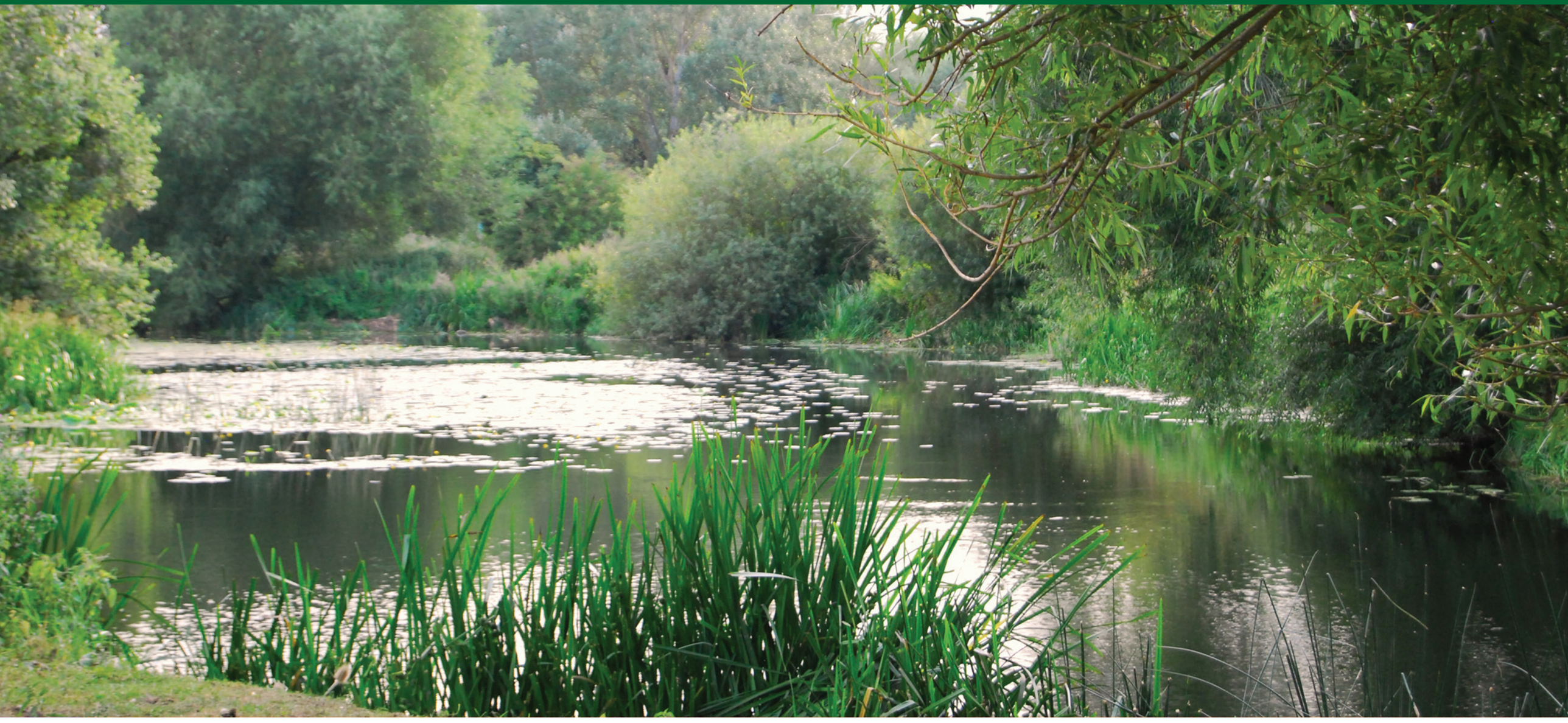
HIGHWAYS AGENCY

Safe roads, reliable journeys, informed travellers

Cambridge to Huntingdon improvement scheme
Preliminary environmental information report

A14

April 2014



An executive agency of the Department for Transport

This document is the A14 Cambridge to Huntingdon Improvement Scheme Preliminary Environmental Information Report. It provides an initial statement of the main environmental information available for the study area, along with descriptions of the likely environmental effects and mitigation measures envisaged for the proposed scheme. This document is intended to give members of the public an understanding of the key issues and enable them to prepare well-informed responses to consultation.

It should be noted that at this stage the information is preliminary. An iterative process of scheme development and environmental impact assessment is ongoing. The assessment undertaken for this report is based mainly on the scheme at the stage the design was at in January 2014. However, for consistency with the spring 2014 consultation material, the April 2014 proposed scheme design is shown in the figures of this report, unless otherwise specified. Chapter 1 summarises the main design differences. In most cases, any differences are very small and do not give rise to material changes in impacts. Possible exceptions to this are detailed below:

- **Borrow pit locations:** Recent amendments have been made to proposed borrow pit locations and **Appendix A** (Borrow Pit Development) provides an assessment of possible environmental impacts.

- **Brampton interchange arrangement:** This is described in **Chapter 4** (Outline of Main Scheme Alternatives), **Box 4.1** (Proposed Layout for Brampton Interchange). At the time of undertaking the assessment for this report, the April 2014 proposed Brampton layout, shown on **Figure 4.1** of this report, emerged as an alternative arrangement. The ongoing process of design development and assessment now identifies this arrangement as the proposed layout and it thus forms part of the April 2014 proposed scheme and is referred to as the proposed Brampton layout in the spring 2014 consultation material.

In addition to ongoing refinement of the scheme design, the traffic model was also refined during the period of this preliminary assessment. The traffic figures used to provide the data for the preliminary environmental information assessments therefore slightly differ from the figures shown on the spring 2014 consultation material. The difference in flows is not envisaged to be significant.

Preface

The Highways Agency is responsible for the maintenance and improvement of the trunk road and motorway network in England. The Highways Agency's key objectives are to achieve safe roads and reliable journeys for informed travellers.

In late 2013, the Highways Agency appointed a consortium of consultants known as J2A (Jacobs, Aecom and Arup) as the Designer for the A14 Cambridge to Huntingdon Improvement Scheme.

The role of the Designer includes preparation of the preliminary design of the proposed scheme, carrying out the environmental impact assessment (EIA) and preparation of the application to the Secretary of State through the Planning Inspectorate (as responsible agency) for a Development Consent Order (DCO). The Secretary of State for Transport will make the final decision on whether or not a DCO is granted for the scheme.

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Contents

Preface ... **ii**

NON TECHNICAL SUMMARY ... **viii**

1 INTRODUCTION ... **1**
1.1 A14 Cambridge to Huntingdon Improvement Scheme ... 1
1.2 Environmental Impact Assessment ... 1
1.3 Purpose of this Report ... 2
1.4 Scope and Content of the Preliminary Environmental Information Report ... 2
1.5 Human Health Impacts ... 3
1.6 Summary of EIA Process ... 3
1.7 Availability of the Preliminary Environmental Information Report ... 4
1.8 A Note about Data and Figures ... 4

2 SCHEME BACKGROUND ... **5**
2.1 Objectives of the Proposed Scheme ... 5
2.2 Recent Scheme History ... 5

3 DESCRIPTION OF THE SCHEME ... **7**
3.1 Overview ... 7
3.2 Widening of the A1 ... 7
3.3 Huntingdon Southern Bypass ... 7
3.4 Downgrading of the Existing A14 trunk road through Huntingdon ... 7
3.5 A14 Widening ... 7
3.6 New Junctions and Junction Upgrades ... 7
3.7 Local Access Roads ... 10
3.8 Provision for Pedestrians, Cyclists and Equestrians ... 10
3.9 Proposed Borrow Pits ... 10
3.10 Design Considerations for Climate Change ... 10

4 OUTLINE OF MAIN SCHEME ALTERNATIVES ... **11**
4.1 Introduction ... 11
4.2 A14 Study Options (Department for Transport 2011 – 2012) ... 11
4.3 Development of Options 7A and 7B ... 13
4.4 The April 2014 Proposed Scheme ... 13

5 AIR QUALITY AND NOISE ... **15**
5.1 Introduction ... 15
5.2 Local Environment ... 16
5.3 Potential Impacts on Air Quality ... 19
5.4 Potential Impacts on Noise and Vibration ... 20
5.5 Chapter Summary ... 21

6 CULTURAL HERITAGE ... **22**
6.1 Introduction ... 22
6.2 Archaeological Remains ... 22
6.3 Built Heritage ... 23
6.4 Historic Landscape ... 23
6.5 Potential Impacts during Construction ... 23
6.6 Potential Mitigation during Construction ... 27
6.7 Potential Impacts during Operation ... 27
6.8 Potential Mitigation for Impacts from Operation ... 27
6.9 Chapter Summary ... 27

7 LANDSCAPE AND VISUAL IMPACTS ... **28**
7.1 Introduction ... 28
7.2 Landscape and Townscape Character ... 28
7.3 Views and Visual Amenity ... 29
7.4 Potential Impacts during Construction ... 29
7.5 Potential Mitigation for Effects upon Landscape and Views from Construction ... 30
7.6 Potential Impacts during Operation ... 30
7.7 Potential Mitigation for Effects upon Landscape and Views from Operation ... 30
7.8 Chapter Summary ... 31

8 NATURE CONSERVATION ... **32**
8.1 Introduction ... 32
8.2 Designated Habitats ... 32
8.3 Protected Species ... 33
8.4 Potential Impacts upon Nature Conservation ... 34
8.5 Potential Mitigation and Designing for Nature Conservation Enhancement ... 35
8.6 Chapter Summary ... 35

9 THE WATER ENVIRONMENT ... **36**
9.1 Introduction ... 36
9.2 Water Environment Receptors ... 36
9.3 Potential Impacts on the Water Environment ... 37

9.4 Potential Mitigation for the Water Environment 37
9.5 Chapter Summary 38

10 GEOLOGY, SOILS, MATERIAL RESOURCES AND WASTE 39
10.1 Introduction 39
10.2 Contamination and Contaminated Land 39
10.3 Geology 40
10.4 Soil 40
10.5 Material Resources 42
10.6 Sustainable Construction 43
10.7 Proposed Borrow Pits 43
10.8 Chapter Summary 43

11 PEOPLE AND COMMUNITIES 44
11.1 Introduction 44
11.2 Local Community 44
11.3 Local Economy and Private Assets 44
11.4 Potential Impacts upon Local Community, Local Economy and Private Assets 44
11.5 Measures to Mitigate Impacts upon Local Communities & Economy 45
11.6 Highway Users 45
11.7 Public Rights of Way 46
11.8 Open Space 46
11.9 Potential Impacts on Highway Users, Public Rights of Way and Open Space during Construction 46
11.10 Potential Impacts on Highway Users, Public Rights of Way and Open Space during Operation 47
11.11 Chapter Summary 47

12 CUMULATIVE EFFECTS 49
12.1 Introduction 49
12.2 Approach to Assessment 49
12.3 Preliminary Identification of Key Developments 49
12.4 Potential Cumulative Impacts 49
12.5 Chapter Summary 49

13 CONCLUSIONS 51
13.1 Proposed Scheme 51
13.2 Potential Impacts on the Environment 51

14 NEXT STEPS 52
14.1 Consultation 52
14.2 After the Consultation 52

15 TECHNICAL GUIDANCE, LEGISLATION AND SOURCES OF INFORMATION 53
15.1 Introduction 53
15.2 List of Guidance Informing the EIA Process 53
15.3 Information Sources Used to Inform Preliminary Baseline 55

Glossary 57

Appendix A: Borrow Pit Development 60

Tables

Table 4.1: Shortlisted Highway Options from DfT A14 Study
Table 5.1: Air Quality Standards
Table 5.2: Typical Sound Levels found in the Environment
Table 5.3: Likely Impacts upon Sensitive Noise Receptors from the January 2014 Scheme Operation
Table 9.1: WFD Water Body and Status
Table 10.1: Waste Management Targets

Figures

Figure 0.1: Schematic Diagram of proposed A14 Cambridge to Huntingdon Improvement Scheme
Figure 1.1: Schematic diagram of the April 2014 proposals for the A14 Cambridge to Huntingdon Improvement Scheme
Figure 1.2: Schematic diagram of the January 2014 proposals for the A14 Cambridge to Huntingdon Improvement Scheme (which mainly is addressed in this report)
Figure 3.1a: Proposed A14 Cambridge to Huntingdon Improvement (Ellington to Fenstanton)
Figure 3.1b: Proposed A14 Cambridge to Huntingdon Improvement (Fenstanton to Milton)
Figure 4.1: Original and Proposed Brampton Layouts
Figure 5.1a: Huntingdon and Brampton AQMAs
Figure 5.1b: St Neots AQMA
Figure 5.1c: Hemingford - Fenstanton A14 AQMA
Figure 5.1d: A14 Corridor and Cambridge City AQMAs
Figure 6.1a: Environmental Context (Ellington to Fenstanton)
Figure 6.1b: Environmental Context (Fenstanton to Milton)
Figure 6.1c: Environmental Context (Huntingdon town centre)

Figure 10.1: January 2014 scheme overlaid on ALC Map

Figure 10.2: The Waste Hierarchy

Figure A.1a: Borrow Pit 5

Figure A.1b: Borrow Pit 6

Figure A.1c: Borrow Pit 7

Figure A.2: Proposed Borrow Pits and 2009 A14 Ellington to Fen Ditton Scheme Borrow Pits

Plates

Plate 6.1: The medieval Huntingdon Bridge

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NON TECHNICAL SUMMARY

Introduction

The Highways Agency has commissioned this Preliminary Environmental Information (PEI) Report to be prepared as part of the environmental impact assessment (EIA) process for the A14 Cambridge to Huntingdon Improvement Scheme (the proposed scheme). The aim of this document is to provide the public with sufficient understanding of the design and environmental issues to be able to develop a good understanding of the proposed scheme, so that they can give informed responses as part of the consultation.

It should be noted that the design of the proposed scheme is currently being developed. The Highways Agency is still in the process of gathering environmental information and identifying how the environment is likely to be affected by the proposed scheme. The information within this document should therefore be understood as a ***preliminary*** account of the environmental issues. The final EIA will be provided within a document called an Environmental Statement (ES) which will be submitted as part of the Development Consent Order (DCO) application to the Secretary of State through the Planning Inspectorate (as responsible agency) in autumn 2014[1].

Objectives of the Scheme

The Government's **Draft National Policy Statement for National Networks**[2], published in December 2013, states that the Government's policy is to deliver improvements in capacity and connectivity on the national network to support economic growth and improve quality of life. The objectives of the proposed scheme can be summarised as follows:

- **combat congestion:** making the route between Huntingdon and Cambridge more reliable and providing capacity for future traffic growth;
- **unlock growth:** enabling major residential and commercial developments to proceed, leading to increased economic growth, regionally and nationally;
- **connect people:** by placing the right traffic on the right roads and freeing up local capacity for all types of road user, including pedestrians, cyclists and equestrians;
- **improve safety:** designing the proposed scheme to modern highway standards, introducing better lane control, and providing adequate capacity for predicted traffic levels; and
- **create a positive legacy:** recognising the wider benefits of the road improvement scheme for local communities and businesses.

For further detail regarding the objectives of the proposed scheme, refer to the **A14 Cambridge to Huntingdon improvement scheme, Technical review of options**[3] (September 2013) which is available as part of the spring 2014 consultation material for the proposed scheme and at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/243999/a14-technical-review-of-options.pdf

Description of the Scheme

The proposed scheme is a highway improvement between Huntingdon and Cambridge, covering a distance of approximately 34km (21 miles) west to east of the A14 corridor, and online improvements of the A1, covering a distance of approximately 6km (3 ¾ miles) north to south.

The proposed scheme involves:

- Widening and realignment of the A1 between Brampton and Alconbury over a length of approximately 6km (3 ¾ miles) including tie-ins, from the existing two lane dual carriageway to a three lane dual carriageway. There is a proposed new interchange with the A14 west of Brampton.
- A new Huntingdon Southern Bypass of approximately 18km (11 ¼ miles) in length, which would provide a two lane dual carriageway between Ellington and the A1 at Brampton and a three lane dual carriageway between Brampton and Swavesey; this would remove a large proportion of traffic from the section of the existing A14 between Huntingdon and Swavesey. The new bypass would include a raised viaduct section of road running across the river Great Ouse and a bridge over the East Coast Mainline railway.
- Downgrading the existing A14 trunk road (de-trunking to county road status) over approximately 21.5km (13 ½ miles) between Ellington and Swavesey, as well as between Alconbury and Spittals interchange.
- Huntingdon Town Centre improvements - to include the demolition of the A14 viaduct over the East Coast Mainline railway and Brampton Road in Huntingdon. A through route would be maintained broadly along the line of the existing A14 through Huntingdon, making use of the Brampton Road bridge to cross the railway line and by constructing a new link road from Brampton Road to connect with the A14 to the west.
- Widening of the existing A14 over approximately 9km (5½ miles) to provide three lanes in both directions between Swavesey and Bar Hill, and four lanes in both directions between Bar Hill and Girton.
- Widening of a 2.5km (1½ mile) section of the Cambridge Northern Bypass between Histon and Milton.
- Improvement of existing A14 junctions at Swavesey, Bar Hill and Girton – to improve the capacity of the road, compatibility with adjacent proposed developments, such as Northstowe, and connections for non-motorised users.
- New local access roads – to consist of approximately 8km (5 miles) of single carriageway local access road alongside the widened A14 between Fen Drayton and Girton. This local access road would provide a route for local traffic between Cambridge and Huntingdon, as well as providing access to properties and businesses along the corridor.

An iterative process of scheme development and EIA is ongoing. The assessment undertaken for this report is based mainly on the scheme at the stage the design was at in January 2014

[1] A Development Consent Order is required for projects which are classified as Nationally Significant Infrastructure Projects under the Planning Act 2008.
Projects under the Planning Act 2008.
[2] Department for Transport (December 2013). Draft National Policy Statement for National Networks. The Stationary Office, London.
[3] Highways Agency (September 2013). A14 Cambridge to Huntingdon improvement scheme. Technical review of options.

(referred to in this report as '**the January 2014 scheme design'**) and therefore the report mainly addresses the likely impacts of this version of the scheme. While this report was being prepared the scheme continued to be developed and an alternative favoured scheme design emerged in April 2014. As a result there are some differences between the proposed scheme shown in the spring 2014 consultation material (referred to in this report as '**the April 2014 proposed scheme design'**) and the scheme assessed in the main body of this report. However, for consistency with the spring 2014 consultation material, the April 2014 proposed scheme design is shown in the figures of this report, unless otherwise specified. The key elements of the scheme (as at January 2014 and April 2014) are indicated schematically on **Figure 0.1**.

The majority of the differences between the January 2014 scheme design and the April 2014 proposed scheme design are minor and make no difference to the potential environmental impacts described. There are two exceptions to this, where design changes are more significant: borrow pit locations (this is addressed in **Appendix A** (Borrow Pit Development) of this report); and the layout of the A1 and A14 interchange at Brampton (this is addressed by text in yellow boxes within this report). The January 2014 Brampton layout and the April 2014 proposed Brampton layout are illustrated in **Box 4.1** (Proposed Layout for Brampton Interchange) of this report.

The detailed figures included in this report show the April 2014 proposed scheme design (which includes the April 2014 proposed Brampton layout) with explanatory insets to show the Brampton layout from the January 2014 scheme design.

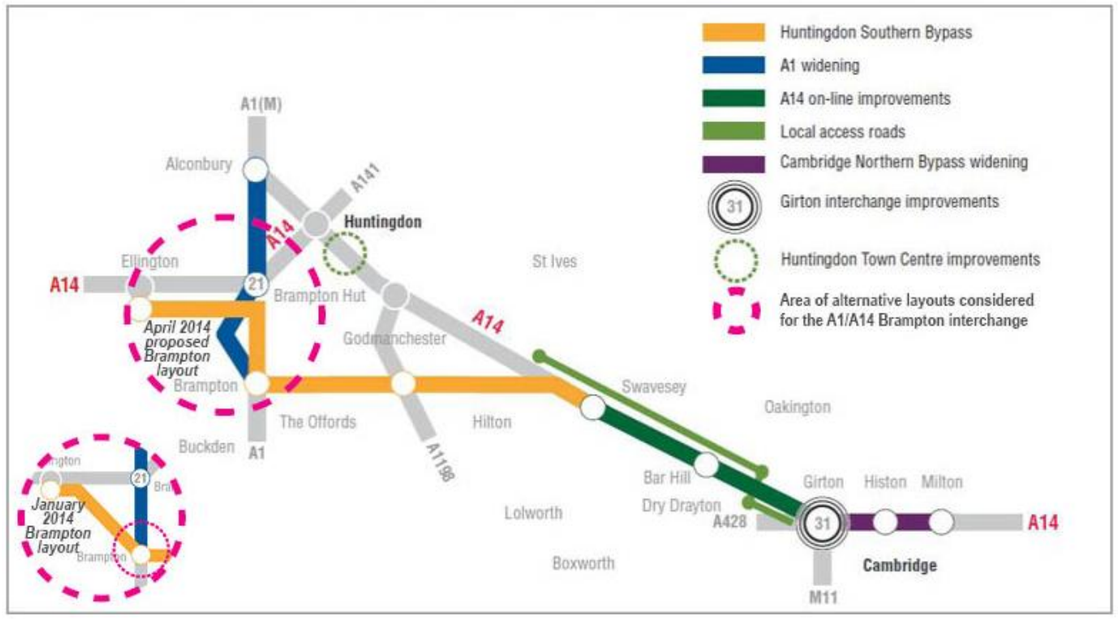

Figure 0.1: Schematic Diagram of proposed A14 Cambridge to Huntingdon Improvement Scheme

Alternatives

Several potential alternative options for improvement of the A14 have been considered and consulted upon previously. The alternatives considered in previous studies have included finding ways to alleviate congestion through other modes of transport as well as through other highway arrangements and route corridors. These previous studies have identified that the congestion problems cannot be tackled by improvements to other transport modes alone and that a highway scheme is needed. The design of the proposed scheme has evolved through consideration of a number of highway arrangement options against economic, social and environmental criteria.

Potential Environmental Effects

The scale and location of the proposed scheme would mean that several different aspects of the environment would be potentially affected, either through the construction of the proposed scheme or during its operation. Our preliminary findings (based on a slightly earlier iteration of the scheme design) indicate that environmental impacts are likely to be as follows:

Air Quality

There are existing areas which suffer from poor air quality within the A14 corridor as a result of traffic emissions. Six areas have been designated as Air Quality Management Areas (AQMAs) because air quality standards have been breached. It is anticipated that air quality would improve as a result of the proposed scheme in three AQMAs (Huntingdon, Brampton and Hemingford to Fenstanton A14 AQMAs) as a result of reduced traffic flows through the areas due to the downgrading of the existing A14 trunk road to county road status and diversion of traffic onto the proposed bypass south of Huntingdon. There is not expected to be a significant change for the remaining three AQMAs as a result of the proposed scheme. It is likely that air quality would deteriorate in areas where the new bypass would be located but not to an extent that air quality standards are breached.

During construction the main impact upon air quality would be likely to be dust, which can cause nuisance to people and property in close proximity to construction activities. However, there are various construction practices which would be applied to control dust emissions and the contractors would be required to implement them.

Noise and Vibration

There are likely to be increases in road traffic noise in some locations, such as for properties close to the proposed Huntingdon Southern Bypass, whilst there would be decreases in other locations such as properties within Huntingdon. Further assessment will be carried out to confirm whether overall there would be an increase or decrease in locations subject to significant traffic noise. There would not be any significant impact from ground-borne vibration during the proposed scheme operation although there is a potential for airborne vibration which will be assessed as part of the ongoing EIA. The design of the proposed scheme would include noise barriers to help reduce noise in key locations. During construction there would be noise from construction activities which would be managed through the application of British Standards relating to control of construction related noise.

Cultural Heritage

There are several heritage assets which potentially could be adversely affected by the proposed scheme either directly, for example through loss or damage during construction, or indirectly, for

example through adverse effects upon the setting. However, the removal of the trunk road through Huntingdon would also have a potential beneficial effect upon the setting of historic sites. The options for mitigation would include designing the proposed scheme to avoid or reduce impacts upon heritage assets and possibly enable the preservation of archaeological assets *in situ*. Archaeological investigations and historic building and landscape recording undertaken in advance of construction would help to mitigate potential effects on heritage assets, whilst careful design choices and landscaping could help to mitigate the effects upon the settings of historic buildings and other features.

To inform the preparation of the final assessment for cultural heritage, further work will be undertaken including site inspections, archaeological fieldwork and specialist input to the detailed design of the proposed scheme.

Landscape and Visual Impacts

There are likely to be significant effects (both adverse and beneficial) upon views and the landscape as a result of the construction and operation of the proposed scheme. Traffic on the highway, the presence of new bridges, lighting, sign gantries, as well as associated landscaping and tree planting, would all affect views and the landscape. However, ways of mitigating impacts will be explored, where practicable, through sensitive design and construction planning.

Nature Conservation

The biodiversity value of much of the proposed scheme area has been compromised by intensive agriculture. However, there are some existing areas of valuable habitat which could potentially be affected by the proposed scheme. There are also species of significant nature conservation importance, including protected species, which could be affected by the proposed scheme. Impacts would potentially include the actual loss of habitat and fragmentation of habitat, disturbance to wildlife from noise and lighting, and animal mortalities from collisions with traffic. The ongoing EIA work for the proposed scheme will help to identify ways to mitigate the potential impacts through sensitive design and management during the construction and operation phases. Sensitive landscaping and scheme design may help to improve local biodiversity in the longer term.

The Water Environment

The water environment includes surface water features such as rivers, ponds and marshes, areas associated with flood risk and groundwater resources. Within the study area there are water resources important for various reasons including ecology, recreation and water supply. The proposed scheme would require crossings of the following watercourses: Alconbury and Brampton Brooks, Ellington Brook, river Great Ouse, West Brook, Swavesey Drain and Cottenham Lode (Beck Brook). The options for mitigation would include designing the proposed culverts, outfalls and realignments in a way that follows best practice and provides benefit to the surrounding environment where possible.

Highway drainage design standards have been developed to protect the water environment from highway pollution and to prevent increases in flood risk. There are also established construction practice guidelines to manage pollution risks during construction. Further investigations and assessments will be completed to inform the EIA process and design.

Geology, Soils, Material Resources and Waste

There is potential for the proposed scheme to encroach upon areas of land which would potentially expose sources of contamination. Further site investigations as part of the EIA would help to identify whether contamination is present and the measures to be undertaken to ensure that there would be no significant risk of significant harm to people and the environment.

A large part of the proposed scheme would affect agricultural land of high quality. A suitable soil management strategy would help retain as much soil as possible in good condition for re-use within the proposed scheme landscape proposals and re-instatement of land disturbed by temporary construction impacts, including borrow pit works.

The proposed scheme, as a major infrastructure project, would require large volumes of material and may generate significant quantities of waste. The implementation of a Site Waste Management Plan would help to focus on identifying opportunities to reduce waste and re-use of suitable materials wherever possible.

People and Communities

Various public and private assets would be affected by the proposed scheme, in particular agricultural land and the farming businesses which rely on that land. There is also likely to be a combination of beneficial and adverse impacts on the local communities and the wider economy. For example the downgrading of the existing A14 trunk road to county road status would reduce existing severance and may improve access to some businesses. However, the proposed bypass might also take potential business away from some locations. The net effect cannot currently be estimated, but will be further assessed as part of the EIA. Mitigation, such as compensation for loss of land, will be incorporated into the scheme proposals.

There are likely to be beneficial and adverse impacts upon people's journey patterns and amenity from the proposed scheme. This would include some diversions of public rights of way, but there are also opportunities to improve conditions for pedestrians, cyclists and equestrians through the downgrading of the existing A14 trunk road to county road status and proposed new or improved crossings. These will also be investigated further in the EIA in collaboration with local authorities and other groups.

Cumulative Effects

Cumulative effects can result from the impacts of multiple projects or from a number of different impacts from a single project, accumulating to affect a single environmental resource or receptor. There are several large scale developments within the A14 study area, including major housing developments such as Northstowe and land north of Waterbeach, as well as mixed use and employment development proposals, particularly around the northern fringe of Cambridge, which may contribute to cumulative effects on the environment.

Possible cumulative effects may include the incremental loss of agricultural land, fragmentation of wildlife habitat, incremental loss of tranquillity or rural setting, including increased effects of lighting, and increased pressure on recreational and community land. Improved practices in mitigation and design may also lead to positive effects upon biodiversity from incremental enhancements of habitats as a result of landscaping schemes for a variety of projects.

The potential cumulative effects will be investigated further as part of the EIA and recommendations to improve environmental outcomes will be provided where appropriate.

Consultation

The Highways Agency wishes to obtain the views of the public on the draft proposals for the April 2014 proposed scheme design, taking into account the potential environmental effects of the proposed scheme. Those views can then be taken into account in finalising the design and refining the EIA and ES.

There will be a 10 week period from the 7 April 2014 for members of the public to respond to the consultation. Responses can relate to the preliminary environmental information set out in this report or to any other aspect of the proposed scheme. They can be made by completing a questionnaire by letter, by e-mail or online, using any of the following addresses:

By post:

Freepost RRAY-TAUA-SUGT

A14 Cambridge to Huntingdon Improvement Scheme

Highways Agency

Woodlands

Manton Lane

Bedford

MK41 7LW

Website: http://www.highways.gov.uk/roads/road-projects/A14-Cambridge-to-Huntingdon-Improvement-Scheme

Email: A14CambridgeHuntingdon@highways.gsi.gov.uk

After the Consultation

After the consultation period, all responses will be considered in finalising the proposed scheme design and the ES. A report will be prepared on the responses received and how they have been taken into account, including whether or not they led to changes to the proposed scheme.

The Highways Agency is required to seek authorisation to construct the proposed scheme through an application to the Secretary of State through the Planning Inspectorate (as responsible agency) for a DCO. The ES will be submitted with the DCO application in autumn 2014. Once accepted by the Planning Inspectorate on behalf of the Secretary of State, the public will have further opportunity to comment on the application. Details of how the process works can be found on the National Infrastructure Planning website[4] and information is also provided in the A14 Consultation Brochure.

[4] The Planning Inspectorate (2012). National Infrastructure Planning. Available at: http://infrastructure.planningportal.gov.uk/

1 INTRODUCTION

1.1 A14 Cambridge to Huntingdon Improvement Scheme

1.1.1 The Highways Agency intends to improve the A14 trunk road in Cambridgeshire between Ellington on the western outskirts of Huntingdon and Milton Junction on the Cambridge Northern Bypass.

1.1.2 The A14 Cambridge to Huntingdon Improvement Scheme (the proposed scheme) essentially involves:

- Widening and realignment of the A1 between Brampton and Alconbury over a length of approximately 6km (3 ¾ miles) including tie-ins, from the existing two lane dual carriageway to a three lane dual carriageway. There is a proposed new interchange with the A14 west of Brampton.
- A new Huntingdon Southern Bypass of approximately 18km (11 ¼ miles) in length, which would provide a two lane dual carriageway between Ellington and the A1 at Brampton and a three lane dual carriageway between Brampton and Swavesey; this would remove a large proportion of traffic from the section of the existing A14 between Huntingdon and Swavesey. The new bypass would include a raised viaduct section of road running across the river Great Ouse and a bridge over the East Coast Mainline railway.
- Downgrading the existing A14 trunk road (de-trunking to county road status) over approximately 21.5km (13 ½ miles) between Ellington and Swavesey, as well as between Alconbury and Spittals interchange.
- Huntingdon Town Centre improvements - to include the demolition of the A14 viaduct over the East Coast Mainline railway and Brampton Road in Huntingdon. A through route would be maintained broadly along the line of the existing A14 through Huntingdon, making use of the Brampton Road bridge to cross the railway line and by constructing a new link road from Brampton Road to connect with the A14 to the west.
- Widening of the existing A14 over approximately 9km (5½ miles) to provide three lanes in both directions between Swavesey and Bar Hill, and four lanes in both directions between Bar Hill and Girton.
- Widening of a 2.5km (1½ mile) section of the Cambridge Northern Bypass between Histon and Milton.
- Improvement of existing A14 junctions at Swavesey, Bar Hill and Girton – to improve the capacity of the road, compatibility with adjacent proposed developments, such as Northstowe, and connections for non-motorised users.
- New local access roads – to consist of approximately 8km (5 miles) of single carriageway local access road alongside the widened A14 between Fen Drayton and Girton. This local access road would provide a route for local traffic between Cambridge and Huntingdon, as well as providing access to properties and businesses along the corridor.

1.1.3 The proposed scheme is described in detail in **Chapter 3** (Description of the Scheme).

1.1.4 An iterative process of scheme development and environmental impact assessment (EIA) is ongoing. The assessment undertaken for this report is based mainly on the scheme at the stage the design was at in January 2014 (referred to in this report as '**the January 2014 scheme design'**) and therefore the report mainly addresses the likely impacts of this version of the proposed scheme, which is shown in the schematic diagram on **Figure 1.2**. While this report was prepared the proposed scheme continued to be developed and an alternative favoured scheme design emerged in April 2014, as shown on the schematic diagram on **Figure 1.1** indicating the key elements. As a result there are some differences between the proposed scheme shown in the spring 2014 consultation material (referred to in this report as '**the April 2014 proposed scheme design**') and the scheme assessed in the main body of this report. However, for consistency with the spring 2014 consultation material, the April 2014 proposed scheme design is shown in the figures of this report, unless otherwise specified.

1.1.5 The majority of the differences between the January 2014 scheme design and the April 2014 proposed scheme design are minor and make no difference to the impacts described. There are two exceptions to this where design changes are more significant; borrow pit locations (this has been addressed in **Appendix A** (Borrow Pit Development)); and the layout of the A1 and A14 interchange at Brampton (this has been addressed by adding text in yellow boxes within the report). The Brampton interchange layouts are illustrated in **Box 4.1** of this report.

1.1.6 The detailed figures included in this report show the April 2014 proposed scheme design with explanatory insets to show the Brampton layout from the January 2014 scheme design.

1.1.7 The proposed scheme is classed as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008 and, as such, requires a Development Consent Order (DCO) to proceed. The Highways Agency intends to submit an application for a DCO to construct the proposed scheme to the Secretary of State through the Planning Inspectorate (as responsible agency) in autumn 2014. However, prior to submission of the DCO application, the Highways Agency will be carrying out consultation, EIA and refinement of the preliminary engineering design of the proposed scheme.

1.2 Environmental Impact Assessment

1.2.1 EIA is a statutory process required for the proposed scheme[5]. It is a systematic process to identify, predict and evaluate the environmental effects of a proposed project. Its primary purpose is to inform the decision as to whether a project should go ahead. However, the EIA process will also have an important influence on the design of the proposed scheme since it enables environmental impacts to be identified and, where possible, to be avoided through sensitive design. In addition it identifies enhancement opportunities that can be incorporated in the design, where appropriate.

[5] In accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the EIA Regulations) and the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended).

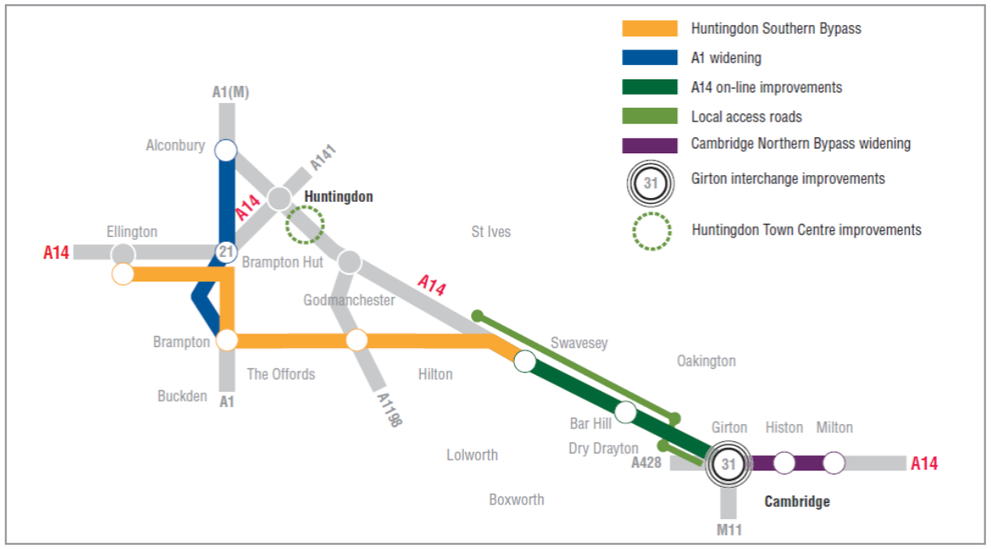

Figure 1.1: Schematic diagram of the April 2014 proposals for the A14 Cambridge to Huntingdon Improvement Scheme

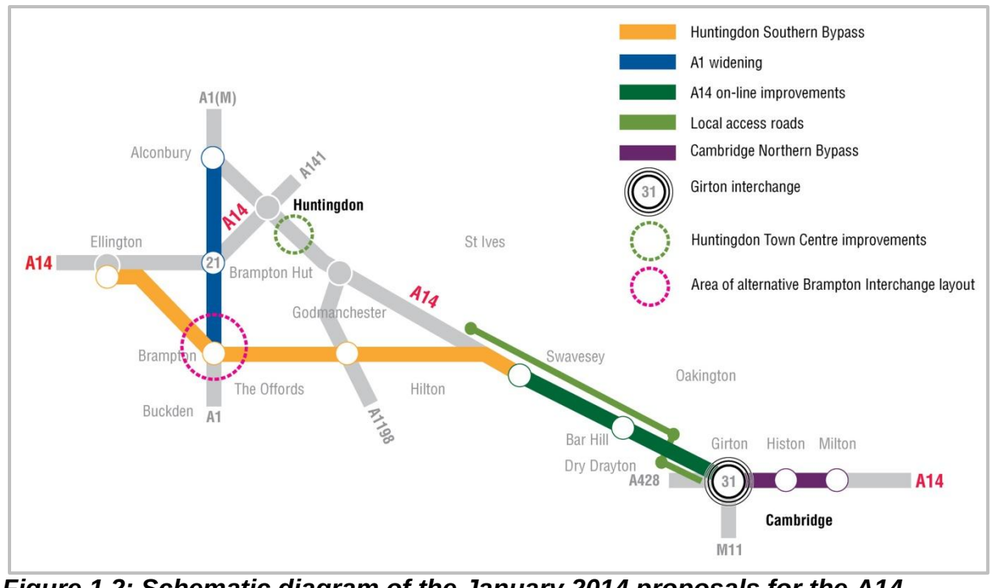

Figure 1.2: Schematic diagram of the January 2014 proposals for the A14 Cambridge to Huntingdon Improvement Scheme (which mainly is addressed in this report)

1.2.2 The EIA for NSIPs is reported in two stages, as follows:

- a 'preliminary environmental information' (PEI) report is prepared, to inform consultation of the public about the proposed scheme; and
- following consultation with the public, an Environmental Statement (ES) is prepared to accompany the application for a DCO.

1.3 Purpose of this Report

1.3.1 This report provides an initial statement of the main environmental information available for the study area, along with descriptions of the likely environmental effects and mitigation measures envisaged for the proposed scheme. This document is intended to give members of the public an understanding of the key issues and enable them to prepare well-informed responses to consultation.

1.3.2 It should be noted that at this stage the information is ***preliminary***, and is based mostly on the January 2014 scheme design, as described above. Further EIA work is currently being undertaken to confirm the scale and significance of predicted environmental impacts arising from the April 2014 proposed scheme design. The final EIA work will be reported within the ES, which will accompany the DCO application to be made in autumn 2014.

1.3.3 This report has been prepared for a non-technical readership. Individuals who are interested in the detailed proposals and assessment criteria to be used in the EIA process should refer to the **A14 Cambridge to Huntingdon Improvement EIA Scoping Report**[6] (March 2014), which is available on the National Infrastructure Planning website:

http://infrastructure.planningportal.gov.uk/wp-content/ipc/uploads/projects/TR010018/1.%20Pre-Submission/EIA/Scoping/Scoping%20Request/A14_Applicant_Scoping_Report.pdf

1.4 Scope and Content of the Preliminary Environmental Information Report

1.4.1 This report is organised into a number of chapters which set out the main environmental topics being considered in the EIA. Since the proposed scheme is a highway project, the design and assessment is guided by the Department for Transport's **Design Manual for Roads and Bridges**[7] (DMRB). The volume of the DMRB on Environmental Assessment and associated Interim Advice Notes prepared by the Highways Agency set out the main environmental topic areas considered as part of a highway scheme EIA. This report covers those topic areas, but is structured under the following chapter headings, with the aim of making the document more concise and accessible for members of the community and general public:

- air quality and noise;
- cultural heritage;
- landscape and visual impact;
- nature conservation;
- water environment;
- geology, soils, materials resources and waste; and
- people and communities.

1.4.2 Each environmental topic chapter of this report describes the local environment, the likely impacts that the January 2014 scheme would have on that environmental

[6] Highways Agency (March 2014). A14 Cambridge to Huntingdon Improvement EIA Scoping Report.
[7] The Highways Agency et al. (1993). Design Manual for Roads and Bridges.

aspect, as well as the types of mitigation that are under consideration, to seek to minimise any impacts of the proposed scheme.

1.4.3 Please note that in the context of EIA the terms 'impact' and 'effect' can have different meanings. However, for ease of understanding they are used interchangeably in this document.

1.5 Human Health Impacts

1.5.1 The assessment of the proposed scheme will include consideration of impacts to human health. This will be reported as part of the submission for the DCO application.

1.5.2 Transport schemes can affect human health in a variety of ways, for example;

- direct effects on health and wellbeing through changes in noise, air pollution, water quality and climate change;
- lifestyle changes such as encouraging travel by means other than private car and encouraging walking and cycling;
- effects on the local economy by changing access to employment;
- effects on access to key services, particularly access to health facilities;
- changes to the built environment to promote exercise through a healthy environment; and
- impacts on accessibility to the countryside and open spaces.

1.5.3 It is recognised that changes in travel behaviour have contributed to a decline in physical activity. For example, a report by the Chief Medical Officer in 2004 revealed that "*In England, people undertake less regular travel on foot or by bicycle than in the past: over the last 25 years, both walking (which is the most common form of physical activity) and cycling have declined by 26%*"[8].

1.5.4 The effect of switching from active modes of travel (walking and cycling) to the use of the private car is now regarded by many health professionals as the most significant health impact of recent transport policy and behaviour. Deaths from heart disease and stroke and cancer, which are linked to sedentary lifestyles, are greater in England than deaths from road accidents.

1.5.5 The potential impacts of the January 2014 scheme on pedestrians and cyclists in terms of human health effects are covered in **Chapter 11** (People and Communities) of this report. Potential human health impacts are also referred to in **Chapter 5** (Air Quality and Noise) and **Chapter 10** (Geology, Soils, Material Resources and Waste). The subject will be reported in more detail as part the DCO submission.

1.6 Summary of EIA Process

Scoping

1.6.1 The scoping process is used to determine which environmental topics should be assessed and the level of detail that should be included in the EIA. A scoping report has been prepared for the proposed scheme, setting out the key potential impacts and the proposed approach to the assessment. The **A14 Cambridge to Huntingdon Improvement EIA Scoping Report** (March 2014) can be accessed by following the link provided in section 1.3.3 above.

Identifying Baseline Conditions and Sensitive Receptors

1.6.2 An important stage in undertaking the EIA, which usually commences at the scoping stage, is to establish the baseline conditions. The baseline conditions are not necessarily the same as those that exist at the current time; they are the conditions that would exist in the absence of the proposed scheme either (a) at the time that construction is expected to start, for impacts arising from construction or (b) at the time that the scheme is expected to open to traffic, for impacts arising from its operation. Therefore, the identification of the baseline conditions involves predicting changes that are likely to happen in the intervening period, for reasons unrelated to the scheme. Work is currently ongoing to understand the baseline conditions. This report provides preliminary information about the baseline conditions.

1.6.3 The identification of sensitive receptors is closely linked to the baseline conditions. Receptors may be a physical resource (e.g. a water body or a habitat type) or a user group (e.g. local residents or recreational users of an area). Some receptors will be more sensitive to particular environmental impacts than others or be considered more valuable.

Predicting Environmental Impacts

1.6.4 The next stage of the EIA process is to predict the potential impacts that might arise as a result of the proposed scheme. Impacts are changes to the environment, compared with the baseline environment, attributable to the construction and operation of the scheme and may be adverse or beneficial, direct or indirect, temporary or permanent.

1.6.5 The methods of forecasting impacts vary by topic. For example, the assessment of air quality and noise relies upon traffic modelling. The general approach to assessment is outlined in this document where appropriate. However, interested readers should consult the scoping report for further information. A list of the technical guidance, policies and legislation that influence the assessment approach for various topics is provided in **Chapter 15** (Technical Guidance, Legislation and Sources of Information) of this report.

Evaluating Significance

1.6.6 The EIA process then provides an evaluation as to how significant these impacts are likely to be. In considering significance, the assessor takes account of the sensitivity of the environmental receptor, the nature of the impact (for example if it is permanent or temporary, large-scale or small scale, etc.) and whether it can be mitigated through good design or construction management. The attribution of significance is informed by the guidance listed in **Chapter 15** (Technical Guidance, Legislation and Sources of Information).

Mitigation and Enhancement

1.6.7 Where significant adverse effects are identified, mitigation may be proposed to reduce the impacts. In some cases EIA professionals and stakeholders involved in the process may also identify and recommend enhancement opportunities for a

[8] Department of Health (2004). At Least Five a Week. Evidence on the Impact of Physical Activity and Its Relationship to Health. A report from the Chief Medical Officer. Department of Health, London.

project, in order to achieve improved environmental outcomes. It is therefore important that the EIA process takes place alongside the development of a scheme design in order to make the most of such opportunities.

Reporting

1.6.8 EIA work for the proposed scheme is currently being undertaken by environmental specialists. The final results of the EIA for the proposed scheme will be reported in the ES.

1.7 Availability of the Preliminary Environmental Information Report

1.7.1 Copies of this report will be available as part of the spring 2014 consultation material for the proposed A14 Cambridge to Huntingdon Improvement Scheme. Details of these events are contained in the Highways Agency's 'Statement of Community Consultation' (SoCC). The SoCC can also be seen on the Highways Agency Website:

http://www.highways.gov.uk/roads/road-projects/a14-cambridge-to-huntingdon-improvement-Scheme/

1.8 A Note about Data and Figures

1.8.1 As previously stated, the information within this report is based upon preliminary studies, and draws upon studies carried out for the previous A14 Ellington to Fen Ditton (EFD) scheme. The preliminary information provided on environmental impacts relates in the main to the January 2014 scheme design, while the April 2014 proposed scheme design is presented at public consultation, as previously explained. New information will continue to be gathered and added as a result of further studies and consultation, and will be used in the assessment to be presented in the ES

1.8.2 This also relates to data illustrated in the figures in this report. The environmental data have been obtained from a range of sources, including data obtained for the A14 EFD scheme, as well as more recently obtained data from local authorities and statutory consultees. It should be noted that the datasets used have a varying coverage. Some have regional or national coverage, whereas others have been prepared as bespoke datasets for the relevant study area. For this reason, there is a difference in coverage of the environmental features presented on **Figure 6.1**.

The Highways Agency would welcome feedback where members of the public have identified omissions in the relevant environmental information.

2 SCHEME BACKGROUND

2.1 Objectives of the Proposed Scheme

2.1.1 The A14 is a major strategic route that links the M1/M6 motorway junction with the port of Felixstowe. It is part of the TEN-T Trans-European Network. In total it is approximately 210km (130 miles) in length. The section of the A14 between Cambridge and Huntingdon also caters for traffic moving to and from the M11 Junction 14 and the A1(M) at Alconbury.

2.1.2 As a consequence, the A14 Cambridge to Huntingdon corridor is heavily trafficked, carrying significant local, regional and long-distance traffic. A high proportion of this traffic is heavy goods vehicles (HGVs). This section of the A14 suffers from substantial congestion and delays and has a reputation for being severely affected by accidents and breakdowns.

2.1.3 The Government's **Draft National Policy Statement for National Networks**[9], published in December 2013, states that the Government's policy is to deliver improvements in capacity and connectivity on the national network to support economic growth and improve quality of life. The objectives of the proposed scheme can be summarised as follows:

- **combat congestion:** making the route between Huntingdon and Cambridge more reliable and providing capacity for future traffic growth;
- **unlock growth:** enabling major residential and commercial developments to proceed, leading to increased economic growth, regionally and nationally;
- **connect people:** by placing the right traffic on the right roads and freeing up local capacity for all types of road user, including pedestrians, cyclists and equestrians;
- **improve safety:** designing the proposed scheme to modern highway standards, introducing better lane control, and providing adequate capacity for predicted traffic levels; and
- **create a positive legacy:** recognising the wider benefits of the road improvement scheme for local communities and businesses.

For further detail regarding the objectives of the proposed scheme, refer to the **A14 Cambridge to Huntingdon improvement scheme, Technical review of options**[10] (September 2013) which is available as part of the spring 2014 consultation material for the proposed scheme and at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/243999/a14-technical-review-of-options.pdf

2.2 Recent Scheme History

2.2.1 There has been a long history of proposed improvements to the A14 between Cambridge and Huntingdon, dating back to the 1970s. A previous proposal for the A14, known as the A14 Ellington to Fen Ditton (EFD) scheme was cancelled in 2010 during the Government's comprehensive spending review as it was deemed unaffordable.

2.2.2 However, the Government still recognised that the problems on the A14 remained severe and that the route is critical to economic growth. Therefore, between 2011 and 2012, the Department for Transport (DfT) led a new study of the A14 corridor (the A14 Study), to *"...identify cost effective and practical proposals which bring benefits and relieve congestion – looking across modes to ensure … sustainable proposals."*[11]

2.2.3 The A14 Study recommended a package of measures intended to tackle the challenges on this section of the A14, including a road improvement scheme comprising online improvements to the A14 between Milton and Fen Drayton, local access roads between Girton and Fen Drayton and a new offline bypass to the south of Huntingdon and Godmanchester. The section of the existing A14 between Fen Drayton and Brampton interchange would be downgraded to county road status and the Huntingdon rail viaduct removed. This recommendation has formed the basis of the proposed scheme.

2.2.4 Prior to this scheme, other transport improvement packages recommended by previous studies have been carried out, including the Cambridge Guided Busway and a rail freight package. Whilst these have positively affected the network, congestion remains an issue.

2.2.5 **Box 2.1** provides a timeline setting out the key stages in the more recent project history up to the preparation of this Preliminary Environmental Information Report.

[9] Department for Transport (December 2013). Draft National Policy Statement for National Networks. The Stationary Office, London.
[10] Highways Agency (September 2013). A14 Cambridge to Huntingdon improvement scheme. Technical review of options.
[11] Department for Transport (20 October 2010). Transport Spending Review Press Notice.

Box 2.1a: Timeline of Scheme History: 1998 - 2007

1998

The Roads Review put on hold a previous scheme to widen the A14 between Bar Hill and Huntingdon and Government commissioned a multi-modal transport study to investigate the combined problems of congestion, road safety, and residential development pressure in the Cambridge and Huntingdon area. The results of the **Cambridge to Huntingdon Multi-Modal Study** (CHUMMS) were published in 2001 and recommended the introduction of a bus-based rapid transit system, traffic calming in the Cambridgeshire villages and improvements to the A14 trunk road.

2003

The highway improvement scheme was further developed and entered the Government's Targeted Programme of Improvements in April 2003. A number of route options were developed following the principles set out in CHUMMS. The CHUMMS strategy included a dual three-lane southern bypass of Huntingdon and the removal of the trunk road viaduct across the East Coast Mainline railway in Huntingdon.

2005

The CHUMMS strategy was taken to a public consultation in March 2005, together with an alternative strategy in which the Huntingdon viaduct was retained for movements between the north and east. There was greater support for the CHUMMS strategy than for the alternative during this consultation.

2006

A legal challenge was mounted by local opponents of the scheme and it was agreed that the Highways Agency would consult further on six previously considered route options, which would be referenced against the CHUMMS proposal. A second public consultation therefore followed in 2006/2007.

The A14 Huntingdon Study was also commissioned by the Highways Agency in conjunction with the local authorities to assess the effectiveness of proposed connections with the local network. The study concluded that removing the viaduct, replacing it with an at-grade junction in Brampton Road, building the West of Town Centre Link and providing a new link at Mill Common to the existing A14 would be most beneficial to the town.

2007

A preferred route announcement was made by the Secretary of State in two stages: first, the route between Fen Drayton and Fen Ditton was announced in March; and second, the route between Ellington and Fen Drayton, which validated the CHUMMS strategy, was announced in October.

Box 2.1b: Timeline of Scheme History: 2009 - 2013

2009

Further work was done between 2007 and 2009 to develop the preferred route and to prepare draft line and de-trunking orders, side roads and compulsory purchase orders. A scheme costing £1.1 billion was developed and a start of works date in early 2012 was proposed.

Atkins reports the environmental impact assessment (EIA) for the A14 EFD scheme in the A14 Ellington to Fen Ditton Environmental Statement, October 2009 and Corrigenda to the Environmental Statement November 2009.

2010

Plans were drawn up to commence a public inquiry in July 2010 but in the Government's 2010 Spending Review the A14 EFD scheme was withdrawn from the roads programme as it was considered to be unaffordable in the current climate.

2011

In late 2011, following the termination of the A14 EFD scheme, the Department for Transport commissioned a study to re-consider multi-modal options for this section of the A14 trunk road. The A14 Study identified a range of interventions, which included a public transport package, a rail-freight package and a road package. The A14 study identified 21 un-tolled road options, from which six viable highway packages emerged and were further considered against traffic, economic, environmental and social criteria.

2012

Secretary of State for Transport announces that the A14 Cambridge to Huntingdon Improvement Scheme will enter the road programme as a tolled scheme. A14 Study recommends a seventh scheme option that is tolled. Further analysis of this option is carried out to improve the effectiveness and reduce the construction costs.

2013

Autumn 2013: Highways Agency undertakes a scheme options consultation.

December 2013: Government concludes that the proposed scheme should not be tolled. Design workshops are undertaken by J2A with the Highways Agency to review options and apply value engineering principles.

3 DESCRIPTION OF THE SCHEME

3.1 Overview

3.1.1 The proposed scheme corridor is 34km long. It is presented in **Figure 3.1** and involves the following key elements:

- Widening and realignment of the A1 between Brampton and Alconbury over a length of approximately 6km (3 ¾ miles) including tie-ins, from the existing two lane dual carriageway to a three lane dual carriageway. There is a proposed new interchange with the A14 west of Brampton.
- A new Huntingdon Southern Bypass of approximately 18km (11 ¼ miles) in length, which would provide a two lane dual carriageway between Ellington and the A1 at Brampton and a three lane dual carriageway between Brampton and Swavesey; this would remove a large proportion of traffic from the section of the existing A14 between Huntingdon and Swavesey. The new bypass would include a raised viaduct section of road running across the river Great Ouse and a bridge over the East Coast Mainline railway.
- Downgrading the existing A14 trunk road (de-trunking to county road status) over approximately 21.5km (13 ½ miles) between Ellington and Swavesey, as well as between Alconbury and Spittals interchange.
- Huntingdon Town Centre improvements - to include the demolition of the A14 viaduct over the East Coast Mainline railway and Brampton Road in Huntingdon. A through route would be maintained broadly along the line of the existing A14 through Huntingdon, making use of the Brampton Road bridge to cross the railway line and by constructing a new link road from Brampton Road to connect with the A14 to the west.
- Widening of the existing A14 over approximately 9km (5½ miles) to provide three lanes in both directions between Swavesey and Bar Hill, and four lanes in both directions between Bar Hill and Girton.
- Widening of a 2.5km (1½ mile) section of the Cambridge Northern Bypass between Histon and Milton.
- Improvement of existing A14 junctions at Swavesey, Bar Hill and Girton – to improve the capacity of the road, compatibility with adjacent proposed developments, such as Northstowe, and connections for non-motorised users.
- New local access roads – to consist of approximately 8km (5 miles) of single carriageway local access road alongside the widened A14 between Fen Drayton and Girton. This local access road would provide a route for local traffic between Cambridge and Huntingdon, as well as providing access to properties and businesses along the corridor.

3.2 Widening of the A1

3.2.1 The A1 would be widened to a dual three-lane carriageway between the new Brampton interchange and Alconbury in order to provide the additional capacity needed to cope with traffic linking to the A1 from the new Huntingdon Southern Bypass. The A1 widening would be approximately 6km (3 ¾ miles), in length.

3.3 Huntingdon Southern Bypass

3.3.1 A new bypass is proposed, referred to as the Huntingdon Southern Bypass. This three-lane dual carriageway would start on the existing A14 east of Ellington, with slip roads west of Brampton Hut and north of Buckden to connect to the A1. There would be a junction south of Godmanchester on the A1198 for movements to and from the west, and it would rejoin the existing A14 corridor at Swavesey. The proposed new section would be approximately 18km (11 ¼ miles) in length.

3.4 Downgrading of the Existing A14 trunk road through Huntingdon

3.4.1 The existing A14 trunk road would be downgraded to county road status (de-trunked) and local traffic in and around Huntingdon would use the de-trunked A14 corridor and new local roads for local access. Approximately 21.5km (13 ½ miles) of the existing A14 route would be downgraded to county road status.

3.4.2 As part of this element of the proposed scheme it is proposed to demolish the A14 viaduct over the East Coast Mainline railway and Brampton Road in Huntingdon. The structure is ageing and is considered to be a costly maintenance liability. It is also believed that its demolition would reduce existing severance and open up opportunities for improvements in the local townscape.

3.4.3 New local link roads would be provided to reconnect the downgraded A14 into the existing local road network. The East Coast Mainline railway would still be crossed using the existing Brampton Road bridge.

3.4.4 The Huntingdon viaduct would be demolished after the new Huntingdon Southern Bypass and A1 widening sections of A14 improvement and the local link roads are completed.

3.5 A14 Widening

3.5.1 The existing two-lane dual carriageway A14 would be widened to a three-lane dual carriageway trunk road running from Swavesey to the Bar Hill junction; transitioning to a our-lane dual carriageway trunk road from Bar Hill junction to the interchange with the M11 (junction 14) at Girton. Approximately 9km (5 ½ miles) of the A14 would be widened between Swavesey and Girton. The proposed scheme would also include widening of the existing A14 Cambridge Northern Bypass from two-lane dual carriageway to three-lane dual carriageway from Histon Junction to Milton Junction (approximately 2.5km or 1 ½ miles).

3.5.2 The section between Girton interchange (junction 31) and Histon (junction 32) is in the process of being widened as part of the A14 Junction 31 to 32 Eastbound and Westbound Improvements scheme.

3.6 New Junctions and Junction Upgrades

3.6.1 The Girton and Milton junctions would be upgraded to improve traffic flow and to add more capacity.

3.6.2 In addition, two new junctions would be constructed at Bar Hill and Swavesey to maintain existing access to the trunk road and to connect with the new local access road. The A1/A14 interchange is also proposed to be upgraded.

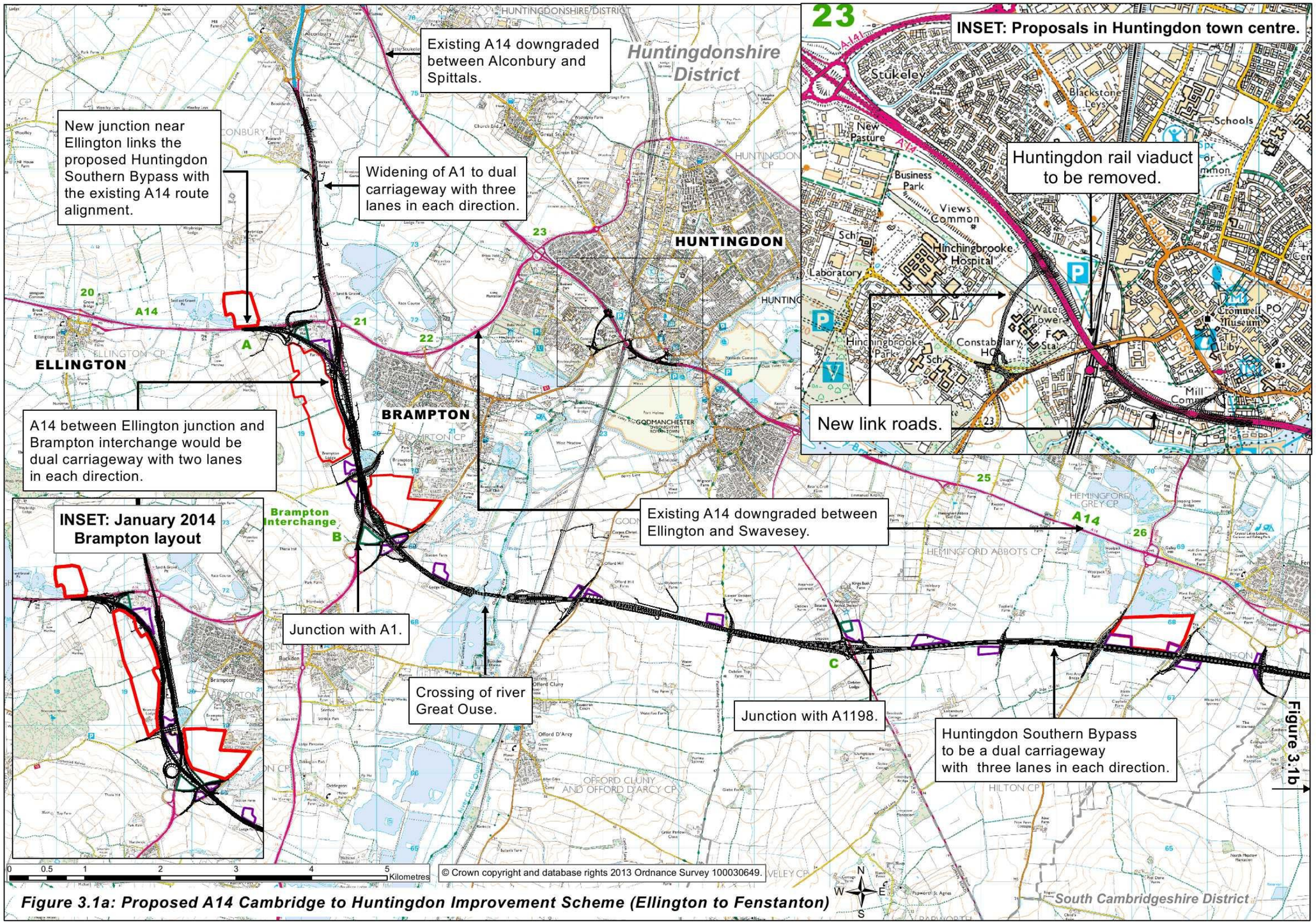

Figure 3.1a: Proposed A14 Cambridge to Huntingdon Improvement Scheme (Ellington to Fenstanton)

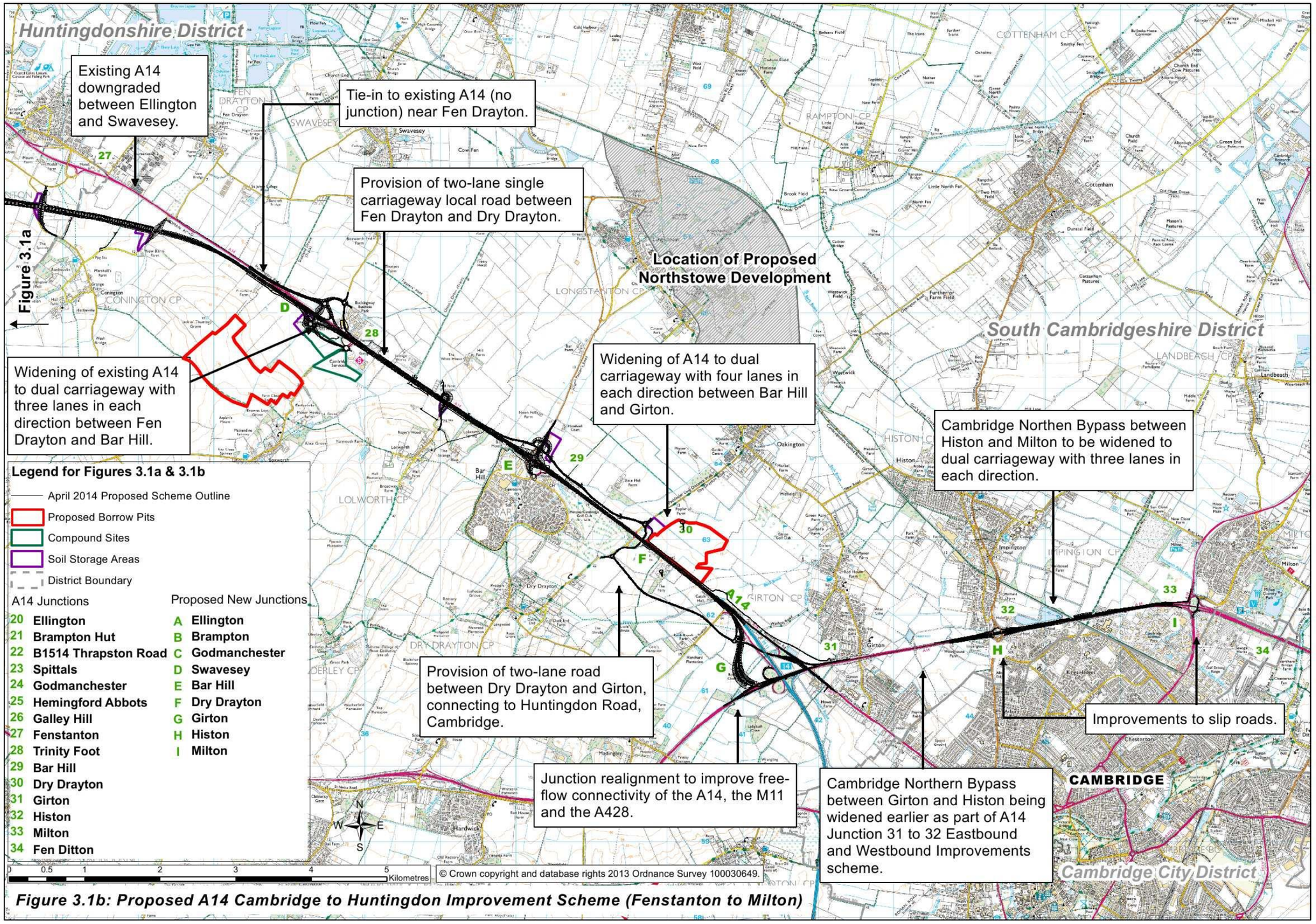

Figure 3.1b: Proposed A14 Cambridge to Huntingdon Improvement Scheme (Fenstanton to Milton)

3.6.3 Two layouts have been explored for the interchange at Brampton. This is explained further in **Box 4.1** and **Figure 4.1**, in **Chapter 4** (Outline of Main Scheme Alternatives).

3.7 Local Access Roads

3.7.1 A new single carriageway local access road would be provided alongside the improved A14 between Fen Drayton and Girton. This new road would provide a route for local traffic between Cambridge and Huntingdon as well as access to properties and businesses along the corridor.

3.7.2 The road would help to separate local traffic from strategic movement and aims to provide an improved environment for more vulnerable road users' such as pedestrians and cyclists. The inclusion of this local access road means that the improved A14 would have fewer side-roads joining it, improving safety and making it a less congested route into and out of Cambridge

3.8 Provision for Pedestrians, Cyclists and Equestrians

3.8.1 The improved A14 trunk road would remain unsuitable for travel on foot or by bicycle or horse. However, the new local access road would provide a more suitable route and there would be provision for these types of travellers along its length at a range of proposed new crossings of the A14.

3.9 Proposed Borrow Pits

3.9.1 Materials such as gravel, soil and sand will be required in order to construct the proposed scheme. To reduce the distance these materials needs to be transported, it is proposed to source the materials locally where practicable. A series of local borrow pits are therefore proposed in conjunction with the April 2014 proposed scheme. **Chapter 10** (Geology, Soils, Material Resources and Waste) and **Appendix A** (Borrow Pit Development) provides more detail about the proposed borrow pits.

3.10 Design Considerations for Climate Change

3.10.1 The scheme design will incorporate climate change resilience features, such as enhanced sizing of the drainage network, balancing ponds and culverts, to include a suitable allowance for the predicted impacts of future climate change as agreed with the Environment Agency. Earthworks details would have flood resistant design features, and in general, the road would be designed to maintain drainage capability during flood events. Critical infrastructure, such as electricity distribution points, would be placed above flood levels.

4 OUTLINE OF MAIN SCHEME ALTERNATIVES

4.1 Introduction

4.1.1 This chapter outlines the alternative scheme options that have been considered as part of the proposed scheme, following the cancellation of the A14 Ellington to Fen Ditton (EFD) scheme.

4.1.2 The main alternatives considered during the development of the A14 EFD scheme, including the iterations which followed the announcement of the preferred route option in 2007, were described in the **A14 EFD scheme Environmental Statement**[12], which was published for public consultation in 2009. Those alternatives are therefore not replicated or discussed within this chapter.

4.2 A14 Study Options (Department for Transport 2011 – 2012)

4.2.1 Following the cancellation of the A14 EFD scheme in 2010, due to questions regarding affordability, further options were developed as part of the A14 Study. The study sought to address the transport problems of the A14, while recognising that the A14 EFD scheme had been considered too expensive.

4.2.2 One of the objectives of the A14 Study was to generate and sift options for addressing the transport issues of the A14 corridor and to recommend a shortlist. The A14 Study identified a range of measures which comprised a public transport package, a rail-freight package and a road package.

Public Transport Package

4.2.3 The public transport package involved a park and ride site at Alconbury; a new local bus service between Cambridge city centre, Bar Hill and Cambridge Science Park; as well as an express bus service between Peterborough and Cambridge. However, the A14 Study showed that the public transport package in itself would not be sufficient to address issues of congestion along the A14 corridor, since it was forecast to result in only a one to two per cent increase in public transport trips within the study area.

Freight Package

4.2.4 The A14 Study also identified a preferred package of freight measures. This aimed to reduce heavy goods vehicle (HGV) traffic on the A14 by encouraging transfer of freight movements from road to rail. The recommended freight package was forecast to reduce HGV traffic in the core study area by up to eleven per cent, which would offset 60 – 80 per cent of the forecast growth in HGV traffic on the A14 between 2011 and 2031. It was therefore assumed that the freight package would be implemented in order to create the baseline for assessing the highway packages as part of the A14 Study.

Roads Package

4.2.5 A total of 21 un-tolled highway packages that varied considerably in scale, location and components were considered in the A14 Study. These were evaluated through two rounds of appraisal against the agreed success measures of the A14 Study which were:

- reduction of lost productive time;
- supporting the growth of the wider UK economy;
- supporting the growth of Greater Cambridgeshire;
- improving access to labour markets;
- improving quality of life and welfare;
- reducing the number of accidents on the A14; and
- reducing air quality and noise impact.

4.2.6 As a result of this evaluation process, six highway packages emerged. Further consideration was given to these options against economic, environmental, and social and community criteria. The main elements of the six packages (titled Options 1 – 6) are outlined in **Table 4.1**, along with an outline of the key environmental issues relating to each option and the decisions made regarding each of those options.

Tolling

4.2.7 In the period up to June 2012, in which the six highway packages were identified and assessed, the issue of tolling had not been given significant consideration. However, in June 2012 the government indicated that the proposed scheme might be part-funded through tolling. In response, the scope of the final stages of the A14 Study was broadened to include consideration of whether a highway option existed which was both beneficial in economic, environmental and social terms, and which could be partly self-funding through the application of a toll. The potential for tolled versions of the options in the long-list, to perform better under tolling than any of the shortlisted six options, was not considered or tested.

Discounting of Options and the Emergence of Option 7

4.2.8 As indicated in **Table 4.1**, Options 1, 2, 4 and 6 were discounted in the final stages of the A14 Study, which left Options 3 and 5 as the two best un-tolled options. The key difference between these two options was that Option 5 retained the Huntingdon rail viaduct for strategic traffic to and from the A1(M), whilst Option 3 removed the viaduct and downgraded the A14 through Huntingdon to county road status, as had been the intention previously with the cancelled A14 EFD scheme.

4.2.9 The decision whether or not to retain the Huntingdon rail viaduct and strategic highway through Huntingdon was finely balanced. The monetised elements of the appraisal (cost-benefit analysis) tended to support retaining the existing route (as per Option 5), but most of the non-monetised elements (particularly environmental, regeneration and asset liability factors) pointed towards downgrading the route to county road status (as in Option 3).

4.2.10 A new option, known as Option 7, was then identified for testing. This option was effectively Option 5, but with the Huntingdon rail viaduct removed (i.e. it combined the best performing aspects of Options 3 and 5). The removal of the Huntingdon rail viaduct was included as part of the option on the basis that it had been accepted that it would mitigate unwanted diversionary effects of the toll.

[12] Highways Agency (October 2009). A14 Ellington to Fen Ditton. Environmental Statement.

Table 4.1: Shortlisted Highway Options from Department for Transport A14 Study

	Key elements of option	Outline of key environmental issues[13]	Decision outcomes
Option 1	Improvement of Cambridge Northern Bypass, enhancement of Girton interchange, and the provision of local access roads between Girton and Trinity Foot. Retention of the existing A14 trunk road between Trinity Foot and Ellington.	No significant change in air quality in Huntingdon. Slightly adverse effect on landscape; neutral effect on townscape and a moderately adverse effect on heritage. Neutral effect on biodiversity (no impacts on designated sites).	Option discounted as although cheaper, was forecast not to resolve many of the problems experienced in the A14 corridor. Also discounted as it retained the Huntingdon rail viaduct.
Option 2	No improvement of Cambridge Northern Bypass, limited enhancement of Girton interchange, on-line widening and new junctions between Trinity Foot and Girton. Construction of dual three lane Huntingdon Southern Bypass between Trinity Foot and Ellington with A1 junction at Brampton. De-trunking of bypassed sections of A14 and removal of the A14 bridge across the East Coast Mainline.	71% reduction in traffic emissions affecting air quality in Huntingdon. Large adverse effect on landscape from Huntingdon Southern Bypass and its impact on the Great Ouse valley. Slightly beneficial effect on townscape in Huntingdon from removal of the rail viaduct. Moderately adverse impact on heritage through visual intrusion at Offord Cluny Conservation Area and potential impact on buried archaeological remains. Slightly beneficial to Fenstanton Conservation Area. Moderately adverse impact on biodiversity, resulting from loss of habitat along Huntingdon Southern Bypass.	Discounted on the basis that online widening between Trinity Foot and Girton performed less well than local access roads at reducing delays and emissions.
Option 3	Improvement of Cambridge Northern Bypass, limited enhancement of Girton interchange, on-line widening and new junctions between Trinity Foot and Girton. Construction of dual three lane Huntingdon Southern Bypass between Trinity Foot and Ellington with A1 junction at Brampton. De-trunking of bypassed sections of A14 and removal of the A14 bridge across the East Coast Mainline.	71% reduction in traffic emissions affecting air quality in Huntingdon. Landscape, townscape, heritage, and biodiversity effects largely similar to Option 2.	This option generated relatively high benefits and costs meaning it offered a lower benefit-cost ratio than option 5. However, the removal of the rail viaduct in Huntingdon resulted in considerable improvements in air quality in Huntingdon which were not captured in the monetised cost-benefit analysis. More positive elements were taken forward into Option 7.
Option 4	Improvement of Cambridge Northern Bypass, limited enhancement of Girton interchange on-line widening and new junctions between Trinity Foot and Girton. Construction of dual two lane Huntingdon Southern Bypass between Trinity Foot and Ellington (no junction with A1). Existing A14 past Huntingdon retained.	30% reduction in traffic emissions affecting air quality in Huntingdon. Landscape, heritage, and biodiversity effects as Option 2. Neutral effect on townscape as route through Huntingdon is retained. Moderately adverse effect on heritage (as Option 2).	Discounted on the basis that online widening between Trinity Foot and Girton performed less well than local access roads at reducing delays and emissions. Also discounted as it retained the Huntingdon rail viaduct.
Option 5	Improvement of Cambridge Northern Bypass, full enhancement of Girton junction, on-line widening and new junctions between Trinity Foot and Girton, together with new local access road. Construction of dual two lane Huntingdon Southern Bypass between Trinity Foot and Ellington (no junction with A1). Existing A14 past Huntingdon retained.	30% reduction in traffic emissions affecting air quality in Huntingdon. Landscape, heritage, and biodiversity effects as Option 2. Neutral effect on townscape as route through Huntingdon is retained. Moderately adverse effect on heritage (as Option 2).	This option performed well in benefit-cost analysis. However, the retention of Huntingdon rail viaduct was determined to have greater social and environmental costs not captured in the benefit cost analysis. More positive elements of the option were taken into Option 7.
Option 6	Improvement of Cambridge Northern Bypass, enhancement of Girton junction to enable free-flow. A428 widening to dual four lane carriageway between Girton and Caxton Gibbet. A1198 widened to dual three lane carriageway north of Caxton Gibbet to intersection with dual two lane Huntingdon Southern Bypass, which continues west to Ellington with junction onto A1 at Brampton. Existing A14 de-trunked between Girton and A1/A1(M).	68% reduction in traffic emissions affecting air quality in Huntingdon. Large adverse effect on landscape (as Option 2, but also impacts the settlements of Offord Cluny, Buckden and Brampton). Affects three registered parks and gardens in the A428 corridor. Effects on townscape as Option 2, but with moderately adverse effect on Papworth Everard. Effects on heritage as Option 2, but additional potential adverse effects on two Scheduled Monuments near A1198 and Madingley historic mansion. Moderately adverse effect on biodiversity as A428/A1198 is within 1km of three ancient woodland (SSSI) sites.	Discounted on the basis that it was forecast to offer low value for money. The option would generate fewer benefits than the other options, but have a high cost.
Option 7	Tolled between Ellington and Swavesey. Improvement of Cambridge Northern Bypass. Dual 3 lane carriageway Huntingdon Southern Bypass between Swavesey and Brampton. Dual 2 lane carriageway from Brampton to Ellington. Single carriageway local access roads between Trinity Foot and Girton. Full enhancement of Girton interchange Huntingdon rail viaduct removed and bypassed sections of A14 from Brampton Hut to Swavesey de-trunked.	The change in traffic emissions affecting air quality in Huntingdon specifically was not quantified. However it is likely to be a large reduction of the order seen for Options 2, 3, and 6 due to the removal of the Huntingdon rail viaduct and de-trunking: i.e. possible 71% reduction in traffic emissions affecting air quality in Huntingdon. Landscape, townscape, heritage, and biodiversity effects largely as with Option 2.	This option was selected as the proposed option in the A14 Study on the basis that it had a higher benefit-cost ratio than the other options that included removal of Huntingdon rail viaduct (options 2, 3 and 6). Removal of the viaduct provides significant benefits to Huntingdon town centre and other settlements along the de-trunked A14, particularly reduced congestion and improved air quality,

[13] These environmental effects are summarised from appraisal information set out in Atkins (November 2012). A14 Study: Output 3, Package Testing & Appraisal Report. Department for Transport.

Decision to Remove Huntingdon Rail Viaduct

4.2.11 Following further testing of all seven shortlisted options, to take account of the influence of tolling, a decision was made by the project board on 17th December 2012 that the Huntingdon rail viaduct would be removed for the following reasons:

- uncertainty over its future lifespan and maintenance costs;
- the impacts of the rail viaduct, and traffic on it, on the residents of Huntingdon; and
- the reduction in toll revenue, due to the route via Huntingdon offering a viable alternative to the Huntingdon Southern Bypass (in conflict with the desire to separate local from strategic traffic).

4.2.12 Option 7 therefore emerged as the preferred option from the A14 Study to be taken forward into more detailed development.

For further information, including layouts of the options discussed in this section, refer to the **A14 Cambridge to Huntingdon improvement scheme, Technical review of options**[14] (September 2013) which is available as part of the spring 2014 consultation material for the proposed scheme and at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/243999/a14-technical-review-of-options.pdf

4.3 Development of Options 7A and 7B

4.3.1 Following the A14 Study and the decision to take forward Option 7, the Highways Agency consultant was briefed to further develop, refine and value engineer the scheme.

4.3.2 Further review of Option 7 confirmed that the option was broadly sound, but that the standard of A14 mainline between Swavesey and Bar Hill should be increased to a three lane dual carriageway. In addition, the section between Bar Hill and Girton should be increased to a four lane dual carriageway instead of three lanes. This revised option became known as Option 7A.

4.3.3 Following on from the identification of Option 7A, a value engineering exercise was undertaken which looked specifically at junctions along the scheme and at the cross-section. Various refinements were made to this scheme which included junction and access arrangements, crossings for local access vehicles and public rights of way and the proposed tolling aspects of the scheme. The value engineered option also incorporated widening of the A1 and provision of links from the existing A14 alignment to the local road network at Huntingdon, for use following demolition of the rail viaduct. The refined option became known as Option 7B.

4.4 The April 2014 Proposed Scheme

4.4.1 The proposed scheme at present retains the key elements of Option 7B, but with some alterations, for example to key junctions. Design development will continue

Box 4.1: Proposed Layout for Brampton Interchange

Up until January 2014, the design under development had involved the separation of the A14 and A1 carriageways because that layout had allowed for tolling, as shown on **Figure 4.1** on the layout labelled January 2014 Brampton layout (also referred to as the original Brampton layout). However, following the Government's decision not to toll the proposed scheme, an alternative layout has emerged, as shown on **Figure 4.1** on the layout labelled April 2014 proposed Brampton layout (also referred to as the proposed Brampton layout). This layout involves the A14 crossing the A1 near Brampton Hut on an elevated section of road.

The ongoing process of design development and assessment now identifies this arrangement as the proposed layout due to construction and operational benefits. The layout makes best use of the existing infrastructure and would avoid the need for construction adjacent to live traffic, improving safety for construction workers, and remove the need for speed restrictions during construction of this section. Improved connection for pedestrians, cyclists and equestrians between Brampton and the Brampton Services and Brampton Woods could be another benefit. As such, this layout forms part of the April 2014 proposed scheme design as presented in the spring 2014 consultation material. It must, however, be noted that the main text in this report relates to the January 2014 Brampton layout. The topic chapters (**Chapters 5 – 11**) include a brief description of the key comparative impacts between the January 2014 Brampton layout and the April 2014 proposed Brampton layout, as identified by preliminary environmental assessment work.

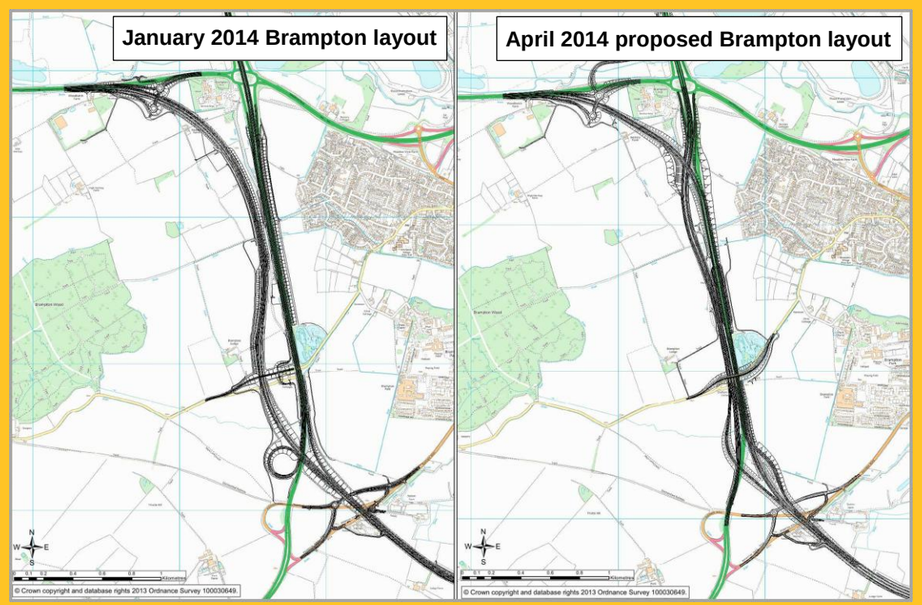

Figure 4.1: Original and Proposed Brampton Layouts

[14] Highways Agency (September 2013). A14 Cambridge to Huntingdon improvement scheme. Technical review of options.

through to summer 2014, but it is not anticipated that any future design alterations would differ significantly from the main route alignment shown on **Figure 3.1**.

4.4.2 The April 2014 proposed scheme will be further developed and refined. A recent refinement includes a different layout at Brampton interchange, as explained in **Chapter 1** (Introduction) and indicated on **Figure 4.1**.

4.4.3 The proposed application boundary has been developed to allow for some flexibility in the design process and the environmental impact assessment (EIA) is considering a worst case footprint, based upon the size of the application boundary.

5 AIR QUALITY AND NOISE

5.1 Introduction

5.1.1 This chapter describes the existing environment in the surrounding area with respect to the factors relevant to air quality, noise and vibration. The chapter describes the likely effects upon air quality and noise that are anticipated from preliminary studies in relation to the January 2014 scheme. It also outlines the measures that could be taken to help mitigate potential adverse effects.

Air Quality Assessment

5.1.2 Emissions from motor vehicle exhausts contain a number of pollutants including oxides of nitrogen (NO_x), carbon monoxide (CO), hydrocarbons, carbon dioxide (CO_2) and particulate matter (PM). The quantity of each pollutant emitted depends upon the type of vehicle, quantity and type of fuel used, engine size, speed of the vehicle and abatement equipment fitted. Once emitted, the pollutants are diluted and dispersed in the ambient air. Pollutant concentrations in the air can be measured or modelled and then compared with statutory air quality objectives and EU limit values.

5.1.3 The air pollutants of concern in the context of this assessment are oxides of nitrogen (NO_x), nitrogen dioxide (NO_2) and fine particles (PM_{10}). These pollutants are the most likely to be present at concentrations close to or above their statutory limit values in areas where traffic emissions are the main sources of air pollutants.

Table 5.1: Air Quality Standards

Pollutant	Averaging period	Limit value / Objective	Date for compliance
Nitrogen Dioxide (NO_2)	Annual mean	40µg/m^3	UK[15] 11 June 2010
			EU[16] 01 Jan 2010
	1-hour mean	200µg/m^3 (not to be exceeded more than 18 times a year (99.8th percentile))	UK[4] 11 June 2010
			EU[5] 01 Jan 2010
Particulate Matter (PM_{10})	Annual mean	40µg/m^3	UK[4] 11 June 2010
			EU[5] 01 Jan 2005
	24-hour mean	50µg/m^3 (not to be exceeded more than 35 times a year (90.4th percentile))	UK[4] 11 June 2010
			EU[5] 01 Jan 2005
Nitrogen Oxide (NOx)[17]	Annual mean	30 µg/m3	31 Dec 2000 UK
			19 July 2001 EU

5.1.4 Air quality limit values and objectives are quality standards for clean air. These are shown in **Table 5.1**. Some pollutants have standards expressed as annual average concentrations due to the chronic way in which they affect human health or the natural environment (i.e. effects occur after a prolonged period of exposure to elevated concentrations) and others have standards expressed as 24-hour or 1-hour average concentrations due to the acute way in which they affect human health or the natural environment (i.e. after a relatively short period of exposure).

5.1.5 The study area for assessing air quality in the environmental impact assessment (EIA) consists of the area within 200m of road sections which are likely to be affected (known as the 'affected road network'). This is the distance within which air pollution is considered to have a potentially significant effect. Beyond this distance air pollution will have dispersed to insignificant levels. The affected roads are defined in the **Design Manual for Roads and Bridges** (DMRB) as those which meet any of the following criteria:

- road alignment would change by 5m or more;
- daily traffic flows would change by 1000 annual average daily traffic (AADT) or more;
- heavy duty vehicle (HDV) flows would change by 200 AADT or more;
- peak hour speed would change by 20km/hr or more; and/or
- daily average speed would change by 10km/hr or more.

Noise and Vibration Assessment

5.1.6 Noise is defined as unwanted sound, and the unit of measurement is the decibel (dB). Noise levels range from the threshold of hearing at 0dB to levels of over 130 dB at which point the noise becomes painful.

5.1.7 Sound consists of vibrations transmitted to the ear as rapid variations in air pressure. The more rapid the fluctuation the higher the frequency of the sound. However the sensitivity of the human ear varies with frequency. Therefore most everyday noise is measured in dB(A), the (A) suffix indicating that the measured level has been modified to allow for this phenomenon. It has been found that changes in noise level when measured in dB(A) most closely correlate with the changes in subjective reaction.

5.1.8 The range of values of pressure over which the ear can hear is enormous and for convenience the decibel scale, which is logarithmic, is used as the resulting numbers correspond generally to the noise perceived. A change in noise level of 10dB(A) represents a halving or doubling in perceived loudness. **Table 5.2** gives examples of typical sound levels.

[15] The Air Quality Standards Regulations 2010, SI2010/1001.
[16] European Commission (2008). Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.
[17] For the protection of ecosystems.

Table 5.2: Typical Sound Levels found in the Environment

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of pain

5.1.9 A highway scheme has the potential to cause both increases and decreases in traffic noise on an existing road by altering traffic flows. In the case of a new road, for example a bypass, a completely new noise source can be created.

5.1.10 In the UK the standard index used for traffic noise is the $L_{A10,18h}$ level, which is quoted in decibels. Further information on the terminology and units used in noise assessment is provided in the glossary.

5.1.11 The construction process of a highway scheme also has the potential to cause noise impacts. The impact of construction activities is usually reported in terms of changes in absolute noise level using the L_{Aeq} index, although the maximum noise level, often referred to as the L_{Amax}, from any one activity may also be assessed.

5.1.12 Vibration is a low frequency disturbance producing physical movement in buildings and their occupants. Vibration has the potential to cause nuisance and physical damage. These impacts can happen during the operation of an existing or new road, during the improvement or maintenance of an existing road, and also during the construction of a new road.

5.1.13 The study area proposed for the assessment of noise, as part of the proposed scheme EIA, is primarily defined as 600m around the proposed new or altered highways and sections of existing roads within 1km of the proposed scheme that are predicted to be subject to a change in noise level of more than 1dB(A). The distance of 600m is considered to be the distance that receptors are likely to be sensitive to traffic noise in accordance with the guidance in the DMRB. Beyond this distance, the noise levels are less discernible or are masked by other noises within the environment.

5.1.14 Existing roads subject to a change of 1 decibel (dB)(A) or more will be identified from traffic forecasts that predict an increase in flow by at least 25% or decrease by 20% in the proposed scheme opening year (excluding those where the predicted traffic flow was less than 1000 vehicles per 18 hour day in both with-scheme and without-scheme scenarios). Collectively these are called 'affected routes' whether there is a possibility of a change of 1dB$L_{A10,18h}$ or more in the short-term or possibility of a change of 3 dB $L_{A10,18h}$ or more in the long-term.

5.2 Local Environment

Sensitive receptors

5.2.1 The key receptors for noise and air quality impacts from the proposed scheme are residential properties and other sensitive receptors such as schools, hospitals and nature conservation sites, in close proximity to the proposed scheme. At present the A14 is routed through the southern part of Huntingdon and over a rail viaduct, resulting in existing adverse noise and air quality impacts on residents within the community.

5.2.2 There are also several residential areas in the northern parts of Cambridge which are close to the existing A14 and exposed to air pollution and noise from this major road.

5.2.3 In relation to both air quality and noise the receptors that would potentially be affected are localised to the road, with receptors within 200 metres of the affected road network likely to experience the largest changes in air quality, and properties within 600 metres of the proposed scheme likely to experience increases or decreases in noise levels.

5.2.4 Residential properties are considered to be sensitive to noise as they are places that are largely quiet in nature and where people relax and sleep. Baseline noise monitoring surveys were undertaken in 2003, 2006 and 2008 as part of the previous studies to inform the previous A14 Ellington to Fen Ditton (EFD) scheme. The results of these studies provide preliminary information about the likely existing noise environment.

5.2.5 In areas such as Papworth St Agnes, Papworth Everard, Buckden, and parts of Offord Cluny and Hilton, which are well away from busy traffic, noise levels were 45 to 50 dB $L_{A10\ 18\text{-}hr}$, with similar $L_{Aeq,18h}$ levels. Where data is available, L_{A10} night levels at these locations are in the range of 35 to 40 dB, again with similar L_{Aeq} levels**.**

5.2.6 Areas including Conington, Boxworth (Manor House), Hinchingbrooke, parts of Offord Cluny and parts of Brampton and Milton set back from the main roads, had noise levels in the range of 50 to 55 dB $L_{A10,18h}$ with LA10 night levels in the range of 48 to 52 dB.

5.2.7 Areas including many parts of Brampton (east of the A1), Dry Drayton, Longstanton, Impington, Madingley, Huntingdon, Fenstanton and Girton (away from the A14) had existing noise levels of 55 to 60 dB $L_{A10,18h}$ with night time levels of 51 to 55 dB L_{A10}.

5.2.8 Dwellings closest to the major roads at Milton and Brampton, and close to the road at Grapevine Cottages, Boxworth, had existing noise levels of 60 to 65 dB $L_{A10,18h}$. Night-time L_{A10} values were 5 – 6 dB lower than during the daytime.

5.2.9 Approximately 1200 dwellings have so far been identified as part of the noise assessment within 100m of the likely affected roads.

5.2.10 There are a number of existing noise barriers and earth bunds that provide some protection to properties. These would be retained or replaced as part of the proposed scheme where appropriate.

5.2.11 In addition, the noise assessment also considers open spaces and public rights of way. As with residential properties, open spaces and public rights of way are locations where people are able to distinguish changes in noise levels. In these

instances, however, people do not experience the noise attenuating benefits of walls and windows.

5.2.12 The noise assessment process for the January 2014 scheme has so far identified ten hotels, a guest house, a children's nursery, the Cambridge University Farm, a church and Cambridge City Crematorium as other receptors that may be sensitive to changes in noise. The noise assessment will therefore consider changes in noise levels for these locations. **Table 5.3** sets out identified noise receptors and how these are expected to be affected by the operation of the January 2014 scheme.

Air Quality Management Areas

5.2.13 There are six Air Quality Management Areas (AQMA) in the surrounding area. All of these have been declared in relation to pollutants associated with motor vehicle emissions (NO_2 and PM_{10}).

Huntingdon AQMA

5.2.14 The Huntingdon AQMA shown on **Figure 5.1a**, encompasses the southern part of the town centre. It is bounded largely by the A141 to the west, A141 to the north, A14 to the south and the river to the east. It was declared after an assessment in 2005, due to levels exceeding the annual mean NO_2 objective. The area was amended in 2007 to include additional properties in the north (south of the A141), the east (north of the river) and to the south (in Godmanchester). The AQMA would be likely to experience an improvement in air quality as a result of the January 2014 scheme due to reductions in traffic flows through the area.

Brampton AQMA

5.2.15 The Brampton AQMA, shown on **Figure 5.1a**, is an area encompassing properties at Wood View, Nursery Cottages, Thrapston Road, Bliss Close and Flamsteed Drive, close to the A14 in Brampton and Hinchingbrooke. It was declared an AQMA in 2006 due to levels exceeding the annual mean NO_2 objective. It was then amended in 2007 to include a larger area of the residential properties to the north of Bobs Wood, east of the A14, and properties to the north of the A14 (north of Wood View). The AQMA would be likely to experience an improvement in air quality as a result of the January 2014 scheme due to reductions in traffic flows through the area.

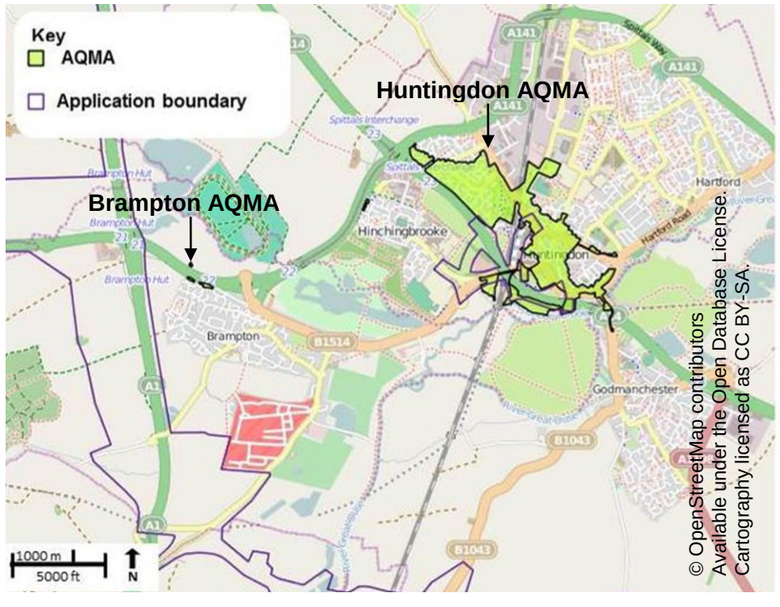

Figure 5.1a: Huntingdon and Brampton AQMAs

St Neots AQMA

5.2.16 This area, shown on **Figure 5.1b**, encompasses the junction of the High Street, St Neots, with New Street and South Street. It was declared an AQMA in 2005 further to an assessment identifying levels exceeding the annual mean NO_2 objective. Further assessment in 2007 resulted in amendments to the AQMA to include a larger area along the high street, largely bound by the river to the east, either side of Huntingdon Road to the east, and extending to the north either side of New Street. This AQMA is not expected to be significantly affected by the January 2014 scheme, since the main impacts upon air quality would likely be traffic within the town which will not be changed as a result of the January 2014 scheme.

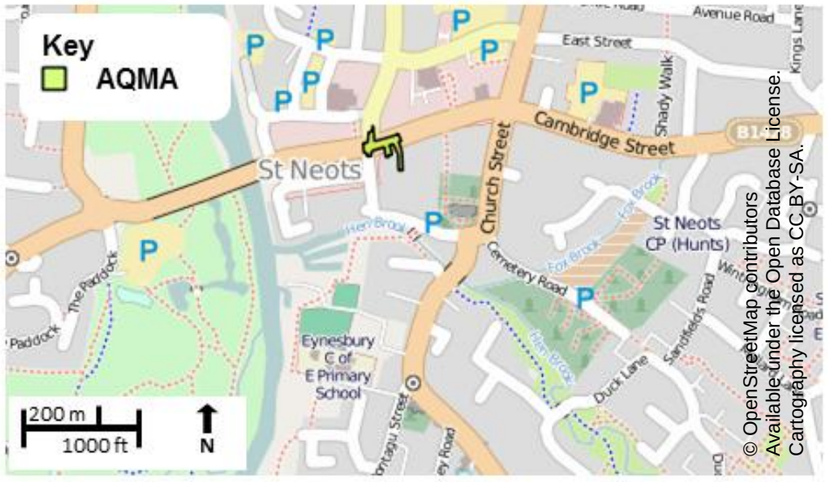

Figure 5.1b: St Neots AQMA

Hemingford - Fenstanton A14 AQMA

5.2.17 This area shown in **Figure 5.1c** encompasses a number of properties either side of the A14 between Hemingford and Fenstanton. It was declared an AQMA in 2006 due to levels exceeding the annual mean NO_2 objective. The AQMA would be likely to experience an improvement in air quality as a result of the January 2014 scheme due to reductions in traffic flows through the area.

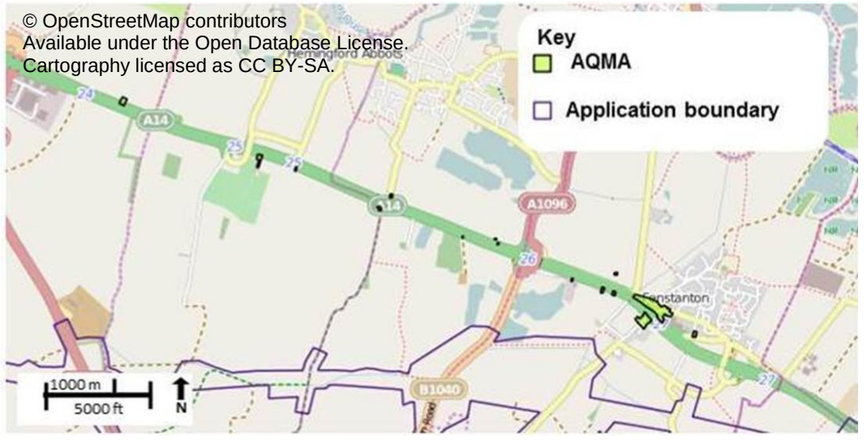

Figure 5.1c: Hemingford - Fenstanton A14 AQMA

A14 Corridor AQMA

5.2.18 This AQMA shown in **Figure 5.1d**, covers an area along the A14 between Bar Hill and Milton. It was declared an AQMA in 2007 due to levels exceeding the annual mean NO_2 objective and, from 2008, also due to daily mean PM_{10}. It was agreed with Defra that the boundary for NO_2 and PM_{10} would be the same. An assessment in 2011 indicated that the AQMA may need to be extended to the north of the A14 to incorporate Hill Farm Cottages at Swavesey. The AQMA is not expected to have a significant improvement with the January 2014 scheme since traffic flows are not expected to change. There may be reduced congestion and improved traffic flow which can reduce air quality concentrations.

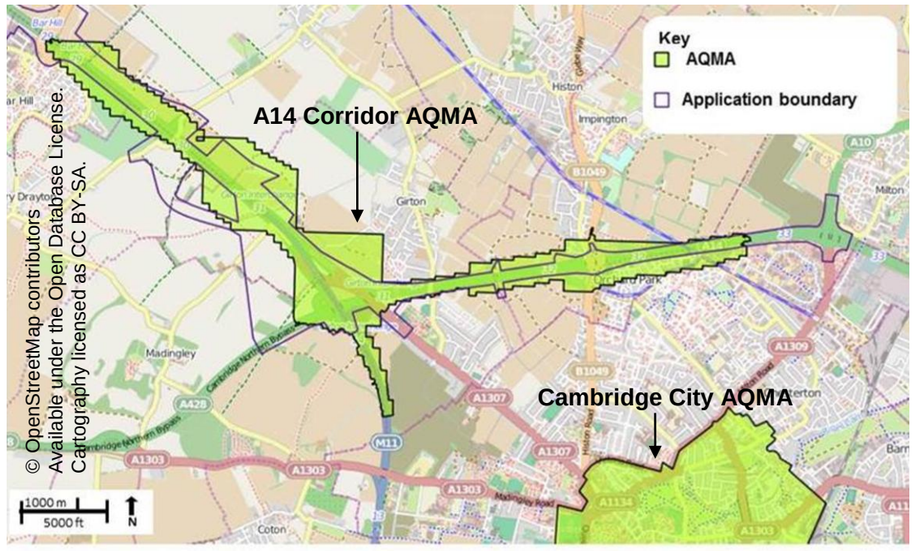

Figure 5.1d: A14 Corridor and Cambridge City AQMAs

Cambridge City AQMA

5.2.19 This AQMA shown on Figure **5.1d**, is an area which encompasses the inner ring road and all the land within it (including a buffer zone around the ring road and its junctions with main feeder roads). It was declared an AQMA in 2004 due to levels exceeding the annual mean NO_2 objective. It is not expected that there would be a change in this AQMA as a result of the January 2014 scheme. This is because the main impacts on air quality within the AQMA relate to traffic within the city which would not be significantly affected by the January 2014 scheme.

Air Quality Monitoring

5.2.20 Measurements of pollutant concentrations in the local area are undertaken using both continuous monitoring instruments and passive monitoring diffusion tubes. Results of local monitoring are available from the UK air website[18] and from local authority air quality reports.

5.2.21 Current monitoring data indicates that annual mean NO_2 concentrations are being exceeded at several roadside locations in the vicinity of the proposed scheme. These levels exceeding are located in both of the main urban areas affected by the proposed scheme in Cambridge and Huntingdon. Along the A14 and in neighbouring towns there are also a number of properties inside AQMA areas, as the air quality concentrations are above or close to the annual mean objective for NO_2. It is

[18] Department for Environment, Food and Rural Affairs (2014). UK-AIR: Air Information Resource [online]. Accessed 20 March 2014. Available at: http://uk-air.defra.gov.uk/

expected the January 2014 scheme would improve NO_2 annual mean concentrations in the Huntingdon area, primarily the Huntingdon AQMA, the Hemingford – Fenstanton A14 AQMA and the Brampton AQMA. The other main AQMA in the region along the A14 corridor north of Cambridge may improve due to reduction of congestion and improved traffic flow resulting from the January 2014 scheme. Detailed assessment will confirm this preliminary assessment.

5.2.22 The one hour mean objective for NO_2 is not currently being exceeded in the region of the proposed scheme. It is not expected the January 2014 scheme would cause any levels exceeding the level of the objective.

5.2.23 PM_{10} concentrations in relation to the annual mean have been achieved at all sites. It is not expected that the January 2014 scheme would cause any levels exceeding the level of this objective. The 24 hour mean objective for PM_{10} is exceeded within the A14 Corridor AQMA north of Cambridge. It is anticipated that the January 2014 scheme would improve traffic flow and reduce congestion in this area, therefore reducing the potential levels exceeding.

5.3 Potential Impacts on Air Quality

Construction

5.3.1 During construction the operation of site equipment, vehicles and machinery would result in emissions to atmosphere of exhaust gases, but such emissions are unlikely to be significant, particularly in comparison to levels of similar emissions from vehicle movements on the local road network. Any impacts can be mitigated by use of equipment meeting recent emission control standards, operating well-maintained vehicles and planning to reduce trip generation.

5.3.2 Construction traffic would comprise haulage/construction vehicles and vehicles used for workers' trips to and from site.

5.3.3 Fugitive dust emissions arising from construction and demolition activities would be likely to be variable in nature and would depend upon the type and extent of activity, soil type and moisture, road surface conditions and weather conditions. Periods of dry weather combined with higher wind speeds have the potential to generate more dust.

5.3.4 Demolition and construction activities that are considered to be the most significant potential sources of fugitive dust emissions are:

- demolition of existing buildings and the size reduction and handling of materials;
- earth moving, due to the handling, storage and disposal of soil and subsoil materials;
- construction aggregate use, due to the transport, unloading, storage and use of dry and dusty materials (such as sand and cement);
- movement of heavy vehicles on dry or untreated haul routes; and
- movement of vehicles over surfaces where muddy materials have been transferred off site (for example, on public highways).

5.3.5 Fugitive dust arising from construction and demolition activities generally has a particle size greater than the PM_{10} fraction (which can potentially affect human health). Nevertheless it is recognised as a nuisance and measures to control dust would be implemented as part of good construction practice.

Potential Measures to Mitigate Air Pollution during Construction

5.3.6 There are several standard and best practice mitigation measures that could be implemented during construction to help mitigate potential adverse effects upon air quality during construction. Various mitigation measures will be recommended within the Environmental Statement (ES) following the assessment. Typical examples include:

- dampening down site access roads as necessary using a water bowser to reduce airborne dust, to be monitored on a daily basis during hot, dry weather;
- locating internal haulage routes away from sensitive receptors where possible and dampening down the routes where necessary;
- re-vegetating or temporarily sealing completed earthworks as soon as is practicable; and
- sheeting vehicles carrying spoil, fill or earthworks material leaving the site to prevent loss of materials off-site.

Operation

5.3.7 The operational effects from the proposed scheme would relate to changes in pollutant concentrations from vehicle emissions using the roads in the local area.

5.3.8 Changes to the pollutant contributions would be dependent on a number of variables such as changes related to vehicles and changes related to vehicle location. Examples of changes related to vehicles which can have an effect on the overall impact are:

- vehicle numbers;
- vehicle speed;
- traffic congestion; and
- number of heavy duty vehicles.

5.3.9 Changes related to vehicle location and numbers would have an effect based on their proximity to sensitive human or ecological receptors. Essentially if the number of vehicles is reduced in an area an improvement in air quality would be seen and vice versa. Moving traffic away from local receptors and improving flow would result in air quality improvements. The addition of the bypass is likely to result in improvements in air quality along the existing A14 between Fen Drayton and the A1. However, the areas where the bypass will be located will experience a deterioration in air quality, although it is unlikely that any air quality standards would be breached.

5.3.10 The January 2014 scheme would therefore have both positive and negative impacts on air quality. One of the objectives of the proposed scheme is to reduce congestion and route through traffic and heavy goods vehicle (HGV) traffic away from Huntingdon town centre, and thus away from a main centre of population.

5.3.11 The EIA for the A14 EFD scheme reported that more residential properties would experience an improvement in air quality than those that would experience a deterioration. Further assessment work to be undertaken as part of the ongoing EIA would establish whether this would remain the case with the proposed scheme.

Proposed Layout for Brampton Interchange

Based upon preliminary information it is not considered likely that there would be a significant difference in the effect on air quality between the January 2014 Brampton layout and the April 2014 proposed Brampton layout. This is due to the small change between the two layouts in the distance to receptors.

5.4 Potential Impacts on Noise and Vibration

Construction

5.4.1 Temporary noise and vibration effects would occur during the construction phase as a result of on-site activities along the whole route, including demolition, excavation, earthworks construction, and construction of foundations and structures. The duration of noise impacts would be variable, depending on the location relative to the route, site access/compounds and structures locations.

5.4.2 The main sources of construction vibration would likely be vibratory compaction (during earthworks and pavement construction) and piling, particularly for foundations for bridge piers. These impacts would be of short duration and/or intermittent. Where significant effects are identified, these can generally be mitigated through the use of low vibration methods.

5.4.3 It is inevitable that some disturbance would be caused to those people living nearby during construction. However, several safeguards and mitigation measures exist to reduce the effects of noise and vibration and these could be applied during the construction phase.

Mitigating Construction Related Noise Impacts

5.4.4 Existing safeguards to manage construction related noise include:

- various EC Directives and UK Statutory Instruments limit the noise output of a variety of construction plant;
- guidance set out in British Standard 5228, covers noise control on construction and open sites;
- powers that exist for Local Authorities under Sections 60 and 61 of the Control of Pollution Act 1974 and Section 80 of the Environmental Protection Act 1990 to control environmental noise and pollution on construction sites; and
- adoption of Best Practicable Means, as defined in the Control of Pollution Act 1974 is usually the most effective means of controlling noise from construction sites.

5.4.5 Mitigation practices to manage construction noise include:

- the contract documents to require the effects of environmental noise to be addressed and limit to the contractor to certain hours of working was well as limiting permitted construction noise levels as a further safeguard;
- any compressors brought on-site to be silenced or sound reduced models fitted with acoustic enclosures;
- all pneumatic tools to be fitted with silencers or mufflers;
- deliveries to be programmed to arrive during daytime hours only and care to be taken when unloading vehicles to reduce noise;
- delivery vehicles to be routed to reduce disturbance to local residents and delivery vehicles to be prohibited from waiting within the site with their engines running;
- all plant items to be to be sited so that the noise impact at nearby noise sensitive properties is reduced and to be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive noise;
- construction site access and plant movements to be planned to reduce the need for reversing, therefore reducing reversing vehicle warning sounds;
- local hoarding, screens or barriers to be erected as necessary to shield particularly noisy activities; and
- problems concerning noise from construction works to be avoided by taking a considerate and neighbourly approach to relations with local residents.

5.4.6 By implementing these measures, typical noise levels from construction works can be reduced by approximately 5 to 10 dB(A).

5.4.7 **Table 5.3** sets out the likely impacts upon noise sensitive receptors from the January 2014 scheme operation.

5.4.8 It is unlikely that significant levels of ground-borne vibration would be generated by traffic using a newly laid road surface since it is a requirement of new highway construction specification that the surface would be smooth. Therefore no impacts or effects from ground-borne vibration are predicted.

5.4.9 Heavy goods vehicles have the potential to cause vibration nuisance to locations close to main roads. The scale of the impact can be assessed relative to predicted noise effects, for a given level of traffic noise exposure, the percentage of people bothered very much or quite a lot by airborne vibration is 10% lower than the corresponding amount for noise nuisance. As such the assessment of airborne vibration will be included within the assessment of airborne noise.

Table 5.3: Likely Impacts upon Sensitive Noise Receptors from the January 2014 Scheme Operation

Noise sensitive receptors likely to be subject to an increase in road traffic noise	Noise sensitive receptors likely to be subject to a decrease in road traffic noise	Noise sensitive receptors likely to be subject to little or no change in road traffic noise
• Residential properties and other locations within the vicinity of the proposed Huntingdon Southern Bypass; • Four dwellings on Brampton Road (B1514); • Lodge Farm; • Dwellings close to Offord Hill; • Debden Farm; • Lower Debden Farm; • Oxholme Farm; • New Barnes Cottages; • Days Inn, Cambridge; • Travelodge, Swavesey; • Travelodge, Lolworth; • Cambridge City Crematorium; • Premier Inn, Impington; • Holiday Inn, Lakeview; and • Milton Country Park.	• Premier Inn, Brampton Hut interchange; • Marriot, Huntingdon; • Just Learning Day Nursery, Huntingdon; • Hinchingbrooke Country Park; • Brampton Racecourse SSSI; • Portholme SAC; • Hinchingbrooke Hospital (and nursery); • Hinchingbrooke House Performing Arts Centre; • Huntingdon Methodist Church; • The Old Bridge Hotel; • It's a Small World Nursery, Hemingford Abbots junction; • Hemingford Grey Meadow SSSI; • Travelodge, Fenstanton; • Tudor Hotel, Fenstanton; and • Gallows Guest House, Fenstanton.	• Brampton Meadow SSSI; • Rectory Farm; and • Brampton Hut.

Potential Measures to Mitigate Noise Impacts during Operation

5.4.10 There are various design opportunities and traffic management options which can be employed to reduce the impacts of noise during operation. These include the following mitigation measures:

5.4.11 The vertical alignment of the proposed scheme could potentially be designed to keep the route low within the natural topography to exploit any natural screening and enhancing this by the use of cuttings. The vertical alignment is being considered as part of the detailed design, but needs to also take account of other issues, such as the need to achieve effective surface water drainage and the possible requirement to provide wildlife tunnels.

5.4.12 Acoustic barriers can be very effective at reducing noise for receptors close to the source. In such cases, noise can be reduced by 10dB or more. Acoustic barriers are currently being considered for locations alongside the A1 for Alconbury and Brampton. Acoustic barriers are also likely to be required for the Cambridge Northern Bypass at Orchard Park and Impington. The need for acoustic barriers is also being appraised along the new route for the villages of Hilton and Conington.

5.4.13 The proposed scheme would be constructed using lower noise surfacing. Lower noise surfacing is effective in reducing the sound of tyre noise when traffic speeds exceed 75kph (47mph). It is likely that over time lower noise surfacing would be implemented along the route anyway (in the absence of the proposed scheme) as part of ongoing maintenance. However, the proposed higher specification of the surfacing, as part of the January 2014 scheme design, would be likely to reduce noise by a further 1dB compared to the future baseline scenario.

5.4.14 Traffic speed restrictions is another mitigation measure. Above 40 kph (25mph), noise level increases with the speed of the vehicle and a reduction in speed would normally cause a reduction in noise level. The reduced speed of traffic through Huntingdon would therefore be beneficial.

Proposed Layout for Brampton Interchange

The April 2014 proposed Brampton layout would incorporate a combination of earth modelling and noise fencing to provide mitigation of potential noise effects. With the incorporation of this mitigation it would be marginally more beneficial than the January 2014 Brampton layout.

5.5 Chapter Summary

5.5.1 This chapter has identified that the January 2014 scheme would reduce adverse air quality and noise effects within Huntingdon, a key area of population, by directing strategic traffic away from the town. However, the Huntingdon Southern Bypass would introduce a new source of traffic noise in a currently rural location. There would only be potential for airborne vibration. Certain design options, such as the use of acoustic barriers, are being developed as part of the design.

5.5.2 It is likely that there would be impacts upon people close to the proposed scheme location from construction noise and dust during construction, but good construction management would reduce these effects. Further assessment, as part of the EIA, will consider potential impacts to human health.

5.5.3 The ES will provide a more detailed assessment of the impacts of the proposed scheme upon air quality and noise, including an indication of significance.

6 CULTURAL HERITAGE

6.1 Introduction

6.1.1 The assessment of impacts upon cultural heritage considers three sub-topics:

- archaeological remains – the material remains of human activity from the earliest periods of human evolution to the present, which may be buried traces of human activities, sites visible above ground, or moveable artefacts;
- historic buildings – 'architectural or designed or other structures with a significant historical value', which may include structures that have no aesthetic appeal or structures not usually thought of as 'buildings', such as milestones or bridges; and
- historic landscape – the current landscape, whose character is the result of the action and interaction of natural and/or human factors, and includes evidence of past human activities, which is a significant part of the historic landscape, and may derive both from archaeological remains and historic buildings within it.

6.1.2 This chapter sets out preliminary environmental information in relation to the subject of cultural heritage based on the January 2014 scheme. The understanding of the historic environment has been derived from published information such as the National Heritage List, Historic Environment Record and environmental impact assessment (EIA) work previously published in the A14 Ellington to Fen Ditton (EFD) Environmental Statement (2009).

6.1.3 The results of further scheme specific site inspection and archaeological investigations, including archaeological trial trenching and geophysical survey work, which were not available prior to the preparation of this Preliminary Environmental Information Report, will be reported in the forthcoming Environmental Statement (ES) for the proposed scheme.

6.1.4 The assessment of cultural heritage considers a study area that typically extends 200m around the scheme footprint. In addition, the potential for impacts on designated heritage assets[19] outside the study area will also be considered during preparation of the ES.

6.1.5 **Figure 6.1**, which illustrates the indicative environmental constraints for the wider study area, includes the locations of cultural heritage assets judged to be of high and medium quality.

6.2 Archaeological Remains

6.2.1 At this stage of the cultural heritage assessment, a total of 327 archaeological remains have been identified, covering all periods from the Middle Palaeolithic (circa 300,000 to 30,000 BP[20]) to the modern period (AD 1901 to present).

High Value Archaeological Remains

6.2.2 Scheduled monuments are nationally important heritage sites which are given legal protection by being placed on a list, or 'schedule'. Such archaeological assets are considered to be of high value as they can contribute significantly to acknowledged national research objectives. There are two Scheduled Monuments within the study area, both of which are in Huntingdon, within close proximity to the existing A14:

- the remains of Huntingdon Castle (a motte and bailey castle dating from the medieval period); and
- an earthwork on Mill Common, which is believed to date from the medieval period to 19th centuries, and which was impacted upon by the previous construction of the railway.

Medium Value Archaeological Remains

6.2.3 A total of 76 archaeological assets in the January 2014 scheme study area have been assessed to be of medium value in the context of the EIA due to their potential to contribute to regional research objectives such as understanding the prehistoric landscape and settlement, Romanisation, burial practice, Roman/Saxon transition and the development of the medieval built environment. These assets include:

- Palaeolithic and Mesolithic individual worked flint artefacts and scatters of worked flint artefacts thought to represent activity areas;
- Bronze Age features such as a round barrow and possible settlement activity in the form of enclosures;
- mixed-period assets dating to Iron Age and Roman periods such as enclosed settlements, burial grounds and activity associated with major Roman roads later known as Ermine Street, which ran between London and York, and is believed to run along the current route of the A1198 to Godmanchester and north from there, and Via Devana, which is followed by the current route of the A14 which connected Colchester with Chester; and
- various assets across the study dating to the medieval period; including Anglo-Saxon and later settlement activity which has been identified in Brampton, Girton and Huntingdon, as well as other activity including cremation and inhumation cemeteries, evidence of the medieval development of Huntingdon, and deserted medieval villages at Conington and Houghton.

6.2.4 A further 181 identified archaeological assets have been identified to be of local value which date from the early prehistoric to modern periods. These sites are considered to have the potential to contribute to local research objectives. The assets include prehistoric artefacts and evidence of Roman activity. Medieval activity is represented by evidence for the development of the agricultural landscape, such as ridge and furrow; and urban growth such as evidence of building foundations, floor surfaces and features, such as rubbish pits in Huntingdon. Activity dating to the modern period includes a possible 1st World War runway and 2nd World War defensive structures.

6.2.5 A total of 68 archaeological assets have been assessed to be of negligible value. The majority of these assets date to the medieval and later periods. They largely comprise findspots where the actual location of the find is uncertain, the sites of buildings that have been demolished and areas of degraded ridge and furrow identified by

[19] Designated heritage assets include world heritage sites, scheduled monuments, listed buildings, registered parks and gardens, registered battlefields, conservation areas and locally listed buildings.
[20] BP is Before Present which is recorded as AD 1950.

geophysical survey. These have been assessed to be of negligible value as they have little surviving archaeological interest.

6.3 Built Heritage

6.3.1 Scheduled monuments, Grade I and Grade II* listed buildings are ascribed a high value in the cultural heritage assessment. Sixteen buildings of high value have been identified within the study area, the majority of which are located within the former county town of Huntingdon. These include:

- the medieval Huntingdon Bridge (a scheduled monument) (**Plate 6.1**);
- the medieval parish churches of St Mary's and All Saints (Grade I listed buildings);
- the Town Hall (Grade II* listed building); and
- domestic buildings such as Cowper House (Grade II*) and Hinchingbrooke House (Grade I).

6.3.2 Outside Huntingdon a further three buildings are assessed as high value; the medieval parish church at Lolworth, the 18th century house of Conington Hall, and Girton College on the outskirts of Cambridge (all Grade II* listed buildings).

Plate 6.1: The medieval Huntingdon Bridge

6.3.3 The majority of historic buildings identified as being of medium value are Grade II listed buildings located within Huntingdon. These are typically domestic buildings dating from the 18th or 19th centuries, or earlier buildings which were re-fronted during this period. Also present within Huntingdon are assets such as drinking fountains, a war memorial and almshouses. The Huntingdon and Godmanchester conservation areas are located to the north and south of the river Great Ouse respectively and cover the core of these historic towns.

6.3.4 Within the study area along the A14 and A1, there are a small number of Grade II listed milestones. To the northwest of this area there are a small number of post-medieval farmhouses and cottages which are designated as Grade II listed buildings, and the Alconbury conservation area, which comprises the surviving core of this historic rural village.

6.3.5 Nineteen historic buildings have been assessed as being of low value. These include a medieval gravestone within the graveyard of All Saints Church in Lolworth (the oldest identified asset of low value) and post-medieval buildings such as schools, a Methodist chapel, milestones, World War II pillboxes and an RAF base. Such assets are judged to have historic and architectural importance at a local level and make a contribution to local character.

6.3.6 Three buildings assessed to be of negligible value have been identified within the study area. These comprise undesignated civic buildings of late 20th century date of limited historic and architectural interest.

6.4 Historic Landscape

6.4.1 Four historic landscape types have been identified within the study area. The main historic landscape type comprises 20th century agriculture. This landscape results largely from development in the 20th century, with the removal of earlier field boundaries to create larger fields. However, small areas of earlier character survive including 18th-19th century enclosure; and pre-18th century enclosure. The fourth historic landscape type present within the study area is formed by small areas defined as water features which include former gravel extraction sites.

6.4.2 In consideration of their value as evidence of local agriculture in the post-medieval period, these historic landscape types have been assessed to be of low value.

6.5 Potential Impacts during Construction

6.5.1 Construction of the proposed scheme has the potential to affect heritage assets in the following ways:

- partial or total removal of heritage assets;
- compaction of archaeological deposits by construction traffic and structures;
- changes in groundwater levels leading to the desiccation of previously waterlogged archaeological deposits;
- effects on the setting of heritage assets including visual and noise intrusion; and
- severance and adverse impacts on amenity as a result of construction works.

6.5.2 There is potential for the construction of the January 2014 scheme to physically affect the Mill Common earthwork scheduled monument. Scheduled Monument Consent is usually required for any works which might affect a scheduled monument either above or below ground level. However, when required as part of a Nationally Significant Infrastructure Project this consent would be sought under the overarching Development Consent Order (DCO).

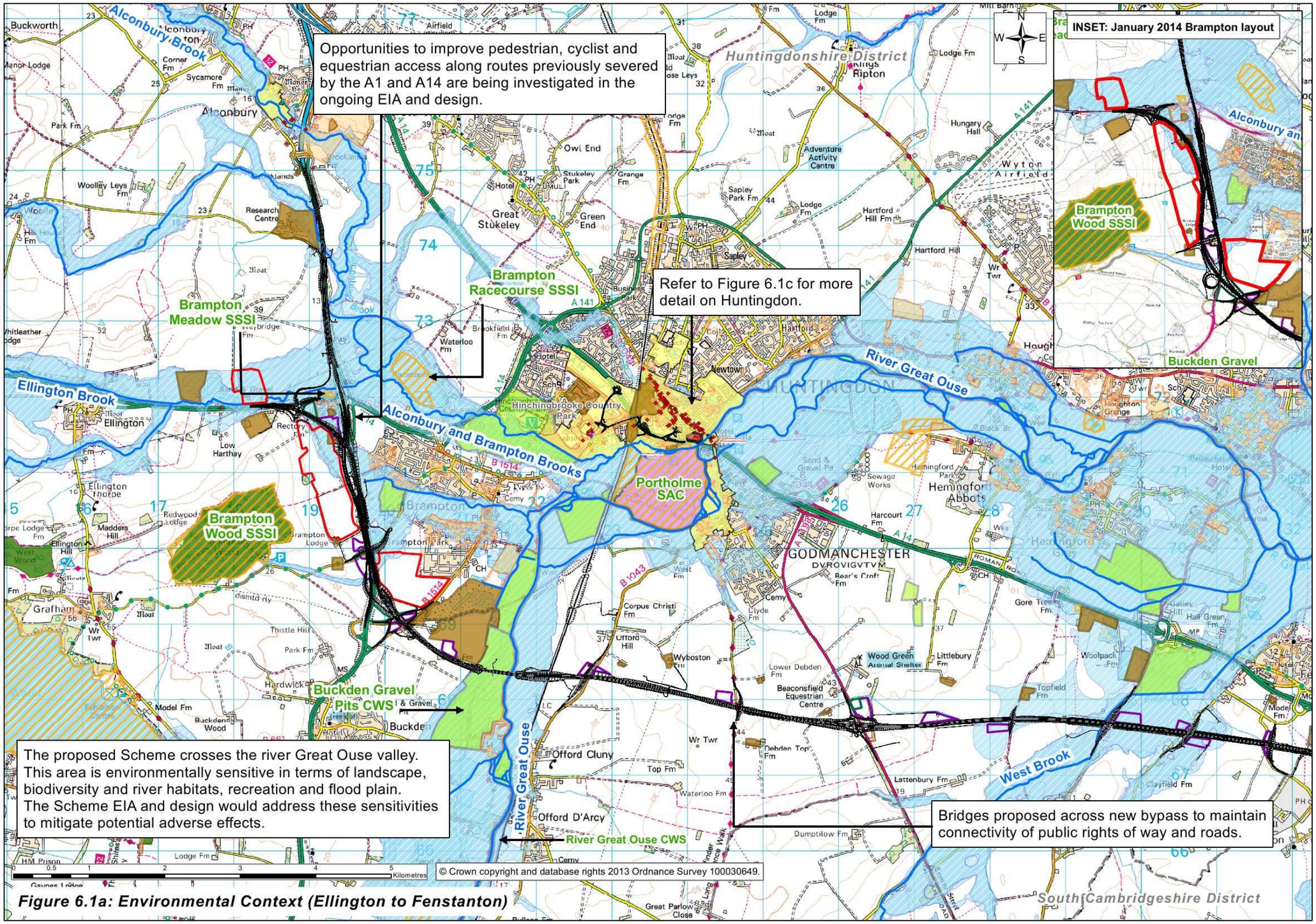

Figure 6.1a: Environmental Context (Ellington to Fenstanton)

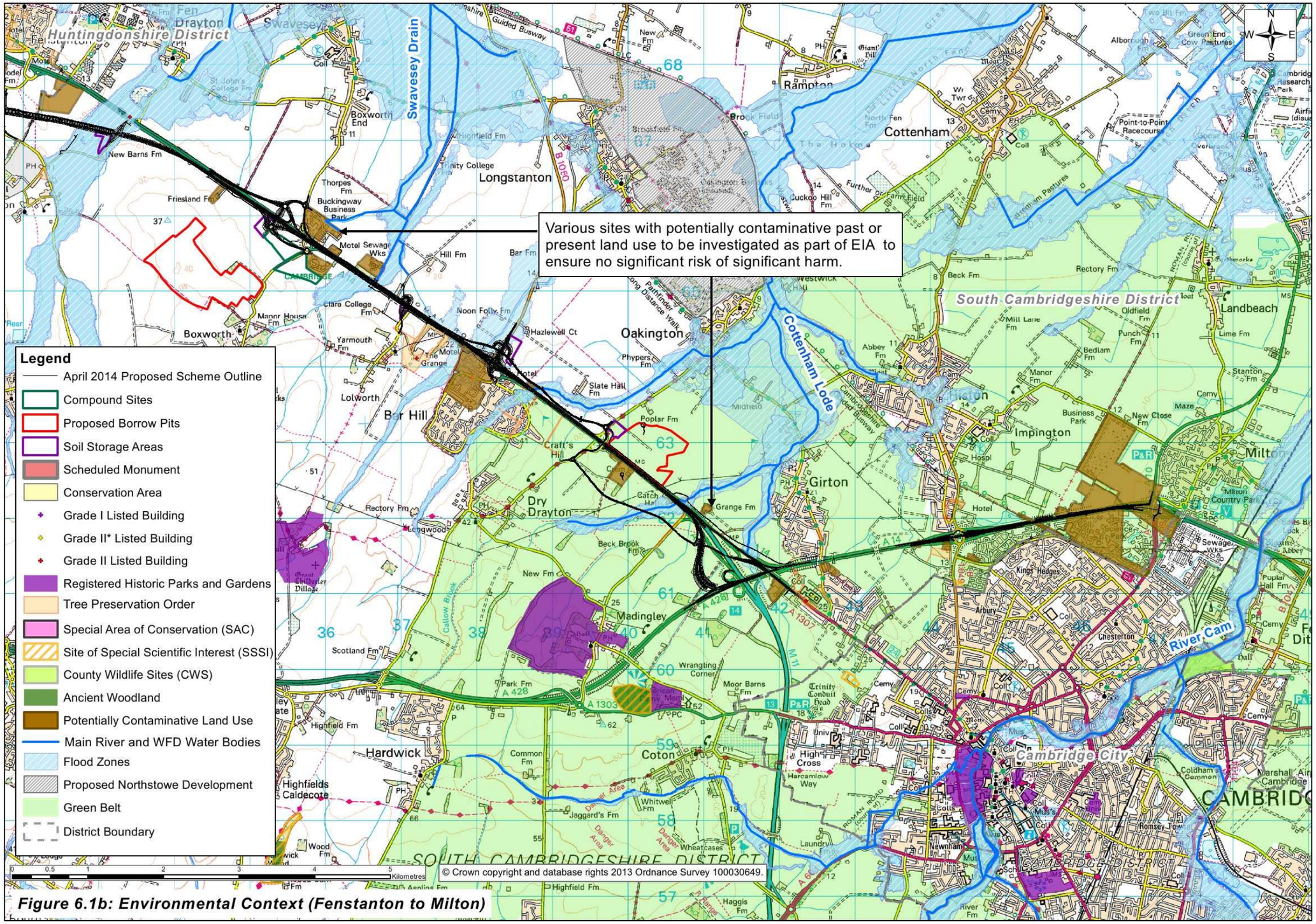

Figure 6.1b: Environmental Context (Fenstanton to Milton)

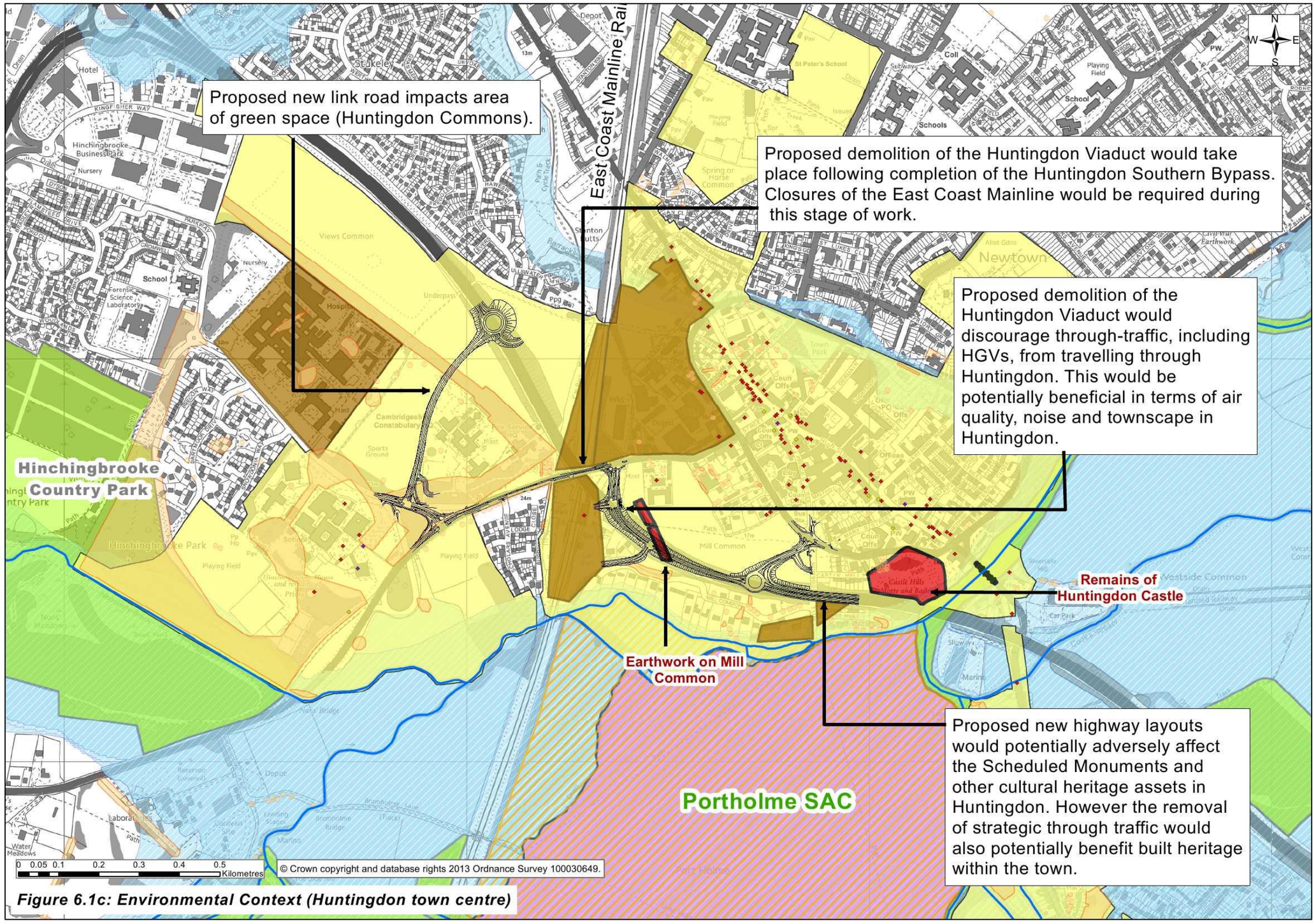

Figure 6.1c: Environmental Context (Huntingdon town centre)

6.5.3 In addition, dependant on the final design there is also potential for adverse effects on the setting of Huntingdon Castle due to the construction of a new sound barrier.

6.5.4 Based on the January 2014 scheme, there is potential for physical effects on five Grade II listed milestones, through removal; the Great Northern Railway and the Great Ouse Navigation, all of which are located within the January 2014 scheme footprint. There is also potential for adverse effects on the setting of Huntingdon conservation area and historic buildings located along the proposed scheme during construction due to activities such as topsoil stripping, bulk earthworks operations, erection of new highways structures, piling, or excavation.

6.5.5 The January 2014 scheme has the potential to physically affect historic landscape types during construction through removal of the character types.

6.6 Potential Mitigation during Construction

6.6.1 Potential mitigation measures for effects on heritage assets include:

- detailed design of development proposals to avoid or reduce impacts on heritage assets;
- installation of physical protection measures, or temporary removal of assets and for reinstatement following the completion of construction works;
- archaeological investigations in advance of, or during, construction;
- historic building recording and historic landscape recording in advance of construction to provide a permanent documentary record of assets in their current form and condition; and
- dissemination of the results of all surveys in an appropriate format and supporting archive.

6.7 Potential Impacts during Operation

6.7.1 Operation of the January 2014 scheme has the potential to result in impacts on the setting of heritage assets. In the majority of cases, these would be long-term in nature. These impacts would commence during construction of the proposed scheme and continue during operation; however the degree of impact may vary between phases. Such impacts can include:

- changes to the surroundings of heritage assets or the general character of their setting;
- changes to access or the viability of heritage assets; and
- cumulative impacts on historic landscape elements as a result of operational maintenance through alteration of historic landscape elements.

6.7.2 Operation of the January 2014 scheme has the potential to result in impacts on the setting of heritage assets located along the route, including the scheduled monuments within Huntingdon and Huntingdon conservation area, due to the presence of the new road configuration, noise and visual intrusion, resulting from the movement of vehicles, lighting, noise barriers and signage.

6.7.3 There is also the potential for beneficial impacts on the setting of historic buildings within Huntingdon and the Huntingdon conservation area, due to the downgrading of the existing A14 through the town to county road status, the removal of the intrusive Huntingdon rail viaduct, and reductions in traffic levels within the designated area. Changes in traffic levels on the road network in the surrounding area also have the potential to result in beneficial impacts on heritage assets at some distance from the proposed scheme.

6.8 Potential Mitigation for Impacts from Operation

6.8.1 Adverse impacts on the setting of heritage assets resulting from operation of the proposed scheme can be mitigated through detailed design of the proposed scheme. This may include measures such as consideration of the horizontal or vertical alignment of the proposed scheme to reduce its visual prominence, careful siting of lighting or signage, the use of noise fencing or maintenance of access routes to a historic building to maintain its viability. Further mitigation can be provided through the use of landscape mitigation measures such as bunds, planting or cladding of highways structures. These measures can help to reduce the visual prominence of the scheme and aid its integration with the surrounding landscape.

Proposed Layout for Brampton Interchange

There is little difference between the January 2014 Brampton layout and the April 2014 proposed Brampton layout in relation to potential cultural heritage effects. Both layouts have the potential to negatively impact on buried archaeological remains, but this could be mitigated through preservation by record.

6.9 Chapter Summary

6.9.1 This chapter has identified that there are several heritage assets which potentially could be adversely affected by the January 2014 scheme either directly, for example through loss or damage during construction, or indirectly, for example through adverse effects upon the setting. However, the removal of the trunk road through Huntingdon would also have a potential beneficial effect upon the setting of historic buildings.

6.9.2 The options for mitigation would include designing the proposed scheme to avoid or reduce impacts upon heritage assets and enable the preservation of archaeological assets *in situ*. Archaeological investigations, and historic building and landscape recording undertaken in advance of construction would help to mitigate potential effects on heritage assets, whilst careful design choices and landscaping can help to mitigate the effects upon the settings of historic buildings and other features.

6.9.3 To inform the preparation of the final assessment for cultural heritage, further work will be undertaken including site inspections, archaeological fieldwork and specialist input to the detailed design of the proposed scheme. The final detailed assessment of potential impacts on heritage assets will be presented in the forthcoming ES, in the cultural heritage chapter.

7 LANDSCAPE AND VISUAL IMPACTS

7.1 Introduction

7.1.1 As part of the environmental impact assessment (EIA), an assessment will be made as to how the proposed scheme would alter the character of the landscape as well as the quality of people's views. The final assessment to be presented within the Environmental Statement (ES) will take account of the value and sensitivity of the landscape or views at given locations, for example in terms of the existing quality of landscape or relative importance of visual amenity at a given location, as well as the degree of change predicted to occur from the proposed scheme. This chapter sets out preliminary information in relation to the subject of landscape and visual impacts which is available from previous studies based on the January 2014 scheme, as well as the scoping exercise for the proposed scheme.

7.2 Landscape and Townscape Character

7.2.1 A landscape's character is formed from a combination of elements such as topography, watercourses, land use and pattern, land cover and vegetation, public open space and cultural heritage influences. Landscapes vary considerably in character and quality, and are a key component of the distinctiveness of any local area. The same principles apply within built-up areas, also known as 'townscape'.

National Character Area 88: Bedfordshire and Cambridgeshire Claylands

7.2.2 The Countryside Character Initiative, overseen by Natural England, is concerned with the character of England's countryside. It has mapped 159 separate, distinctive national character areas intended to inform and contribute towards policy development and local planning, action and development.

7.2.3 The proposed scheme lies within national character area 88: Bedfordshire and Cambridgeshire Claylands. Some of the key characteristics are:

- gently undulating topography and plateau areas, divided by broad shallow valleys;
- predominantly an open and intensive arable landscape, consisting of fields bounded by either open ditches or sparse closely trimmed hedges, both containing variable numbers and quality of hedgerow trees;
- river corridors of the river Great Ouse and Ivel comprise cohesive sub-areas characterised by flood plain grassland, riverine willows and larger hedges;
- woodland cover is variable including clusters of ancient deciduous woods on the higher plateau area and smaller plantations and secondary woodland within river valleys;
- settlement pattern clusters around major road (A1) and rail corridors, including many with raw built edges, as well as smaller, dispersed settlements elsewhere, with village edge grasslands being an important feature; and
- restored gravel working lakes adjacent to the river Great Ouse.

Regional Landscape Character

7.2.4 The Cambridgeshire County Council's publication, **The Cambridgeshire Landscape Guidelines**[21], indicates that the proposed scheme mainly lies within two landscape character areas; the 'Western Claylands' and 'Ouse Valley', with the improvement section northeast of Cambridge just within the 'Chalklands' and 'Fenlands' character areas.

7.2.5 More detailed local analysis of landscape character is provided by Cambridge City Council's **Cambridge Landscape Character Assessment**[22]; South Cambridgeshire District Council's **Cambridge Green Belt Study**[23], and the **Huntingdonshire Landscape and Townscape Assessment Supplementary Planning Document**[24] (adopted 2007).

Landscape Character in the Study Area

7.2.6 The published landscape character assessments at a local scale do not provide full coverage of the study area. Therefore the final assessment within the ES will include a detailed assessment of the landscape character, value and sensitivity throughout the study area in accordance with the latest guidance, against which to assess landscape impacts. The following paragraphs provide a preliminary overview of the landscape character, value and sensitivity.

7.2.7 The landscape surrounding the proposed scheme is distinguished by three principal features: the low lying flood plains of the river Great Ouse; the low rounded hills which rise up gently on either side of the valleys to form plateau areas to approximately 50m above sea level; and the flatter fen edges around Cambridge and to the north of the existing A14 below 20m sea level, merging almost imperceptibly with the fens to the north at approximately 10m sea level and below.

7.2.8 West of Cambridge, the landscape south of the A14 is predominantly undulating and north of the A14 flat, both with expansive views of large scale intensive arable farmland, contained either by sparse trimmed hedgerows, open ditches or streamside vegetation. The scattered woods, some of which are ancient woodlands form important visual and wildlife features.

7.2.9 The shallow valley of the river Great Ouse passes through a picturesque and enclosed landscape, meandering through a mosaic of water meadows, working and disused gravel pits and lakes. The area is an important local recreational resource and is highly valued for its landscape.

7.2.10 Early settlement has influenced the development of the area and archaeological evidence is abundant in the valleys. Both the existing A14 and proposed scheme passes close to the Cambridge northern fringe and settlements south of Huntingdon such as Brampton and Godmanchester.

7.2.11 Settlement within the arable landscape is sparse, with small villages and isolated farms scattered throughout the area, usually in sheltered places with trees. Small

[21] Cambridgeshire County Council (1991). The Cambridgeshire Landscape Guidelines.
[22] Cambridge City Council (2003). Cambridge Landscape Character Assessment.
[23] Landscape Design Associates (2002). Cambridge Green Belt Study – A vision of the future for Cambridge and its Green Belt Setting.
[24] Huntingdonshire District Council (June 2007). Huntingdonshire Landscape and Townscape Assessment Supplementary Planning Document.

grass paddocks typically occur on the edges of villages. Church spires and towers, windmills and water towers form distinctive local landmarks. The historic city of Cambridge is located to the south-east of the study area and the village of Alconbury lies at the northern extent of the proposed scheme. The town of Godmanchester has important Roman connections and Buckden was a former coaching stop for the A1 Great North Road. The expansion of the town of Huntingdon has resulted in new industrial and residential built edges encroaching on the open countryside which somewhat degrade the local landscape character.

7.2.12 Many of the settlements both north and south of the existing A14 and the southern part of Huntingdon incorporate conservation areas and listed buildings which create localised areas of high townscape value throughout the study area.

7.2.13 Overall the landscape is considered to be of low to moderate value and sensitivity, with more attractive high value landscape in parts of the river valleys, Brampton Wood at the western end of the proposed scheme, Milton Country Park at the eastern end of the proposed Scheme, around some of the villages, and within the southern part of Huntingdon.

Tranquillity

7.2.14 The Campaign to Protect Rural England (CPRE) has undertaken a study of tranquillity in England and has mapped and published the results. CPRE highlight new roads, planes and runways, light pollution and a lack of funding as the greatest threats to remaining levels of tranquillity. Major highways including the A14 are listed as areas of disturbance and low tranquillity within the Bedfordshire and Cambridgeshire Claylands landscape character area.

Designations

7.2.15 Childerley Park, Madingley Park and the American Military Cemetery are recorded on the Register of Historic Parks and Gardens held by English Heritage. These are well to the south of the study area and should not be affected by the proposals.

7.2.16 Conservation areas are incorporated within many of the rural settlements surrounding the proposed scheme. Of particular relevance, because parts of the proposed scheme are situated within it, a large part of the urban extent of Huntingdon has conservation area status. Statutory listed buildings are concentrated within the conservation areas, but are also scattered throughout the wider study area. There are two scheduled monuments in Huntingdon beside the existing A14 as mentioned in **Chapter 6** (Cultural Heritage).

7.2.17 Brampton Wood at the western end of the proposed scheme is recorded ancient woodland and there are several areas of vegetation and individual trees throughout the study area that have tree preservation orders in place.

7.2.18 The proposed scheme north and west of Cambridge falls within the Green Belt. Whilst not strictly a landscape designation, the 'openness' of the landscape within the Green Belt is relevant to landscape impact assessment and will be considered within the final assessment.

7.2.19 The likely impacts on these designations and other policy areas of relevance to landscape will be detailed within the final assessment.

7.3 Views and Visual Amenity

7.3.1 The zone of theoretical visibility (ZTV) generally extends up to approximately 1.5km – 2km around the proposed scheme in areas of open landscape, and is contained by the edge of built settlements including Alconbury, Brampton, Buckden, Offord Cluny, Hilton, Fenstanton and Fen Drayton in the west, and Bar Hill, Girton, Impington, Milton and Cambridge in the east. The ZTV is likely to be most tightly contained by built development to the south of the proposed scheme at Bar Hill, both sides of the proposed scheme at Girton, north of the proposed scheme at Impington and Milton, and south of the proposed scheme at Cambridge. The ZTV around the proposals within Huntingdon is reasonably well contained by built development. The ZTV would be further defined and clarified within the final EIA.

7.3.2 The landscape and visual assessment will consider how people's views throughout the ZTV may be affected by the proposed scheme. The assessment will identify which visual receptors are likely to be more sensitive to changes in views. The value and sensitivity of these visual receptors are classed as 'high', 'moderate' and 'low'.

High Value and Sensitivity

7.3.3 Residential properties, public rights of way and recreational facilities are locations which are considered to be of high sensitivity to potential changes to views and visual amenity.

7.3.4 In the context of the January 2014 scheme, the residential locations which are likely to be most sensitive are on the peripheries of Alconbury, Brampton, Buckden, Offord Cluny, Hilton, Fenstanton and Fen Drayton in the west, and Bar Hill, Girton, Impington, Milton and Cambridge in the east, as well as scattered properties throughout the rural extent where views may be influenced by the proposed scheme.

7.3.5 Other sensitive views would be from some of the surrounding hotels, the public rights of way and other areas of open space such as parks.

Moderate Value and Sensitivity

7.3.6 Outdoor workplaces, scenic roads and schools are regarded as being of 'moderate' sensitivity to changes in view resulting from the proposed scheme. This would include some of the minor rural lanes that cross the area of the proposed Huntingdon Southern Bypass, outdoor workers within the landscape and students and staff at educational establishments throughout the area where the proposed scheme would potentially be visible.

Low Value and Sensitivity

7.3.7 Indoor workplaces, main roads and sports facilities are regarded as being of 'low' sensitivity. This would include people at their place of work, vehicle travellers on main roads (including the existing A14) and, other surrounding and non-scenic routes.

7.4 Potential Impacts during Construction

7.4.1 The construction of the proposed scheme would require the movement of construction plant, vehicle haul routes, presence of contractor's compounds and the construction village, together with temporary lighting. In order to demolish and construct bridges and retaining structures, there is a likelihood of the need to use tall cranes and other similar machinery.

7.4.2 It is therefore likely that during construction, people in surrounding properties and businesses, and along public rights of way and other locations, would experience short term adverse effects on their views. Many of these effects are likely to be significant, particularly from the residential peripheries of some surrounding nearby settlements and public rights of way that run close to, or cross, the proposed route.

7.4.3 There would also be short term adverse effects on landscape character which would be extensive and are likely to be significant in places, particularly in areas of high sensitivity such as the Ouse Valley and within the setting of designated historic features.

7.5 Potential Mitigation for Effects upon Landscape and Views from Construction

7.5.1 Potential landscape and visual effects during construction could be mitigated to some extent. For example, where screen mounds are proposed as part of the permanent works, they would be constructed as early as is practicable to provide screening to the construction work. Retained vegetation would be protected during construction in accordance with current best practice. Where land would be used temporarily, such as for compounds, haul roads, re-grading areas, etc., then this would be returned to a condition suitable for the continuation of its original use, where possible. This would include the replanting of hedgerows and trees, where removal could not be avoided.

7.5.2 Some residual landscape and visual effects during construction are likely to remain significant despite mitigation, for example visual effects from highly sensitive receptors where views would be close at hand and impossible to screen effectively.

7.6 Potential Impacts during Operation

7.6.1 The potential landscape and visual impacts during operation are likely to be associated with the increased highway infrastructure including widened sections of the existing A14, the offline section of the proposed scheme, with numerous bridges for minor road crossings, junction improvements, lighting, gantries and signage.

7.6.2 The potential landscape and visual effects during operation as assessed for the January 2014 scheme are likely to include:

- the offline section runs through open farmland dissecting fields, and through tree and hedge lined boundaries, and may have adverse effects on landscape character and quality, with a loss of perceived openness and tranquillity;
- new junctions and improvements to existing junctions are likely to cause localised effects on landscapes and settlements;
- the visual effects of the Great Ouse viaduct are likely to be significant due to its position and size, although this would be sensitively designed to try to reduce impact, but properties on the outskirts of Brampton, Buckden Marina and Offord Cluny are particularly likely to experience adverse views of the proposed scheme and the structures over the river Great Ouse and the East Coast railway line;
- properties on the edges of surrounding settlements and numerous isolated properties are likely to experience adverse visual effects from the proposed scheme;
- lighting of the proposed scheme is likely to create adverse visual effects, which could be both daytime and night-time, including lit junctions and roundabouts, which in particular can result in a concentration of light pollution;
- proposed lane widening on the existing stretches of road would in places result in the loss of mature vegetation that currently screens views to the road; and
- there are a number of properties that front the A14 along the online section that would face substantial changes as the widening brings the road closer to them and screening vegetation is removed.

7.6.3 However, preliminary assessment of the January 2014 scheme indicates that there are also likely to be beneficial impacts which would include:

- reduction of traffic from Huntingdon through to Fen Drayton and road rationalisation on the existing A14 benefiting the townscapes of the settlements in this area;
- currently open areas alongside the improved A14 and widened A1 trunk roads may be planted where appropriate;
- the existing A14 Huntingdon rail viaduct would be removed and parts of the approach embankments lowered, with new local road links designed to join the Huntingdon ring road and Brampton Road, which would have a beneficial effect on those properties and open spaces to the south of Huntingdon and on the area around the railway station; and
- removal of the viaduct and new junction layouts would offer opportunities for third party townscape improvements within Huntingdon.

7.7 Potential Mitigation for Effects upon Landscape and Views from Operation

7.7.1 A comprehensive landscape treatment would be implemented for the proposed scheme that would address adverse landscape, visual and other environmental impacts where possible to integrate the proposed scheme into the local landscape, and provide new habitats.

7.7.2 The potential design options under consideration, which could help mitigate the adverse effects upon landscape and views include:

- sensitive design of screen mounding and balancing ponds;
- sensitive location of main road signs and gantries to limit visual intrusion;
- following current local authority planning guidelines in the landscape design;
- use of locally indigenous native plants to reflect the distinctive local character, with more ornamental varieties used at key locations if appropriate in the more urban settings;
- dense native tree and shrub planting on and adjacent to highway earthworks to create woodlands, copses and shelterbelts in order to break up the scale of the road, screen structures, traffic and lighting and help integrate the scheme into the existing landscape pattern;
- retention of views to local landmarks through breaks in the planting to help create a sense of place for vehicle travellers, where possible;
- rounding of crests and toes of embankments to achieve better integration with the surrounding landform, where space and materials are available;
- use of false cuttings to screen traffic and headlights in sensitive situations;

- use of hedges on the highway boundary, to link into existing field boundaries, provide screening and integration into the local pattern;
- off-site planting by agreement with landowners outside the highway boundary could potentially be offered to augment the on-site proposals and provide additional screening; and
- utilisation of sensitive lighting design such as the use of horizontally mounted flat glass lanterns.

Proposed Layout for Brampton Interchange

The April 2014 proposed Brampton layout is more contained to the west of the A1, compared with the January 2014 Brampton layout. It would subsequently cause a landscape impact of slightly less significance because it would have a smaller footprint. It would also be less visually intrusive in views from the west. The proposed elevated structure west of Brampton would be slightly more visually intrusive than the January 2014 Brampton layout in views from the outskirts of Brampton and public rights of way between Brampton and the A1, but this could be mitigated with sensitive earth modelling and landscape planting.

Overall the significance of landscape and visual impacts that would be caused by the two layouts would be reasonably similar.

7.8 Chapter Summary

7.8.1 This chapter has identified that based on preliminary assessment of the January 2014 scheme there are likely to be significant effects (both adverse and beneficial) upon views and the landscape as a result of the construction and operation. However, there are also several ways of mitigating many of the impacts through sensitive design and construction planning. The final detailed assessment of landscape and visual impacts will be presented in the landscape chapter of the forthcoming ES.

8 NATURE CONSERVATION

8.1 Introduction

8.1.1 This chapter considers how the January 2014 scheme potentially would affect nature conservation. Impacts on nature conservation are broadly split into two categories: habitats and species.

The Proposed Study Area

8.1.2 The ecological study area includes the development footprint plus an additional ecological buffer. This buffer area differs according to the type of habitat or species that is being considered. The study area for some mobile species is larger than that for habitats and less mobile species, with the study area often extending some distance from the proposed scheme footprint. The phase 1 habitat surveys typically have a minimum buffer of 250m, and desk studies of existing records are generally undertaken to 2km from the scheme.

8.2 Designated Habitats

8.2.1 The key designated habitats relevant to the environmental impact assessment (EIA) are:

- Portholme Special Area of Conservation (SAC);
- Eversden and Wimpole Woods SAC;
- Brampton Meadow Site of Special Scientific Interest (SSSI);
- Brampton Wood SSSI;
- Brampton Racecourse SSSI;
- River Great Ouse County Wildlife Site; and
- Buckden Gravel Pits County Wildlife Site.

8.2.2 The key designated habitats are indicated on **Figure 6.1**.

8.2.3 In addition to designated sites, other localised habitats can be important for a wide variety of wildlife.

Special Areas of Conservation (SAC)

8.2.4 SACs are a legal designation for nature conservation at the European level; sites are designated for a range of features, including habitats or species. There are two SACs within the vicinity of the proposed scheme. These are described in the following paragraphs.

8.2.5 Portholme SAC is located less than 100m away from the proposed scheme at its closest point near Huntingdon. It is the largest surviving traditionally managed hay meadow in the UK, with an area of 104ha of alluvial flood meadow. It supports a small population of the plant Snake's Head Fritillary. Early assessments based on the January 2014 scheme suggest that there will be no significant impact on this site and the site may even benefit from reduced vehicle emissions from traffic through Huntingdon.

8.2.6 Eversden and Wimpole Woods SAC is located approximately 11km south west of the proposed scheme, near Great Eversden. The site comprises a mixture of ancient coppice woodland (Eversden Wood) and high forest woods likely to be of more recent origin (Wimpole Woods). A colony of barbastelle bats is associated with the trees in Wimpole Woods. These trees are used as a maternity roost with most of the roost sites within tree crevices. The bats also use the site as a foraging area. Some of the woodland is also used as a flight path when bats forage outside the site. At this stage no assessment work has been undertaken with respect to this site.

Sites of Special Scientific Interest (SSSI)

8.2.7 SSSIs are a legal designation for nature conservation at the national level; sites are designated for a range of features, including habitats or species. There are three SSSIs within the vicinity of the proposed scheme, described in the paragraphs below.

8.2.8 Brampton Meadow SSSI is located approximately 50m from the proposed scheme near the current A1-A14 interchange. This small species-rich meadow exhibits plant communities of the calcareous clay pasture type. Grasslands of this type are restricted to the south of the country and are generally declining due to changes from traditional management practices. Early assessments based on the January 2014 scheme suggest that there will be no likely significant effects on this site.

8.2.9 Brampton Wood SSSI is located approximately 800m west of the January 2014 scheme near Ellington Thorpe. This site is one of the largest remaining blocks of ancient woodland in Cambridgeshire. The tracks support a rich neutral grassland flora, representing additional plant communities which are now uncommon in the county. The variety of habitat makes this a valuable site for invertebrates for which it is additionally noted. A variety of plants characteristic of ancient woodland sites are present. Early assessments based on the January 2014 scheme suggest that there will be no significant impact on this site, subject to further assessments regarding air quality. Brampton Wood is managed as a Wildlife Trust Reserve.

8.2.10 The Brampton Racecourse SSSI is located approximately 500m east of the proposed scheme near Brampton. Brampton Racecourse is an extensive area of unimproved neutral grassland located within the flood plain of Alconbury Brook. Unimproved grasslands of this type are restricted to the lowlands of southern England and are now nationally scarce. In Cambridgeshire such examples are especially rare. The grassland community is species-rich and includes the largest population of green-winged orchid in the county. Early assessments based on the January 2014 scheme suggest that there will be no significant impact on this site.

County Wildlife Sites (CWS)

8.2.11 CWSs are not legally protected sites, but they still have the potential to support a great diversity of plants and animals. There are ten sites within the vicinity of the proposed scheme. Particularly relevant are Buckden Gravel Pits and the River Great Ouse County Wildlife Sites which are crossed by the proposed scheme. Buckden Gravel Pits CWS is mainly considered important for its ornithological interest whereas the River Great Ouse CWS supports a population of nationally scarce vascular plant species and breeding populations of a nationally rare chaser dragonfly species.

8.2.12 The other CWSs in the vicinity of the proposed scheme are: Fenstanton Gravel Pits; Kings Hedges Triangle/Scrub; Park Road Grasslands; Madingley Brick Pits; Milton Road Hedge; Brampton Flood Meadow; Littlebury Farm Meadows and Hinchingbrooke Gravel Pits.

Other Habitats

8.2.13 The floristic value of habitats along the majority of the route corridor, but outside of designated sites, is considered to be relatively low owing to much of the area being cultivated arable land bounded by species-poor hawthorn and blackthorn hedgerows.

8.2.14 Although the majority of watercourses and other surface water features across the study area have been modified by human activity, they still provide important habitat and habitat corridors for wildlife at the local level. Current classifications for water bodies across the study area and their status under the Water Framework Directive are described in **Chapter 9** (The Water Environment).

8.3 Protected Species

8.3.1 There are a variety of protected or otherwise notable species that have been recorded within the study area; these include bats, birds, badgers, water voles, great crested newts, brown hares, otters, reptiles, European eel and invertebrates.

Plants

8.3.2 The habitat within the majority of the study area is relatively poor with respect to its ability to support rare plants and the large areas of intensive farmland support mainly common species.

Animals

8.3.3 There are a range of animals that can be found within the study area. While many of them are common species, listed below are those which are either rare or protected by nature conservation legislation.

Bats

8.3.4 All bat species in the UK are of international concern with regards to their conservation status.

8.3.5 Surveys that have been undertaken so far have shown low to moderate levels of bat activity within 100m of the January 2014 scheme.

8.3.6 Three small transitory roosts used by the more common bat species have been identified along the proposed scheme corridor. The only known maternity roost (for a pipistrelle species and brown long-eared bats) within the vicinity of the proposed scheme is at Cambridge Crematorium which is located more than 100m from the proposed scheme corridor. No hibernation roosts have been identified so far. The nationally rare barbastelle species was recorded on one occasion along a hedgerow between the scheme corridor and Brampton Wood. If further planned work reveals this species to be using habitat affected by the proposed scheme then a greater level of value may be considered appropriate for bats in the study area.

Otters

8.3.7 Otters are recovering from a severe decline in abundance and distribution in the latter half of the 20th century. However, the proposed scheme is within a sub-region believed to have been successfully re-populated for some time. The rivers and wetland habitats in the vicinity of the proposed scheme are limited in extent and form a relatively small portion of the region's overall otter habitat.

Other mammals

8.3.8 Badgers are widespread and abundant throughout the study area. Water voles are declining and under threat in many parts of their range; recent evidence of water vole presence within the study area is very limited (two sites only). Brown hares are known to be widespread and relatively abundant in this region.

Birds

8.3.9 There are numerous species of birds within the study area. Of particular relevance to the proposed scheme is the barn owl, as the area holds a significant portion of the county's population. The area surrounding the proposed scheme is also used by a range of wintering birds.

Great crested newts

8.3.10 Great crested newts are a protected species, but they remain relatively widespread in south-east England. There are 13 known breeding ponds within the vicinity of the scheme corridor and as great crested newts spend most of the lifetime in the surrounding vegetation, suitable habitats surrounding these ponds is important to their survival.

Reptiles

8.3.11 Common reptile species such as grass snakes and common lizards are protected in the UK. Two sites in the vicinity of the scheme corridor have been identified as supporting grass snakes and common lizard. It is believed that reptiles are present in very low numbers due to the relatively poor habitat over the majority of the area.

European eel

8.3.12 The European eel is classified as endangered in the UK. The river Great Ouse and tributaries are considered an important stronghold for them. Although many of the water courses across the proposed scheme area are considered of poor ecological quality for fish, eel are particularly effective at utilising marginal habitats. As such, any potential impacts on their distribution and habitats will be carefully assessed.

Invertebrates

8.3.13 The relative lack of floristic diversity will tend to support assemblages of relatively common invertebrates. However, some notable species are associated with hedgerows and grazed flood meadows near the river Great Ouse. These include the white-spotted pinion moth, which is associated with English elm trees, and was recorded at and near to Wood Green Animal Shelter.

8.3.14 A number of ponds and lakes along the proposed scheme corridor include some endangered species as well as species which are regionally or locally scarce. Some of the ponds and lakes in the CWSs are also noted as important for the nationally-scarce chaser dragonfly species.

8.4 Potential Impacts upon Nature Conservation

8.4.1 There are a number of ways in which a highways scheme can impact on biodiversity and nature conservation, both during construction and once the road has opened. A summary of the main impacts is given below.

Habitat Loss

8.4.2 Habitat Loss is directly attributable to the change of use of the land from countryside to a highway. The offline sections of the proposed scheme, including borrow pits and contractor's compounds, are where these effects are likely to be most significant as the land take is at its greatest. Some of the habitat loss would be permanent (the actual alignment of the road) and other areas will be lost during construction, but may be possible to be restored once construction has been completed.

Habitat Damage

8.4.3 Habitats that extend from the construction footprint include downstream aquatic habitats that are sensitive to pollution from fuel and chemicals spills, and from sediment run-off. While best practice construction techniques for pollution prevention and control would be used, there is always a risk that pollution could result while construction takes place. Indirect impacts may also arise on designated sites where vegetation may be sensitive to elevated levels of airborne dust from the works, again the risk of this would be reduced with best practice control of the construction sites.

Disturbance

8.4.4 Disturbance resulting from construction can lead to significant effects on sensitive species. This could lead, amongst other things, to abandonment of young, predation risk and use of critical energy reserves. This would be a temporary impact and it would be mitigated through the instigation of method statements that would address potential impacts on species. This would for instance include removal of vegetation outside of bird nesting periods.

Severance

8.4.5 Given the predominantly arable landscape, the severance of existing wildlife corridors along the proposed scheme (such as watercourses, field margins, hedgerows and tree lines) could have significant effects on species in the area. Severance caused by construction of the new highway is expected to be a key potential impact based on assessment of the January 2014 scheme and will be a focus for the mitigation strategy. This severance would be permanent in the case of the road alignment, but harm caused during the construction phase only could be remediated with the restoration of hedgerows and tree lines once the road has been completed.

8.4.6 Severance leads to isolation both within and between populations and from specific resources vital for survival. The effects of this could include reduced foraging success, increased competition, genetic isolation and inbreeding, which can lead to local extinctions.

8.4.7 Severance would begin during site clearance. The effects could then continue during operation, as in the absence of mitigation the road acts as a barrier across the landscape to a range of species.

Wildlife Corridor Creation

8.4.8 A beneficial effect may arise from the development of the offline section of the proposed scheme. However, highway verges, if managed appropriately, can provide valuable habitat and habitat corridors for wildlife over significant distances. They may help to link other important habitats, otherwise isolated from each other. This is especially the case where such verges replace less valuable, intensive forms of land use, such as arable land, as is the case here. Therefore, based on assessment of the January 2014 scheme, east to west connectivity for some species may be improved if the highway verge and landscaping is sensitively planted and managed.

Species Mortality during Construction

8.4.9 Less mobile species, or animals that are young or hibernating, are likely to be those most vulnerable to direct mortality during construction.

8.4.10 The effects of individual mortality erode the population, which can lead to local extinctions once the population falls beneath a critical threshold. These population level effects of direct mortality can take considerable time to become apparent. Often it is the longer-lived species, with greater parental investment and low annual reproduction, which struggle to recover from the loss of individuals resulting from construction activities.

Changes in Air Quality

8.4.11 Vehicle emissions may increase during construction due to the presence of construction traffic, while in the longer term overall vehicle emissions in some areas would increase and in others decrease as a result of the proposed scheme. Sites that are designated for their floristic importance, and any species that depend on them, are particularly sensitive to changes in air quality. Elevated NO_x concentrations are generally considered to be the main threat to vegetation from vehicle emissions, but normally only within close proximity to the road. More detail on air quality impacts is set out in **Chapter 5** (Air Quality and Noise).

Species Mortality (vehicle collisions)

8.4.12 Many animals are killed on UK roads each year and this is likely to be the case on the new roads in the proposed scheme in the absence of mitigation. Most of these deaths are the result of collisions with vehicles. Animals that are at particular risks are barn owls, due to the manner in which they hunt, and bats, badgers and otters, as a result of the severance of their wildlife corridors. There are some mitigation measures that can be employed to reduce the risk of collisions and these will be considered during the ongoing design of the proposed scheme.

Disturbance from Road Lighting

8.4.13 Impacts from lighting are most likely to affect bat species along the alignment of the proposed scheme. The effects of road lighting are complex, but include roost disturbance and abandonment, severance and loss of foraging habitats through avoidance, and a decline in airborne invertebrate prey.

8.4.14 Habitats where the impact of lighting can be particularly severe include habitats along river corridors, woodland edges and hedgerows.

8.5 Potential Mitigation and Designing for Nature Conservation Enhancement

8.5.1 A detailed mitigation strategy is being developed to avoid or reduce the impacts described above. This strategy will seek to employ best-practice methods for dealing in particular with disturbance, habitat loss and habitat severance. At this early stage, based on assessment of the January 2014 scheme, it is thought that through mitigation and compensatory habitat creation there would be a minimal overall effect on wildlife and, in some cases, there could be a benefit in terms of habitat creation along the new road corridor.

8.5.2 The environmental master plan prepared in 2009 as part of the previous A14 Ellington to Fen Ditton (EFD) scheme is considered to provide the general starting point for the level of provision of nature conservation mitigation areas. Where appropriate, the environmental master plan would be adjusted to take account of the most recent design for the proposed scheme and assessment, with reference to the following guiding principles which have been developed specifically for the proposed scheme:

- maintain key north-south habitat and wildlife dispersal corridors across the scheme corridor as far as is practicable, using bridges, culverts and structural planting (in conjunction with appropriate fencing and sensitive lighting to maximise effectiveness) within the design;
- seek opportunities to maximise east-west habitat connectivity along both sides of the proposed scheme with new landscaping using native, locally appropriate species;
- aim for no net loss of valued semi-natural habitats;
- seek to minimise culverting of watercourses and, where unavoidable, design culverts according to current best practice design;
- if realigning watercourses, incorporate river restoration techniques to provide benefits for habitats and species;
- aim to avoid direct or indirect impacts on sites designated for nature conservation, as the first principle of mitigation, with further mitigation or compensation as a last resort;
- seek to increase habitats for key species that are limited by low availability of suitable habitat / connectivity e.g. dormice, barn owl, great crested newt;
- adjust to account for evolving design, including drainage, borrow pits, compounds and storage areas;
- account for new ecological receptors as further surveys and survey analysis develops;
- adjust landscape , visual, noise and drainage mitigation where practicable to broaden habitat opportunities and biodiversity without compromising other mitigation provision;
- seek opportunities to provide new habitat linkage to existing habitat features and designated sites (e.g. Brampton Wood, Buckden Gravel Pits/River Great Ouse, Fenstanton Gravel Pits), including possible off-site treatments by agreement; and
- identify broad areas beyond the proposed scheme boundary where lasting benefits might be achieved through additional land take and/or working with partners

Proposed Layout for Brampton Interchange

Overall the effects on nature conservation arising from the April 2014 proposed Brampton layout would potentially be slightly beneficial, compared to the January 2014 Brampton layout, since the proposed layout would move the scheme further away from Brampton Wood and would also have a smaller overall footprint.

8.6 Chapter Summary

8.6.1 The biodiversity value of much of the proposed scheme area has been compromised by intensive agriculture. Based on assessment of the January 2014 scheme there are some existing areas of valuable habitat and species of significant nature conservation importance, including protected species, which could be affected. The ongoing EIA work planned for the proposed scheme will help to identify ways to mitigate the potential impacts through sensitive design and management during the construction and operational phases. A set of guiding principles has been established to help guide the development of design and mitigation for nature conservation. Sensitive landscaping and scheme design may help to improve some aspects of local biodiversity in the longer term.

9 THE WATER ENVIRONMENT

9.1 Introduction

9.1.1 This chapter considers how the January 2014 scheme potentially would affect the water environment. It covers the hydrology (including water quantity and flood risk), water quality and geomorphology of surface waters and groundwater, taking account of the construction and operational impacts of the scheme.

9.1.2 During the environmental impact assessment (EIA) process geomorphology, water quality, groundwater, hydrology and flood risk will be further assessed in relation to the proposed scheme. In parallel to this a separate assessment will be completed in response to **Water Framework Directive**[25] (WFD) legislation. This assessment is proposed to be appended to the Environmental Statement (ES) with the main findings being summarised within the road drainage and the water environment chapter.

9.2 Water Environment Receptors

Surface Waters

9.2.1 There are seven 'Main Rivers' close to or crossed by the proposed scheme which are all designated under European water legislation as WFD water bodies.

9.2.2 These rivers are shown on **Figure 6.1** and are presented in **Table 9.1**.

Table 9.1: WFD Water Body and Status

WFD Surface Water Body	Ecological Status/Potential
Alconbury and Brampton Brooks	Moderate Potential
Ellington Brook	Moderate Potential
River Great Ouse	Moderate Potential
West Brook	Moderate Potential
Swavesey Drain	Good Status
Cottenham Lode	Moderate Potential
River Cam	Moderate Potential

9.2.3 The WFD has the overarching objective of enabling all water bodies in Europe to attain 'good' or 'high' ecological status by 2015, 2021 or 2027. The Environment Agency is the competent authority in England responsible for delivering this objective. At the local level River Basin Management Plans (RBMP) specifically set out measures to ensure that water bodies in England achieve 'good ecological status. The geomorphology (i.e. landforms and sediment/erosional processes within the channel) plays a vital role in contributing to 'good ecological status' and therefore is one of the key areas assessed. The ecological status of the WFD surface water bodies relevant to the proposed scheme are presented in **Table 9.1.**

9.2.4 Based on the January 2014 scheme there are a further 16 watercourses that are crossed and also require assessment, some of which are Internal Drainage Board drains and Award Drains.

9.2.5 Lakes, ponds and reservoirs will also be considered and assessed as part of the EIA process where applicable along the proposed scheme.

Groundwater

9.2.6 The term groundwater refers to water stored in soils or rocks under the surface. Where water is stored in rocks they can be classified as aquifers.

9.2.7 The Environment Agency classifies the importance of groundwater resources (aquifers) as principal, secondary A, secondary B, secondary (undifferentiated) and non-productive strata based on the quality of the resource. Within the study area there are principal aquifers, secondary A aquifers and non-productive rock layers.

9.2.8 Principal aquifers are layers of rock or drift deposits with high inter-granular and/or fracture permeability. This means that they usually provide a water supply and/or river base flow over a considerable geographical area.

9.2.9 Secondary aquifers are permeable layers of rock capable of supporting water supplies at a local scale. In some cases they form an important source of base flow to rivers.

9.2.10 Non-productive rock layers or drift deposits have low permeability and are of negligible significance for water supply or river base flow.

9.2.11 There is also a WFD groundwater body that is crossed by the proposed scheme located to the south west of Oakington. This is the Cam and Ely Ouse Woburn Sands water body and is assessed to be of 'good quantitative quality'.

Flood Risk

9.2.12 The Environment Agency has prepared flood maps for the whole of England that detail areas at risk of flooding at a high level. These flood maps divide areas into the following:

- Flood Zones 1 – land assessed as having less than 1 in 1,000 annual probability of flooding;
- Flood Zones 2 – land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of flooding; and
- Flood Zones 3 – land assessed as having a great than 1 in 100 annual probability of flooding.

9.2.13 The proposed scheme crosses through all flood zones, including Flood Zones 2 and 3 around river environments. There are a number of river crossings along the proposed scheme; the following is a list of some of the key crossings:

- Alconbury & Brampton Brooks;
- Ellington Brook;
- River Great Ouse;
- West Brook;
- Swavesey Drain; and

[25] European Union (2000). Directive (2000/60/EC) of the European Parliament and the Council establishing a framework for the Community action in the field of water policy.

- Cottenham Lode (Beck Brook)

9.2.14 A number of other watercourses are crossed but are not classified as Main River or Water Framework Directive water bodies.

Drainage

9.2.15 The current A14 has a level of flow attenuation through the use of balancing ponds at the existing junctions. There are also some basic pollution control measures along the existing road. The proposed scheme would be designed to ensure that water drainage from the carriageway is adequately attenuated and would include pollution control measures appropriate to the development.

9.2.16 The proposed scheme design would include an allowance for climate change. Consideration of climate change will be made when sizing the highway attenuation ponds and assessing the impact on water levels in existing floodplains, when developing floodplain compensation.

Water Dependent Nature Conservation Sites

9.2.17 There are a number of nature conservation sites, most notably the wetlands associated with the River Great Ouse and Buckden Gravel Pits CWSs, and Portholme SAC, that may be dependent on water within the proposed scheme area.

9.2.18 There is also a history of mineral extraction in the vicinity of the proposed scheme with numerous worked/ disused gravel pits remaining. Many of these have since filled with water and are now key water features of value in their own right for irrigation, recreation and/or wildlife.

9.3 Potential Impacts on the Water Environment

Construction

9.3.1 Without considering any form of mitigation, the construction of highway schemes has the potential to have impacts on the water environment in the following ways:

- mobilisation of sediments, particularly during earthworks and high rainfall events;
- inadvertent discharge to surface waters or groundwater;
- disruption of groundwater or surface water flows, in particular in areas where excavations are proposed (i.e. road cuttings and/or borrow pits); and
- the risk that construction works could create new pathways for contaminants to migrate into water receptors.

9.3.2 There is also the potential for pollution in surface water runoff or from on-site spills by sediment and polluting substances (e.g. oils, fuels etc.).

9.3.3 There are standard construction techniques and best practices to avoid or reduce these potential environmental impacts as set out in the water environment chapter summary.

Operation

9.3.4 During operation of the road, pollutants from vehicles such as spillages, metals, rubber and paints will be deposited on road surfaces. However, the Highways Agency has a duty to ensure that highway runoff (from either routine runoff or spillages) does not pollute receiving waters.

9.3.5 Pollution treatment measures are likely to be needed at some specific locations where a risk of pollution has been identified through further assessment of the operation of the road. Where possible Sustainable Drainage Systems (SuDS) would be used in support of national SuDS guidance. Facilities will also be required to deal with accidental spillages that might occur on the carriageway. This is likely to involve containment areas as well as natural vegetative treatment systems.

9.3.6 Culverts, outfall structures and diverted watercourses may potentially cause an impact on the water environment in the proposed scheme area, specifically on the 'Main Rivers'/WFD water bodies.

9.3.7 Changes to water flow and quality also have the potential to have an impact on a number of water dependent nature conservation sites, as described above. However, mitigation would be put in place to reduce the risk of the impacts that are subsequently identified in Section 9.4 (Potential Mitigation for the Water Environment).

9.3.8 The Transport policy for flood risk requires that transport infrastructure in the floodplain must be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows; and
- not increase flood risk elsewhere.

9.3.9 It is the intention of the scheme design process to ensure there are no deleterious impacts on existing levels of flood risk. Highway runoff to watercourses would be attenuated, loss of floodplain would be assessed and, where required, compensatory storage would be introduced. There is an awareness of a history of flooding in the villages of Hilton on the West Brook and Oakington on the Oakington Brook. The assessment will determine if the proposed scheme would have an impact on these locations.

9.3.10 The protection of groundwater resources will need to be considered when designing flow attenuation measures or controlling water quality.

9.4 Potential Mitigation for the Water Environment

9.4.1 During the construction process best practices would be followed to address the potential impacts detailed above, including the Environment Agency's Pollution Prevention Guidelines. These would all be clearly documented in method statements and a bespoke Construction Environmental Management Plan.

9.4.2 Culverts would be designed to reduce effects on the flora and fauna, with existing wildlife corridors maintained where practicable.

9.4.3 Diverted watercourses and drains will be designed in such a way to aim for no significant loss of habitat or flood conveyance and, where practicable, to enhance biodiversity, geomorphology and flood storage.

9.4.4 New habitat may be created where land is available to allow adequately sized ponds and provide additional wetland or a 'set aside' habitat. (This will form part of the

assessment of impacts and mitigation in the ES in the nature conservation chapter, but will be informed by the water specialists).

9.4.5 A detailed mitigation strategy is being developed to avoid or reduce the operational impacts of the proposed scheme. The drainage philosophy complies with the principles of SuDS dealing with direct disturbance to surface waters, water quality and flood risk. Based on assessment of the January 2014 scheme it is considered that through applying mitigation such as flood storage lagoons, the proposed scheme would have a minimal overall effect on the water environment, and in some cases may lead to the improvement of watercourses and flood risk in the area. There may also be opportunities to provide a flood risk benefit to downstream communities.

Proposed Layout for Brampton Interchange

Geomorphology and Water Quality

The April 2014 proposed Brampton layout would have similar potential impacts, on both water quality and geomorphology, as the January 2014 Brampton layout. None of the watercourses are European protected WFD water bodies. The overall number of watercourses affected would be the same in both layouts. The discharges from both layouts would be very similar.

Flood Risk

Provisionally it has been assessed that overall there would be little difference between the April 2014 proposed Brampton layout and the January 2014 Brampton layout in terms of flood risk. Any changes in the volume of floodplain compensation due to changes in the footprint of the road layout and associated mitigation are likely to be minimal.

Hydrogeology

It is considered unlikely that the impacts on the hydrogeology of the April 2014 proposed Brampton layout would be significantly different to the January 2014 Brampton layout.

9.5 Chapter Summary

9.5.1 This chapter has identified that based on assessment of the January 2014 scheme there are several water environment receptors that could potentially be adversely affected. However, there are also several means of mitigating the impacts on the water environment during both construction and operation.

9.5.2 The options for mitigation would include designing the proposed culverts, outfalls and realignments in a way that follows best practice and provides benefit to the surrounding environment where practicable. Further investigations and assessments will be completed to inform this process including geomorphology, water quality, groundwater and flood risk.

9.5.3 The final assessment will be reported in the road drainage and water environment chapter of the ES.

10 GEOLOGY, SOILS, MATERIAL RESOURCES AND WASTE

10.1 Introduction

10.1.1 The environmental impact assessment (EIA) of the proposed scheme will include the assessment of potential impacts upon geology and soils, contaminated land, the use of material resources and the generation of waste. This chapter sets out preliminary information about the current conditions, likely potential effects, based on the January 2014 scheme, and mitigation measures that could be used to avoid or reduce adverse effects or even to improve conditions.

10.2 Contamination and Contaminated Land

10.2.1 The assessment of contaminated land takes account of the 'source-pathway-receptor' approach which seeks to establish whether there would be a link between a source and receptor which may then constitute a risk. This is supplemented by detailed risk assessment taking into account contaminant toxicity and exposure routes, to assess the significance of any consequences of the risk being realised. Source, pathway and receptor are defined as follows:

- source (contaminant) – a substance which is located in, on or under the land and has the potential to cause harm to human health, water resources or the wider environment;
- pathway – the means or route by which a source of contamination can migrate; an identified receptor can be exposed to, or be affected by an identified source;
- receptor – something which could come to harm, including human health, water resources, surface water courses or the wider environment.

Potential Sources of Contamination

10.2.2 A desk-based review of historical maps and other sources of information has allowed the preliminary identification of sites where there may have been activities with the potential to result in land contamination. Inclusion of locations in this section does not indicate that contamination is present at these locations, but that there is a possibility that contamination may be present.

10.2.3 The land between Ellington junction and the new Godmanchester junction has remained predominantly arable prior to 1890, with a railway present in the west running parallel and within the valley of the river Great Ouse. The river Great Ouse has had extensive sand and gravel extraction to the northeast and southwest along its valley. These excavations have been restored as recreational lakes or by landfilling. The section of the A1 present in this part of the proposed scheme was constructed as an improvement to the older road alignment in the 1970s and the 1990s.

10.2.4 A number of potentially contaminative historical and recent activities within and adjacent to the proposed scheme route have also been identified on this section between Ellington junction to the new Godmanchester junction. These include the Buckden former fuel depot (Goff Petroleum), a disused railway line and Linton's Farm on the proposed scheme route and landfills (Buckden North and South) located in the vicinity of, but not on, the route.

10.2.5 Between the new Godmanchester junction and the new Bar Hill junction most of the land to either side of the proposed alignment has remained predominantly arable from 1885, apart from the construction of Bar Hill, a purpose-built village dating to the 1960s and developments around the Trinity Foot junction on the route of the existing A14, including a sewage works and service station (built by the early 1980s, now closed) and Buckingway Business Park (shown by mapping from 2000). Further potentially contaminated sites adjacent to this section include two further fuel service stations (both current), a further business/industrial park at Bar Hill and a cement additives depot at Bar Hill. A number of historic landfills have been identified in the vicinity of this section of the proposed scheme including Conington, Wool Pack Farm and Hemingford Grey landfills.

10.2.6 Land between the Bar Hill junction and Milton junction has remained predominantly arable from 1885 until construction of the A45 Cambridge Northern Bypass in the 1970s (which became part of the A14 in the 1990s) and continued gradual development of villages including Girton and Milton to become suburbs of Cambridge. A number of historical and current potentially contaminated sites have been identified adjacent to the Bar Hill to Milton section including an animal research centre, Milton landfill and a former military camp/depot and associated rail sidings. The Milton authorised landfill is located immediately adjacent to the proposed scheme at Milton junction and it is not clear from the information currently available whether the proposed scheme would encroach on to the landfill infrastructure.

Potential Pathways

10.2.7 Without a pollutant pathway, there is not a risk, even if a contaminant is present. Potential pathways could include:

- direct contact with soil including ingestion of soil and skin contact;
- direct inhalation of dusts, fibres, vapour and gas;
- indirect contact via ingestion of fruit and vegetables;
- transport of contaminated soil off-site as windblown dust;
- migration and leaching of contamination within the shallow groundwater, migration of contamination to the deeper groundwater or direct release to surface water; and
- pathways to built infrastructure by direct contact with contamination in soils and shallow groundwater and build up of vapours/gases.

10.2.8 Since the proposed scheme is a highway, with a prevalence of hardstanding, the pathways of contamination from source to receptor would generally be limited to the construction phase, particularly when earthworks are being undertaken, as well as maintenance activities. Without appropriate mitigation measures, as described below, the construction of the proposed scheme could potentially result in the mobilisation and release of contamination through disturbance of existing contamination in the ground. However, the end-use, with hardstanding in place would generally act as a barrier to the potential pathways to human receptors.

Potential Receptors

10.2.9 The assessment of potential effects from contaminated land considers the following potential receptors:

- potential human health receptors on the route and surrounding sites;
- potential controlled water receptors including surface watercourses and the underlying groundwater/aquifers on the route and surrounding sites; and
- potential property receptors (including buildings, services and infrastructure) on the route and surrounding sites.

10.2.10 For the potential receptors identified, the EIA considers the likelihood of a risk of significant harm from a contaminative source occurring and values them accordingly. This involves considering the sensitivity of the receptor to potential contamination and the likelihood of exposure.

10.2.11 For example, there is a principal aquifer underlying part of the proposed scheme. Since principal aquifers usually provide a high level of water storage and may support water supply and/or river base flow on a strategic scale, it is considered to be a high value receptor. **Chapter 9** (The Water Environment) identifies the key waterbodies within the study area.

10.2.12 The key potential human health receptors on site are considered to be construction workers and highway maintenance workers who are more likely to be exposed to potential sources of contamination during earthworks, carriageway repairs and maintenance.

10.2.13 Potential human health receptors off-site are likely to be limited to the construction phase only, when pathways such as wind-blown dust, as a result of earthworks, are more likely to occur.

10.2.14 Given that the development includes construction and improvements of a roadway and associated infrastructure, buildings/structures other than the road itself are unlikely to be affected by contamination, and impacts on the road can be mitigated by design.

Measures to Mitigate Risks of Potential Contamination

10.2.15 The following measures can be applied to help mitigate the risks of potential contamination:

- prior to construction, investigation of soil quality in areas where there have been potentially contaminative uses to assess whether potentially significant contamination is present;
- development of soil assessment criteria specific to the scheme using detailed risk assessment methods, to assess the significance of any potential contamination which may be identified;
- good practice principles to be applied during earthworks including minimising direct worker contact with soil by the use of machinery, good site hygiene, wheel washing and dust minimisation;
- incorporation of good practice construction design and implementation that dovetails with and complements where needed the provisions and design criteria upon which the remediation design relies;
- good practice principles in design and construction programming such as minimising soil stockpiling;
- preparation and implementation of environmental management planning in accordance with good practice principles such as use of a Construction Environmental Management Plan including details of soil handling and stockpiling;
- good practice management controls in place to ensure works are implemented in line with the specified designs and specification methods;
- associated site management provisions along with operational plans to manage and deal with issues that give rise to adverse effects; and
- ongoing monitoring to assess the effects of the development and to enable revision and improvement of the methods where required.

10.3 Geology

10.3.1 The EIA considers the potential effects upon geology as important resources (e.g. protected geological sites) through disturbance from of the baseline conditions, such as destruction of important sites, during the construction and operation of the proposed scheme.

Geology and Geological Sites

10.3.2 There is one geological site of special scientific interest (SSSI) within the study area of the EIA which is statutorily protected. The Histon Road geological SSSI is located below ground level under a private allotment site at Histon Road, just south of Orchard Park in Cambridge. Since the site is approximately 500m south of Histon junction and approximately 450m from the proposed scheme it is not likely to be affected by the proposed works.

10.3.3 No regionally important geological/geomorphological sites (RIGS) have so far been identified on the route of the January 2014 scheme. However, further consultation would be required to check for the presence of RIGS, which may not be identified as publicly accessible geodiversity sites and features in the area on the Geo-East geodiversity partnership website (http://www.geo-east.org.uk/placestovisit.htm).

10.3.4 Based upon assessment of the January 2014 scheme in relation to preliminary information, no significant effects upon geology and geological sites are considered likely. The final assessment will be presented within the forthcoming Environmental Statement (ES).

10.4 Soil

10.4.1 Soil is a finite resource which serves several vital, interlinked functions that are essential to life. Soil takes many years to develop, but can be quickly lost or degraded. Understanding how a development may affect soil and seeking ways to protect soil is an important consideration in EIA.

10.4.2 The **Agricultural Land Classification**[26] (ALC) (1988) provides a framework for classifying land according to how well its soil, climate and topography supports agricultural use in the long term. Agricultural land which is classified under grades 1 to 3a is considered in planning policy to be the best and most versatile agricultural land.

[26] Ministry of Agriculture, Fisheries and Food (1988). Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.

10.4.3 It can be seen that the majority of the off-line route forming the Huntingdon Southern Bypass would cross grade 2 and 3 agricultural land, which is within the best and most versatile land category, as illustrated on **Figure 10.1**. As a result, the proposed scheme, including the associated borrow pits, would result in the loss of land and soil which is valuable to agricultural production.

10.4.4 Furthermore, based on assessment of the January 2014 scheme, it is likely that the proposed Ellington junction and much of the on-line widening work between Fen Drayton and Girton would also encroach within the best and most versatile land. However, the published ALC map of the study area does not subdivide grade 3 land into 3a and 3b, which is required to make the distinction.

10.4.5 The lower quality areas (in terms of agriculture), are located within the river Great Ouse valley and there are also the urban areas and land which has recently been built on, not identified on the ALC map. However, these areas are relatively small in comparison to the areas of grade 2 and 3 land crossed by the proposed scheme.

10.4.6 Since a large part of the route is underlain or potentially underlain by best and most versatile agricultural land, the loss of such land is a notable potential adverse effect of the proposed scheme.

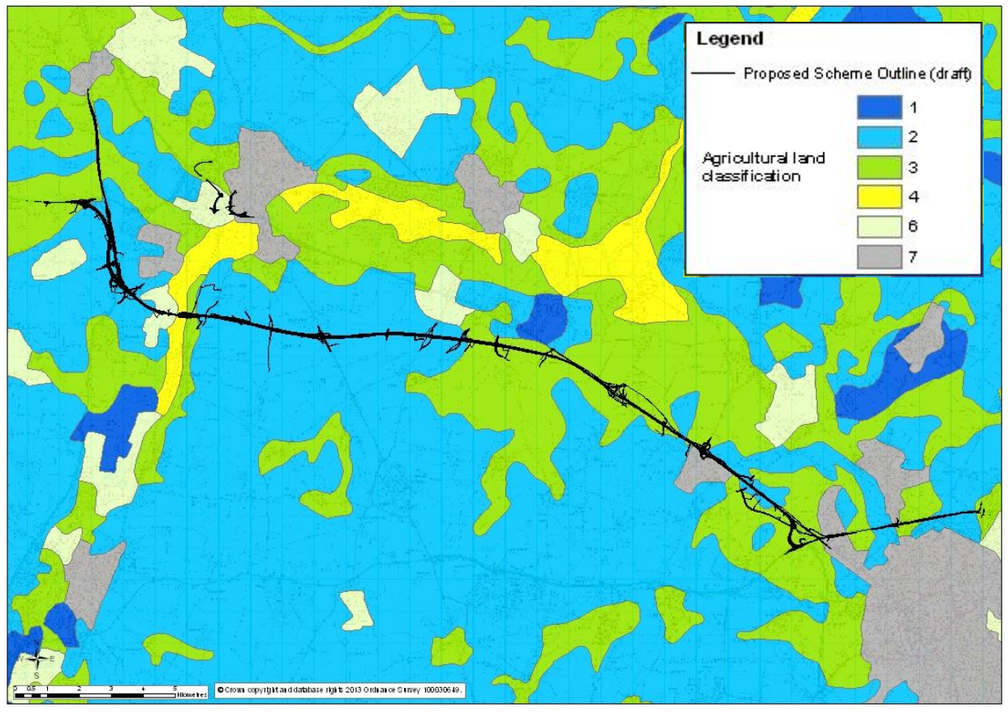

Figure 10.1: January 2014 scheme overlaid on the ALC map

10.4.7 There are limited opportunities to avoid affecting high quality agricultural land and soils since much of the surrounding landscape within Cambridgeshire supports equally valuable agricultural land. However, the use of a soil management strategy could help to reduce the risk of losing, damaging or contaminating valuable soil resources during construction.

Proposed Layout for Brampton Interchange

Although the April 2014 proposed Brampton layout would have a smaller footprint than the January 2014 Brampton layout the adjacent borrow pit would need to be larger. Therefore the effects of the two layouts on agricultural land would be similar.

Soil Resource Management during Construction

10.4.8 A Soil Resource Plan could form part of a Materials Management Plan and may be factored in to the Site Waste Management Plan (SWMP) for the site. It should include the following:

- maps showing topsoil and subsoil types, and the areas to be stripped and left *in situ*;
- methods for stripping, stockpiling, respreading and ameliorating the soils;
- location of soil stockpiles and content (e.g. topsoil type A, subsoil type B) and schedules of volumes for each material;
- expected after-use for each soil whether topsoil to be used on site or, used or sold off site;
- subsoil to be retained for landscape areas, used as structural fill or for topsoil manufacture; and
- identification of person responsible for supervising soil management.

10.4.9 Good management during construction could include measures such as:

- ensuring that there is sufficient space to stockpile all soils that are to remain on site;
- investigating beneficial off-site uses for all soil materials that are surplus to requirement;
- planning site works so that soil stripping and replacement can be undertaken in summer months in order to reduce likelihood of compaction, and other problems due to wet conditions;
- avoiding stripping soils during or after heavy rainfall or when there are pools of water on the surface;
- clearly marking out all haul routes and areas to be protected from construction activity, ensuring that the width of haul roads are kept to a minimum to protect as much soil *in situ* as possible; and
- avoiding stripping topsoil too deeply so that subsoil becomes incorporated, thereby reducing fertility and avoid stripping together subsoils of different quality and composition (e.g. clay with sand).

10.5 Material Resources

10.5.1 The EIA will include an assessment of the potential effects from the proposed scheme in relation to the use of material resources and the generation and management of waste.

10.5.2 It is anticipated that construction of the proposed scheme would require the production, procurement, transport and use of construction materials, including bulk materials for earthworks, concrete, steel and other structural material, pre-cast or prefabricated concrete, steel or other components, road surface material, timber used in temporary works (e.g. hoarding, shuttering) or in the permanent works (e.g. fencing), and other materials as required.

10.5.3 Construction work would also result in the production of construction wastes, including surplus topsoil or subsoil materials arising from earthworks, surplus materials not used as intended, any hazardous or contaminated material found on site, vegetation and other above-ground materials produced by site clearance, and demolition wastes.

10.5.4 The management/use of surplus materials and waste would be undertaken in accordance with the waste hierarchy, outlined in the Waste (England and Wales) Regulations 2011. The waste hierarchy is presented in diagrammatic form on **Figure 10.2** below.

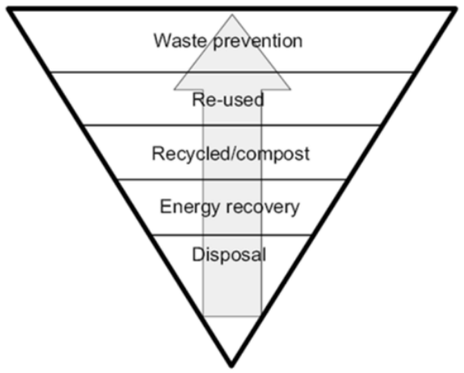

Figure 10.2: The Waste Hierarchy

10.5.5 The **Cambridgeshire and Peterborough Minerals and Waste Core Strategy**[27] (2011) sets out recycling and recovery targets for construction and demolition waste, outlined in **Table 10.1.**

Table 10.1: Waste Management Targets

Targets	2016	2021	2026
Construction and demolition waste recycling/ recovery targets	65%	70%	70%

Source: Cambridgeshire and Peterborough Core Strategy (2011)

10.5.6 These targets would be taken into consideration when developing targets for the proposed scheme design and for the construction contract.

10.5.7 At the time of preparation of this report and, based on the January 2014 scheme, there is a shortfall of fill material required to construct the proposed scheme. There is a need to identify sources of additional fill and to import materials. During the design process, opportunities will be sought to try to alter the vertical alignment of the proposed scheme to achieve a greater balance between the material to be excavated and the material required to construct the proposed scheme (i.e. the cut-fill balance).

10.5.8 Relatively few local sources of suitable engineering fill material are available. It is therefore proposed that a significant proportion of this material would be obtained from local 'borrow pits'. This would increase both the footprint and cost of the proposed scheme. The EIA will include the assessment of environmental impacts of proposed borrow pits as part of the proposed scheme. Further information about the development of proposals for borrow pits is provided later in this chapter and in **Appendix A** (Borrow Pit Development).

10.5.9 Other sources of aggregate are being investigated including use of recycled concrete from runways on disused airfields in the area.

10.5.10 Construction aggregates such as sand and gravel may also be commercially available in the region, but hard rock is not available locally and, as such, would need to be imported over a longer distance.

10.5.11 SWMPs are prepared prior to a construction project commencing in order to ensure that waste is considered throughout the project. SWMPs identify the type of waste expected to be produced during the project, estimate the quantity of waste that will be produced and identify the planned waste management action proposed for each type of waste.

10.5.12 Although SWMPs are no longer a statutory requirement in England, the size and value of the proposed scheme means that the potential exists for significant impacts in relation to material use and waste generation. As such, the assessment of materials would be undertaken as part of the EIA. The implementation of a SWMP encourages the effective management of materials and ensures waste is considered at all stages of a project, from detailed design through to completion.

10.5.13 The main aims of a SWMP are to:

- improve resource efficiency and reduce the amount of waste produced on construction sites;
- promote reuse, recycling and recovery of waste rather than disposal; and
- reduce fly-tipping by keeping a full audit trail of waste removed from the site.

10.5.14 The best opportunities for improving materials resource efficiency in construction projects occur during the design stage. Measures to design out waste include:

- the re-use and recovery of materials on site;
- designing the layout to use the existing topography;
- balancing cut/fill quantities;
- screening arisings for use as recycled aggregates;

[27] Cambridgeshire County Council and Peterborough City Council (July 2011). Cambridgeshire and Peterborough Minerals and Waste Development Plan. Core Strategy Development Plan Document. Available at: http://www.cambridgeshire.gov.uk/NR/rdonlyres/76AE7877-5A20-44E9-97CF-34BCF0017FE2/0/CoreStrategyAdopted19July2011.pdf. Accessed 20 March 2014.

- importing materials with high recycled content;
- designing for off-site construction of elements if practical (e.g. manholes, bridge components etc.); and
- designing for deconstruction and flexibility to make sure structures can be maintained, refurbished or extended if required.

10.5.15 Additional measures that can be taken to reduce waste during construction include:

- segregating all arisings on site;
- identifying re-useable materials on site for use on site, storage or resale; and
- removing recyclable and recoverable materials from site to be processed by a licensed facility.

10.6 Sustainable Construction

10.6.1 Measures which can be used to promote sustainable construction may include:

- sourcing materials locally to reduce transport requirements;
- selecting materials which do not have onerous Health and Safety Executive (HSE) or Personal Protective Equipment (PPE) requirements;
- maximising the use of sustainably sourced materials such as FSC certified timber products; and
- using recycled materials for aggregate.

10.6.2 The opportunities to incorporate sustainable construction will be assessed and reported on in the ES.

10.6.3 The embodied energy associated with the manufacture and transport of materials will also be assessed. Opportunities to reduce embodied energy of materials used will be investigated as part of the EIA.

10.7 Proposed Borrow Pits

10.7.1 Construction of the proposed scheme would require the use of materials such as gravel, soil and sand. Nearby locations for borrow pits to source these materials have been identified based on the **Cambridgeshire and Peterborough Minerals and Waste Core Strategy**[28], which was adopted by Cambridgeshire County Council and Peterborough City Council in July 2011.

10.7.2 Sourcing suitable materials locally would reduce road congestion by minimising the distances materials would need to be transported, as well as limiting carbon emissions and costs.

10.7.3 The majority of the proposed borrow pits are located within the Mineral Safeguarding Areas as defined in the **Minerals and Waste Core Strategy**. However, early investigations by geotechnical engineers have identified some other suitable sites that would yield better engineering materials, thereby increasing the volume of construction materials that can be sourced locally.

10.7.4 **Appendix A** (Borrow Pit Development) provides additional information on the proposed borrow pit locations, and highlights where these locations differ from those outlined in the **Cambridgeshire and Peterborough Minerals and Waste Core Strategy**. Early consultation regarding the proposed borrow pit locations has been undertaken with Cambridgeshire County Council.

10.8 Chapter Summary

10.8.1 This chapter has identified that, based on the January 2014 scheme, there is potential for encroachment upon areas which would potentially expose sources of contamination. Further site investigations as part of the EIA would help to identify whether contamination is present and the measures to be undertaken to ensure that there would be no significant risk of significant harm to human health and the environment.

10.8.2 Based on assessment of the January 2014 scheme, a large part of the scheme would be likely to affect agricultural land of high quality. A suitable soil management strategy would help to ensure that as much soil as practicable is retained in good condition for re-use within the proposed scheme landscape proposals and re-instatement of land disturbed by temporary construction impacts, including borrow pit works.

10.8.3 The proposed scheme, as a major infrastructure project, would require large volumes of material and may generate significant quantities of waste. Several local borrow pits are likely to be required to supply local fill material for the proposed scheme. The implementation of a SWMP would help to focus on identifying opportunities to reduce waste and re-use of suitable materials wherever practicable.

Proposed Layout for Brampton Interchange

The April 2014 proposed Brampton layout would potentially have a slightly more adverse effect on materials compared with the January 2014 Brampton layout, due to additional volumes of fill materials which would be likely to be required for earthworks and landscaping during construction.

[28] Cambridgeshire County Council and Peterborough City Council (July 2011). Cambridgeshire and Peterborough Minerals and Waste Development Plan. Core Strategy Development Plan Document.

11 PEOPLE AND COMMUNITIES

11.1 Introduction

11.1.1 This chapter considers the potential impacts upon people and local communities based upon the January 2014 scheme. It focuses on the potential impacts upon the local economy, as well as how people get around within their local communities and other journeys they make for work or recreation.

11.1.2 The proposed study area for the assessment includes all roads and other rights of way that meet or cross the scheme corridor, and the communities through which the proposed scheme is routed.

11.2 Local Community

11.2.1 The Greater Cambridge area is one of the fastest growing areas of the UK. There are two principal settlements in the study area, Cambridge and Huntingdon.

Cambridge

11.2.2 Cambridge is the regional service centre and attracts visitors from the whole study area, predominantly for work, but also for shopping and leisure. It is located approximately 80km north of London. The 2011 census recorded its population as 123,867, including 24,488 students.

11.2.3 In addition to the universities located in the town, the local economy contains a range of businesses with a focus on technology based activities with high value output.

11.2.4 The dynamism and attractiveness of Cambridge's local economy has led to considerable housing development taking place around the A14 between Cambridge and Huntingdon.

Huntingdon

11.2.5 Huntingdon is one of the five principal towns in Huntingdonshire District, and, similarly to Cambridge, it contains a range of businesses, specialising in the biosciences and technology. The A14 trunk road is currently routed through the centre of Huntingdon and the Proposed Huntingdon Southern Bypass would remove this traffic from the town centre.

A14 Corridor

11.2.6 Due to the housing growth in this part of Cambridgeshire, the area between Huntingdon, Cambridge and St Ives (approximately 2.5km north of the A14 between Huntingdon and Cambridge) functions increasingly like a conurbation. For many people living and working around Cambridge, the A14 is the main route across the Greater Cambridge area given the lack of suitable alternative roads.

11.2.7 A number of smaller settlements can be found within the study area, a corridor extending five kilometres either side of the proposed scheme. There is interaction between these smaller settlements and those in the wider area, with the larger settlements offering a greater range of services, such as schools, shops and other community facilities for residents of the smaller settlements.

11.3 Local Economy and Private Assets

11.3.1 The proposed scheme lies within the county of Cambridgeshire, which is a relatively affluent area compared with other counties in the UK. Businesses in the town centres are focussed around the universities and biosciences. In the more rural areas, arable agriculture is the main source of employment. Further analysis, as part of the environmental impact assessment (EIA), will address both the immediate economies of settlements near the proposed scheme and the wider economy of Cambridgeshire.

Agriculture

11.3.2 Farming in the area is predominately arable and mainly characterised by large farms. Nearly half of these farms are tenanted and owned by large institutions, including Cambridge University colleges and the Church Commissioners. Many agricultural holdings are inhabited outliers of larger farms, some of which are outside the study area.

11.3.3 The main crops are those associated with heavy land rotations, typically winter wheat with beans and oil seed rape. Even on patches of lighter soils the rotations do not change significantly.

11.3.4 There is a small amount of grassland, with herds of cattle at Conington, Brampton and Girton and some pony paddocks, particularly around the towns and villages. At Bar Hill, the route corridor includes nationally important agricultural trials grounds belonging to the National Institute for Agricultural Botany (NIAB).

Development Land

11.3.5 There are a number of strategic development sites and planning applications in the study areas that may, if consented, have an influence on the proposed scheme. Details of some of these are outlined in **Chapter 12** (Cumulative Effects). Further investigation into all development proposals within the study area will identify any conflicting uses which would be affected by the proposed scheme.

11.4 Potential Impacts upon Local Community, Local Economy and Private Assets

11.4.1 The effects during construction would relate to the loss of land required for the proposed scheme footprint, as well as that needed for borrow pits, storage areas and construction compounds.

11.4.2 During construction there may be temporary severance of access to areas of farmland, businesses or community facilities as a result of construction haul routes or other construction-related land use requirements. Although the severance would be temporary, there may be longer term effects if the viability of the farm based assets becomes undermined through lack of use or access during the construction period.

11.4.3 There is also potential for beneficial local socioeconomic effects during the construction period. The proposed scheme could provide opportunity for direct employment in the local districts and contribute to the enhancement of employee skills in the engineering and construction industries which could be transferable to other local construction projects. The construction work is likely to create demands for goods and services from local firms and may stimulate highly localised economic activity at the individual business level, especially in relation to food and beverage establishments.

11.4.4 Individual local commercial and residential property may also be affected through loss of land from the proposed scheme footprint, but as the proposed scheme is primarily rural it is not thought this type of effect would be widespread or large in scale. Any affected receptors would be assessed individually.

Operational Effects

11.4.5 The potential effects summarised in this section are based on assessment of the January 2014 scheme.

11.4.6 The majority of affected land is likely to be agricultural land, permanently reducing the resource of arable land and fertile soil in the region and potentially reducing the viability of farming businesses. It is expected that there would be minimal land take from residential or non-agricultural commercial property, though some private properties are present and impacts on these will be assessed individually.

11.4.7 Along with potential impacts on agricultural land, the proposed scheme could affect the farming businesses which are associated with the land. Farm severance could result in portions of remaining agricultural land being uneconomical to farm, with knock on impacts on employment and incomes from agriculture. The service station and hotel at Brampton Hut would also be potentially affected by the proposed scheme alignment.

11.4.8 Other potential effects during operation relate to how changes in traffic patterns may affect local communities. Reduced traffic flows in some settlements, such as Huntingdon and villages that are currently used as 'rat-runs', may result in a relief of severance, improving opportunities to access local businesses, community facilities and services.

11.4.9 There is also potential for traffic to be diverted away from businesses, resulting in a loss of passing trade. Permanent severance of accesses to businesses and facilities, as a result of the off-line elements of the proposed scheme, is possible if existing linkages between communities and facilities are not maintained.

11.5 Measures to Mitigate Impacts upon Local Communities & Economy

11.5.1 Effects from temporary severance during construction could be mitigated by ensuring essential access for businesses, farms and community facilities is maintained throughout the construction period or at least during the normal operating hours of the businesses and facilities. Alternative access provisions for farming could be provided as necessary to ensure farming work is minimally disturbed.

11.5.2 Suitable additional signage could be used to direct traffic to businesses which stand to lose out on passing trade. Additional pedestrian routes could be used to maximise the benefits in local communities of reduced severance.

11.5.3 Compensation for land-take would mitigate against the loss of private land. The details of such arrangements are not known at this time.

11.6 Highway Users

Vehicle Drivers

11.6.1 There are a number of elements that contribute to the experience of vehicle drivers. Firstly, views from the road, and secondly driver stress.

11.6.2 Open intermittent views of the countryside are possible from much of the A14 and A1 due to the absence of hedgerows along the highway boundaries. Similarly, views for vehicle travellers using the existing roads that would be crossed by the proposed Huntingdon Southern Bypass route, tend to be intermittent or open views of the large arable fields characteristic of the area, which is made up of relatively flat, open, arable fields.

11.6.3 While there are small settlements close to the existing A14 views of these settlements from the road tend to be limited due to the presence of noise barriers, screening vegetation and cuttings.

11.6.4 Driver stress is a combination of frustration, the fear of accidents and uncertainty of the route. The main factors contributing to driver frustration along the existing A14 relate to the current capacity of the carriageway and the amount of heavy goods vehicle (HGV) traffic.

11.6.5 There are eleven service stations that have been identified in the study area close to and signposted from the road. Some of these are specific roadside amenities, whereas some have a wider market. These service areas can provide an opportunity to alleviate driver stress by enabling them to take breaks in their journey. These may be affected by disruption in traffic patterns during construction.

Cyclists, Pedestrians and Equestrians

11.6.6 Although not prohibited from using the route, the current A14 is not suitable for journeys on foot or by bicycle or horse due to the traffic speed, high traffic levels, high proportions of HGVs and the frequency of slip road merge and diverge tapers. Therefore, although there are several locations along the A14 where local roads, bridleways or footpaths join the A14, it is not possible to use these connections as part of a journey by modes other than motor vehicle. It is likely that the A14 trunk road is seen as a barrier to these types of journeys in many locations.

11.6.7 The existing A14 has a range of crossing points within the study area, either as road bridges, most of which are part of the existing junctions, or as public rights of way that pass over or under the route. These all provide valuable points of access across the trunk road, which would otherwise present a barrier to pedestrian, cyclist and equestrian movement. However, many of the road bridges are too busy for most cyclists and horse riders to consider using and many do not have footways.

11.6.8 The current conditions of the A14, which may act as a barrier to active modes of travel, has significant implications in terms of human health, as described in Section 1.5.

Bus Users

11.6.9 The Cambridgeshire Guided Busway predominantly follows the route of the old Huntingdon to Cambridge railway track to Cambridge railway station and onwards to Addenbrooke's Hospital and Trumpington Park & Ride.

11.6.10 There are a number of bus services that operate within the study area, including six services that follow the A14. The route links settlements, such as St Ives, Impington and Histon, to Cambridge by means other than the private car.

11.6.11 Other bus routes identified within the study area include services that follow the A14 between Huntingdon and Cambridge. Bus services 1A, 1B and 5, are operated by Whippet and link Cambridge and Huntingdon with stops at various locations in

between, along the A14 route. The bus service Citi 5, is operated by Stagecoach and operates along the A14, linking some villages north of the trunk road with Cambridge. There are also two direct services between Huntingdon and Cambridge (349 and 350), which are operated by National Express. Bus services 2, 3 and 8 are all operated by Whippet and have routes between some of the villages south of the A14, two of which link to Cambridge, whilst service 3 links to Huntingdon. There are likely to be other services, such as community run services which are not currently identified in the baseline.

11.7 Public Rights of Way

11.7.1 There is a network of public rights of way within the indicative study area. This includes designated footpaths, bridleways and byways, many of which cross or meet the line of the proposed scheme and existing A14. In addition to public rights of way, there are also a number of permissive paths shown on the definitive map.

11.7.2 Some footpaths have been severed in the past by previous improvements to the A1 and A14. For example there is a footpath which meets the eastern embankment of the A1 approximately 400m south of the Brampton interchange – a point at which an at-grade road crossing would be hazardous. Likewise, two footpaths near Fen Drayton are bisected by the existing A14. It was reported in usage surveys, undertaken for the previous A14 Ellington to Fen Ditton (EFD) scheme EIA, that these footpaths were little used due to the proximity of the A14 which was very hazardous to cross at that location.

11.7.3 Based on the assessment of the January 2014 scheme, twenty four public rights of way have been identified within the scheme footprint. This includes 15 which are within the footprint of the proposed Huntingdon Southern Bypass. Three public rights of way have been identified within the footprint of the proposed scheme in Huntingdon town centre.

National Cycle Network

11.7.4 National Cycle Network (NCN) route 51 extends as far as Oxfordshire and Essex, but includes a route which connects Huntingdon and Cambridge. The NCN 51 follows the Guided Busway route between Cambridge and Impington. It meets NCN 12 within Huntingdon. NCN 11 joins NCN 51 and crosses the existing A14 via Jane Coston Bridge just east of Milton junction at the eastern extreme of the study area.

Distance Walking Trails

11.7.5 The Ouse Valley Way is a long distance walking trail which follows the river Great Ouse, crossing the existing A14 via an underpass near Godmanchester. The Pathfinder long distance walk is located east of the Great Ouse valley. This long distance walk is a heritage trail in memory of the RAF Pathfinder Force and links up four airfields (Wyton, Graveley, Oakington and Warboys). In the vicinity of the proposed Huntingdon Southern Bypass, the route comes off a public footpath, following Debden Top Farm access track before joining Silver Street into Godmanchester. It then crosses the A14, via the Cambridge Road (B1044) underpass north of Godmanchester, before continuing northwards. Other long distance trails identified are east of Milton, just outside the study area.

Cambridgeshire Guided Busway

11.7.6 The Cambridgeshire Guided Busway includes a shared use path suitable for cyclists, pedestrians and horse riders.

11.7.7 The route links settlements such as St Ives, Impington and Histon to Cambridge by means other than the private car.

11.8 Open Space

11.8.1 Current data regarding public open space is being obtained from the relevant local planning authorities. This data will be reviewed against the proposed application boundary and potential areas of replacement land equating to the same area of public open space that would be affected by the proposed scheme will be identified within the surrounding area. The impact on public open space will be assessed in detail as part of the EIA.

11.8.2 The Development Plan for Huntingdon contains a number of policies to ensure the protection of open space within the town. Although not of national landscape significance, there are open spaces and gaps for protection located throughout Huntingdon. Views Common is designated as an 'open space allocation', adjacent to the viaduct. Mill Common to the east of the viaduct is designated as an 'open space and gap for protection'.

11.9 Potential Impacts on Highway Users, Public Rights of Way and Open Space during Construction

Pedestrians, cyclists and equestrians

11.9.1 During construction, in addition to noise and disturbance, there may be temporary closures and diversions of public rights of way and other routes used by these types of travellers. This would inconvenience travellers and/or lengthen their journey times. These effects could be partially mitigated through the provision of information in advance of closures and diversions.

Bus travellers

11.9.2 Access to bus stops may be disrupted during construction. Furthermore the journey times for bus services may become temporarily unreliable as a result of road works and associated traffic delays. These impacts could be potentially significant if people are unable to get to important destinations on time, such as hospital appointments. Early liaison with bus companies, the provision of good information for passengers and good traffic management would help to mitigate such disruption to some extent.

Vehicle travellers

11.9.3 Driver stress may be temporarily increased during construction as a result of road works and associated traffic delays. Good traffic management would help to reduce delays and clear signage may help to mitigate driver stress to some extent.

Open Space

11.9.4 There would be temporary impacts arising from construction operations on users of retained open space within Huntingdon.

11.10 Potential Impacts on Highway Users, Public Rights of Way and Open Space during Operation

Pedestrians, cyclists and equestrians

11.10.1 The construction of a new road has the potential to create barriers to journeys undertaken by pedestrians, cyclists and equestrians. These barriers may be physical, such as permanent severance of a public right of way, or psychological, such as the fear of traffic deterring people from making journeys by active modes of travel.

11.10.2 The proposed scheme design will seek to ensure that the network of public rights of way is not bisected by providing diversions and new crossings where appropriate. Some public rights of way may be improved by the proposed scheme.

11.10.3 Diverted routes may, however, increase journey times or present additional obstacles such as bridges which may affect the amenity of the routes. The presence of a new road close to existing public rights of way, with the traffic and noise associated with it, is also likely to affect the amenity of journeys for pedestrians, cyclists and equestrians.

11.10.4 Based on assessment of the January 2014 scheme there may be beneficial effects for pedestrians, cyclists and equestrians too. For example, the downgrading of the A14 through Huntingdon to county road status might improve conditions for journeys by active modes of travel, where traffic volume, including HGV traffic, is reduced.

11.10.5 The use of a local access road, which would run from Cambridge to the western side of Fenstanton, would potentially allow greater access for the local population and for safer, easier journeys by active modes of travel. There are also opportunities to improve provision for pedestrians and cyclists that need to negotiate current junctions on the A14, some of which are currently impractical to use safely.

11.10.6 By exploiting opportunities to improve conditions for pedestrians and cyclists in particular, the proposed scheme could provide a potential legacy for improved human health if greater numbers of people are able to walk and cycle to their chosen destinations.

Bus travellers

11.10.7 Based on assessment of the January 2014 scheme it has been identified that there may need to be alterations to existing bus routes and services in response to the new roads. However, it is likely that overall the scheme would be beneficial for bus travellers, as reduced congestion and the segregation of local and strategic journeys would potentially enable more reliable journey times.

Vehicle travellers

11.10.8 There is a growing body of research that suggests road monotony leads to driving behaviour impairment comparable to that observed when the driver is fatigued[29]. The variation and quality of views from the road may also contribute to reducing driver stress.

11.10.9 Based on assessment of the January 2014 scheme it is anticipated that the improvements would potentially benefit overall traveller stress and frustration through reduced congestion, the separation of local and strategic traffic and the reduction in fear of accidents.

11.10.10 On the basis that the current A14 trunk road is noted for delays and driver frustration and based on assessment of the January 2014 scheme, it is considered that there would potentially be a significant beneficial effect upon driver stress.

Open Space

11.10.11 The proposed scheme in Huntingdon would involve the removal of the rail viaduct and the existing highway embankments, improving the visual amenity of Views Common and returning some open space. However, the new road links would also encroach on parts of Mill Common and Views Common. Given these positive and negative contributions, the January 2014 scheme is considered to be neutral in relation to the open space policy objectives relevant to Huntingdon.

11.10.12 Elsewhere other areas of open space may be impacted by the proposed scheme.

Proposed Layout for Brampton Interchange

Community and Private Assets

There is potential for the loss of two properties within the April 2014 proposed Brampton layout, although it should be noted that these properties would be heavily blighted anyway under the January 2014 Brampton layout. Overall the differences between the two layouts are unlikely to be significant for community and private assets.

Pedestrians, Cyclists and Equestrians

For pedestrians, cyclists and equestrians the April 2014 proposed Brampton layout would mean that it might be possible to improve connections. Whilst the January 2014 Brampton layout would take up more space and therefore would be physically closer to some tracks and footpaths, the additional height of the April 2014 proposed Brampton layout might be equally intrusive.

Vehicle Travellers

There would be no significant difference between the two layouts in terms of views from the road for vehicle travellers.

11.11 Chapter Summary

11.11.1 Based on assessment of the January 2014 scheme, this chapter has identified that some public and private assets would be affected, in particular agricultural land and the farming businesses which rely on that land. There is also likely to be a combination of beneficial (such as through reduced severance) and adverse impacts on the local communities and the wider economy. The net effect cannot currently be estimated, but will be further assessed as part of the EIA and will be presented within the forthcoming Environmental Statement (ES).

[29] Larue, Gregoire S., Rakotonirainy, Andry, & Pettitt, Anthony N. (2010). Predicting driver's hypovigilance on monotonous roads: literature review. In *1st International Conference on Driver Distraction and Inattention*, Gothenburg, Sweden.

11.11.2 Based on assessment of the January 2014 scheme, this chapter has also identified potential effects for travellers, indicating that both beneficial and adverse impacts are likely. The proposed scheme offers considerable potential to improve human health outcomes if appropriately designed to improve opportunities for walking and cycling between local communities. These impacts will also be investigated further as part of the EIA.

11.11.3 Impact on open space will also be further assessed as part of the EIA and will be presented within the forthcoming ES.

11.11.4 The proposed scheme will be designed to maintain connectivity of existing public rights of way, although, based upon assessment of the January 2014 scheme, there would be effects upon amenity from the presence of the new road. Opportunities are being explored with Cambridgeshire County Council to improve connections of routes previously severed by earlier road schemes and to improve overall route connectivity for cyclists and others.

12 CUMULATIVE EFFECTS

12.1 Introduction

12.1.1 Cumulative effects can result from the impacts of multiple projects, or from a number of different impacts from a single project, interacting to affect a single environmental resource or receptor.

12.1.2 Each impact from a project may not be significant on its own, but when combined with other impacts, could become significant.

12.2 Approach to Assessment

12.2.1 The environmental impact assessment (EIA) will take a two-stage approach to assessing cumulative effects. The first stage would identify potential cumulative impacts from the proposed scheme and other proposals in the study area. It is proposed to consider reasonably foreseeable development proposals within a 5km radius of the proposed scheme.

12.2.2 The second stage would determine whether these impacts could lead to significant environmental effects based upon certain considerations, such as:

- which receptors/resources would be affected;
- how the activity or activities would affect the condition of the receptor/resource;
- the likelihood of such effects occurring; and
- the ability of the receptor/resource to absorb further effects before the change becomes irreversible.

12.2.3 Where significant cumulative effects, beyond those identified as residual effects from the proposed scheme in isolation, are identified, additional mitigation measures would be recommended.

12.2.4 It should be noted that such mitigation measures proposed at this stage may be beyond the control of the Highways Agency, but will provide useful guidance to relevant planning authorities when considering other applications.

12.3 Preliminary Identification of Key Developments

12.3.1 A preliminary review of the relevant Local Development Plans has identified the following major development sites within 5km of the January 2014 scheme.

12.3.2 Orchard Park is a mixed use development site bounded by the A14, Histon Road and Kings Hedges Road including up to 900 dwellings. The majority of the site has already been developed.

12.3.3 Land between Huntingdon Road and Histon Road is a largely residential development of 1000 dwellings, as well as associated facilities and services including a school, shops and community facilities.

12.3.4 Cambridge Northern Fringe East and land surrounding the proposed Cambridge Science Park Station is a mixed-use development primarily for employment purposes.

12.3.5 Northstowe is an area of approximately 432 hectares, located to the east of Longstanton and to the north of Oakington, to accommodate a new town with a target capacity of 10,000 dwellings (aiming for at least 4,800 dwellings by 2016) and associated employment, services, facilities and infrastructure.

12.3.6 Cambridge East is an area safeguarded for longer term development beyond 2031. It is anticipated that land north of Newmarket Road will deliver approximately 1,200 dwellings and land north of Cherry Hinton will deliver approximately 110.

12.3.7 Land North of Waterbeach is a new town of 8,000 to 9,000 dwellings and associated uses proposed on the former Waterbeach Barracks and land to the east and north.

12.3.8 Bourn Airfield is land south of the A428 based on Bourn Airfield which is allocated for the development of a new village of approximately 3,500 dwellings.

12.3.9 Huntingdon West is envisaged as a vibrant part of the town enjoyed by residents, workers and visitors by 2026 in the Huntingdon West Area Action Plan (Adopted 2011). To achieve this it is proposed to develop new and improved transport routes, provide modern residential, retail and office development, and enhance and enlarge Hichingbrooke Country Park.

12.3.10 For the EIA, these developments will be assessed further to identify whether they are likely to come forward during the timescales of the proposed scheme. In addition, Local Planning Authorities will be contacted to determine whether any additional large scale planning applications have been submitted for determination or have been granted, which may lead to potential cumulative impacts.

12.4 Potential Cumulative Impacts

12.4.1 The EIA will assess the potential effects based upon results of baseline surveys and data collection, and the information available about the key developments identified.

12.4.2 Potential cumulative impacts may include:

- incremental loss of agricultural land;
- fragmentation of wildlife corridors;
- incremental enhancements of habitat and biodiversity associated with landscaping proposals for a variety of projects;
- incremental noise increases;
- urbanising effect upon landscape, including increased effects of lighting;
- increased demand for use of public rights of way (requiring suitable provision with the proposed scheme); and
- increased pressure on recreational and community land.

12.4.3 It should be noted that the traffic model which would be used to inform the EIA, particularly for the assessment of air quality and noise, is likely to take into account projected traffic growth from planned development. Therefore, the cumulative effect of developments is likely to be taken into account in those topic assessments in the EIA.

12.5 Chapter Summary

12.5.1 A systematic approach to the assessment of cumulative effects will be applied as part of the EIA. This would take account of planned development in a 5km radius of the proposed scheme, as well as potentially combined impacts upon individual receptors.

The results will be reported in a separate chapter in the Environmental Statement (ES).

13 CONCLUSIONS

13.1 Proposed Scheme

13.1.1 The proposed scheme is a highway improvement between Huntingdon and Cambridge, which is classed as a Nationally Significant Infrastructure Project, covering a distance of approximately 34km (21 miles) west to east of the A14 corridor, and online improvements of the A1, covering a distance of approximately 6km (3 ¾ miles) north to south.

13.1.2 The proposed scheme involves the following key elements:

- Widening and realignment of the A1 between Brampton and Alconbury over a length of approximately 6km (3 ¾ miles) including tie-ins, from the existing two lane dual carriageway to a three lane dual carriageway. There is a proposed new interchange with the A14 west of Brampton.
- A new Huntingdon Southern Bypass of approximately 18km (11 ¼ miles) in length, which would provide a two lane dual carriageway between Ellington and the A1 at Brampton and a three lane dual carriageway between Brampton and Swavesey; this would remove a large proportion of traffic from the section of the existing A14 between Huntingdon and Swavesey. The new bypass would include a raised viaduct section of road running across the river Great Ouse and a bridge over the East Coast Mainline railway.
- Downgrading the existing A14 trunk road (de-trunking to county road status) over approximately 21.5km (13 ½ miles) between Ellington and Swavesey, as well as between Alconbury and Spittals interchange.
- Huntingdon Town Centre improvements - to include the demolition of the A14 viaduct over the East Coast Mainline railway and Brampton Road in Huntingdon. A through route would be maintained broadly along the line of the existing A14 through Huntingdon, making use of the Brampton Road bridge to cross the railway line and by constructing a new link road from Brampton Road to connect with the A14 to the west.
- Widening of the existing A14 over approximately 9km (5½ miles) to provide three lanes in both directions between Swavesey and Bar Hill, and four lanes in both directions between Bar Hill and Girton.
- Widening of a 2.5km (1½ mile) section of the Cambridge Northern Bypass between Histon and Milton.
- Improvement of existing A14 junctions at Swavesey, Bar Hill and Girton – to improve the capacity of the road, compatibility with adjacent proposed developments, such as Northstowe, and connections for non-motorised users.
- New local access roads – to consist of approximately 8km (5 miles) of single carriageway local access road alongside the widened A14 between Fen Drayton and Girton. This local access road would provide a route for local traffic between Cambridge and Huntingdon, as well as providing access to properties and businesses along the corridor.

13.1.3 The Government's **Draft National Policy Statement for National Networks**[30], published in December 2013, states that the Government's policy is to deliver improvements in capacity and connectivity on the national network to support economic growth and improve quality of life. The objectives of the proposed scheme can be summarised as follows:

- **combat congestion:** making the route between Huntingdon and Cambridge more reliable and providing capacity for future traffic growth;
- **unlock growth:** enabling major residential and commercial developments to proceed, leading to increased economic growth, regionally and nationally;
- **connect people:** by placing the right traffic on the right roads and freeing up local capacity for all types of road user, including pedestrians, cyclists and equestrians;
- **improve safety:** designing the proposed scheme to modern highway standards, introducing better lane control, and providing adequate capacity for predicted traffic levels; and
- **create a positive legacy:** recognising the wider benefits of the road improvement scheme for local communities and businesses.

For further detail regarding the objectives of the proposed scheme, refer to the **A14 Cambridge to Huntingdon improvement scheme, Technical review of options**[31] (September 2013) which is available as part of the spring 2014 consultation material for the proposed scheme and at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/243999/a14-technical-review-of-options.pdf

13.2 Potential Impacts on the Environment

13.2.1 Based on assessment of the January 2014 scheme, the scale and location would mean that several different aspects of the environment would potentially be affected, some adversely and some beneficially. Some of these impacts would occur during construction, such as the loss of land, vegetation and wildlife habitat, the generation of dust and disruption for travellers. Other impacts would occur during operation, such as noise from traffic, new travel conditions and development of new habitats from the landscape and ecological mitigation proposals.

13.2.2 Some of the potential beneficial effects are likely to include improvements in air quality, noise and the setting of built heritage within parts of Huntingdon. There may also be opportunities to improve wildlife habitat and flood resilience through the detailed design process.

13.2.3 The ongoing environmental impact assessment (EIA) work will assess how significant these adverse and beneficial effects may be, taking into account proposed mitigation measures.

[30] Department for Transport (December 2013). Draft National Policy Statement for National Networks. The Stationary Office, London.
[31] Highways Agency (September 2013). A14 Cambridge to Huntingdon improvement scheme. Technical review of options.

14 NEXT STEPS

14.1 Consultation

14.1.1 The Highways Agency wishes to obtain the views of the public on the draft proposals for the April 2014 proposed scheme design, taking into account the potential environmental effects of the proposed scheme. Those views can then be taken into account in finalising the design and refining the environmental impact assessment (EIA) and Environmental Statement (ES).

14.1.2 Consultation at this stage follows previous consultations of the community in September 2013. The previous consultations were about choosing the best options for the improvement. The current consultation is about more detailed proposals that have now been developed for the option that was selected.

14.1.3 There will be a 10 week period from the 7 April 2014 for members of the public to respond to the consultation. Responses can relate to the preliminary environmental information set out in this report or to any other aspect of the proposed scheme. They can be made by completing a questionnaire by letter by e-mail or online, using any of the following addresses:

By post:

Freepost RRAY-TAUA-SUGT

A14 Cambridge to Huntingdon Improvement Scheme

Highways Agency

Woodlands

Manton Lane

Bedford

MK41 7LW

Website: http://www.highways.gov.uk/roads/road-projects/A14-Cambridge-to-Huntingdon-Improvement-Scheme

Email: A14CambridgeHuntingdon@highways.gsi.gov.uk

14.2 After the Consultation

14.2.1 After the consultation period, all responses will be considered in finalising the proposed scheme design and the ES. A report will be prepared on the responses received and how they have been taken into account, including whether or not they led to changes to the proposed scheme.

14.2.2 The Highways Agency is required to seek authorisation to construct the proposed scheme through an application to the Secretary of State through the Planning Inspectorate (as responsible agency) for a Development Consent Order (DCO). The ES will be submitted with the DCO application in autumn 2014. Once accepted by the Planning Inspectorate on behalf of the Secretary of State, the public will have further opportunity to comment on the application. Details of how the process works can be found on the National Infrastructure Planning website[32] and information is also provided in the A14 Consultation Brochure.

[32] The Planning Inspectorate (2012). National Infrastructure Planning. Available at: http://infrastructure.planningportal.gov.uk/

15 TECHNICAL GUIDANCE, LEGISLATION AND SOURCES OF INFORMATION

15.1 Introduction

15.1.1 This section lists the technical guidance and information sources used to inform the environmental impact assessment (EIA) process and the understanding of the preliminary baseline. For more information about the technical guidance and approaches to EIA, readers should refer to the **A14 Cambridge to Huntingdon Improvement EIA Scoping Report**. (Refer to **Chapter 1**: Introduction).

15.2 List of Guidance Informing the EIA Process

The Highways Agency et al. (1993). Design Manual for Roads and Bridges, Volume 11 Environmental Assessment, Section 3: Environmental Assessment Techniques

Part 1 – HA207/07 Air Quality (2007).
Part 2 – HA208/07 Cultural Heritage (2007).
Part 3 - Disruption Due to Construction (1993).
Part 4 – Ecology and Nature Conservation (1993).
Part 5 – Landscape Effects (1993).
Part 6 – Land Use (Incorporating Amendment No. 1 dated August 2001).
Part 7 – HD213/11 – Revision 1 Noise and Vibration (2011).
Part 8 – Pedestrians, Cyclists, Equestrians and Community Effects (1993).
Part 9 – Vehicle Travellers (1993).
Part 10 – HD45/09 Road Drainage and the Water Environment (2009).
Part 11 – Geology and Soils (1993).
Part 12 – Impact of Road Schemes on Policies and Plans (1994).

The Highways Agency (various years). Interim Advice Notes (IANs)

Air Quality
IAN 170/12v3 Updated air quality advice on the assessment of future NOx and NO_2 projections for users of DMRB Vol.11.3.1. Air Quality (HA207/07) (November 2013).
IAN 174/13 Updated advice for evaluating significant local air quality effects for DMRB Vol.11.3.1. Air Quality (HA207/07) (June 2013).
IAN 175/13 Updated advice on risk assessment related to compliance with the EU Directive on ambient air quality and on the production of Scheme Air Quality Action Plans for users of DMRB Vol. 11.3.1. Air Quality (HA207/07) (June 2013).

Landscape
IAN 135/10 Landscape and Visual Effects Assessment (November 2010).

Geology and Soils
IAN 130/10 Ecology and Nature Conservation: Criteria for Impact Assessment (September 2010).

Noise and Vibration
IAN 125/09 Supplementary guidance for users of DMRB Volume 11 'Environmental Assessment' (October 2009).
IAN 153/11Guidance on the Environmental Impact Assessment of Materials (October 2011).
IAN 114/08 Highways Agency Carbon Calculation and Reporting Requirements (September 2008).

All Travellers
IAN 125/09 Supplementary guidance for users of DMRB Volume 11 'Environmental Assessment (October 2009).

Other Technical Guidance, Policy and Legislation

Air Quality
Department of Environment, Food and Rural Affairs (February 2009). Local Air Quality Management Technical Guidance (LAQM.TG (09)).
European Union (1996). Directive (96/62/EC) on ambient air quality assessment and management.
European Union (1999). Directive (99/30/EC) relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air.
European Union (2008). Directive (08/50/EC) of the European Parliament and of the Council on ambient air quality and cleaner air for Europe.
Planning Inspectorate (February 2011). Advice Note Nine – Rochdale Envelope.

Cultural Heritage
Ancient Monuments and Archaeological Areas Act 1979 (amended by the National Heritage Act 1983 and 2002).
Cambridge City Council (July 2006). Cambridge Local Plan: Policy 4/9.
Cambridge City Council (July 2006). Cambridge Local Plan: Policy 4/11.
Cambridge City Council (February 2008). Cambridge East Area Action Plan: Policy CE15.
Cambridge City Council (February 2008). Cambridge East Area Action Plan: Policy CE19.
Department for Communities and Local Government (March 2012). National Planning Policy Framework – with particular reference to Section 12 Conserving and Enhancing the Historic Environment.
Hedgerows Regulations 1997 amended 2003.
Huntingdonshire District Council (1995). Huntingdonshire Local Plan: Policy En9.
Huntingdonshire District Council (1995). Huntingdonshire Local Plan: Policy En11.
Planning (Listed Buildings and Conservation Areas) Act 1990.
South Cambridgeshire Development Control Policies Development Plan Document: Policies CH/1 and CH/2 (July 2007).
South Cambridgeshire Development Control Policies Development Plan Document: Policy CH/5 (July 2007).

Nature Conservation

Cambridgeshire and Peterborough Biodiversity Partnership (2008/09). Biodiversity Action Plans.
Cambridgeshire County Council et al (June 2011). Green Infrastructure Strategy.
Conservation of Habitats and Species Regulations 2010 (as amended).
Highways Agency (2002), Biodiversity Action Plan (currently under review).
Hundt, L. (2012) Bat Surveys; Good Practice Guidelines, 2nd edition, Bat Conservation Trust.
Huntingdonshire District Council (2007). Huntingdonshire Landscape and Townscape Assessment Supplementary Planning Document.
Huntingdonshire District Council (2012) Huntingdonshire Local Plan to 2036 – not yet adopted.
Department for Communities and Local Government (March 2012). National Planning Policy Framework.
Natural Environment & Rural Communities Act 2006 (NERC) Section 40 & 41.
Huntingdonshire District Council (1995). Saved Policies: Huntingdonshire Local Plan.
South Cambridgeshire District Council (July 2007). Development Control Policies Development Plan Document (DPD).
South Cambridgeshire District Council (July 2013). South Cambridgeshire Local Plan: Proposed Submission – not yet adopted.
Wildlife & Countryside Act 1981 (as amended).

Geology and Soils

Department for Communities and Local Government (March 2012). National Planning Policy Framework.
Department for Environment, Food and Rural Affairs (2003). Part IV of the Environment Act 1995: Local Air Quality Management: Technical Guidance LAQM.TG (09), London: Crown.
Department for Environment, Food and Rural Affairs (2004). Contaminated Land Report 11: Model procedures for the management of land contamination.
Environmental Protection Act 1990, Part 2A, Section 78 (1990, amended 1995 and 2012).

Materials

Cambridgeshire County Council and Peterborough City Council (July 2011). Cambridge and Peterborough Minerals and Waste Development Plan, Core Strategy, Development Plan Document.
Contaminated Land: Applications in Real Environments (March 2011). The Definition of Waste: Development Industry Code of Practice Version 2.
Department for Business, Innovation and Skills (June 2008). Strategy for Sustainable Construction.
Environment Agency (June 2012). Guidance Note SR2010No8_100Kte) Use of waste in construction.
London 2012 Olympic and Paralympic Games (2012). Learning Legacy Website on London (learninglegacy.independent.gov.uk/).

Noise and Vibration

BS 5228 Code of Construction Practice for noise and vibration on construction and open sites (December 2008).
BS 6472 Guide to the evaluation of human exposure to vibration in buildings (June 2008).
BS 7385 Evaluation and measurement for vibration in buildings (November 1993).
Control of Pollution Act, 1974.
Department of Transport (1998). Calculation of Road Traffic Noise (CRTN).
Department for Transport (January 2014). Transport analysis guidance: WebTAG.
Environmental Protection Act 1990.
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Glossary

Term or abbreviation	Definition
AADT	Annual Average Daily Traffic
ALC	Agricultural Land Classification
AQMA	Air Quality Management Area
Award drain	A ditch or pipe that has different legal status and is managed by a council, such as South Cambridgeshire District Council, for drainage purposes excluding maintenance.
BAP	Biodiversity Action Plan
Borrow pit	An area where material (usually soil, gravel or sand) has been dug for use at another location, for example as part of the scheme embankments.
CIEEM	Chartered Institute of Ecology and Environmental Management
CO	Carbon Monoxide
CWS	County Wildlife Site
CPRE	Campaign to Protect Rural England
CRTN	Calculation of Road Traffic Noise
Cumulative effects	Effects upon the environment that result from the incremental impact of an action when added to other past, present or reasonably foreseeable actions. Each impact by itself may not be significant, but can become a significant effect when combined with other impacts.
Db	Decibel The ratio of sound pressures which we can hear is a ratio of 10^6:1 (one million:one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (L_p) and the associated measurement unit is the decibel (Db). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.
Db(A)	The unit used to define a weighted sound pressure level, which correlates well with the subjective response to sound. The 'A' weighting follows the frequency response of the human ear, which is less sensitive to low and very high frequencies than it is to those in the range 500Hz to 4kHz. In some statistical descriptors the 'A' weighting forms part of a subscript, such as L_{A10}, L_{A90}, and L_{Aeq} for the 'A' weighted equivalent continuous noise level.

Term or abbreviation	Definition
DCO	Development Consent Order
Defra	Department for the Environment, Food and Rural Affairs.
De-trunking	The removal of trunk road status and transferral of responsibility for the road to the local highway authority rather than the Highways Agency (in England).
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EIA	Environmental impact assessment. A process by which information about environmental effects of a proposed development is collected, assessed and used to inform decision-making. For certain projects, EIA is a statutory requirement.
A14 EFD scheme	The A14 Ellington to Fen Ditton scheme. A previous proposal for the A14, which was cancelled in 2010 during the Government's comprehensive spending review as it was deemed unaffordable.
Environmental effect	The consequence of an action (impact) upon the environment such as the decline of a breeding bird population as a result of the removal of hedgerows and trees.
Environmental impact	The change in the environment from a development such as the removal of a hedgerow.
Environmental Statement	A document produced in accordance with the EIA Directive as transported into UK law by the EIA Regulations to report the results of an EIA.
ES	Environmental Statement
EU	European Union
FSC	Forest Stewardship Council. FSC is an independent not for profit organisation established to promote the responsible management of the world's forests
GLVIA	Guidelines for Landscape and Visual Impact Assessment
HDV	Heavy Delivery Vehicle / Heavy Duty Vehicle
HER	Historic Environment Records
HGV	Heavy Goods Vehicle

Term or abbreviation	Definition
Hydrology	The study of water movement through the environment which also seeks to predict the behaviour of water bodies under various circumstances.
IAN	Interim Advice Note
L_A	A-weighted sound pressure level (in decibels, dB) The measured sound level incorporating a logarithmic base and weighting system to approximate the manner in which humans perceive sound. An increase in 10 dB is approximately equivalent to a perceived doubling of loudness.
L_{Aeq}	Equivalent continuous A-weighted sound pressure level (in decibels, dB).
L_{Amax}	The maximum noise level identified during a measurement period. Experimental data has shown that the human ear does not generally register the full loudness of transient sound events of less than 125ms duration and fast time weighting (F) has an exponential time constant of 125ms which reflects the ear's response. Slow time weighting (S) has an exponential time constant of 1s and is used to allow more accurate estimation of the average sound level on a visual display. The maximum level measured with fast time weighting is denoted as $L_{Amax, F}$. The maximum level measured with slow time weighting is denoted $L_{Amax, S}$.
$L_{A10, 18h}$	A-weighted sound pressure level (in decibels, dB) obtained using "Fast" time-weighting that is exceeded for 10% of the 18 hour day (06:00 – 24:00). In the UK this metric is used for the assessment of road traffic noise.
$L_{Aeq,18h}$	Equivalent continuous A-weighted sound pressure level (in decibels, dB), for 18 hour day (06:00 – 24:00).
L_{eq}	An index for assessment for overall noise exposure is the equivalent continuous sound level, L_{eq}. This is a notional steady level which would, over a given period of time, deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating levels can be described in terms of a single figure level.

Term or abbreviation	Definition
L_p	The sound power emitted by a source results in pressure fluctuations in the air, which are heard as sound. The sound pressure level (L_p) is ten times the logarithm of the ratio of the measured sound pressure (detected by a microphone) to the reference level of 2 x 10^{-5}Pa (the threshold of hearing). Thus L_p (dB) = 10 log $(P1/P_{ref})^2$ where P_{ref}, the lowest pressure detectable by the ear, is 0.00002 pascals (ie 2x10^{-5} Pa). The threshold of hearing is 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dBL_A and a change of 3dB is only just detectable. A change of 10dB is subjectively twice, or half, as loud.
MAFF	Ministry of Agriculture, Fisheries and Food. (Now Defra).
Magnitude	The scale, size or degree of change (impact) to the environment from an action upon it.
Mitigation	The action of reducing the severity and magnitude of change (impact) to the environment. Measures to avoid, reduce, remedy or compensate for significant adverse effects.
NIAB	National Institute for Agricultural Biology
NMU	Non-Motorised User – A term to describe users of the highway such as pedestrians, cyclists or horse riders, who do not travel by motorised vehicles.
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
PM_{10}	Particulate Matter with a diameter of 10 micrometres or less
Potential effect	The predicted consequential change may occur upon the environment as a result of a development, in the absence of mitigation.
RBMP	River Basin Management Plan
Receptor	A defined individual environmental feature usually associated with population, fauna and flora that has potential to receive an impact or impacts from a development.
Residual effect	The predicted consequential change on the environment from the impacts of a development after mitigation.

Term or abbreviation	Definition
RIGS	Regionally Important Geological / Geomorphological Site
SAC	Special Area of Conservation
Scoping	The process of identifying the issues to be addressed by an environmental impact assessment process. It is a method of ensuring that an assessment focuses on the important issues and avoids those that are considered unlikely to be significant.
Significance	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
SoCC	Statement of Community Consultation
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
Trial trenching	A method of intrusive archaeological investigation which uses targeted trenches to estimate the archaeological potential of a site. An archaeological evaluation method required as part of the planning permission of large developments to determine whether sub-surface archaeology is present in a site and any likelihood of impact.
WFD	Water Framework Directive
WHO	World Health Organisation
ZTV	Zone of Theoretical Visibility

Appendix A: Borrow Pit Development

A1. Borrow pits are included in the proposed scheme in order to provide fill materials such as gravel, clay and sand. This appendix has been prepared to set out recent changes to the proposed locations of borrow pits.

Changes to Proposed Borrow Pit Locations

A2. Seven borrow pits were originally proposed at the time of the previous A14 Ellington to Fen Ditton (EFD) scheme and these are indicated on **Figure A.2**. However, ongoing work for the proposed scheme has identified alternative locations for some borrow pits which are also indicated on **Figure A.2**.

A3. There are now six borrow pits proposed as part of the April 2014 proposed scheme and these are numbered 1, 2, 3, 5, 6 and 7. The previously proposed borrow pit 4 is now removed from the proposed scheme since the material in that location is considered to be unsuitable and it is therefore not illustrated on **Figure A.2**. Whilst some earlier borrow pit locations are no longer proposed (such as three located close to the existing A14 between Boxworth and Bar Hill), borrow pits 5, 6 and 7 bring new areas of land within the April 2014 proposed scheme footprint.

A4. With the exception of borrow pit 5, the borrow pits are all located within areas allocated for mineral extraction under the **Cambridgeshire and Peterborough Minerals and Waste Core Strategy**[33], which was adopted by Cambridgeshire County Council and Peterborough City Council in July 2011. The proposed locations of the borrow pits (other than borrow pit 5) have therefore been environmentally assessed at a strategic level as part of the **Cambridgeshire and Peterborough Minerals and Waste Core Strategy**.

Borrow Pit 5

A5. In the case of borrow pit 5, the original borrow pit (purple hatched area, Figure **A.1a**), Boxworth End Farm, North of Trinity Foot Junction, was identified in **Cambridgeshire and Peterborough Minerals and Waste Site Specific Proposals Development Plan**[34], adopted in February 2012, as a clay and general fill borrow pit for any future improvements of the A14. This site was proposed for the 2009 A14 EFD scheme.

A6. The new proposed borrow pit (indicated in red, Figure **A.1a**) has been relocated, due to more suitable engineering materials being identified in the new location, and now falls partially outside of the area allocated for mineral extraction under the **Minerals and Waste Core Strategy**. An initial environmental assessment for this proposed borrow pit location identified the need to relocate local drainage ditches and investigate groundwater flows. In addition it has been identified that under the **South Cambridgeshire District Council Development Control Policies DPD**[35], adopted in July 2008, there is a Protected Village Amenity Area and an Important Countryside

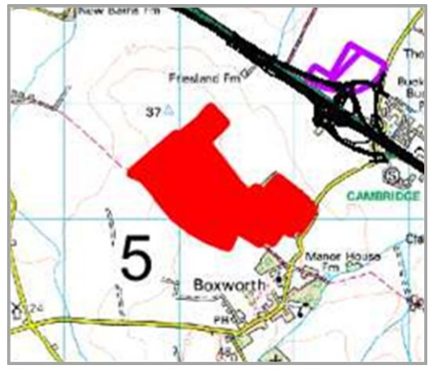

Figure A.1a: Borrow Pit 5

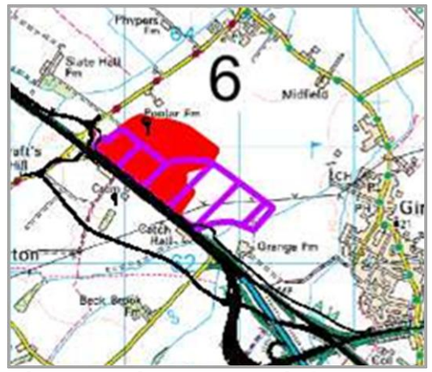

Figure A.1b: Borrow Pit 6

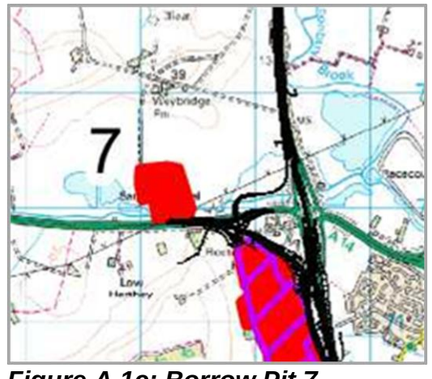

Figure A.1c: Borrow Pit 7

[33] Cambridgeshire County Council and Peterborough City Council (July 2011). Cambridgeshire and Peterborough Minerals and Waste Development Plan. Core Strategy Development Plan Document. Available at: http://www.cambridgeshire.gov.uk/NR/rdonlyres/76AE7877-5A20-44E9-97CF-34BCF0017FE2/0/CoreStrategyAdopted19July2011.pdf. Accessed 20 March 2014.

[34] Cambridgeshire County Council and Peterborough City Council (February 2011). Cambridgeshire and `Peterborough Minerals and Waste Development Plan. Site Specific Proposals Development Plan.

[35] South Cambridgeshire District Council (July 2007). South Cambridgeshire District Council Development Control Policies. Development Plan Document.

Frontage at Boxworth. Mature vegetation and small woodland blocks north west of Boxworth would, however, limit the landscape and visual impacts, although glimpsed views of the borrow pit through existing vegetation surrounding the farmstead would be possible and therefore some further consideration of landscape and visual mitigation may be required.

A7. The other identified potential impacts of borrow pit 5 are similar to the other proposed borrow pits, such as the need to survey for potential protected species and the possibility of nuisance from dust and disruption during construction on nearby receptors. No significant effects upon cultural heritage are anticipated.

Borrow Pit 6

A8. The site for borrow pit 6 (Slate Hall Farm, North Dry Drayton) was proposed in **Cambridgeshire and Peterborough Minerals and Waste Site Specific Proposals Development Plan**, adopted in February 2012. As part of this process, this area (SSP M7E) has been identified as a site to serve any future improvements of the A14.

A9. The borrow pit (purple hatched area on **Figure A.1b**) was proposed for the 2009 A14 EFD scheme. The revised borrow pit (red, **Figure A.1b**) is however still located within the area designated under the **Minerals and Waste Site Specific Proposals Development Plan**. No significant environmental differences have been identified between the current and previous borrow pit footprints although the proximity to two farm properties differs with each.

Borrow Pit 7

A10. The proposed borrow pit 7 (Weybridge Farm, Alconbury on **Figure A.1c**) was not part of the 2009 A14 EFD scheme proposals although it has been identified within the **Cambridgeshire and Peterborough Minerals and Waste Site Specific Proposals Development Plan** (SSP M2E) as an Area of Search for Sand and Gravel Borrowpit to serve any future improvements of the A14. Information provided in the **Minerals and Waste Site Specific Proposals Development Plan** identifies the following site characteristics:

- close to listed buildings;
- close to sensitive receptors;
- within Flood Zones 2 and 3;
- situated above a minor aquifer;
- archaeologically sensitive site; and
- Brampton Wood SSSI lies to the south of the site.

Restoration Design Strategy and Approach

A11. Restoration designs for the borrow pits are being developed and will depend, amongst other things, on final volumes of material extracted and materials available for restoration. The following paragraphs provide an indication of possible approaches to restoration.

A12. It is envisaged that post-extraction pit profiles could be modified by slackening side slopes to make them suitable for restoration as wetland habitats, due to the anticipated infilling of most excavations by groundwater.

A13. Where areas remain economically viable for agriculture, consideration will be given to restoring these to agricultural use.

A14. Borrow pit 5 (Boxworth) which is on locally elevated ground could possibly be restored to agriculture over the greater part, with a steep bank created by the excavation, perhaps retained as a landscape feature. This could be restored as native grassland for biodiversity benefits and to enhance the local landscape character in relation to the public bridleway.

A15. Peripheral areas not impacted by excavation and not suitable for agriculture could be available for quiet recreation (where public access exists or is agreed). These areas could potentially be furnished with a mixture of native grasslands, native shrubs, trees and small scale woodland planting.

Reporting of Ongoing Assessment

A16. The six proposed borrow pits are now considered to be part of the April 2014 proposed scheme footprint. Their impact upon the environment will be assessed as part of the ongoing work on the A14 Cambridge to Huntingdon Improvement Scheme environmental impact assessment (EIA). Measures to mitigate the impacts of the proposed borrow pits will also be explored as part of the EIA. Both assessment of impacts and mitigation measures will be reported within the forthcoming Environmental Statement (ES).

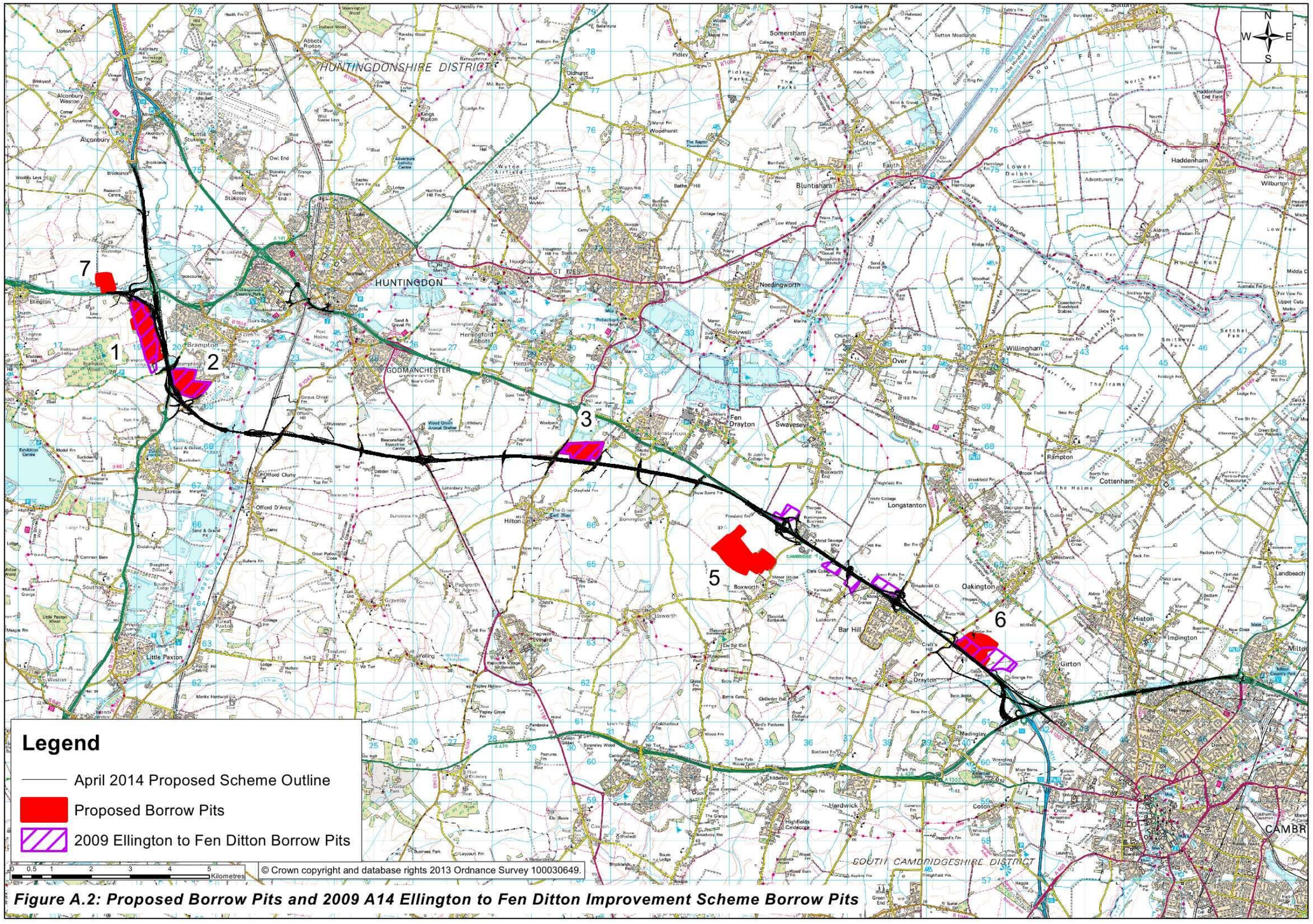

Figure A.2: Proposed Borrow Pits and 2009 A14 Ellington to Fen Ditton Improvement Scheme Borrow Pits

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