South West Hertfordshire Growth and Transport Plan

Prospectus

June 2019

Hertfordshire

AECOM

Quality information

Prepared by	Checked by	Approved by
A Findlay	A Tobin	S Willison
C Durbin	B Wickenden	
G Vecia		
E Oyokose		

Revision History

Revision	Revision date	Details	Revisions Originator	Revisions Reviewer
Update 1	25/08/17	Officer Comments Update	GV	SPW
Update 2	17/11/17	Member Comments Update	GV, AF	SPW
Update 3	08/01/18	Additional Edits	SPW	-
Update 4	12/03/18	Additional Edits	AF, EO	SPW
Update 5	08/06/18	Additional Edits	AF	SPW
Update 6	04/01/18	Post consultation edits	OC	-
Update 7	11/03/18	Additional post consultation edits	AF	SPW
Update 8	5/4/19	Final edits	OC	

Prepared for:

Hertfordshire County Council

Prepared by:

AECOM

AECOM Limited
AECOM House
63-77 Victoria Street
St Albans
Hertfordshire
AL1 3ER
UK

T: +44(0)1727 535000
aecom.com

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1. Introduction

The provision of high quality transport infrastructure and services is an essential component in the functioning of urban and rural areas, and in the delivery of sustainable and accessible development. Transport helps facilitate journeys from home to work, to school, for leisure purposes and for access to vital services such as healthcare.

Businesses are reliant upon an efficient, safe and reliable transport system in order to attract employees and customers, as well as for the transport of goods and services to different places. As well as catering for existing requirements, transport (or a lack thereof) can also help unlock or be a constraint on new opportunities, both for economic development and for individual wellbeing.

Good planning practices can help identify the conditions needed to operate an efficient transport system and facilitate development growth proposals. If the process of planning is not equipped to deal with these requirements, the delivery of sustainable development could be delayed or even prevented, and this could therefore have lasting negative consequences on towns and communities.

Hertfordshire is facing significant levels of housing and employment growth which are expected to have an impact on the county's local and strategic transport systems and networks in the short, medium and long term. In a post-recession economy, delivering economic growth has become one of the UK Government's main priorities. However, this is set against a backdrop of increasing competition for funding to help invest in new infrastructure, with less money available for local authorities to spend today than perhaps in the past.

The transport needs of large-scale residential and employment development coming forward within Hertfordshire and surrounding areas may be reliant upon seeking vital funding from Central Government and elsewhere, and this funding may only be obtained if a good case is made for investment which is based on robust evidence and positive collaborative planning.

With this in mind, Hertfordshire County Council has developed a fresh approach to planning for the short, medium and long term transport needs. In 2018 Hertfordshire adopted a new Local Transport Plan (LTP) 4, to replace the previous LTP 3 and which grew out of work that defined a Transport Vision for Hertfordshire to 2050. The LTP sets the overarching direction of transport policy and priorities across Hertfordshire.

At a sub-county level, the County Council has for some years been producing Urban Transport Plans (UTP) cyclically and these have been a mechanism for assessing transport issues and identifying improvement schemes at a fairly small-scale for individual towns.

The UTP approach to transport planning does not allow for a more extensive review of evidence in order to fully understand transport issues occurring in an area. Some of the transport challenges occurring within towns can be as a consequence of underlying issues or trends occurring elsewhere or spread over a much wider geographical area than an individual town.

Consequently, UTPs have tended to identify quite small-scale interventions such as individual pedestrian crossings or minor junction improvements. Whilst these small schemes can deliver vital local benefits and have a positive impact of people's lives, they may not always be

the most effective means of tackling the challenges occurring over a wider geographical area. These challenges could be the underlying causes of the issues which are a feature within towns such as traffic congestion, noise and poor air quality.

Taking a more strategic view means that cooperation between local authorities on cross-boundary issues will be important.

In an evolving planning landscape and changing economic climate, Hertfordshire County Council has sought to develop a new approach to sub-county transport planning which is more in alignment with planned future housing and employment growth, and based on evidence - therefore helping lead towards a more efficient, joined-up approach to transport planning.

Planning for growth and for transport should be considered in the context of the health of the population. Linkages between the delivery of public health improvements and transport planning have gained recognition in recent years. Local authorities' statutory responsibilities for public health services are set out in the UK Health and Social Care Act (2012). Local authorities including the County Council have a duty to take proactive steps towards improving the health of local people.

Hertfordshire County Council's Public Health unit has an increasingly integrated role within the authority's wider functions and is actively engaged in cross-disciplinary discussions regarding proposed development, transport infrastructure and service priorities. A priority of The Hertfordshire Public Health Service Strategy 2017-2020 is increasing levels of physical activity - including through working with planners and transport planners to make the active choice the easy choice for people. Prevention of ill health is a driving aspect of the service and its work to implement regulatory, policy and population measures to improve health.

The Growth and Transport Plan ('GTP') is a new approach to sub-county transport planning. The South West Hertfordshire GTP is the first of a suite of new GTPs which will cover different sub-areas of Hertfordshire with the intention of promoting modal shift to non-motorised and public transport, providing greater modal choice, and facilitating growth sustainably.

A GTP is a strategic spatial transport plan developed by Hertfordshire County Council in partnership with key stakeholders, including District/Borough councils and the Local Enterprise Partnership, for the purpose of applying LTP policies and objectives to a growth-focused sub-area within Hertfordshire.

Hertfordshire County Council is also developing two corridor transport strategies for the A414 and A505. These strategies will propose interventions which seek to address the growth and transport challenges for these important east-west routes and which reflect the priorities in Hertfordshire's LTP4.

The GTPs and the corridor transport strategies are being developed to align as far as possible and to harmonise with the other supporting documents of the LTP. The GTP and Corridor Strategy areas are shown in Figure 1.

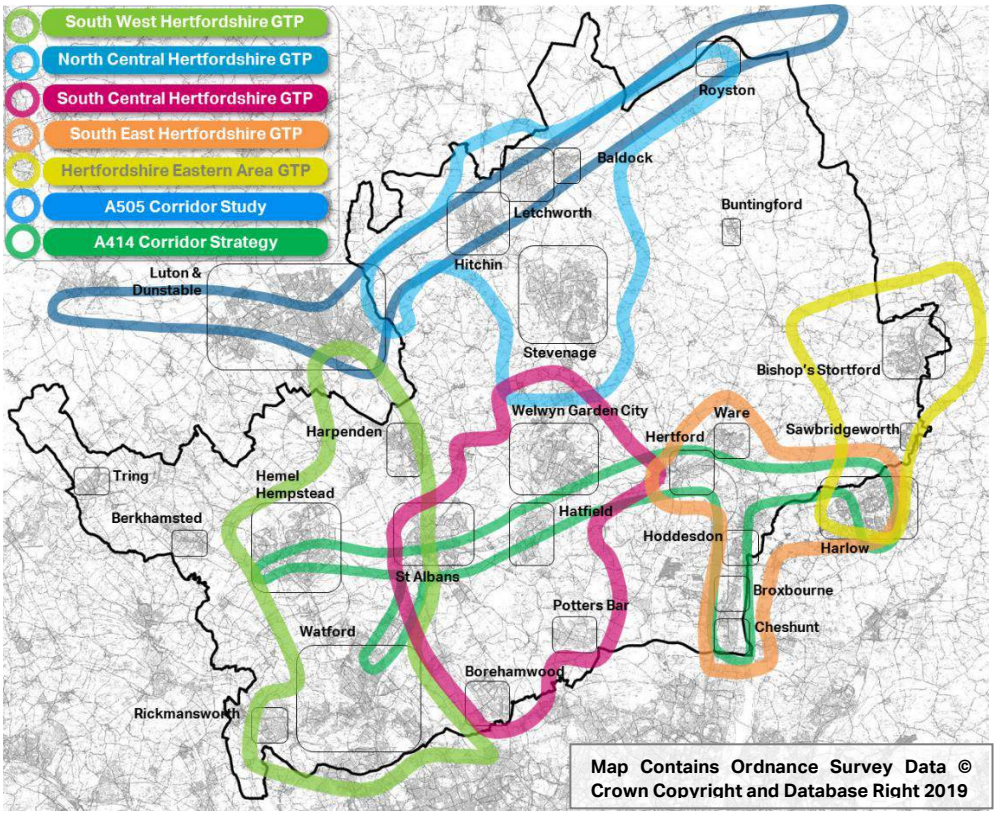

Figure 1: Coverage Map with GTP areas and Corridor Studies

On its adoption, the South West Herts Growth & Transport Plan will supersede the South West Herts Transport Plan, the Hemel Hempstead Urban Transport Plan and the West Herts Transport Plan. As they are not directly covered by this plan, the South West Herts Cycle Strategy 2013 and the Tring, Northchurch and Berkhamsted Urban Transport Plan 2013 will be retained as current strategies until such a time that they are revised or replaced by another plan or strategy.

This GTP Prospectus provides an overview of the first GTP which covers South West Hertfordshire. This area incorporates the large towns of Watford and Hemel Hempstead (and their interactions with St Albans) and is one of the most congested and constrained parts of Hertfordshire in terms of growth and transport. Taking a more strategic and joined up approach to transport planning here is therefore critical.

This Prospectus forms one of a portfolio of documents which make up the GTP.

Section 2 describes the process of developing the GTP and the policy context including the close relationship between the GTP, the LTP and Local Plans.

Section 3 provides a spatial portrait of South West Hertfordshire including the planned housing and employment growth in the area.

Section 4 summarises the main growth and transport challenges in South West Hertfordshire which are the focus of the GTP.

Section 5 summarises the objectives developed specifically for the GTP which have guided the review of evidence, prioritisation and sifting of growth and transport challenges, and the formulation of transport interventions.

Section 6 describes the approaches to address the growth and transport challenges through innovative packages of interventions.

Process and Policy Context

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2. Process and Policy Context

A GTP is a strategic spatial transport plan developed in partnership with key stakeholders, including District/Borough councils and the Local Enterprise Partnership, for the purpose of applying Hertfordshire County Council's LTP policies and objectives to a growth-focused area.

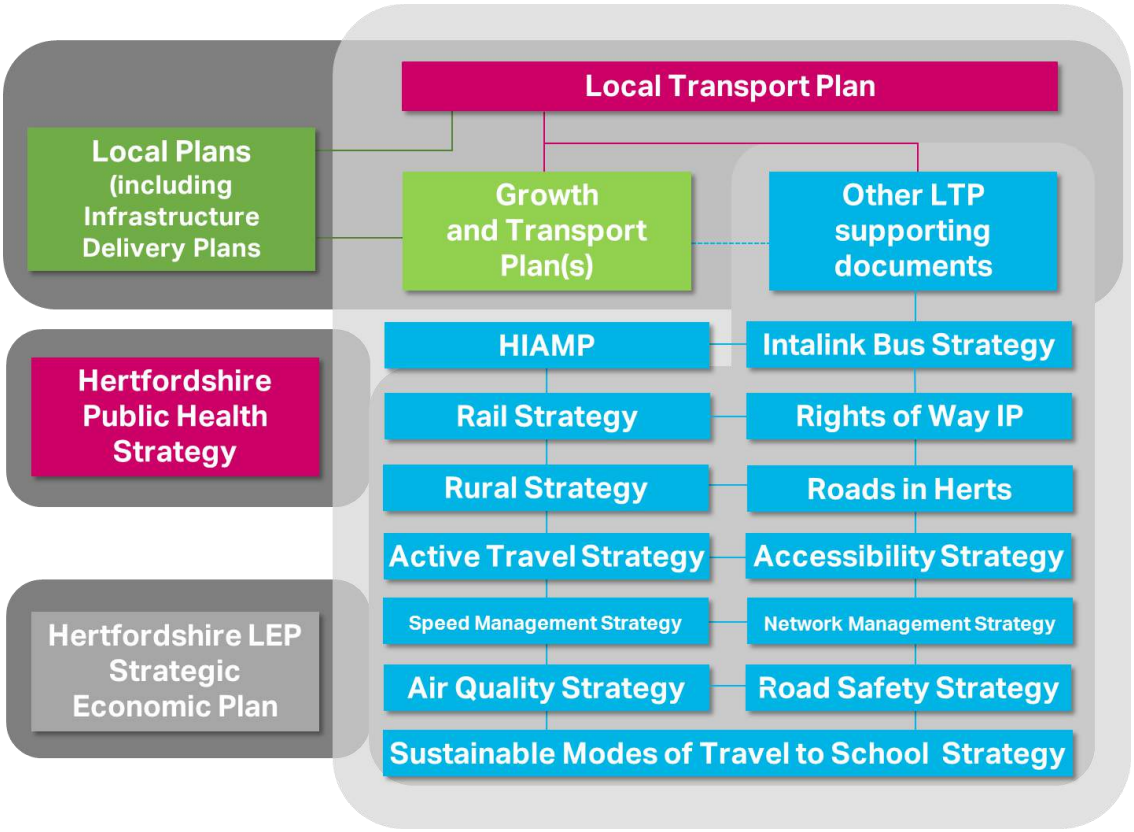
A GTP is a supporting document of the LTP, and is informed by the overarching guidance and direction of the LTP. The GTPs sit alongside the range of other LTP supporting documents, which are developed to give further direction and detail to the county council's transport strategy and which must align with the LTP policy (see Figure 1). Hertfordshire's transport policy is likewise informed by the other policy objectives of the county council, such as the County's Public Health Strategy. As they are being developed in parallel, every effort is being made to ensure that the South West Herts GTP links coherently with the other GTPs, LTP4 proposals and other emerging transport strategies of the county council.

A GTP is also linked to Local Plans which are prepared by the district/borough local planning authorities within Hertfordshire. Local Plans describe the level and spatial distribution of housing and employment growth, and it is the role of Hertfordshire County Council as local highway authority to engage collaboratively and proactively to understand the transport pressures and needs arising from this planned development growth and make appropriate plans in response.

Hertfordshire Local Enterprise Partnership has prepared a Strategic Economic Plan which sets out the overarching economic development priorities for the County and should be strongly aligned with the Local Plans and LTP.

The GTPs are one of the key approaches for the County Council to respond and work collaboratively with the local planning authorities, LEP and other stakeholders to plan for the future transport system.

Figure 2 - Plan-Policy Framework



To complement the GTPs and support the delivery of LTP 4 objectives, the county council will also seek to work with district and borough council partners to develop Local Cycling & Walking Infrastructure Plans. These plans would take a comprehensive approach to planning better networks for walking and for cycling and establishing priorities for improvement across an individual town or urban area. By looking at the whole network, the LCWIP would help knit together the packages of interventions proposed through GTPs.

The GTP is not a single-town plan but instead covers a wider geographical area. It should therefore be concerned with growth and transport challenges within *and* between two or more principal towns.

For this GTP, the focus is on South West Hertfordshire. This area incorporates the principal towns of Hemel Hempstead and Watford, their interactions with St Albans, as well as smaller settlements including Rickmansworth and Harpenden and the rural areas in between. The area's interaction with locations outside of Hertfordshire is also of interest, such as Luton to the north and Greater London to the south.

An overarching aim of the GTP is to identify the interventions which will be needed to support and help facilitate sustainable development including new homes and new jobs, and secure opportunities for positive change to local communities and their well-being. The GTP defines the current and future growth and transport challenges facing South West Hertfordshire, and sets out a schedule of recommended short, medium and long term interventions which are sorted into a range of packages. These packages are focused towards addressing the key challenges and supporting planned growth.

These interventions are proposed by Hertfordshire County Council (HCC) and thus HCC will work with all relevant stakeholders - including Hertfordshire districts and boroughs, Highways England, the Local Enterprise Partnership, Network Rail, transport operators, community

groups, and adjacent Local Authorities – to further investigate and develop the opportunities presented in the Growth and Transport Plans. As such, a GTP is not prescriptive but instead forms the basis for informed discussions on the future of transport infrastructure and interventions across the growth-focused areas of Hertfordshire.

This GTP Prospectus is one of a portfolio of documents which make up the GTP (see Figure 3).

A series of Evidence Packs have been developed for the principal towns in Hertfordshire and these packs include a wide range of data and key information about transport, travel and socio-demographics. Information contained in these packs has been used to help understand the key current and future transport situation in towns and the surrounding areas in South West Hertfordshire.

These packs have been used to carry out some specific analysis for this GTP to investigate challenges across South West Hertfordshire, both within and between towns, and this is set out in the Evidence Analysis Paper.

A series of objectives have been defined which have been used to shape the GTP's direction and interventions, and these are described in the Objectives Paper.

Transport can have a transformative effect in terms of the local economy but it can also act as a constraint by making it difficult for people to access jobs. Potential economic impacts of transport interventions are considered in general terms within the Economic Impacts Paper. This research provides a backdrop to some of the interventions considered in the GTP.

A large toolkit of interventions is available to help address growth and transport challenges but not all 'tools' are suitable in all situations. The Interventions Ideas Paper identifies the range of interventions that could be implemented, and captures the views of council officers and elected members on the approaches that could be taken in South West Hertfordshire.

This Prospectus briefly summarises the challenges and objectives, and describes the approach to tackling the growth and transport challenges through packages of interventions.

An Environmental Statement has been produced summarising the Strategic Environmental Assessment undertaken for this GTP.

Figure 3 - Growth and Transport Plan Portfolio

A staged approach has been adopted to develop the GTP which is briefly summarised in Figure 4 below.

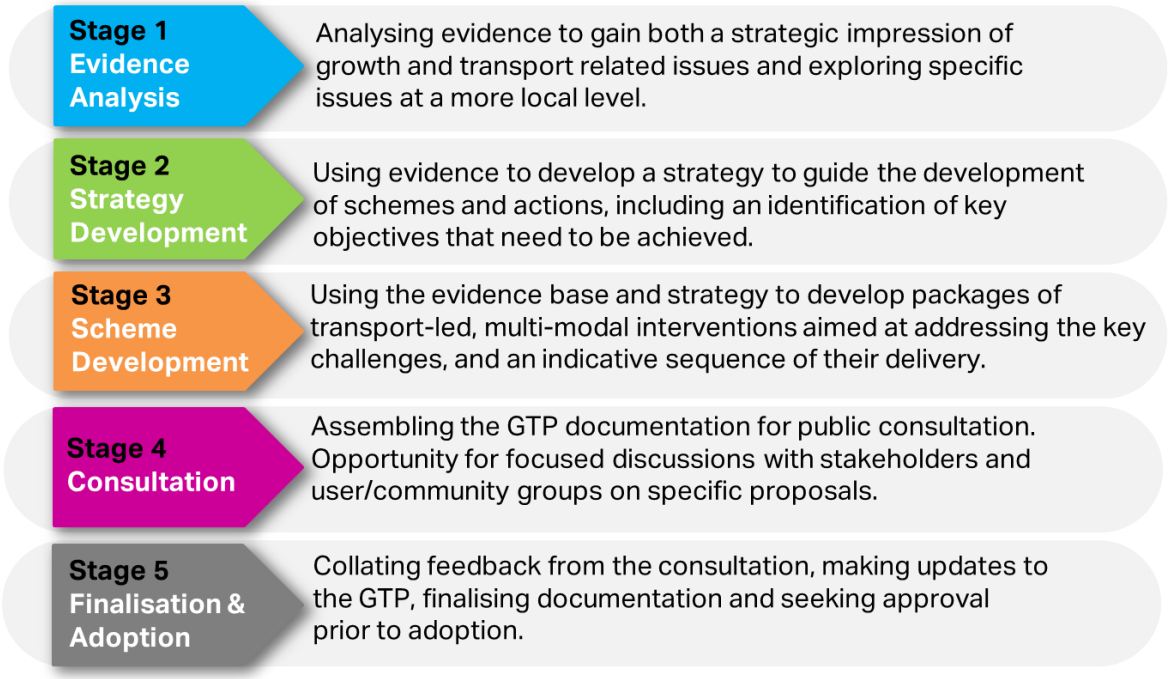


Figure 4 - Growth and Transport Plan Stages of Development

South West Hertfordshire

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3. South West Hertfordshire

The intention is not for a GTP to be constrained by county or district administrative boundaries. Journey patterns to, from and between places are unlikely to adhere to administrative boundaries. Therefore in order to plan effectively for the future transport needs of an area it is more appropriate for the study area of a GTP to reflect predominant urban and inter-urban travel movements, the location of current and future challenges (such as traffic congestion hotspots) and where significant housing and employment growth is planned, regardless (to a large extent) of the boundaries in place. The broad area of South West Hertfordshire is shown in Figure 5 below.

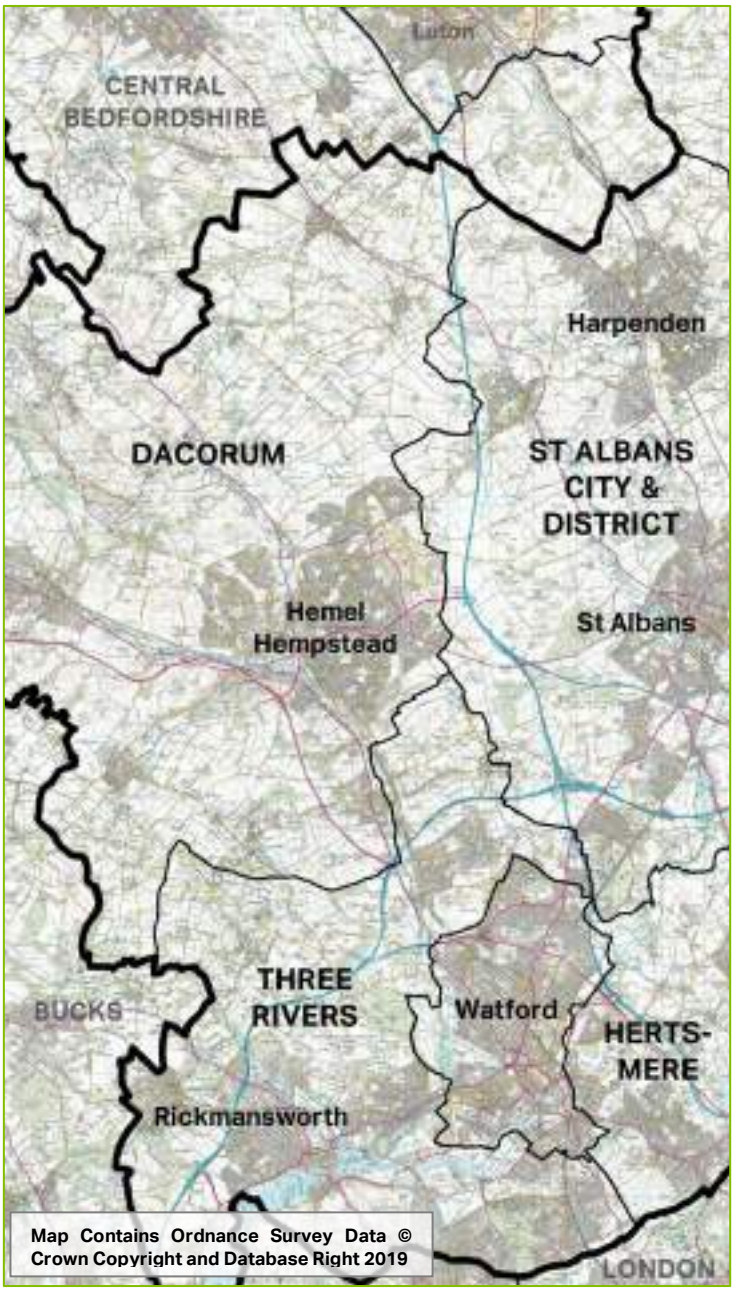

Figure 5 - South West Hertfordshire area

South West Hertfordshire incorporates large parts of Watford borough, Dacorum borough, Three Rivers district, smaller parts of St Albans city and district (primarily the linkages between St Albans and Hemel Hempstead/Watford and Harpenden's relationship with the M1 corridor) and Hertsmere borough.

The principal towns within the area are Hemel Hempstead and Watford. Adjoining Watford are multiple settlements including Abbots Langley, Croxley Green, South Oxhey, Eastbury and Bushey, which function in movement terms as part of a greater Watford area (the phrase 'the Watford area' is used in this plan to describe the continuous urban area around Watford). The plan area also includes the linkages of the two main towns with St Albans, Harpenden, Rickmansworth and a host of villages and rural areas.

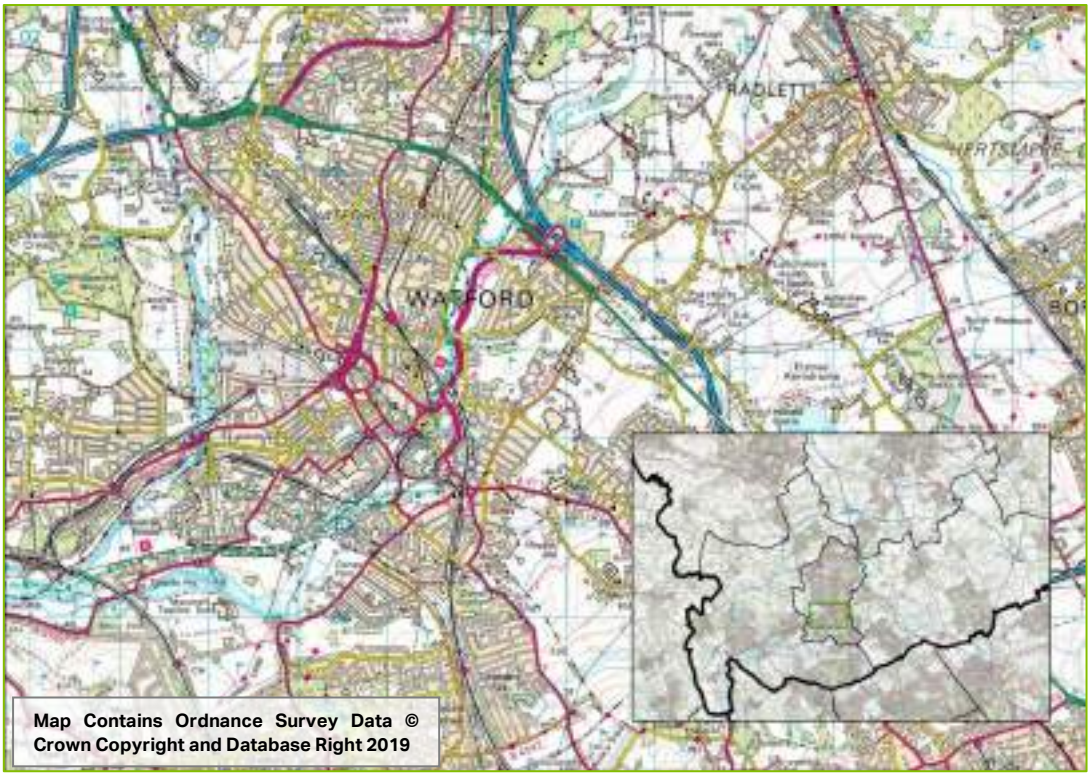

Figure 6 - Map of Watford

The borough of Watford is an urban borough located on the north-western edge of Greater London. The borough covers approximately 8 square miles.

Watford is a long established urban centre, with a market charter dating back to the 12th century. Watford has expanded rapidly from its linear layout along the historic High Street during the nineteenth century with the coming of the railway line.

Much of Watford's character is formed by the streets of terraced Victorian housing surrounding the town centre, which were followed by larger planned housing estates during the twentieth century. These estates, along with their associated employment areas, reflect the styles of design that predominated at the time of their construction, with the resulting diversity of urban character visible across the borough.

Watford town centre is a regional centre with a large retail offer which attracts shoppers from a wide area. The main high street incorporates pedestrianised sections. The large indoor Intu Watford shopping centre houses major retailers, and was expanded with a £110 million redevelopment of the former Charter Place shopping area, including new retail units and a multiplex cinema, which opened in 2018.

Watford is strongly influenced by London which is likely to bring benefits to the Watford economy as companies seek the advantages of close proximity to the capital's large labour market and cheaper properties than those in Central London. However, this also brings environmental pressures such as high levels of traffic congestion, higher house prices and pressures on land which is echoed across different parts of Hertfordshire.

Figure 7 - Aerial view of Watford Town Centre

Watford is an under-bounded urban borough, with parts of the borough falling within the Metropolitan Green Belt. This governs where new housing and employment development can be located. From a broader planning perspective, current and future challenges facing Watford are focused around maintaining the important regional role of the town, providing good jobs and attractive places to live which are well connected to the wider area by an efficient transport system.

Watford Borough Council's Local Plan sets out a long term vision for the borough, including a set of strategic objectives including making Watford a family-friendly town centre; promoting attractive, safe and distinctive residential neighbourhoods with good quality of life and a strong sense of community; enhancing the borough's regional economic and transport role; enhancing Watford's regional health, recreational, educational, cultural and social role; and enhancing the Borough's environment.

Major development locations include the area surrounding Watford Junction railway station which incorporates land to the north including current railway sidings and industrial land.

Between the station and the town centre along Clarendon Road an area of high density, high quality offices has developed and continues to expand and thrive. This area offers higher-earning service-sector jobs and accommodates some well-known global companies in sectors such as finance, retail and telecommunications.

Watford Business Park and adjoining Croxley Park sit on the Watford-Three Rivers border and are home to office, light industry and logistics companies. It is an area of focus for Watford Borough Council to intensify and diversify land uses and the new supermarket and school located at the north eastern end of the business parks is the first step towards a re-imagined Western Gateway to Watford.

A number of retail parks are located in the south-eastern part of Watford, between the town centre and Oxhey, and are home to major, large-format retailers including DIY stores and supermarkets.

Watford Riverwell (formerly referred to as Watford Health Campus), located south-west of the town centre is an ambitious £250m long-term scheme which will deliver new employment premises including the Trade City business zone, new homes and the opportunity to develop enhanced facilities at Watford General Hospital.

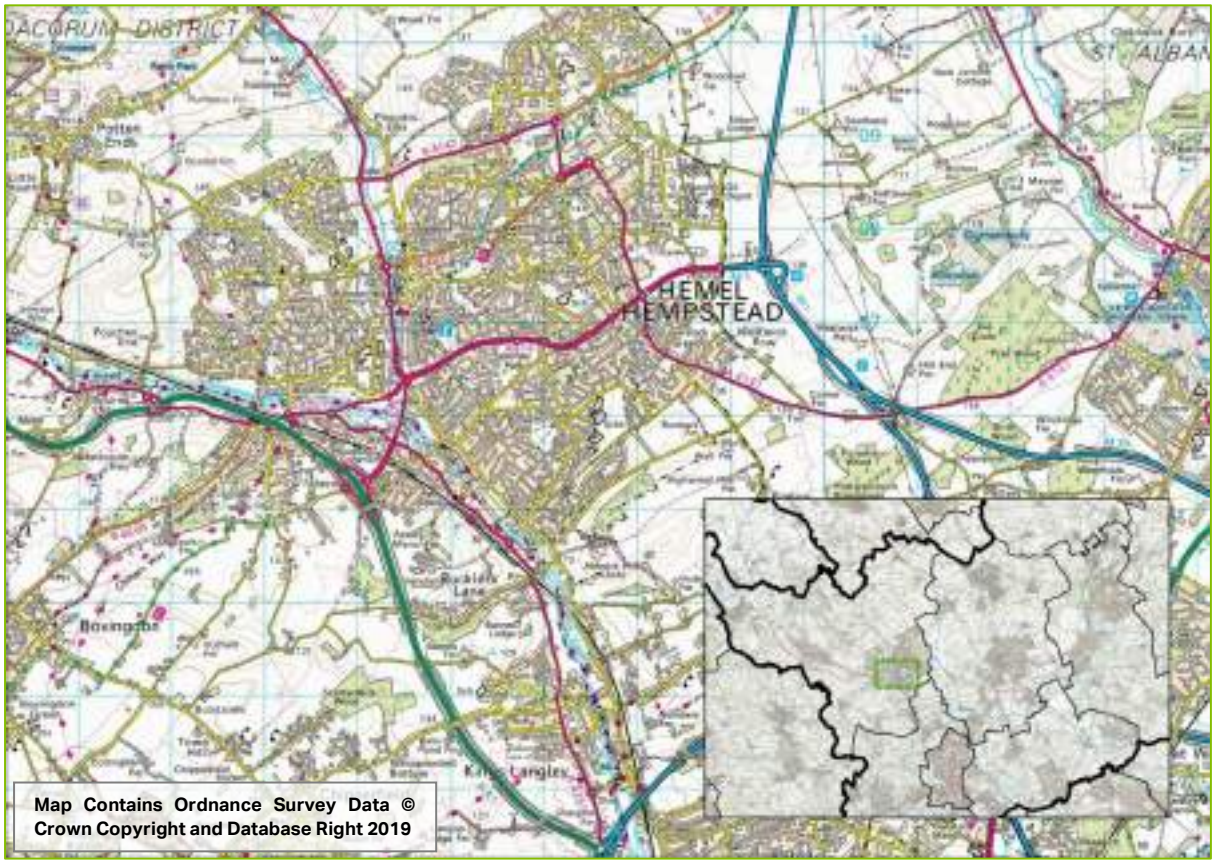

Figure 8 - Map of Hemel Hempstead

The more rural borough of Dacorum covers approximately 80 square miles extending broadly from the northern outskirts of the greater Watford areas northwards to the Chiltern Hills.

The largest town in Dacorum is Hemel Hempstead which is a Mark 1 New Town developed in the 1950s and 1960s. The town continues to be the focus for development and change within the borough. Large suburbs have developed in the last few decades and the town is undergoing an ambitious programme of regeneration.

A key aspiration of Dacorum Borough Council is to enhance the quality of offer and environment of Hemel Hempstead Town Centre. The council is focused on revitalising the town centre with the ultimate goal of increasing its prosperity and conserving its heritage for future generations. The Hemel Hempstead Town Centre Masterplan provides a vision to 2031 and has and will continue to guide the town centre's regeneration.

The Two Waters Masterplan covers the area which is anchored in the west by Hemel Hempstead railway station, in the east by Apsley railway station and to the north by the Plough 'Magic' Roundabout on the edge of Hemel Hempstead town centre. There is currently an eclectic mix of land uses around the edges of Two Waters, including residential, light

industrial, retail and community uses, and a swathe of recreational land in the centre, owned and managed by the Box Moor Trust. The masterplan aims to promote coordinated development in an area which is under pressure for new development.

The large Maylands industrial area is located on the eastern side of Hemel Hempstead.

Maylands forms part of the Hertfordshire Enviro Tech Enterprise Zone (EZ). The overarching aim of the EZ is to support and develop the existing enviro-tech sector in west Hertfordshire and attract more businesses to the area thanks to its excellent national and international transport links. The multi-site EZ also covers buildings at the Building Research Establishment (Bricket Wood) and Rothamsted Research (Harpenden).

The aims of the EZ as defined by Hertfordshire LEP are to:

- harness Hertfordshire's relationship with London and elsewhere (the area benefits from direct access to the M1, with easy links to London, international hubs including London Luton Airport, the wider South East and the Midlands and provides a gateway to the UK economy);
- to maintain global excellence in science and technology (the EZ sits at the heart of the Golden Research Triangle (Cambridge-London-Oxford) so attracts inward investment and supports businesses seeking expansion space from constrained sites within Greater London);
- harness the expertise of partnership organisations including BRE, Rothamsted Research and the University of Hertfordshire to establish Hertfordshire as a globally renowned centre of excellence in green technology; and
- provide the foundations for growth.

The EZ is expected to deliver over 8,000 new jobs, 800 new businesses, many of which will be based in Maylands, and an uplift in land values in the region of £120m.

Maylands Business Park is already one of the largest business parks in the East of England and it is currently home to over 650 businesses that employ over 18,000 people. It benefits from superior access to the motorway network meaning that businesses can benefit from being well connected with the rest of Hertfordshire, Greater London, the South East of England and beyond. The site contains a range of premises and uses to suit all business needs. From large scale warehousing to small incubator units for new business start-ups.

Figure 9 - Aerial view (westwards) of Hemel Hempstead

In addition to Hemel Hempstead, there are also two market towns within Dacorum - Berkhamsted and Tring - and a number of villages including Markyate and parts of Kings Langley, all with their own distinctive character.

Almost 85% of Dacorum is considered rural and a large proportion of this area falls within the Metropolitan Green Belt. The Chiltern Hills Area of Outstanding Natural Beauty is one of the most accessible areas of countryside for residents of many large towns and cities, including Aylesbury, Luton, Watford and London, to spend their leisure time.

Three Rivers is a semi-rural / semi-urban district which encircles a large part of Watford borough. It incorporates the town of Rickmansworth and numerous smaller settlements including Moor Park, Eastbury, Croxley Green, Abbots Langley, South Oxhey and Carpenders Park. Other settlements within Three Rivers but not covered by this plan are Maple Cross and Chorleywood.

Warner Bros. Studios Leavesden and the neighbouring business park are located in the northern part of the district, north of Watford near Abbots Langley. The successful Warner Bros. Studio Tour is a popular attraction bringing in visitors not just from the local area but from London and beyond.

Croxley Park is an employment area in Three Rivers, immediately neighbouring Watford Business Park. A number of other smaller business and industrial parks are located nearby off Tolpits Lane, with further concentrations of employment at Kings Langley, Maple Cross and Ricksmansworth town centre.

There has been significant residential development in Abbots Langley in the last 10 years. Meanwhile The South Oxhey Initiative is a £150 million mixed use regeneration project, bringing new homes, retail and public space at the centre of South Oxhey, including the approach to the station.

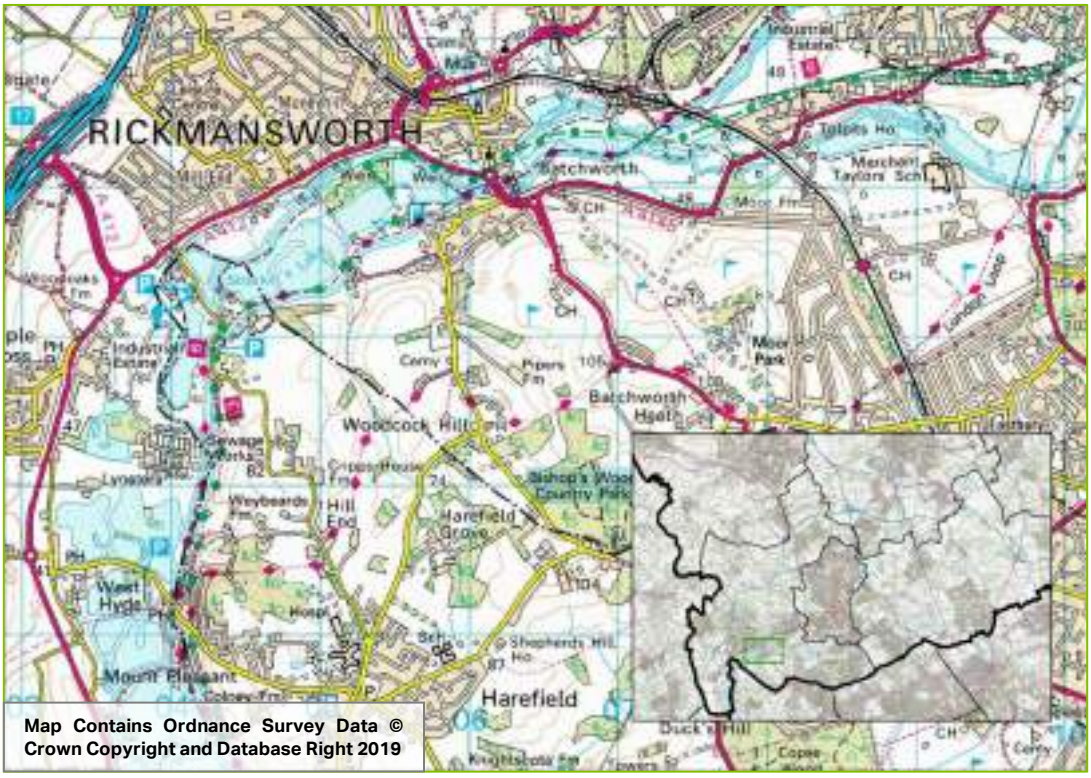

Figure 10 – Rickmansworth and South Three Rivers

Hertsmere Borough is located to the east and south-east of Watford. For the purposes of this plan, only a small part of the borough on the western side of the M1 is considered, including most notably Bushey which is located to the south-east of Watford.

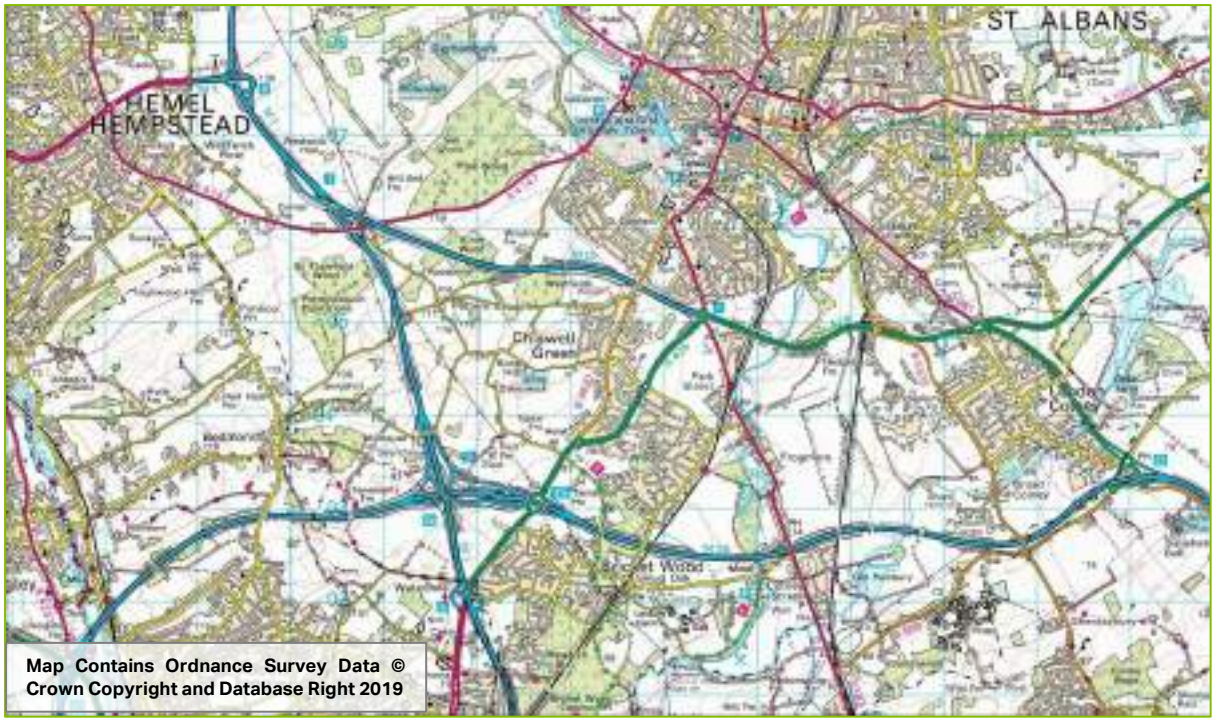

Figure 11 - South St Albans area and connections to Watford and Hemel Hempstead

St Albans District includes the historic city of St Albans, the medium sized town of Harpenden and smaller settlements including Redbourn, Bricket Wood, How Wood and Park Street. This GTP's main concern is with the linkages between this district and the remaining part of South West Hertfordshire.

Figure 12 - Aerial view (southwestwards) of south St Albans, Bricket Wood, and How Wood

UK Census data provides data on where people live and where they work, and hence can provide a broad indication of the corridors along which people travel and the modes of transport they use (in the form of Journey to Work data). This data has been used to confirm the shape of the GTP area and the key movements of interest. These are shown in Figure 13.

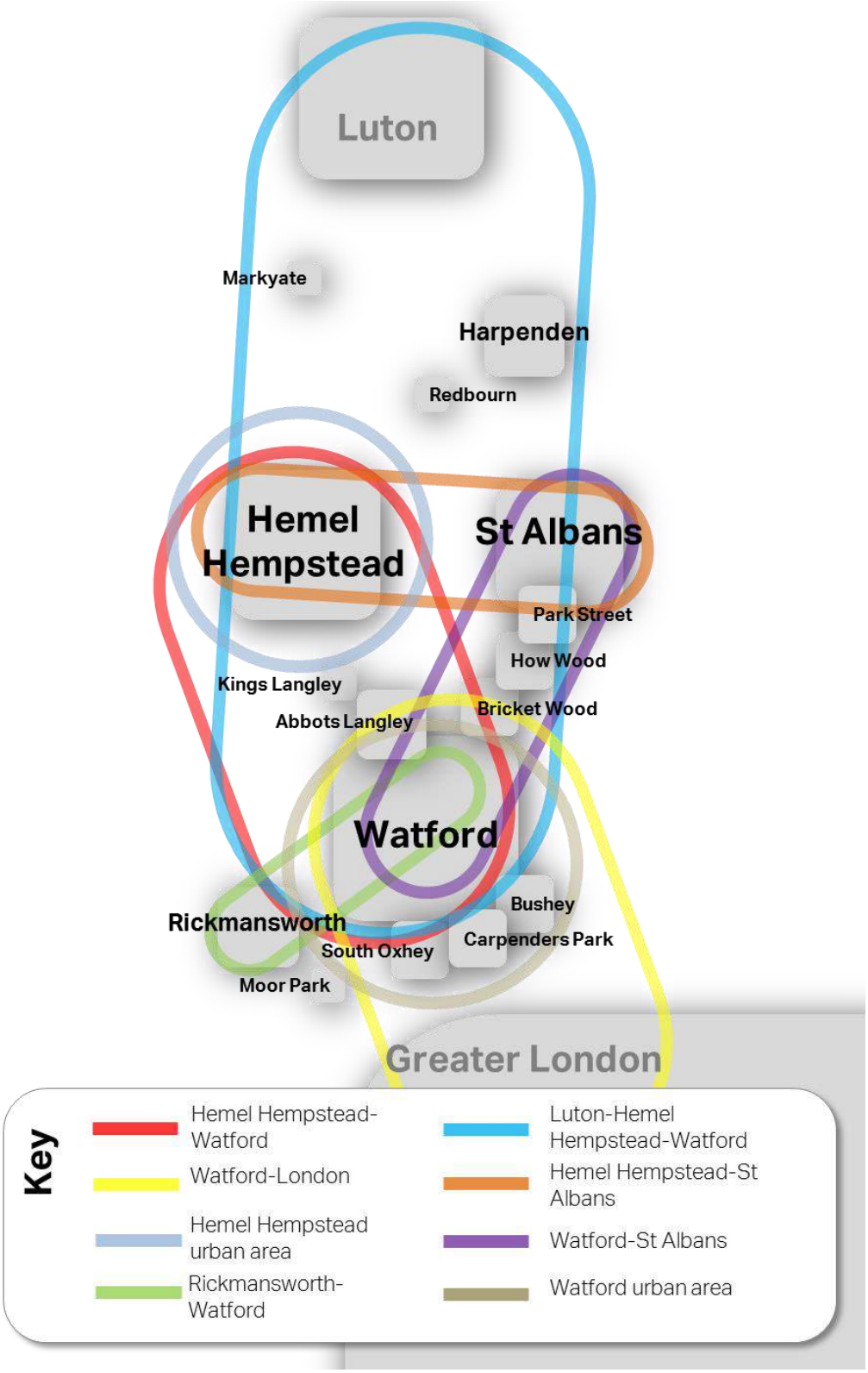

Figure 13 - Broad relationship between urban areas in South West Hertfordshire

South West Hertfordshire Transport System

The South West Hertfordshire transport network is characterised by a complex system of highways, railways, bus/coach service routes, inner-urban and segregated inter-urban cycleways, footways and dedicated pedestrian/cycle crossings. These are shown in Figure 14.

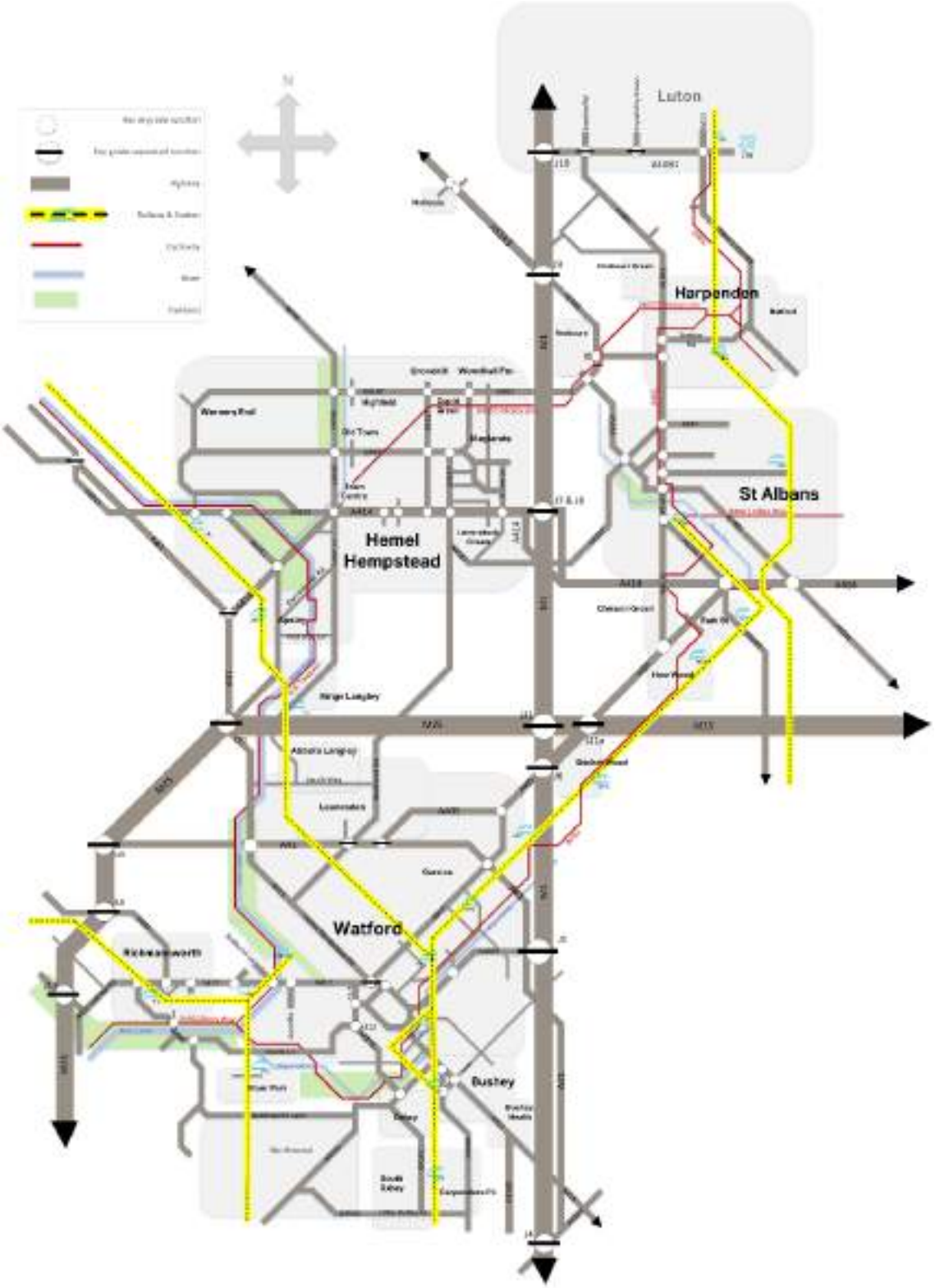

Figure 14 - South West Hertfordshire Transport Network

Roads

The area is dissected by a series of major roads. The M1 runs broadly north-south, linking the North of England, Milton Keynes and Luton to the north, and Greater London to the south, with key junctions including Junctions 5 (the main access to Watford), 6/6a (interchange with the M1, M25 and A405), 7/8 (interchange with the main A414 east-west cross-county corridor and main access to Hemel Hempstead) and 9 (interchange with the A5183 (formerly the A5) linking Dunstable and Milton Keynes to the north). As a route of nationally strategic importance, the M1 facilitates long distance journeys across England and beyond. The M1 also serves a more local and sub-regional function, with short sections between junctions facilitating movements between towns, for example Luton-Hemel Hempstead and Hemel Hempstead-Watford.

The M25 London orbital motorway separates Watford from Hemel Hempstead and a large part of Hertfordshire. Like the M1, the M25 is a route of nationally strategic importance and therefore caters for longer distance trips but also acts as a local distributor route on some sections. Within South West Hertfordshire key junctions include J19 (as a gateway to Watford from the west), J20 (as a conduit between Buckinghamshire and the western-most fringes of Hertfordshire), and Junction 21/21a (interchange with the M1/M25/A405).

The M1 and M25 are managed by Highways England but interface with roads and junctions which are managed by Hertfordshire County Council. The primary roads including the A41 linking Aylesbury, Tring and Berkhamsted in the north and northern parts of Greater London to the south and serving an important link between Hemel Hempstead and Watford. The A41 varies in character along its length, from a rural dual carriageway express road to the west of Hemel Hempstead, to an intraurban distributor road through northern and eastern Watford.

The A414 is one of the few major east-west highway routes crossing Hertfordshire. It is largely a dual carriageway road catering for a mixture of shorter and longer distance journeys. It runs through the middle of Hemel Hempstead (via the Plough 'Magic' Roundabout) but functions more as an edge of town bypass south of St Albans. Part of the A414 between the M1 and Park Street (formerly the M10) is managed by Highways England.

Figure 15 - Plough 'Magic' Roundabout, Hemel Hempstead Town Centre

The A405 links with the A41 in the northern part of Watford and the A414 near Park Street, and forms the main highway route between Watford and St Albans. It is mostly an urban/semi-urban dual carriageway road which facilitates journeys heading between towns and towards the M1 and M25. Part of the A405 linking the M1 and M25 is managed by Highways England.

Other important highway routes include the A5183 (Watling Street) linking Dunstable, Redbourn, St Albans and parts of Hertsmere; the A4146/B440 linking Hemel Hempstead and Leighton Buzzard via the Chilterns Area of Outstanding Natural Beauty; the A4147 linking Hemel Hempstead and St Albans; the A4251 which runs broadly parallel with the A41 and forms the main high streets in Berkhamsted, Apsley and Kings Langley; the A412 linking Rickmansworth and Watford; the A4008 Stephenson Way linking the M1, central Watford and Harrow; and A411 linking Watford, Bushey and Borehamwood. The vast majority of local roads excluding motorways and major A-trunk roads are managed by Hertfordshire County Council as local highway authority.

These major routes are complemented by a system of other A and B roads, as well as more minor roads, which serve important local and strategic functions.

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Figure 16 - Watford Junction railway station main entrance

Railways

In terms of the rail network, the principal rail route running through South West Hertfordshire is the West Coast Main Line which connects London to the south with Milton Keynes, Birmingham and the West Midlands, North West England and Scotland to the north. A mixture of high speed services calling at Watford Junction, and local services calling at stations including Hemel Hempstead and Kings Langley use the West Coast Main Line. Additional services from Hemel Hempstead and Watford Junction to East Croydon are also in (and use the West London Line).

A number of rail services also run through the wider Watford area and Rickmansworth. The Aylesbury to London Line serves Rickmansworth and Chorleywood with a terminus in

Marylebone. London Underground Metropolitan Line also runs to these stations, alongside serving western Watford via Croxley, Moor Park and Watford stations. London Overground services from Euston also terminate in Watford Junction via Bushey.

The Abbey Line provides a more locally-focused shuttle rail service linking Watford Junction (and the West Coast Main Line) and St Albans Abbey stations via a ribbon of suburbs and smaller settlements including Garston, Bricket Wood and Park Street.

Figure 17 – St Albans Station on the Abbey Line

The Midland Main Line is to the east of the South West Herts GTP area, linking London to the south with Luton, Bedford and the East Midlands to the north via St Albans and Harpenden.

Bus Routes

A wide range of bus services route within and between towns in South West Hertfordshire. These include longer-distance local services including 300/301 between Hemel Hempstead and Stevenage via St Albans and Hatfield; 320 between Rickmansworth and Hemel Hempstead via Watford; 321 between Watford and Luton via St Albans and Harpenden; 500/501 between Watford and Aylesbury via Kings Langley, Hemel Hempstead and Tring; 142 linking Watford and Brent Cross via Bushey; 258 linking Watford and South Harrow; 46 linking Hemel Hempstead and Luton; and 724 linking Heathrow Airport and Harlow via Watford and St Albans.

A number of express coach services also route through the area, some calling within towns including 755/757 linking Luton and London via Bricket Wood and 748/758 linking Hemel Hempstead and London.

Cycleways

A network of cycle routes exists in South West Hertfordshire. Some routes are on-road, some on shared footways / cycleways alongside roads, and others largely segregated along dedicated alignments which bypass some roads and intersect with others. Parts of the

designated National Cycle Route Network feed through South West Hertfordshire: the Nickey Line (National Cycle Route 57) connects Hemel Hempstead, Redbourn and Harpenden on a former railway alignment; and National Cycle Route 6 connects (locally) Rickmansworth, Watford, St Albans, Harpenden and Luton, parts of which run along former railway lines.

Figure 18 - The Nickey Line (National Cycle Route 57)

Freight

In terms of freight and logistics, a lorry park is located on the A5183 close to M1 Junction 9, providing overnight and short stay parking facilities for HGVs.

Recently Completed Interventions

There are several major transport interventions in the GTP area that have recently been completed, the most notable one being Thomas Sawyer Way (Watford; completed 2016).

Thomas Sawyer Way is a new link road providing access to Watford General Hospital and the wider Riverwell development. The road links Dalton Way which loops around the Watford Arches Retail Park, A4178 Wiggenhall Road which links West Watford and Oxhey and the hospital site. Part of the road is for the use of ambulances and buses only, with no other vehicle access permitted. As such, the road cannot be used as a cut through for vehicles between Wiggenhall Road and Vicarage Road.

Metropolitan Line Extension Scheme

HCC in conjunction with the DfT and TfL have for many years been developing a major infrastructure project called the Metropolitan Line Extension (or "MLX"; formerly referred to as the Croxley Rail Link). This was intended to divert London Underground Metropolitan Line trains via a former railway link to Watford Junction station via Watford High Street, and include two brand new stations at Cassiobridge (on Ascot Road, Western Gateway) and Vicarage Road (Riverwell). It was envisaged that the extension would improve access to public transport for local residents; create new links to Watford General Hospital, Watford and Croxley Business Parks and Cardiff Road Industrial Estate, increase employment opportunities; and provide access for Metropolitan Line passengers to West Coast Main Line national rail links from Watford Junction station. The MLX would support access to and between the key residential and employment development sites planned at Riverwell/Health Campus, Western Gateway area and Watford Junction and the town centre. In early 2018

following forecast cost increases for the project and bids for additional funding, partners were not able to agree a funding arrangement for the scheme to progress. The Transport & Works Act Order giving the powers to construct the project subsequently lapsed in August 2018. The Met Line Extension project is now not expected to come to fruition.

Hertfordshire County Council, Watford Borough Council and Three Rivers District Council are committed to achieving improved connectivity across Watford and linking to adjoining areas, and as such are seeking to safeguard the route and explore all the options for achieving that outcome.

Waterways

A number of rivers and canals flow through South West Hertfordshire. The Grand Union Canal links Rickmansworth, Croxley Green, Abbots Langley, Kings Langley and Hemel Hempstead.

The River Colne is a tributary of the Thames and links London to the south with Rickmansworth, Watford and Colney Heath south of St Albans. The River Gade originates from the Chiltern Hills and flows through Hemel Hempstead, Kings Langley and the western side of Watford through Cassiobury Park, passing Croxley Green before reaching Rickmansworth, where it joins the River Colne. The Rivers Bulbourne and Ver are smaller rivers running through Hemel Hempstead and St Albans respectively.

Growth in South West Hertfordshire

One of the key considerations of this plan is growth and its interactions with the transport system in South West Hertfordshire.

In its broadest sense, growth can be regarded as an increase or an improvement in something. Growth can concern people and how they conduct their daily lives. It can therefore be regarded as an opportunity or an intention to improve people's lives and the activities that people participate in day by day. It can also sometimes be regarded as a threat, especially if it is not understood, planned or managed in the most appropriate way.

Growth can involve the building of new homes which provide an increase in the range of properties available to buy or rent in different places. Additional homes will result in a redistribution and increase in population in some areas and this will place extra demand upon infrastructure and services such as utilities, education, health, retail and transport.

People not only need somewhere to live but they may also need access to jobs. In terms of the economy, growth can mean the creation of new jobs or an increase in the amount of goods and services produced per head of the population over a period of time (gross value added). It can also involve taking action in order to retain jobs in particular places by improving facilities, intensifying land uses, or relocating jobs from one place to another.

Ambitions for economic growth may only be achieved if the right people with the appropriate skills can access jobs, and this means that there needs to be a sufficient amount of and type of housing available in sustainable locations with good transport connections in place that offer choice of travel route and/or mode, and which can facilitate safer and healthier journeys.

Economic growth can lead to improved living standards for existing populations. Education also plays an important role in equipping the population with the skills and knowledge needed

to secure jobs. This is recognised in Hertfordshire Local Enterprise Partnership's priorities Strategic Economic Plan[1] which sets out four priorities:

- Maintain our global excellence in science and technology;
- Harness positively our interconnectedness, particularly our relationships with London and elsewhere;
- Re-invigorate our places for the 21st Century; and
- Build the wider foundations for growth across our populations of both businesses and people.

Growth can also be linked to the population's health. Provision of new high quality homes and access to good jobs could lead to increased living standards which in turn could have a beneficial effect on people's health. The negative effects of transport on health can be managed if the appropriate action is taken to implement infrastructure and services which could eventually lead to an improvement in air quality, such as new or better facilities for people to make journeys on foot and by bike rather than by car. The building of new housing and employment developments can be a mechanism for securing the right investment which can lead to a range of benefits for different groups of people across a wider area.

Growth should be inclusive to all parts of society. The need to maintain and enhance accessibility to key services such as GP surgeries and education is very important, and barriers which can negatively influence how people get from A to B need to be recognised and steps taken to reduce or remove these barriers.

There are of course potential challenges to overcome in order to ensure that growth delivers positive outcomes for local people. If growth is not planned properly, it could have negative effects on communities. If the planning of new homes and jobs is not coordinated with the planning of the transport network, development may be delayed or inappropriate decisions taken on what needs to happen where and when. This could lead to negative consequences such as increasing traffic congestion and poorly connected public transport services.

While the building of new homes and creation of new jobs can often act as indicators of growth, consideration should be given to the much broader prospects of growth and the opportunities it can facilitate if planned properly.

Coordinated planning between different stakeholders is essential to ensuring growth is achieved in the most sustainable way and that joined-up decisions can be made.

The GTP is a tool that can be used to promote and enable joined up planning by focusing on the transport network's contribution towards achieving positive growth across South West Hertfordshire as a whole.

Planned housing and employment growth is identified by the Local Planning Authorities (in Hertfordshire, the district and borough councils) in their Local Development Plans.

These plans are often referred to as a Local Plan. These plans, which previously incorporated the Core Strategy, should set out local planning policies, identify how land should be used, and determine the type and quantity of development that should be built where and by when.

[1] Hertfordshire Local Enterprise Partnership - Strategic Economic Plan 2017-2030 https://www.hertfordshirelep.com/news-events/news/revised-strategic-economic-plan-published/

Typically, Local Development Plans are prepared at different times by different authorities. Therefore, whilst some authorities may have a recently adopted plan in place, others may still be in the process of preparing a new plan which will eventually replace dated policies.

The majority of the districts/boroughs within South West Hertfordshire have an adopted plan in place and set out housing and job growth projections to as far as 2031. However all the authorities are working on new plans which will eventually identify growth beyond 2031, potentially as far as 2036.

In 2018 the local planning authorities of Dacorum Borough Council, Three Rivers District Council, St Albans City and District Council, Hertsmere Borough Council and Watford Borough Council commenced work on a Joint Strategic Plan for the South West Hertfordshire area. This plan will identify longer term strategic growth requirements for the whole area and will help to inform each authority's next Local Plan.

Across all of the districts, based on the current adopted Local Plans, it is estimated that almost 30,000 new homes will be built and over 42,000 new jobs could be created by 2031 as shown in Figure 19. The South West Herts area Local Authorities are expecting substantially higher housing targets for the next set of Local Plans, following changes proposed by the government around calculating housing need with a standard methodology. The annual local housing need (dwellings per year) would be more than double that within the current adopted Local Plans for South West Herts if this methodology comes into use. While these values represent a growth scenario for Hertfordshire they are current estimates and thus may change over time. As such, the growth scenario shown here should be understood as simply indicative of wider growth trends in South West Hertfordshire.

A number of key development sites are allocated in the Local Development Plans. The most significant sites are highlighted in Figure 20 and include the Radlett Rail Freight Interchange; Watford Riverwell (formerly known as Watford Health Campus); Watford Western Gateway; West Hemel Hempstead; East Hemel Hempstead and the Enviro-Tech Enterprise Zone incorporating the Maylands industrial area. Figure 19 also includes a number of large sites being considered through emerging Local Plans.

		Watford 2006-2031	Three Rivers 2011-2026	Dacorum 2013-2031	Hertsmere 2012-2027	St Albans 2011-2031
Local Plan[1]	Total jobs	12,686	6,627	4,782	4,258	13,968
Local Plan[1]	Total homes	7,938	2,516	9,566	4,426	7,809
Local Plan[2]	Homes per year	260	180	430	266	360
SHMA target[3]	Homes per year	577	514	756	599	705
Local Housing Need[4]	Homes per year	798	615	1,035	714	902

1 - Housing and employment predictions including completions for the plan period in currently adopted Local Plan for Watford, Three Rivers, Dacorum and Hertsmere, and for consultation draft Local Plan for St Albans
2 - Housing annual target for the plan period in currently adopted Local Plan for Watford, Three Rivers, Dacorum and Hertsmere, and for consultation draft Local Plan for St Albans
3 - South West Herts Strategic Housing Market Assessment 2016 (based on 2013 projections) target homes per year
4 - Government draft Local Housing Need (capped) (based on 2014 projections) - homes per year

Figure 19 – Potential Housing and Jobs Growth in South West Hertfordshire

Figure 20 - Key planned developments in South West Hertfordshire

Any planned development will have varying levels of impact on the surrounding transport system. Developments may generate new travel movements, for instance new residents travelling from home to work, goods being transported and people travelling to shops. These movements could take place at different times of the day and by different modes of transport, for example by car, train, bus, bicycle or on foot. These movements will therefore

place extra demand upon existing infrastructure and services – extra cars on the road, more people on trains and buses. In some instances, infrastructure and services may be able to accommodate and withstand the additional travel demand, whereas in other situations improvements to infrastructure and services may be required.

The COMET model shows the highest levels of congestion in the urban areas of Watford, St Albans, Hemel Hempstead, Hatfield, Hertford and Broxbourne towns. In 2031 during the AM peak it will take 45% longer to make a journey from Hemel Hempstead to Watford. In 2031 during the PM it will take 25% longer to make a journey from Watford to Rickmansworth. Forecast results also indicate that the rail network in Hertfordshire will experience an increase in passengers usage by approximately 25% in the AM and PM peaks betweek 2014 and 2031. This suggests crowding at rail stations could increase.

The demands in the immediate surroundings of new developments can be taken into account through the planning system, however those occurring further away may not. Depending on the scale of development proposed, it is likely that there will be a requirement for developers and land owners to provide appropriate access to the wider transport network. This may include new highway junctions and pedestrian crossing facilities immediately adjacent to a development site. These requirements are typically negotiated between developers and the local authorities through the planning application process. It is not the purpose of the GTP to identify site-specific access arrangements or mitigation measures which are directly required as a consequence of an individual development site.

When considered in combination, planned developments could have a much wider geographical impact on the transport network. It is not always feasible or appropriate for local authorities to negotiate with each developer in turn over what additional transport infrastructure might be needed as a result of a multiple developments across an area. After all, developments come along at different times. However there will come a point in time in the future when the impacts of all developments combined could materialise.

It is more efficient to plan for these cumulative needs rather than deal with them in piecemeal fashion. For instance, a single highway junction improvement may be sufficient to accommodate traffic generated by more than one development, and a new bus service or increased frequency of existing services could benefit several developments along a particular route.

The demands placed on the transport network by planned developments could be over and above problems already experienced today on the transport network, or what could be experienced in the future irrespective of planned developments coming forward. These challenges cannot be overlooked, however growth may be the key to realising an improvement that might otherwise be unfeasible or too costly to implement.

The GTP therefore takes a holistic approach to planned growth and considers the combined transport needs for the whole of South West Hertfordshire.

Challenges

04

4. Challenges

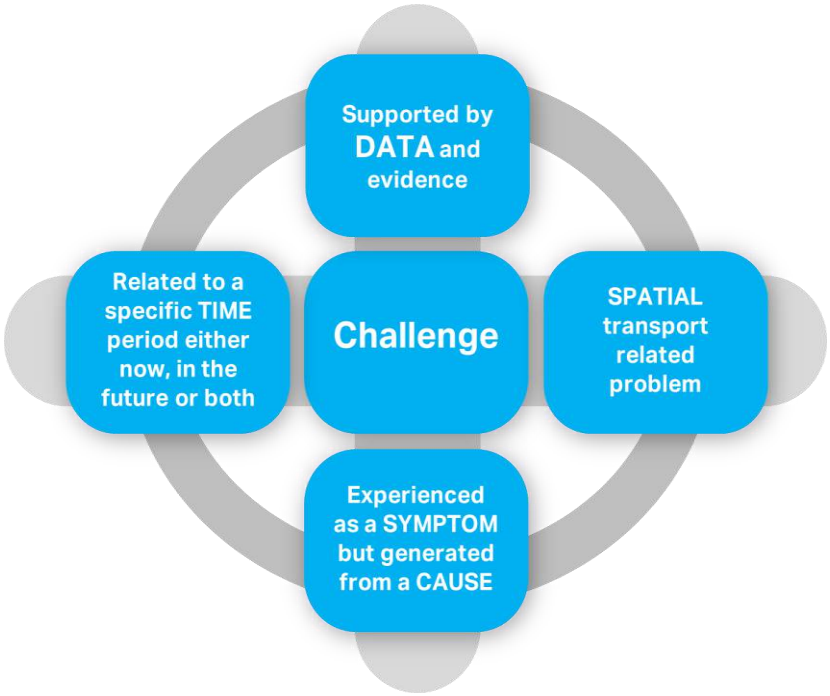
The key driver for delivering positive change on Hertfordshire's transport network is to address current and future growth and transport challenges.

A challenge can be identified in terms of a **symptom** and a **cause**. A symptom is typically what most people may recognise and experience first-hand. For example, a symptom might be rush hour traffic congestion at a particular road junction.

What is important however is to recognise the potential underlying cause of a symptom. In the case of traffic congestion at a particular location, the underlying cause of this congestion might be poor multi-modal connectivity between two towns which is leading to a high proportion of journeys being made by car as opposed to other modes of transport such as bus and train, or it could be as a consequence of insufficient highway capacity.

By recognising the symptom as well as understanding the potential underlying cause(s), more appropriate and effective solutions can be identified in response. The solution to a road junction's congestion may not therefore be simply to provide additional road capacity, especially where a location may be constrained in terms of space. Taking a longer term view, focusing on improving alternative modes of transport to help reduce traffic volumes could be a more effective approach. Solutions which extend along a corridor or a group of interventions may be required to address both the symptom and the underlying cause.

Figure 21 - Approach to Identifying Challenges



A series of workshops were held in late 2016/early 2017 with county council and district/borough officers and elected members to consider the key challenges facing South West Hertfordshire. A large number of challenges were identified and detailed using the approach shown in Figure 21, and it was then necessary to group these challenges for further analysis. The challenges were grouped spatially and by symptom to form six core challenge groups.

For each of the challenge groups identified, evidence analysis has been undertaken to understand the challenges in greater detail. The results of this analysis are presented in the Evidence Analysis Report and associated pro-forma. The pro-forma present data on a number of indicators related to each challenge, including:

- Key routes
- Inbound and outbound commuting patters
- Highway traffic volumes
- Highway Delay
- Comparative car and PT journey times
- Modal choice
- Public transport and active travel provision
- Commited and local plan development
- Car parking

It is important to note that, while significant challenges such as road safety and air pollution have not been explicitly defined here, it is recognised that the design and implementation of all interventions proposed in the GTP should be done in such a way to mitigate against these issues. Indeed, focusing on interventions such as streetscape improvements, public transport infrastructure, and the rationalisation of road space to prioritise modal choice and all road users has the potential to significantly mitigate against and improve the conditions of the aforementioned challenges.

Based on these indicators and the challenges identified, a summary is provided of the key challenge symptoms and their potential causes in Table 1.

Table 1 - Challenge Groups

Challenge Group	Key Symptoms
Hemel Hempstead Urban Area	Highway Congestion Limited accessibility for non-car modes
Watford Urban Area	Highway Congestion Limited accessibility for non-car modes
Watford - St Albans Strategic inter-urban route	Highway Congestion Limited accessibility for non-car modes
Watford - Hemel Hempstead Strategic inter-urban route	Highway Congestion Limited accessibility for non-car modes
M1 Corridor Strategic inter-urban route	Highway Congestion Limited accessibility for non-car modes Poor network resilience
Rail Commuting	Pedestrian Congestion at rail stations Difficulty in accessing rail stations

Figure 22 below summarises some of the key challenges in the context of the South West Hertfordshire transport network.

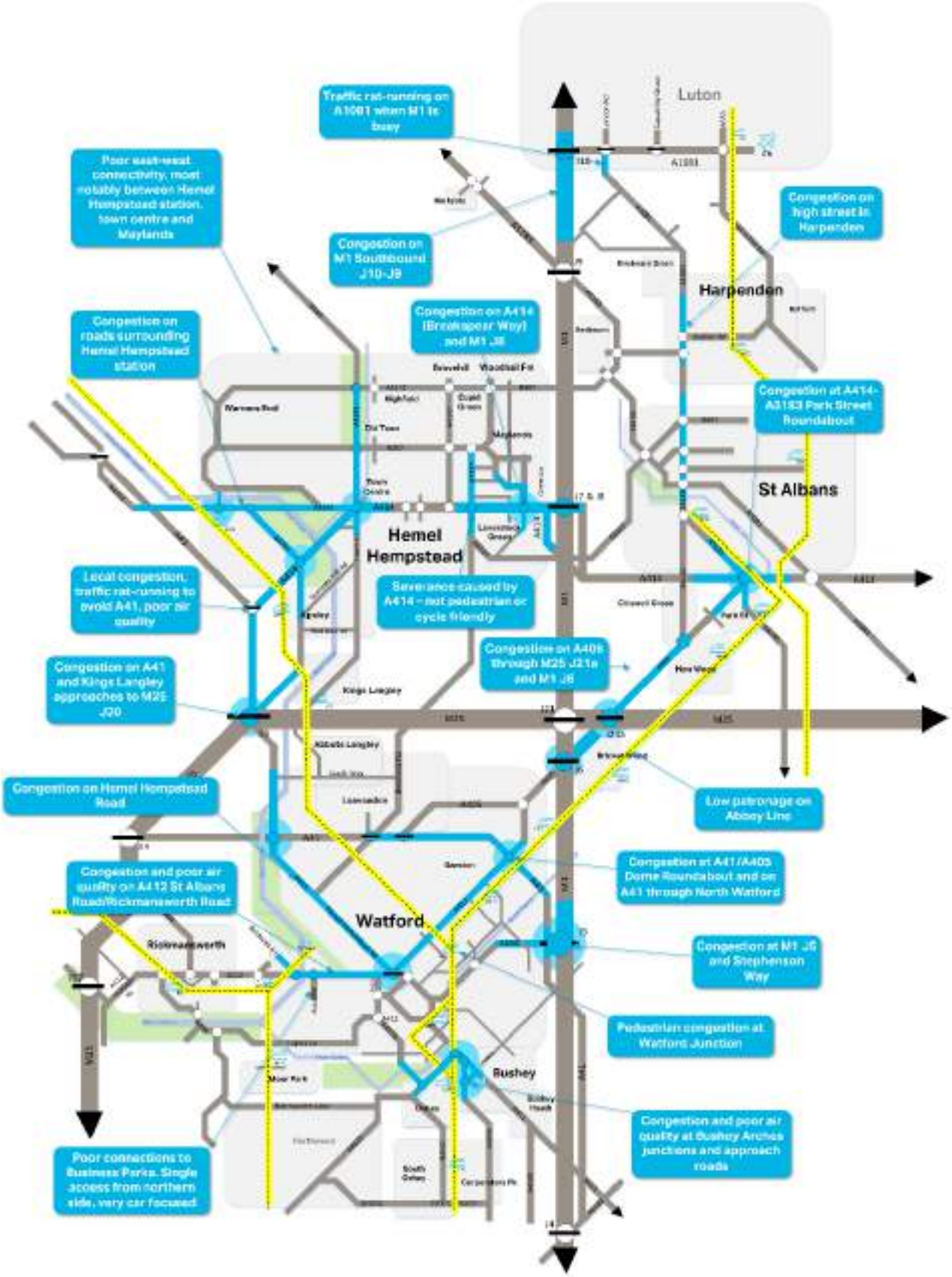


Figure 22 - Summary of Challenge Symptoms

It can sometimes be difficult to fully understand how challenges such as those described above can affect people's lives and the transport and travel choices they need to make. Figure 23 (below and overleaf) introduces example 'personas' for five sets of people who live and/or work in South West Hertfordshire. Each persona is described in terms of how they would currently use the transport network and the challenges they experience.

These case studies are revisited later in this Prospectus in terms of how their experiences of the transport network could be influenced by the proposals put forward in this GTP.

Figure 23 – Personas – 'current' experiences of transport and travel in South West Hertfordshire

- **Nik and Karen (in the early 50s)**
- **Plus their son Josh (22) and daughters Emily (18) and Abi (15)**
- Live in Oxhey, south of Watford, close to Bushey station.
- Nik works in Wembley (North London) and Karen works at the Watford Business Park. Josh has recently returned home from university and is working part time in Watford Town Centre. Emily is studying at the West Hertfordshire College, Watford. Abi attends a secondary school in nearby Bushey.
- The family owns two cars.
- Although Nik's place of work is reasonably close to Wembley Central Station (which is on the same railway line as Bushey station), he drives to work because he needs his car on company business throughout the day. He prefers to use the M1 via Junction 5 than local roads towards North London, although he has to route via Bushey Arches which is a very busy junction.
- Karen drives to work as there are no direct public transport services between home and work. It generally takes between 20 and 30 minutes by car, although Karen has little choice but to travel via Bushey Arches junction which is very congested during the rush hour. Spaces at her place of work are limited, and sometimes she has to double park which is not very convenient.
- Josh uses his bicycle as often as he can for both work and leisure. A new covered cycle shelter was recently installed at his work alongside a new shower facility.
- Emily most often walks to/from college, taking the most direct route via Bushey Arches and the town centre high street which takes around 35-40 minutes. Karen occasionally drives Emily part or all the way to or from college, which can add another 10 minutes to her journey.
- Abi walks with friends to/from school which take around 10 minutes. The walk involves crossing the busy A4008 London Road. One of Abi's friends was involved in an accident there recently.

Joyce

- Retired, widowed
- Lives in the Adeyfield area of Hemel Hempstead
- Doesn't own a car
- Joyce's daughter Annie, Annie's partner Rob and two grand children live in the Bennetts End area of Hemel Hempstead on the opposite side of the A414 St Albans Road.
- Joyce remains reasonably active, volunteering two days a week in the town centre. She takes the local bus service as she has a concessionary bus pass and it is too far to walk.
- She visits her daughter and family twice a week as she is responsible for collecting her youngest grandchild from primary school two days a week when her daughter and partner are at work.
- She walks to her daughter's home. Most of the journey is on fairly quiet residential roads, however she needs to cross the busy and fast moving A414 St Albans and has to use a subway beneath the road linking Longlands and Rant Meadow.
- Rob drives Joyce home as it is later in the evening and she doesn't like to walk alone when it gets dark.

Mira and Mark

- A couple in their late 30s, no children
- Live in Leverstock Green, Hemel Hempstead
- Own two cars
- Both work full-time
- Mira works in Central London, commutes by train everyday and drives to Hemel Hempstead Station
- Mark works in Watford close to the main station and drives every day - he has an allocated space in the car park beneath the office.
- Mira considers she has no attractive alternative to the car for getting to the station. Driving to the station takes her around 15 minutes although the roads around the station are very congested and she has missed her train on several occasions. She considers the roads are too busy to cycle on and the buses are unreliable and non-direct.
- Mark encounters congestion and delays on his way to/from work everyday. He is finding he needs to leave the house earlier to avoid the morning rush hour and maintain the same journey time. Levels of congestion have worsened in the last few years. He has often used the A41 via Apsley or the M1 via Junction 5 but more recently is using country lanes via Bedmond and Abbots Langley. Journey times are unpredictable, varying from 20 minutes to 40 minutes depending on congestion, even when travelling at the same time of the day.

- **Jason**
- Early 20s
- Lives in Luton and works in the Maylands area of Hemel Hempstead
- He owns a car
- Jason works for a logistics company
- He drives everyday to/from work, using the M1 between Junctions 8 and 10.
- He has found his journey is taking longer now than it did a few years ago. Significant traffic congestion can often occur on the M1. Because there is limited parking spaces at work, he can't afford to arrive late, so he sometimes drives cross-country via quieter lanes to avoid the congestion.
- Jason considers he has no choice but to drive as there are very few direct bus services between Luton and Hemel Hempstead – the nearest bus stop is around a 20 minute walk from the warehouse and the buses are too infrequent.
- A few of Jason's colleagues also live in Luton, and drive to work, although they don't work the same shifts every day.

- **Annie and Rob (in their early forties)**
- **Plus their daughter Ava (8) and son Aiden (5)**
- Live in Bennets End, Hemel Hempstead.
- Annie is Joyce's daughter. She works full time as a nurse at a GP Surgery in Apsley
- Annie's partner Rob works full time in a warehouse in Maylands, Hemel Hempstead.
- The family owns two cars.
- Annie drives to work which takes less than 10 minutes during the morning. She is able to park directly outside the surgery. Three days a week she starts work at 8am and finishes around 3pm and on two days she starts at 9:30am and finishes at 6pm.
- Rob also drives to work and generally starts by 9am. The warehouse has almost enough spaces for staff however recent recruitment has meant that demand for spaces has increased and people often double-park. His employer is considering implementing a permit system because parking is beginning to impact operations of the warehouse. Rob may have to consider changing his commuting habits. Rob's journey time to/from work can change significantly from day to day depending on congestion which can be especially severe on the A414 and also on some roads within the Maylands area, but typically would take him between 10 and 15 minutes each way. He has thought about walking to/from work, but he does do the school run on some mornings.
- Ava and Aiden attend a local primary school which is approximately 1 mile from their home. Either Annie or Rob drive them both to school on their way to work in the morning. For three days a week, Annie collects the children from school on her way home from work in the car, and on the other two days a week, the children's grandmother Joyce collects them and walks them home. Joyce stays with the children until Rob and Annie get home.

Objectives

05

5. Objectives

The challenges identified in the previous chapter were used to inform the definition of objectives set out in this chapter. The objectives are unique and tailored to the current and future growth and transport challenges which are most relevant to South West Hertfordshire. While many of South West Hertfordshire's challenges are likely to be experienced in other parts of the county, the following objectives are considered to reflect the distinct characteristics of the settlements and local transport network within South West Hertfordshire.

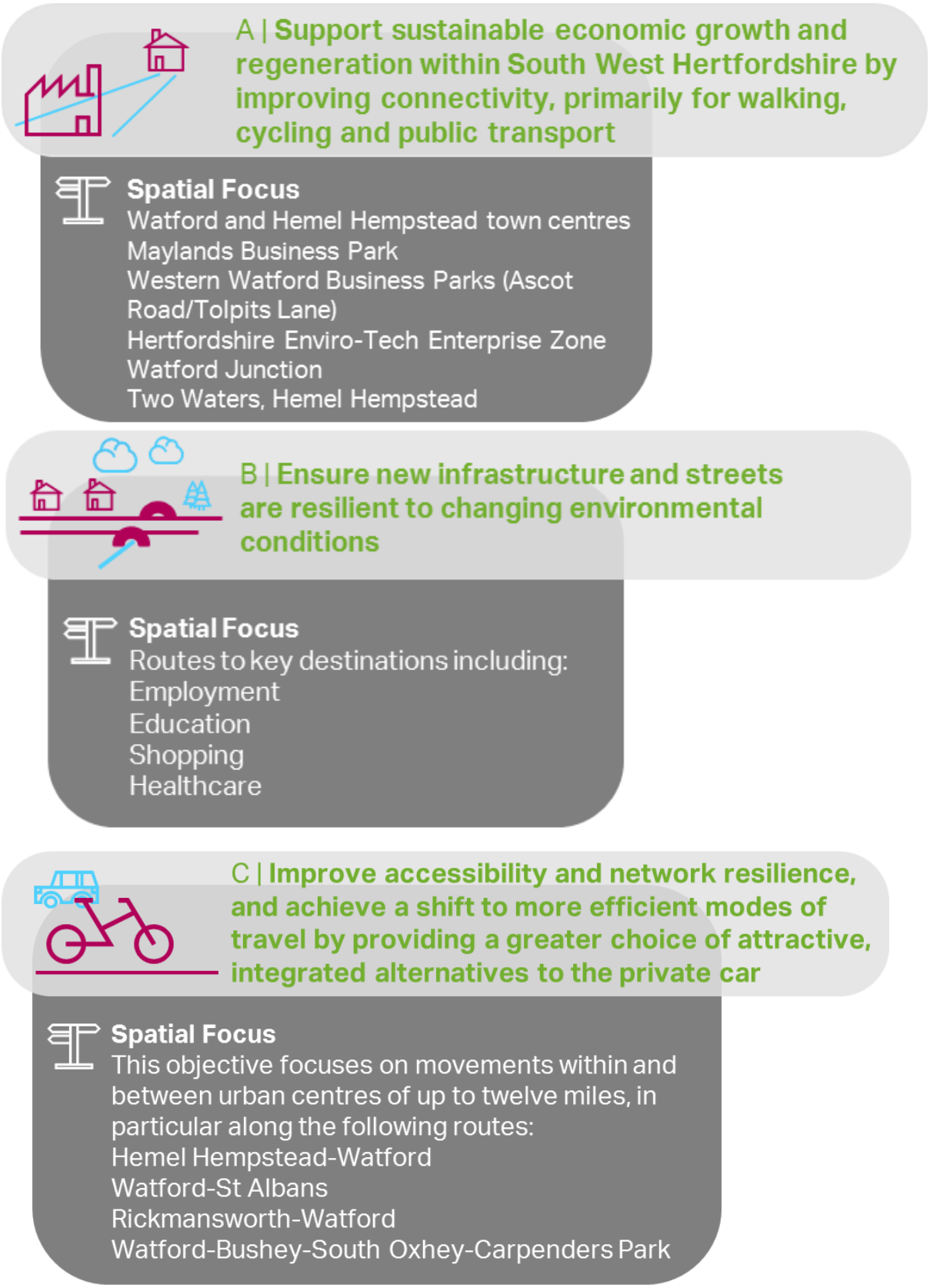
The objectives are aligned with local transport and development policy, including the Hertfordshire Local Transport Plan, the Districts'/Boroughs' Local Plans and Hertfordshire Local Enterprise Partnership's Strategic Economic Plan. This should help to promote a joined-up and cohesive approach to delivering positive change on the county's transport network.

A set of seven objectives are defined for the South West Hertfordshire GTP (see Figure 24).

Each objective is supported by a range of evidence which justifies why an objective is important and relevant to South West Hertfordshire. Objectives consider the unique challenges within South West Hertfordshire and seek to provide measurable aims for mitigating against these challenges. Each objective also has a spatial focus: by no means is this intended to suggest that an objective will only be addressed in a particular geographical area, but given that it is not feasible for the GTP to address all potential challenges across the entire South West Hertfordshire area, the spatial focus is where it is considered the most benefit could arise.

A full discussion around each objective is contained in the South West Hertfordshire GTP Objectives Paper.

Figure 24 - South West Hertfordshire GTP Objectives



D | **Improve public health and quality of life, through encouraging and enabling active travel and reducing transport-generated air and noise pollution**

Spatial Focus
Neighbourhoods and town centres, in particular around designated Air Quality Management Areas (AQMAs).

E | **Encourage vibrant communities by integrating streets, enhancing walking and cycling networks, and improving the natural, built and historic environment**

Spatial Focus
Neighbourhoods and town centres
Major new development

F | **Improve safety and perception of safety and security risks by providing high quality and safe facilities for walking, cycling and public transport users**

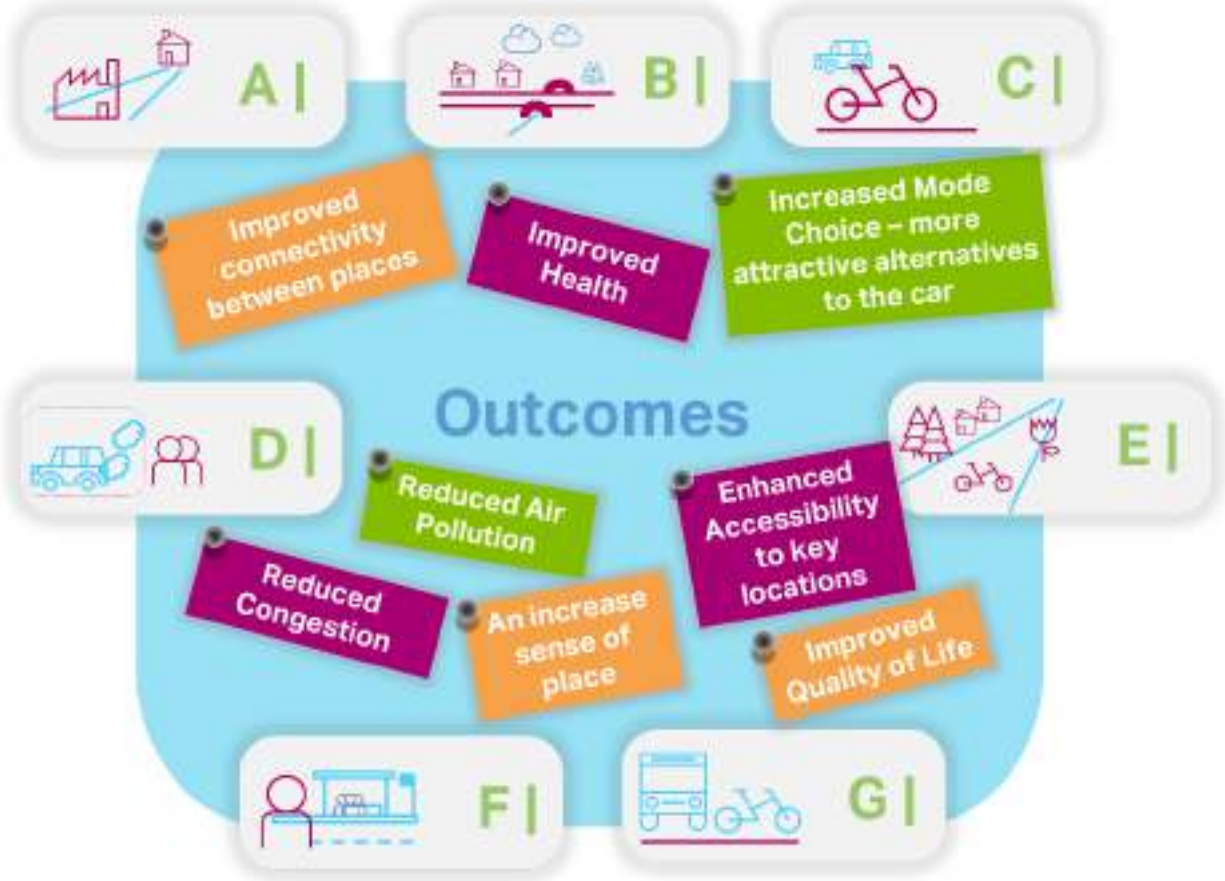
Spatial Focus
Routes to key destinations including:
Employment
Education
Shopping
Healthcare

G | **Seek to reduce transport related emissions by embracing new technologies and encouraging sustainable travel modes**

Spatial Focus
Congested urban areas.

The objectives encompass a range of relevant topics and desired outcomes which span the GTP, LTP and Local Plans as well as more overarching national planning policy, including those summarised in Figure 25 below.

Figure 25 - Objectives and Key Topics



The objectives laid out in this section have guided all further activities of this GTP namely, optioneering, intervention assessment and appraisal, decision-making within intervention packaging, and future monitoring and evaluation activities. These objectives can also be used to help steer future transport infrastructure optioneering and assessment within the South West Hertfordshire context.

Addressing the Challenges

06

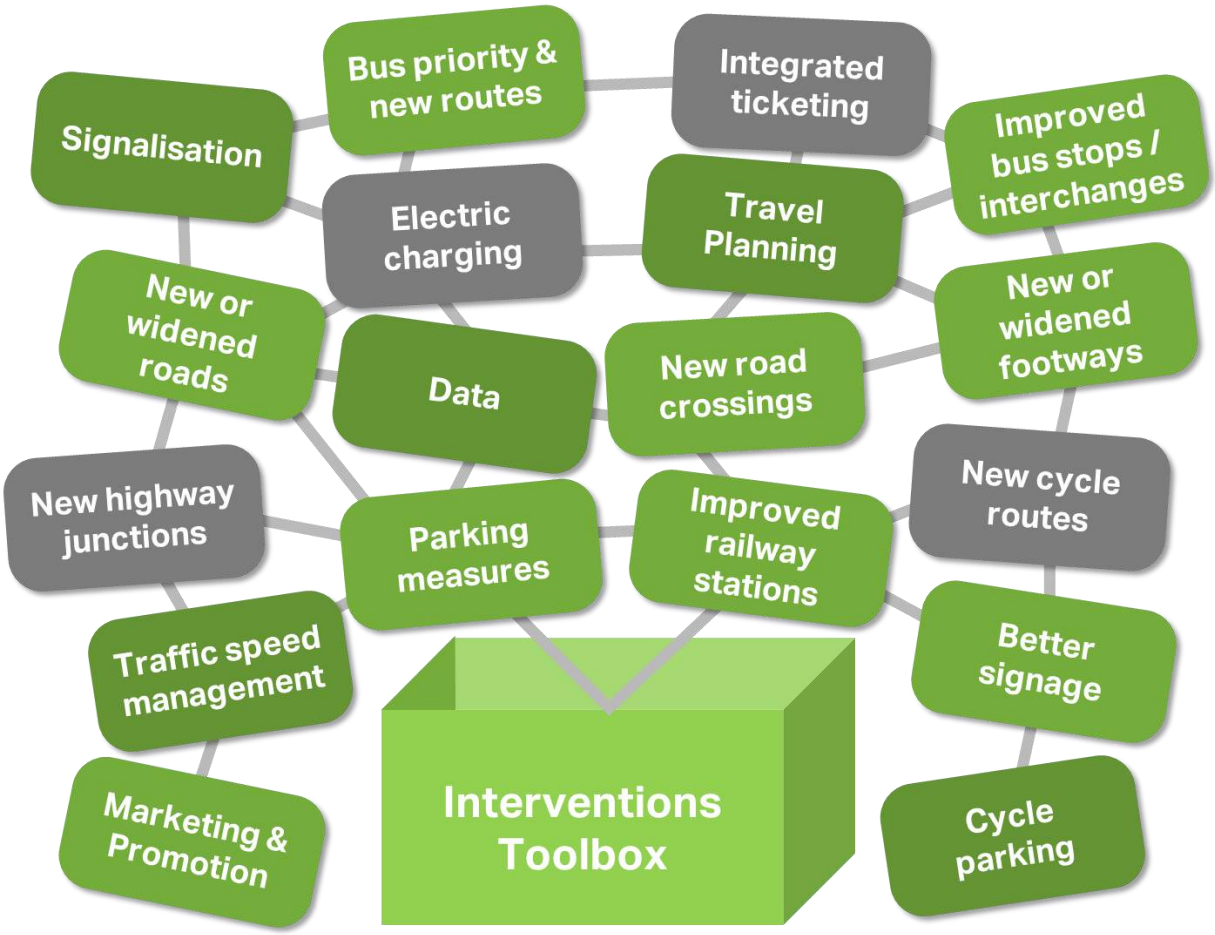
6. Addressing the Challenges

The challenges described earlier in the Prospectus can be addressed in many different ways. To an extent, over time the challenges will be influenced by wider trends and changes in travel behaviour which can affect people's decisions to use particular modes of transport, the route they take, the time of day they travel, even where they live, work and participate in leisure activities.

However we cannot rely on wider influences and factors alone to either address a challenge, or assume it will reduce in scale of impact over time. A coordinated and smart approach is needed to tackle challenges through a wide range of physical interventions, some small and some large in scale, which are targeted at addressing a challenge symptom or more critically the underlying cause(s).

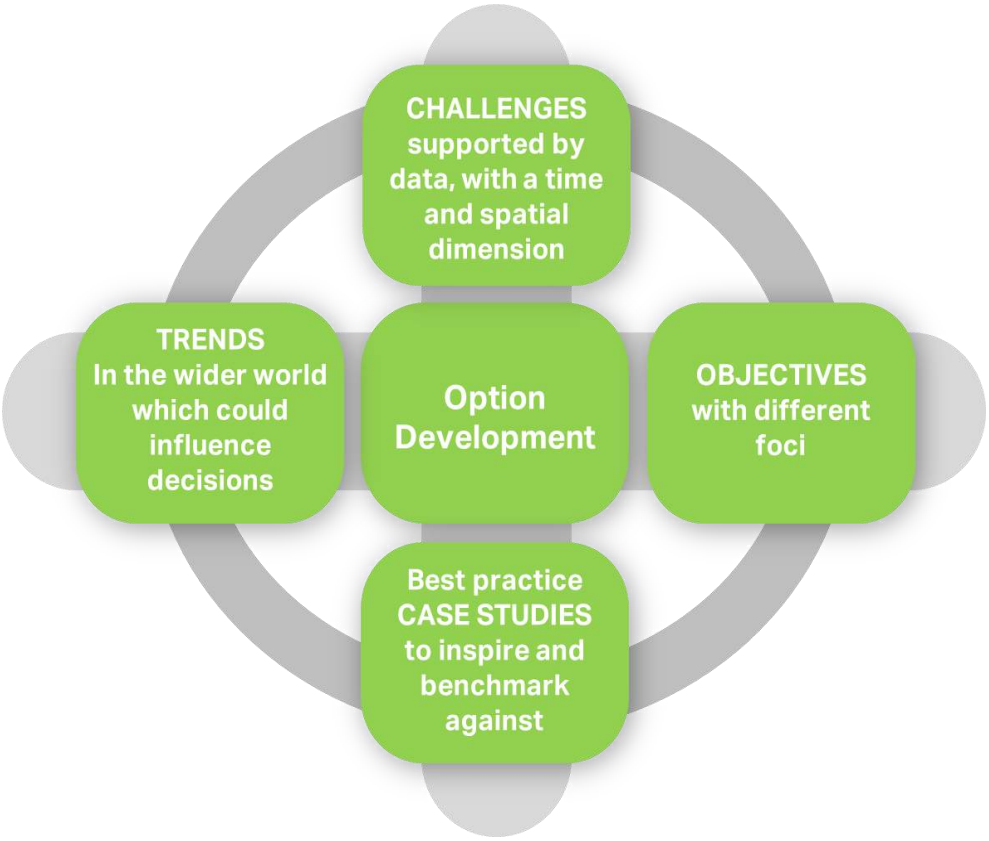
Hertfordshire County Council and partners have a toolkit of approaches to help influence transport and travel behaviour. This includes both infrastructure interventions and so-called 'soft measures', these being behaviour change initiatives such as promotion of bus services, travel planning for new developments, cycling training and exploring opportunities for integrated ticketing. Figure 25 illustrates the range of interventions available to influence travel choices and behaviour.

Figure 26 - Current Toolbox of Interventions



For this plan, the approach to identifying interventions has taken into consideration the characteristics of each challenge; wider trends which could influence how people travel and the demands placed upon the transport network now and in the future; best practice case studies of how similar challenges may have been tackled effectively elsewhere; and the GTP's objectives, which provide a framework for shaping and prioritising the interventions (see Figure 27).

Figure 27 - Approach to Identifying Interventions



All of the packages of interventions identified in this Prospectus should be complemented by a range of supporting interventions and initiatives, which should be considered and rolled-out consistently across the GTP area. These area-wide interventions and measures are described in Appendix E.

The South West GTP area faces significant levels of growth. There is the prospect of further growth being identified in the area beyond that which is currently identified in the Local Plans. It will be important that this development is sustainable in transport and travel terms. A range of suggested principles for planned development is also provided in Appendix E.

Implementing these principles and area-wide measures will be important to achieving the objectives of the South West Herts GTP.

Future Trends – what we know and what we don't yet know

The world of transport is predicted to undergo a profound transformation in the coming years and decades. New technologies could change how we travel and also how frequently. Over time new technology and other initiatives could supplement or replace tools which are currently available to Hertfordshire County Council and partners to address transport issues.

Research has shown that the younger population is increasingly favouring access over ownership. Faced with increasing costs of ownership, they prefer pay-per-use or renting of everyday items such as smart phones but also cars. Those aged between 18 and 35 are 40% more likely than other age groups to move to leasing as opposed to ownership of cars, certainly if costs continue to rise[2].

Mobility as a Service (MaaS) describes a shift away from personally owned modes of transportation and towards mobility solutions that are consumed as a service, paid for on demand through connected technologies. Research undertaken by Transport Systems Catapult[3] envisages that MaaS could change our travel behaviour. It could result in more journeys and distances travelled by car (or potentially less); it could enable policy makers and transport planners to have a greater influence on managing travel demand and responding to changing travel behaviours; and it could affect the transport industry with car makers and transport operators moving away from a business to consumer model.

For MaaS to be successful and offer flexibility to customers, a wide range of integrated transport services will be needed. As part of a public transport package sitting alongside rail services and traditional bus services (those running on fixed, timetabled routes), there are examples of Demand Responsive Transit (DRT) services emerging across the country in both rural and urban areas.

DRT "provides transport 'on demand' from passengers using fleets of vehicles scheduled to pick up and drop off people in accordance with their needs" [4]. DRT services tend to use smaller buses or minibuses and provide variable routes which are tailored to the users' needs. DRT services such as ArrivaClick enable passengers to order and track a DRT vehicle from an app, which will also tell them the name of the driver, and allow them to choose a pick-up point and reserve a seat.

The system is powered by technology which uses complex algorithms to match passengers travelling in the same direction, dynamically routing vehicles in real-time to determine the optimal route for their trip. The system calculates the shortest and fastest routes, with a guaranteed fare and real-time information on time of departure and arrival is provided. Passengers are then picked up and dropped off by the bus in the order most convenient for them. Opportunities for establishing DRT services in Hertfordshire are currently being investigated.

How cars are powered is changing. Electric vehicles are increasing in popularity and it is predicted that even if fuel efficiency improves in more traditional petrol and diesel powered vehicles, electric vehicles will be cheaper to own than conventional vehicles by 2022[5]. Substantial investment will be needed in supporting infrastructure such as charging points. In 2018, the UK Government launched its Road to Zero Strategy [6] which sets out the ambition for at least 50% of new car sales to be ultra low emission by 2030 alongside up to 40% of new vans. The government expects the transition to ultra low emission vehicles to be industry and consumer led, supported by a range of government-led measures including increasing the supply and sustainability of low carbon fuels; taking steps to accelerate the

[2] ABN Amro (August 2016) 'On The Road To The Circular Car', https://www.circle-economy.com/thecircularcar
[3] Transport Systems Catapult (July 2016) 'Mobility as a Service – Exploring the Opportunity for Mobility as a Service in the UK', https://ts.catapult.org.uk/wp-content/uploads/2016/07/Mobility-as-a-Service_Exploring-the-Opportunity-for-MaaS-in-the-UK-Web.pdf
[4] Mageeanand Nelson (2003) as cited by Laws and Potter (2009) "Demand responsive transport: A review of Schemes in England and Wales", Journey of Public Transporation, 12, 1, 2009. https://oro.open.ac.uk/18426/1/JPT12-1Laws.pdf
[5] Egerton-Read, S. (March 2016) Circulate News http://circulatenews.org/2016/03/electric-cars-will-be-cheaper-than-conventional-cars-by-2022-new-report-predicts/
[6] The Road to Zero – Next steps towards cleaner road transport and delivering our Industrial Strategy (2018) www.gov.uk

adoption of fuel-efficient motoring by company car drivers, businesses operating fleets and private motorists; consulting on reforms to the Vehicle Excise Duty to incentivise van drivers to make the cleanest choices when purchasing a new van; working with industry to develop an ultra low emission standard for trucks; and investment in research and development including the next generation battery technology.

New cars entering the market today already incorporate ever more advanced technology – sensors, parking assist systems, automatic braking – and manufacturers are exploring increased connectivity so that a vehicle's navigation system can detect available parking spaces and can communicate with traffic signals to optimise traffic flow.

Autonomous, driverless vehicle technology is being investigated across the world. The UK Government is actively exploring the potential opportunities and risks posed by this new technology. There have been several rounds of government funding in its Connected Autonomous Vehicles (CAV) [7]. Trials to test driverless cars on the streets are currently underway in places such as Milton Keynes and in Greenwich (London). Autonomous vehicles will help support the MaaS concept, and could greatly increase social mobility particularly for those who cannot afford to own a car. The potential effects on mass transport, in particular local bus services, is unknown, and concerns about the technology's resilience, safety and insurance is still to be fully understood.

This all presents significant uncertainties going forward and clearly poses risks in terms of decisions that are made today, such as the type of transport improvements which are implemented, later becoming obsolete if technology influences how people travel to such an extent that those transport improvements are no longer required or (conversely) are insufficient to meet future needs.

However, whilst it is important to ensure transport infrastructure is future-proof as far as possible, it is not feasible to hold off important decisions today and wait for new technologies to fully emerge and be adopted. Our current understanding of the impact and potential of new technologies is ever-changing. There is a need therefore to continue to plan based on the current toolkit of transport infrastructure intervention types.

Identifying Interventions

A hierarchical approach to defining interventions has been adopted for this GTP. This means that small interventions are distinguished from large interventions. This is important because each intervention is likely to involve a different amount of work to take it from concept (today) to implementation (in the future). They may also present varying level of risks and therefore need different approaches to planning. The scale of impact may also vary which needs to be highlighted at this early stage.

It is also necessary to recognise how different interventions may relate to one another, how they may complement each other and how it may be necessary to deliver them in a particular sequence for reasons such as engineering feasibility, impact on people and places or obtaining funding.

Each intervention must not therefore be considered in isolation. Such an approach is overly simplistic as it could overlook or mask an important decision that needs to be made. For

[7] UK Centre for Connected and Autonomous Vehicles https://www.gov.uk/government/organisations/centre-for-connected-and-autonomous-vehicles

example, if 'Intervention X' is delivered ahead of 'Intervention Y', it may not be possible to implement 'Intervention Y' without 'Intervention X' needing to be removed or rebuilt which would be wasteful in terms of public resources, and disruptive to people's lives.

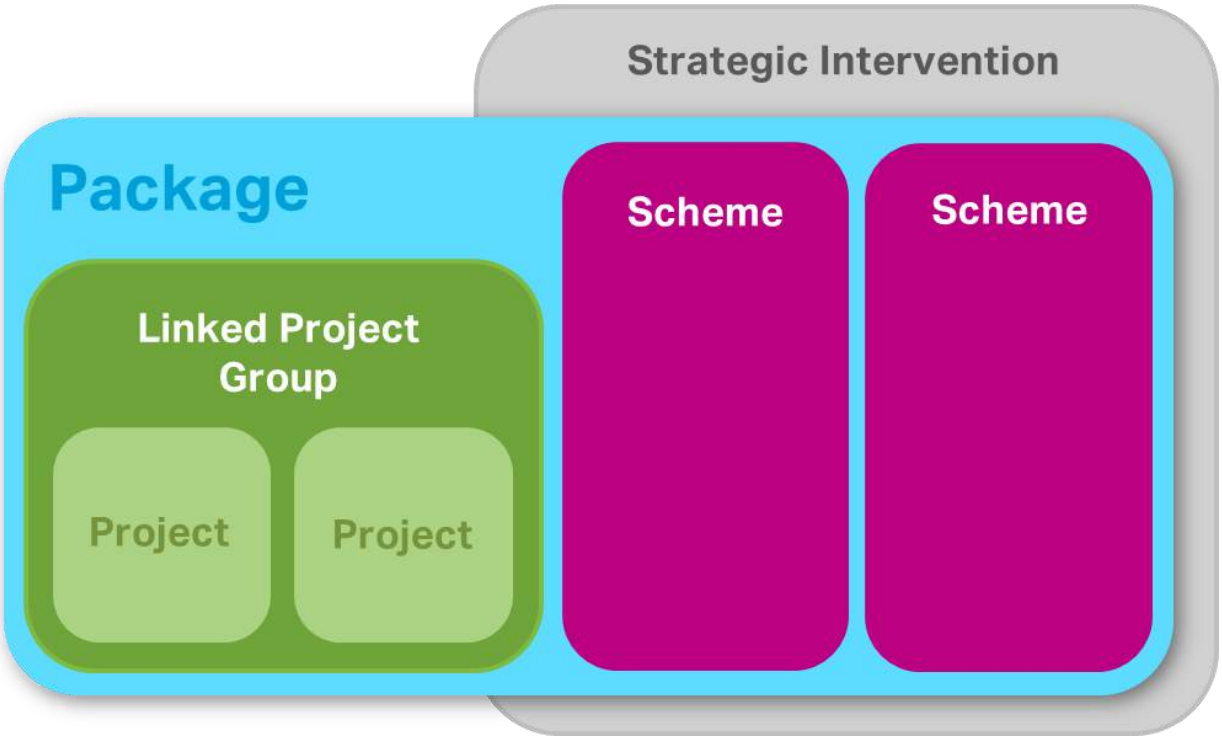
It is important to bear in mind that this is a strategic spatial transport plan. Interventions are identified at a very broad, conceptual level of detail. In practice, the linkages, sequence and groupings of interventions which are set out in this GTP may eventually be influenced by other factors which cannot be identified at this time.

This GTP however provides a broad framework for how a set of interventions could or should in principle be brought forward, and how and why they complement each other in terms of their intention to address a challenge.

The Intervention Hierarchy

Interventions are defined as Projects, Linked Project Groups or Schemes, which are combined together into challenge-focused Packages. Larger-scale Strategic Interventions which originate from outside of the GTP itself are also considered as they may influence the Packages put forward. Packages are bundled together to form a Scenario as shown in Figure 28 below.

Figure 28 - Intervention Hierarchy



Project

A Project represents an individual, smaller-scale intervention that would impact quite a localised, distinct geographical area or apply to multiple geographical areas in a relatively minor way. For example, a Project could include:

- *A discrete section of cycleway*

- *A new signalised crossing*
- *Minor road or junction redesign*
- *Additional bus stop/facility or cycling infrastructure points;*

Linked Project Group

A Linked Project Group represents a geographically-related group of Projects that may impact a broader geographical area than an individual Project. The groups have flexibility in so much that Projects can be brought forward in isolation, in a programmed sequence, or at the same time. If individual projects are dropped, the overarching aim of the Linked Project Group would be weakened, however there should remain some benefit in bringing forward the remaining elements of the Linked Project Group, i.e. they are not so closely entwined that one Project cannot occur without another.

Linked Project Group examples could include:

- *A collection of cycleway projects forming a network*
- *A set of non-motorised and public-transport interventions at a particular junction or along a distinct stretch of road*
- *A series of minor motorway junction redesigns at successive junctions.*

Scheme

A Scheme is a medium-to-large scale intervention or study that would most likely impact a broader geographical area than a Project or apply to multiple geographical areas in a more significant way than a Linked Project Group. A Scheme could comprise of a single large intervention or a closely related set of measures which would not be deliverable as separate projects. Scheme examples could include:

- *Station redesigns or relocations with a less than major impact on the surrounding geographical area*
- *Town-wide bus service reconfigurations*
- *Long route or major road redesign*
- *Full motorway junction redesigns.*

Package

A Package represents a collection of Schemes and Linked Project Groups, often within distinct geographical areas, that seek to solve or mitigate against a specific GTP challenge group. Schemes and Linked Project Groups may be assembled into packages for one or more overarching purpose related to the challenge groups, such as:

- *Improving connectivity between two towns*
- *Generating more transport links along a particular corridor*
- *Reducing congestion within a town centre, neighbourhood or sub-area of a town such as a business park.*

Strategic Interventions

Strategic Interventions are related to major decision points. A number of prospective major, county-significant infrastructure interventions with the potential to affect South West Hertfordshire and beyond are defined exclusively at this level. These interventions originate outside of this GTP; however they are highlighted at this level because it is recognised that if

they were taken forward through other plans such as the LTP, they could significantly influence decision making through the GTP.

Approaches

There are important choices to be made, not only about whether or not a particular intervention is required and the type of intervention, but also the potential different approaches that could be taken to address the challenge.

There may be more than one approach to dealing with a particular challenge (see Figure 29). An Approach represents an alternative option for the implementation of a Scheme (or Strategic Intervention) and this therefore influences the combination of interventions within Packages.

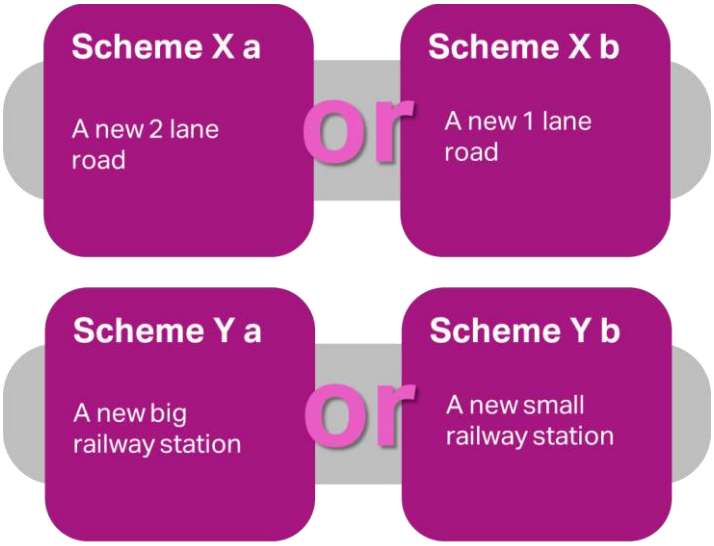


Figure 29 - Example Scheme Approaches

There may be a choice in which mode of transport takes priority in terms of the intervention, for example whether to invest in highway capacity by improving junctions and widening roads, or instead to invest in public transport and alternatives modes by improving bus services and cycleways. The choices however may be more subtle than this, such as the geographic extent or location of an intervention.

It is important to recognise these choices in making informed decisions about tackling the challenges.

Schedule of Interventions

The following schedule of interventions is defined for this GTP.

Figure 30 - Schedule of Interventions

Appraisal – Making Informed Choices

With a schedule as large as this, there are dozens of potential combinations of Scenarios, Packages, Schemes and Linked Project Groups, each distinguished by the different Approaches available. However, not every single Approach would be viable, for example a particular Approach in one Scheme may not be compatible with an Approach for another Scheme.

A high-level appraisal framework has been developed to identify a short list of combinations which could best serve the interests of South West Hertfordshire and have the potential to achieve the GTP objectives.

The basis of the methodology for appraising interventions is to initially assess each intervention to determine its individual merit, followed by an assessment at the Package level.

Appraising the interventions on an individual basis is important so that decision makers can consider the merits of that intervention. At a later point in time, external factors may influence which interventions can or cannot come forward so therefore consideration can be given to the individual scoring.

Whilst this GTP aims to guide decisions and clarify the potential knock-on effects of making certain decisions on interventions, there will need to be a certain degree of flexibility so that individual interventions could be brought forward in isolation or as part of a new combination of interventions.

A series of steps have been followed in appraising the interventions which are described overleaf.

Step 1

For each of the individual interventions at Project and Scheme levels, a qualitative assessment has been undertaken based on the categories below.

- Cost range for implementation
    - *Less than £0.5 million*
    - *£0.5 million - £1 million*
    - *£1 million – £2.5 million*
    - *£2.5 million - £5 million*
    - *£5 million - £10 million*
    - *£10 million - £50 million*
    - *£50 million - £100 million*
    - *£100 million +*
- Timescales for implementation – this would be the timescale for implementing an intervention in isolation, irrespective of any packaging and sequencing of interventions.
    - *0-2 years*
    - *2-5 years*
    - *5-10 years*
    - *10-20 years*
- Risks

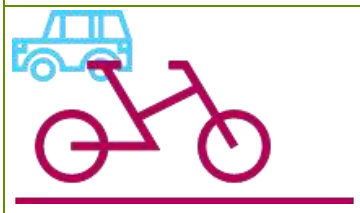
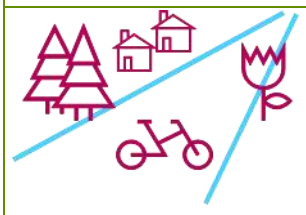
  To consider the potential for any risks associated with the intervention, such as: public acceptability; practical feasibility; quality of supporting evidence; and whether it needs supporting programmes, revenue support, e.g. behaviour change programmes.
    - *Low Risk*
    - *Medium Risk*
    - *High Risk*
- Likelihood of funding
    - *Low Likelihood*
    - *Medium Likelihood*
    - *High Likelihood*

Step 2

Each of the interventions has been scored against the seven GTP Objectives. Scoring has been based on a comparison to a 'Do Nothing' situation with careful consideration of the scale and spread of potential impacts.

The score can be negative, neutral or positive depending on whether the impact reflects a dis-benefit, no change, or beneficial impact to the objective. The scoring categories are shown in the full assessment table (in the Appendix[]). A total score has been given to each scheme to represent its overall impact against the objectives. For reference a scoring sample has been included below to provide reasonings for an example scheme (SM7c) in Table 2.

Table 2 - Scoring Sample: M1 Junction 8 Enhancements (SM7c)

Objective	Score	Reasoning
 (A)	Small benefit	While not improving connectivity for walkers and cyclists, improvements at M1 J8 reduce congestion for car drivers and public transport routes using the junction.
 (B)	No impact	Existing infrastructure is already seen as resilient to changing environmental conditions.
 (C)	Small benefit	Reduced congestion from junction improvements has the opportunity to encourage greater accessibility and improve network resilience at the junction. Opportunity also exists to provide more capacity for public transport routes through the junction.
 (D)	Small dis-benefit	Improved capacity will induce demand and allow greater volumes of cars through the junction, thereby increasing transport-generated air and noise pollution.
 (E)	Small dis-benefit	Improvements at the junction will likely require more greenspace to be converted to roadspace, which will be inaccessible to walkers and cyclists.
 (F)	No impact	No additional facilities for walkers, cyclists, nor public transport users are proposed.

Objective	Score	Reasoning
 (G)	Small dis-benefit	Improved capacity will induce demand and allow greater volumes of cars through the junction, thereby increasing transport-related emissions.

Steps 1 and 2 are intended to cover the categories of the Department for Transport's Early Assessment Sifting Tool (EAST) assessment approach. EAST is a decision support tool that enables decisionmakerts to summarise and present information on options and to identify trade-offs and uncertainties in order to filter those options. EAST is broadly consistent with transport business case principles which are aligned with the Treasury's five case model comprising of Strategic, Economic, Managerial, Financial, and Commerical. The table below details the relationship between EAST categories and the GTP assessment.

Table 3 - Assessment Criteria

EAST Category	GTP Assessment Category
Strategic Addressing the identified problems (challenges); scale of impact; fit with wider transport and government objectives; likely degree of consensus with stakeholders.	GTP Objective Score
Economic Economic growth in terms of connectivity, reliability, delivery of housing, resilience and wider economic impacts; also social, environment and wellbeing impacts; and potential for regeneration and the spread of overall impact.	GTP Objective Score
Managerial Consideration of the risks that can occur during the development and delivery of the schemes, such as obtaining stakeholder and pubic support, multiple stakeholders involved, environmental constraints, long or complex delivery period, securing operator agreements, testing and implementing new technology and lack of supporting evidence to justify the scheme.	Risks
Financial Simply a consideration of all the potential costs appropriate to the level of detail known of the scheme (a more detailed assessment would include a cost profile over the life of the implementation and operation but this cannot be undertaken at this time); and a consideration of the potential affordability and revenue support required. At this early concept stage of the GTP, only a consideration of an implementation cost range and the potential revenue support in the form of travel behaviour change programmes (identified in Risks) would be required for the purpose of this assessment.	Cost Range for Implementation and Risks
Commercial A consideration of the commercial case of the scheme such as the potential sources of funding and how flexible the scheme is to change, i.e. can only part of the scheme go ahead if funding is suddenly cut.	Funding Source

The GTP assessment is based on the best available information available at this time. Given that the GTP is identifying schemes as broad concepts, it is likely in the vast majority of cases that very limited information will be available to complete a detailed assessment. The advantage therefore of using an EAST-based approach is that it can be revisited and updated with more information as/when it becomes available, and it will also be possible to highlight uncertainties. It can also be carried through the entire lifecycle of developing interventions from concept (GTP stage) through to business case, funding and eventually implementation.

At the end of this step, the individual intervention assessment will have been completed and the qualitative assessments and scores of the interventions been set.

Step 3

In order to then assess the approaches within each Package, each set of interventions relevant to a Package have been assembled along with their individual assessment.

Step 4

For each Package, the specific challenge groups that each are trying to address have been identified and consideration has been given to how well the Package could address the challenge groups. The average of scores assigned to Linked Project Groups and to Schemes has then been determined to provide an indication of how the overall scoring against the objectives for each Packages compares.

Step 5

Finally, the practical feasibility of the highest ranking Package Approach has been considered. The early assessment undertaken in Step 1 has then been revisited for the individual interventions (Schemes and Projects) and consideration given to questions such as,

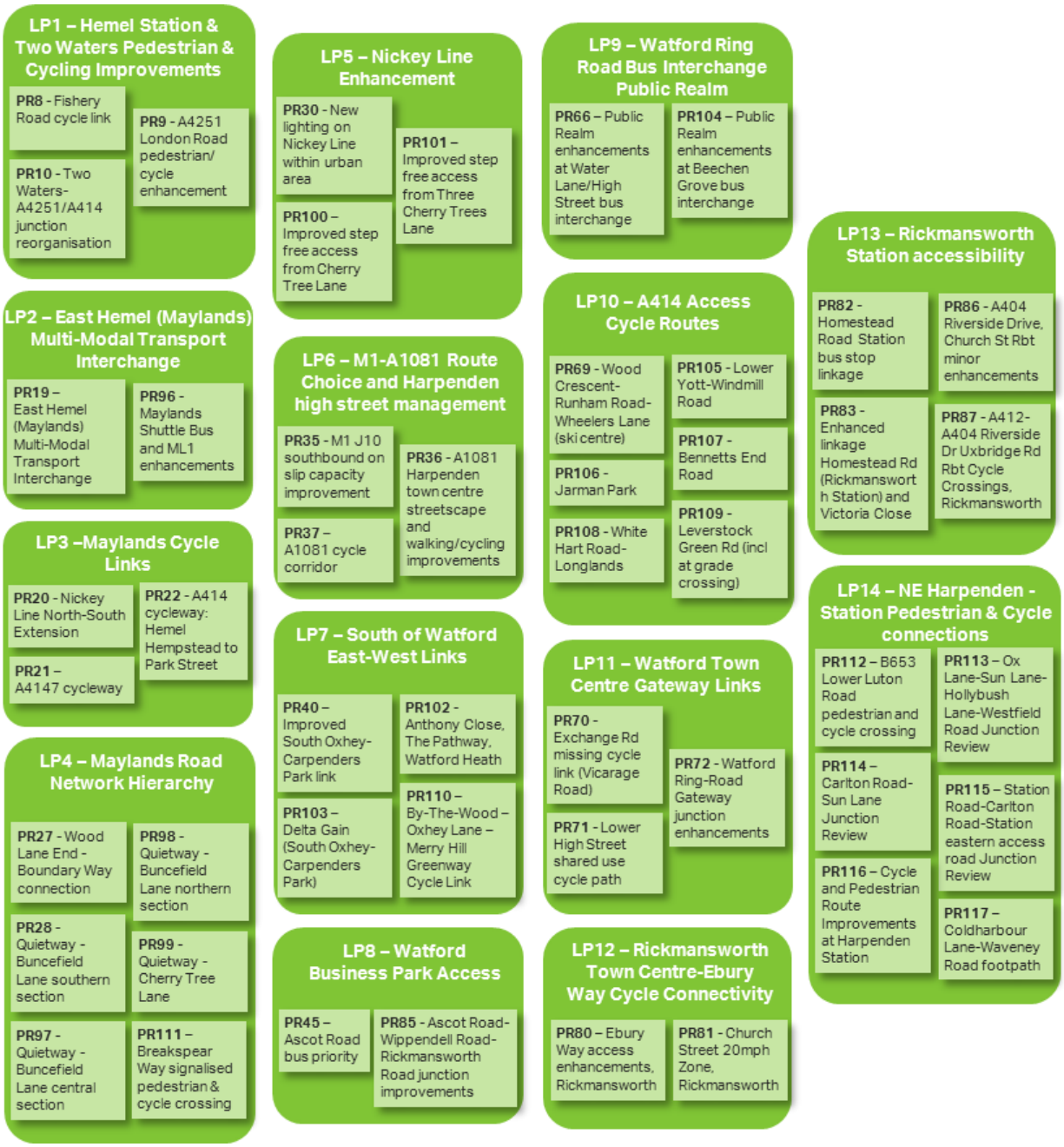
- *How well do the schemes fit together or enhance one another?*
- *Collectively, do the risks change with the package of schemes?*
- *How likely is the entire set of schemes in a package option to be funded and supported by stakeholders?*
- *Do schemes conflict with one another within a package option?*
- *Is there a practical order of implementation of the schemes?*

By considering these questions it will be possible to determine whether the preferred package of schemes from Step 4 will have a synergy and be practically possible to implement.

Projects and Linked Project Groups

Forty four Projects have been assembled into a series of fourteen Linked Project Groups which are summarised below.

Figure 31 - Linked Project Groups



Schemes

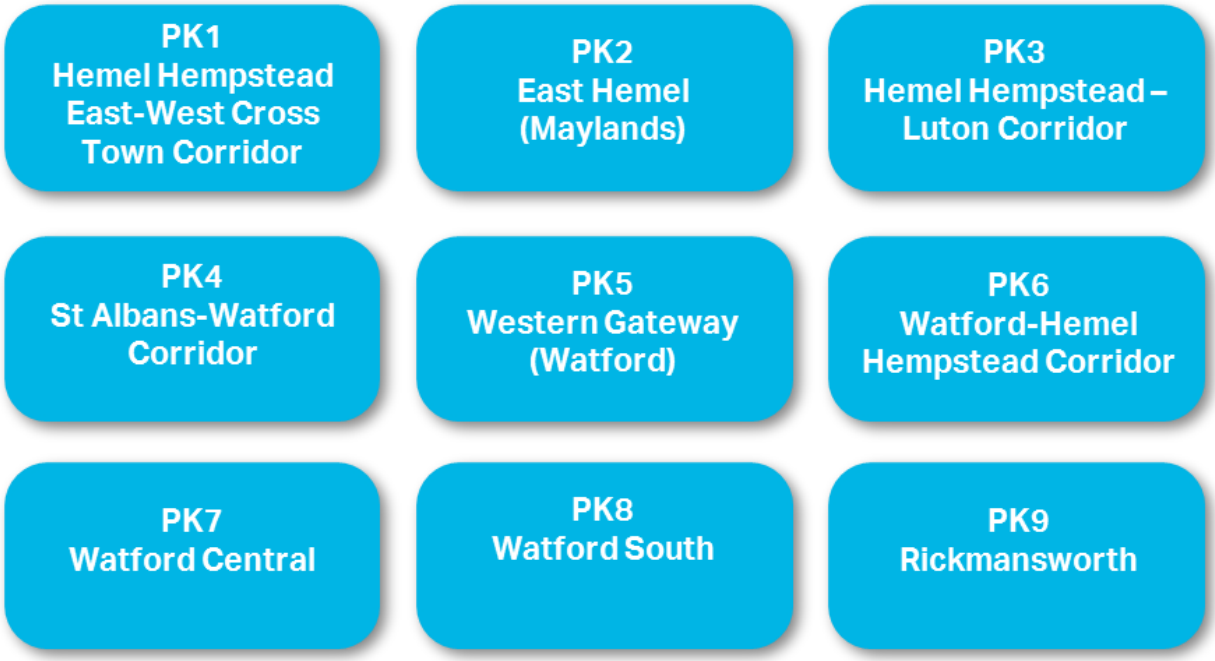
Thirty two Schemes are defined, twelve of which include different Approaches (these are referred to as governing Schemes).

Figure 32 - Schemes

Packages

Nine packages have been defined, seven of which include more than one Approach governed by the different Scheme Approaches.

Figure 33 - Packages



Strategic Interventions and Corridors

Larger, strategic interventions with Hertfordshire-wide or national signficance could have a bearing on the proposals put forward in this GTP. As noted earlier, these interventions are not specifically proposed for this GTP but provide an important backdrop to considering the effectiveness of Packages. These strategic interventions and corridors are presented in the figure below.

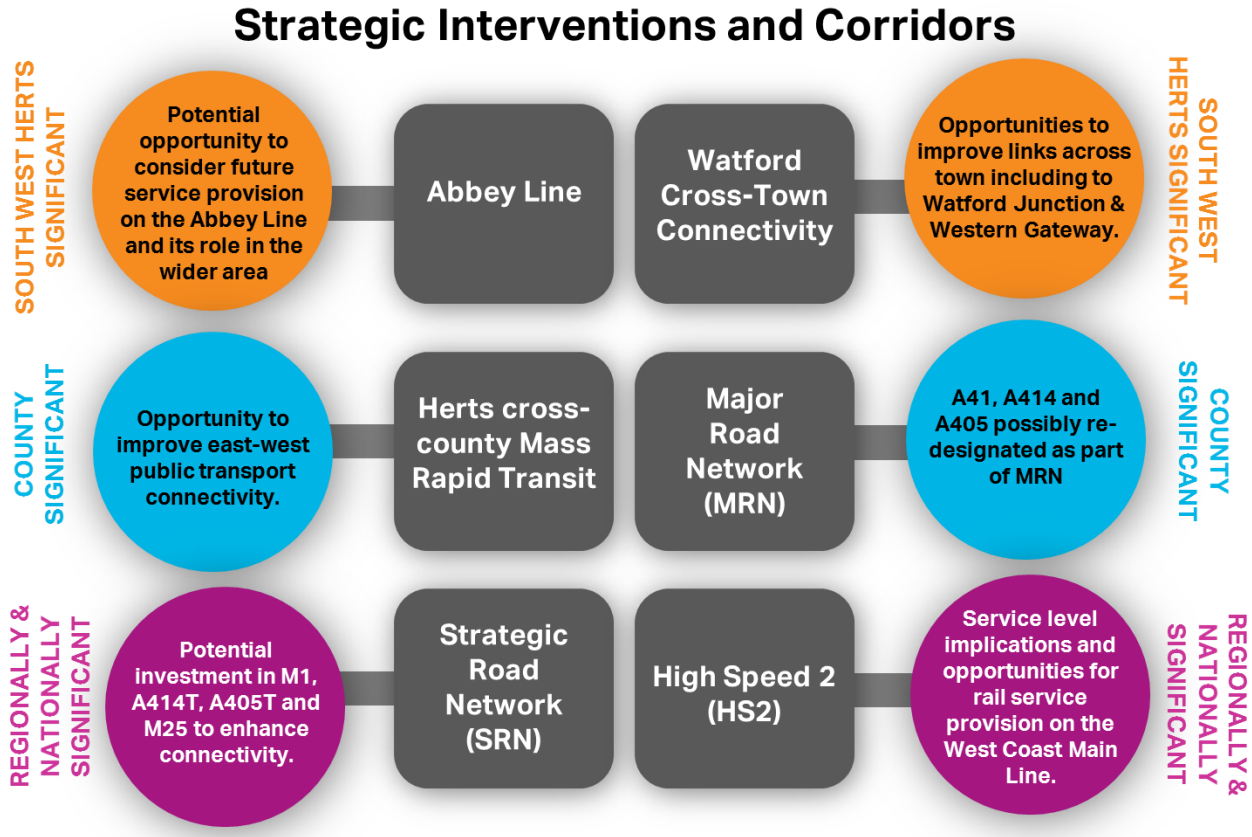


Figure 34 - Strategic Interventions

Abbey Line – The Abbey Line provides a vital link between Watford town centre and St Albans and also connects communities along the corridor such as Park Street and Garston. The parallel A405 and A412 experience traffic congestion so there is likely to be potential for the Abbey Line to provide an attractive alternative to the car. There could be opportunities to enhance rail services on the Abbey Line as part of a more cohesive public transport system in the future.

Watford Cross-Town Connectivity – As discussed earlier, the major scheme to extend the London Underground Metropolitan Line to Watford Junction, previously promoted by HCC, is now not expected to come to fruition. However, improving non-car connectivity across Watford remains a significant priority for Hertfordshire County Council, Watford Borough Council and Three Rivers District Council. Key objectives are to provide a viable alternative to private car-based travel on the congested A412 route and provide improved connections into Watford Junction, the Western Gateway area and Riverwell. The disused railway line is a recognised opportunity for sustainable transport. Further work will be undertaken to understand how the outcome of improved connectivity can best be achieved. HCC will also

work with partners to safeguard the disused railway corridor to ensure it remains available as a future sustainable transport route.

Mass Rapid Transit system – HCC's LTP4 highlights the opportunity to provide a high quality bus rapid transit system across the County. The A414 Corridor Strategy developed the concept of a cross-county Mass Rapid Transit (MRT) system in Hertfordshire. Such a system would be integral to the viability of some of the Packages and interventions put forward in this GTP, including new edge of town multi-modal interchanges.

Major Road Network (MRN) - In 2017/18, the DfT consulted on a potential new designation of road - MRN - which will sit between the local road network (managed here by HCC) and the strategic road network (managed by Highways England). Certain roads such as the A414 and A405 could transfer to the MRN. The implications of this redesignation is not yet certain however HCC will be looking to confirm the most appropriate redesignation to ensure investment and key decision making continues to be in the best interests of Hertfordshire and aligns with key local policies in the Local Plans, LTP4 and the GTPs.

Highways England Road Investment Strategy - Highways England is investing significantly in maintaining and improving the strategic road network (all motorways and major A-roads). Whilst no specific proposed investments are identified for the SW Herts GTP area, traffic congestion does remain an issue and HCC, the local planning authorities, Hertfordshire LEP and Highways England will continue to liaise on priorities for improving strategic road links across the county.

High Speed 2 - The UK Government is developing a new high speed rail link between London, Birmingham, the North of England and Scotland. Although HS2 will pass through the South West corner of Hertfordshire, it will not directly serve the area. However it is expected to have an influence on rail services along the West Coast Main Line through Watford and Hemel Hempstead.

While no decision on any strategic intervention has been prescribed by the GTP, thinking around the future possibilities and opportunities of these interventions and initiatives has guided or influenced discussions on the optioneering and prioritisation of interventions and packages.

Identifying Preferred Packages

The GTP process has identified numerous interventions (Projects and Schemes), with some different approaches set out for particular Schemes. The scoring identified in the appraisal framework for the governing Schemes has been compared in order to identify a preferred set of Packages. The interventions are all listed in Appendix A - Intervention Schedule, with scoring in Appendix B, and details on the packaging and selection of preferred approaches in Appendix C.

Each preferred Package is described in turn in this section, including the overarching aim of the Package; a schematic map broadly indicating the locations and spatial extents of interventions as well as their relationship to proposed large scale development sites; the overall rationale for the Package and the outcomes that are intended; an estimate of the cumulative cost for the entire package; and an indicative sequence of delivery of all Package interventions, i.e. the recommended order in which the interventions should be implemented.

Package Sequencing

Some interventions feature in more than one Package. This is because they are focused towards tackling more than one challenge. Each Package sequence of delivery chart takes into account the estimated timescale for delivering a particular intervention, and the envisaged linkages between interventions. Where interventions feature in more than one Package, the timescales for implementation may differ as a result of the linkages with other interventions.

If for example a small scale intervention which may in practice only take 2 years to design and implement, but cannot be implemented until a larger intervention which may take 10 years to design and implement is in place, then this will be reflected on the sequence of delivery chart.

Package 1 – Hemel Hempstead East-West Corridor

The overarching aim of Package 1 is:

To form an east-west, cross-town, multi-modal corridor which facilitates attractive and convenient journeys on foot, by bike, by bus and also by car between Hemel Hempstead railway station, the Town Centre, Jarman Park and Maylands industrial area.

The package consists of:

- Converting the A414 into a multi-modal transport corridor that better facilitates walking, cycling and buses alongside private vehicles, and improving connectivity both along and across the key route - potentially enabled by a future Mass Rapid Transit system.
- Improving access to the M1 through the provision of an additional junction and enhancements to Hemel's existing junction.
- The reorganisation of road space in the Apsley/Two Waters area to facilitate an improved environment for walking and cycling

The full schedule of interventions is shown in the table below. Package 1 includes several Schemes where there is more than one approach to providing a solution. The table indicates the selection of Scheme approaches to form the preferred Package 1.

Table 4 - Package 1 Schedule of Interventions

PK1 – Hemel Hempstead East-West Cross Town Corridor			
ID	**Project / Approach**	**Name**	**Description**
LP1	**PR8**	Fishery Road improved pedestrian and cycle link	Improved cycling and pedestrian connectivity along Fishery Road towards the station, to better link residential areas in the west of Hemel Hempstead with the station, and create a safer environment for all users.

PK1 – Hemel Hempstead East-West Cross Town Corridor			
ID	**Project / Approach**	**Name**	**Description**
	PR9	A4251 London Road pedestrian/cycle enhancement	Pedestrian and cycle enhancements along London Road (A4251) to enhance safety and attractiveness of non-car travel. Consideration of cycle lanes and wider footpaths with the intention of promoting healthier method of travel through the Two Waters area of the town, alongside opportunities to improve bus facilities on this route.
	PR10	Two Waters-A4251/A414 junction reorganisation	A4251/A414 junction reorganisation to reduce junction footprint and improve crossing facilities for pedestrians and cyclists. Turning movements from the A414 to the A4251 towards Apsley will be de-prioritised. Consider opportunities for incorporating bus priority at the junction.
LP3	**PR20**	Nickey Line North-South Extension	An off-road exemplary cycle route that connects to the Nickey Line and A4147 through the East Hemel Hempstead proposed development area to improve cycle connectivity and facilitate non-motorised trips across the East Hemel Hempstead development.
	PR21	A4147 cycleway	Planned off-road cycle route alongside part of the A414 (M1 J7-8 section) and connecting to the A4147, then running off road alongside the A4147 to St Albans.
	PR22	A414 cycleway: Hemel Hempstead to Park Street	Cycleway along the A414 to connect Maylands with Park Street (and A414 / A405 shared cyclepaths).
LP10	**PR69**	Wood Crescent-Runham Road-Wheelers Lane (ski centre)	New cycle routes mainly on roads which cross the A414 including: Wood Crescent/Runham Rd (incl. link to ski centre); Lower Yott/Windmill Road; Jarman Park; Bennetts End Rd, White Hart Rd, Longlands (incl. link to Adeyfield shops); Leverstock Green Road. New at-grade crossings on the A414 will be required. Provide linkages to neighbourhood centres such as Adeyfield and Bennetts End.
	PR105	Lower Yott-Windmill Road	
	PR106	Jarman Park	
	PR107	Bennetts End Road	
	PR108	White Hart Road-Longlands	
	PR109	Leverstock Green Rd (incl. at grade crossing)	

PK1 – Hemel Hempstead East-West Cross Town Corridor				
ID	**Project / Approach**		**Name**	**Description**
SM2	a	✘	Relocation of Hemel Hempstead station	Relocate Hemel Hempstead station to a position broadly west of Two Waters Road.
	b	✘	Moderate enhancement to Hemel Hempstead station	Moderate enhancement to the existing Hemel Hempstead station - forecourt and access improvements.
	c	✔	Substantial enhancement to Hemel Hempstead station	Substantial enhancement to Hemel Hempstead station at its existing location - forecourt, access enhancements, car park capacity increase, new south-eastern platform access and parallel footway to Two Waters Road and Boxmoor.
	Decision: Relocation of the station will be costly. Any new location will still be remote from large parts of the town. Moderate station enhancements will be sufficient enough to promote inter-modal connectivity. However more substantial investment in station facilities complemented by improved walking/cycling routes will promote inter-modal connectivity.			
SM4	a	✔	Magic Roundabout - Bus focused improvements	Explore options for bus priority on and approaching the Magic Roundabout, supporting proposed A414 corridor improvements to improve journey times between Hemel Hempstead station and the eastern part of the town including Maylands.
	b	✘	Magic Roundabout - Minor Cycle Improvements	Partially segregated cycle improvements at the Magic Roundabout that primarily connects routes on St Albans Road to Station Road and Two Waters Road.
	Decision: It is preferable to keep cyclists off the carriageway so that the roundabout remains vehicle-focused. Bus priority will support E-W cross-town connectivity in a more significant way. There is also an opportunity to provide for cycle movements through SM27 – Magic Roundabout Flyover.			
SM5	a	✔	A414 multi-modal and bus priority improvements	Convert St Albans Road (A414) from Green Lane to the Plough (Magic) Roundabout to better provide for different travel modes, with reduced speed limit, some road capacity reduction, more at-grade (surface-level) crossings, public realm enhancements for pedestrians and cyclists, and bus priority lanes on the A414 providing more attractive journey times for buses running between Hemel Hempstead station, town centre and Maylands.

PK1 – Hemel Hempstead East-West Cross Town Corridor				
ID	**Project / Approach**		**Name**	**Description**
	b	✔	Northern distributor road	Northern link road across the north of Hemel Hempstead either as a strategic link from A41-M1 or a series of more local links. Strongly linked to East Hemel Hempstead spine road (SM6) and M1 access alterations (SM7), this would be a longer term prospect to support potential future development.
	c	✘	A414 Thoroughfare - grade-separated junctions	Convert existing junctions along St Albans Road (A414) from Green Lane to the Plough (Magic) Roundabout to large-scale grade-separated thoroughfare junctions with the intention of increasing capacity along the A414, improving journey times for motorists and catering for short and long distance journey to/from and through Hemel Hempstead.
	Decision: The A414 dissects the town, therefore measures which encourage more traffic onto the road and increase severance (making it harder for people to cross the road) are discouraged. A new road to the north of the town may only be viable in conjunction with additional development which is not proposed at present. Introducing elements of bus priority and improved at-grade cycle/pedestrian crossings is considered a suitable first step towards reimagining the role of the A414 and the hierarchy of roads across Hemel Hempstead.			
SM7	a	✘	M1 Junction 9 relocation	The relocation of M1 Junction 9 to the south-west of Redbourn on the B487 in conjunction with enhanced links to Maylands / East Hemel Hempstead (SM6).
	b	✔	M1 Junction 8a (additional junction)	Provision of an additional M1 Junction 8a (potential north-facing slip roads only) in conjunction with enhanced links to Maylands/East Hemel Hempstead (SM6).
	c	✔	M1 Junction 8 enhancement	Enhancement to M1 Junction 8 and the adjacent junction at Breakspear Way/Green Lane to provide additional capacity and connectivity to Maylands, and relieve congestion on the A414.
	Decision: As studies in and around the Maylands area built the case for M1 J8 improvements, an exception has been made to acknowledge that both SM7b and SM7c will likely be needed as a solution for congestion at M1 J8. M1 J8 enhancement may be required in the shorter term however an extra J8a could provide better connectivity to the town and help ease pressure on the A414 in the longer term.			

PK1 – Hemel Hempstead East-West Cross Town Corridor			
ID	**Project / Approach**	**Name**	**Description**
SM8	-	Hemel Hempstead town-wide bus service reconfiguration	Work with bus operators to explore potential reconfiguration of bus services throughout Hemel Hempstead to provide efficient routes across the town with the aim of maximising connections to Maylands, the station, town centre and east-west links to neighbouring towns. Encourage best use of data and technology to optimise bus routes and attract demand.
SM27	-	Magic Roundabout Cycle Flyover	A cycle bridge over the Magic Roundabout that primarily connects routes on St Albans Road to Station Road and Two Waters Road, providing a safe, attractive and user-focused facility.
SM32	-	Streetscape and walking/cycling enhancements in Apsley/Two Waters area	Streetscape and highway improvements to create a slower speed, safer environment for walking and cycling along Lawn Lane from the Plough (Magic) Roundabout to Durrants Hill Road and along the A4251 from its junction with the A414 to Durrants Hill Road, seeking to minimise rat-running along the A4251 (from the A41), whilst maintaining suitable routes for buses.

Hemel Hempstead railway station is located on the western edge of the town, remote from most of the large residential areas of the town and the Town Centre. This is perceived to cause town-wide issues of high car dependency and poor connectivity.

Maylands, one of the largest employment areas in Hertfordshire, is located on the eastern edge of the town and benefits from close proximity to the M1 motorway but is approximately 3km from the Town Centre and 4.5km from the railway station.

The A414 runs broadly east-west across Hemel Hempstead and is a high capacity dual carriageway along much of its length. It experiences quite severe traffic congestion during the weekday morning and evening rush hours but facilitates high speed movement by car outside of these busy periods. This creates difficulties for people to cross the road on foot or by bike due to the physical severance caused by the route.

Package 1 is focused on addressing the east-west connectivity and improving north-south permeability through the formation of a multi-modal corridor anchored by the railway station at one end and Maylands at the other, via the Town Centre and Jarman Park retail/leisure area.

Substantial enhancement to Hemel Hempstead station (**SM2c**) would form the western anchor. Improved connectivity between the town and M1 near Maylands would be achieved

by a new M1 junction as the eastern anchor (**SM7b**) alongside a short-term solution to M1 J8 congestion via a junction enhancement (**SM7c**). An evolution of the A414 from a vehicle-dominated expressway to a multi-modal 'street' will also provide greater equality for all transport users including pedestrians and cyclists, bus users and motorists (**SM5a**) by way of bus priority at junctions (including bus lanes on the approaches), a new continuous cycleway, at-grade pedestrian/cycle crossings (complemented by **LP10**), and a consistent, reduced speed limit along the entire length within the urban area to no more than 40mph. These enhancements seek to establish a step change in the provision of alternatives to the private car along this corridor, and could represent a step towards a potential future cross-county Mass Rapid Transit system.

A new road to the north of the town (**SM5b**) may only be viable in conjunction with additional development in this area which is not currently proposed.

The reimagined A414 will be complemented by new on/off-road cycle routes along residential streets which feed into the A414 (**LP10**), therefore reducing severance caused by the main road and promoting healthier journeys north-south (for instance between Bennetts End and Adeyfield) and east-west (e.g. towards the town centre, station and Maylands).

The Plough 'Magic' Roundabout is a major highway junction, facilitating cross-town journeys. To complement measures on the improved A414, limited bus priority will be looked at for sections of the roundabout or its approaches (**SM4a**). Cyclists travelling between the improved cycle facilities along the A414 corridor and the improved railway station will be taken over the junction via a cycle bridge (**SM27**) therefore eliminating the need to navigate what is a complex system of roundabouts. A long term vision for the junction could also include more radical arm closures and the redesign of the junction itself, potentially freeing up additional space for development opportunities. This vision could be explored after the evolution of the A414 is progressed (**SM5a**).

In order to maximise the benefits brought about by changing the A414, bus operators will be engaged in a strategic study or review of bus services (**SM8**) to identify how routes can/should change to meet the needs of local people, better support existing and proposed park and ride services, and further encourage travel by sustainable modes. This review, alongside the consideration of "rapid" east-west bus services across Hertfordshire (a strategic intervention identified in LTP4) is intended to help improve both local and regional east-west travel by public transport, which is a key priority in LTP4.

At the western end of this multi-modal corridor, substantial enhancements (**SM2c**) to the railway station (which include a remodelled forecourt, station ticket office, footbridge and new south-eastern pedestrian access) will be complemented by improvements to pedestrian and cycle facilities surrounding the station (**LP1**) and reducing some road space at the large Two Waters-A4251-A414 London Road signalised crossroads to help make journeys on foot or by bike more attractive.

In turn, these improvements to the walking and cycling environment - including those at the A4251/A414 junction (**LP1**) - will be complemented by alterations to the local road system through Apsley along Lawn Lane and the A4251 (**SM32**) which is intended to discourage through-traffic using these roads to avoid congestion on other more strategic roads such as the A41.

At the eastern end of this corridor, east-west connectivity will be improved beyond the limits of Hemel Hempstead towards St Albans, by new cycleways running alongside the A4147 (towards King Harry Lane and Verulamium Park) and A414 (towards Cottonmill and Park Street) (**LP3**). These new routes will be connected to the existing Maylands area and planned development on the eastern edge of Hemel Hempstead via a new cycle route which connects with the Nickey Line (**LP3**).

Mira has more options in how she travels to work.

Public transport services east-west Hemel Hempstead have been vastly improved with regular services towards the station which Mira can access at a bus stop on the A414. The bus stop has a shelter and real time information which improves the journey experience . The combined bus-rail ticket makes the transfer more convenient.

Since alterations were made to the A414 Breakspear Way/St Albans Road (**SM5a**), buses get priority at some junctions which makes journey times far more attractive. Furthermore, Mira can afford to leave the house a little later because she no longer needs to beat the traffic or is at risk of not getting a parking space at the station.

Joyce has benefited to changes made to the A414 St Albans Road, with the introduction of new at-grade crossings and reduction in road space (**SM5a**). It feels much less intimidating and the town feels more connected. Joyce feels happier and safer crossing the A414, much preferring the new crossing to the old subway which has been closed off.

Joyce no longer feels as isolated making the journey to/from her daughter's home in Bennetts End.

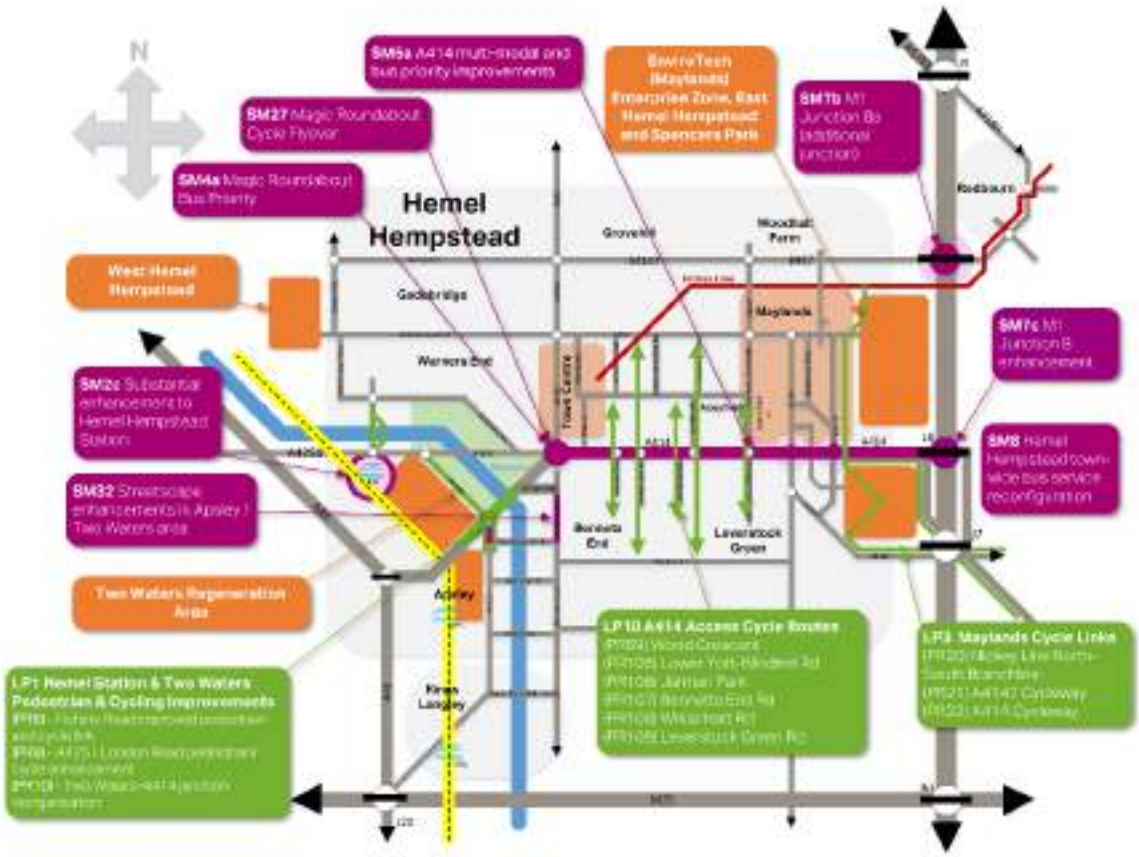


Figure 35 - Package 1 Preferred Combination

The table below simply marks which of the seven GTP Objectives could be achieved with Package 1. Each intervention has been assessed against the objectives which is contained in the Appendix.

Table 5 - Package 1 Objectives

A	B	C	D	E	F	G
						
✔	✔	✔	✔	✔	✔	✔

The envisaged roll-out of Package 1 would commence with a review and identification of bus services throughout Hemel Hempstead (**SM8**). This review will identify what changes will be beneficial in response to emerging changes to the network, including in particular alterations to the form and function of the A414 running through the middle of the town (**SM5a**). Actual changes to bus services would be implemented by bus operators, in conjunction with changes to the network and to serve planned new housing and employment developments in the area.

Changes to the A414 (**SM5a**) need to occur in advance of improvements to the Magic Roundabout (**SM4a** and **SM27**) as well as new cycle routes and crossings being established along roads which feed into the A414 (**LP10**).

Towards the eastern end of Hemel Hempstead, it is envisaged that an improvement to M1 Junction 8 and the adjacent A414 Breakspear Way/Green Lane roundabout will need to occur within 2-5 years in response to planned development at Eastern Hemel Hempstead (alongside wider Enterprise Zone development proposals). New cycle routes to the A4147 and A414 (**LP3**) will not be as feasible until an enhancement of Junction 8 (**SM7c**) is in place – if they are implemented earlier there is a risk they will need to be removed and replaced within a short timeframe which will not be cost effective.

Improvements at Junction 8 are envisaged to facilitate traffic growth up to 2031, and therefore a new junction 8a (**SM7b**) would follow at a later date, subject to development requirements post 2031.

Changes to walking and cycling routes to/from Hemel Hempstead station (**LP1**) can be implemented within a short timeframe, and should be implemented in advance of improvements to the railway station (**SM2c**) which will focus on improving accessibility on foot/by bike and improving inter-modal transfer.

The figure below provides a potential sequence of delivery of the various Schemes and Linked Project Groups within Package 1.

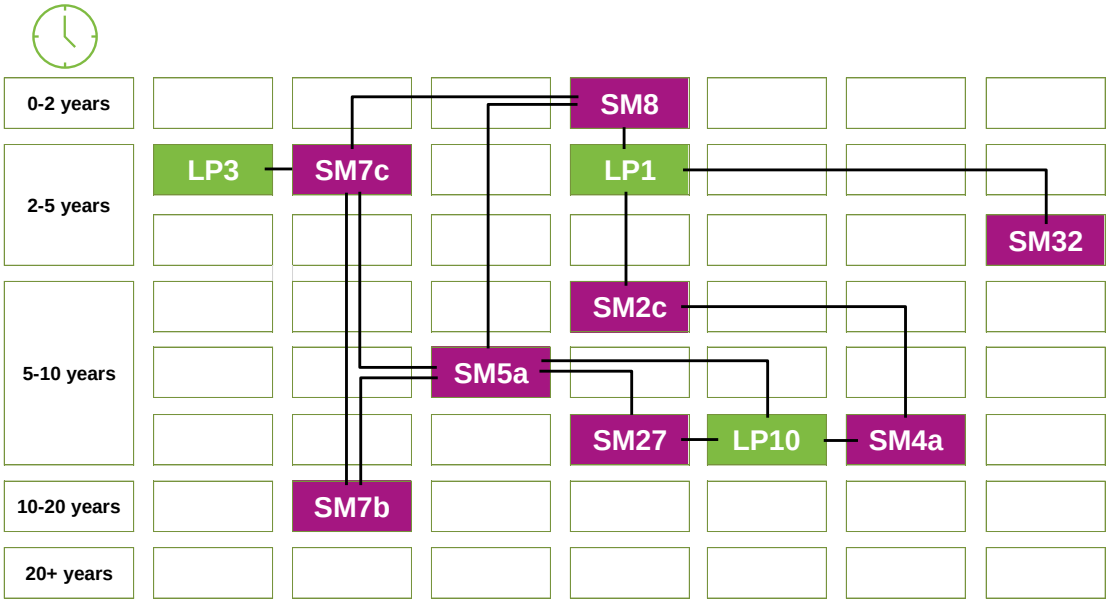


Figure 36 - Package 1 Indicative Sequence of Delivery

If delivered in its entirety, it is estimated that Package 1 could cost between £42 million and £179 million. It should be noted that interventions are identified as concepts in this GTP, and therefore further work is required to develop them in more detail. This more detailed work should result in more accurate cost estimates being provided and therefore the estimated cost range presented here may narrow and the minimum and maximum values may change.

Package 2 – Maylands (Hemel Hempstead)

The overarching aim of Package 2 is:

To provide improved access to the Maylands industrial area from both within Hemel Hempstead and outside of the town by all modes of transport.

The package consists of:

- The introduction of an East Hemel (Maylands) Multi-Modal Transport Interchange serving the Maylands and Enterprise Zone developments.
- Improving access to the M1 through the provision of an additional junction and enhancements to Hemel's existing junction.
- A new spine road serving East Hemel Hempstead urban extension and Maylands alongside a series of cycling improvements to improve connectivity across the proposed developments.

The full schedule of interventions is shown in the table below. Package 2 includes several Schemes where there is more than one approach to providing a solution. The table indicates the selection of Scheme approaches to form the preferred Package 2.

Table 6 - Package 2 Schedule of Interventions

PK2 – Maylands (Hemel Hempstead)			
ID	**Project / Approach**	**Name**	**Description**
LP2	**PR19**	East Hemel (Maylands) Multi-Modal Transport Interchange	A bus and coach interchange near to Maylands with access to the A414/M1. Served by existing or new express coach services along the M1 (e.g. Greenline and National Express) and local express buses to neighbouring towns including a potential cross-county express bus service. Opportunity for associated cycle and pedestrian improvements.
	PR96	Maylands Shuttle Bus and ML1 Enhancements	A shuttle bus service connecting the multi-modal transport interchange , car park and Maylands area, potentially incorporating enhancements to existing ML1 services.

PK2 – Maylands (Hemel Hempstead)			
ID	**Project / Approach**	**Name**	**Description**
LP3	**PR20**	Nickey Line North-South Extension	An off-road exemplary cycle route that connects to the Nickey Line and A4147 through the East Hemel Hempstead proposed development area to improve cycle connectivity and facilitate non-motorised trips across the East Hemel Hempstead development.
	PR21	A4147 cycleway	Planned off-road cycle route alongside part of the A414 (M1 J7-8 section) and connecting to the A4147, then running off road alongside the A4147 to St Albans.
	PR22	A414 cycleway: Hemel Hempstead to Park Street	Cycleway along the A414 to connect Maylands with Park Street (and A414 / A405 shared cyclepaths).
LP4	**PR27**	Wood Lane End - Boundary Way connection	Establish a new all-vehicle link road between Wood Lane End and Boundary Way.
	PR28	Quietway - Buncefield Lane southern section	Conversion of existing 'country lanes' through the Maylands area to so-called quietways for cyclists and pedestrians (limited access for vehicles) travelling from north and south Hemel Hempstead into Maylands.
	PR97	Quietway - Buncefield Lane central section	
	PR98	Quietway - Buncefield Lane northern section	
	PR99	Quietway - Cherry Tree Lane	
	PR111	A414 Breakspear Way signalised pedestrian & cycle crossing	Toucan (pedestrian and cycle) crossing on the A414 Breakspear Way near Buncefield Lane, to improve safety and connectivity on foot and cycle.
LP5	**PR30**	New lighting on Nickey Line within urban area	Enhance the Nickey Line cycleway by installing additional lighting to improve perception of safety, improve signage to make navigation easier day and night. To cover both the urban section within Hemel Hempstead and the rural section to Redbourn.
	PR100	Improved step free access from Cherry Tree Lane	Replacement of current steep steps with a ramp structure suitable for cyclists and people with impaired mobility.
	PR101	Improved step free access from Three Cherry Trees Lane	Replacement of current steep steps with a ramp structure suitable for cyclists and people with impaired mobility.

PK2 – Maylands (Hemel Hempstead)				
ID	**Project / Approach**		**Name**	**Description**
SM6	a	✘	Hemel Hempstead Eastern Spine Road - Car Focus	A high speed Eastern Spine Road that connects A4147 and B487 to enhance connections and access to Maylands by car from the north. Connects Green Lane to B487.
	b	✔	Hemel Hempstead Eastern Spine Road – Multimodal Focus	A lower speed Eastern Spine Road that connects A4147 and B487 to enhance connections and access to Maylands by car, bus and cycle from the north. Connects Green Lane to B487 and into other cycleways in Maylands. Designed to provide high quality facilities and attractive environment for walking and cycling.
	Decision: A spine road which is not promoted as a high capacity, high speed road but instead incorporates high quality facilities for pedestrians, cyclists, and public transport should encourage shorter distance trips within Hemel Hempstead by healthier travel modes.			
SM7	a	✘	M1 Junction 9 relocation	The relocation of M1 Junction 9 to the south-west of Redbourn on the B487 in conjunction with enhanced links to Maylands/East Hemel Hempstead (SM6).
	b	✔	M1 Junction 8a (additional junction)	Provision of an additional M1 Junction 8a (potential north-facing slip roads only) in conjunction with enhanced links to Maylands/East Hemel Hempstead (SM6).
	c	✔	M1 Junction 8 enhancement	Enhancement to M1 Junction 8 and the adjacent junction at Breakspear Way/Green Lane to provide additional capacity and connectivity to Maylands, and relieve congestion on the A414.
	Decision: As studies in and around the Maylands area built the case for M1 J8 improvements, an exception has been made to acknowledge that both SM7b and SM7c will likely be needed as a solution for congestion at M1 J8. M1 J8 enhancement may be required in the shorter term however an extra J8a could provide better connectivity to the town and help ease pressure on the A414 in the longer term.			
SM8	-		Hemel Hempstead town-wide bus service reconfiguration	Work with bus operators to explore potential reconfiguration of bus services throughout Hemel Hempstead to provide efficient routes across the town with the aim of maximising connections to Maylands, the station, town centre and east-west links to neighbouring towns. Encourage best use of data and technology to optimise bus routes and attract demand.

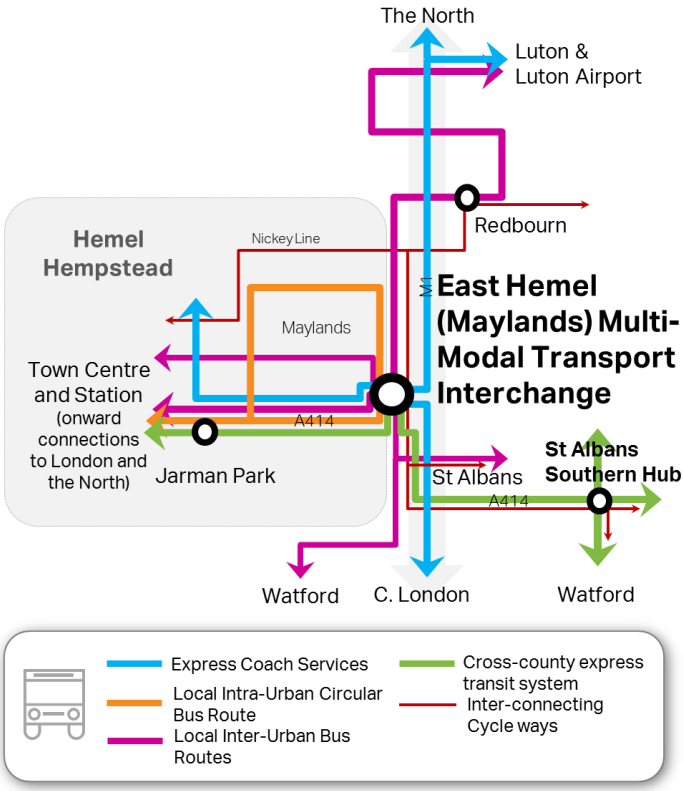
PK2 – Maylands (Hemel Hempstead)			
ID	**Project / Approach**	**Name**	**Description**
SM10	-	M1 dedicated coach service connecting Luton and Hemel Hempstead (or Greenline 757 diversion)	Explore with operators the potential for a new express coach service along the M1 connecting Hemel Hempstead to Luton, or potential to divert existing Greenline services from Luton to London via Hemel Hempstead (Maylands). Would complement East Hemel (Maylands) Multi-Modal Transport Interchange (LP2).
SM29	-	A414 J8 Cycle Bridge	High quality green cycle bridge over the A414 Breakspear Way near M1 Junction 8, to improve cycle routes to areas north and south of the A414 (strongly linked to the East Hemel Hempstead urban extension).

Maylands is one of the largest and most important industrial areas in Hertfordshire. Its continued success will depend on an efficient and well connected transport network which can facilitate attractive and convenient journeys by all modes, not just the car. Maylands will continue to need good access to the M1, as many of the employers located there are transporting goods by lorry far and wide using the strategic road network. Maylands attracts its workers over short and long distances. Some workers live in surrounding residential areas but still choose to drive to work over relatively short distances. Some live in other towns such as Luton and Dunstable, and they have very few alternatives to the car to get to/from work.

As planned development at Eastern Hemel Hempstead and Spencer's Park come forward alongside expansion and intensification within Maylands itself, there will be increased demand placed on existing transport infrastructure in the area. It is likely that the M1 will continue to play a major role in facilitating longer distance journeys to/from Maylands, however this does not necessarily mean that more traffic needs to be generated on what are already busy roads.

An East Hemel (Maylands) Multi-Modal Transport Interchange (**LP2 –** see Figure 36) is an opportunity to influence how people travel to/from the area and substantially increase the attractiveness and connectedness of public transport services.

Local bus and express coach services will be able to call at the interchange, providing connections from within Hemel Hempstead, surrounding towns such as Watford, St Albans and Luton (including **SM10**), and further afield including London. A shuttle bus service will provide onward connections into Maylands via the planned residential urban extensions east of the town, supported by a town-wide bus service reconfiguration review to better capitalise on the opportunities generated from improved bus priority infrastructure across Hemel Hempstead (**SM8**).



EXAMPLE The Milton Keynes Coachway is an edge of town public transport facility, adjacent to the M1 at J14, for local long distance express services, as well as a Park and Ride. It provides a model for the East Hemel (Maylands) Multi-modal Transport Interchange

Figure 37 - Bus Connectivity at the East Hemel (Maylands) Multi-Modal Transport Interchange

Pressure placed on the existing M1 Junction 8 will be reduced by enhancements to the junction (**SM7c**) in the short term (as suggested in the Maylands Corridor Growth Study) and the introduction of a new Junction 8a (**SM7b**) in the long term, which will free up road capacity on the A414 between Junction 8 and Green Lane for buses and coaches.

A new eastern spine road (**SM6b**) will link the planned new developments and will be designed in such a way that it does not become a busy bypass to Maylands. A high quality cycleway will run alongside the road, and cross over the A414 via a new cycle bridge (**SM29**). Onward connections will be provided to an improved Nickey Line (**LP5**) enhancing the environment for cyclists and pedestrians towards Harpenden and Luton, and to different parts of St Albans via the proposed cycleways along the A4147 and A414 (**LP3**).

Getting around Maylands will be improved by the conversion of some existing lanes into so-called 'quietways' (**LP4**). Measures will be introduced to discourage through traffic, making these lanes quieter and far more attractive for journeys on foot or by bike. Re-linking Wood Lane End and Boundary Way will provide access to a new development at Maylands Gateway, and will include measures to control the amount of traffic using Wood Lane End to minimise the impact on local residents living on this road (including Hales Park).

Rob has the opportunity to change how he travel to and from work because his employer is implementing measures to reduce parking. Rob has been encouraged by the improvements to cycle and pedestrian infrastructure throughout the Maylands area (LP4). Upgraded facilities alongside and across the A414 (LP10, SM5a) have made the option of travelling to/from work by bike far more attractive than it has ever been before.

Mira has occasionally taken the commuter coach which stops at the new bus/coach interchange close to M1 Junction 8 (LP2) which she can access via an attractive 'green bridge' over the A414 (SM29) and an safe and convenient walking route through the new East Hemel Hempstead urban extension.

Jason is more flexible with his travel arrangements. Jason can now use the improved direct coach service which runs between Luton and Hemel Hempstead (SM10) and stops at the new bus/coach interchange (LP2). Jason can use the shuttle bus or walk. Jason finds the services are convent and operate at the hours which fit his shift pattern.

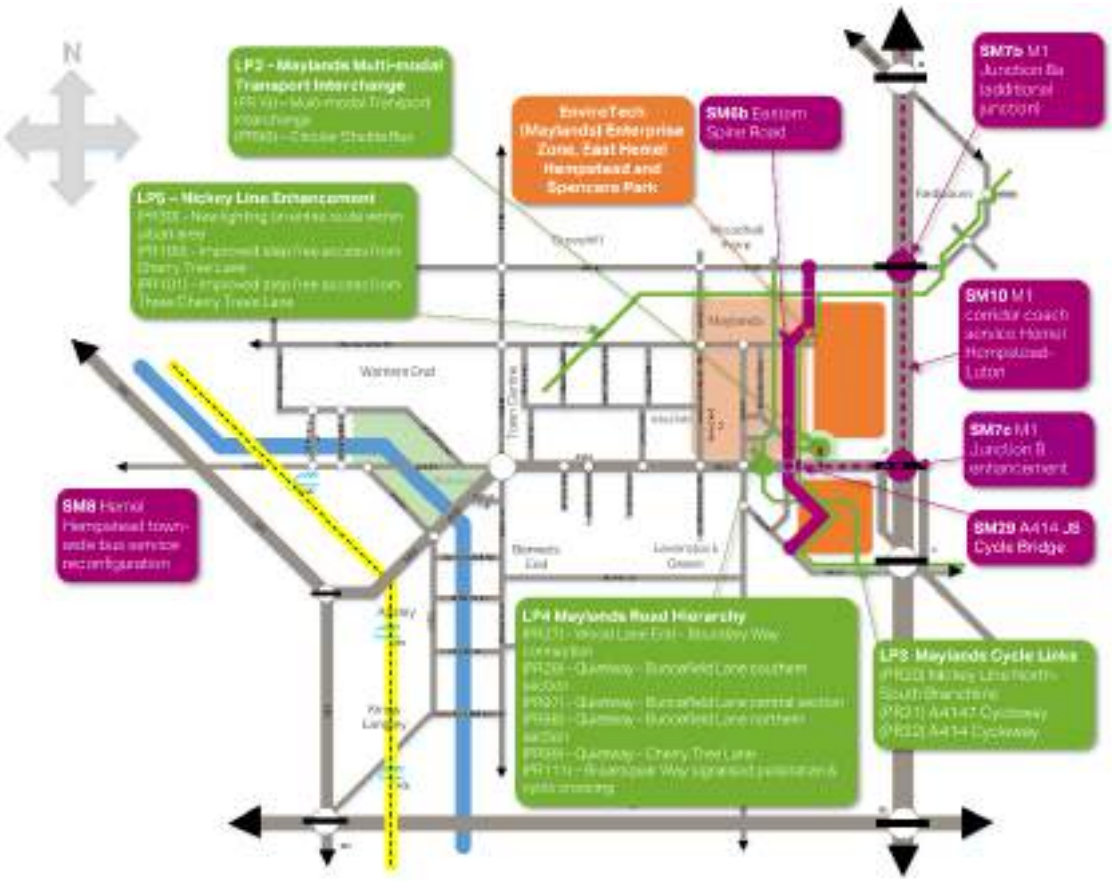


Figure 38 - Package 2 Preferred Combination

The table below simply marks which of the seven GTP Objectives could be achieved with Package 2. Each intervention has been assessed against the objectives which is contained in the Appendix.

Table 7 - Package 2 Objectives

A	B	C	D	E	F	G
						
✔	✔	✔	✔	✔	✔	✔

The envisaged roll-out of Package 2 would commence with a review and identification of bus services throughout Hemel Hempstead (**SM8**). This review will identify what changes will be needed in response emerging changes to the network and bus infrastructure including a new eastern bus/coach interchange (**LP2**) and the introduction of quietways (**LP4**). This in turn will be triggered by other changes to the road network brought about through the East Hemel Hempstead and Spencers Park developments including a Junction 8 enhancement (**SM7c**) and an Eastern Hemel Hempstead spine road (**SM6b**).

The new eastern bus/coach interchange (**LP2**) needs to be implemented in advance of a new M1 coach service (**SM10**) otherwise the service may not be as attractive as potential future users of the service will have difficulty accessing the service.

Improvements at Junction 8 are envisaged to facilitate traffic growth up to 2031, and therefore a new junction 8a (**SM7b**) would follow at a later date, subject to development requirements post 2031.

A new bridge over the A414 linking the different parts of the East Hemel Hempstead development, designed specifically for pedestrians and cyclists (**SM29**) needs to be implemented in advance of establishing new/improved cycle routes linking the Nickey Line with the A4147 and A414 (**LP3**). These cycle improvements will be complemented by enhanced access to the Nickey Line in the northern part of Hemel Hempstead which can come forward in the short term ideally in advance of the new routes being implemented.

The figure overleaf provides a potential sequence of delivery of the various Schemes and Linked Project Groups within Package 2.

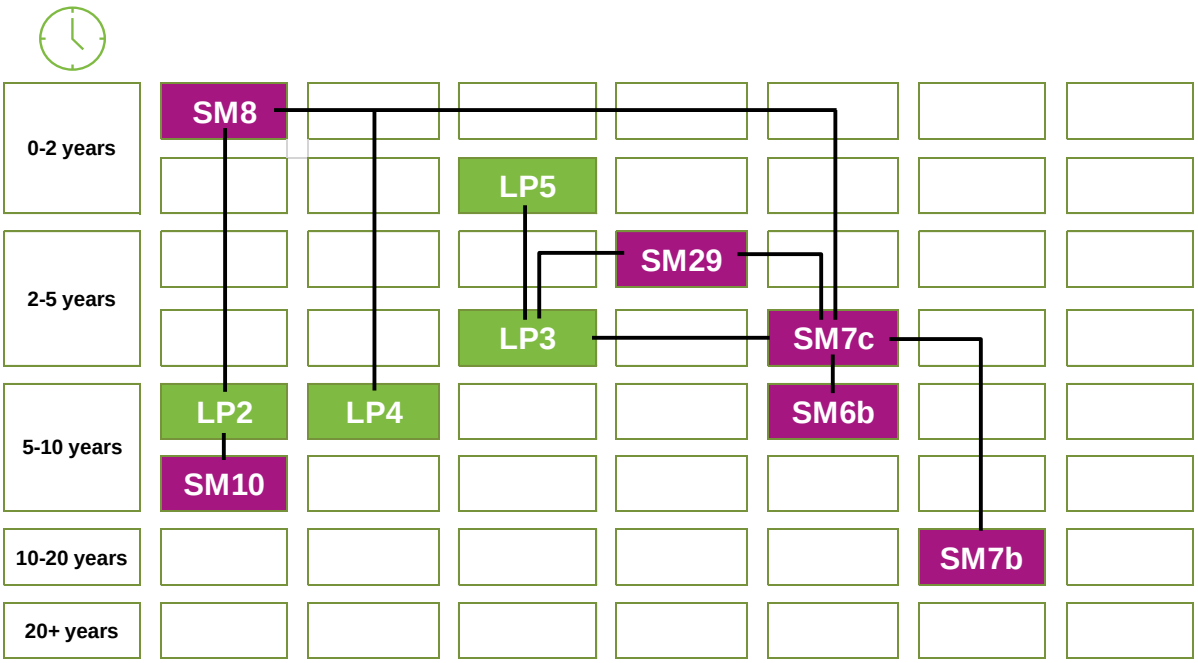


Figure 39 - Package 2 Indicative Sequence of Delivery

If delivered in its entirety, it is estimated that Package 2 could cost between £40 million and £174 million. It should be noted that interventions are identified as concepts in this GTP, and therefore further work is required to develop them in more detail. This more detailed work should result in more accurate cost estimates being provided and therefore the estimated cost range presented here may narrow and the minimum and maximum values may change.

Package 3 – Hemel Hempstead-Luton Corridor

The overarching aim of Package 3 is:

To improve connectivity between Hemel Hempstead and Luton by car and by public transport and limit the impact of rat-running traffic on roads within Harpenden and nearby country lanes.

The package consists of:

- The introduction of an East Hemel (Maylands) Multi-Modal Transport Interchange serving the Maylands and Enterprise Zone developments.
- Improving access to the M1 through the provision of an additional junction and enhancements to Hemel's existing junction.
- Exploring enhanced bus and coach services between Luton and Maylands/Hemel Hempstead, alongside streetscape improvements in Harpenden.

The full schedule of interventions is shown in the table below. Package 3 includes several Schemes where there is more than one approach to providing a solution. The table indicates the selection of Scheme approaches to form the preferred Package 3.

Table 8 - Package 3 Schedule of Interventions

			PK3 –Hemel Hempstead – Luton Corridor	
ID	**Project / Approach**		**Name**	**Description**
LP2	**PR19**		East Hemel (Maylands) Multi-Modal Transport Interchange	A bus and coach interchange near to Maylands with access to the A414/M1. Served by existing or new express coach services along the M1 (e.g. Greenline and National Express) and local express buses to neighbouring towns including a potential cross-county express bus service. Opportunity for associated cycle and pedestrian improvements.
	PR96		Maylands Shuttle Bus and ML1 Enhancements	A shuttle bus service connecting the multi-modal transport interchange, car park and Maylands area, potentially incorporating enhancements to existing ML1 services.

			PK3 –Hemel Hempstead – Luton Corridor	
ID	**Project / Approach**		**Name**	**Description**
LP6	**PR35**		M1 J10 southbound on slip capacity improvement	Improve capacity on slip roads at M1 J10 south of Luton with the intention of reducing congestion and consequently encouraging trips to travel on the M1 rather than avoiding delays by instead rat-running along local roads via Kinsbourne Green and Harpenden. Cooperation with Highways England required.
	PR36		A1081 Harpenden town centre streetscape and walking/cycling improvements	Improve the streetscape and layout in Harpenden town centre and on Station Road for pedestrians and cyclists making journeys within the town (e.g. to/from the station), whilst providing a suitable environment for buses and seeking to enhance heritage assets. Could involve narrowing of the road, more crossings and speed tables. Should complement PR35 in terms of discouraging rat-running traffic avoiding congestion on the M1.
	PR37		A1081 cycle corridor	New or improved off-road cycleway alongside the A1081 for cyclists travelling between Luton, Harpenden, and St Albans. Would connect into facilities built into the recently improved M1 J10a. Improved cycle provision along section within Kinsbourne Green (potentially off road) adjacent to possible new North of Harpenden development in addition to speed limit reduction from 40mph to 30mph within Kinsbourne Green area. Cooperation with Central Bedfordshire Council and Luton Borough Council required.
LP14	**PR112**		B653 Lower Luton Road pedestrian and cycle crossing	A new signal-controlled crossing, associated with the NE Harpenden development and potentially integral to a new development vehicle access, enabling pedestrians and cyclists to safely cross the busy Lower Luton Road.
	PR113		Ox Lane-Sun Lane-Hollybush Lane-Westfield Road Junction Review	To review the layout of the double mini roundabout to identify potential improvements to enable cyclists to route to/from Sun Lane.

			PK3 –Hemel Hempstead – Luton Corridor	
ID	**Project / Approach**		**Name**	**Description**
	PR114		Carlton Road-Sun Lane Junction Review	To review the layout of the priority T-junction to identify potential improvements to enable cyclists to route to/from Carlton Road.
	PR115		Station Road-Carlton Road-Station eastern access road Junction Review	To review the layout of the staggered priority crossroads to identify potential improvements to make cyclists entering/exiting the station more prominent.
	PR116		Cycle and Pedestrian Route Improvements at Harpenden Station	Liaise with the train operator to identify improvements to the pedestrian and cycle route into Harpenden Station (eastern side) along the access road and through the car park. Investigate the potential for a cycle short cut through the premier parking area to reach the cycle parking at the northern end of the car park over a shorter distance.
	PR117		Coldharbour Lane-Waveney Road footpath	Cut back vegetation, provide additional signage and introduce dropped kerb (on Waveney Road) to improve the attractiveness of this route for pedestrians.
SM7	a	✘	M1 Junction 9 relocation	The relocation of M1 Junction 9 to the south-west of Redbourn on the B487 in conjunction with enhanced links to Maylands/East Hemel Hempstead (SM6).
	b	✔	M1 Junction 8a (additional junction)	Provision of an additional M1 Junction 8a (potential north-facing slip roads only) in conjunction with enhanced links to Maylands/East Hemel Hempstead (SM6).
	c	✔	M1 Junction 8 enhancement	Enhancement to M1 Junction 8 and the adjacent junction at Breakspear Way/Green Lane to provide additional capacity and connectivity to Maylands, and relieve congestion on the A414.
	Decision: As studies in and around the Maylands area built the case for M1 J8 improvements, an exception has been made to acknowledge that both SM7b and SM7c will likely be needed as a solution for congestion at M1 J8. M1 J8 enhancement may be required in the shorter term however an extra J8a could provide better connectivity to the town and help ease pressure on the A414 in the longer term.			

			PK3 –Hemel Hempstead – Luton Corridor	
ID	**Project / Approach**		**Name**	**Description**
SM10			M1 dedicated coach service connecting Luton and Hemel Hempstead (or Greenline diversion)	Explore with operators the potential for a new express coach service along the M1 connecting Hemel Hempstead to Luton, or potential to divert existing Greenline services from Luton to London via Hemel Hempstead (Maylands). Would complement East Hemel Hempstead Multi-Modal Transport Interchange (LP2).

The M1 is a route of strategic national importance and provides a major route for long distance journeys. It also facilitates shorter distance inter-urban journeys, for instance between Luton and Hemel Hempstead. When the M1 experience congestion issues, traffic can re-route on to local roads such as the A1081 through Harpenden as this is an Highways England (HE) Diversionary Route.

Measures will be introduced to increase capacity and resilience on the M1 through improvements at M1 Junction 10 alongside measures to make the A1081 through Harpenden less car dominant (**LP6**). A new cycleway and reduced speed limit within the urban area will create an attractive route between planned new development north-west of Harpenden, the town centre and railway station. There is the potential for the cycleway to extend alongside the A1081 all the way to Luton. This will complement improvements to the existing cycleway alongside the A1081 between Harpenden and St Albans providing a high quality interurban route between the three urban areas. These measures combined could help to ensure that the most appropriate road is being used for journeys – the M1 for journeys between Luton and Hemel Hempstead (and beyond) and the A1081 for journeys between Luton and Harpenden.

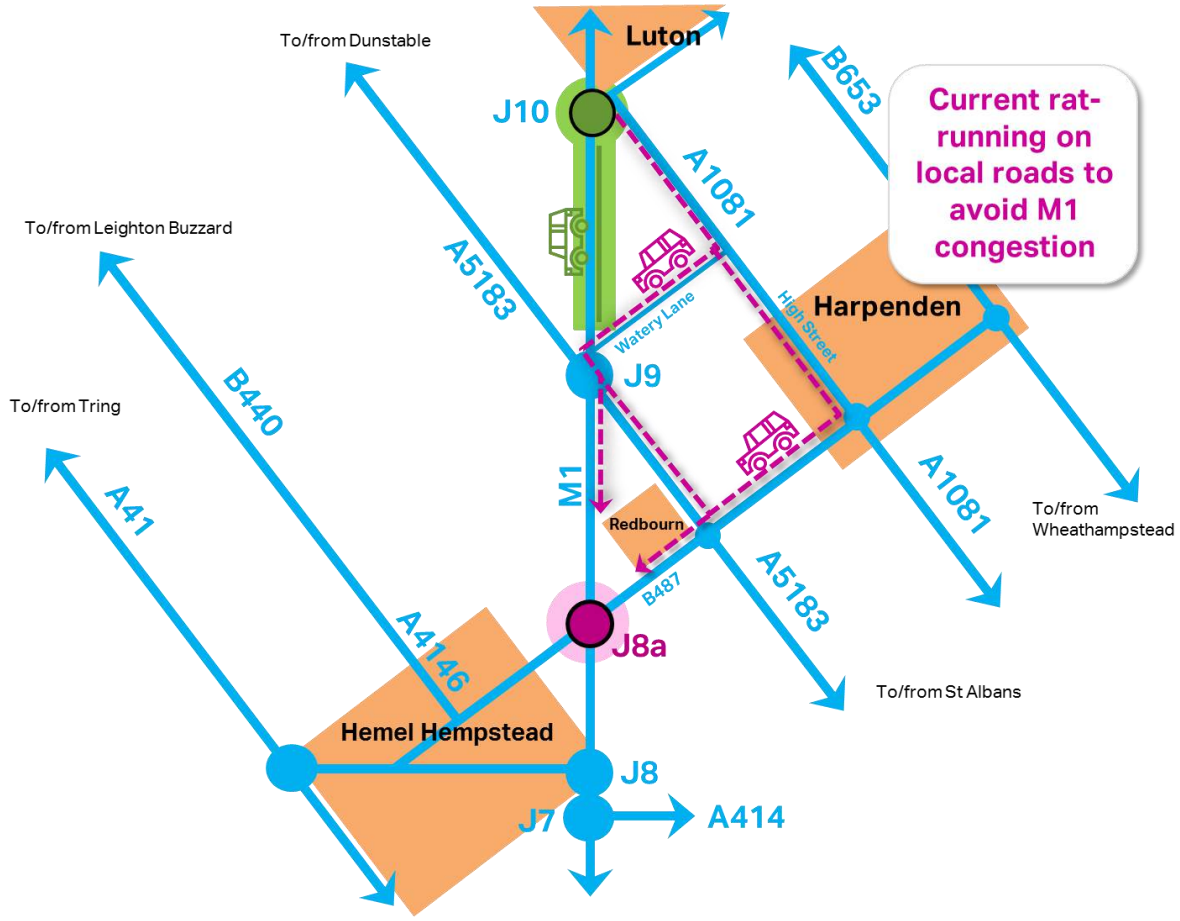


Figure 40 - Luton-Hemel Hempstead Corridor 'Rat-Running'

An East Hemel (Maylands) Multi-Modal Transport Interchange (**LP2** – see Figure 40) is an opportunity to influence how people travel to/from the area. Local bus and express coach services will be able to call at the interchange, providing connections from within Hemel Hempstead, surrounding towns such as Watford, St Albans and Luton (including **SM10**), and further afield including London.

Pressure placed on the existing M1 Junction 8 will be reduced by enhancements to the junction (**SM7c**) in the short term (as suggested in the Maylands Corridor Growth Study) and the introduction of a new Junction 8a (**SM7b**) in the long term, which will free up road capacity on the A414 between Junction 8 and Green Lane for buses and coaches.

Potential new residential development on the north eastern side of Harpenden at Batford will place additional pressure on the B653 Lower Luton Road. It will be critical that residents have safe and attractive routes to the railway station and Harpenden town centre. A new signal-controlled crossing on Lower Luton Road and a series of small junction improvements (**LP14**) will improve routes for pedestrians and cyclists between the new development, station and town centre.

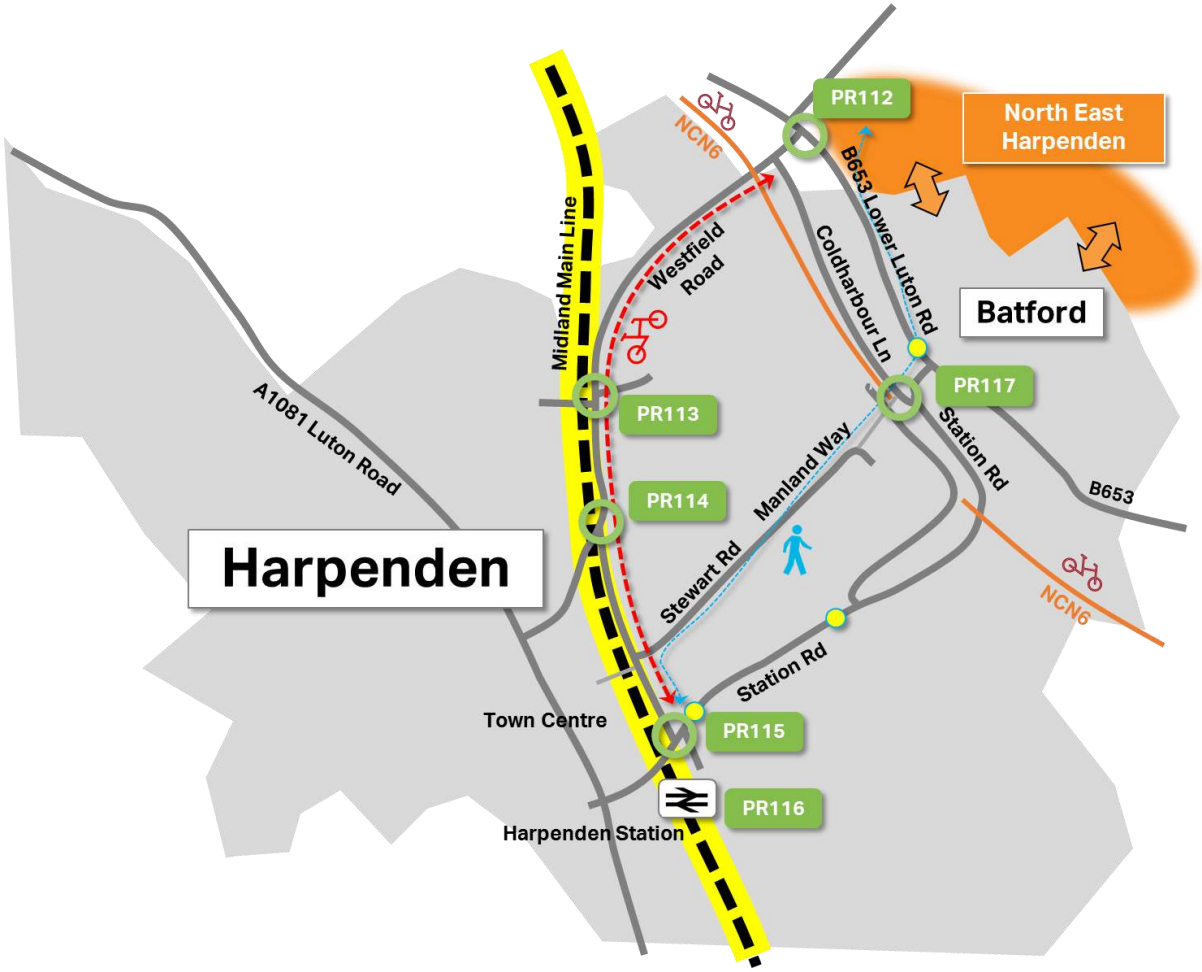


Figure 41 – Projects supporting North East Harpenden Development

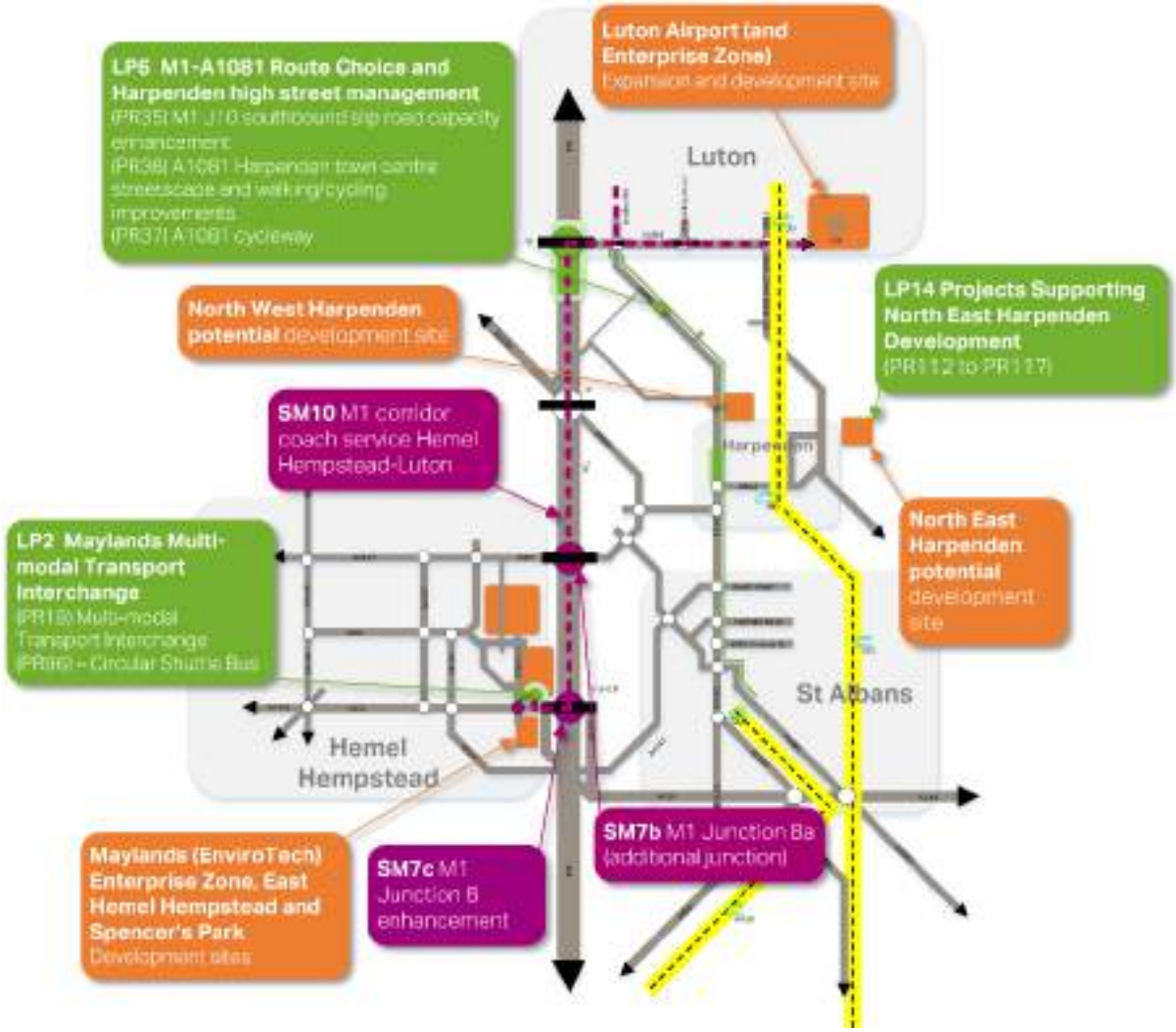


Figure 42 - Package 3 Preferred Combination

The table below simply marks which of the seven GTP Objectives could be achieved with Package 1. Each intervention has been assessed against the objectives which is contained in the Appendix.

Table 9 - Package 3 Objectives

A	B	C	D	E	F	G
						
✔	✔	✔	✔	✔	✔	✔

The envisaged roll-out of Package 3 would commence with the implementation of improvements to M1 Junction 8 and the adjacent A414 Breakspear Way-Green Lane junction (**SM7c**). These improvements will reduce congestion and therefore provide the opportunity to provide a step-change in bus/coach service provision (**LP2** and **SM10**). If

these services were introduced prior to these junction improvements, they may be affected by traffic congestion and severe delays.

The figure below provides a potential sequence of delivery of the various Schemes and Linked Project Groups within Package 3. The timing of LP14 will be influenced by when the proposed NE Harpenden development will come forward.

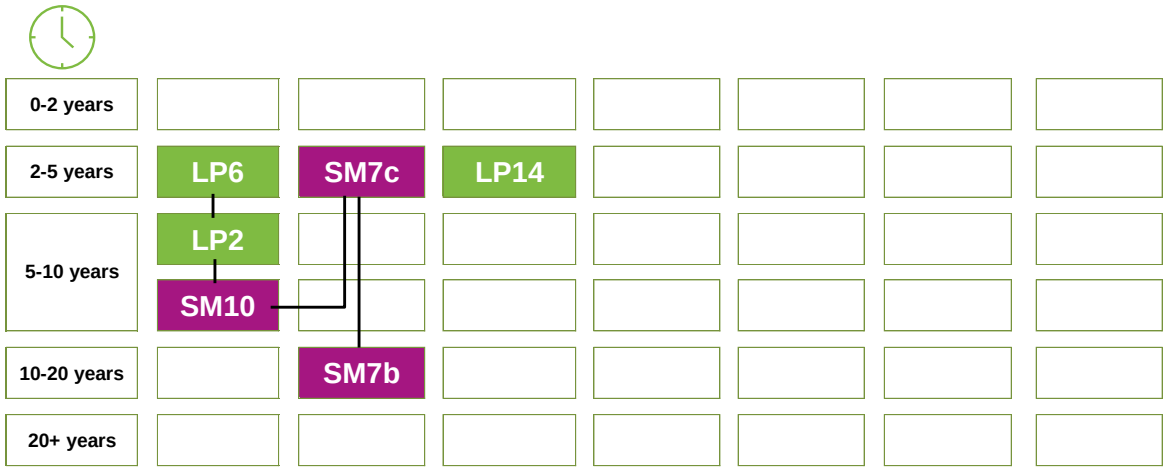


Figure 43 - Package 3 Indicative Sequence of Delivery

If delivered in its entirety, it is estimated that Package 3 could cost between £28 million and £119 million. It should be noted that interventions are identified as concepts in this GTP, and therefore further work is required to develop them in more detail. This more detailed work should result in more accurate cost estimates being provided and therefore the estimated cost range presented here may narrow and the minimum and maximum values may change.

Package 4 – St Albans-Watford Corridor

The overarching aim of Package 4 is:

To maximise the potential of the existing Abbey Line as a rail route by enhancing onward connections into St Albans City, and to transform the parallel A405 into a multi-modal road by diverting strategic traffic onto the motorway network, freeing up space for more local journeys by bus, bike or by car.

The package consists of:

- The introduction of a new St Albans South Public Transport Hub, including a new station on the Abbey Line, direct bus services to St Albans City Station, and a transfer point between local and interurban buses.
- Additional slips at M25 J21 to allow all movements between the M25 and M1, and streetscape improvements along the A405 at Bricket Wood.
- Enhanced cycling facilities along the A405 linking St Albans and Leavesden.

The full schedule of interventions is shown in the table below. Package 4 includes several Schemes where there is more than one approach to providing a solution. The table indicates the selection of Scheme approaches to form the preferred Package 4.

Table 10 - Package 4 Schedule of Interventions

PK4 – St Albans-Watford Corridor				
ID	**Project / Approach**		**Name**	**Description**
SM13	**a**	✔	Abbey Line Park & Rail Hub: Extension of Park Street Station platform	Extension of Park Street station platform northwards to facilitate the introduction of a Park and Rail hub south of the A414. Vehicle access provided off the A414 at a new at-grade junction. Existing rail line connects to St Albans Abbey Station
	b	✔	Abbey Line Park & Rail Hub: Additional station	Abbey Line Park and Rail hub at an extra new station (Cottonmill area) north of the A414. Vehicle access provided off the A414 at a new at-grade junction. Local pedestrian/cycle links into southern St Albans. Abbey Station would remain, connected by rail to the new station.

PK4 – St Albans-Watford Corridor				
ID	**Project / Approach**		**Name**	**Description**
	c	✔	Abbey Line Park & Ride Hub: Additional station and bus only link to Cottonmill Lane	Abbey Line Park and Rail hub at an extra new station (Cottonmill area) north of the A414. Vehicle access provided off A414 at a new at-grade junction. Local pedestrian/cycle links into southern St Albans, plus new bus link into southern St Albans (to City Station) via Holyrood Crescent or Butterfield Lane. Abbey Station would remain, connected by rail to the new station.
	d	✔	Abbey Line Park & Rail Hub: Park Street relocated	Abbey Line Park and Rail hub at a relocated Park Street station south of the A414 - car park linked to the A414. Local pedestrian/cycle links plus new bus link into southern St Albans (to City Station). Bridge over A414 for buses, cyclists and pedestrians. Abbey Station would remain, connected by rail to the new station.
	Decision: The Abbey Line presents an opportunity to substantially enhance connectivity between Watford and St Albans and provide an attractive alternative to the car. A Park and Rail Hub could substantially enhance local connectivity in the area and could link to development coming forward on the former Radlett aerodrome site. The facility can also be promoted as a Park and Rail hub for motorists on the A414 and A405 corridor, and east-west cross county inter-urban bus services could also interchange with the hub. No specific approach is preferred at this stage and further investigations as to the type of facility, its connections and business case are required.			
SM16	a	✘	M1 J6 reconfiguration (Bricket Wood)	Reconfiguration of M1 J6 to reduce congestion on the slip roads and enhance local connections into Bricket Wood to reduce severance.
	b	✔	M1 J6a/M25 J21 all movement additional slips plus options for A405 bus priority	Additional slip roads catering for all movements at M1 J6a/M25 J21a. Seek options to use freed up capacity on the A405 brought about by new junction slips in order to improve bus priority, such as with bus lanes in both directions.
	c	✘	M1 J6a/M25 J21 partial additional slips plus plus options for A405 part bus priority	Additional slips for partial movements at M1 J6a/M25 J21a (M1 South to M25 anticlockwise and M25 anticlockwise to M1 South) and seeking options to use any freed up capacity on the A405 to provide some additional bus priority close to M25 J21a and M1 J6.

PK4 – St Albans-Watford Corridor				
ID	**Project / Approach**		**Name**	**Description**
	Decision: Currently journeys between M1 South (Watford and London) and the M25 have to route via M1 J6 and a section of the A405. This makes this section of road very busy as it also carries a mixture of local and strategic journeys. Providing additional interchange links at M25 J21 could remove traffic from the A405 making it more viable to provide bus priority and further encourage non-car journeys between St Albans and Watford. An improvement at M1 J6 would not provide these opportunities, and a partial improvement at J21, whilst cheaper, may not deliver sufficient benefit in terms of traffic flow reduction on the A405 which could facilitate improvements such as bus priority which would complement the potential increased bus frequencies that may result from a "Herts Rapid" BRT type service (SI2) and opportuntities that may arise from the proposed Watford Area Bus Service Reconfiguration study (SM22).			
SM20	-		A405 Cycleway	Provision of off-road cycleway broadly alongside the A405 running from Coningsby Bank (St Albans) and Bricket Wood (M1 J6) and connecting to existing route. Enhancing existing cycleway continuing to Garston (including the Leisurepark) and Leavesden (including the business park).
SM22	-		Watford Area Bus Reconfiguration (study)	Work with bus operators to explore potential reconfiguration of bus services throughout Watford and connections to neighbouring settlements, including Bushey and the London fringe in liaison with TfL. Aim to provide efficient routes across the town and maximising connections to the town centre, Watford & Croxley business parks, retail parks, and rail stations. Encourage best use data and technology to optimise bus routes and attract demand.

The Abbey Line connects St Albans Abbey station with Watford Junction. Due to the line consisting of a single track, train frequency is limited to roughly one service running every 45 minutes in each direction. Stations at both ends of the Abbey Line are fairly remote from the urban centres.

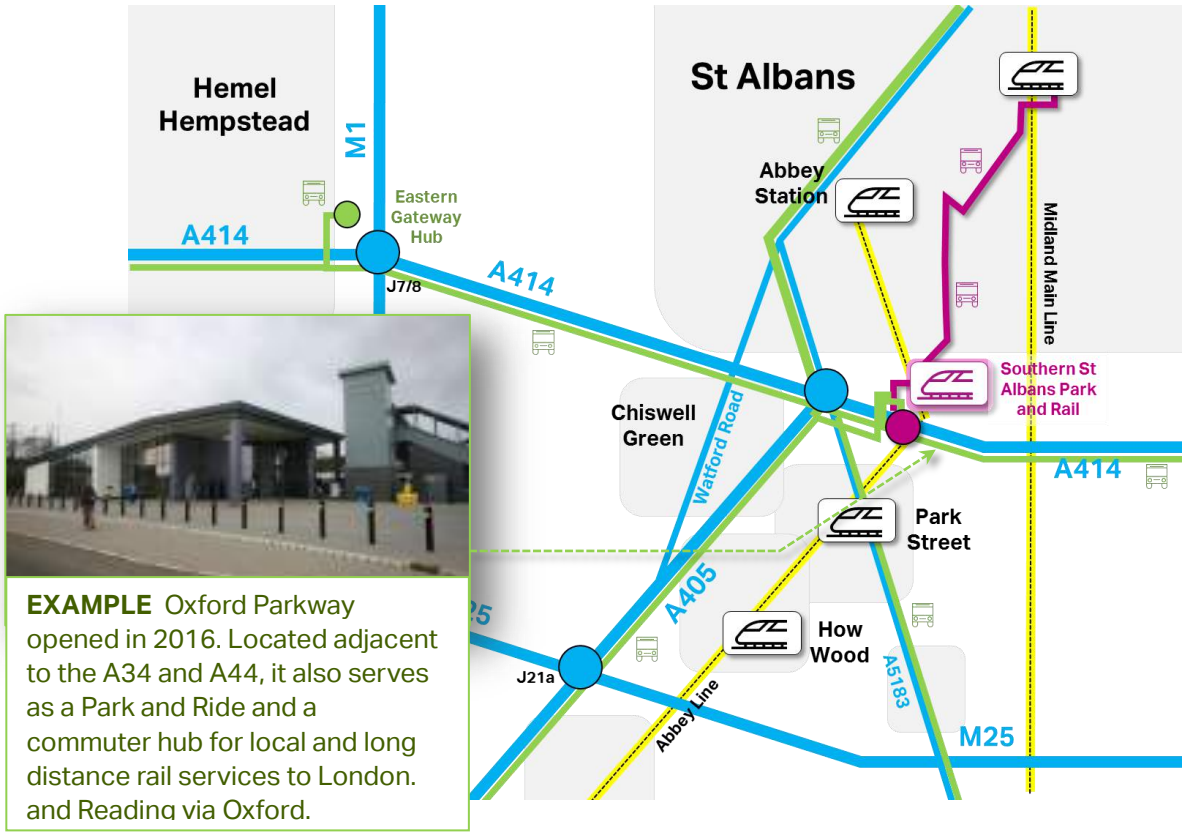


Figure 44 - Southern St Albans Park and Rail Hub

Despite both having a direct rail service linking St Albans and Watford and significant committed improvements coming to Watford Junction station, the corridor is car dominated and experiences significant congestion, especially along the A405 between Chiswell Green and Bricket Wood and at M25 J21a. While committed transport improvements associated with the Radlett Strategic Rail Freight Interchange are scheduled for M25 J21a, it is seen as important to increase the attractiveness of the Abbey Line and local bus services to provide a viable alternative to the car along this corridor. This will provide an opportunity to address traffic congestion between St Albans and Watford through encouraging more sustainable journeys by modes other than the private car, thereby reducing congestion along the corridor.

The centrepiece for Package 4 is a new public transport facility – the Southern St Albans PT Hub - on the southern edge of St Albans adjacent to the A414 (**SM13** – see Figure 44). The facility will provide 'park and rail' facilities via the Abbey Line, potentially facilitating more sustainable travel from new developments in East Hemel Hempstead in central Watford (as an alternative to the M1). A new direct bus connection could also be provided to St Albans City Station, acting in a similar way to the previous Abbey-City Station Shuttle bus.

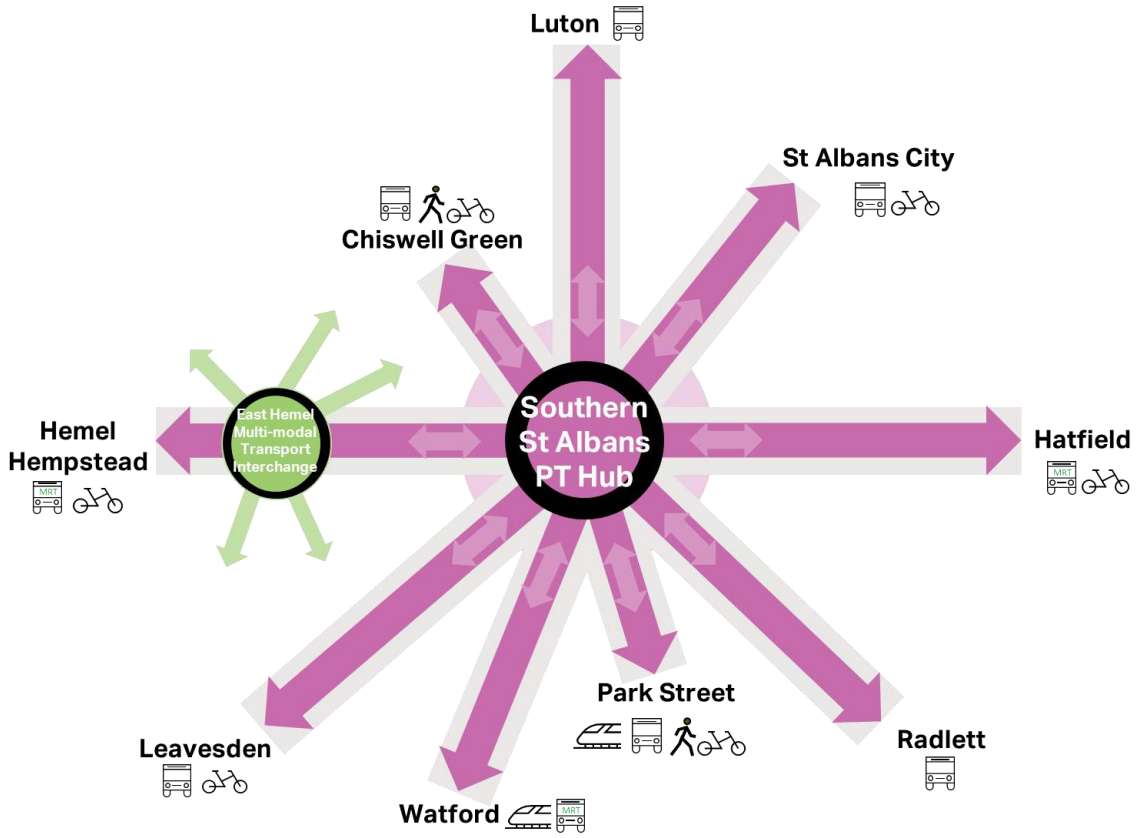


Figure 45 - Southern St Albans Public Transport Hub and possible onward connections

Lending to its central location between Hemel Hempstead, St Albans, Hatfield, and Watford (see Figure 45) the Hub could act as a significant interchange between a potential east-west rapid bus service or mass rapid transit sytem (a strategic intervention identified in LTP4) and an improved Abbey Line (a strategic intervention that requires further exploration by HCC alongside other stakeholders including Network Rail and DfT). While the GTP is not intended to be prescriptive, particularly in deciding strategic interventions, the development of the Southern St Albans PT Hub is seen as an opportunity to capture any future benefits from decisions on east-west rapid bus transit and improvements to the Abbey Line.

The facility will also be served by other bus and coach services, such as those connecting Park Street and Radlett to the south with St Albans to the north, and potentially enhanced services to/from Watford (the case for which will be explored further by a Watford area bus services reconfiguration study; **SM22**) benefiting from the proposed bus priority routes running along the A405 (**SM16b**).

The A405 runs broadly parallel with the Abbey Line. Sections of this road are used by motorists heading towards major strategic roads such as the M1 and M25. These longer distance trips are mixed with shorter distance journeys, including those between St Albans and Watford. The section of the A405 between the M1 at Junction 6 and the M25 at Junction 21a is the only means of travelling between the M1 (Watford / London) and the M25 (clockwise / anticlockwise; Figure 46). This section runs adjacent to the small settlement of Bricket Wood. There is an opportunity to remove some traffic from this road by providing direct connections between the M1 and M25 (**SM16b**).

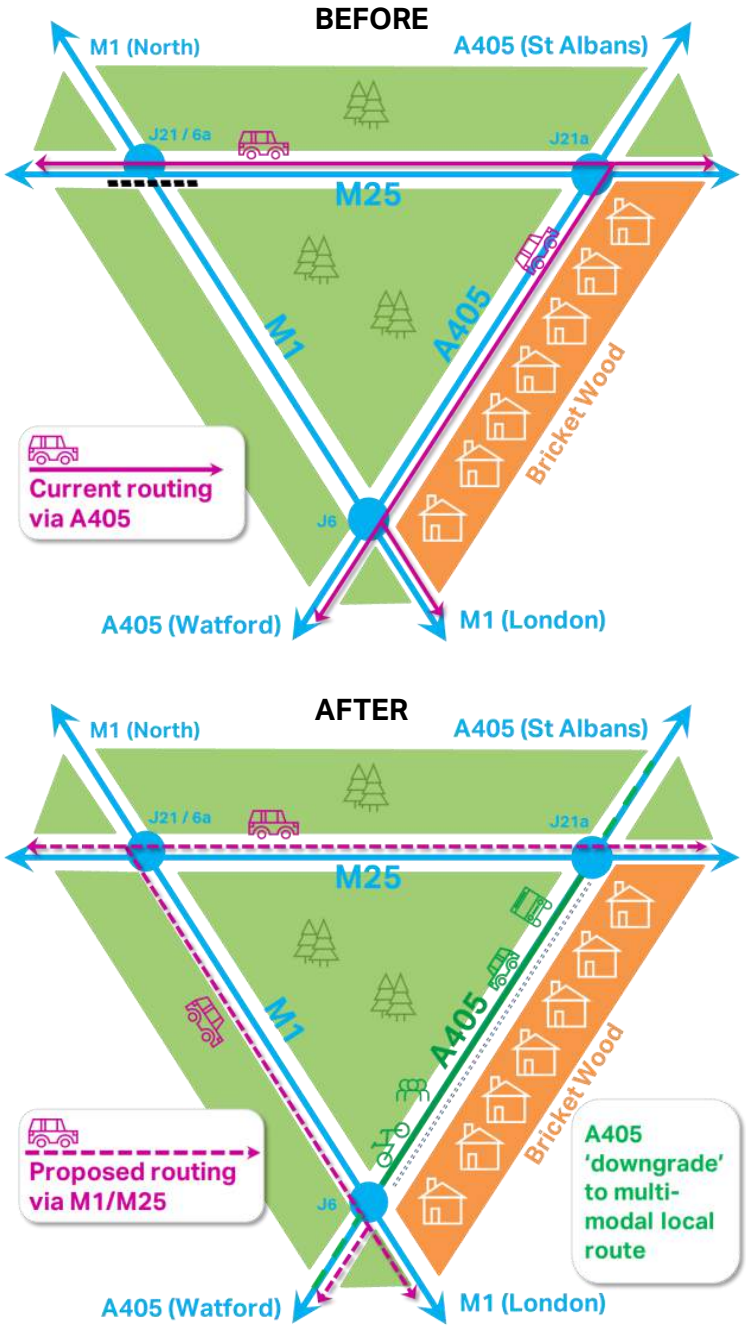


Figure 46 - Multi-Modal A405 (Bricket Wood)

However, it is crucial that when removing traffic from the A405 (Bricket Wood) that the vacant roadspace is not then utilised by other motorists who take advantage of the freeing up of capacity. There is opportunity therefore to transform this section of the A405 into a multi-modal corridor, potentially removing one lane in each direction and reallocating this to local bus services and much improved cycle facilities (**SM20**) which could form part of a new St Albans to Watford cycling corridor, extending to parts of north Watford (including Garston and Leavesden).

Figure 47 - Package 4 Preferred Combination

The table below simply marks which of the seven GTP Objectives could be achieved with Package 4. Each intervention has been assessed against the objectives which is contained in the Appendix.

Table 11 - Package 4 Objectives

A	B	C	D	E	F	G
✔	✔	✔		✔	✔	

The envisaged roll-out of Package 4 would commence with a review and identification of bus services throughout Watford and the wider area (**SM22**) in conjunction with the implementation of a new A405 cycleway (**SM20**). The bus service review will help inform what

type and level of bus service provision is needed between Watford and St Albans, including identifying opportunities for services which should route via the proposed St Albans Southern railway station and park and ride hub (**SM13**).

A large scale change to the Bricket Wood Triangle road network (**SM16b**) will most likely take a long time to design and implement. It will involve significant alterations to the Strategic Road Network which is managed by Highways England and therefore procedures for progressing projects of this time need to be followed. It is therefore envisaged that these alterations would not be deliverable within 10 years.

The figure below provides a potential sequence of delivery of the various Schemes within Package 4.

Figure 48 - Package 4 Indicative Sequence of Delivery

If delivered in its entirety, it is estimated that Package 4 could cost between £111 million and £153 million and potentially more depending on the configuration and complexity of a revised M1 J6a / M25 J21 (SM16). It should be noted that interventions are identified as concepts in this GTP, and therefore further work is required to develop them in more detail. This more detailed work should result in more accurate cost estimates being provided and therefore the estimated cost range presented here may narrow and the minimum and maximum values may change.

Package 5 – Watford Western Gateway

The overarching aim of Package 5 is:

To improve access to Watford Western Gateway and the Watford and Croxley business parks through the enhancement of sustainable transport links.

The package consists of:

- A new southern access into the Watford Western Gateway business parks area for cyclists and buses only, and enhancements of the Ebury Way for walking and cycling.
- Making use of the disused railway alignment in West Watford to enable sustainable and mass transit transport opportunities, informed by a study of options
- The introduction of a new bus- and cycle-only link across the River Colne linking South Oxhey and the Business Parks area.
- Enhanced cycleways and facilities linking the Western Gateway area to Watford Junction.

The full schedule of interventions is shown in the table below. Package 5 includes several Schemes where there is more than one approach to providing a solution. The table indicates the selection of Scheme approaches to form the preferred Package 5.

Table 12 - Package 5 Schedule of Interventions

PK5 – Western Gateway (Watford)				
ID	**Project / Approach**		**Name**	**Description**
LP8	**PR45**		Ascot Road bus priority	Reduce Ascot Road (main entrance link road) from dual carriageway to a single carriageway, with a lane converted to bus only lane in each direction.
	PR85		Ascot Road - Whippendell Road- Rickmansworth Road junction improvements	Simplification of some road space at the Western Gateway Business Park access junctions including reduction in lanes approaching roundabouts and enhanced provisions for pedestrians on Ascot Road (linked to bus priority scheme PR45).

PK5 – Western Gateway (Watford)				
ID	**Project / Approach**		**Name**	**Description**
SM12	a	✘	Holywell to South Oxhey Cross-Colne Sustainable Link (cycle only)	Improved cycle links between South Oxhey and Western Gateway connecting Hampermill Lane/Eastbury Road to Tolpits Lane via Ebury Way and existing cyclable route by Bushey Cricket Club. Enhanced public realm in South Oxhey, improve pedestrian facilities and cycle links towards Ebury Way Link to connect South Oxhey with Western Gateway and central Watford.
	b	✔	Holywell to South Oxhey Cross-Colne Sustainable Link (cycle and bus only)	Explore opportunity to upgrade the Ebury Way cycleway from Tolpits Lane to adjacent to Electricity Transmission Station, and existing cyclable route running to Hampermill Lane alongside Bushey Cricket Club, to become a bus and cycle route. New/rerouted bus services from Bushey and South Oxhey areas.
	Decision: The provision of a cycle and bus link over the River Colne from Tolpits Lane to Hampermill Lane (east of Hampermill Lake) presents an opportunity to substantially influence mode shift from car to more sustainable modes of transport for journeys to/from the Western Gateway business parks. A combined bus and cycle link may also be more effective at helping to address congestion at the Bushey Arches junctions than purely a cycle link. An all traffic link would perpetuate high levels of travel by car to the Western Gateway area and undermine the quality of existing sustainable routes.			
SM21	-		Watford Western Gateway to Watford Junction orbital cycle route	Enhanced cycleway link between Watford Junction and the Western Gateway area, via Langley Road, Stratford Road and Stratford Way, through Cassiobury Park (via existing route), Cassiobury Park Avenue, Swiss Avenue, Gade Avenue, Rickmansworth Road and Ascot Road (utilising existing provision with some enhancements at junctions and across roads such as the A412).
SM22	-		Watford Area Bus Reconfiguration (study)	Work with bus operators to explore potential reconfiguration of bus services throughout Watford and connections to neighbouring settlements, including Bushey and the London fringe in liaison with TfL. Aim to provide efficient routes across the town and maximising connections to the town centre, Watford & Croxley business parks, retail parks, and rail stations. Encourage best use data and technology to optimise bus routes and attract demand.
SM28	a	✔	Western Gateway Southern Access: Buses, pedestrians and cycles only	A new southern access into the Watford & Croxley business parks area from Tolpits Lane for buses, pedestrians and cyclists only (bus services use existing roads to Moor Park, Northwood etc.).

PK5 – Western Gateway (Watford)				
ID	**Project / Approach**		**Name**	**Description**
	b	✘	Western Gateway Southern Access: All traffic	Southern access into the Watford & Croxley business park area from Tolpits Lane open to all traffic. Enhancement to Tolpits Lane including widening on some sections to cater for increased traffic.
	Decision: An all vehicle access to the business park from the south would most likely encourage journeys by car. Tolpits Lane may not have sufficient capacity to accommodate additional traffic and it would likely have more widespread effects on traffic route choice. There is however an opportunity to increase journeys by bike, on foot and by public transport by not allowing cars to use the southern access. The preferred approach would best complement improvements made to the Ebury Way as opposed to an all vehicle access which could reduce the attractiveness of journeys along the Ebury Way.			
SM34	-		Watford cross-town connectivity study	A study exploring options to provide improved sustainable mode connectivity East-West in Watford, using the disused rail line. Options study to link to SM22, to maximise network benefits.
SM35	-		Ebury Way improvements	Enhance existing Ebury Way for walking and cycling including improved surface for all weather use, and better links onto wider network, including at Riverside Park, to King George V Playing Fields, and formalised access to Dwight Road and the Vale Industrial Park & Olds Approach Industrial Estate.

The Western Gateway development area comprises of the Watford Business Park and adjoining Croxley Park. For such a large site and concentration of business activity, it is only served by a single vehicle route from the A412 Rickmansworth Road to the north of the site (there are several footway/cycleway access feeding into the site towards the southern end). It is however a focus of major development and intensification. The new Croxley Danes secondary school on Baldwin's Lane will generate further trips and travel demand in this area.

Enhanced sustainable transport connections across Watford, including between the Western Gateway, Town Centre, Watford Junction and the Metropolitan Line, will be a significant priority for HCC. An options study for providing significant east-west sustainable links and using the disused rail line (former proposed Met Line Extension route) will help identify how to fill this gap as a first step (**SM34**).

Major roads feeding Watford broadly follow a radial pattern. There is poor connectivity between these radial routes, due in part to green spaces, parklands and rivers which are a significant asset in the local area, including the River Colne and Cassiobury Park (see Figure 49).

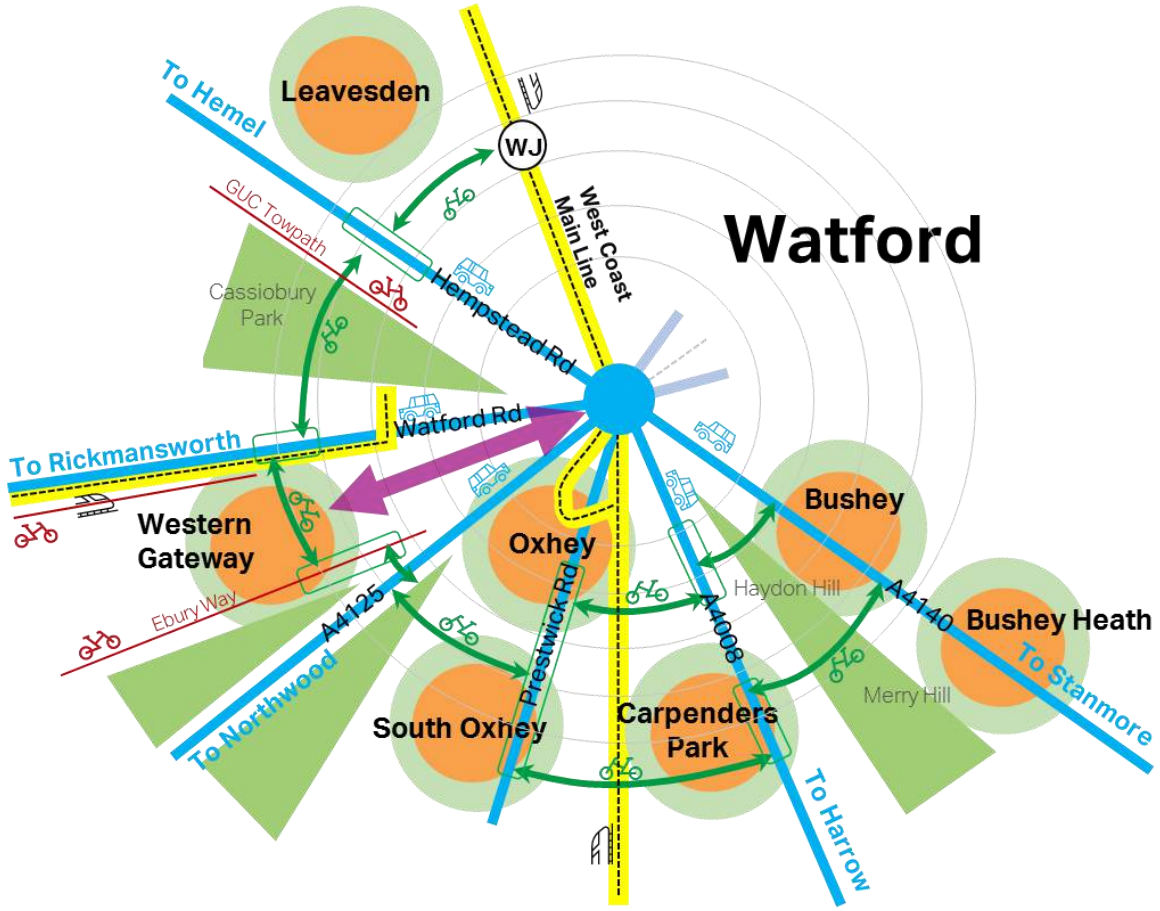


Figure 49 - Radial and Missing Orbital Links around Southern and Western Watford

Package 5 will address some of the immediate 'orbital' gaps between the radial routes leading to/from Watford and improving sustainable transport links between the Western Gateway Business Parks and Leavesden, Oxhey, South Oxhey and beyond.

A new southern access to the Western Gateway site will be provided from Tolpits Lane (**SM28a**). Crucially, this will only be open to pedestrians, cyclists and local buses. The Ebury Way greenway will be enhanced with improved surfacing and formalised walking and cycling accesses to adjacent business parks and green spaces to encourage commuting and leisure use (**SM35**). Onward connectivity around the more southerly orbital links will be achieved via a new link between Tolpits Lane and the A4125 Hampermill Lane (**SM12b**) across the River Colne (east of Hampermill Lake). This link will run adjacent to the protected Ebury Way greenway and facilitate cycling, walking, and bus travel along the route providing a new orbital bus route between South Oxhey and the Western Gateway– the case for which will be ascertained through a strategic study of bus services across Watford and the wider area (**SM22**). This new link will retain the greenway characteristics of the area and non-motorised transport users will retain priority along the link.

On the northern side of the Western Gateway, the current generous road space provided on Ascot Road will be scaled back. One lane in each direction on the dual carriageway section will be replaced with a bus lane. Road space at the roundabout junctions with Rickmansworth Road and Whippendell Road will also be consolidated (**LP8**). By removing lanes, it will make it

easier and less intimidating for people to cross the road which will aim to better facilitate pedestrian movements in this area, which will aim to better facilitate pedestrian movements in this area, especially those routing between the Watford Metropolitan Line terminus and the Western Gateway area.

This improved environment for pedestrians and cyclists will also help reinforce existing routes from Cassiobury Park which will be enhanced with additional way-finding signage and widened cycleways (**SM21**), providing a much better link from the A411 Hemel Hempstead Road and onwards towards Leavesden and Abbots Langley alongside providing greater accessibility for cyclists from western Watford to Watford Junction station.

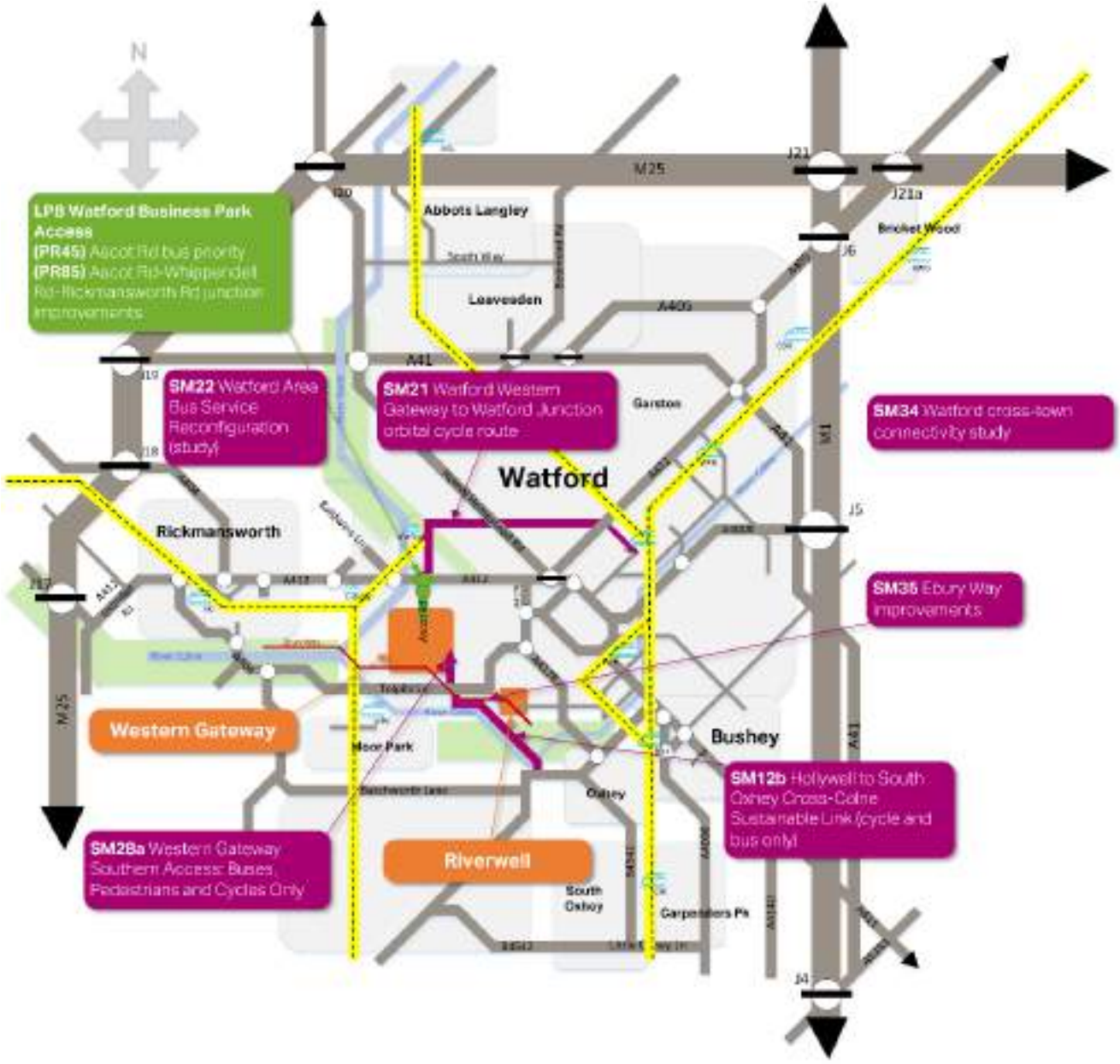


Figure 50 - Package 5 Preferred Combination

Karen now has several choices in how to get to work. Since the new bus/cycle link was implemented from Tolpits Lane into the business park (SM28a), a new bus service is now in operation from Borehamwood via Bushey (SM12b). Journey times are around 15 minutes which is a lot more attractive than driving.

During the summer she has taken up cycling. Ebury Way cycle route enhancements (SM12b) have made the journey more convenient and attractive. She feels a lot healthier as a result.

The table below simply marks which of the seven GTP Objectives could be achieved with Package 5. Each intervention has been assessed against the objectives which is contained in the Appendix.

Table 13 - Package 5 Objectives

A	B	C	D	E	F	G
						
✔	✔	✔	✔	✔	✔	✔

The envisaged roll-out of Package 5 would commence with the cross-town connectivity study (**SM34**) and a review and identification of bus services throughout Watford (**SM22**).

The implementation of a northern orbital cycle route (**SM21**) linking the Western Gateway business parks with Watford Junction via Cassiobury Park can come forward in the short term, and will help to instill more sustainable travel behaviour in advance of changes to Ascot Road (**LP8**) which forms the northern access to the business parks. Given that Ascot Road is currently the only means of accessing the business parks for vehicular traffic, it is envisaged that these changes should come forward in conjunction with (but not fully implemented until) the opening of a new southern access to the business parks from Tolpits Lane for buses (**SM28a**). The risk of implementing **LP8** in advance would be to reduce the ease of access for vehicles without providing an attractive and viable alternative mode which **SM28a** is envisaged to do.

The opening of the southern access will open up new journey opportunities by bus. **SM22** will have identified service changes that should come about across Watford and the wider area, including what links and service provision are required to connect the Western Gateway area with the Town Centre and Watford Junction station. A new cycle and bus link between Tolpits Lane and A4125 Hampermill Lane (**SM12b**) should come forward after the southern access into the business park is established but not before.

The figure overleadf provides a potential sequence of delivery of the various Schemes and Linked Project Group within Package 5.

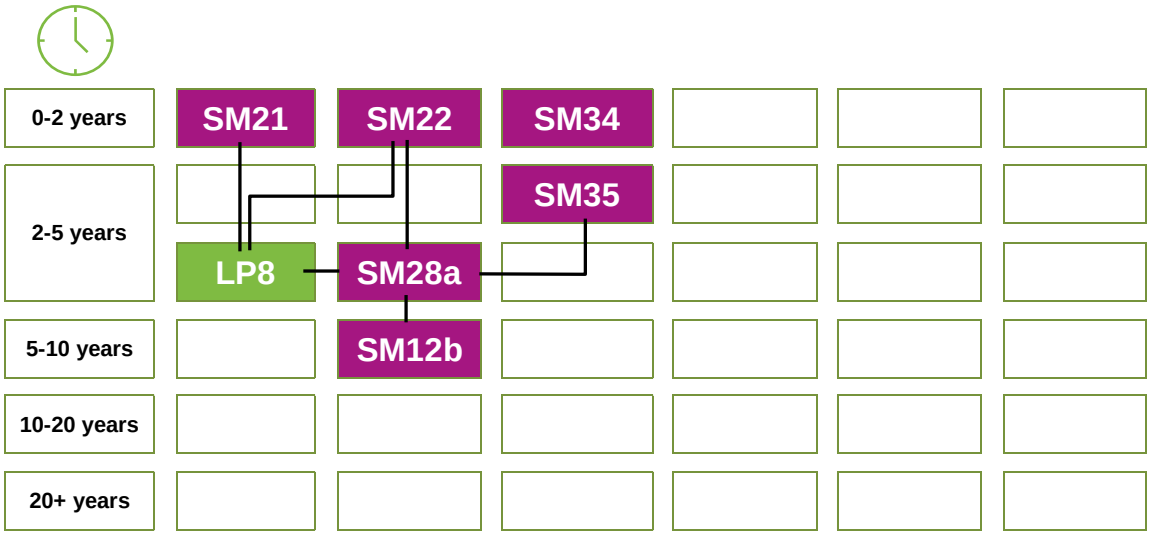


Figure 51 - Package 5 Indicative Sequence of Delivery

If delivered in its entirety, it is estimated that Package 5 could cost between £11 million and £23 million. It should be noted that interventions are identified as concepts in this GTP, and therefore further work is required to develop them in more detail. This more detailed work should result in more accurate cost estimates being provided and therefore the estimated cost range presented here may narrow and the minimum and maximum values may change.

Package 6 – Watford-Hemel Hempstead Corridor

The overarching aim of Package 6 is:

To promote journeys between Watford and Hemel Hempstead by train and by bus, and to discourage journeys by car on inappropriate routes.

The package consists of:

- Improvements to M25 J20, bus priority along the A41, and enhanced interurban bus services between Hemel Hempstead and Watford.
- Enhanced cycleways and facilities along the Grand Union Canal Towpath and the A411 from Hemel Hempstead to Watford town centre.
- Watford Junction and Town Centre public realm enhancements.

The full schedule of interventions is shown in the table below. Package 6 includes several Schemes where there is more than one approach to providing a solution. The table indicates the selection of Scheme approaches to form the preferred Package 6.

Table 14 - Package 6 Schedule of Interventions

PK6 – Watford-Hemel Hempstead				
ID	**Project / Approach**		**Name**	**Description**
LP1	**PR8**		Fishery Road improved pedestrian and cycle link	Improved cycling and pedestrian connectivity along Fishery Road towards the station, to better link residential areas in the west of Hemel Hempstead with the station, and create a safer environment for all users.
	PR9		A4251 London Road pedestrian/cycle enhancement	Pedestrian and cycle enhancements along London Road (A4251) to enhance safety and attractiveness of non-car travel. Consideration of cycle lanes and wider footpaths with the intention of promoting healthier method of travel through the Two Waters area of the town, alongside opportunities to improve bus facilities on this route.

PK6 – Watford-Hemel Hempstead				
ID	**Project / Approach**		**Name**	**Description**
	PR10		Two Waters-A4251/A414 junction reorganisation	A4251/A414 junction reorganisation to reduce junction footprint and improve crossing facilities for pedestrians and cyclists. Turn de-prioritisations for movements from the A414 to the A4251 towards Apsley. Consider opportunities for incorporating bus priority.
SM1	-		Capacity improvements to M25 J20 and Hunton Bridge roundabout	Increased capacity and enhanced access to and from M25 J20 south of Kings Langley and at adjoining M25 J19/A41 Hunton Bridge roundabout.
SM2	a	✘	Relocation of Hemel Hempstead station	Relocate Hemel Hempstead station to a position broadly west of Two Waters Road.
	b	✘	Moderate enhancement to Hemel Hempstead station	Moderate enhancement to the existing Hemel Hempstead station - forecourt and access improvements.
	c	✔	Substantial enhancement to Hemel Hempstead station	Substantial enhancement to Hemel Hempstead station at its existing location - forecourt, access enhancements, car park capacity increase, new south-eastern platform access and parallel footway to Two Waters Road and Boxmoor.
	Decision: Relocation of the station will be costly. New location will still be remote from large parts of the town. Moderate station enhancements will be sufficient enough to promote inter-modal connectivity. Substantial investment in station facilities completed by improved walking/cycling routes will promote inter-modal connectivity.			
SM15	-		Watford Junction - Town Centre (Clarendon Road) public realm enhancements	Enhance the public realm between Watford Junction station and the town centre along Clarendon Road over and above existing/planned provision. Improve pedestrian facilities and cycling and enforce non-motorised priority over motorised vehicles.
SM17	-		A411 Hempstead Road and Grand Union Canal Corridor Cycleway Improvements	Cycle Lane (on or off road) along A411 Hempstead Road (Watford) plus enhance the section in front of West Herts College between A411 and High Street. Additional general improvements along the Grand Union Canal corridor and transfer improvements at Grove Mill Ln are to improve connectivity to the Towpath from the A411.

PK6 – Watford-Hemel Hempstead				
ID	**Project / Approach**		**Name**	**Description**
SM19	a	✔	A41 Kings Langley Station Park and Ride	Construction of Park and Ride transport hub close to Kings Langley station. New link road connecting to A4251 and onwards to M25 J20. Served by improved bus links between Hemel, Watford and Western Gateway business parks, 500/501 bus service and walk-link to Kings Langley station. Comprehensive review of town parking and wider transport needs required to inform any P&R scheme.
	b	✘	A41 Hemel Hempstead West Park and Ride	Construction of Park and Ride transport hub south of Hemel Hempstead Station east of Roughdown Road. Additional pedestrian access over the rail line linking the Park and Ride to the station. Served by bus shuttle link to/from Town Centre, and/or improved Hemel-Watford bus link which also connects Maylands and Western Gateway.
	c	✘	A41 Bourne End Park and Ride	Construction of Park and Ride transport hub along the A4251 east of Bourne End Lane. Served by bus shuttle link to/from Town Centre via Hemel Station, and/or improved Hemel-Watford bus link which also connects Maylands and Western Gateway, as well as east-west Cross-County busway and diverted 500/501 bus service
	d	✘	A41 Tring Park and Ride	Construction of Park and Ride transport hub nearby Tring station. Served by bus shuttle link to Tring station and diverted 500/501 bus service.
	Decision: A Park and Ride facility at Kings Langey Station could serve residents of southern Hemel Hempstead and northern Watford Area facilitating trips to both urban centres. The Park and Ride facility is seen as well-situated to capture the benefits from (potential) increased service frequency/semi-fast service from Kings Langley post-HS2.			
SM21	-		Watford Western Gateway to Watford Junction orbital cycle route	Enhanced cycleway link between Watford Junction and the Western Gateway area, via Langley Road, Stratford Road and Stratford Way, through Cassiobury Park (via existing route), Cassiobury Park Avenue, Swiss Avenue, Gade Avenue, Rickmansworth Road and Ascot Road (utilising existing provision with some enhancements at junctions and across roads such as the A412).

PK6 – Watford-Hemel Hempstead			
ID	**Project / Approach**	**Name**	**Description**
SM24	-	Watford Junction - Station Road and Woodford Road - road space consolidation and pedestrian, cycle and bus access improvements	Improving cycle and pedestrian facilities and streetscape improvements on roads leading to Watford Junction Station, to encourage and facilitate sustainable travel to and from the station. Consideration to increasing the width of footways, improving pedestrian crossings, reallocation of road space to sustainable modes, and improving bus priority and bus access to station. Would seek to complement or build on SM15.
SM30	-	A41 (M25 J20 and J19)Bus Priority measures	Bus priority on some approaches, at and between M25 J20 and M25 J19 spur (Hunton Bridge Roundabout), including consideration of potential for bus lanes with bus priority signals.
SM31	-	Enhanced Watford-Hemel Bus Services	Work with operators to explore enhancing local-express bus service(s) between Hemel Hempstead and Watford -specifically linking Maylands, Hemel Hempstead Town Centre, Apsley, Abbots Langley, Leavesden and Watford & Croxley business parks. Maintaining and enhancing existing routes including 500 and 320, to better serve trips to key workplace destinations at Maylands and Watford & Croxley Business Parks.
SM32	-	Streetscape and walking/cycling enhancements in Apsley/Two Waters area	Streetscape and highway improvements to create a slower speed, safer environment for walking and cycling along Lawn Lane from the Plough (Magic) Roundabout to Durrants Hill Road and along the A4251 from its junction with the A414 to Durrants Hill Road, seeking to minimise rat-running along the A4251 (from the A41), whilst maintaining suitable routes for buses.

There is a choice of transport mode for journeys taking place between Hemel Hempstead and Watford. The corridor is well served by highway routes. The A41 runs to the west of Hemel Hempstead, interchanging with the M25 at Junction 19 (Sarratt, North Watford) and Junction 20 (Kings Langley) as well as the A405 (from St Albans), and then skirting the northern part of Watford through Garston and then forming the eastern boundary of the town through M1 Junction 5 before headings southestwards towards Elstree and Greater London beyond. The M1 runs to the east of Hemel Hempstead and Watford. The M1 and A41 are the principal highway routes between the two towns. The A411 Hempstead Road links central Watford with the A41 north of the town. The A414 links central Hemel Hempstead with the A41.

The A4251 runs broadly parallel with the A41 between Hemel Hempstead and M25 J20 at Kings Langley. It can act as an alternative route for inter-urban traffic especially when the A41 is busy. It runs through the Two Waters area of Hemel Hempstead which is very built-up.

Lower capacity cross-country routes also link the two towns, with Station Road-Gallows Hill running through Kings Langley and Abbots Langley, and Bedmond Road running through Leverstock Green, Bedmond and Leavesden.

Watford and Hemel Hempstead are directly served by rail. The West Coast Main Line provides fast and frequent services between the two towns. Rail is disadvantaged somewhat by the locations of the two main stations in both towns – in particular Hemel Hempstead which is in an edge of town location remote from residential areas and the town centre. Watford Junction, although a ten-fifteen minute walk from the town centre, is located adjacent to the main central commercial area of the town.

A number of bus services run between the two towns. Service 320 for example links Hemel Hempstead town centre and Rickmansworth and routes via Maylands and Watford Town Centre.

The A41 experiences peak period congestion at M25 J19 and 20, and the Dome Roundabout in Garston.

Package 6 seeks to encourage more journeys between Watford and Hemel Hempstead by train and by bus, and to discourage journeys by car on inappropriate routes by providing focused enhancements to highway capacity at selective locations. Part of the decision to take a train between two places will be influenced by how easy it is to get to/from the station at each end of the journey (the 'first' and 'last mile problem').

EXAMPLE Oxford Parkway opened in 2016. Located adjacent to the A34 and A44, it also serves as a Park and Ride and a commuter hub for local and long distance rail services to London and Reading via Oxford.

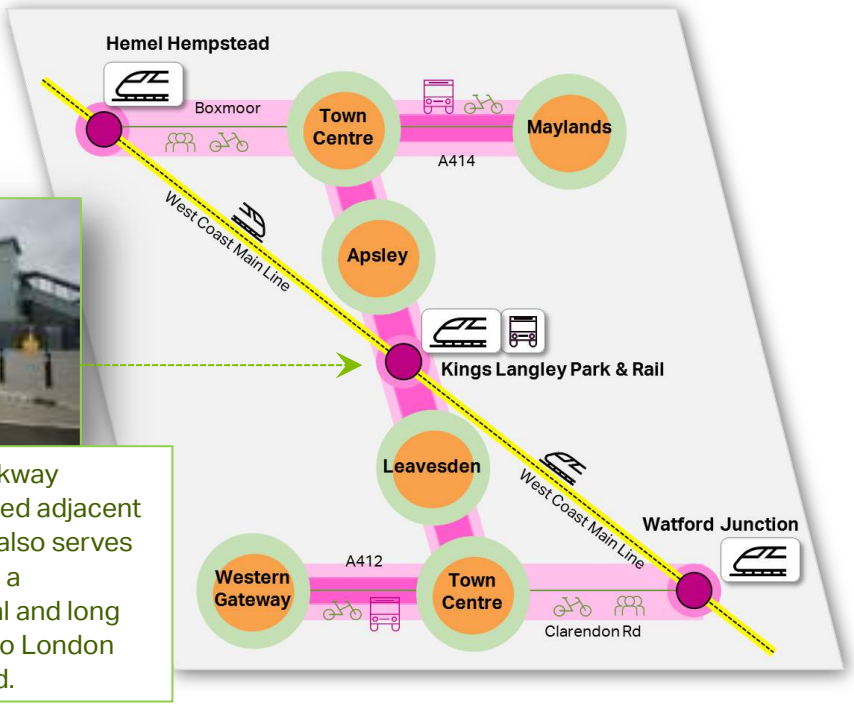


Figure 52 - Hemel Hempstead - Watford Corridor Public Transport Linkages

At the Hemel Hempstead end of the corridor, substantial enhancements to Hemel Hempstead station (**SM2c**) will make the station a more attractive place to be, with a new pedestrian/cycle access provided from the south eastern end of the station. This will be complemented by a series of enhancements to pedestrian and cycle facilities on roads surrounding the station (**LP1**) including an improved link over the canal towards Warners End, reduced road space and improved pedestrian crossings at the A414/A4251 London Road Two Waters signalised crossroads junction.

In turn, these improvements to the walking and cycling environment, including those at the A414/A4251 junction (**LP1**) will be complemented by alterations to the local road system through Apsley along Lawn Lane and the A4251 (**SM32**) which is intended to discourage through-traffic using these roads to avoid congestion on other more strategic roads such as the A41.

At the Watford end of the corridor, the public realm will be enhanced along Clarendon Road (**SM15**) which will give greater priority for pedestrians while capturing the benefits from committed improvements to Watford Junction station. In conjunction, the road layout to the front of the station and the forecourt will be simplified and made more pedestrian and cyclist friendly and with improved bus access and priority on Station Road (**SM24**). The adjacent bus interchange will be improved with new waiting facilities as part of the station redevelopment. Opportunities at the front of the station will be increased if alternative routing to station car parking can be achieved as part of the redevelopment.

Further cycleway enhancements will be made along the A411 (**SM17**) and along Stratford Rd/Langley Rd (**SM21**) to increase accessibility and connectivity to Watford Junction station from the west, prioritising non-motorised transport users with a destination in the town centre/Watford Junction station. Finally, general improvements to the Grand Union Canal Towpath and associated connections to the A411/Cassiobury Park (**SM17/21**) will help it better serve as a cycling corridor between Watford and Hemel Hempstead town centres.

Congestion at M25 Junction 20 will be targeted directly with enhancements to increase traffic throughput and reduce delays including some limited additional lane capacity on some approaches (**SM1**). This will be provided in conjunction with bus priority measures on some of the junction approaches to and between M25 Junctions 19 and 20 (**SM30**), which will benefit enhanced inter-urban express bus services between Maylands, Hemel Hempstead Town Centre, Kings Langley, Watford Town Centre and Western Gateway Business Parks (**SM31**). Kings Langley Station will be enhanced with increased parking and improved road links to M25 Junction 20 (**SM19**). The station will be promoted as a 'Park and Rail' facility, provided in conjunction with a new timetable on the West Coast Main Line (post opening of the new High Speed 2 rail route from London to the North) which could offer the prospect of more frequent and faster services being able to call at the station.

Annie considers that a major barrier to her either walking or cycling to work is the perception that not all roads she needs to travel on are suitable or safe. Furthermore, there is quite a steep hill between home and the GP Surgery. The express bus which runs along the A414 (SM31) (the nearest stop is around a 3 minute walk from the house) and through Apsley, operates at an attractive frequency throughout the day. With flexible ticket arrangements, Annie is able to use the bus service on some days which has freed up a valuable parking space at the surgery for patients to use instead.

Mark's journey time to work by car had increased. He could no longer tolerate sitting in traffic queues. The rat-running route via Apsley is now less attractive (LP1 and SM32).
On the days he travels to the office, Mark has taken the enhanced express bus (SM31) which stops on the A414 and connects with Watford (he has a 5 minute walk at either end). The bus has on-board wifi which means that he can check emails on his way to work.
Alterations to roads near to work around Watford Junction station (SM24) mean that walking to and from the office feels more pleasant and stress free.

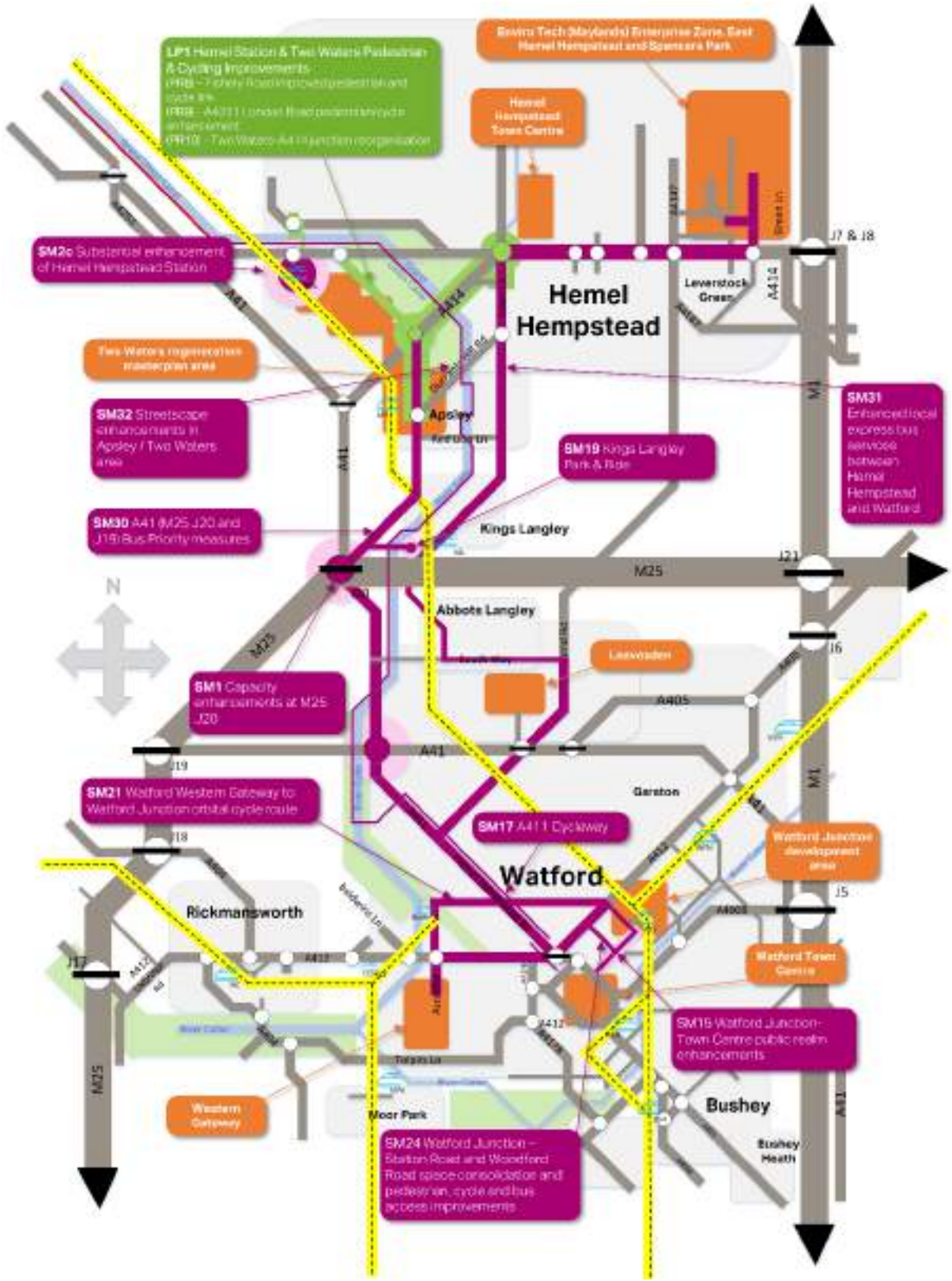


Figure 53 - Package 6 Preferred Combination

The table below simply marks which of the seven GTP Objectives could be achieved with Package 6. Each intervention has been assessed against the objectives which is contained in the Appendix.

Table 15 - Package 6 Objectives

A	B	C	D	E	F	G
						
✔	✔	✔	✔	✔	✔	✔

The envisaged roll-out of Package 6 would commence with the implementation of a northern orbital cycle route between the Ascot Road business parks and Watford Junction (**SM21**) within 2 years and culminate in capacity improvements at M25 Junction 20 and Hunton Bridge junction (M25 J19 spur link) (**SM1**).

SM21 would be complemented by improvements to the Grand Union Canal towpath between Hemel Hempstead-Kings Langley and western Watford (**SM17**). At the northern end within Apsley, proposed changes to local roads to help facilitate walking and cycling and to discourage rat-running (**SM32**) should come forward in advance of, or at least in conjunction with the implementation of a new Park and Ride facility at Kings Langley (**SM19**). The timing of the latter will be influenced by land availability as well as opportunities to improve access to Kings Langley station as well as improved rail services on the West Coast Main Line through the station which in turn may be influenced in the long term by the implementation of High Speed 2.

Bus priority on the A41 and approaching M25 J20 (**SM30**) will be needed in conjunction with the Park and Ride facility to optimise the operation of new/improved bus services (**SM31**) on the Hemel Hempstead-Kings Langley-Abbots Langley-Watford corridor.

Whilst independent of the aforementioned schemes, the purpose of Package 6 is to improve end-to-end journey experience between Watford and Hemel Hempstead. Improvements at Watford Junction and its linkages with the town centre (**SM15** and **SM24**) should be implemented in advance of or in conjunction with new/improved bus services routing between Watford and Hemel Hempstead which are likely to route via Watford Junction. Meanwhile, at the northern end of the corridor, improvements to links to Hemel Hempstead station and the station itself (**LP1** and **SM2c**) can be brought forward within 2-5 years.

The figure below provides a potential sequence of delivery of the various Schemes and Linked Project Group within Package 6.

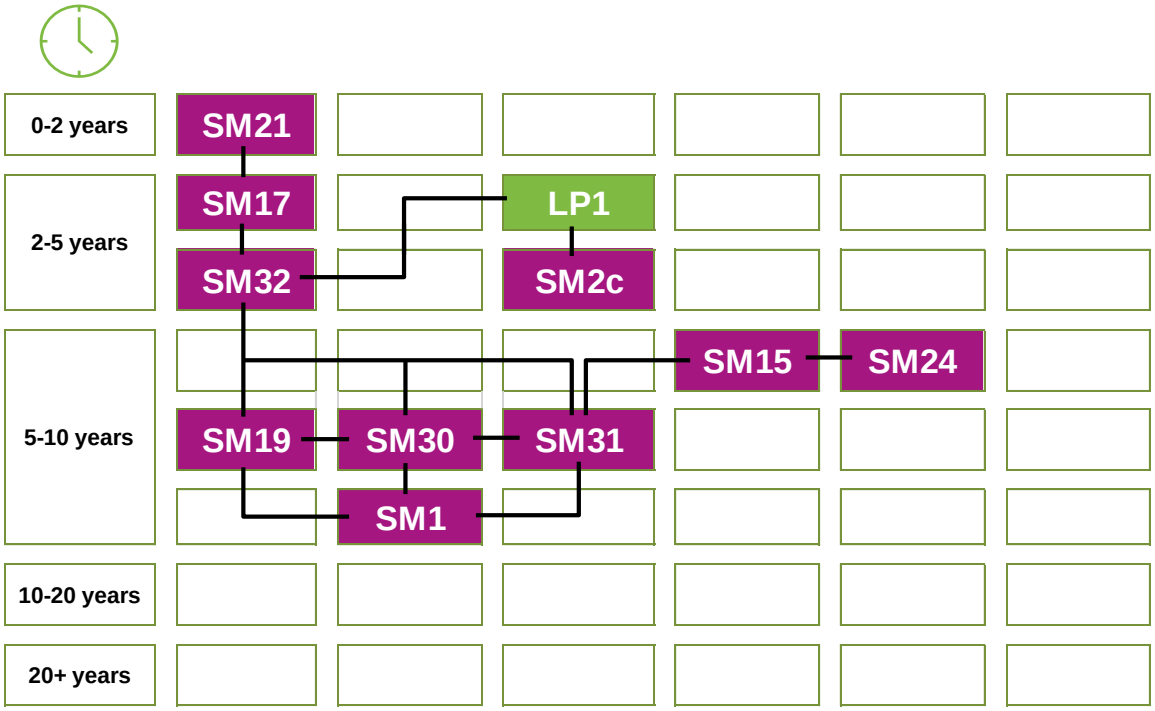


Figure 54 - Package 6 Indicative Sequence of Delivery

If delivered in its entirety, it is estimated that Package 6 could cost between £32 million and £95 million. It should be noted that interventions are identified as concepts in this GTP, and therefore further work is required to develop them in more detail. This more detailed work should result in more accurate cost estimates being provided and therefore the estimated cost range presented here may narrow and the minimum and maximum values may change.

Package 7 – Watford Central

The overarching aim of Package 7 is:

To reduce traffic congestion in Watford town centre by enhancing infrastructure which benefits journeys made on foot, by bicycle and by bus, and provide new route options for traffic which avoid busy urban roads.

The package consists of:

- Significant public realm enhancements and improvements to movement and permeability for sustainable modes on Watford Ring Road.
- Improved walking and cycling environment on routes to Watford Junction Stationand a new foot, cycle and bus link bridge at Colonial Way.
- The introduction of slips at M1 Junction 4 to allow all movements between the M1 and A41, alongside a Park and Ride facility at M1 Junction 5.

The full schedule of interventions is shown in the table below. Package 7 includes several Schemes where there is more than one approach to providing a solution. The table indicates the selection of Scheme approaches to form the preferred Package 7.

Table 16 - Package 7 Schedule of Interventions

PK7 – Watford Central				
ID	**Project / Approach**		**Name**	**Description**
LP9	**PR66**		Public Realm enhancements at Water Lane/High Street bus interchange	Enhance public realm at bus interchanges on the edges of the town centre adjacent to the ring road, e.g. Water Lane/High Street and Charter Place.
	PR104		Public Realm enhancements at Beechen Grove bus interchange	
LP11	**PR70**		Exchange Road missing cycle link (Vicarage Road)	Improving linkage between Vicarage Road and Exchange Road for people cycling. Extending shared use foot and cycle way south, improving crossing of Vicarage Road, and relocating signs and reducing signage clutter to increase footway space.

PK7 – Watford Central			
ID	**Project / Approach**	**Name**	**Description**
	PR71	Lower High Street shared use cycle path	Shared use cycle path between Bushey Arches and Dalton Way including provision of new cycle/pedestrian bridge over the River Colne or reducing the road width and reallocating space to footways.
	PR72	Watford Ring-Road Gateway junction enhancements	Enhancements to improve facilities at the junctions to make it easier for people walking and cycling and reducing severance effect of the ring road: Market St; Clarendon Rd; Estcourt Rd; Lower High St, Water Lane.
SM14	-	Watford M1 J5 Park and Ride	Park and Ride at Watford M1/A41 J5 to the north east of the town centre. Car parking facilities that allow for car users to park on outskirt of town and then use bus link to the town centre. Bus priority route to connect to Watford town centre to support P&R. Comprehensive review of town parking and wider transport needs to inform any P&R scheme.
SM15	-	Watford Junction - Town Centre (Clarendon Road) public realm enhancements	Enhance the public realm between Watford Junction station and the town centre along Clarendon Road over and above existing/planned provision. Improve pedestrian facilities and cycling and enforce non-motorised priority over motorised vehicles.
SM17	-	A411 Hempstead Road and Grand Union Canal Corridor Cycleway Improvements	Cycle Lane (on or off road) along A411 Hempstead Road (Watford) plus enhance the section in front of West Herts College between A411 and High Street. Additional general improvements along the Grand Union Canal Corridor and transfer improvements at Grove Mill Ln are to improve connectivity to the Towpath from the A411.
SM18	-	Parking Strategy Study & Action Plan (includes cycle parking provision,regulation of freight deliveries and Park & Ride)	A parking strategy to identify current constraints and future demand for car and cycle parking in Watford town centre, as well as to identify the impact of freight deliveries. Study to investigate evidence base, case and options for Park & Ride as part of the parking strategy.

PK7 – Watford Central				
ID	**Project / Approach**		**Name**	**Description**
SM22	-		Watford Area Bus Service Reconfiguration (study)	Work with bus operators to explore potential reconfiguration of bus services throughout Watford and connections to neighbouring settlements, including Bushey and the London fringe in liaison with TfL. Aim to provide efficient routes across the town and maximising connections to the town centre, Watford & Croxley business parks, retail parks, and rail stations. Encourage best use data and technology to optimise bus routes and attract demand.
SM23	a	✘	Colonial Way - St Albans Road all traffic link	New all traffic link road comprising of a bridge over the Abbey Line connecting Colonial Way (east) and A412 St Albans Road (west).
	b	✔	Colonial Way-St Albans Road bus, pedestrian and cycle only link	New bus, cycle and pedestrian only link road comprising of a bridge over the Abbey Line connecting Colonial Way (east) with the planned Watford Junction development.
	c	✘	Colonial Way-St Albans Road pedestrian and cycle only link	New pedestrian and cycle bridge over the Abbey Line connecting Colonial Way (east) with the planned Watford Junction development.
	Decision: A bus, pedestrian and cycle only link serves to improve permeability on foot and cycle through the Watford Junction area alongside improving connectivity from the development east of the rail line towards the town centre. This option also supports a vision to improve town centre routes to better serve sustainable modes. The high level appraisal approach in this GTP indicates this performs better against the plan's objectives, although more detailed investigation will be needed to confirm which is the best approach. The need for either an all traffic link or restricted link are to be confirmed through further investigations, including traffic modelling and considering the wider context of growth and transport infrastructure interventions in the town.			
SM24	-		Watford Junction - Station Road and Woodford Road - road space consolidation and pedestrian, cycle and bus access improvements	Improving cycle and pedestrian facilities and streetscape improvements on roads leading to Watford Junction Station, to encourage and facilitate sustainable travel to and from the station. Consideration to increasing width of footways, improving pedestrian crossings, reallocation of road space to sustainable modes, and improving bus priority and bus access to station. Would seek to complement or build on SM15.
SM25	a	✘	Watford Strategic Gateway - M1 J5 focus	Significant enhancements to Junction 5 on the M1 to ease congestion around the junction and Watford, either by creating new flyover links, widening overbridges to accommodate additional lanes, and/or closure of the A41 slip roads.

PK7 – Watford Central				
ID	**Project / Approach**		**Name**	**Description**
	b	✔	Watford Strategic Gateway - M1 J4 focus	Additional 'missing' slip roads on the M1 at Junction 4 (Elstree Hill) to improve access to the M1 South and reduce M1 South traffic within Watford town centre area.
	Decision: M1 Junction 5 may require substantial investment in order to provide additional capacity. This may not however draw traffic away from Bushey Arches. The provision of the missing slip roads at M1 Junction 4 could however help facilitate journeys between Watford South and London, and could result in a reduction in traffic at Bushey Arches. The potential more strategic implications of M1 J4 improvements would need to be considered in the Greater London context.			
SM26	-		Ring road multi-modal movement, access and permeability improvements	Integrated scheme of improvements on the ring road to improve access to the town centre by foot, cycling and bus. Investigation of options to include consideration of operation of the ring road, bus priority measures, improved crossings and reducing the impact of severance.
SM34	-		Watford cross-town connectivity study	A study exploring options to provide improved sustainable mode connectivity East-West in Watford, using the disused rail line. Options study must link to SM22, to maximise network benefits.

Watford is an urban centre of regional importance, both for employment and for its retail and leisure offer. Substantial investment is already underway with the redevelopment of Charter Place providing an expanded Intu Watford shopping centre (including a new cinema), and at Watford Junction where a major new mixed use development is proposed. Providing good links into and around the town centre is therefore very important.

The main town centre shopping area is surrounded by a busy ring road fed by a series of radial routes which lead into the town centre from Watford's suburbs and neighbouring towns. The ring road provides access to the town centre car parks, and facilitates some bus movements around different parts of the town centre. The ring road also serves a more strategic purpose as motorists use the ring road to travel from one side of town to the other. The alternatives are fairly limited – the A41 is on the eastern side of town and the A4178 Wiggenhall Road/Merton Road skirts the western edge of the town centre and is partly subject to a one-way system.

The transport system is quite road and car friendly. This is not to say that there is not a good provision of public transport services and infrastructure nearby. There is a bus interchange at Watford Junction and groups of bus stops at different locations around the shopping area. Overground services call at Watford High Street station which is at the southern end of the town centre. There is potential to build upon public transport features of central Watford and to re-think the priority given to the private car to provide better access on foot, by bike, by train and by bus. By offering greater choice, Watford town centre will become a more accessible destination for shopping, for work, for access to vital services and for onward travel.

With the long-planned scheme to extend the Metropolitan Line to Watford Junction no longer a likely prospect, there is a a significant gap to fill in the town's future sustainable transport network. A study (**SM34**) will identify options to improve east-west routes and fully explore how the disused rail line can be used to provide a sustainable mass transit corridor connecting the growth areas at Western Gateway, Riverwell, the town centre and Watford Junction. The shape and direction of other schemes within this Package (**SM14**, **SM15**, **SM23**, **SM24**, **SM26**) would need to develop to ensure opportunities for improving connectivity and service levels are maximised.

An exploration of opportunities to rethink the function and operation of the road network around central Watford, including the ring road, to better provide for buses and to allow easier movement on foot and by cycle will be undertaken, supported by traffic modelling. Through an integrated package of interventions, the car will become less dominant and the severance impact of the ring road will be reduced, opening up more space for walking and cycling and improved access for buses (**SM26**). Conversion of the current one-way ring road to two-way working by truncation of the road at the Exchange Road Bridge (buses, cycles and taxis continuing to use an at-grade link across the High Street) could be an option, although implications for access and operation of the town centre car parks and bus routing and the potential benefits and disbenefits of such a change would need to be understood therefore it is not an immediate priority.

Alternatively, dedicated bus lanes could replace general traffic lanes to help the smooth flow of buses entering and leaving the town centre, supported by the development of a link for buses, pedestrians and cycles only connecting Colonial Way on the east side of Watford Junction to St Albans Road on the west (**SM23**). This new link will further facilitate bus and non-motorised travel across the town centre and improve accessibility and connectivity from developments to the east of Watford Junction with the rest of the town centre. Additionally, a section of the ring road will be truncated adjacent to Watford High Street station and public realm improvements introduced to maximise the opportunity of the space freed up. Further investigations including traffic modelling are needed to confirm what interventions and combinations of interventions will best support and enable sustainable development and mobility in the centre of Watford.

The groups of bus stops which lie on the ring road will be enhanced with a coherent public realm treatment including new high quality bus shelters, seating, real-time information, and accessible urban landscaping (**LP9**).

Accessing the town centre area by bike will be made easier with a selection of improvements including a better cycle link between Exchange Road and Vicarage Road (**LP11**). Key 'gateway' junctions for pedestrian flows to the main shopping area on the ring road (including Clarendon Road, Market Street and Lower High Street) will be re-modelled to give greater priority to pedestrians and cyclists and reduce the severance effect of the ring road (**LP11**). Cycle links along Lower High Street between the town centre and the Ebury Way (adjacent to Bushey Arches) will be improved with a mixture of on and off-road designated provision. Either a new cycle bridge or widened footway over the River Colne will be provided on what is a busy section of road (**LP11**).

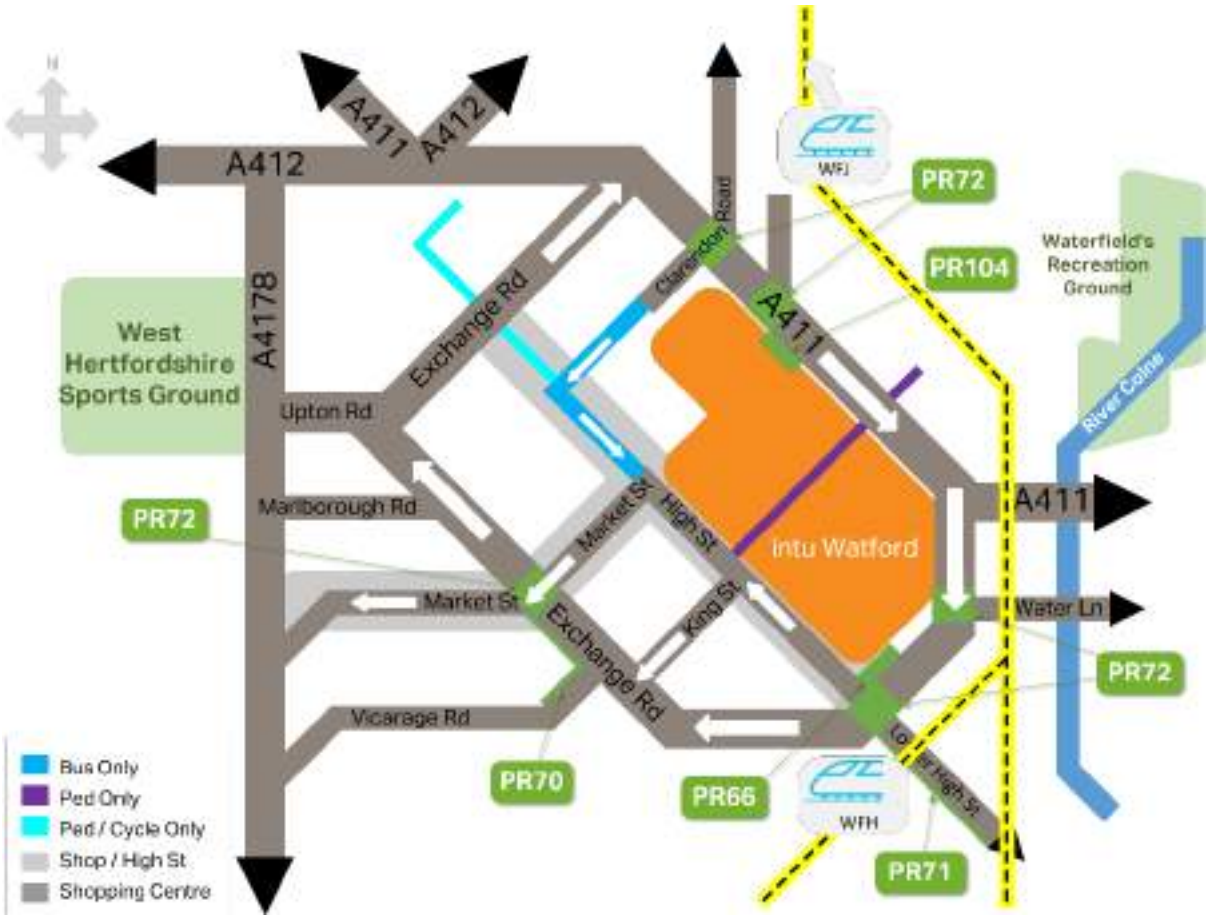


Figure 55 - Watford Ring Road – Present day (top) vs after SM26 implementation (bottom)

The Dome Roundabout has not been featured in this package. The Dome roundabout has been the subject of localised improvements over the years, and whilst there may be small potential for some further improvements to the junction, these are unlikely to deliver significant improvement in terms of reduced congestion and improved journey times.

The roundabout is constrained on all sides by a mix of land uses including residential and retail. A step-change in highway capacity, if this were deemed desirable, would not necessarily be considerate of these land uses and may in turn encourage more traffic to route through the junction in the longer term.

Further discussion on the Dome Roundabout and potential approaches that had been considered for improving the junction directly or indirectly, is included in a supplementary note contained in Appendix D.

Emily, who is not very confident on the bike and who would not have considered cycling previously, takes the bike to college because the route has been improved over the river (she can now safely cycle off road), across the town centre ring road (LP11) and in front of the college building (SM17).

Josh has benefited from a new cycle bridge over the River Colne on Lower High Street (**LP11**) which has vastly improved connectivity, making his journey more convenient.

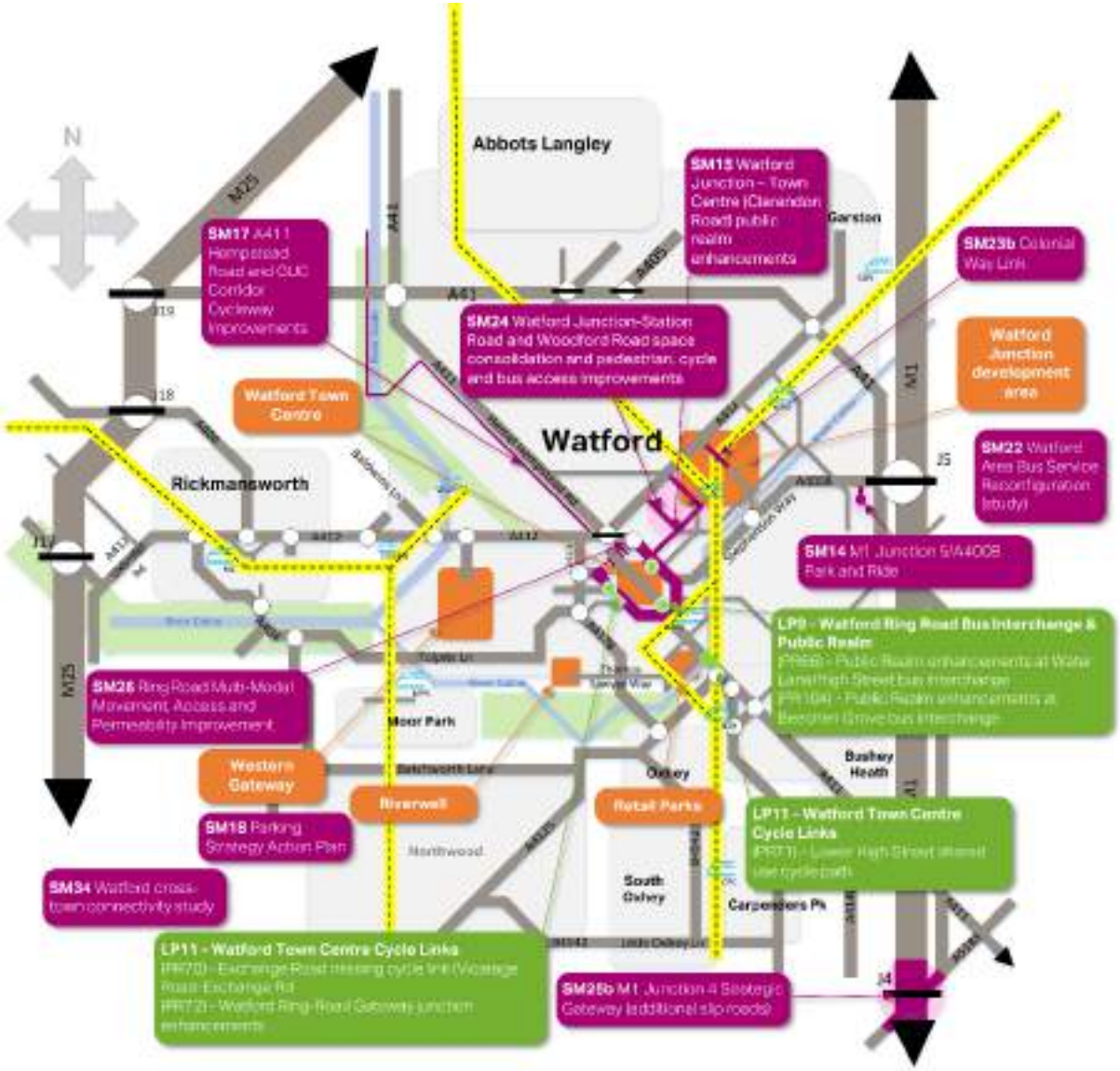


Figure 56 - Package 7 Preferred Combination

The table below simply marks which of the seven GTP Objectives could be achieved with Package 7. Each intervention has been assessed against the objectives which is contained in the Appendix.

Table 17 - Package 7 Objectives

A	B	C	D	E	F	G
						
✔	✔	✔	✔	✔	✔	✔

The envisaged roll-out of Package 7 would commence with the study of options for future cross-town sustainable mode connectivity (**SM34**) and a review and identification of bus services throughout Watford and the wider area (**SM22**). This will help to identify beneficial service changes including those arising from alterations to bus interchanges in Watford town centre (**LP9**). Bus services may also be influenced by alterations to 'gateway' junctions into the town centre (**LP11**) so it will be important to recognise what service changes may be needed in advance. Potential changes to the town centre ring-road could significantly influence the routing pattern of bus services and therefore, again, **SM22** will be needed far in advance of **SM26**. Furthermore, the design and implementation of **LP9** and **LP11** should take into account the forthcoming truncation of the ring road and the effects this is likely to have on traffic routing patterns and volumes.

In conjunction with **SM22**, a parking strategy will identify the current level of provision and future needs across Watford town centre (**SM18**). This will be required in advance of implementing a park and ride facility close to M1 Junction 5 (**SM14**) and may indeed help to inform what type and scale of facility is needed. It is envisaged that a reconfiguration of M1 Junction 4 will relieve pressure at M1 Junction 5 but it is unlikely that it can come forward until up to 10 years and potentially beyond.

Also essential to Package 7 are improved links to Watford Junction (**SM15**, **SM23b** and **SM24**). The delivery of **SM23b** will be largely dependent upon the build-out of planned development to the north and east of Watford Junction. It should however come forward in advance of any major changes to the road system (**SM15** and **SM24**) which currently forms the main access to the station on the town centre side of the West Coast Main Line.

The figure below provides a potential sequence of delivery of the various Schemes and Linked Project Groups within Package 7.

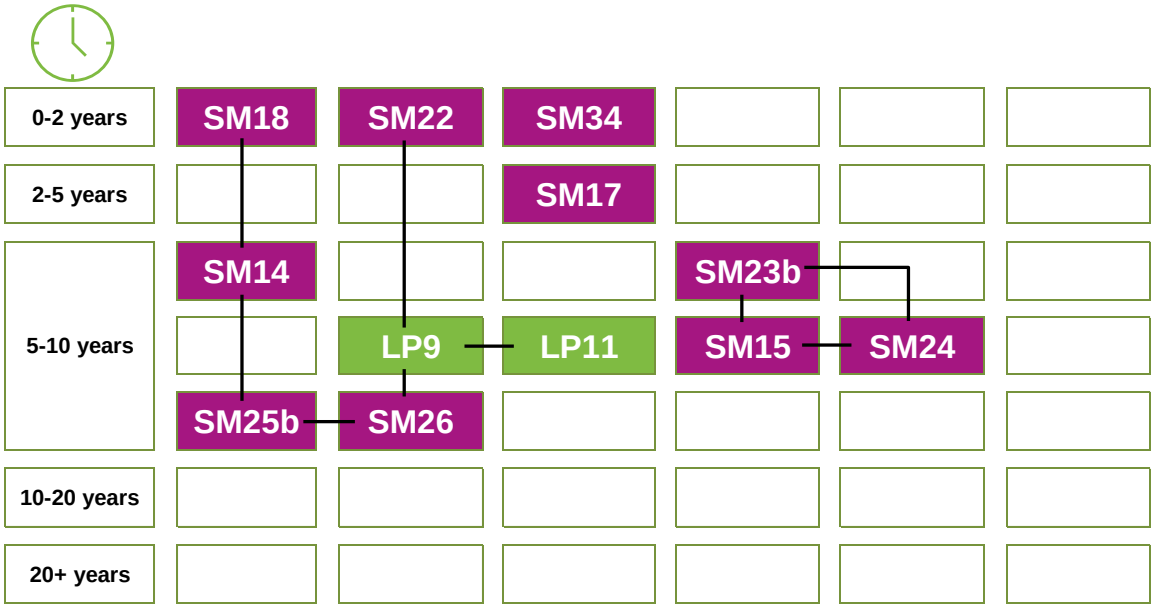


Figure 57 - Package 7 Indicative Sequence of Delivery

If delivered in its entirety, it is estimated that Package 7 could cost between £73 million and £173 million. It should be noted that interventions are identified as concepts in this GTP, and therefore further work is required to develop them in more detail. This more detailed work should result in more accurate cost estimates being provided and therefore the estimated cost range presented here may narrow and the minimum and maximum values may change.

Package 8 – Watford South

The overarching aim of Package 8 is:

To enhance the attractiveness of journeys by bike and bus in areas to the south of Watford, and facilitate more appropriate route options for traffic which avoid Bushey Arches.

The package consists of:

- Exploring enhanced bus priority infrastructure and services through Bushey and Carpenders Park.
- Cycling links in Oxhey, South Oxhey, Carpenders Park, and Bushey.
- The introduction of slips at M1 Junction 4 to allow all movements between the M1 and A41, alongside a Park and Ride facility at M1 Junction 5.
- Review of traffic and sustainable transport options on local road network around Bushey Arches

The full schedule of interventions is shown in the table below. Package 8 includes several Schemes where there is more than one approach to providing a solution. The table indicates the selection of Scheme approaches to form the preferred Package 8.

Table 18 - Package 8 Schedule of Interventions

PK8 – Watford South				
ID	**Project / Approach**		**Name**	**Description**
LP7	**PR110**		By-the-Wood - Oxhey Lane - Merry Hill Greenway Cycle Link	Enhance existing cycleway provision from By-the-Wood (Carpenders Park), along a section of A4008 Oxhey Lane and linking to the existing Greenway to Merry Hill Road.
	PR40		Improved South Oxhey-Carpenders Park Link	Enhanced road, cycle and pedestrian links over the railway line linking South Oxhey and Carpenders Park areas. To address current constrained and limited linkages and tie into improved Station Square.
	PR102		Anthony Close, The Pathway, Watford Heath	Enhance the routes leading to the existing footbridge over the West Coast Main Line (along Anthony Close/The Pathway west of the railway line, and Watford Heath east of the railway line).

PK8 – Watford South				
ID	**Project / Approach**		**Name**	**Description**
	PR103		Delta Gain (South Oxhey-Carpenders Park)	Enhancements to the pedestrian and cycle environment on Delta Gain and Gibbs Couch on the approach to Carpenders Park Station including measures to manage on-street parking.
LP11	**PR70**		Exchange Road missing cycle link (Vicarage Road)	Improving the link between Vicarage Road and Exchange Road for people cycling. Extending shared use foot and cycle way south, improving crossing of Vicarage Road, and relocating signs and reducing signage clutter to increase footway space.
	PR71		Lower High Street shared use cycle path	Shared use cycle path between Bushey Arches and Dalton Way including provision of new cycle/pedestrian bridge over the River Colne.
	PR72		Watford Ring-Road Gateway junction enhancements	Enhancements to improve facilities at the junctions to make it easier for people walking and cycling and reducing severance effect of the ring road: Market St; Clarendon Rd; Estcourt Rd; Lower High St, Water Lane.
SM12	a	✘	Holywell to South Oxhey Cross-Colne Sustainable Link (cycle only)	Improved cycle links between South Oxhey and Western Gateway connecting Hampermill Lane/Eastbury Road to Tolpits Lane via Ebury Way and existing cyclable route by Bushey Cricket Club. Enhanced public realm in South Oxhey, improve pedestrian facilities and cycle links towards Ebury Way Link to connect South Oxhey with Western Gateway and central Watford.
	b	✔	Holywell to South Oxhey Cross-Colne Sustainable Link (cycle and bus only)	Explore opportunity to upgrade the Ebury Way cycleway from Tolpits Lane to adjacent to Electricity Transmission Station and cyclable section running to Hampermill Lane alongside Bushey Cricket Club, to become a bus and cycle route. New/rerouted bus services from Bushey and South Oxhey areas.
	Decision: The provision of a cycle and bus link over the River Colne from Tolpits Lane to Hampermill Lane (east of Hampermill Lake) presents an opportunity to substantially influence mode shift from car to more sustainable modes of transport for journeys to/from the Western Gateway business parks. A combined bus and cycle link may also be more effective at helping to address congestion at the Bushey Arches junctions than purely a cycle link. An all traffic link would perpetuate high levels of travel by car to the Western Gateway area and undermine the quality of existing sustainable routes.			

PK8 – Watford South				
ID	**Project / Approach**		**Name**	**Description**
SM14	-		Watford M1 J5 Park and Ride	Park and Ride at Watford M1/A41 J5 to the north east of the town centre. Car parking facilities that allow for car users to park on the outskirts of town and then use a bus link to the town centre. Bus priority route to connect to Watford town centre to support P&R. Comprehensive review of town parking and wider transport needs to inform any P&R scheme.
SM22	-		Watford Area Bus Service Reconfiguration (study)	Work with bus operators to explore potential reconfiguration of bus services throughout Watford and connections to neighbouring settlements, including Bushey and the London fringe in liaison with TfL. Aim to provide efficient routes across the town and maximising connections to the town centre, Watford & Croxley business parks, retail parks, and rail stations. Encourage best use data and technology to optimise bus routes and attract demand.
SM25	a	✘	M1 Junction 5 improvements	Significant enhancements to Junction 5 on the M1 to ease congestion around the junction and Watford, either by creating new flyover links, widening overbridges to accommodate additional lanes, and/or closure of the A41 slip roads.
	b	✔	Additional slip roads at M1 Junction 4	Additional 'missing' slip roads on the M1 at Junction 4 (Elstree Hill) to improve access to the M1 and reduce M1 South traffic within Watford town centre area.
	Decision: M1 Junction 5 may require substantial investment in order to provide additional capacity. This may not however draw traffic away from Bushey Arches. The provision of the missing slip roads at M1 Junction 4 could however help facilitate journeys between Watford South and London, and could result in a reduction in traffic at Bushey Arches. The potential more strategic implications of M1 J4 improvements would need to be considered in the Greater London context.			
SM36	-		Bushey Arches and Nearby Network - All Modes Traffic Movement Study	A study to investigate the movement of traffic on the highway network through Bushey Arches and the nearby network including Dalton Way, Thomas Sawyer Way, Eastbury Road, Deacons Hill and Wiggenhall Road. The study should identify potential improvements for all modes (including bus, cycle and pedestrians).

Bushey Arches is a well-recognised congestion hotspot and Air Quality Management Area. It comprises of a series of highway junctions intercepting several important radial routes including the A411 London Road (from Bushey), the A4008 Pinner Road (from Carpenders Park and Harrow) and the A4125 Eastbury Road (from Northwood) which converge adjacent

to and beneath the railway arches of the West Coast Main Line. It is one of the few points of access to Watford Town Centre from the south. The major retail park area of Watford is located immediately to the north of Bushey Arches.

Opportunities are extremely limited to address traffic congestion at Bushey Arches itself. It is in a built up area and widening roads to provide more road space is not considered to be the ideal solution as it risks enticing more traffic through the junction.

Evidence indicates that a proportion of traffic using Bushey Arches neither originates nor is destined for Watford Town Centre and it is in fact a route for motorists seeking access to the M1 North and South.

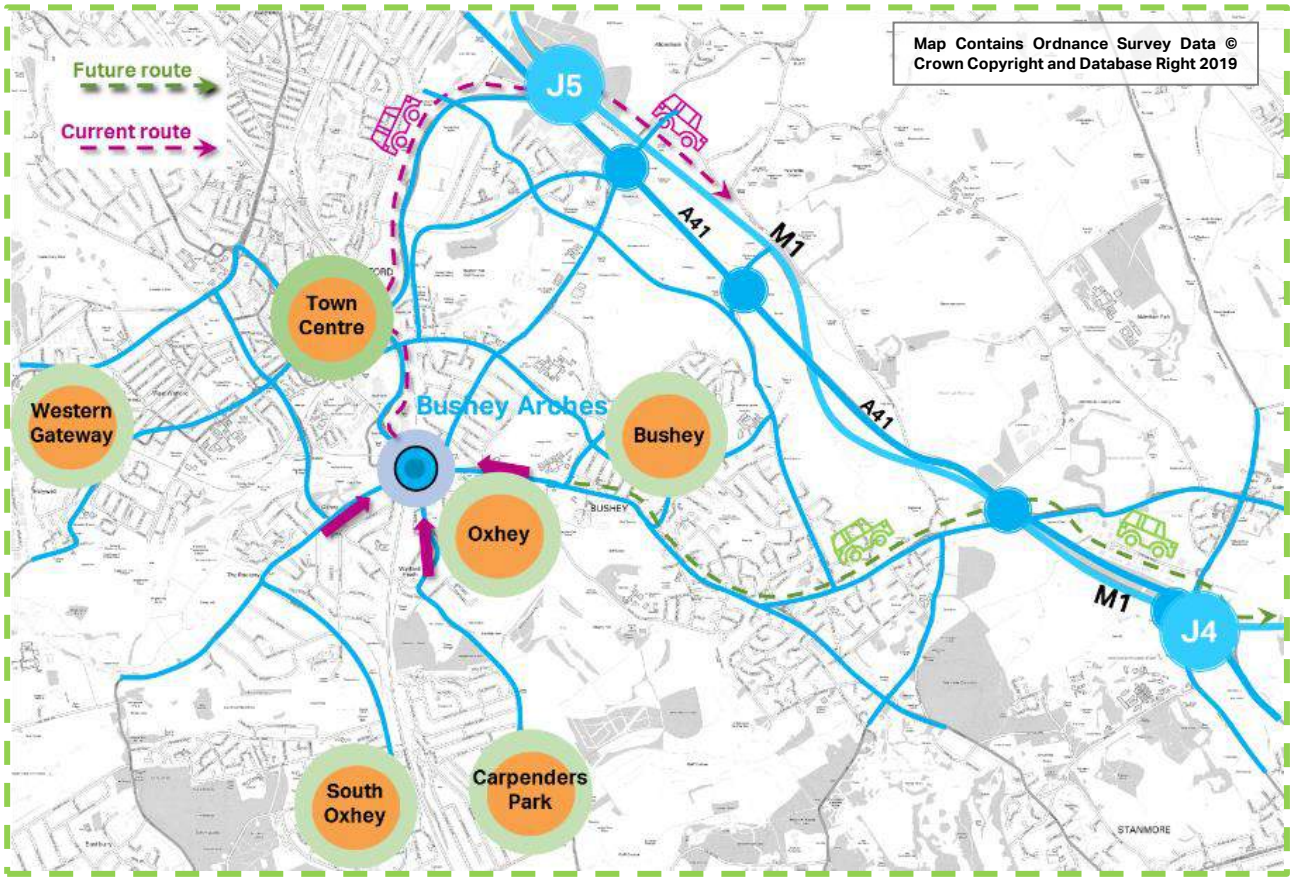
Rather than build in capacity at Bushey Arches which would be extremely difficult, the approach with Package 8 is two-pronged – making journeys taking place through Bushey Arches more attractive by modes other than the car, and providing new route options for motorists which avoid Bushey Arches altogether.

To get a better picture of the opportunities within the nearby road network to modify or add routing options for different modes, a traffic movement study will be undertaken (**SM36**). This will indicate where improved pedestrian and cycling connections could help improve connectivity and encourage more active and public transport journeys in this area. It will also explore if existing roads could be better used to relieve some general traffic pressure from Bushey Arches itself. The study would need to take account of the outcomes and direction of the Watford cross-town connectivity study (**SM34**).

There is potential for bus services to be enhanced along the A411 London Road with improved bus stop facilities and an increased service frequency. The exact nature of these improvements will be informed by a strategic study assessing bus services across the whole of Watford and the surrounding area (**SM22**) and liaison with bus operators.

East-west orbital cycle links will be improved (**LP7**), complementing the measures put forward under Package 5 (see Figure 47) - including the improved link from South Oxhey to Holywell and the Watford and Croxley business parks area (**SM12**). These improvements will comprise of additional signage pointing cyclists in the right direction, and new/improved crossings including on the A4008 Pinner Road. Additional pedestrian and cycling accessibility improvements and upgrades around the town centre and along Lower High Street will also facilitate more non-motorised travel between Bushey Arches and the town centre (in line with Package 7; **LP11**).

At a more strategic level, substantial alterations at M1 Junction 4 will facilitate journeys which are not currently possible (**SM25b**). Anyone wishing to travel south on the M1 from the Watford area has to do so via the Town Centre and M1 Junction 5 because M1 Junction 4 does not incorporate south-facing slip roads (see the figure overleaf). It is envisaged that by providing these missing slip roads, motorists will no longer need to travel on busy urban roads in Watford, including through Bushey Arches, alongside potentially reducing the level of intervention needed at Junction 5 if Junction 4 improvements provide a reduction in congestion and through traffic. M1 Junction 5 instead will be a focus of improvements to public transport with the introduction of a Park and Ride facility (**SM14**) to further reduce town centre-bound car traffic.



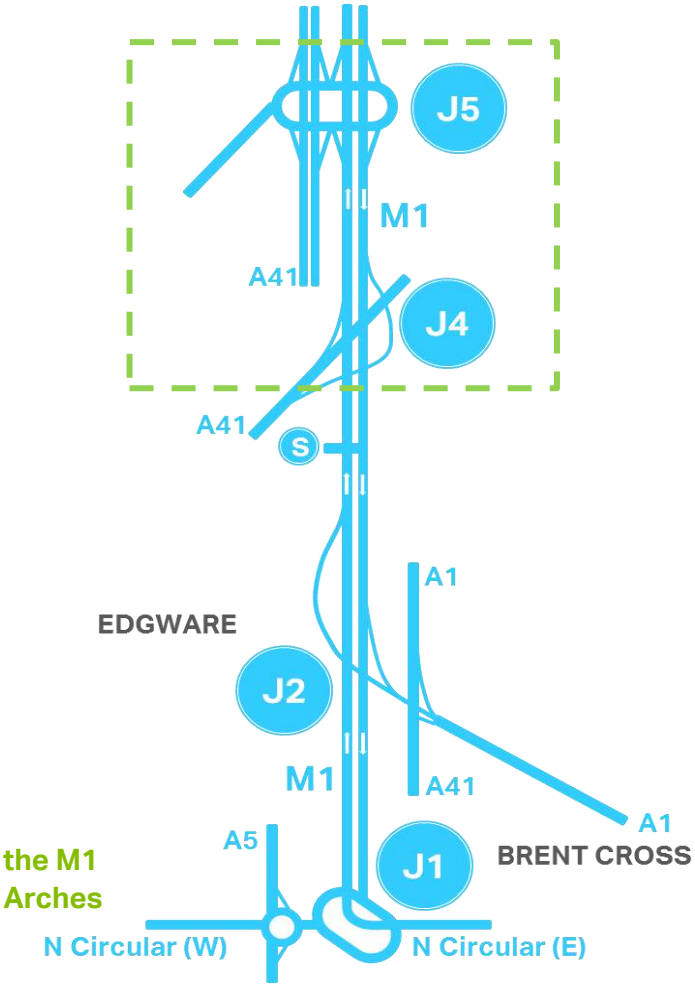


Figure 58 - Junction layout along the M1 and route choice through Bushey Arches

Alongside these interventions, consideration will be given to other improvements along the M1 - such as additional mainline capacity or slips that may be idenfitied by HE - to facilitate and capture the benefits from proposed GTP schemes at Junctions 4 and 5.

Nik still needs to drive to work as his job requires it. Since improvements were made to M1 Junction 4 (**SM25b**), Nik no longer has to drive via Bushey Arches and join the M1 at Junction 5.

Abi continues to walk to school. Improvements to bus services along London Road (**SM22**) means that traffic level increased have been minimised meaning that crossing the road is no less convenient.

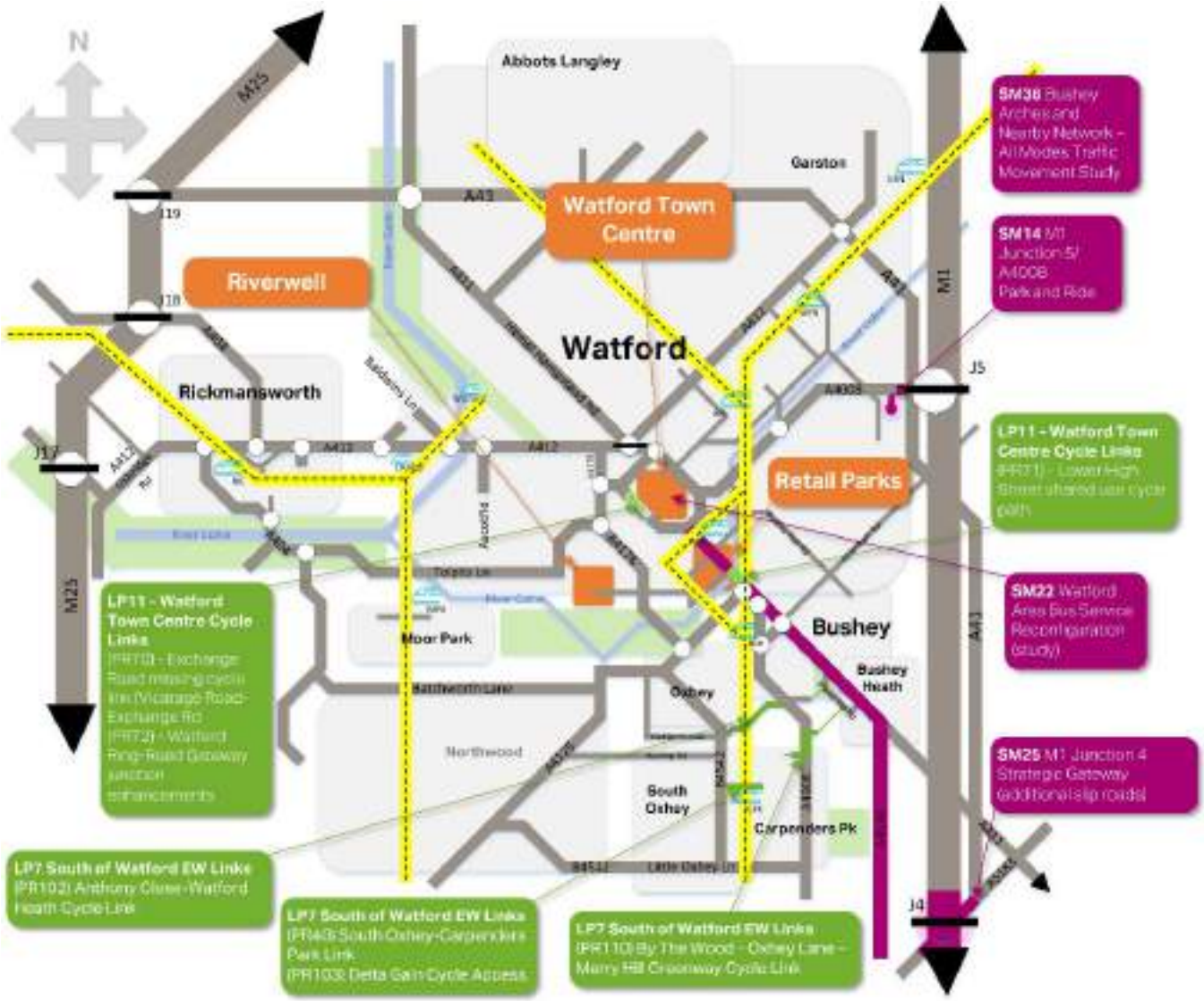


Figure 59 - Package 8 Preferred Combination

The table below simply marks which of the seven GTP Objectives could be achieved with Package 8. Each intervention has been assessed against the objectives which is contained in the Appendix.

Table 19 - Package 8 Objectives

A	B	C	D	E	F	G
						
✔	✔	✔	✔		✔	✔

The envisaged roll-out of Package 8 would commence with the Bushey Arches traffic movement review (**SM36**) and a review and identification of bus services throughout Watford and the wider area (**SM22**). This will help to identify potential bus infrastructure and routing improvements on the local network and the potential for a new Park and Ride facility serving Watford Town Centre from the M1 corridor at Junction 5 (**SM14**). The feasibility of a new Park and Ride facility needs to be determined and will depend on the availability of land. This could influence how quickly the facility can be brought forward. It is currently envisaged that it could take between 5 and 10 years.

Meanwhile, improvements to cycle links across the West Coast Main Line between Bushey and South Oxhey (**LP7**) can be established in the short term if no new structures are required, and either in advance of or in conjunction with improved links into Watford town centre (**LP11**).

A reconfiguration of M1 Junction 4 (**SM25b**) will open up new routing opportunities for motorists heading to/from north London boroughs. Given the complexities of such a scheme, it is unlikely to be delivered for up to ten years, and potentially longer.

The figure overleaf provides a potential sequence of delivery of the various Schemes and Linked Project Groups within Package 8.

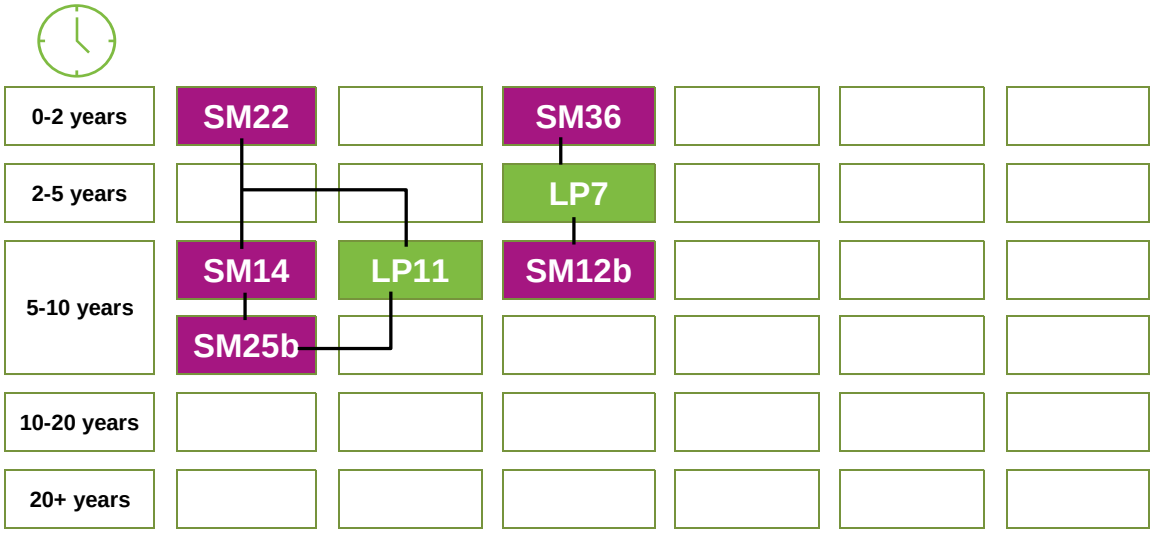


Figure 60 - Package 8 Indicative Sequence of Delivery

If delivered in its entirety, it is estimated that Package 8 could cost between £63 million and £120 million. It should be noted that interventions are identified as concepts in this GTP, and therefore further work is required to develop them in more detail. This more detailed work should result in more accurate cost estimates being provided and therefore the estimated cost range presented here may narrow and the minimum and maximum values may change.

Package 9 - Rickmansworth

The overarching aim of Package 9 is:

To enhance the attractiveness of journeys to Rickmansworth railway station and access to the Ebury Way (towards Watford) on foot and by bike.

The package consists of:

- A new southern access into the Watford Western Gateway Business Parks area for cyclists and buses only.
- Enhanced cycleways and facilities towards Rickmansworth railway station and town centre.
- Enhancement of the Ebury Way for walking and cycling

The full schedule of interventions is shown in the table below. Package 9 includes several Schemes where there is more than one approach to providing a solution. The table indicates the selection of Scheme approaches to form the preferred Package 9.

Table 20 - Package 9 Schedule of Interventions

PK9 – Rickmansworth				
ID	**Project / Approach**		**Name**	**Description**
LP12	**PR80**		Ebury Way access enhancements, Rickmansworth	Improvements to the cycleway including junction treatments between Ebury Way and Church Street via Skidmore Way, Rickmansworth.
	PR81		Church Street 20mph Zone, Rickmansworth	20mph zone introduced on Church Street, Rickmansworth - between High Street and A404 to help facilitate potentially safer journeys by bike and on foot.
LP13	**PR82**		Homestead Road Rickmansworth Station bus stop linkage	Improved pedestrian linkage from bus Stop C on Homestead Road and the railway station.
	PR83		Enhanced linkage between Homestead Rd (Rickmansworth Station) and Victoria Close	Provide an at-grade (surface level) crossing on the A412 between Homestead Rd (Rickmansworth Station) and Victoria Close.
	PR86		A404 Riverside Drive, Church Street Roundabout minor enhancements	A404 Riverside Drive, Church Street Roundabout partial signalisation or spiral markings to improve efficiency of traffic throughput incorporating better cycle crossing facilities linking the River Chess and Church Street.

PK9 – Rickmansworth				
ID	**Project / Approach**		**Name**	**Description**
	PR87		A412-A404 Riverside Drive Uxbridge Road Roundabout Cycle Crossings, Rickmansworth	Replacement of existing zebra crossings with pedestrian and cycle crossings on southern and western arms. Link to the quieter streets and existing signed route to Mill End via Nightingale Road.
SM28	a	✔	Western Gateway Southern Access: Buses, pedestrians and cycles only	A new southern access into the Watford & Croxley business parks area from Tolpits Lane for buses, pedestrians and cyclists only (bus services use existing roads to Moor Park, Northwood etc.).
	b	✘	Western Gateway Southern Access: All traffic	Southern access into the Watford & Croxley business parks area from Tolpits Lane open to all traffic. Enhancement to Tolpits Lane including widening on some sections to cater for increased traffic.
	Decision: An all vehicle access to the business park from the south would most likely encourage journeys by car. Tolpits Lane may not have sufficient capacity to accommodate additional traffic and it would likely have more widespread effects on traffic route choice. There is however an opportunity to increase journeys by bike, on foot and by public transport by not allowing cars to use the southern access. The preferred approach would best complement improvements made to the Ebury Way as opposed to an all vehicle access which could reduce the attractiveness of journeys along the Ebury Way.			
SM35	-		Ebury Way improvements	Enhance existing Ebury Way for walking and cycling including improved surface for all weather use, and better links onto wider network, including at Riverside Park, to King George V Playing Fields, and formalised access to Dwight Road and the Vale Industrial Park & Olds Approach Industrial Estates.

There is an opportunity to improve sustainable transport connectivity between Rickmansworth and Watford Western Gateway business parks (see Figure 61). Encouraging more journeys by bicycle along the attractive Ebury Way cycle route could help ease some pressure on the busy A412 Rickmansworth Road (**SM35**). Connectivity by bike within Rickmansworth will be improved with the introduction of new cycle crossings on the A412-A404 Uxbridge Road roundabout (**LP13 – PR87**) therefore opening up the opportunity for more sustainable journeys from the western part of the town including Mill End and Money Hill.

Connectivity between the northern part of Rickmansworth (the area around Valley Road and Chorleywood Road), the railway station and town centre will be enhanced with a new at-grade crossing (**LP13 – PR83**) on the A412/A404 between Victoria Close and Homestead Road.

Homestead Road loops around, connecting the A412 Park Road/Rectory Road with Station Road which links to the town's high street. Bus stops along Homestead Road will be improved, as will the pedestrian route between the aforementioned new at-grade crossing, the station and Station Road (**LP13 – PR82**).

The introduction of a cycle crossing on the A404 at the Riverside Drive-Church Street Roundabout (**LP13 – PR86**) will improve connectivity between the southern part of Rickmansworth (the area around Harefield Road and Sherfield Avenue) and the town centre.

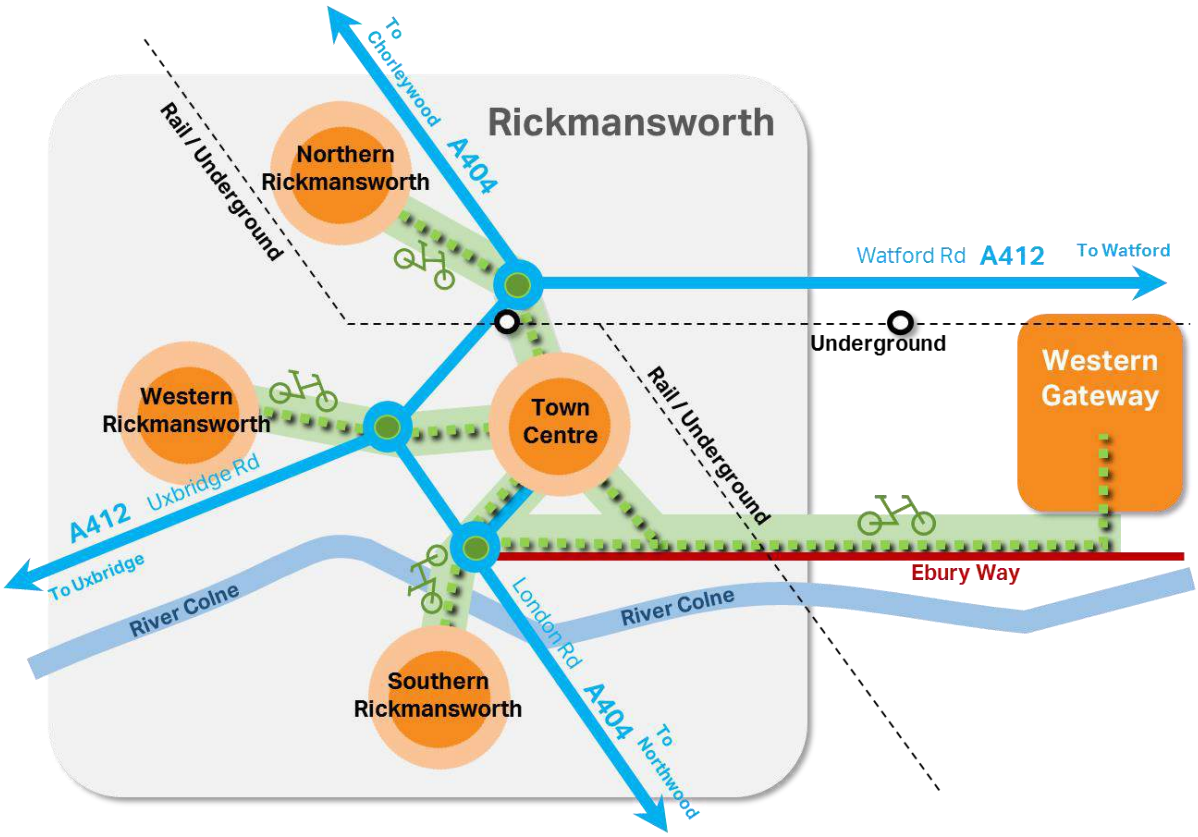


Figure 61 - Rickmansworth Cross-Town Connectivity

A 20mph speed limit will be introduced along the length of Church Street from the A404 roundabout to the Town Centre (**LP12 – PR81**), making journeys on foot and by bike (on road) safer. Additional way-finding signage on Skidmore Way (**LP12 – PR80**) will improve the linkage between Church Street and the Ebury Way, therefore opening up this route for trips towards Watford including the Western Gateway business parks. Improved linkages between different parts of Rickmansworth and the Ebury Way will be complemented by improved non-car access at the southern end of the Western Gateway (**SM28a**).

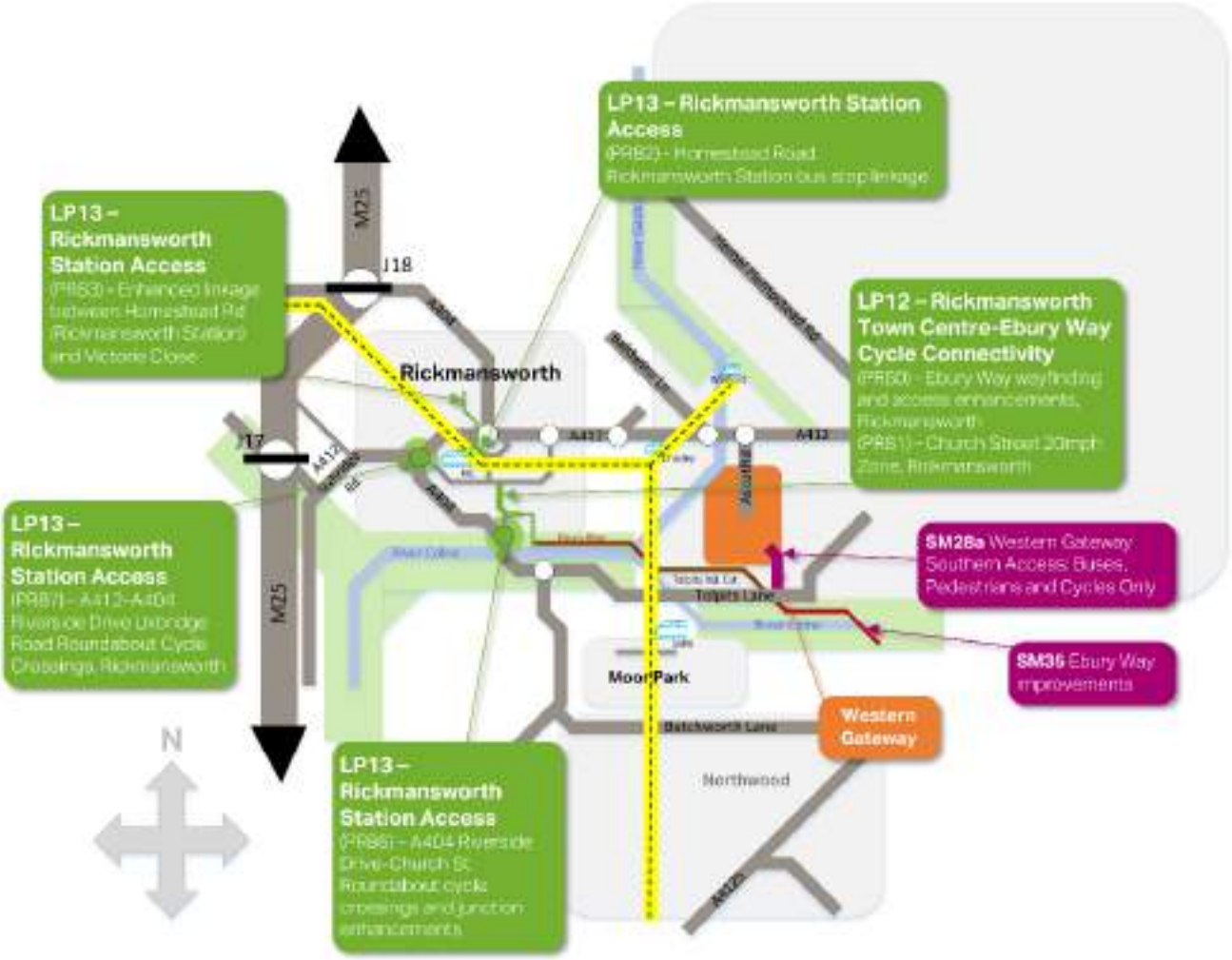


Figure 62 - Package 9 Preferred Combination

The table below simply marks which of the seven GTP Objectives could be achieved with Package 9. Each intervention has been assessed against the objectives which is contained in the Appendix.

Table 21 - Package 9 Objectives

A	B	C	D	E	F	G
						
✔	✔	✔	✔		✔	✔

The envisaged roll-out of Package 9 would commence with both improvements to cycle links between Rickmansworth town centre and the Ebury Way (**LP12**) and cycle-pedestrian access improvements to Rickmansworth station (**LP13**). Subject to design and feasibility checks, it is envisaged that these two sets of measures could be delivered within a short timeframe, potentially within 2 years within the same period as improvements to the Ebury Way (**SM35**).

The two sets of measures are complementary and will help facilitate better end-to-end journeys across the town if implemented in parallel. **LP12** will improve the link to the Ebury Way which provides an inter-urban link to the business parks on Tolpits Lane and Ascot Road. It is envisaged therefore that **LP12** should be implemented in advance of a new southern access to the Ascot Road business parks (**SM28a**). This link will benefit from new or reconfigured bus services which will be identified through a study of services across the wider area (**SM22**).

The figure below provides a potential sequence of delivery of the Linked Project Groups within Package 9.

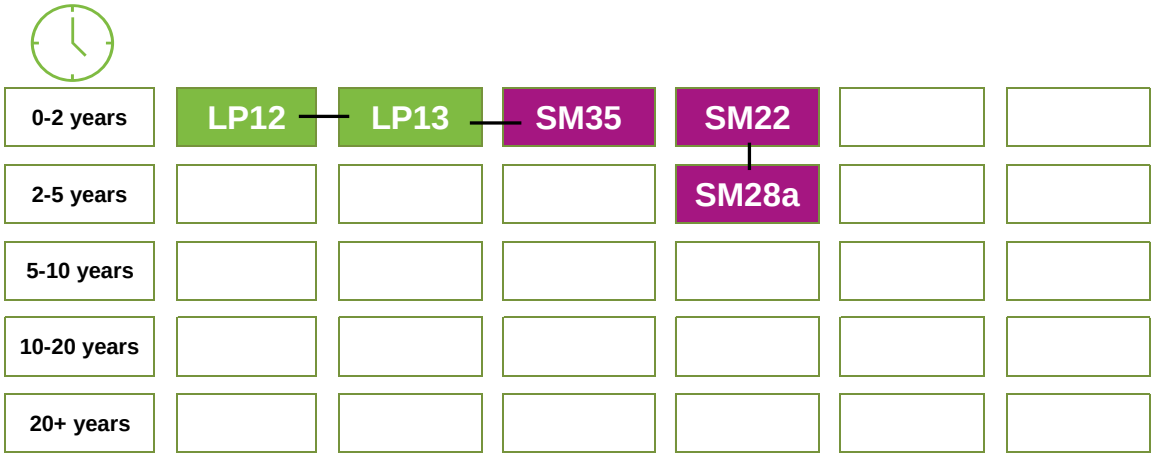


Figure 63 - Package 9 Indicative Sequence of Delivery

If delivered in its entirety, it is estimated that Package 9 could cost between £5 million and £12 million. It should be noted that interventions are identified as concepts in this GTP, and therefore further work is required to develop them in more detail. This more detailed work should result in more accurate cost estimates being provided and therefore the estimated cost range presented here may narrow and the minimum and maximum values may change.

Combined Packages Schedule of Interventions

A summary of estimated cost ranges per package is provided below.:

- **Package 1** - £42 million - £179 million
- **Package 2** - £40 million - £174 million
- **Package 3** - £28 million - £119 million
- **Package 4** - £111 million - £153 million
- **Package 5** - £11 million - £23 million
- **Package 6** - £32 million - £95 million
- **Package 7** - £73 million - £173 million
- **Package 8** - £63 million - £120 million
- **Package 9** - £5 million - £12 million
- **Combined** - £275 million - £1 bilion *(taking into account interventions which feature in more than one Package)*

It must be emphasised that interventions are identified as concepts in this GTP, and therefore further work is required to develop them in more detail.

Cost ranges specified for each intervention and package are indicative estimates at this stage. If interventions are taken forward, they will be developed in more detail and therefore the cost estimates will be refined and the range between upper and lower estimates mostly likely narrowed.

Earlier in the Prospectus, a series of case studies involving people who live and/or work in South West Hertfordshire were introduced. Their 'current' situation in terms of their experiences of using the local transport network was described. The packages of interventions have the potential to positively influence people's travel behaviour and daily choices, and the personas were revisited in relation to each Package to highlight those interactions that had the greatest impact on their 'future' situation. The cumulative impacts of package interventions on the future situation of each case study are summarised below.

Figure 64 – Future experiences of transport and travel in South West Hertfordshire following the implementation of GTP interventions

Mira and Mark

- Mira has more options in how she travels to work. Public transport services east-west Hemel Hempstead have been vastly improved. There are regular services towards the station which Mira can access at a bus stop on the A414. The bus stop has a shelter and real time information which improves the journey experience . The combined bus-rail ticket makes the transfer more convenient.
- Since alterations were made to the A414 Breakspear Way/St Albans Road (**SM5a**), buses get priority at some junctions which makes journey times far more attractive. Furthermore, Mira can afford to leave the house a little later because she no longer needs to beat the traffic or is at risk of not getting a parking space at the station.
- Mira has also on occasions taken the commuter coach which stops at the new bus/coach interchange close to M1 Junction 8 (**LP2**) which Mira can access via an attractive 'green bridge' over the A414 (**SM29**) and an attractive walking route through the new East Hemel Hempstead urban extension.
- Mark's journey time to work by car had increased and he could no longer tolerate sitting in traffic queues day after day. The rat-running route via Apsley is now less attractive (**LP1** and **SM32**). He now works more flexibly, spending at least one day a week working from home. On the days he travels to the office, he has taken the enhanced express bus (**SM31**) which stops on the A414 and connects with Watford (he has a 5 minute walk at either end). The bus has on-board wifi which means that he can check emails on his way to work. Furthermore, the alterations to roads close to work around Watford Junction station means that walking to and from the office feels more pleasant and stress free.

Joyce

- The changes made to the A414 St Albans Road have involved the introduction of new at-grade crossings and reduction in road space (**SM5a**). It feels less intimidating and the town feels much more connected. Joyce feels happier and safer crossing the A414, much preferring the new crossing to the old subway which has been closed off.
- The improvements (which also include **LP10**) have made journeys on foot (and by bike) in the area a lot more popular, so Joyce doesn't feel as isolated making the journey to/from her daughter's home.

Jason

- Jason's employer has introduced new parking restrictions because the warehouse has been extended taking space from the car park. The company has liaised with the County Council and introduced its own travel plan including information about public transport services.
- Jason now uses the improved direct coach service which runs between Luton and Hemel Hempstead (**SM10**) and stops at the new bus/coach interchange (**LP2**). Jason can use the shuttle bus or walk. Jason finds the services are convenient and operate at the hours which fit his shift pattern.

Nik, Karen, Josh, Emily and Abi

- Nik still needs to drive to work as his job requires it. Since improvements were made to M1 Junction 4 (**SM25b**), Nik no longer has the drive via Bushey Arches and join the M1 at Junction 5.
- Karen now has several choices in how to get to work. Since the new bus/cycle link was implemented from Tolpits Lane into the business park (**SM28a**), a new bus service is now in operation from Borehamwood via Bushey (**SM12b**). Journey times are around 15 minutes which is a lot more attractive than driving.
- During the summer months she has taken up cycling. Enhancements made to the Ebury Way cycle route (**SM12b**) have made the journey more convenient, attractive and popular and other employees of the business park use the route. She feels a lot healthier as a result. Nik and Karen plan to sell one of their cars.
- A new cycle bridge over the River Colne on Lower High Street (**LP11**) has vastly improved connectivity, making Josh's journey more convenient.
- Emily, who is less confident on the bike and who would not have considered cycling previously, takes the bike to college because the route has been improved over the river (she can now safely cycle off road), across the town centre ring road (**LP11**) and in front of the college building (**SM17**).
- Abi continues to walk to school. Improvements to bus services along London Road (**SM22**) means that traffic level increased have been minimised meaning that crossing the road is no less convenient.

- **Annie, Rob, Ava and Aiden**

- Annie considers that a major barrier to her either walking or cycling to work is the perception that not all roads she needs to travel on are suitable or safe. Furthermore, there is quite a steep hill between home and the GP Surgery. The express bus which runs along the A414 (**SM31**) (the nearest stop is around a 3 minute walk from the house) and through Apsley, operates at an attractive frequency throughout the day. With flexible ticket arrangements ,Annie is able to use the bus service on some days which has freed up a valuable parking space at the surgery for patients to use instead.
- Rob has the opportunity to change how he travel to and from work because his employer is implementing measures to reduce parking. Rob has been encouraged by the improvements to cycle and pedestrian infrastructure throughout the Maylands area (**LP4**). Upgraded facilities alongside and more crucially, across the A414 (**LP10**, **SM5a**), has made the option of travelling to/from work by bike far more attractive than it has ever been before.
- As part of the parking controls introduced at his workplace, Rob's employer is replacing a parking space with improved cycle parking. On the days that he needs to take the children to school, Rob will either drive on those days (because he has a flexible permit) or he will escort the children on foot, pushing along his bike. As the school is not too far off his route to/from work, Rob considers this a great way for he and his children to get more exercise.
- As a result of the changes made to both Annie and Rob's commuting choices, they are able to sell one of their two cars. This is especially important because as the children are growing up, they need to buy a more practical car suitable for the whole family's needs.

Conclusion and Next Steps

07

7. Conclusion and Next Steps

The provision of high quality transport infrastructure and services is an essential component in the functioning of urban and rural areas, and in the delivery of sustainable and accessible development. Transport helps facilitate journeys from home to work, to school, for leisure purposes and for access to vital services such as healthcare.

Businesses are reliant upon an efficient, safe and reliable transport system in order to attract employees and customers, as well as for the transport of goods and services to different places. As well as catering for existing requirements, transport (or a lack thereof) can also help unlock or be a constraint on new opportunities, both for economic development and for individual wellbeing.

Good planning practices can help identify the conditions needed to operate an efficient transport system and facilitate development growth proposals. If the process of planning is not equipped to deal with these requirements, the delivery of sustainable development could be delayed or even prevented, and this could therefore have lasting negative consequences on towns and communities.

Hertfordshire is facing significant levels of housing and employment growth which are expected to have an impact on the county's local and strategic transport systems and networks in the short, medium and long term. In a post-recession economy, delivering economic growth has become one of the UK Government's main priorities. However, this is set against a backdrop of increasing competition for funding to help invest in new infrastructure, with less money available for local authorities to spend today than perhaps in the past.

The transport needs of large-scale residential and employment development coming forward within Hertfordshire and surrounding areas may be reliant upon seeking vital funding from Central Government and elsewhere, and this funding may only be obtained if a good case is made for investment which is based on robust evidence and positive collaborative planning.

With this in mind, Hertfordshire County Council has developed a fresh approach to planning for the short, medium and long term transport needs.

The Growth and Transport Plan ('GTP') is a new approach to sub-county transport planning. A GTP is a strategic spatial transport plan developed by Hertfordshire County Council in partnership with key stakeholders, including District/Borough councils and the Local Enterprise Partnership, for the purpose of applying LTP policies and objectives to a growth-focused sub-area within Hertfordshire. The South West Hertfordshire GTP is the first of a suite of new GTPs and covers the large towns of Watford and Hemel Hempstead (and their interactions with St Albans).

This area is one of the most congested in Hertfordshire. It also faces significant levels of housing and employment growth in the coming years. Across all of the districts within the area it is estimated that almost 30,000 new homes will be built and over 42,000 new jobs could be created by 2031, with further growth beyond this horizon certain.

The GTP provides an opportunity to plan for the cumulative transport needs of this planned development growth, and recognise this in conjunction with much broader needs to maintain and improve the quality of life of residents, employees and visitors to the area.

The South West Hertfordshire GTP puts forward a bold schedule of transports interventions which have been formulated in response to a range of challenges and in line with a set of robust and forward-looking objectives. Interventions are defined as Projects – which are arranged into complementary Linked Project Groups - and Schemes, and in turn these have been assembled into nine Packages. The Packages are geographically aligned with the challenges and reflect key movements, current and future pressures on the transport system, and/or opportunities arising from planned future development.

It is not intended for the GTP to prescribe a rigid forward programme of works but to act as a decision making guide to steer future direction of investment and prioritisation in transport. It is envisaged that only by implementing all of the interventions within a Package will the overall benefits that the GTP aspires to be unlocked. However, it is recognised that interventions are only defined at a broad, conceptual level of detail and therefore more detailed work may reveal important changes to interventions, or alternative interventions, that could also achieve the same aim and goals of each Package.

There are many unknowns which will influence the implementation of the GTP's proposals and vision: the availability of funding; scale, location and build-out of planned development; travel behaviour; development and take-up of innovative new transport technologies; local and macro-social, economic and environmental factors. These could all exert an influence on future decision making. As far as possible, the GTP provides a flexible decision making framework built upon currently available evidence and forecasts which could and should evolve in response to changing factors.

The next step in implementing the GTP will involve the absorption of interventions into the district/borough Local Plans (and accompanying Infrastructure Delivery Plans). This is critical as it places the GTP's proposal directly in the context of local development needs.

There will also need to be a process of assessing proposals in more detail using existing or new tools including transport models. This will help to refine and validate proposals in the local and strategic context.

The schedule of interventions will also be adopted by HCC and entered into their established ranking processes and forward programme of works. This will prioritise interventions and confirm if/when more detailed work needs to be carried out in order to eventually implement interventions.

Continual recognition and monitoring of potential funding opportunities is critical. For major investment in transport, Local Authorities are increasingly reliant upon making bids to funding competitions often promoted by Central Government. It is important therefore that a robust case can be put forward for successfully obtaining funds. The GTP in conjunction with other supporting strategies and policies including Hertfordshire's Local Transport Plan and the district/borough Local Plans, will form the necessary foundation for presenting a robust narrative for why awarding funds to support Hertfordshire's transport needs represents good value for money.

This GTP should not be set in stone indefinitely therefore it is recognised that a periodic update will be required, especially where there is a significant change in local circumstances which may warrant a re-evaluation of growth and transport challenges and opportunities. In this way, the GTP will respond to an ever-changing development context and provide a robust framework for strategic spatial transport planning today and into the future.

Appendix

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8. Appendices

The following appendices pages include:

A. Intervention Schedule and Assessment – Preferred Combination

B. Intervention Objective Scoring

C. Scheme Approach Selection and Packaging

Appendix A - Intervention Schedule and Assessment – Preferred Combination

Intervention Qualitative Assessment

Intervention ID	Scheme Approach ID / Project	Intervention Name	District(s)	Cost Range	Timescale if delivered in isolation	Level of Risk	Likelihood of Funding (internal or external)
SM1	-	Capacity improvements to M25 J20	Three Rivers	£5m-£10m	5-10 years	Medium Risk	Medium Likelihood
SM2	a	Relocation of Hemel Hempstead station	Dacroum	£50m-£100m	5-10 years	High Risk	Low Likelihood
	b	Moderate enhancement to Hemel Hempstead station	Dacroum	£1m-£2.5m	2-5 years	Low Risk	High Likelihood
	c	Substantial enhancement to Hemel Hempstead station	Dacroum	£10m-£50m	2-5 years	Medium Risk	Medium Likelihood
SM4	a	Magic Roundabout - Bus focused improvements	Dacroum	£1m-£2.5m	2-5 years	Medium Risk	Medium Likelihood
	b	Magic Roundabout - Minor Cycle Improvements	Dacroum	£1m-£2.5m	2-5 years	High Risk	Low Likelihood
SM5	a	A414 multi-modal & bus priority improvements	Dacroum	£5m-£10m	5-10 years	Medium Risk	Medium Likelihood
	b	Northern distributor road	Dacroum	£50m-£100m	10-20 years	Low Risk	High Likelihood
	c	A414 Thoroughfare - grade-separated junctions	Dacroum	£10m-£50m	10-20 years	High Risk	Low Likelihood
SM6	a	Hemel Hempstead Eastern Spine Road - Car Focus	Dacorum, St Albans	£5m-£10m	5-10 years	Low Risk	High Likelihood
	b	Hemel Hempstead Eastern Spine Road - Multimodal Focus	Dacorum, St Albans	£2.5m-£5m	5-10 years	Low Risk	High Likelihood
SM7	a	M1 Junction 9 relocation	St Albans	£10m-£50m	5-10 years	High Risk	Low Likelihood
	b	M1 Junction 8a (additional junction)	St Albans	£10m-£50m	5-10 years	High Risk	Medium Likelihood
	c	M1 Junction 8 enhancement	St Albans, Dacorum	£10m-£50m	5-10 years	Medium Risk	High Likelihood
SM8	-	Hemel Hempstead town-wide bus service reconfiguration	Dacorum	£0-£500k	0-2 years	Low Risk	Medium Likelihood
SM10	-	M1 dedicated coach service connecting Luton and Hemel Hempstead (or Greenline 757 diversion)	Dacorum, St Albans, Central Bedfordshire, Luton	£2.5m-£5m	2-5 years	Low Risk	Medium Likelihood
SM12	a	Holywell to South Oxhey Cross-Colne Sustainable Link (cycle only)	Three Rivers, Watford	£500k-£1m	0-2 years	Low Risk	Medium Likelihood

Intervention ID	Scheme Approach ID / Project	Intervention Name	District(s)	Cost Range	Timescale if delivered in isolation	Level of Risk	Likelihood of Funding (internal or external)
	b	Holywell to South Oxhey Cross-Colne Sustainable Link (cycle and bus only)	Three Rivers, Watford	£5m-£10m	5-10 years	Medium Risk	Medium Likelihood
SM13	a	Abbey Line Park & Rail Hub: Extension of Park Street Station platform	St Albans	£2.5m-£5m	5-10 years	Medium Risk	Low Likelihood
	b	Abbey Line Park & Rail Hub: Additional station	St Albans	£10m-£50m	5-10 years	Medium Risk	Medium Likelihood
	c	Abbey Line Park & Ride Hub: Additional station and bus only link to Cottonmill Lane	St Albans	£10m-£50m	5-10 years	Medium Risk	Medium Likelihood
	d	Abbey Line Park & Rail Hub: Park Street relocated	St Albans	£10m-£50m	5-10 years	Medium Risk	Medium Likelihood
SM14	-	Watford M1 J5 Park and Ride	Watford, Hertsmere	£5m-£10m	5-10 years	Medium Risk	Medium Likelihood
SM15	-	Watford Junction - Town Centre (Clarendon Road) public realm enhancements	Watford	£1m-£2.5m	2-5 years	Low Risk	Medium Likelihood
SM16	a	M1 J6 reconfiguration (Bricket Wood)	St Albans, Watford	£10m-£50m	5-10 years	Medium Risk	Low Likelihood
	b	M1 J6a/M25 J21 all movement additional slips plus options for A405 bus priority	St Albans	£100m+	10-20 years	High Risk	Medium Likelihood
	c	M1 J6a/M25 J21 partial additional slips plus options for A405 part bus priority	St Albans	£50m-£100m	5-10 years	High Risk	Medium Likelihood
SM17	-	A411 Hempstead Road and Grand Union Canal Corridor Cycleway Improvements	Watford	£500k-£1m	2-5 years	Low Risk	Medium Likelihood
SM18	-	Parking Strategy Study & Action Plan (includes cycle parking provision, regulation of freight deliveries and Park & Ride)	Watford	£0-£500k	0-2 years	Low Risk	Medium Likelihood
SM19	a	A41 Kings Langley Station Park and Ride	Three Rivers	£5m-£10m	5-10 years	Medium Risk	Medium Likelihood
	b	A41 Hemel Hempstead West Park and Ride	Dacorum	£5m-£10m	5-10 years	Medium Risk	Medium Likelihood
	c	A41 Bourne End Park and Ride	Dacorum	£5m-£10m	5-10 years	Medium Risk	Medium Likelihood
	d	A41 Tring Park and Ride	Dacorum	£5m-£10m	5-10 years	Medium Risk	Medium Likelihood
SM20	-	A405 Cycleway	St Albans, Watford	£1m-£2.5m	0-2 years	Low Risk	Medium Likelihood
SM21	-	Watford Western Gateway to Watford Junction orbital cycle route	Watford	£500k-£1m	0-2 years	Low Risk	High Likelihood
SM22	-	Watford Area Bus Reconfiguration (study)	Watford, Three Rivers, Hertsmere	£0-£500k	0-2 years	Low Risk	High Likelihood
SM23	a	Colonial Way - St Albans Road all traffic link	Watford	£10m-£50m	5-10 years	Medium Risk	Medium Likelihood

Intervention ID	Scheme Approach ID / Project	Intervention Name	District(s)	Cost Range	Timescale if delivered in isolation	Level of Risk	Likelihood of Funding (internal or external)
	b	Colonial Way-St Albans Road bus, pedestrian and cycle only link	Watford	£10m-£50m	5-10 years	Medium Risk	Medium Likelihood
	c	Colonial Way-St Albans Road pedestrian and cycle only link	Watford	£1m-£2.5m	5-10 years	Medium Risk	Medium Likelihood
SM24	-	Watford Junction – Station Road and Woodford Road road space consolidation and pedestrian, cycle and bus improvement	Watford	£2.5m-£5m	2-5 years	Medium Risk	Medium Likelihood
SM25	a	Watford Strategic Gateway - M1 J5 focus	Hertsmere, Edgware	£50m-£100m	5-10 years	High Risk	Low Likelihood
	b	Watford Strategic Gateway - M1 J4 focus	Hertsmere	£50m-£100m	5-10 years	High Risk	Low Likelihood
SM26	-	Ring Road multi-modal movement, access and permeability improvements	Watford	£2.5m-£5m	5-10 years	High Risk	Medium Likelihood
SM27	-	Magic Roundabout Cycle Flyover	Dacorum	£2.5m-£5m	2-5 years	Medium Risk	Low Likelihood
SM28	a	Western Gateway Southern Access: Buses, pedestrians and cycles only	Watford, Three Rivers	£2.5m-£5m	2-5 years	Low Risk	High Likelihood
	b	Western Gateway Southern Access: All traffic	Watford, Three Rivers	£2.5m-£5m	2-5 years	Low Risk	High Likelihood
SM29	-	A414 J8 Cycle Bridge	St Albans, Dacorum	£10m-£50m	5-10 years	Low Risk	Medium Likelihood
SM30	-	A41 (M25 J20 and J19) Bus Priority measures	Dacorum, Three Rivers	£2.5m-£5m	5-10 years	Medium Risk	Low Likelihood
SM31	-	Enhanced Watford-Hemel Bus Services	Dacorum, Three Rivers, Watford	£2.5m-£5m	2-5 years	Medium Risk	Medium Likelihood
SM32	-	Streetscape and walking/cycling enhancements in Apsley/Two Waters area	Dacorum	£1m-£2.5m	2-5 years	Medium Risk	Medium Likelihood
SM34	-	Watford cross-town connectivity study	Watford	£0-£500k	0-2 years	Low Risk	Medium Likeihood
SM35	-	Ebury Way improvements	Watford, Three Rivers	£1m-£2.5m	2-5 years	Low Risk	Medium Likeihood
SM36	-	Bushey Arches and nearby network - All modes traffic movement study	Watford, Three Rivers, Hertsmere	£0-500k	0-2 years	Low Risk	Medium Likeihood
LP1	PR8	Fishery Road improved pedestrian and cycle link	Dacorum	£500k-£1m	2-5 years	Medium Risk	Medium Likelihood
	PR9	A4251 London Road pedestrian/cycle enhancement		£0-£500k	0-2 years	Low Risk	High Likelihood
	PR10	Two Waters-A4251/A414 junction reorganisation		£500k-£1m	2-5 years	Medium Risk	Medium Likelihood
LP2	PR19	East Hemel (Maylands) Multi-Modal Transport Interchange	St Albans, Dacorum	£2.5m-£5m	5-10 years	Medium Risk	Medium Likelihood

Intervention ID	Scheme Approach ID / Project	Intervention Name	District(s)	Cost Range	Timescale if delivered in isolation	Level of Risk	Likelihood of Funding (internal or external)
	PR96	Maylands Shuttle Bus and ML1 enhancements		£500k-£1m	5-10 years	Medium Risk	Medium Likelihood
LP3	PR20	Nickey Line north-south extension	Dacorum, St Albans	£0-£500k	2-5 years	Low Risk	High Likelihood
	PR21	A4147 cycleway		£500k-£1m	0-2 years	Low Risk	Medium Likelihood
	PR22	A414 cycleway: Hemel Hempstead to Park Street		£500k-£1m	5-10 years	High Risk	Low Likelihood
LP4	PR27	Wood Lane End - Boundary Way connection	Dacorum	£500k-£1m	2-5 years	Medium Risk	High Likelihood
	PR28	Quietway - Buncefield Lane southern section		£0-£500k	2-5 years	Low Risk	High Likelihood
	PR97	Quietway - Buncefield Lane central section		£0-£500k	2-5 years	Low Risk	High Likelihood
	PR98	Quietway - Buncefield Lane northern section		£0-£500k	2-5 years	Low Risk	High Likelihood
	PR99	Quietway - Cherry Tree Lane		£0-£500k	2-5 years	Low Risk	High Likelihood
	PR111	Breakspear Way signalised pedestrian & cycle crossing	Dacorum	£0-£500k	0-2 years	Medium Risk	High Likelihood
LP5	PR30	New lighting on Nickey Line within urban area	Dacorum, St Albans	£0-£500k	0-2 years	Medium Risk	Medium Likelihood
	PR100	Improved step free access from Cherry Tree Lane		£0-£500k	0-2 years	Medium Risk	Medium Likelihood
	PR101	Improved step free access from Three Cherry Trees Lane		£0-£500k	0-2 years	Medium Risk	Medium Likelihood
LP6	PR35	M1 J10 southbound on slip capacity improvement	St Albans, Dacorum, Central Bedfordshire, Luton	£1m-£2.5m	2-5 years	Medium Risk	Medium Likelihood
	PR36	A1081 Harpenden town centre streetscape and walking/cycling improvements		£500k-£1m	2-5 years	Medium Risk	Medium Likelihood
	PR37	A1081 cycle corridor		£500k-£1m	2-5 years	Medium Risk	Medium Likelihood
LP7	PR110	By-the-Wood -Oxhey Lane -Merry Hill greenway cycle link	Three Rivers, Watford	£0-£500k	0-2 years	Low Risk	Medium Likelihood
	PR40	Improved South Oxhey-Carpenders Park link		£0-£500k	0-2 years	Low Risk	Medium Likelihood
	PR102	Anthony Close, The Pathway, Watford Heath		£0-£500k	0-2 years	Low Risk	Medium Likelihood
	PR103	Delta Gain (South Oxhey-Carpenders Park)		£0-£500k	0-2 years	Medium Risk	Medium Likelihood

Intervention ID	Scheme Approach ID / Project	Intervention Name	District(s)	Cost Range	Timescale if delivered in isolation	Level of Risk	Likelihood of Funding (internal or external)
LP8	PR45	Ascot Road bus priority	Watford, Three Rivers	£500k-£1m	2-5 years	Medium Risk	High Likelihood
	PR85	Ascot Road -Whippendell Road-Rickmansworth Road junction improvements		£1m-£2.5m	2-5 years	Medium Risk	Medium Likelihood
LP9	PR66	Public Realm enhancements at Water Lane/High Street bus interchange	Watford	£500k-£1m	2-5 years	Medium Risk	Medium Likelihood
	PR104	Public Realm enhancements at Beechen Grove bus interchange		£500k-£1m	2-5 years	Medium Risk	Medium Likelihood
LP10	PR69	Wood Crescent-Runham Road-Wheelers Lane (ski centre)	Dacorum	£0-£500k	0-2 years	Low Risk	High Likelihood
	PR105	Lower Yott-Windmill Road		£0-£500k	0-2 years	Low Risk	High Likelihood
	PR106	Jarman Park		£0-£500k	0-2 years	Low Risk	High Likelihood
	PR107	Bennetts End Road		£0-£500k	0-2 years	Low Risk	High Likelihood
	PR108	White Hart Road-Longlands		£0-£500k	0-2 years	Low Risk	High Likelihood
	PR109	Leverstock Green Rd (incl. at-grade crossing)		£0-£500k	0-2 years	Low Risk	High Likelihood
LP11	PR70	Exchange Road missing cycle link (Vicarage Road)	Watford	£0-£500k	0-2 years	Low Risk	Medium Likelihood
	PR71	Lower High Street shared use cycle path		£0-£500k	0-2 years	Medium Risk	High Likelihood
	PR72	Watford Ring-Road gateway junction enhancements		£2.5m-£5m	2-5 years	Medium Risk	Medium Likelihood
LP12	PR80	Ebury Way access enhancements, Rickmansworth	Three Rivers	£500k-£1m	0-2 years	Low Risk	Medium Likelihood
	PR81	Church Street 20mph Zone, Rickmansworth		£0-£500k	0-2 years	Low Risk	Medium Likelihood
LP13	PR82	Homestead Road Rickmansworth Station bus stop linkage	Three Rivers	£0-£500k	0-2 years	Low Risk	Medium Likelihood
	PR83	Enhanced linkage between Homestead Rd (Rickmansworth Station) and Victoria Close		£0-£500k	0-2 years	Medium Risk	Medium Likelihood
	PR86	A404 Riverside Drive, Church Street Roundabout minor enhancements		£0-£500k	0-2 years	Low Risk	Medium Likelihood
	PR87	A412-A404 Riverside Drive Uxbridge Road Roundabout Cycle Crossings, Rickmansworth		£500k-£1m	0-2 years	Medium Risk	Medium Likelihood
LP14	PR112	B653 Lower Luton Road pedestrian and cycle crossing	St Albans	£0-£500k	2-5 years	Low Risk	High Likelihood

Intervention ID	Scheme Approach ID / Project	Intervention Name	District(s)	Cost Range	Timescale if delivered in isolation	Level of Risk	Likelihood of Funding (internal or external)
	PR113	Ox Lane-Sun Lane-Hollybush Lane-Westfield Road Junction Review	St Albans	£0-£500k	2-5 years	Low Risk	High Likelihood
	PR114	Carlton Road-Sun Lane Junction Review	St Albans	£0-£500k	2-5 years	Low Risk	High Likelihood
	PR115	Station Road-Carlton Road-Station eastern access road Junction Review	St Albans	£0-£500k	2-5 years	Low Risk	High Likelihood
	PR116	Cycle and Pedestrian Route Improvements at Harpenden Station	St Albans	£0-£500k	2-5 years	Medium Risk	Medium Likelihood
	PR117	Coldharbour Lane-Waveney Road footpath	St Albans	£0-£500k	2-5 years	Low Risk	High Likelihood

Appendix B - Intervention Objective Scoring

Objectives

A	Support sustainable economic growth and regeneration within South West Hertfordshire by improving connectivity, primarily for walking, cycling and public transport
B	Ensure new infrastructure and streets are resilient to changing environmental conditions
C	Improve accessibility and network resilience, and achieve a shift to more efficient modes of travel by providing a greater choice of attractive, integrated alternatives to the private car
D	Improve public health and quality of life, through encouraging and enabling active travel and reducing transport-generated air and noise pollution
E	Encourage vibrant communities by integrating streets, enhancing walking and cycling networks, and improving the natural and built environment
F	Improve safety and perception of safety and security risks by providing high quality and safe facilities for walking, cycling and public transport users
G	Seek to reduce transport related emissions by embracing new technologies and encouraging sustainable travel modes

Achievement against GTP Objective	Score
Large Benefit	2
Small Benefit	1
Not Impact	0
Small Dis-benefit	-1
Large Dis-benefit	-2

Intervention ID	Scheme Approach ID / Project	Intervention Name	GTP Objectives							Total Score	Scheme Approach Rank
			A	B	C	D	E	F	G		
SM1	**-**	Capacity improvements to M25 J20	Small benefit	No impact	Small benefit	Small benefit	Small benefit	No impact	Small dis-benefit	3	N/A
SM2	**a**	Relocation of Hemel Hempstead station	Small benefit	No impact	Small benefit	No impact	Large benefit	No impact	No impact	4	**1**
	b	Moderate enhancement to Hemel Hempstead station	No impact	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	4	**1**

Intervention ID	Scheme Approach ID / Project	Intervention Name	GTP Objectives							Total Score	Scheme Approach Rank
			A	B	C	D	E	F	G		
	c	Substantial enhancement to Hemel Hempstead station	Small benefit	No impact	No impact	Small benefit	Small benefit	Large benefit	Small dis-benefit	4	1
SM4	a	Magic Roundabout - Bus focused improvements	Small benefit	No impact	Small benefit	Small benefit	No impact	No impact	Small benefit	4	2
	b	Magic Roundabout - Minor Cycle Improvements	No impact	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	5	1
SM5	a	A414 multi-modal & bus priority improvements	Small benefit	No impact	Small benefit	Large benefit	Large benefit	Large benefit	Small benefit	9	1
	b	Northern distributor road	Small benefit	No impact	No impact	Small dis-benefit	Small dis-benefit	No impact	Small dis-benefit	-2	2
	c	A414 Thoroughfare - grade-separated junctions	Small benefit	No impact	Large dis-benefit	Small dis-benefit	Large dis-benefit	Large dis-benefit	Large dis-benefit	-8	3
SM6	a	Hemel Hempstead Eastern Spine Road - Car Focus	Small benefit	No impact	No impact	No impact	Small dis-benefit	No impact	Small dis-benefit	-1	2
	b	Hemel Hempstead Eastern Spine Road - Multimodal Focus	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	1
SM7	a	M1 Junction 9 relocation	Small benefit	No impact	Small benefit	Small dis-benefit	Small dis-benefit	No impact	Small dis-benefit	-1	1
	b	M1 Junction 8a (additional junction)	Small benefit	No impact	Small benefit	Small dis-benefit	Small dis-benefit	No impact	Small dis-benefit	-1	1
	c	M1 Junction 8 enhancement	Small benefit	No impact	Small benefit	Small dis-benefit	Small dis-benefit	No impact	Small dis-benefit	-1	1
SM8	-	Hemel Hempstead town-wide bus service reconfiguration	Large benefit	No impact	Large benefit	Small benefit	No impact	Small benefit	Small benefit	7	N/A
SM10	-	M1 dedicated coach service connecting Luton and Hemel Hempstead (or 757 Greenline diversion)	Small benefit	No impact	Small benefit	No impact	No impact	No impact	Small benefit	3	N/A
SM12	a	Holywell to South Oxhey Cross-Colne Sustainable Link (cycle only)	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	1
	b	Holywell to South Oxhey Cross-Colne Sustainable Link (cycle and bus only)	Small benefit	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	5	2
SM13	a	Abbey Line Park & Rail Hub: Extension of Park Street Station platform	Small benefit	No impact	Small benefit	No impact	No impact	No impact	No impact	2	4
	b	Abbey Line Park & Rail Hub: Additional station	Small benefit	No impact	Large benefit	Small benefit	Small benefit	Small benefit	Small benefit	7	1
	c	Abbey Line Park & Ride Hub: Additional station and bus only link to Cottonmill	Small benefit	No impact	Large benefit	Small benefit	Small benefit	Small benefit	Small benefit	7	1

Intervention ID	Scheme Approach ID / Project	Intervention Name	GTP Objectives							Total Score	Scheme Approach Rank
			A	B	C	D	E	F	G		
		Lane									
	d	Abbey Line Park & Rail Hub: Park Street relocated	Small benefit	No impact	Large benefit	Large benefit	Small benefit	Small benefit	No impact	7	1
SM14	-	Watford M1 J5 Park and Ride	No impact	No impact	Small benefit	Small benefit	No impact	No impact	Small benefit	3	N/A
SM15	-	Watford Junction - Town Centre (Clarendon Road) public realm enhancements	Small benefit	No impact	Large benefit	Small benefit	Large benefit	Large benefit	Small benefit	9	N/A
SM16	a	M1 J6 reconfiguration (Bricket Wood)	No impact	No impact	Small benefit	No impact	Small dis-benefit	No impact	Small dis-benefit	-1	3
	b	M1 J6a/M25 J21 all movement additional slips plus options for A405 bus priority	No impact	No impact	Small benefit	Small benefit	Large benefit	Large benefit	No impact	6	1
	c	M1 J6a/M25 J21 partial additional slips plus options for A405 part bus priority	No impact	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small dis-benefit	3	2
SM17	-	A411 Hempstead Road and Grand Union Canal Corridor Cycleway Improvements	No impact	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	4	N/A
SM18	-	Parking Strategy Study & Action Plan (Includes cycle parking provision, regulation of freight deliveries and Park & Ride)	Small benefit	No impact	Small benefit	Small benefit	Large benefit	Small benefit	Small benefit	7	N/A
SM19	a	A41 Kings Langley Station Park and Ride	No impact	No impact	Small benefit	No impact	No impact	No impact	Small benefit	2	1
	b	A41 Hemel Hempstead West Park and Ride	No impact	No impact	Small benefit	No impact	No impact	No impact	Small benefit	2	1
	c	A41 Bourne End Park and Ride	No impact	No impact	Small benefit	No impact	No impact	No impact	Small benefit	2	1
	d	A41 Tring Park and Ride	No impact	No impact	Small benefit	No impact	No impact	No impact	Small benefit	2	1
SM20	-	A405 Cycleway	No impact	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	4	N/A
SM21	-	Watford Western Gateway to Watford Junction orbital cycle route	Small benefit	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	7	N/A
SM22	-	Watford Area Bus Reconfiguration (study)	Large benefit	No impact	Large benefit	Small benefit	No impact	No impact	Small benefit	6	N/A
SM23	a	Colonial Way - St Albans Road all traffic link	Small benefit	No impact	No impact	Small dis-benefit	No impact	Large dis-benefit	Small dis-benefit	-3	3
	b	Colonial Way-St Albans Road bus, pedestrian and cycle only link	Small benefit	No impact	Small benefit	Small benefit	Large Benefit	Large Benefit	No impact	7	1

Intervention ID	Scheme Approach ID / Project	Intervention Name	GTP Objectives							Total Score	Scheme Approach Rank
			A	B	C	D	E	F	G		
	c	Colonial Way-St Albans Road pedestrian and cycle only link	Small benefit	No impact	Small benefit	Small benefit	Large Benefit	Small benefit	No impact	6	2
SM24	-	Watford Junction – Station Road and Woodford Road road space consolidation and pedestrian, cycle and bus imrpovement	No impact	No impact	Small benefit	Small benefit	Large benefit	Small benefit	Small benefit	6	N/A
SM25	a	Watford Strategic Gateway - M1 J5 focus	No impact	No impact	Small dis-benefit	No impact	No impact	No impact	Small dis-benefit	-2	2
	b	Watford Strategic Gateway - M1 J4 focus	No impact	No impact	Small dis-benefit	No impact	Small benefit	No impact	Small dis-benefit	-1	1
SM26	-	Ring Road multi-modal movement, access and permeability imrpovements	No impact	No impact	Small benefit	No impact	Small benefit	Small benefit	Small benefit	4	N/A
SM27	-	Magic Roundabout Cycle Flyover	Large benefit	No impact	Small benefit	Small benefit	Small benefit	Large benefit	No impact	7	N/A
SM28	a	Western Gateway Southern Access: Buses, pedestrians and cycles only	Large benefit	No impact	Large benefit	Small benefit	No impact	Small benefit	Small benefit	7	1
	b	Western Gateway Southern Access: All traffic	Large benefit	No impact	Small benefit	No impact	No impact	No impact	No impact	3	2
SM29	-	A414 J8 Cycle Bridge	No impact	Small benefit	Small benefit	Small benefit	Large benefit	Small benefit	Small benefit	7	N/A
SM30	-	A41 (M25 J20 and J19) Bus Priority measures	Small benefit	No impact	No impact	Small benefit	Small benefit	No impact	Small benefit	4	N/A
SM31	-	Enhanced Watford-Hemel Bus Services	Small benefit	No impact	Small benefit	Small benefit	No impact	No impact	Small benefit	4	N/A
SM32	-	Streetscape and walking/cycling enhancements in Apsley/Two Waters area	No impact	No impact	Small benefit	No impact	Small benefit	Small benefit	No impact	3	N/A
SM34	-	Watford cross-town connectivity study	Small benefit	No impact	Small benefit	Small benefit	Small benefit	No imapct	Small benefit	4	N/A
SM35	-	Ebury Way improvements	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A
SM36	-	Bushey Arches and nearby network - All modes traffic movement study	Small benefit	No impact	Small benefit	Small benefit	Small benefit	No imapct	Small benefit	4	N/A
LP1	PR8	Fishery Road improved pedestrian and cycle link	No impact	No impact	Small benefit	Large benefit	Small benefit	Small benefit	Small benefit	6	N/A
	PR9	A4251 London Road pedestrian/cycle enhancement	No impact	No impact	Small benefit	Small benefit	Small benefit	Large benefit	Small benefit	6	N/A
	PR10	Two Waters-A4251/A414 junction reorganisation	Small benefit	No impact	Small benefit	No impact	Small benefit	Small benefit	Small benefit	5	N/A

Intervention ID	Scheme Approach ID / Project	Intervention Name	GTP Objectives							Total Score	Scheme Approach Rank
			A	B	C	D	E	F	G		
LP2	PR19	East Hemel (Maylands) Multi-Modal Transport Interchange	Small benefit	No impact	Small benefit	Small benefit	No impact	No impact	No impact	3	N/A
	PR96	Maylands Shuttle Bus and ML1 enhancements	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A
LP3	PR20	Nickey Line north-south extension	No impact	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	4	N/A
	PR21	A4147 cycleway	No impact	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	4	N/A
	PR22	A414 cycleway: Hemel Hempstead to Park Street	Small benefit	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	5	N/A
LP4	PR27	Wood Lane End - Boundary Way connection	No impact	No impact	Small benefit	No impact	Small dis-benefit	No impact	No impact	0	N/A
	PR28	Quietway - Buncefield Lane southern section	No impact	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	5	N/A
	PR97	Quietway - Buncefield Lane central section	No impact	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	5	N/A
	PR98	Quietway - Buncefield Lane northern section	No impact	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	5	N/A
	PR99	Quietway - Cherry Tree Lane	No impact	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	5	N/A
	PR111	Breakspear Way signalised pedestrian & cycle crossing	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A
LP5	PR30	New lighting on Nickey Line within urban area	No impact	No impact	Small benefit	Small benefit	No impact	Large benefit	Small benefit	5	N/A
	PR100	Improved step free access from Cherry Tree Lane	No impact	No impact	Small benefit	Small benefit	No impact	No impact	Small benefit	3	N/A
	PR101	Improved step free access from Three Cherry Trees Lane	No impact	No impact	Small benefit	Small benefit	No impact	No impact	Small benefit	3	N/A
LP6	PR35	M1 J10 southbound on slip capacity improvement	No impact	No impact	No impact	Small benefit	Large benefit	Small benefit	Small dis-benefit	3	N/A
	PR36	A1081 Harpenden town centre streetscape and walking/cycling improvements	Small benefit	No impact	Small benefit	Large benefit	Large benefit	Small benefit	Small benefit	8	N/A
	PR37	A1081 cycle corridor	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A
LP7	PR40	Improved South Oxhey-Carpenders Park link	No impact	No impact	Small benefit	Small benefit	No impact	No impact	Small benefit	3	N/A
	PR102	Anthony Close, The Pathway, Watford Heath pedestrian and cycle links	No impact	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	4	N/A

Intervention ID	Scheme Approach ID / Project	Intervention Name	GTP Objectives							Total Score	Scheme Approach Rank
			A	B	C	D	E	F	G		
	PR103	Delta Gain (South Oxhey-Carpenders Park) pedestrian and cycle links	No impact	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	4	N/A
	PR110	By-the-Wood -Oxhey Lane -Merry Hill greenway cycle link	No impact	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	4	N/A
LP8	PR45	Ascot Road bus priority	Small benefit	No impact	Small benefit	Small benefit	No impact	No impact	Small benefit	4	N/A
	PR85	Ascot Road -Whippendell Road-Rickmansworth Road junction improvements	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A
LP9	PR66	Public Realm enhancements at Water Lane/High Street bus interchange	No impact	No impact	Small benefit	Small benefit	Small benefit	No impact	Small benefit	4	N/A
	PR104	Public Realm enhancements at Beechen Grove bus interchange	No impact	No impact	No impact	Small benefit	Small benefit	Small benefit	No impact	3	N/A
LP10	PR69	Wood Crescent-Runham Road-Wheelers Lane (ski centre) cycle and pedestrian improvements	No impact	No impact	Small benefit	Large benefit	Small benefit	Small benefit	Small benefit	6	N/A
	PR105	Lower Yott-Windmill Road cycle and pedestrian improvements	No impact	No impact	Small benefit	Large benefit	Small benefit	Small benefit	Small benefit	6	N/A
	PR106	Jarman Park cycle and pedestrian improvements	No impact	No impact	Small benefit	Large benefit	Small benefit	Small benefit	Small benefit	6	N/A
	PR107	Bennetts End Road cycle and pedestrian improvements	No impact	No impact	Small benefit	Large benefit	Small benefit	Small benefit	Small benefit	6	N/A
	PR108	White Hart Road-Longlands cycle and pedestrian improvements	No impact	No impact	Small benefit	Large benefit	Small benefit	Small benefit	Small benefit	6	N/A
	PR109	Leverstock Green Rd cycle and pedestrian improvements (incl. at-grade crossing)	No impact	No impact	Small benefit	Large benefit	Small benefit	Small benefit	Small benefit	6	N/A
LP11	PR70	Exchange Road missing cycle link (Vicarage Road)	No impact	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	4	N/A
	PR71	Lower High Street shared use cycle path	No impact	No impact	Small benefit	Small benefit	No impact	Small benefit	Small benefit	4	N/A
	PR72	Watford Ring-Road gateway junction enhancements	No impact	No impact	Small benefit	Small benefit	Small benefit	Large benefit	Small benefit	6	N/A
LP12	PR80	Ebury Way access enhancements, Rickmansworth	Small benefit	No impact	Small benefit	Small benefit	No impact	Small benefit	No impact	4	N/A
	PR81	Church Street 20mph Zone, Rickmansworth	No impact	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	5	N/A
LP13	PR82	Homestead Road Rickmansworth Station bus stop linkage	No impact	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	5	N/A
	PR83	Enhanced linkage between Homestead Rd (Rickmansworth Station) and Victoria Close	No impact	No impact	No impact	No impact	Small benefit	Small benefit	No impact	2	N/A

Intervention ID	Scheme Approach ID / Project	Intervention Name	GTP Objectives							Total Score	Scheme Approach Rank
			A	B	C	D	E	F	G		
	PR86	A404 Riverside Drive, Church Street Roundabout minor enhancements	No impact	No impact	No impact	No impact	No impact	Small benefit	No impact	1	N/A
	PR87	A412-A404 Riverside Drive Uxbridge Road Roundabout Cycle Crossings, Rickmansworth	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A
LP14	PR112	B653 Lower Luton Road pedestrian and cycle crossing	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A
	PR113	Ox Lane-Sun Lane-Hollybush Lane-Westfield Road Junction Review	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A
	PR114	Carlton Road-Sun Lane Junction Review	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A
	PR115	Station Road-Carlton Road-Station eastern access road Junction Review	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A
	PR116	Cycle and Pedestrian Route Improvements at Harpenden Station	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A
	PR117	Coldharbour Lane-Waveney Road footpath	Small benefit	No impact	Small benefit	Small benefit	Small benefit	Small benefit	Small benefit	6	N/A

Appendix C - Scheme Approach Selection and Packaging

Packages

1	Hemel Hempstead East-West Cross Town Corridor
2	Maylands (Hemel Hempstead)
3	Hemel Hempstead – Luton Corridor
4	St Albans – Watford Corridor
5	Western Gateway (Watford)
6	Watford – Hemel Hempstead Corridor
7	Watford Central
8	Watford South
9	Rickmansworth

Intervention ID	Scheme Approach ID / Project	Approach Selection		Challenge Group(s) Alignment			Packages								
							1	2	3	4	5	6	7	8	9
SM1	-	-	-	Watford - Hemel Hempstead Strategic inter-urban route	-	-						6			
SM2	a	✘	Relocation of the station will be costly. Any new location will still be remote from large parts of the town. Moderate station enhancements will be sufficient enough to promote inter-modal connectivity. However more substantial investment in station facilities complemented by improved walking/cycling routes will promote inter-modal connectivity.	Hemel Hempstead Urban Area	Watford - Hemel Hempstead Strategic inter-urban route	Rail Commuting									
	b	✘		Hemel Hempstead Urban Area	Watford - Hemel Hempstead Strategic inter-urban route	Rail Commuting									
	c	✔		Hemel Hempstead Urban Area	Watford - St Albans Strategic inter-urban route	Rail Commuting	1					6			
SM4	a	✔	It is preferable to keep cyclists off the carriageway so that the roundabout remains vehicle-focused. Bus priority will support E-W cross-town connectivity in a more significant way.	Hemel Hempstead Urban Area	-	-	1								
	b	✘		Hemel Hempstead Urban Area	-	-									
SM5	a	✔	The A414 dissects the town, therefore measures which encourage more traffic onto the road and increase severance (making it harder for people to cross the road) are discouraged. A new road to the north of the town may only be viable in conjunction with additional development which is not proposed at present. Introducing elements of bus priority	Hemel Hempstead Urban Area	-	-	1								
	b	✔		Hemel Hempstead Urban Area	-	-									

Intervention ID	Scheme Approach ID / Project	Approach Selection		Challenge Group(s) Alignment			Packages								
	c	✘	and improved at-grade cycle/pedestrian crossings is considered a suitable first step towards reimagining the role of the A414 and the hierarchy of roads across Hemel Hempstead.	Hemel Hempstead Urban Area	-	-									
SM6	a	✘	A spine road which is not promoted as a high capacity, high speed road but instead incorporates high quality facilities for pedestrians, cyclists, and public transport should encourage shorter distance trips within Hemel Hempstead by healthier travel modes.	Hemel Hempstead Urban Area	-	-									
	b	✔		Hemel Hempstead Urban Area	-	-		2							
SM7	a	✘	As studies in and around the Maylands area built the case for M1 J8 improvements, an exception has been made to acknowledge that both SM7b and SM7c will likely be needed as a solution for congestion at M1 J8. M1 J8 enhancement may be required in the shorter term however an extra J8a could provide better connectivity to the town and help ease pressure on the A414 in the longer term.	M1 Corridor Strategic inter-urban route	-	-									
	b	✔		M1 Corridor Strategic inter-urban route	-	-	1	2	3						
	c	✔		M1 Corridor Strategic inter-urban route	-	-	1	2	3						
SM8	-	-	-	Hemel Hempstead Urban Area	-	-	1	2							
SM10	-	-	-	M1 Corridor Strategic inter-urban route	-	-		2	3						
SM12	a	✘	The provision of a cycle and bus link over the River Colne from Tolpits Lane to Hampermill Lane (east of Hampermill Lake) presents an opportunity to substantially influence mode shift from car to more sustainable modes of transport for journeys to/from the Western Gateway business parks. A combined bus and cycle link may also be more effective at helping to address congestion at the Bushey Arches junctions than purely a cycle link. An all traffic link would perpetuate high levels of travel by car to the Western Gateway area and undermine the quality of existing sustainable routes.	Watford Urban Area	-	-									
	b	✔		Watford Urban Area	-	-					5			8	
SM13	a	✔	The Abbey Line presents an opportunity to substantially enhance connectivity between Watford and St Albans and provide an attractive alternative to the car. A Park and Rail Hub which could incorporate a bus (+ foot and cycle) connection to St Albans City Station via the Cottonmill area of St Albans, could substantially enhance connectivity. The facility can also be promoted as a Park and Rail hub for motorists on the A414 and A405 corridor, and east-west	Watford - St Albans Strategic inter-urban route	-	-				4					
	b	✔		Watford - St Albans Strategic inter-urban route	-	-				4					
	c	✔		Watford - St Albans Strategic inter-urban route	-	-				4					

Intervention ID	Scheme Approach ID / Project	Approach Selection		Challenge Group(s) Alignment			Packages								
	d	✔	cross county inter-urban bus services could also interchange with the hub. A preferred option has not been identified at this time.	Watford - St Albans Strategic inter-urban route	-	-				4					
SM14	-	-	-	Watford Urban Area	M1 Corridor Strategic inter-urban route	-							7	8	
SM15	-	-	-	Watford Urban Area	Rail Commuting	-						6	7		
SM16	a	✘	Currently journeys between M1 South (Watford and London) and the M25 have to route via M1 J6 and a section of the A405. This makes this section of road very busy as it also carries a mixture of local and strategic journeys. Providing additional interchange links at M25 J21 could remove traffic from the A405 making it more viable to provide bus priority and further encourage non-car journeys between St Albans and Watford. An improvement at M1 J6 would not provide these opportunities, and a partial improvement at J21, whilst cheaper, may not deliver sufficient benefit in terms of traffic flow reduction on the A405 which could facilitate improvements such as bus priority which would complement the potential increased bus frequencies that may result from a "Herts Rapid" MRT type service (SI2) and opportuntities that may arise from the proposed Watford Bus Service Reconfiguration study (SM22).	M1 Corridor Strategic inter-urban route	Watford - St Albans Strategic inter-urban route	-									
	b	✔		M1 Corridor Strategic inter-urban route	Watford - St Albans Strategic inter-urban route	-				4					
	c	✘		M1 Corridor Strategic inter-urban route	Watford - St Albans Strategic inter-urban route	-									
SM17	-	-	-	Watford Urban Area	Watford - Hemel Hempstead Strategic inter-urban route	-						6	7		
SM18	-	-	-	Watford Urban Area	-	-							7		
SM19	a	✔	A Park and Ride facility at Kings Langey Station could serve residents of southern Hemel Hempstead and northern Watford Area facilitating trips to both urban centres. The Park and Ride facility is seen as well-situated to capture the benefits from (potential) increased service frequency/semi-fast service from Kings Langley post-HS2.	Watford - Hemel Hempstead Strategic inter-urban route	Rail Commuting	-						6			
	b	✘		Watford - Hemel Hempstead Strategic inter-urban route	Rail Commuting										
	c	✘		Watford - Hemel Hempstead Strategic inter-urban route	Rail Commuting										
	d	✘		Watford - Hemel Hempstead Strategic inter-urban	Rail Commuting										

Intervention ID	Scheme Approach ID / Project	Approach Selection		Challenge Group(s) Alignment			Packages								
				route											
SM20	-	-	-	Watford - St Albans Strategic inter-urban route	-	-				4					
SM21	-	-	-	Watford Urban Area	-	-					5	6			
SM22	-	-	-	Watford Urban Area	-	-				4	5		7	8	
SM23	a	✘	A bus, pedestrian and cycle only link serves to improve permeability on foot and cycle through the Watford Junction area alongside improving connectivity from the development east of the rail line towards the town centre. This option also supports a vision to improve town centre routes to better serve sustainable modes. The high level appraisal approach in this GTP indicates this performs better against the plan's objectives, although more detailed investigation will be needed to confirm which is the best approach. The need for either an all traffic link or restricted link are to be confirmed through further investigations, including traffic modelling and considering the wider context of growth and transport infrastructure interventions in the town.	Watford Urban Area	Rail Commuting	-									
	b	✔		Watford Urban Area	Rail Commuting	-							7		
	c	✘		Watford Urban Area	Rail Commuting	-									
SM24	-	-	-	Rail Commuting	Watford Urban Area	-						6	7		
SM25	a	✘	M1 Junction 5 may require substantial investment in order to provide additional capacity. This may not however draw traffic away from Bushey Arches. The provision of the missing slip roads at M1 Junction 4 could however help facilitate journeys between Watford South and London, and could result in a reduction in traffic at Bushey Arches. The potential more strategic implications of M1 J4 improvements would need to be considered in the Greater London context.	Watford Urban Area	M1 Corridor Strategic inter-urban route	-									
	b	✔		Watford Urban Area	M1 Corridor Strategic inter-urban route	-							7	8	
SM26	-	-	-	Watford Urban Area	-	-							7		
SM27	-	-	-	Hemel Hempstead Urban Area	-	-	1								
SM28	a	✔	An all vehicle access to the business park from the south would most likely encourage journeys by car. Tolpits Lane may not have sufficient capacity to accommodate additional traffic and it would likely have more widespread effects on	Watford Urban Area	-	-					5				9

Intervention ID	Scheme Approach ID / Project	Approach Selection		Challenge Group(s) Alignment			Packages								
	b	✘	traffic route choice. There is however an opportunity to increase journeys by bike, on foot and by public transport by not allowing cars to use the southern access. The preferred approach would best complement improvements made to the Ebury Way as opposed to an all vehicle access which could reduce the attractiveness of journeys along the Ebury Way.	Watford Urban Area	-	-									
SM29	-	-	-	Hemel Hempstead Urban Area	-	-		2							
SM30	-	-	-	Watford - Hemel Hempstead Strategic inter-urban route	-	-						6			
SM31	-	-	-	Watford - Hemel Hempstead Strategic inter-urban route	-	-						6			
SM32	-	-	-	Watford - Hemel Hempstead Strategic inter-urban route	Hemel Hempstead Urban Area	-	1					6			
SM34	-	-	-	Watford Urban Area	-	-					5		7		
SM35	-	-	-	Watford Urban Area	-	-					5				9
SM36	-	-	-	Watford Urban Area	M1 Corridor Strategic inter-urban route	-								8	
LP1	PR8	-	-	Hemel Hempstead Urban Area	Rail Commuting	Watford - Hemel Hempstead Strategic inter-urban route	1					6			
	PR9	-	-	Hemel Hempstead Urban Area	Rail Commuting	Watford - Hemel Hempstead Strategic inter-urban route									
	PR10	-	-	Hemel Hempstead Urban Area	Rail Commuting	Watford - Hemel Hempstead Strategic inter-urban route									
LP2	PR19	-	-	Hemel Hempstead Urban Area	M1 Corridor Strategic inter-urban route	Watford - Hemel Hempstead Strategic inter-urban route		2	3						
	PR96	-	-	Hemel Hempstead Urban Area	M1 Corridor Strategic inter-urban route	Watford - Hemel Hempstead Strategic inter-									

Intervention ID	Scheme Approach ID / Project	Approach Selection		Challenge Group(s) Alignment			Packages								
						urban route									
LP3	PR20	-	-	Hemel Hempstead Urban Area	-	-	1	2							
	PR21	-	-	Hemel Hempstead Urban Area	-	-									
	PR22	-	-	Hemel Hempstead Urban Area	-	-									
LP4	PR27	-	-	Hemel Hempstead Urban Area	-	-		2							
	PR28	-	-	Hemel Hempstead Urban Area	-	-									
	PR97	-	-	Hemel Hempstead Urban Area	-	-									
	PR98	-	-	Hemel Hempstead Urban Area	-	-									
	PR99	-	-	Hemel Hempstead Urban Area	-	-									
	PR111			Hemel Hempstead Urban Area											
LP5	PR30	-	-	Hemel Hempstead Urban Area	-	-		2							
	PR100	-	-	Hemel Hempstead Urban Area	-	-									
	PR101	-	-	Hemel Hempstead Urban Area	-	-									
LP6	PR35	-	-	M1 Corridor Strategic inter-urban route	-	-			3						
	PR36	-	-	M1 Corridor Strategic inter-urban route	-	-									
	PR37	-	-	M1 Corridor Strategic inter-urban route	-	-									
LP7	PR110	-	-	Watford Urban Area	-	-								8	
	PR40	-	-	Watford Urban Area	-	-									
	PR102	-	-	Watford Urban Area	-	-									
	PR103	-	-	Watford Urban Area	-	-									

Intervention ID	Scheme Approach ID / Project	Approach Selection		Challenge Group(s) Alignment			Packages								
LP8	PR45	-	-	Watford Urban Area	-	-					5				
	PR85	-	-	Watford Urban Area	-	-									
LP9	PR66	-	-	Watford Urban Area	-	-							7		
	PR104	-	-	Watford Urban Area	-	-									
LP10	PR69	-	-	Hemel Hempstead Urban Area	-	-	1								
	PR105	-	-	Hemel Hempstead Urban Area	-	-									
	PR106	-	-	Hemel Hempstead Urban Area	-	-									
	PR107	-	-	Hemel Hempstead Urban Area	-	-									
	PR108	-	-	Hemel Hempstead Urban Area	-	-									
	PR109	-	-	Hemel Hempstead Urban Area	-	-									
LP11	PR70	-	-	Watford Urban Area	-	-							7	8	
	PR71	-	-	Watford Urban Area	-	-									
	PR72	-	-	Watford Urban Area	-	-									
LP12	PR80	-	-	Watford Urban Area	-	-									9
	PR81	-	-	Watford Urban Area	-	-									
LP13	PR82	-	-	Watford Urban Area	-	-									9
	PR83	-	-	Watford Urban Area	-	-									
	PR86	-	-	Watford Urban Area	-	-									
	PR87	-	-	Watford Urban Area	-	-									
LP14	PR112	-	-	Rail Commuting	-	-			3						
	PR113	-	-	Rail Commuting	-	-									

Intervention ID	Scheme Approach ID / Project	Approach Selection		Challenge Group(s) Alignment			Packages								
	PR114	-	-	Rail Commuting	-	-									
	PR115	-	-	Rail Commuting	-	-									
	PR116	-	-	Rail Commuting	-	-									
	PR117	-	-	Rail Commuting	-	-									

Appendix D – Supplementary Note – Dome Roundabout

Figure D1 – aerial photo of Dome Roundabout and adjacent signal controlled crossroads

The Dome Roundabout is situated at the junction of the A41 Colne Way and the A412 St Albans Road in Garston, north Watford. The junction comprises of a lozenge-shaped signal-controlled roundabout with four main arms. The A41 runs broadly east-west and the A412 runs broadly north-south through the junction. The A41 effectively forms a bypass to Watford town centre and links the M25 (Junction 20), Hemel Hempstead, Tring and Aylesbury to the north-west with eastern and south-eastern parts of Watford, Bushey and Greater London to the south-east. The A412 is the main local route between Rickmansworth, Watford, Bricket Wood and St Albans.

There is a Sainsbury's supermarket located on the north-eastern side of the junction, an ASDA supermarket on the south-eastern side, a petrol filling station and small Waitrose convenience store on the south-western side and residential dwellings (with a short service road running adjacent to the roundabout) on the north-western side of the junction. Signal-controlled pedestrian and cycle crossings are located on the eastern, southern and western arms. Shared use footways-cycleways cross the junction on both the eastern and western sides of the junction via the signal controlled crossings.

The junction itself is subject to a 50mph speed limit. Different speed limits are in place on the various approach arms upstream - 30mph on A412 St Albans Road north and south, 40mph on the A41 west, and 50mph on the A41 east.

The junction traffic signals are SCOOT controlled.

A large signalised crossroads is located very close to the roundabout on the eastern side which provides access/egress to both of the supermarkets. ASDA can also be accessed from the A412 St Albans Road, south of the Dome Roundabout.

The junction experiences congestion especially during morning and evening peak periods.

Anecdotally, it is observed that slow-moving 'rolling' queues and stationary queues can form on all approaches especially during the AM and PM peak periods. Significant variations in traffic speed from the posted speed limit occur as shown in Figures 5.5.2 and 5.3.2 of the Watford Evidence Pack.

Queues on the A41 west arm can extend back at least as far as the A405 North Orbital junction approximately 1.4km away, although this is a mixed picture as congestion is also caused at the on-slip from the A405 junction where traffic is merging with the A41 and there is also a reduction from two lanes to a single lane approximately 0.8km west of the Dome Roundabout. Queuing is understood to extend north on the A412 St Albans Road, on occasions as far as the A405 approximately 1.5km away. Queues on the A41 west and A412 north arms are worse in the AM peak.

Long queues can form on the A41 east approach, on occasions back to the Westlea Avenue-Woodmere Avenue junction approximately 1.2km away. Queues also form on the southern arm, the extent to which is unclear as some congestion upstream could be attributed to other junctions such as Station Road as well as so-called 'link friction' which is caused by land-uses immediately fronting the road which themselves may generate traffic movements such as vehicles turning on/off the main road, and vehicles parking, which can cause disruption.

Part of the A412 St Albans Road, its northern-most end approximately 430m to the south of the Dome Roundabout and encompassing a number of properties, is a designated Air Quality Management Area where high levels of Nitrogen dioxide NO_2 have been measured.

The Dome Roundabout is used by a mixture of shorter and longer distance trips, including trips to/from Watford town centre and to/from the supermarkets, some of which may originate very locally. The A412 is more likely to be used for shorter distance trips whereas the A41 is more likely to be used by people travelling longer distances with neither an origin nor destination within the local Watford area. The supermarkets themselves are likely to generate dedicated shopping trips, but also may form part of other journeys, e.g. someone returning from work making a detour to the supermarket.

How to address congestion issues at the Dome Roundabout.

Dome Roundabout was recognised early on as a congestion hotspot. During the early stages of developing the South West Hertfordshire GTP, three broad courses of action to addressing the junction were initially considered, these being:

- **Do Nothing** – take no action at the junction or elsewhere to address issues at the Dome Roundabout
- **Direct Intervention** – take direct action at and/or in the vicinity of the Dome Roundabout in the form of an improvement
- **Indirect Intervention** – take action further away from the Dome Roundabout which is targeted at the users of the Dome Roundabout.

The objective of any improvement would be to reduce delays and congestion at the Dome Roundabout, and achieve some level of modal shift from car to more sustainable modes of travel in line with the GTP objectives.

Furthermore, the GTP is tending to take a longer term view of growth and transport priorities, and whilst Dome Roundabout is seen as an immediate challenge, consideration needed to be given to what could be achieved across a wider area in line with the objectives of the GTP.

The first of the three broad approaches was dismissed because, whilst congestion might be a solution to congestion, the impact on Watford and the wider area by not taking any form of action, direct or indirect, could be significant.

The second broad approach was given some consideration. A series of options were identified which are discussed in more detail in the table at the end of this note. It was considered that a large and potentially expensive intervention would be needed to have any noticeable effect at the junction and that further tweaks to the junction were unlikely to provide much benefit even though they could be delivered in the short term.

The third broad approach was eventually preferred as it was more complementary to the GTP's objectives and would fit together better with interventions being made elsewhere within the broader corridors that feed the Dome Roundabout.

The GTP instead focuses in particular on the longer distance journeys which are made through the junction by seeking to improve the attractiveness of non-car modes as well as promote the M25 and M1 as strategic bypasses to Watford by improving the interchange at M25 J21/M1 J6a and at M1 J4. As mentioned earlier, the Dome Roundabout is used by a variety of trip types, some of which originate from Hemel Hempstead, St Albans and villages in between.

The figure overleaf illustrates the two corridors which feed into the Dome Roundabout and the interventions which the GTP has put forward to address the different stages of journeys that take place through the junction. It should be noted that further interventions at the St Albans end of the corridor will be identified in the forthcoming South Central Hertfordshire GTP.
Key interventions in Hemel Hempstead aim to improve access to the railway station, thus increasing the attractiveness of rail for end-to-end journeys between Hemel and Watford.

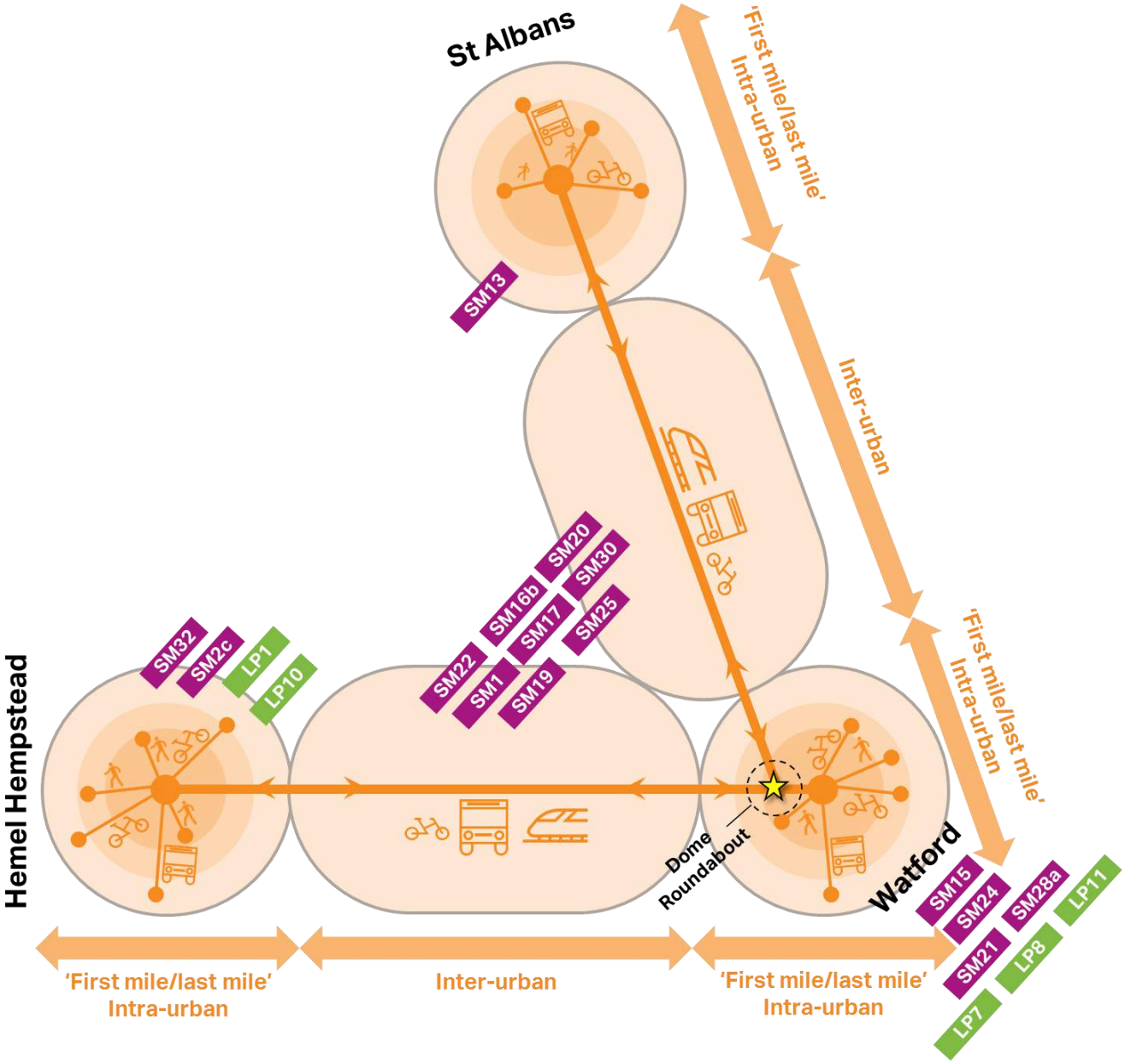

Figure D2 – Corridors feeding the Dome Roundabout and proposed interventions

The approach of proposing a direct intervention at the Dome Roundabout was dismissed in favour of the indirect approach described above.

A number of intervention approaches were considered at the Dome Roundabout however these were all discounted for the reasons described in the table overleaf.

Table D1 – Dome Roundabout direct interventions optioneering

Name	Description	Cost Range	Reason for dismissal
Signalised Hamburger	The existing roundabout is modified to incorporate a straight-ahead cut-through link (or 'hamburger') which separates right turning and straight ahead traffic. The objective would be to increase capacity, traffic throughput and reduce delays.	£10m-£50m	The option has been dismissed because of the elongated shape of the existing junction footprint which is unlikely to be sufficient to accommodate hamburger links with adequate capacity and designed to a specification which meets DMRB junction design standards.
Banned turns	Some turns could be banned from the junction through minor modification of the existing junction layout, the purpose of which would be to increase capacity for other movements. For instance, the right turns A41W-A412S and A412N-to-A41W could be banned with traffic instead rerouting via the A405 North Orbital Road.	£500k-£2.5m	The option has been dismissed because of the potential knock-on impacts this would have on other parts of the network which may in turn need to be improved. The level of benefit on the junction may be too small in comparison.
Signalised crossroads	Convert the existing roundabout into a signal controlled crossroads. Some additional capacity on approach arms could be achieved, albeit small, as stop lines are positioned closer to the junction centre.	£10m-£50m	The option has been dismissed because the level of benefit could be very small in comparison with the cost. Furthermore, the junction layout would most likely prohibit U-turning which could cause difficulties in accessing the northern-western residential service road and other land uses close to the junction.
Widened A41 (west)	Some congestion in the vicinity of the junction is caused by a separate issue of the A405-A41 merge to the west. Verge and existing right-turning filter lanes would be removed to provide two eastbound lanes. The nearside lane would be continuous from the A405 and the offside lane continuous from the A41 (which is reduced to a single lane upstream of the A405	£10m-£50m	The option has been dismissed as the full impacts are unclear and may not be entirely positive. For example, banning right-turners into side arms will generate additional movements at roundabouts at either end thus potentially causing additional congestion. Reducing the A41 to a single lane upstream of the A405 merge could push the queuing problem further north-west. Additional capacity afforded to the A41

	merge). Traffic wishing to turn right into or out of the A41 instead has to U-turn at the Dome roundabout or A405-A41 junction.		approaching the Dome Roundabout could unleash additional traffic demand onto the junction, thus in turn diminishing the benefit.
Bus priority	Several bus routes traverse the Dome Roundabout including Arriva 321 (Watford-St Albans-Luton), Greenline 724 (Heathrow-Watford-Harlow) and Uno 635 (Watford-Hatfield). Buses are primarily on the A412 corridor. Sections of bus lanes and bus priority signals could be provided on approach arms giving buses an advantage over other vehicles. This would be in addition to existing bus lane provision on A412 south.	£5m-£10m	The option has been dismissed as the extent of queueing means that bus services are unlikely to reach the priority signals and therefore will not gain much advantage unless there was a significant reduction in traffic. Space is too limited on the A412 north of the junction to accommodate a length of bus lane and priority signals.
Grade separation - A41EW movement	Provision of a grade-separated junction incorporating a flyover or underpass for the A41 and on-off slips connected to a modified Dome Roundabout below/above.	£100m+	The option has been dismissed because of the very significant cost, disruption during construction (with very lengthy closures) and third-part land take almost certain including demolition of nearby residential properties. Additional capacity would however be created, but this could be diminished as capacity which is created by the new junction could encourage more traffic, e.g. re-routing from elsewhere, through an urban area.
Grade separation -A412NS movement	Provision of a grade-separated junction incorporating a flyover or underpass for the A412 and on-off slips connected to a modified Dome roundabout below/above.	£100m+	For the same reasons as above.
Double 'Cassette' roundabout	Convert to a double roundabout arrangement. Layout would remove the need for traffic changing from the A41 to the A412 to travel almost fully around the roundabout. Instead, this	£10m-£50m	The option has been dismissed as two separate but closely spaced roundabouts within the existing junction footprint are unlikely to provide sufficient stacking space to accommodate queuing vehicles

	traffic would be able to make an unopposed right turn via independent roundabouts thereby reducing the opposed movement with some other arms of the junction. All arms would be fully signalised which would ensure that the traffic control benefits afforded by this method of control remains		and therefore there is a risk the junction will lock up.
A405/A41 signal 'metering' and coordination	Signals implemented on A405-A41 junction to the west, including 'ramp-metering' signals on the on-slip and (potentially) signals on A41 mainline (upstream of the merge) to hold back traffic until queues have reduced downstream at the Dome roundabout.	£10m-£50m	The option has been dismissed as it could cause new areas of disruption on the A405 North Orbital and elsewhere. This may in turn encourage traffic onto alternative and less suitable routes. The length of time that traffic is held back at signals to allow queuing downstream at the Dome Roundabout to dissipate sufficiently may be too long and could cause driver frustration. It could cause queuing adjacent to the A41-to-A405 diverge, thus potentially creating an unsafe situation with stationary traffic immediately adjacent to fast moving traffic.
A412 North diverted into Sainsbury's access/egress	The A412 southbound approach is diverted into a new link road feeding into the existing Sainsbury's access/egress road. Thus traffic wishing to continue towards the A412 south then has to make a right turn at the supermarket signal controlled crossroads and then a left turn at the Dome Roundabout. The existing approach onto the Dome roundabout could be made buses only. The objective would be to provide some additional capacity for other movements at the Dome Roundabout.	£5m-£10m	The option has been dismissed as there may be difficulties in providing a safe and convenient means of access to Cow Lane.
New Sainsbury's access-only off	A new access (no exit) into Sainsbury's car park via Cow	£500k-£2.5m	The option has been dismissed because the benefits to the

A412N	Lane thus reducing some traffic at the Dome Roundabout.		Dome Roundabout will be very small.
Enlarged roundabout	The existing roundabout is enlarged to provide additional circulatory 'stacking' space and wider approaches on all arms. This could allow more green time to be given to certain movements as the junction circulatory carriageway will not lock up as quickly.	£50m-£100m	The option has been dismissed as it would require third party land take including potential demolition of residential properties and/or reconfiguration of supermarket site layouts. The benefits may be small as what capacity is gained encourages more traffic to route through the junction.
Grade separated cycleway and footways	Removal of existing signal controlled crossings and replacement with new grade-separated links for pedestrians and cyclists. The objective would be to reduce disruption to traffic at the Dome Roundabout caused by the crossings.	£5m-£10m	Whilst one of the objectives of any improvement would be to achieve some level of mode shift from car to walking or cycling, the extent to which this can be achieved by way of a grade-separated cycleway/footway, at least in isolation of any other improvement, is very uncertain.

Appendix E – Area Wide Interventions and Sustainable Development Principles

Area Wide Interventions and Principles

Name	Details
School travel planning	School travel plans are a proven method to achieve reduced car use and increase active travel among young people. They can be voluntary or secured through the planning process. However, increases in journey length for education trips and increases in 'trip-chaining' where people combine trips for two or more journey purposes, such as dropping off children to school, commuting and shopping, is making it harder to achieve modal shift away from cars. Nevertheless, it should remain a priority to continue and enhance school travel planning across the plan area. Particular emphasis should be placed on travel planning for schools in the local vicinity of the interventions listed below which have a focus upon improving walking, cycling and public transport routes. Particular attention should also be given to engaging with secondary schools, including those with large catchment areas, to determine how the proportion of pupils travelling to/from school on foot, by bike, by bus as part of a car share (as opposed to travelling individually by car) can be encouraged and linked to the educational programme. Travel Plans could also be considered alongside measures such as increased parking restrictions, banned turns for vehicles during school opening and closing times etc (See LTP4 Policy 3: Travel Plans and Behavioural Change)
Workplace travel planning	Work with employers to develop workplace travel plans, timed to coincide with the opening of infrastructure interventions, in order to gain maximum return on investment. (See LTP4 Policy 3: Travel Plans and Behaviour Change)
Work with operators to improve the quality of bus services.	Identify bus routes for premium service upgrade, and provide bus priority infrastructure on these routes to support upgrade. The defined Core Bus Network in Hertfordshire should be a key priority for investment. (See LTP4 Policy 9: Buses)
Ensure sustainable transport access to developments	New developments should be designed in line with Local Plan policies to support travel by walking, cycling and public transport. Direct walking and cycle routes should be included to connect to existing and planned walking and cycle routes on the fringes of the development site, knitting new development into existing active travel infrastructure. In larger developments, a suitable corridor for bus access should be provided, designed to harmonise with existing and planned bus services. Consultation with bus operators will be helpful in ensuring that the highway network within the development enables bus service performance. Walking and cycling routes should be as direct as possible to existing key services, schools, shops and local public transport services. *See separate principles in relation to sustainable developments below*

Develop a network of electric vehicle charging points	Local authorities should should develop a network of public electric vehicle charging points in line with projected demand, in order to enable the uptake of electric vehicles. The location and number of sites required will require further study into likely demand patterns, which may be undertaken in cooperation with vehicle charging network operators. The local authorities will need to work with the industry to monitor the uptake of electric vehicles across the county and identify where the provision of additional charging points can be optimised.
Car clubs	The provision of car clubs, including car clubs using electric vehicles and floating car clubs, is to be explored through development management in all locations where there is a likelihood that these could be supported. Car clubs play an important role in enabling sustainable travel choices by reducing the need for vehicle ownership. Reduced vehicle ownership allows residents greater flexibility in travel mode choice by reducing sunk costs for travel. Existing car clubs such as the University of Hertfordshire's CarPlus-BikePlus scheme and Herts Liftshare could be used as templates for expansion or replication in other parts of the county. The provision of car clubs should be considered in conjunction with current parking standards and provision.
Area-wide wayfinding	Encourage and adopt coherant wayfinding strategies and programmes across town centres, neighbourhoods and key movement corridors with the aim of promoting walking and cycling trips and improved, more sustainable access to public transport services.
Improved information and wayfinding at bus stops	Work with operators to provide improved information at bus stops; including real time information, spider maps and local area maps in order to make it easier for bus users to navigate.
Integrated Ticketing	Create integrated ticketing area with London to allow easier interchange between modes
Integrated Transport Planning	Support the establishment of a London Capital Region Transport Body, or other administrative structure which will allow greater integration of transport and land use planning between Local Authorities, support multi-modal planning and enable integrated ticketing across Hertfordshire and surrounding areas.
Town Bike Share Schemes	Implement bike share schemes in larger towns with bike locations at train stations and town centres. HCC are looking for a single provider that could enable inter-urban journeys
Play Streets	Implement Play Streets concept on local residential streets. Play streets are a simple, effective and low-cost way for children to be able to play out in the streets where they live. Local authorities can use existing powers under road traffic legislation to allow temporary street closures at regular weekly or monthly intervals. Local parents and other residents would typically act as marshals, allowing their neighbours to access by car their homes at a safer walking pace, while through traffic is re-directed to other roads. The result is intended to be a significant increase in children playing out and making friends on their street. In turn, adult neighbours get to know each other and community spirit grows.
Temporary Road Closures for special events	Implement weekend closures of roads to coincide with special events or to promote more sustainable travel behaviour

Parking at railway stations	There should be a presumption against additional car parking at railway stations except where a need has been demonstrated with evidence and agreed between all relevant stakeholders. Any additional parking should incorporate dedicated spaces for electric vehicles and potentially high occupancy vehicle spaces if sufficient monitoring systems can be put in place. The current extent and effectiveness of Controlled Parking Zones around stations needs to be reviewed in the context of potential increases in travel demand. (See LTP4 Policy 4: Demand Management)
Parking in new developments	The number of parking spaces to be provided within new developments needs to be in line with the standards set out in local guidance. Where practical and appropriate to do so, a reduced number of spaces should be considered
Parking in Town Centres	Many town centres depend on sufficient provision of car parking to cater for visitors and employees. Any proposals to increase overall provision of spaces should take into account the future demand for car travel as well as the relationship to other GTP proposals which aim to encourage more sustainable travel.
Parking on roads	There should be a presumption against providing additional parking on roads. Where there is opportunity to re-evaluate the place and movement function of a road or corridor, consideration could be given to reviewing the provision of on-road parking spaces in consultation with local residents and businesses. Where any reduction in on-road parking provision is proposed, consideration should be given to the opportunities this could afford to improving conditions for cyclists, pedestrians and the efficient movement of bus services.
20mph speed limits	All new residential streets should have a design speed of 20 mph. Where routine carriageway resurfacing on existing residential streets becomes due, options should be assessed to adjust the highway alignment, footways and parking arrangements to create a 20 mph zone or limit. Any changes should be made in consultation with local residents, through which process the advantages of a reduced speed layout should be effectively communicated as well as any limitations. Where there is strong local support, or residential streets form a part of cross-town walking and cycling routes, consideration of a 20 mph zone or limit should be brought forward.

Sustainable development principles

Name	Details
High access and connectivity	At least 50% of all internal trips within Garden communities to be made by non-car means.
	Vehicular access to the local highway network should be of no more than the minimum standard necessary to facilitate forecast vehicle trips, taking into account adjusted trip generation reflecting desire shift to sustainable modes

	Access to the development should provide priority for buses sufficient to mitigate the impact of congestion on bus services, and an appropriate route or routes through the development should be provided sufficient to support an efficient and attractive bus service
	No direct access to be provided to the Strategic Road Network, in order the impact of local journeys on valuable strategic highway capacity
	No major off-site highway improvements should be made which provide additional capacity
	Access to the development should include measures to control/gate traffic flows, potentially through traffic signal technology, and incorporate high quality facilities for pedestrians and cyclists
Site layout	A site layout which provides walkable neighbourhoods and convenient and not circuitous routes for pedestrians and cyclists
	Provision of segregated cycle routes within sites which are more direct than vehicular routes and have priority over traffic at junctions
	20mph speed limit applied to all local roads internal within the Garden development
Bus service provision and connectivity	All bus stops to be provided with a shelter, real time information, seating, step-free access, easy access kerbing, and to be connected via direct footpaths and cycleways to the surrounding development
	All households should be less than 400m from a bus stop, and there should be bus stops within 200m of town centres and places of education
	A direct bus service or services to at least one mainline railway station which provides direct rail services to London with at least a 20 minute service frequency
	A direct bus service or services to the town centre or centre of the nearest principal town within the county, with at least a 20 minute service frequency
	A direct bus service or services to the nearest large-scale employment centre (if different from the principal town) operational during weekday peak periods
	Developers to subsidise services for an agreed period of time during and after build-out of the development to help ensure services become commercially sustainable.
Car clubs	A car club initiative should form an integral part of the development and actively promoted through travel planning
Cycle connectivity	Direct access to the National Cycle Network and/or cross-county cycle network with direct off-road linkage to at least the nearest principal town
	Where applicable and feasible, cycle hire initiatives (linked with County-wide initiatives to promote more joined-up journeys by bike) should form a core part of the development's transport and travel offer and be actively promoted through travel planning
Future Technology	A future-ready transport network which can be cost-effectively adapted for new travel technologies
	Plug-In electric charging facilities on site
Parking provision	Parking provision no more than the standard per household as defined in local authority guidance
	Safe, secure, sheltered cycle parking for all dwellings, one space per bedroom

	A presumption against the provision of additional car parking at the nearest railway station(s) especially where alternative travel modes can be considered in preference
Travel Planning	Personalised travel planning offered to residents
	A site-wide travel plan to be in operation and maintained for at least 5 years post-completion of the development (following criteria set in Hertfordshire County Council's Travel Planning Guidance).

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