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## Land at South Drive, Harwell Campus, Oxfordshire

### Transport Assessment for the Examination in Public of the VWHDC Local Plan

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## Amendments & Authorisation Record

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## **1.0 Introduction**

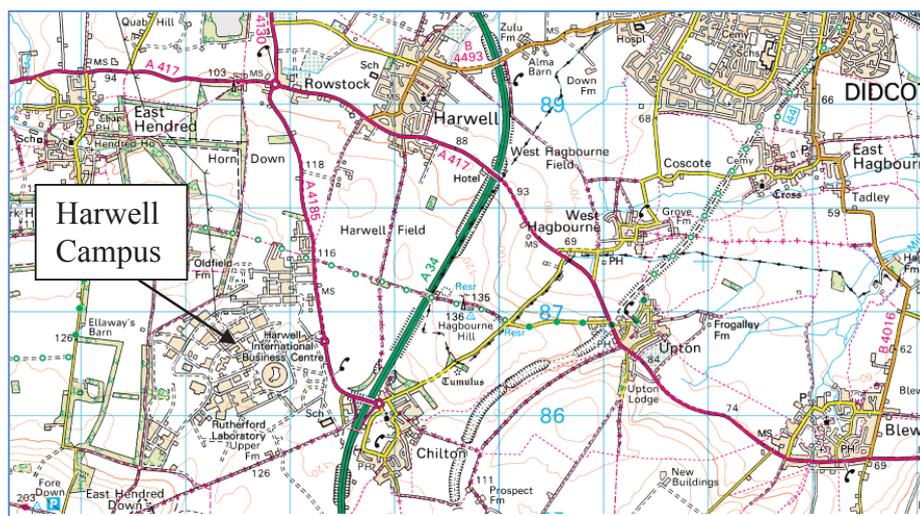
- 1.1 This Transport Assessment (TA) has been prepared on behalf of the Harwell Campus for the proposed residential development of around 1400 dwellings at South Drive, which is being promoted through the Vale of White Horse District Council's (VWHDC's) Local Plan process. This TA will therefore form part of the submissions by the Harwell Campus to the EiP regarding the Local Plan, and is intended to set out the existing situation regarding transport infrastructure and facilities in the area, transport policy, the proposed access strategy and traffic and transport issues at a high level. This TA has been completed in liaison with Oxfordshire County Council (OCC) as the Highway Authority.
- 1.2 Harwell is a world renowned Campus of 710 acres (290 hectares), less than 15 miles south of Oxford and is already a leading Science & Innovation Campus in Europe, hosting over 5,000 people working in more than 200 organisations.
- 1.3 Harwell has for some time been engaged in a consultation exercise with the VWHDC and Oxfordshire County Council (OCC), about its plans for the future development/redevelopment. In addition, the new Science Vale UK Enterprise Zone, which includes Harwell, will benefit new and expanding science and technology businesses.
- 1.4 The transport planning policy framework set out in Section 3.0 has informed the emerging masterplan for the Harwell Campus as a whole. Land use planning policies encourage employment and residential development being located in close proximity, in order to increase the attractiveness of sustainable modes of travel and thereby reduce the reliance on the private motor vehicle. Residential development is therefore being promoted at Harwell Campus to complement the planned employment growth. There will be a relatively high number of people living and working on site as a result of the development proposals, which will minimise the need to travel in line with local, regional and national transport policy and this is discussed in later sections of this TA.

1.5 This TA sets out the site location and existing situation at Section 2.0 and considers current transport policy at Section 3.0. The site is already located in a sustainable location, as demonstrated by the identification of existing local facilities for walking, cycling, and local public transport services, and this is presented in further detail in Section 4.0. The development proposals and access strategy are then discussed in Section 5.0, and the trip generation, base traffic flows and traffic assessment are covered in Sections 6.0 and 7.0. The conclusions are contained in Section 9.0.

## **2.0 Site Location and Existing Situation**

### **2.1 Local Area**

2.1.1 The Harwell Campus is located within the VWHDC area and is shown, in the context of the surrounding highway network on **Figure 1**.



***Figure 1: Site Location Plan***

2.1.2 The proposed residential site is at the northern end of Harwell Campus, and there are a wide range of employment uses within the campus, including research and development, starter units, offices and light industrial uses within easy walking/cycling distance. A number of amenities are also provided on-site, including occupational health, sports facilities, technical library, two conference centres, crèche, newsagents, hairdressers, post office, bank, sandwich bar/café and restaurant, which help to enhance the

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sustainability of the site by reducing the need to travel.

## 2.2 Local and Strategic Highway Network

2.2.1 Harwell Campus is located immediately west of the A4185 which runs between the A34 at Chilton Interchange, approximately 500m to the south, and Rowstock roundabout just over 1.5km to the north. Rowstock roundabout connects with the A417, which runs west towards Wantage and Grove and east towards Harwell village. The A4130 runs north from Rowstock to the A34 at Milton Interchange and on towards Didcot.

2.2.2 The A34 provides a strategic link, connecting the campus with the M4 (Junction 13) and Newbury, to the south, and Abingdon, Oxford and the M40 (Junction 9) to the north. The A34 is managed by Highways England, and a scheme to provide north facing slips at Chilton Interchange is underway, as well as an improvement scheme at the Milton Interchange roundabout. The proposed site is therefore well connected in terms of the local and strategic highway networks.

2.2.3 Harwell Campus is connected to the A4185 via 4 existing site access junctions. Due to the internal road layout at the campus, any of the 4 access points listed below could be used as an access route between the A4185 and the proposed residential development, even though the residential development itself is accessed via Curie Avenue:

1. Curie Avenue
2. Thomson Avenue
3. Fermi Avenue
4. Perimeter Road

2.2.4 The A4185 adjacent to the proposed site is subject to a 40mph speed limit, which commences just to the north of North Drive (see **Figure 2** below) and continues to a point to the east of Chilton village.



**Figure 2: View of the A4185 looking south towards site at start of 40mph zone**

2.2.5 There is a footway on the western side of the A4185, which provides pedestrian links to the bus stops on the A4185 in front of the Harwell Campus and also to Chilton School and Chilton village to the south.

2.2.6 There is a ghosted right turn lane at the A4185/Curie Avenue junction, and footways extend along Curie Avenue into the Harwell Campus. Curie Avenue is subject to a 30mph speed limit. A view of the Curie Avenue junction is shown on **Figure 3** below:



**Figure 3: View south along A4185 showing Curie Avenue junction**

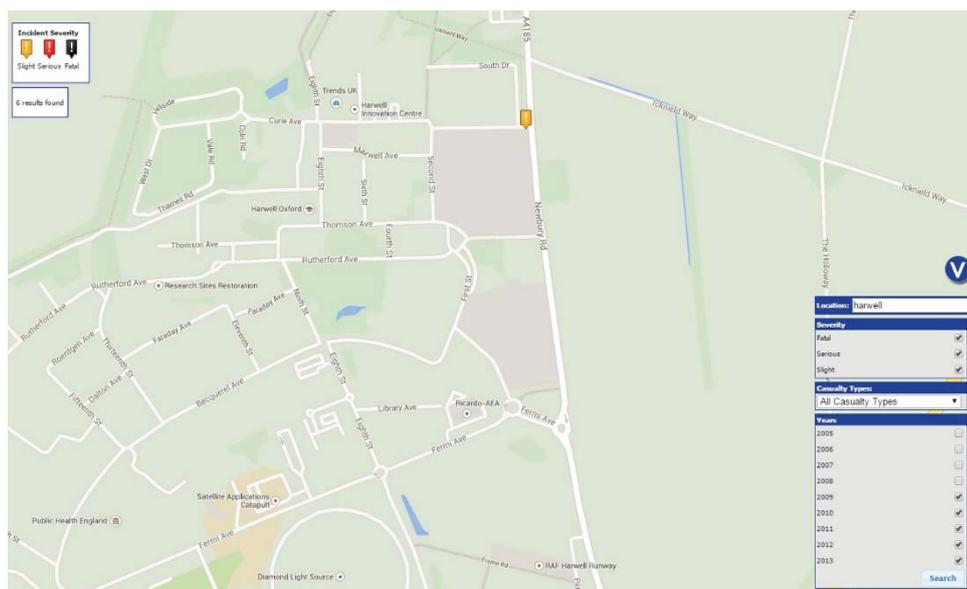
2.2.7 There is also a ghosted right turn lane at the junction of the A4185 with Thomson Avenue, with footways extending into the Harwell Campus. The junction of the A4185 with Fermi Avenue was improved over ten years ago to a roundabout. The A4185 junction with Perimeter Road is a simple T-junction.

## 2.3 Personal Injury Accident Records

2.3.1 Analysis of Personal Injury Accident (PIA) records contained on the Crashmap website has taken place for the 5 year period between the start of 2009 and the end of 2013. A plan showing the study area is provided as **Figure 4**.

2.3.2 The only PIA recorded over the period took place at the A4185/Curie Avenue junction and was classified as slight in terms of severity. The PIA involved a collision between two motor vehicles at the junction in November 2009.

2.3.3 The PIA information analysed indicates that there are no road safety issues directly adjacent to the campus, and similarly, there are no clusters of accidents which may constitute an inherent PIA concern. There is no evidence to suggest that road geometry or design poses a highway safety concern.



***Figure 4: Personal Injury Accident Locations***

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### 3.0 Transport Policy Framework

3.01 A range of transport policies and objectives at national and local levels are relevant to the residential development proposals at the Harwell Campus. These policies and objectives are discussed in the following paragraphs:

#### 3.1 National Policy

3.1.1 The latest Transport White Paper published in 2011 entitled ‘*Creating Growth, Cutting Carbon, Making Sustainable Local Transport Happen*’ updates current transport policy, and sets out to help create growth in the economy whilst tackling climate change by cutting our carbon emissions. The vision set out in this latest White Paper is ‘*for a transport system that is an engine for economic growth, but one that is also greener and safer and improves quality of life in our communities.*’

3.1.2 The National Planning Policy Framework (NPPF) was published on the 27th March 2012, and paragraph 30 in Chapter 4, Promoting Sustainable Transport, states that “*Encouragement should be given to solutions which support reductions in greenhouse gas emissions and reduce congestion. In preparing Local Plans, local planning authorities should therefore support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport.*”

3.1.3 Paragraph 37 sets out that “*Planning policies should aim for a balance of land uses within their area so that people can be encouraged to minimise journey lengths for employment, shopping, leisure, education and other activities.*”

3.1.4 Paragraph 38 expands on this point by stating that “*For larger scale residential developments in particular, planning policies should promote a mix of uses in order to provide opportunities to undertake day-to-day activities including work on site. Where practical, particularly within large-scale developments, key facilities such as primary schools and local shops should be located within walking distance of most properties.*”

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3.1.5 Paragraph 32 indicates that all developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment, and “Plans and decisions should take account of whether: . . .

- *safe and suitable access to the site can be achieved for all people; and*
- *improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. **Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.***

National Planning Practice Guidance (March 2014)

3.1.6 On March 2014, the Department for Communities and Local Government (DCLG) published the National Planning Practice Guidance (NPPG). The NPPG indicates that it is important for local planning authorities to undertake an assessment of the transport implications in developing or reviewing their Local Plan so that a robust transport evidence base may be developed to support the preparation and/or review of that Plan. It also sets out that Travel Plans, Transport Assessments and Statements are all ways of assessing and mitigating the negative transport impacts of development in order to promote sustainable development, and confirms that these reports are required for all developments which generate significant amounts of movements.

3.2 County Level Transport Policy

3.2.1 OCC adopted its third **Local Transport Plan (LTP3) 2011 – 2030** as policy on 5 April 2011 following its approval by Cabinet on 15 March 2011.

3.2.2 LTP3 contains a set of 9 objectives for transport to 2030:

- To improve the condition of local roads, footways and cycleways, including resilience to climate change
- To reduce congestion

- 
- To reduce casualties and the dangers associated with travel
  - To improve accessibility to work, education and services
  - To secure infrastructure and services to support development
  - To reduce carbon emissions from transport
  - To improve air quality, reduce other environmental impacts and enhance the street environment
  - To develop and increase the use of high quality, welcoming public transport
  - To develop and increase cycling and walking for local journeys, recreation and health

3.2.3 OCC are currently preparing a new Local Transport Plan, LTP4, and this was out for an 8 week consultation period during February/March 2015. OCC's consultation document regarding the objectives of LTP4 states that *“Current forecasts are for over 80,000 new jobs in the county by 2031, with forecast population growth of 90,000 by 2026 and up to 100,000 new homes built by 2031. Major development areas identified across the county include Oxford, Bicester and Science Vale. This will have a significant impact on our transport network, with an ever increasing number of people and goods needing to use it. Given the existing pressures on the network and the scale of growth we are anticipating, we cannot rely on small, short-term solutions – we need to think of larger, more radical solutions to transform transport in Oxfordshire for its people and growing economy over the next twenty years and beyond.....As the transport authority for Oxfordshire, the county council already works closely with public and private sector partners to improve transport connections. £800M of public and private sector investment is going into transport in Oxfordshire over the next 20-30 years. . . .”*

3.2.4 LTP4 sets out 4 goals which include *“To support economic and housing growth in the county . . .”* and also *“To facilitate inclusive and sustainable access to jobs and services”*. Eight objectives are set out in order to achieve the goals, and the first of these is to *“Minimise the need to travel.”*

3.2.5 Highway improvement schemes which will be completed by 2020 are shown on **Figure 5** below, which is an extract from the LTP4 consultation document:



***Figure 5: Transport Improvements to 2020 from OCC’s LTP4 Consultation Document***

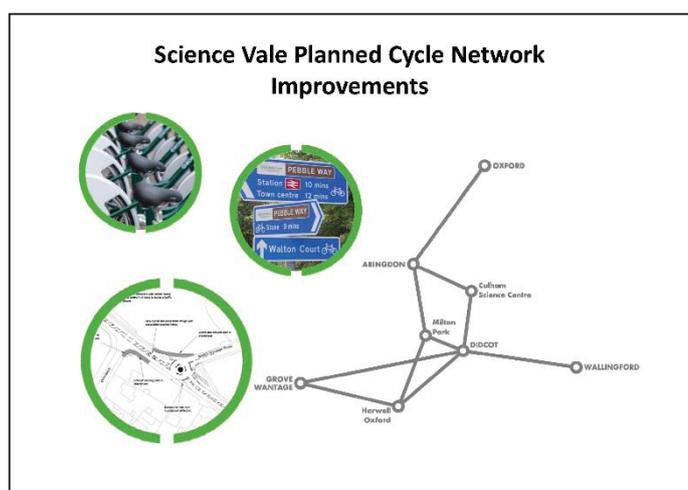
3.2.6 The proposed highway improvements within the Science Vale area are shown in greater detail on the extract of Figure 5.6a - see the later section below entitled ‘Pre Submission Draft Local Plan 2031 Strategic Sites and Policies’.

3.2.7 One of the key highway schemes in the area is the construction of north facing slips at Chilton Interchange. The A34 junction at Chilton currently only has south facing slips, so there is no access to or from the north. New north facing slip roads will create a

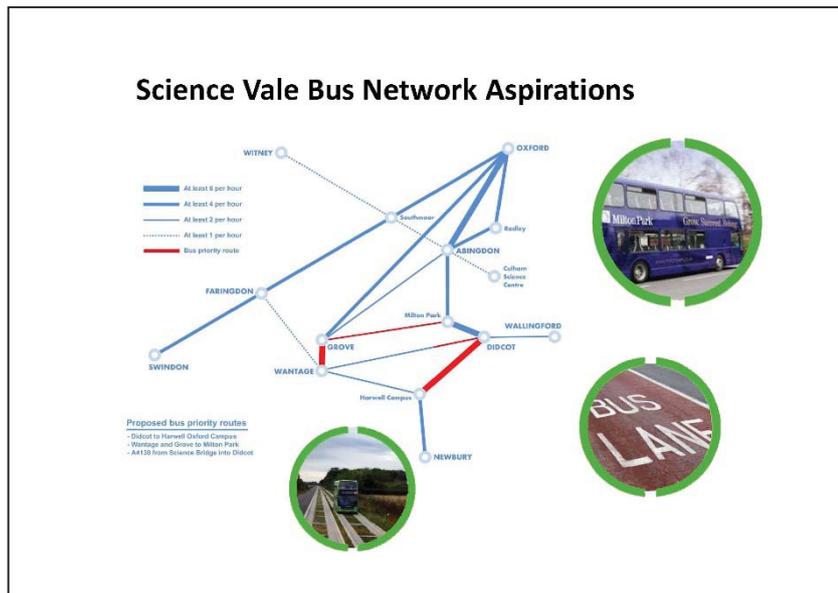
direct route to Harwell Campus. The scheme will also help reduce the use of local roads such as the A4130 south from Milton Interchange, Steventon signalled crossroads, Rowstock roundabout and the A4185 to Harwell Campus. Work is planned to be complete by spring 2016 and details of the scheme are included in **Appendix A**. It should also be noted that work began in January 2015 on a scheme to provide additional capacity on the A34 at Milton Interchange.

3.2.8 In addition to the above, the Oxford and Oxfordshire City Deal was announced by Deputy Prime Minister Nick Clegg in January 2014, stating that “*The Oxford City Deal will provide the improved roads and public transport links the area needs to make the most of its world class universities and innovative science facilities.*” At the same time, Transport Minister Baroness Kramer announced that “*These schemes will improve access to the Science Vale Oxford Enterprise Zone and the Northern Gateway development site, and the Oxford Science Transit scheme will connect the area’s innovation and growth centres with universities. This confirms our commitment to support transport infrastructure projects that unlock sites for economic growth, helping to create jobs and to connect people to jobs.*”

3.2.9 LTP4 also commits to a number of schemes regarding cycleway and public transport improvements as shown indicatively on **Figures 6 and 7** below.



***Figure 6: Science Vale Cycle Network Improvements Diagram from LTP4***



***Figure 7: Bus Aspirations Diagram from LTP4***

### 3.3 Local Planning Policy

#### *The Development Plan*

3.3.1 The current development plan consists of two 'saved' policies in the **South East Plan** (neither of which are relevant to Harwell), and 'saved' policies in the **Vale of White Horse Local Plan** (adopted 2006).

#### *Vale of White Horse Local Plan (adopted July 2006)*

3.3.2 The current Local Plan for the VWHDC area was adopted in 2006. The new Local Plan is currently under preparation and until the new plan has been adopted by the council the current plan must still be considered in terms of day-to-day planning decisions. The current Local Plan includes the following aims:

- To promote high quality, sustainable development
- To reduce the need to travel and the harmful effects of traffic on people and the environment

- To maintain and improve the quality of life of all members of the local community
- To encourage a strong and sustainable economy which is beneficial to all who live in, work in, or visit the Vale

3.3.3 The Local Plan highlights the fact that transport and land use planning are inextricably linked as there is a direct relationship between the use of land and the need for movement to and from that use. The policies and proposals of the Local Plan must therefore always have regard to the transport needs and demands arising from land use proposals. Policy TR2 States that *“Proposals for development which would be likely to increase traffic will be required to include provision of specific measures designed to deliver more sustainable transport choices for people and/or the moving of freight and to promote access to jobs, shopping and leisure facilities whilst reducing the need to travel, especially by car. Such measures will include the provision and/or improvement of public transport, walking or cycling facilities, new highways infrastructure, and specific measures detailed in the integrated transport strategies.”*

3.3.4 With specific regard to new development at the Harwell campus the Local Plan sets out Policy E7 which states that:

*“Development proposals will be considered in the context of a comprehensive approach to the whole Harwell science and innovation campus. New business development or redevelopment for business purposes will be permitted at the Harwell science and innovation campus as shown on the proposals map for B1 and B2 purposes subject to the following criteria:*

*1) The development is in accordance with and meets the requirements of the Travel Plan for the whole campus to make the necessary contributions in order to implement sustainable transport initiatives including minimising car usage and increasing the use of public transport, walking and cycling;*

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*2) Appropriate contributions funded by the landowner or developer being made to improving/upgrading access to the campus from the A34 trunk road, the A4185 to the east, and the A417 to the north . . . . ”*

It should be noted that a Framework Travel Plan was updated for the whole campus in 2011 which was shared with the Travel Choices team at OCC.

*The New Local Plan 2031 Part 1: Strategic Sites and Policies*

3.3.5 On 18<sup>th</sup> March 2015, the VWHDC submitted the Local Plan 2031 Part 1: Strategic Sites and Policies to the Secretary of State for independent examination.

3.3.6 The new Local Plan document supports employment growth at Harwell and identifies land at North-West Harwell for a development of 550 dwellings.

3.3.7 The draft Plan states at paragraph 2.13 that *“It is important that growth across the district effectively addresses any highway constraints and helps to deliver a shift towards more sustainable modes of travel.”*

3.3.8 Strategic transport objectives of the draft Plan include:

SO 8: Reduce the need to travel and promote sustainable modes of transport, and;

SO 9: Seek to ensure new development is accompanied by appropriate and timely infrastructure delivery to secure effective sustainable transport choices for new residents and businesses.

3.3.9 Harwell is considered under the ‘South East Vale Sub-Area Strategy’. Paragraph 5.68 states that *“There is an ambitious programme of job creation and growth for the Science Vale area, including the two Enterprise Zone sites at Harwell Campus and Milton Park designated in 2011. It is important this growth is delivered alongside new housing and the provision of appropriate infrastructure to help make the area more self-contained and to achieve a sustainable pattern of development.”* Paragraph 5.73 continues that *“A key challenge to the continued attractiveness of this rapidly expanding area is the capacity of the local road network and a number of improvements have been identified*

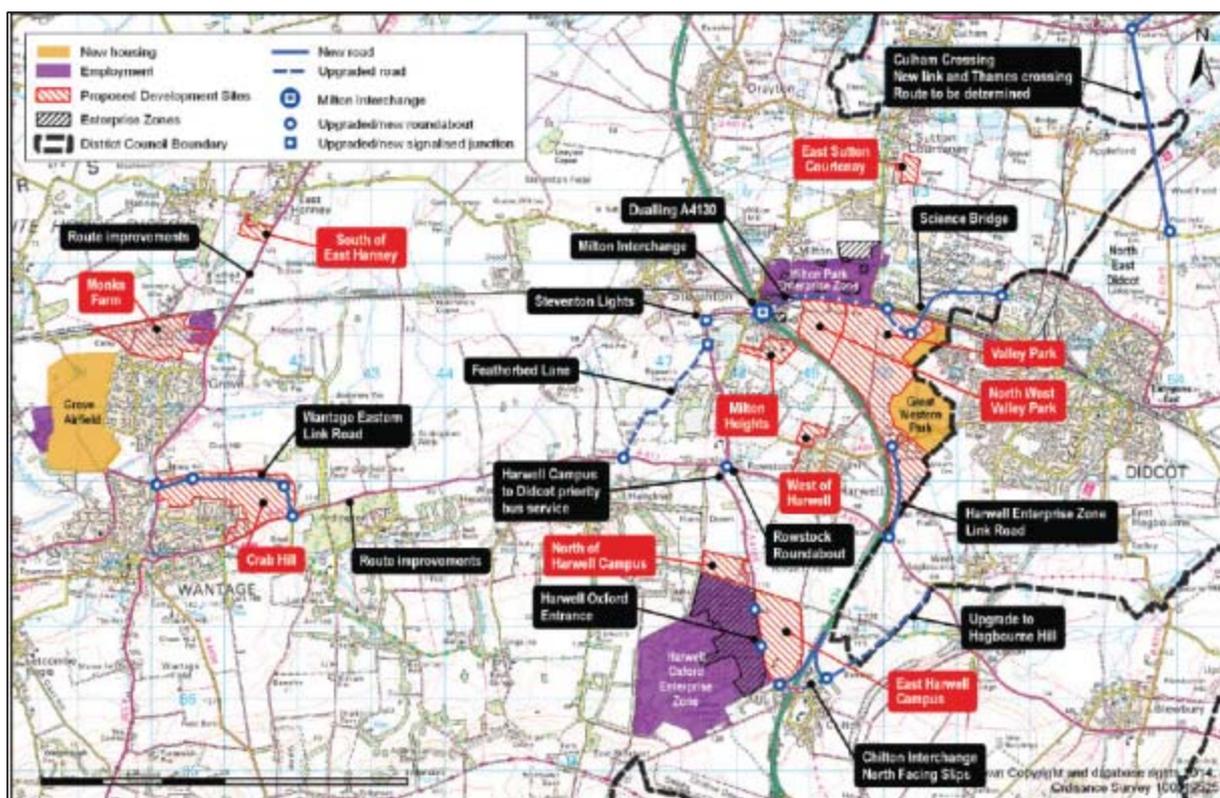
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*in the Science Vale Area Strategy. These are outlined in the ‘Supporting sustainable transport and accessibility’ section of this Sub-Area Strategy.”*

3.3.10 Core Policy 17: Delivery of Strategic Highway Improvements within the South-East Vale Sub-Area states that *“In order to deliver the growth in the South East Vale Sub-Area and the wider Science Vale area, the Science Vale Area Strategy has identified highways infrastructure to mitigate the impact of the planned growth across Science Vale and secure the future economic viability of the area. The package will be further refined through development of the Local Transport Plan 4 being developed by Oxfordshire County Council, and the Science Vale Area Action Plan.*

*All development within the South East Vale Sub-Area will be required to contribute in accordance with Core Policy 7: Providing Supporting Infrastructure and Services. Within the South East Vale Sub-Area this will include contributions towards the infrastructure identified within the Science Vale Area Strategy. . . . .*

The policy then lists a number of improvements which are shown on Figure 5.6a in the Plan entitled ‘Map showing the proposed road and junction improvements within the Science Vale area’ which is included on **Figure 8** below:



***Figure 8: Extract of Figure 5.6a from the VWHDC Local Plan***

3.3.11 Core Policy 17 includes improvements to sustainable transport such as the *improvement to the bus network, particularly between the strategic housing and employment growth, including a priority bus system between Harwell Campus and Didcot*. A number of highway improvement schemes are also listed as shown on Figure 5.6a above.

3.3.12 Paragraph 5.94 of the Plan explains that the VWHDC has been working with the Oxfordshire Growth Board and the Oxfordshire Local Enterprise Partnership (OxLEP) to identify funding mechanisms for this infrastructure to secure its delivery. Core Policy 7 sets out the principle that all developments will contribute to infrastructure provision as identified in the Infrastructure Delivery Plan (IDP). The draft IDP (October 2014), sets out detailed sources of funding for transport improvements in the Vale. A large portion of funds for infrastructure to support development in the Vale is controlled by the OxLEP, who have identified the ‘Oxfordshire Knowledge Spine’, which includes the Science Vale, as its priority location for investment. OxLEP controls a number of

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funding streams for infrastructure, including EZ Business Rates, Growing Places Fund, Local Sustainable Transport Fund, City Deal, Growth Deal and Local Pinch Point Fund. An extract of the IDP (i.e. 'Section 4.0 Science Vale Transport Package') is included in **Appendix B** for reference.

3.3.13 Additional Core Policies which relate to transport are also included in the Plan, such as CP 33: Promoting Sustainable Transport and Accessibility, CP34: A34 Strategy, CP35: Promoting Public Transport, Cycling and Walking and CP47: Delivery and Contingency.

#### 3.4 Summary

3.4.1 We consider that the residential development proposals for the Harwell Campus are entirely consistent with national, regional and local transport policies. Harwell is located in a sustainable location in transport terms, being served by a number of frequent bus services and located close to the strategic highway network. In addition, safe and convenient access points are provided to the existing local highway network.

3.4.2 The co-location of residential and employment land uses at Harwell will minimise the need to travel in line with transport and land-use policies, as the proposed mix of the residential units will result in a relatively large proportion of people living and working on-site. Good quality pedestrian and cycle facilities will be provided within the site, tying in to the surrounding footway and cycleway networks. Harwell has also voluntarily developed a Framework Travel Plan (FTP), which is discussed in later sections of this TA. The FTP was discussed in detail with OCC in the past and has recently been updated.

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## **4.0 Sustainable Travel Options**

4.0.1 This section of the report considers the existing sustainable travel options available to access the site in accordance with Chapter 4 of the NPPF, and also considers the strategic improvements which are contained in the emerging Local Plan and Local Transport Plan (LTP4) documents.

### **4.1 Walking**

4.1.1 ‘A Guide to Better Practice’, the companion guide to the revoked PPG13 Transport, states that “motorised modes are rarely used for trips of around half a mile (0.8 km) or less and that *‘walking is the most important mode of travel at the local level and offers the greatest potential to replace short car trips, particularly under 2 kilometres’*.”

4.1.2 The 0.8km threshold distances relates to the typical distance that people are prepared to walk before considering reverting to motorised modes of travel. 2.0km is the threshold distance below which current planning policy seeks to replace car trips for walking trips. The site location means there is some potential for trips to be made on foot and there are existing pedestrian facilities in close proximity to the site.

4.1.3 Within the campus, shared footways/cycleways run alongside Fermi Avenue and Eighth Street, whilst footways run along the remaining site roads throughout the Harwell Campus, including Curie Avenue. The pedestrian network provides access to the shared footway/cycleway provision running alongside the A4185 Newbury Road. In addition, the on-site footway network provides good, safe, well lit pedestrian routes between the proposed site and the existing employment buildings and on-site amenities.

4.1.4 Crossing facilities are provided at various points within the Harwell Campus. Zebra crossing facilities are provided across Fermi Avenue adjacent to the roundabout junction with the A4185 Newbury Road, which will facilitate pedestrian access between the proposed residential site and Chilton Primary School/Chilton village. Uncontrolled crossing points, including dropped kerbs and tactile paving, are also provided to aid

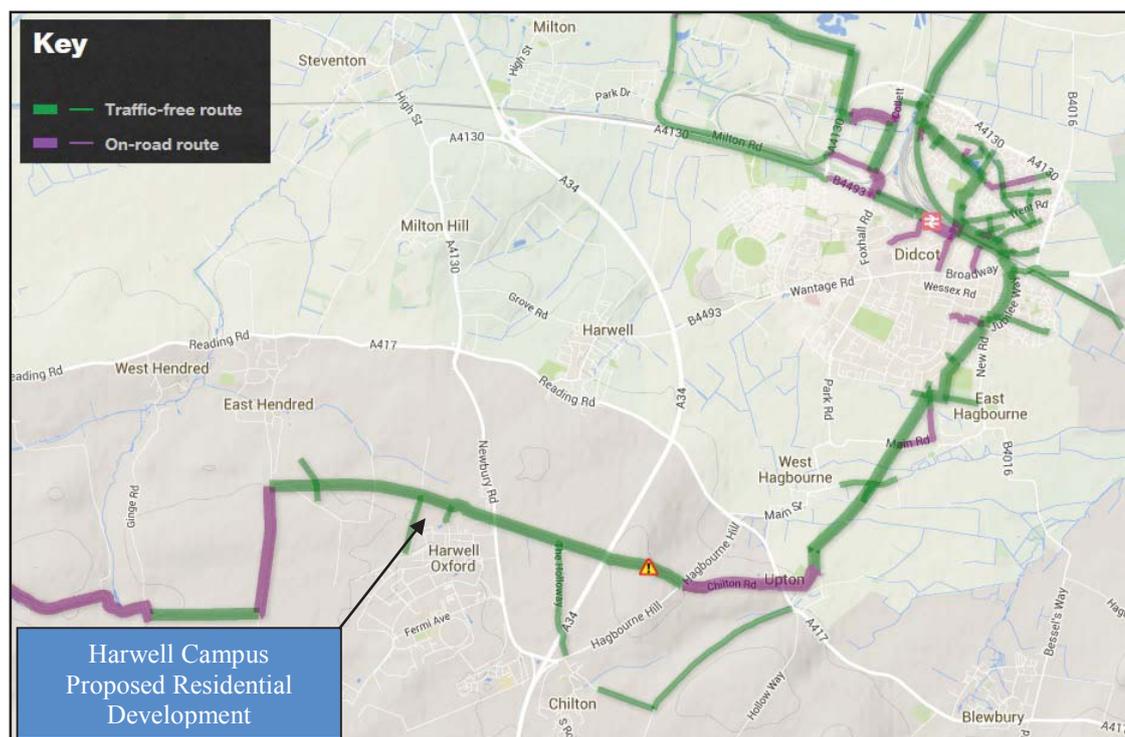
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pedestrians crossing the majority of the on-site roads.

- 4.1.5 In addition to the pedestrian network running alongside the highway network, there are a number of public rights of way within the vicinity of the site as indicated on the OCC public rights of way plan for the area, included in **Appendix C**.

## 4.2 Cycling

- 4.2.1 Cycling has the potential to substitute for short car trips, particularly those under 5.0km, and to form part of a longer journey by public transport.
- 4.2.2 Within the campus, shared pedestrian/cycleways run alongside Fermi Avenue and Eighth Street, providing off-carriageway cycle provision between the campus and the A4185 Newbury Road. A shared pedestrian/cycleway also runs along the western side of the A4185 between the junction with Perimeter Road (to the south) and Thomson Avenue (to the north). The route then continues northwards along a dedicated route to Curie Avenue, then up South Drive to the Ickniel Way, and connections to the Ickniel Way will be created within the proposed site.
- 4.2.3 The cycle network in the vicinity of the site includes the Cycle Route 544 which runs along the Ickniel Way and provides a route between Wantage and Didcot. Route 544 connects with National Cycle Route 5 within Didcot, providing a route through to Oxford. **Figure 9** is an extract from the Sustrans website showing the cycle routes within the wider area.



**Figure 9: Off Campus Cycle Routes**

- 4.2.4 The draft LTP4 includes a Science Vale Cycling Strategy at Volume 4, which states that *“Our ambition is to raise the status of cycling in the Science Vale area through the provision of innovative and high quality cycling facilities comparable with those found in the cycling countries of continental Europe, supporting the growth and investment being made in Science Vale”*.
- 4.2.5 Cycling investment benefits everyone. More cyclists results in fewer people driving, which will reduce congestion. No one form of transport alone can provide the means to ensure the transport network remains functional. The Cycling Strategy states that cycling will be a central part of the transport system for Science Vale, supporting OCC’s aims set out in the Oxfordshire Cycling Strategy, the Science Transit Strategy and the new Local Transport Plan.
- 4.2.6 There are already above average levels of cycling in Science Vale. For example, at the last census (2011), 4.1% of journeys to work were made by bike in Science Vale. This

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is higher than the average across England and Wales of 2.8%, or within Oxfordshire (excluding Oxford), where the average rate is 3.2%. OCC aim to increase the overall proportion of journeys made by cycling in Science Vale by 50% by 2021.

4.2.7 The Oxfordshire Cycling Strategy introduces the concept of Cycle Premium Routes. The network of Cycle Premium Routes in Science Vale will be based on connecting the large employment sites, including Harwell Campus to the towns; Didcot, Abingdon, Wantage and Grove. This will enable OCC to maximise their opportunities for funding and investment by focussing the network on the employment and housing growth areas.

4.2.8 The delivery of improvements to cycle routes is already in progress and OCC have secured £5million from the Oxfordshire Local Growth Fund to implement the highest priority schemes as the first phase of realising their vision. Future phases will follow once funding has been secured and the cycling strategy will be an important tool in securing that funding. The proposed Science Vale cycle schemes are also discussed in the emerging Local Plan, and **Figure 6** in Section 3.0 shows an indicative representation of these routes. There are three potential routes relating to Harwell, with a number of alternatives for each of the routes between Harwell and Abingdon, Harwell and Didcot, and Harwell and Wantage. The latest scheme proposals/alternatives are included in **Appendix C**, and it is understood that these schemes are proposed to be completed within the next three years.

### 4.3 Bus

4.3.1 In line with current local and national transport objectives, particularly those which encourage modal shift away from the private car by increasing accessibility through sustainable travel, public transport has an important role to play. The public transport system in the area surrounding the proposed development consists of bus services operated by Stagecoach, Thames Travel and Newbury & District, together with train services at Didcot Parkway station (approximately 6km to the north-east).

4.3.2 Bus stops are situated along Fermi Avenue, at the campus bus station (situated to the north of Fermi Avenue and west of Library Avenue) and along the A4185 Newbury Road.

4.3.3 Bus travel is part subsidised by Harwell Campus, who have already made a substantial financial contribution in this regard. The existing bus services within the vicinity of the proposed residential site are summarised within **Table 1**.

***Table 1: Bus Service Summary***

Service No.	Stop	Route	Days	Times	Approximate Frequency
6 / 6A	Fermi Ave / Campus Bus Station	Newbury – Chieveley – East Ilsley – Hermitage – Newbury	Mon-Fri	0724-1350	2 Services
		Newbury – Hermitage – East Ilsley – Chieveley – Newbury	Mon-Fri	1706	1 Service
X1 / X32 'Connector'	Fermi Ave / Newbury Rd / Campus Bus Station	Oxford – Abingdon - Didcot – Harwell – Chilton Village - Wantage	Mon-Fri	0713-1947	15 mins
			Sat	0744-1906	60 mins
			Sun	0946-1845	60 mins
		Wantage - Chilton Village – Harwell – Didcot – Abingdon - Oxford	Mon-Fri	0609-2031	15 mins
			Sat	0743-1906	60 mins
			Sun	0945-1852	60 mins
34	Fermi Ave / Newbury Rd / Campus Bus Station	Oxford – Abingdon – Harwell Campus – Wantage	Mon-Fri	0736-0843	2 Services
		Wantage –Harwell Campus – Abingdon – Oxford	Mon-Fri	1655-1805	2 Services

*Note: Service times taken at the Campus Bus Station*

4.3.4 A bus plan of the Oxfordshire area is included as **Appendix C** whilst full timetable details can be found at [www.travelinesoutheast.org.uk](http://www.travelinesoutheast.org.uk). It should also be noted that an additional bus service is anticipated to start up in the near future as part of the Science Transit scheme, where bus services will run between Harwell Campus, Oxford City and the University of Oxford.

4.3.5 LTP4 confirms that public transport will be significantly improved and bus priority measures implemented during the plan period to 2031. This will provide high quality, high frequency bus services linking Didcot station with major Science Vale residential

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and employment sites, as well as connecting to other towns outside of Science Vale. **Figure 7** from the Local Plan in Section 3.0 above shows the proposed improvements to the bus network, required to support development in the Science Vale area, and the 'Connector' service in **Table 1** above commenced in early July 2015 as part of this commitment. In addition, highways schemes to provide extra capacity and accessibility on key routes to Harwell Campus will offer route choice and travel options between homes and workplaces, helping to spread the impact of increased traffic on the roads.

- 4.3.6 The Bus Strategy contained in LTP4 includes a specific strategy for Science Vale in Volume 4, which states that *“Improved rail services and travel opportunities, although an important part of the strategy, will only be able to cater for a small proportion of all transport needs generated within the area given the complex and dispersed nature of internal and external travel patterns. The bus network will therefore need to provide the backbone of the public transport system in the area and needs to be accorded a much higher priority in integrated land use-transport planning”*.

#### 4.4 Rail

- 4.4.1 Bus services 32, X1, X32 and the 'Connector' service travel via Didcot Parkway Rail Station, enabling connections to be made with train services running via the station. A taxi rank is also situated immediately outside the station.
- 4.4.2 There are frequent direct train services travelling between Oxford and London Paddington, which call at Didcot Parkway and include other destinations such as Reading and Slough. Train timetable information can be found at [www.firstgreatwestern.co.uk](http://www.firstgreatwestern.co.uk).
- 4.4.3 In addition to the services operating between Oxford and London, other services available at Didcot Parkway provide hourly links through Cardiff and Bristol, also calling at locations including Swindon, Bath and Newport on route.

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- 4.4.4 The draft LTP4 recognises that strengthening the public transport networks between Science Vale, Oxford and other important centres of employment is essential to enable the vision for Science Vale to be achieved. At Didcot Station a new transport interchange has created a modern transport hub for Didcot and Science Vale. The new interchange has additional pedestrian space, a larger bus station, two-tier cycle parking, Brompton Dock cycle hire, a taxi rank, drop-off zone and disabled parking.
- 4.4.5 The ambition of OCC is for Didcot Station to be further transformed into a ‘state of the art’ multi-modal interchange and gateway to the area, fronted by a new public square. The masterplan for the station envisages a new pedestrian / cycle entrance north of the railway, additional platforms, a larger station building, and increased car parking, including a multi-storey car park. In addition, there are plans to redevelop the area opposite Didcot station so that a welcoming gateway to Didcot and Science Vale is created. Proposals include a public square, traffic calming, and a mixed use development including a hotel, serviced apartments, office, retail, restaurant, a nursery and residential units.
- 4.4.6 Improved rail services will also enable journeys to connect to rail services from London and airports at Heathrow, Birmingham and Gatwick as well as the growth areas of Oxford, Milton Keynes and Reading.

#### 4.5 Summary

- 4.5.1 The site location is considered to be highly sustainable due to its proximity to employment opportunities, and also as a result of its position within an established campus which provides links to existing pedestrian, cycling and public transport networks. A number of destinations (of both local, regional and national significance) are accessible via the use of sustainable travel modes, facilitated by the high-frequency ‘Connector’ bus service. There is also a broad range of on-site amenities available to new residents, which will effectively reduce the need to travel between the campus and amenities further afield. Improvements are however proposed to walking, cycling and public transport facilities as set out in Section 5.0 under Development Proposals.

4.5.2 In addition to the above, contributions will be made as appropriate towards the 'Science Vale Area Strategy', which includes strategic highway improvement schemes as well as improvements to walking, cycling and public transport infrastructure and services.

4.5.3 An FTP has been produced for the campus as a whole, and this will be expanded to include the proposed residential development.

## **5.0 Development Proposals**

### **5.1 Development Schedule**

5.1.1 An indicative masterplan for the proposed residential development is included in the main submission document. The proposed development schedule is set out in **Table 2** below, and it is anticipated that this will be developed out in a phased manner:

***Table 2: Proposed Development Schedule***

Tenure	%	Total Units	Split of Total Units	
			Apartments	Houses
Affordable	35	516	236	280
Market for rent	33	487	222	265
Market for sale	27	398	182	216
Market premium	5	74		74
Total	100	1475	640	835

Note: the split between apartments and houses is assumed to be the same for the affordable, market for rent and market for sale elements.

### **5.2 Proposed Vehicular Access Strategy:**

5.2.1 A road hierarchy for the Harwell Campus which ties in with the proposed residential layout is shown on the movement framework plan in **Appendix D**. This has been set out to include primary, secondary and tertiary routes, and have been graded in line with the anticipated use of each road.

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- 5.2.3 As previously discussed, the key access route will be via Curie Avenue, with at least two access junctions from Curie Avenue into the proposed site with a loop road arrangement within the proposed residential site. There are however three other campus junctions with the A4185 which provide access between the local distributor road network and Curie Avenue/the proposed site, which include Thomson Avenue (due to be upgraded to a roundabout by OCC over the next few years), Fermi Avenue and Perimeter Road.
- 5.2.4 Curie Avenue will need to be upgraded at some stage in the future, although the trigger point for these improvements will depend on the extents of any re-assignment of existing vehicular trips which may arise due to the ongoing highway improvements by OCC/Highways England, and in particular, as a result of the additional slip roads at Chilton Interchange (see section 7.2 below). In the following section we have carried out a junction capacity assessment for Curie Avenue based on the existing flows and committed development at Harwell, and the trigger for the improvements would be in the order of an additional 250 dwellings. It is proposed that the junction would be upgraded to a signal junction, as previously agreed with OCC, and the proposed layout is shown on drawing number 03081-SDH005 in **Appendix E**.
- 5.2.5 An additional point of access is also feasible from a point on the A4185 north of the site, as shown indicatively on drawing number 03081-SDH001 in **Appendix E**. It is considered that it would be beneficial to push the existing 40mph speed limit north of such a proposed access as indicated on the drawing, which also shows the geometry (which includes a ghosted right turn lane) and visibility splays. There would be potential for this access road to also serve the Hendred Estate, bringing significant highway benefits to East Hendred by removing estate traffic from the village, and it is proposed that this access scenario will be explored further with OCC in due course.

### 5.3 Proposed Walking Strategy:

- 5.3.1 In addition to the road hierarchy, the movement framework diagram also includes existing/proposed facilities for walking and cycling, together with details of bus routes.

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The existing facilities have already been discussed in Section 4.0. The proposed facilities/improvements are set out below.

5.3.2 Footways will be provided as part of the development proposals to tie in with the existing footway network within and surrounding the site, and also to existing Public Rights of Way adjacent to the site (e.g. the Winnaway & Icknield Way). Footways will be high quality, well lit and designed to maximise natural surveillance in order to increase pedestrian safety. In addition, crossing points on site roads will be provided along key desire lines, with the type of crossing being appropriate to the numbers of pedestrians and vehicles using the particular section of highway.

5.3.3 A movement framework diagram has been produced, and this is included in **Appendix D**. It can be seen that the key pedestrian routes not only provide strong east – west links between the A4185 and the site, but also north – south links between the proposed residential development, employment uses and amenities at the Campus and to Chilton School and Chilton village further to the south.

5.3.4 A ‘Starter Pack’ will be provided for each dwelling, which will set out the pedestrian routes within and adjacent to the site, and will highlight links to the wider footway network surrounding the campus.

#### 5.4 Proposed Cycling Strategy:

5.4.1 It is proposed that a combined footway/cycleway will be provided within the proposed site adjacent to the main north-south access road, tying in to off-site cycleways along the Icknield Way. This will in turn facilitate connections to the cycleways along the A4185 and The Winnaway. These cycleways will also tie in to the cycle route upgrades which are currently being investigated by OCC, and which will inevitably encourage more people to cycle to and from the Harwell Campus. The movement framework diagram is included in **Appendix D**.

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5.4.2 Safe and secure cycle parking will be provided at key locations, such as adjacent to the school and also at other amenity/leisure/retail facilities. Cycle parking will be positioned in convenient positions at the above locations, and will be 'Sheffield Stand' or similar to enable cycles to be securely parked.

5.4.3 Cycle routes within and surrounding the site will be included within the starter packs, which will also include details of the nearest bike shops.

#### 5.5 Proposed Bus Strategy:

5.5.1 As part of the site wide masterplan proposals, it is proposed that a bus loop will be provided within the campus as shown indicatively on the movement framework diagram in **Appendix D**, and it is anticipated that this could be operational towards the end of 2015. At present bus services run along Fermi Avenue to the bus station, however, this results in a relatively long walk distance for people accessing bus services from the western and northern parts of the campus. The existing bus services will be routed along the bus loop once the bus station is closed, and this will therefore provide significantly more convenient services for users, initially by travelling along Fermi Avenue, Eighth Street and Curie Avenue. Bus stops (either on Curie Avenue or the A4185 by North Drive) will be within a 400m walk distance from a large part of the proposed residential site. It should be noted that the Guidelines for Planning for Public Transport in Developments published in 1999 by the Institution of Highways and Transportation states that the recommended maximum 400m walk distance to the nearest bus stop "*is quoted for guidance, and should not be followed slavishly . . .*", and hence although the walk distances from parts of the proposed site to the nearest bus stops is greater than 400m, the high frequency of bus services will compensate for this.

5.5.2 Bus service and timetable information will be provided within the starter packs, and an application form for a bus taster ticket could also be included in each pack if required.

5.5.3 Harwell Campus will continue to liaise with bus operators in order to maximise the opportunities for bus travel to and from the campus, and the residential development at

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the site (in combination with the employment growth) will serve to improve the viability of the bus services in the future.

#### 5.6 Proposed Rail Strategy:

5.6.1 The proposed residential development cannot on its own fund improvements to the rail network or train services. However, the improved bus penetration of the Harwell Campus as discussed above will in turn facilitate high-frequency bus connections to and from Didcot rail station thereby making combined rail/bus (or taxi) travel a much more attractive alternative.

5.6.2 In addition to the above, rail services will be summarised in the starter packs which will be distributed to each dwelling.

#### 5.7 Proposed Parking Strategy:

5.7.1 It is anticipated that cycle parking and car parking will be provided in line with the parking standards set out in the VWHDC Local Plan (and SPG) and also in accordance with requirements set out by OCC.

### **6.0 Traffic Impact Assessment**

#### 6.1 Existing Traffic Flows

6.1.1 As discussed in Section 2.0, vehicular site access is provided to the proposed residential site from the A4185 via 4 existing site access junctions at the following locations:

1. Curie Avenue
2. Thomson Avenue
3. Fermi Avenue
4. Perimeter Road

6.1.2 Existing traffic data has been obtained from Oxfordshire County Council (OCC) for the 4 site access junctions above, from traffic counts which were undertaken in March 2014, i.e. during school term time.

## 6.2 Trip Generation and Distribution

6.2.1 In order to predict the potential traffic from the proposed residential development, average trip rates have been used from the TRICS database. At this stage, we have not included trips which would be associated with other uses such as a potential convenience store, primary school etc, as these would be primarily serving the new development and hence are not anticipated to generate a significant number of vehicular trips. The summary of the trip rates and numbers of trips for the AM and PM peak hours are summarised in **Tables 3** and **4** below:

***Table 3: Vehicular trip rates from the TRICS database***

Trip Rate	Weekday AM Pk Hr (8:00-9:00)			Weekday PM Pk Hr (5:00-6:00)		
	In	Out	Total	In	Out	Total
Private housing	0.149	0.395	0.544	0.353	0.203	0.556
Private flats	0.076	0.274	0.350	0.284	0.137	0.421
Affordable housing	0.137	0.241	0.378	0.242	0.172	0.414
Affordable flats	0.086	0.110	0.196	0.116	0.088	0.204

***Table 4: Number of vehicular trips generated by the proposed development***

Trip Rate	Weekday AM Pk Hr (8:00-9:00)			Weekday PM Pk Hr (5:00-6:00)		
	In	Out	Total	In	Out	Total
Private housing	83	219	302	196	113	309
Private flats	31	111	142	115	55	170
Affordable housing	38	67	105	68	48	116
Affordable flats	20	26	46	27	21	48
<b>Total</b>	<b>172</b>	<b>423</b>	<b>595</b>	<b>406</b>	<b>237</b>	<b>643</b>

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### 6.3 Assessment

- 6.3.1 The key issue to note regarding the campus access junctions with the A4185 is that the campus controls a great swathe of site frontage along the A4185 which could be used to implement improvements to the junctions in the future.
- 6.3.2 OCC have an improvement scheme for the Thomson entrance, which involves upgrading the existing ghosted right turn junction to a roundabout. The size of this roundabout will be designed in order to provide a significant increase in the amount of spare capacity at this junction.
- 6.3.3 In addition to the above, and depending on the amount of re-assignment of traffic from the A4185 north to the A34 and the new slips at Chilton Interchange, improvements may be required at the Fermi Avenue roundabout and/or the Perimeter Road junction at some stage in the future. Both of these junctions currently have a large amount of spare capacity. The Ratio of Flow to Capacity (RFC) values are less than 0.1 at the Perimeter Road junction and around 0.7 for the Fermi Avenue junction at 2016 with committed development, so there is an amount of spare capacity for future residential traffic (PICADY and ARCADY assessments indicate that a junction performs satisfactorily with Ratio of Flow to Capacity (RFC) values of less than 0.85. Above this value, queues begin to elongate slowly as the junctions become more congested, and with RFC values of greater than 1.0, the queues would begin to elongate rapidly). It is proposed that the requirement for potential improvements at these locations is investigated further following completion of the Chilton slip roads and improvements to Milton Interchange, when any traffic re-assignment could be quantified and capacity assessments undertaken based on actual traffic data. Should improvements be required in the future, then these could include a dedicated left turn lane into Fermi Avenue from the A4185 south, and an improved junction alignment or even a new form of junction (e.g. a roundabout or signal control) at the Perimeter Road junction. There is ample land available for improvements at these locations if required. It is therefore considered that if necessary, junction improvements could be considered at these locations at a later date.

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6.3.4 Curie Avenue will potentially experience the largest traffic impact as a result of the proposed residential development, unless the northern access goes ahead as discussed in Section 5.0, in which case there will be very little residential development traffic passing through this junction. The existing junction layout (ghosted right turn lane) has an amount of existing spare capacity and would potentially be able to accommodate traffic from in the order of 250 dwellings. However, further development would then potentially trigger the need for a junction upgrade, and this is anticipated to be a signal controlled junction. This was discussed in Section 5.0 and the proposed layout of the signal junction is shown on drawing number 03081-SDH005 in **Appendix E**.

6.3.5 A junction capacity model has been created using the software program Linsig for the layout shown on the above drawing. A number of assumptions have been made at this stage in assessing the future traffic and capacity at this junction, and these are listed below:

- design year = 2026
- through traffic growthed up using Temprow
- a 30% internalisation factor has been applied to the residential trips. It is anticipated that the dwellings will be in high demand from employees/visiting scientists to the campus and that there will be a higher than normal proportion of people living/working at the campus. The types of units proposed are being planned with this in mind. It should also be noted that the 2011 Census sub-area in which Harwell campus falls indicates a 20% internalisation factor for people living and working in the area (this area includes all of the Harwell Campus together with a small sliver of Milton Park). A 30% internalisation/reduction factor is therefore considered to be a realistic but robust assumption at this stage.
- assumed growth at the Harwell Campus includes an additional 6,650 jobs, on top of the existing 5,000 employees currently working at the campus. These additional trips have been discounted for internalisation as above to avoid any double counting of development trips.
- 20% of traffic will re-assign from the A4185 north to the A34/Chilton slips.

6.3.6 The results of the Linsig model are shown summarised in **Table 5** below:

***Table 5 Summary of LINSIG Results – A4185 / Curie Avenue***

	AM Peak Hour	PM Peak Hour
	Max PRC	Max PRC
2026 Base + Committed + Proposed	+14.7%	+0.1%

6.3.7 For signal junctions, a Practical Reserve Capacity (PRC) of no less than zero is considered to be an optimum figure, however, this can reduce to -10% if considering the theoretical capacity.

6.3.8 **Table 5** above shows that at the design year 2026, the proposed signal junction at the A418/Curie Avenue would operate satisfactorily with all of the planned employment growth at Harwell and the proposed 1400 dwellings in place. If however there is a significant change in base traffic flows in the interim period, then the capacity of this junction could be increased if required by a re-design (there is ample land available for this as previously mentioned), and it is proposed that the suitability of the design is re-confirmed closer to the proposed trigger level, which is on occupation of 250 dwellings.

#### 6.4 The Wider Highway Network

6.4.1 As set out above, the highway improvements included within the Science Vale Area Strategy will increase capacity at certain locations, and will also result in changes to existing traffic patterns as drivers re-assign to more convenient routes. In addition to this, the precise nature of future development at the Harwell Campus is difficult to model with any certainty in terms of specific land uses and hence traffic generation at this stage, even though a proposed masterplan has been developed. The co-location of the proposed residential development adjacent to the employment uses will also inevitably reduce the number of car trips, with people having the opportunity to live within close proximity of their workplace. This will increase the likelihood that people will use sustainable modes

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of travel to commute to and from work.

- 6.4.2 In light of the above, it has been agreed with OCC during discussions regarding masterplan development at Harwell Campus that traffic modelling of any off-site junctions and links would be premature at this stage, and that more detailed traffic modelling and junction capacity assessments should be completed as part of any future development specific TA work. Further credence is added to this position by the fact that the OCC area wide traffic model has been used to assess the impact of the committed and Local Plan developments in the Vale, and a quantum of development has been assumed at Harwell following liaison between OCC and the campus. In total, an additional 6,650 jobs have been assumed in the model for the campus, with 550 houses to the north of Harwell. A further 850 houses have been assumed east of Harwell. This total development has been loaded onto a Harwell Campus node, and hence it is irrelevant which side of the A4185 the development lies, as the impact at off-site junctions will be the same. The model has been used to enable the required transport improvements within the Science Vale Area Strategy to be determined, in order to facilitate the Local Plan development. We therefore consider that the total development assumed for the Harwell Campus (together with residential development east of Harwell) is in line with current campus aspirations, and hence that the transport and highway improvements set out in the Science Vale Area Strategy are still appropriate.
- 6.4.3 Contributions will be made as appropriate towards the Science Vale Area Strategy in line with Core Policies 7 and 17 of the Pre-Submission Draft Local Plan 2031 (see Section 3.0), which includes improvements to walking, cycling and public transport infrastructure and services as well as strategic highway improvement schemes.
- 6.4.4 The improvements to Chilton Interchange are currently underway and are scheduled to be completed in 2016. There will be an element of traffic re-assignment once these improvements are completed, as drivers use the new north facing slips on the A34, rather than travelling via Milton Interchange, Steventon Crossroads, Rowstock Roundabout and the A4185 north of the campus. The TA completed for the application for the slip

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road improvements confirmed that the improvements are to 'facilitate investment in The Science Vale Enterprise Zone'. The OCC traffic model was used to assess the impact of the infrastructure improvements, and again took account of committed and Local Plan developments. The results of the model for 2030 indicate that the maximum RFC for the proposed scheme (do something) is around 0.95, i.e. at theoretical capacity, compared to 1.0 under the 'do nothing' scenario. Given the relief to Rowstock Roundabout, Steventon Crossroads and Milton Interchange under the 'do something' scenario, it was recommended to proceed with the provision of the north facing slips at Chilton Interchange. This will therefore reduce the amount of traffic on the A4185 travelling to and from the north as there is a re-assignment of some traffic to the A34 and the new slips at Chilton Interchange, and this will provide capacity benefits to the local highway network.

- 6.4.5 At the campus wide level, a Framework Travel Plan (FTP) has also been produced, and a section will be included within the FTP for the proposed residential development at South Drive. Measures for the proposed residential site will tie in with, and complement, the travel plan measures for the campus as a whole. The overarching aim will be to further reduce the number of single occupancy car trips associated with the proposed residential development, thereby also reducing any traffic impact.

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## **7.0 Conclusions**

- 7.1 The proposed residential development at South Drive, Harwell Campus is in a sustainable location in transport terms, with numerous options available to those wishing to walk, cycle or use public transport for work or other journeys. By positioning a sizeable residential site adjacent to a large employment site, the need to travel will inevitably be reduced, and it is anticipated that there will be a high demand for people to live and work at the campus. In addition, there are a number of existing on-campus amenities which will further reduce the need to travel out of the site, including occupational health, sports facilities, technical library, two conference centres, crèche, newsagents, hairdressers, post office, bank, sandwich bar/café and restaurant.
- 7.2 A range of improvements to walking, cycling and bus facilities are proposed to increase the sustainability of the site, and these improvement measures are set out in Section 5.0. In addition, Harwell Campus has previously developed a Framework Travel Plan, and this will be updated to include the proposed residential development. A Travel Plan Co-ordinator will oversee the implementation and future monitoring/review of the FTP as the campus evolves.
- 7.3 In terms of the proposed vehicular access strategy, the 4 existing access points with the A4185 (i.e. Curie Avenue, Thomson Avenue, Fermi Avenue and Perimeter Road) can be used to travel between the proposed residential development and the local distributor road network. The A4185/Curie Avenue junction has spare capacity for around 250 dwellings on top of the committed development, and development in addition to this would potentially trigger the need to upgrade the existing layout to a signal controlled junction. A potential layout is shown on drawing number 03081-SDH005 in **Appendix E**, and a capacity assessment indicates that this layout would provide sufficient capacity for the 2026 design year will full employment growth and the proposed residential development at Harwell Campus in place.
- 7.4 There is also the possibility of providing a new northern access into the proposed residential site as shown on drawing number 03081-SDH001 in **Appendix E**. This could

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be combined with a new access to the Hendred Estate, which will provide significant benefits to East Hendred village by removing traffic from this part of the local highway network. Other access junctions have varying amounts of spare capacity, and these will be checked for capacity once the wider highway improvements (e.g. Chilton and Milton Interchanges) have been completed. It is recommended that traffic surveys are re-done at that stage in order to establish the latest traffic flow patterns following re-assignment of drivers through the improved network. It should be remembered that Harwell Campus owns a large swathe of road frontage along the A4185, and should any requirements for junction upgrades at Perimeter Road and Fermi Avenue be identified in the future, then there is plenty of scope to accommodate junction improvements.

- 7.5 It is anticipated that an appropriate level of transport contributions will be agreed with OCC, calculated using the appropriate mechanism at the time to support the implementation of the improvements set out in the 'Science Vale Area Strategy'. These improvements to the highway network, as well as to walking, cycling and public transport facilities, are set out in OCC's draft LTP4 document and also in the VWHDC's draft Local Plan.
- 7.6 It is considered that the proposed residential development is in line with national, regional and local transport policies as discussed in Section 3.0. In addition, residential development at Harwell Campus will be truly sustainable in line with the aspirations in the NPPF, in a way which other large residential sites would struggle to compete with. This is due to the close proximity to employment facilities, the vast array of on-campus amenities, the high-frequency bus services and excellent provision for cycling and walking.
- 7.7 In light of the above, the proposed residential development of around 1400 dwellings at Harwell Campus is considered to be acceptable in transport and highway terms.