Connecting Oxfordshire 'Local Transport Plan 4' (LTP4): Strategic Environmental Assessment

Prepared for

Oxfordshire County Council

January 2015

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Contents

Section **Page**

Figures

Tables

Acronyms and Abbreviations

ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
BAP	Biodiversity Action Plan
CO_2	Carbon dioxide
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EA	Environment Agency
EIA	Environmental Impact Assessment
EU	European Union
HAMP	Highways Asset Management Plan
HER	Historic Environment Register
HRA	Habitat Regulations Assessment
LNR	Local Nature Reserve
LTP3	Local Transport Plan 3
NO_2	Nitrogen dioxide
NOx	Oxides of nitrogen
OCC	Oxfordshire County Council
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SPA	Special Protection Area
SFRA	Strategic Flood Risk Assessment
SSSI	Site of Special Scientific Interest
WFD	Water Framework Directive

Glossary

Area of Outstanding Natural Beauty	AONBs were formally designated under the National Parks and Access to the Countryside Act of 1949 to protect areas of the countryside of scenic quality that cannot be selected for National Park status.
Baseline Environment	The state of the environment against which to measure change from the plan
Biodiversity Action Plan	An agreed plan for a habitat or species, which forms part of the UK's commitment to biodiversity.
Conservation Area	These are areas, usually in towns and villages, where the character of buildings and other public spaces is of 'special architectural or historical interest'. Such areas are defined by the Local Planning Authorities and are afforded different development controls to open countryside and built up areas not under this definition.
Countryside Quality Counts	A project sponsored by Natural England in partnership with Defra and English Heritage to develop a national indicator on how the countryside is changing.
Ecosystem services	Benefits to people from resources and processes that are supplied by natural ecosystems. For example clean drinking water and processes such as the decomposition of waste.
Flood Risk	Flood risk is the product of the likelihood (or frequency) of flood events and their consequences (such as property loss or damage, physical harm or distress and social and economic disruption).

Green Infrastructure Local Nature Reserve	Areas set aside for multi-functional purposes of leisure, exercise, drainage, wildlife corridors, green space and play areas. Designated under the National Parks and Access to the Countryside Act 1949 by local authorities, for their locally important wildlife or geological features.
National Nature Reserve	Designated under the National Parks and Access to the Countryside Act 1949 or the Wildlife and Countryside Act 1981 (as amended) primarily for nature conservation.
Water Framework Directive	European Community Directive (2000/60/EC) on integrated river basin management. The WFD sets out environmental objectives for water status based on ecological and chemical measures, common monitoring and assessment strategies, arrangements for river basin administration and planning, and a programme of measures to meet the objectives.

SECTION 1

1 Introduction

1.1 Background

CH2M HILL was commissioned by Oxfordshire County Council (OCC) to undertake a Strategic Environmental Assessment (SEA) of their emerging and fourth Local Transport Plan (LTP) - 'Connecting Oxfordshire: LTP4 2015 - 2031'. As a Local Transport Provider, OCC is required to produce a LTP under the Transport Act 2000 (as amended by the Local Transport Act 2008) in which are set out objectives and plans for developing transport in the county.

This Environmental Report sets out the results of a SEA carried out for the LTP4 in accordance with the requirements of the SEA Directive, which is transposed into English legislation by the Environmental Assessment of Plans and Programmes Regulations 2004 (the 'SEA Regulations'). The purpose of the SEA is to identify, evaluate and describe the likely significant effects on the environment of implementing the plan. The SEA is an iterative process, which informs the decision-making in plan development. It provides opportunities for the public to get involved in developing a plan that will meet important objectives for people and the environment.

This report is available for consultation, together with the draft LTP4, to download from https://www.oxfordshire.gov.uk/cms/content/local-transport-plan-ltp4 [to be confirmed] and in hard copy at the following office: -

Oxfordshire County Council
Speedwell House
Speedwell Street
Oxford
OX1 1NE

Comments should be provided by [date to be confirmed] either by email to our email address or by post to the above address.

This draft report has been formally issued to the SEA statutory consultees during this consultation period; namely the Environment Agency, Natural England and English Heritage.

1.2 Scope of Assessment and Study Area

The study area comprises the entire county of Oxfordshire (see Figure 1.1), which is located in the south east of England. The county comprises the districts of Oxford, Cherwell, Vale of White Horse, West Oxfordshire and South Oxfordshire.

Figure 1.1: Oxfordshire Study Area (OCC 2014c)

1.3 SEA

1.3.1 Introduction

SEA is the systematic appraisal of the potential environmental impacts of policies, plans, strategies and programmes, before they are approved. It ensures that any implications for the environment are fully and transparently considered before final decisions are taken.

The requirement to undertake statutory SEA stems from the EC Directive (2001/42/EC) 'on the assessment of the effects of certain plans and programmes on the environment', known as the 'SEA Directive', which came into force in 2004. The overall aim of the SEA Directive is to '*provide a high level of protection to the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development*'.

The Directive is implemented in England through the Environmental Assessment of Plans and Programmes Regulations (SI 1633 2004) – the SEA Regulations. The SEA Regulations provide a systematic method to consider likely effects on the environment and ensure environmental considerations are addressed as early as possible and in balance with technical and economic factors.

Table 1.1 sets out the principal stages in the SEA process and the steps that have been undertaken for the assessment of the Oxfordshire LTP4.

SECTION 1

Table 1.1: *SEA Stages and the SEA Process followed for Oxfordshire LTP4*

SEA Stage	What is involved	Oxfordshire LTP4 Development Milestones	SEA Milestones
A: Scoping	Setting the context and objectives, establishing the baseline and deciding on the scope	Development of high level goals and objectives for LTP4 and public consultation (20 June to 1 August 2014)	SEA Scoping Report prepared between April and May 2014. Scoping Report issued to statutory stakeholders on 11 April 2014 for five-week statutory consultation (April to May 2014).
B: Interim Assessment of LTP4 Option Development	Developing and refining LTP alternative options and assessing environmental effects in SEA matrices	Preferred strategies presented informally to County Council's Cabinet on 6 January 2015.	Interim report to Oxfordshire County Council including compatibility assessment and high level assessment of transport options – September 2014. Assessment of area and supporting strategies issued to Oxfordshire County Council to accompany presentation to Cabinet (December 2014)
C: Preparing the Environmental Report	To present the predicted environmental effects of the LTP, including alternatives, in a form suitable for public consultation and use by decision-makers.	Completion of draft LTP4 for consultation (January 2010) Approval of the draft LTP and SEA for public consultation by committee (27 January 2015).	Revision of assessment of preferred scenarios in light of further detail provided in local area strategies Preparation of this Environmental Report on the SEA of the draft LTP4 issued to Oxfordshire County Council in January 2015
D: Consulting	Consultation on the draft LTP and the Environmental Report	Consultation on draft LTP4 and Environmental Report planned for January-March 2015 Adoption of Oxfordshire LTP4 scheduled to take place by Summer 2015. Preparation of Post-adoption Environmental Statement to record how SEA was taken into account for LTP4.	
E: Monitoring	Monitor the significant effects of implementing the LTP or programme on the environment	Monitoring plan developed in December 2014	Monitoring regime to be developed and agreed by Oxfordshire County Council

1.3.2 Limitations and Difficulties Encountered

The SEA identified a number of areas where further information would either have been helpful to the SEA or will benefit the future assessment of environmental effects at the project level, including: -

- A project level desk based assessment of the historic and cultural heritage significance, which may be useful to better understand the archaeological potential of areas affected by transport improvements.
- Baseline environmental conditions have been defined using readily available information.

The assessment of the environmental effects of the LTP4 and the proposed mitigation measures are based on a number of assumptions, including: -

- The assessment is based on high level details of Area and Supporting Strategies. Detailed alignments and locations of transport improvements, and designs will be developed and assessed individually at the project level, which is likely to influence the extent and significance of environmental effects. Further environmental assessments at the project level will be required.

The following uncertainties need to be considered as project level schemes are taken forward: -

- Mitigation measures for all the potentially adverse strategic effects have been proposed. However, there are uncertainties around whether all adverse impacts may be mitigated against; there may therefore be residual adverse effects. The mitigation measures will also need to be reviewed and assessed as projects are taken forward.
- Other plans (e.g. Neighbourhood Plans) are currently being developed that have the potential for in-combination or cumulative impacts. Until the details of these plans are available, their in-combination impacts cannot be fully assessed.
- There remain uncertainties in securing funding from the Local Enterprise Partnerships and through planning obligations to implement all of the transport strategies identified, and therefore OCC will need to prepare strong business cases to support the investment in schemes that contribute to economic growth. Therefore uncertainties also remain with regard to the exact timescales for implementation.

1.4 Habitat Regulations Assessment

Due to the potential for the LTP4 to have significant effects on sites of international nature conservation importance (Natura 2000 sites – Special Areas of Conservation (SACs) (see Section 4.7.1) in Oxfordshire, a Habitats Regulations Assessment (HRA) Screening Report has been produced in parallel with this SEA.

The HRA is required under the EU Habitats Directive (EU Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora) and the Birds Directive (Council Directive 2009/147/EC) and the transposing U.K. Regulations (The Conservation of Habitats and Species Regulations, SI 2010 No. 490, as amended 2012).

The HRA has been integrated with the SEA process, with the findings used to guide the development of the alternative options to be considered as part of the SEA. The assessment considers possible impacts on Natura 2000 sites within and outside of the study area that could be affected by the recommendations of the plan.

1.5 Water Framework Directive (WFD)

The Water Framework Directive (WFD)[i] is a European Directive which provides a strategic planning process to manage, protect and improve the water environment. It came into force on 22 December 2000 and was transposed into UK law in 2003.

The Directive helps to protect and enhance the quality of surface freshwater (including lakes, streams and rivers), groundwater, groundwater dependant ecosystems, estuaries and coastal waters.

The WFD is aimed at protecting physical, chemical and biological water quality. Its purpose is to establish a framework for the protection of water bodies (including terrestrial ecosystems and wetlands directly dependent on them) which aims to:

- Prevent deterioration in the classification status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- Achieve at least good ecological and chemical status for all waters. Where this is not possible, good status should be achieved by set deadlines ranging from 2015 to 2027;
- Promote sustainable use of water as a natural resource;
- Conserve habitats and species that depend directly on water;
- Progressively reduce or phase out release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Contribute to mitigating the effects of floods and droughts[ii].

The LTP4 has been assessed for WFD compliance to ensure that the high level policies and strategy area/supporting area proposals comply with the WFD, and where possible, contribute to achieving WFD objectives. The WFD assessment has been incorporated into the SEA, and there is a SEA objective covering water quality, which incorporates underlying criteria to assess whether the LTP4 policies or proposals have the potential to impact on the water bodies or constrain any water bodies from achieving Good Ecological Status (GES) or Good Ecological Potential (GEP). The complete list of SEA objectives is provided in Chapter 5 of this report.

2 Consultation

2.1 Introduction

Effective stakeholder and public engagement is central to the development of the LTP4, in order to arrive at a plan that is acceptable to as many parties as possible and to engage those parties in the process. The objectives of consultation, in relation to the LTP4 are to:

- Meet regulatory requirements for consultation under the EU SEA Directive and Local Transport Act 2008; and
- Contribute to the success of the Plan and improve decision-making by;
    - Raising awareness of transport issues within Oxfordshire;
    - Informing stakeholders of the LTP4 development process and how decisions have been made;
    - Informing the development of the LTP4 by involving and working with stakeholders to understand their views, and ensure they are demonstrably considered;
    - Gathering information from stakeholders to inform the development of the plan.

Further consultation has been undertaken in relation to the LTP4, and the consultation responses received have been considered during the development of this SEA.

2.2 Scoping Consultation

During the scoping stage of the SEA in Spring 2014, existing information on Oxfordshire was collated, and a decision-making framework was established that could be used to evaluate the impact of the LTP4 on sensitive aspects of the environment.

A Scoping Report was prepared to document the scoping stage and identified issues that would require detailed consideration in this SEA ER. Table 2.1 summarises the issues scoped out of further assessment because they are not considered likely to be significant.

Table 2.1: Issues Scoped Out

Receptor	Scoped Out
Biodiversity (habitats and species)	The Strategy does not consider specific species and habitats not likely to be found in or adjacent to the study area, for example, marine / intertidal habitats or species
Soils	The interactions between the LTP4 and geology will be considered further at project EIA stage.
The Historic Environment	The SEA broadly defines the historic environment but does not determine the effects of the LTP4 options on every known feature of heritage interest. Similarly, the SEA does not consider individual sites where they relate to local finds or where they are not of demonstrably equivalent significance to scheduled assets, and therefore are unlikely to influence decision-making at the plan level. The effects on these features would be considered further at project EIA stage. The effects of the LTP4 implementation on as yet unidentified heritage resources will be considered further at project level assessment.
Landscape	Appropriate lighting levels associated with individual area or supporting strategies in the LTP4 will be considered during the project level implementation of the plan.

The Scoping Report was formally issued to statutory SEA consultees to request a scoping opinion, and was subject to a five week consultation from 11 April 2014 to 16 May 2014.

Comments were invited on the scope and content of the Scoping Report to ensure that our understanding of the study area, the key issues related to transport planning and the influences from external plans are adequately reflected in our objectives.

All comments received were recorded and acknowledged, and used to inform the development of the strategy. The consultation comments received are provided in Section 2.4.

2.3 Stakeholders

The following stakeholders have been engaged in the development of the LTP4 to contribute information, local knowledge and provide views on particular topic areas:

- Steering Group: [Richard J to confirm]
- Statutory Consultees: Environment Agency, Natural England and English Heritage
- Local Authorities: West Oxfordshire District Council, Cherwell District Council, Vale of White Horse District Council, South Oxfordshire District Council, county councils
- Transport Operators, Providers and Companies: National Express, Oxford Bus Company and Stagecoach Oxfordshire, David Pryor (Taxi Proprietor), London Oxford Airport, Highways Agency, Oxfordshire Cycling Network, Chiltern Railways, Rail Future, Road Haulage Association/Freight Transport Association
- Other Key Stakeholders: Chilterns Conservation Board, Highways Agency, North Wessex Downs AONB, Oxford Brookes, Age UK, councillors, OXTRAG, Oxfordshire Air Quality Network, University of Oxford, Campaign to Protect Rural England (CPRE), Oxford Civic Society, Oxford Preservation Trust, EZDG, parish councils
- Landowners
- Public

The outcome of consultation on the draft LTP4 and SEA will be documented within a post-adoption Statement of Environmental Particulars.

2.4 Consultee Comments

The consultation comments received during the development of the SEA are provided in Appendix A, together with a summary of how they have been addressed.

A summary of the key comments are provided below: -

- Welcome recognition given to AONBs within the county and need to consider the North Wessex Downs 2014 – 2019 AONB Management Plan, when published.
- Consider how the LTP4 can mitigate cumulative rural traffic impacts on designated landscapes from allocated housing in local plans and consider direct impacts of development within and adjacent to AONBs including loss of countryside
- Need to consider noise reduction measures for surfacing new highways
- Recommend referencing the National Heritage Protection Plan, National Heritage List, Heritage at Risk Register, a Historic Landscape Characterisation currently underway for Oxfordshire, Environmental Noise Directive areas and Transport Circular 2/2013
- Need to identify the National Planning Policy Framework's aims to conserve heritage assets
- Would be helpful to identify what changes in circumstances would be likely to place in the absence of the LTP4, with potential to affect the historic environment
- Amendments suggested to objectives, assessment criteria and scope of heritage issues
- Request for a stronger link between the baseline and sustainability issues
- Recommend that the flood section of the Scoping Report is expanded to consider flooding from groundwater, sewer and reservoir flooding and includes information from the Local Flood Risk Management Strategy when published.

- Need to identify the threats/opportunities that the plan presents to biodiversity including Oxford Meadows Special Area of Conservation (SAC)

Consultation on the draft LTP4 and this accompanying ER will be the most significant opportunity for stakeholders and the general public to influence the content and recommendations of the plan.

Following completion of the consultation period on [Richard J to confirm], OCC will consider all responses received regarding the draft LTP4 and its ER and amendments made to the plan, before publishing the final LTP4 and associated post-adoption Statement of Environmental Particulars.

SECTION 3

3 Connecting Oxfordshire: LTP4

3.1 Introduction

LTPs are the key building blocks of the Government's integrated transport policy. Their introduction was announced in the Government's Transport White Paper 'A New Deal for Transport: Better for Everyone', published in July 1998. Local transport planning is a '*vital tool to help each local authority work with its stakeholders to strengthen its place-shaping role and its delivery of services to the community*' (Department for Transport 2009).

OCC is the transport authority for the whole of Oxfordshire, with responsibility for the county's adopted transport assets, including roads, pedestrian and cycle ways, bus shelters and bus stop infrastructure, signing and car parks. OCC is also responsible for ensuring that public transport in the county meets local needs. Motorways and trunk roads are the responsibility of the Highways Agency.

OCC has prepared three LTPs to date. The first LTP (LTP1) covered the period 2001 to 2006, the second, LTP2, covered the period 2006 to 2011. The third LTP (LTP3), which was amended in 2012, covered the period 2011 to 2030. The currently adopted LTP3 and associated SEA considered the potential impact of the strategy on various environmental receptors, and can be viewed online at www.oxfordshire.gov.uk/cms/content/local-transport-plan-2011-2030. The LTP3 has been reviewed annually since its adoption in 2011 and was amended in 2012.

Building on the earlier LTP3, the draft Oxfordshire LTP4 has now been prepared to set the policy and strategy for Oxfordshire's transport requirements, and OCC's approach to addressing the challenges of the transport system in Oxfordshire, in the period from 2015 – 2030. The draft LTP4 takes account of changes in housing and economic growth forecasts, new and emerging spatial planning, and places an increased focus on reducing demand for travel.

The LTP4 considers the demand and need for transport provision and management in Oxfordshire and the roles of individual transport modes and potential interventions. The LTP4 has been developed to help meet the following priority national goals, which are set out in the Department for Transport's 'Delivering a Sustainable Transport System.'

National Goals for LTPs (Department for Transport, 2008)

- to support national economic competitiveness and growth, by delivering reliable and efficient transport networks;
- to reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of tackling climate change;
- to **contribute to better safety, security and health** and longer life expectancy by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health;
- to **promote** greater **equality of opportunity** for all citizens, with the desired outcome of achieving a fairer society; and
- to **improve quality of life** for transport users and non-transport users, **and** to promote a **healthy natural environment**.

3.2 LTP4 Objectives

The objectives for the draft LTP4 are: -

Theme 1: Supporting growth and economic vitality (Goal 1)

1. Maintain and improve transport connections to support economic growth and vitality across the county.
2. Make most effective use of all available transport capacity through innovative management of the network;
3. Increase journey time reliability and minimise end-to-end public transport journey times on main routes
4. Develop a high quality, resilient integrated transport system, that is attractive to customers and generates inward investment;

Theme 2: Cutting carbon (Goal 2)

5. Minimise the need to travel;
6. Reduce the proportion of journeys made by private car by making the use of public transport, walking and cycling more attractive
7. Influence the location of development to maximise the use and value of existing and planned strategic transport investment;
8. Reduce per capita carbon emissions from transport in Oxfordshire in line with UK government targets

Theme 3: Improving quality of life (Goals 3, 4 and 5)

9. Mitigate and wherever possible, enhance the impacts of transport on the local built and natural environment
10. Improve public health and well-being by increasing levels of walking and cycling, reducing transport emissions, reducing casualties, and enabling inclusive access to jobs, education, training and services.

The LTP4 objectives helped to set the long term aspirations of the Plan and guide the prioritisation of schemes that put forward in the LTP4.

3.3 Development of LTP4 Policies and Area Strategies

LTP4 policies were developed by OCC to support the themes and objectives identified in Section 3.2.

Area Strategies have also been developed by OCC as part of the LTP4, for those parts of the county that are due to experience significant housing and/or employment growth, and to reflect the emerging Local Plans. The Area Strategies describe how these different localities or key centres to Oxfordshire, will meet local transport needs in the county. These Area Strategies comprise: -

- Oxford
- Science Vale (an area encompassing Wantage and Grove, Abingdon, Didcot, Culham Science Centre, Milton Park and Harwell Oxford Campus)
- Bicester
- Banbury
- Witney
- Carterton

These Area Strategies, which are presented in detail in the draft LTP4, set a clear strategy for transport to guide decision-making and support future funding arrangements.
Other strategies that have been developed to support the Area Strategies are: -

- Science Transit Strategy
- Bus Strategy
- Rail Strategy
- Cycling Strategy
- Freight Strategy
- A420 Strategy
- Highways Asset Management Plan
- Green Infrastructure Strategy – not available at the time of writing this report

The likely environmental effects of alternative LTP4 policies, Area Strategies and Supporting Strategies were assessed through a staged and systematic approach, which was informed and influenced by key stakeholders.

Assessment of the environmental constraints and opportunities associated with the LTP4 was then considered over three epochs: '2015 – 2020', '2021 – 2031' and 'beyond 2031 (post LTP4)'.

In identifying the draft LTP4, the assessment considered whether the policies, Area and Supporting Strategies would: -

- Meet or support the SEA objectives and the assessment criteria previously defined
- Meet environmental legislative requirements – notably the Habitats and Species Conservation Regulations 2010 (as amended) and the Water Environment (WFD) (England and Wales) Regulations 2003
- Address the objectives of the LTP4
- Be economically feasible.

3.4 The Draft LTP4

The LTP4 policies are shown in Table 3.1. These policies will be applied across the county through:

- OCC's key role in integrated strategic land use and transport planning for the county
- Involvement in the development of Local Plans and Neighbourhood Plans
- OCC's response to strategic infrastructure and development proposals
- OCC's response to planning applications
- The development of Area Strategies for areas planned for growth
- The development of Supporting Strategies
- OCC's work with partners to develop transport solutions; and
- OCC's decision making process for all aspects of transport for which they have control.

Table 3.1: Policies of the LTP4

LTP 4 Policy	Policy Description
1.	Oxfordshire County Council will work to ensure that the transport network supports sustainable economic and housing growth in the county, whilst protecting its environmental and heritage assets, and supporting the health and wellbeing of its residents.
2.	Oxfordshire County Council will work in partnership with the Local Enterprise Partnership and developers to meet the objectives of the plan and seek external funding to support the delivery of transport infrastructure priorities as set out in the SEP, City Deal and Local Investment Plan.
3.	Oxfordshire County Council will encourage the use of modes of travel associated with healthy and active lifestyles and will improve built and green infrastructure to support greater levels of walking and cycling.
4.	Oxfordshire County Council will prioritise the needs of different types of users in developing transport schemes or considering development proposals, taking into account road classification and function/purpose, and the need to make efficient use of transport network capacity.

LTP 4 Policy	Policy Description
5.	Oxfordshire County Council will consult from an early stage in the development of schemes and initiatives so that the needs of individuals, communities and all groups sharing a protected characteristic under the Equalities Act 2010 are considered and, where appropriate, acted upon.
6.	Oxfordshire County Council will target new investment and maintain transport infrastructure to minimise long-term costs.
7.	Oxfordshire County Council will publish and keep updated its policy on prioritisation of maintenance activity: this will be set out in the Highways Asset Management Plan.
8.	Oxfordshire County Council will manage and, where appropriate, improve and extend the county's road network to reduce congestion and minimise disruption and delays, prioritising strategic routes.
9.	Oxfordshire county Council will support the use of a wide range of data and information technology to assist in managing the network and influencing travel behaviour, and work with partners to ensure that travel information is timely, accurate and easily accessible in appropriate formats for different user groups.
10.	Oxfordshire County Council will manage the parking under its control and work with district councils to ensure that overall parking provision and controls support the objectives of local communities and this Plan.
11.	Oxfordshire County Council will support initiatives to increase the proportion of freight carried by rail, and will identify suitable routes for freight movement by road and, where appropriate, implement measures to support the use of these routes, balancing the needs of businesses with protection of the local environment and maintenance of the highway network.
12.	Oxfordshire County Council will identify those parts of the highway network where significant numbers of accidents occur over a monitoring period of five years, and propose engineering solutions where these would be effective in helping to prevent accidents.
13.	Oxfordshire County Council will work with partners to support road safety campaigns and educational programmes aimed at encouraging responsible road use and reducing road accident casualties, and will keep speed limits under review, including giving consideration to the introduction of 20mph speed limits and zones.
14.	Oxfordshire County Council will carry out targeted safety improvements on walking and cycling routes to school, to encourage active travel and reduce pressure on school bus transport.
15.	Oxfordshire County Council will work with partners and particular sections of the community to identify how access to employment, education, training and services can be improved, particularly for those with disabilities or special needs, or who otherwise have difficulties in walking, cycling or using public transport, or for people without access to a car.
16.	Oxfordshire County Council will support the development and use of community transport to meet local accessibility needs.
17.	Oxfordshire County Council will promote the use of low carbon forms of transport, including electric vehicles and associated infrastructure where appropriate
18.	Oxfordshire County Council will work to reduce the carbon footprint of transport assets and operation where economically viable, taking into account energy consumption and the use of recycled materials.
19.	Oxfordshire County Council will seek to ensure that the location, layout and design of new developments minimise the need for travel, encourage walking and cycling for local journeys and leisure, allow the developments to be served by high quality public transport and will support the development of travel plans to achieve this.
20.	Oxfordshire County Council will • Secure transport improvements to mitigate the cumulative adverse transport impacts from new developments in the locality and/or wider area, through financial contributions from developers or direct works carried out by developers • Identify the requirement for passenger transport services to serve the development and seek developer funding for these to be provided until they become commercially viable, • secure works to achieve suitable access to and mitigate against the impact of new developments in the immediate area, generally through direct works carried out by the developer

LTP 4 Policy	Policy Description
	• require that all infrastructure associated with the developments is provided to appropriate design standards and to appropriate timescales • set local routeing agreements where appropriate to protect environmentally sensitive locations from traffic generated by new developments • seek support towards the long term operation and maintenance of facilities, services and selected highway infrastructure from appropriate developments, normally through the payment of commuted sums ensure that developers promote sustainable travel for journeys associated with the new development
21.	Oxfordshire County Council will support the development of air travel services and facilities that it considers necessary to support economic growth objectives for Oxfordshire.
22.	Oxfordshire County Council will record, maintain, improve and waymark the public rights of way network so that all users, including cyclists and horse riders, are able to understand and enjoy their rights in a safe and responsible way.
23.	Oxfordshire County Council will support appropriate opportunities for improving towpaths along the waterways network, for local journeys and leisure, where it would not harm the ecological value of the area or waterway network.
24.	Oxfordshire County Council will work with operators and other partners to enhance the network of high quality, integrated public transport services, interchanges, and supporting infrastructure, and will support the development of quality Bus Partnerships and Rail Partnerships, where appropriate.
25.	Oxfordshire County Council will work with the rail industry to enhance the rail network in Oxfordshire and connections to it, where this supports the county's objectives for economic growth.
26.	Oxfordshire County Council will work with partners towards the introduction and use of smart, integrated ticketing solutions for a range of transport services.
27.	Oxfordshire County Council will work to reduce negative environmental impacts of the operation of the transport network, and where possible provide environmental improvements, particularly in Areas of Outstanding Natural Beauty, Conservation Areas and other areas of high environmental importance.
28.	Oxfordshire County Council will work with partners to improve public spaces and de-clutter the street environment.
29.	Oxfordshire County Council will classify and number the roads in its control to direct traffic, particularly lorry traffic, onto the most suitable roads as far as is practicable.
30.	Oxfordshire County Council will help reduce the need to travel by seeking further opportunities to improve internet and mobile connectivity across Oxfordshire and supporting other initiatives that enable people to work at or close to home, and will work in partnership with service delivery organisations to influence the location of key services where possible
31.	Oxfordshire County Council will support measures that make more efficient use of transport network capacity by reducing the proportion of single occupancy car journeys and encouraging a greater proportion of journeys to be made on foot, by bicycle, or by public transport.
32.	Oxfordshire County Council will continue to provide support for bus services it considers socially necessary, where these cannot be provided commercially, and will develop a strategy for determining where this is applicable.
33.	Oxfordshire County Council will work with district councils to develop and implement transport interventions to support Air Quality Action Plans by reducing harmful emissions from vehicles where feasible, giving priority to measures which also contribute to other transport objectives.
34.	Oxfordshire County Council will support the development of Neighbourhood Plans (as outlined in its published Toolkit) and seek to influence neighbourhood plans with a view to ensuring consistency with the Local Transport Plan. Where a Neighbourhood Plan has been adopted, the Council will seek funding to secure the Plan's transport improvements from local developments and the Community Infrastructure Levy as appropriate.

LTP 4 Policy	Policy Description
35.	Oxfordshire County Council will support the research, development and use of new technologies and initiatives that improve access to jobs and services, taking into account their environmental impact and fit with the other objectives of LTP4.

3.5 Relationship with other relevant plans, policies and programmes

To ensure integrated success of transport and development planning objectives, the LTP4 must complement the requirements of the Core Strategies and other planning documents forming the Local Development Frameworks (LDFs) of the following District Authorities within Oxfordshire:

- Cherwell District Council;
- Oxford City Council;
- South Oxfordshire District Council;
- Vale of White Horse District Council; and
- West Oxfordshire District Council.

While needing to comply with national, regional and local policies, plans and programmes, the LTP4 will also influence, and be influenced by other statutory and non-statutory plans, strategies, policies and on-going studies. Of particular relevance are the following regional and local plans/ strategies, which have been considered during the development of the SEA: -

- Oxfordshire 2030: A partnership plan for improving quality of life in Oxfordshire;
- A Thriving Oxfordshire – Draft Corporate Plan 2014/15 – 2017/18 (OCC 2014a)
- Oxfordshire Strategic Economic Plan (2014b) (Oxfordshire Local Enterprise Partnership);
- Green Infrastructure Framework for Oxfordshire – emerging (OCC);
- Economic Development Strategy Oxfordshire 2006-2016 (OCC); and
- Oxfordshire Local Flood Risk Management Strategy – emerging.

Appendix B: 'Plans, Policies and Programmes Review (PPP Review) contains a list and summary description of the legislative and policy framework documents that are most relevant to the LTP4.

The SEA has been fully integrated into the development of the LTP4 to ensure that environmental considerations are taken into account and show how the SEA has influenced the LTP process. The Environmental Report has identified opportunities for environmental enhancement as well as mitigating any potentially adverse effects of the LTP4.

4 Baseline Environment

4.1 Population

4.1.1 Local Population

Oxfordshire is the second most rural county in the south-east of England, with a total population of approximately 661,000 people in 2012 (OCC 2014a). Approximately 50% of the population live in settlements of 10,000 or less (OCC 2013c), and rural isolation is an issue in some areas outside the major towns and cities. Connections between people and places are therefore an important consideration of the LTP, which public transport can help to facilitate.

Deprivation is generally low throughout the county. However, there are some highly deprived areas and transport services to these areas will require consideration in the developing LTP4. The county *'contains relatively high levels of deprivation on the geographic barriers index, which assesses the average road distance to key services such as hospitals and schools. 139 of the 404 neighbourhoods in the county are among the 20% most deprived nationwide in this respect. The majority of these areas are in Cherwell, South Oxfordshire, Vale of White Horse, and West Oxfordshire and are predominantly rural'* (OCC 2014b).

The county continues to have a high proportion of population aged over 65, with the number of older people increasing at greater than twice the overall population growth rate (18%).

In the ten years between the 2001 and 2011 census, population growth in Oxfordshire (8%) was well above the average for the south east region (6.7%) and there is increasing inward migration. The county supports approximately 29,000 businesses (OCC 2014a), predominantly in the tourism industry. It is estimated that the county's visitor and cultural economy contributes approximately £3.1b to the local economy (OCC 2014a).

Continued population growth is expected and will be greatest in urban areas, in particular Science Vale (including Didcot, Wantage and Grove), Oxford, Bicester, and Witney (OCC, 2012). Continued population growth in the rural areas is also anticipated due to the increasing life expectancy of the existing population (OCC 2014b). This increasing population increases demands on housing and the existing transport infrastructure, which requires improved connectivity and infrastructure to match new travel patterns.

Areas of proposed growth potential in population, employment and housing (identified as the 'Oxfordshire Knowledge Spine') at Bicester, Oxford City and Science Vale Oxford will require wider local and national transport links (OCC 2014a).

Oxfordshire has a higher number of cars per household than the national average, resulting in an increasing volume of traffic on the roads and county-wide. However, Oxford city has a higher percentage of households with no cars than elsewhere in the county. The high use of private cars in Oxfordshire overall, causes significant emissions of greenhouse gases and noise. It also contributes to community severance and can create unsafe conditions for pedestrians and cyclists, reducing rates of physical activity through these forms of travel (see Section 4.2.2).

4.1.2 Recreation

Oxfordshire's countryside access network is a significant asset to the county, comprising approximately 2,500 miles of public rights of ways (Lepus 2014), National Trails, cycle trails (including parts of the National Cycle Network), areas of common land, together with nature reserves and green spaces for informal recreation.

These areas not only attract visitors to the area, but also provide opportunities for healthier lifestyles for those living and working in Oxfordshire.

Improvements to this established network and the county's Green Infrastructure (GI) have the potential to reduce fossil fuel consumption by providing corridors for walking and cycling. These efficient and reliable modes of transport for shorter journeys can be integrated into healthy daily routines, reducing private vehicle usage and associated air pollution. An increased uptake of walking and cycling can also improve general wellbeing, health and fitness for all ages, as well as help reduce obesity levels (see Section 4.3 'Human Health').

The LTP4 will seek to maximise opportunities to natural green space, making better use of cycle trails and footpaths, and the countryside, by promoting the creation of, improvements to and extensions of the existing countryside access network and GI. Such opportunities, which should consider personal mobility within the county and the 'safe provision' of cycle/walking routes, will help improve 'quality of life'.

Population: Likely evolution of the baseline without LTP4

The population across the region has more than doubled in size since the 1940s and this increase is set to continue. The proportion of people of pension age is expected to rise in line with the general aging trend of the UK population.

Road transport is expected to increase in the county and the reliance on cars as the main mode of transport for commuters will continue unless strategic action is taken. Appropriate spatial planning can help reduce the population's need for journeys.

Traffic increases are likely to cause further community severance increasing isolation and safety fears/accidents among pedestrians and cyclists.

Ongoing development for new housing will increase settlement size, which will exert pressure on the floodplain and transport infrastructure. Increasing development within Oxfordshire will place additional pressure on open spaces, GI and recreational land.

4.2 Human Health

Health considerations have been integrated into the SEA process through the production of a Health Impact Assessment (HIA), which considers the impacts of the LTP4 on relevant health and well-being issues within the county including physical activity, obesity and environmental inequality linked to transport planning, and the distribution of those effects within the population. The HIA, which is provided in Appendix C, examines transport to work and physical activity (walking/cycling opportunities (see Section 4.2.2), community severance and barriers to active travel, road injuries and deaths, air pollution, noise, mental health and well-being, and inequalities and vulnerable groups (e.g. urban/rural areas, deprived communities, ageing population and increasing disability).

The health of those residing in Oxfordshire is generally good and better than the England average (2013c). Only 3.5% of the population declare themselves as being in bad or very bad health, with the largest proportion of these residing in urban areas. Of the eight Output Areas (small census statistic areas) with the highest proportion of residents declaring themselves in bad or very bad health, four are in Oxford City, three in Banbury, and one at Salford, near Chipping Norton (ONS, 2011).

Life expectancy in the county for a person born in 2013 was above the national average at 80.3 years for males and 84.1 years for females (Public Heath Observatories 2013); although there are variations between districts.

Although levels of physical activity are comparable in the south-east to the rest of England, and estimated levels of physical activity and obesity are better than the England average; the Oxfordshire Partnership notes that obesity levels are rising across localities and age groups. Additionally, the Joint Strategic Needs Assessment (OCC 2014b) identifies the increase in 'unhealthy' lifestyles, which leads to preventable disease, as a specific challenge. Promoting healthy lifestyles through physical activity is an effective way of reducing the risk of chronic disease and premature death (Oxfordshire Clinical Commissioning Group et al 2013), and the LTP4 can directly promote this.

The rate of road injuries and deaths is worse in Oxfordshire than the England average; however the total number of road accidents in Oxfordshire has fallen from 3,077 in 2003 to 2,304 in 2012 (OCC, 2013b).

A study combining UK and EU emissions data with models of weather and the ways in which chemicals disperse suggested that 'pollution from overall UK combustion emissions causes approximately 13,000 premature deaths a year, with road transport being the biggest source'. A further 6,000 deaths are estimated to be due to European Union emissions produced outside the UK (NHS 2012). Despite considerable improvements in air quality in the last few decades, air pollution (see Section 4.5) from road transport (in addition to combustion sources) continues to pose respiratory and inflammatory health risks to people. Elevated levels and/or long term exposure to air pollution can lead to a range of serious symptoms affecting human health. Many areas in the UK still fail to meet the health based national air quality objectives and European limit values, particularly for particles and nitrogen dioxide (www.environmental-protection.org.uk/committees/air-quality/air-pollution-and-transport/car-pollution/).

Human Health: Likely evolution of the baseline without LTP4

The numbers of serious or fatal road accidents in the county has been decreasing. However, without a road safety strategy within and beyond the county, some roads may become more dangerous, for example through inappropriate use.

Obesity, lack of exercise and unhealthy lifestyles are problems that face the county and are likely to worsen across the country. Health issues related to low physical activity and obesity are likely to reduce the use of alternative modes of transport rather than the car, compounding traffic growth.

Health issues related to air pollution are likely to increase. The Climate Change Risk Assessment for the 'health' sector (Defra 2012) shows the principal impacts of climate change on human health are expected to come from changing temperatures, ground-level ozone levels and sunlight.

Ongoing development for new housing will increase settlement size, which will exert pressure on the floodplain and transport infrastructure. Increasing development within Oxfordshire will place additional pressure on open spaces, GI and recreational land.

4.3 Noise

The National Noise Incidence Survey 2000 indicated that 55% (+/-3%) of the population in England and Wales live in dwellings that are exposed to noise levels above the day-time threshold recommended by the World Health Organisation. It also indicates that 68% (+/- 3%) of the population live in dwellings exposed to noise levels above the night-time threshold (Grimwood et al, 2000).

The same survey also indicated that an estimated 87% of the population are exposed to general road traffic noise in their homes, an estimated 2% of the population were exposed to noise in their homes from motorways and 12% are exposed to noise from railways (Building Research Institute, 2001).

In 2007/2008 there were 139 complaints per million people in the UK relating to traffic noise (Chartered Institute for Environmental Health, 2008).

The Campaign to Protect Rural England (CPRE) 'Intrusion mapping' shows that in 2007, an estimated 59% of Oxfordshire was disturbed by noise and visual intrusion from major infrastructure such as motorways and A-roads, urban areas and airports factors, compared with almost 70% in the wider South East region (CPRE, 2007).

Significant traffic noise has been considered in the assessment of the LTP4 as it can interfere with the enjoyment of those working, visiting and residing in the county.

Noise: Likely evolution of the baseline without LTP4

The increasing pressure for development and new infrastructure is likely to result in continued traffic growth, which can result in greater proportions of the population being disturbed by transport-related noise. However noise is usually a local issue and can often be mitigated with careful design of infrastructure and abatement technologies.

The overall evolution without the plan is therefore uncertain.

4.4 Air Quality

Air quality across Oxfordshire is generally good but there are a number of areas in the county where elevated levels of pollutants have been detected. Local Air Quality Management within the County is the responsibility of each district council who are required to provide routine reports on air quality in each district in relation to air quality standards and objectives, as defined in the UK Air Quality Strategy. Exceedances of air quality objectives require declaration of Air Quality Management Areas (AQMAs), along with Action Plans produced in conjunction with OCC as the transport authority.

There are currently nine declared Air Quality Management Areas (AQMAs) in Oxfordshire (Abingdon, Banbury, Botley, Oxford City, Chipping Norton, Henley, Wallingford, Watlington and Witney). In addition a number of other sites are currently being investigated in detail to see if further declarations are required, as shown on Figure 4.1.

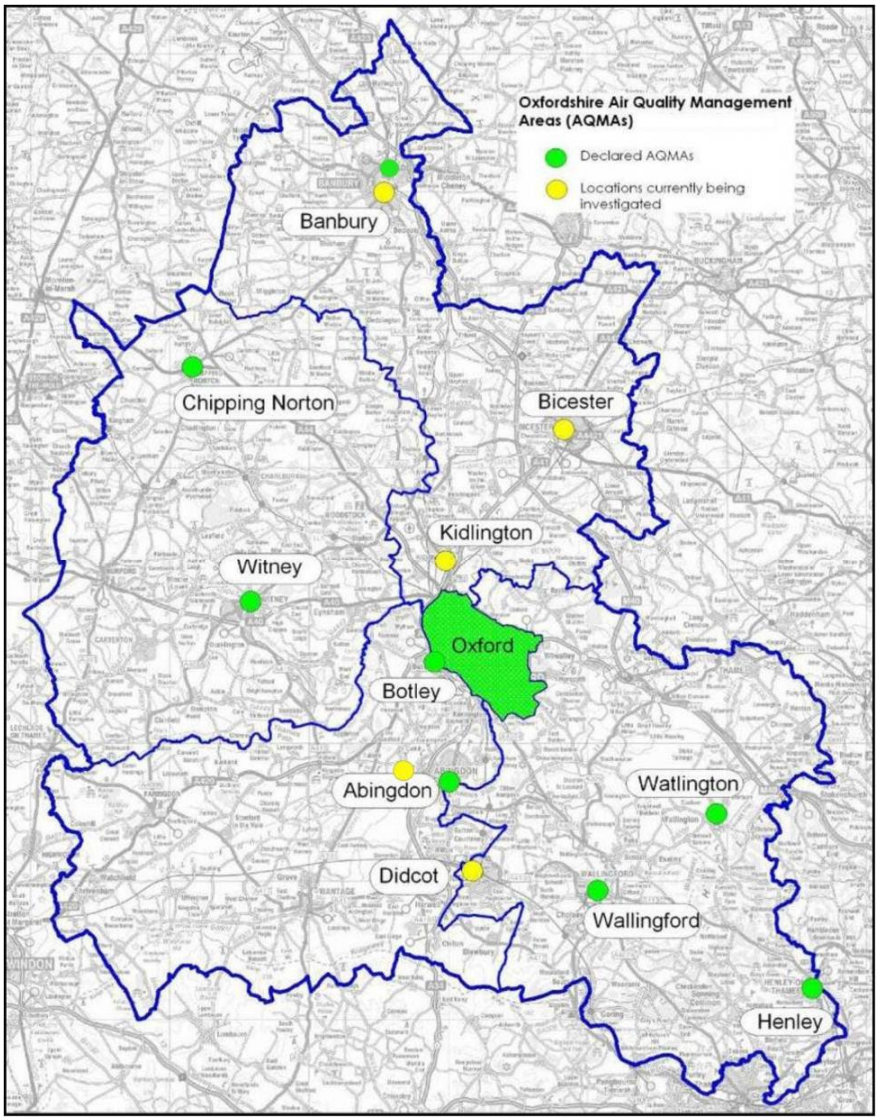
Air pollution in Oxfordshire is monitored across the county including three sites within the UK Automatic Urban and Rural Network; one in Oxford city centre, one south of Oxford city and the other in Harwell in the Vale of White Horse. A further range of automatic and non-automatic monitoring is carried out in order to determine compliance with air quality objectives. Monitoring by Cherwell, Vale of White Horse and South Oxfordshire district councils considered that additional AQMAs may need to be declared in the future, in Bicester and Kidlington (Cherwell District Council, 2014), Marcham and Didcot.

In all the AQMAs in Oxfordshire, the declaration has been made on the basis of the annual average level (and also in some cases such as Cherwell, the hourly mean) of nitrogen dioxide [NO_2]. Oxford City Council is also currently investigating whether a further declaration is required on the basis of hourly mean concentrations of nitrogen dioxide in Oxford city centre.

The trend for a reduction in emissions per vehicle as the vehicle stock is replaced by newer vehicles meeting higher emissions standards has not taken place as expected. The relative growth in numbers of newer diesel vehicles with emission control technology, have given rise to higher direct emissions of nitrogen dioxide into vehicle exhausts. The result has been detected as some increases in localised pollution levels in urban centres

and a failure of pollution levels to decrease at the rate predicted. Any downward trend can be offset locally if traffic growth exceeds reductions due to improvements in technology; overall emissions increases are even more likely if traffic growth results in increased congestion. However, traffic pollution has become worse and is now a major threat to lung health and a contributor to climate impacts.

Figure 4.1: Air Quality Management Areas in Oxfordshire (OCC 2011)



The most troublesome pollutants are:

- oxides of nitrogen;
- particles;
- volatile organic compounds; and
- carbon monoxide.

In comparison to many other countries, air pollution levels in the UK are low, although in parts of major cities, including parts of central Oxford, particularly near busy roads, they are high enough to be of concern. The local pollution picture reflects a complex mixture of sources and distribution of pollutants. They contribute not only to local air pollution impacts, but also to increasing ground levels of ozone, adding to local and global climate

impacts. Predictions of future emissions have to include consideration of future traffic levels and composition, and the manner of future traffic flow through an area.

Due to the long distance nature of some air pollutants, any potential changes in air quality that result from implementing the Oxfordshire LTP4 are not likely to be confined to Oxfordshire alone. Consequently, the SEA considers cross-boundary effects, where possible.

Air Quality: Likely evolution of the baseline without LTP4

Whilst the vehicle fleet in general is getting cleaner with improved emissions standards, the projected growth for Oxfordshire is likely to lead to increased traffic volumes and greater traffic congestion unless strategic action is undertaken.

This in turn could lead to more AQMAs being declared as the increases in traffic and congestion outweigh improvements in emissions standards.

4.5 Climatic Factors

4.5.1 Greenhouse Gas Emissions

Whilst national data shows an overall fall in greenhouse gas emissions in the UK since 1990, UK emissions of carbon dioxide (CO_2) from road transport have increased, against the trend in emissions from other sectors.

In 2009, CO_2 emissions in Oxfordshire were estimated to be 8.1tonnes of CO_2 per capita (tCO_2), declining from $9tCO_2$ per capita in 2007; however this remained higher than the national and regional average ($7.4tCO_2$ and $6.9tCO_2$ respectively) (DECC, 2009).

In 2011, CO_2 emissions in Oxfordshire were estimated to have reduced further to $6.8tCO_2$. Regional data released in 2011 also indicated that domestic sources accounted for 31% of the county's total CO_2 emissions and road transport for 29% (DECC, 2011). Traffic and associated congestion continues to increase in Oxfordshire, which will have implications for county emissions of CO_2. The LTP4 considers ways in which carbon emissions can be reduced in the county and alternative 'cleaner' modes of transport.

4.5.2 Climate Change

There is increasing concern that climate change is accelerating towards higher temperatures. It is now generally accepted that global warming is taking place, with global mean air temperatures having increased by 0.3 to 0.6^0C during the 20th century and having risen at about 0.2^0C/decade over the past 25 years (UKCIP, 2009). Temperatures for Central England have seen a more rapid rise than that of the global average land-surface temperature over the same period, and considerably faster than that of the global mean temperature.

The recent Intergovernmental Panel on Climate Change (IPCC) report (IPCC 2013) indicates that more than half the increase in global surface temperatures from 1951 to 2010 is attributable to human activities, which underlies the role of fossil fuel burning in climate change.

The UK Climate Impacts Programme (UKCIP) projects that the UK climate is likely to experience hotter/drier summers, warmer/wetter winters and more weather extremes, which will increase pressure on transport assets within Oxfordshire. Studies in the South East by UKCIP indicate that by 2080 (under a medium emissions scenario), there will be an increase in winter mean temperature of 3ºC, an increase in summer mean temperature of 3.9^0C, an increase in winter mean precipitation by 22% and a reduction in summer mean precipitation of 22%.

Climatic Factors: Likely evolution of the baseline without LTP4

Greenhouse gas emissions are currently growing, however government and international targets indicate significant cuts in these emissions by 2020.

Without action, the contribution of transport to CO_2 emissions (and associated climate change) will continue to rise.

It is predicted that Oxfordshire and the South East will experience warmer, drier summers and warmer, wetter winters.

Extreme weather events such as droughts and flooding are predicted to become more frequent with increasing demands on maintenance of transport infrastructure such as repairs to structures, reinforcements to embankments and additional drainage requirements.

4.6 Biodiversity, Flora and Fauna

4.6.1 International Conservation Sites (Natura sites)

There are no Special Protection Areas or Ramsar sites in Oxfordshire. Seven Special Areas of Conservation (SACs) lie wholly or partly within Oxfordshire (see Table 4.2 and Figure 4.2).

Table 4.2: Special Areas of Conservation in Oxfordshire

SAC name	SAC Area (ha)	Component SSSIs
Oxford Meadows	265.89	Cassington Meadows
		Pixey & Yarnton Meads
		Port Meadow with Wolvercote Common and Green
		Wolvercote Meadows
Little Wittenham	68.76	Little Wittenham
Hartslock Wood	34.24	Hartslock
Hackpen Hill	35.83	Hackpen, Warren and Gramp's Hill Downs
Cothill Fen	43.55	Cothill Fen
Aston Rowant	127.75	Knightsbridge Lane
Chilterns Beechwoods	1276.48	Ashridge Commons and Woods (Bucks/ Herts)
		Ellesborough and Kimble Warrens (Bucks)
		Tring Woodlands (Herts)
		Windsor Hill (Bucks)
		Bradenham Woods, Park Wood and the Coppice (Bucks)
		Bisham Woods (Berks)
		Hollowhill and Pullingshill Woods (Bucks)
		Naphill Common (Bucks)

4.6.2 Implications of the LTP4 under the Habitats Regulations: HRA Screening

A Habitat Regulations Assessment (HRA) Screening Report has been prepared for the LTP4 to fulfil the requirements of the Conservation of Habitats and Species Regulations 2012 (as amended) and is provided in Appendix D.

The assessment identified uncertain impacts on the following internationally designated conservation sites (European sites) from delivery of some elements of the LTP4, prior to mitigation: -

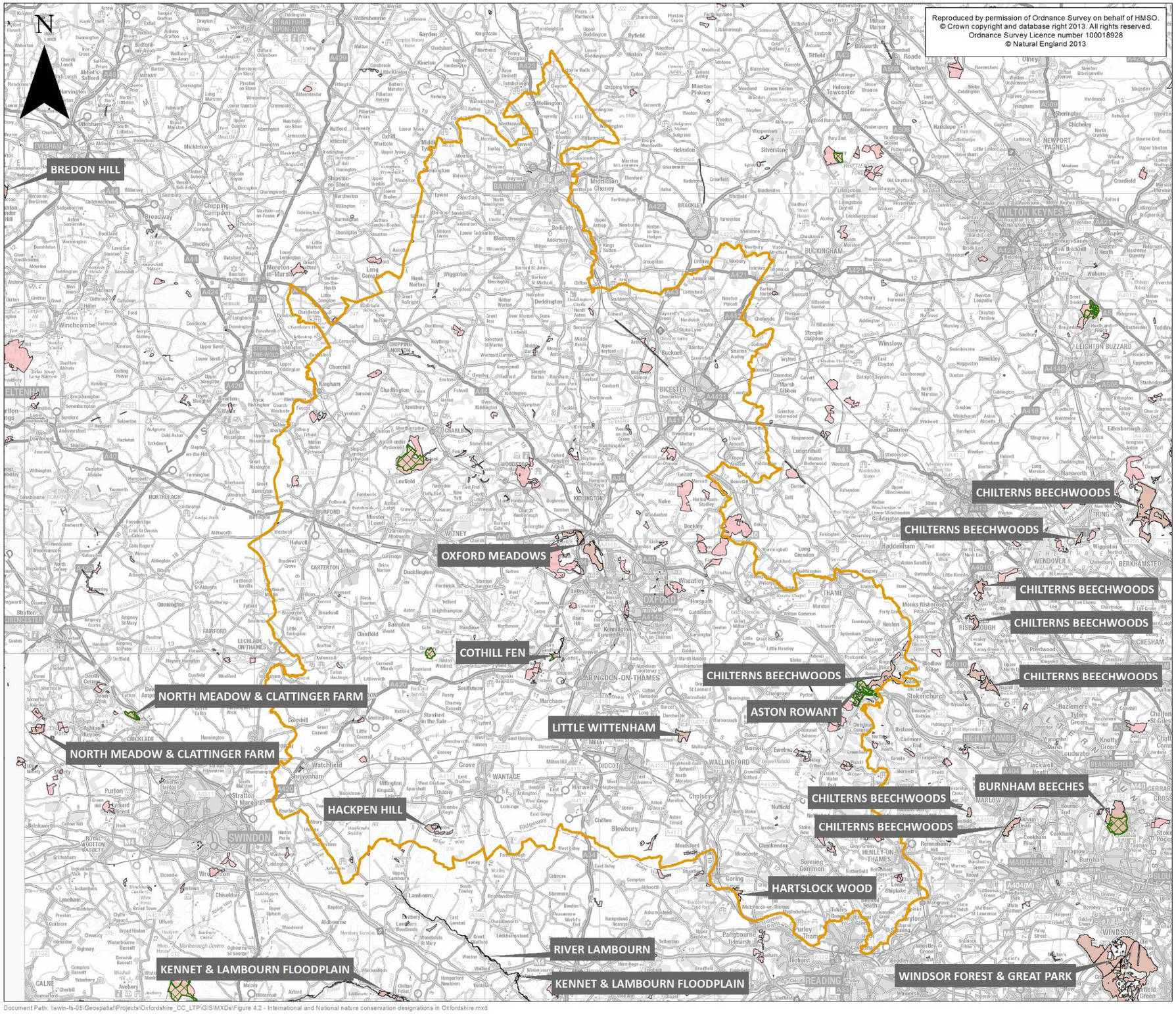
- **Oxford Meadows SAC** - Disruption to hydrological regime from changes in run-off regimes, spray and water drainage and nutrient enrichment from NO_x deposition from road transport infrastructure construction and changes in traffic flows and volumes, resulting from elements of the Oxford Transport Strategy. Such changes could affect the lowland hay meadows and creeping marshwort.
- **Little Wittenham SAC** – Loss or fragmentation of habitat that may support Great crested newts, resulting from delivery of some elements of the Science Vale Strategy.

Following the implementation of strategic level mitigation, the HRA Screening Report concluded no likely significant effects on any European sites. However, it is recommended that project level HRA is undertaken (in consultation with Natural England) when further details of the delivery of transport schemes within the Oxford and Science Vale Strategies are available, to ensure compliance with the Habitats Regulations.

4.6.3 National Conservation Sites

There are 105 Sites of Special Scientific Interest (SSSIs) in Oxfordshire and nine National Nature Reserves (NNRs) - see Figure 4.2. As shown in Table 4.2, 14 of these are constituent parts of SACs but the majority are separate entities. Approximately 99% of SSSI units within Oxfordshire are in favourable or recovering favourable condition (Natural England, 2013).

Figure 4.2: International and National Nature Conservation Designations in Oxfordshire



Key

- Oxfordshire Local Authority Boundary
- Special Areas of Conservation
- National Nature Reserve
- Site of Special Scientific Interest

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Kilometres

Rev	By	Chkd	Apprvd	Date	Description

Client
Oxfordshire County Council
County Hall
New Road
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OX1 1ND

OXFORDSHIRE COUNTY COUNCIL

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CH2MHILL.

Project :
Oxfordshire County Council LTP4: SEA

Drawing :
International & National nature conservation designations in and around Oxfordshire

Drawn By :	Tim Hughes	Date: 07/04/2014
Checked By :	Corinna Morgan	Date: 07/04/2014
Approved By :	John Fox	Date: 07/04/2014

Drawing No. : Figure 4.2
Revision -

Drawing Scale : 1:310,000

Document Path: \\swin-fs-05\Geospatial\Projects\Oxfordshire_CC_LTP\GIS\MXDs\Figure 4.2 - International and National nature conservation designations in Oxfordshire.mxd

4.6.4 Local Conservation Sites

Figure 4.3 shows the location of local nature conservation designations across Oxfordshire. This includes Local Nature Reserves (statutory sites), Local Wildlife Sites, ancient woodland, Sites of Local Importance for Nature Conservation (SLINCs) and Conservation Target Areas (target areas for conservation action in the county identified by the Oxfordshire Wildlife and Landscape Study (OWLS)).

The UK priority habitats within Oxfordshire comprise:

- Grasslands: lowland meadow, lowland calcareous grassland and lowland dry acid grassland.
- Woodlands: lowland wood pasture and parkland, lowland beech and yew woodland, lowland mixed deciduous woodland, wet woodland and traditional orchards.
- Wetlands: floodplain grazing marsh, fens, eutrophic standing waters, ponds, reedbeds and rivers.
- Other: hedgerows, open mosaic habitats, arable field margins and lowland heathland.

These UK priority habitats correspond to those identified under Section 41 of the Natural Environment and Rural Communities Act 2006, as habitats of principle importance.

The LTP4 has been developed to ensure that its measures do not affect the conservation status of nature conservation sites and UK priority habitats and species i.e. by the fragmentation, damage or loss of habitats by roads, increasing recreational pressures on sensitive flora/fauna, and elevating air and noise pollution or polluting aquatic environments, for example through road surface runoff. As the LTP4 is delivered, it will also need to ensure its measures align with guidance on the management of road verges (e.g. as provided for Road Verge Nature Reserves in Oxfordshire).

Delivery of the LTP4 also has potential to support improvements for biodiversity, for example, by incorporating principles on creating new biodiversity areas or restoring existing ones, implementing WFD measures, and supporting linkages between biodiversity sites as part of plans for improving GI and fostering 'living landscapes', as promoted by the UK wildlife trusts.

Biodiversity: Likely evolution of the baseline without LTP4

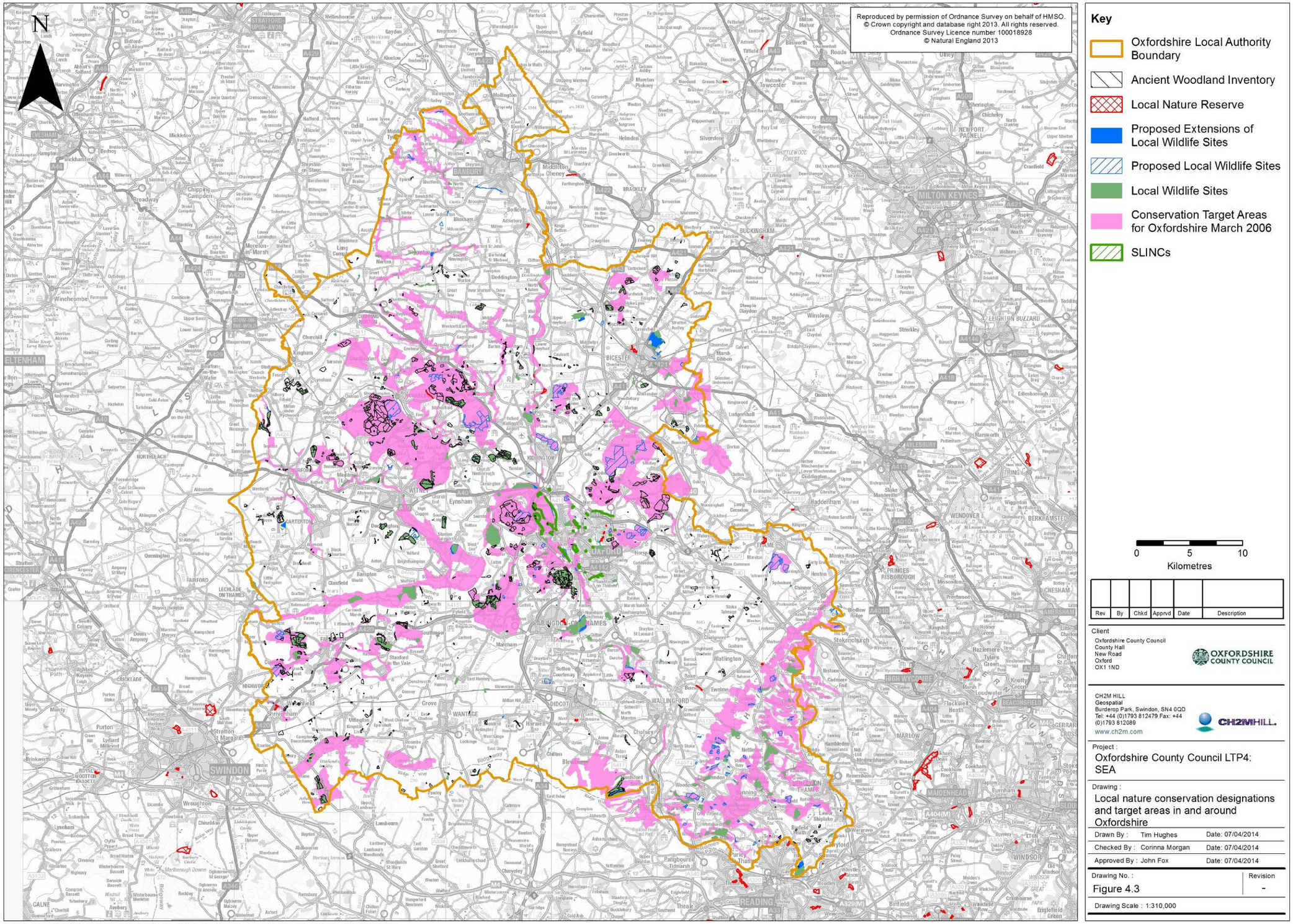
Trends in biodiversity can be due to a wide variety of factors, including climate change and land management activities. Climate change is likely to affect all habitats, for example through changes in flood risk from all sources, changes in the frequency of flooding or flow volumes to water dependant habitats. The spread of invasive species is also likely to continue.

The continued pressure for development and new infrastructure is likely to result in further loss and fragmentation of habitats and associated species.

More stringent protection of conservation sites strengthened through the government's 2020 biodiversity strategy which seeks to halt biodiversity losses by 2020 and beyond.

If there was no co-ordinated transport plan at a strategic level it is possible that new transport plan schemes or plans could have an adverse impact on wildlife at a local and strategic level.

Figure 4.3: Local Nature Conservation Designations in Oxfordshire



Document Path: \\swin-fs-05\Geospatial\Projects\Oxfordshire_CC_LTP\GIS\MXDs\Figure 4.3 - Local nature conservation designations in Oxfordshire.mxd

4.7 Water

4.7.1 Water Framework Directive (WFD)

The EU WFD (2000/60/EC) came into force in 2000 and was transposed into law in England and Wales by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. It combines water quantity and water quality issues in an integrated approach to the management of all water bodies at the river basin level. Water bodies include rivers, lakes, estuaries ("transitional" water bodies), coastal waters and groundwaters. The WFD effectively supersedes all EU environmental water-related legislation such as the Fisheries and Dangerous Substances Directives, and now drives the existing licensing and consenting framework in England.

The Directive sets out a framework for each Member State to establish River Basin Districts (RBD), for each of which a River Basin Management Plan (RBMP) must be developed and delivered. Each RBMP sets out the objectives for the water bodies within it. Oxfordshire falls largely within the Thames RBMP (Environment Agency 2009), which outlines the actions required to enable the water bodies to achieve GES/ GEP. Two river water bodies fall within the Anglian RBMP. The RBMPs have been used to guide the assessment of the implications of the proposed LTP4 on the water bodies that might be affected by it.

The WFD requires that all natural water bodies achieve good chemical status and good ecological status (GES), and Good Ecological Potential (GEP) for artificial and heavily modified water bodies (HMWB i.e. physical alterations by human activity that substantially change its hydrogeomorphological character), by set deadlines ranging from 2015 to 2027 dependent on the specific issue.

The WFD sets out a number of environmental objectives against which plans and projects should be assessed, as follows:

- WFD1 - No changes affecting high status sites;
- WFD2 - No changes that will cause failure to meet surface water good ecological status / potential or that will result in a deterioration of surface water ecological status / potential;
- WFD3 - No changes which will permanently prevent or compromise the environmental objectives being met in other water bodies;
- WFD4 - No changes that will cause failure to meet good groundwater status or result in a deterioration in groundwater status.

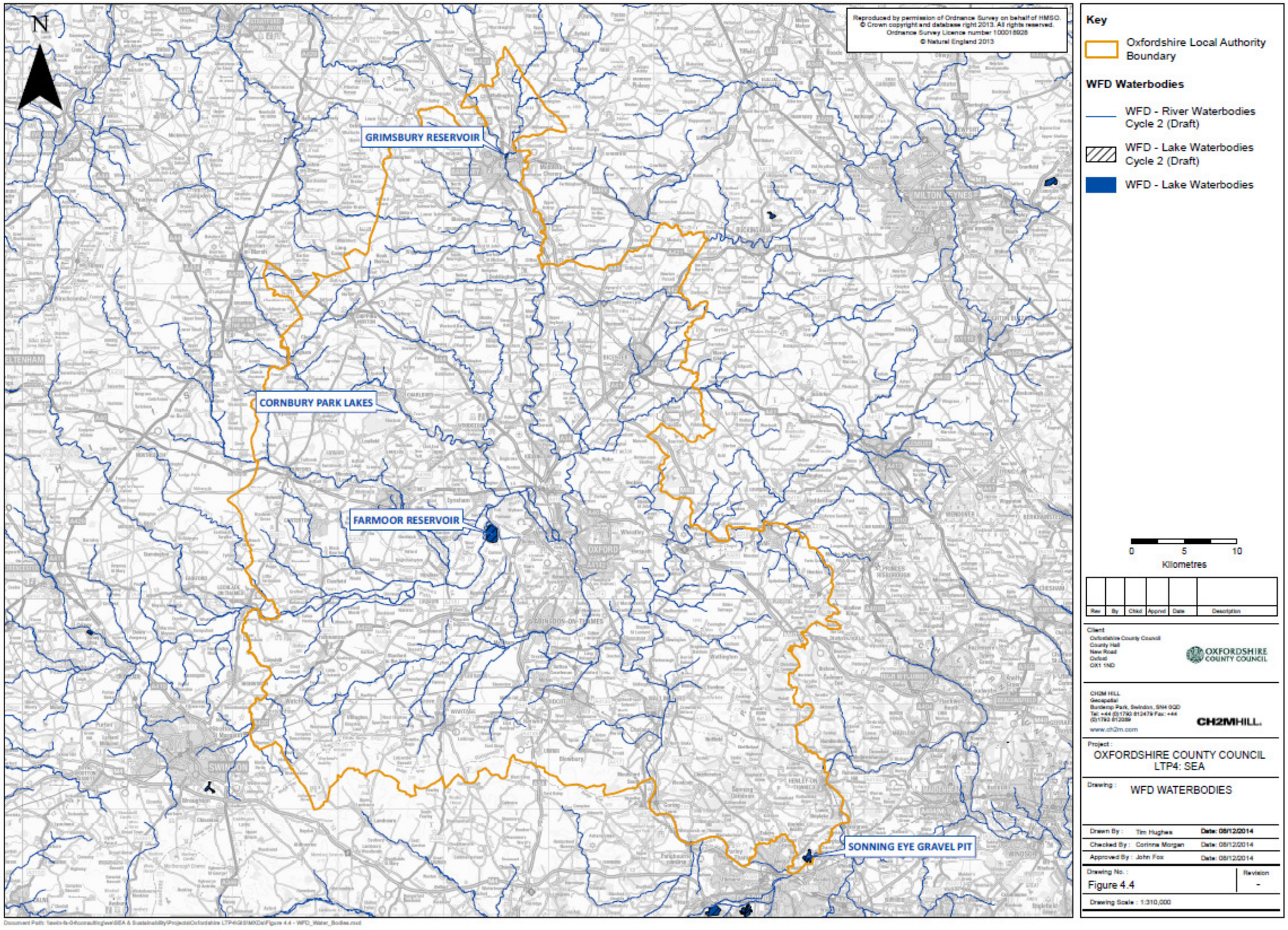
Any activity which has the potential to impact on a water body's ecological status or potential (either directly impacting biological elements, or changing physico-chemical, morphological, hydrological or chemical conditions) needs to be assessed against the objectives of the WFD. An assessment of the proposed LTP4 has therefore been undertaken to determine whether it might result in deterioration in the status of any water body or impede any water body from reaching future GES or GEP, as appropriate.

Water Bodies in the Study Area

The water bodies (as defined in the Thames and Anglian RBMPs) located within or that intersect the Oxfordshire county boundary are shown on Figure 4.4, as follows: -

- 95 river water bodies
- 4 lake water bodies: Grimsbury Reservoir, Cornbury Park Lakes, Farmoor Reservoir and Sonning Eye Gravel Pit.

Figure 4.4: River and Lake Water Bodies



4.7.2 Surface Water Quality

River water quality in Oxfordshire is variable between districts and between parameters. In 2009, 23% of surface waters in the Thames River Basin were classified to be good or better ecological status/ potential and 29% assessed surface waters as being at good or better biological status. This assessment included 571 surface water bodies assessed for ecological status/ potential and 362 for biological status.

On a county level it was not possible to determine what percentage of water pollution incidents could be attributed to transport but for England and Wales, 4% of all serious incidents are related to transport.

4.7.3 Flood risk

Large areas of Oxfordshire lie within 'main river' catchments and are prone to flooding. Approximately 12% of land in Oxfordshire is within a floodplain (Lepus 2014), including central areas of Oxfordshire, around Witney (from the River Windrush), Abingdon (River Ock and River Thames) and Oxford (from the River Thames and River Cherwell) (OCC 2013c). The Oxford Flood Risk Management Strategy (Environment Agency 2010) includes actions for a conveyance channel around the west and south of Oxford, which is currently being pursued by relevant partners in Oxfordshire.

In the past decade, Oxfordshire has experienced four major flood incidents (OCC 2014b), which have resulted in significant damage to property and potential flooding of some key transport links. OCC has been pro-active in responding to flood risk, addressing key issues identified during recent flood events and the potential impact of new development by advocating the implementation of Sustainable Drainage Systems (SuDS) (OCC, 2013c). The draft Oxfordshire Flood Risk Management Strategy (OCC 2014d) for consultation identifies areas at flood risk, provides a vision for how flood risk will be dealt with in Oxfordshire and measures to keep key transport links clear.

Water: Likely evolution of the baseline without LTP4

Water resources within Oxfordshire are under increasing pressure from a growing population and increased demand for wastewater treatment and drinking water.

Increasing traffic volumes are likely to lead to greater levels of diffused pollution from surface-water run-off on older roads and increasing pollution of adjacent water bodies.

Winter flooding and the risk of drought in summers is predicted to increase as a result of the effects of climate change. These changes could affect water supply or treatment facilities, resulting in loss of service or contamination of water supplies.

The Environment Agency is aiming to improve water quality to ensure water bodies achieve GES/GEP in line with the WFD through the Thames RBMP, and maintain this status into future years. The programme of measures required to achieve GES/GEP under the WFD by 2015 will drive improvements in the water environment.

Additionally, the UK CCRA for the water sector (UK CCRA 2012) shows that climate change is likely to cause the following impacts on water nationally:

River flows - By the 2080s, reductions in summer river flows may be significant across the UK, with the largest decreases in southern and eastern England;

Water supply - By the 2080s almost the whole UK population may be living in areas affected by a supply-demand deficit unless significant action is taken. By the 2050s, there may be a significant decrease in the number of rivers where sustainable water abstraction is possible and this situation may grow more severe by the 2080s;

Water quality - This depends to a large extent on water volume and is therefore influenced by river flows. For example, pollutants are less likely to be diluted by lower summer flows. Higher water temperatures may also contribute to changes in water quality; and

Assets and Infrastructure - Many UK sewers are part of combined systems that carry both sewerage and surface water runoff. When their carrying capacity is exceeded by heavy rainfall, or they become blocked, they overflow or 'spill'. Although heavily influenced by socio-economic factors (e.g. population change), significant increases in spill frequency may result from climate change due to changes in rainfall patterns (e.g. more heavy winter precipitation).

4.8 Geology and Soils

The study area is underlain by a series of rocks of Jurassic and Cretaceous age that are gently tilted to the south-east (www.oxfordshire.gov.uk/cms). There are 31 SSSIs notified for their geological interest and 45 Local Geology Sites that reflect the geological importance of Oxfordshire.

Approximately 78% of the land in Oxfordshire is agricultural (see Figure 4.4), although the area of agricultural land decreased from 195,510ha in 2007 (OCC 2013c) to 192,410ha in 2008.

Oxfordshire comprises 20% of Grade 2 land (very good quality for crop production), 55% of Grade 3 land (land of moderate quality), 20% of Grade 4 land (poor quality), with areas of non-agricultural/ urban land in the centre of the county.

Each of the five district councils are obligated by law to keep a contaminated land register. Very few sites have been put on the registers in the county. However, there are a large number of potentially contaminated sites that require further investigation.

In West Oxfordshire, approximately 40% of development is on previously developed land, with 60% on greenfield sites, due to the lack of available brownfield sites (West Oxfordshire District Council, 2009). There are no data on potentially developable brownfield land or contaminated land in Oxfordshire collected at a county level.

Geology and Soils: Likely evolution of the baseline without LTP4

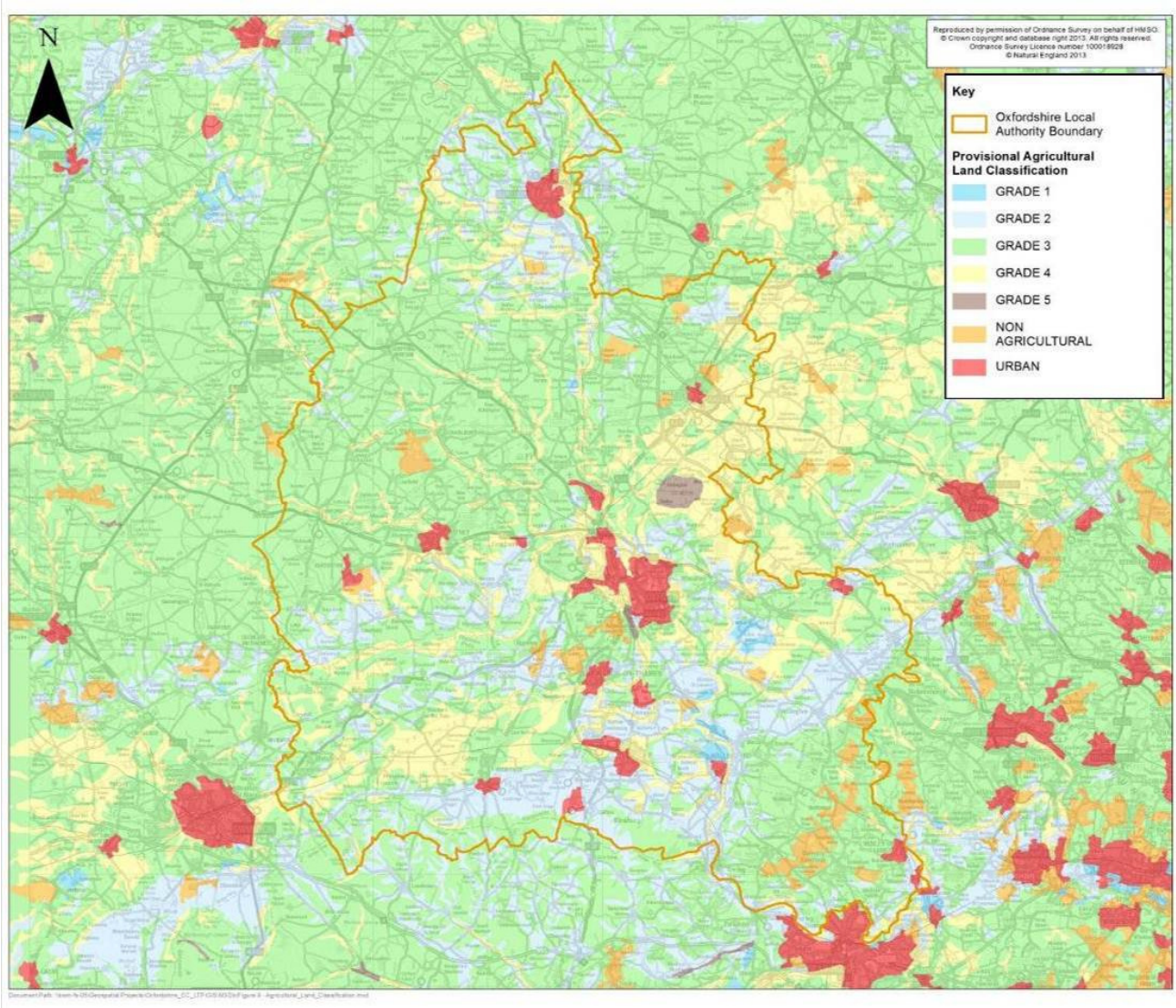
It is likely that soil erosion in the county will continue due to surface water flash flooding and other causes.

Compaction and sealing will also continue to occur, for example through an increase in developed areas and impermeable surfaces.

The continued pressure for development and new infrastructure is likely to result in further Greenfield development and loss of farmland.

Increased traffic volumes are likely to lead to greater levels of diffused pollution from surface-water run-off on older roads, causing further pollution to adjacent soil resources.

Figure 4.4: Agricultural Land Classification in Oxfordshire



4.9 Material Assets

The term "material assets" is not defined in the SEA Directive. For the purposes of this SEA, the term is used in relation to the following receptors not discussed in other sections of this report:

Critical infrastructure - these are assets that are essential for the functioning of a society and economy and include the road and rail network, energy (e.g. power stations including Didcot and associated decommissioning of Didcot A, sub-stations) and critical services (e.g. public transport system, emergency services, schools, hospitals, cemeteries etc.). Oxfordshire supports key strategic transport routes, which impact on air quality in the county, including the M40, A40, A44, A43, A420 and A34. Traffic on Oxfordshire's roads is steadily increasing and Oxford City is becoming increasingly important as a nationally important transport hub. The county also supports major rail infrastructure including main and branch railway lines.

The UK Climate Change Risk Assessment (Defra 2012) shows that flooding as a result of climate change is likely to pose an increasing threat to critical infrastructure. This includes increased risk to transport networks, as well as energy supplies, hospital and schools. There is a high risk of confidence in the 'significant likelihood of

flooding' risk posed to roads and a medium level of confidence in relation to power stations, hospitals and schools (Defra, 2012).

Mineral resources - The transport sector uses mineral resources in the construction of new infrastructure as well as fuels for vehicles. Fossil fuels are non-renewable and subject to price fluctuations on the global market due to changes in supply and demand. Dependence on car use has high resource requirements since significant land is required to accommodate traffic growth while continued capacity improvements are required on the transport network such as road widening and the provision of parking infrastructure. Increased uptake of passenger transport and walking and cycling has lower overall demands on resources per person.

Waste management - this an indicator of the inefficient use of resources.

Material Assets: Likely evolution of the baseline without LTP4

Without a strategic plan to stem road traffic, congestion and pollution, traffic numbers would be likely to rise at a faster rate than the current rate of increase. The heavy reliance on Oxfordshire's road and railway network and comprehensive public transport system will continue with increased population growth.

The condition of many roads and footpaths will deteriorate. Increasing occurrence of extreme weather events as a result of climate change is likely to increase the need for repairs to structures.

Renewable energy is likely to form a greater part of the county's energy mix as technology advances and policies to promote their uptake mature.

The volume of waste generated is likely to increase and place extra demand on the county's roads.

4.10 The Historic Environment

Figure 4.5 shows the location of designated archaeological sites and heritage across Oxfordshire.

Oxfordshire has a rich archaeological resource, with Blenheim Palace UNESCO World Heritage Site (WHS), 55 Registered Parks and Gardens, nearly 13,000 listed buildings, 242 Conservation Areas, 2 historic battlefields and approximately 350 Scheduled Monuments.

OCC is responsible for maintaining the Historic Environment Record (HER), which currently holds information on more than 13,000 archaeological remains.

There is considerable archaeological potential elsewhere in the county, which is not designated, and on sites where information is presently limited. Historic town and village centres, greenfield and previously developed sites may all contain surviving or buried archaeology.

Delivery of the LTP4 will consider how best to accommodate the proposed changes and proposed economic growth in the county while sustaining the significance and character of the heritage assets.

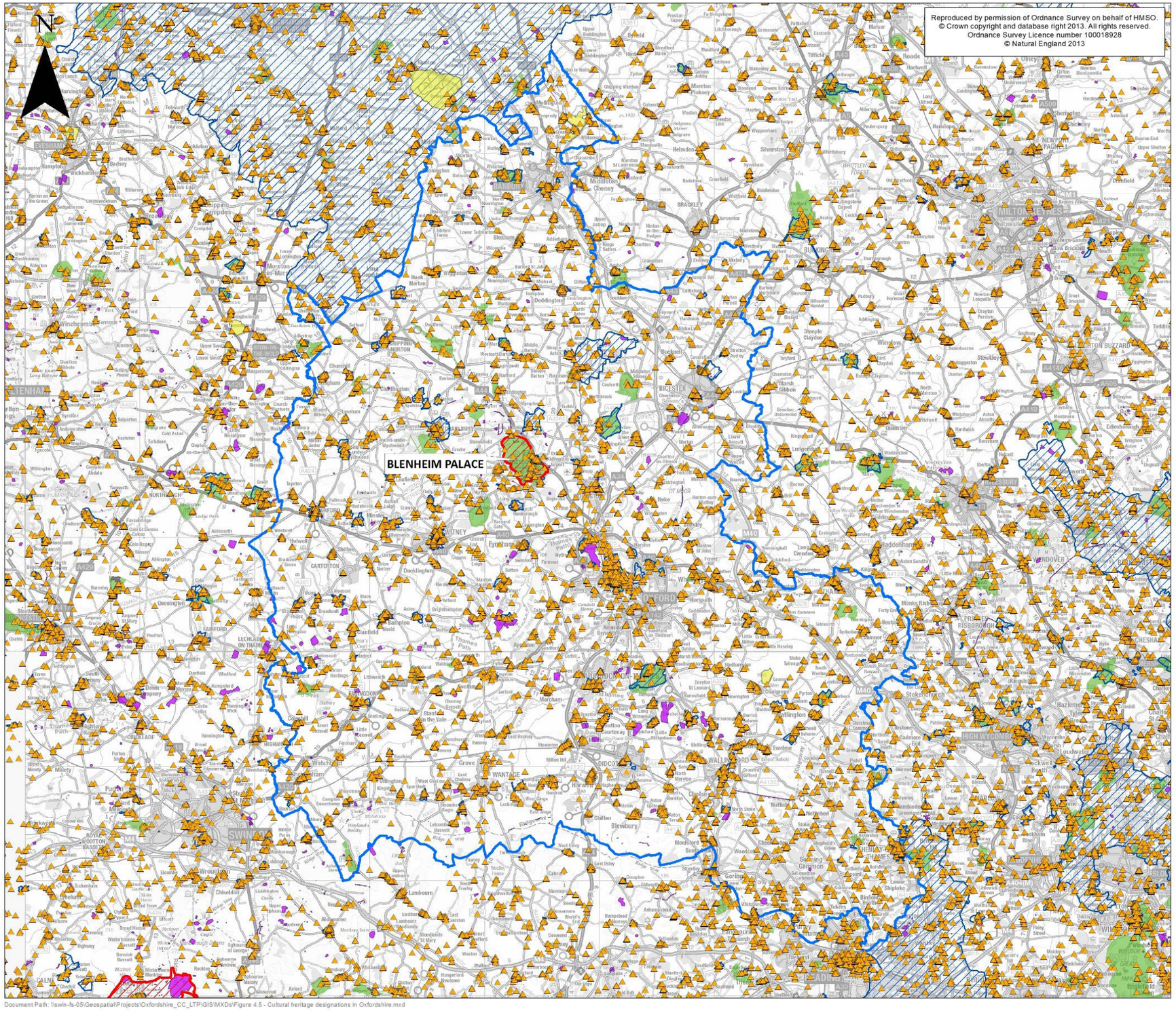
Historic Environment: Likely evolution of the baseline without LTP4

The historic environment is likely to remain an important economic, social and cultural feature of the county and the management and restoration of heritage assets is likely to continue. However, increasing traffic levels will impact upon the amenity and quality of the archaeological sensitivity of streetscapes and the cultural environment.

Air and noise pollution, physical or chemical erosion and pressures from an increasing population and important tourist industry will continue to increase pressure on Oxfordshire's cultural heritage.

The archaeological and architectural assets in Oxfordshire (and their settings) will continue to be threatened by development pressures as well as inadequate management of features, landscapes or nearby resources, neglect and inappropriate development within or near historic features or landscapes.

Figure 4.5: Cultural Heritage Designations in Oxfordshire



Key

- Oxfordshire Local Authority Boundary
- Listed Buildings
- Historic Battlefield
- Conservation Area
- Registered Park & Garden
- Scheduled Monument
- Bleinham Palace World Heritage Site

0 5 10
Kilometres

Rev	By	Chkd	Apprvd	Date	Description

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Project :
Oxfordshire County Council LTP4: SEA

Drawing :
Cultural heritage designations in and around Oxfordshire

Drawn By :	Tim Hughes	Date: 07/04/2014
Checked By :	Corinna Morgan	Date: 07/04/2014
Approved By :	John Fox	Date: 07/04/2014

Drawing No. : Figure 4.5
Revision -

Drawing Scale : 1:310,000

Document Path: \\swin-fs-05\Geospatial\Projects\Oxfordshire_CC_LTP\GIS\MXDs\Figure 4.5 - Cultural heritage designations in Oxfordshire.mxd

4.11 Landscape

4.11.1 Landscape Character

The baseline landscape character of Oxfordshire has been assessed by OCC, Natural England and The Earth Trust in the Oxfordshire Wildlife and Landscape Study (OWLS), accessed in April 2014 (https://www.oxfordshire.gov.uk/cms/content/oxfordshire-wildlife-and-landscape-study-owls). The landscape is classified as lying within 9 Regional Character Areas (corresponding to Countryside Character Areas) and has been divided into 24 landscape types:-

1. Alluvial Lowlands
2. Chalk Downlands and Slopes
3. Clay Vale
4. Estate Farmlands
5. Farmland Hills
6. Farmland Plateau
7. Farmland Slopes & Valley Sides
8. Lowland Village Farmland
9. Pasture Hills
10. River Meadowlands
11 Rolling Clayland
12. Rolling Farmland
13. Rolling Village Pastures
14. Settled Ancient Pastures
15. Terrace Farmland
16. Upstanding Village Farmland
17. Vale Farmland
18. Wooded Downland
19. Wooded Estateland
20. Wooded Estate Slopes and Valley Sides
21. Wooded Farmland
22. Wooded Hills
23. Wooded Plateau
24. Wooded Pasture Valleys and Slopes

The value and sensitivity of these landscape character types, together with their capacity to accommodate new development in Oxfordshire varies throughout the study area.

4.11.2 Landscape Designations

Landscape designations (see Figure 4.6) are applied to areas of special value at international, national, regional or local level in response to particular qualities or historical or cultural associations. Almost 75% of Oxfordshire's landscape has been designated and comprises: -

- Green Belt: governed by the National Planning Policy Framework (NPPF) (DCLG 2012) and local planning policy to prevent urban sprawl by keeping land permanently open and safeguarding the countryside from development.
- Areas of Outstanding Natural Beauty (AONB): national designation to conserve and enhance the natural beauty of an area. The designation gives formal recognition to an area's landscape importance and allows for the development of communities and economic activity. However development is only permitted in an AONB in ways that enhance its landscape character. The NPPF emphasises the need to conserve AONBs. There are three AONBs that partly lie within Oxfordshire (see Figure 4.6) and cover 24% of the county; the Chilterns, the Cotswolds and the North Wessex Downs.
- Area of High Landscape Value: local designation to protect locally important landscapes. Approximately 14% of Oxfordshire is designated as an Area of High Landscape Value.

Oxfordshire's settlement pattern provides few opportunities for major re-use of land within existing built up areas. This has led to a high proportion of development being accommodated on greenfield sites on the edge of the County Towns (Banbury, Bicester, Didcot and Witney).
According to CPRE, light pollution is rapidly increasing in the south-east and 'there are no dark skies left in Oxfordshire'. Lighting, which can be integral to some transport policies, can affect the quality of people's lives, by providing a greater feeling of security and safety, while also limiting views of the night sky.

Landscape: Likely evolution of the baseline without LTP4

It is likely that increasing urbanisation will increase pressure on the skyline and viewpoints around Oxfordshire.

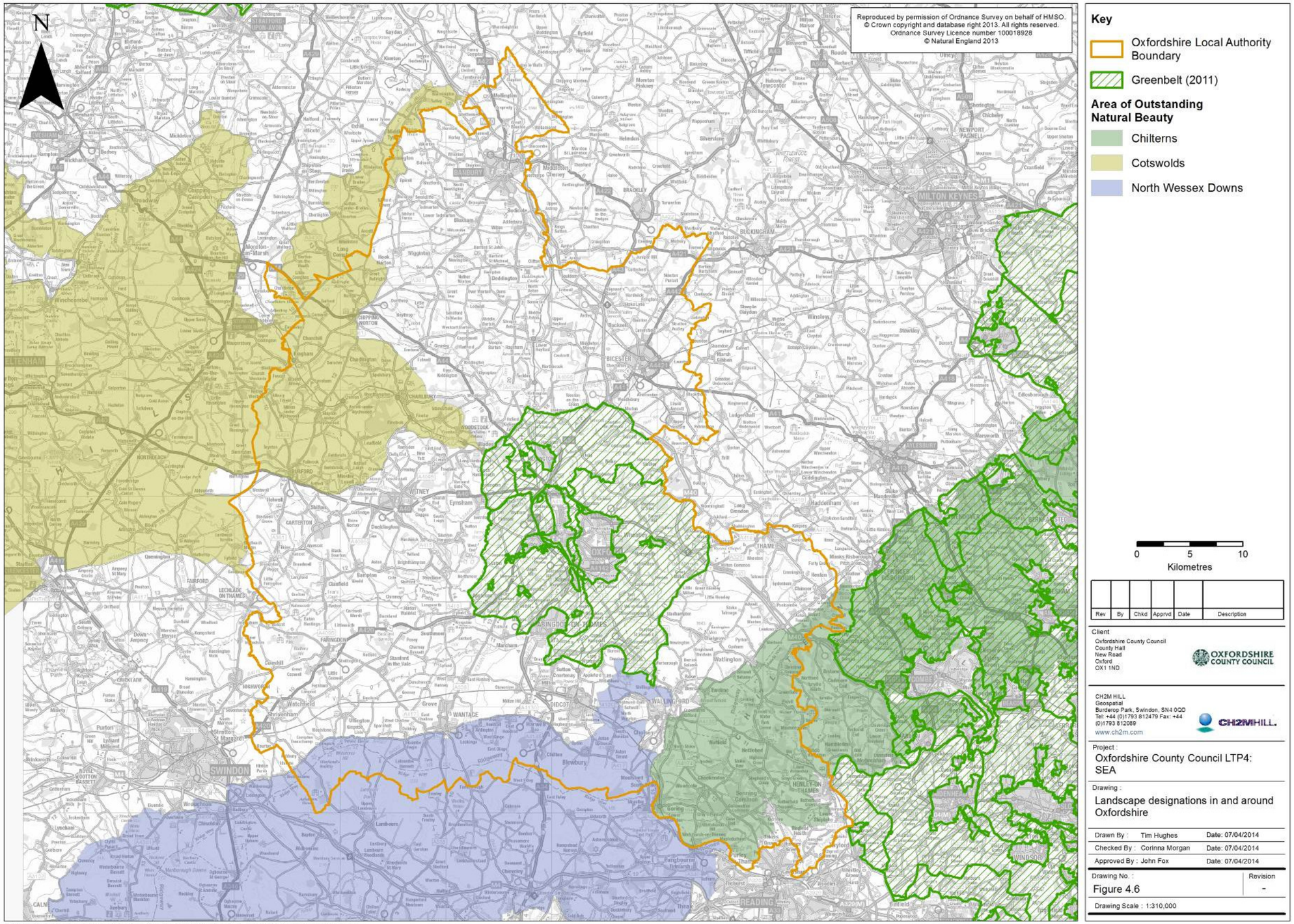
There is potential for development pressure to detract from the quality of some of the county's landscapes.

Light pollution from development will continue.

Increasing traffic volumes will increase noise disturbance in the countryside and the loss of tranquillity.

Increases in traffic will cause more vehicles to use unsuitable rural roads. However, plans to de-clutter streets and improvements to the public realm will improve the townscape in some areas.

Figure 4.6: Areas of Outstanding Natural Beauty within Oxfordshire



5 SEA Approach

5.1 Establishing SEA Objectives

The baseline information, PPP review (Appendix A) and relevant key environmental issues identified have been used to define a series of SEA objectives. These objectives have been developed in order to assess the environmental effects of the LTP4.

The development of SEA objectives for the Oxfordshire LTP4 has been an iterative process. The objectives proposed at the scoping stage of the SEA were reviewed and revised in the light of comments received on the SEA Scoping Report and further understanding of the key environmental problems, issues and opportunities concerning the Oxfordshire LTP4.

The final SEA objectives that have been used to assess the LTP4 are listed in Table 5.1.

SEA sub-objectives and assessment criteria were also identified for developing and appraising high level policies, Area Strategies and the Supporting Strategies, as shown in Table 5.1. The table shows the main receptors that were considered in the SEA and associated questions that were addressed to determine the implications of the plan for those receptors. These assessment criteria were developed through consultation with key organisations and knowledge of key environmental features and issues identified during the scoping stage.

The SEA objective (no. 9) covering water quality incorporates underlying criteria to assess potential impacts on the physical, chemical or biological status of water bodies, in accordance with the WFD.

Table 5.1: SEA Objectives and Assessment Criteria

SEA Receptor	LTP4 SEA Objective	Sub-objectives	Assessment Criteria
Population	**1. Maintain the vitality of town centres**	• Ensure town centres are well connected to surrounding areas by sustainable modes of travel • Provide a sustainable, functional, uncongested transport network in keeping with the character and local distinctiveness of town centres	• Is the LTP4 policy likely to reduce the impacts of traffic in the public realms of key settlements? • Will it be possible to access key settlements and proposed growth areas by convenient public transport? • Will town centres be easier to walk or cycle to and around for local residents?
	2. Improve accessibility to jobs, facilities and services	• Reduce transport related community severance • Improve access to facilities, particularly for disadvantaged groups, the elderly, mobility impaired and those without a car • Improve the integration of and between different modes of travel	• Is public transport and community transport likely to improve under the LTP4 policy? • Are all groups' transport needs catered for including rural residents without cars, elderly, disabled and children?
	3. Enhance and protect the green infrastructure and countryside	• Protect and improve the interconnectivity of green infrastructure • Enable people to access and appreciate the natural heritage • Protect and improve the quality of green infrastructure for wildlife, drainage, landscape value and accessibility • Protect and improve pedestrian, cycling and public transport routes to and from GI	• Are schemes included to promote non-motorised access and maximise opportunities to natural green space and the countryside? • Does the LTP4 policy increase the safe provision of bridleways, cycle trails and footpaths? • Do new schemes promote the creation/extension of and improvements to GI, including consideration of personal mobility?
Human Health	**4. Protect and promote everyone's physical and mental wellbeing and safety**	• Increase opportunities and amenity of active travel modes for health benefits • Promote safer non-motorised and public transport • Ensure access to health facilities by a wide range of sustainable modes of travel • Provide safer conditions for pedestrians and cyclists, including children and the infirm.	• Does the LTP4 policy improve conditions for pedestrians and cyclists? • Does the LTP4 policy demonstrate a commitment to the health benefits of physical activity and a move away from car dependency for shorter journeys? • Does the LTP4 increase capacity of transport infrastructure and improve connectivity?
Noise	**5. Reduce noise pollution**	• Reduce the number of people being affected by transport noise • Avoid/minimise the impacts of transport related noise on sensitive receptors	• Will disturbance from traffic be reduced in residential areas? • Is noise from traffic likely to change in rural locations and affect tranquility?
Air quality	**6. Reduce all forms of transport-related air pollution in the interests of local air quality**	• Minimise the negative impact of transport on Air Quality Management Areas and those areas where monitoring shows high levels of pollutants • Maintain good air quality in areas of low pollutants • Minimise the number of exceedances of Air Quality Standards • Improve air quality levels where possible	• Does the LTP4 policy encourage and facilitate the use of active travel and short journeys? • Will the LTP4 policy help to reduce traffic congestion? • Will the LTP4 policy limit the more polluting vehicles in sensitive areas? • Will the LTP4 policy help to limit traffic growth?

SEA Receptor	LTP4 SEA Objective	Sub-objectives	Assessment Criteria
Climatic factors	**7. Reduce transport related greenhouse gas emissions**	• Minimise carbon emissions from construction and maintenance activities • Improve energy/fuel efficiency in transport, by enabling a shift to alternative fuels • Minimise need to travel by promoting and protecting local facilities • Minimise freight travel distances e.g. by raising awareness of 'food' miles, air pollution etc	• Does the LTP4 policy reduce or limit dependency on finite fossil fuels? • Does the LTP4 policy support or facilitate the use of low carbon modes of transport? • Does the LTP4 policy help ensure that vehicle journeys can be made efficiently with minimum disruption or distance?
Biodiversity, flora, fauna	**8. Protect and enhance habitats and the diversity and abundance of species**	• Avoid or minimise transport related damage to habitats and species • Manage the transport network in a way that protects, and enhances biodiversity, including ecological connectivity • Minimise wildlife casualties in the transport network	• Will new schemes affect priority habitats or the conservation status of designated nature conservation sites? • Are new transport routes likely to cause severance of wildlife corridors? • Does the LTP4 policy support biodiversity improvements?
Water, geology and soil	**9. Maintain and improve the quality of water resources**	• Avoid transport related pollution of water in line with the measures to protect water resources set out in the Water Framework Directive	• Is the LTP4 policy likely to significantly increase the risk of diffuse pollution from increasing traffic volumes? • Do new schemes constrain any water bodies from achievement of GES/GEP under the WFD?
	10. Retain the floodwater storage function of riparian land and the floodplain and reduce the risk of flooding where it would be detrimental	• Avoid increasing detrimental flood risks resulting from infrastructure development and maintenance • Ensure water table is protected in natural areas dependent upon the status quo • Reduce the extent of non-permeable surfaces and promote Sustainable Drainage Systems (SuDS) in infrastructure	• Will the LTP4 policy improve capacity of drainage of existing older infrastructure? • Will the LTP4 policy lead to the inclusion of SuDS? • Will the LTP4 policy increase or reduce flood risk?
	11. Maintain resources such as minerals and soils and enhance geological diversity	• Promote the use of secondary and recycled materials for transport including manufactured aggregates and soils • Use sustainable construction and maintenance methods, and materials • Improve currently contaminated land through the construction and maintenance of transport infrastructure • Protect soils and minimise loss or contamination • Protect agricultural land, particularly the best quality land according to the Agricultural Land Classification system • Protect the varied geological features within the county and improve access to sites of greatest geodiversity	• Does the LTP4 policy require large scale demolition and construction of new infrastructure? • Will proposals under this LTP4 policy require significant resources for ongoing maintenance? • Is the LTP4 policy likely to increase demand for greenfield land and/or result in the loss of moderate to high quality (Grades 3 and above) agriculturally productive land? • Is there a likelihood that new schemes will affect geologically designated sites?
	12. Optimise the use of previously developed	• Protect greenfield land wherever possible • Make the best use of existing resources	• Do the proposals make use of previously developed sites? • Are transport improvements feasible within the footprint of existing infrastructure?

SEA Receptor	LTP4 SEA Objective	Sub-objectives	Assessment Criteria
	(brownfield) land thereby reducing waste generation		
Material Assets	**13. Adapt transport network to climate change**	• Minimise the vulnerability of transport infrastructure to climate change impacts, including surface and groundwater flooding and extreme weather • Avoid exacerbating climate change impacts such as flooding on areas adjacent to transport network	• Does the LTP4 policy provide proposals to address the issues of climate change? • Will the LTP4 policy improve capacity of drainage of existing older infrastructure
The Historic Environment	**14. Protect and enhance the historic environment, the significance of heritage assets and their settings**	• Avoid or minimise negative effects on cultural assets, the historic environment and local distinctiveness? • Protect and enhance access to areas valued for cultural heritage by sustainable modes? • Enhance the historic fabric and character of towns and villages	• Will the LTP4 policy negatively affect any cultural heritage assets and/or their setting? • Is there a likelihood that proposals will encroach upon undeveloped land, which may harbour archaeological remains? • Does the LTP4 policy include provision for (and enhancement of) sustainable access to key cultural heritage sites? • Are the LTP4 measures sympathetic to the local character of the historic environment, and provide opportunities to enhance the historic character of the towns and villages?
	15. Maintain and enhance the quality and distinctiveness of the built environment	• Promote a high quality built environment through good planning and design? • Prevent the negative impact upon designated sites, such as Conservation Areas?	• Will the LTP4 policy conserve and contribute to the enhancement of the built environment? • Does the LTP4 policy make appropriate use of existing historic buildings and structures?
Landscape	**16. Maintain and enhance the quality and character of the landscape, including its contribution to the setting and character of settlements**	• Protect and enhance landscape character from impacts of transport • Minimise light pollution caused by transport	• Will additional transport infrastructure be developed which will encroach upon designated landscapes and the countryside? • Will lighting provision change on transport infrastructure?

5.2 Assessment Approach

This section describes the appraisal process that was used to predict and appraise the environmental effects that are likely to arise from implementation of the LTP4.

The general methodology followed the various SEA stages in 'A Practical Guide to the Strategic Environmental Assessment Directive' published by the office of the Deputy Prime Minister in 2005. SEA differs from Environmental Impact Assessment (EIA) mainly because it is used to assess relatively broad strategies rather than site specific proposals (in this case, the individual infrastructure elements).

The level of detail assessed during this SEA therefore reflects the overall level of detail in the draft LTP4, and has involved assessing the three main components of the draft LTP4 described in Chapter 3: -

- High Level Policies
- Area Strategies
- Supporting Strategies

The LTP4 policies and strategies have been evaluated with consideration of their potential for significant environmental effects on the different SEA topics/receptors using assessment criteria. The assessment of these environmental effects has been informed by professional judgement and experience with other transport related SEAs, as well as an assessment of national, regional and local trends. In some cases, the assessment draws upon mapping data and GIS to identify areas of potential pressure, for example due to flood risk or presence of environmental designations.

For all LTP4 policies and strategies, a table has been used to evaluate how the environment would be affected, positively or negatively, from the implementation of the LTP4 in relation to the SEA objectives. All LTP4 policies and strategies have been assessed based on their likely impact duration and magnitude, and described in terms of their nature, permanence, scale and duration using the criteria defined below,.

Effects of the LTP4 will be described in terms of their:

- Nature: whether they are anticipated to be:
    - **Positive** (+)
    - **Neutral** (N)
    - **Negative** (X) or
    - **Uncertain** (?)
- Timescale: the timescale over which environmental effects are anticipated to arise:
    - **2015 – 2020**: effects expected up until 2020 (i.e. in the short-term).
    - **2021 - 2031**: effects expected from 2020 to 2031 (i.e. in the medium-term).
    - **Beyond 2031**: effects expected beyond the timescale of the plan (i.e. in the long-term).
- Reversibility:
    - A **reversible** effect **(R)** is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
    - An **irreversible** effect **(I)** is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.
- Spatial Scale:
    - **Local (L)**: effect is restricted to the immediate location of the proposal or to a specific site within one of the four areas – Oxford, Larger Towns, Smaller Towns, Rural Oxfordshire

- **Regional (R)**: effect is anticipated to cover a significant proportion or all of Oxfordshire.
- **National (N):** effect covers the whole of England and/or the UK (also includes international).

- Frequency:
  - A **constant (C)** effect is one that results from a physical change that continues beyond the life of the LTP.
  - A **temporary/intermittent (T)** effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.

The significance of effects upon each of the SEA objectives has been evaluated using the scoring criteria outlined below (Table 5.2). The determination of significance takes into account the criteria set out in the SEA Directive's Annex II.

Table 5.2: Assessment Criteria

++ **Major Positive**	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/ or maximising opportunities for environmental enhancement. This effect is considered to be significant at the plan level.
+ **Minor Positive**	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N **Neutral**	The option would have a neutral effect on the SEA objective.
? **Uncertain**	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x **Minor Negative**	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx **Major Negative**	The option would severely undermine the SEA objective by contributing to an environmental problem and/ or undermining opportunities for environmental enhancement. This would be considered to be a significant effect at the plan level.

6 Assessment of LTP4 and its Alternatives

6.1 LTP4 Objectives

6.1.1 Alternative LTP4 Objectives

The development of the LTP4 objectives (see Section 3.2) was an iterative process, taking into account stakeholder consultation feedback and environmental and social acceptability. The LTP4 objectives in Table 6.1 were revised on environmental grounds.

Table 6.1: Revisions to LTP4 Objectives

Initial LTP4 Objective	Final LTP4 Objective	Relevant SEA Objective	Reason for Revision
Manage impacts of transport on human health and safety, and the environment, including reducing carbon emissions.	**Revised wording:** Reduce per capita carbon emissions from transport in Oxfordshire in line with UK government targets.	7. Reduce transport-related greenhouse gas emissions	• Revised to reflect the importance of carbon reduction and the need to reduce greenhouse gases by making this an objective in its own right.
	New objective: Mitigate and wherever possible enhance the impacts of transport on the local built and natural environment.	3. Enhance and protect the green infrastructure and countryside 8. Protect and enhance habitats and the diversity and abundance of species 9. Maintain and improve the quality of water resources 11. Maintain resources such as minerals and soils and enhance geological diversity 14. Conserve and enhance the historic environment, the significance of heritage assets and their settings 15. Maintain and enhance the quality and distinctiveness of the built environment 16. Conserve and enhance the quality and character of the landscape, including its contribution to the setting and character of settlements	• 'Manage the impacts' was felt to give insufficient assurance against damage to the environment. • The objective was therefore made clearer about what is meant by environment and how this can be measured.
Encourage and facilitate physically active travel to support health.	**Revised wording:** Improve public health and wellbeing by increasing levels of walking and cycling, reducing transport emissions i, reducing casualties, and enabling inclusive access to jobs, education and services.	2. Improve accessibility to jobs, facilities and services 4. Protect and promote everyone's physical and mental wellbeing and safety 6. Reduce all forms of transport-related air pollution in the interests of local air quality 7. Reduce transport related greenhouse gas emissions	• Brings in specific reference to air quality and road safety by including them under the health objective. • 'Walking and cycling' covers recreational opportunities, not just use of the modes for travel. • Inclusive access supports Health and Wellbeing strategy and reflects comments about lack of equalities objectives

6.1.2 Assessment of LTP4 Objectives

Appendix E presents the compatibility assessment between the SEA and LTP4 objectives, and the recommendations of the compatibility assessment.

LTP4 objective 9 '*Mitigate and wherever possible enhance the impacts of transport on the local built and natural environment*' seeks to ensure that schemes are designed in an environmentally sensitive manner and is therefore compatible with all of the SEA objectives.

No conflicts have been identified between the SEA objectives and the other LTP4 objectives; however, some uncertainties have been identified where fulfilment of the LTP4 objectives could negatively impact on the environment, depending on how the objectives are met through policy implementation. For example, the construction of new infrastructure (e.g. new road links, changes to junctions), alternative development layouts or improvements to existing infrastructure to improve transport connections, will involve new land take, which could impact upon greenfield land, water resources, habitats, soils, minerals, landscape and archaeological assets; while effects associated with growth in traffic could arise from economic growth/development (noise, air emissions and congestion).

While improvements to the cycle and walking infrastructure (including safer routes to schools) will promote green infrastructure improvements and potentially improve safety, which are considered to be positive effects, other improvements to public transport such as air travel are likely to be damaging to the countryside and affected communities.

In fulfilling the LTP4 objectives, the SEA highlighted the following recommendations, which were taken forward during the development of high level policies, area strategies and supporting strategies:

- OCC should take into account the principles of sustainable development and current spatial planning policy in seeking to make the best use of current infrastructure and to make prudent use of natural resources. The need to support economic growth should be balanced against the need to maintain the value of the environment, including the services provided by healthy ecosystems. Significant new infrastructure, where required, should be subject to detailed environmental assessment to ensure the most sustainable options are promoted and adverse environmental effects are mitigated wherever possible. Careful planning is required to ensure that new transport connections do not result in the loss of intrinsic countryside (particularly within designated sites), high value agricultural land, natural greenspace and associated biodiversity.
- In partnership with others, OCC should seek to influence the location of new development layouts, and improved cycling and public transport infrastructure at an early stage to ensure development is undertaken within the current footprint of development wherever possible or is appropriately sited to avoid impacts on designated or sensitive environmental areas.
- The use of low noise surfacing should be considered at scheme level when delivering new or upgraded transport connections, which would benefit the health and well-being of communities in close proximity to works.
- OCC should prioritise alternatives to new roads when seeking measures to reduce congestion and improve journey time reliability. For example, through encouraging modal shift from private car use to more efficient urban transport options.
- Potential opportunities to make better use of existing services and infrastructure should be prioritised. Where new infrastructure is deemed necessary, sites should be subject to detailed assessment and survey at project level to inform specific routes and mitigation requirements, and to ensure development takes place in the most sustainable locations and avoids environmentally sensitive sites.

6.2 Draft LTP4 Policies

6.2.2 Alternative LTP4 Policies

The development of the LTP4 policies (see Table 3.1) was an iterative process, taking into account stakeholder consultation feedback and environmental and social acceptability. Table 6.2 shows those policies that were revised to reflect changes to benefit the environment.

Table 6.2: Revisions to LTP4 Policies

Initial LTP4 Policy	Final LTP4 Policy	Relevant SEA Objective	Reason for Revision
Policy 3: [Richard to confirm]	**Revised wording:** Oxfordshire County Council will encourage the use of modes of travel associated with healthy and active lifestyles and will improve built and green infrastructure to support greater levels of walking and cycling	3. Enhance and protect the green infrastructure and countryside 4. Protect and promote everyone's physical and mental wellbeing and safety	• Inclusion of improvements to green infrastructure
Policy 23: : [Richard to confirm]	**Revised wording:** Oxfordshire County Council will support appropriate opportunities for improving towpaths along the waterways network, for local journeys and leisure, where it would not harm the ecological value of the area or waterway network.	3. Enhance and protect the green infrastructure and countryside 8. Protect and enhance habitats and the diversity and abundance of species	• Amended to promote protection of the ecology of the area or waterway network

6.2.3 Assessment of LTP4 Policies

The assessment of the LTP4 policies is presented in Appendix E. The assessment took the form of a compatibility assessment using a similar approach to that applied to assess the compatibility of the LTP4 Objectives.

All 35 policies in the draft LTP4 were assessed for compatibility against each of the SEA objectives using a matrix and the criteria in Table 5.3. The focus of this assessment was to highlight areas where the policies may conflict with environmental objectives in order to highlight ways to reduce the potential for environmental harm, or preferably to increase the potential for positive environmental outcomes.

A significant conflict was identified between LTP4 Policy 21 ('*Oxfordshire County Council will support the development of air travel services and facilities that it considers necessary to support economic growth objectives for Oxfordshire*') and SEA objectives 5 (noise pollution), 6 (air pollution) and 7 (greenhouse gas emissions). New infrastructure to support the development of air travel services (e.g. supporting the growth of London Oxford Airport) could encroach on undeveloped land, with the potential to impact on biodiversity, green spaces, cultural assets, the built environment and the wider landscape. The future of air travel services (e.g. those that may increase flight capacity) in Oxfordshire has the potential to cause significant negative impacts on noise, air quality and greenhouse gas emissions and negative impacts on green infrastructure, countryside, landscape and human health, which will require further consideration at the project level.

However, Policy 27 '*Oxfordshire County Council will work to reduce negative environmental impacts of the operation of the transport network, and where possible provide environmental improvements, particularly in Areas of Outstanding Natural Beauty, Conservation Areas and other areas of high environmental importance'* is likely to promote significant beneficial effects, promoting protection of, and enhancements to the environment, and supporting the majority of the SEA objectives.

Policy 28 '*Oxfordshire County Council will work with partners to improve public spaces and de-clutter the street environment*' also seeks to protect the environment and will positively (and significantly) support SEA objectives 15 (built environment) and 16 (landscape character).

Additionally, many of the LTP4 policies are likely to promote significant beneficial impacts on the environment and support the SEA objectives, particularly those objectives that relate to the population, air pollution and the built environment, as follows: -

- SEA Objective 2 - 'Improve accessibility to jobs, facilities and services' – policies 1 to 4, 8, 15, 16, 24, 25, 31 and 35 positively support achievement of this objective.
- SEA Objective 3 - 'Enhance and protect the green infrastructure and countryside' – policies 3, 22, 27 and 28 positively support achievement of this objective.
- SEA Objective 4 - Protect and promote everyone's physical and mental well-being and safety – policies 1, 3, 5, 12, 14, 19, 22 and 31 positively support achievement of this objective.
- SEA Objective 6 - Reduce all forms of transport-related air pollution in the interests of local air quality – policies 17, 18, 27, 30, 31 and 33 positively support achievement of this objective.
- SEA Objective 7 - Reduce transport related greenhouse gas emissions – policies 11, 17, 18, 27, 30 and 31 positively support achievement of this objective.

6.3 Effects of Draft LTP4

6.3.1 Area and Supporting Strategy Impacts

The assessment of the alternative Area and Supporting Strategies is presented in Appendix F.

The results of the assessments have been aggregated in the subsequent sub-sections to provide an overall assessment of the effects of the draft LTP4 on the SEA receptors and SEA objectives.

This LTP4 has been developed to benefit people and their travel, supporting accessibility and future development/economic growth. Significant positive effects are identified such as improvements to the vitality of town and city centres, air quality, the built environment and walking and cycling. However, the draft LTP4 is likely to give rise to a number of construction related impacts on the environment such as land take, change in landscape, loss of habitats, resource use and impacts upon the historic environment. In many instances, these effects are likely to be better than the 'without LTP4 scenario', where such changes to provide short-term solutions, would be unplanned.

6.3.2 Population

SEA Objective 1: Maintain the vitality of town centres

The majority of the Area Strategies have been identified as having significant beneficial impacts on town and city centres through the reduction in through traffic (including freight movements), improvements to the public realm and the provision of infrastructure to support regeneration and economic growth. Such improvements are likely to result from improved traffic management and reduced congestion, the construction of bus tunnels (e.g. at Oxford), access restrictions, improved transport links and improved access to parking and employment.

The draft LTP4 is committed to deterring the use of freight on inappropriate minor roads and movements through towns (except where this is essential for local access) and reinforcing the attractiveness of recommended lorry routes to avoid important market towns, in particular at Burford, Chipping Norton and Henley-on-Thames. In Oxford, signage will be reviewed on the ring road to ensure that lorries are directed to their destinations within the city by the most appropriate routes. Additionally, as a result of investment in strategic rail in Oxfordshire, there may also be a shift in freight from road to rail in support of Route Based Strategies in the county. These measures will help to maintain the vitality of town centres.

Additionally, the LTP4 promotes the use of public transport, which will help to improve the environment of town centres if more people use public transport in preference to vehicles. The cycling strategy aims to encourage a greater uptake of cycling, improved cycle parking facilities in cities and towns, and a higher quality cycle network, which, together with an improved public transport system, is likely to help reduce the use of cars in town centres.

However, during construction of any transport improvements, the proposed network improvements are likely to result in some initial travel disruption within town centres and in the city of Oxford.

SEA Objective 2: Improve accessibility to jobs, facilities and services

The draft LTP4 proposes major improvements to the strategic road and rail network through Area Strategies, which are all predicted to have significant beneficial impacts on accessibility in the short and medium-term. The Area Strategies will improve access and connectivity to businesses, residential areas, leisure, retail destinations, employment opportunities and new and existing development locations. The LTP4 will seek to deliver effective peripheral routes around towns, promote collaborative working and reduce out-commuting in some areas (e.g. Bicester). Additionally, some of the Area Strategies support regeneration (including the redevelopment of some town centres and train stations) and seek to attract economic investment.

The LTP4 will also improve access to/from Oxfordshire from further afield (including rail services from London and airports at Heathrow, Birmingham and Gatwick).

The LTP4 also seeks to enhance pedestrian, cycle and public transport links (e.g. faster, more frequent and more reliable bus journeys, and public transport priority measures) to improve access between train stations, key employment sites and residential areas, particularly for commuters and those in education. Such improvements will provide access though fully integrated transport systems to job opportunities and essential services and facilities for people without a car, by choice or necessity. The Rail Strategy proposes significant improvements through service upgrades, a greater choice of routes and increase in services with better links through Oxfordshire between Didcot, Oxford and Bicester to further afield. The Cycling Strategy includes the development of cycling strategies for towns and journey to work/schools, enabling people to cycle into towns, park bikes securely, and access shops, offices, stations and priority bus routes.

The Freight Strategy commits to planning the location of new employment sites and any related transport infrastructure so that these can function well, with efficient freight access to and from the strategic transport network without adverse impacts on local communities, other road users and the environment.

However, the improvements to the transport network as a result of the Area Strategies would also support significant traffic growth, which could lead to further community severance effects and reduce accessibility following delivery of the LTP4 (post 2031). The long term effects of the Area Strategies on accessibility is uncertain as the effects may be dependent upon the implementation of some proposals that may be subject to change, transport provision in future plans and the capability of the road and capacity improvements to accommodate the forecasted traffic growth.

SEA Objective 3: Enhance and protect the green infrastructure and countryside

No significant strategic impacts on the countryside and green infrastructure have been identified. The majority of impacts have been identified as uncertain, as a result of delivering the draft LTP4. The LTP4 promotes improvements to, linkages between, and the creation of new pedestrian and cycle routes (and their facilities), but there is uncertainty as to the effect of new and improved road, rail and public transport infrastructure on the countryside and existing green infrastructure during construction. The capacity improvements have the potential to impact on the countryside as a result of land-take, which will require further consideration at project level.

Cycling and walking facilities require relatively small infrastructure changes to the environment, but any impacts on the countryside will be dependent on appropriate siting of new cycle/pedestrian routes.

6.3.3 Human Health

SEA Objective 4: Protect and promote everyone's physical and mental wellbeing and safety

No negative impacts on human health have been identified as a result of the LTP4. This LTP4 identifies strategies to improve facilities, links and safety conditions for pedestrians and cyclists to encourage the uptake of walking and cycling. These improvements include the provision of super-premium and premium cycle routes, a cycling strategy for Science Vale, a Sustainable Transport Strategy for Bicester, a low traffic 'Oxford' city centre, innovative cycle parking facilities with cycle hubs and strategies to increase use of public transport. These are considered significant beneficial impacts as they will help to improve the health and well-being of local communities, tackling the increasing levels of obesity while enabling access to housing sites and facilitating movement between employment sites, retail centres and residential areas. OCC will also seek enhancements to the Public Rights of Way network from new developments, and promote the use of towpaths along the River Thames and the Oxford Canal for long distance walking, through partnership working.

This LTP4 demonstrates a commitment to maintaining the safety and condition of local roads and highway related assets with systematic prioritisation where there are safety related issues, premium bus routes and high pedestrian and cycle usage whilst still maintaining the network as a whole.

The Science Transit strategy also demonstrates a commitment to improving travel information and integrated and reliable services for the population to improve the traveller experience and support the development of road safety technologies. Such systems will seek to work with modern lifestyles and align with aspirations for personalised mobility options. Additionally, the LTP4 together with the Science Transit will develop interchange points between multiple modes of transport (hubs) that will maintain safe walk and cycle access by keeping people segregated from public transport and vehicles.

As part of the Freight Strategy, features will be developed to influence lorry routes and journey times that reduce the danger that lorries pose to cyclists. Additionally, rest areas and proper facilities will be developed for lorry drivers with security, refreshments, washing and toilets catering better for drivers in terms of health and safety.

In the longer term, there may be increasing risks to cyclists and pedestrians from the estimated increase in large lorries, but these risks will increase at a greater rate in the absence of the LTP4.

6.3.4 Noise

SEA Objective 5: Reduce noise pollution

No significant strategic impacts on noise have been identified as a result of implementing the LTP4. Any impacts of the strategies on noise are likely to be dependent on location.

There are likely to be benefits in terms of reducing noise in towns and Oxford city centre (e.g. through traffic reductions, proposals to re-route traffic and reduce freight traffic volumes, and the construction of bus tunnels). However, there will be elevated noise levels in other areas (e.g. at park and ride sites located further from towns and the city, and in more rural tranquil areas) through transport network improvements, the provision of more bus services and increased road traffic (including freight). It is uncertain how the Science Transit will align with the LTP4 and affect noise patterns through improved frequency, speed and reliability of services.

There are also likely to be negative impacts through increased noise pollution associated with construction of infrastructure works.

Noise will be assessed as part of scheme design and suitable noise mitigation will be used to reduce any impacts identified.

6.3.5 Air Quality

SEA Objective 6: Reduce all forms of transport-related air pollution in the interests of local air quality

No significant strategic impacts on air quality have been identified as a result of implementing the LTP4. Any impacts of the strategies on air quality are likely to be dependent on location and partnership working.

Improvements to air quality are likely to be realised through the support of high capacity vehicles with low or zero emissions, through zero emissions restrictions for freight and taxis in some areas (e.g. Oxford), through support for low carbon modes of public transport and through the implementation of schemes that deter road traffic from town centres or provide traffic calming measures. Improvements to air quality in cities and town centres are also likely to be realised through the implementation of measures that deter freight traffic, and consolidate freight items, combining them for onward delivery to the same destination.

Additionally, proposals to encourage the use of sustainable modes of transport (e.g. walking and cycling) are likely to improve air quality in some areas. Cycling is a largely carbon-free form of transport and will therefore help to reduce the reliance on vehicle based transport and associated air pollutants from transport.

However, increases in air pollutants may result elsewhere from the re-routing of traffic (particularly freight traffic) and the improvements to the transport network, which will increase road capacity and may encourage further traffic growth in the long-term. The construction of new road and rail infrastructure and associated facilities is also likely to elevate air pollution.

6.3.6 Greenhouse Gas Emissions

SEA Objective 7: Reduce transport related greenhouse gas emissions

No significant strategic impacts on greenhouse gas emissions have been identified as a result of implementing the LTP4.

The LTP4 will encourage greater use of sustainable modes of transport (walking and cycling) together with an improved rail service, more energy efficient buses, park and ride sites and a fully integrated and enhanced public transport system with bus priority measures, which will help to reduce greenhouse gas emissions.

However, the effects of the LTP4 on this SEA objective are uncertain in the short-term as some of these benefits may be offset by increased emissions during construction of road, rail and air infrastructure. Some of the long term effects will also be dependent on traffic growth and emission standards.

The impacts of the freight strategy on greenhouse gases are likely to be dependent on location.

6.3.7 Biodiversity, Flora and Fauna

SEA Objective 8: Protect and enhance habitats and the diversity and abundance of species

No significant strategic impacts on biodiversity have been identified as a result of implementing the LTP4.

However, the LTP4 assumes a number of new road improvements and cycle routes to improve accessibility and support housing growth, which may have an overall adverse effect upon biodiversity through the loss and fragmentation of habitats with associated impacts on species of principal importance and European protected Species. Such improvements will encourage further traffic so it is likely that there would also be an increase in road kills and air pollution effects on biodiversity and therefore ongoing negative effects.

There is also potential for negative impacts on some SSSIs, which will require further consideration at project level, when further detail is available to assess the potential for impacts as a result of planned road, rail, pedestrian and cycle network improvements and bus network aspirations.

This HRA Screening has found that no likely 'strategic' significant effects are predicted from elements of the LTP4's Area Strategies on any European sites, subject to appropriate design and mitigation. However, project level HRA is recommended (in consultation with Natural England) with regard to Oxford Meadows SAC and Little Wittenham SAC when further details of the delivery of transport schemes within the Oxford and Science Vale Strategies are available, to ensure compliance with the Habitats Regulations.

In the absence of further details of proposed works (e.g. verge cutting, highway shrub and tree maintenance) as part of the Highways Asset Management Plan (HAMP), it is uncertain whether there will be any impacts on habitats and species.

6.3.8 Water

SEA Objective 9: Maintain and improve the quality of water resources

No significant effects upon water quality are anticipated as it is assumed that any new infrastructure would be designed with appropriate drainage to address potential surface water pollution.

The LTP4 is unlikely to have any significant adverse impacts on any river or lake water bodies, but has the potential to result in pressure on the water environment, in-combination with other development. Elements of the Area Strategies in the draft LTP4 may therefore give rise to schemes or physical interventions that themselves could require a WFD compliance screening assessment; these include (but are not limited to):

- New or improved transport connections and enhancements to road capacity – potential for increased risks to water bodies
- Drainage improvements - If improved highway drainage results in additional stormwater discharge into any watercourse (water body or tributary) there is potential for effects. Flow changes could be beneficial or adverse, for example improving flow in Thames tributary brooks, or resulting in scour at discharge points. There may also be changes in water quality for example if highway runoff is poor quality, or if drainage improvements incorporate some runoff treatment.

The LTP4 may promote schemes or physical interventions that could make positive contributions towards WFD environmental objectives; these are:

- Drainage improvements – as above
- Management of flood risk, as outlined in the Oxfordshire Local Flood Risk Management Strategy.
- Partnership working - presents an opportunity to promote the WFD environmental objectives alongside other responsibilities of stakeholders, which could result in future beneficial contributions to the objectives.
- Development of GI - can support flood risk management and has potential to support WFD objectives

SEA Objective 10: Retain the floodwater storage function of riparian land and the floodplain and reduce the risk of flooding where it would be detrimental

The LTP4 demonstrates a commitment to maintaining drainage and associated infrastructure to minimise flooding on and from the highway network. This includes (but is not limited to) adopting a strategic approach to drainage and flood management and investigating reports of highway flooding and damaged or blocked highway drain, taking appropriate measures to get water off of the highway, alleviate or mitigate flooding as appropriate.

It is assumed that new capacity and access improvements would be designed with appropriate drainage to address potential flood risk.

6.3.9 Geology and Soil

SEA Objective 11: Maintain resources such as minerals and soils and enhance geological diversity

The potential transport network improvements associated with the LTP4 are likely to be resource intensive. It is assumed that increases in frequency and length of trips to be taken by road would lead to an ongoing high maintenance requirement and long term high mineral use, which would result in negative impacts (some of which may be significant). The increased frequency of public transport services may help reduce dependence on fossil fuels but this effect is likely to be undermined by the convenience of car use.

Some impacts on minerals and soils will also be dependent on appropriate siting and construction of new infrastructure. Care will be required if any road improvements are undertaken at Drayton, in association with the new housing west of Warwick Road, to ensure protection of the geologically designated Neithrop Field Cutting Site of Special Scientific Interest (SSSI).

The HAMP demonstrates a commitment to making the best use of natural mineral resources, planning for Oxfordshire's long-term minerals need whilst minimising waste going to landfill, which is considered to be a beneficial impact of the LTP4.

SEA Objective 12: Optimise the use of previously developed (brownfield) land thereby reducing waste generation

No significant strategic impacts on the brownfield land have been identified.

The impacts have been identified either as uncertain. Although the LTP4 will support growth on brownfield sites in sustainable locations, it is unknown at this plan level whether brownfield land will be used for the proposed transport network improvements, or where land-take is likely to comprise currently undeveloped greenfield sites or agricultural land.

The LTP4 will however seek to use previous brownfield land, wherever possible, for example, a currently disused underpass under the railway at Milton Park, which will be reopened for cyclists. The HAMP also demonstrates a commitment to maintaining the highway assets, following the principles of Reduce, Reuse, Replace in its use and disposal of materials. This will be done by reducing the need to transfer waste material to landfill sites, by reusing material where possible and by taking a whole life approach to asset management, which optimises maintenance requirements.

6.3.10 Material Assets

SEA Objective 13: Adapt transport network to climate change

No significant strategic impacts on climate change have been identified.

It is assumed that the LTP4 schemes would be constructed to design standards that take account of climate change predictions and therefore be more resilient than existing infrastructure, which is considered a beneficial impact. The plan also demonstrates a commitment to improving the condition of local roads, footways and cycleways, including resilience to severe weather events. However in the long term there is a risk that infrastructure would be overwhelmed by extreme weather events.

6.3.11 The Historic Environment

SEA Objective 14: Conserve and enhance the historic environment, the significance of heritage assets and their settings

The impacts of the LTP4 on the historic environment are uncertain and will be dependent on the nature, location and siting of new and improved transport infrastructure and services. Access improvements and the Sustainable Transport Strategy may also improve sustainable access to known heritage sites.

A reduction in traffic (including freight) in town centres and Oxford city is likely to benefit heritage assets and their setting, conserving historic centres though improved air quality, visual amenity and reduced vibration.

However, there may be some negative impacts upon the historic environment from the improvements to the transport network and the re-routing of road traffic although the LTP4 generally seeks to ensure that historically sensitive areas (e.g. Banbury town) are protected. In particular, there is potential for the LTP4 to affect designated (e.g. WHS buffer zone, listed building, scheduled monuments and registered parks and gardens) and undesignated heritage assets and their settings from new road and rail schemes, traffic congestion and noise/air pollution, which will require further consideration at project level. Additionally, indirect impacts, such as loss of landscape character, and changes in water table, can affect the preservation of archaeological and built heritage in situ.

Further consideration will be required at project level to understand the risk to heritage and archaeology once the location, siting, alignment and nature of transport improvements have been determined.

SEA Objective 15: Maintain and enhance the quality and distinctiveness of the built environment

No significant strategic impacts on the built environment have been identified.

It is likely that improved road and rail infrastructure, and new pedestrian and cycling facilities would benefit the built environment. The LTP4 also promotes public realm improvements to enhance the quality of the pedestrian environment by creating a sense of 'place'. Such improvements will complement proposed investment in the regeneration and redevelopment of some town centres.

The LTP4 is also committed to deterring the use of freight on inappropriate minor roads and reinforcing the attractiveness of recommended lorry routes to avoid important market towns, in particular at Burford, Chipping Norton and Henley-on-Thames. Additionally, as a result of investment in strategic rail in Oxfordshire, there may also be a shift in freight from road to rail in support of Route Based Strategies in the county, which may help to improve the built environment.
The HAMP demonstrates a commitment to maintaining street furniture, road markings and other assets that contribute to the quality of the built environment.

However, the new road infrastructure, and associated traffic growth to support housing growth could have negative effects on the built environment in the long-term.

6.3.12 Landscape

SEA Objective 16: Conserve and enhance the quality and character of the landscape, including its contribution to the setting and character of settlements

The potential for significant adverse impacts on landscape character have been identified as a result of delivering the Science Vale Area Strategy, where road improvements to improve access could affect landscape character within the Wessex Downs AONB and its wider setting (e.g. impact on landscape features, loss of open countryside, loss of tranquillity, change in visual amenity).

In other areas, the construction of new and permanent elements in the landscape such as road and junction improvements, and park & rides are likely to have an adverse effect on landscape character. The design of all new infrastructure should seek to minimise impacts on landscape character and visual intrusion.

Additionally, road improvements to improve access could have a negative effect on local landscape character during construction works implemented throughout the lifetime of the plan (i.e. 2015 to 2031), as a result of earthworks and the presence of plant and machinery.

Enhancements to existing cycle routes may including lighting to avoid conflicts between use of space by walkers and cyclists and this will require careful consideration in areas of high landscape value and rural locations.

At some locations, the LTP4 promotes potential improvements to long-term landscape character such as the construction of bus tunnels in Oxford, which will help to reduce congestion. New landscaping schemes

as part of new developments may also improve landscape character in areas where there is currently low quality landscapes.

However, new landscaping schemes as part of new developments may improve landscape character in areas where there is currently low quality landscapes. For example, proposals to redevelop parts of Science Vale to improve the visual impression of Didcot for visitors arriving by train, may benefit the area. Pedestrian improvements and the HAMP's commitment to maintain street furniture and other assets that contribute to the local landscape character (while removing redundant or obsolete street furniture) will help to improve the streetscape in some areas.

6.3.13 Cumulative Impacts

6.3.13.1 Cumulative Effects of LTP4

Many of the effects predicted for the LTP4 are cumulative in their nature. For example, the predicted positive effect on air quality depends upon a reduction in traffic arising from the cumulative effect on modal shift from the combination of public transport measures and promotion of walking and cycling.

The negative effects predicted on landscape character, soils and biodiversity are chiefly due to the cumulative effect of transport measures in combination with development pressure and land-take within greenfield sites and the countryside in general. Few of the Area Strategies will, alone, lead to any significant impacts on a strategic scale, but the additive effect of loss of greenfield land would lead to a significant overall effect.

It is anticipated that there would be a cumulative positive effect on human health through active travel. The combination of a reduction in traffic in urban centres, an increase in walking and cycling and improvements to walking and cycling facilities would combine to improve human health through a combination of increased physical activity and reduced air and noise pollution.

When project level detail associated with the LTP4 schemes (including location of transport improvements and ongoing maintenance and repair works) is available, further assessment of potential in-combination or cumulative impacts should be considered.

6.3.13.2 Cumulative Effects of Others Plans, Strategies and Projects

The LTP4 has been developed in such a way to ensure that it has been fully integrated with other plans, strategies and programmes, as follows: -

- **Local Plans** – the LTP4 has been developed alongside the district councils' Local Plans to ensure that the policies and Area/Supporting Strategies complement and do not conflict with those in the Local Plans. In particular, work is taking place by Oxfordshire County Council to understand the potential for in-combination or cumulative transport impacts on Oxfordshire from other developments (example, the Eastern Villages development proposed by Swindon Borough), which will require further consideration as the LTP4 is implemented through project level schemes.
- **Town Masterplans** - The LTP4 has also been developed alongside town masterplans to ensure that the policies and Area/Supporting Strategies complement and do not conflict with those in the masterplans. For example, Oxfordshire County Council is working with Carterton Town Council as their masterplan for Carterton, which will seek transport infrastructure and services to support regeneration initiatives is emerging.
- **MOD Proposals** - The LTP4 has the potential for in-combination and cumulative impacts with future changes and new infrastructure provided by the MOD through the intensification of military operations at RAF Brize Norton, which will require further consideration when details of their plans including Programme GATEWAY become available. This is most relevant to the Carterton Area Strategy.
- **Rail Proposals** - The Rail Strategy of the LTP4 is being developed alongside other Oxfordshire road strategies in partnership with Network Rail and other train operators to ensure that the policies do not conflict with the proposals of others. Further consideration will need to be given to the

programming of such schemes to identify in-combination constraints (e.g. travel disruption) and opportunities (beneficial re-use of resources) associated with construction.

- **Development Proposals** - The LTP4 has been developed to support new development proposals in the county associated with economic growth. The in-combination impacts of these developments on the environment will require further consideration at project level, when the nature, design and location of other developments are available. Additionally, as measures are taken forward as part of the Freight Strategy of the LTP4, consideration will be given to the potential for in-combination and cumulative impacts on freight and logistics associated with large scale residential and business developments and the council will ask developers of such sites to prepare Construction Logistics Plans and Delivery and Servicing Plans to ensure that businesses make ongoing arrangements to ensure protection of the environment.

7 Environmental Mitigation and Recommendations

The draft LTP4 provides an opportunity to protect or enhance the environment and provide more pleasant areas in which to work and live. Wherever possible the LTP4 seek to provide the greatest value to the county by delivering multiple benefits through investment in transport infrastructure.

7.1 Population

No significant negative effects on the vitality of town centres, accessibility to jobs, facilities and services or on the countryside/green infrastructure have been identified as a result of delivering the LTP4 Strategies and therefore no mitigation is required.

However, the following recommendations should be taken forward as the plan is delivered to improve local community conditions or where uncertain impacts have been identified:

- Develop schemes that are appropriately sited and designed to avoid or minimise impacts on local communities, their access to the countryside and availability of green infrastructure.
- Promote an intensive educational programme encouraging local journeys on foot or by bicycle or public transport to help support use of town centre facilities.
- Continue to take account of those without access to cars and to provide equality of opportunity, particularly to the elderly and rural communities
- Continue to develop effective partnerships with the public and private sector (e.g. Highways Agency, bus operators, developers, local employers, business groups, rail industry including Network Rail, Department of Transport and councils) to deliver the vision for improved accessibility and capacity improvements.
- Develop the concept of Intelligent Mobility and apply it to transport systems within the county during the implementation of the LTP4.
- Work closely with local planning authorities within the constraints of the National Planning Policy Framework to influence the location and design of new employment sites and any related transport infrastructure.
- Ensure developers of major sites prepare Construction Logistics Plans to minimise impacts of large scale residential and business development planned for Oxfordshire, as well as Delivery and Servicing Plans to ensure that businesses make ongoing arrangements for sustainable freight and logistics. The development of Construction Logistics Plans should also take into consideration the need to maximise opportunities to natural green space and the countryside.
- In line with guidance from Natural England (2009), plan new transport developments to integrate green infrastructure into the design. The demand management element may help to reduce traffic and open up more possibility to convert space otherwise occupied by roads or parking to new elements of green infrastructure.
- Link footpaths and cycleways to existing green infrastructure, especially play spaces, which would support safer access by children and improved physical activity.

7.2 Human Health

No significant negative effects on human health have been identified as a result of delivering the LTP4 Strategies and therefore no mitigation is required.

However, the following recommendations should be taken forward as the plan is delivered to provide improvements to human health or where uncertain impacts have been identified:

- Continue to seek opportunities at project level to promote sustainable travel to support the planned housing growth, and to improve the safety of existing rights of way as part of strategy area implementation.

- Develop new walking and cycling infrastructure where possible, maximising opportunities to natural green space and the countryside, and promoting the creation/extension of and improvements to green and blue infrastructure.
- Continue to seek opportunities at project level to improve the safety and quality of existing rights of way (e.g. improving the quality of surfaces, providing directional signage, access to public transport) as part of strategy area implementation and to provide better integration with rail and strategic bus networks.

7.3 Noise

Some negative noise impacts have been identified, which will arise during the construction of schemes, and will require mitigation: -

- Plan construction activities to minimise disturbance to pedestrians, residents, tourists and workers within affected areas, for example through the use of temporary acoustic screening where appropriate.
- Seek to ensure that freight traffic uses the most appropriate routes, as outlined in Oxfordshire's Inter-urban Freight Strategy and Oxfordshire Lorry Routes Guidance.
- Consider the use of low noise surfacing when constructing new roads and in delivering new walking and cycling routes, which would also have associated health and well-being benefits.

7.4 Air Quality

Some negative air quality impacts have been identified, which will arise during the construction of schemes, and potentially through the increased capacity of the road network to support more vehicles in the longer term, which will require mitigation: -

- Seek to implement measures to counteract traffic growth (e.g. by continuing to improve opportunities for sustainable transport).
- Continue to work with the Highways Agency, district councils, Network Rail and train operators to identify air quality improvements associated with the road and rail network to complement measures identified in Air Quality Action Plans.
- Carefully plan schemes in terms of location, scale and design at project level to ensure air quality reductions are realised.
- Apply restrictions on more polluting vehicles within Oxford to encourage a cleaner fleet. Consideration could be given as to how to apply a "polluter pays" principle into demand management measures.
- Consider use of trees in appropriate locations to filter out pollutants; urban tree planting can be beneficial to air quality, and should be considered at project level.

7.5 Greenhouse Gas Emissions

Some negative greenhouse gas emissions impacts have been identified, which will arise during the construction of schemes, and potentially through the increased capacity of the road network to support more vehicles in the longer term, which will require mitigation: -

- Plan Park & Ride facilities to minimise the likelihood of people driving greater distances than they would otherwise have done if parking.
- Carefully plan road infrastructure improvements (e.g. those on A420) in terms of location, scale and design at project level to ensure gas emission reductions are realised.
- Seek funding through allocated development sites in the Local Plans for improvements to public transport, which will help reduce reliance on private car use and thus greenhouse gases.
- Consider implementing a more intensive programme of 'Intelligent Mobility' services and demand management to increase the uptake of more carbon efficient travel (public transport, walking and cycling) within large towns where there is significant opportunity because of the relative close proximity of various services.

7.6 Biodiversity, Flora and Fauna

Some negative impacts on biodiversity have been identified, which are likely to arise during the construction of transport schemes (e.g. in the footprint of new infrastructure, through habitat fragmentation or through indirect impacts such as reduced air quality/increased noise), and these will require mitigation: -

- Detailed ecological assessment at project level should be undertaken to inform specific routes, siting of infrastructure and associated impact assessment and mitigation requirements, in consultation with Natural England.
- Consideration should be given to integrated habitat improvements as part of schemes, including (but not limited to) opportunities to plant native peripheral trees and shrubs, which can provide improved habitats for birds, invertebrates and small mammals, different mowing regimes and management to ensure pollutants in run-off from roads are intercepted or otherwise reduced.
- Where irreversible and unpreventable impacts on habitats and species are identified, habitat offsetting and replacement is likely to be required.

7.7 Water

Some negative impacts on water have been identified, which are likely to arise during the construction of transport schemes, and these will require mitigation: -

- Detailed assessment at project level should be undertaken to inform specific routes, siting of infrastructure and associated impact assessment and mitigation requirements, in consultation with the Environment Agency to ensure no impacts on water bodies. This is likely to include the requirement for a Water Framework Directive compliance assessment. Schemes will need future consideration during site-specific design to determine whether proposed highway and drainage improvements will result in any significant changes in the quantity and/or quality of highway discharges to any water body. This consideration should include the potential effects combined across the highway network as a whole, and any site-specific sensitivities within the water bodies involved.
- SuDS should be integrated into the design of new infrastructure to help provide opportunity to enhance the existing drainage network and help improve water quality further. The planting of trees and vegetation would also help to reduce surface run-off rates.

7.8 Geology and Soil

Some significant negative impacts on soils and mineral use have been identified, which are likely to arise during the construction and ongoing maintenance of transport schemes, and these will require mitigation:

- Promote the use of secondary materials to reduce the amount of resource consumption in new designs and the beneficial re-use of material. Where possible, existing infrastructure should be used or incorporated into designs to minimise the generation of waste.
- Continue to seek measures to counteract traffic growth, which would help to reduce the maintenance requirements on the road network.
- Seek previously developed sites in the design and construction of new infrastructure.
- Enhance partnership working with local planning authorities and use of the planning system to achieve better coordination between land use planning and future public service provision.
- Carry out detailed environmental assessment of the effects on land use of individual highway schemes and new park & ride facilities (e.g. at Eynsham Park, Vendee Drive junction area, Bicester Village, Lodge Hill interchange), which should be a material consideration in site selection and considered as part of detailed EIA. Wherever possible, new park and ride sites should be located where there would be the least impact upon soils, particularly productive agricultural soils. Where this is not feasible, soils should be recovered and used taking into account relevant legislation.

7.9 Material Assets

No negative impacts on material assets have been identified. However, the following recommendations should be taken forward as the plan is delivered to provide environmental improvements or to mitigate for uncertain impacts:

- Plant trees along key pedestrian walkways and cycleways to create shade and have a cooling effect, where considered appropriate
- Use SuDS and temperature resilient surfaces for new networks.
- Ensure maintenance requirements take into account climate change predictions in seeking to make adaptations such as more temperature resilient surfacing.

7.10 Historic Environment

No negative impacts on material assets have been identified. However, the following recommendations should be taken forward as the plan is delivered to provide environmental improvements or to mitigate for uncertain impacts:

- Detailed archaeological assessment at scheme level including detailed historic characterisation studies to inform development to ensure the protection of cultural heritage and archaeology during construction
- Measures to restrict access of polluting vehicles would help to preserve building facades which are vulnerable to particulate pollution.
- Wherever traffic congestion in town centres is reduced it is recommended that the benefits are locked in through reallocation of road space to enhance the public realm.
- Prepare management plans for heritage assets; as appropriate

7.11 Landscape

Significant negative impacts on landscape character have been identified as a result of the LTP4, which will require project level mitigation:

- Detailed landscape and visual impact assessment at scheme level to ensure that schemes are designed to protect national (e.g. North Wessex Downs AONB), regional and local landscape character and seek to minimise visual intrusion. This should be implemented through a detailed scheme level EIA, where appropriate.

8 Monitoring Plan

8.1 Introduction

The SEA directive sets out that 'member states shall monitor the significant environmental effects of the implementation of plans and programmes to identify at an early stage, unforeseen negative effects, and to be able to undertake appropriate remedial action' (Article 10.1). In addition, the Environmental Report should provide a 'description of the measures envisaged concerning monitoring' (Annex I(i)).

This chapter therefore documents how, once adopted, Oxfordshire County Council will monitor the environmental effects of implementing the LTP4 against the predictions made by the SEA. The key principles of implementation and monitoring are to: -

- Ensure that mitigation measures are fully implemented and are effective
- Monitor all the significant environmental effects identified during assessment and documented in the Environmental Report. This includes all significant positive, negative, foreseen and unforeseen environmental effects
- Identify any unforeseen environmental effects
- Avoid duplication of monitoring by utilising existing monitoring programmes

Monitoring is important in evaluating any unforeseen cumulative effects and can also be used to address any uncertainties or gaps in the data through the provision of a more detailed baseline.

8.2 Monitoring Proposals

The monitoring proposals included in this section refer to the significant effects that have been predicted as a result of the draft LTP4 Policies and Area/Supporting Strategies, as well as the effects which are highly uncertain.

At present the monitoring requirements are not well developed. There is currently significant uncertainty over available public funding and the monitoring programme may need to be designed to be achievable within limited budgets. Therefore it may be necessary to identify other monitoring regimes and link in with those processes to avoid duplication of effort, and to make the best use of available information. The monitoring framework will be developed further and confirmed in the SEA Statement which will be prepared once the Final SEA has been developed.

8.3 Monitoring Plan

Table 8.1 provides an overview of monitoring proposed in relation to the predicted **significant effects** (major positive and negative effects) during the life of the LTP4 (up to 2031) or where uncertain effects have been identified in this same timescale, taking into consideration the SEA assessment criteria that have been derived.

Table 8.1 Environmental Strategic Monitoring Plan [for discussion – as to what is achievable]

SEA Receptor	Assessment Criteria	Potentially Significant or Uncertain Impact	Monitoring Required	Potential Response	Target
Population	• Is the LTP4 likely to reduce the impacts of traffic in the public realms of key settlements? • Will it be possible to access key settlements and proposed growth areas by convenient public transport? • Will town centres be easier to walk or cycle to and around for local residents?	**Significant beneficial effects** Improvement to town centres	Change in accessibility to key settlements by public transport and sustainable modes of transport through level of service by bus and rail services (number of routes and frequencies), plus a qualitative assessment of cycling provision.	To be confirmed	Vitality of town centres maintained
	• Is public transport and community transport likely to improve under the LTP4? • Are all groups' transport needs catered for including rural residents without cars, elderly, disabled and children?	**Significant beneficial effects** Improved accessibility to jobs, facilities and services	Change in community severance Change in accessibility for disadvantaged groups Maintain a record of the levels of public transport and community transport available to isolated communities.	To be confirmed	Improved accessibility to jobs, facilities and services
	• Are schemes included to promote non-motorised access and maximise opportunities to natural green space and the countryside? • Does the LTP4 increase the safe provision of bridleways, cycle trails and footpaths? • Do new schemes promote the creation/extension of and improvements to GI, including consideration of personal mobility?	**Uncertain effects:** potential impacts on GI and countryside due to land-take	Change in area of GI and number of new GI improvements Area of land-take within countryside Number of new public rights of way	To be confirmed	GI and sensitive countryside protected from transport improvements
Human Health	• Does the LTP4 improve conditions for pedestrians and cyclists? • Does the LTP4 demonstrate a commitment to the health benefits of	**Significant beneficial effects** Improved facilities for pedestrians and cyclists with associated effects on health and safety	Accessibility to health facilities Accident statistics for pedestrians and cyclists	To be confirmed	Improved physical and mental well-being and safety of communities in Oxfordshire, as a result of the LTP4

SEA Receptor	Assessment Criteria	Potentially Significant or Uncertain Impact	Monitoring Required	Potential Response	Target
	physical activity and a move away from car dependency for shorter journeys? • Does the LTP4 increase capacity of transport infrastructure and improve connectivity?				
Noise	• Will disturbance from traffic be reduced in residential areas? • Is noise from traffic likely to change in rural locations and affect tranquility?	**Uncertain effects:** uncertain due to increased noise pollution during construction. Longer term impacts will be dependent on location of new infrastructure	Changes in noise levels as a result of transport improvements Change in number of sensitive receptors affected by transport noise	Project-level noise impact assessment / EIA mitigation required	Reduced transport related noise to sensitive receptors
Air quality	• Does the LTP4 encourage and facilitate the use of active travel and short journeys? • Will the LTP4 help to reduce traffic congestion? • Will the LTP4 limit the more polluting vehicles in sensitive areas? • Will the LTP4 help to limit traffic growth?	**Uncertain effects:** impacts are dependent on location of new infrastructure	Change in air quality within AQMAs Change in air quality levels	Project-level air quality impact assessment / EIA mitigation required	Air quality maintained and exceedances of air quality standards reduced
Climatic factors	• Does the LTP4 reduce or limit dependency on finite fossil fuels? • Does the LTP4 support or facilitate the use of low carbon modes of transport? • Does the LTP4 help ensure that vehicle journeys can be made efficiently with minimum disruption or distance?	**Uncertain effects:** uncertain in the short-term due to increased emissions during construction	Number of awareness campaigns to minimise freight travel	Project-level air quality impact assessment / EIA mitigation required	Reduced transport related greenhouse gas emissions
Biodiversity, flora, fauna	• Will new schemes affect priority habitats or the conservation status of designated nature conservation sites? • Are new transport routes likely to cause severance of wildlife corridors? • Does the LTP4 support biodiversity improvements?	**Significant negative effects** Potential loss and fragmentation of habitats Potential impacts on designated nature conservation sites	Change in condition of designated wildlife sites at risk from transport infrastructure or transport	Project-level ecological impact assessment / EIA mitigation required Project level HRA relating to Oxford Meadows SAC. Review and if necessary revise Area/Supporting Strategies if assessments concludes detrimental	No deterioration in condition of designated sites No net loss of habitats or species of principal importance

SEA Receptor	Assessment Criteria	Potentially Significant or Uncertain Impact	Monitoring Required	Potential Response	Target
				effects on nature conservation features	
Geology and soils	• Does the LTP4 require large scale demolition and construction of new infrastructure? • Will proposals under LTP4 require significant resources for ongoing maintenance? • Is the LTP4 likely to increase demand for greenfield land and/or result in the loss of moderate to high quality (Grades 3 and above) agriculturally productive land? • Is there a likelihood that new schemes will affect geologically designated sites?	**Significant negative effects:** The transport network improvements are likely to be resource intensive and comprise considerable land-take	Volumes of materials exported/imported to site during construction of schemes Area of agricultural land affected by schemes (in particular Grades 1 – 3 land)	To be confirmed	Protection of soils and mineral resources
	• Do the proposals make use of previously developed sites? • Are transport improvements feasible within the footprint of existing infrastructure?	**Uncertain effects:** unknown at this plan level whether brownfield land will be optimised/prioritised when safeguarding land for transport schemes	Area of brownfield and greenfield land affected by delivery of LTP4	To be confirmed	Use of greenfield land avoided or minimised as a result of delivering the LTP4
The Historic Environment	• Will the LTP4 negatively affect any cultural heritage assets and/or their setting? • Is there a likelihood that proposals will encroach upon undeveloped land, which may harbour archaeological remains? • Does the LTP4 include provision for sustainable access to key cultural heritage sites? • Are the LTP4 measures sympathetic to the local character of the historic environment?	**Uncertain impacts:** Potential damage to heritage assets and their setting, and potential opportunities to improve access	Change in number of heritage assets adversely affected by the LTP4 (using heritage Counts: State of the Historic Environment and locally derived indicators) Change in accessibility to heritage assets as a result of LTP4 delivery e.g. public transport service/pedestrian/cycle access to heritage sites Number of designated heritage assets within Air Quality Management Areas	Production of archaeological assessments during project development	Production of archaeological evaluations where heritage assets are affected. Avoidance of harm to the significance of heritage assets as a result of the LTP4 delivery. Improved access to key cultural heritage sites
Landscape	• Will additional transport infrastructure be developed which will encroach upon	**Significant negative effects** Road improvements may adversely affect landscape character within the	Area of AONB affected by transport proposals	LVIA undertaken during project development EIA, and projects involving new	No detrimental effects on landscape

SEA Receptor	Assessment Criteria	Potentially Significant or Uncertain Impact	Monitoring Required	Potential Response	Target
	designated landscapes and the countryside? • Will lighting provision change on transport infrastructure?	Wessex Downs Area of Outstanding Natural Beauty (AONB) and its wider setting (e.g. impact on landscape features, loss of open countryside, loss of tranquillity, change in visual amenity).	Change in lighting provision	transport infrastructure, should be subject to 'before' and 'after' landscape assessment	character within the North Wessex Downs AONB
Cumulative impacts	• Integration of LTP4 with plans and projects of other organisations	**Uncertain effects:** cumulative impacts with Local Plans, town masterplans, proposed and allocated development, Network Rail and rail operator proposals, and MOD proposals	Monitor development of other major plans and projects	Prepare detailed project level cumulative impact assessment	Cumulative impacts are clear and can be managed if required.

9 Next Steps

The SEA Regulations set specific requirements for consultation with the Consultation Bodies, the public and other interested parties (these could include non-governmental organisations and community groups), and require that the Environmental Report is made available for consultation alongside the consultation draft LTP4.

This Environmental Report and a separate Non-Technical Summary will be made available on the Oxfordshire County Council consultation webpage under Local Transport Plan 4:

http://www.oxfordshire.gov.uk or from

[address to be inserted].

The consultation period for the draft LTP4 and this ER will start on [to be confirmed] and will run for xno weeks [to be confirmed]. Comments received during this period will be taken into account in the preparation of the final LTP4 and a document will be prepared to explain how any comments have been addressed.

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