.3
Plymouth 027	City Centre	25.1

[ONS 2014]

4.5 METHOD OF TRAVEL TO WORK

Comparison with England & Wales and neighbouring authorities

4.5.1 **Figure 4.7** compares the proportion of Plymouth residents using each method of travel to work with the figures for England & Wales (excluding London) from the Census 2011. **Figure 4.8, Figure 4.9** and **Figure 4.10** show the proportions of travel to work recorded in the census 2011 undertaken by driving a car or van, by bus or on foot respectively for lower super output area (LSOA) geography. They show the substantial variations in the use of these modes for travel to work.

4.5.2 The statistics indicate that the majority of journeys to work in each JLP authority area are made by car. Car commuting in South Hams and West Devon is at broadly similar levels to the England & Wales excluding London average whilst in Plymouth the proportion is slightly lower. In respect of driving to work, the highest proportions of residents using this mode are found in Chaddlewood, Goosewell, Tamerton Foliot (in Plymouth) and in Woolwell, west and east Ivybridge (in South Hams). These suburban areas exhibit higher levels of car commuting than many of the more rural parts of SHWDC. The proportion of the workforce in employment travelling as a passenger in a car or van is slightly higher in Plymouth (6.2%) than in South Hams or West Devon (4.4% and 4.5% respectively).

4.5.3 Areas with the lowest proportions of driving to work are found in Plymouth's central areas as well as a small pocket around Derriford (possibly accounted for by University of St. Mark & St. John (Marjon) students living on campus).

4.5.4 Commuting by bus is higher in Plymouth than across England & Wales excluding London, placing the city in the top 20% of authorities for this commuting mode. Above average levels of bus commuting are located in the western parts of Plymouth (from Devonport to St. Budeaux).

4.5.5 14.7% of Plymouth's working residents walk to work – this is higher than the England & Wales (excluding London) average (10.7%). Similar levels of walking to work were recorded in South Hams (13.7%) and West Devon (14.2%). Much of the southern part of the city has a substantial proportion of working residents walking to work (with more than 30% of commuters in St. Peter & The Waterfront & Drake wards and more than 20% in Sutton & Mount Gould, Stoke and Devonport), and with a small concentration immediately surrounding Derriford Hospital. The market towns in the JLP also have high levels of walking to work – 15-20% in Tavistock, 25% in Totnes and Okehampton, and more than 30% in Dartmouth.

4.5.6 2.6% of Plymouth's working residents cycle to work – this proportion has remained the same in the 2001 and 2011 censuses. This is similar to the England & Wales average of 2.8% and higher than the levels in South Hams (1.3%) and West Devon (1.1%). Totnes and Dartington recorded above average levels of employed residents commuting by bike at 3.4% and 4.2% respectively.

4.5.7 Commuting by train is lower than the England & Wales excluding London average in all three authorities.

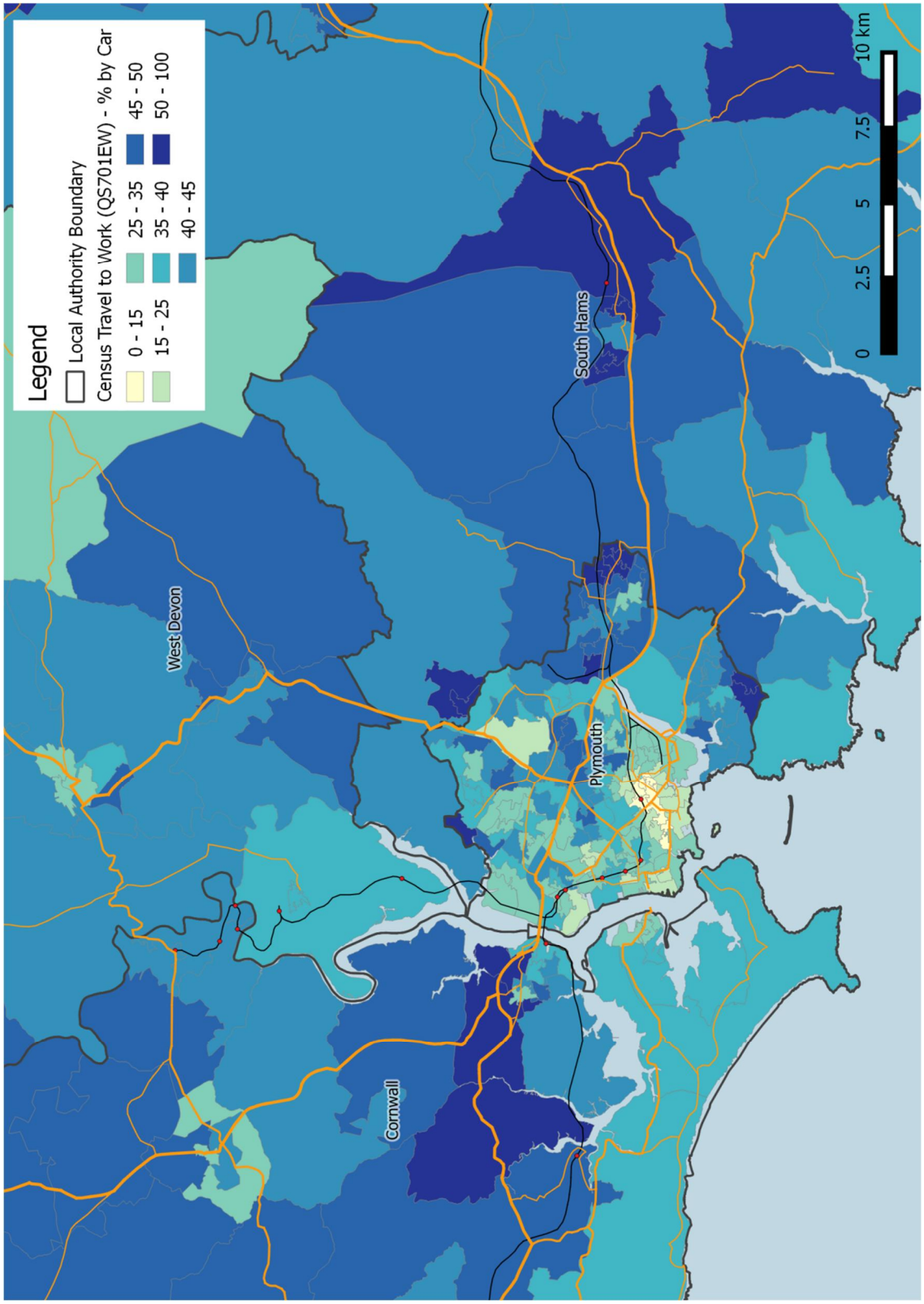
Figure 4.7 – 2011 Census: Method of travel to work by all residents aged 16-74 in employment, by authority



[ONS 2013c]

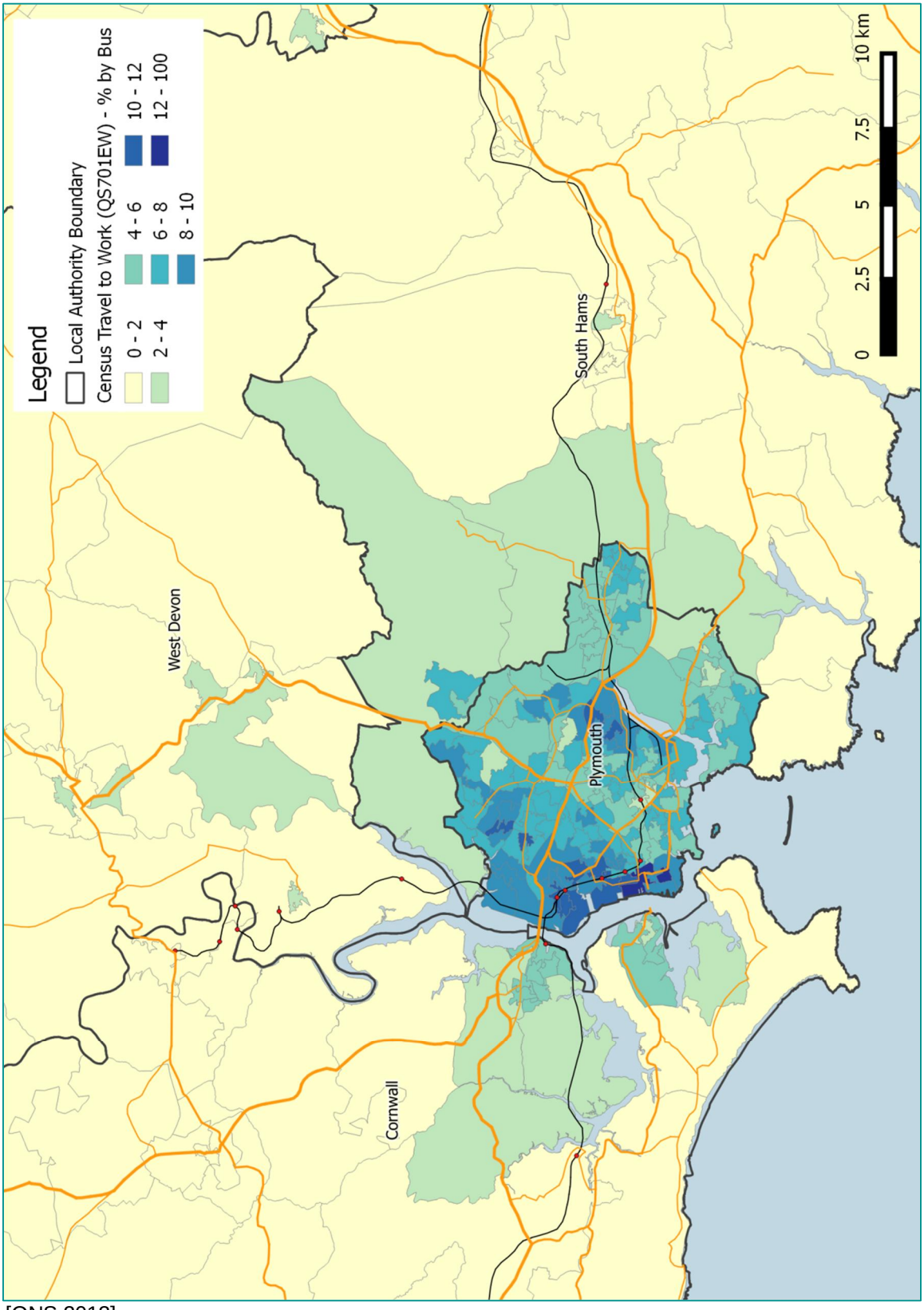
Note: *some census respondents working mainly at or from home could record, for example, that they travelled to work as a driver in a car or van, despite being based at home – therefore the data in the figure above differs from that in Figure 4.4 and Figure 4.5.*

Figure 4.8 – Method of travel to work – proportion driving to work



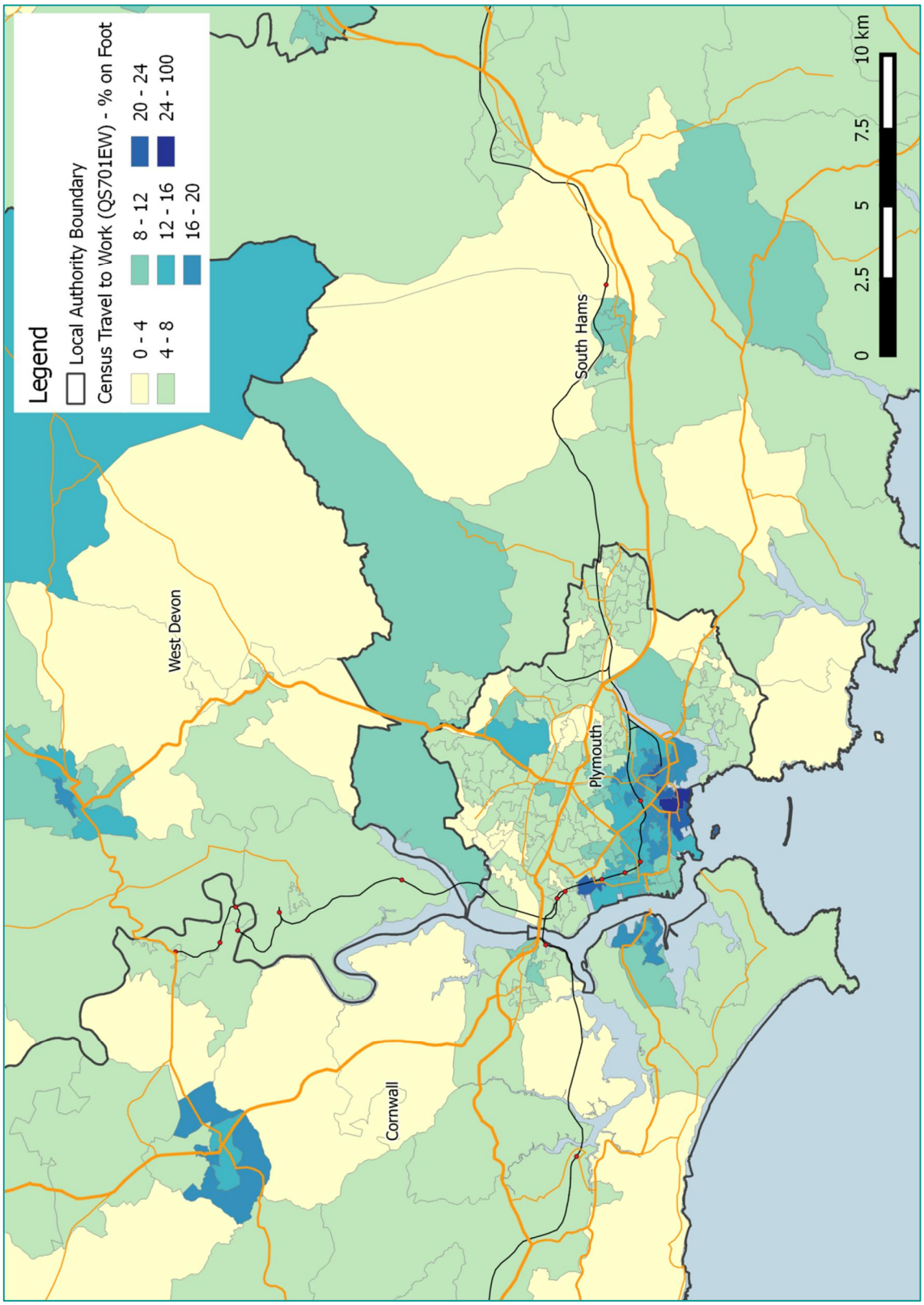
[ONS 2013]

Figure 4.9 – Method of travel to work – proportion travelling by bus



[ONS 2013]

Figure 4.10 – Method of travel to work – proportion travelling on foot



[ONS 2013]

4.6 CAR OWNERSHIP & DRIVING LICENCE HOLDING

4.6.1 The total number of vehicles licenced in the UK has increased in every year since the end of the Second World War except 1991 [DfT Statistics 2016h]. Since 1995 the number of licenced cars has increased by 41%, but this has been surpassed by the increase in numbers of vans and motorcycles (71% and 75% growth respectively) [ibid].

4.6.2 28% of Plymouth households do not have access to a car or van; this is slightly higher than the England & Wales average of 26% [ONS 2013a], and substantially higher than in the neighbouring authorities (South Hams and West Devon 13% each; Cornwall 17%). At a national level the proportion of no-car households has remained relatively constant at around 25% since 2005. Over the same period one-car households have declined slightly, mirrored by a slight increase in the proportion of households with two or more cars [DfT Statistics 2016e].

4.6.3 The majority of the city south of the A38 has lower than average vehicle ownership, and in many cases substantially so. More than a third of households have no access to a vehicle in North Prospect, Keyham, Mutley, the East End and Stonehouse, rising to more than half of households in the City Centre and Devonport. Residential neighbourhoods on the edge of the city have the lowest levels of non-car or van availability, in particular on the eastern fringes (Woodford (13%) and Chaddlewood (8%)) and northern fringes (Roborough (12%). Those parts of South Hams and West Devon in the Plymouth urban fringes tend to have fewer than one in ten of households without access to a car or van [ONS 2013a].

4.6.4 74% of residents aged 17 or over hold a full driving licence, although there is a gender imbalance in licence holding – 80% of men versus 68% of women. Only one-third of 17-20 year-olds hold a full driving licence.

4.7 SUMMARY FINDINGS

- à At a national level the number of trips made per person per year has been in decline over a number of years, largely attributable to a fall in numbers of car and walking trips made per person;
- à Local roadside interview data reveals that trip purpose varies substantially according to time of day and city location, making for a complex mosaic of journeys;
- à The Plymouth urban area is relatively self-contained, with a high proportion of employees who live in the city or urban fringe also working there;
- à Plymouth also has a wide commuter hinterland, from which residents travel to work in locations in the authority or in the urban fringe. Plymouth's key work locations (in terms of numbers of people employed there) are in the city centre, along the rest of the waterfront, and at Derriford and surrounding area;
- à Compared with the England and Wales (excluding London) averages, Plymouth has higher than average levels of commuting by bus and on foot and lower levels of car commuting. SHWD have higher levels of working from home and walking to work. However, travel to work patterns can vary markedly from neighbourhood to neighbourhood, reflecting the different levels of accessibility of transport services and proximity of employment or facilities; and
- à Nationally car ownership has steadily risen, with growth in the numbers of vans and motorcycles surpassing growth in car ownership in recent years. Locally there is substantial geographical variation in vehicle ownership, from more than 90% of households on the urban fringe to less than two-thirds of households in the city centre and waterfront.

5 ROAD NETWORK & TRAFFIC

5.1 INTRODUCTION

5.1.1 The Traffic Management Act 2004 places a duty on every local transport authority, including PCC and DCC, to manage the road network effectively for all users (known as the Network Management Duty). The same Act empowers Highways England to manage and undertake enforcement of the SRN. This chapter describes the road network in the JLP area, including data on traffic flows and locations of congestion. It concentrates on strategic roads in Plymouth and the urban fringe, including the A38(T) (part of national SRN) as these are most critical to the functioning of the transport network, but additionally discusses highway assets and maintenance, road collisions and parking. Major transport schemes which have been approved or are in preparation are also described.

5.2 ROAD NETWORK – TRAFFIC FLOWS

Annual Average Weekday and Daily Traffic Flows

5.2.1 **Table 5.1** details annual average weekday traffic (AAWT) flows along the A38(T) whilst **Table 5.2** outlines the AADT and annual average weekday traffic (AAWT) on other strategic city corridors in Plymouth. Both data sets are shown on the map in **Figure 5.1**.

Table 5.1 – Annual Average Weekday Traffic (AAWT) Flows in 2015 – A38

Section	Eastbound	Westbound	Two-way Totals
Saltash Bypass	14,164	15,178	29,342
St. Budeaux to Weston Mill	20,655*	24,200*	44,855*
Weston Mill to Manadon	25,725*	21,915	47,640*
Manadon to Marsh Mills	33,522	30,196*	63,718*
Marsh Mills to Wrangaton (South Brent)	25,673	25,522	51,195

[Highways England 2016] *Note: * incomplete data for some months*

Table 5.2 – Annual Average Weekday Traffic Flows in 2015 – Other Strategic City Roads

Corridor	Road	Location	Count Ref	AADT	AAWT
Northern Corridor	A386	Roborough by-pass (Woolwell)	*002*	23,076	24,461
		Tavistock Road south of Southway Drive	*033*	27,331	29,148
		Tavistock Road north of Manadon Interchange	*032*	60,097	65,038
		Outland Road (at Morrison's)	*4003*	42,946	45,931
		Saltash Road	*029*	22,413	23,526
	B4313	Forder Valley Road	*006*	25,173	27,950
	B3250	Mannamead Road	*003*	16,257	16,967
	B3250	Mutley Plain	*027*	26,191	26,798
Eastern Corridor	A379	Elburton Road	*005*	9,708	10,224
		Billacombe Road	*058*	18,672	19,990
		Billacombe Road east of Laira Bridge	*055*	38,059	40,378
	A374	Exeter Street	*030 & 031*	41,132	43,156
		Embankment Road	*007 & 008*	57,749	61,837
City Centre and Waterfront	A379	Ferry Road	*004*	5,986	6,341
		Stonehouse Bridge	*051*	13,350	14,467
Western Corridor	A3064	St Budeaux Bypass	*028*	18,658	20,689

[Drakewell Limited 2016]

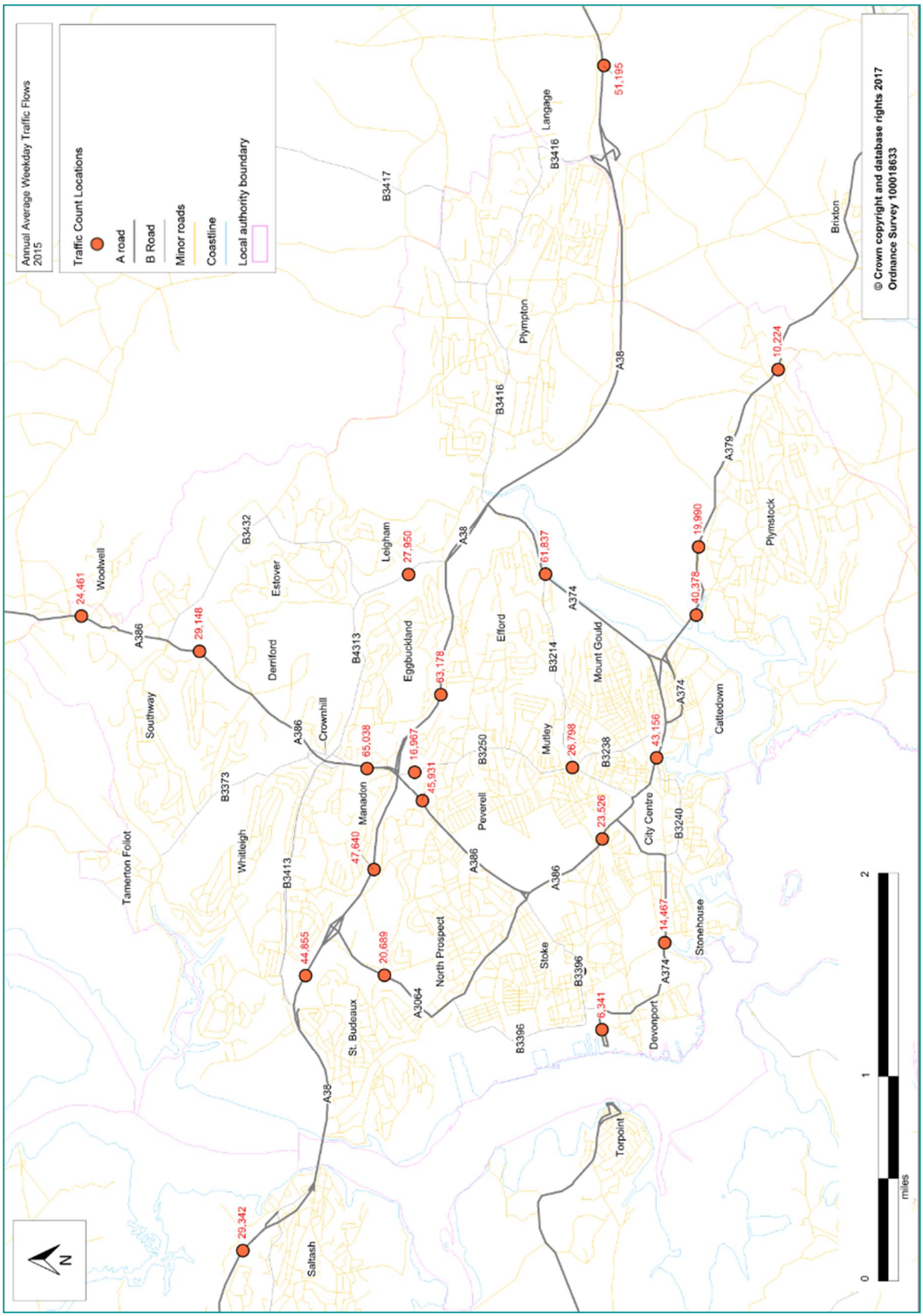
5.2.2 The table above indicates that the section of A386 north of Manadon Interchange carries almost as many vehicles as the A38 to the east of the interchange, but on a road with a series of at-grade-signal junctions and accesses to residential and commercial properties. Substantial volumes of traffic enter the city centre on an average weekday, most particularly along the eastern corridor, with in excess of 43,000 vehicles on Exeter Street and more than 23,000 on Saltash Road north of the city centre. The busy commercial and residential area of Mutley Plain is used by an average of 26,000 vehicles every weekday, substantially more than use the purpose-built St. Budeaux Bypass.

5.2.3 The A38 is a critical link providing access to and from many key employment areas and connecting residents to services and facilities. It is a multi-purpose route used for a disparate range of journey purposes including transportation of freight, commuting to work and holiday traffic. As it divides the city in two, many north-south journeys (such as from the northern suburbs to the city centre) interact with the A38 by passing through the junctions at St Budeaux, Weston Mill, Manadon, Forder Valley, Marsh Mills and Deep Lane even if they do not use the mainline carriageway.

5.2.4 The section of the A38 between Marsh Mills and Manadon has annual average two-way daily traffic flows in excess of 63,000 vehicles, and is almost the busiest section of SRN west of the M5 [Highways Agency 2014].

5.2.5 The A38 also experiences a degree of seasonal variation in the traffic flows that the road network has to accommodate. August average daily traffic flows for sections of the A38(T) through the city are between 3% and 6% higher than the annual average daily total flows (AADT) [Highways Agency 2014a]. However the seasonal variation is more pronounced on other sections of SRN in the JLP area, such as the A30(T) north of Dartmoor, which experiences increases of 25% to 48% during the same period [ibid].

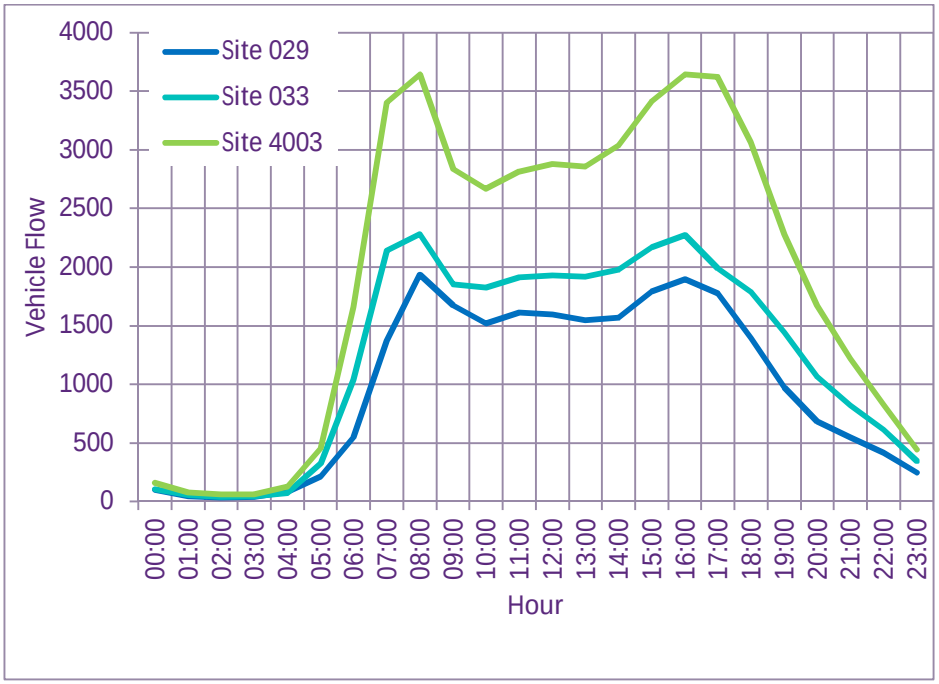
Figure 5.1 – Annual Average Weekday Traffic on Selected Roads in Plymouth – 2015



[Drakewell Limited 2016]

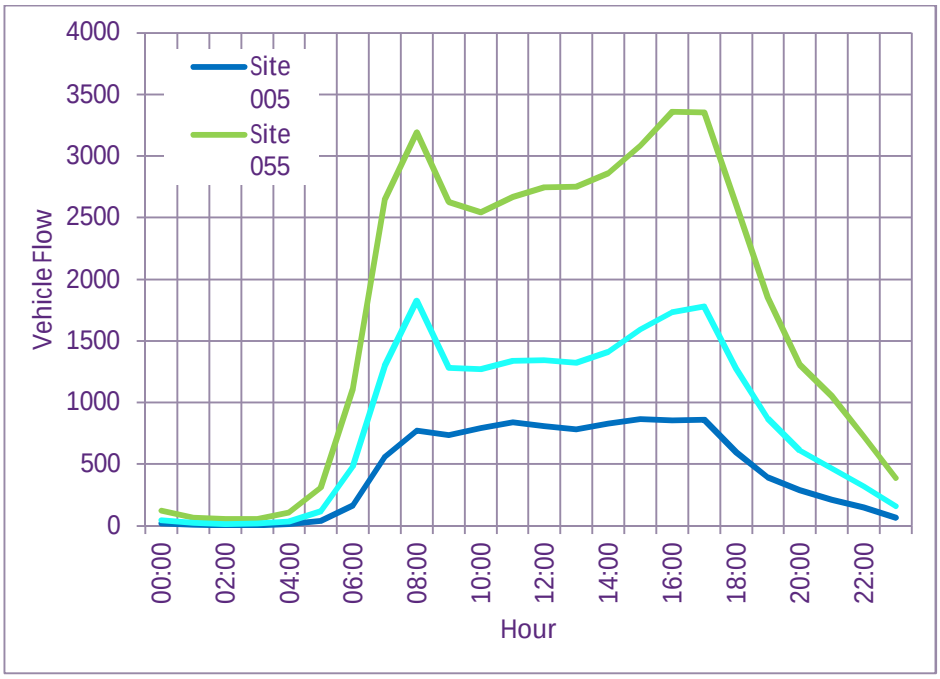
5.2.6 The change in traffic through the course of the average June 2015 weekday is illustrated in **Figure 5.2, Figure 5.3** and **Figure 5.4** for selected sites on the A386, A379 and A3064 respectively.

Figure 5.2 – Average Weekday Flow Profile – Selected Locations on A386, June 2015



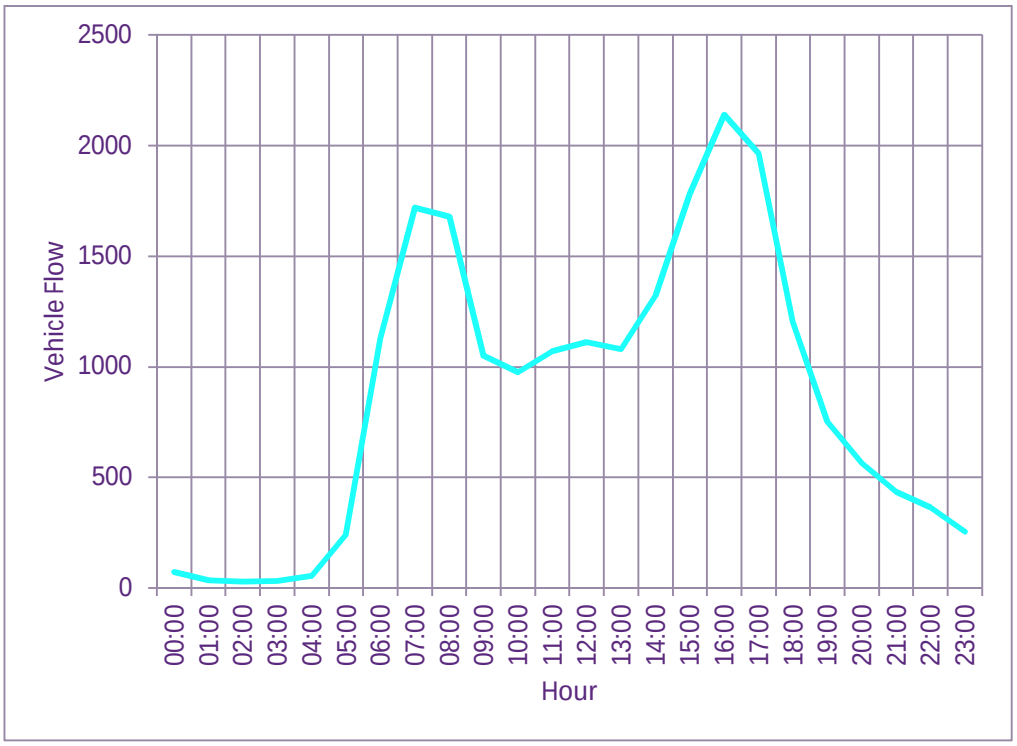
[Drakewell Limited 2016] *Notes: Site 029 - Saltash Road; Site 033 - Tavistock Road south of Southway Drive; Site 4003 – Outland Road (at Morrison's)*

Figure 5.3 – Average Weekday Flow Profile – Selected Locations on A379, June 2015



[Drakewell Limited 2016]
Notes: Site 005 - Elburton Road; Site 055 - Billacombe Road; Site 058 – Laira Bridge

Figure 5.4 – Average Weekday Flow Profile – A3064 St Budeaux Bypass, June 2015



[Drakewell Limited 2016]

5.2.7 Whilst morning and evening peak periods can be discerned in several count locations, a key finding is that traffic volumes remain high on many major road corridors in the city throughout the interpeak period. This is especially the case on the sites on the A386 north of Derriford and on the A379 at Elburton. Other sites show a more noticeable reduction in traffic during the interpeak period, such as on St. Budeaux Bypass.

5.2.8 **Figure 5.3** also shows the increase in traffic flows along the A379 towards the city centre, with the lowest flows (site 005) on the eastern edge of the city, rising to the highest flows on the corridor (site 058) as traffic funnels from Plymstock to cross Laira Bridge, a key constraint on the network.

Peak hour flows

5.2.9 **Table 5.3** below sets out the AM and PM peak flows on selected strategic city roads and the hours when these occur.

Table 5.3 – Peak Hours and Peak Hour Flows, Plymouth Strategic City Roads, June 2015

	Count Location	AM Peak Hour Starting	AM Peak Flow	PM Peak Hour Starting	PM Peak Flow
Northern Corridor	A386 North of Interchange	08:00	2278	16:00	2273
	A386 Outland Road	08:00	3642	16:00	3641
	B3413 Forder Valley Road	08:00	2231	16:00	2190
	A386 Pennycomequick Hill	08:00	1935	16:00	1898
Eastern Corridor	A379 Billacombe Road	08:00	3192	16:00	3357
	A374 Exeter Street OUTBOUND	11:00	1543	16:00	2059
	A374 Exeter Street INBOUND	08:00	2244	17:00	1672
	A374 Embankment Road	08:00	2288	16:00	2864
	B3416 Plymouth Road, Plympton	08:00	2961	17:00	2620
Other areas	A3064 St. Budeaux Bypass	07:00	1720	16:00	2139
	Ferry Road	07:00	691	16:00	837

[Drakewell Limited 2016]

5.2.10 The table indicates that the recorded morning peak hour on a majority of strategic city roads is between 08:00 and 09:00, with the exception being St. Budeaux Bypass and Ferry Road (adjacent to the Torpoint Ferry), where the peak hour is earlier (07:00 to 08:00). Outbound traffic on Exeter Street peaks between 11:00 and 12:00 but the peak hour for two-way flows is between 08:00 and 09:00.

5.2.11 In terms of the PM peak hour a majority of selected sites record a peak between 16:00 and 17:00, the exceptions being B3416 Plymouth Road in Plympton and inbound on Exeter Street, where the peak is between 17:00 and 18:00.

Freight

5.2.12 Road transport is the main method of transporting freight in the UK and there has been a significant shift over the last 25 years towards using larger vehicles [DfT Statistics 2016d]. Despite a rise in heavy goods vehicle (HGV) traffic since 2012, total annual HGV vehicle mileage has not yet exceeded the pre-recession levels in 2007. Growth in light goods vehicles (LGV) has outstripped other categories of vehicle, attributed in part to internet shopping deliveries.

5.2.13 In Plymouth traffic counts indicate that HGVs comprise between 1.9% and 7.9% of average daily traffic flows, varying according to the link, time of day and day of the week (see **Table 5.4** and **Table 5.5**). HGVs tend to compose a higher proportion of all traffic on weekdays and significantly smaller percentages on Saturdays and Sundays. The A38(T) and key routes serving industrial areas, such as the A386 and A3064 to Devonport Dockyard, have higher proportions of HGVs compared to other roads in the city.

Table 5.4 – Heavy Goods Vehicles as Percentage of All Traffic, June 2016 – A38(T)

Count Location	Direction	Daily Average	Weekday Average	Saturday Average	Sunday Average
A38 east of Deep Lane	Westbound	7.9	9.3	5.0	4.0
	Eastbound	7.5	8.6	4.5	3.8
A38 Manadon to Marsh Mills	Westbound	5.1	6.3	2.8	2.8
	Eastbound	5.2	6.1	3.3	2.8

[Highways England 2016]

Table 5.5 – Heavy Goods Vehicles as Percentage of All Traffic, June 2016 – Other Strategic City Roads in Plymouth

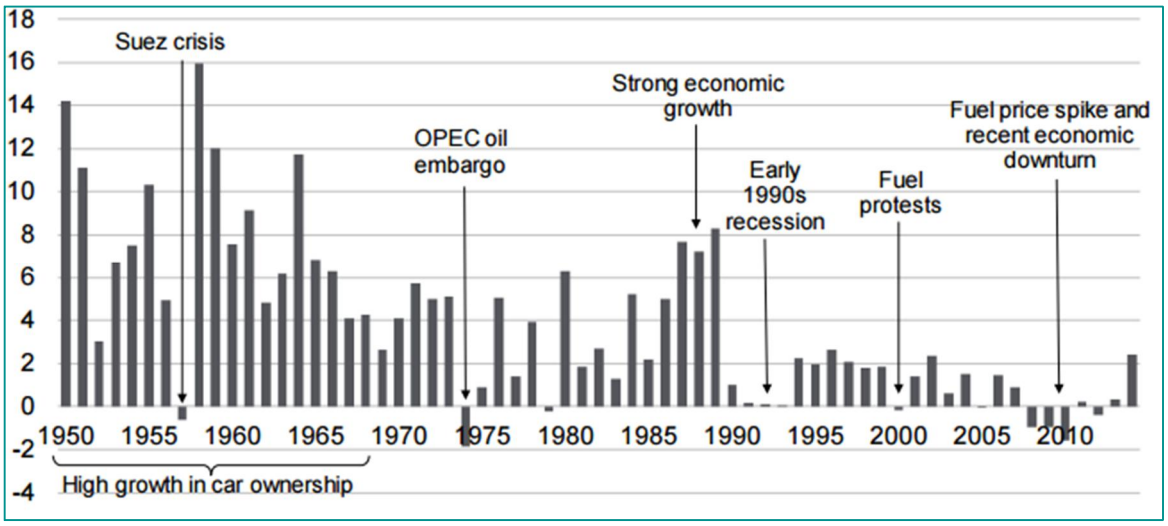
Count Location	Direction	Daily Average
Mutley Plain	Both directions	3.5
Embankment Road	Inbound	3.5
	Outbound	3.1
Exeter Street	Inbound	2.2
	Outbound	1.9
Billacombe Road	Both directions	2.5
Tavistock Road (by airport)	Southbound	3.2
	Northbound	2.5
St Budeaux Bypass	Southbound	7.8
	Northbound	6.9

[Drakewell Limited 2016]

5.3 ROAD NETWORK – TRAFFIC GROWTH

5.3.1 **Figure 5.5** shows that whilst motor vehicle traffic has tended to grow year-on-year the rates of growth have slowed over the last two decades, and 2008-2010 was the first three-year consecutive period when traffic levels fell year-on-year. Data for 2013 and 2014 suggests a return to traffic growth. However, in general, traffic on Highways England managed roads has increased more quickly after the recession, increasing by 1.7% between 2013 and 2014, whilst traffic reduced more substantially on local authority managed roads during the recession and on the whole has not yet returned to pre-recession levels [DfT Statistics 2016h].

Figure 5.5 – Year-on-year growth in motor vehicle traffic in Great Britain



[DfT Statistics 2016h]

5.3.2 **Table 5.6** outlines the changes in traffic levels on selected key roads in Plymouth over a 10 year period from 2005 to 2015. Data shows that, in similarity to the national picture, traffic flows on some key corridors in 2015 had not yet returned to pre-recession levels but emerging data for 2016 suggests that further strong traffic growth is now underway.

Table 5.6 – Changes in Traffic Levels On Selected Road Corridors in Plymouth, 2005 to 2015

Count location	direction	2005	2015	% change
Forder Valley Road	Two-way	24,382	25,260	3.12%
Tavistock Road (by airport)	Two-way	27,147	27,208	0.44%
Embankment Road	Northbound	28,924	29,046	0.20%
	Inbound	29,261	28,706	-2.60%
Exeter Street	Inbound	22,668	19,797	-7.18%
	Outbound	24,838	22,369	-14.38%
St. Budeaux Bypass	Two-way	20328	18,473	-9.04%
Mutley Plain	Two-way	28,916	26,193	-11.92%
Mannamead Road	Two-way	19,247	16,170	-16.96%

[Drakewell Limited 2016]

5.4 NETWORK PERFORMANCE AND CONGESTION

Introduction

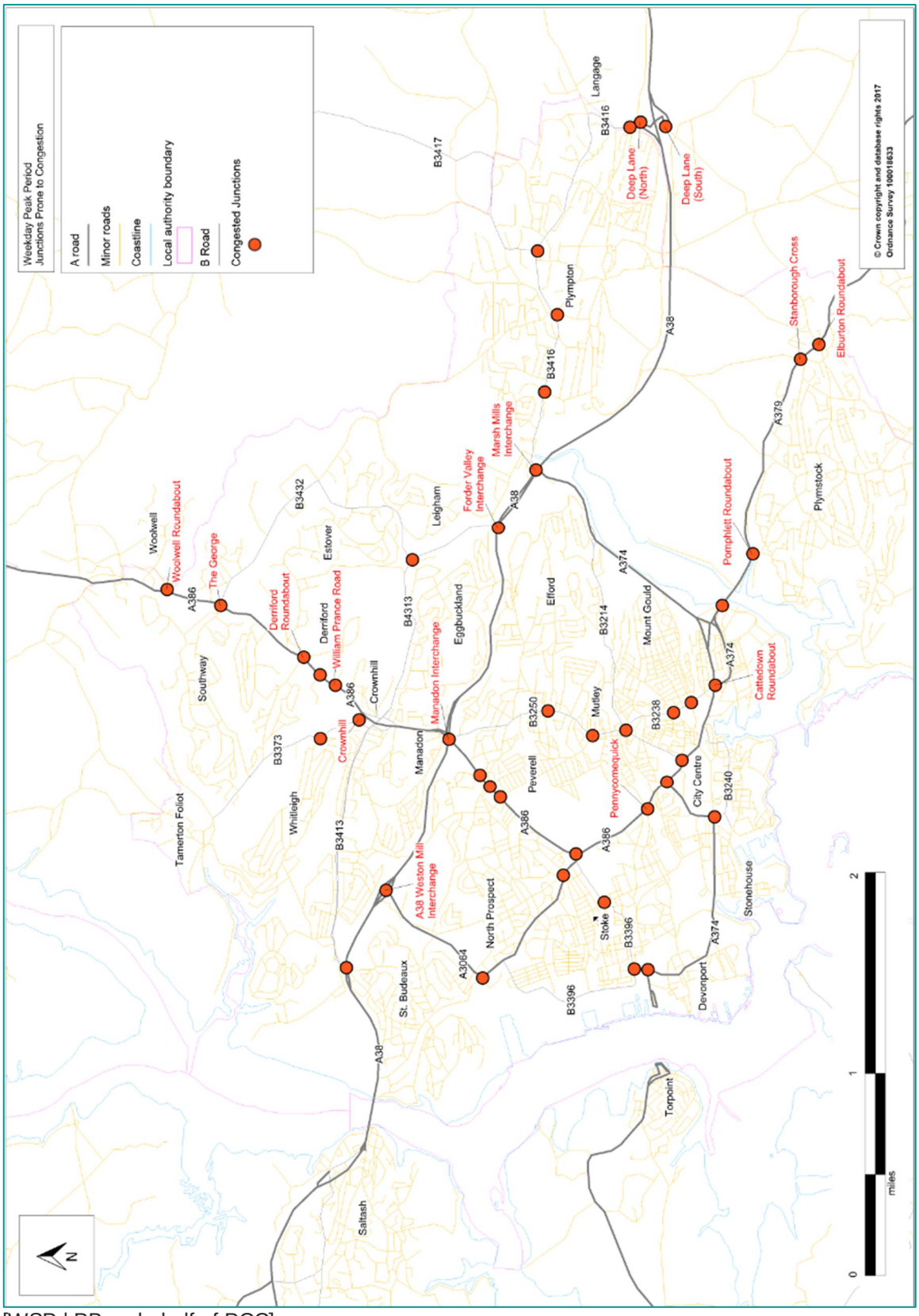
5.4.1 Congestion and slow traffic speeds tend to arise as a result of three types of conflicting movements which compete for limited space, as follows:

- à Conflicts of flow: when different movements compete for space at a key point on the network, such as at busy road junctions, most obviously during weekday morning and evening peak traffic periods;
- à Conflicts of mode: where different modes of transport need to use the same space, such as at a pedestrian crossing or a bus stop. These are common around the city centre, where pedestrians need to cross busy roads to reach shops or workplaces; and

- à Conflicts of use: as a result of transport activities mixing with non-transport activities, such as retail, business and leisure, within a restricted space. A familiar example in Plymouth is Mutley Plain, where a main road axis divides a local retail and leisure hub.

5.4.2 **Figure 5.6** highlights key junctions where delay is known to occur and locations where congestion is most prevalent based on local knowledge. Specific examples are discussed further on in this section.

Figure 5.6 – Junctions on Plymouth Road Network Prone to Congestion – 2016



[WSP | PB on behalf of PCC]

Network Performance – Northern Corridor

5.4.3 The A386 forms the principal north-south spine of Plymouth's transport network and connects the city centre to the A38, the northern employment areas – including nationally significant medical and education facilities in the Derriford area – and onwards to Yelverton and Tavistock. The whole corridor is affected by poor performance. Most key junctions along this route are at or near to capacity at peak times, including the Woolwell Roundabout, George Junction, Derriford Roundabout, Crownhill Interchange and Manadon Interchange.

5.4.4 Key locations and network performance issues are described below:

- à Woolwell Roundabout to the George Junction: between these two points the A386 reduces to single carriageway, with consequent knock-on effects for congestion and delay. Available highway space is particularly constrained in this section of road, with frontage development on both sides;
- à Derriford Roundabout: 12-hour traffic flows in excess of 19,000 vehicles in both directions were recorded in 2012 south of the roundabout. Approximately 43,800 vehicles were recorded passing through Derriford Roundabout in a 12 hour period with 4,225 in the morning peak hour and 4,090 in the evening peak hour. Right turning movements from Tavistock Road (south) to Derriford Road are critical to the operation of the junction as this opposes the other major movement (Tavistock Road (north);
- à B3413 Forder Valley Road / Fort Austin Avenue form a key route from eastern Plymouth to reach Derriford and north Plymouth and are used as an alternative to negotiating the Manadon Interchange. Very substantial delays occur northbound along Forder Valley Road approaching the junction with the B3422 Novorossiysk Road in the morning peak hour;
- à B3422 Novorossiysk Road and Miller Way are north-south routes which connect employment areas in the Northern Corridor, including Derriford Hospital and Plymouth Science Park. Junctions along these routes, including the signal junction where the two roads meet, experience queuing and delay in both weekday peak periods;
- à B3250 Mannamead Road runs north-south and terminates at the Manadon Roundabout. Delays particularly occur at the signal junctions with Eggbuckland Road and the approaches to the Manadon Roundabout;
- à A386 Outland Road has a series of signal junctions in close proximity to each other which gives rise to queuing and pedestrian conflict; and
- à B3250 Mutley Plain has a key role as major transport corridor, including for bus services, local retail centre and focus for leisure activity. Several roads funnel into it, and junctions at both the northern and southern ends have to accommodate complex turning movements. The conflicts between different traffic flows, transport modes and uses places multiple demands on the public space and the recorded average speeds remain below 18mph throughout the working day.

5.4.5 The congestion and poor network performance on the A386 affects cross-boundary journeys from other parts of the JLP, such as Tavistock. Several sections are already exceeding design capacities, resulting in variable and unreliable journey times (see **Table 5.7** overleaf). Data collected in 2012 by Automatic Number Plate Recognition cameras showed that journey times from Tavistock to Plymouth City Centre in the AM peak period varied by as much as 11 minutes (between 29 and 40 minutes journey time). In the reverse direction the variation is a more substantial 19 minutes (between 28 and 47 minutes) [DCC 2014].

Table 5.7 – A386 Cross-boundary Highway Capacity and Demand

Section	Carriageway Type	Capacity Qc	Design Capacity 85% Qc	2008 Traffic Flow	Year Design Capacity Exceeded
Manadon to Derriford	Dual carriageway	3260	2770	3650	Already
Derriford to Woolwell	Part single / part dual carriageway	1630	1390	1890	Already
Woolwell to Roborough (border)	Dual carriageway	3260	2770	1610	After 2026
Roborough to Yelverton	Single carriageway	1180	1000	1290	Already
Yelverton to Tavistock	Single carriageway with narrow sections	1020	870	760	Before 2026

[DCC 2014]. *Notes: All capacities and traffic flows are vehicles per hour per direction. Capacities are based on minimum road width in each section and % heavy vehicles at peak times. Qc denotes maximum realistic traffic flow*

Network Performance – Eastern Corridor

5.4.6 The Eastern Corridor refers to road links which connect Plymstock and Plympton to the rest of the city. It includes the following routes and key issues:

- The B3416 through Plympton (Sandy Road / Glen Road / Plymouth Road) is a key route to employment areas at Langage and for access to the A38. Delays and congestion regularly occur at many of the junctions along this route, several of which are mini-roundabouts;
- The A379, which runs east-west through Plymstock and crosses Laira Bridge. Junctions on this corridor, including the Pomphlett roundabout, Billacombe Roundabout, Stanborough Cross, and Elburton Roundabout all experience delays and queues, particularly inbound to the city centre in the morning peak period and outbound in the evening peak period. The Laira Bridge is a key constraint on the network and junctions east and west of bridge are at or near capacity in peak periods;
- The A374 connects the A38 at Marsh Mills Interchange to the city centre, with two key traffic flows merging and diverging in Prince Rock, with consequent impacts on flows. Whilst the East End Transport Scheme has enabled many key traffic flows to be routed away from the residential communities in the East End other flows (such as outbound traffic to Plymstock) must still pass through several congested junctions; and
- A374 Cattedown Roundabout. This junction and its approaches experiences conflicts between east-west strategic traffic and local movements and causes particular delays for outbound vehicles in the evening peak period.

Network Performance – A38

5.4.7 The A38(T) through Plymouth experiences particularly poor performance when measured in terms of journey time reliability, average speed and delay. In terms of junction operation most of the A38 junctions in Plymouth have capacity issues at certain times of the day and the operation of the Weston Mill & Manadon Interchanges give rise to queues on the mainline carriageway itself.

5.4.8 Key aspects identified in the *Route Strategy Evidence Report* [Highways England 2014] were as follows:

- The section between Marsh Mills and Weston Mill has particularly unreliable journey times;
- The section from Carkeel Roundabout across the Tamar Bridge to Weston Mill has particularly low average speeds in peak hours, ranging from 31 to 40mph; and
- The sections between Carkeel Roundabout and Weston Mill (both directions) and Marsh Mills to Manadon (westbound) particularly suffer from high levels of *vehicle hours delay* (a term used to describe aggregate travel time over and above that which could be expected from free-flow conditions) and fall within the worst 10% of all sections of motorway and trunk road nationally against this measure.

5.4.9 The Manadon Interchange is where the A38 slip roads meet three other main roads (A386 Tavistock Road, A386 Outland Road and B3250 Mannamead Road), and a fourth more minor road, with vehicles making several different turning movements at the junction. In excess of 4,600 vehicle movements are made at the junction in the morning peak hour [PCC 2013]. Queuing and delay is regularly experienced in the morning peak hour on several approaches, including from Outland Road and the two A38(T) slip roads. Surveys recorded in excess of 100m of queuing vehicles on the westbound off-slips between 07:45 and 08:25 and on the eastbound off-slips between 08:25 and 08:45, rising at times to more than 250m.

5.4.10 Marsh Mills Interchange operates close to capacity in both peak hours, with regular queues on the roundabout approaches, particularly on the westbound approach from Forder Valley Interchange and on the Longbridge Road arm. Developer contributions which have been secured to install MOVA to the signals at the junctions are likely to improve capacity.

5.4.11 The Deep Lane interchange is already operating at capacity in peak periods, as evidenced by traffic counts and Closed Circuit Television (CCTV) camera observations, with queuing on the approaches to the Ridgeway Roundabout. This is compounded by the stacking of vehicles at the Deep Lane junction itself [DCC 2016b].

5.4.12 The Saltash Tunnel / Tamar Bridge collectively act as a critical network constraint due to the reduction in lanes and operation of the tolls, in particular:

- The operation of the Tamar Bridge toll booths in the AM peak period when high numbers of vehicles (approximately 2,500) heading eastbound combine with buses from Saltash calling priority at the toll plaza [Peter Brett Associates 2013]; and
- Queuing westbound towards the bridge into AM peak period, where the number of operational lanes reduces from two to one as a result of the tidal flow arrangements in place.

Network Performance – Western Corridor

5.4.13 The Western Corridor comprises routes from the city centre towards the Tamar Bridge and Torpoint Ferry. It includes the following routes and key issues:

- à A3064 Wolseley Road / St. Budeaux Bypass leading to the A38. Junctions, including the Camel's Head Junction, experience delays associated with the peak dockyard employee arrival and departure times. The peak weekday flows on the St. Budeaux Bypass tend to occur earlier than elsewhere on the network, between 07:00 and 08:00 and 15:00 and 16:00;
- à A374 from the city centre to Torpoint Ferry through Devonport – this route passes through busy residential and commercial areas, with frequent junctions and pedestrian crossings, causing delay, particularly at times of peak ferry use;
- à The B3396 through Stoke Village, where the road passes through the shopping area and through junctions where available highway space is particularly constrained; and
- à Torpoint Ferry approaches, where queues build up waiting for ferries.

5.4.14 At full operation the Torpoint Ferry has an hourly capacity of 438 cars and 900 foot passengers in each direction and currently the maximum flow in each direction is just below the capacity level (400 vehicles per hour). However, spikes in demand within the peak hours can result in queuing vehicles not being able to board the first ferry which arrives [Peter Brett Associates 2013]. Analysis in 2013 indicated that the Torpoint Ferry is forecast to exceed capacity (when cars are unable to board the first ferry after joining the queue) between now and 2026 on the key tidal flows (AM peak hour eastbound into Plymouth and PM peak hour westbound into Cornwall) by approximately 100 and 160 vehicles respectively [Peter Brett Associates 2013].

Network Performance – City Centre

5.4.15 The city centre is the focus for much of the city's retail, employment and tourism activity and several main road corridors converge in the city centre at junctions on the ring road. Key city centre junctions and their approaches are therefore prone to congestion and delays, including Western Approach/Union Street, North Cross, the approaches to Drake Circus and Charles Cross. Delays and congestion can also occur outside of the usual weekday peaks – on Saturdays the delays are exacerbated by vehicles queuing to enter the Drake Circus car park, which blocks back across the Charles Cross roundabout, impacting on several bus services.

5.4.16 As well as high vehicle flows in the city centre, there is competition between different transport modes for highway space. This is particularly evident on Royal Parade, where there are very substantial numbers of bus movements and pedestrian movements as well as through traffic. Similarly, on the ring road, high vehicle and pedestrian flows compete for time at signal crossings.

5.4.17 Traffic for the continental ferries at Millbay Docks, including HGVs, is signed through the city centre and has to negotiate the residential and commercial areas of Union Street and Martin Street to reach the ferryport. Embarkation and disembarkation of the ferries leads to periods of high traffic flow, causing localised delays. Road access to the Cattewater port area is superior to Millbay, being closer to the A374 dual carriageway.

Other network issues

5.4.18 In addition to the issues arising from capacity constraints, other factors can give rise to congestion and delay, including roadworks, parked vehicles and incidents – such as adverse weather and road collisions, vehicle breakdowns, for example. These can all impact on the flow of traffic and reduce journey reliability.

5.5 NETWORK MANAGEMENT

5.5.1 All three highway authorities use a range of Intelligent Transport Systems (ITS) – harnessing telecoms and computer technology – to make more efficient use of the highway space. ITS includes (but is not limited to) the following aspects:

- à Traffic signals, which help to regulate opposing flows of traffic, balancing competing road user needs and ensure safe turning movements;
- à Variable Message Signs (VMS) giving key information on roadside digital displays;
- à Control centres, which manage and monitor traffic conditions.

Plymouth

5.5.2 In Plymouth over 100 junctions, including some of the city's most complex and heavily trafficked locations, are controlled by signals [DCC et al 2011].

5.5.3 Approximately half the signal controlled junctions have the dynamic traffic management tool SCOOT[5] installed[6] – which measures the traffic flow and adjusts traffic signal timings accordingly to maximise traffic flow through the network [ibid]. DfT advice indicated that SCOOT can reduce delays by approximately 12 – 20% over a typical fixed time system [DfT 1999].

5.5.4 A small number of additional locations use MOVA[7] – an advanced demand-responsive system for single junctions – and this system has been shown to reduce delays by an average of between 8% and 13% compared to vehicle-actuated systems [DfT 1997]. Junctions currently using MOVA are mostly situated in the Northern Corridor (A386 George Junction, Derriford Road/Plymbridge Lane, the Manadon Roundabout, Novorossiysk Road / Miller Way, Novorossiysk Road / Forder Valley Road, Mannamead Road/Kneele Gardens) and close to Torpoint Ferry (Ferry Road/Park Avenue) [DCC et al 2011].

5.5.5 Alongside the traffic signal systems, nearly 30 VMS are used to convey key messages to drivers on main road corridors. 18 VMS are used to guide drivers to car parks with spaces and a further 11 VMS are available to highlight delays, roadworks or other transport messages [ibid].

A38 (Highways England)

5.5.6 Highways England uses a network of CCTV cameras and sensors under the carriageway to monitor traffic conditions in its Regional Control Centre, with five CCTV cameras at locations along the A38(T) between Ivybridge and Weston Mill. There are 2 VMS on the eastern approaches to Plymouth (at Voss Mill and Plympton) and at Manadon on the approach to the Tamar Bridge / Saltash Tunnel[8] [Highways Agency 2014a]. The A38(T) between the M5 and the Tamar Bridge is the only non-motorway section of SRN in the South West to have a dedicated traffic officer presence to deal with incidents [Highways Agency 2014].

[5] Split Cycle and Offset Optimisation Technique
[6] Along with a small number of signal-controlled pedestrian crossings
[7] Microprocessor Optimisation Vehicle Actuation
[8] There are equivalent VMS on the western approaches in Cornwall

5.6 HIGHWAY ASSETS AND MAINTENANCE

Local highway network assets and maintenance

5.6.1 Within the JLP area all public highways other than A30(T) and A38(T) are managed and maintained by the respective local highway authorities of PCC, and for SHWD, DCC. The Highways Act 1980 places a duty on these local highway authorities to maintain a safe highway network. The highway infrastructure represents the largest and most valuable set of assets maintained by them [DCC 2016b, PCC 2015e].

5.6.2 **Table 5.8** below identifies the proportion of classified roads (A, B and C roads) in Plymouth and Devon where maintenance should be considered on classified roads relative to the England averages. It shows that a smaller proportion of principal roads in Plymouth and Devon should have maintenance considered than the England average, and the proportion has reduced over the last 8 years for which data has been collected.

Table 5.8 – Portion of classified roads where maintenance should be considered local highway authority, 2008/09 to 2014/15

	Principal roads (local authority maintained A-roads) (%)				Non-principal roads (local authority maintained B and C roads) (%)			
	2008/09	2010/11	2012/13	2014/15	2008/09	2010/11	2012/13	2014/15
Plymouth	5	5	4	3	5	8	6	4
Devon	4	4	2	2	10	14	15	11
England	5	5	5	4	9	10	9	7

[DfT Statistics 2016f]

5.6.3 Plymouth City Council is responsible for 823km of carriageways, as described in **Table 5.9** below.

Table 5.9 – Highway Assets in Plymouth

Category of Road	Length (km)	Notes
A Class Road	29.4	Examples include the city centre ring road, A386 Tavistock Road and A374 Embankment Road
B Class Road	36.0	Secondary main roads including Mutley Plain, Greenbank Road, Devonport Road / Milehouse Road through Stoke Village
C Class Road	84.3	Includes key routes connecting Plymouth's neighbourhoods, such as Southway Drive and Honicknowle Lane, for example
Unclassified Road	673.2	Includes most residential and minor roads
Totals	822.9	

[PCC 2012a]

5.6.4 During 2014/15 the City Council repaired more than 25,000 potholes and resurfaced 121 streets [PCC 2015e] and in excess of £3.2m was allocated to replace street light bulbs in 2015/16 and 2016/17 [PCC 2015h].

5.6.5 In 2015 Plymouth City Council was successful in its bid for £8.385m from the DfT's local highway maintenance challenge fund, with a further £2.794m being pledged from the City Council's approved Capital Highway Maintenance funding – a combined total of £11.179m. This was used to target 63% of the city's strategic road network, concentrating on key arterial routes which underpin the economic growth of the city, with the aim of bringing it to a serviceable standard [PCC 2015d].

5.6.6 The City Council has an ongoing investment programme in 'Living Streets' schemes to address safety, accessibility and other transport issues across communities, including in Ham, Peverell, Stonehouse, West Park and Whitleigh. Alongside this are funds for local safety schemes, targeting collision hot spots and requests from key stakeholders such as the Police and Safety Camera Partnership, and ward member-led local improvements, with funding divided by ward [PCC 2015e]. Alongside physical highway works the City Council has also committed to appropriate consideration of 20mph speed limits on residential roads especially near schools and colleges, wherever it is practical to do so, mindful of the need to support efficient operation of the network overall.

5.6.7 20 mph zones have been introduced to a growing number of streets, including wide communities such as West Park, Whitleigh, Estover, Ham, North Prospect, Stonehouse and West Hoe, along with sections of roads outside several schools in other parts of the city.

5.6.8 DCC has a total countywide highway network of 12,850km in length, a proportion of which is located in SHWD. The summary findings of the machine surveys identify that the Devon's A, B and C roads are being maintained in a relatively steady state and good condition [DCC 2016b]. In 2015 DCC was successful with its Challenge Fund bid to the DfT and received £10m to replace all street lights on main roads with LED lighting, with consequential benefits in terms of reduced energy use and routine maintenance demands [DCC 2016b].

5.6.9 DCC divides its capital transport funding programme into the following categories:

- à schemes which are primarily required to support economic growth or are essential to enable development to take place (referred to as the *Market and Coastal Town and Rural Devon Targeted Capital Investment Programme*); and
- à schemes which are primarily aimed at meeting road safety, walking, cycling, public transport and local traffic management objectives (the *Countywide Foundation* and *Market and Coastal Town and Rural Devon Foundation Programmes*).

Highway Asset Strategies

5.6.10 PCC and DCC both have a suite of policies, strategies and plans to document how they manage their highway assets in order to fulfil their statutory duties and comply with the objectives in the Code of Practice entitled *'Well Maintained Highways'*[9]. These are summarised in **Table 5.10** below.

Table 5.10 – Asset Management Documents

	Role	Plymouth document	Devon document
Asset Management Policy	Setting out the vision, scope and principles of adopting and implementing an asset management to highways	Highway Asset Management Policy (June 2013)	Highway Asset Management Policy 2013
Asset Management Strategy		Highway Asset Management Strategy June 2013	Highway Asset Management Strategy 2013
Asset Management Plan	Describes the regime of highway maintenance, inspection and condition assessments, and service standards according to highway asset type	Transport Asset Management Plan 2012	Highway Asset Management Plan 2013

[PCC 2013c, PCC 2013d, PCC 2012a, DCC 2013c, DCC 2013d, DCC 2013b]

[9] [9] http://www.ukroadsliaisongroup.org/en/guidance/index.cfm

Characteristics of the local road network

5.6.11 The city includes several sections of dual carriageways, including the ring road (formed by Western Approach, Cobourg Street & Charles Street), parts of radial corridors (the A386 Tavistock Road / Outland Road corridor, A3064 Alma Road / Wolseley Road corridor, A379 from Plymstock, A374 Exeter Street and Embankment Road on the route from Marsh Mills to the city centre) and much of the east-west B3413 Crownhill Road. However, these can be discontinuous (such as the northern part of Tavistock Road) and have complex junctions along their routes, both of which have implications for the capacity of each route.

5.6.12 In Plymouth the road network is at its most dense in some of the Victorian inner suburbs (Ford, Peverell, Mount Gould), where a variety of routes are available. Route choice is more limited in many of the more northern suburbs, with suburbs and parts of the road network often being separated by steep intervening valleys, which places additional pressure on the key routes which do exist. Beyond the edge of the urban area, and apart from the key A roads, the highway network is largely characterised by narrow lanes.

5.6.13 Some residential suburbs in parts of the city are characterised by cul-de-sac layouts, which forces vehicles to route through certain key junctions, can lengthen vehicle journeys and make areas difficult to serve effectively by bus. These layouts are particularly commonplace in Goosewell, Elburton, Leigham and Chaddlewood.

Taxi Infrastructure

5.6.14 Taxis provide an important service for residents and visitors. PCC provides ranks for Hackney carriages at 52 locations across the city and their provision is regularly reviewed. 36 of the 52 ranks are available for use 24hrs and include several city centre locations, Plymouth railway station, Derriford Hospital and the Torpoint and Cremyll ferry landings. The remaining 16 tend to have hours of operation covering the evening and early morning and are located near to the theatres, restaurants, pubs and clubs [PCC 2013b].

A38 trunk road assets

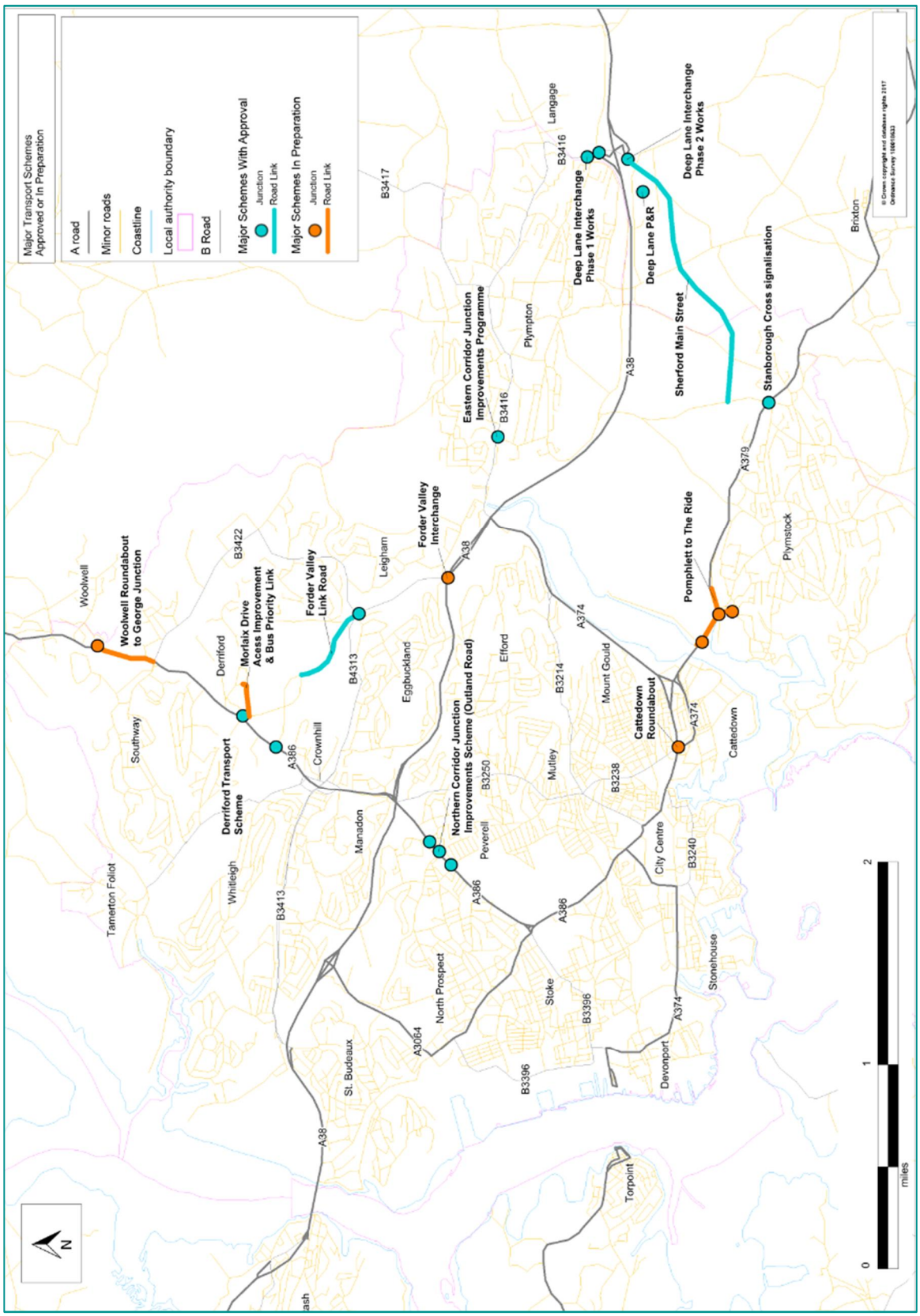
5.6.15 Much of the A38(T) within the JLP area is two-lane dual carriageway running west to the Tamar Bridge toll plaza roundabout, with a dual-three lane section between Voss and Marsh Mills Interchanges east of the city. Whilst A38 junctions within Plymouth east of the Tamar Bridge toll plaza roundabout are all grade separated, almost all of them are different to each other. Most junctions enable all movements to be made, except for the Marsh Mills westbound on and off slip and Forder Valley eastbound on-slip which are linked by parallel one-way roads either side of the A38, requiring some movements to use both roundabouts to join or leave the A38. Between Ivybridge and Plymouth there are a series of closely-spaced junctions which do not provide for all movements and have varying standards of design.

5.6.16 The Tamar Bridge itself has four lanes for vehicular traffic and is tolled in the eastbound direction, with 80% of vehicle crossings making use of the electronic Tamar Tag system [Peter Brett Associates 2013]. One lane is reserved for local traffic from Saltash travelling eastbound into Plymouth; the use of the remaining three lanes is controlled by overhead gantries, which enables tidal flows to operate at peak hours. This tidal control also operates on the three-lane Saltash Tunnel, immediately to the west of the Tamar Bridge.

5.7 HIGHWAY INVESTMENT PROGRAMME – PLYMOUTH & URBAN FRINGE

5.7.1 Major highway schemes in Plymouth and its urban fringe area which have had funds approved by the LTB or which are at an advanced stage of being developed for submission to the LEP are set out below and their location illustrated on **Figure 5.7**. Equivalent schemes with a public transport or active travel focus are described in their respective chapters.

Figure 5.7 – Major Highway Schemes With Approval or In Preparation, Plymouth and Urban Fringe



[WSP | PB on behalf of PCC]

Derriford Transport Scheme

5.7.2 The Derriford Transport Scheme aims to reduce current congestion on the A386 and minimise the impact of additional trips on the highway network that will be generated from new developments in the area. The scheme will achieve this through localised highway widening to give space for additional traffic and bus lanes enabling more efficient use of the existing Derriford Roundabout and Tavistock Road / William Prance Road junction. The provision of improved walking and cycling facilities and greater public transport priority will encourage and enable more sustainable journeys to be made. The LTB have approved a £10.16m contribution from the LEP towards the scheme.

Northern Corridor Junction Improvements Scheme Phases 1 & 2 (Outland Road)

5.7.3 This scheme is a rolling five-year investment programme which commenced in 2015/16 and will continue to 2019/20 to provide upgrades to critical road infrastructure. Phases 1 and 2 will address three junctions on Outland Road – where it meets Peverell Park Road, Weston Park Road and Torr Lane. Each junction will have changes to layouts to increase the junction capacity, changes to traffic signals to make the junctions more efficient in the peak and interpeak periods, upgrades to pedestrian crossings, and on-road cycle lanes and advance stop lanes for cyclists introduced. The project had its business case approved by LTB in December 2014 and final approval given in January 2016. Further phases are intended to focus on B3250 Mannamead Road.

Eastern Corridor Junction Improvements Programme

5.7.4 This is a 5-year programme which commenced in 2016/17 and will continue to 2020/21 to replace and renew traffic signal controlled junctions with new equipment at key junctions in Plympton and Plymstock, funded by a £2.1m grant from the DfT along with developer funding. It includes changes to junction layouts to increase capacity and measures to give buses priority, starting with the Plymouth Road / Cot Hill junction in Plympton.

Forder Valley Link Road (FVLR)

5.7.5 This proposed new road, with two lanes uphill and one lane downhill, and a viaduct across the Forder Valley, is intended to connect the eastern end of Brest Road to the junction of Forder Valley Road / Novorossiysk Road. The new link will provide an alternative route to and from the Derriford area, increasing accessibility by all modes, and will provide a direct link to Derriford from the east for P&R services proposed to operate between the Deep Lane P&R (Sherford) in eastern Plymouth and Derriford (see **section 6.8**). Off-road cycle and pedestrian links are included as part of the scheme. It will enable the full build-out of developments in the Derriford area and reduce congestion and improve journey times on existing road links, making the A386 in particular more resilient.

5.7.6 Development of the design work for FVLR is ongoing, and it is anticipated that the Final Business Case will be submitted to DfT for approval in July 2017 [PCC 2016g]. The LTB confirmed support for the scheme and have approved up to £22.5m of funding subject to the final business case [Heart of the South West LTB 2016a].

A38 Deep Lane Interchange Phase 1 Works

5.7.7 This scheme comprises two main elements to accommodate the additional traffic generated by key new developments at Sherford new community and Langage Phase 2 and to discharge planning conditions [SHDC 2013, DCC 2016a]. The first element, Phase 1, is the replacement of the existing Ridgeway / Sandy Road roundabout with a signalised junction to increase capacity and improve traffic flow. The second element, Phase 2, is amending the layout of the junction of the A38 eastbound off slip and westbound on slip with bus priority to enable convenient interchange between car and park and ride at the Deep Lane junction. Traffic signals at both junctions will be optimised and linked to better manage traffic flows. £2m has been allocated for the works by the LEP for Phase 1, alongside substantial contributions from the planning applicants for Sherford and Langage Phase 2 and the works are estimated to be completed in March 2017.

5.7.8 Signals have already been installed at the junction of the westbound slip roads with Deep Lane, which removes the banned right turn from Deep Lane (south) onto the A38 westbound and enables all movements to be made [DCC 2016a].

Other Infrastructure Associated with Sherford new community

5.7.9 A range of additional highway infrastructure is committed to support the Sherford new community, as follows:

- à At Stanborough Cross the existing roundabout has been replaced with an all-movements signal crossroads to provide more vehicle capacity, including bus priority technology; and
- à A street network, including the Main Street, will run through the new heart of the community. The first section of this route (the Haye Road Link, running east from Haye Road itself) is already under construction.

Other major schemes in preparation

5.7.10 Preparatory work is already advanced for the following major schemes:

- à A386 Woolwell Roundabout to the George Junction: A scheme to widen this section of Tavistock Road to two lanes in each direction, with changes to the layout of the Woolwell Roundabout, along with improved routes and crossings for pedestrians and cyclists. This scheme would address congestion at a current pinch point on the A386, improve traffic flow from the north of the city, and make bus journeys faster and more reliable;
- à A38 Forder Valley Roundabout Improvements: Proposed capacity improvements to the roundabout above the A38(T) and on the B3413 Forder Valley Road itself. Estimated to cost £7.9m [PCC 2016g];
- à Morlaix Drive Access Improvement & Bus Priority Link: Creation of an east-west bus priority route from PIMTP to Derriford Hospital, enabling buses to bypass congestion on the Derriford roundabout. The LTB have resolved that the improvement scheme is their 6th highest priority for Growth Deal 3 funding [Heart of the South West LTB 2016];
- à Cattedown Roundabout Scheme: A proposal to improve traffic flows through this key junction on the Eastern Corridor into the city, by replacing the roundabout with a signal junction to include additional lanes, bus priority, improved cycleways and footways and the replacement of the existing steep footbridge with at-grade signal crossings. The scheme will reduce congestion at an existing pinch point on the network, will help to address poor air quality in the AQMA and provide the infrastructure necessary to accommodate additional traffic generated from the new development at Morley Park and Sherford. Bus journey times will become more reliable and walking and cycling will be safer and easier. The LTB have resolved that the improvement scheme is their 8th highest priority for Growth Deal 3 funding [Heart of the South West LTB 2016];

- à A379 Pomphlett to the Ride Improvement: Widening of the A379 east of Laira Bridge, and remodelling of the Pomphlett roundabout, to provide bus priority lanes and accommodate traffic generated by new developments in the Eastern Corridor; and
- à A38 Deep Lane Interchange Phase 2 works – further works to support development at Sherford new community. Involves installing traffic signals where the westbound off-slip meets Deep Lane, closing the existing westbound on-slip and constructing a replacement on-slip to the west of Deep Lane

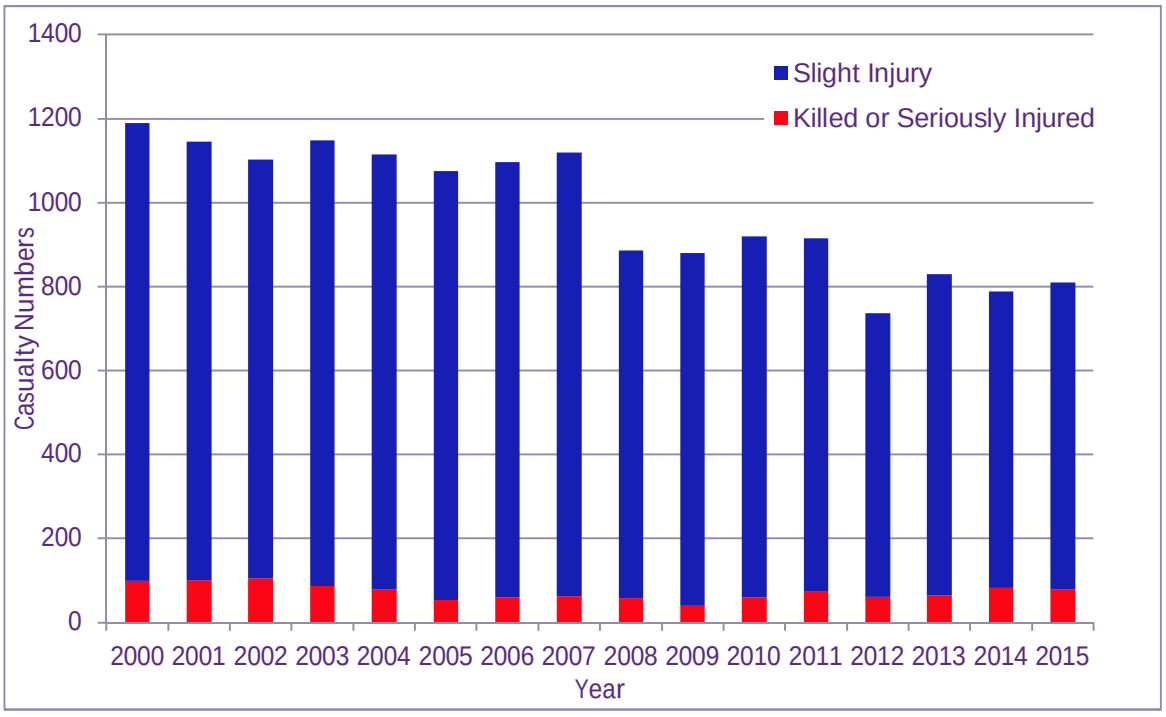
A38 (Highways England)

5.7.11 The government's *Road Investment Strategy* (RIS) [DfT 2015a] sets out a five-year approach to the SRN covering the period 2015-16 to 2019-20; however no major highway infrastructure schemes were confirmed in the strategy for the JLP area or the sections of the A38(T) or A30(T) leading to the M5. In the south west the RIS was informed by the *South West Peninsula Route Strategy* [Highways England 2015] and accompanying technical evidence [Highways England 2014, 2014a], bringing together various strands of data about use of the SRN. Preparatory work is underway for the RIS to cover the second road period onwards from 2020 and the JLP partner authorities are lobbying to ensure that priority investment for the region is included in the emerging strategy.

5.8 COLLISIONS AND ROAD SAFETY – PLYMOUTH

5.8.1 PCC, along with its partner organisations, has been very successful in reducing casualties on the city's roads, with the number of people injured in road collisions reducing by a third between 2000 and 2015 [PCC 2016f]. The road casualty statistics for the period between 2000 and 2014 are shown in **Figure 5.8**. Despite the long-term continued decrease in road casualties, 810 people were injured on Plymouth's roads in 2015; therefore taking action on improving safety for all road users remains of significant importance.

Figure 5.8 – Road casualty statistics for Plymouth authority area, 2000 to 2015



[PCC 2016f]

5.8.2 The road casualty statistics for 2014 and 2015 are disaggregated by severity and road user in **Table 5.11**. In 2015 pedestrians and powered-two wheeler users composed 68% of those killed and seriously injured in Plymouth. Conversely car occupants account for 60% of slight injuries.

Table 5.11 – Road casualty statistics by severity and road user, 2014 and 2015, Plymouth authority area

		2014	2015	Proportion by road user category, 2015	% change 2014-2015
Killed or seriously injured	Pedestrians	20	23	29%	+15%
	Cyclists	22	8	10%	-64%
	Powered Two Wheelers	19	31	39%	+63%
	Car Users	21	15	19%	-29%
	Other vehicle users	3	2	3%	-33%
	Totals	***85***	***79***	***100%***	***-7%***
Slight injuries	Pedestrians	86	91	12%	+6%
	Cyclists	47	65	9%	+38%
	Powered Two Wheelers	104	92	13%	-12%
	Car Users	418	443	61%	+6%
	Other vehicle users	52	40	5%	-23%
	Totals	***707***	***731***	***100%***	***+3%***

[PCC 2016f]

5.8.3 The Road Traffic Act 1988 places a duty on LHAs to undertake studies into road traffic collisions and prepare and carry out a programme of measures designed to promote road safety. To help with this task the City Council holds data on road traffic collisions reported through the police Stats19 process, and held on Accsmap, a GIS-compliant database. A study of the causes of collisions in the city has revealed that the majority of injuries arose as a consequence of user error, with car drivers and passengers aged 17- 24 years being the most commonly injured, with accidents most likely to happen between 07:00 to 09:00 and 15:00 to 18:00 [PCC 2015b].

5.9 PARKING

Location and Amount – Plymouth

5.9.1 A range of off-street and on-street parking exists across the city, varying in amount, ownership, cost to use it and the categories of user or vehicles who can park. The city centre currently has more than 5,000 off-street public parking spaces, 4,200 of which are concentrated in seven large multi-storey car parks (MSCPs). The largest of these are Drake Circus (1270 spaces) and Western Approach (1094 spaces). **Table 5.12** and **Table 5.13** set out the charges made at a range of car parks in the City Centre & Waterfront and across the rest of the city respectively.

Table 5.12 – Weekday Parking Tariffs for Cars in Selected Car Parks – Plymouth City Centre and Waterfront

	Weekday Parking Charge (in £)							
	1hr	2hrs	3hrs	4hrs	5hrs	6hrs	Other tariffs	24hrs
Armada Centre (Sainsbury's)	1.00	1.50						
Western Approach MSCP	1.00	2.00	3.00	4.00	n/a	n/a	Over 4hrs 5.00	n/a
PCC City Centre Short Stay Car Parks*	1.20	2.40	3.60					
Mayflower Street East	1.20	2.20	3.30	n/a	n/a	4.00	Over 6hrs 8.00	n/a
Regent Street MSCP	1.20	2.40	3.60	4.80	6.00	7.20	Over 6hrs 12.00	n/a
Drake Circus MSCP	1.40	2.80	3.90	4.80	6.00	7.20		12.00
Royal William Yard	-	2.00	-	-	5.00	-	-	10.00
Rail Station MSCP	-	-	5.90	-	-	-		9.80

[Parkopedia 2017 & PCC 2017]
Notes: ** Short stay car parks include Exchange Street, St Andrew's/Whimple Street, Guildhall, Mayflower House Court, Woolworth East & Colin Campbell Court.*

Table 5.13 – Weekday Parking Tariffs for Cars in Selected Car Parks – Rest of Plymouth

	Weekday Parking Charge (in £)						
	1hr	2hrs	3hrs	4hrs	5hrs	6hrs	Other Tariffs
PCC Car Parks (Mutley Barracks, Plymstock Broadway)	1.00	2.00	3.00				
Other PCC Car Parks	free						
Meavy Way (Crownhill)	1.00	2.00	n/a	n/a	n/a	n/a	Up to 10hrs 3.00
Derriford Hospital#	1.20	2.40	3.60	4.80	6.00	7.20	Over 6hrs 12.00

Notes: *# very short stays are free*
[Parkopedia 2017, PCC 2017 & Plymouth Hospitals NHS Trust 2017]

5.9.2 Controlled Parking Zones (CPZ) – in which all on-street parking is controlled – cover substantial areas within and surrounding the city centre, covering The Barbican and The Hoe, Coxside, St. Judes, Greenbank, Mutley, Ford Park and Stonehouse, and selected areas away from the city centre, such as close to Crownhill local shopping centre. These CPZs cover substantial areas of housing whose residents often do not have any alternative off-street parking available to them [PCC 2014b].

5.9.3 Outside of the city centre, and particularly in the post-war suburbs, many non-residential land uses such as retail parks, employment sites and leisure facilities have generous levels of private parking and in the majority of locations no charge is made for customers, visitors or employees to park. PCC provide a number of off-street car parks available for public use, many of which are situated within or adjacent to local and district centres, such as Crownhill, Leigham, Mutley, Plympton, Plymstock and Whitleigh Green. Charges are levied at a small number of these sites with no charge levied at the remainder.

Use

5.9.4 Demand and pressure for parking is particularly strong in the city centre and the northern employment hub around Derriford. Analysis in 2010 found that city centre surface level limited waiting car parks and disabled off-street car parks are consistently at capacity most of the time, and that some City Centre longer-stay car parks are consistently full, whilst others consistently have spaces available [PCC 2010b]. Demand exceeds supply in the run up to Christmas; those on the edge of the city centre are at capacity on Saturdays, and those close to the waterfront and Barbican experience high demand in summer months [ibid].

Location and Amount – Rest of JLP (Thriving Towns & Villages)

5.9.5 Most of the off-street car parks in the rest of the JLP are owned and operated by SHWDC, whilst on-street parking is the responsibility of DCC as local highway authority. DCC works in partnership with SHWDC and the other district councils to operate a Civil Parking Enforcement Scheme for all on-street waiting and parking restrictions [DCC & Torbay Council 2011].

Parking in New Developments

5.9.6 At present parking standards for new developments within the Plymouth authority area are set out in the *Development Guidelines Supplementary Planning Document First Review* [PCC 2013a], which supports Core Strategy Policy CS34. These set maximum levels of parking, according to size of dwelling or category of land use, and emphasise that parking provision should take account of the level of public transport accessibility. It adds that parking for disabled motorists, powered two-wheelers and bicycles should be incorporated and that account should be taken of other considerations including sharing parking between different land uses.

5.9.7 In South Hams the Development Policies DPD (adopted July 2010) [SHDC 2010] policy DP7 uses vehicle parking standards from Planning Policy Guidance Note 13 now superseded by National Planning Policy Framework and states that, together with residential parking and the level of cycle parking, will be assessed on a flexible site-by-site basis depending on the provision of public transport and access to local facilities. In West Devon local plan policy T8 [WDBC 2005] set maximum standards[10], expects provision to be made for the parking of cycles and motorcycles and provision for disabled car users, with precise levels of provision being a matter for agreement with planning applicants.

[10] the residential parking element was in line with Planning Policy Guidance Note 3 which required overall provision to not exceed 1.5 spaces per dwelling

5.9.8 More recent national policy is outlined in NPPF states that if local authorities are setting local parking standards for residential and non-residential development, they should take into account the accessibility of the development, the type, mix and use of development, the availability of and opportunities for public transport, local car ownership levels and an overall need to reduce the use of high-emission vehicles [Department for Communities and Local Government 2012].

Electric Vehicle Charging Infrastructure

5.9.9 In Plymouth there are currently 20 publicly available electric vehicle charging points at 12 locations, as follows:

- In city centre car parks - Regent Street (2 charging points), Theatre Royal (2), Western Approach (2);
- At P&R Sites - Coypool (1), Milehouse (2), George Junction (2);
- At NHS sites – Derriford Hospital (4), Mount Gould Hospital (1), Cumberland Centre (1), and Thornberry Centre (1); and
- Other locations – City College Devonport (1) and Life Centre (1).

[ZapMap 2016]

Almost all of these points enable fast charging (7kwh or 22kwh), with one point in Regent Street enabling rapid charging (43kwh). Charging points are also available for staff at four additional City Council workplace locations.

5.9.10 In SHWD publicly available locations are currently limited to one rapid charging point (43kw and 50kw) at the A30 Whitehouse Services east of Okehampton[11] [ZapMap 2016].

5.9.11 Electric vehicles currently represent a very small proportion of all registered vehicles, at both a national and local level. However, registrations in Plymouth, South Hams and West Devon have broadly doubled over the last year for which data has been released (Q1 2015 to Q1 2016) [DfT Statistics 2016b].

Car Clubs

5.9.12 Car clubs are companies or community organisations which enable members to hire cars by the hour from convenient, usually on-street, locations close to where they live or work. Whilst no car clubs are currently operating in Plymouth developer contributions have been secured to establish a car club presence at Palmerston Heights, in the Seaton New Neighbourhood [PCC 2016e]. E-Co Cars[12], a community car club, operates elsewhere in the JLP area, with four vehicles and three car club designated parking locations in Totnes, and bookings are made on-line, using smartphones or computers, which trigger member's smartcards to enable the booked vehicle.

[11] Others charging points are available at visitor accommodation, such as hotels and bed and breakfast locations

[12] http://www.e-cocars.com/how-it-works/

5.10 SUMMARY FINDINGS

- Parts of the A38 and A386 have average daily weekday traffic flows of more than 60,000 vehicles and in general terms there is a return to year-on-year traffic growth after flows decreased during the recession;
- Whilst some locations exhibit discernible morning and evening peaks in traffic flow, other sites remain busy throughout the working day;
- Several key junctions and routes regularly experience congestion, including along major routes in the Eastern and Northern Corridors, parts of the A38 and in the city centre;
- ITS is installed at approximately half of the city's traffic signals to maximise the effectiveness of their operation;
- A series of major highway schemes are committed to address key congested parts of the network – these include the Derriford Transport Scheme, Forder Valley Link Road, Deep Lane Interchange Phase 1, and Northern and Eastern Corridor Junction Improvement Programmes, for example;
- Taken as a whole roads and highway infrastructure represents the most valuable asset owned and maintained by PCC and DCC, with funding targeted to ensure it can be used safely and reliably;
- Road casualties in Plymouth have reduced by a third over the last 15 years but more than 800 people were injured in road collisions in the authority area during 2015;
- Much of the parking available in the city centre is provided in large MSCPs, and many southern areas of the city lie within CPZs to control the use of parking. Demand for parking is strongest in the city centre and at Derriford; and
- Limited electric vehicle and car club infrastructure is in existence at present.

6 BUS & COACH TRAVEL

6.1 INTRODUCTION

6.1.1 This chapter describes the current bus and coach network, including P&R services. It describes the infrastructure available, along with brief details on patronage and user satisfaction.

6.2 BUS NETWORK AND SERVICE FREQUENCIES

6.2.1 An extensive network of bus services covers Plymouth and its fringes. Most local bus services start, terminate or call at one of the stops on Royal Parade in the city centre and many services operate on a loop through city centre streets (Mayflower Street, Western Approach, Union Street, Derry's Cross, Royal Parade, Exeter Street, Charles Street) before radiating out along key corridors to serve the city. The bus routes and operators are shown on the public transport network map contained in **Appendix D** (correct at January 2016).

6.2.2 During weekday daytimes, services operate on up to a ten minute frequency (i.e. 6 buses per hour). Services are either less frequent during evenings and weekends or do not operate during these times or days, which can limit journey opportunities. Local residents in communities including Ernesettle, Tamerton Foliot and Glenholt raised dissatisfaction during Plymouth Plan consultations with the level of bus accessibility available to them [PCC 2015].

6.2.3 Conversely the combination of several services operating on the same corridor can give a much more significant bus frequency in selected parts of the city, as described in **Table 6.1** below.

Table 6.1 – Weekday daytime combined bus frequencies on key city bus corridors

Corridor	Weekday daytime combined bus frequency (services per hour)
Union Street westwards towards Devonport and Torpoint Ferry*	9
Saltash Road – Alma Road – Wolseley Road to the north-west towards Tamar Bridge	24
Across the Tamar Bridge from Saltash	12
North Hill – Mutley Plain (towards Crownhill, Derriford Hospital and Tavistock)	19
Exeter Street – Embankment Road towards Plympton and Plymstock	34

Notes: * *Further 2 buses per hour via Royal William Yard and 1 per hour via Paradise Road*

6.2.4 Whilst bus journeys from most parts of the city to the city centre may be straightforward (and to a lesser extent for travel to other local hubs such as Derriford), orbital or cross-city journeys tend to involve interchange between services. As a consequence these journeys have a resultant time penalty and can require a walk between different stops to complete the journey.

South Hams and West Devon

6.2.5 The bus network and service frequencies in the rest of SHWD are shown on the maps in **Appendix E** and **Appendix F** respectively. Bus services tend to radiate out from each of the market or coastal towns, with the most frequent services operating on key interurban corridors. In South Hams hourly or better service frequencies operate from Torquay, Paignton, Totnes to Plymouth (Gold), Ivybridge to Plymouth (service 20 / Gold), Dartmouth, Kingsbridge and Modbury to Plymouth (service 3), Kingsbridge to Salcombe (606), Kingswear to Brixham (18/18A), Kingswear to Paignton (120), Marldon to Paignton (67) Totnes to Buckfastleigh (88) and Totnes to Newton Abbot (177) [DCC 2016c[13]].

6.2.6 In addition the South West Falcon service (limited stop coach service from Plymouth to Bristol via Exeter, Taunton & Bridgwater) calls at the Marley Head junction on the A38, enabling interchange onto Stagecoach Gold (see **para 6.7.5**).

6.2.7 In West Devon hourly or better service frequencies[14] operate between Tavistock, Yelverton and Plymouth (service 1 / X1, giving 4 journeys per hour), Tavistock to Calstock-Gunnislake-Callington (79/79A) and between Tavistock and Whitchurch (89). Okehampton and North Tawton have relatively frequent services to Exeter with services 5A/5B and 6/6A respectively, but these do not combine to give clockface hourly timetables [DCC 2016d].

6.2.8 Away from the core interurban route corridors access to bus services can be substantially lower, with some villages having a less than daily service. Two parts of rural South Hams are served by Fare Car, a public transport service using private hire vehicles.

Accessibility to services

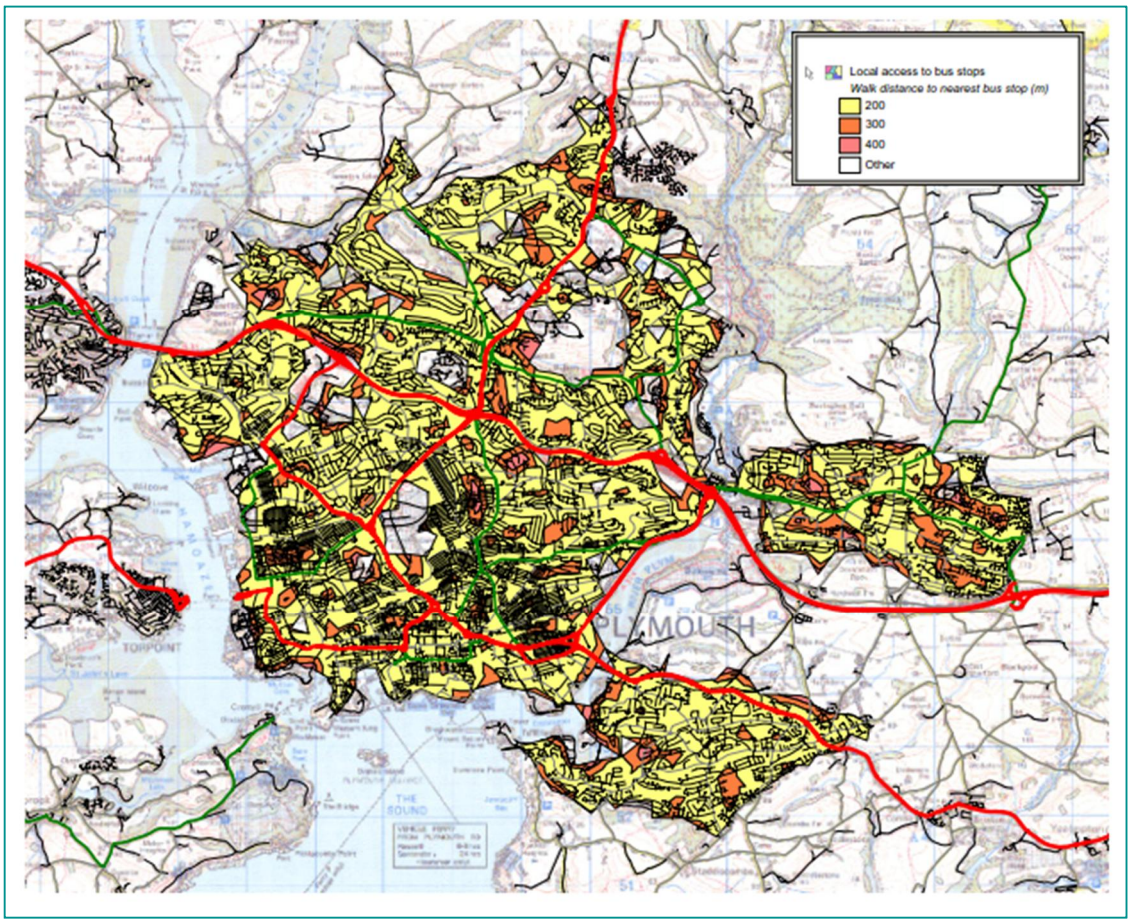
6.2.9 Accessibility to public transport services in Plymouth has been plotted using specialist software and a plan illustrating accessibility in 2010 is reproduced in **Figure 6.1**. This indicates that in 2010 almost all homes (99%) within the city are within 800m of a bus stop and a significant proportion – 84% – of residents are within 400m walking distance of stops [PCC 2010]. Some employment sites such as at Estover are less accessible by bus than other parts of the city [PCC 2015].

6.2.10 However, these statistics do not take account of topography, with steep hills in many places reducing the acceptable walk distances for some people. It should also be borne in mind that the frequency of services available from the stops varies according to the route and the time of day / day of week.

[13] Information correct at time of DCC bus guide publication in May 2016. Other services with less than hourly frequency cover other parts of South Hams district

[14] Information correct at time of DCC bus guide publication in May 2016. Other services with less than hourly frequency cover other parts of West Devon borough

Figure 6.1 – Distance from dwellings to bus stops, Plymouth authority area



[PCC 2010]

6.2.11 Analysis by Steer Davies Gleave [2007] demonstrated a statistically significant correlation between public transport provision and the rate of missed hospital appointments. This appears to be an important result with a 10 minute change in public transport travel time contributing to a 6%-8% change in missed appointments for areas of low car ownership. However, the study highlighted that findings might reflect that households with higher car ownership do not tend to have as many hospital appointments, or that more deprived areas are situated further away from the hospital access than more affluent areas.

Bus Operators

6.2.12 The majority of bus services within Plymouth are operated by Plymouth Citybus (part of the Go-Ahead Group) and Stagecoach South West (part of the Stagecoach Group). Both operators also provide a wide range of inter-urban services with Stagecoach linking the city to destinations in the South Hams, Torbay and Exeter, as well as the frequent link to Tavistock. Bus services in SHWDC are run by a wider range of operators, including Dial-a-Bus, Country Bus, Jackett's Coaches, Tally Ho! Coaches, Target Travel and Tavistock Country Bus, along with a series of community bus associations.

6.3 BUS & COACH INFRASTRUCTURE & INTERCHANGE LOCATIONS – PLYMOUTH CITY

Key Bus & Coach Interchange Locations

6.3.1 Mayflower Street is the new location for Plymouth's city centre coach station for scheduled coach services, with National Express, Megabus & Stagecoach Falcon services. The new, seven-stand station on the Mayflower West multi-storey car park site opened on 7 September 2016 and replaces the former facility at Bretonside. The new location is closer to main rail station and provides a much higher quality facility, with an indoor ticket office and waiting room and toilets, real time information screens and a food and drink kiosk. It is operated by National Express. Significant improvements have also been made to the look and feel of the streets around the new coach station, including taxi and general drop off/pick up areas.

6.3.2 Derriford Hospital also acts as a significant hub for bus services, being the best served location outside the city centre, with 30 departures per hour in the off-peak period. The Derriford Hospital Interchange scheme, currently under construction and secured with contributions from government Growth Deal funds, will widen the hospital entrance to enable two-way bus operations. It will facilitate more efficient bus journeys, improve the waiting areas and provide four additional bus stops.

Plymouth City Centre visitor coach facilities

6.3.3 Visitor coach stops are available at Phoenix Wharf in the Barbican area (three spaces) and at Derry's Cross (five spaces). Derry's Cross includes covered waiting shelters and safe boarding and alighting for continental coaches with doors on the offside [PCC 2016b].

Bus-rail Interchange

6.3.4 Bus-rail interchange in the city is focused on Plymouth Rail Station, which is approximately 650m walk distance from the new coach station and approximately 900m from the principal local bus stops on Royal Parade. At present no bus services directly access the station forecourt (on the southern side of the lines) in view of the operational difficulties of doing so.

Bus-ferry Interchange

6.3.5 Bus services pass close to, or directly serve most of the local ferry landings (Barbican, Admiral's Hard, Mount Batten and Devonport). As highlighted earlier bus services from Cornwall use the Torpoint Ferry and are given priority loading. The cross-channel ferry terminal at Millbay is, however, not directly served by bus services.

Bus Stops

6.3.6 There are approximately 1,815 formal bus stops within the authority area. There is considerable variation in the facilities available at bus stops across the city in terms of such factors as the passenger waiting environment (e.g. shelters, the information available for waiting passengers and whether step-free access to buses is possible). At present:

- à Over 94% have a display case for timetables (1723 stops);
- à One-third have shelters (605 stops);
- à 18% have raised boarders to enable step-free access (321 stops); and
- à 5% have electronic displays giving real-time bus departure information (85 stops), mainly concentrated in the city centre and at locations on the key north-south bus routes, such as the University, Mutley Plain and Derriford Hospital.

Bus Priority Infrastructure

6.3.7 There is a significant level of bus priority infrastructure in the city, comprising bus lanes and bus gates, much of which is located on the main radial bus corridors and on the city centre loop. Many of the bus lanes have 24hr operation and camera enforcement is used to ensure compliance by drivers. In some places, often where highway land is constrained such as on parts of the A386 Tavistock Road, infrastructure is not continuous, with implications for the efficient movement of buses. The completion in 2015 of the Marjon Link Road has provided a two-way bus-only connection between Plymbridge Lane and Derriford Road to improve bus reliability and enhance public transport access to the university and hospital.

6.4 BUS & COACH INFRASTRUCTURE & INTERCHANGE LOCATIONS – SOUTH HAMS & WEST DEVON

6.4.1 In terms of bus infrastructure, off-street bus stations are provided in Tavistock and Kingsbridge, with buses serving the other main market and coastal towns using on-street stops. In some cases bus services use a common set of on-street stops, such as in Totnes (adjacent to the Royal Seven Stars Hotel), Dartmouth (at The Pontoon), whilst in Okehampton stop location can vary by service (e.g. Fore Street, Market Street and School Way). Real-time bus information screens are to be installed at seven locations in SHWD as part of a countywide investment programme (Dartmouth Pontoon, Ivybridge town centre, Kingsbridge bus station, Okehampton town centre, Tavistock bus station, Totnes rail station and Totnes Seven Stars) [DCC 2014a].

6.5 BUS PATRONAGE

6.5.1 **Table 6.2** indicates that Plymouth has higher per capita bus use than neighbouring authorities and higher than the English non-metropolitan authority average. This level of bus use has remained relatively constant for several years.

Table 6.2 – Bus passenger journeys per head of population, 2014/15

Authority	Average bus passenger journeys per head of population
Plymouth	**80.7**
Cornwall	18.7
Devon	37.6
Torbay	61.2
England non-metropolitan average	38.0

[DfT Statistics 2015, DfT Statistics 2015a]

6.5.2 Data collected by the PCC public transport team indicates that overall bus patronage fell by 4.86% between 2014-2015 and 2015-16 (from 21,378,691 reported trips in 2014-15 to 20,339,562 in 2015-16). These figures include a 4% uplift. This decline is thought to be attributable *inter alia* to cheaper fuel prices [PCC 2016].

Subsidised services

6.5.3 In line with provisions in the Transport Act 1985, PCC and DCC subsidise a selected number of bus services in part or in full which would not be commercially viable; however, pressure on such subsidies are under pressure as a result of substantial reductions in local authority total budgets. In Plymouth total trips on all subsidised services increased from 491,238 in 2014-15 to 590,534 in 2015-16 (20.2% increase), which is largely attributable to the introduction of service 34A (Royal William Yard to City Centre) in April 2015. The average cost of providing these services has reduced slightly from £1.62 per passenger using the services to £1.51 per passenger. A major challenge in Devon, in common with other rural authorities, is how to reconcile public expectations of frequent transport services when the level of actual usage, however well promoted the service may be, falls far short of that required to ensure a sustainable subsidy requirement [DCC 2015d].

6.6 BUS SERVICE QUALITY AND USER SATISFACTION

Bus Punctuality and Reliability

6.6.1 Data on bus punctuality and reliability is collected by Global Positioning Systems (GPS) fitted to many vehicles (to enable real-time departure information to be provided) and reported by the DfT at local authority level. In 2014/15 92% of all monitored services in Plymouth arrived within the Traffic Commissioners' window of tolerance (up to 1 minute before or up to 5 minute after the scheduled time) [DfT Statistics 2015b, Traffic Commissioners of Great Britain 2015]. **Table 6.3** identifies that bus punctuality in Plymouth is better than in neighbouring authorities and the England averages.

Table 6.3 – Percentage of non-frequent bus services running on time by authority, 2014/15

Authority	% of services defined as on time			
	2008/09	2010/11	2012/13	2014/15
Plymouth	**85.0**	**88.0**	**91.0**	**92.0**
Cornwall	86.0	79.0	79.0	82.0
Torbay	83.0	81.0	92.0	88.0
Devon	78.0	76.0	77.0	76.0
England outside London	79.4	81.5	82.7	83.2
English non-metropolitan areas	79.6	82.8	83.9	83.1

[DfT Statistics 2015b] *Note: Non-metropolitan areas refers to all areas of England outside Greater London, Greater Manchester, Merseyside, South Yorkshire, Tyne & Wear, West Midlands and West Yorkshire*

6.6.2 For 2014/15 Plymouth Citybus reported overall bus punctuality of 88.2% [Go-Ahead Group 2015] and Stagecoach South West stated 96.1% of all their services operated within 5 minutes of their scheduled time [Stagecoach Group 2015].

6.6.3 A key factor affecting bus service journey times is traffic congestion, with bus journeys at peak times being timetabled to make allowance for slower road conditions. As an example end-to-end journeys on Service 42C (City Centre to Woolwell) are timetabled to take 8 minutes longer outbound and 9 minutes longer inbound during peak periods [DCC 2016d].

6.6.4 However, notwithstanding accounting for slower journey times in timetables, data captured by on-board GPS highlights the problems of bus reliability on key corridors. **Table 6.4** below identifies the substantial variance between average, shortest and longest journey times during peak times on the section of Tavistock Road between Plymbridge Lane (near Derriford Roundabout) and Great Berry Road (north of Manadon Roundabout).

Table 6.4 – Bus journey times southbound on Tavistock Road, 2014

Peak Period	Recorded Journey Times (mins:secs)		
	Average journey	Shortest journey	Longest journey
AM Peak	5:25	2:44	12:30
PM Peak	5:53	2:48	15:38

[PCC 2014c]

6.6.5 The poor bus reliability on this section of road affects journeys to and from the key employment areas around Derriford, to the city centre from northern suburbs and on the key inter-urban corridor to Tavistock and reduces the attractiveness of the bus as a viable transport mode. Across the JLP area the consequences of congestion impacts on the ability of bus operators to operate a frequent service and increases their operating costs – additional buses and drivers are required to maintain the level of service.

User Satisfaction

6.6.6 Annual surveys undertaken by the National Highways & Transport Network Survey indicates that, whilst satisfaction with bus services is relatively high in Plymouth, at around 60%, satisfaction with information provision is lower, at about 50% [National Highways & Transport Network 2015]. Plymouth Citybus reports a user satisfaction rate of 91% [Go-Ahead Group 2015].

Investment

6.6.7 The major bus companies operating in the area both reported substantial investment in new vehicles during 2014/15, with Stagecoach South West spending £2.2m and Plymouth Citybus spending £3.6m [Stagecoach Group 2015, Go-Ahead Group 2015]. The average age of the Stagecoach South West bus fleet stands at 7.3 years.

6.7 COACH SERVICES

Megabus

6.7.1 Megabus is operated by the Stagecoach Group and provides a network of long distance scheduled coach services across Britain. From Plymouth there are five departures daily to London, once a day to Newcastle-on-Tyne, once a day to Leeds and two per day through Cornwall to Penzance. The Stagecoach depot at The Ride, Chelson Meadow provides drivers and vehicles for the Megabus network and servicing of the coaches occurs there. No other locations in the JLP area are served by Megabus.

National Express

6.7.2 National Express is the major provider of scheduled long distance coach services in the UK. Plymouth has been a long established interchange point for services between Cornwall and the rest of the country. Currently there are 8 departures daily to London, two to Scotland, one along the South Coast to Eastbourne, one to the North West and Blackpool, one to North East and Newcastle Upon Tyne and one to the Midlands and Nottingham. There are 8 departures daily into Cornwall. Key destinations from Plymouth are London, Heathrow Airport, Bristol and Birmingham.

6.7.3 As well as serving Plymouth's city centre coach station, National Express services call at stops at Marsh Mills, as well as Totnes and Ivybridge.

6.7.4 A local coach operator, Parks of Plymouth, based at Burrington Way, Honicknowle is a major contractor providing drivers and vehicles on the National Express network.

South West Falcon

6.7.5 Stagecoach introduced the South West Falcon limited stop coach service on 14th February 2016, linking Plymouth with key sites including Exeter's P&R sites, Cullompton, Taunton, Bridgwater, Bristol Airport and Bristol city centre. The service operates 24/7 and both provides links for Plymouth residents to the wider South West and also opportunities for incoming visitors to Plymouth from Bristol Airport. Connections are also available from the Exeter P&R sites to Exeter Airport.

6.7.6 There are 18 departures daily from Plymouth to Bristol Airport and Bristol, with the first at 01:30 and the last at 23:30. All the drivers and vehicles on the South West Falcon service are based at Stagecoach's depot at The Ride.

Visiting and Touring Coaches

6.7.7 PCC Staff at Bretonside have been recording details of visitor & touring coaches using the Coach Station over the last few years and have recorded the number of customers on each coach arriving in Bretonside, as follows:

- Summer (July 2015): 4,957
- Winter (February 2016): 4,523
- Spring (April 2016): 3,700

These figures will not include those customers set down on the seafront, at the Theatre Royal or at local hotels but does give fair indication of number of customers heading towards the city centre retail area. The figure for February 2016 demonstrates importance of the visiting/touring coach market to Plymouth even in the middle of winter and attraction of the wider far South West as an all-year round destination for coach holidays based elsewhere in the south west.

6.8 PARK AND RIDE

Sites – Plymouth and Urban Fringe

6.8.1 Plymouth is served by three P&R sites located on key transport corridors with a total of 1,900 parking spaces, as follows:

- Coypool (450 spaces), by the A38 Marsh Mills Roundabout, serves travellers arriving from the eastern side of the city, with service 200 connecting non-stop to the city centre;
- The George (750 spaces), situated on the A386 Tavistock Road, serves the northern corridor; and
- Milehouse (700 spaces), near Home Park, is accessible from the northern and western corridors.

6.8.2 The P&R bus services operate six days a week from all three sites. The sites are however open every day with Coypool being used by walkers and cyclists as well as visitors to the Plym Valley Steam Railway, The George Junction being available for car boot sales and vintage bus and coach rallies and Milehouse for Central Park users and for the Plymouth Life Centre. Limited-stop service 100 connects The George & Milehouse sites to the city centre, with a variant, 101, serving all stops outbound in weekday morning peaks and inbound in weekday evening peaks. Service PR3, operated by Target Travel, runs between The George P&R and Derriford Hospital and Marjon University for the benefit of staff and visitors to the two organisations. All three P&R services are operated commercially.

6.8.3 A further P&R site, to the south of the A38 and west of Deep Lane, was granted outline planning permission in 2013 as part of the Sherford new community [SHDC 2013]. This site is planned to initially have at least 500 spaces, rising to 1000 spaces at a later date during the development. The scheme has been categorised as the fifth highest priority scheme for Growth Deal 3 funding by the LTB [Heart of the South West LTB 2016].

Sites – South Hams & West Devon (Excluding Urban Fringe)

- In the wider JLP area P&R services operate as follows: At Dartmouth, from a site on the A3122, opposite Sainsbury's, daily from Easter to the end of October; and
- At Salcombe, from Bonfire Hill, adjacent to the A381, operating on spring bank holidays, summer weekends and summer school holiday weekdays.

Use

6.8.4 All of the Plymouth sites are well used with the George Junction site being full on most days reflecting not only demand for the city centre but increasingly for Derriford Hospital, the Plymouth Science Park and Marjon University. The current P&R facilities have strong local usage with a large proportion of people driving less than 2 miles to use them. Total Park & Ride patronage increased by 4.31% between 2011/12 and 2015/16. Last year 43.88% of all P&R journeys in Plymouth were by concessionary passholders, and total concessionary patronage decreased by 0.3% between 2011/12 and 2015/16 [PCC 2016].

Studies

6.8.5 *The Western Corridor P&R Study* [ITP, 2009] describes the investigation into the development and feasibility of strategic P&R for the Plymouth's western corridor. Six locations were initially identified (Camel's Head west of Wolseley Road, east of Weston Mill Drive, north and south of the A38 Weston Mill junction, Ernesettle Lane, and Broadmoor Farm, north-west of the Carkeel Roundabout in Saltash) with a further combined option (Camel's Head and Broadmoor Farm) being included later in the study process.

6.8.6 Routes and forecast demand were investigated to three destinations (City centre, Derriford Hospital and Sherford). Key assumptions were made for the forecasting, including parking charges in the Derriford area being equivalent to those in operation in the city centre, and service frequencies being similar to those at Coypool.

6.8.7 The study recommended that, subject to agreement from the landowner, the Camel's Head option be taken forward for business case development, or failing that, sites adjacent to the A38 Weston Mill Junction. It also recommended that discussions take place with the developer of Broadmoor Farm regarding P&R on that site, as the only option which had the potential to remove vehicle trips from the Tamar Bridge; however the planning permission for the site does not include P&R[15].

[15] Application reference PA14/02447 http://planning.cornwall.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=N2JC5FFG0E800

6.8.8 These studies, and the recommendations they contain, are being reviewed as part of a wider strategy formation process to support the JLP. Recommendations may not necessarily be carried forward in full or in part, as a result of the outcome of the strategy process.

6.9 SUMMARY FINDINGS

- à Plymouth city centre, Derriford Hospital and town centres in the rest of the JLP area act as foci of bus services;
- à Almost all of Plymouth is within walking distance of bus services, with many areas benefiting from high frequencies; however, evening and weekend services are less extensive;
- à In the rest of the JLP area interurban services are the most frequent, connecting the market towns to each other and to key centres outside the JLP area;
- à Major public sector investment has been made recently in bus and coach infrastructure, including the bus-only Marjon link road, the new City Centre Coach Station and Derriford Bus Interchange upgrade;
- à Congestion impacts on the punctuality of bus and coach services and in Plymouth extensive bus priority exists to combat reliability issues;
- à Coach services provide wider regional or national connections, with routes mostly available from Plymouth and to a lesser degree from Ivybridge and Totnes; and
- à Popular P&R services operate on a commercial basis from three locations serving Plymouth. P&R also serves Dartmouth and Salcombe.

7 RAIL TRAVEL

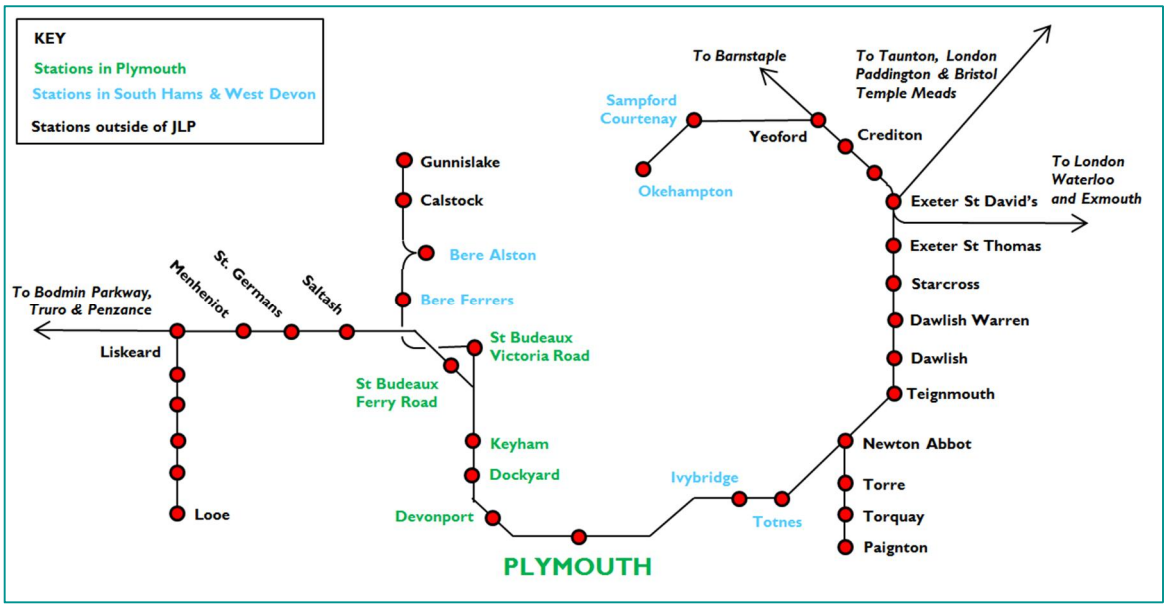
7.1 INTRODUCTION

7.1.1 This chapter describes the rail network serving the JLP area, including infrastructure, rail services and proposed enhancements. It discusses existing passenger levels and forecast growth.

7.2 RAIL NETWORK & SERVICES

7.2.1 The National Rail network covering the JLP and surrounding area is shown in **Figure 7.1** and is centred on a single mainline from Penzance to London Paddington.

Figure 7.1 – National Rail Network serving the JLP area



[WSP | PB on behalf of PCC]

Stations

7.2.2 The following National Rail stations are located in the JLP area:

- à Plymouth, Devonport, Dockyard, Keyham, St. Budeaux Ferry Road and St. Budeaux Victoria Road in the Plymouth authority area;
- à Ivybridge and Totnes in the South Hams authority area; and
- à Bere Alston, Bere Ferrers, Okehampton and Sampford Courtenay in West Devon.

7.2.3 Details of services and facilities at these stations are set out in **Table 7.1.**

Table 7.1 – National Rail Stations in the JLP area

Station	Services calling at station	On-site car parking spaces	Manned ticket office?	Notes on accessibility to platforms and cycle parking
Bere Alston	Tamar Valley Line Services	13	No	4 cycle parking spaces. Step-free access available to platform
Bere Ferrers	Tamar Valley Line Services	9	No	6 cycle parking spaces. No wheelchair access available to trains
Devonport	Great Western local services (Cornish Mainline and Tamar Valley line)	10	No	No step-free access to platforms. 4 cycle parking spaces
Dockyard	Great Western local services (Cornish Mainline and Tamar Valley line)	0	No	No step-free access to platforms. No cycle parking
Ivybridge	Great Western local services and selected high speed services	100	No	Step-free access to platforms. No cycle parking
Keyham	Great Western local services (Cornish Mainline and Tamar Valley line)	0	No	4 cycle parking spaces. No step-free access to platforms
Okehampton	Dartmoor Sunday Rover summer services only	Yes	Yes	Shop and café. Step-free access to platforms
Plymouth	Great Western high speed and local services CrossCountry long distance services	312	Yes	Fully accessible with lifts to platforms. 61 cycle parking spaces
St. Budeaux Ferry Road	Cornish Mainline local services	0	No	8 cycle parking spaces. Platform only accessible via a ramp steeper than 1:12 gradient
St. Budeaux Victoria Road	Tamar Valley Line Services	0	No	Platform only accessible via a ramp steeper than 1:12 gradient. 4 cycle parking spaces.
Sampford Courtenay	Dartmoor Sunday Rover summer services only	Yes	*	*
Totnes	Great Western high speed and local services CrossCountry long distance services	102	Yes	Step-free access to both platforms but transfer between platforms / buildings requires use of A382 road bridge. 52 cycle parking spaces.

[National Rail Enquiries 2016] * *Note: details not available from National Rail for these stations*

7.2.4 Parts of the JLP area are a considerable distance from National Rail stations, hindering connections to other parts of the UK. As a result of this, stations outside the JLP area are sometimes also used by travellers from SHWD to access rail services, including:

- à the Riviera Line (Paignton to Torquay), east of the South Hams district boundary;
- à the Tarka Line (Barnstaple-Exeter) north-east of the West Devon boundary;
- à Gunnislake at the terminus of the Tamar Valley Line; and
- à Mainline stations such as Tiverton Parkway (adjacent to the M5 motorway).

7.2.5 Plymouth Rail Station on North Road East in the city centre is the busiest of the six stations in the city and acts as the primary gateway for long distance rail travel for the wider region. Nearly 2.5m passenger entries and exits were recorded at Plymouth Rail Station in 2014/15, making it the busiest in the far south west. It is also an important interchange station between long-distance and local services.

7.2.6 **Table 7.2** shows the entries and exits at each of the stations in Plymouth and selected stations in adjoining areas, calculated from ticket purchases. It highlights the substantial growth in passenger numbers from most stations in the JLP area and its commuter hinterland. It should be noted that these statistics are likely to under-report passenger numbers due to ticketless travel from smaller unstaffed stations.

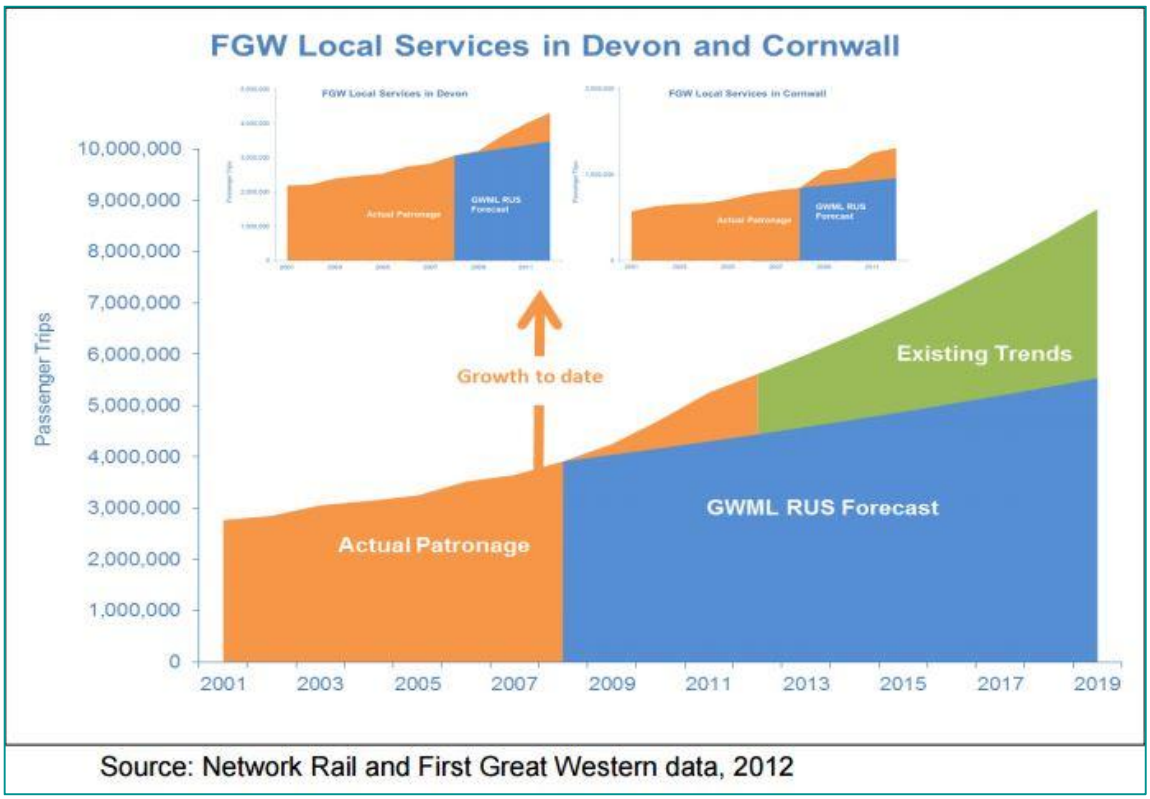
Table 7.2 – Entries and Exits at National Rail Stations in the JLP area and selected other local stations

	Station	1997-98	2004-05	2014-15	% change 97/98-14/15	% change 04/05-14/15
Plymouth	**Plymouth**	**1,294,698**	**1,519,011**	**2,495,248**	**93%**	**64%**
	Devonport	38,189	16,202	33,968	-11%	110%
	Dockyard	6,005	5,088	6,300	5%	24%
	Keyham	8,421	6,374	6,936	-18%	9%
	St. Budeaux Ferry Road	1,357	969	3,926	189%	305%
	St. Budeaux Victoria Road	4,991	5,818	10,332	107%	78%
South Hams	Ivybridge	19,683	40,613	59,374	202%	46%
	Totnes	295,522	353,580	657,754	123%	86%
West Devon	Bere Alston	33,875	29,552	37,082	9%	25%
	Bere Ferrers	15,184	12,862	16,858	11%	31%
	Okehampton	-	-	2,984	-	-
	Sampford Courtenay	-	-	196	-	-
Cornwall	Liskeard	193,439	232,269	357,086	85%	54%
	Gunnislake	33,462	37,190	54,356	62%	46%
	Saltash	29,559	35,349	68,526	132%	94%

[Office of Rail & Road 2015] *Note: Figures do not include interchanging passengers*

7.2.7 **Figure 7.2** highlights that demand for rail travel in the far south west has witnessed unprecedented passenger growth over the last 21 years, rising by 128% during this time. This has led the industry passenger forecasts for 2019 to already be surpassed by 2012 [PRTF 2014]. 25m passengers travelled into and out of the peninsula in 2014/15, the 5th highest of the regions across the UK, with 11.5m (2014/15) journeys to London, the 4th highest of the regions. In the decade to 2012 the Plymouth to Penzance line had 184% growth, Exeter to Plymouth/Paignton saw 108% growth and the Tamar Valley Line 47% growth [Cornwall Council et al 2013].

Figure 7.2 – Passenger growth on local rail services



[PRTF 2014a]

7.2.8 Rail passenger demand is characterised by a number of seasonal peaks that stretch capacity, including holiday periods and student travel and these often lead to overcrowding. It is widely acknowledged that the level of service – in terms of train length and service frequency – has neither kept pace with the growing demand for rail travel generally nor taken sufficient account of seasonal peaks of demand.

Forecast passenger growth

7.2.9 Historically the level of growth in passenger usage has been underestimated by the rail industry, with Network Rail's *Western Route Study* [2015] identifying growth of 2.6%. This is against the growth shown in the section above and the most recent forecasts indicate future rail growth in the region of 5.7% per annum, exceeding previous estimates [WSP | PB 2016a]. Rail commuting demand to Plymouth and Truro is predicted to increase by 47% by 2023 and 111% by 2043 [Network Rail 2015]. The same study identifies that the heaviest loadings on long-distance services are widely spread both between services and different parts of the route. Crowding on these services is not exclusively within the peaks, and several non-peak services are at risk of on-train crowding. By 2023, the forecast growth would present significant on-train crowding on the CrossCountry services from Plymouth. The underestimation of growth by the rail industry has serious implications for the growth of the economy of the region.

Infrastructure & Resilience

7.2.10 The mainline railway is double track, with the exception of a section of single track across the Tamar on the Royal Albert Bridge. Similarly, the Gunnislake branch line is also single track. The long signalling headways between Totnes & Plymouth & Saltash & Liskeard limit the number of services which can operate at present on the mainline. Some infrastructure exists for railfreight, with sidings at Marsh Mills (known as Tavistock Junction) and a branch line running from Laira to Cattedown and Friary Yard [PCC 2010a]. Network Rail own and maintain the rail infrastructure.

7.2.11 Over recent years the rail infrastructure at key locations on the mainline serving the South West Peninsula has seen serious closure through seawall collapse at Dawlish and flooding at Cowley Bridge north of Exeter and on the Somerset Levels. The PRTF is campaigning for Network Rail to make the route resilient. This is considered further in **Section 7.6**.

7.3 TRAIN OPERATING COMPANIES

7.3.1 The principal train operating company (TOC) serving the region is Great Western Railway (part of First Group), who also manage all the stations in Plymouth and on the surrounding lines. Government has directly awarded franchise extensions twice to First Group, most recently in September 2015. A new Great Western Franchise is due to be awarded in December 2019 and commence in April 2020, with the invitation to tender being issued to shortlisted bidders in February 2019 [DfT 2016a].

7.3.2 Long distance services to the Midlands and Northern England form part of the franchise, currently operated by CrossCountry (Part of Arriva UK Trains). The TOC has had their franchise extended from the previously set end date (October 2016) until October 2019, at which point a new franchise will commence [ibid].

7.3.3 The region benefits from the Devon & Cornwall Rail Partnership, a longstanding, active and award-winning community rail partnership. The DCRP leads on promotion and development of the local lines [Devon & Cornwall Rail Partnership 2016].

7.4 SERVICE QUALITY AND USER SATISFACTION

7.4.1 **Table 7.3** compares levels of satisfaction by different traveller categories by TOC and route. Leisure travellers tend to be the most satisfied with their journeys; conversely less than three-quarters of commuters are satisfied with their journeys on local services in the region. Levels of satisfaction with reliability and punctuality is around 80% for the three groups of services surveyed in the region, which is higher than the Great Britain average. The long-distance services (to Birmingham and London) score poorly for value for money.

Table 7.3 – National Rail Passenger Survey satisfaction, spring 2016

Satisfaction theme	Great Western		CrossCountry Birmingham to SW	GB Average
	Long Distance services	West (local services)		
Overall satisfaction – commuters	81	73	85	72
Overall satisfaction – business journeys	81	75	79	82
Overall satisfaction – leisure journeys	92	90	87	90
Punctuality / Reliability	79	82	80	73
Value for money	43	64	52	45

[Transport Focus 2016, 2016a & 2016b]

7.4.2 A key service quality theme affecting rail journeys in the far south west is the age of rolling stock in use, with the region having the 2nd oldest fleet in the UK. Many of the train units currently in operation do not meet the Rail Vehicle Accessibility Regulations[16] to enable ease of travel by disabled or less mobile travellers. Similarly many of these older vehicles have doorways located at the end-of-carriage, making boarding and alighting less efficient and increasing dwell time at stations [Heart of the South West LEP undated] and do not offer high standards of space and comfort for travellers.

7.4.3 **Table 7.4** shows the majority of delays experienced by the TOCs running services in the JLP area are attributable to Network Rail, arising from problems with the infrastructure or their operations.

Table 7.4 – Delay Split by Operator for the 365 days to 17 September 2016

	Attributed to Network Rail				Caused by TOC	Caused by other passenger TOCs	Caused by freight TOC
	Infra-structure	Operations and Other	External	Totals			
Great Western Railway	26%	20%	15%	62%	27%	6%	5%
CrossCountry	29%	16%	20%	65%	10%	19%	6%
Nationally	-	-	-	60%	30%	10%	

[Network Rail 2016] *Note: Relates to passenger train delays of 3 minutes or more. 'External' includes weather, fatalities on the line, etc.*

7.4.4 The PRTF surveyed employers in June 2016 in order to assess the importance of rail services to the business sector in the South West Peninsula, and to gauge reactions to the priorities of the emerging PRTF strategy. The findings are set out below:

- Rail services are important to South West businesses:
  - Over 75% of those responding said that rail is important for their business, with varying reasons according to the circumstances and location of each business;
  - Over 87% of respondents said that rail is used by their staff for business travel;
  - Over 53% said that rail travel is used by their suppliers; and
  - Some 36% said that rail is used by their staff for commuting.
- The following proportion of respondents said rail connections to the following areas is important for their businesses:
  - To London and the South East - more than 91%;
  - To Bristol and the Midlands/ North - over 80%;
  - Within the South West - almost 69%; and
  - To international airports - 60%.

7.4.5 A key requirement for future services is the provision of reliable and resilient wifi and continuous mobile network coverage on rail services, in order to meet business and leisure traveller expectations and enable travellers to work effectively on trains.

[16] The Rail Vehicle Accessibility (Non-Interoperable Rail System) Regulations 2010 (RVAR 2010) set out the accessibility standards to which new non-mainline rolling stock (and older rail vehicles as and when they are refurbished) must comply. Regulated by the Office of Rail and Road. http://orr.gov.uk/

7.5 COMMITTED FUTURE CHANGES TO RAIL INFRASTRUCTURE AND SERVICES

7.5.1 In 2014 the government confirmed that the *Cornwall Rail Improvement Package* would go ahead, covering a major upgrade to the Night Riviera Sleeper service, enhancements to the traincare maintenance centre in Penzance, and bringing forward a part improvement of the signalling improvements between Totnes and Penzance, to allow two trains an hour between Plymouth and Penzance [DfT 2014].

7.5.2 Further rail service improvements were committed in the most recent direct franchise award to First [DfT 2015], as follows:

- A combination of local, Intercity and CrossCountry services to provide a 2tph service frequency on the Cornish Mainline from December 2018;
- An additional early London to Cornwall service;
- The core Intercity service to be supported by a two-hourly stopping service between Paddington and Exeter to provide connectivity to the intermediate stations;
- The introduction of new bi-mode (electro-diesel) high-speed trains (AT300) for the South West of England for delivery in time for the December 2018 timetable change, giving journey time reductions of 6 minutes on the journey from Paddington to Plymouth and increasing seating capacity by 24%;
- Cascading of train fleets to replace the Class 143 ('Pacer') units currently used on local services (will not be compliant with interoperability regulations from 2020); and
- Introduction of on-train free wifi across the train fleet.

7.6 PRIORITIES FOR FUTURE RAIL INFRASTRUCTURE AND SERVICES

7.6.1 The PRTF published its 20 year plan entitled '*Closing The Gap – The South West Peninsula Strategic Rail Blueprint* [PRTF 2016], in November 2016, setting out the improvements being sought for the South West peninsula. The 20 year plan outlines these improvements in three phases – to 2019, to 2029 and then 2030 onwards, which follow the 3 point plan:

- Immediate Priorities to 2019:
  - Invest £284m in resilience, including commencing the securing of the main rail line through Dawlish and Teignmouth;
  - Completion of committed flood relief schemes;
  - Introduce trains capable of operating along the seawall in all weathers;
  - Invest £2.5m in GRIP 3 options for the diversionary route East of Exeter;
  - Invest £22m in GRIP 3 options for reducing journey times;
  - Increase frequency to 2 direct trains an hour from Plymouth to London in the new franchise, reducing journey times by up to 10 minutes, whilst at least maintaining existing services; and
  - Work with the rail industry to maximise the benefits of the new trains from Dec 2018 and invest £25m to make our journeys more productive through on board travelling office, media and mobile/wi-fi connectivity.
- Medium Term Priorities to 2029:
  - Invest £301m to complete Dawlish seawall and cliffs resilience, the diversionary route between Exeter and Castle Cary and estuary flood protection;

- Invest £1.5bn to reduce journey times by up to 14 minutes to Penzance, through infrastructure improvements, partial electrification and franchise renewal;
- Invest £150m reducing journey times and increasing core capacity on the Exeter –Waterloo line;
- Invest £358m to improve capacity and comfort through new rolling stock, infrastructure enhancements and phased opening of the Northern Route; and
- Increase frequency to 2 trains an hour west of Exeter to Bristol and the Midlands.

Other key documents include *The South West Spine- The case for Greater Investment across the South West Peninsula Railway* [Cornwall Council et al 2013]. The studies and documents that were undertaken to support the 20 year plan are published on the PRTF website – www.penisularailtaskforce.co.uk .

Key Infrastructure Issues

7.6.2 A series of key infrastructure schemes are either in preparation or have been the subject of reports and assessment. These are summarised below:

Bere Alston to Tavistock Railway Reinstatement

7.6.3 DCC is leading plans to relay track on 5.5 miles of former rail alignment and construct a new station at Tavistock with adjacent car park. The proposal would connect the town to the National Rail network at Bere Alston and the line is safeguarded in West Devon's Core Strategy. The proposal is for a single track rail line and the intention is ultimately to deliver an hourly service in each direction, with a forecast journey time to Plymouth of 28-33 minutes [DCC 2013]. It will offer an alternative route into the city and minimise the number of private vehicle trips generated by new development in Tavistock [ibid].

7.6.4 The proposed development constitutes a Nationally Significant Infrastructure Project and was included in the Great Western Franchise Invitation To Tender document, with the successful bidders required to cooperate with DCC in delivering the scheme [DCC 2013]. Design, land acquisition and preparation work continues on the scheme [DCC 2016]. The key milestones anticipate the submission of an application in summer 2017, with construction in 2019/20 and the railway opening in 2021 [Planning Inspectorate 2015]. The scheme has been included in the 2015-2019 implementation programme by the Local Transport Board [DCC 2014].

Plymouth Station Improvement Scheme

7.6.5 A major upgrade of Plymouth station is currently under development, with plans to deliver the first stage by 2020. The LTB have resolved that the improvement scheme is their 3rd highest priority for Growth Deal 3 funding [Heart of the South West LTB 2016].

Mainline Electrification

7.6.6 When Network Rail's current programme of electrification works are completed the route to the Far South West will be the only remaining non-electrified mainline in England. The *Economic Study Into The Electrification of Rail Services to Plymouth & Cornwall* [WSP 2014] highlights that, based on current service patterns, electrification of the mainline to Devon and Cornwall would deliver up to £1bn of operational savings over the 60-year appraisal period. It identifies that there is a strong case for an enhanced service alongside electrification.

Dawlish Avoiding Line / Northern Route to Plymouth

7.6.7 Assessments have been made into infrastructure which would make the far south west less reliant on the section of coastal line at Dawlish. After the seawall collapse in February 2014 Network Rail assessed a range of route options to avoid Dawlish, including reinstating the former Teign Valley Line, or options for new lines between Exeter and Newton Abbot. This also examined the potential for a rail line to the north of Dartmoor, reopening 15½ miles of railway from Meldon Quarry at Okehampton to Tavistock [Network Rail 2014]. This would create a second route from Plymouth to Exeter along the northern flank of Dartmoor, enabling more freight traffic and bringing rail services closer to unserved areas of West Devon and North Cornwall and the *PRTF: Northern Route Workstream* [Jacobs 2016] made an assessment of the scheme costs and benefits.

Plymouth Metro

7.6.8 *Plymouth Metro* is the brand given to proposals for enhanced services linking Plymouth with different parts of the commuter hinterland, including Liskeard, Gunnislake (including the future Tavistock Railway), Paignton and Exeter. Enhancements could be delivered through increased frequencies and clock face departures from Plymouth. Consideration is also given to a new Park & Ride station at Trerulefoot to target road traffic from South East Cornwall into Plymouth. [Network Rail 2015].

Okehampton East Rail Station

7.6.9 Design work is underway to investigate the option for a second station at Okehampton closer to Exeter Road [DCC 2015b]; however the station is dependent on a regular weekday rail service between Okehampton and Exeter being specified in one of the new rail franchises [DCC 2016].

7.7 SUMMARY FINDINGS

- à Regional rail has been characterised by very strong passenger growth over last two decades and the increasing passenger numbers have not been adequately catered for with a parallel increase in rolling stock or services;
- à The PRTF was formed in 2013 to lobby for ambitious rail investment to address resilience issues, meet growth in rail travel, provide electrification and journey time improvements
- à The next few years will see the introduction of a new fleet of high speed trains and rolling stock from other parts of the UK being cascaded to the South West to replace some existing trains; and
- à A programme of rail investment is being developed, including the reinstatement of the railway line to Tavistock and the Plymouth Station Improvement Scheme. The PRTF is also pursuing a programme of more transformative infrastructure to benefit the wider region such as mainline electrification and options to route the railway away from Dawlish.

8 ACTIVE TRAVEL NETWORKS & SUSTAINABLE TRANSPORT INITIATIVES

8.1 INTRODUCTION

8.1.1 Active Travel refers to the encouragement of physically active modes of travel (walking and cycling), in preference to more sedentary motorised travel. According to Sport England's Active People Survey 84.8% of Plymouth residents walked for any purpose every month, slightly less than the England average of 86.3% [DfT Statistics 2016c]. In terms of cycling, 14.6% of Plymouth residents cycle every month for any purpose, in line with the England average of 14.7% [ibid]. The City Council's Wellbeing Survey identified that 18.6% of the adult population of Plymouth exercises for 30 minutes three times a week [PCC 2015f], making the city one of the lowest exercising areas in the South West [PCC 2015g] and building active travel into people's everyday lives is acknowledged as one of the most effective ways of increasing rates of physical activity.

8.1.2 As outlined in **section 4.5**, a substantial number of walking and cycling journeys are already made in the JLP area. Similarly consultation roadshow surveys identified that 17.7% of commuting journeys on the Northern Corridor are made by walking or cycling, rising to 35.5% of non-commuter trips [PCC 2015c]. This chapter explores the walking and cycling network available, gives insights into the numbers of active travel journeys made and the supporting promotion activities and their impact.

8.2 EXTENT AND QUALITY OF ACTIVE TRAVEL NETWORK

Infrastructure for walking and cycling – Introduction

8.2.1 Plymouth benefits from substantial lengths of traffic-free routes for walking and cycling which often form part of a wider network of green and blue infrastructure – multi-functional natural spaces which attenuate flood waters, provide habitats for wildlife, space for recreation and routes for walking and cycling. They include routes along the waterfront and beside rivers, through woodlands, parks and allotments, key sections of the National Cycle Network (NCN) and the South West Coast Path National Trail.

8.2.2 Some of these routes are public rights of way (PROW), shown on the Definitive Map and Statement [PCC 2014d] but many other routes are available for public use but not designated as PROW. Often the existing green infrastructure assets are the valley 'fingers' running between the existing residential neighbourhoods in the city's northern suburbs. Infrastructure for active travel is also provided as part of the highway (such as the footways adjacent to most carriageways, on-carriageway cycle lanes and shared cycle/footways).

8.2.3 The rest of the JLP area has an extensive network of PROW, ranging from key connections in the market towns and local centres, to rural footpaths, bridleway and byways. DCC has identified that 95% of its PROW are easy to use [DCC & Torbay Council 2011] and published its latest Rights of Way Improvement Plan in 2012 [DCC 2012].

8.2.4 The condition of footways and cycleways is monitored by detailed visual inspection surveys undertaken by PCC and DCC in line with the code of practice in *Well Maintained Highways*. In Plymouth the full network is covered every 2 years, whilst in Devon the full network is inspected annually [DCC 2013b].

Cycle infrastructure

8.2.5 Key National Cycle Network (NCN) routes pass through Plymouth and across the rest of the JLP area, as follows:

- Route 2 (Cornwall to Dover): This runs from the Cremyll Ferry at Admiral's Hard in Plymouth through Stonehouse Creek Park, North Cross and past the university, through the East End and along Embankment Road and eastwards through Plympton. The route then heads east through South Hams, connecting Ivybridge, South Brent and Totnes. It includes the Dart Valley Cycleway, nine miles of mostly off-road routes connecting Totnes, Dartington and other rural communities in the valley
- Route 27 (Devon Coast to Coast): This runs from Admiral's Hard, along the Waterfront, over the reopened Laira Rail Bridge and through the Saltram Estate. North of Marsh Mills the route follows the Plym Valley, skirting the edge of Dartmoor and reaching Tavistock. NCN27 continues north to Lydford, Okehampton and Hatherleigh and into Torridge District at Meeth. The section between Plymouth and Tavistock is known as Drake's Trail, the section between Lydford & Tavistock as the Granite Trail and the section north of Meeth is known as the Tarka Trail. Much of this route uses former railway alignments, making use of the historic Meldon Quarry Viaduct near Okehampton and crossing the iconic new Gem Bridge across the River Walkham south of Tavistock; and
- Route 28 (Okehampton to Plymouth via Eastern Dartmoor): This route is in development and is currently signposted along rural lanes across the South Hams from Totnes to Salcombe and Yealmpton [SHDC 2015].

8.2.6 Plymouth has a growing network of cycling routes, with more than 140 miles of off-road cycleways [PCC 2014e], and when these are delivered they often include improvements for pedestrians and those with mobility and other impairments. Responses to the winter 2015 Plymouth Plan consultation frequently highlighted a desire for improved and additional cycle routes across the city [PCC 2016h].

8.2.7 PCC publishes the Plymouth Cycle Map [PCC 2015a], which records the combination of off-road routes and recommended and signed on-road routes. Unsigned advisory routes are also included on the map, and the map also indicates individual streets and areas where the speed limit has been reduced to 20mph, improving actual and perceived safety. As routes and other relevant improvements are delivered they are added to the map.

8.2.8 DCC has published a series of cycle maps for key towns, including Tavistock [DCC 2010] and Totnes & Dartington [DCC 2013a], as well as guides to several of the longer trails, such as the Devon Coast-to-Coast.

8.2.9 The 2009 *Strategic Cycle Network* (SCN) [PCC 2009] sets out PCC's long term aspirations for a comprehensive network of routes and was formally adopted by full Council as part of the LTP in 2011. The SCN categorises routes according to the speed of journeys possible along the route, or whether the route is suitable for experienced or less experienced cyclists. This is contained in **Appendix G** and it helps to form the City Council's basis for making walking and cycling investment decisions in the city.

8.2.10 Devon's 2015 *Cycling and Multi-Use Trail Network Strategy* [DCC 2015c] sets out how the County Council will develop a segregated, high quality multi-use cycle route network that provide access for all. Figure 3 from the strategy, which maps the existing and proposed rural and leisure trails, is reproduced in **Appendix H**.

Numbers of cycling journeys

8.2.11 The DfT have over 30 traffic count points across the city as a whole and data collected over an 8 year period between 2005 and 2013 showed a 114% increase in the number of cyclists on, or adjacent to, these roads [DfT Statistics 2016]. This is likely to be a conservative estimate as the counts do not take account of cyclists using off-road routes [Peter Brett Associates 2015]. More recent DfT data suggests that cycling has increased by at least 50% in the 6 years from 2009 to 2015 using a three-year rolling average [DfT Statistics 2016].

8.2.12 PCC also has a series of permanent cycle counters at various locations around the city. The data in **Table 8.1** below shows cyclist numbers at selected count locations. It underlines the popularity of off-road routes and substantial flows which take place on them. It also emphasises the importance of connecting these routes together into a comprehensive network which can be used for end-to-end journeys.

Table 8.1 – Average daily cyclist numbers at count locations in Plymouth, January to August 2016 inclusive

Count location	Daily average	Totals year to date
Laira Rail Bridge cycleway	456	100,593
Lower Embankment Road cycleway	298	69,914
Cycle bridge over Lower Embankment Road	179	41,991
Entrance to Victoria Park from Mill Bridge	168	39,936

[Drakewell Limited 2016]

8.2.13 Comparison of count data indicates that cycling levels have more than doubled where targeted investment has taken place, such as since the opening of the Laira Rail Bridge for walking and cycling. There is considerable daily variation in cycle flows, with some off-road routes (Laira Bridge) tending to have higher flows on weekends whilst others (Victoria Park, Lower Embankment Road) having higher cycle flows on weekdays.

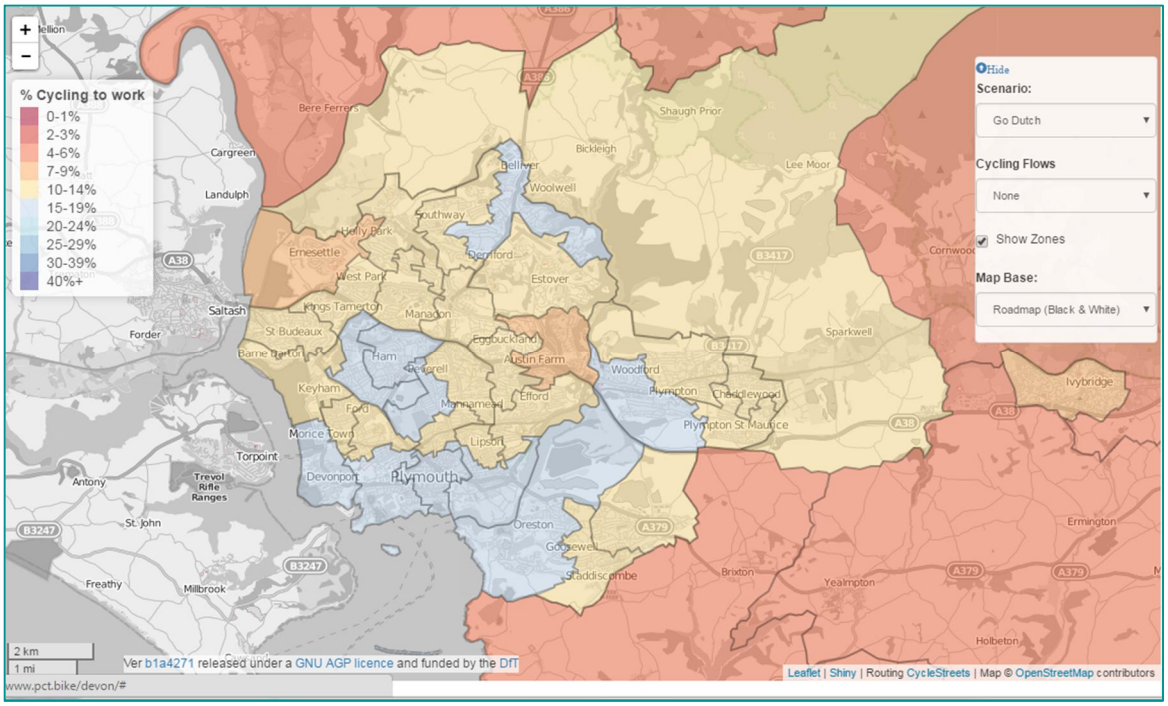
8.2.14 Outside of Plymouth key sections of the NCN in parts of SHWD are also popular, with almost 32,000 cycle trips recorded at Gem Bridge, south of Tavistock, in 2014 – a 7% increase on the previous year [DCC 2015].

8.2.15 The DfT-commissioned Propensity to Cycle Tool (PCT) [DfT 2016] uses existing origin-destination data to identify which trips could most easily switch to cycling, taking account of hilliness and journey distance, to help authorities pinpoint investment. The PCT compares four different scenarios, as follows:

- à 1) meeting government targets to double cycling levels by 2025;
- à 2) achieving gender equality in cycling levels with more women cycling (75% of cycling commutes in the UK are presently by men);
- à 3) *Go Dutch*: What would occur if UK residents had the same likelihood to cycling as people in the Netherlands); and
- à 4) *E-bikes:* taking account of the additional contribution of electric bikes for longer and hillier trips [MRC Epidemiology Unit 2016].

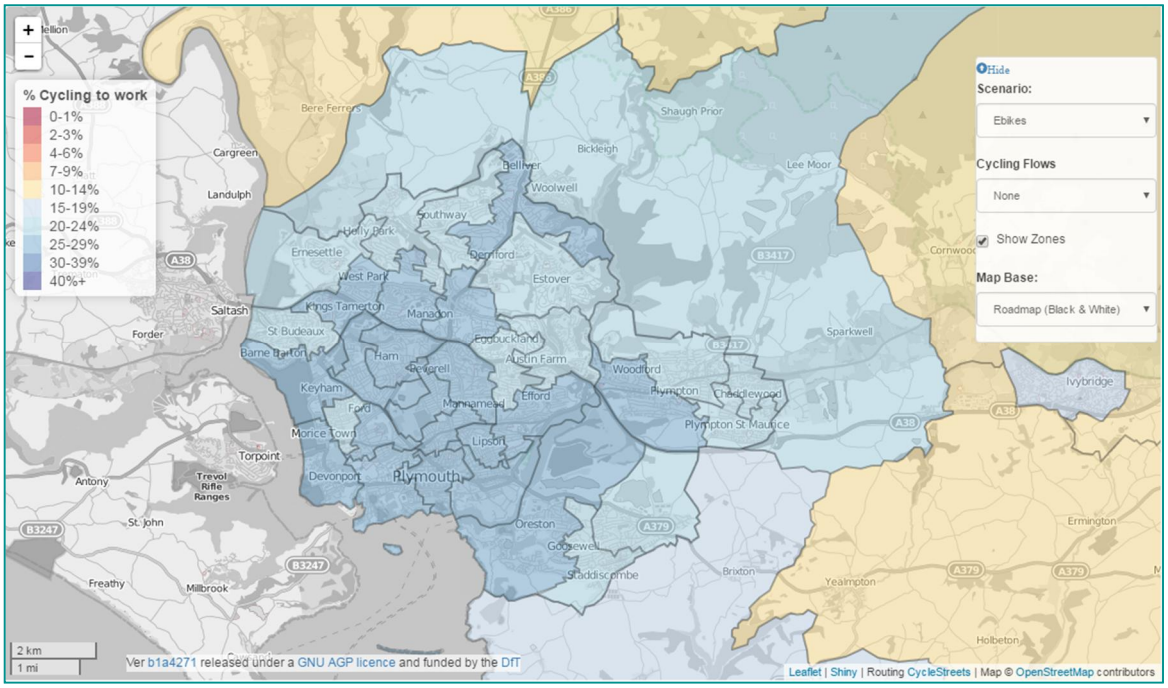
8.2.16 **Figure 8.1** and **Figure 8.2** overleaf illustrate the potential levels of cycling to work in Plymouth and the urban fringe which the PCT suggests could occur under the Go Dutch and E-Bikes scenarios respectively.

Figure 8.1 – Propensity to Cycle Map of Plymouth and urban fringe – '*Go Dutch*' Scenario



[DfT 2016]

Figure 8.2 – Propensity to Cycle Map of Plymouth and urban fringe – E-Bikes Scenario



[DfT 2016]

8.2.17 The figures above indicate that under the Go Dutch scenario the cycling commuting mode share could reach 15-19% in neighbourhoods in the Plym Valley, City Centre & Waterfront, Central Park, North Prospect areas and parts of the Northern Corridor. The PCT forecasts that the contribution of e-bikes has the potential in many areas to increase the cycle commuting mode share more substantially, suggesting that it could exceed one quarter of all commuting trips [DfT 2016].

8.2.18 The evidence reviews and data analysis which has been undertaken as part of the PCT emphasises the importance of high-quality and direct routes as means of opening up cycling to women and older people. These groups have a stronger preference for separation from motor traffic and are less likely to make longer trips by cycle [ibid].

Cycle parking

8.2.19 Levels of available cycle parking varies across Plymouth, with improvements in recent years delivered as part of new developments and in the city centre. A substantial increase in cycle parking was delivered in and around the city centre in 2015, with 77 additional spaces funded by the DfT through its Local Sustainable Transport Fund (LSTF). Public cycle parking locations are identified to some extent on the Plymouth Cycle Map.

8.2.20 At present cycle parking can be of variable quality and not often conveniently and visibly located, which can discourage cycle use. More secure forms of cycle parking, such as lockers, or possibly cycle hubs, should be considered to complement the existing provision.

Walking infrastructure

8.2.21 There are more than 666 miles of footways alongside roads within the Plymouth authority area [PCC 2014e] and most of the city's off-road routes are available to both pedestrians and cyclists. However, some links are reserved for pedestrians only.

Numbers of walking journeys

8.2.22 In Plymouth data on pedestrian flows is collected at four permanent city centre locations – two on Cornwall Street and two on New George Street – and average footfall is set out for July 2016 in **Table 8.2**:

Table 8.2 – Average pedestrian footfall, July 2016

Day of week	New George Street (East End)	Cornwall Street (middle)	New George Street (West End)	Cornwall Street (West End)
Mondays	26,119	11,973	8,125	5,421
Tuesdays	25,757	11,885	8,179	5,220
Wednesdays	25,579	11,761	8,686	5,337
Thursdays	27,313	12.249	8,426	5,353
Friday	28,743	13,146	9,184	6,087
Saturday	34,573	15,765	11,387	7,282
Sunday	18,771	6,038	7,494	2,718
Average weekday	*26,799*	*12,248*	*8,551*	*5,748*

[Plymouth City Centre Company 2016]

8.2.23 The data shows that Saturdays consistently record the busiest pedestrian flows across the city centre, approximately one third more footfall than an average weekday. Sundays have the lowest numbers in all recorded locations, with between 12% and 50% fewer pedestrians than the average weekday. There is also substantial variation between locations across the city centre, with the highest levels of movement close to Drake Circus and pedestrian activity decreasing further west towards the city market. In terms of pedestrian movements into the city centre 12-hr pedestrian flows of 6,000 to 7,000 were recorded in 2008 crossing the ring road [PCC 2010a].

8.2.24 Data collected in the city centre streets over several years indicates there are substantial monthly variations in pedestrian footfall through the year. December is consistently the busiest month, with March, September and June recording above average numbers of pedestrians in city centre streets.

Quality of the Active Travel Network – Plymouth

8.2.25 The quality and availability of routes for active travel varies across the different city neighbourhoods and issues have been identified which can influence the attractiveness of travelling by these modes [PCC 2011, PCC 2015]. Plymouth is a relatively hilly city by virtue of its geology, rising from sea level on its western and southern boundaries and along the Plym Estuary to over 150m above sea level in some of the northern suburbs. The Mutley Plain – Tavistock Road corridor broadly follows the main ridgeline, with land tending to fall away steeply into valleys to the east and west. These steep valleys have tended to prevent good links between areas, resulting in a series of poorly connected neighbourhoods; however there are examples in the UK and abroad which demonstrate topography is not an absolute barrier to achieving higher walking and cycling levels [PCC 2010a].

8.2.26 Whilst several streets in the city centre are car-free, other parts can appear vehicle-dominated [LDA Design 2016]; for example the ring road is in many places a barrier to pedestrian movement which can require crossing in several stages [PCC 2010b]. Crossing or negotiating city centre roundabouts, such as Charles Cross, can present difficulties to cyclists [PCC 2010]. In parts of the waterfront the urban structure is complicated and confusing or poorly connected due to land uses and topography [LDA Design 2016]. Major transport schemes in preparation and the City Centre and Waterfront Masterplans [LDA Design 2016, 2016a] are aimed at tackling these issues.

8.2.27 Beyond the city centre major roads can cause severance and cut off communities from each other. The A386 is one example of this, having, a section between Crownhill and William Prance Road of over 600m of urban dual carriageway without any safe crossing point [PCC 2012]. In the Derriford area, cyclists can be deterred by high vehicle speeds, complex road layouts and discontinuous cycle infrastructure [PCC 2012] and recent and ongoing investment is aimed at addressing these issues. Similarly the A38(T) restricts north-south walking and cycling opportunities. Elsewhere in the city rail lines have limited crossing points, such as in Lipson and Laira, and post-war residential estates are often characterised by cul-de-sacs resulting in confusing street layouts for pedestrians and cyclists.

8.2.28 The City Council has previously undertaken comprehensive surveys to identify problem locations for pedestrians, as follows:

- The *Redress Severance Site Identification Report* [Amey 2009] identified major routes (roads, railways and rivers) in the city which could be considered to be preventing or negatively affecting access to facilities or services to communities. More than 80 existing crossing points on these major routes were assessed and a prioritised list of sites requiring some form of engineering works was prepared. It is not clear how many of these sites have now been addressed through works and how many remain to be tackled.
- The *Barriers to Walking – Feasibility Report* [Amey 2009a] identified barriers to walking which existed in the city and recommended solutions to them. Nine categories of barrier were identified – lack of crossing points, lack of footways, poorly maintained footways, pedestrian

conflicts and signals, traffic lights without pedestrian phases, crossings without facilities for the disabled, locations with insufficient lighting, speed or volume of traffic is perceived to be a barrier, or where there is inadequate information on how to access particular areas on foot. It is not clear how many of these sites have now been addressed through works and how many remain to be tackled.

8.3 COMMITTED FUTURE INFRASTRUCTURE INVESTMENT

Plymouth Eastern Corridor & City Centre Strategic Cycle Network Proposals

8.3.1 PCC secured a combination of £3.42m from the LTB and a further £1.49m of developer funding to improve walking and cycling links in the Eastern Corridor and city centre, complementing the recently opened Laira Rail Bridge. The funds will provide the following:

- à extend the existing off-road route from Laira Rail Bridge to the Saltram Meadow development, and widen the existing route along The Ride;
- à improve and make more direct the walking and cycling link from North Cross to The Hoe along Armada Way, to enhance connections from the rail station to the city centre and waterfront;
- à make improvements to the waterfront section of NCN route 27 between The Barbican and Laira Rail Bridge [PCC 2016c].

The LTB approved the proposals to form part of the LTB 2015-2021 Programme [Heart of the South West LTB 2015].

8.3.2 Alongside the investment from the local authorities, an extensive network of new cycleways and footways, including links into the Saltram Estate, and connecting onto NCN route 2, will be provided as part of the Sherford new community, to be delivered by developer [SHDC 2013].

Plymouth Northern Corridor Strategic Cycle Network Investment Programme

8.3.3 PCC secured £3.51m of Growth Deal funding to create 4.5km of the city's planned SCN over the next five years. The funds cover four proposed major elements:

- à Plymbridge Road (Wrigleys roundabout to the George Junction P&R): creation of a new segregated off-road walking and cycle route with a speed limit reduction to 30mph on the western end; and creation of cycle lane with hatching at the eastern end of Plymbridge Road;
- à Southway Drive (The George Junction to Southway shopping centre): Primarily off-road provision serving Oakwood Primary School;
- à Tavistock Road: Off-road walking and cycling route; and
- à Crownhill Road to the A38: Combination of the use of quiet roads and off-road provision, also improving access to Shakespeare Primary School.

Key Programmed Investment - South Hams & West Devon (Excluding Plymouth Urban Fringe)

8.3.4 DCC continues to develop new and upgraded sections of cycle routes through its *Market and Coastal Town and Rural Devon Foundation Programme*. Relevant investment in the JLP during the 2016/17 financial year is as follows:

- à NCN2 Missing Link, Ivybridge - Cycle\footpath link between Bowdens Park and Belmont Road as an alternative route to Western Road;
- à Phase 2 of Pegasus Way at Beaworthy – a multi-use trail on the former Okehampton to Halwill Junction railway, to connect to the Granite Way (NCN27); and

- à Tarka Trail – a new route for the section between Meeth Quarry and the River Torridge.

[DCC 2015a, 2015b, 2016]

8.3.5 Planning permission was also granted in 2015[17] for an extension of Tavistock's Viaduct Walk, running westwards from Crease Lane and involving the construction of a new bridge over Callington Road on the site of the former railway bridge.

8.4 DEMAND MANAGEMENT & REDUCING THE NEED TO TRAVEL

8.4.1 Demand management refers to a range of techniques that can be implemented to minimise traffic generation, especially single occupancy car journeys. Examples include:

- à Creating and implementing travel plans for developments likely to generate significant amounts of travel; and
- à Implementing Personalised Travel Planning (PTP);
- à Enabling working from home and reducing the need for business travel;
- à Road user charging, such as the Congestion Charge in central London;
- à Workplace parking levies – where employers that provide parking are require to pay a charge for them, which operates in Nottingham;
- à Parking pricing structures to encourage use of non-car travel modes, or discourage on-street commuter parking, for example;
- à Road space re-allocation and priority, traffic calming, access control and restrictions on through traffic.

8.4.2 DfT policy outlining Highways England's involvement in spatial planning stipulates that, only after travel plan and demand management measures have been fully explored and applied will capacity enhancement measures be considered [DfT 2013]. Whilst some aspects of demand management, such as travel planning, PTP and sustainable transport promotion campaigns, are now relatively widespread in the UK (and in the JLP area), several others are not extensively used at present.

Sustainable Transport Promotion – Plymouth (Plymotion)

8.4.3 PCC was successful in securing funding from the DfT for a large-scale sustainable transport promotion campaign to encourage people to try greener, cheaper and healthier ways of getting around the city. Branded as *Plymotion*, and funded between 2012 and 2016, it comprised:

- à *Plymotion on Your Doorstep* – PTP to residents;
- à *Plymotion At Your Workplace* – PTP for businesses and employers; and
- à *Plymotion at Events*.

8.4.4 *Plymotion on Your Doorstep* visited over 84,000 homes in the city (77% of city households) to deliver personal journey planning to residents [PCC 2016a]. Overall, 14% of people said they had changed, or were planning to change, the way they travel to adopt more sustainable and active travel modes [PCC 2016a]. Data insights from surveys conducted before and after PTP from surveys completed Pre-and post PTP demonstrates:

- à an increase in reported levels of daily cycling from 2.3% to 3.7% (61% increase);
- à an increase in those cycling several times a week from 4.7% to 6.1% (30% increase);

[17] Devon County Council planning application reference DCC/3653/2014

- à a drop in those that "never cycled" from 78.2% to 66.5% (15% reduction);
- à an increase in those reporting using the Plymouth cycle network from 11% to 14%;
- à an increase in those using the Plymouth cycle map from 4.7% to 8%;
- à an increase in those reporting using the bus more or much more from 13.2% to 18.1% [PCC 2016e]

8.4.5 30 Plymotion At Your Workplace events were held in 2015/16 and demand from businesses for events was so high that in some cases requests could not be met [PCC 2016e]. Between 2012 and 2015 the mass participation cycling element of Plymotion was delivered through Sky Ride, the national programme designed to encourage behavioural change in cycling habits through recreational cycling. 17,900 people have participated in the four mass participation events held in Plymouth and many more have engaged in the weekly led rides and Breeze.

8.4.6 The *Bike It Plus* project has involved promoting active travel (including cycling, walking and scooting) in 26 schools and supports the creation of 'champions' within schools to make the case for cycling, scooting and walking through activities and events. The project seeks to build a legacy of active travel culture within the schools.

8.4.7 Since its launch in September 2012, Bike It Plus has delivered events and activities to 9,800 pupils [PCC 2016e]. Headline outcomes of this investment include:

- à Regular cycling to school more than tripling from a baseline at the start of the project of 3.9% to 14.4% afterwards, and levels of regular walking to school maintained at 63%;
- à Levels of regular scooting and skating to school have tripled from 6.9% to 18.3% after one year of project engagement; and
- à The increases in active travel to school corresponds with a decrease in children being regularly driven to school from 45% down to 34%. [PCC 2016e]

Sustainable Transport Promotion (South Hams & West Devon)

8.4.8 DCC was also successful with its bid for LSTF monies, being awarded £4.941m. It focuses on innovative, low cost and high impact measures to transform the journey to work and travel patterns in the three fastest growing areas in Devon, one of which was Totnes and its hinterland.

Digital and telecoms connectivity

8.4.9 Rural areas across SHWD can struggle to receive basic broadband or reliable mobile phone coverage, impacting on businesses' and residents' ability to benefit from online services. Two central government funded programmes are underway to improve this:

- à Superfast Broadband Programme – aims to provide superfast (over 24Mbps) broadband to 90% of premises in the UK and universal access to basic broadband of 2Mbps, with phase 2 further extending coverage to 95%; and
- à Mobile Infrastructure Project – improving mobile phone network coverage for voice calls and text messages to the final 0.3-0.4% of UK premises that do not currently have it.

[Department for Culture, Media & Sport 2015]

8.4.10 *Connecting Devon and Somerset* (CDS) has been set up as part of a taxpayer subsidised programme to deliver next generation broadband infrastructure to areas where the market has failed to invest. Under phase 1 around 275,000 residents and businesses in Devon and Somerset will have access to superfast broadband by December 2016, mostly through fibre-optic cables run from telephone exchanges to new roadside cabinets, with some fibre-optic cables to the premises themselves, while in other areas other technology will be used. However CDS acknowledge that some locations are so geographically remote that superfast broadband will not be achievable due to technical reasons (such as copper line distance between a cabinet and the premises) and/or prohibitive costs [Connecting Devon & Somerset 2016].

8.5 REPORTS AND STUDIES

8.5.1 Plymouth Green Infrastructure Delivery Plan [PCC et al 2010] identifies the network of sites required for the city to grow sustainably. The Delivery Plan highlights eight site-specific projects as strategically important green infrastructure priorities, including:

- à the existing resources at Plym Valley & Cann Woods, Central Park and Mount Edgecumbe;
- à a new countryside park at Saltram,
- à new community parks at Derriford and Sherford;
- à protecting Plymouth Sound and Estuaries; and
- à realising any green infrastructure opportunities arising from mineral site restoration at Lee Moor & Hemerdon.

8.6 SUMMARY POINTS

- à Substantial investment is committed by PCC and DCC to walking and cycling infrastructure across the JLP area, including on National Cycle Network routes, and in the Plymouth's Northern and Eastern Corridors; Both authorities have strategic plans identifying how they propose to enhance the cycle network coverage;
- à Recent key new infrastructure has included Laira Rail Bridge, reopened for walking and cycling use in 2015, but the quality of infrastructure varies across the JLP area and severance caused by major roads can be an issue on several corridors;
- à Statistics identify an increasing number of cyclists using roads and off-road infrastructure, particularly where investment has been targeted. The DfT cycling propensity tool suggests that, given the right conditions and investment, substantial further growth can be stimulated;
- à PTP provided to 77% of Plymouth households has led to changes in travel behaviour away from the car and onto sustainable travel modes. This has been supported by work with schools and businesses as part of the successful *Plymotion* programme;
- à While some aspects of demand management, such as sustainable transport promotion, PTP and travel planning, are widely used in the JLP area, certain other interventions are not; and
- à Digital connectivity remains a barrier in some places to enabling effective access to online services.

9 MARINE CONNECTIONS

9.1 LOCAL FERRIES

9.1.1 In Plymouth local ferry services connect:

- à Devonport to Torpoint (all-year; frequencies vary from every 10 minutes (3 ferry operation), every 20 minutes (2 ferry operation) and half-hourly (single ferry).
- à Stonehouse to Cremyll in Cornwall (foot passenger ferry; all-year; half hourly).
- à The Barbican to Royal William Yard (foot passenger ferry; all-year; hourly)
- à The Barbican to Mount Batten (foot passenger ferry; all year; half-hourly); and
- à The Barbican to Cawsand in Cornwall (foot passenger ferry; seasonal; approximately 6 services per day).

9.1.2 The Torpoint Ferry is the only 24hr service with all the others typically operating 12 hours per day with extended periods of operation during the summer months. The Torpoint Ferry crossing is jointly owned by Cornwall Council and Plymouth City Council with its operation being governed by the Tamar Bridge and Torpoint Ferry Joint Committee (TBTFJC).

9.1.3 Landing stages suitable for use by local ferries exist at Mount Batten, Barbican, Royal William Yard, North Corner as well as at Saltash and Calstock [Cornwall Council 2013]. Seven public slipways have been identified along the Plymouth waterfront, including Admiral's Hard, along with a further two in Cornwall [ibid]. Shipping in Hamoaze is restricted to a 10 knots speed limit, which impacts on the ability to provide a ferry service with attractive journey times.

9.1.4 In the rest of the JLP regular ferry services operate across and along the Dart, on the Salcombe Estuary and across the rivers Yealm and Avon. They are summarised below:

- à Dartmouth Higher Ferry – situated to the north of Dartmouth town centre and Kingswear village and connecting the A379 on both sides of the Dart. Continuous service all year operated by the Dartmouth & Kingswear Floating Bridge Company. Tag concessions available for frequent users;
- à Dartmouth Lower Ferry – running from the Ferry Slip on Lower Street in Dartmouth to Kingswear village, close to the steam railway station. Continuous service all year except Christmas Day; carrying up to 8 vehicles and 90 passengers. It is owned by SHDC;
- à Dartmouth Passenger Ferry – running from Kingswear village to Dartmouth Pontoon and operated by the Dartmouth Steam Railway & River Boat Company; all year except Christmas Day, Boxing Day and New Year's Day; every 15 minutes;
- à Dartmouth Castle passenger ferry – South Embankment to castle, Easter to end of October;
- à Dartmouth to Greenway passenger ferry (Christie Belle) – March to October, Wednesdays to Sundays and selected Mondays and Tuesdays;
- à Dittisham to Greenway passenger ferry – daily from March to October;
- à Totnes to Dartmouth passenger cruisers – daily from March to October;
- à Salcombe to East Portlemouth passenger ferry – all year, daily half-hourly service;
- à Salcombe to South Sands passenger ferry – March to October, daily half-hourly service;
- à Kingsbridge to Salcombe passenger ferry (Rivermaid) – June to September;
- à River Avon passenger ferry at Bantham – April to September, Mondays to Saturdays; and

- River Yealm passenger ferry – daily, March to September, between Noss Mayo, Newton Ferrers and Warren Point (for coast path).

[South Devon AONB Unit 2016]

These services can offer a vital link between coastal communities which avoid substantial detours inland to use alternative routes and also provide popular tourist services connecting to visitor attractions.

9.2 LOCAL FERRIES - STUDIES

9.2.1 The *Tamar River Transportation Study* [Cornwall Council 2013] is the most recent investigation into the feasibility and viability of new local ferry services. As part of its investigation it reviewed and summarised previous studies, including *Plymouth Sound and Estuaries – Water Transportation Study* [Scott Wilson in 2004]. It found the common view was that:

- The development of water transport services is contingent on redevelopment of waterfront land to provide high quality residential, employment, education and leisure facilities; and
- Alternative sources of funding would be required to procure the necessary landing stage infrastructure, the capital costs for which are substantial.

9.3 PORT FACILITIES AND TRAFFIC

Ferries and Cruise Ships

9.3.1 Millbay Docks are the location for Brittany Ferry services and calling cruise ships. Half of the passenger traffic using the ferries originates from outside Devon [DCC and Torbay Council 2011].

Freight

9.3.2 Plymouth as a whole handled 2.089m tonnes of freight in 2014 [DfT Statistics 2015d] and most freight movements are handled at the wharves at Cattedown, Victoria Wharf and Pomphlett Quay. The fish market at Sutton Harbour is the third most important in England (after Newlyn and Brixham) by value of sales [House of Commons Library 2016].

9.4 SUMMARY POINTS

- A wide range of ferry connections exist along the JLP coastline, including three vehicle ferries;
- The development of further ferry connections along Plymouth's waterfront is in part contingent on redevelopment to increase travel demand; and
- Plymouth retains a substantial marine freight role, from sites east of the city centre, and with international ferries operating from Millbay on the western side of the city centre.

10 PLYMOUTH CORRIDORS AND AREAS – STRATEGIES AND STUDIES

10.1 PLYMOUTH CITY CENTRE AND WATERFRONT

10.1.1 A series of studies and reports have considered traffic and movement in the city centre. These are summarised below.

City Centre Strategic Masterplan 2016

10.1.2 The *Plymouth City Centre Strategic Masterplan* [LDA Design 2016] identifies 20 masterplan opportunities, several of which are transport-focused, including two of the six which are described as major interventions. They are as follows:

- à Major transformation of the rail station area, including demolition of the existing MSCP, creation of new public square to the immediate south of the station entrance, introduction of direct pedestrian links towards the city centre, with covered escalators, steps and lifts and the erection of a replacement MSCP to the east of Intercity House; and
- à Strategic crossings of the ring road – improved surface level crossings at key locations , (Union Street, Frankfort Gate, Drake Circus (two locations) and by St Andrew's Cross Roundabout;
- à Derry's Cross and St Andrew's Cross – reconfiguration to improve the public realm;
- à Redeveloping the Armada Centre, including the reconfiguration of the MSCP to the middle of the site;
- à New north-south 'lanes' to improve city centre connectivity;
- à Western Approach – providing better pedestrian and cycle links to the surrounding neighbourhoods, including the removal of the existing pedestrian footbridge at Frankfort Gate, and an attractive and high quality public transport route.

Waterfront Strategic Masterplan 2016

10.1.3 The *Plymouth Waterfront Strategic Masterplan* [LDA Design 2016a] identifies 21 opportunities, many of which relate to improving connections between the waterfront and city centre – strongly emphasised in stakeholders conversations – and visitor wayfinding. Three of the five identified major interventions have a transport focus, as follows:

- à Millbay Boulevard – providing a clear, direct and attractive route to connect the regeneration at Millbay with the city centre, leading as far north as Union Street;
- à Bretonside and Buckwell Street – An equivalent direct and clear connection from the waterfront at Sutton Harbour to city centre, to complement with existing less direct but more historic visitor routes;
- à Armada Way – has the potential to be the most significant transformation to connect the city to the waterfront, the reconfigured and simplified public realm.

10.1.4 Alongside these are a series of additional opportunities with transport focus:

- à Lock Bridge– This provides a critical connection across Sutton Harbour entrance but is in need of repairs. A replacement landmark bridge may be appropriate, with provision for pedestrians and cyclists;
- à Exeter Street – opportunities to improve the arrival route, introduce avenue planting, explore potential for at-grade crossings;
- à Introducing a new waterfront connection between Durnford Street and Millbay through the ferry terminal; and
- à Union Street – better meeting the role of neighbourhood street linking communities to the north and south and providing a fitting gateway on the approach from the west.

Draft City Centre Transport Strategy 2010

10.1.5 This strategy [Amey 2010] considered the existing travel characteristics and transport infrastructure of the city centre in the light of proposed levels of growth being proposed in the City Centre AAP. The implications of the development in terms of demand for public transport, requirements to upgrade public transport infrastructure, and strategies for parking, active travel and making use of intelligent transport systems was discussed. The impact of the proposals on bus services and general traffic was modelled using the Paramics model.

City Centre Infrastructure Study Interim Review 2010

10.1.6 This study [Amey 2010a] took forward potential options for six related projects across the city centre to help inform the development of the AAP, based on the work for the city centre transport strategy. A preferred option was identified for each location, which was fully costed in both capital and revenue terms and the impacts modelled and documented. The six study sites were:

- à North Cross – reconfiguration to make improvements for all modes, and possibly reducing the amount of land used for transport;
- à Drake Circus – reconfiguration to reduce traffic congestion;
- à Charles Church – improving pedestrian access to the church;
- à Royal Parade – enhancing interchange opportunities;
- à Union Street / Western Approach – reconfiguration of junction; and
- à Western Approach – improvements for all modes.

10.2 NORTHERN CORRIDOR

10.2.1 The *Derriford Transport Strategy 2006 – 2021* [PCC 2012] was prepared to support the delivery of the Derriford and Seaton AAP. A key part of the strategy is balancing the function of the A386 as a key movement corridor whilst reducing its environmental impact, severance and physical dominance. This made use of traffic modelling to understand the impacts of proposed development outlined in the AAP. The outcome of the analysis was a suite of recommended transport interventions, including:

- A new road connection between Forder Valley and Brest Roads (The FVLR);
- The Marjon Link Road (now complete);
- The Derriford Transport Scheme;
- A series of high quality public transport interchanges at key destinations;
- Reconfiguring other roads and junctions to provide space for buses, pedestrians and cyclists or enable key movements to take place; and
- A requirement for substantial programme of travel behaviour change and parking management.

10.3 EASTERN CORRIDOR

10.3.1 A series of studies have been undertaken into transport conditions and possible interventions along the main transport corridors linking the city centre to key proposed development locations to the east of the city, as follows:

- *Plymouth Eastern Gateway Study: Paramics Modelling* [SIAS Limited 2003] analysed the impacts of nine transport intervention scenarios, using the Paramics traffic modelling program;
- *Plymouth Eastern Gateway Vision* [Llewelyn Davies et al 2004] was tasked with identifying and evaluating integrated solutions to transport, development and environmental issues within the study area. The study identified a preferred do-maximum option comprising a replacement main transport route along the existing freight railway line north of the existing roads, and a new east-west bridge north of Laira Bridge. This was considered the best way of tackling congestion and releasing space for dedicated public transport through the area;
- *Plymouth Eastern Corridor Study Final Report* [Faber Maunsell, 2006] considered the range of public transport options which could serve the corridor between the proposed major development sites at Sherford and Plymstock Quarry and the city centre. It recommended that a bus rapid transit system be introduced, including a P&R site at Deep Lane, and making use of the former railway alignment east of the Plym, along with the use of the Laira railway bridge for pedestrians and cyclists; and
- *East of Plymouth Infrastructure Study* [Faber Maunsell, 2007] had the aim of developing a strategy for public transport and highway infrastructure required to support development in the Eastern Corridor, and to provide a timetable of delivery for phased implementation of the strategy.

10.4 WESTERN CORRIDOR

10.4.1 A series of studies have been undertaken into transport conditions and possible interventions required on the Tamar Bridge & Torpoint Ferry (often referred to collectively as the Tamar Crossings) connecting Plymouth to Cornwall. These are described below.

10.4.2 *River Tamar Crossings Study* [Peter Brett Associates, 2013] assessed current and future potential demand for travel on the Tamar Bridge, Torpoint Ferry, Royal Albert Bridge and Cremyll Ferry. This led to 17 potential projects being identified to increase capacity across the Tamar. These comprised:

- à Full household PTP in South East Cornwall (1), intensive travel planning in Derriford and South East Cornwall growth areas (3) and innovative car sharing marketing campaign (4);
- à Further data collection to better understand travel patterns (2);
- à More informed travel choices through improved travel information (5);
- à Differential toll and pricing strategies to incentivise travel outside the traditional peak periods (6);
- à Development of Saltash to Derriford cycle routes (7);
- à Bus services, both direct from Saltash to Derriford (9) and express service from Saltash to Plymouth city centre (8);
- à Develop plans for additional Torpoint Ferry capacity (10), either larger capacity ferries, or fourth ferry if landing stage space can be secured;
- à Conversion of existing Tamar Bridge foot/cycleway into general traffic lane (11) or high occupancy vehicle lane (12). These would be subject to securing alternative pedestrian and cyclist crossing facilities;
- à Reconfiguring lane merges on westbound (13) and eastbound approaches (14), or reroute buses on their approach to the toll plaza to enable them to make their manoeuvres without requiring all toll booth barriers to be held down (16);
- à Increase use of Tamar Tag system (15); and
- à Develop long-term plans for additional bridge to the north (17).

10.4.3 *The Tamar Crossings Travel Analysis Study* [WSP | PB 2016] has involved a data collection and analysis exercise for the Tamar Bridge and Torpoint Ferry Crossings to understand current travel patterns, including origin and destinations, mode choice and journey purpose. The data analysis informed a set of options which could reduce single-occupancy trips (and thus free up capacity on the Tamar Crossings).

10.5 SUMMARY FINDINGS

- à A suite of studies have investigated current and future transport conditions focusing on the main city growth areas;
- à Some recommended schemes now form completed or committed schemes; and
- à Other elements will form part of the JLP's emerging transport strategy.

11 OVERVIEW OF OPPORTUNITIES AND CONSTRAINTS

11.1.1 The JLP covers a large area with diverse economic, environmental and travel characteristics. As well as covering three local planning authorities, it includes parts of five travel to work areas, meaning that in addition to Plymouth and its commuter hinterland, residents in certain parts of South Hams and West Devon have a stronger functional relationship with other major centres such as Torbay and Exeter. The JLP's spatial strategy proposes to focus the majority of new development in and around Plymouth, with a continued focus on three growth areas - the city centre and waterfront, northern corridor and eastern corridor. Beyond the city a network of market towns will provide the locations for the remaining growth.

Road network

11.1.2 Plymouth is characterised by a relatively small network of strategic routes, intensively used by a significant proportion of journeys through, within, and into the city. These strategic routes include the A38(T), A386, A374 and A379. Significant and growing levels of congestion and delay occur on key parts of the city's strategic highway network, and traffic flows exceed capacity on certain road links and junctions at peak times. This congestion can spread onto less suitable roads. Sections of the strategic highway network also tend to be those parts of the city which have particularly poor air quality and the highest levels of noise caused by road transport.

11.1.3 Demand for travel to and from the new homes, businesses and facilities already in the development pipeline will intensify pressure on the road network. Key transport infrastructure projects, which will be delivered over the coming years, are closely aligned to the requirements of growth areas. They include providing additional capacity at key junctions (A38 Deep Lane interchange) and provide alternative routes to existing congested corridors (Forder Valley Link Road). Traffic modelling work is underway to understand the impact of the proposed JLP site allocations on the road network by modelling the current flows and identifying which critical junctions have forecast flows which exceed junction capacity. The concentration of development in three growth areas which are located on major transport corridors does provide the opportunity to manage traffic levels by providing priority to users of public transport and other sustainable modes such a walking and cycling.

11.1.4 A range of Intelligent Transport Systems measures are applied to the parts of the network; however, just over half of the signal junctions in Plymouth use SCOOT or MOVA technology to optimise the efficiency of the junctions. Introducing these measures presents an opportunity at key junctions.

11.1.5 Residential areas in Plymouth's urban fringe, along with recently developed areas in Ivybridge, exhibit highest levels of commuting to work by car. Maximising levels of non-car travel to and from new sites in the urban fringe – especially walking and cycling to adjacent major employment sites or bus travel to the city centre and Derriford areas – will therefore be a key challenge for the JLP.

Bus

11.1.6 Most city neighbourhoods and rural communities are served by buses, and most of these are run on a commercial basis. In Plymouth residents and businesses close to key corridors leading into Plymouth centre benefit from the highest frequency of services, although interchange between services often necessitates travel to the city centre. P&R services are available on some, but not all, the key approaches to the city and other sites serve Dartmouth and Salcombe. Congestion affects the reliability of bus services, especially on key corridors, such as the A386. To reduce barriers to interchange, bus operators offer a range of day rider and travelcards. PCC brokered the introduction of the Skipper Ticket allowing travel across multiple bus operators across most of the TTWA.

Rail

11.1.7 Plymouth is served by six stations, with the main station serving the city centre providing interchange between local and long-distance services. The stations are however concentrated in the south-west of the city, with the Northern and Eastern Growth corridors having no local stations and requiring travel to Plymouth Station to access the rail network. The region has been characterised by strong and continued levels of passenger growth which has led to Network Rail forecasts for 2019 being surpassed in 2012; services and rolling stock have not kept pace with this demand and crowding is an increasing issue on peak and some off-peak services. If not addressed this could limit future passenger growth.

11.1.8 In South Hams only two of the four market towns (Ivybridge and Totnes) are on the National Rail network, with Dartmouth and Kingsbridge a substantial distance from the nearest railhead. In West Devon Tavistock is not served by rail and in Okehampton services only operate on summer weekends. However, a major scheme is being advanced to reinstate the line from Bere Alston to Tavistock, which will widen rail accessibility and provide a reliable alternative for journeys between Tavistock and Plymouth, and the infrastructure remains in place to enhance services between Okehampton and Exeter. A key concern for the JLP area as a whole is the vulnerability of the rail network to extreme weather events and the reliance on a single mainline connection to the rest of the UK.

Active Travel

11.1.9 Plymouth has above average levels of walking to work, with the highest levels concentrated in the southern half of the city. Similarly the relatively short distances between homes, facilities and jobs in most of the market towns contribute to levels of walking to work substantially above the national averages.

11.1.10 There are a growing number of high quality off-road walking and cycling routes connecting communities and neighbourhoods and evidence which demonstrates the positive impact these routes have on increasing numbers of active travel journeys, particularly cycle journeys. These routes often make use of the network of greenspaces in between built-up areas, as well as former railway lines in South Hams & West Devon. There are opportunities to substantially increase levels of cycling across the JLP. For example the DfT propensity to cycle tool indicates that targeting cycle infrastructure investment towards communities in Plymstock, Plympton, the City Centre & Waterfront, Central Park, North Prospect areas along with parts of the Northern Corridor would give rise to the greatest increase in cycling levels. Research indicates the importance of good quality routes segregated from heavy traffic as being critical to achieving this.

11.1.11 In the more densely urbanised parts of the city constrained roadspace can make it challenging to introduce quality facilities for pedestrians and cyclists alongside motor traffic and the more heavily trafficked strategic roads can present barriers to movement by foot and by cycle.

Marine connections

11.1.12 Whilst passenger ferries already connect parts of the waterfront, there are opportunities to improve coverage and raise its profile. The continued focus on regenerating sites along the waterfront and in the city centre will help generate demand, and ongoing viability, for new and enhanced services.

Other Demand Management Measures

11.1.13 The effectiveness of comprehensive PTP, promotion and information campaigns has been evidenced through analysis of LSTF investment, which enabled people to make widespread changes in travel behaviour and increase receptiveness to using non-car travel modes. Levels of digital connectivity are not uniform across the JLP area and can limit economic growth and access to online services, especially in rural areas. The opportunities for other aspects of demand management to be implemented during the plan period will require further consideration to determine their effectiveness, viability and acceptability.

12 SOURCES

- Amey 2009 *Redress Severance – Site Identification Report* http://web.plymouth.gov.uk/redress_severance.pdf
- Amey 2009a *Barriers to walking – Feasibility Report* http://web.plymouth.gov.uk/barriers_to_walking_feasibility_report.pdf; http://web.plymouth.gov.uk/barriers_to_walking_appendix_1_areas_1_-_30.pdf; http://web.plymouth.gov.uk/barriers_to_walking_appendix_1_areas_31_-_53.pdf
- Amey 2010 *City Centre Transport Strategy Draft* http://web.plymouth.gov.uk/draft_city_centre_transport_strategy.pdf
- Amey 2010a *Plymouth City Centre Infrastructure Study Interim Review Report 1 April 2010* http://web.plymouth.gov.uk/plymouth_city_centre_infrastructure_study.pdf
- Connecting Devon & Somerset 2016 *About the broadband rollout* https://www.connectingdevonandsomerset.co.uk/faqs-2/
- Cornwall Council 2013 *River Tamar Transportation Study Main Report* [unpublished]
- Cornwall Council, Devon County Council, Plymouth City Council, Somerset County Council and Torbay Council 2013 *The South West Spine – The Case for Greater Investment across the South West Railway Network February 2013* http://web.plymouth.gov.uk/the_south_west_spine.pdf
- Cornwall Council, Devon County Council, Plymouth City Council, Somerset County Council, Torbay Council, Cornwall & Isles of Scilly Local Enterprise Partnership and Heart of the South West Local Enterprise Partnership 2014 *The South West - Extreme weather resilience: 2012 and early 2013 Report: February 2014* http://www.devon.gov.uk/extreme-weather-resilience-in-the-sw.pdf
- Department for Culture, Media & Sport 2015 *Broadband Delivery UK First published: 27 February 2013 Last updated:21 December 2015* https://www.gov.uk/guidance/broadband-delivery-uk
- Department of Energy and Climate Change 2016 *2005 to 2014 UK local and regional CO2 emissions – data tables* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/532949/2005-2014_UK_local_authority_and_regional_CO2_emissions_data_tables.xlsx
- Department of Environment, Food & Rural Affairs 2015 *AQMAs interactive map July 2016* https://uk-air.defra.gov.uk/aqma/maps
- Department of Environment, Food & Rural Affairs 2016 *Noise Action Planning Important Areas Round 2 England May 2015* https://data.gov.uk/dataset/noise-action-planning-important-areas-round-2-england1/resource/ba1a058f-8902-4614-a6f2-dd03865c8d0d
- Department for Transport 1997 *Traffic Advisory Leaflet 3/97 The "MOVA" signal control system March 1997* http://webarchive.nationalarchives.gov.uk/20090505152230/http:/www.dft.gov.uk/adobepdf/165240/244921/244924/TAL_3-971
- Department for Transport 1999 *Traffic Advisory Leaflet 7/99 The "SCOOT" Urban Traffic Control System April 1999* http://tna.europarchive.org/20090316203319/http:/www.dft.gov.uk/adobepdf/165240/244921/244924/TAL_7-991
- Department for Transport 2013 *DfT Circular 02/2013 The Strategic Road Network and the Delivery of Sustainable Development 10 September 2013* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/237412/dft-circular-strategic-road.pdf
- Department for Transport 2014 *News story Major package of rail improvements for Cornwall* https://www.gov.uk/government/news/major-package-of-rail-improvements-for-cornwall

- Department for Transport 2014a *Transport Resilience Review A review of the resilience of the transport network to extreme weather events July 2014* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/335115/transport-resilience-review-web.pdf
- Department for Transport 2015 *Government Response to 2014 Great Western Franchise Consultation March 2015* https://www.gov.uk/government/publications/great-western-franchise-response-to-the-2014-consultation
- Department for Transport 2015a *Road Investment Strategy: for the 2015/16 – 2019/20 Road Period March 2015* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/408514/ris-for-2015-16-road-period-web-version.pdf
- Department for Transport 2016 *National Propensity to Cycle Tool Ver b1a4271* http://www.pct.bike/devon/
- Department for Transport 2016a Rail Franchise Schedule Published December 2016 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/574792/december-2016-rail-franchise-schedule.pdf
- Department for Transport Statistics 2014 *National Travel Survey Factsheet Trip Chaining: 2002-2014* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/509447/nts-trip-chaining.pdf
- Department for Transport Statistics 2015 *Table BUS0110 Passenger journeys on local bus services per head by local authority: England, from 2009/10 Last updated: 29 September 2015* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/464187/bus0110.xls
- Department for Transport Statistics 2015a *Table BUS0103 Passenger journeys on local bus services by metropolitan area status and country per head of population: Great Britain, annual from 1991/92 Last updated: 29 September 2015* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/528722/bus0103.ods
- Department for Transport Statistics 2015b *Table BUS0902 Non-frequent bus services running on time by local authority: England, annual, from 2004/05 Last updated: 29 September 2015* https://www.gov.uk/government/publications/proportion-of-bus-services-running-on-time
- Department for Transport Statistics 2015c *Table SPAS0101 UK International sea passenger movements, by port and port area: 1950-2015 Last updated February 2015* https://www.gov.uk/government/statistical-data-sets/spas01-uk-international-sea-passengers
- Department for Transport Statistics 2015d *Table PORT0301 Key port statistics, top 30 UK ports by tonnage, annually: 2013-2014 Last updated 25 August 2015* https://www.gov.uk/government/statistical-data-sets/port03-key-port-statistics
- Department for Transport Statistics 2016 *Traffic counts – Plymouth traffic profile for 2000 to 2015* http://www.dft.gov.uk/traffic-counts/area.php?region=South+West&la=Plymouth
- Department for Transport Statistics 2016a *National Travel Survey statistics* Published: 30 July 2013 Updated: 7 April 2016 https://www.gov.uk/government/collections/national-travel-survey-statistics
- Department for Transport Statistics 2016b *Table VEH0131 Plug-in cars, vans and quadricycles licensed at the end of quarter, UK, by local authority of registered keeper from 2011 Q4* https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01#table-veh0131
- Department for Transport Statistics 2016c *Table CW0103 Proportion of residents who do any walking or cycling, for any purpose, at least once per month by local authority, from 2012-2013 (walking) and 2010/11 (cycling)* https://www.gov.uk/government/statistics/local-area-walking-and-cycling-in-england-2012-to-2013

- Department for Transport Statistics 2016d *Domestic Road Freight Statistics, United Kingdom 2015 Statistical Release 18 August 2016* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/546346/domestic-road-freight-statistics-2015.pdf
- Department for Transport Statistics 2016e *National Travel Survey* https://www.gov.uk/government/statistics/national-travel-survey-2015
- Department for Transport Statistics 2016f *Table RDC0120 Principal and non-principal classified roads where maintenance should be considered, by local authority, in England, 2007/08 to 2014/15* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/510054/road-conditions-england-tables.zip
- Department for Transport Statistics 2016g *Vehicle Licensing Statistics: Quarter 4 (Oct - Dec) 2015 Statistical Release 14 April 2016* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/516429/vehicle-licensing-statistics-2015.pdf
- Department for Transport Statistics 2016h *Road Use Statistics Great Britain 2016 Statistical Release 7 April 2016* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/514912/road-use-statistics.pdf
- Department for Transport Statistics 2016i *National Travel Survey: 2015* https://www.gov.uk/government/statistics/national-travel-survey-2015
- Devon County Council 2010 *Tavistock Cycle Guide Edition 2 April 2010,* https://devoncc.sharepoint.com/sites/PublicDocs/Transport/_layouts/15/guestaccess.aspx?guestaccesstoken=7OS%2bxgKJnSld5GDVCOCDVlbht4fhr6XdeD2LN9QKy%2fk%3d&docid=00757627dcf0a44758373bb50ca5b8ef4
- Devon County Council 2012 *Rights of Way Improvement Plan 2 Policies and Action Published: 2012* https://devoncc.sharepoint.com/sites/PublicDocs/Highways/_layouts/15/guestaccess.aspx?guestaccesstoken=9P2Cal3KAzm0vtLaUKeExtP%2bMz2KDD3dZ3YYYHsFfOo%3d&docid=0ed6dbaf5652b42c7a09119ae520d6c24&rev=1
- Devon County Council 2013 *Heart of the South West Local Transport Board Scheme Prioritisation Proforma – Option Name Tavistock Railway 8th May 2013* http://heartofswlep.co.uk/wp-content/uploads/2016/09/DCC-Tavistock-Railway-Publication-Version.pdf
- Devon County Council 2013a *Totnes & Dartington Cycling Guide & Map February 2013 Edition 2* https://beta.devon.gov.uk/traveldevon/files/2012/09/Totnes-Map-Web.pdf
- Devon County Council 2013b *Highway Asset Management Plan Background Paper 3 to HTM/13/26* https://devoncc.sharepoint.com/sites/PublicDocs/Highways/_layouts/15/guestaccess.aspx?guestaccesstoken=4MfaoPCX1V86%2fRcLXlJQT33M1Sn%2bWOko%2bliwXFWxLUA%3d&docid=0536b7bf648994597a2ed5d237a3257c3
- Devon County Council 2013c *Highway Asset Management Policy AM.12 v.3, 23 January 2013* http://www.devon.gov.uk/highway-asset-management-policy.pdf
- Devon County Council 2013d *Highway Asset Management Strategy AM.14 v.1, 31 January 2013* http://www.devon.gov.uk/highway-asset-management-strategy.pdf
- Devon County Council 2014 *Connections from Tavistock to Plymouth Option Assessment Report Final* October 2014 http://www.devon.gov.uk/tavistock-rail-oar.pdf
- Devon County Council 2014a *Bus Real Time Information System for Devon - Devon News Centre Posted 10th September 2014* https://www.devonnewscentre.info/bus-real-time-information-system-for-devon/

- Devon County Council 2014b *Extreme weather resilience report: Devon May 2014* http://www.devon.gov.uk/devon-weather-report-may2014.pdf
- Devon County Council 2015 *Additional funding to continue growth in cycling in Devon Devon News Centre Posted on 5th February 2015* https://www.devonnewscentre.info/additional-funding-should-continue-growth-in-cycling-in-devon/
- Devon County Council 2015a *Devon and Torbay Local Transport Plan 2011-2026: South Hams Programme for 2015/16 and 2016/17 PTE/15/62 South Hams Highways and Traffic Orders Committee 13 November 2015* http://democracy.devon.gov.uk/Data/South%20Hams%20Highways%20and%20Traffic%20Orders%20Committee/20151113/Agenda/pdf-PTE-15-62.pdf
- Devon County Council 2015b Devon and Torbay Local Transport Plan 2011-2026: West Devon Programme for 2015/16 and 2016/17 PTE/15/57 West Devon Highways and Traffic Orders Committee 5 November 2015 http://democracy.devon.gov.uk/Data/West%20Devon%20Highways%20and%20Traffic%20Orders%20Committee/20151105/Agenda/pdf-PTE-15-57.pdf
- Devon County Council 2015c *Cycling and Multi- Use Trail Network Strategy March 2015 Appendix II To PTE/15/22 Cabinet 8 April 2015* http://democracy.devon.gov.uk/Data/Cabinet/20150408/Agenda/supplementary%20information-PTE-15-22.pdf
- Devon County Council 2015d *Public Transport Budget: Proposed Implementation of Supported Bus Service Reductions Cabinet 10 June 2015 SC/15/9* https://new.devon.gov.uk/publictransportbudget/files/2015/06/Cabinet-report.pdf
- Devon County Council 2016 *Transport Capital Programme 2016/17 Report of Head of Planning, Transportation and Environment Cabinet 14 September 2016 PTE16/43* http://democracy.devon.gov.uk/documents/s4078/pte1643.pdf
- Devon County Council 2016a *A38 Deep Lane North Junction Improvements – Sherford: Approval to appointment of contractor and construction Cabinet 13 January 2016 PTE/16/1* http://democracy.devon.gov.uk/Data/Cabinet/20160113/Minutes/pdf-PTE-16-1.pdf
- Devon County Council 2016b *County Road Highway Maintenance Capital Budget: Progress on 2015/16 Schemes and the 2016/17 Programmes Cabinet 13 April 2016 HCW/16/31* http://democracy.devon.gov.uk/documents/s771/hcw1631.pdf
- Devon County Council 2016c *South Hams Bus Times from 29 May 2016* http://www.devonbustimetables.info/south_hams_new/
- Devon County Council 2016d *West Devon Bus Times from 29 May 2016* http://www.devonbustimetables.info/west_devon_new
- Devon County Council, Plymouth City Council and Torbay Council 2011 *Traffic Control Maintenance 2012-2017 Appendix to Service Information – Section 9 – Plymouth City Council Equipment* [internal document]
- Devon County Council & Torbay Council 2011 *Devon and Torbay Local Transport Plan 3, 2011-2026 Strategy* https://devoncc.sharepoint.com/sites/PublicDocs/Highways/_layouts/15/guestaccess.aspx?guestaccesstoken=4LCjQdQ%2bKwkzpWw6I8e%2bSSeVQKL0kJwGT4Ta8LAPGe0%3d&docid=06216b5c5f54845a49f02551a73933a1c
- Devon & Cornwall Rail Partnership 2016 *Annual Review 2016* http://www.dcrp.org.uk/wp-content/uploads/2016/09/dcrp-annual-review-2016.pdf
- Drakewell Limited 2016 *C2-Cloud Traffic Data. Data prepared by Drakewell Cloud Hosting* https://drakewell04.drakewell.com
- Environment Agency 2016 *Flood Risk Map for Planning* http://apps.environment-agency.gov.uk/wiyby/37837.aspx

- Faber Maunsell 2006 *Plymouth Eastern Corridor Study Final Report* http://web.plymouth.gov.uk/homepage/transportandstreets/transportplanning/transportstudies/easterncorridor.htm
- Faber Maunsell 2007 East of Plymouth Infrastructure Study http://web.plymouth.gov.uk/homepage/transportandroads/policyandplanning/transportstudies/infrastructurestudy.htm
- Go Ahead Group 2015 *Plymouth Citybus Sustainability Report 2015* http://www.go-ahead.com/en/sustainability/performance-and-reports.category1.year2015.html
- Heart of the South West LEP undated *Response to the Long Term Passenger Rolling Stock Strategy for the Rail Industry*
- Heart of the South West Local Transport Board 2015 *Minutes of Meeting 13.30, 7th December 2015, County Hall, Exeter* http://heartofswlep.co.uk/wp-content/uploads/2016/09/H-of-SW-LTB-Minutes-7th-December-2015_aa.pdf
- Heart of the South West Local Transport Board 2016 *Paper C Notes of informal LTB 160425 & 160531 - Growth Deal 3 – Outcome of informal LTB meeting on 25 April 2016 / Heart of the South West Growth Deal 3 Transport Programme Prioritisation 2016*
- Heart of the South West Local Transport Board 2016a *Heart of South West Local Transport Board Minutes of Meeting 10.00 9th February 2016 Council House, Plymouth* http://heartofswlep.co.uk/wp-content/uploads/2016/09/Minutes-of-Heart-of-SW-LTB-Meeting-9th-February-2016.pdf
- Highways Agency 2014 *South West Peninsula Route Strategy Evidence Report April 2014* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/365290/South_West_Peninsula.pdf
- Highways Agency 2014a *South West Peninsula Route Strategy Evidence Report Technical Annex April 2014* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/365301/South_West_Peninsula_Technical_Annex.pdf
- Highways England 2015 *South West Peninsula Route Strategy* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416750/South_West_Peninsula.pdf
- Highways England 2016 *Traffic Information System* [traffic data] http://webtris.highwaysengland.co.uk/
- House of Commons Library 2016 *Briefing Paper – UK Sea Fisheries Statistics Number 2788, 21 January 2016* http://researchbriefings.files.parliament.uk/documents/SN02788/SN02788.pdf
- ITP 2009 *Western Corridor Park & Ride Study Final Report September 2009* http://www.plymouth.gov.uk/western_corridor_park_and_ride_study.pdf
- Jacobs 2016 *PRTF: Northern Route Workstream Assessment of Costs and Benefits 18 March 2016* https://peninsularailtaskforce.files.wordpress.com/2016/11/01-prtf-northern-route-preliminary-economic-impact-161122.pdf
- LDA Design 2016 *Plymouth City Centre Strategic Masterplan Version 5.0* June 2016 http://plymouth.objective.co.uk/file/4064399
- LDA Design 2016a *Plymouth Waterfront Strategic Masterplan Version 1.1* June 2016 http://plymouth.objective.co.uk/file/4064396
- Llewelyn Davies, King Sturge, SIAS and Scott Wilson 2004 *Plymouth Eastern Gateway Vision Final Report March 2004* http://web.plymouth.gov.uk/homepage/transportandroads/policyandplanning/transportstudies/easterngateway.htm

- MRC Epidemiology Unit 2016 *Propensity to Cycle Tool* [video] https://www.youtube.com/watch?v=58UaVb8ZCrc Published on Jul 20, 2016
- National Highways & Transport Network 2015 *NHT Survey Report 2015 Summary Report for Plymouth City*
- Natural England 2016 *Multi-Agency Geographic Information for the Countryside (MAgiC)* http://www.magic.gov.uk/
- Network Rail 2014 *West of Exeter Route Resilience Study Summer 2014* https://www.networkrail.co.uk/wp-content/uploads/2016/11/West-of-Exeter-Route-Resilience-Study.pdf
- Network Rail 2015 *Long term Planning Process: Western Route Study August 2015* https://www.networkrail.co.uk/wp-content/uploads/2016/11/Western-Route-Study-Final-1.pdf
- Network Rail 2016 *Performance* http://www.networkrail.co.uk/about/performance/
- National Rail Enquiries 2016 *Stations services and facilities* http://www.nationalrail.co.uk/stations_destinations/default.aspx
- Office for National Statistics 2013 *Census 2011 QS701EW Method of travel to work Last updated 30 Jan 2013* https://www.nomisweb.co.uk/census/2011/qs701ew
- Office for National Statistics 2013a *Census 2011 KS404EW Car or van availability Released 30 Jan 2013* https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=621
- Office for National Statistics 2013b *United Kingdom: Travel to Work Areas, 2001* https://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/maps/travel-to-work-areas-2001.pdf
- Office for National Statistics 2013c *CT015EW 2011 Census Analysis, Method of Travel to Work in England and Wales* http://webarchive.nationalarchives.gov.uk/20160105160709/http:/www.ons.gov.uk/ons/ons/publications/re-reference-tables.html?edition=tcm%3A77-295663
- Office for National Statistics 2014 WU03EW Location of usual residence and place of work by method of travel to work (MSOA level) Updated 25 July 2014 https://www.nomisweb.co.uk/census/2011/wu03ew
- Office for National Statistics 2015 *United Kingdom: Travel to Work Areas, 2011* https://data.gov.uk/dataset/travel-to-work-areas-december-2011-map-in-the-united-kingdom1
- Office for National Statistics undated *Commuting patterns in the United Kingdom, 2011 Census* http://www.neighbourhood.statistics.gov.uk/HTMLDocs/dvc193/
- Office for National Statistics undated2 *Super Output Areas Explained* http://webarchive.nationalarchives.gov.uk/20160105160709/http://neighbourhood.statistics.gov.uk/dissemination/info.do?page=nessgeography/superoutputareasexplained/output-areas-explained.htm
- Office of Rail & Road 2015 *Estimates of Station Usage Time Series - 1997-98 to 2014-15 Publication Date: 15th December 2015* http://orr.gov.uk/statistics/published-stats/station-usage-estimates
- Parkopedia 2017 *Parking in Plymouth* http://en.parkopedia.co.uk/parking/plymouth/
- Peninsula Rail Task Force 2014 *Stakeholder Briefing: November 24, 2014 Unlocking economic growth across the South West Peninsula* http://www.fsb.org.uk/LegacySitePath/121/images/unlocking%20economic%20growth%20across%20the%20south%20west%20peninsula.pdf
- Peninsula Rail Task Force 2014a Great Western Rail Franchise Consultation Response from the Peninsula Rail Task Force https://resiliencesw.files.wordpress.com/2014/07/prtf-gwf-response.pdf

- Peninsula Rail Task Force 2016 *Closing The Gap – The South West Peninsula Strategic Rail Blueprint* https://peninsularailtaskforce.co.uk/closing-the-gap-the-south-west-peninsula-strategic-rail-blueprint/
- Peter Brett Associates 2013 *The River Tamar Crossings Study Final Report July 2013* http://www.plymouth.gov.uk/river_tamar_crossings_study_final_report.pdf
- Peter Brett Associates 2015 *Eastern Corridor Strategic Cycling Network Economic Appraisal Report* http://heartofswlep.co.uk/wp-content/uploads/2016/09/Appendix-2-Economic-Appraisal-Report-v2.pdf
- Planning Inspectorate 2015 *Meeting note – 19 March 2015 Project up-date meeting* https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR040010/TR040010-Advice-00003-1-150319_TR040010_Bere%20Alston%20to%20Tavistock%20Project%20Update%20Meeting%20Note.pdf
- Plymouth City Centre Company 2016 *Pedestrian footfall data for New George and Cornwall Streets* [Excel data; unpublished]
- Plymouth City Council 2009 *Strategic Cycle Network* http://web.plymouth.gov.uk/strategiccyclenetwork.pdf
- Plymouth City Council 2010 *Local Transport Plan 2011 to 2026 Facts and Figures* http://web.plymouth.gov.uk/ltp3_facts_and_figures.pdf
- Plymouth City Council 2010a *Local Transport Plan 2011-2026* http://web.plymouth.gov.uk/homepage/transportandroads/policyandplanning/ltp/ltp2011-2026.htm
- Plymouth City Council 2010b *City Centre Transport Strategy March 2010 Draft* http://web.plymouth.gov.uk/draft_city_centre_transport_strategy.pdf
- Plymouth City Council 2011 *Sustainable Neighbourhood Development Plan* pamphlets (39 leaflets) http://web.plymouth.gov.uk/homepage/environmentandplanning/planning/planningpolicy/ldf/ldfsiteproposals/sustainableneighbourhoodsipo.htm
- Plymouth City Council 2012 *Derriford Transport Strategy 2006-2021* http://web.plymouth.gov.uk/transport_strategy_2012.pdf
- Plymouth City Council 2012a *Transport Asset Management Plan V1.2* [internal document]
- Plymouth City Council 2013 *Planning Application Report 12/02027/OUT Land at Seaton Neighbourhood Planning Committee Report 7 November 2013* http://democracy.plymouth.gov.uk/documents/s50475/ITEM%205.pdf
- Plymouth City Council 2013a Development Guidelines Supplementary Planning Document First Review Adopted May 2013 http://web.plymouth.gov.uk/dgs_planning_document.pdf
- Plymouth City Council 2013b *Hackney Carriage Appointed Stands V.2 November 2013* http://web.plymouth.gov.uk/hackney_carriage_appointed_stands_list.pdf
- Plymouth City Council 2013c *Asset Management Policy June 2013* http://web.plymouth.gov.uk/homepage/transportandroads/highways/highwaysasset.htm
- Plymouth City Council 2013d *Asset Management Strategy June 2013* http://web.plymouth.gov.uk/homepage/transportandroads/highways/highwaysasset.htm
- Plymouth City Council 2014 *Plymouth Plan Topic Paper - Local Transport* http://web.plymouth.gov.uk/topicpaperlocaltransport.pdf
- Plymouth City Council 2014a *2014 Air Quality Progress Report Version 1 August 2014* http://web.plymouth.gov.uk/progress_report_air_quality_in_plymouth_2014.pdf
- Plymouth City Council 2014b *Controlled Parking Zones: On-Street parking Review A report of the Working Plymouth Cooperative Review Scrutiny group following a review of Controlled Parking Zones: On Street Parking – Cabinet 15/07/2014*

http://democracy.plymouth.gov.uk/documents/s56113/Co-operative%20Scrutiny%20Review%20Report%20-%20Controlled%20Parking%20Zones%20On%20Street%20Parking%20Review.pdf

- Plymouth City Council 2014c *Derriford Transport Scheme Option Assessment Report Revision A 16th October 2014* http://web.plymouth.gov.uk/dts_option_assessment_report.pdf
- Plymouth City Council 2014d *Plymouth's Definitive Map and Statement* https://www.plymouth.gov.uk/parkingandtravel/walkingandrightsway/publicrightsway/rightswaymap
- Plymouth City Council 2014e *Pothole Fund Application Form* http://web.plymouth.gov.uk/plymouth_pothole_fund_bid_application.pdf
- Plymouth City Council 2015 *Plymouth Plan 2011 to 2031 Part Two Toolkits* (8 toolkits) http://web.plymouth.gov.uk/pppparttwo
- Plymouth City Council 2015a *Plymouth Cycle Map* http://web.plymouth.gov.uk/plymouth_cycle_map.pdf
- Plymouth City Council 2015b *Road Casualty Report 2014 Revised November 2015* [internal document]
- Plymouth City Council 2015c *Executive Decision Supporting Paper – Investment in the Northern Corridor Strategic Cycle Network Addition of the Northern Corridor Strategic Cycle Network Investment Programme to the Council's Capital Programme.02.03.15* http://democracy.plymouth.gov.uk/documents/s62055/Northern%20Corridor%20SCN%20-%20Exec%20Decision%20Supporting%20Paper%20v2%2002.03.15.pdf
- Plymouth City Council 2015d *Briefing Note: Local Highways Maintenance Challenge Fund Publication date: 30/10/2015* http://democracy.plymouth.gov.uk/documents/s67360/DFT%20Challenge%20Fund%20Bid%202015-16%20Briefing%20Note.pdf
- Plymouth City Council 2015e *Highways Capital Programme for 2015/16 – Briefing Note* http://democracy.plymouth.gov.uk/documents/s62544/Briefing%20note%2002-04-15.pdf
- Plymouth City Council 2015f *Physical Activity Needs Assessment for Plymouth 2015-2018* http://web.plymouth.gov.uk/physical_activity_needs_assessment_2015_to_2018.pdf
- Plymouth City Council 2015g *Eastern Corridor and City Centre Strategic Cycle Network Business Case (non-major)* http://heartofswlep.co.uk/wp-content/uploads/2016/09/Eastern-Corridor-and-City-Centre-Strategic-Cycle-Network-BC-LTB-Dec-2015-v3_0.pdf
- Plymouth City Council 2015h *Indicative 2016/17 Revenue Budget plus 2 Year Indicative Financial Forecast and 2016/17 to 2019/20 Capital Programme* http://democracy.plymouth.gov.uk/documents/s68207/2016-17%20Indicative%20Revenue%20and%20Capital%20Budget%20December%20Cabinet%20v14%2007-12-15%20Final%20for%20print.pdf
- Plymouth City Council 2015i *Plymouth Plan 2011 to 2031 Part One Approved September 2015* http://web.plymouth.gov.uk/plymouth_plan_part_one.pdf
- Plymouth City Council 2016 *The State of the Bus Network* [internal document]
- Plymouth City Council 2016a *LSTF 2015/16 Outputs Survey* [unpublished]
- Plymouth City Council 2016b *Work on new visitor coach stops to start Plymouth Newsroom entry posted 21 July 2016* http://plymouthnewsroom.co.uk/work-new-visitor-coach-stops-start/
- Plymouth City Council 2016c Plymouth Newsroom Funding boost for walking and cycling improvements on eastern corridor http://plymouthnewsroom.co.uk/funding-boost-for-walking-and-cycling-improvements-on-eastern-corridor/
- Plymouth City Council 2016d *Monthly casualty statistics for 2015* [unpublished]

- Plymouth City Council 2016e *Sustainable Travel Transition Year Revenue Competition 16/17 - Application Form* http://web.plymouth.gov.uk/application_document__573kb_.pdf
- Plymouth City Council 2016f *Plymouth Plan Collect Summary Report – June 2016* http://www.plymouth.gov.uk/summary_report_final.pdf
- Plymouth City Council 2016g *Forder Valley Transport Improvements - Forder Valley Link Road and Forder Valley Roundabout improvements Consultation information September/October 2016* http://web.plymouth.gov.uk/forder_valley_transport_improvements_consultation_leaflet.pdf
- Plymouth City Council 2016h *Roadside Interview Data – Forder Valley Road (09/03/2016), Billacombe Road (22/02/2016), Exeter Street (16/05/2016) and Tavistock Road (29/02/2016)* [unpublished]
- Plymouth City Council 2017 *Find somewhere to park* Data retrieved 17 February 2017 http://www.plymouth.gov.uk/parkingandtravel/findsomewherepark
- Plymouth City Council, Forestry Commission, Natural England, South Hams District Council & Woodland Trust 2010 *Plymouth's Green Infrastructure Delivery Plan* http://web.plymouth.gov.uk/green_infrastructure_delivery_plan.pdf
- Plymouth City Council, South Hams & West Devon Councils 2016 *Plymouth & South West Devon Joint Local Plan July 2016 At Plymouth Consultation* http://plymouth.objective.co.uk/portal/planning/jlp/
  - *A brief introduction to the three growth areas/area visions* http://plymouth.objective.co.uk/file/4060198
  - *Map showing all sites being considered for development -* http://plymouth.objective.co.uk/file/4060199
  - *Details of all sites being considered for development -* http://plymouth.objective.co.uk/file/4060197
- Plymouth Hospitals NHS Trust 2017 *Parking at Derriford Hospital* https://www.plymouthhospitals.nhs.uk/parking-at-derriford
- Scott Wilson 2004 *Plymouth Sound and Estuaries Water Transportation Study* http://web.plymouth.gov.uk/plymouth_water_transportation_study.pdf
- SIAS Limited 2003 *Plymouth Eastern Gateway Study: Paramics Modelling* http://web.plymouth.gov.uk/57920_final_gateway_modelling_report_gjb.pdf
- South Devon Area of Outstanding Natural Beauty Unit 2016 *Ferry Timetable 2016* http://www.southdevonaonb.org.uk/uploads/files/explore/2016_ferry_timetable.pdf
- South Hams District Council 2006 *South Hams Local Development Framework Core Strategy adopted December 2006* http://www.southhams.gov.uk/CHttpHandler.ashx?id=3672&p=0
- South Hams District Council 2010 *South Hams Development Policies Development Plan Document adopted July 2010* http://www.southhams.gov.uk/CHttpHandler.ashx?id=3675&p=0
- South Hams District Council 2012 *Air Quality Action Plan for South Hams District Council* http://www.southhams.gov.uk/CHttpHandler.ashx?id=1279&p=0
- South Hams District Council 2013 *Decision Notice for Planning Application 7_49/2426/06/O (Sherford New Community land south and south west of A38 Deep Lane junction and east of Haye Road Elburton, Plymouth)* http://www.southhams.gov.uk/civica/Resource/Civica/Handler.ashx/Doc/pagestream?cd=inline&pdf=true&docno=279696
- South Hams District Council 2015 *South Hams Green Infrastructure Framework April 2015* http://www.southhams.gov.uk/CHttpHandler.ashx?id=17920&p=0 and http://www.southhams.gov.uk/CHttpHandler.ashx?id=17919&p=0

- Stagecoach Group 2015 *Stagecoach South West Annual Report May 2014 to April 2015* https://www.stagecoachbus.com/media-library/files/south%20west/stagecoach%20south%20west%20annual%20report.pdf
- Traffic Commissioners of Great Britain 2015 *Statutory Document No. 14 Local buses in England (outside London) and Wales First published 14 December 2015* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/482588/statutory-document-14.pdf
- Transport Focus 2016 *Rail Passenger Satisfaction at a glance: Great Western Railway - Spring 2016* http://d3cez36w5wymxj.cloudfront.net/wp-content/uploads/2016/06/30101554/NRPS-At-a-Glance-Great-Western-Railway-Spring-20161.pdf
- Transport Focus 2016a *Rail Passenger Satisfaction at a glance: CrossCountry - Spring 2016* http://d3cez36w5wymxj.cloudfront.net/wp-content/uploads/2016/06/30101613/NRPS-At-a-Glance-CrossCountry-Spring-20161.pdf
- Transport Focus 2016b *Rail Passenger Satisfaction at a glance: Great Britain - Spring 2016* http://d3cez36w5wymxj.cloudfront.net/wp-content/uploads/2016/06/30101603/NRPS-At-a-Glance-GB-Spring-20161.pdf
- West Devon Borough Council 2005 *West Devon Local Plan Review March 2005 As amended by the adopted Core Strategy April 2011* http://www.westdevon.gov.uk/CHttpHandler.ashx?id=2207&p=0
- West Devon Borough Council 2011 *2011 Air Quality Progress Report for West Devon Borough Council* http://www.westdevon.gov.uk/article/2524/Air-Quality
- West Devon Borough Council 2011a *Local Development Framework Core Strategy Development Plan Document (2006-2026) Adopted April 2011* http://www.westdevon.gov.uk/CHttpHandler.ashx?id=3745&p=0
- WSP 2014 *Economic Study into Rail Electrification of Rail Services to Plymouth & Cornwall Final Report – with a revised set of scenarios 23/04/2014* https://resiliencesw.files.wordpress.com/2014/11/prtf-elec-rpt-2014-vfinal.pdf
- WSP | Parsons Brinckerhoff 2016 *Tamar Crossings Travel Analysis Study Main Report Final Draft September 2016* [unpublished]
- WSP | Parsons Brinckerhoff 2016a *Dawlish Additional Line – Assessment February 2016* https://peninsularailtaskforce.files.wordpress.com/2016/11/dal-final-report-vfinal-160318.pdf
- ZapMap 2016 *Map of charging points for electric car drivers in the UK* https://www.zap-map.com/live/