2. The Challenges

2.1 This section outlines the background against which this plan has been developed. There is great uncertainty about many of the factors which are outlined here due to the impact of the economic downturn and from the government's proposed (but still unclear) changes in the planning framework. The result that the Plan needs to be flexible enough to respond to changes in these factors while still delivering the desired objectives. The following is based upon the current information at the time of writing, but this may need to be revised.

Supporting the Local Economy

Population Growth

2.2 All of the district councils had developed their emerging Local Development frameworks to an advanced stage in the period to summer 2010, although no Framework had been fully adopted. While the changes in the planning system that are set to be introduced by the government mean that these plans will be subject to revision, the overall figures that were laid out in these documents give an indication of the level of growth that this Local Transport Plan will need to accommodate.

2.3 The effect of this is that the population of the county could grow from its current level of around 630,000 to over 700,000 by 2029. this could have some profound impacts on the geography of the county. Although there is a great degree of uncertainty in any small area estimates, these data do indicate that by 2016 Didcot is expected to have grown to about the same size as Abingdon (c. 38,000) and that by 2026 it would be approaching Banbury in size (c. 46,000).

2.4 If these levels of population growth are realised then this will require corresponding increases in the county's employment base if Oxfordshire is not to become merely a dormitory area. The location of the new jobs will impact on the level of commuting that takes place around the county, with a corresponding impact on congestion. Other services, such as schools, shops and health services, will also need to be expanded to cater for this growth.

Housing 2006-2026 (no of houses planned in each area)					
Oxfordshire 55,200	Central Oxon 40,680	Cherwell	6,400	Bicester	4,900
				Rest of Cherwell	1,500
		Oxford	8,200		
		South Oxon	8,240	Didcot	6,000
				Rest of SODC	2,240
		VOWH	10,240	Abingdon	1,500 (0)
				Wantage/Grove	3,570 (5,070)
				Didcot	2,900
				Botley	750
				Rest of VOWH	1,520
		West Oxon	3,800	Witney	3,000
				Rest of WODC	800
		Unallocated	4,000		
	Rest of county 14,520	Cherwell	7,000	Banbury	4,800
				N Cherwell	2,200
		South Oxon	2,700		
		VOWH	1,320	Faringdon	1,060
				Rest of VOWH	260
		West Oxon	3,500	Carterton	1,500
				Chipping Norton	800
				Rest of WODC	1,200

Sources: SE Plan (May 2009); Latest versions of core strategies/preferred options statements of district Local Development Frameworks (as of September 2009) - two options for development locations remain in Vale LDF

Improving Accessibility

Oxfordshire's Road Network

2.5 There are over 4,000 kilometres of road in Oxfordshire. The majority of these operate satisfactorily but there are a number of locations where the network is under stress. Many of the key delay points are at junctions, including:

* M40 junctions 9 and 10 and approaches to junction 11
* A34/A44 junction at Peartree
* A40/A44 Wolvercote and A40 Cutteslowe Roundabouts
* A34 Hinksey Hill interchange and Kennington and Heyford Hill roundabouts on the Oxford Ring Road

2.6 A number of key links in the network are under stress, including:

* A40 Witney – Oxford
* A34 between Milton interchange and Marcham Interchange and between Lodge Hill and M40
* M40 between junctions 9 and 10
* A43 north of M40

2.7 The M40 and A34 carry particularly high levels of heavy goods vehicles reflecting these routes' role as one of the primary links between the south coast ports and most UK markets. The A44 and A420 are largely single carriageway routes but both have high proportions of lorries on all or part of them, as does the A40 between Burford and Witney. There is also significant congestion on urban roads in Oxford, Abingdon, Banbury, Bicester, Henley and Witney.

(Figures 2.1 and 2.2 - Traffic flow diagrams)

Central Oxfordshire

2.8 Central Oxfordshire faces significant growth and infrastructure challenges over the life of this Plan and it will be important that an efficient and effective road network is provided to ensure that the housing and economic growth potential of Oxfordshire is realised. During this plan period, there will be substantial private investment going into the Science Vale area to ensure that the opportunity to develop world-class science based R&D capability is fully maximised.

2.9 Due to the importance of the road network and the expected growth in road traffic in Central Oxfordshire, Oxfordshire County Council invested in the Central Oxfordshire Transport Model (COTM), an advanced multi-modal strategic model, covering central Oxfordshire to help with strategic transport planning decisions.

2.10 The COTM has been able to identify likely areas of congestion and the extent of this congestion for the current situation (2007) and future years 2016 and 2026; these future years incorporate some assumed highway and public transport network infrastructure changes, in addition to committed and assumed housing and employment growth. The following paragraphs summarise the general findings.

INSERT PLOTS FROM COTM

2.11 In both the am and pm peak periods the model predicts an increase in the number of trips being made on the network between 2007 and 2016 and again between 2016 and 2026. The total time spent and distance travelled on the network is predicted to increase between 2007 and 2026 while there is predicted to be a decrease in the average speed of trips on the network.

2.12 The model is also able to assess the impact of public transport trips in future years, both rail and bus. Outputs from the model show that there is an increase in the number of public transport trips made towards Oxford in the AM peak between 2007 and 2026. This is most notable from origins in the East/South East of the city. It also shows that there are different routeing options taken from outlying settlements to reach Oxford.

2.13 In 2007, the junctions at capacity include the Culham and Clifton Hampden river crossings, junctions on the Oxford southern by-pass such as Hinksey Hill and Kennington, and key access points onto the A34 and A40.

2.14 By 2026 there is an increase in the number of junctions that are predicted to experience delays, particularly in the AM peak. Those with the greatest delays are mainly situated around Central Oxford and to the South of Oxford. Junctions of note are:

* Bicester Town Centre (Field Street, North Street and St John's Street gyratory),
* Middleton Stoney Road/Oxford Road junction;
* Middleton Stoney (B430 – signalised junction);
* Botley Interchange (A34 southbound on-slip);
* Central Oxford (St Aldates and Beaumont Street);
* Hinksey Hill Junction and the Kennington Roundabout;
* Clifton Hampden at the river crossing;
* Culham at the river crossing;
* Frilford Lights
* Milton Interchange; and
* Chilton (A4185 southbound towards the Chilton Slips).

2.15 In addition to junction capacities, many more links are over capacity in 2026 when compared to 2007:

* The A34 is generally at capacity in the peak periods, as indicated by the actual modelled flows being less than the demand flows. The growth in trips is more significant in the PM peak when compared to the AM peak period.
* The predominant traffic flow on the M40 through Oxfordshire is southbound in the AM peak and northbound in the PM peak, due to the attractiveness of London as a destination. In 2007 all sections of the M40 through Oxfordshire are operating within capacity; however it reaches capacity between Junctions 9 and 10 by 2026 in both directions.
* The A40 west of Oxford experiences increases in demand flows between 2007 and 2026, with more significant increases westbound. The eastbound approach to Wolvercote roundabout operates at capacity in the future year morning peak periods.
* The A44 operates within capacity in 2007 with increases in flows on the majority of sections up to 2026.
* The A40 east of Oxford operates within capacity in 2007. In 2026 the road is within capacity between M40 J8 and Jackson Road (Cutteslowe), but is over capacity west of Jackson Road to Wolvercote roundabout.
* On the A4074/A4142 the section of the road between Hinksey Hill roundabout and Sainsbury's roundabout operates at capacity due to delays caused at junctions. There are significant increases in traffic flows up to 2026 between Sainsbury's roundabout and the Garsington roundabout, leading to further volume over capacity implications.
* The A4260 operates within capacity in 2007. By 2026 sections of the corridor have up to 80% more trips compared to 2007; however some trips are redistributed as a result of the Northern Gateway development, planned for north Oxford. This leads to an increase in the number of trips made northbound north of Cutteslowe roundabout in the AM peak and southbound trips on the same section of the corridor increase in the PM peak.
* Some eastbound sections of the A420 operate over capacity in the AM peak and the problems are further exacerbated in future years.

2.16 With all of the above measures careful assessment needs to be carried out to ensure the congestion problems are not just being relocated to the next bottle neck or

congestion hotspot.

Banbury

2.17 Cherwell District Council has a major amount of development outside of the Central Oxfordshire area and has identified that Banbury should take the majority of that district's allocation. Although Banbury already has a good economic background, additional jobs would be required to balance the housing growth with 10 hectares of employment land being allocated.

2.18 In order to better understand the impact of this growth in Banbury on the roads in and around the town and on the strategic network, in particular on the M40, the county and district councils invested in a *SATURN* model of the town and immediate area.

2.19 The general findings of the model can be summarised as:

* Over time, total time spent and distance travelled on the network increase, whilst the average speed across the network decreases.
* The most significant changes on the network are predicted between 2007 and 2016, with lower increases predicted between 2016 and 2026.
* All development options show the total time spent and distance travelled on the network are higher than in the 2026 base, resulting in the average speed decreasing by about 3km per hour.
* The number of over capacity junctions increases more significantly between the 2007 and 2016 model runs, with little difference between the 2016 and 2026 base model runs.

2.20 In 2007 there was peak time delay on the A422, A361 and the A4260 in Banbury, although these delays were not as significant as on some other parts of the county network.

2.21 In 2007, the model calculates that there are 15 junctions in Banbury at or over capacity. By 2016 this is predicted to increase to 33 junctions, but only increasing to 34 in the 2026 base. The worst this gets to is 44 junctions under one of the greenfield development options.

2.22 The majority of junctions which are at or over capacity are on north-south routes, including:

* Ruscote Avenue / Queensway
* Southam Road / Oxford Road
* Concord Avenue / Upper Windsor Street
* Middleton Road / Ermont Way

2.23 A link-flow analysis highlighted that increases in traffic were focused on Ruscote Avenue/Queensway, Southam Road and Upper Windsor Street, tying in with the junction problems. The M40 Junction 11 is over capacity for all development options. This congestion will clearly impact on bus services in the area as many of these use these north-south routes.

Reducing the Environmental Impact of Travel

2.24 Transport can produce a number of impacts on the environment at a number of different levels. The impact of the proposals in this plan will be subject to strategic environmental assessment (SEA) which will aim to quantify the overall impact of the proposals and identify opportunities for any adverse impacts to be mitigated against. The following set out the background for some of the major impacts but this can be found in more detail in the scoping report prepared for the SEA.

Natural Environment

2.25 Natural environment assets include:

* Over two thirds of Oxfordshire are devoted to agriculture. As well as contributing to the rural economy and producing food, fibre and fuel, farmed land can also provide other public benefits including clean water, biodiversity, climate change mitigation through flood storage and attenuation, high quality landscapes and access to the countryside via the public rights of way network.
* Distinctive rural and urban landscapes- almost a quarter of Oxfordshire is designated as one of three Areas of Outstanding Natural Beauty. The Oxfordshire Wildlife and Landscape study divides the county into nine distinctive landscape character areas, and over 240 landscape description units which describe more subtle variations
* A distinctive geology which has influenced local building materials and styles.

* Biodiversity of national and international importance. Oxfordshire is a biodiverse county with habitats including rivers and wetlands, woodlands, grasslands, and farmland. Seven Special Areas for Conservation are designated under European law; there are also four National Nature Reserves, 102 Sites of Special Scientific Interest; 362 local wildlife sites, and many other reserves run by trusts and charities. In addition a wide range of species are found in Oxfordshire, many protected by legislation.
* Woodlands - some 7% of the county is wooded, including nearly 3% Ancient Semi-Natural Woodlands, dating from 1600AD or earlier.
* Oxford city is surrounded by Green Belt land, with great potential to improve the natural environment and other public benefits here for the benefit of local people

2.26 These assets, together with other non-built land such as rights of way, road verges, green spaces, plus street trees and landscaped areas in the wider 'public realm' are collectively described as 'Green Infrastructure'. The definition of Green Infrastructure is *"a strategically planned and delivered network of high quality green spaces and other environmental features. It should be designed and managed as a multifunctional resource capable of delivering a wide range of environmental and quality of life benefits for local communities."* Green Infrastructure can provide many social, economic and environmental benefits close to where people live and work including:

* Space and habitat for wildlife with access to nature for people
* Places for outdoor relaxation and play
* Climate change mitigation, such as growing wood for fuel, helping to reduce CO_2 emissions
* Climate change adaptation, such as reducing surface runoff, improving water storage capacity, reducing the effects of extreme weather events, and cooling urban heat islands.
* Environmental education
* Improved health and well-being – lowering stress levels and providing opportunities for exercise

2.27 Green Infrastructure should be provided as an integral part of all new development, alongside other infrastructure such as utilities and transport networks. The management of existing networks of land can also be improved to increase multifunctional benefits.

Highways land and rights of way are an important part of Oxfordshire's green infrastructure resource.

Climate Change

2.28 A number of scenarios were developed for the Copenhagen Conference on Climate Change in 2009. In all of these scenarios it is likely that this will mean for Oxfordshire that there would be hotter dryer summers and warmer wetter winters and an increased likelihood of severe weather incidents by 2050. The UK Climate Impacts Programme has looked in more detail at the potential impact on mean annual temperature. This indicates that predicted temperature increase is highly unlikely to be less than 1-2 degrees and highly unlikely to be more than 3-4 degrees.

Medium emissions scenario 2050 Oxfordshire					
Probability level	10%	33%	50%	67%	90%
Increase in average daily temperature	1-2°	2-3°	2-3°	2-3°	3-4°

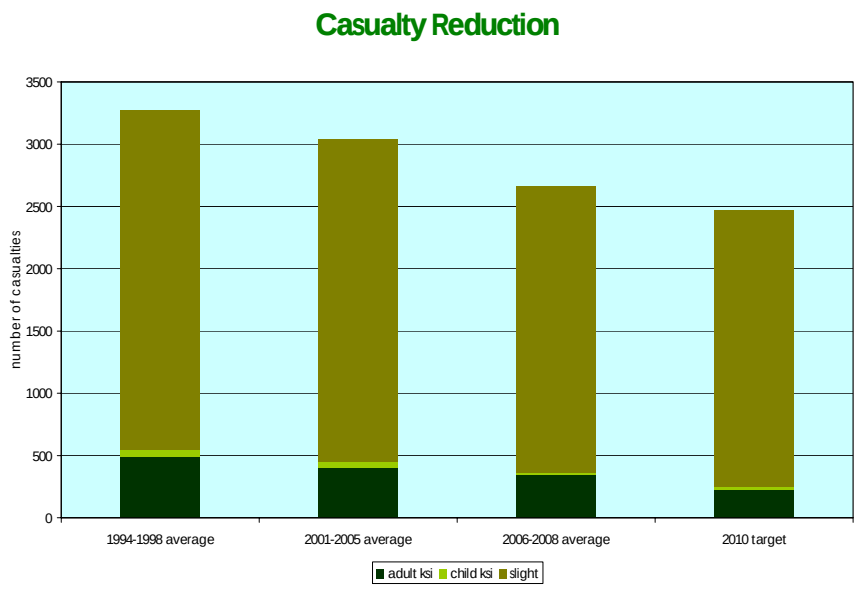
Source: UK Climate Impacts Programme, UK Climate Predictions 09 (2009) (interpreted from published maps)

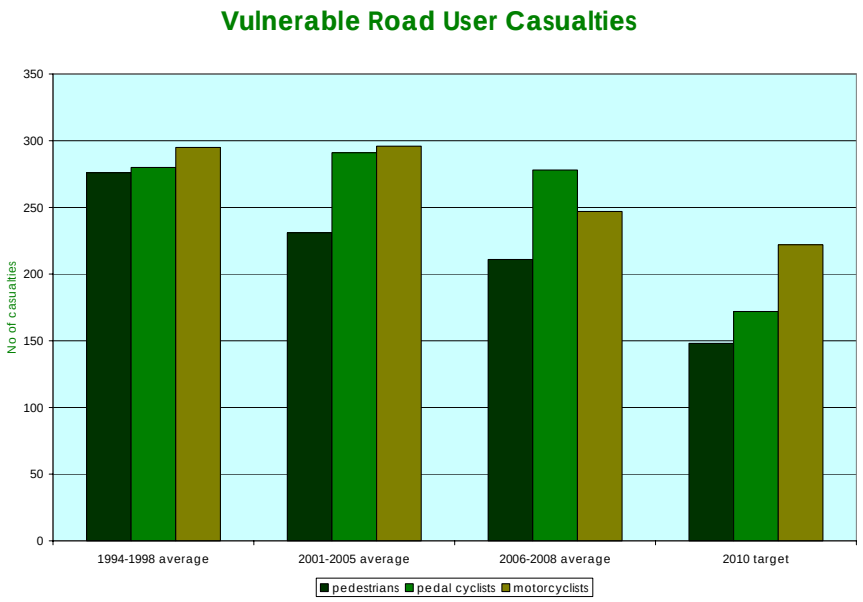
2.29 For petrol cars, carbon production is at its lowest at speeds of about 60kph (40mph). As with other pollutants carbon emissions are lowest when steady speeds are achieved - start/stop conditions are likely to be the least carbon efficient conditions. However, any potential reduction in carbon emissions from speed control is likely to be outweighed by even a small increase in traffic levels. This means that while traffic management proposals may moderate the amount of carbon produced by travel it is likely that reductions can only be made if there is a large scale change in the form of power used by transport or by reductions in the amount of travel undertaken, or both of these.

Promoting Better Travel

Casualties

2.30 Oxfordshire's progress on reducing casualties over the last fifteen years has at least matched national trends, and has resulted in reductions in total casualty numbers of over 25% between 1994-98 and 2006-08. Our reduction in pedestrian and, in particular, pedal cycle injuries, however, has been disappointing.





Health & Life Expectancy

2.31 There is a considerable difference at ward level between areas with the highest life expectancy and those with the lowest as shown below. This is a highly complex issue which is related to many factors including lifestyle and social class. However, another important aspect in this difference is that areas with lower current age profiles tend to have the longer life expectancy while those with older populations have a shorter expectancy. This can cloud other relationships such as between activity levels and life expectancy where in some areas it is unclear if current population age or activity level is responsible for lower life expectancy levels (in any case these are likely to be highly related to each other).

Health and life expectancy			
	% who participate in moderate intensity activity*	Top 20% life expectancy range	Bottom 20% life expectancy range
Oxford	20.5	81-82	75-77
Cherwell	24.0	82-85	75-78
South Oxfordshire	22.3	82-89	73-79
Vale of White Horse	25.0	82-84	77-79
West Oxfordshire	25.7	82-85	78-79
Oxfordshire		**82-89**	**73-79**
Top five wards for life expectancy		Didcot Ladygrove, Burford, Kidlington North, Abingdon Dunmore, Bicester South	
Bottom 5 wards for life expectancy		Sandford, Caversfield, Oxford Carfax, Otmoor, Oxford Blackbird Leys	

Source: Oxfordshire Partnership, Public Health Strategy for Oxfordshire (October 2007)
(at least 30 mins of moderate intensity activity 3 times a week)*

2.32 While the population in all groups is expected to increase through this LTP period, the numbers in older age groups is expected to rise by the greatest, as shown below. The numbers of people aged over 60 (for females) or 65 (for males) is expected to increase by over 40% with the number over 85 increasing by over 50%.

Projected population age ranges, Oxfordshire (000s)			
	2006	*2016*	*2026*
0-15	114	121	126
16 - 59(f)/64(m)	390	410	414
65+(m)/60+(f)	111	136	160
85+	15	20	23
Total population	**616**	**668**	**701**

Source: Oxfordshire Population and household forecasts, 2009 (August 2009)