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Wokingham STDEP

**Potential Development Sites Transport
Review – Twyford**

February 2017

Project Code: 2242

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Version Control and Approval

Version	Date	Main Contributors	Issued by	Approved by
A	08 February 2017			

Prepared for

Thames Valley Berkshire LEP



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I Introduction

I.1 Overview

- 1.1.1 This report sets out a sustainable transport strategy for a potential development site within Wokingham Borough to the east of Twyford.
- 1.1.2 The report has been funded through the Sustainable Transport Delivery Excellence Programme through the DfT. The fund is aimed at Local Economic Partnerships (LEPs) and provides guidance on the delivery of sustainable transport schemes within their areas.
- 1.1.3 Thames Valley Berkshire LEP have requested assistance from the STDEP fund to provide guidance and strategy for the delivery of two significant developments sites within the borough of Wokingham.
- 1.1.4 Sustrans has commissioned Phil Jones Associates to deliver this support through the production of a transport review and high level strategy for the two identified potential development sites.

I.2 Wokingham

- 1.2.1 The site being reviewed at Twyford lies in the borough of Wokingham, to the south west of London. Wokingham is one of six Berkshire Unitary authorities.
- 1.2.2 The borough of Wokingham borders Reading. The Twyford site will, if allocated through the Local Plan process, form a significant extension to the town of Twyford itself, which lies just eight kilometres to the east of Reading town centre. The site will be heavily reliant for employment on the town of Reading and its various large employment centres, as well as the wider Wokingham borough.

I.3 Objectives of Commission

- 1.3.1 This STDEP commission has been undertaken with the following objectives:
- Consider existing transport baseline including journey to work travel patterns across Wokingham Borough, focused upon travel to and from Reading;
 - Consider sustainable transport options for the Twyford site;
 - Review proposed transport improvements in Wokingham and Reading area;
 - High level trip generation and analysis of future travel patterns;
 - Analysis of potential mode share achievable at the development with high quality sustainable transport options available;
 - Outline Transport Strategy for the site.



2 Policy Background

2.1 Introduction

- 2.1.1 This chapter provides a summary of the relevant policy in relation to development in Wokingham Borough, as well as an overview of the STDEP project and work to date.

2.2 Sustainable Transport Delivery Excellence Programme (STDEP)

- 2.2.1 The STDEP initiative, being led by Sustrans, is focused upon providing support and advice to LEPs on the design and delivery of transport solutions that enable increased levels of active and sustainable travel.
- 2.2.2 Thames Valley LEP have already commissioned a review considering housing density and sustainable transport as part of the first stage of STDEP. This resulted in the report 'Being Dense: it's the clever option'. This advocated the application of high density development in areas where high quality sustainable transport infrastructure is provided. The ideas within this earlier report have been considered as part of this study.

2.3 Wokingham Borough Core Strategy Development Plan Document

- 2.3.1 The Wokingham Core Strategy was adopted in January 2010 and sets out the vision for how the borough will develop up to 2026. It was developed with extensive consultation with the public and reflects the key message received from these consultations: to concentrate development in a few locations in order to preserve the character of existing areas and create high quality infrastructure rich communities.

- 2.3.2 Paragraph 2.43 specifically mentions transport and accessibility of local facilities:

'For communities to be sustainable there must be easy access to a range of facilities such as GP surgeries, shops, leisure facilities, and community and faith venues. Improved bus and train transport as well as specialist transport for those with significant disabilities, will also be required to reduce isolation and increase involvement in the community. As well as providing improved healthcare to the borough's residents, the authority will work with the PCT to ensure that adequate accessible public or community transport is available to Wokingham and other hospitals.'

- 2.3.3 There is also a focus of sustainable development. Policy CP1 looks at the ways developments can be as sustainable as possible, including methods related to transport:

'Planning permission will be granted for development proposals that:

- 1) Maintain or enhance the high quality of the environment;*
- 2) Minimise the emission of pollutants into the wider environment;*



- 3) *Limit any adverse effects on water quality (including ground water);*
- 4) *Ensure the provision of adequate drainage;*
- 5) *Minimise the consumption and use of resources and provide for recycling;*
- 6) *Incorporate facilities for recycling of water and waste to help reduce per capita water consumption;*
- 7) *Avoid areas of best and most versatile agricultural land;*
- 8) *Avoid areas where pollution (including noise) may impact upon the amenity of future occupiers;*
- 9) *Avoid increasing (and where possible reduce) risks of or from all forms of flooding (including from groundwater);*
- 10) *Provide attractive, functional, accessible, safe, secure and adaptable schemes;*
- 11) *Demonstrate how they support opportunities for reducing the need to travel, particularly by private car in line with CP6; and*
- 12) *Contribute towards the goal of reaching zero-carbon developments⁴¹ as soon as possible by:*
 - a) *Including appropriate on-site renewable energy features; and*
 - b) *Minimising energy and water consumption by measures including the use of appropriate layout and orientation, building form, design and construction, and design to take account of microclimate so as to minimise carbon dioxide emissions through giving careful consideration to how all aspects of development form.'*

2.3.4 Policy CP6 relates to managing travel demand in new developments. It states that:

'Planning permission will be granted for schemes that:

- a) *Provide for sustainable forms of transport to allow choice;*
- b) *Are located where there are or will be at the time of development choices in the mode of transport available and which minimise the distance people need to travel;*
- c) *Improve the existing infrastructure network, including road, rail and public transport, enhance facilities for pedestrians and cyclists, including provision for those with reduced mobility, and other users;*
- d) *Provide appropriate vehicular parking, having regard to car ownership;*



- e) *Mitigate any adverse effects upon the local and strategic transport network that arise from the development proposed;*
- f) *Enhance road safety; and*
- g) *Do not cause highway problems or lead to traffic related environmental problems.'*

2.3.5 Policy CP9 sets out criteria for the scale and location of new housing developments:

'The scale of development proposals in Wokingham borough must reflect the existing or proposed levels of facilities and services at or in the location, together with their accessibility. Development proposals (in addition to the Strategic Development Locations in policies CP18-21) within development limits will be acceptable in:

- 1) *The major development locations of Earley, Green Park, Shinfield (North of M4), Twyford, Winnersh, Wokingham and Woodley;*
- 2) *The modest development locations of Arborfield Garrison, Pinewood (Crowthorne), Finchampstead North, Ruscombe, Shinfield, Spencers Wood, Three Mile Cross and Wargrave.*
- 3) *The limited development locations of Arborfield Cross, Barkham Hill, Charvil, Finchampstead, Hurst, Riseley, Sindlesham, Sonning and Swallowfield.*
- 4) *The boundary of the Science Park proposed under policy CP16 as defined in the Managing Development Delivery DPD.*

Affordable housing on rural exception sites will be permitted adjoining the Development Limits of Modest or Limited Development Locations, if a need is demonstrated for residents, workers or other people with family connections within the Parish Council's area.'

2.4 Wokingham Local Transport Plan

2.4.1 The Local Transport Plan for Wokingham borough was adopted in 2011 and provides details of how transport and accessibility will be improved in the borough up to 2026. It lists five goals that the plan policies are intended to work towards in order to achieve the local and national policy priorities. These are:

- *'Highways Goal: "To have a resilient, safe highway network that balances capacity for all users, enhances the economic prospects of the Borough, and promotes sustainable travel."*
- *Active Travel Goal: "To work with partners to promote walking and cycling as a health enhancing physical activity for all of our residents through providing:*



- *Connected, convenient, safe and signed pedestrian networks across the Borough to enhance existing networks;*
- *New cycleways integrated with the existing cycle network; and*
- *Improved cycle parking at stations, businesses and schools”*
- *Public Transport Goal: “To promote an integrated and inclusive public transport network that provides a convenient, acceptable, reliable and affordable alternative to car travel. “*
- *Smarter Choices and Demand Management Goal: “To enable people who live, visit and work in the Borough to make informed, safe and sustainable travel decisions from a range of transport options.”*
- *Strategic Projects Goal: “To manage the demand for travel in order to ensure that people have a high level of access to different destinations, with sufficient choice, whilst minimising the adverse effects of congestion.””*

2.4.2 The policies in the plan are categorised to show which will help achieve each goal. There is a big focus on improving infrastructure to increase accessibility and encourage sustainable travel. Policy SC/DM3 states that new developments must have accompanying travel plans to show what measures will be taken to mitigate impact on the road network and encourage people to travel by sustainable modes.

‘Policy SC/DM3: Travel Plans for New Development - We will require developers to produce comprehensive and effective Travel Plans and monitor their success against an agreed set of SMART targets.’

2.5 Wokingham Strategic Development Locations

South of M4 Strategic Development Location: SPD (October 2011)

2.5.1 The *South of the M4 Strategic Development Location: Supplementary Planning Document* was adopted by Wokingham Borough Council in October 2011. It sets out the requirements for the three extensions to Shinfield, Spencers Wood, and Three Mile Cross, all to the south of Junction 11 of the M4. The overall development south of the M4 is expected to deliver 2,500 dwellings.

2.5.2 The document notes the following transport requirements of the South of M4 Strategic Development Location (SDL):

- A contribution towards the delivery of new Park and Ride south of Junction 11 on the M4. The Park and Ride is to include a bus interchange for access via bus as well as car.
- The SDL will include a sustainable travel connection linking Spencers Wood and Shinfield.



- The SDL will provide for a Shinfield Eastern Relief Road between the A327 Arborfield Road and the A327 Black Boy Junction. This will include a new bridge across the M4.

2.5.3 The Shinfield Eastern Relief Road is expected to open during November 2016. The new M4 bridge crossing to connect with this Relief Road opened in summer 2016.

2.5.4 The Park & Ride facility identified is now operational as the MereOak Park and Ride facility on the A33.

Shinfield

2.5.5 The Shinfield development is split across various proposals including Shinfield West, Cutbush Lane, The Manor, and Shinfield Local Centre.

2.5.6 Shinfield West is the largest of the sites, totalling 1,350 dwellings to the southwest of the existing built-up area of Shinfield. The proposals received outline planning approval from the Secretary of State on appeal (Wokingham Borough Council reference no. O/2010/1432) in November 2012.

2.5.7 The appeal allowed for the construction of the Shinfield Eastern Relief Road, as detailed above.

2.5.8 Cutbush Lane comprises a smaller development of 126 dwellings to the north of Cutbush Lane and east of Monarch Drive. The development will have access to both Cutbush Lane and the Eastern Relief Road and will therefore provide a through-route between the two.

2.5.9 The Manor, located to the north of Gloucester Avenue and west of Hollow Lane, comprises the former National Dairy Institute site. The proposed development will deliver approximately 125 dwellings with access off Brooker's Hill.

Spencers Wood

2.5.10 Construction of the first phase of Spencers Wood, known as Croft Gardens, is currently in progress. A reserved matters application for the next phase of the development, known as North of Croft Road, is due to be submitted. The remainder of the development will comprise 363 dwellings with associated infrastructure.

Three Mile Cross

2.5.11 Development at Three Mile Cross was permitted as part of the hybrid planning application for Spencers Wood and Three Mile Cross (Wokingham Borough Council ref. no. O/2013/0346).

2.5.12 Approximately 280 new dwellings are proposed at Three Mile Cross, on land to the north and south of Church Lane. Reserved matters applications for the two sites to the north and south of Church Lane are due to be submitted.



Transport Contributions

2.5.13 The developments at Spencers Wood and Three Mile Cross have contributed towards the following transport improvements:

- Shinfield Eastern Relief Road
- MereOak Park and Ride
- Bus services towards Reading town centre
- Basingstoke Way / Hyde End Road junction improvements
- Church Lane mini roundabout

Arborfield Garrison

2.5.14 The *Arborfield Garrison Strategic Development Location: Supplementary Planning Document* was adopted by Wokingham Borough Council in October 2011. It sets out the requirements for the re-use of Arborfield Garrison following the Ministry of Defence's vacation of the site.

2.5.15 Arborfield Garrison is identified in the *Wokingham Borough Core Strategy* as being capable of accommodating around 3,500 new dwellings.

2.5.16 The Arborfield Cross relief road will assist with the delivery of this SDL by reducing the traffic impact on Arborfield Cross. Wokingham Borough Council undertook a consultation of route options in Autumn 2013.

2.5.17 The Council announced in March 2014 that Option B had emerged as the preferred option for further refinement. This option provides a link between the A327 Reading Road (west of Greensward Lane) and the A327 Eversley Road just to the south of Langley Common Road Roundabout (south of Arborfield Cross).

South Wokingham

2.5.18 The *South Wokingham Strategic Development Location Supplementary Planning Document* was adopted by Wokingham Borough Council in October 2011. It sets out the requirements for the proposed development site to the south of Wokingham Town. The site comprises largely agricultural land either side of the Wokingham-London railway line.

2.5.19 The site is identified within the *Wokingham Borough Core Strategy* as being capable of accommodating around 2,500 residential dwellings with associated infrastructure.

2.5.20 The SDL requires the construction of a new strategic road link – the Southern Distributor Road (SDR) to connect from London Road to Finchampstead Road (A329). The first section of this route has been completed on the northern side of the railway line, connecting with London Road, as part of the Montague Park development.



- 2.5.21 The development to the south of the railway line is currently going through the pre-application masterplanning stage.

North Wokingham

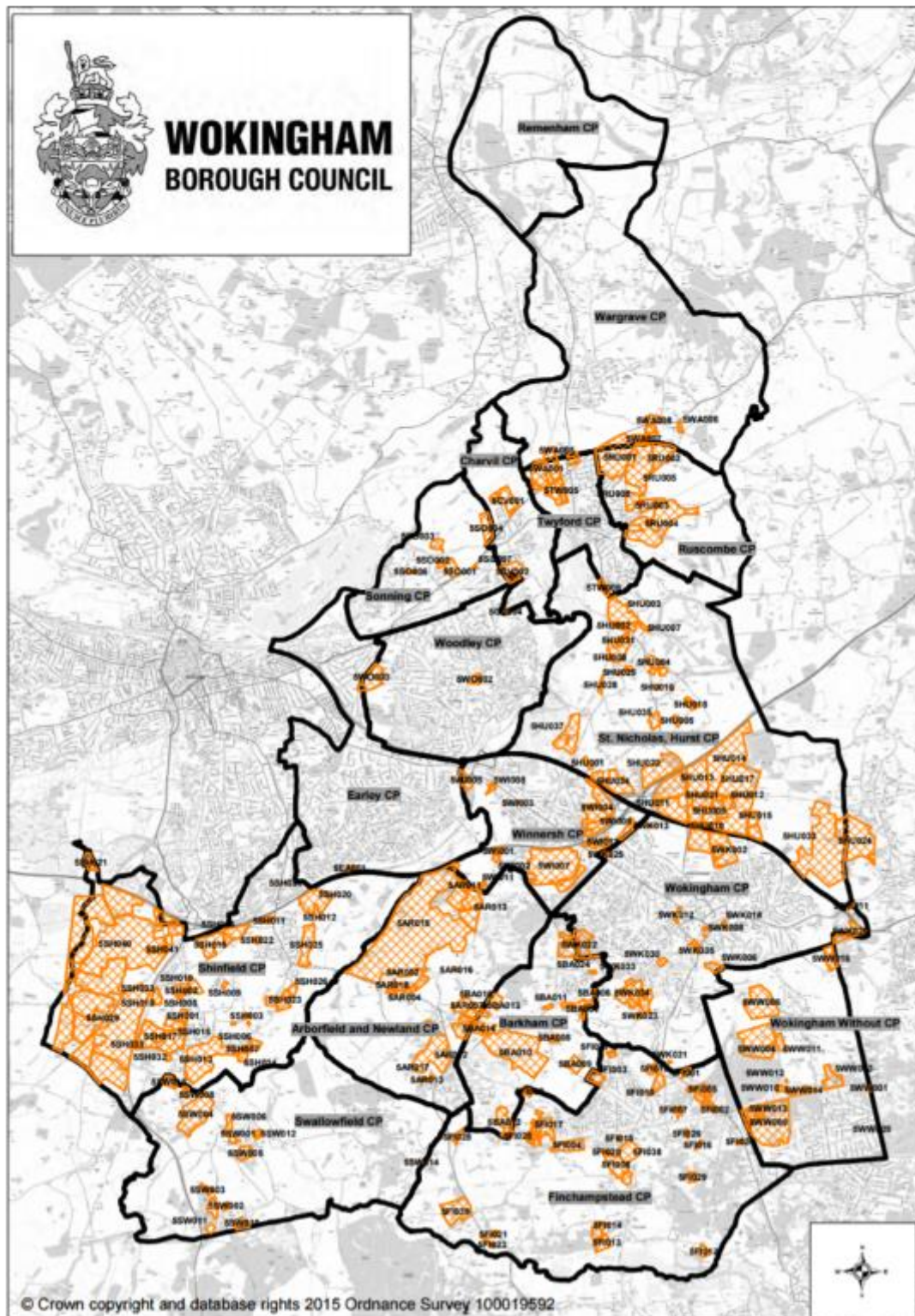
- 2.5.22 The *North Wokingham Strategic Development Location Supplementary Planning Document* was adopted in October 2011. The site is an urban extension to Wokingham, adjoining the Kentwood and Matthewsgreen neighbourhoods. The site is identified as being capable of accommodating around 1,500 dwellings with associated infrastructure.
- 2.5.23 The SDL identifies the need for the construction of a new strategic link – the Northern Distributor Road – which will connect the site to Toutley Road. A further connection may be provided in the future, connecting around the east of the town to the Coppid Beech Roundabout and potential Park and Ride site.
- 2.5.24 The whole site is either completed, under construction or has outline planning permission. The Distributor Road is currently under construction, along with Kentwood East and Matthewsgreen.

2.6 Local Plan Update– Call for Sites

- 2.6.1 Wokingham Borough Council has recently commenced work on the Local Plan Update (LPU) which will shape the future of the Borough. This updated Local Plan will guide development in the Borough for the next 20 years. As part of the LPU, the Council are seeking to understand what land is available for new housing, business and leisure development, and other uses. Therefore, they undertook two 'Call for Sites' consultations, which were an open invitation for anybody to suggest land to be considered for development. Figure 2-1 below provides an overview of submitted sites and their locations across Wokingham Borough. However, other sites may be suggested to the Council through the LPU process and the most recent information will be published via <http://www.wokingham.gov.uk/planning-and-building-control/planning-policy/local-plan-update/>.



Figure 2-1: Local Plan Update – Call for Sites Map



3 Site Details

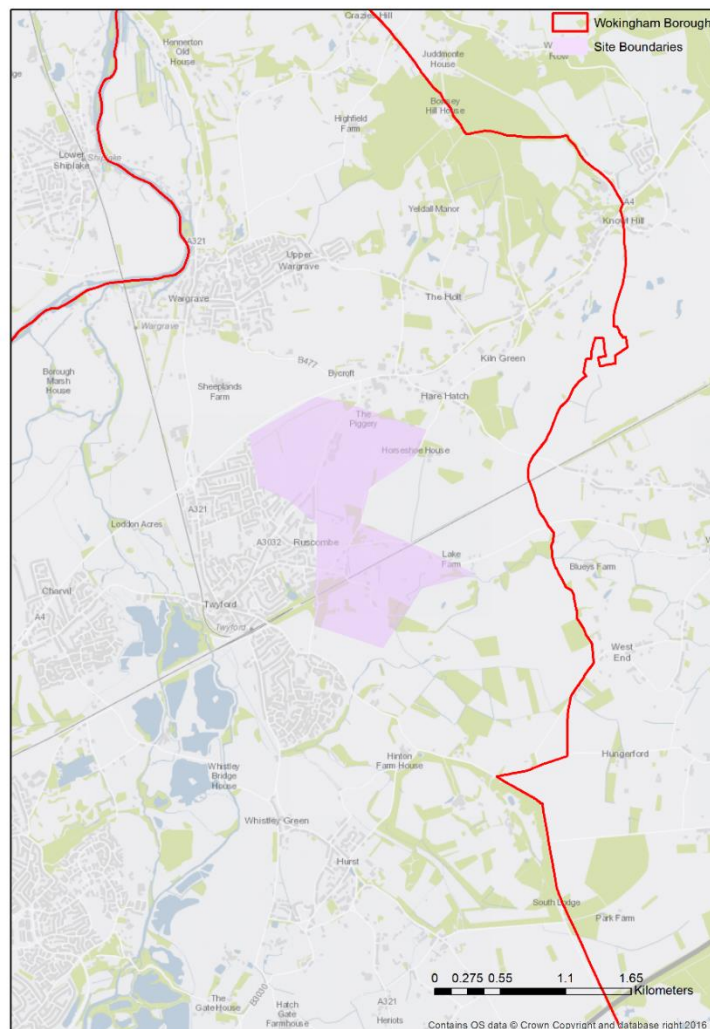
3.1 Overview

- 3.1.1 This chapter provides an overview of the Twyford site in terms of location, local context and potential development quantum.

Site Location

- 3.1.2 The site lies to the east /northeast of Twyford and could provide an opportunity to accommodate approximately 3,000 dwellings with associated infrastructure. The site location is shown in Figure 3-1.

Figure 3-1: Twyford Site Location



- 3.1.3 To the west, the town of Reading lies eight kilometres away. Reading is one of the largest towns in the UK, with a population of over 200,000 and serves as an important employment, commercial



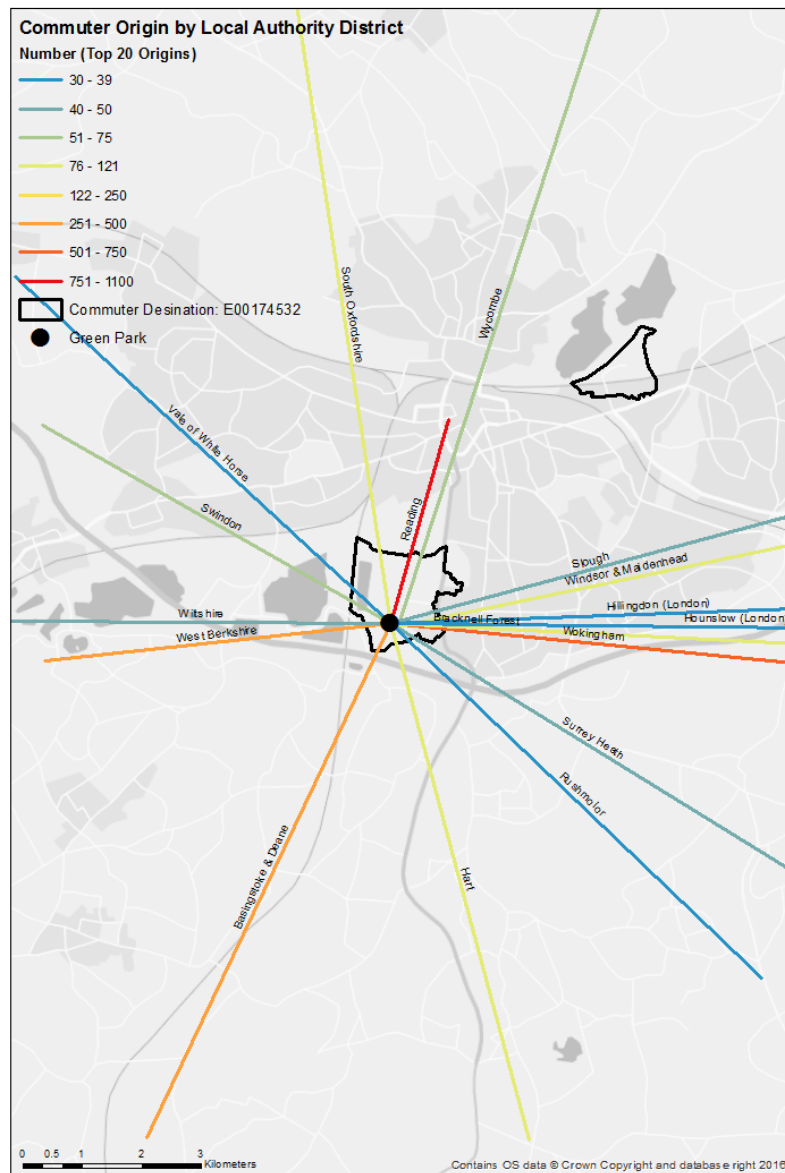
and retail centre in the Thames Valley. Reading benefits from great transport links to London and other strategic destinations such as London Gatwick and Heathrow Airports, Birmingham, and Bristol, attracting a large number of commuters during the morning and afternoon peak hours.

- 3.1.4 The site is crossed by the Great Western mainline connecting the west and south west of England with London Paddington. Twyford Station lies to the west of the site. To the north of the site, the Bath Road connects Twyford with Reading to the west and Maidenhead to the east.
- 3.1.5 The site borders the existing urban edge of Twyford and will form an urban extension to the town. The boundary runs directly to the east of the Ruscombe area of Twyford. The site is currently primarily agricultural with limited buildings or settlements located within the proposed boundary.



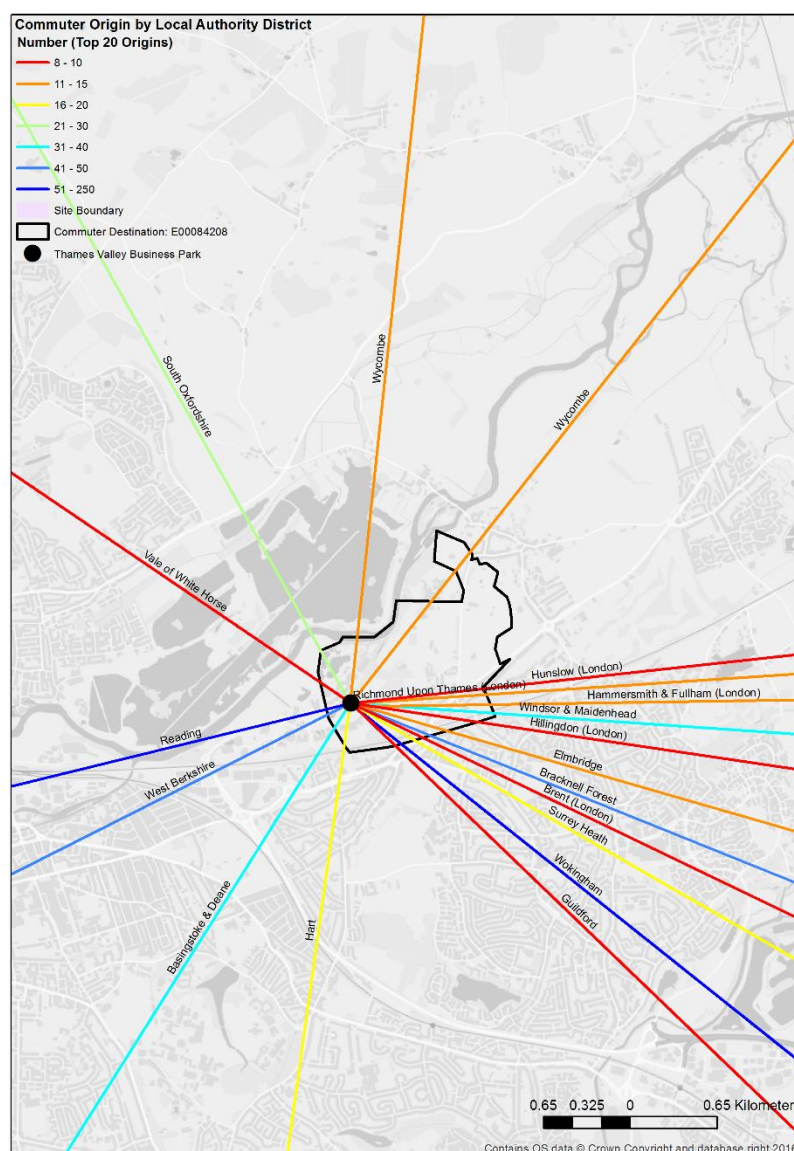
- 4.2.3 With regard to the origin of Green Park employees (Figure 4-2), over 600 people travel to Green Park from Wokingham Borough. Almost 1,100 employees work in Green Park and live within Reading Borough.

Figure 4-2: Origin of Green Park Employees



- 4.2.4 With regard to the origin of Thames Valley Park employees (Figure 4-3), over 200 employees travel to work there from within Reading and a further 190 from Wokingham Borough.

Figure 4-3: Origin of Thames Valley Park Employees



4.3 Local Highway Network

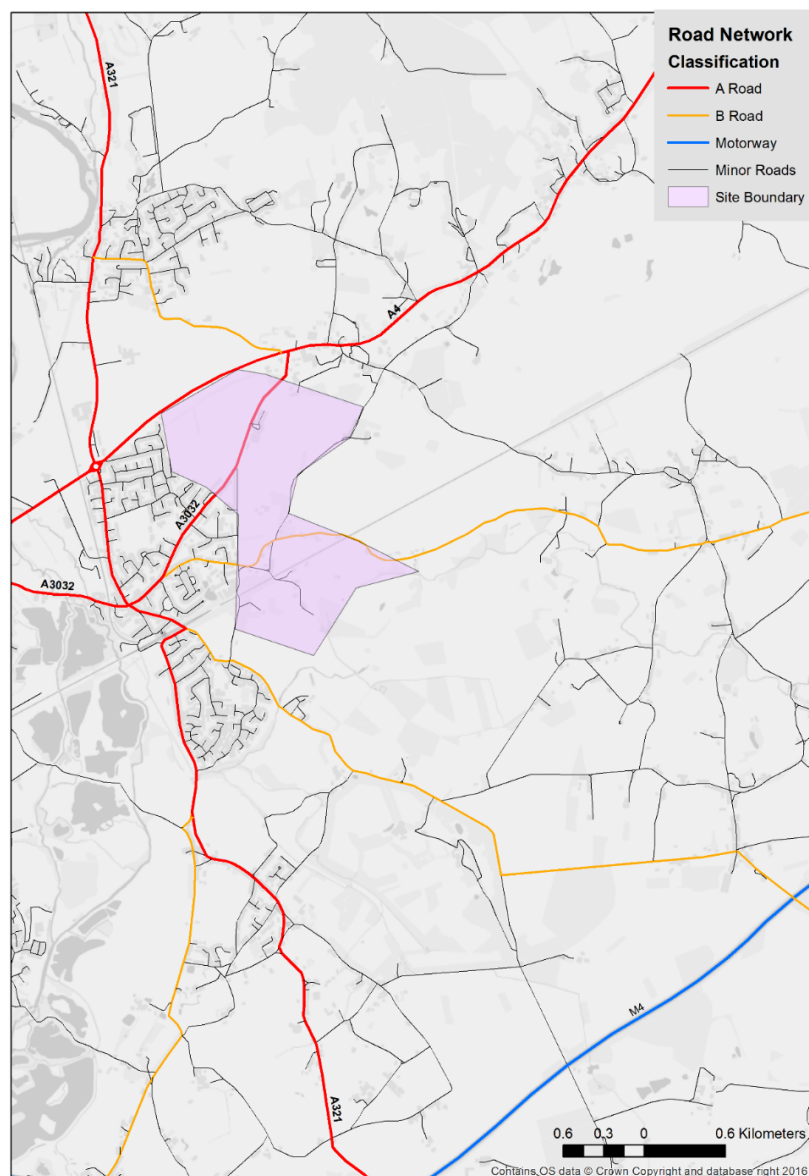
- 4.3.1 The proposed site is located on the eastern edge of Twyford. The site is split by the main Reading to Paddington railway line and is bounded by the A4 New Bath Road to the north. To the south the B3024 Waltham Road and A3032 London Road both run through the site.
- 4.3.2 The A4 runs between Bath and London. In the vicinity of the site it is a single carriageway road with a speed limit of 60mph. On the eastern side of the junction with the A321 there are footways on both sides of the road, to the west of the junction there is a footway only on the northern side of the road. It goes through the centre of Reading to the west and through Maidenhead and Slough to the east, running very close to Heathrow Airport as it enters London.



M4 Motorway Improvements

- 4.3.3 The M4 runs to the south of Twyford with the nearest access to the motorway is Junction 10, approximately 6.5km away. This junction is reached via the A321 Twyford Road.
- 4.3.4 The M4 runs between London and South Wales and is subject to national speed limit. To the west the M4 passes through Swindon and Bristol before entering Wales via the Severn Bridge

Figure 4-4: Local Highway Network



- 4.3.5 Highways England are about to commence works (March 2017) on the M4 between Junctions 3 and 12 to implement a 'smart motorway'. The scheme will use technology to improve journeys and reduce congestion by monitoring traffic flow and introducing variable speed limits. This scheme



will also create additional capacity along the busy stretch of motorway through the conversion of the hard shoulder to permanent traffic lane. The works are due for completion in March 2022.

4.3.6 A two-year redevelopment scheme of the Junction 11 was completed in 2010, widening the northern section of the dual carriageway and significantly expanding and improving the vehicular capacity of the motorway junction. These improvements also included the introduction of bus priority lanes through the centre of the gyratory.

4.3.7 Figure 4-4 above provides an overview of the local highway network in the vicinity of the Twyford site.

4.4 Bus Services

4.4.1 Twyford is served by a relatively comprehensive bus network, providing connections to Wokingham, Reading, Maidenhead and nearby villages.

4.4.2 The most convenient bus stops to serve the Twyford site are to the west of the site in the town centre and along the A3032 through the site. These stops are served by the 850 bus which runs between Reading Town Centre and High Wycombe on a high frequency.

4.4.3 There is also a set of bus stops on Amberley Drive, just south of the A321/A4 junction, only 250m from the site boundary. These stops are served by multiple services providing transport to Reading, Wokingham and nearby villages.

4.4.4 More services are available from the centre of Twyford a short walk away. Table 4-1 below shows details of the bus services available close to the site.

Table 4-1: Bus Services

Service Number	Route	Peak Hour Frequency	Operating Hours	Days of Operation
850	Reading Town Centre – High Wycombe	Every 15 minutes	05:25-23:58	Mon-Sun
127	Reading – Maidenhead	5 services per day	08:25-18:15	Saturday
128	Reading – Wokingham	1 per hour	07:07-19:27	Mon - Sat
129	Reading – Wokingham	3-5 services morning and evening	06:07-09:04 15:30-18:29	Mon - Fri
F30	Madejski Stadium – Twyford	Once per day	13:00-23:00	Mon - Sat



4.4.5 Figure 4-5 below shows the bus routes available in the Twyford area. Figure 4-6 following provides the network map for Reading town.

Figure 4-5: Bus Routes

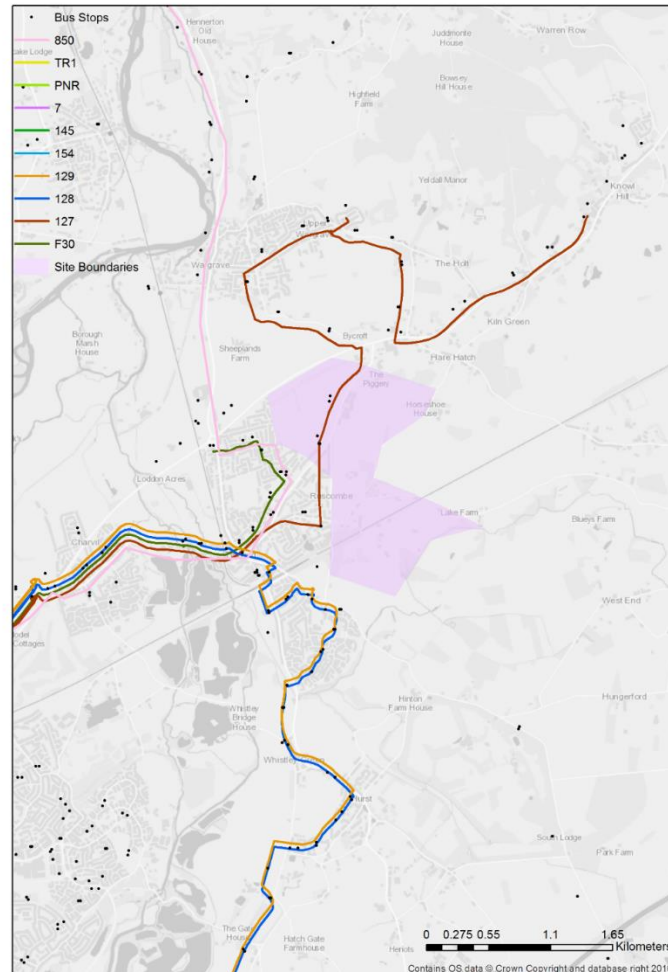
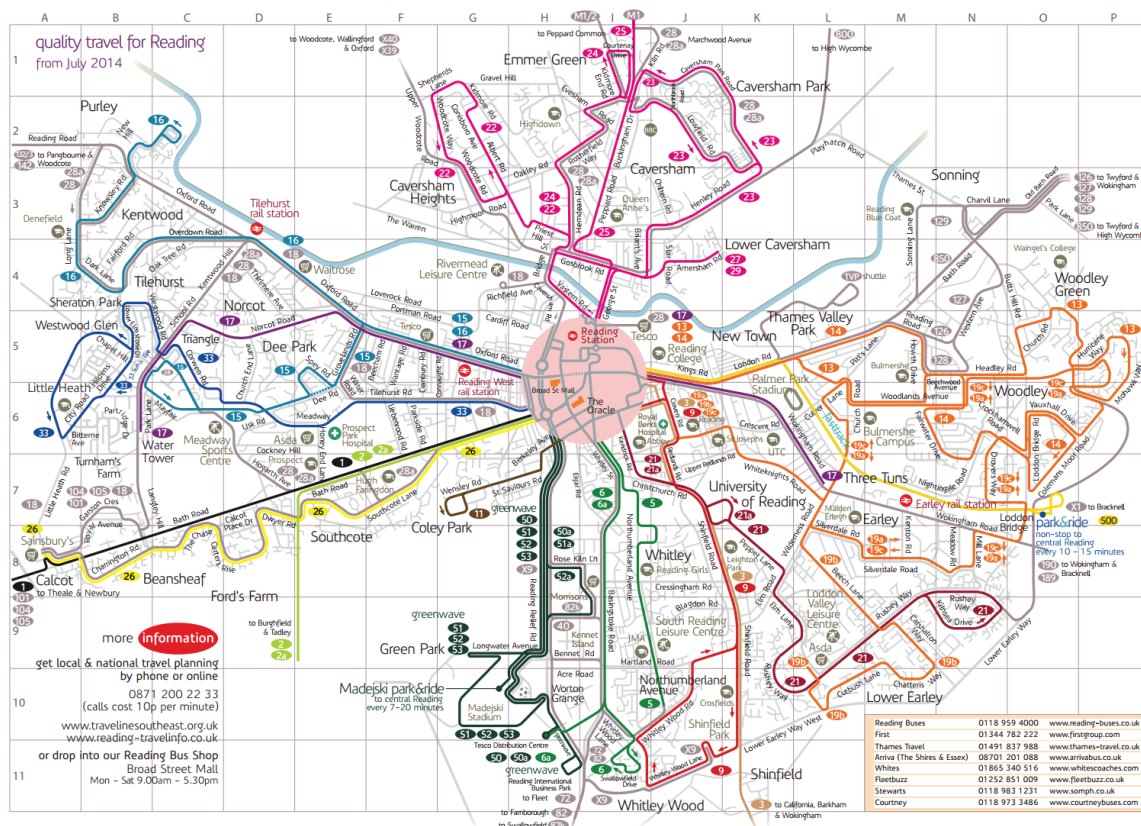




Figure 4-6: Reading Bus Network Map



Eastern Park and Ride

- 4.4.6 East Reading Mass Rapid Transit (MRT) is a proposed public transport link between central Reading and the proposed Thames Valley Park P&R site to the east of the Reading urban area, running parallel to the Great Western mainline. The Park and Ride facility is scheduled to commence operation in March 2017 with the associated MRT infrastructure to be completed by September 2019.

4.5 Rail Services

- 4.5.1 Twyford is served by two rail lines – the main Great Western Rail line, and the branch line providing links to Henley-on-Thames.
- 4.5.2 Twyford Station provides connections to Reading, Oxford and London Paddington. Parking for 57 bicycles and 324 cars is provided and a taxi rank is available outside the station entrance. This station is accessible for disabled passengers and staff assistance is available if required. The frequency of trains from Twyford Station are as follows:
- Five services during peak hours to Reading
 - Five services during peak hours to London Paddington



- Two services per hour to Oxford

4.5.3 Reading Station offers services to a wide variety of destinations all over the country such as Plymouth, Bristol, Manchester, Newcastle, Gatwick and Heathrow.

Crossrail

4.5.4 From December 2019, Twyford Station will be served by two trains per hour on the Elizabeth Line – Crossrail. This will enable passengers to travel through to Liverpool Street and Canary Wharf with no changes. It will also cut journey times to these two stations by 20 minutes during the peak hour. The introduction of Crossrail provides significant additional capacity for passengers travelling from the west to Central London.

Western Rail Access to Heathrow (WRATH)

4.5.5 As detailed in Chapter Four, the WRATH scheme is proposed to introduce a new direct rail service from the west into Heathrow Airport. It is proposed that Twyford Station be served by these new direct services, significantly raising the status of the station and potentially increasing the level of passengers using the station to interchange to these services.

Twyford Station Improvements

4.5.6 The introduction of Crossrail services has not resulted in additional investment at the station to increase capacity or improve facilities to accommodate the additional demand that the services will generate. Demand will be further increased by introduction of WRATH services. This will all be combined with an increase in local rail demand from additional residential developments in and around Twyford. Wokingham Borough Council have commissioned an options study to consider the feasibility for interventions at the station. These interventions being considered are:

- Improvements to the current station where possible;
- Construction of a new station to the east of Twyford, splitting service between existing station and new location;
- Full relocation of the station and realign the Henley branch to facilitate interchange.

4.5.7 This options assessment exercise will feed into a more detailed business case and economic appraisal as the options are developed in more detail.

4.6 Local Facilities

4.6.1 The centre of Twyford is approximately 18 minutes' walk from the site, approximately 1.4km, and provides many of the facilities residents will require. Twyford High Street features a Waitrose, a Tesco Express, a Post Office and a number of restaurants, cafes and small shops. Twyford GP surgery is located close to the town centre.

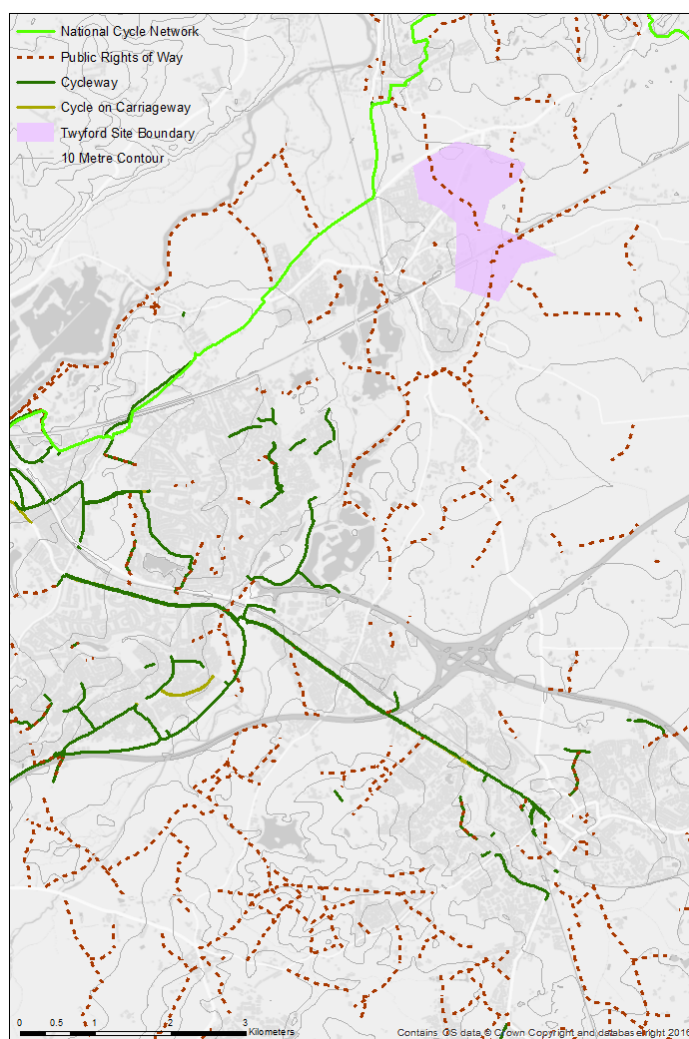
- 4.6.2 There are a number of primary schools in Twyford... (The Piggott CE School, Cedar Park Day Nursery and Preschool, Polehampton C of E Junior School, Polehampton Infant School, The Colleton Primary School). The Piggott CE Secondary School is located 2km northwest of the site.

4.7 Walking and Cycling Network

Walking

- 4.7.1 Walking is the most sustainable mode of transport and accounts for a significant proportion of all journeys. In terms of benefits, walking requires no external energy and causes no congestion or pollution. It improves personal health and encourages social interaction, helping to strengthen local communities. It is highly inclusive, being available to most people regardless of age or income.
- 4.7.2 The Twyford site is crossed by a number of Public Rights of way which should be included in any future masterplan. These are shown on Figure 4-7.

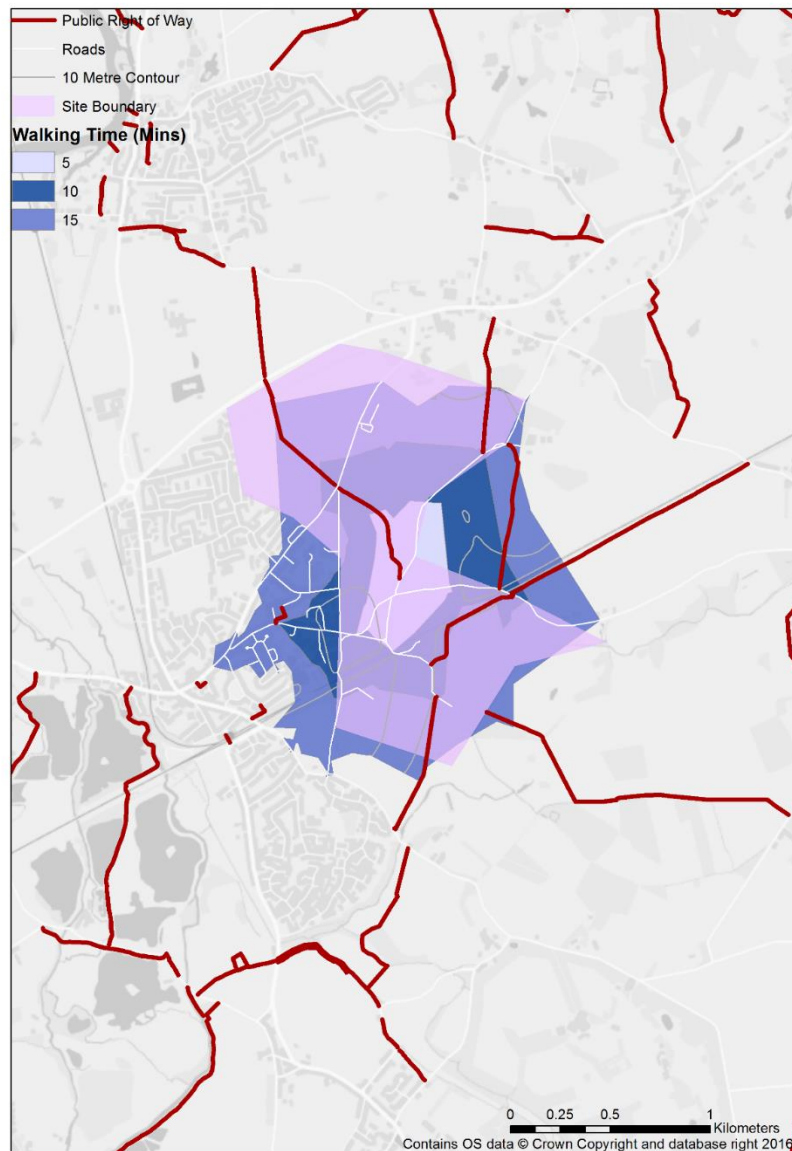
Figure 4-7: Local Cycle and Walk Network





- 4.7.3 The A3032 London Road has footway on the western side, although this is narrow and of relatively poor quality. Further south, Castle End Road, which forms part of the eastern site boundary is a relatively narrow country lane with no footway provision. South of the railway, there are further public rights of way connecting the proposed site to the urban edge of Twyford.
- 4.7.4 Figure 4-8 below shows the walk catchment of the Twyford site based on the current network.

Figure 4-8: Site Walk Catchment



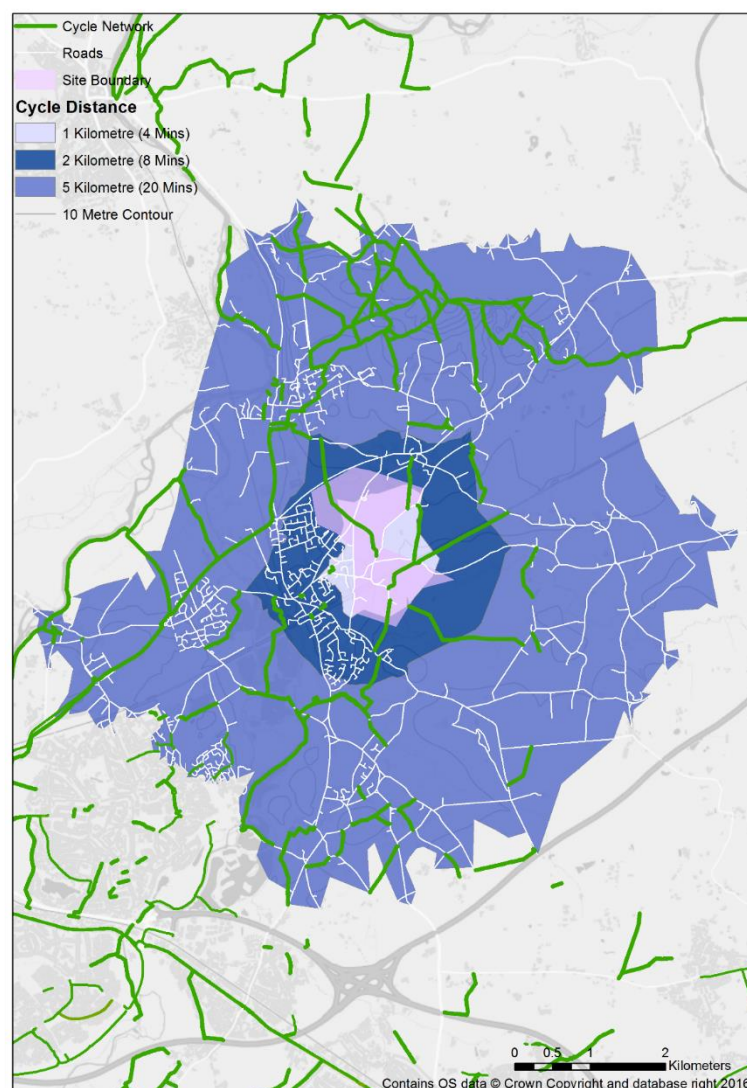
Cycling

- 4.7.5 In the UK and internationally, cycling is increasingly seen as an integral element of solutions to support economic growth, tackle congestion, improve personal mobility and address health

problems associated with obesity and lack of physical activity. Cycling, like walking is a great way to travel short distances as an alternative to using the car.

- 4.7.6 The National Cycle Network Route 4 passes to the north of Twyford as shown on Figure 4-7. NCN Route 4 is a long distance route that connect London with Fishguard via Reading, Windsor, and Newbury and on towards Bath, Bristol and South Wales.
- 4.7.7 Reading operates the Readybike bicycle hire scheme across the town centre. A total of 200 bicycles are available spread over 29 docking points. It is recommended that extensions to this scheme are considered to the east of Reading as part of the Park and Ride expansion.

Figure 4-9: Site Cycle Catchment



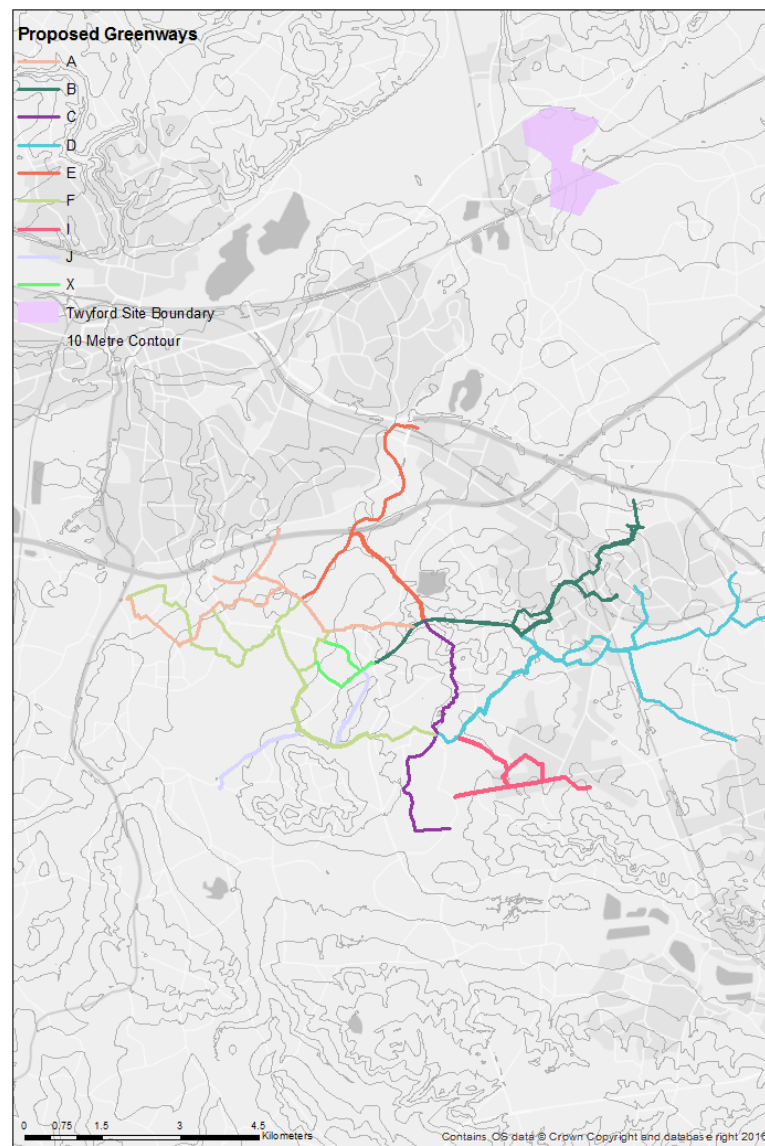


- 4.7.8 Figure 4-9 above shows the site cycle catchment. This shows that the east of Reading is accessible within a 20-minute cycle ride of the site. This catchment could be improved with the introduction of more direct cycle routes through Twyford towards Reading.

Greenways

- 4.7.9 The Greenways network is a series of pedestrian and cycle paths being introduced across Wokingham Borough to encourage sustainable travel between rural and urban areas. These routes are initially planned to link developments in Shinfield and Arborfield with Wokingham. Figure 4-10 provides a map of currently planned Greenways routes.

Figure 4-10: Proposed Greenways Routes





5 Sustainable Transport Infrastructure

5.1 Introduction

- 5.1.1 This section sets out a series of potential interventions and infrastructure schemes that could be introduced to form a wider Transport Strategy for the Twyford site. This has drawn upon ideas proposed at earlier planning workshops and discussed in detail with Wokingham Borough officers and Thames Valley LEP.
- 5.1.2 The delivery of high quality and accessible sustainable transport links by rail / bus / foot / cycle will be key for ensuring delivery of a successful and sustainable new community and encouraging residents to use cars less. Of particular importance will be high quality connections to the Reading area – both the town centre and the main employment areas, and connections to the rail network via Twyford Station, and links to Central London.

5.2 Site Density and Layout

- 5.2.1 To achieve a truly accessible development, it is essential that accessibility is aligned with existing and new land use patterns, ideally with a focus on Transit-Oriented Development (TOD). Higher order public transport need to be located right at the heart of neighbourhood and district centres to achieve the required modal shift to sustainable transport.
- 5.2.2 The 'Being Dense' report highlighted the relationship between housing density and successful uptake of sustainable transport, and the need to link housing density to parking levels wherever possible. The London Plan, produced by the Greater London Authority, advocates relating public transport accessibility to housing density, with areas of high Public Transport Accessibility Level (PTAL) proposed to develop higher residential densities. However, the density will clearly vary across the site and, the site being in a relatively rural location, means modal share will also vary across the site.

Dutch 'ABC Model'

The ABC location policy, applied in the Netherlands since 1988, is designed to help reduce the growth of car travel on commercial developments. Locations are graded according to their accessibility by public and private transport. Their rating then determines the level of parking provision permitted at developments within those locations.

'A' Locations – highly accessible by public transport, with relatively poor car access

'B' Locations – highly accessible by both public and private transport

'C' Locations – highly accessible by car but poorly accessed by public transport



- 5.2.3 The Dutch ABC model described above provides a framework within which the site layout and relative density can be defined according to the access to key public transport nodes. It is vital that the development is sensitive to the changes in density according to accessibility, otherwise will lack commercial viability. Such an approach at Twyford will create the opportunity for denser development along the western edge where access to Twyford Station and the local public transport networks is highest.
- 5.2.4 The layout of a site is key to influencing mode choice. There should be focus on a range of street types catering for different movements needs and distances. Street networks should be designed to maximise connectivity and 'walkability'.

Freiburg - Reiselhof

High frequency public transport (in this case trams) runs right through the heart of the neighbourhood and was provided from the start.

Street hierarchy prioritise pedestrian, cycle and public transport movements whilst including some parking within sympathetic street design.

Parking is limited to one space per unit. In neighbouring Vauban, parking is more restricted through car-free neighbourhoods and the provision of parking areas on the edge of the



Recommendations: Develop a clear framework of density targets related to sustainable transport accessibility, using Dutch ABC style zoning as a basis for new strategic development site densities and layouts.

High quality links to the existing urban edge of the town will be essential in integrating the development to the existing town of Twyford.

Parking needs to be restrained but viable. Linking parking to density and sustainable transport access provides a clear approach which can be adopted by developers.



5.3 Highway Infrastructure

- 5.3.1 The focus of this study is upon the sustainable transport aspect of the development. However, as part of any future transport masterplan, a comprehensive highway infrastructure strategy will be necessary. Therefore, some reference has been made to potential highway network improvements below.
- 5.3.2 Proximity to the Strategic Road Network provides the opportunity for traffic to disperse across the network quickly. When considering the highway network for the Twyford site, links to the south and M4 Junction 10 will be important for mitigating congestion on existing roads in Twyford.
- 5.3.3 The proximity of the site to the A4 Bath Road provides good access to the north and provides the opportunity to achieve high quality street frontage

Upton Northamptonshire

Upton in Northampton showcases best practice street design, through the creation of a permeable street network. The permeable network creates a high quality place for pedestrians and cyclists as well as allowing vehicular movements.

The existing A43 has been redesigned in the vicinity of the site to create a wide boulevard style pavement, street trees, and a services road allowing new development frontage to form a local retail centre, taking advantage of passing trade.

Recommendation: High quality highway links to the north and south of the site to provide access to the A4 to the north and M4 to the south.

The A4 should act as the ‘front door’ of the development with quality frontage and street design.

5.4 Rail Infrastructure

- 5.4.1 The proximity of the site to Twyford Station presents the opportunity to provide excellent links to Crossrail, Heathrow (via WRATH) and Central London.
- 5.4.2 The proposed Twyford Station improvements should be considered in the context of this eastern urban extension. Emerging proposals, covered briefly in Chapter Four, are considering options for improving capacity and interchange opportunities at Twyford. One such option is to relocate the station further east along the line to allow a larger facility to be constructed. This would be very close to, or even within the identified development site boundary and offers the opportunity to achieve high quality rail links directly into this urban extension.



Recommendation:

In Twyford, the provision of direct pedestrian and cycle links to Twyford Station in order for residents to link to Crossrail and other national services is essential.

Twyford Station improvement proposals should be developed in the context of this urban extension with consideration of a relocated station within the identified site boundary.

5.5 Bus Network Improvements

- 5.5.1 The addition of up to 3,000 dwellings to the east of Twyford will create significant additional public transport demand from new residents. Trips between the site and Reading are those more likely to be by bus.

The campaign group, Greener Journeys, commissioned a study looking at the impact of congestion on bus passengers. The study makes a series of recommendations for growing bus patronage and reducing traffic volumes in cities.

Of these recommendations, four are relevant to the planning of development:

- *Demand management*
- *Bus priority*
- *Bus stop dwell times*
- *Mobilising bus passengers*

With respect to demand management, the study notes that if bus patronage increases without demand management measures, the extra capacity freed up on the road network will be taken by latent demand and congestion will therefore not decrease. Instead, the study recommends that contentious schemes such as congestion zones or workplace parking levies are implemented.

The study highlights bus priority as being conducive to modal shift, noting that a comprehensive quality corridor initiative in a major conurbation delivered a 75% increase in bus passengers over 5 years, with 20% being new customers.

Bus Priority and Rapid Transport Network

- 5.5.2 The scale is such that there will be potential demand to introduce a new sustainable transport connection to the development, most likely an extension of the MRT corridor already being extended out to Thames Valley Park. Such a route provides the opportunity to create a corridor that can be upgraded in the future. Future corridor usage could be by Autonomous or Guided vehicles, or a combination of transport options.

- 5.5.3 The MRT scheme demonstrates the wider support for bus rapid transit infrastructure in the area in the form of bus priority or segregated/guided busways.

Eclipse BRT – Fareham

The Eclipse BRT service runs between Fareham and Gosport providing a frequent bus link, with sections of the route along dedicated busway. The service provides a 7-minute headway during peak periods. Since commencing operation in April 2012, patronage has increased 64% on new routes E1 and E2 compared with the equivalent routes which they replaced. Over the Gosport peninsula as a whole, there has been a 12% general increase in bus use since operation.



Recommendation:

Consider further extending the MRT through to Twyford on the A4 corridor. Explore options for segregated or guided sections where possible.

5.6 Cycle Infrastructure

- 5.6.1 The inclusion of high quality cycle infrastructure and corridors throughout the development itself as well as the creation of high quality links between the site and Reading town centre will be essential. These corridors should be designed for multiple uses and be adaptable to future technology such as small Autonomous vehicles or pods, pedestrian routes and different categories of cyclist.



Delft – Cycle Network

The City of Delft in Holland was selected as a model for transport planning in the 1970s. IN 1999, a Cycling Action Plan was devised based on a three-level hierarchy of cycle routes:

- *‘Town’ – main ‘superhighway’ routes to centres with heavy flows and a network density of 500m*
- *‘District’ – links between strategic locations across network and joining up ‘town’ routes at a density of 200-300m*
- *‘Sub-district’ – links between residential areas, often shared with pedestrians at a density of 100m*

The city has seen a 12% increase in daily cycle trips and an overall cycle mode share of 43%.



Achieving high cycle mode share will require the provision of high quality connections for commuters to the local employment centres and Reading town centre. There is a need for a hierarchy of cycle infrastructure within the site as well as connecting the site to areas outside in order to optimise cycle use for all reasonable journeys and for all user groups. Below we identify the types of route hierarchy that should be applied within the development.

Local Network

- 5.6.2 The network within the new neighbourhood of the Twyford development site should be focused upon low speed, traffic calmed routes where all cycle users can travel safely, ideally segregated from both pedestrians and vehicles. Where necessary, shared cycle/footways can be used but with sufficient width to allow safe interaction.

Primary Streets

- 5.6.3 Primary routes within the development should allow sufficient space for cyclists with priority provided at sideroads for cyclists to cross. Cycle routes should ideally be segregated from the main traffic and pedestrian routes



Major Routes

- 5.6.4 Major routes into and out of the site for cyclists should be dedicated direct routes, ideally shorter than equivalent vehicle routes where cyclists have priority and speed is prioritised. Gradients should be low wherever possible. Links between the Twyford site and Twyford Station and town centre should be of this type.

Recommendations: Design in high quality cycle network to the development from the start with a clear hierarchy and network of routes within both developments.

Ensure Readybike bicycle hire scheme is extended further east at the earliest opportunity.

5.7 Long Term Interventions

- 5.7.1 The development at Twyford should consider the longer-term transport requirements and will need to have an element of 'futureproofing' by considering longer term technology advances.

Autonomous Vehicles

- 5.7.2 A significant emerging development in transport which will need to be considered as the settlements develop is the prospect of Autonomous Vehicle (AV) technology, as referenced earlier in the report. Presently, the types of vehicles, and the extent to which AV technology will be adopted across the country is relatively unknown. The technology of the vehicles themselves is developing very rapidly, whilst the infrastructure and governance of their potential networks is somewhat behind.
- 5.7.3 It is clear that AV use is gathering momentum, however, and the design of the development will need to consider some elements of 'futureproofing'. This will be in the street design, in terms of dimensions that can be adapted to accommodate AV (or reduced to allow for less road space demand); parking and development plots may need to be adaptable should car ownership reduce significantly through AV use.
- 5.7.4 A recent white paper, jointly published by WSP|PB and Farrells¹, has set out to consider the impact on places – both urban and rural – of the introduction of autonomous vehicle technology. The report suggests that between 15% and 20% of additional developable land can be created where shared AV use is proposed compared to a normal urban layout. The land is primarily gained through the removal of parking spaces. They also suggest land is gained through more simplified travel corridors. The report highlights that cars are typically parked for 80% of the time, creating a

¹ <http://www.wsp-pb.com/GlobalIn/UK/WSPPB-Farrells-AV-whitepaper.pdf>



significant waste of land. The widespread use of AV could transform suburban areas to free up a considerable amount of land currently used for parking.

Recommendations: Ensure all areas of the development, from individual plots to street sections and circulatory areas, are designed with the ability for future adaptation to technology and travel behaviour.

5.8 Summary of Recommendations

5.8.1 This chapter has set out a series of recommendations and factors to be considered when developing the plans for any future development at Twyford. These recommendations are set out below:

- Develop a clear framework of density targets related to sustainable transport accessibility, using Dutch ABC style zoning as a basis for both development sites.
- Internalise as many trips as possible through mixed land uses with walkable neighbourhoods and high quality services and infrastructure including schools, retail, live-work units, high speed broadband, delivery hubs and workhubs. High quality links and connections to the existing urban edge will be essential.
- Parking needs to be restrained but viable. Linking parking to density and sustainable transport access provides a clear approach which can be adopted by developers as the sites grow.
- High quality highway links to the north and south of the site to provide access to the A4 to the north and M4 to the south.
- The A4 should act as the 'front door' of the development with quality frontage and street design
- In Twyford, the provision of direct pedestrian and cycle links to Twyford Station in order for residents to link to Crossrail and other national services is essential.
- Twyford Station improvement proposals should be developed in the context of this urban extension with consideration of a relocated station within the identified site boundary
- Extend MRT further east to serve Twyford. Branding of the network/corridor with high quality vehicles and facilities provides the opportunity to attract new public transport users. Identification of key corridors through the site that can be adapted for future technology.
- Explore options for segregated or guided MRT sections where possible
- Design in high quality cycle network to the development from the start with a clear hierarchy and network of routes within both developments.
- Ensure all areas of the development, from individual plots to street sections and circulatory areas, are designed with the ability for future adaptation.



6 Forecast Travel Patterns

6.1 Introduction

- 6.1.1 This section considers the future travel patterns of the Twyford development site. As a basis, the analysis has used the 2011 Census Journey to Work data for the wider Reading area to consider the level of achievable sustainable travel, comparing a number of areas across Reading where the access to public transport and the housing density would be similar to the proposals at Twyford.
- 6.1.2 The proposed transport infrastructure and level of service improvements outlined in Chapter Five have been used to forecast a future modal split for residents of the development.

6.2 Standard Trip Generation – Wokingham Strategic Model Trip Rates

- 6.2.1 A trip generation exercise has been undertaken using the trip rates as applied within the Wokingham Strategic Transport Model. The trip rates are based on a TRICS assessment undertaken on behalf of WBC. These trip rates assume no trip internalisation or linked trips as they are based on much smaller development quantum and, as such, are not representative of the likely trip levels at the Twyford site.

Table 6-1: WBC Strategic Model Vehicle Trip Rates and Forecast Vehicle Trips

	AM Peak			Inter-Peak			PM Peak		
	Arrival	Departure	Total	Arrival	Departure	Total	Arrival	Departure	Total
	Trip Rates								
Dwelling Houses	0.13	0.4	0.53	0.17	0.16	0.33	0.33	0.2	0.54
Dwelling Flats	0.08	0.2	0.28	0.08	0.07	0.16	0.17	0.08	0.25
	Forecast Trips – Twyford								
Dwelling Houses	292.5	900	1192.5	382.5	360	742.5	742.5	450	1215
Dwelling Flats	60	150	210	60	52.5	120	127.5	60	187.5
TOTAL	352.5	1050	1402.5	442.5	412.5	862.5	870	510	1402.5



Table 6-2: WBC Strategic Model Public Transport Trip Rates and Forecast Total Trips

	AM Peak			Inter-Peak			PM Peak		
	Arrival	Departure	Total	Arrival	Departure	Total	Arrival	Departure	Total
	Trip Rates								
Dwelling Houses	0.01	0.05	0.06	0.02	0.01	0.03	0.03	0.01	0.04
Dwelling Flats	0.01	0.1	0.1	0.01	0.01	0.01	0.03	0	0.03
	Forecast Trips – Twyford								
Dwelling Houses	22.5	112.5	135	45	22.5	67.5	67.5	22.5	90
Dwelling Flats	7.5	75	75	7.5	7.5	7.5	22.5	0	22.5
TOTAL	30	187.5	210	52.5	30	75	90	22.5	112.5

- 6.2.2 The use of standard TRICS trip rates in isolation results in very high levels of vehicular trips being forecast. It is anticipated that the development will generate a relatively high level of ‘internalisation’. Furthermore, the proximity of the Twyford site to the town centre will enable much shorter trips to be generated for retail, leisure and education journey purposes.

6.3 National Travel Survey – First Principles Approach

- 6.3.1 The National Travel Survey (NTS) 2015 has been used to forecast in more detail the number of trips by mode and purposes likely to be generated by the development. This has used a first principles approach.
- 6.3.2 To calculate the total trips per households, a number of reports from the NTS have been used. The NTS states that in the South East, an average of 946 trips per person were recorded. Based on the 2011 Census, the average population per household in Reading was 2.47. Therefore, a total of 2,343 trips per household per year can be assumed. This can then be calculated as 6.8 trips per household each weekday.
- 6.3.3 When considering the peak hour, the morning peak accounts for 11.9% of trips and the evening peak hour accounts for 7.9% (based on table NTS 0502). This can then be applied to trip purposes to derive a trip rate by purpose by peak hour as shown in Table 6.3.



Table 6-3: Breakdown of Forecast Trips by Purpose – Twyford

Trip Purpose	Percentage		Trip Rate		Total	
	AM	PM	AM	PM	AM	PM
Commuting	22%	34%	0.18	0.18	534	545
Shopping	4%	12%	0.03	0.06	97	192
Leisure	3%	19%	0.02	0.10	73	304
Personal Business	17%	24%	0.14	0.13	413	385
Education	50%	5%	0.40	0.03	1214	80
Other	3%	6%	0.02	0.03	73	96
Total	100%	100%	0.80	0.53	2405	1602

6.3.4 The NTS can also be used to calculate mode split by journey purpose as follows:

Table 6-4: Mode Share by Journey Purpose

Mode	Walk	Cycle	Car	Mcycle	Bus	Rail	Other
Commuting	10%	4%	70%	1%	8%	6%	2%
Shopping	25%	1%	63%	0%	9%	1%	1%
Leisure	18%	2%	70%	0%	5%	2%	4%
Personal Business	27%	1%	63%	0%	5%	1%	2%
Education	39%	1%	44%	0%	10%	2%	4%
Other	35%	0%	62%	0%	2%	0%	0%

6.3.5 When this modal share breakdown is applied to the trip rates detailed in Table 6-4, the breakdown of trips by mode and purpose can be calculated for the Twyford site.



Table 6-5: Trips by Journey Purpose

Mode	Walk		Cycle		Car		Mcycle		Bus		Rail		Other	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Commuting	53	54	20	20	372	379	6	6	42	43	34	35	8	8
Shopping	24	48	1	2	61	121	0	0	9	17	1	1	1	2
Leisure	13	55	1	5	51	213	0	1	3	14	1	6	3	11
Personal Business	112	105	4	4	261	243	1	1	21	20	4	4	9	8
Education	473	31	18	1	537	35	0	0	118	8	21	1	47	3
Other	26	34	0	0	45	60	0	0	1	1	0	0	0	0

- 6.3.6 As the trip purposes and modes are broken down it begins to emerge which categories of trips are likely to be ‘internalised’ within this new settlement.
- 6.3.7 Both education and shopping trips can be assumed to be strongly internalised within the Twyford development where it is likely that a primary school and neighbourhood centre will form part of the development.
- 6.3.8 As the Masterplan for the Twyford site develops, a more detailed trip model can be developed which forecasts the level to which trips will be retained within the settlements. This will enable sustainable transport interventions to be targeted towards particular journey types and modes.



7 Modal Share and Accessibility

- 7.1.1 The 2011 Census and the National Travel Survey provide a comprehensive record of travel patterns in the area. Although the Census data collected only relates to commuting journeys, these account for almost 20% of all daily trips², particularly those travelling outside of a settlement during peak hours as discussed in Chapter Six.
- 7.1.2 The Journey to Work data has been analysed in detail for the wider Reading/Wokingham area to understand the local relationship between access to sustainable transport and mode share. This analysis provides a basis upon which the sustainable transport mode share can be forecast for the new settlements, and a potential target for development density around areas of high accessibility.

7.2 Mode Share Variation - Reading

- 7.2.1 The variation in sustainable transport mode share has been modelled across the Reading and Wokingham areas to understand the local patterns in sustainable travel. Figures 7.1 to 7.3 show the variation in journey to work mode share of rail, bus and cycle use by output area.
- 7.2.2 Figure 7.1 demonstrates the correlation between proximity to rail stations and rail mode share, as would be expected. This is particularly the case for mainline stations such as Reading and Twyford which have regular direct services into Central London. In some areas of central Reading and Twyford, journey to work mode share is higher than 30% compared to an average across Reading of 9%.
- 7.2.3 Figure 7.2 shows the equivalent data for bus modal share. This shows a mode share of up to 30% in some parts of Reading. These areas of high bus use correlate with key bus corridors, as shown by the bus stop locations.
- 7.2.4 The plans show the direct relationship between the proximity and access to frequent public transport services and the modal share. This relationship can be used to start to forecast the likely mode share of residents of the Twyford development based on the level of sustainable transport services provided and proximity to access to these services. This approach uses a similar, if simplified approach as PTAL calculations in Greater London.
- 7.2.5 To further consider the likely impact on modal share of access to sustainable transport services, analysis has been undertaken to measure the relationship of public transport access and frequency, and modal share. For the purposes of this high level strategy, an analysis has been undertaken of bus and rail accessibility only.

² 2015 National Travel Survey



Figure 7-1: Rail Journey to Work Mode Share by Output Area

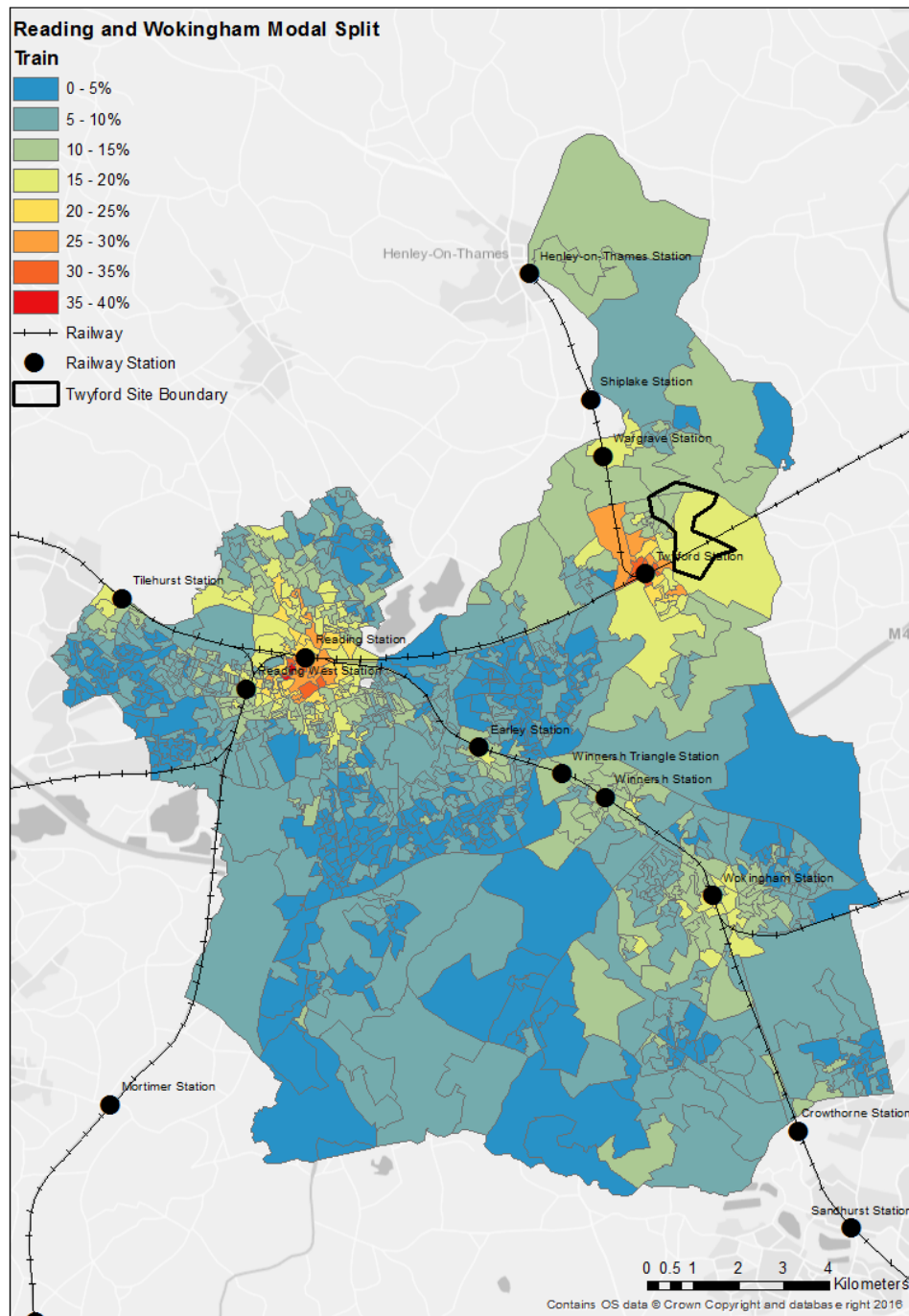


Figure 7-2: Bus Journey to Work Mode Share by Output Area

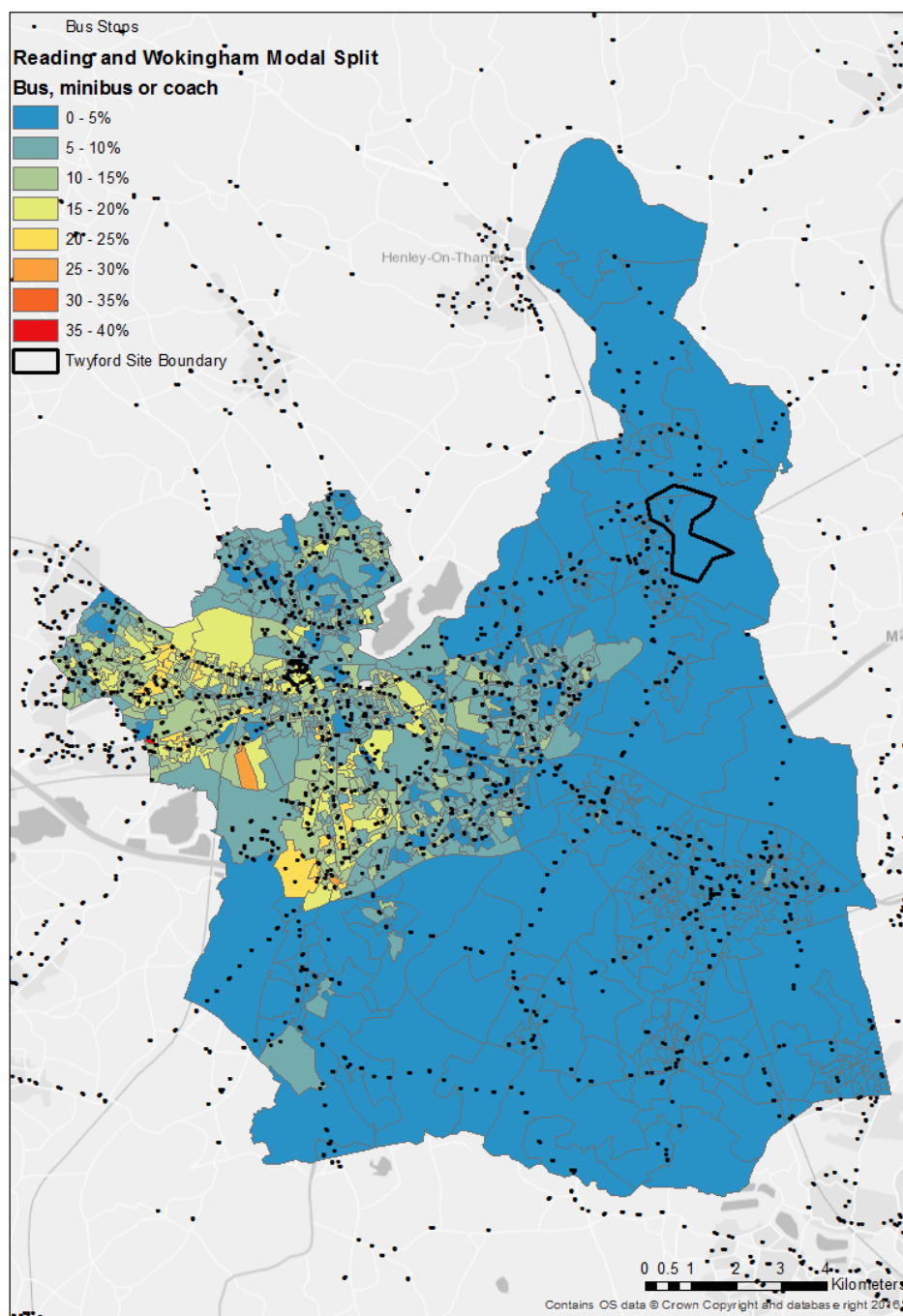
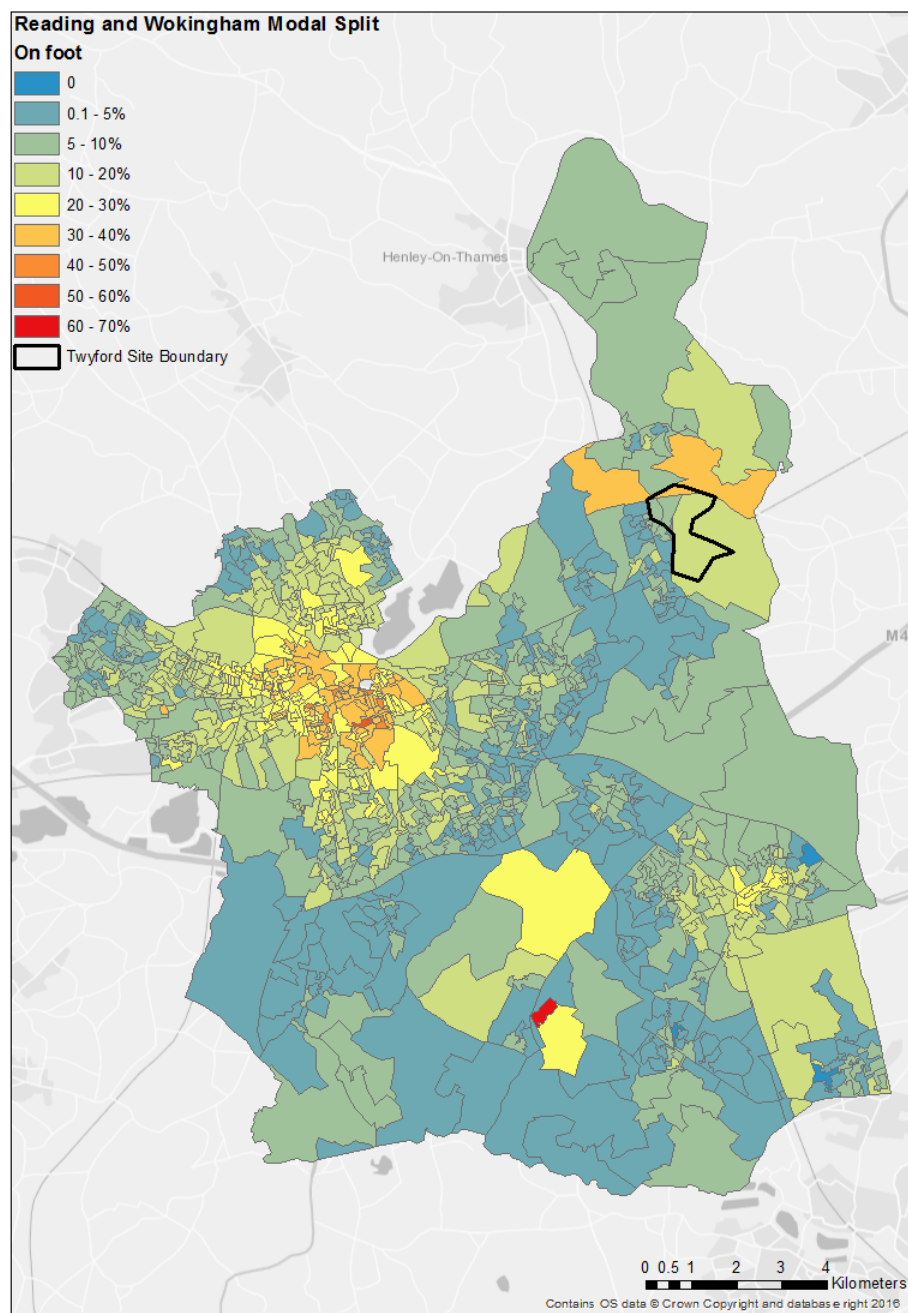




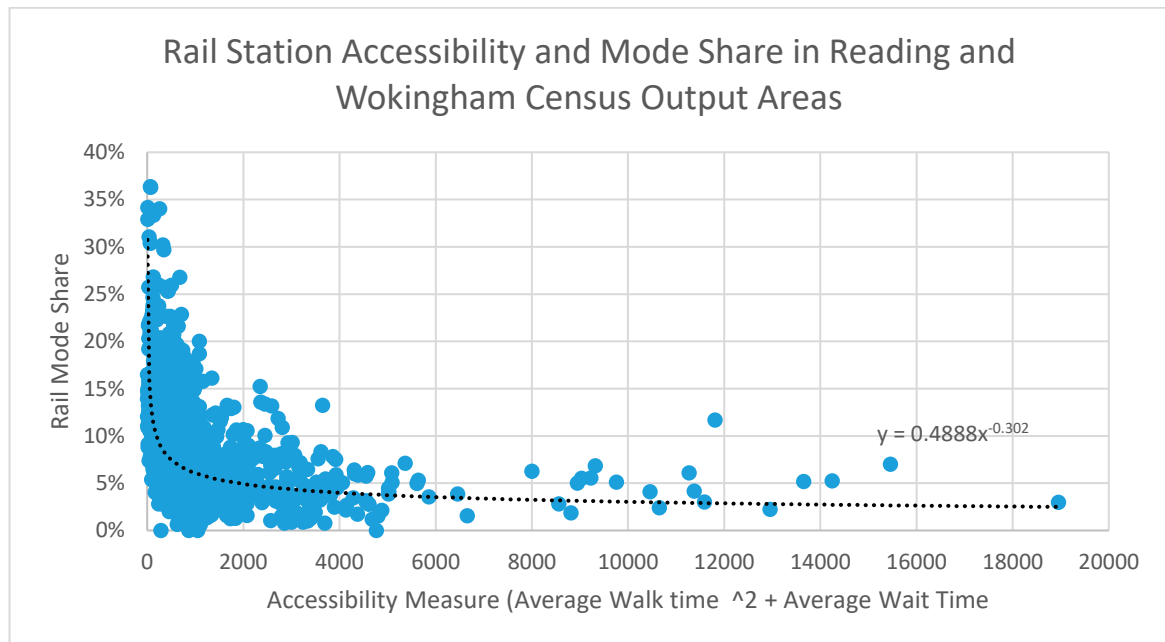
Figure 7-3: Cycle Journey to Work Mode Share by Output Area



Rail Accessibility

- 7.2.6 To model the relationship between access to rail services and modal share, the rail mode share by outputs area has been modelled against a measure of accessibility encompassing walk time and service frequency as shown in Figure 7.4.

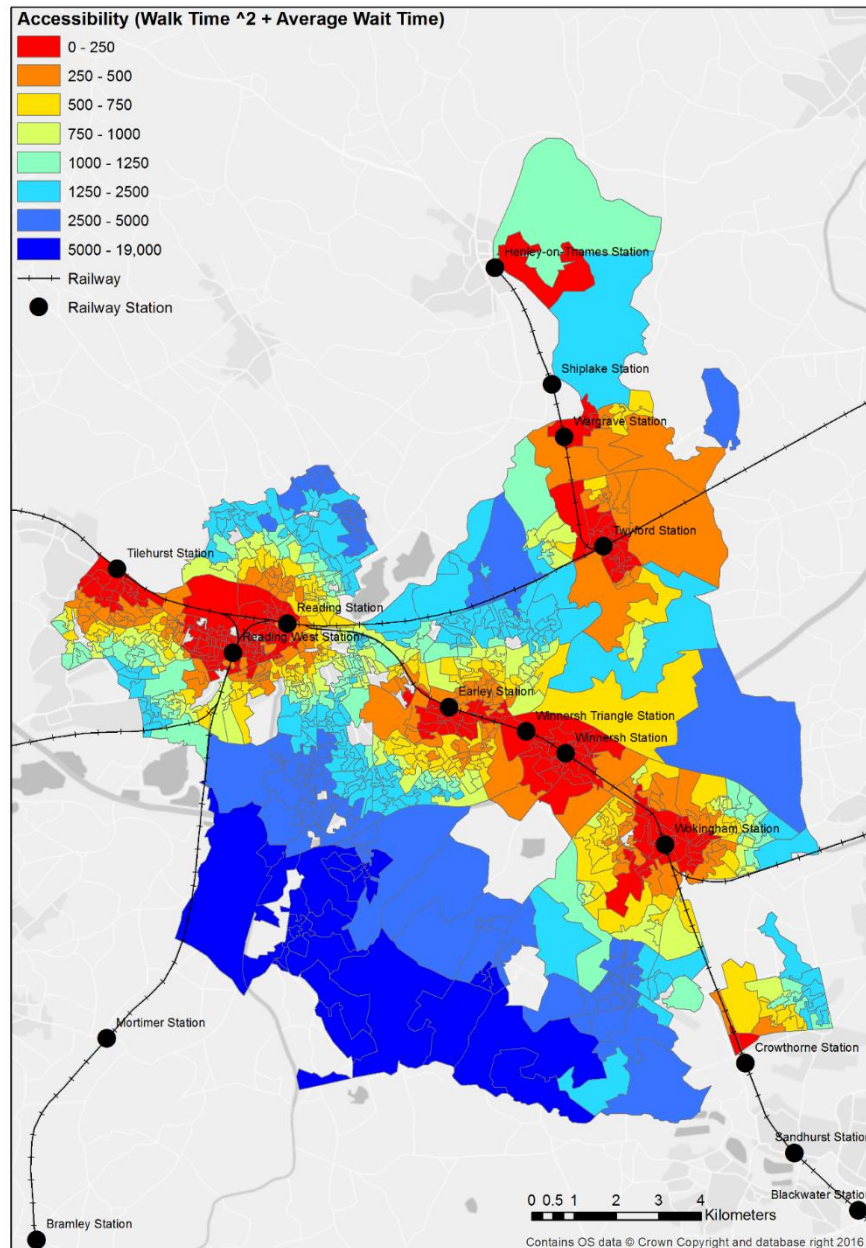
Figure 7-4: Rail Accessibility Assessment



- 7.2.7 The graph shows a direct relationship between mode share and accessibility to rail services. Areas of central Reading, within walking distance of Reading Station, have a rail modal share of up to 35%. This relationship can be used to forecast the likely rail use in the new developments based on the available services and proximity to stations.
- 7.2.8 Figure 7-5 displays this variation in accessibility across the study area. This clearly shows the relationship between proximity to stations and rail accessibility.



Figure 7-5: Rail Accessibility Map

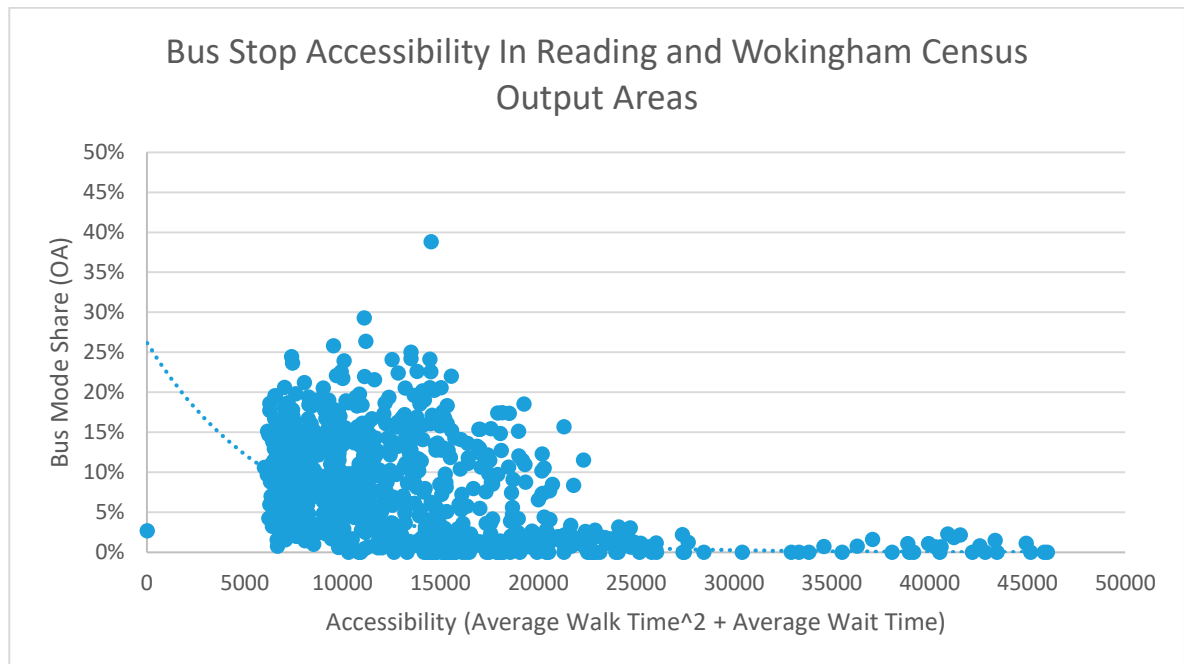


Bus Accessibility

- 7.2.9 Again, to model the relationship between access to bus services and modal share, walk access to bus routes across Reading has been modelled against a measure of accessibility encompassing walk time and route frequency. For the purposes of this exercise, access to all bus stops from each census output area was modelled due to limited resource to undertake a more complex analysis. The overall results produced a similar pattern of modal share against accessibility. The pattern is shown more clearly in the map of accessibility by output area with a clear increase in accessibility in the central Reading area.



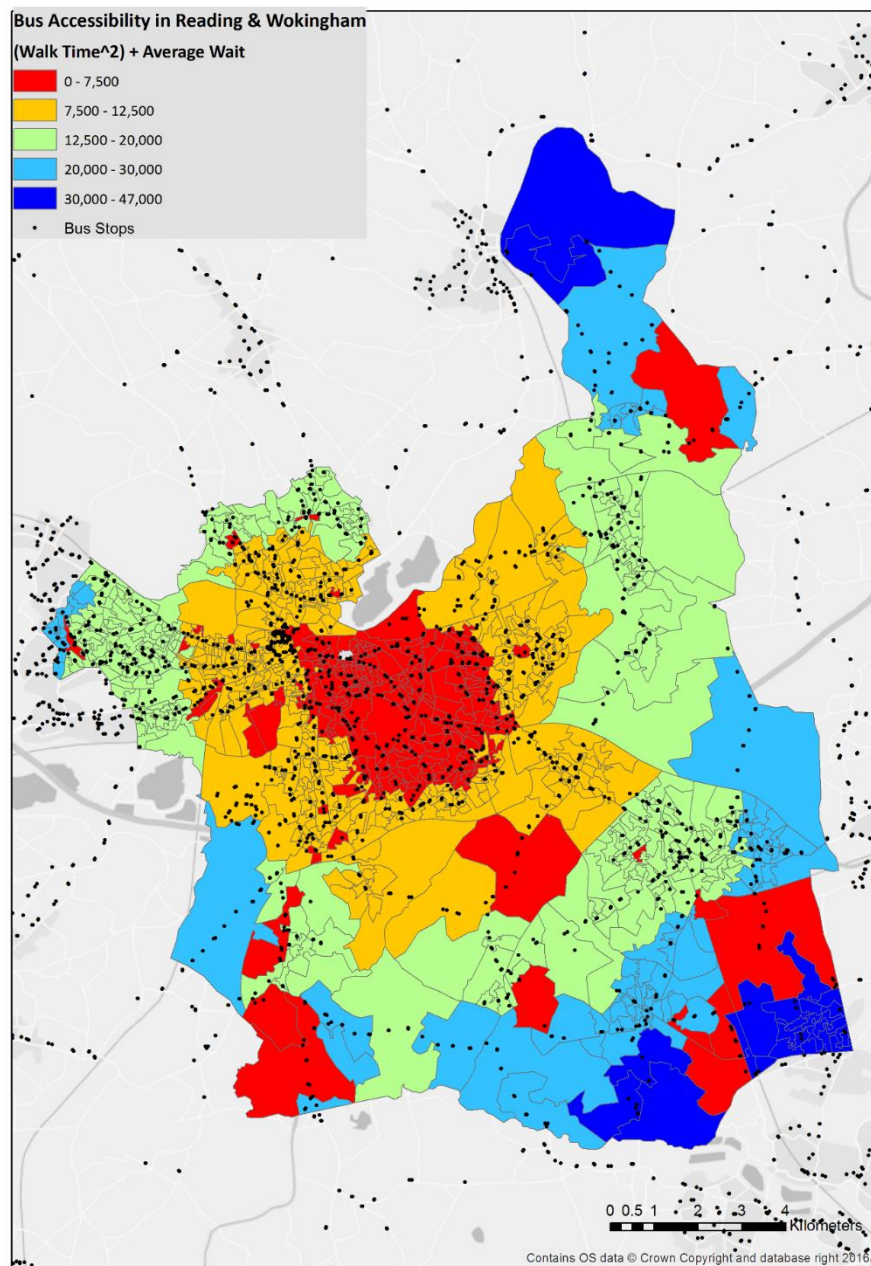
Figure 7-6: Bus Accessibility Assessment



- 7.2.10 A more refined analysis should be undertaken to model the relative accessibility along route corridors based on a finer grain of analysis than output area. It is recommended this is undertaken at 100metre intervals.



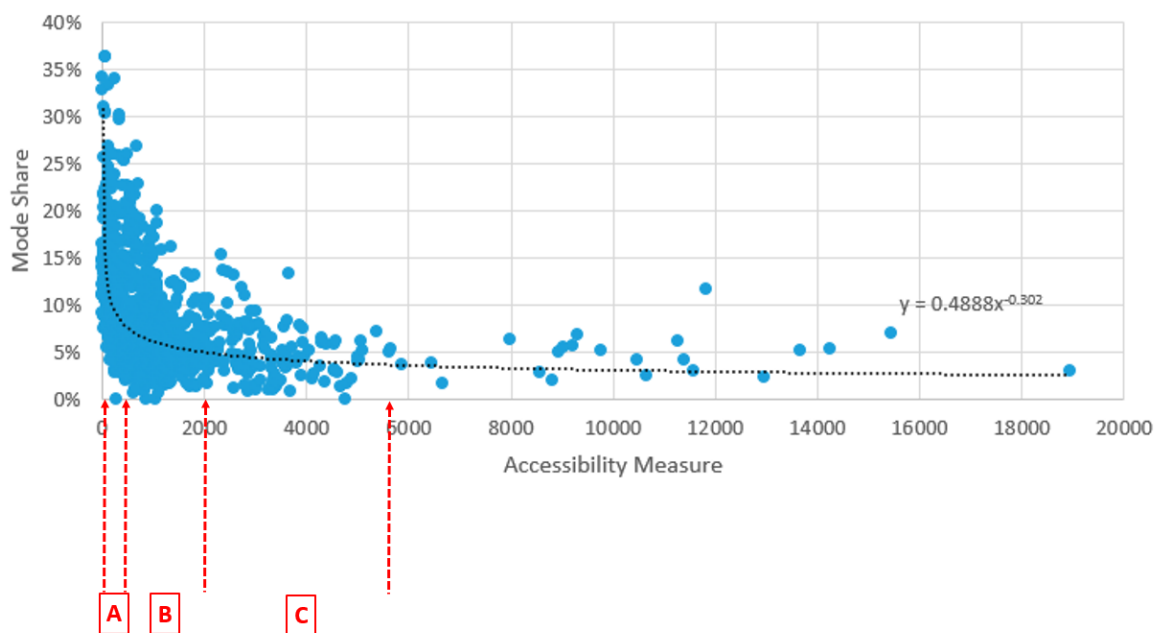
Figure 7-7: Bus Accessibility Map



Composite Accessibility Measure

- 7.2.11 The combined rail and bus accessibility can be combined to achieve a composite measure of accessibility against mode share.
- 7.2.12 This composite measure can then be used to forecast modal share across a new development and influence the housing density.

Figure 7-8: Example Composite Accessibility Measure



- 7.2.13 Figure 7-8 above demonstrates how the 'ABC' zoning can be defined according to the composite accessibility measure based on the forecast mode share that is achievable.
- 7.2.14 The process of developing the transport strategy can be undertaken alongside this analysis to develop the optimum location for rail, bus and cycle networks to achieve the most sustainable mode share.
- 7.2.15 For the purposes of this report, the composite measure set out below is an example of how density and/or parking provision can be related to accessibility across a large site development.

Recommendation: Further assessment be commissioned to model sustainable transport accessibility – both current and future – to devise an 'ABC' style model to apply to density and/or parking provision. This would build upon the existing analysis and create a finer level of accessibility measure. Such a measure can then be applied to the proposed development site to determine the appropriate level of density and/or parking levels to recommend as the masterplan and relevant design codes emerge.



8 Recommended Next Steps

- 8.1.1 The recommendations made within this report are based on a high-level review of transport conditions and proposed interventions at the Twyford site.
- 8.1.2 As the Masterplans for the Twyford site emerges, the forecasting can be refined in order to test various sustainable transport scenarios. This will enable the optimum transport strategy to be developed for the site from the start.

Highway Network

- 8.1.3 Further modelling of the wider highway network is required in order to understand the future available capacity between the Twyford site and Junction 10 of the M4 and along the A4 corridor.
- 8.1.4 Development of strong north and south highway links to ensure the Twyford development does not cause adverse congestion within the existing town centre.

Rail Proposals

- 8.1.5 At Twyford Station, work closely with those developing options for station improvement and relocation options to ensure strong links between the Twyford development site and any potential new station.

Bus Proposals

- 8.1.6 A high-quality bus network should be devised at the earliest opportunity. This will need to consider available capacity on the A4 corridor, with the potential to consider extending the MRT scheme further east towards Twyford.
- 8.1.7 Bus infrastructure such as guided or segregated routing to achieve reduced journey times should be prioritised.

Cycle Network

- 8.1.8 Identify new direct cycle routes between Twyford and Reading town centre. A Route Assessment exercise can be undertaken to forecast the likely shift to cycle use depending on the quality of the infrastructure, the gradient and the routing.

Future Technology

- 8.1.9 Ensure the masterplan considers the future impacts of technology development such as Autonomous Vehicles, guided buses and electric vehicles to create adaptable corridors and networks.