# CONTENTS

## NON-TECHNICAL SUMMARY

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1.1</td>
<td>Outline</td>
<td>1</td>
</tr>
<tr>
<td>1.2</td>
<td>Legal Basis for the Environmental Statement</td>
<td>1</td>
</tr>
<tr>
<td>1.3</td>
<td>Related Documents</td>
<td>2</td>
</tr>
</tbody>
</table>

## THE ENVIRONMENTAL STATEMENT AND ASSESSMENT METHODOLOGY

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Structure of the Environmental Statement</td>
<td>5</td>
</tr>
<tr>
<td>2.2</td>
<td>Study Team</td>
<td>6</td>
</tr>
<tr>
<td>2.3</td>
<td>Scope of the Environmental Impact Assessment</td>
<td>6</td>
</tr>
<tr>
<td>2.4</td>
<td>The Environmental Impact Assessment Process</td>
<td>7</td>
</tr>
<tr>
<td>2.5</td>
<td>Scoping and Preliminary Consultation</td>
<td>8</td>
</tr>
<tr>
<td>2.6</td>
<td>Baseline Data</td>
<td>8</td>
</tr>
<tr>
<td>2.7</td>
<td>Consultation</td>
<td>9</td>
</tr>
<tr>
<td>2.8</td>
<td>Assessment Methodology</td>
<td>10</td>
</tr>
<tr>
<td>2.9</td>
<td>Consideration of Alternatives</td>
<td>11</td>
</tr>
<tr>
<td>2.10</td>
<td>Cumulative and Interactive Effects</td>
<td>12</td>
</tr>
<tr>
<td>2.11</td>
<td>Content of the Environmental Statement</td>
<td>13</td>
</tr>
</tbody>
</table>

## NEED FOR AND EVOLUTION OF THE CAMBRIDGESHIRE GUIDED BUSWAY

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Introduction</td>
<td>17</td>
</tr>
<tr>
<td>3.2</td>
<td>History of the Scheme</td>
<td>17</td>
</tr>
<tr>
<td>3.3</td>
<td>Cambridge to Huntingdon Multi-Modal Study (CHUMMS)</td>
<td>19</td>
</tr>
<tr>
<td>3.4</td>
<td>Local Transport Plan Processes</td>
<td>20</td>
</tr>
<tr>
<td>3.5</td>
<td>Structure Plan Processes</td>
<td>21</td>
</tr>
<tr>
<td>3.6</td>
<td>Liaison with Local Planning Authorities</td>
<td>22</td>
</tr>
<tr>
<td>3.7</td>
<td>CGB Objectives</td>
<td>22</td>
</tr>
</tbody>
</table>

## SCHEME DESCRIPTION

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Introduction</td>
<td>25</td>
</tr>
<tr>
<td>4.2</td>
<td>Main Components of the Scheme</td>
<td>25</td>
</tr>
<tr>
<td>4.3</td>
<td>Route Overview</td>
<td>30</td>
</tr>
<tr>
<td>4.4</td>
<td>Detailed Description of Scheme Elements along the Route</td>
<td>32</td>
</tr>
<tr>
<td>4.5</td>
<td>Construction Methodology</td>
<td>43</td>
</tr>
</tbody>
</table>

## ASSESSMENT OF ALTERNATIVES

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Introduction</td>
<td>53</td>
</tr>
<tr>
<td>5.2</td>
<td>Alternative Public Transport Systems</td>
<td>53</td>
</tr>
<tr>
<td>5.3</td>
<td>Alternative Scheme Options</td>
<td>57</td>
</tr>
</tbody>
</table>

## PLANNING POLICY CONTEXT

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>Introduction</td>
<td>71</td>
</tr>
<tr>
<td>6.2</td>
<td>National Planning Policy Guidance (PPGs) and Statements (PPS)</td>
<td>72</td>
</tr>
<tr>
<td>6.3</td>
<td>National Studies</td>
<td>78</td>
</tr>
<tr>
<td>6.4</td>
<td>Regional Planning Guidance</td>
<td>78</td>
</tr>
<tr>
<td>6.5</td>
<td>Cambridgeshire and Peterborough Structure Plan (Adopted October 2003)</td>
<td>81</td>
</tr>
<tr>
<td>6.6</td>
<td>County Local Plans</td>
<td>86</td>
</tr>
<tr>
<td>6.7</td>
<td>Local Plans</td>
<td>88</td>
</tr>
<tr>
<td>6.8</td>
<td>Conclusions</td>
<td>104</td>
</tr>
</tbody>
</table>
7. **AGRICULTURE**
7.1 Introduction 121
7.2 Review of Development Proposals 121
7.3 Methodology 121
7.4 Consultation 122
7.5 Limitations, Constraints and Assumptions 122
7.6 Baseline 123
7.7 Assessment 125
7.8 Mitigation Measures 131
7.9 Residual Effects 132

8. **AIR QUALITY**
8.1 Introduction 137
8.2 Review of Development Proposals 139
8.3 Methodology 139
8.4 Limitations, Constraints and Assumptions 141
8.5 Baseline 141
8.6 Consultation 149
8.7 Relevant Guidance 150
8.8 Assessment 150
8.9 Mitigation Measures 164
8.10 Residual Effects 165

9. **ARCHAEOLOGY**
9.1 Introduction 169
9.2 Review of Development Proposals 169
9.3 Methodology 169
9.4 Limitations and Assumptions 171
9.5 Baseline 172
9.6 Consultation 184
9.7 Assessment 184
9.8 Mitigation Measures 190
9.9 Residual Effects 194

10. **BUILT HERITAGE**
10.1 Introduction 201
10.2 Review of Development Proposals 201
10.3 Methodology 201
10.4 Limitations, Constraints and Assumptions 203
10.5 Baseline 203
10.6 Consultation 205
10.7 Relevant Policy and Guidance 205
10.8 Impact Assessment 205
10.9 Mitigation Measures 209
10.10 Residual Impacts 210

11. **ECOLOGY**
11.1 Introduction 215
11.2 Methodology 215
11.3 Baseline 220
11.4 Consultation 247
11.5 Relevant Guidance 248
11.6 Assessment 249
11.7 Mitigation Measures 261
11.8 Residual Effects 275
11.9 Summary 276

12. GROUND CONTAMINATION 299
12.1 Introduction 299
12.2 Review of Development Proposals 299
12.3 Methodology 302
12.4 Limitations, Constraints and Assumptions 306
12.5 Baseline 306
12.6 Consultation 311
12.7 Assessment 312
12.8 Mitigation Measures 316
12.9 Residual Effects 317
12.10 Summary 317

13. LANDSCAPE AND VISUAL ASSESSMENT 323
13.1 Introduction 323
13.2 Methodology 323
13.3 Limitations, Constraints and Assumptions 329
13.4 Baseline 329
13.5 Consultation 343
13.6 Relevant Guidance 343
13.7 Assessment and Mitigation 343
13.8 Mitigation 379
13.9 Residual Effects 385
13.10 Summary 387

14. NOISE AND VIBRATION 409
14.1 Introduction 409
14.2 Assessment Methodology 409
14.3 Baseline 412
14.4 Predicted Effects 415
14.5 Summary of Effects 421
14.6 Proposed Mitigation 421
14.7 Residual Effects 422
14.8 Summary 422

15. SOCIO-ECONOMIC ASSESSMENT 427
15.1 Introduction 427
15.2 Baseline 427
15.3 Economic Context 429
15.4 Socio- economic Analysis 434
15.5 Predicted Effects 438
15.6 Employment Benefits 442
15.7 Potential Negative Impacts and Proposed Mitigation Measures 444
15.8 Summary 445

16. TRANSPORT AND ACCESS 449
16.1 Introduction 449
16.2 Methodology 449
16.3 Limitations, Constraints and Assumptions 453
16.4 Baseline Conditions and Scheme Design 456
16.5 Assessment of Impacts 460
16.6 Mitigation Measures 482
16.7 Residual Effects 483
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.</td>
<td>WATER RESOURCES</td>
<td>489</td>
</tr>
<tr>
<td>17.1</td>
<td>Introduction</td>
<td>489</td>
</tr>
<tr>
<td>17.2</td>
<td>Review of Development Proposals</td>
<td>489</td>
</tr>
<tr>
<td>17.3</td>
<td>Methodology</td>
<td>490</td>
</tr>
<tr>
<td>17.4</td>
<td>Baseline</td>
<td>490</td>
</tr>
<tr>
<td>17.5</td>
<td>EA and IDB Consultation Responses</td>
<td>494</td>
</tr>
<tr>
<td>17.6</td>
<td>Relevant Guidance</td>
<td>495</td>
</tr>
<tr>
<td>17.7</td>
<td>Assessment</td>
<td>495</td>
</tr>
<tr>
<td>17.8</td>
<td>Mitigation Measures</td>
<td>500</td>
</tr>
<tr>
<td>17.9</td>
<td>Conclusions</td>
<td>502</td>
</tr>
<tr>
<td>17.10</td>
<td>Residual Effects</td>
<td>502</td>
</tr>
<tr>
<td>17.11</td>
<td>Summary</td>
<td>502</td>
</tr>
<tr>
<td>18.</td>
<td>INTERACTIONS AND CUMULATIVE EFFECTS</td>
<td>509</td>
</tr>
<tr>
<td>18.1</td>
<td>Introduction</td>
<td>509</td>
</tr>
<tr>
<td>18.2</td>
<td>Interactive Effects</td>
<td>509</td>
</tr>
<tr>
<td>18.3</td>
<td>Cumulative Effects</td>
<td>510</td>
</tr>
<tr>
<td>18.4</td>
<td>Summary</td>
<td>513</td>
</tr>
</tbody>
</table>
APPENDICES

1A  CGB Route Overview
2A  Summary of superCAM Scoping Responses
2B  Summary of EIA Consultation Reponses
2C  Summary of Annex E Submission Guided Bus Consultation Responses
2D  Cambridgeshire County Council Consultation Report
4A  Limits of Deviation
4B  Land-take for On-street Works, Park & Ride and Kiss & Ride Sites
4C  Typical Guideway Cross Section
4D  Rights of Way
4E  Construction Traffic Access Routes
5A  Option Appraisal Summary Tables
5B  Alternatives Considered for the SuperCAM Scheme
6A  Planning Designations and Features
7A  Best and Most Versatile Agricultural Land in Cambridgeshire
7B  Soil Associations and Predicted ALC Grades
7C  Description of Soil Associations
7D  Definition of MAFF ALC Grades
7E  Soil Types per MAFF ALC Grade
8A  Modelled Air Quality Receptors
8B  Location of Air Quality Receptors
8C  Windrose
8D  Air Quality Modelling Results
9A  Known Archaeological Sites and Finds
9B  Archaeological Evaluation Sites
9C  Sites and Monuments Record Data
10A  Summary of Built Heritage Resources
11A  Phase 1 Habitat Survey
11B  Target Notes
11C  Protected Species Summary Maps
11D  Invertebrate Survey Report
11E  Plant Species List
11F  Designated Sites Citation Sheets
11G  Protected Species Licensing Information
12A  Main Features Relating to Ground Resources and Contamination
12B  Ground Resources Scoping Baseline Assessment
12C  Ground Resources and Contamination Sample Locations
12D  Ground Resources and Contamination Results Tables
Contents

12E Geological SSSI Citation Sheet
13A Landscape Character Areas
13B Zones of Visual Influence
13C Landscape Features and Visual Receptors
13D Schedule of Landscape Features
13E Landscape and Ecological Mitigation Plans
14A Noise Survey Locations
14B Noise Survey Results
15A Socio-economics Data
17A Watercourses and Sampling Points
17B Report on Preliminary Design of Surface Water Drainage
17C Environment Agency Correspondence
17D Indicative Flood Plain Map
17E Water Quality Data
17F Report on Embankment Design to Minimise Impact on Flooding

Confidential Appendix – Badger Information
## GLOSSARY & ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADMS</td>
<td>Atmospheric Dispersion Modelling System, developed by CERC Ltd – computer based air emissions dispersion model. ADMS Urban is a regional scale model version.</td>
</tr>
<tr>
<td>AOD</td>
<td>Above Ordinance Datum, similar to height above sea level</td>
</tr>
<tr>
<td>AQMA</td>
<td>Air quality management area, a local authority’s legally designated area covering at least the areas at which air quality objectives are predicted to not be achieved and where public exposure is likely.</td>
</tr>
<tr>
<td>Aquifer</td>
<td>Sub-surface reservoir of water, usually contained in porous rock</td>
</tr>
<tr>
<td>ARCADY</td>
<td>Computer program used to calculate capacity, delay and queue lengths at roundabout junctions.</td>
</tr>
<tr>
<td>Artefact</td>
<td>A man made object of any age and made of inorganic or organic materials.</td>
</tr>
<tr>
<td>ASTM</td>
<td>Appraisal Summary Table</td>
</tr>
<tr>
<td>Attenuation</td>
<td>Increase in duration of a flow event, with a consequent reduction in peak flow.</td>
</tr>
<tr>
<td>AURN</td>
<td>Automatic Urban Rural Network</td>
</tr>
<tr>
<td>Balancing pond</td>
<td>Pond used for the collection and slow release of surface water runoff</td>
</tr>
<tr>
<td>BGS</td>
<td>British Geological Survey</td>
</tr>
<tr>
<td>BMV</td>
<td>Best and Most Versatile agricultural land</td>
</tr>
<tr>
<td>BOAT</td>
<td>Byway open to all traffic</td>
</tr>
<tr>
<td>BS</td>
<td>British Standard</td>
</tr>
<tr>
<td>C&amp;D</td>
<td>Construction and Demolition</td>
</tr>
<tr>
<td>CALINE</td>
<td>A US road source emissions dispersion model – a detailed dispersion model developed by the California State Department of Transportation and approved by the US Environmental Protection Agency for assessing the air quality effects of road schemes.</td>
</tr>
<tr>
<td>CCC</td>
<td>Cambridgeshire County Council</td>
</tr>
<tr>
<td>CERC</td>
<td>Cambridge Environmental Research Consultants – developers of the ADMS model</td>
</tr>
<tr>
<td>CGB</td>
<td>Cambridgeshire Guided Busway</td>
</tr>
<tr>
<td>ch</td>
<td>Chainage - length in metres from the start of the guideway (west to east)</td>
</tr>
<tr>
<td>CHUMMS</td>
<td>Cambridge to Huntingdon Multi Modal Study carried out in 2001</td>
</tr>
<tr>
<td>CO</td>
<td>Carbon monoxide (an air pollutant)</td>
</tr>
<tr>
<td>CoCP</td>
<td>Code of Construction Practice</td>
</tr>
<tr>
<td>CRN</td>
<td>Calculation of Railway Noise</td>
</tr>
<tr>
<td>CRTN</td>
<td>Calculation of Road Traffic Noise</td>
</tr>
<tr>
<td>CSO</td>
<td>Combined Sewer Overflow</td>
</tr>
<tr>
<td>Culvert</td>
<td>Structure or drain for the diversion of a stream or river</td>
</tr>
<tr>
<td>dB</td>
<td>A measure of noise levels in decibels</td>
</tr>
<tr>
<td>dB(A)</td>
<td>The unit generally used for measuring environmental, traffic or industrial noise is the A-weighted sound pressure level in decibels, denoted dB(A). An A-weighting network can be built into a sound level measuring instrument such that sound levels in dB(A) can be read directly from a meter. The weighting is based on the frequency response of the human ear and has been found to correlate well with human subjective reactions to various sounds. It is worth noting that an increase or decrease of approximately 10 dB corresponds to a subjective doubling or halving of the loudness of a noise, and a change of 2 to 3 dB is subjectively barely perceptible.</td>
</tr>
<tr>
<td><strong>Decibels</strong></td>
<td>Ten times the logarithm (to base 10) of the ratio of two mean square values of sound pressure.</td>
</tr>
<tr>
<td><strong>DEFRA</strong></td>
<td>Department of the Environment, Food and Rural Affairs</td>
</tr>
<tr>
<td><strong>DETR</strong></td>
<td>(Former) Department for the Environment, Transport and the Regions, replaced by DTLR and DEFRA – DTLR subsequently replaced by DfT and ODPM</td>
</tr>
<tr>
<td><strong>DfT</strong></td>
<td>Department for Transport</td>
</tr>
<tr>
<td><strong>DMRB</strong></td>
<td>The Highways Agency Design Manual for Roads and Bridges (DMRB) contains a screening method for assessing the air quality impacts of road schemes.</td>
</tr>
<tr>
<td><strong>DTLR</strong></td>
<td>(Former) Department for Transport, Local Government and the Regions</td>
</tr>
<tr>
<td><strong>Dutch Intervention Values</strong></td>
<td>Screening values used in the Netherlands to identify serious soil, sediment and groundwater contamination</td>
</tr>
<tr>
<td><strong>EA</strong></td>
<td>Environment Agency</td>
</tr>
<tr>
<td><strong>EC</strong></td>
<td>European Commission</td>
</tr>
<tr>
<td><strong>EH</strong></td>
<td>English Heritage</td>
</tr>
<tr>
<td><strong>EHO</strong></td>
<td>Environmental Health Officer</td>
</tr>
<tr>
<td><strong>EIA</strong></td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td><strong>Equivalent Continuous Sound Level</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>ES</strong></td>
<td>Environmental Statement</td>
</tr>
<tr>
<td><strong>Fauna</strong></td>
<td>A collective term for the animals of a region</td>
</tr>
<tr>
<td><strong>Flora</strong></td>
<td>A collective term for the plants of a region</td>
</tr>
<tr>
<td><strong>French drain</strong></td>
<td>Open drain, filled with a graded stone mix, used for primary filtration of runoff</td>
</tr>
<tr>
<td><strong>Guided Bus Patronage Model</strong></td>
<td>Spreadsheet based mode choice model calculating mode share between car, conventional bus and guided bus.</td>
</tr>
<tr>
<td><strong>GQA</strong></td>
<td>General Quality Assessment</td>
</tr>
<tr>
<td><strong>HSE</strong></td>
<td>Health and Safety Executive</td>
</tr>
<tr>
<td><strong>Hydro-Brake</strong></td>
<td>A hydraulic control to limit water flow rates</td>
</tr>
<tr>
<td><strong>IEEM</strong></td>
<td>Institute of Ecology and Environmental Management</td>
</tr>
<tr>
<td><strong>IFA</strong></td>
<td>Institute of Field Archaeologists</td>
</tr>
<tr>
<td><strong>IMD</strong></td>
<td>Indices of Multiple Deprivation – DETR.</td>
</tr>
<tr>
<td><strong>Kiss and ride</strong></td>
<td>A drop off point for the guided busway</td>
</tr>
<tr>
<td><strong>$L_{Aeq,T}$</strong></td>
<td>Equivalent continuous sound level in dB(A) over the period T</td>
</tr>
<tr>
<td><strong>$L_{Ae,T}$</strong></td>
<td>Rating level as defined in BS 4142</td>
</tr>
<tr>
<td><strong>$L_{A90}$</strong></td>
<td>Statistical noise level exceeded for 90% of the time</td>
</tr>
<tr>
<td><strong>$L_{A10}$</strong></td>
<td>Statistical noise level exceeded for 10% of the time</td>
</tr>
<tr>
<td><strong>$L_{Amax}$</strong></td>
<td>Maximum instantaneous A-weighted noise level within a defined period</td>
</tr>
<tr>
<td><strong>LAPC</strong></td>
<td>Local (authority) air pollution control</td>
</tr>
<tr>
<td><strong>LAPPC</strong></td>
<td>Local (authority) air pollution prevention and control</td>
</tr>
<tr>
<td><strong>LAQM</strong></td>
<td>Local air quality management, the system of air quality review, assessment and improvement</td>
</tr>
<tr>
<td><strong>Term</strong></td>
<td><strong>Definition</strong></td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>LEZ</td>
<td>Low emission zone, proposals being investigated by the GLA and London local authorities</td>
</tr>
<tr>
<td>LINSIG</td>
<td>Computer software used to calculate capacity, delay and queue lengths at signalised junctions.</td>
</tr>
<tr>
<td>Made Ground</td>
<td>Man placed upper level of ground</td>
</tr>
<tr>
<td>MENTOR</td>
<td>Software used for the land-use element of the sub-regional land-use/transport model.</td>
</tr>
<tr>
<td>Main river</td>
<td>Rivers managed by the Environment Agency</td>
</tr>
<tr>
<td>Minor aquifer</td>
<td>Minor aquifers are of intermediate permeability and capable of sustaining locally important groundwater abstractions. Minor aquifers may also provide base flow to surface water courses.</td>
</tr>
<tr>
<td>NAEI</td>
<td>National Atmospheric Emissions Inventory</td>
</tr>
<tr>
<td>NATA</td>
<td>New Approach to Assessment</td>
</tr>
<tr>
<td>NETCEN</td>
<td>National Environmental Technology Centre</td>
</tr>
<tr>
<td>NO</td>
<td>Nitrogen monoxide, nitric oxide, an atmospheric gas.</td>
</tr>
<tr>
<td>NO2</td>
<td>Nitrogen dioxide, an atmospheric gas.</td>
</tr>
<tr>
<td>NOx</td>
<td>A generic term for oxides of nitrogen, principally NO and NO2.</td>
</tr>
<tr>
<td>Non-aquifer</td>
<td>Non-aquifers are of relatively low permeability and unable to support any sustained groundwater abstractions.</td>
</tr>
<tr>
<td>ODPM</td>
<td>Office of the Deputy Prime Minister, includes planning responsibility</td>
</tr>
<tr>
<td>OS</td>
<td>Ordnance Survey</td>
</tr>
<tr>
<td>Orifice plate</td>
<td>A water flow device</td>
</tr>
<tr>
<td>Overbridge</td>
<td>Bridge that spans the guideway</td>
</tr>
<tr>
<td>PAHs</td>
<td>Polycyclic Aromatic Hydrocarbons (a ground and water pollutant)</td>
</tr>
<tr>
<td>PECs</td>
<td>Pedestrians, equestrians and cyclists</td>
</tr>
<tr>
<td>Perched Water</td>
<td>Groundwater that occurs when percolation is impeded by a localised layer of impermeable or low permeability strata, forming an area of saturation above the permanent water table.</td>
</tr>
<tr>
<td>PM10</td>
<td>Particulate matter with an (equivalent aerodynamic) diameter of ten microns (10µm) or less – a size range of airborne particles (an air pollutant)</td>
</tr>
<tr>
<td>PPG</td>
<td>Planning Policy Guidance (and also Pollution Prevention Guidelines)</td>
</tr>
<tr>
<td>Receptor</td>
<td>Anything in the environment which could be impacted by an emission or other environmental effect. Includes people, animals, plant life and man made structures.</td>
</tr>
<tr>
<td>RTS</td>
<td>Rapid Transit Scheme (a previous name of the CGB Scheme)</td>
</tr>
<tr>
<td>SAM</td>
<td>Scheduled Ancient Monument</td>
</tr>
<tr>
<td>SATURN</td>
<td>Network traffic assignment modelling software for use on large scale road networks and strategic transport network alterations.</td>
</tr>
<tr>
<td>Section 106 Agreement</td>
<td>A bilateral agreement is an agreement between the applicant and the local authority, and occasionally others. The need for this type of agreement normally comes to light either during the pre-application discussion process or after the application has been submitted.</td>
</tr>
<tr>
<td>Services</td>
<td>Conduits, pipes and lines that carry water, telephone, electricity, sewage, etc.</td>
</tr>
<tr>
<td>S.I.</td>
<td>Statutory Instrument</td>
</tr>
<tr>
<td>SMR</td>
<td>Sites and Monuments Record</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
</tr>
<tr>
<td>Soil association</td>
<td>A map unit consisting of one or more main soil series occurring with smaller areas of others. This grouping of the series is usually based on similarity of parent material.</td>
</tr>
<tr>
<td>Source Protection Zone (SPZ)</td>
<td>SPZs provide an indication of the risk to groundwater supplies, for which SPZ have been defined, that may result from potentially polluting activities and accidental releases of pollutants. Generally, the closer the activity or release is to a groundwater source, the greater the risk. Three zones (an inner, outer and total catchment) are usually defined although a fourth zone (zone of special interest) is occasionally defined.</td>
</tr>
<tr>
<td>SO₂</td>
<td>Sulphur dioxide (an air pollutant)</td>
</tr>
<tr>
<td>SPG</td>
<td>Supplementary Planning Guidance</td>
</tr>
<tr>
<td>SSSI</td>
<td>Site of Special Scientific Interest</td>
</tr>
<tr>
<td>Statistical noise levels</td>
<td>For levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index which allows for this variation. The L₁₀, the level exceeded for ten per cent of the time period under consideration, has been adopted in this country for the assessment of road traffic noise. The L₉₀, the level exceeded for ninety per cent of the time, has been adopted to represent the background noise level. The L₁, the level exceeded for one per cent of the time, is representative of the maximum levels recorded during the sample period. The reference time period (T) is normally included, e.g. dBL₁₀, 5 min or dBL₁₀, 8 hr.</td>
</tr>
<tr>
<td>SUDS</td>
<td>Sustainable Urban Drainage Systems – A sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques.</td>
</tr>
<tr>
<td>SUSTRANS</td>
<td>Sustainable transport charity promoting walking, cycling and public transport use.</td>
</tr>
<tr>
<td>TEMPRO</td>
<td>Computer software used to predict future traffic growth by UK region.</td>
</tr>
<tr>
<td>TEOM</td>
<td>Tapered Element Oscillating Microbalance</td>
</tr>
<tr>
<td>Topography</td>
<td>Mapping of land surface shape</td>
</tr>
<tr>
<td>TPO</td>
<td>Tree Preservation Order</td>
</tr>
<tr>
<td>TRO</td>
<td>Traffic Regulation Order – an Order made under the Road Traffic Regulation Act 1994 (a)</td>
</tr>
<tr>
<td>TUBA (Transport User Benefit Analysis)</td>
<td>Computer program used to provide economic appraisal for competing travel modes in study areas.</td>
</tr>
<tr>
<td>TWA</td>
<td>Transport and Works Act</td>
</tr>
<tr>
<td>Underbridge</td>
<td>Bridge that carries the guideway</td>
</tr>
<tr>
<td>Vibration Dose Value (VDV)</td>
<td>The relation between vibration magnitude and duration</td>
</tr>
<tr>
<td>VOC</td>
<td>Volatile organic compounds, constituents of air pollution</td>
</tr>
<tr>
<td>Watching Brief (archaeological)</td>
<td>Attendance during engineering ground-work to monitor and record data to ensure that appropriate action (e.g. recovery of artefacts) is taken in the event of encountering artefacts or sites.</td>
</tr>
<tr>
<td>Watching Brief (ecological)</td>
<td>Attendance during engineering works or vegetation clearance to monitor and record data to ensure that appropriate action is taken in the event of encountering rare or protected species.</td>
</tr>
<tr>
<td>Wing Wall</td>
<td>A retaining wall adjacent to a bridge abutment</td>
</tr>
<tr>
<td>µg/m³</td>
<td>Micrograms per cubic metre</td>
</tr>
</tbody>
</table>
NON-TECHNICAL SUMMARY

Introduction

This document is a non-technical summary (NTS) of the information provided in the Cambridgeshire Guided Busway (CGB) Environmental Statement (ES), available as a separate report. The ES (including this NTS) is one of the documents accompanying Cambridgeshire County Council’s application for an Order under the Transport and Works Act 1992.

An Environmental Statement, describes the environmental effects of the construction and operation of a major project, such as the guided busway, and identifies adverse and beneficial impacts, together with measures that are proposed to avoid, reduce or offset these, termed mitigation. The Cambridgeshire Guided Busway ES assesses the project for which powers are to be sought in the TWA Order, together with the additional works necessary for the overall Scheme, which would be delivered by the County Council under its other powers as part of its wider bus and local transport strategy.

Transport and Works Act Orders are a special form of statutory authority which a public body or private developer can apply for in order to build certain types of transport infrastructure including guided busways. The Order, if made, would authorise construction of the proposed works and also provide additional powers, including compulsory purchase powers and deemed planning permission.

This NTS summarises the key points in the ES and its findings for each of the environmental topics covered.

The Scheme

The CGB Scheme is intended to provide a high quality public transport connection between Huntingdon, to the north west of Cambridge, to Trumpington to the south of Cambridge, with provision for a link to Addenbrooke’s Hospital. From St Ives to the northern edge of Cambridge and from Cambridge Railway Station to Trumpington, suitably adapted buses would run on guideways constructed along the routes of the disused St Ives and Bedford rail corridors. It is proposed that the guideways will be twin track with a maintenance track alongside, with the exception of Trumpington cutting, which will be a single-track guideway plus maintenance track only, due to the physical constraints of this location. Between Huntingdon and St Ives, and through Cambridge City, buses would run on roads as normal vehicles.

Cambridgeshire County Council is promoting the Scheme and has consulted with Officers from Huntingdonshire District Council, South Cambridgeshire District Council and Cambridge City Council in its development. The Scheme is part of Cambridgeshire County Council’s wider Local Transport Strategy being promoted through the Local Transport Plan (2004 – 2011). It also forms part of the proposed transport infrastructure in the Cambridgeshire and Peterborough Structure Plan (adopted 2003).
The Need for the Scheme

The Cambridge Sub-Region is one of the most economically vibrant areas in the country. Regional Planning Guidance recognises the importance of Cambridge as a world leader in higher education, research and knowledge-based industries. The success of the high-technology and business economy has contributed to continued population growth and new household formation. However, this growth has resulted in pressures on existing transport infrastructure and ways to relieve this have been the subject of investigation for over a decade.

The A14 is the principal route between the east coast ports and the M1/M6 motorways. It also forms part of the Trans European Network route and part of the country’s strategic north-south route via its connection with the M11 at Cambridge. It also acts as a local distributor road, particularly for trips to Cambridge and Huntingdon. The A14 suffers from major traffic congestion, particularly at peak times, which inhibits the operation of this economically important area. This also leads to congestion on local roads, causing pollution and affecting public safety, as well as obstructing local bus services.

Development of a high quality public transport system between Cambridge and Huntingdon has been a long standing objective of the County Council and has planning policy support from the regional down to the local level. Problems associated with increasing traffic levels have been recognised by the Structure Plan for many years.

In 2000, the Cambridge to Huntingdon Multi-modal Study, (CHUMMS) was commissioned by Government, to investigate possible solutions to the A14 corridor problems. The study was completed in 2001 and one of its key recommendations was to establish a guided bus scheme along the disused Cambridge to St Ives railway line, with extensions to Trumpington and Addenbrooke’s Hospital as well as Huntingdon. The study concluded that the proposals would:

‘provide a high quality alternative to the car for the large number of people who travel between Cambridge, Huntingdon and the intervening towns and villages for work, shopping and leisure.’

The East of England Local Government Conference and the County Council accepted these findings. The package was endorsed by the Secretary of State in December 2001, at which point the County Council was requested to prepare a full appraisal of the guided bus scheme for submission with its 2002 Local Transport Plan Annual Progress Report (APR). The purpose of the appraisal was to demonstrate the viability of the scheme and to bid to Government for funding to implement it.

The Cambridgeshire and Peterborough Structure Plan (Adopted 2003) adds further support to the need for development of sustainable public transport, particularly in the Cambridge Sub-Region. A key element of its transport strategy is the implementation of the guided bus scheme. CGB has thus emerged as a response to CHUMMS and as a mechanism for delivering land-use and transport planning policy objectives.
Alternatives

Both the submission the Council made to Government in the Local Transport Plan APR and the preparation of the ES require that alternative options are appraised. The ES provides an assessment of the main alternatives that were looked at in deciding upon the Cambridgeshire Guided Busway (CGB) Scheme, including:

- alternative public transport systems; and
- alternative Scheme options.

Alternative Public Transport Systems

In determining the most appropriate public transport system for the disused St Ives to Cambridge route the County Council considered a number of options in addition to the CGB Scheme, including:

- limited bus priorities along existing roads in the Huntingdon to Cambridge corridor not using the disused railway line;
- light rail or heavy rail along the disused rail corridor; and
- a bus only road along the disused rail corridor.

These were assessed to determine whether they provided a better or more efficient way of achieving the objectives and whether they would be economically viable.

A detailed assessment of these options is provided in Section 5 of the Environmental Statement and is summarised below.

Bus Priorities Along Existing Roads

Whilst relatively easy to implement, and with a lower cost than a guided bus scheme, it would bring only limited benefits to existing bus users and with little or no benefits to other transport users. Such a scheme was shown to bring very little transfer of journeys to public transport and would not significantly alleviate traffic congestion.

Light or Heavy Rail

The studies undertaken have all demonstrated that, although a light or heavy rail option could achieve local and national objectives, the costs of such a scheme would be considerably higher than the costs for guided bus and the benefits would be considerably lower. In addition, a light or heavy rail scheme would lack the ability to serve town and city centres as flexibly as guided bus.

Bus Only Road

A bus only road would cost only slightly less than the CGB Scheme to construct but would not be as effective as the guided bus in a number of important ways including ride quality, access and safety. Such a scheme would not achieve the fundamental objective of attracting existing car users onto public transport and extending the choice of transport modes for everyone, including private car drivers.

For these reasons these alternatives were discounted.
Scheme Options

Throughout the development of the Scheme, alternatives for some of the elements of the Scheme have been considered and assessed in determining the final scheme design. A number of alternatives at different locations have undergone desk-top assessments to optimise the proposed design and minimise as far as possible any negative impacts. These assessments have been informed by the various consultations, discussions with the three district councils and Cambridgeshire County Council Members. A detailed analysis of the assessments leading to the final scheme design are set out in Section 5.3 of the main ES.

Scheme Description

Route Overview

The CGB buses would run from Huntingdon and St Ives to the northwest of Cambridge, through Cambridge City Centre, and out to Addenbrooke’s Hospital and Trumpington to the south of Cambridge. The route would also serve the villages of Swavesey, Longstanton, Oakington and Histon & Impington to the northwest of Cambridge. A guideway would be installed along the disused rail corridors from St Ives to Cambridge and Cambridge to Trumpington, and guided links would also be constructed along the edge of the proposed Arbury Park development, in northwest Cambridge, and to Addenbrooke’s Hospital, south of Cambridge. Other key features of the Scheme would include new park and ride sites at St Ives and Longstanton, a short stay interchange facility (Kiss and Ride) at Swavesey, and limited parking at the Histon & Impington Stop.

Main Components of the Scheme

The CGB proposal is for an open access guided busway, meaning that any operator who has suitable vehicles and can meet a defined quality threshold would be eligible to use the guideway. Buses meeting the quality threshold would be able to join the guideway from the surrounding road network, which would promote use of the Scheme by rural services and minimise the need for interchange.

Open access would allow for operational flexibility, and bus operations would not necessarily be limited to end-to-end services. Services between specific stops on the guideway, entry at road crossings for feeder services and use of the guideway by contract services could be accommodated subject to commercial demand and integration with the main guideway timetable.

CGB Buses

The route would be able to accommodate single and double deck vehicles on the northern section from St Ives to Cambridge. Single deck buses only would be accommodated on the guideway to the south of Cambridge. Use of modern, low emission (Euro IV) vehicles on the guideway would be required as part of the CGB quality threshold. The threshold would also specify low floor/easy access buses with air conditioning, prepaid/electronic ticketing and real time information.

CGB Stops

CGB stops will be provided along the guideway at St Ives, Swavesey, Longstanton, Oakington, Histon & Impington, Arbury Park, Cambridge Regional College, the Science Park, in Cambridge City Centre and Railway Station, and at Trumpington. These will offer:
level boarding and alighting for all
- weather proof waiting facilities
- secure cycle facilities, subject to site specific constraints
- real time information and off board ticketing (prepaid/electronic/self serve); and
- lighting designed to high standards with CCTV at all stops.

There will also be a request stop at Fen Drayton Nature Reserve.

Park and Ride Sites

The park and ride sites would be of high quality, incorporating buildings with passenger waiting facilities, toilets, real time information for services and ticketing facilities, CCTV and secure cycle parking.

Guideway

Each guideway would have a minimum width of 2.6m with a 180mm kerb for the side-guidance tracking system. This would consist of small horizontal wheels attached to the front axle steering mechanisms that steer the buses along the guideway.

The maintenance track would be available for use by emergency vehicles and would also be made available as public rights of way in the form of a bridleway along the section north of Cambridge and as a cycleway south of Cambridge Railway Station.

Public Rights of Way

The scheme has been designed to accommodate existing public rights of way that either cross or run adjacent to it. No breaks in the guideway are proposed where footpaths and bridleways cross the route and safety measures will be incorporated to prevent users of footpaths and bridleways straying from the route of their path across the guideway.

Service Levels

Service levels will be dependent on market demand but the aim, consistent with the provision of a high quality public transport system as defined in the Structure Plan, is to have a minimum 10 minute frequency during peak periods and a minimum 20 minute frequency inter-peak.

Predicted service levels are significantly higher than this and forecasts of demand indicate service levels eventually up to 24 vehicles an hour each way on the busier sections of the route.

Services are expected to operate between the hours of 0600 and 2400, seven days a week.

Operational Controls

Guideway operations are intended to be controlled by:
- traffic lights at road crossings giving priority to guided buses
- a control centre, which is likely to be located at the proposed St Ives Park and Ride site and will be in direct contact with all vehicles.
Driver training will be provided before bus drivers can use the guideways.

**Emergency and Breakdown Procedures**

In the event of an emergency when vehicles are on the guideway, passengers would be evacuated to the emergency strip on the outside of the guideway and would proceed to the nearest stop or road junction. Police and emergency services would be able to access the system using the maintenance track. Emergency procedures would be as for conventional bus services. In the event of a vehicle breakdown, the maintenance vehicle would be sent to attend. The broken down vehicle would be towed to the next break in the guideway.

**Route Details**

**Huntingdon to St Ives**

The proposed CGB route begins at Hinchingbrooke Hospital. It is proposed that the service will run through the town centre via Huntingdon Railway Station and the Bus Station, providing interchange with rail and bus services, and along B1514 and the A1123 to St Ives. Services will connect to the guideway at the park and ride site on the east side of St Ives, via the St Ives town centre. This will provide interchange between car, cycle and bus and also connect with other local bus services.

CGB buses could serve the housing areas of Huntingdon and St Ives and other local villages.

**St Ives to Northern Cambridge**

It is proposed that a twin guideway will commence at St Ives, allowing buses to run along the 19 km stretch to the outskirts of Cambridge. Stops on the guideway will be located at the villages of Swavesey, Longstanton, Oakington, Histon & Impington, and at the Regional College, Arbury Park and the Science Park in the northern outskirts of Cambridge. A request stop is proposed at Fen Drayton Nature Reserve for leisure use. Feeder services will be able to enter the guideway at most road crossing points.

A park and ride site of up to 500 spaces, initially, is proposed at St Ives, with sufficient land acquired to extend up to 1000 spaces in the future. A further park and ride is proposed at Longstanton for up to 350 spaces initially, with the potential for future expansion to 700 spaces. This would serve Longstanton and surrounding areas. Provision is made for the guideway to be able to connect to the proposed Northstowe new settlement near Longstanton. The park and ride sites would provide interchange opportunities between car and bus and also connections with local bus services.

A short stay interchange facility (kiss and ride) is to be provided at Swavesey, which will enable car drivers to drop off their passengers for the guided bus. There will also be a short stay car park (40 spaces) at Histon and Impington. These facilities would provide interchange opportunities between car and bus.

The guideway will continue along the edge of the proposed Arbury Park development. This would connect to the on-street running section at Histon Road. The maintenance track around Arbury Park would also serve as a cycleway.

The guideway continues east of Milton Road along the route of the disused railway corridor to connect to a proposed development site at Chesterton Sidings. Further development of this section would be dependent on the master planning of this area.
Cambridge City

Buses would leave the guideway on the northern outskirts of Cambridge to operate on street along Milton Road and Histon Road, where the County Council are proposing some bus priority measures, connecting into the city centre.

The most likely on street routes to Cambridge City Centre are:

- Histon Road to Bridge Street; Round Church Street; Park Street; Jesus Lane; Emmanuel Road; Emmanuel Street; Regent Street; Hills Road; Station Road; and
- Milton Road to Victoria Avenue; Emmanuel Road; Emmanuel Street; Regent Street; Hills Road; and Station Road.

A number of changes are proposed in the City Centre as part of the CGB Scheme. Stops are proposed outside Castle Court, on Drummer Street for southbound bus services and St Andrew’s Street for northbound services.

Cambridge Station to Trumpington

The route will join the southern guideway at Cambridge Railway Station. This section, which will be approximately 4 km in length, will run through the Hills Road bridge embankment via a new underpass, run alongside the active main line railway before branching off to follow the disused Cambridge to Bedford railway line, finally connecting to the existing park and ride site at Trumpington. A maintenance track will be constructed to serve the guideway from south of Hills Road to Trumpington Park and Ride, this will also provide access for cyclists.

Addenbrooke’s Hospital Link

A guideway link, connected to the main route from Cambridge Station to Trumpington will be provided to serve Addenbrooke’s Hospital, to the south of Cambridge. This will require the construction of a new bridge over the mainline railway with a maintenance track, providing access for emergency services, cyclists and pedestrians.

Summary of Environmental Impacts

The ES describes aspects of the environment that are likely to be significantly affected by the Scheme. In addition, it describes the likely significant effects of the Scheme on the environment. Established assessment criteria have been used to evaluate the nature, duration, extent and scale of the impacts. Impacts can be either beneficial or negative and range in scale from major to negligible. Where significant impacts have been identified mitigation measures, such as pollution control, noise screening, landscaping, and creation of habitats are proposed.

Planning

The review of policy has concluded that the Scheme complies with a large numbers of policies of the Structure Plan and local plans and supports the objectives of government and regional guidance. In particular the Scheme supports Government, regional, county and local policy objectives through providing access to a more sustainable mode of transport within the Cambridgeshire Sub Region and by providing a key component of infrastructure to support
growth within the sub-region. The Scheme also accords with policies of local plans to safeguard the disused railways corridors to the north and south of Cambridge for a rapid transit system.

The route runs through or near to some designated areas protected by policy including the Cambridge Green Belt, Areas of Best Landscape, City and County Wildlife Sites, Conservation Areas and Scheduled Ancient Monuments. The assessment of policy has concluded that the scheme does not conflict with policies to protect Areas of Best Landscape or Green Belt. It has concluded that although there will be some minor visual and landscape impacts on the setting of some Conservation Areas (at Swavesey and Westwick) and on a Schedule Ancient Monument (at Swavesey) given the nature of these impacts and the scope for mitigation there are no significant conflicts with policies to protect these areas and features. There are some conflicts with policies to protect locally designated sites of nature conservation interest (City and County Wildlife Sites) although the Environmental Statement has identified appropriate mitigation to compensate for the loss of habitat within these sites.

**Agriculture**

The CGB Scheme will use mainly non-agricultural land, within the boundary of the disused St Ives and Bedford railway lines and will run on existing highways between Huntingdon and St Ives and in Cambridge. Some additional land will be needed for road widening between Huntingdon and St Ives, to construct new park and ride sites at St Ives and Longstanton and a kiss and ride at Swavesey. Additional land will also be needed for the links around Arbury Park and to Addenbrooke’s Hospital. The provision of a maintenance track and facilities associated with the guideway such as drainage outfalls and balancing ponds will require widening outside the existing rail corridor, to varying degrees along the route. In addition, some land will be taken out of agricultural use to provide landscape and ecological enhancement.

Loss of agricultural land graded as “best and most versatile” is regarded as a moderate adverse impact at the local level. However this should be seen in the context of Cambridgeshire, which has a greater proportion of this land than any other county. Where appropriate agricultural land will be re-instated and farm access maintained.

**Air Quality**

The air quality assessment examines how the Scheme would affect local air quality, mainly due to emissions from construction and traffic. Air quality has been assessed against National and European air quality standards.

The assessment of emissions from construction has been based on the likely construction activities with controls in place to reduce dust, ensure careful handling and storage of materials, and that all plant is kept in a state of good repair and maintenance. On this basis the residual impact on air quality is considered to be negligible.

The emissions from traffic generated by the operational Scheme have been modelled, concentrating on areas where air quality is of concern, and overall, the Scheme is considered to have a negligible impact on nitrogen dioxide concentrations, and either a negligible, slight adverse or slight beneficial effect on fine particulate matter concentrations. Given this, no mitigation measures are proposed in relation to operational impacts.
Archaeology

An assessment of the potential archaeological impacts of the Scheme has been carried out using documentary records of archaeological features along the route. A series of trial excavations has been carried out to evaluate the archaeological resources of sites. These have been targeted where significant areas of land would need to be taken for facilities such as park and ride sites, the kiss and ride site, balancing ponds, construction sites and access routes. These works have identified archaeological remains ranging in age from Bronze Age to Post-Medieval, illustrating the rich heritage of buried archaeological resources present in the area.

The potential impacts to archaeological resources from the Scheme have been assessed and range from negligible to major adverse. Particular consideration has been given to the site of Swavesey Priory, a Scheduled Ancient Monument, which adjoins the CGB route corridor. Where adverse impacts have been identified, a mitigation strategy has been proposed ranging from implementation of an archaeological watching brief to full excavation and documentation of sites, with conservation of remains. In some cases, preservation on site is considered to be the preferred option.

Taking account of the mitigation measures proposed the overall impacts on archaeology are assessed as minor adverse.

Built Heritage

An assessment has been carried out to determine the impact of the Scheme on historic and protected buildings and structures along the route.

Between Huntingdon and St. Ives and within Cambridge, the CGB buses will run on existing roads with localised widening of the existing carriageway. This would not have a significant impact on the built heritage. However, the guideway sections of the Scheme along the disused railway lines will remove railway heritage features, and this has been assessed as a locally significant impact.

The Scheme would involve the demolition of a number of structures that contribute to the local built heritage, such as the station building at Histon & Impington Stop and Windmill Bridge. The demolition of these structures would adversely affect the local built heritage. At Swavesey Conservation Area it has been assessed that the residual impact of the Scheme on the setting of this area, having taken account of mitigation measures, outlined in the Landscape and Visual Impact section of the ES would be minor adverse.

Where impacts on the built heritage are identified, a programme of mitigation including recording will be undertaken. After mitigation the Scheme is considered to result in a minor adverse impact on the built heritage.

Ecology

An assessment of impacts of the scheme on ecology has been carried out based on published information and records and consultation with the bodies responsible for nature conservation. In addition, a series of surveys of the CGB route, including specialist ecological surveys for protected species (birds, bats, badgers, reptiles, amphibians, water voles and invertebrates), has been carried out.
The scheme will have adverse impacts on a number of sites designated for their nature conservation value. These include County Wildlife Sites and City Wildlife Sites. In addition, impacts on undesignated sites and habitats of local ecological value have been identified. Adverse impacts have also been identified on a range of rare and protected species, including badgers, bats, birds, reptiles, water vole and invertebrates.

Mitigation measures proposed to address the impacts identified include the following:

- habitat restoration, creation and replacement along the route for designated sites and undesignated sites and habitats of ecological value
- restoration and enhancement of habitats temporarily affected by construction works
- provision of pollution control measures
- provision of new ditches and ponds, including habitat creation around balancing ponds
- hedgerow replacement and new planting
- measures to protect protected species, and to restore and re-create habitats used by protected species
- protection of breeding birds
- translocation of nationally scarce plants to suitable receptor sites
- action to safeguard ecological resources during construction activities; and
- production and implementation of an ecological management strategy.

The Scheme will give rise to a range of ecological impacts that would be reduced with the successful application of the identified measures and, over time, the establishment of new habitats. Where certain protected species are affected the necessary licences will be obtained from the regulatory bodies including the Department of the Environment, Food and Rural Affairs (DEFRA) and English Nature.

**Ground Contamination**

The impact of the Scheme on soil and groundwater conditions along the route has been assessed. Measures to prevent, reduce or offset adverse impacts have been identified and residual impacts assessed.

A number of areas were considered in more detail during the assessment, including:

- the proposed railway crossing at Addenbrooke’s Hospital where an important aquifer is located close to the surface with little protection from overlying soils;
- the proposed park and ride site at St Ives which is located on a former landfilled area;
- the disused railway line from St Ives to Cambridge where railway activities may have caused pollution of the track bed soils; and
- an area of disused railway line at Swavesey where soils polluted with oil-based substances were identified during the ground investigation.
Construction of the Scheme will not have any impacts upon designated geological or mineral resources within the vicinity of the route. During construction, it has been assessed that the existing ground conditions along some parts of the route could potentially have a negative impact upon the health of construction workers, visitors to the construction area and users of nearby sites. By implementing Health and Safety procedures appropriate to the ground conditions and dust control measures during construction, these effects would be fully mitigated.

Construction and operation of the Scheme would require the bulk storage of fuels and other liquid chemicals at some locations along the route. Spills or leaks that may occur from such storage facilities could adversely impact upon the underlying soil and groundwater. Storage facilities would conform with Government regulations and guidance issued by the Environment Agency and Health and Safety Executive and would incorporate measures to prevent spills or leaks from tanks infiltrating the ground.

The removal of any grossly contaminated soils encountered during construction would have a beneficial effect upon the existing ground conditions. Placement of hard surfaces over areas of existing soil contamination would reduce infiltration of rainwater and reduce the movement of contaminants through the ground, resulting in a beneficial effect upon groundwater resources in these areas.

With implementation of the mitigation measures identified, it is assessed that all potential adverse effects resulting from existing ground contamination along the corridor would be reduced to a negligible level and all impacts of the Scheme upon the quality of ground resources along the route would have negligible effects.

**Landscape and Visual Assessment**

The Scheme passes through different landscape and townscape areas and has been assessed for both its landscape and visual impacts. The character and quality of the natural and built environment changes along the route with the Scheme affecting different areas to varying degrees.

The impacts on landscape character and quality and visual effects will occur mainly through the removal of vegetation on and immediately adjacent to the disused railway line and adjacent to highways where widening is required.

The landscape and visual impacts of the Scheme will be greatest during construction and in the early operational phases, but many of these negative impacts will diminish over time with, for example, the establishment, replacement and enhancement of planting along the route. Some impacts, such as lighting, will not diminish over time and so fixtures which would minimise light spillage would be used where additional lighting is required, such as road crossings, stops and park and ride facilities.

In some areas it is predicted that the Scheme would give rise to moderate/major adverse impacts but generally, most of the landscape/townscape and visual impacts would be slight. A range of mitigation measures has been proposed, incorporating landscape and ecological objectives. These would, over time, minimise most of the adverse impacts.

At Histon and Impington, where the route passes alongside the gardens of residential properties, an environmental noise/visual barrier will be used to help reduce the visual effects and noise to these properties. The timber barriers will be integrated into the surroundings with planting.
The potential visual impacts of larger elements of the scheme, such as the St Ives Park and Ride, Longstanton Park and Ride and the Addenbrooke’s overbridge link, are relatively low because of the small numbers of residents having direct views of these sites. In these areas planting would be used to help screen views and to integrate the facilities into the local landscape.

The Scheme will pass adjacent to or through areas protected by local policies including Conservation Areas and areas protected by Tree Preservation Orders. It is considered that, as a result of the Scheme, there will be localised changes in setting and views in these areas. Mitigation measures would include replacement tree planting.

There would be a small loss of protected trees at Impington Wood and protected woodland areas immediately to the east. This loss is considered significant in the short to medium term but would be mitigated in the long term by appropriate replacement tree planting and strengthening of the woodland edges.

A route wide series of landscape design/mitigation proposals have been drawn up which would help to screen unwanted views, reinstate important vegetation and integrate the Scheme as far as possible into the landscape and townscape. These proposals have been developed to complement, and where possible, enhance landscape character and quality as well as ecological character. As a result of these measures most potential impacts would be mitigated over time.

**Noise and Vibration**

An assessment has been carried out of the potential noise and vibration impacts of the Scheme during both construction and operation, including baseline noise surveys along all sections of the route.

The ES concludes that there will be some temporary, short-term noise and vibration impacts during the construction of the Scheme, but these would be mitigated by the adoption of measures contained in a Code of Construction Practice. This would be agreed between the County Council and the district councils. The Code would require the contractor to meet agreed standards in carrying out the works. The Code would also provide for agreed hours of working (currently anticipated to be between 07.00 and 18.00hrs Monday to Friday and 08.00 to 13.00hrs on Saturday, subject to agreement to other hours of working if necessary).

The nature of the proposed vehicles and the guided system means that no significant vibration impacts are anticipated during operation. Operational noise on the guided section would not generally be significant, although there are some localised impacts, particularly where houses are in close proximity to the guideway. In the Histon area, a noise barrier will be provided along the northern side of the guideway, adjacent to Pease Way, St. Audrey’s Close and Melvin Way and along the southern side of the guideway, adjacent to Villa Place, which will reduce noise impacts to negligible levels.

Along the on-street sections of the route, the increased traffic flows due to introduction of the Scheme will be negligible, with no significant noise and vibration impacts.

With the above mitigation measures in place, no significant residual noise and vibration impacts are expected to arise from the Scheme.
Socio-economic Assessment

Many of the communities along the rural parts of the CGB route suffer from a relative lack of access to key services such as a post offices, food shops, GPs and primary schools. In addition, there are over 8,000 pupils attending secondary schools on or near to the proposed CGB route and a further 16,000 students enrolled at Further Education/6th Form Colleges with catchment areas covering the proposed route. There is therefore potential for the CGB Scheme to improve access for people living in these areas.

Currently, many of the jobs in Cambridge are being filled by in-commuters, many of whom travel along the A14 from settlements in South Cambridgeshire and Huntingdonshire. The Scheme will enable workers to access jobs, in the City Centre and elsewhere on the route.

It is estimated that 73 full time equivalent (FTE) construction jobs would be created through the construction of the CGB. In addition, 88 FTE indirect construction jobs are forecast to be created.

55-60 full time equivalent jobs are forecast to be created through the operation of the CGB. In addition, around 61-66 induced full time equivalent jobs would be created through spending by employees in the local economy.

The Scheme will generate adverse impacts in terms of access restrictions during construction to some existing roads (and some diversions of roads), footpaths and bridleways that cross the route, and also to the access to a windsurfing club at Fen Drayton. It is considered that the re-routing of these accesses would mitigate these impacts to a large extent.

Travel time saving benefits will result from the Scheme, both for those using the guided busway and for those using roads where congestion has been reduced by the Scheme. This benefits residents and businesses and will assist Cambridge to maintain its strong economic position.

Transport and Access

The transport assessment examines how the Scheme impacts on users of CGB and other transport users. Areas that were assessed in detail included the forecast numbers of users of CGB, the effect that this would have on the surrounding road network, the effects that creating new road junctions would have and the effects on public rights of way. The assessment covers both the operation of the CGB and the construction of the Scheme.

Assessment of construction traffic impact on existing roads indicates that the additional traffic will have a negligible effect on other road users. In general, the impact of construction activities on existing roads will be negligible, although there would be some localised areas where impacts would be moderately adverse.

The Scheme will result in significant journey time savings for both CGB users and non-users. There will be some impact on existing roads where the guideway crosses but this would be offset by the general reduction in vehicle flows as a result of the Scheme and the consequent de-congestion benefits that would arise.

During construction there will be some slight adverse impact on existing rights of way resulting from temporary stopping up or diversions. However, once operational, pedestrians, equestrians and cyclists will benefit considerably from the Scheme as a result of the new segregated routes available to them, including the proposed bridleway along the maintenance track between St Ives and north Cambridge.
Communities will benefit considerably, as a result of the improved access to transport and the new transport links created to employment and other community facilities. The new sustainable transport links created to new settlement areas at Northstowe, Arbury Park and Clay Farm will also be beneficial.

Overall, the Scheme is beneficial in increasing transport choice, reducing journey times and improving journey time reliability for people living in Huntingdon, St Ives and Cambridge and in villages along the CGB route. In addition, new opportunities for transport interchange would be created and this would also be a significant benefit.

**Water Resources**

An assessment was carried out of potential impacts on flooding, surface water drainage and water quality, resulting from construction and operation of the Scheme in consultation with a number of organisations including the Environment Agency.

Within Cambridge, St Ives and Huntingdon the proposed route runs on the existing road network, which is drained by a traditional highway drainage system. The proposed guideway route crosses a number of watercourses including the River Great Ouse, Moore Brook, Swavesey Drain, Beck Brook, Reynolds’ Ditch, River Cam and Hobson’s Brook.

The water resources assessment has demonstrated that the CGB, as currently proposed, will not impact on the existing flood regime and that embankment changes necessary will be acceptable as long as they are carried out with a material of similar permeability. Any water quality effects can be mitigated by ensuring good construction practices and considering water quality during design. Sustainable Urban Drainage Systems (SUDS) will be used throughout the Scheme to control and reduce the amount of water entering the surface water system. The impact of the additional water on the surface water system has been evaluated as negligible.

**Interactions and Cumulative Impacts**

This section of the ES considers the key interactions between environmental topics, such as the effect of increased traffic on noise. It also assesses the cumulative effects – these are the combined effects on the environment of the Scheme and other proposed developments in the surrounding area.

In general, interactive effects are addressed in the appropriate sections of the ES and no further effects have been identified that require assessment.

A review has been carried out of significant planning application in the vicinity of the CGB Scheme. Cumulative impacts have generally been considered in the appropriate sections of the ES, particularly Air Quality (Section 8), Noise and Vibration (Section 14) and Transport and Access (Section 16).

The transport impacts of the Scheme have been assessed using a transportation land use model which makes provision for the allocated development sites and includes the traffic generated by them on the transport network.

No significant adverse impacts arising from cumulative effects have been identified.
Conclusions

The Environmental Statement identifies a variety of environmental impacts arising from the Scheme. Measures have been proposed to prevent, reduce and, where possible, offset these either by design changes or the implementation of mitigation.

The Scheme will deliver environmental and socio-economic benefits through the provision of improved public transport in the Huntingdon to South Cambridge corridor. The potential impacts identified in the Environmental Statement will be fully addressed by Cambridgeshire County Council in the development of the detailed design and construction of the project to mitigate their effect on local people and the environment.
References

1. INTRODUCTION

1.1 Outline

1.1.1 The Cambridgeshire Guided Busway (CGB) Scheme (hereafter referred to as “the Scheme”) is intended to provide a high quality public transport connection between Huntingdon and the area to the south of Cambridge. Between St Ives and the northern side of Cambridge and from Cambridge Railway Station southwards, buses would run on guideways constructed primarily along the routes of the disused St Ives and Bedford rail corridors. Between Huntingdon and St Ives, and through Cambridge City Centre, buses would run on roads as normal vehicles.

1.1.2 The Scheme is being promoted by Cambridgeshire County Council and is associated with a wider Local Transport Strategy being promoted through the Local Transport Plan (2004-2011), which include a bus strategy. It also forms part of the proposed transport infrastructure in the Cambridgeshire and Peterborough Structure Plan (Adopted 2003).

1.1.3 Cambridgeshire County Council has commissioned Arup to carry out an Environmental Impact Assessment (EIA) of the Scheme for which powers are to be sought in an Order made under the Transport and Works Act 1992 (TWA), together with the additional works necessary for the Scheme, which would be delivered under other powers.

1.1.4 The proposed guideway and on-street sections of the route are shown on the plans contained in Appendix 1A.

1.2 Legal Basis for the Environmental Statement

1.2.1 The guideways and works and operations relating to them will be the subject of an Order under the TWA. This Environmental Statement (ES) has been prepared in compliance with the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2000 (the Rules).

1.2.2 The Rules require that an ES must be provided with all applications for an Order under the TWA unless the Order would:

- not authorise a project mentioned in Annex I or Annex II of the EIA Directive;

or

- authorise a project covered by Annex II to the EIA Directive but which the Secretary of State has decided (by means of a “screening decision”) would not have a significant effect on the environment.

1.2.3 It is considered that the proposed TWA Order would authorise a project falling within Annex II to the Directive, and an EIA has been undertaken accordingly.

1.2.4 This ES documents the results of the EIA and forms the statement of environmental information required to be submitted with the TWA Order application in accordance with the Rules.

1.2.5 Further information on legislation and guidance for the preparation of environmental impact assessments is given in Section 2 of this ES.
1.3 Related Documents

1.3.1 In addition to this Environmental Statement a number of other documents are required to accompany the TWA Order application. These include:

- the draft TWA Order by which the Secretary of State will grant statutory authority for the guideways and works and operations relating to them;
- plans and sections showing the location and alignment of the works and the land required for their construction and operation; and
- a book of reference containing the names of owners or occupiers of land subject to compulsory acquisition and those entitled to enjoy easements and other private rights which may be extinguished.
Appendices

Appendix 1A    CGB Route Overview
References

1 Local Transport Plan 2004-2011, Cambridgeshire County Council
2 Cambridgeshire and Peterborough Structure Plan (Adopted 2003)
3 Transport and Works Act 1992 (c. 42), ISBN 0105442925
2. THE ENVIRONMENTAL STATEMENT AND ASSESSMENT METHODOLOGY

2.1 Structure of the Environmental Statement

2.1.1 Volume 1 of the Environmental Statement (ES) is divided into 18 sections, with the Introduction forming Section 1. Sections 2 to 6 provide an overview of the Scheme and its development.

Section 2 describes the Environmental Statement and assessment methodology;

Section 3 describes the need for and evolution of the Scheme;

Section 4 describes the Scheme and the construction methodology;

Section 5 presents the reasons for choosing a guided bus solution over other public transport systems, lists the alternatives considered in the development of the Scheme and describes how environmental issues have been taken into account in this process; and

Section 6 sets out the planning policy framework for the Scheme.

2.1.2 Sections 7 to 17 comprise the technical reports for specialist topics necessary to describe the aspects of the environment likely to be significantly affected by the Scheme and the likely significant effects of the Scheme on the environment. Where potentially significant effects on the environment are predicted, these sections also include a description of the measures envisaged to prevent, reduce and where possible offset these. These sections are as follows:

Section 7 Agriculture

Section 8 Air Quality

Section 9 Archaeology

Section 10 Built Heritage

Section 11 Ecology

Section 12 Ground Contamination

Section 13 Landscape, Townscape and Visual

Section 14 Noise and Vibration

Section 15 Socio- economics

Section 16 Transport and Access

Section 17 Water Resources

2.1.3 Section 18 provides an assessment of interactions between environmental effects considered under the different topic headings and any likely cumulative effects from the Scheme and neighbouring or related major development proposals.

2.1.4 The Non-Technical Summary (NTS), provided separately, summarises the main findings of the environmental impact assessment in non-technical language.

2.1.5 Appendices referred to in the technical sections are provided in separate volumes of the Environmental Statement.
2.2 Study Team

2.2.1 The multi-disciplinary team involved in the preparation of the Environmental Statement included Arup, WSP, Atkins, Ardent Management, Steer Davies Gleave (SDG) and Cambridgeshire County Council (CCC). Arup oversaw and undertook most of the environmental assessment work as well as advising on engineering, design and planning. Ardent Management undertook the land referencing and land acquisition information required to understand the full land take requirements. SDG and CCC undertook a project management role and contributed to the introductory sections of the ES. WSP and Atkins provided specialist reports on agriculture and transport and access respectively.

2.3 Scope of the Environmental Impact Assessment

2.3.1 The Scheme comprises both guided and unguided sections. The guided sections are the subject of an application for powers under a TWA Order, whereas the unguided sections would consist of existing roads (with some widening and related works) on which the buses would operate unguided, as normal vehicles. As described below, an Environmental Impact Assessment (EIA) has been carried out on the Scheme and therefore covers both guided and unguided sections.

Works Proposed as part of TWA Order

2.3.2 The guideways and works and operations relating to them will be the subject of an application for an Order under the Transport and Works Act 1992 and for deemed planning permission in connection with that Order pursuant to section 90(2A) of the Town and Country Planning Act 1990 (the 1990 Act).

2.3.3 In addition to the miscellaneous works in and along the route of the guideway which would be required (including earth works, balancing ponds, guideway stops, provision of maintenance track and bridge works), the following works as ancillary to the guideway have been identified for inclusion in the TWA Order:

- traffic junction crossing of A1096 St Ives Bypass;
- St Ives Park and Ride, including depot and control centre;
- Swavesey short stay interchange facility (kiss and ride);
- Longstanton Park and Ride;
- Histon & Impington car park;
- Milton Road Bus Lane along the frontage of the car showrooms on the approach to the guideway; and
- link between the Cambridge Railway Station forecourt and the disused Cambridge to Bedford rail corridor.

2.3.4 The TWA Order will also include deemed Traffic Regulation Orders (TROs) at the access/exit points to the guideways and at the park and ride sites.

Additional Works Assessed in this EIA

2.3.5 Between Huntingdon and St Ives and through the centre of Cambridge, the CGB buses would run on normal roads. At a number of locations, works are proposed to widen or realign the carriageway to accommodate bus lanes or improve junctions. These works cannot be included in the TWA Order but have been assessed in the EIA and are described in this ES, as
elements of the Scheme. The road works proposed for the Scheme are as follows:

**Huntingdon to St Ives**

- widening of the B1514 Huntingdon Ring Road, to provide an additional traffic lane linking the two sections of Hartford Road;
- widening of the B1514 to provide a new westbound bus lane from 144 Hartford Road to the Ring Road;
- widening of Hartford Road at junction with Old Houghton Road;
- re-opening of Old Houghton Road as a westbound bus only road with pedestrian and cycle use;
- widening of the A1123 Huntingdon Road, to provide for a westbound bus lane between Old Houghton Road and approximately 150m east of Hartford Marina; and
- widening of the A1123 Houghton Road, between the B1090 Houghton Hill junction and High Leys junction, to provide an east bound bus lane.

**Cambridge**

- widening to provide guideway access from and to Histon Road, near King’s Hedges Road; and
- widening for the provision of a stop on Drummer Street.

2.3.6 A description of these works is given in Section 4 of this ES, with reference to appropriate drawings. These works will be progressed by Cambridgeshire County Council in their role as Highway Authority through appropriate processes such as Traffic Regulation Orders (TROs).

2.3.7 Other impacts arising from the running of the CGB buses on the road sections between Huntingdon and St Ives and through Cambridge have been considered in the EIA and are described as appropriate in this ES.

2.4 The Environmental Impact Assessment Process

2.4.1 The principal stages of the EIA process are:

- scoping study and preliminary consultation;
- baseline data gathering;
- consultation;
- impact assessment; and
- preparation of Environmental Statement.

2.4.2 The following sections describe the methods used in each of these stages.

2.4.3 During the EIA process, consideration has been given to current UK guidance in relation to TWA projects contained in the DETR publications *A Guide to TWA Procedures* and *Environmental Impact Assessment – A Guide to Procedures*. 
2.5 **Scoping and Preliminary Consultation**

2.5.1 An environmental scoping study is the first stage of an EIA. It is carried out to establish preliminary information about the development proposals and the receiving environment, and to agree the scope of the EIA with the planning authorities and other key consultees. The objectives of the study are:

- to identify, as far as possible, the environmental issues associated with the proposals and the receiving environment;
- to determine the methods needed to effectively assess the environmental impacts identified;
- to consult with the statutory authorities at an early stage and reach agreement, as far as possible, on the baseline surveys and assessment methodology to be applied; and
- to ensure that consideration is given to the environmental aspects of the Scheme from the outset of the development process;

2.5.2 Environmental scoping for the Scheme has involved two rounds of consultation:

- A Scoping Study Report was produced for the previous superCAM guided bus proposals in 2002 (see Section 3), and submitted to a wide range of statutory bodies and organisations for comment. A summary of the responses generated by this study is included in Appendix 2A and the issues raised have been taken into consideration in the preparation of this ES.

- A further programme of scoping and consultation was undertaken in summer 2003, to provide an opportunity for those organisations consulted for the previous scheme to comment on the revised proposals. The responses received were largely in line with previous comments, and a summary of these can be found in Appendix 2B.

2.5.3 In May 2003 a Steering Group was convened in order that key district council partners (Cambridge City Council, Huntingdonshire District Council, South Cambridgeshire District Council) could work together with the County Council to influence and contribute to the development of the guided bus scheme. This Group has met regularly, providing guidance and representation from their respective organizations, which have informed this ES.

2.6 **Baseline Data**

2.6.1 A wide range of baseline data on the environment has been obtained, for the purposes of the assessment, including:

- documentary information from a wide variety of sources, including historical and contemporary records;
- survey information, including background noise levels, ecological features, landscape character, traffic levels on the road network, community facilities, etc;
- maps of both historical and contemporary features; and
- data from many organisations, including statutory and non-statutory consultees.

2.6.2 The baseline information obtained is included in each of the respective specialist sections of this ES, as required to describe the aspects of the environment likely to be significantly affected by the development.
2.6.3 Other baseline data required to undertake the assessment relate to the description of the Scheme. This information is included in Section 4, together with the related figures included in the appendices.

2.6.4 It is considered that the information available for the EIA and included in this ES, describing the environment and the Scheme, has been sufficient to enable a robust assessment of the environmental impacts of the Scheme.

2.7 Consultation

2.7.1 This Environmental Statement takes into account the views of consultees, which have been received in response to the EIA scoping studies (see Section 2.5) and through consultations undertaken by Cambridgeshire County Council. Detailed consultation has been carried out in relation to the specialist studies undertaken for the EIA, and further details are given in the specialist sections of this ES.

2.7.2 In April 2002, prior to submission of the County Council’s bid to government for funding of a guided bus scheme through the Local Transport Plan (LTP) Annual Progress Report (APR), consultation with interested parties was undertaken as part of that process. A summary of responses is included in Appendix 2C.

2.7.3 In July and August 2003 Cambridgeshire County Council, in partnership with Cambridge City Council, Huntingdonshire District Council and South Cambridgeshire District Council, undertook a comprehensive consultation on the proposed guided bus scheme. The objective was to give those organisations and individuals potentially affected by the Scheme the opportunity to understand the proposals and comment accordingly. A number of different consultation techniques were employed, including the distribution of 155,000 consultation leaflets, including a questionnaire, press releases and a programme of 20 staffed exhibitions at various locations along the route. Representatives of the project team were available at the exhibitions to answer questions and provide information on the Scheme. A total of 1,783 people attended the exhibitions. There was high overall interest in the Scheme.

2.7.4 The issues raised in the Council’s public consultation included both support for the Scheme and concerns about its effects. Comments covered a wide range of topics including:

- environmental impacts;
- alternative modes of public transport;
- traffic impacts on local roads and junctions;
- on-street measures and more buses in town and city centres;
- parking near guided stops;
- flooding in the St Ives area; and
- provision of a bridleway / cycleway alongside the guideway.

2.7.5 The report provided in Appendix 2D, summarising the responses to the consultation exercise undertaken by Cambridgeshire County Council, was reviewed and taken into consideration in the preparation of this Environmental Statement.

2.7.6 Several matters were considered, revised or adapted in response to comments received during the consultation, including:

- relocation of the proposed kiss and ride at Swavesey to the north of the guideway;
2.8 Assessment Methodology

2.8.1 The assessment is based on the development as described in Section 4 of this ES. The assessment methodology varies from topic to topic and is set out in detail in the specialist sections. In general, however, all of the assessments have involved a lengthy process of interaction between the assessors and the design team. Throughout the design process, particular attention has been paid to the minimisation of adverse effects on the environment during the construction and operation of the Scheme.

2.8.2 The geographical extent of the assessment varies depending on the impact being assessed. Certain environmental impacts would be largely confined within the boundaries of the works and operations proposed; examples of this type include archaeology and ground contamination. Other impacts would extend beyond the application site, such as air quality, socio-economic and noise impacts. The geographical scope of the assessments and the underlying rationale is set out in the specialist sections.

2.8.3 In general, the assessment process considers changes brought about by the construction and operation of the Scheme as compared with the existing environment. However, in some instances, where environmental conditions are predicted to change independently of the Scheme, the assessment considers impacts against a ‘do nothing’ or ‘do minimum’ option, which takes account of the changing baseline. Examples of this type include traffic and air quality assessments.

Assessment Criteria

2.8.4 There are well-established assessment criteria for many environmental topics, which have been applied where relevant and are set out within the specialist sections of the ES. However, since assessment criteria are better developed in some fields than others, a set of generic descriptors has been used where no established criteria exist, to ensure a consistent approach throughout each of the environmental topics. These are:

- Nature of impact:
  - Positive / Negative
- Direct / Indirect (secondary)
- Permanent / temporary
- Cumulative

- **Duration of impact:**
  - Short term: <12 months
  - Medium term: 1-5 years
  - Long term: +5 years
  - Permanent: irreversible

- **Extent of impact:**
  - Local, Regional or National

- **Scale of impact:**
  - Major: impacts that are judged to be important in the planning and decision making process
  - Moderate: impacts that are judged to be important at a local scale
  - Slight: impacts that are judged to be of low importance locally
  - Negligible: impacts that are below normal levels of perception

### Mitigation and Residual Impacts

2.8.5 Where potentially significant impacts have been identified during the assessment, measures have been proposed to prevent, reduce and where possible offset these, either by design changes or mitigation measures. These are described as appropriate in the specialist sections.

2.8.6 Where mitigation measures are proposed, the residual impacts have been assessed and are described in the ES. Residual impacts are the net impacts of the Scheme, after taking account of the impact reduction brought about by implementation of the mitigation measures.

2.8.7 Examples of mitigation measures include:

- pollution control measures;
- noise / visual screening;
- landscaping and ecological measures;
- creation of replacement habitats; and
- monitoring and ongoing management.

### 2.9 Consideration of Alternatives

2.9.1 The Scheme for which powers are sought under a TWA Order is the culmination of a lengthy process of design. During this process, many aspects of both the surrounding environmental setting and the factors affecting the design of the Scheme have been considered and taken into account.

2.9.2 The design for the Scheme is intended to respond to the various opportunities, constraints and influences in the surrounding environment, including:
Environmental considerations have been central in the Scheme development and have influenced many aspects of the Scheme. These have included:

- transport and access;
- air quality;
- ecology;
- ground conditions and topography;
- landscape and townscape character;
- noise and vibration; and
- water resources.

The proposals for which powers are sought under a TWA Order therefore represent the outcome of an evolutionary process (see Section 3), during which all aspects of the design have been examined in the light of the contextual setting and the environmental influences that this invokes. In this sense, a range of alternatives has been evaluated, during the design development of the current Scheme.

The major alternatives considered and the environmental aspects taken into account are summarised in Section 5 of this ES.

### Cumulative and Interactive Effects

#### Cumulative Effects

For environmental impact assessment, cumulative effects are generally considered to arise from the combination of effects from the Scheme and from other permitted developments (not yet constructed) in the vicinity, acting together to generate elevated levels of impacts. Examples of these kinds of effects that can be readily appreciated could include:

- traffic generated on the surrounding road network; and
- emissions to air and the water environment.

These types of effects have been assessed in the EIA process and are reported in the relevant sections of the ES. The planning position in respect of major developments in the vicinity of the Scheme and the potential cumulative impacts arising are summarized in Section 18 of the ES.

#### Interactive Effects

Interactive effects arise where effects from one environmental element bring about changes in another environmental element. Examples of this could include the effect of traffic on noise or of water discharges on ecology. These effects are described in the specialist sections of this ES, as appropriate. Examples of the main types of interactive effects are as follows:
2.10.4 The interactive effects arising from the Scheme are summarised in Section 18.

2.11 Content of the Environmental Statement

2.11.1 Annex 6 of the Guide to TWA Procedures\textsuperscript{iii} sets out the required content of an ES as follows:

1. A description of the project comprising information on the site, design and size of the proposed work;

2. A description of the measures proposed to be taken in order to avoid, reduce and, if possible, remedy any significant adverse effects on the environment of the proposed works;

3. The data required to identify and assess the main effects which the proposed works are likely to have on the environment;

4. An outline of the main alternatives to the proposed works studied by the applicant and an indication of the main reasons for his choice, taking into account environmental effects; and

5. A non-technical summary of the information provided under items 1 to 4 above.

The ES must also include so much of the information specified below as is relevant to the proposed works (subject to any scoping opinion given by the Secretary of State under Rule 8).

6. A description of the project, including in particular:

   a) a description of the physical characteristics of all of the works covered by the application and the land-use requirements during the construction and operational phases;

   b) a description of the main characteristics of the production process, for instance, the nature and quality of the materials used; and

   c) an estimate, by type and quality, of the expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation and any other) resulting from the operation of the project.

7. A description of the aspects of the environment likely to be significantly affected by the project, including, in particular, population, flora, fauna, soil, water, air, climatic factors, material assets (including architectural and archaeological heritage), landscape and the inter-relationship between the above factors.

8. A description of the likely significant effects of the project on the environment, which should cover the direct effects and any indirect, cumulative, short term, medium term and long term, permanent and temporary, positive and negative effects of the project resulting from:

   a) the existence of the project,
b) the use of natural resources, and

c) the emission of pollutants, the creation of nuisances and the elimination of waste

and a description by the applicant of the forecasting methods used to assess the effects on the environment.

9. A non-technical summary of the information provided under paragraphs 6 to 8 above.

10. An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the developer in compiling the required information.

2.11.2 With regard to items on the above list, relevant information is included in the Environmental Statement as follows:

1 A description of the Scheme is provided in Section 4 and the site is described in detail in the baseline sections of the specialist section of the ES.

2 Mitigation measures are detailed in the specialist sections of the ES.

3 Details of the data used in the assessment is given in Section 2.6 and in the methodology sections within each specialist section.

4 The alternatives considered in the development of the Scheme are detailed in Section 5.

5 A non-technical summary covering 1 to 4 above is provided as a separate document.

6 A full description of the Scheme and construction methodology is given in Section 4. Residues and emissions are covered under the relevant specialist sections.

7 The receiving environment is described in the baseline sections within each specialist section.

8 Environmental effects are described and assessed in the specialist sections of the ES.

9 A non-technical summary covering 6 to 9 above is provided as a separate document.

10 Limitations and assumptions are described as necessary within the specialist sections.
Appendices

Appendix 2A  Summary of superCAM Scoping Responses
Appendix 2B  Summary of EIA Consultation Responses
Appendix 2C  Summary of Annex E Guided Bus Consultation Responses
Appendix 2D  Cambridgeshire Consultation Report for Guided Bus
References

i Transport and Works Act 1992 (c. 42), ISBN 0105442925
ii Town and Country Planning Act 1990 (c.8) ISBN 0105408905
3. NEED FOR AND EVOLUTION OF THE CAMBRIDGESHIRE GUIDED BUSWAY

3.1 Introduction

3.1.1 This section of the Environmental Statement (ES) provides a summary of the background to the Cambridgeshire Guided Busway (CGB) Scheme, including the identification of a need for improved public transport infrastructure between Huntingdon and Cambridge and the subsequent studies undertaken in the development of the Scheme.

3.1.2 The Government’s Sustainable Development Strategy recognises that in order to build sustainable communities there is a need for a good transport system. This is seen as essential for both a strong economy and a better quality of life.

3.1.3 The Cambridge Sub-Region is one of the most economically vibrant areas in the country. Regional Planning Guidance recognises the importance of Cambridge as a world leader in higher education, biotechnology research and knowledge-based industries and the need to maintain this position is emphasised. The success of the high-tech and business economy has contributed to continued population growth and new household formation. However, this growth has resulted in pressures on existing transport infrastructure and ways to relieve this have been the subject of investigation for over a decade.

3.2 History of the Scheme

3.2.1 The rail line between St Ives and Cambridge ceased to be used for scheduled passenger services in October 1970. Since that time, the County Council has considered a number of alternatives to improve public transport provision in this corridor including heavy rail, light rail transit, and guided bus. These are detailed below in chronological order.

3.2.2 In 1987 the Railway Development Society published an initial report Making Tracks for St Ives (1987), which investigated the potential of reopening the St Ives to Cambridge rail-line (linked to Stansted) as an electrified double track. The viability of such a scheme was contested in a report commissioned the same year by the County Council, prepared by Transport Planning Associates, which suggested that the cost of a rail service between St Ives and Cambridge would outweigh the revenue made from its operation. Based on these findings in 1988 the County Council decided not to pursue a heavy rail scheme.

3.2.3 The County Council did, however, continue to investigate alternative transport options for the A14 corridor, and in 1990 commissioned the Cambridge Transport Strategy - Potential for Light Rail Transit (1990), (WS Atkins). While this report predicted a high benefit to cost ratio for light rail transit, it warned of likely difficulties in attracting capital funding. On the basis of the findings of this report a further study, including the evaluation of guided bus as an alternative option, was commissioned.

3.2.4 The Cambridge Guided Bus Study, reported to the Cambridgeshire County Council Transport Service Committee in 1992, was the first significant comparison between guided bus and light rail transit. This report detailed the comparative benefits of guided bus, emphasising cost and practical benefits, concluding that further work was required to determine the practicalities of such a scheme within Cambridge itself. The costs and patronage associated with a guided bus scheme were examined through a follow up report Cambridge Guided Bus Study, Demand Forecasts and Economic/Financial Appraisal which was published one month later. This highlighted the benefits of guided bus compared to light rail, and detailed user benefits of 2.5 times those of light rail, with less than half the set up.
costs, as well as 20% lower operating costs, thus producing an economic rate of return for
guided bus of double that expected for light rail.

3.2.5 The guided bus option gained further credence through the September 1992 report,
Cambridge Guided Bus\textsuperscript{vii}, commissioned by CCC and prepared by JMP Consultants. In 1993
a second report, Cambridge Transport Strategy: Guided Bus\textsuperscript{viii} advocating guided bus was
taken to Transport Services Committee, in which proposals for the development of a guided
bus link were set out. Consideration of these proposals was held in abeyance, however, until
a decision on the A14 by the Department of Transport had been finalised, and the possibility
of re-opening the rail link established. The St Ives to Cambridge line was finally closed to
freight traffic in 1993.

3.2.6 At the same time the County Council were also still actively investigating the case for re-
opening the rail line. The report The Future of the Cambridge – St Ives Railway Line\textsuperscript{ix},
supported by an Engineering and Costs Appraisal\textsuperscript{x} produced by MPBL consultants, was
taken to the Council’s Transport Services Committee in 1993. A further report, Patronage
Forecasts, Costings and Economic Assessment Report\textsuperscript{xi} (Atkins 1994) provided a review of
alternative uses of the route (along with a more detailed rail appraisal), including an
assessment of the patronage forecasts, costings and economic assessment of schemes.
Although this report indicated that light rail and guided bus patronage were likely to be
higher than that of heavy rail. This report recommended that the track bed should be
acquired, and inquiries should be made into the application for an S56 grant to fund the
reinstatement of the line.

3.2.7 The County Council were concerned that the total closure of the line would lead to its sale to
a party not connected to the County Council, and thus bring with it the potential loss of future
public transport initiatives along that corridor. As such the County Council continued to
pursue the heavy rail option, and published a leaflet in 1994, detailing plans to reopen the rail
link as a low cost railway from St Ives to Cambridge.

3.2.8 The County Council carried out further analysis of the transport options for the A14 corridor
and, in the 1995 Structure Plan, proposed investigating guided bus as a transport mode for the
A14 corridor. This was stated in Policy SP 7/5:

“The Local Authorities will investigate and support, subject to the
availability of financial resources and the results of professional
appraisals ...(ii) All options including guided busways to serve
Cambridge and in particular the Cambridge to St Ives…”

3.2.9 During the late 1990s and prior to the publication of the Cambridge to Huntingdon Multi-
Modal Study in 2001 (see Section 3.3) and the Cambridgeshire and Peterborough Structure
Plan (Adopted 2003)\textsuperscript{xii} reports investigating potential solutions to the A14 corridor transport
problems tended to be based on single issues. They did not take account of the particular
context within which the scheme would be operating, such as high economic activity,
population growth, higher than average car ownership and high house prices.

3.2.10 These reports continued to advocate either one of the two solutions, with the guided bus
scheme generally being favoured. Of particular note is the Cambridge to St Ives Rapid
Transit System Feasibility Report\textsuperscript{xiii}, which explored alternative modes of transport including
rail, light rail and guided bus. The guided bus scheme met each of the assessment criteria in
this report and showed the greatest number of passengers and highest cost benefit ratio.

3.2.11 Following acceptance of the CHUMMS recommendations in December 2001 (see section
2.2) the Government invited the County Council to come forward with a full appraisal of the
early phases of a guided bus scheme (see Section 3.4).

3.2.12 In 2001, a private sector consortium, Cambridge Rapid Transit System (CRTS), consisting of Stagecoach and Rapid Transit International (RTI) submitted a planning application to build a guided bus scheme from the Cambridge City Centre to Addenbrooke’s and Trumpington.

3.2.13 In 2002 CRTS and Gallagher Estates jointly promoted superCAM, a guided bus link from Huntingdon to Addenbrooke’s and Trumpington. Public consultation and environmental scoping for the scheme was undertaken in March 2002 with the aim of submitting a TWA Order at the end of 2002. Promotion of the project was assumed by Cambridgeshire County Council in 2003.

3.3 Cambridge to Huntingdon Multi-Modal Study (CHUMMS)

3.3.1 In 2000, the Cambridge to Huntingdon Multi-modal Study, (CHUMMS)xiv was commissioned by Government, and carried out by a consortium led by Mouchel. This was the first study to take into consideration land use, travel demand, and modal choice in analysing the possible solutions to the A14 corridor problems. The study identified the following concerns:

- A transport infrastructure deficit, taking the form of both insufficient public transport, which is placed under greater pressure as it seeks to serve a more dispersed population, and an inadequate road network. The A14 is the most important route serving the area, and Highways Agency statistics show that the two-lane section is one of the most congested dual carriageways in the UK.

- Increasing levels of commuting into Cambridge, brought about by an imbalance of housing and jobs in the city, leading to growing congestion at peak times and delays for all road users, especially on the radial routes into Cambridge.

- Increasing levels of car use brought about by an expanding population, economic prosperity and insufficient alternatives to the private car. The Sub-Region has 20% higher levels of car ownership than the national average and it is expected that, if transport problems are not addressed, the level of car use will continue to rise.

- A high level of traffic noise and fumes adjacent to the A14.

- Rat running to avoid the A14, resulting in congestion, pollution and road safety problems in villages.

- Peak hour congestion, blocking the A14 Milton junction and access to the Science Park – one of the main centres of the high technology industry in the Sub-Region.

3.3.2 CHUMMS was designed to examine the contribution that all modes could make in tackling transport problems whilst supporting regional strategies for land use and economic development over the coming decades. One of the key recommendations of CHUMMS was to establish a guided bus scheme along the disused Cambridge to St Ives railway line, with extensions to Trumpington and Addenbrooke’s Hospital and also, at a later stage, to Godmanchester and Huntingdon. The study concluded that the proposals would:

‘provide a high quality alternative to the car for the large number of people who travel between Cambridge, Huntingdon and the intervening towns and villages for work, shopping and leisure.’
3.3.3 CHUMMS also made provision for a longer term widening of the A14. The study advocated widening the existing A14 to a dual 3-lane carriageway, between the Horningsea/Fen Ditton junction and an appropriate point east of Fenstanton, incorporating the Cambridge northern bypass. In addition to this a new dual 3 lane carriageway was recommended to be constructed to the south of Godmanchester, Huntingdon and Brampton to rejoin the A14 west of the A1.

3.3.4 The County Council considered and accepted the findings of CHUMMS in 2001. These were accepted by the East of England Local Government Conference and also broadly by the District Councils.

3.3.5 Government announced the decision to support the full range of CHUMMS proposals in December 2001, and backed the conclusion from the study that, to achieve real multi-modal benefits, the guided bus should be in place before the road improvements. The Secretary of State placed responsibility for advancing the public transport and local road elements of the package on the County Council, whilst the Highways Agency was responsible for improvements to the A14. The Secretary of State requested that the County Council prepare a full appraisal of the guided bus scheme for submission with the 2002 Local Transport Plan Annual Progress Report (APR). The purpose of the appraisal was to demonstrate the viability of the scheme, and to bid to Government for funding to implement it.

3.4 Local Transport Plan Processes

3.4.1 Following the request from Government for the County Council to prepare an appraisal of the early phases of the guided bus, internal processes were established to ensure political accountability and stakeholder engagement. Prior to submitting the appraisal, County Council Member involvement included:

- briefing on the proposed scheme and its development to Environment and Transport spokesmen (13 March 2002, 20 May 2002);
- consideration of the proposals for a guided bus system by the Transport and Waste Service Development Group (12 March 2002, 14 June 2002, 10 July 2002) and Environment and Transport Scrutiny Committee (18 July 2002);
- agreement that a bid would be submitted for a guided bus scheme through the APR in July 2002; and

3.4.2 In Annex E Cambridgeshire County Council concluded that:

- the guided bus scheme would provide a flexible transport system for the A14 corridor, utilising segregation where possible and bus priorities elsewhere;
- improvements on the A14 and the development of the proposed new settlement near Longstanton/Oakington were to be accompanied by the completion of a high quality public transport system;
- modelling work indicated that the scheme would be financially viable at the predicted operating level;
- the scheme would bring about journey time benefits to users and non users; and
- the scheme would result in accident savings on the A14.
3.4.3 The Local Transport Plan settlement letter, received in December 2002, welcomed the County Council’s response to the Secretary of State’s request to undertake a full appraisal of the guided bus scheme and submit a bid for funding, and signalled that a response would be forthcoming in due course.

3.4.4 Following submission of the Annex E, Transport and Waste and Strategic Planning Service Development Groups were updated on the processes for moving the guided bus scheme forward towards a TWA submission (2 May 2003). In particular Members were informed that the superCAM consortium was no longer involved in the development of the guided bus proposals, and that the County Council would take the Scheme forward. In addition, Members endorsed the technical work that needed to be completed before submission of the TWA Order and supported consultation prior to submission of the Order.

3.4.5 Cabinet approved the details of the Scheme for consultation on 17 June 2003. Preliminary consultation was undertaken throughout July and ended on 7 August 2003. This provided a forum for the public and stakeholders to make their views about the Scheme known.

3.4.6 The County Council developed and submitted to Government in July 2003, a new Local Transport Plan to cover the period 2004-2011, in which the guided bus was a key factor. The document, compiled in partnership with the District Councils, was endorsed by Cabinet on 17 June 2003.

3.4.7 Since the submission of the Local Transport Plan the guided bus scheme has developed through the County Council’s Member processes. On 17 September 2003 full Council endorsed the submission of a Transport and Works Act application to seek the legal powers to implement the guided busway project. Details of the scheme have been finalised through the joint meetings of the Transport and Waste and Strategic Planning Service Development Groups on 10 October 2003, 19 November 2003 and 14 January 2004.

3.4.8 The Government announced the results of the 2004/05 local transport capital expenditure settlement to the County Council on 19 December 2003. The settlement contained the details of the Government’s funding commitments to the County Council and the financial allocations towards major schemes, maintenance and integrated transport. Within the major schemes element of the settlement the guided busway project was ‘provisionally accepted’ subject to the outcome of the TWA inquiry and Government agreed to a contribution of £65 million towards the scheme.

3.4.9 Further to the funding agreement from Government, the Transport and Waste Service Development Group (14 January 2003) considered final details of the guided bus submission. Cabinet, on 27th January 2004, endorsed the proposals and approved the TWA application. Full Council, on 10 February 2004, endorsed the recommendation of Cabinet.

3.5 Structure Plan Processes

3.5.1 Development of a high quality Cambridge to Huntingdon public transport system is a long standing objective of the County Council which has planning policy support from the regional down to the local level (as described and assessed in more detail in Section 6).

3.5.2 Problems associated with increasing traffic levels have been recognised by the Structure Plan for many years. The Cambridgeshire and Peterborough Structure Plan (adopted 1995) sought to address these as part of its sustainable development aims as well as through specific transport policies.

3.5.3 The Deposit Draft Cambridgeshire and Peterborough Structure Plan (2002) added further
support to the need for development of sustainable public transport, particularly in the Cambridge Sub-Region, a key element of its transport strategy being the implementation of the guided bus scheme.

3.5.4 The guided bus scheme was discussed as an issue at the Examination in Public (October – December 2002). In reporting on the findings (February 2003) at the Examination in Public, the Panel made the following recommendation

"The Transport Strategy for the Cambridge Sub-Region is based on: The provision of a network of high quality public transport services along key transport corridors connecting Cambridge with the Market Towns, other centres and major development sites; the first phase will be a rapid transit system between Cambridge, St Ives and Huntingdon and between the city centre and Trumpington."

3.5.5 The development strategy contained within the Cambridgeshire and Peterborough Structure Plan (Adopted 2003) aims to promote sustainable transport modes, rather than making provision for cars, in accordance with the sustainable development framework of the Plan. To achieve this, a number of transport infrastructure improvements are required to serve proposed strategic development locations identified in the Plan.

3.5.6 Structure Plan Policy P8/10 identifies the schemes to be implemented over the Structure Plan period to meet strategic requirements and the needs of major developments. The guided bus forms a central element of these schemes. Chapter 9 of the Plan contains the Strategy for the Cambridge Sub-Region. This identifies the need to restore the balance between jobs and housing, and cites the lack of investment in infrastructure as a key problem in the Sub-Region.

3.6 Liaison with Local Planning Authorities

3.6.1 Cambridge City Council, South Cambridgeshire District Council and Huntingdonshire District Council were generally supportive of the scheme presented in Annex E.

3.6.2 Following commencement of detailed work on the guided bus in March 2003 processes were established to engage with stakeholders. In particular, a Steering Group was set up with District Council officers from the three local authorities through which the route runs. There have been a regular series of meetings enabling officers and Members to be kept up-to-date and influence the Scheme as it has developed. In addition, working task groups were established to address specific elements of the Scheme. These covered air quality, noise and contamination, urban design, landscape, and planning issues. In addition a Huntingdonshire Task Group was established to address Scheme development in their district.

3.7 CGB Objectives

3.7.1 CGB has thus emerged as a response to CHUMMS and as a mechanism for delivering land-use and transport planning policy objectives. The specific objectives are to:

- extend choice of transport modes for all, including private car drivers to encourage a shift to public transport;
- promote sustainable development by providing high quality public transport links to new settlements;
- improve access to public transport in areas that currently have poor provision;
- improve integration of the public transport network;
promote social inclusion by improving access to employment, leisure and educational opportunities; and

improve safety along the corridor by providing a high quality public transport alternative to the private car.
References

1 A better quality of life: a strategy for sustainable development for the UK, DETR 1999
2 Making Tracks for St Ives, Rail Development Society, 1987
3 Report on prospect of re-opening rail line, Transport Planning Associates, 1987
4 Cambridge Transport Strategy - Potential for Light Rail Transit, WS Atkins, 1990
5 Cambridge Guided Bus Study, WS Atkins, June 1992
7 Cambridge Guided Bus, JMP Consultants, 1992
8 Cambridge Transport Strategy: Guided Bus, JMP Consultants, 1993
9 The Future of the Cambridge – St Ives Railway Line, Cambridgeshire County Council, 1993
10 Engineering and Costs Appraisal, MPBL consultants, 1993
12 Cambridgeshire and Peterborough Structure Plan, Adopted 2003
13 Cambridge to St Ives Rapid Transit System Feasibility Report, Steer Davies Gleave, 1999
14 Cambridge to Huntingdon Multi-modal Study, Mouchel, 2000
Cambridgeshire County Council
4. **SCHEME DESCRIPTION**

4.1 **Introduction**

4.1.1 The purpose of this section is to provide a description of the proposals in accordance with the requirements set out in the Schedule 1 of the TWA Rules 2000.

4.1.2 This section comprises:

- a description of the main components of the Scheme including operational characteristics;
- an overview of the route;
- a detailed route description outlining the main Scheme elements within each section of the route; and
- an outline of the construction methodology.

4.1.3 The Cambridgeshire Guided Busway (CGB) Scheme would provide a key Sub-Regional transport system, utilising two disused railway corridors into Cambridge. To the northwest of Cambridge, the route of the disused Cambridge to Huntingdon railway line is virtually intact as far north as St. Ives and, to the south, part of the Cambridge to Bedford line is also available. The location of the Scheme is shown in Appendix 1A. Plans showing the proposed limits of deviation are given in Appendix 4A, and land required for on-street works in Appendix 4B.

4.2 **Main Components of the Scheme**

4.2.1 The Scheme comprises an open access guided busway, meaning that any operator who has suitable vehicles and can meet a defined quality threshold would be eligible to use the guideway. Buses meeting the quality threshold would be able to join the guideway from the surrounding road network, which would promote use of the Scheme by rural services and minimise the need for interchange.

4.2.2 Open access would allow for operational flexibility, and bus operations would not necessarily be limited to end-to-end services. Services between specific stops on the guideway, entry at road crossings for feeder services and use of the guideway by contract services could be accommodated subject to commercial demand and integration with the main guideway timetable.

4.2.3 For the purposes of this Environmental Impact Assessment (EIA), assumptions have been made about the route to be taken by buses off the guideway through St Ives and Huntingdon. The possible routes of feeder services in rural areas have not been predicted or assessed. More details on the scope of the EIA are given in Section 2.3.

**CGB Buses**

4.2.4 The route would be able to accommodate single and double deck vehicles on the northern section from St Ives to Cambridge. Single deck buses only would be accommodated on the guideway to the south of Cambridge. Use of modern, low emission (Euro IV) vehicles on the guideway would be required as part of the CGB quality threshold. The threshold would also specify low floor/easy access buses with air conditioning, prepaid/electronic ticketing, real time information and branding to encourage patronage.
4.2.5 It is recognised that a coherent image is important in attracting passengers and it is proposed to highlight the CGB route using a specific branding. Operators with vehicles solely using the route would be encouraged to re-brand their vehicles accordingly and the brand would feature in advertising, bus stops, information boards and other public interfaces.

**CGB Stops**

4.2.6 As a minimum, CGB stops (except request stops) would have:

- simple and uncluttered design, allowing level boarding and alighting for all;
- high levels of passenger comfort and weather proof waiting facilities;
- secure cycle facilities, subject to site specific constraints;
- real time information and off board ticketing (prepaid/electronic/self serve); and
- lighting designed to high standards with CCTV at all stops to ensure passenger security.

**Park and Ride Sites**

4.2.7 The park and ride sites would be open for the entire period when services are in operation. Buildings would be constructed to provide a waiting area for passengers, with facilities including toilets, real time information for services and ticketing. Secure cycle parking facilities would also be provided.

4.2.8 The sites would be equipped with monitored CCTV, and would be lit through all hours of operation. These features would require the installation of underground services and utilities.

4.2.9 Groundworks for the construction of the park and ride sites would be likely to involve the stripping of topsoil and soft subsoils and the provision of a combination of car parking surfaces including tarmac and concrete, with paved areas for pedestrian circulation.

4.2.10 Landscaping works would be required in the car parking area and around the perimeter of the development to provide visual screening.

4.2.11 Petrol interceptors would be provided to treat surface water prior to being discharged into the balancing ponds.

**Guideway**

4.2.12 The total minimum width of the corridor would be 12m. This would include a twin guideway and a maintenance track. The guideways would be twin track, with the exception of Trumpington cutting, which would be a single-track guideway plus maintenance track only, due to the physical constraint of these locations.

4.2.13 Each guideway would have a minimum width of 2.6m, to accommodate buses, with a central reserve of up to 1.2m in width. A 180-millimetre upstand is needed for conventional side-guidance tracking systems, which comprise small horizontally-inclined wheels attached to the steering mechanism of the CGB buses. A range of surface treatments for the guideway could be contemplated but, for the purposes of this assessment, a concrete track surface with a permeable area between the running surfaces has been assumed. A typical cross section of the guideway is provided in Appendix 4C.

4.2.14 A maintenance track adjacent to the twin guideways would be available for use by emergency vehicles. This would also be made available as a public rights of way in the form of a
bridleway along the section north of Cambridge and as a cycleway south of Cambridge Railway Station. The maintenance track would be delineated to separate it from the guideway.

4.2.15 To prevent unauthorised motor vehicles travelling along the guideway or the maintenance track, physical measures would be introduced at points which connect with the highway network.

Public Rights of Way

4.2.16 The Scheme has been designed to accommodate the footpaths (FP), bridleways (BR), byways and prospective footpaths (to be provided under planning obligations under Section 106 TCPA 1990) that either cross or run adjacent to it (see Appendix 4D). Existing definitive map routes and prospective paths would be protected as far as possible and, where this is not practicable, diversions would be put in place.

4.2.17 No breaks in the guideway are proposed where footpaths and bridleways cross the route, as the 180mm guideway steps could be negotiated without difficulty by pedestrians, cyclists and equestrians. The Chairman of the Cambridgeshire branch of the British Horse Society has confirmed this as acceptable for any reasonably competent horse rider. It is proposed that the following safety measures would be incorporated to prevent users of footpaths and bridleways straying from the route of their path across the guideway:

- the line of the path would be delineated through incorporation of a solid, hard or special grip surface over the guideway central reservation and drainage areas;
- chicanes and holding areas would be provided where bridleways approach the guideway to ensure cyclists and equestrians stop before crossing; and
- signs would be provided on footpaths to warn users of the guideway ahead and along the guideway to warn drivers of buses about a public right of way crossing point.

4.2.18 It is intended to provide new rights of way on the maintenance track in the form of a bridleway on the northern part of the route and a cycleway on the southern part, subject to maintenance requirements.

Service Levels

4.2.19 Service levels would be dependent on market demand but the aim, consistent with the provision of a high quality public transport system as defined in the Structure Plan, is to have:

- a minimum 10 minute frequency during peak periods; and
- a minimum 20 minute frequency inter-peak.

4.2.20 Predicted service levels are significantly higher than this and forecasts of demand indicate service levels eventually up to 24 vehicles an hour each way on the busier sections of the route.

4.2.21 Services are expected to operate between the hours of 0600 and 2400 seven days a week.
Operational Controls

4.2.22 Guideway operations are intended to be controlled in the following manner:

- at grade road crossings to be traffic-signal controlled to normal highway standards;
- provision to maintain separation between vehicles to reduce the likelihood of bunching; and
- a control centre at St Ives Park and Ride site, which is likely to be co-located with the proposed depot to ensure smooth operation of the guideway. The control would be in direct contact with all vehicles.

4.2.23 Appropriate driver training would be provided before drivers use the guideways.

Maintenance

4.2.24 A guideway maintenance depot is proposed to be provided adjacent to the proposed St Ives Park and Ride site, from which maintenance of the guideways would be controlled.

4.2.25 Access for maintenance would be provided via a maintenance track along the route, with the exception of a section from Cambridge Railway Station to south of Hills Road Bridge. Access to this section would be from identified access points. The majority of maintenance activities would be undertaken during operational hours. This includes grass cutting, vegetation clearance and graffiti removal.

4.2.26 Closure of the guideways may occasionally be required during the daytime to undertake some work such as heavier guideway maintenance or maintenance along those sections where a maintenance track is not provided. Heavy maintenance work during the night time would only be undertaken as a last resort and consultation with local residents and the local authorities would be undertaken except in the event of emergency works. Such heavy works could include the use of lighting and generators as well as heavy engineering machinery.

Emergency and Breakdown Procedures

4.2.27 In the event of an emergency when vehicles are on the guideway, passengers would be evacuated to the emergency strip on the outside of the guideway and would proceed to the nearest stop or road junction. Police and emergency services would be able to access the guideways at the intermittent junction points as well as at the end of the guideways. Emergency procedures would be as for conventional bus services.

4.2.28 In the event of a vehicle breakdown, the maintenance vehicle would be deployed to attend to the broken down vehicle. Passengers would be asked to join the next service. The broken vehicle would be towed to the next break in the guideway or taken to the end of the guideway. In the event of a long-term disruption to services, buses would be diverted on to the highway network to bypass the affected section of guideway.

Surface Water Drainage

4.2.29 Sufficient land is available within the limits of deviation for the surface water drainage within the working area required by the earthworks operations. Longitudinal drains would be provided either side of the corridor at the toe of the embankment. Off-line outfalls would be provided from the guideway to receiving watercourses or similar points of discharge and a 10m wide strip is considered sufficient for the maintenance of these outfalls. The guideway
would be drained via the permeable area between the guideway running surfaces.

4.2.30 Preliminary consultation has been undertaken with both the Environment Agency, South Cambridgeshire District Council and appropriate Internal Drainage Boards. Anglian Water has also been contacted with regard to public surface water sewerage. Their initial comments have been incorporated into the design of the drainage scheme.

4.2.31 Sustainable drainage system (SUDS) techniques have been incorporated into the surface water design. Key design objectives include:

- attenuation of peak flows using balancing ponds along the full length of the route;
- where possible, the use of infiltration techniques;
- use of natural drainage structures, such as balancing ponds and open ditches, where appropriate, to enhance the landscape and biodiversity; and
- use of oil/petrol interceptors in strategic locations including car parking areas.

**Landscape and Ecology**

4.2.32 The overarching landscape and ecological design principle is to ensure that the Scheme recognises and responds to the Cambridgeshire Landscape Guidelines, local Biodiversity Action Plans and Local Authority Landscape Assessments reflecting the changing environment of the landscape along the route.

4.2.33 The landscape and ecological design would aim to:

- reflect, protect and enhance the range of landscape characters and habitats including use of planting as mitigation and enhancement and incorporating sustainable design principles such as Sustainable Urban Drainage Systems (SUDS)
- mitigate the loss of existing trackside vegetation through replacement planting designed to match the landscape character and ecological value of that removed;
- provide additional land areas alongside the guideway for further landscape and ecological planning and habitat creation works to compensate for loss of existing vegetation; relocate or recreate important habitats affected by the Scheme where possible; and
- use appropriate native species and informal planting to promote biodiversity.

4.2.34 These principles have informed the landscape and ecological mitigation objectives in the Landscape and Ecological Mitigation Plans (see Appendix 13E). These objectives are designed to help integrate the Scheme into the landscape as well as enhance landscape and ecological character and quality.

4.2.35 A landscape and ecological management and monitoring scheme will be prepared and agreed prior to construction.
4.3 Route Overview

4.3.1 The CGB route would run from Huntingdon and St Ives to the northwest of Cambridge, through Cambridge City Centre, and out to Addenbrooke’s Hospital and Trumpington to the south of Cambridge. The route would also serve the villages of Swavesey, Longstanton, Oakington, and Histon & Impington to the northwest of Cambridge. A guideway would be installed along the disused rail corridors from St Ives to Cambridge and Cambridge to Trumpington, and guided links would also be constructed along the edge of the proposed Arbury Park development, in northwest Cambridge, and to Addenbrooke’s Hospital, south of Cambridge. Other key features of the Scheme would include new park and ride sites at St Ives and Longstanton, a short stay interchange facility (kiss and ride) at Swavesey, and limited parking at the Histon & Impington Stop.

4.3.2 Buses would leave the guideway to utilise existing roads from Huntingdon to St. Ives and through Cambridge City Centre. The most likely routes through Huntingdon and Cambridge are described and assessed in this ES, although the exact routing of on-street services would be a matter for the bus operators to decide. A plan of the route is included in Appendix 1A.

Huntingdon to St Ives

4.3.3 The CGB route begins at Hinchingbrooke Hospital, operating as a conventional on-street bus service. The service would run through the town centre via Huntingdon Railway Station, providing an interchange with rail services, and along the B1514 and the A1123 to St Ives. Services would run through St Ives town centre and connect to the guideway at the park and ride site on the east side of St Ives. This would provide interchange between car, cycle and other local bus services. Connections with other local bus services would be available at Huntingdon and St Ives town centres.

St Ives to Northern Cambridge

4.3.4 A twin guideway would commence at St Ives, allowing buses to run along the 19 km stretch to the outskirts of Cambridge utilising the former Cambridge to Huntingdon railway corridor. This section of the guideway would be capable of accommodating double-decker vehicles. Buses from Huntingdon and St Ives and other feeder services would join the guideway at a new junction on the A1096 St Ives bypass to the east of St Ives Bus Station.

4.3.5 Stops on the guideway would be located at the villages of Swavesey, Longstanton, Oakington, Histon & Impington, and at the Regional College, Arbury Park and the Science Park in the northern outskirts of Cambridge. A request stop is proposed at Fen Drayton Nature Reserve for leisure use. Feeder services would be able to enter the guideway at most road crossing points.

4.3.6 A park and ride site of up to 500 spaces is proposed at St Ives, with sufficient land acquired to extend up to 1000 spaces in the future. A further park and ride is proposed at Longstanton for up to 350 spaces initially, with additional land acquisition to allow for future extension of the facility to 700 spaces. This would serve Longstanton and surrounding areas. Provision is made for the guideway to be able to connect to the proposed Northstowe new settlement near Longstanton. These would provide interchange opportunities between car, cycle and also connections with local bus services.

4.3.7 A short stay interchange facility (kiss and ride) is to be provided at Swavesey and short stay car parking at Histon and Impington. These would provide interchange opportunities between car and bus.
4.3.8 A guided bus link along the edge of the proposed Arbury Park development would connect to the on-street running section at Histon Road.

4.3.9 The guided bus route would continue east of Milton Road along the route of the disused railway corridor to connect to a proposed development site at Chesterton Sidings. Further development of this section would be dependent on the master planning of this area.

**Cambridge City**

4.3.10 Buses would leave the guideway on the northern outskirts of Cambridge to operate as on street services along Milton Road and Histon Road, connecting into the City Centre.

4.3.11 The most likely on street routes to Cambridge City Centre are:

- Histon Road to Bridge Street; Round Church Street; Park Street; Jesus Lane; Emmanuel Road; Emmanuel Street; Regent Street; Hills Road; Station Road; and

- Milton Road to Victoria Avenue; Emmanuel Road; Emmanuel Street; Regent Street; Hills Road; and Station Road.

4.3.12 A number of changes are proposed in the City Centre as part of the CGB Scheme. Stops would be located outside Castle Court, on Drummer Street for southbound bus services, and St Andrew’s Street for northbound services. These stops would provide interchange opportunities with other local buses and long distance coach services.

**Cambridge Station to Trumpington**

4.3.13 The route would join the southern guideway at Cambridge Railway Station. This section, which would be approximately 4 km in length, would run alongside the active main line railway before branching off to follow the disused Cambridge to Bedford railway line, finally connecting to the existing park and ride site at Trumpington. This section of the route would serve Trumpington and areas of proposed development in the Clay Farm and Shelford Road areas. Interchange opportunities would be provided at Cambridge Railway Station and the park and ride site.

4.3.14 A new underpass is proposed through the Hills Road embankment, with guided buses passing between the main line railway and the signal box. Buses would then continue along the disused railway beneath the existing disused Long Road underbridge. A maintenance track would be constructed to service the guideway from south of Hills Road to Trumpington Park and Ride. This would provide access for emergency services and serve as a cycleway. A new subway is proposed to accommodate the maintenance track through Long Road embankment.

**Addenbrooke’s Hospital Link**

4.3.15 A guideway link, with a maintenance track, would be provided to serve Addenbrooke’s Hospital, south of Cambridge. This would require the construction of a new bridge over the mainline railway. The maintenance track would provide access for emergency services and serve as a cycleway.
4.4 Detailed Description of Scheme Elements along the Route

4.4.1 For projects of a linear form it is usual to split the route into sections to aid the Scheme description and assessment of impacts. The route sections used in this ES are identified as follows, and are shown on Appendix 1A:

- Section 1: Huntingdon to St Ives Park and Ride
- Section 2 - St Ives Park and Ride to District Boundary (Fen Drayton)
- Section 3: District Boundary (Fen Drayton) to Swavesey Drain
- Section 4: Swavesey Drain to Longstanton Park and Ride
- Section 5: Longstanton Park and Ride to A14
- Section 6: A14 to Cambridge Railway Station
- Section 7: Cambridge Railway Station to Trumpington
- Section 8: Link to Addenbrooke’s Hospital

4.4.2 In the description below, locations along the guided sections of the route are provided in chainage (ch) units. The northern section commences at ch 1000, at the junction of the A1096 St. Ives bypass. The southern section commences at ch 40+000 at the junction of Station Road at Cambridge Railway Station. The chainage references are detailed on the Limits of Deviation drawings, which are provided in Appendix 4A.

4.4.3 The land take requirements associated with the on-street works are shown in Appendix 4B. Public Rights of Way crossings referred to in these sections are illustrated in Appendix 4D, which also shows the location of the maintenance track. Further details of construction access arrangements can be found in Section 4.5 and Appendix 4E.

Section 1: Huntingdon to St Ives Park and Ride

Permanent Works

4.4.4 It is envisaged that guided buses would run on existing roads from Hinchingbrooke Hospital, into Huntingdon Bus Station via the Railway Station, then on to the B1514 Hartford Road and along the A1123 to St Ives. The highway and junction improvements proposed for the Scheme in this section will not be delivered through the Transport and Works Act application (refer to Section 2.3). The works are shown in Appendix 4B, and are as follows:

- widening of the B1514 Huntingdon Ring Road, to provide an additional traffic lane linking the two sections of Hartford Road;
- widening of the B1514 to provide a new westbound bus lane from 144 Hartford Road to the Ring Road;
- widening of the B1514 at junction with Old Houghton Road;
- re-opening of Old Houghton Road as a bus only road with pedestrian and cycle use;
- widening of the A1123 Huntingdon Road, to provide for a westbound bus lane between Old Houghton Road and approximately 150m east of Hartford Marina; and
• widening of the A1123 Houghton Road, between the B1090 Houghton Hill junction and High Leys junction, to provide an east bound bus lane.

4.4.5 A new CGB bus stop would be provided on Station Road in St Ives.

4.4.6 In addition, as part of the TWA Order application, a new traffic junction would be constructed in St Ives, crossing the A1096 St Ives Bypass, between Station Road and the proposed park and ride site. The new at-grade junction is proposed to provide access for guided and non-guided buses from A1096 Harrison Way and Station Road into the park and ride site to access the guideway, and from A1096 to access Station Road. The junction would be traffic signal controlled. Bus gates would be provided on Station Road to prevent unauthorised vehicles from crossing A1096.

Temporary Works and Construction Access

4.4.7 The works in this area would require temporary traffic management and lane closures.

Section 2: St Ives Park and Ride to District Boundary (Fen Drayton)

4.4.8 This section covers ch 1000 to 2925 of the guideway and follows the disused railway corridor from St. Ives to the district boundary between Huntingdonshire and South Cambridgeshire.

Permanent Works

4.4.9 CGB Corridor – The majority of the CGB corridor (including embankment and ditches) would be within the former railway boundary.

4.4.10 Drainage Requirements – The Scheme would involve the construction of drainage outfalls to the lakes on either side of the route throughout this section. There are no balancing ponds along this section of the route.

4.4.11 Maintenance Track – It is proposed to locate the 4m wide maintenance track at ground level at the foot of the embankment to avoid the potential loss of flood storage volume resulting from the widening of the embankment. The maintenance track would be raised in order to cross watercourses, including at the River Great Ouse viaduct. The location of the maintenance track is shown on the Rights of Way plans in Appendix 4D.

4.4.12 Public Rights of Way – The route of footpath (FP)13 (Fenstanton), a long distance path (Ouse Valley Way), would be maintained, as would the route of FP5 (St Ives) along Meadow Lane. Footpaths 12 and 15 (Fenstanton), which currently stop at the disused rail line, would be linked into the maintenance track to improve access. Rights of Way are shown in Appendix 4D.

4.4.13 A series of prospective footpaths, established through a Section 106 agreement, exist on the ground, to the east of St Ives. Although the dedication procedures for these have not been completed and they have not been legally created their existence has been taken into account. Apart from one of the proposed paths the routes would be maintained. This path, which runs adjacent to the guideway on the north side would not be formally adopted, but the maintenance track to the south would provide a suitable alternative.

4.4.14 Permanent Accesses - Public access to the park and ride facility would be via the existing A1096 Harrison Way roundabout on the St Ives bypass and Meadow Lane. Access would be maintained to existing office and industrial premises on Meadow Lane. Meadow Lane would also be used as a permanent access for maintenance.
4.4.15 A private access is required to the land to the north of the guideway between the River Great Ouse and Moore Brook. This access would run in a westerly direction from Holywell Ferry Road on the north side of the guideway to join with bridleway B7 (Fen Drayton). The access continues along the bridleway to where it turns north. The private access continues parallel to the guideway and stops opposite footpath FP12 (Fenstanton).

4.4.16 St Ives Park and Ride - An area of land to the northeast of the corridor at St Ives has been proposed for a new park and ride site, which would cover an area of approximately 7 hectares. The facility would have an initial capacity for up to 500 cars, with space for expansion to 1000 spaces. A general description of the proposed park and ride sites is given in Section 4.2

4.4.17 St Ives Guideway Maintenance Depot and Stabling Facility – This depot would be located to the east side of the park and ride site adjoining commercial and industrial uses on Meadow Lane. The depot would be situated within a secure compound, measuring approximately 100m x 50m. There is sufficient land within this area to provide facilities for the stabling for up to 12 vehicles. The depot would comprise:
  - a re-fuelling facility;
  - a control centre with direct links to the real time information, and radio contact with vehicle drivers; and
  - storage of vehicles, equipment and materials for the maintenance of the guideway.

4.4.18 There would be no facility for the maintenance of guided buses on this site.

4.4.19 Structures – The existing deck of the River Great Ouse Viaduct would need to be removed although the substructure of the existing viaduct would remain. The existing substructure would support a new deck, constructed in steel and concrete, to carry the twin guideway and maintenance track. The works to the existing substructure would comprise replacement of failed piers unsuitable to support the new deck.

4.4.20 Second Drove and Existing Culverts - A new accommodation bridge would be constructed at Second Drove to support the proposed guideway. All the existing culvert sub-structures would be extended and new decks constructed to accommodate the guideway and the maintenance track.

Temporary Works and Construction Access

4.4.21 Construction Access – Meadow Lane and Second Drove and the existing gravel extraction haul road would be used as temporary access roads for construction.

4.4.22 Public Rights of Way – The following routes would have to be temporarily stopped up for safety reasons where and when directly affected by construction – FP5 (St Ives), FP13 (Fenstanton), and FP15 (Fenstanton).

4.4.23 A temporary diversion would be put in place before construction commences for FP13 (Fenstanton). After construction the path would be re-instated under the viaduct with a 2 metre minimum width. FP5 (St Ives) would be temporarily diverted whilst FP15 (Fenstanton) would be temporarily stopped up during construction processes.

4.4.24 Construction Access Area - River Great Ouse Viaduct – Access areas would be temporarily required either side of the viaduct/guided bus corridor for construction of the new viaduct deck. This would be constructed by placement of geotextile and aggregate fill over the
existing soil profile, to avoid the need for excavation in the Ouse Valley.

4.4.25 **Site Compound** - A contractor’s compound would be located on the site of the new park and ride at St Ives during construction of the works. Access to the compound would be via Meadow Lane.

4.4.26 **Permanent Accesses** - permanent accesses would be maintained or diverted for safety reasons during construction.

**Section 3: District Boundary (Fen Drayton) to Swavesey Drain**

4.4.27 This section covers chainage 2925 to 7060 of the guideway and follows the disused railway corridor from the District boundary to Swavesey Drain.

**Permanent Works**

4.4.28 **CGB Corridor** – For most of this section, the corridor (including embankment and ditches) would be within the width of the original railway corridor with the exception of the section of the route running through Swavesey. A new byway crossing with warning signs would be located at Holywell Ferry Road and a new traffic signal controlled junction would be provided at Over Road, Swavesey. For the majority of this section the guideway is on low embankment of maximum height of 2.5m.

4.4.29 **Drainage Requirements** – The Scheme would involve the construction of drainage outfalls to the lakes on either side of the route throughout this section.

4.4.30 **Maintenance Track** – The maintenance track is proposed to be provided parallel to the guideway for the entire length of this section. The location of the maintenance track is shown on the Rights of Way plans in Appendix 4D.

4.4.31 **Nature Reserve Request Stop** – a request stop is proposed at the crossing of Holywell Ferry Road, to serve the Nature Reserve.

4.4.32 **Public Rights of Way** - FP14 (Fen Drayton), which currently stops at the disused rail line, would be linked into the maintenance track to improve access.

4.4.33 The route of bridleways BR16 (Fen Drayton) would be maintained. Safety measures would be installed, where BR7 crosses the guideway. The existing line of BR7 (Fen Drayton) would be stopped up and a new line created just to the east of the existing line. Links into the maintenance track would be provided on the south side of the guideway. Rights of Way are shown in Appendix 4D.

4.4.34 A break in the guideway would be provided at Holywell Ferry Road, Byway 5 (Fen Drayton). Give way warning signs would be provided on the byway together with access to the maintenance track on the south side of the guideway.

4.4.35 At Swavesey, the routes of the public rights of way would be maintained across the guideway with 2 metre widths delineated for FP6 and FP9, and a 4 metre width for BR5. Safety measures would be installed, where BR5 crosses the guideway. Links would be provided into the maintenance track on the south side.

4.4.36 **Permanent Accesses** – Permanent vehicular access across the disused railway corridor for Mow Fen Drove and Middle Fen Drove (Swavesey Byways under the Swavesey Byways Act 1984th) would be diverted to run parallel to and north of the guideway. Connection to Over Road, Swavesey, would be made at the new signal controlled crossing at Swavesey.
4.4.37 Permanent vehicular access along Lairstall Drove (a Swavesey Byway) would be diverted. Alternative vehicular access would be provided from Over Road, Swavesey, to Lairstall Drove, as shown in Appendix 4D.

4.4.38 **Swavesey Kiss and Ride** – A kiss and ride site is proposed to the north of the stop, consisting of a drop-off point and space for cars to turn and exit onto Over Road, Swavesey.

4.4.39 **Swavesey Stop** - A stop at Swavesey is proposed, with both platforms located at the east of Over Road/Station Road, Swavesey.

**Temporary Works and Construction Access**

4.4.40 **Construction Access** – Holywell Ferry Road would be used as temporary access road for construction (see Section 4.5).

4.4.41 **Public Rights of Way** - The following routes, where they cross or run adjacent to the guideway, would have to be temporarily stopped up during construction for safety reasons when affected by construction – BR7 and BR16 (Fen Drayton), FP6 and FP9 (Swavesey), and BR5 (Swavesey). Rights of Way are shown in Appendix 4D.

4.4.42 **Construction Access Area** - Covell’s Bridge and Middle Fen Drove – land would be temporarily required either side of these crossing points for construction.

4.4.43 **Permanent Accesses** - permanent accesses would be maintained or diverted for safety reasons during construction.

**Section 4: Swavesey Drain to Longstanton Park and Ride**

4.4.44 This section covers chainage 7060 to 10280 of the guideway and follows the disused railway corridor from the Swavesey Drain to Longstanton Park and Ride.

**Permanent Works**

4.4.45 **CGB Corridor** – For most of this section the corridor (including embankment and ditches) would exceed the width of the existing railway corridor to accommodate mitigation proposals. Agricultural land would need to be acquired to the north and south to provide a widened corridor. Between ch 7620 and ch 8620, the route is in cutting as it passes beneath Windmill Bridge supporting Longstanton Road. Stabilisation of the side slopes would be required. The guideway is predominantly at-grade for the remainder of this section. A new traffic signal controlled highway crossing would be located at the B1050 at Longstanton.

4.4.46 **Drainage Requirements** – Balancing ponds would be provided at ch 7590 to the south of the guideway. Further balancing ponds are proposed in the vicinity of the Longstanton Park and Ride site. All ponds would be located to the south of the guideway.

4.4.47 **Maintenance Track** – The maintenance track is proposed to be provided parallel to the guideway for the entire length of this section. The location of the maintenance track is shown on the Rights of Way plans in Appendix 4D.

4.4.48 **Permanent Accesses** – A permanent 4m wide access road to replace the access rights at ch 7410 would be provided south of Windmill Bridge.

4.4.49 Longstanton B1050 - South of ch 9825 the existing access to the warehouse adjacent to Thoday’s Cottage would be terminated and a new access would be provided from B1050.
4.4.50 **Longstanton Park and Ride** – A park and ride site is proposed at Longstanton, southeast of the B1050 crossing. A new access would be constructed from the B1050. The site would have an initial capacity for up to 350 cars, with space for expansion up to 700 spaces. From here the new park and ride would extend 400m E-W, adjacent to the corridor at ch 10+200, with a maximum width of 250m. A general description of the proposed park and ride sites is given in Section 4.2

4.4.51 The junction for the connection of the future spur into the proposed Northstowe new settlement would be included in the works, and would terminate at the southern end of the park and ride site.

4.4.52 **Structures** – The existing Windmill Bridge at Longstanton Road is proposed to be replaced.

4.4.53 **Longstanton Stop** – Land would be required to the north of the corridor at ch 10+200 for the provision of the Longstanton stop.

**Temporary Works and Construction Access**

4.4.54 **Construction Access** – Temporary access would be provided to ensure that construction traffic would not need to pass through the Longstanton village. This would require the temporary acquisition of agricultural land, which would be returned to farming use following completion of the works (see Section 4.5).

4.4.55 Longstanton Road would be temporarily closed during the construction of the new Windmill Bridge, and diversion routes provided.

4.4.56 **Site Compounds** – The Scheme would utilise an area, approximately 1.5ha, within the proposed park and ride site for a construction compound. A second construction compound would be located southwest of the existing Windmill Bridge.

4.4.57 **Permanent Accesses** - permanent accesses would be maintained or diverted for safety reasons during construction.

**Section 5: Longstanton Park and Ride to A14**

4.4.58 This section covers chainage 10280 to 18670 of the route and follows the disused railway corridor from the Longstanton Park and Ride to the A14.

**Permanent Works**

4.4.59 **CGB Corridor** – For most of this section the CGB corridor (including embankment and ditches) would be within the width of the railway corridor. The guideway would be on embankment between ch 10+280 and ch 14+400, reaching a maximum height of 3m. The guideway would continue on low embankment with an average height of 2m up to ch 15+400. From ch 15+400 to ch 18+670, the guideway is at grade and traffic signal controlled crossings would be provided at Station Road (Oakington), Park Lane and Station Road (Histon).

4.4.60 **Drainage Requirements** – Four balancing ponds would be provided in this section. These would be at ch 10+820, ch 11+430, ch 12+120 and ch 18+620. In addition a drainage outfall is proposed at ch 12+450, discharging to Beck Brook.

4.4.61 **Maintenance Track** – It is proposed to provide a maintenance track parallel to the guideway for the entire length of this section. The location of the maintenance track is shown on the Rights of Way plans in Appendix 4D.
4.4.62 **Public Rights of Way** – Byway 7 (Longstanton) and Byway 4 (Rampton) are linked at the interface of the disused rail line. It is proposed that these byways would be downgraded to bridleways where they cross the guideway and on their immediate approaches to it to allow for provision of safety measures. A 4-metre width delineated route would be provided for the bridleway where it crosses the guideway. The new bridleway would link into the maintenance track on the north side of the guideway. Rights of Way are shown in Appendix 4D.

4.4.63 The routes of FP1 and FP4 (Histon) would be maintained. A 2-metre wide delineated route would be provided for FP4 across the guideway linking into the maintenance track on the south side.

4.4.64 **Permanent Accesses** – Park Lane, Histon - Access to the stables at Histon would be provided by means of a new track running parallel to and south of the proposed guideway.

4.4.65 The private Cambridgeshire County Council level crossing at ch 16+085 would be closed. Access to this land would be via the new access to the stables at Histon.

4.4.66 **Oakington Stop** - The stops would be located to the east side of Station Road.

4.4.67 **Histon & Impington Stop** - Two areas have been identified for the provision of eastbound and westbound stops either side of Station Road. Parking for approximately 40 cars would be provided at this stop to the north of the guideway and west of Station Road.

### Temporary Works and Construction Access

4.4.68 **Construction Access** – A construction access would be provided to bypass Oakington Village (see Section 4.5).

4.4.69 **Public Rights of Way** – Byway 7 (Longstanton) and Byway 4 (Rampton), and FP1 and FP4 (Histon), where they cross or run adjacent to the guideway, would have to be temporarily stopped up for safety reasons when directly affected by construction.

4.4.70 **Permanent Accesses** - permanent accesses would be maintained or diverted for safety reasons during construction.

### Section 6: A14 to Cambridge Railway Station

4.4.71 This section covers chainage ch 18+670 onwards and includes:

- A14 to Milton Road guideway
- Milton Road to Chesterton Sidings guideway
- Arbury Park guideway
- Histon/Cambridge Road bus lane
- Milton Road bus lane
- Cambridge City Centre

4.4.72 The on street section through Cambridge City Centre would be facilitated by the County Council through Traffic Regulation Orders procedures where required, and includes no works to be authorised by the TWA Order.

4.4.73 After passing under the A14 the proposed guideway continues southeastwards, following the
former rail corridor alongside King’s Hedges Road. Stops for the Regional College and Science Park are located on this section. After crossing Milton Road, the guideway then continues as far as the boundary of Chesterton Sidings, to facilitate a possible future link to this proposed development site. CGB buses would leave the guideway and proceed south towards Cambridge City Centre along Milton Road, and continue along Victoria Avenue.

4.4.74 Between the A14 and the Regional College a second guideway section branches off to the south, along the edge of the proposed Arbury Park development site, with two stops proposed in this section. Buses would leave the guideway and proceed south towards Cambridge along Histon Road, following Castle Street, Magdalene Street and Jesus Lane into the City Centre.

4.4.75 The two proposed routes meet in the City Centre, following Emmanuel Road, Drummer Street and St Andrew’s Street. Buses would then run south along St Andrew’s Street onto Hills Road, turning left along Station Road to Cambridge Railway Station, where they would pick up the guideway.

A14 to Milton Road Guideway - Permanent Works

4.4.76 **CGB Corridor** - For most of this section the corridor would be within the width of the railway corridor and at-grade. A new traffic signal controlled junction is proposed at Milton Road, with the existing traffic signal controlled junction at the Regional College modified to accommodate the guided buses.

4.4.77 **Drainage Requirements** – The Scheme would involve the construction of drainage outfalls to the existing highway drainage system.

4.4.78 **Maintenance Track** – The maintenance track is proposed to be provided parallel to the guideway for the entire length of this section. The location of the maintenance track is shown on the Rights of Way plans in Appendix 4D.

4.4.79 **Public Rights of Way** – A break in the guideway would be provided for the Arbury Park spur. This would enable the link between the Lost Highway 117 and Byway 3 (Milton) to be maintained. Byway 3 (Milton) would link into the maintenance track on the north side of the guideway. Rights of Way are shown in Appendix 4D.

4.4.80 **Permanent Accesses** – There are no additional permanent accesses proposed within this section.

4.4.81 **Regional College Stop** – A stop is proposed on either side of the guideway to serve the Regional College at ch 19+380.

4.4.82 **Science Park Stop** – A stop is proposed on either side of the guideway to serve the Science Park at ch 20+060.

A14 to Milton Road Guideway - Temporary Works

4.4.83 **Public Rights of Way** – Where Byway 3 (Milton) and Lost Highway 117 cross the guideway, they would have to be temporarily stopped up for safety reasons when directly affected by construction.

4.4.84 **Construction Access** – Temporary access would be from Kings Hedges Road or Milton Road.
Arbury Park Guideway - Permanent Works

4.4.85 CGB Corridor - The corridor for this section of the route would be within land which has been reserved for the CGB within the Arbury Park planning application.

4.4.86 Drainage Requirements – The Scheme would involve the construction of drainage outfalls to the existing highway drainage system.

4.4.87 Maintenance Track – A 3m maintenance track is proposed to be provided parallel to the guideway for the entire length of this section. The location of the maintenance track is shown on the Rights of Way Plans in Appendix 4D.

4.4.88 Arbury Park North Stop – A stop is proposed on either side of the guideway at the eastern end of the CGB corridor along the edge of Arbury Park at ch 81+250.

4.4.89 Arbury Park Stop – A stop is proposed on either side of the guideway at the main highway vehicular entrance at ch 80+425.

Arbury Park Guideway - Temporary Works and Construction Access

4.4.90 Construction Access - Temporary access would be provided off King’s Hedges Road at three evenly spaced intervals between Histon Road and the Arbury Park junction of the route, avoiding removal of the protected hedgerow in this section (see Section 4.5).

Histon / Cambridge Road Bus Lane - Permanent Works

4.4.91 On-Street Works - The works along Histon / Cambridge Road would involve carriageway widening to the east to provide a southbound bus lane. Works would also be required to the west side of Cambridge Road to provide bus and cycle only access to the currently closed section of Cambridge Road and to construct a new bus and cycle link from this to the junction of Cambridge Road with King’s Hedges Road.

Histon / Cambridge Road Bus Lane - Temporary Works and Construction Access

4.4.92 Construction Access - The works would be carried out using temporary traffic management and lane closures as required. A road closure is not envisaged (see Section 4.5).

Milton Road Bus Lane - Permanent Works and Construction Access

4.4.93 CGB Corridor – The works along Milton Road would involve carriageway widening between Lovell Road junction and the disused rail corridor to provide a new northbound bus lane on the approach to the guideway. The existing underpass, which provides a pedestrian and cycle crossing of the disused rail line on the east side of Milton Road, would be in-filled to enable the modifications necessary to the area of the existing level crossing of Milton Road.

Milton Road Bus Lane - Temporary Works

4.4.94 Construction Access – The minor works to the highway in this area would be carried out by using traffic management and temporary lane closures.

Milton Road to Chesterton Sidings Guideway - Permanent Works

4.4.95 CGB Corridor – It is proposed that the guideway would continue east of Milton Road along the disused corridor to the boundary of a new development proposed at Chesterton Sidings.
Milton Road to Chesterton Sidings Guideway - Temporary Works and Construction Access

4.4.96 **Construction Access** – Temporary Access would be provided from Milton Road.

**Cambridge City Centre - Permanent Works**

4.4.97 **On-Street Works** - Bus stops would be erected in Cambridge City Centre at Castle Street, St Andrew’s Street and Drummer Street. Widening of the carriageway would be undertaken at Drummer Street, to enable buses to pass in both directions when bus stops are occupied.

**Cambridge City Centre - Temporary Works and Construction Access**

4.4.98 **Construction Access** – The works would be carried out using temporary traffic management and lane closures as required. A road closure is not envisaged.

**Section 7: Cambridge Railway Station to Trumpington**

**Permanent Works**

4.4.99 **CGB Corridor** – From ch 40+000 to ch 40+500 the route would run through Cambridge Railway Station forecourt and accommodate a guideway without a maintenance track. The section from ch 40+500 to ch 42+740 would be twin guideway with a maintenance track. From ch 42+740, through the Trumpington cutting, up to ch 43+700, a single track guideway and a 3m maintenance track would be provided. CGB bus movements through the Trumpington cutting would be controlled by traffic lights. Through the Trumpington cutting stabilisation of the side slopes may be required.

4.4.100 **Drainage Requirements** – Balancing ponds are proposed at ch 41+390, 42+040 and 42+470.

4.4.101 **Maintenance Track** – A 3 metre maintenance track is proposed to be provided parallel to the guideway. At ch 40+500 a turning circle would be provided for maintenance vehicles. Access for maintenance south of Hills Road Bridge would be via Shaftsbury Avenue and Cambridge University press land at ch 41+000. Access to the maintenance track is also provided from Long Road at ch 41+700.

4.4.102 **Public Rights of Way** - The routes of FP46 and FP47 (Cambridge) would be maintained. A 2 metre wide delineated route would be provided across the guideway linking into the maintenance track as appropriate. A link would be provided for FP118 (Cambridge) to access the maintenance track. Rights of Way are shown in Appendix 4D.

4.4.103 **Structures** – Works are proposed at Hills Road Bridge and Long Road Bridge. The existing underpass below Hills Road, which accommodates the existing railway line, is not wide enough to allow for a guideway to pass underneath. It is proposed to construct a new box structure through the embankment supporting Hills Road to the north of the existing rail bridge. An underpass to accommodate the maintenance track is proposed adjacent to the existing disused railway at Long Road Bridge.

4.4.104 **Cambridge Station Stop** – A stop serving Cambridge Railway Station is proposed at approximately ch 40+000.

4.4.105 **Trumpington Stop** – A stop servicing Trumpington is proposed at approximately ch 42+740.

4.4.106 **Existing Trumpington Park and Ride Site** – The guideway would link into this existing facility. The stop within the park and ride would need modification to provide level boarding.
facilities for vehicles. Some modification to the access road to the west of the existing roundabout within the park and ride site would be required. Access to the proposed Magistrate’s Court and John Lewis distribution depot would be maintained.

**Temporary Works and Construction Access**

4.4.107 **Construction Compounds** – Two areas for construction compounds have been identified along this section:

- to the east of Clay Farm and adjoining the guideway corridor opposite the Long Road Sixth Form College, approximately ch 41+800; and

- to the east of the corridor, off Shelford Road, approximately ch 43+100.

4.4.108 **Public Rights of Way** – FP46 and FP47 (Cambridge), where they cross the guideway, would have to be temporarily stopped up for safety reasons when directly affected by construction. A temporary diversion would be put in place before construction commences for FP47 (Cambridge). After construction the path would be re-instated with a 2 metre minimum width.

4.4.109 **Construction Access** – Temporary access would be via the permanent accesses detailed under Permanent Works. An additional temporary access would be provided via the highway network (see Section 4.5 for construction access details).

**Section 8: Link to Addenbrooke’s Hospital**

**Permanent Works**

4.4.110 **CGB Corridor** – A link would be provided to Addenbrooke’s Hospital within a 100m wide limit of deviation from ch 60+000 to 60+800. The link would be 800 metres in length, including a new overbridge crossing the existing operational railway. The maximum width of the corridor, including embankments, would be 42m, within the vicinity of the overbridge.

4.4.111 **Maintenance Track** – The maintenance track is proposed to be provided parallel to the guideway for the entire length of this section. The location of the maintenance track is shown on the Rights of Way Plans in Appendix 4D.

4.4.112 **Public Rights of Way** - The level crossing of FP47 (Cambridge), at the junction of the live railway would be terminated. FP47 (Cambridge), would cross the live railway using the overbridge that is to be provided as a link to Addenbrooke’s Hospital.

4.4.113 **Permanent Accesses** – The existing access to agricultural land would be maintained.

4.4.114 **Structures** - An overbridge would be provided across the railway line. The proposed maximum width of the area to be developed (including embankment) is approximately 42m, and would extend approximately 280m in length.

**Temporary Works and Access Arrangements**

4.4.115 **Construction Access** – Temporary access would be alongside Robinson Way (see Section 4.5 for construction access details).

4.4.116 **Construction Area** - Land to the north and south of the corridor link, and to the east and west of the operating railway tracks has been identified as a construction area. A construction compound would be located at the proposed new bridge site over the main railway line from Cambridge to London, which would support the proposed Addenbrooke’s Link works.
4.4.117 **Public Rights of Way** – The existing public right of way FP47 (Cambridge) would be disrupted during construction but would be maintained by a temporary diversion to avoid construction traffic.

4.4.118 **Permanent Accesses** – Permanent accesses would be maintained or diverted for safety reasons during construction.

4.5 **Construction Methodology**

**Temporary Access to Guideway During Construction**

4.5.1 A number of constraints were considered in the development of the construction access arrangements for the Scheme. The main constraints were as follows:

- the need to establish access to both sides of the River Great Ouse viaduct, which divides the St Ives to Cambridge guideway section, until the bridge crossing is established. Access would be required for construction of the guideway and repairs, reconstruction and deck placement of the viaduct;
- limited access opportunities for construction traffic direct from ‘A’ roads and ‘B’ roads between St Ives and the A14;
- appropriate traffic management measures needed for major vehicular routes in Cambridge City Centre due to the general high volume of traffic;
- to minimize, where possible, the impact of construction traffic on settlements; and
- to minimise vehicle-mileage for construction traffic, access points should be located at intervals of 4-6 kilometres along the route.

4.5.2 In light of these considerations, the following construction access routes were identified (see Appendix 4E):

- **Access Route 1A** - via A1096 and Meadow Lane. Exit would be via a temporary haulage route loop back onto Meadow Lane and then on to the A1096.

- **Access Route 1B** - A1096 and Meadow Lane into Second Drove and the existing gravel extraction haul road leading onto the disused railway line.

- **Access Route 2** - A14 towards Fen Drayton, then towards Swavesey, left at Bancroft’s Bridge, then left onto the track leading to the Nature Reserve and onto Holywell Ferry Road and the disused railway line.

- **Access Route 3** - A14 onto the B1050, Hatton’s Road, then left at the cemetery along a 500m stretch of new haul road leading to Gravel Road. Before the Windmill Bridge turn left into the site compound with a temporary haul road leading to the disused railway line. The site compound would also be used as turning circle for the construction vehicles. The 500m long temporary haul road would be constructed in order to minimise disruption to Longstanton village.

- **Access Route 4** - A14 onto the B1050, Hatton’s Road, then left at the cemetery along the 500m temporary haul road constructed for Access 3, up to Windmill Bridge. A new 1000m temporary haul road would be constructed to the proposed Longstanton Park and Ride site. Temporary haul roads are to be constructed in order to minimise disruption to Longstanton village.

- **Access Route 5** - A14 onto Dry Drayton Road towards Oakington, then right onto the track before the village. This would continue left along the track before
turning right into Oakington Road, then left into Park Lane. At the at-grade crossing, it would turn onto the disused railway line.

- **Access Route 6** - A14 onto B1049 Cambridge Road, south, turn left into King’s Hedges Road and left onto the disused railway line just past the college.

- **Access Route 6A** - A14 onto A1309 Milton Road, south, and then to join the disused railway line.

- **Access Route 7** - M11 (J11), north along Hauxton Road, then turn right onto the A1134 Long Road. It would then turn left at the end of Long Road in to Hills Road, and then over the railway bridge before turning right into Station Road. It would then run onto the station forecourt to lead to Hills Road. This access route would only be used outside peak periods.

- **Access Route 8** - M11 (J11), north along Hauxton Road and then right onto A1134 Long Road. It would then turn left at the end into Hills Road and left again, after the railway bridge, into Brooklands Avenue. Turn left into Shaftsbury Avenue to the end, accessing the site through the Cambridge University Press.

- **Access Route 8A** - M11 (J11), north along Hauxton Road and then right onto A1134 Long Road. It would then turn left at the end into Hills Road and left after the railway bridge into the UNEX car park.

- **Access Route 9** - M11(J11), north along Hauxton Road, then right into A1134 Long Road using the access to the northwest of Long Road Bridge embankment.

- **Access 9A** – M11 (J11), north along Hauxton Road, then right into A1134 Long Road using the access to the southwest of Long Road Bridge embankment. The site compound would be located here.

- **Access Route 10** - M11(J11), north along Hauxton Road, then right onto A1134 Long Road, then right into Robinson Way to join a temporary haul road.

- **Access Route 11** - M11 (J11), north along Hauxton Road, then turn right into Shelford Road, with access to the route along the reinforced agricultural access track to the site compound.

- **Access Route 12** - M11 (J11), Hauxton Road via the Trumpington Park and Ride.

4.5.3 Unclassified roads (yellow on the OS 1:50,000 mapping) were considered less suitable as access routes, not only in terms of geometry, but also because there are many settlements along them. These roads have been identified as prohibited routes (see Appendix 4E).

4.5.4 Site access plans would be developed by the contractor in consultation with the local planning authorities.

**Site Access Along Guideway**

4.5.5 Where the guideway route utilises the disused railway corridor it would be possible for the construction to proceed in a linear manner between points of site access. Site vehicles would normally access the site and proceed along the route to a point of delivery before off-loading materials and continuing to exit from a point further along the route. However, there are intermittent areas reserved along the route for balancing ponds, landscape mitigation and drainage outfalls that would also be used as turning circles for construction vehicles. A single guideway would be constructed by this method since site traffic can utilise the width of
the unconstructed second guideway, subject to protection of the formation. The second guideway would be constructed through a combination of the two methods described below:

- Method 1 – Use the maintenance track corridor for access. This is the preferred and less complicated method of access and is proposed for all those sections of the route where a maintenance track is to be provided; and
- Method 2 – Use the completed first lane for access. This guideway could be used before the kerb units are placed.

4.5.6 It is probable that a combination of the above methods would need to be adopted by the contractor particularly where the maintenance track is located at the toe of the embankment through the River Great Ouse flood plain.

Site Compounds

Northern Section – St. Ives to Cambridge

4.5.7 The proposed park and ride sites at St Ives and Longstanton would be used as site compounds for the northern guideway section. It is envisaged that the main compound would be located at Longstanton and would be approximately 150m x 150m, with the smaller compound at St Ives of 100m x 100m. An additional site compound of approximately 100m x 100m would be located adjacent to Windmill Bridge opposite the telecommunication mast compound to the south of the guideway.

Southern Section – Cambridge Railway Station to Trumpington Park and Ride

4.5.8 There are two main site compound areas proposed for this part of the route. The first would lie to the south of the Long Road embankment to the west of the CGB corridor, near Clay Farm and would be approximately 100m x 100m. It would be accessed from Long Road.

4.5.9 The second compound would be to the east of the CGB corridor on land currently used for agriculture and would be approximately 100m x 100m. Access to the site would be from Shelford Road via the existing agricultural access along the eastern edge of the north end of the Trumpington cutting.

4.5.10 In addition, in order to construct the new Hills Road underpass, a temporary construction site would be required to the south of Hills Road, predominantly on the line of the disused railway. To the north of Hills Road, disused sidings adjacent to Cambridge Railway Station accessed along Station Road would be utilised.

Concrete Batching Plant

4.5.11 The contractor would determine whether to use an on-site batching plant, or rely on readymix concrete deliveries. If an on-site facility were provided, it could be contained within the space allocated for the site compounds.

Construction of the Main Structures

Second Drove Accommodation Bridge

4.5.12 A new 4m wide underbridge would be constructed to support the proposed twin guideway. It is proposed that a reinforced concrete box structure flanked with wingwalls at each corner of the bridge would be constructed. To construct this bridge and the approach embankments, Second Drove would be temporarily closed during construction.
River Great Ouse Viaduct

4.5.13 An engineering assessment of the existing viaduct has concluded that, with the exception of one pier, the existing piers and abutments could be used to support the new guideway. It is possible that there would be a need for piling at the bridge site. Craneage would be required to remove the existing deck, carry out repairs and reconstruct the failed pier, to place the new bridge beams and construct the deck.

4.5.14 It would be necessary to give the contractor access to all four corners of the river/site corridor construction area. It is proposed that an area 10m wide, for the length of the viaduct and extending 20m beyond, would be acquired to provide access for construction traffic. The lengths parallel to the guideway would allow space for the storage of materials, and the laying out of deck beams prior to placement.

4.5.15 Each of the four construction site areas would be approximately 40m x 40m, and a working platform of compacted granular material would be placed to give a stable platform. Topsoil stripping would not be undertaken at this location.

4.5.16 A length of 40m from the viaduct parallel to the river would be acquired to provide protection works to the riverbank. At this stage it is not envisaged that any works would be required in the river. Delivery of materials to the bridge site is expected to be by road, as access from the river by barge has been considered to be impractical.

Windmill Bridge

4.5.17 The existing three span arch bridge would be demolished and a new single span bridge is proposed to accommodate double decker buses and the maintenance track. To construct this bridge the road would be closed for a period of six to eight months and an appropriate road diversion would be provided. It is proposed that a conventional pre-cast bridge beam deck solution be adopted, supported by reinforced concrete abutments. A detailed geo-technical investigation is required to determine the appropriate foundations arrangements, but at this stage spread foundations rather than a piled solution is envisaged.

Hills Road Bridge - South of Cambridge Railway Station

4.5.18 The existing underpass below Hills Road, which accommodates the existing railway line, is not wide enough to allow for a guideway to pass underneath. It is therefore proposed to construct a new box structure through the embankment supporting Hills Road to the north of the existing rail bridge. A temporary construction site would be required at the site, as described above.

4.5.19 The method of construction for Hills Road Bridge would be determined by the contractor. However at this stage it is envisaged that a ‘top-down’ construction would be most practical. This would require the temporary diversion of existing utilities in Hills Road and placement of bored cast in-site concrete piles. The top slab of the underpass would be constructed prior to excavation for the underpass beneath. The bottom slab and sidewalls would then be constructed to complete the underpass.

Addenbrooke’s Hospital Link

4.5.20 An overbridge would be constructed for the guideway to pass over the live railway line to the west of Addenbrooke’s Hospital. To construct this structure, an area of 30m x 30m has been identified at the four corners of the bridge site either side of the electrified live railway.

4.5.21 It is proposed that a conventional pre-cast bridge beam deck solution be adopted, supported
by reinforced concrete abutments. A detailed geotechnical investigation is required to determine the appropriate foundation arrangements, but at this stage spread foundations rather than a piled solution are envisaged.

**Other Bridges**

4.5.22 The condition of the other existing structures along the route has been the subject of qualitative assessments that concluded that they are in a fair condition. The majority of the underbridges, culverts and pipe crossings would be widened to accommodate the guideway and refurbishment of the existing structures is planned. A temporary working space of 20m x 20m would be required at each structure for construction access.

4.5.23 An underpass is to be constructed under Long Road Bridge for the maintenance track.

**Other Associated Works**

4.5.24 Slope stabilisation would be required at Over Cutting and may also be required at Trumpington Cutting. Works could involve construction of retaining walls or soil nailing.

**Guideway Communications and Control Systems**

4.5.25 Infrastructure for the containment and protection of the guideway communication and control systems would be constructed as part of the main civil engineering works. These would comprise ducts, jointing boxes, control kiosks and distribution panels. Specialist suppliers would then install the cables and electrical equipment at the end of the construction phase and in preparation for the integrated commissioning of the entire Scheme.

**Landscape and Ecology**

4.5.26 Whilst detailed measures, including site-specific particulars, management programmes and maintenance works would be matters for future consultation with the local planning authorities, the following would be undertaken prior to construction:

- detailed landscape character and visual appraisals of the route and its associated facilities;
- relocation of important habitats as agreed in consultation with English Nature or the Wildlife Trust. In these areas plants and seeds may need to be collected and stored according to appropriate procedures for each individual species; and
- treatment of protected species as agreed with English Nature.

4.5.27 It would be necessary to co-ordinate construction activities to take account of seasonal considerations and ecological sensitivities.

4.5.28 Temporary mounding and/or planting may also be required in sensitive areas to screen construction compounds.

4.5.29 With regards to new planting and the type of planting to be undertaken different soiling regimes are required. Where suitable, topsoil removed during construction would be stored on site and used for new planting or in regeneration areas.

4.5.30 Permanent fencing, including rabbit proofing, may be required to protect new landscape features. This may involve fencing off of some areas or provision of guards on individual specimens.
4.5.31 Depending on the type of planting to be undertaken different soiling regimes are required. Where suitable, topsoil removed during stripping of site areas would be stored on site and used for this purpose. In other areas the use of imported topsoil would be restricted to avoid introduction of seeds and maximise natural re-colonisation. Special treatments for planting and soil profiling would be required at balancing ponds to incorporate marginal and aquatic plants. Where balancing ponds and other areas have been used by construction vehicles, soils may require restoration before planting can take place.

Waste Management

4.5.32 Construction of the guideway and associated works would generate general construction and demolition (C&D) waste. Where possible, this material would be re-used in the Scheme or recycled within the construction industry.

4.5.33 Suitable material from the existing embankments would be used in embankment reinstatement elsewhere on the route. Where appropriate, ballast, topsoil and other ground material would be used in ecological and landscape mitigation areas. Railway heritage and other features of potential value or interest would be offered to local museums or interest groups.

4.5.34 Excavated material for reuse would be stored temporarily on-site. This may require an exemption from the provisions of the Waste Management Regulations 1994iv.

4.5.35 Prior to construction, a Waste Management Plan would be prepared, giving consideration to the Cambridgeshire and Peterborough Waste Local Plan (2003)v and in consultation with the EA. The plan would aim to implement “waste hierarchy” principles, and it is envisaged that the following measures would be included:

- reducing waste volumes;
- re-using materials within the Scheme or other local developments;
- maximising the re-use of inert materials;
- minimising use of primary aggregates for construction;
- minimising the amount of waste disposed to landfill;
- minimising transportation of waste materials;
- disposing of green waste by methods other than landfill; and
- measures for the proper handling of waste materials.

4.5.36 Where disposal of waste is required, this would be to a suitable licensed disposal site in accordance with the Environmental Protection Act 1990vi. The appropriate method of disposal of any contaminated material would be agreed with the Environment Agency.

Programme

4.5.37 The construction programme would be the responsibility of the contractor. However, an indicative construction sequence has been considered.

4.5.38 A pre-construction programme would take into account:

- archaeological surveys;
- ecological surveys and protected species mitigation measures;
- site clearances;
- landscape mitigation measures;
- baseline surveying, including noise; and
- detailed site investigation, including identification of contaminants.

4.5.39 The indicative programme is as follows:

Month 1: set up site, mobilise, protection of selected areas of vegetation and individual specimens

Month 2: site clearance, demolitions, fencing, and security

Months 3 to 11: earthworks, drainage, depot etc

Months 3 to 16: structures

Months 3 to 18: landscaping and ecological mitigation (detailed programming would take into account the planting seasons, which are in autumn and spring)

Months 8 to 15: guideway

Months 16 and 17: installation, testing and commissioning of communications system

Month 19: trial running

Month 20: Scheme opens

**Code of Construction Practice**

4.5.40 A Code of Construction Practice (CoCP), would be developed in consultation with the relevant authorities, and would be included in the construction contract. The CoCP would cover environmental and safety issues such as:

- **Public/private highways** – construction traffic routes; surfacing of haul roads; pedestrian or traffic diversions; protection of street furniture and trees; and minimisation of interference with road traffic.

- **Noise and hours of working** – measures to reduce construction noise near sensitive receivers. Hours of working would be limited to between 07.00 and 18.00 Monday to Friday and 08.00 to 13.00 on Saturday. Extended hours would only be worked by agreement with the County Council.

- **Dust and air pollution** – measures to prevent dust nuisance including enclosure of material stockpiles; hard surfacing of heavily used areas; control of cutting or grinding of materials on site; and coverage of vehicles carrying spoil.

- **Protection of surface and groundwater resources** – obtaining all appropriate licenses from the EA; prevention of surface and groundwater pollution; and proper storage of an fuels and chemicals.

- **Handling and disposal of contaminated materials** – identification of contaminated sites before works commence; precautions to protect workers
exposed to any noxious and toxic chemicals; and procedures for dealing with contaminated materials.

- **Handling and disposal of waste** – waste minimization; reuse and recycling; disposal; and record keeping.

- **Trees and vegetation** – a tree and vegetation protection policy to specify measures for dealing with trees directly affected by the works.

- **Site boundaries/hoardings/temporary structures on the public highway** – measures to ensure safety and security including protection of major works and construction sites from the public and livestock.

- **Site Activities** – emergency procedures, site housekeeping and inspections by Planning Officers and Environmental Health Officers.

- **Liaison and awareness** – contact details and identification requirements.

- **Relevant Standards and Guidelines** – compliance with all relevant legislation and appropriate British Standards.
Appendices

Appendix 4A Limits of Deviation
Appendix 4B Land-take for On-Street Works, Park & Rides and Kiss & Ride
Appendix 4C Typical Guideway Cross Section
Appendix 4D Rights of Way
Appendix 4E Construction Traffic Access Routes
References

3 Swavesey Byways Act, 1984
6 Environmental Protection Act 1990 (c. 43), ISBN 0105443905.
5. ASSESSMENT OF ALTERNATIVES

5.1 Introduction

5.1.1 This section gives an outline of the main alternatives that were looked at in deciding upon the Cambridgeshire Guided Busway (CGB) Scheme. The section describes:

- alternative public transport systems considered, including environmental considerations (Section 5.2); and
- alternative scheme options that have been considered, taking into account environmental considerations (Section 5.3).

5.1.2 In both cases, the sections gives reasons as to why these alternatives were rejected in favour of the Scheme being promoted through this TWA Order application.

5.2 Alternative Public Transport Systems

5.2.1 As part of demonstrating that the CGB is the most appropriate public transport system for the disused St Ives to Cambridge route the County Council looked at three alternative options. These were assessed to determine whether they provided a better or more efficient way of achieving the County Council’s objectives (see Section 3.7) and whether they would be economically viable. These three alternative options were:

- limited bus priorities along existing roads in the Huntingdon to Cambridge corridor, not using the disused railway line;
- light rail or heavy rail along the disused rail corridor; and
- a bus only road along the disused rail corridor.

Option 1: Limited Bus Priorities along the Existing Roads in the Huntingdon to Cambridge Corridor

5.2.2 This low cost alternative would consist of the following:

- a dedicated 300m bus turning lane from the B1050 to the A14 to improve access to the A14 for buses leaving the new settlement (Northstowe) towards Cambridge;
- a 2.5km dedicated bus lane on the A14 between Oakington and Girton, in the Cambridge direction only, to reduce journey times at peak periods for buses travelling to Cambridge; and
- a 500m bus lane and signal priority measures at the A10/A14 grade separated junction to improve bus access at the Science Park area at peak periods.

5.2.3 Vehicles operating along the route would be normal buses, although it was envisaged that a quality partnership could be set up for the route to ensure that the buses would be of high quality.

5.2.4 The scheme was the subject of a full New Approach to Appraisal (NATA) (1998) assessment as set out in the Guidance on the methodology for Multi Modal Studies (GOMMS) published in March 2000. The NATA assessment focuses on Government objectives for the five main areas of Environment; Safety; Economy; Accessibility; and Integration. The impacts of the scheme considered are summarised in an Appraisal Summary Table, which presents the
impacts against sub-criteria.

5.2.5 The analysis showed that, although the scheme would be relatively easy to implement and would have a lower cost than a guided bus scheme, such as on the A14, along the corridor would be ineffective and would bring some limited benefits to existing bus users, but these benefits would largely be confined to peak periods, with little or no benefits to other transport users. Such a scheme was shown to bring very little transfer from public transport, so would not significantly alleviate congestion on the A14.

5.2.6 It was therefore concluded that this alternative would fail to deliver the scheme objectives set out in Section 3.7. For these reasons, the scheme was discounted.

**Option 2: Light Rail or Heavy Rail along the Disused Corridor**

5.2.7 The possibility of introducing either light or heavy rail along the route has been considered since the late 1980s (see Section 3.2). The heavy rail option would follow the route of the disused railway line between Cambridge and St Ives. The light rail option would include extensions into the centres of Cambridge and Huntingdon.

5.2.8 From 1995 onwards, a number of studies were produced comparing the light-rail option with guided bus. In 1999, a report by Steer Davies Gleave looked at public transport access to the proposed Northstowe new settlement at Longstanton/Oakington. The report had similar objectives to the County’s objectives detailed in Section 3.7, and compared the attributes of light rail, heavy rail and guided bus. This showed that the heavy and light rail options would not meet the objectives as effectively as a guided bus option and would be considerably more expensive. The heavy rail option in particular was shown to have a poor economic performance while failing to connect the development with the centre of Cambridge. The light rail option was better at meeting objectives, but the economic performance of the scheme was poor, largely due to the high capital costs of the infrastructure and the vehicles. On balance, the study found that guided bus provided the best way of meeting the objectives for such a scheme and was most economically beneficial.

5.2.9 The findings from this report were substantially confirmed in the government commissioned Cambridge to Huntingdon Multi-Modal Study (CHUMMS)iii, produced in 2001, which made a direct comparison between the three modes. This showed that both could be successful, but that guided bus was a better option, because:

- it would bring greater patronage than light or heavy rail but at approximately half the cost; and

- it had the possibility of penetrating the city and town centres along the route in a way that heavy rail could not and light rail could only do at great expense. Light-rail would also face considerable technical difficulties, with a significant impact on the environment of the historic town and city centres. This would be particularly important in Cambridge, where access into the centre is critical to the success of any public transport system for the area.

5.2.10 Following acceptance by Government of the findings and recommendations of CHUMMS, Government invited the County Council to develop the guided bus scheme further and, if appropriate, submit a bid to fund such a scheme through the Local Transport Plan process. In the County Council’s submission to Government for funding in 2002, a NATA assessment showed that:

- guided bus offers greater benefits at a lesser cost than either light or heavy rail;
• travel demand would be unlikely to generate sufficient revenue to meet operating costs for light or heavy rail;

• light or heavy rail can only operate along fixed dedicated infrastructure whereas guided bus is flexible allowing feeder bus services to provide greater coverage of the corridor;

• the guided bus system combines guided sections with normal on-street running so that passengers can more easily reach their destination without having to change mode of transport;

• light and heavy rail, unlike guided bus, would be unable to penetrate the historic centre of Cambridge without considerable expense and significant impact on the environment and heritage. Guided bus can utilise existing roads and bus measures within the City and complement existing bus services; and

• a light or heavy rail scheme would result in greater severance along the route to public rights of way, as Her Majesty’s Railway Inspectorate (HMRI) would be likely to require permanent closure of such crossings. In addition, a maintenance track also designated as a bridleway to the north of Cambridge and a cycleway to the south alongside the route would not be possible with a light or heavy rail scheme without additional safety measures.

5.2.11 The Appraisal Summary Tables are provided in Appendix 5A.

5.2.12 The studies undertaken have all demonstrated that, although a light or heavy rail option could achieve local and national objectives, the costs of such a scheme would be considerably higher than the costs for guided bus and the benefits would be considerably lower. In addition, an alternative light or heavy rail scheme lacks the flexibility of guided bus. For these reasons light or heavy rail schemes were discounted.

**Option 3: Bus Only Road**

5.2.13 Following the submission of the bid for funding in 2002, Cambridgeshire County Council were asked by the Department for Transport to assess a further alternative option based upon a bus only road along the same disused railway corridor. The alternative scheme consisted of a 7.3m single carriageway road of flexible construction along the same route as that proposed for the Scheme, with bus gates provided at entry and exit points to prevent unauthorised usage by other vehicles. In all other respects infrastructure provision would be the same as for the Scheme including an adjacent cycleway, park and ride sites at St. Ives and Longstanton, the same standard of stops and a control centre.

5.2.14 The net present value and benefit cost ratios of the bus only road scheme compared to guided bus are shown in Table 5.1. It should be noted that as no information is available on public perception of the attractiveness of bus only road travel the values shown for net present value and the benefit to cost ratio relate to the public perception of the attractiveness of buses. However, it is acknowledged that the bus only road could be expected to be perceived as more attractive than a bus subjected to typical highway conditions, but would not be as attractive as a guided system.
### Table 5.1 Benefits and costs of bus only road and guided bus

<table>
<thead>
<tr>
<th></th>
<th>£ million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bus Only Road</td>
</tr>
<tr>
<td>Net Present Value</td>
<td>84</td>
</tr>
<tr>
<td>Benefit Cost Ratio</td>
<td>1.99</td>
</tr>
</tbody>
</table>

5.2.15 Setting aside public perception of “attractiveness”, the assessment showed that the bus only road would produce broadly the same benefits as the guided bus scheme. This may be expected, since it follows the same route as the guided bus scheme and has many similar characteristics. However, the scheme would not be as effective as the guided bus in a number of important ways:

- **Ride quality** – a bus only road option could not provide the same ride quality as the guided bus scheme. The guidance of the latter reduces lateral movement and its ride quality is comparable to that experienced with other track based systems such as rail;

- **Boarding and alighting** – a guided system allows more effective and more precise ‘docking’ with stop platforms providing consistent level boarding. This facilitates easier access for all users;

- **Self enforcement** – because any vehicle could use the bus only road, unauthorised use and consequent delay is higher than a guided bus system where only vehicles fitted with guide wheels would be able to use the guideway;

- **Safety** – the use of side guidance wheels ensures the vehicles follow the running track. In addition, vehicles would only be able to join the guideway at pre-defined junctions unlike a road where multiple private access points are provided;

- **Permanency** – The guided bus scheme, in utilising a dedicated track, provides a high degree of certainty that it would be permanently available for exclusive use by public transport vehicles. In contrast, a bus only road could lead to pressure to open the road for use by all vehicles, thus undermining the benefits of a segregated alignment; and

- **Perception** - The public perception of guided bus is that it is more akin to other “tracked” solutions such as light and heavy rail. This is supported by the findings of FirstGroup in respect of the Leeds Guided Bus scheme, which indicated that 20-25% of users were former car users and showed a customer profile more usually associated with rail traveliv.

5.2.16 In particular, with the bus only road modal switch from the car to public transport is likely to be less than with guided bus. This is at odds with one of the major justifications for the scheme as proposed in CHUMMS, which was to attract existing car users on to public transport, and does not support one of the County Council’s main objectives for the scheme to extend choice of transport modes for all, including private car drivers, to encourage a shift to public transport (see Section 3.7).
5.3 Alternative Scheme Options

5.3.1 Throughout the development of the Scheme, alternatives have been considered and assessed in determining the final scheme design. A number of alternatives at different locations have undergone desk-top assessments to optimise the proposed design and minimise as far as possible any negative impacts. These assessments have been informed by the various consultation processes, the project Steering Group and CCC Members. Alternatives assessed included:

- passing loops;
- location of the Kiss and Ride at Swavesey;
- location of the Longstanton Park and Ride;
- provision of a stop at Girton;
- location of the Histon & Impington Stop;
- provision of parking at Histon & Impington Stop;
- link to Chesterton Sidings;
- Hills Road Bridge;
- Trumpington cutting; and
- link to Addenbrooke’s Hospital;

5.3.2 In the desk-top assessments of these options, the following aspects were considered:

- **Environment** – the extent to which the proposed option(s) reduced or eliminated any environmental impacts;
- **Land** - the extent to which proposed option(s) required additional land take;
- **Engineering feasibility** – the extent to which the option(s) were feasible and practical without significant disruption to the overall scheme;
- **Demand** – whether the option(s) would add to demand and thus be economically viable;
- **Operational implications** – whether the option(s) would affect the overall operational characteristics of the scheme; and
- **Consultation** – any responses received from the public through the consultation exercises.

5.3.3 Consideration was also given to work undertaken by the superCAM scheme in relation to alternatives. The alternatives considered under superCAM are provided in Appendix 5B. These included:

- location and size of St Ives Park and Ride, including alternative routes accessing the sites;
- alternative routes within Cambridge City Centre; and
- alternative routes to Addenbrooke’s Hospital.
Passing Loops

5.3.4 The Annex E submission (Appendix 10 Local Transport Plan Annual Progress Report (2001-2002)) included stops with passing loops at Swavesey, Longstanton, Oakington and Histon & Impington, based upon predicted service frequencies and the consideration that buses (including express services) could pass slower or stationary buses on the guideway. The scheme shown at public consultation in July and August 2003 included passing loops.

5.3.5 Although there may be some justification for passing loops, their inclusion was reassessed given that at each of the stops there would be additional land take outside the railway corridor increasing the environmental impact.

5.3.6 Three options were assessed:
- Option 1: passing loops at all stops;
- Option 2: passing loops at selected stops (as per Annex E and consultation); and
- Option 3: no passing loops.

5.3.7 The assessment indicated that passing loops could only be justified were there is a realistic and frequent likelihood of a non-stopping bus being delayed by a stopping bus ahead of it.

5.3.8 From the new settlement at Northstowe to the Cambridge northern fringe, service levels would eventually be up to 24 vehicles per hour each way. Although it would initially appear that passing loops would be beneficial, it was considered that the likely delays from stationary buses would not be significant on this, the busiest section of the guideway.

5.3.9 Not having passing loops also ensures services must pass each platform, giving a predictable service pattern and avoiding any user confusion.

5.3.10 Passing loops would also require additional breaks in the guideway and would make stopping at the platforms a more difficult manoeuvre. Operationally, the benefits of passing loops was considered to be offset by the disbenefits of additional breaks in the guideway, difficulty in manoeuvring to platforms (and achieving level boarding) and increased CGB bus dwell times.

5.3.11 The operational benefits of passing loops were considered marginal. Table 5.2 summarises the results of the assessment.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Option 1: Passing loops at all stops</td>
</tr>
<tr>
<td>Environmental</td>
<td>Requires additional land along sections of the guideway, outside the railway corridor resulting in additional environmental impact.</td>
</tr>
</tbody>
</table>
### Criteria | Assessment
---|---
**Option 1: Passing loops at all stops** | **Option 2: Passing loops at selected stops** | **Option 3: No passing loops**
**Land** | Requires additional land along sections of the guideway, outside the railway corridor. | Requires additional land along sections of the guideway, outside the railway corridor (although less than Option 1). | Does not require additional land outside the railway corridor.
**Engineering** | Passing loops could be provided with little disruption to the overall programme. |  | 
**Demand** | Service modelling suggests passing loops not warranted. |  | 
**Operational** | Passing loops would create breaks in the guideway causing services to regularly slow down and increasing journey times. Vehicles stopping and passing could cause operational difficulties. | Increased operational difficulties as for Option 1 but to a lesser extent. | No additional operational difficulties.
**Public consultation** | No specific comments received. |  | 

### Location of the Kiss and Ride at Swavesey

5.3.12 The area surrounding the Swavesey Stop has particular environmental significance, as the Priory Scheduled Ancient Monument (SAM) lies adjacent to the disused railway corridor and Station Road, Swavesey. This road would serve as an access route to the Swavesey Stop and allow CGB buses to enter and leave the guideway.

5.3.13 The public consultation in Summer 2003 included both eastbound and westbound stops to the east of Over Road, and a kiss and ride to the southeast of the disused rail line. Concern was raised during the consultation that, because the stop is located some distance from Swavesey and Over villages, the lack of parking may deter potential passengers from using the guided bus. However, concern was also raised during the consultation about the provision of parking in such an environmentally sensitive area and the significant impact this would have on the surroundings at Swavesey and in particular the Priory. Therefore, a kiss and ride was considered more appropriate for this location.

5.3.14 A kiss and ride to provide for car journeys from nearby villages and the dropping off of passengers at the stop within a dedicated facility was therefore investigated. Three options in relation to a kiss and ride were assessed:
- Option 1 - no kiss and ride;
- Option 2 - a kiss and ride to the south of the guideway and east of Station Road; and
- Option 3 - a kiss and ride to the north of the guideway and east of Over Road.

5.3.15 The results of the assessment are summarised in Table 5.3. This indicates that a kiss and ride...
as per Option 3 would facilitate access to the stop, and would meet some of the concerns raised during the public consultation, and would have less environmental impact than Option 2. In addition, the location of the Priory, and the archaeological importance of its immediate surrounds, would preclude provision of a kiss and ride to the southeast, southwest or northwest of the guideway.

Table 5.3 – Assessment of Kiss and Ride options at Swavesey

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Option 1: no kiss and ride</th>
<th>Option 2: Kiss and ride to the south of the guideway</th>
<th>Option 3: Kiss and ride to the north of the guideway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>No impact.</td>
<td>Potential adverse impact on a sensitive area of archaeological importance.</td>
<td>Some impact but considered least in terms of proximity to the Scheduled Ancient Monument</td>
</tr>
<tr>
<td>Land</td>
<td>No impact.</td>
<td>Additional agricultural land required.</td>
<td>Additional agricultural land required.</td>
</tr>
<tr>
<td>Engineering feasibility</td>
<td>No impact</td>
<td>The ‘Kiss &amp; Ride’ could be provided with little disruption to overall programme.</td>
<td>The ‘Kiss &amp; Ride’ could be provided with little disruption to overall programme.</td>
</tr>
<tr>
<td>Demand</td>
<td>No impact</td>
<td>A ‘Kiss &amp; Ride’ would capture additional patronage.</td>
<td>A ‘Kiss &amp; Ride’ would capture additional patronage.</td>
</tr>
<tr>
<td>Operational implications</td>
<td>No significant operational impacts.</td>
<td>Increased safety for passengers through provision of appropriately designed turn in/out for cars.</td>
<td></td>
</tr>
<tr>
<td>Public Consultation</td>
<td>Concerns raised over accessing Swavesey Stop by car.</td>
<td>A ‘Kiss &amp; Ride’ would facilitate access to the stop by car and address public concerns</td>
<td>A ‘Kiss &amp; Ride would facilitate access to the stop by car and address public concerns</td>
</tr>
</tbody>
</table>

Location of the Longstanton Park and Ride

5.3.16 The Longstanton Park and Ride is located in the central section of the northern part of the route primarily serving villages to the north of the A14 and the proposed new settlement (Northstowe).

5.3.17 In considering the location of the park and ride a number of issues were considered, including the size of the site. Within the area of search for a site where the B1050 dissects the disused railway, the four quadrants around the intersection were considered as shown in Table 5.4.

5.3.18 Results of the desk-top analysis indicated the southeast quadrant to be the best location for the park and ride and associated stop for the following reasons:

- the stop could be more easily shared by the park and ride site and people living in the northwest quadrant of Northstowe;
- the majority of traffic coming to the park and ride site would originate from the northern villages and would be able to access it by a left turn therefore
minimizing the potential for any additional traffic delays on the B1050 at the park and ride site access junction;

- it is anticipated that a significant number of bus services would commence at the park and ride site itself. When located to the east of the B1050, buses would be able to access the guideway directly to travel towards Cambridge without having to first cross the B1050. This both increases the effectiveness of these services and reduces any likely traffic delays on the B1050;

- only one break in the guideway would be necessary to accommodate the park and ride site and a future spur to serve Northstowe, thus increasing the efficiency of the system;

- the size of the site was proposed as 1,000 car parking spaces in the consultation in the summer of 2003 and has since been reduced to initially 350 spaces and ultimately 700 spaces as a result of further examination of potential demand. This would have less impact on surrounding properties; and

- there would be less environmental impact, as a park and ride site in the northeast quadrant would have less impact on landscape features, areas of ecological value, surrounding properties and amenity value.

Table 5.4 – Assessment of Longstanton Park and Ride location

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Northwest</td>
</tr>
<tr>
<td>Environment</td>
<td>Increased impact with increased loss of hedgerows.</td>
</tr>
<tr>
<td>Land</td>
<td>Impact on a number of small businesses and difficult to locate suitable access due to residential properties.</td>
</tr>
<tr>
<td>Engineering feasibility</td>
<td>Additional breaks in guideway as the necessary breaks for the park and ride and local stop cannot be combined with the future spur to serve the new settlement (Northstowe).</td>
</tr>
<tr>
<td>Demand</td>
<td>Accessibility in these quadrants would be poor as they are further from both Longstanton and the new settlement (Northstowe) for pedestrians and cyclists and there is also severance caused by the B1050 and the guideway.</td>
</tr>
</tbody>
</table>
Assessment of Alternatives

### Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Northwest</strong></td>
<td>An increased number of buses (i.e. those from the St Ives direction plus those starting at the park and ride) would have to cross the B1050 causing additional delay to both B1050 traffic and the guided bus system.</td>
</tr>
<tr>
<td><strong>Southwest</strong></td>
<td>Additional crossings of the guideway by terminating CGB buses.</td>
</tr>
<tr>
<td><strong>Northeast</strong></td>
<td>Optimal operational layout.</td>
</tr>
<tr>
<td><strong>Southeast</strong></td>
<td></td>
</tr>
<tr>
<td>Public Consultation</td>
<td>No comments made in respect of preferred location.</td>
</tr>
</tbody>
</table>

### Provision of a Stop at Girton

**5.3.19** Suggestions made during consultation included an additional stop at the crossing of the disused railway corridor and Park Lane, Histon. This suggestion was evaluated and the results shown in Table 5.5.

### Table 5.5 – Assessment of Option for Stop at Girton

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Stop at Girton</th>
<th>No Stop at Girton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>The stop could be largely provided in the railway corridor but may add additional noise and visual intrusion.</td>
<td>No impact.</td>
</tr>
<tr>
<td>Land</td>
<td>The stop could be largely provided in the railway corridor but would require a small amount of additional land outside the corridor.</td>
<td>No impact.</td>
</tr>
<tr>
<td>Engineering</td>
<td>The stop could be provided with little disruption to the overall programme.</td>
<td></td>
</tr>
<tr>
<td>Demand</td>
<td>Modelling indicated that the additional stop would generate only 9 additional passenger journeys in the peak hours.</td>
<td></td>
</tr>
<tr>
<td>Operational</td>
<td>The additional stop may allow a further access point for feeder services. However, an additional stop may have the potential to delay and through services and add to journey times.</td>
<td></td>
</tr>
<tr>
<td>Consultation</td>
<td>Limited representation made on the need for a stop in this location.</td>
<td></td>
</tr>
</tbody>
</table>

**5.3.20** It was assessed that the additional impact of providing a stop at this location could not be justified in terms of additional patronage and service opportunities.

### Location of the Histon & Impington Stop

**5.3.21** The stop at Histon & Impington is proposed to be located at the junction of the disused railway corridor and Station Road, Histon. This area is particularly constrained in terms of available land for construction of a stop with buildings and trees extending right up to the road boundaries on both sides of the disused railway corridor.

**5.3.22** Outline design indicated that in order to provide the stop in this location, land outside the
railway corridor would be required. Three options for this stop, which included passing loops, were offered for consultation in July/August 2003. All required amounts of land from either:

- the Copse; and/or
- residential back gardens in Pepys’ Terrace; and/or
- Bishops DIY store car park

5.3.23 Comments from the consultation included strong representations from the residents of Pepys’ Terrace because of the potential loss of part of their gardens. Consequently, further assessment focused on identifying alternatives that would provide similar scheme benefits and minimise the impact on the local area.

5.3.24 This indicated that with minor changes to the stop layout and in particular, if the depth of the platform was reduced and the passing loops removed, the need to impinge on third party land was reduced significantly. These proposed changes were considered not to have a material impact on either the operation of the stop or the attractiveness to passengers.

5.3.25 Thus, the three revised options were evaluated:

- Option 1: the eastbound (Cambridge) and the westbound (Huntingdon) stops are located to the west of Station Road;
- Option 2: adopts a staggered layout with the eastbound stop located to the east of Station Road and the westbound stop located to the west of Station Road; and
- Option 3: the eastbound and westbound stops are both located to the east of Station Road.

5.3.26 Results of the assessment (see Table 5.6) indicate that there is little to choose between the three options on most aspects other than the land requirements and traffic impact. In terms of the land requirements, although reducing the depth of the platforms would reduce the impact, Option 2 would still require a small amount of the Copse and Option 3 a small portion of the rear gardens in Pepys Terrace. In all cases though, the need to impinge on Bishop’s DIY store was removed. With regard to traffic impact, the staggered form of platforms as in Option 2 is the most appropriate as buses would clear the road crossing before stopping. This would minimise delay to users of Station Road whereas in the other options, a standing bus picking up passengers would require road traffic to be stopped. Thus, the additional road traffic and pedestrian safety impacts were significant enough to pursue Option 2.

Table 5.6 – Assessment of Options at Histon & Impington Stop

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1: West of Station Road</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>The environmental impact of all three options is similar although the impact of noise and visual intrusion may be slightly greater in Option 3.</td>
</tr>
<tr>
<td>Land requirements</td>
<td>All options would require the former station platforms.</td>
</tr>
<tr>
<td>Option 2: Staggered layout</td>
<td></td>
</tr>
<tr>
<td>Option 3: East of Station Road</td>
<td></td>
</tr>
</tbody>
</table>
### Criteria for Assessment of Alternatives

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Option 1: West of Station Road</th>
<th>Option 2: Staggered layout</th>
<th>Option 3: East of Station Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>No additional effects.</td>
<td>Small take of land on northeast of the corridor.</td>
<td>Small take of land on northeast and southeast of the corridor.</td>
</tr>
<tr>
<td>Demand</td>
<td>No difference between the options.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultation</td>
<td>Public consultation has indicated that the main issue of concern in Histon &amp; Impington other than to directly affected parties, is the junction of the guideway and Station Road which does not affect the selection of an option.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Parking at Histon and Impington Stop

5.3.27 As a result of comments from consultation in July/August 2003 consideration was given to providing parking at Histon & Impington Stop. An assessment of the stop with and without car parking was undertaken and summarised in Table 5.7.

5.3.28 In order to operate effectively, the parking would, however, need to be carefully managed. In particular, it would be important to ensure that it is operated as a limited stay car park maximising its benefits for local residents.

5.3.29 Given the level of support for parking it was considered that Option 2 would be taken forward.

### Table 5.7 Assessment of car parking at Histon and Impington Stop

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Option 1: No car parking provided</th>
<th>Option 2: Car Parking Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>No impact.</td>
<td>Impact on Old Station Building and its surroundings.</td>
</tr>
<tr>
<td>Land</td>
<td>Land required for stop platforms only.</td>
<td>Additional land required for car park.</td>
</tr>
<tr>
<td>Engineering feasibility</td>
<td>No issues.</td>
<td>Requires additional design of access junction with Station Road</td>
</tr>
<tr>
<td>Demand</td>
<td>No additional benefits.</td>
<td>Increased access and interchange facilities</td>
</tr>
<tr>
<td>Operational implications</td>
<td>Operations not affected.</td>
<td></td>
</tr>
</tbody>
</table>
5.3.30 The Annex E submission included taking the guided bus route through land at Chesterton Sidings in north Cambridge, where a new multi modal interchange and main line railway station are proposed. However, whilst it is important that the guided bus serves the new rail station and interchange it is considered that the routing through the Chesterton Sidings site is best resolved through the land use planning process. In addition, the need for this link would only be triggered when the interchange is in place. Hence, the option of only seeking TWA powers to provide the guideway to the edge of the Chesterton Sidings development site was also considered. Table 5.8 summarises the assessment of both options.

**Table 5.8 – Assessment of link to Chesterton Sidings**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Option 1: Link to Chesterton Sidings boundary only</th>
<th>Option 2: Link including land within Chesterton Sidings area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>No issues.</td>
<td>Greater potential for contaminated land</td>
</tr>
<tr>
<td>Land</td>
<td>Only disused rail corridor required.</td>
<td>Land within the Chesterton Sidings site required. Current location of the interchange facilities are not yet known so difficult to clearly establish land requirements.</td>
</tr>
<tr>
<td>Engineering feasibility</td>
<td>No impact.</td>
<td>Requires additional lengths of guideway and not possible to design scheme within Chesterton Sidings site.</td>
</tr>
<tr>
<td>Demand</td>
<td>No impact.</td>
<td>Link only required and used once Chesterton Railway Station and interchange operational.</td>
</tr>
<tr>
<td>Operational implications</td>
<td>None as would not be operational until the proposed Chesterton Railway Station and interchange opens.</td>
<td></td>
</tr>
<tr>
<td>Public Consultation</td>
<td>No specific comments received.</td>
<td></td>
</tr>
</tbody>
</table>

**Hills Road Bridge**

5.3.31 A desk-top evaluation of the options focusing particularly on the engineering, land and technical issues in the vicinity of Hills Road bridge has been undertaken. The two options for securing the route that have been considered are:

- Option 1 – a guideway under Hills Road Bridge which runs in front of the signal box. The maintenance track would stop short of the bridge on the south side and...
a turning area for maintenance vehicles provided. Cyclists would access the maintenance track from Shaftsbury Avenue though the Cambridge University Press land.

- Option 2 – a dedicated two way public transport road accessing Hills Road Bridge at grade from the station forecourt/Mill area to the north side of the bridge adjacent to the Greene King pub. New traffic signals would provide priority to guided bus vehicles to turn left onto Hills Road Bridge and then to turn right at a new signalised junction on the bridge to access a ramp on the south side of the building down to the guideway adjacent to the railway. Cycles would also follow the route of the buses.

5.3.32 The key issues relating to each of the options have been assessed and are shown in Table 5.9. On the basis of this assessment it is considered that the benefits are such that Option 1 a guideway under Hills Road Bridge was considered to be the best option.

Table 5.9 – Assessment of proposals for Hills Road Bridge

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Option 1: Guideway under Hills Road Bridge</strong></td>
</tr>
<tr>
<td>Environment</td>
<td>Less visual impact.</td>
</tr>
<tr>
<td>Land</td>
<td>All options impact on land outside the railway corridor and require integration with the planning of the Cambridge Railway Station.</td>
</tr>
<tr>
<td>Engineering feasibility</td>
<td>Complex engineering due to proximity to the mainline railway line.</td>
</tr>
<tr>
<td>Demand</td>
<td>Likely to be more attractive to users as most direct and quickest route.</td>
</tr>
<tr>
<td>Operational</td>
<td>Most direct route, quickest journey times, most efficient operations.</td>
</tr>
<tr>
<td>Public Consultation</td>
<td>No specific comments received.</td>
</tr>
</tbody>
</table>

**Trumpington Cutting**

5.3.33 Trumpington Cutting is too narrow to accommodate a twin track guideway and maintenance track/cycleway. In addition, both Hauxton and Shelford Road Bridges are too narrow to accommodate a twin track guideway plus a maintenance track cycleway. Two options considered were:

- Option 1 – Twin track guideway throughout with no maintenance track / cycleway in cutting; and
- Option 2 – Single track guideway throughout, which requires signalling, with maintenance track / cycleway in cutting.

5.3.34 The assessment undertaken for the two options is shown in Table 5.10. On the basis of this
the single track guideway is preferred as it is not likely to restrict operations and there are clear benefits of providing a maintenance and cycle track alongside the guideway.

Table 5.10 – Assessment of options at Trumpington Cutting

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Option 1: Twin track guideway and no maintenance track / cycleway</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Option 2: Single track guideway and maintenance track / cycleway</strong></td>
</tr>
<tr>
<td>Environment</td>
<td>Both options would impact on the County Wildlife Site.</td>
</tr>
<tr>
<td></td>
<td>No impact. Both options have same land take.</td>
</tr>
<tr>
<td>Land</td>
<td>Both options require the protection of the high pressure gas main and the stabilising of the cutting</td>
</tr>
<tr>
<td>Engineering feasibility</td>
<td>No impact. Not predicted to restrict capacity of this section.</td>
</tr>
<tr>
<td>Demand</td>
<td>Requires signalling to allow operation of bi-directional single track guideway, but limited impact on capacity and operations.</td>
</tr>
<tr>
<td>Operational implications</td>
<td>Provision of a cycleway was considered a key issue raised at consultation.</td>
</tr>
</tbody>
</table>

**Link to Addenbrooke’s Hospital**

5.3.35 The 2002 Annex E submission included provision of one crossing of the existing main proposed railway line to serve both the proposed new Addenbrooke’s link road, required for the southern fringe development, and the Scheme. However, these development proposals are still at an early pre-masterplan stage, and hence cannot be relied upon to deliver this link.

5.3.36 The optimum location for the link across to Addenbrooke’s Hospital is along the line of the public footpath FP47 (Cambridge). Alternatives utilising this alignment, comprising a tunnel under the main railway line or a bridge over it, were presented as part of the public consultation in the summer of 2003. Hence three options have been assessed:

- Option 1 – to provide a direct link over to the hospital at the most appropriate location along the line of the existing Right of Way (footpath 47) via a new tunnel;
- Option 2 – to provide a direct link over to the hospital at the most appropriate location along the line of the existing Right of Way (footpath 47) via a new bridge;
- Option 3 – to link the hospital site via a proposed new link road, assumed to be along the line of Hobson’s Brook.

5.3.37 With regard to the environmental impact of the link to Addenbrooke’s, the southern part of the City is an environmentally sensitive area and the Cambridge City Local Plan First Deposit Draft of 2003 states that a green corridor will be maintained in the Southern Fringe Area Action Plan for the development that takes place there. The assessment of the three options is shown in Table 5.11.
### Table 5.11 – Assessment of link to Addenbrooke’s Hospital

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option 1: New tunnel along line of existing Right of Way</strong></td>
<td><strong>Option 2: New bridge crossing along line of existing Right of Way</strong></td>
</tr>
<tr>
<td>Environment</td>
<td>Least visual impact. However there is the potential for flooding and significant impact on water resources (the aquifer).</td>
</tr>
<tr>
<td>Land</td>
<td>Both require similar amounts of land, greater than that for a single crossing of the railway.</td>
</tr>
<tr>
<td>Engineering feasibility</td>
<td>Requires complex engineering. Ongoing need for dewatering.</td>
</tr>
<tr>
<td>Demand</td>
<td>Direct connection to Addenbrooke’s through proposed development therefore maximising the potential for attracting passengers.</td>
</tr>
<tr>
<td>Operational implications</td>
<td>Connection to Addenbrooke’s by the most direct route provides faster journey. Tunnels less attractive to pedestrians and cyclists.</td>
</tr>
<tr>
<td>Public Consultation</td>
<td>No specific comments made on location of link, but respondents were keen on ensuring a link to Addenbrooke’s was provided as part of the scheme.</td>
</tr>
</tbody>
</table>

**5.3.38** In order to provide the most direct connection for the guided bus to Addenbrooke’s Hospital the best solution was considered to be a bridge over the main railway line along the line of the existing right of way (footpath 47). This would maximise the potential for attracting passengers whilst avoiding the potential impact on the aquifer and the complex engineering required and safety concerns for a tunnel. In addition, such a connection also ensures provision of a link to Addenbrooke’s without any reliance upon the timing for the delivery of the proposed southern fringe development.
Appendices

Appendix 5A  Option Appraisal Summary Tables
Appendix 5B  Alternatives Considered for the superCAM Scheme
References

1 New Approach to Appraisal (NATA), Department for Transport 1998
2 Guidance on the methodology for Multi Modal Studies (GOMMS), Department for Transport 2000
3 Cambridge to Huntingdon Multi-Modal Study (CHUMMS), Mouchel, 2001
4 Local Transport Today, 12 March 1998
6 Cambridge City Local Plan (First Deposit Draft) 2003
6. PLANNING POLICY CONTEXT

6.1 Introduction

6.1.1 Section 54A of the Town and Country Planning Act 1990 provides that all planning applications should be determined in accordance with the relevant policies in the development plan, unless other material considerations indicate otherwise. Cambridgeshire has two tiers of local authority therefore the development plan comprises both the structure plan and relevant local plans.

6.1.2 This section of the Environmental Statement (ES) sets out the planning policies that are relevant to the Scheme, and how these policies have been taken into account in the development of the Scheme and through the Environmental Impact Assessment (EIA) process. The table at the end of this section summarises the assessment against policy and guidance.

6.1.3 The CGB route runs through the County of Cambridgeshire and sits within the Cambridge Sub-Region. In addition to assessing the Scheme against national guidance contained in planning policy guidance notes and emerging planning policy statements, the Scheme has been assessed with regard to Regional Planning Policy Guidance for East Anglia (2000) and the Cambridgeshire and Peterborough Structure Plan ( Adopted December 2003).

6.1.4 The proposed CGB route runs through three district authority areas: Huntingdonshire; South Cambridgeshire; and Cambridge City. The Scheme must therefore be assessed with regard to policies in each of these authorities’ local plans. The route runs through or near to some designated areas protected by policy. Plans contained in Appendix 6A show the designated features within a 2 km corridor of the proposed route as identified on proposal maps and/or protected by policies of the plans in relation to the proposed route and stop locations. Consideration has also been given to the relevant policies contained in the Cambridgeshire and Peterborough Waste Local Plan (2003) and the Cambridgeshire Aggregates (Minerals) Local Plan (1991).

6.1.5 In addition the following plans and Government funded studies at the County and Sub-Regional level are of relevance:

- Cambridge to Huntingdon Multi Modal Study (CHUMMS), August 2001
- Cambridgeshire Local Transport Plan 2004-2011

6.1.6 In addition to the plans and studies referred to in this section other policy documents of relevance to specialist topics of the EIA are referred to where appropriate within the relevant sections.

Status of Development Plans

6.1.7 Deposit drafts or the review of development plans are material considerations. The weight accorded to these documents increases through each stage of the review process, particularly following public consultation and even more so following a public inquiry and publication of an Inspector’s report.

6.1.8 The Cambridgeshire and Peterborough Structure Plan has recently been adopted (October 2003) but is currently the subject to a legal challenge.

6.1.9 The Cambridgeshire Aggregates (Minerals) Local Plan was adopted in 1991. On 22 October
2003 Cambridgeshire County Council and Peterborough City Council also resolved to adopt the Cambridgeshire and Peterborough Waste Local Plan iv.

6.1.10 The review of the South Cambridgeshire Local Plan is at an advanced stage and the proposed policies must therefore be accorded considerable weight. The policies in the Deposit 1999 Plan viii amended by the Proposed and Further Proposed Modifications 2002ix and 2003x are therefore considered in this section.

6.1.11 As the review of the Cambridge City Local Plan xiis at an early stage (Deposit Draft consultation took place in June and July 2003), this review concentrates primarily on the adopted planxii, although for completeness the emerging plan is also reviewed.

6.1.12 In Huntingdonshire it is only necessary to consider the adopted Local Plan, 1995xiii as only the housing chapter of this Plan has recently been reviewed.

6.2 National Planning Policy Guidance (PPGs) and Statements (PPS)

PPG1 General Policy and Principlesxiv

6.2.1 PPG1 states that:

“In order to achieve sustainable patterns of development and to help to reduce the environmental impact of transport, local authorities should integrate their transport programmes and land use policies in ways which help to:

- Reduce growth in the length and number of motorised journeys;
- Encourage alternative means of travel which have less environmental impact; and hence
- Reduce reliance on the private car”

6.2.2 The key objectives of the planning system are to:

- Influence the location of different types of development relative to transport (and vica versa); and
- Foster forms of development which encourage walking, cycling and public transport use.

6.2.3 The Scheme complies with these objectives through encouraging travel by a more sustainable mode of transport and through the integration of land use, development schemes and public transport.

PPG2: Green Belts (1995)xv

6.2.4 Planning Policy Guidance Note 2 (PPG2) states that the fundamental aim of Green Belt policy is to “prevent urban sprawl by keeping land permanently open” (para. 1.4). Furthermore the most important attribute of Green Belts is their openness (para 1.4). In addition there are five purposes of Green Belts:

- “to check the unrestricted sprawl of large built-up areas;
- to prevent neighbouring towns from merging into one another;
- to assist in safeguarding the countryside from encroachment;
6.2.5 There is a general presumption against “inappropriate development” in Green Belts (para. 3.1). Inappropriate development is that which would undermine any of the purposes of the Green Belt. The use of the rail corridor for a transport system through the Green Belt is already recognised within the development plans and the use would not conflict with the purpose of the Green Belt.

PPG7: The Countryside – Environmental Quality and Economic and Social Development (1997, amended 2001)

6.2.6 PPG7 sets out the Government’s policy for the countryside. The guidance emphasises the need to accommodate necessary change in rural areas while maintaining and, if possible, enhancing the quality of the environment (para 1.4). It also states:

“Wealth creation and environmental quality are increasingly interconnected.”

6.2.7 Key objectives of PPG7 include meeting the economic and social needs of people who live and work in rural areas and improving the viability of existing villages and market towns.

6.2.8 PPG7 also sets out planning policy on the use of agricultural land and places an onus on local planning authorities to pay due consideration to the best and most versatile agricultural land. This is land that falls under the Department of Environment, Food and Rural Affairs (DEFRA) agricultural land definition of Grades 1, 2 or 3a. As set out at Annex B7 of PPG7:

“Land quality will normally be the most important factor in considering the impact of development on agriculture.”

6.2.9 PPG7 also states that:

“Where development of agricultural land is unavoidable, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality, except where other sustainability considerations suggest otherwise.” (para 2.17)

6.2.10 Some best and most versatile land (BMV) is required for the Scheme, although any loss has to be assessed in relation to the very high presence of BMV within Cambridgeshire. The impact on agriculture has been assessed in Section 7.


6.2.11 This Draft PPS was subject to a period of public consultation that closed in December 2003, and will in due course replace PPG7. Most of the policies in PPS7 reproduce, or are closely based on PPG7, up-dated as appropriate. PPS7 identifies the following as key objectives for the countryside:

“To raise the quality of life and the environment in rural areas;

To promote more sustainable patterns of development and support an urban renaissance;
To make sustainable improvements in the economic performance of all English regions and, over the long term, reduce the persistent gap in growth rates within and between the regions”. (Part 2, pg 5)

6.2.12 The guidance emphasises sustainability as the basis on which all development proposals should be based and the need to ensure an integrated approach to the consideration of social progress, effective protection of the environment, prudent use of natural resources and maintaining high and stable levels of economic growth and employment. By encouraging more sustainable patterns of development, the Scheme accords with one of the key objectives of PPS7.

PPG9: Nature Conservation (1994)xviii

6.2.13 PPG9 provides guidance on nature conservation and how these policies are to be incorporated into land-use planning.

6.2.14 The Government’s objectives for nature conservation are:

“to ensure that its policies contribute to the conservation of the abundance and diversity of British wildlife and its habitats, or minimise the adverse effects on wildlife where conflict of interest is unavoidable, and to meet its international responsibilities and obligations for nature conservation” (para.2).

6.2.15 PPG9 states that nature conservation can be a significant material consideration in determining many planning applications. However, it also states that:

“local planning authorities should not refuse permission if development can be subject to conditions that will prevent damaging impacts on wildlife habitats or important physical features, or if other material factors are sufficient to override nature conservation considerations” (para 27).

6.2.16 PPG9 also emphasises the need to take into account the nature conservation value of non-statutory sites and areas without any formal designation:

‘Statutory and non-statutory sites, together with countryside features which provide wildlife corridors, links or stepping stones from one habitat to another, all help to form a network necessary to ensure the maintenance of the current range and diversity of our flora, fauna, geological and land-form features and the survival of important species’ (para 14).

6.2.17 However, it also states that local planning authorities should have regard to the relative significance of international, national, local and informal designations in considering the weight to be attached to nature conservation interest.

6.2.18 The Scheme does not impact on sites of international or national importance in nature conservation terms and mitigation measures are proposed to address the impact on locally designated sites (Section 11).
PPG13: Transport (2001)\textsuperscript{xxvi}

6.2.19 The main objectives of PPG13 are to:

- “promote more sustainable transport choices for both people and for moving freight;”
- “promote accessibility to jobs, shopping, leisure facilities and services by public transport, walking and cycling; and”
- “reduce the need to travel especially by car” (para 4).

6.2.20 In terms of public transport, PPG13 states that

“the aim should be to establish a high quality, safe, secure and reliable network of routes, with good interchanges, which matches the pattern of travel demand in order to maximise the potential usage of public transport” (para. 72).

6.2.21 Local planning authorities are required to work in partnership with public transport providers and use their planning and transport powers to improve public transport. In preparing development plans and determining planning applications local planning authorities should:

- “identify the key routes for bus improvements and priority measures, and the measures that will be taken;”
- “explore the potential, and identify any proposals, for improving rail travel… including the reopening of rail lines or the creation of new stations on existing rail lines, light rail or guided bus routes.” (para. 74).

6.2.22 Annex C of PPG13 states that:

“care must be taken to avoid or minimise the environmental impact of any new transport infrastructure projects, or improvements to existing infrastructure; this includes the impacts which may be caused during construction” (para 1 Annex C).

6.2.23 The Scheme seeks to address many of the objectives contained in PPG 13 and seeks enhanced integration of land use, development schemes and public transport.

PPG15: Planning and the Historic Environment (1994)\textsuperscript{xxv} and the Planning (Listed Buildings and Conservation Areas) Act 1990\textsuperscript{xxi}

6.2.24 PPG15 provides planning guidance for development involving listed buildings and conservation areas. The requirements set out in the Planning (Listed Buildings and Conservation Areas) Act 1990 are also addressed.

6.2.25 Section 72 of the Planning (Listed Building and Conservation Area) Act 1990 states that in determining applications for development in Conservation Areas:

“special attention should be paid to the desirability of preserving and enhancing the character or the appearance of the area”.

6.2.26 Similarly Section 66 of the Planning (Listed Building and Conservation Area) Act 1990 states that in determining applications affecting listed buildings or their settings, local planning authorities should have:
“special regard to the desirability of preserving the building or its setting”.

6.2.27 PPG15 makes it clear that the setting of a listed building not only includes the ancillary land around the building, but in many cases, can include other adjacent properties. Paragraph 2.17 states that:

“The setting of individual listed buildings very often owes its character to the harmony produced by a particular group of buildings (not necessarily all of great individual merit) and the quality of the spaces created between them...where a listed building forms an important visual element in a street, it would probably be right to regard any development in the street as being within the setting of the building”.

6.2.28 The Scheme runs through several conservation areas and past a number of listed buildings. Guidance in PPG15 has been taken into account where the Scheme could potentially impact on listed buildings and other features of historic importance (see Section 10).

**PPG16: Planning and Archaeology (1990)**

6.2.29 PPG 16 sets out national planning policy on archaeological remains and how they should be preserved or recorded both in an urban setting and the countryside. The desirability of preserving an ancient monument and its setting is a material planning consideration, whether that monument is scheduled or unscheduled (para. 18).

6.2.30 The guidance emphasises that the key to informed planning decisions involving archaeological remains is for consideration to be give early on, before a formal planning application is made, as to whether archaeological remains exist on a site where development is planned and the implications for the development proposal (para 12).

6.2.31 PPG16 sets out a presumption in favour of physical ‘preservation in situ’ of archaeological remains and encourages developers to prepare sympathetic designs which avoid disturbing the remains. However, paragraph 13 acknowledges that preservation in situ is not always feasible, and in some circumstances, an archaeological excavation for the purposes of preservation by record may be acceptable.

6.2.32 Archaeological site investigations have been undertaken in order to assess whether important archaeological remains are present in the land to be acquired for the Scheme. Section 9 sets out the findings and recommendations from these investigations.

**PPG23: Planning and Pollution Control (1997)**

6.2.33 PPG23 sets out the links between the land use planning and pollution control systems and states that pollution can arise from a variety of sources. A number of Government pollution control policies are set out, including those of preventing pollution at source and of minimising the risk to human health and the environment.

6.2.34 PPG23 also sets out Government policy on contaminated land. Historic land contamination should be a material planning consideration which must be taken into account at various stages in the planning process.

6.2.35 A planning authority may require remediation works additional to those that would be required under the Environmental Protection Act (EPA) 1990. For example, in situations where the new land use is more sensitive in health and safety terms than the existing land use, or where the process of ground disturbance due to redevelopment leads to increased environmental risks.
PPG23: Planning and Pollution Control – Consultation Paper (2002)\textsuperscript{xxiv}

6.2.36 A consultation draft of a revised PPG23 was published in 2002. This provides more up-to-date policy in relation to pollution control, air pollution, water pollution and climate change. The revised guidance advises that water and air quality relating to development are material considerations in planning decisions.

6.2.37 This guidance has been taken into account in the assessment of the Scheme and in any recommendations for remediation (see Sections 8, 12 and 17).

PPG24: Planning and Noise (1994)\textsuperscript{xxv}

6.2.38 PPG24 gives guidance to local authorities on the use of their planning powers to minimise the adverse impact of noise and outlines the considerations to be taken into account in determining applications both for noise-sensitive development and for activities which would generate noise.

6.2.39 Paragraph 10 states that much development which is necessary for the creation of jobs and the construction and improvement of essential infrastructure will generate noise. The planning system should not place unjustifiable obstacles in the way of such development. However, local authorities should ensure that development does not cause an unacceptable level of disturbance. Paragraph 13 sets out a number of measures to control the source of, or limit exposure to noise.

6.2.40 Annex 3 of PPG24 (paragraphs 1-5) gives more detailed guidance on the assessment of noise from road traffic and from railways. Annex 5 gives advice on specifying noise limits from a new source of noise. This guidance has been taken into account in the assessment with appropriate mitigation measures proposed (see Section 14).

PPG25: Development and Flood Risk (2001)\textsuperscript{xxvi}

6.2.41 PPG25 establishes the principle that

\begin{quote}
the susceptibility of land to flooding is a material consideration in determining planning applications (para. 57).
\end{quote}

6.2.42 It states that planning authorities should recognise the importance of functional flood plains and apply the precautionary principle to the issue of flood risk.

6.2.43 It acknowledges that a sustainable approach to flood risk would involve avoiding additional development in some areas but where this is not possible development should be designed with an appropriate level of protection.

6.2.44 The guidance states that those proposing developments in flood plains are responsible for providing an assessment of whether the Scheme is likely to be affected by flooding, whether it would increase flood risk elsewhere and the measures to address these. They are required to satisfy the local planning authority that any flood risk to the development or additionally elsewhere would be managed with the minimum environmental effects (para. 20).

6.2.45 PPG25 has been taken into account for those parts of the route within the flood plain and appropriate mitigation measures incorporated into the design/engineering of the Scheme. (see Section 17).
6.3 National Studies

Cambridge to Huntingdon Multi Modal Study (August 2001) (CHUMMS) vi

6.3.1 The Study was undertaken on behalf of the Department of Transport, Local Government and the Regions (DTLR) with the aim to:

"recommend multi-modal transport plans, which address the most urgent transport problems in the corridor between Cambridge and Huntingdon, looking in particular at opportunities for modal shift from the car”

6.3.2 One of the key recommendations of the Study was the provision of a guided bus system. The study states that:

"Improved public transport is seen as a key to reducing congestion and improving the environment, whilst maintaining the economic vitality of the Cambridge to Huntingdon Corridor. The study recommends a guided bus system that uses the disused Cambridge to St. Ives railway corridor with extensions to Trumpington and Addenbrooke’s Hospital, and to Godmanchester and Huntingdon. The system would provide a high quality alternative to the car for the large number of people who travel between Cambridge, Huntingdon and the intervening towns and villages for work, shopping or leisure. It would be flexible and capable of expansion into a wider public transport network (e.g. to Waterbeach, Cambourne and Bar Hill) and could be built earlier than other public transport options, which were examined. To make the system as accessible as possible it is recommended that park and ride (P&R) and improved facilities for cyclists should be included in the detailed design” (Section 5.2.1).

6.3.3 The East of England Local Government Conference (EELGC) has considered the CHUMMS recommendations and has stated that CHUMMS conforms with the emerging Regional Transport Strategy and the recommendations of RPG6.

6.4 Regional Planning Guidance

RPG 6: Regional Planning Guidance for East Anglia to 2016 (2000) ii

6.4.1 RPG6 sets out the strategic planning policy framework for the East Anglia region for the period 1995 to 2016. This area includes Cambridge and the Cambridge Sub-Region. RPG6 establishes the levels of growth that each part of the region should seek to accommodate up to 2016. It provides the policy framework to ensure that this growth is sustainable and maintains the qualities of the region.

6.4.2 The strategic planning guidance provided in RPG6 informed the review of the Cambridgeshire and Peterborough Structure Plan.

6.4.3 RPG6 acknowledges the continuing development pressures in Cambridge and the Cambridge Sub-Region. It states:

“the rapid growth experienced in East Anglia has placed pressures on much of its infrastructure” (para. 2.10).

6.4.4 This includes transport infrastructure, resulting in problems such as congestion within Cambridge and on the main routes into the City. In the context of these pressures, RPG6
seeks to achieve a vision of the region where development is set in a sustainable framework where:

- “Economic opportunities are maintained and improved;
- there is increasing social equity for all areas;
- the environment is protected and enhanced while the distinctiveness of each locality is maintained; and
- natural resources are conserved.” (para. 3.2)

6.4.5 Policy 8 of RPG6 states that provision will be made in Cambridgeshire for an average annual increase of 4,000 new dwellings. Of these, 2,800 should be provided each year in the Cambridge Sub-Region. This increase is required to support the continuing economic growth of the Cambridge Sub-Region (para. 4.16). The RPG strategy for the Cambridge Sub-Region:

“has the objective of achieving a more sustainable balance between rates of growth in jobs and housing by allowing it to accommodate a higher proportion of the region’s housing development” (para. 4.18).

6.4.6 In order to ensure this future development in and around Cambridge is accommodated in a sustainable way, RPG6 recognises the need to improve the transport infrastructure in the Sub-Region. Policy 21 therefore states that the vision and planning framework for the Cambridge Sub-Region should promote a

“more sustainable and spatially concentrated patterns of development and more sustainable travel patterns”.

6.4.7 Policy 22 requires development plans to identify locations for housing in sustainable locations, including existing and new settlements where there is “good public transport access to Cambridge”.

6.4.8 Policy 25 identifies a number of criteria that should be used for identifying the site for a new settlement, including:

“location on or facilitating the provision of high quality public transport”.

6.4.9 RPG6 proposes a full regional transport strategy for East Anglia. It states that this strategy should recognise the dispersed settlement patterns and economic opportunities of the Cambridge Sub-Region. Taking account of these and other considerations, RPG6 states that the transport strategy should:

- “identify regional priorities for transport investment and management across all modes to support the development strategy;
- assess the existing and future roles of the strategic road and rail communication links, and their contribution to the economic development of the region;
- identify main routes and areas for promotion and improvement of public transport” (para 6.3).

6.4.10 RPG6 includes within the strategic priorities for road and rail infrastructure:
“infrastructure to support the sustainable economic growth of the Cambridge Sub-Region and other key development locations” (para 6.28).

6.4.11 RPG6 states that a sustainable transport strategy should reconcile environmental, economic and social considerations. It should seek to:

“improve accessibility to and within the region” [and]

“increase opportunities for travel by sustainable transport modes....” (para. 6.5).

6.4.12 Policy 27 seeks to increase opportunities for more sustainable travel modes. It states the local transport plans and development plans should include measures including the following:

- “enhance public transport (bus and rail) through measures to improve reliability, frequency, accessibility (particularly for people with disabilities), coverage and travel information;
- increase opportunities for integration by developing (in cooperation with transport operators and others) high quality interchange facilities at and between bus and rail stations (particularly in the key locations of Cambridge...).” (page 39)

6.4.13 Policy 31 aims to reduce the environmental impacts of transport by maximising energy efficiency and minimising emissions and maximising the use of the existing transport infrastructure. Any new transport infrastructure projects must respect the countryside, valued landscape, natural habitats and mineral resources of the region.

6.4.14 Policy 35 further states that optimum use should be made of the existing infrastructure in providing sustainable transport provision. New transport infrastructure should be appraised against the following criteria to assess their suitability:

- “the relief of localised environmental problems and the protection of environmental resources;
- safety benefits;
- enhanced economic competitiveness; and
- improved conditions for pedestrians and cyclists; and access to public transport.” (para. 6.26)

6.4.15 Given the future increase in employment and housing developments in the Cambridge Sub-Region, as set out in RPG6, it is increasingly important that adequate sustainable transport is provided, including public transport. RPG6 advises that enhanced public transport provision should make maximum use of the existing infrastructure and have regard to its environmental impact. These objectives have been taken into account in the development of the Scheme through re-use of a disused transport corridor to link existing areas of transport demand as well as proposed growth areas.

6.4.16 Policy 38 is concerned with the protection of designated areas and states that development plans should give priority to protecting and enhancing areas designated at the international or national level for their intrinsic importance in terms of nature conservation value.

6.4.17 Policy 39 is concerned with local environmental designations and requires local planning authorities to take positive steps to conserve and enhance area covered by local landscape and wildlife designations, such as Special Landscape Areas, Local Nature Reserves and County
6.4.18 **Policy 40** is concerned with the conservation of the historic environment and requires development plans to include policies to protect the built and historic heritage.

6.4.19 **Policy 42** is concerned with safeguarding and creating habitats and requires local planning authorities to safeguard threatened habitats and create new habitats.

6.4.20 **Policy 49** states that development plans should include policies for the protection of the best and most versatile agricultural land.

6.4.21 **Policy 51** states that local planning authorities should seek to ensure that the land-use planning system makes an appropriate contribution to the achievement of national air quality objectives. They should also ensure that air quality is properly considered alongside other material considerations in the planning process, particularly where any air quality management areas have been designated.

**Regional Planning Guidance Note 14 and Regional Transport Strategy**

6.4.22 Following the change in regional boundaries in 2001 revised regional guidance for the East of England region which includes Cambridgeshire is being prepared by the East of England Regional Assembly. There has been some delay to the timetable for producing RPG14 following the requirement to include district housing figures. It is anticipated that the first draft for consultation will be published in April 2004, with Public Examination in October 2004 and final publication in September 2005.

6.4.23 A first working draft of the Regional Transport Strategy document has been produced in 2003. A draft background paper on determining investment priorities for the Regional Transport Strategy has also been prepared. This document identifies the guided bus as a committed scheme that accords with many of the objectives and policies of the Regional Transport Strategy.

6.5 **Cambridgeshire and Peterborough Structure Plan (Adopted October 2003)**

6.5.1 Consultation on the deposit draft of the Cambridgeshire and Peterborough Structure Plan (CPSP) took place in Spring 2002, with the Examination in Public in November and December 2002. Following the Panel’s Report and subsequent Proposed Modifications, the Structure Plan was adopted in October 2003. The adopted Structure Plan is currently subject to a legal challenge.

6.5.2 The Plan identifies the need for the development of sustainable public transport, particularly in the Cambridge Sub-Region to meet the needs of the economy and a growing population. The principle of the Scheme has considerable support within the Structure Plan and the relevant local plans.

**Chapter 1: Providing for Today and the Future**

6.5.3 **Policy P1/2 – Environment Restrictions on Development** states that no new development will be permitted within or which is likely to adversely affect:

- “internationally and nationally important nature conservation areas;

- Scheduled Ancient Monuments or other nationally important archaeological sites or their settings;
6.5.4 Although the route passes through the Flood Plain of the River Great Ouse, the Environment Agency has agreed that the Scheme would not have an impact on the existing flood regime (see Section 17). In addition, internationally and nationally important nature conservation sites are not adversely affected. The Scheme also passes adjacent to a Scheduled Ancient Monument (SAM) at Swavesey (see Section 9). However, it is considered that the Scheme would not have any adverse impact on the SAM.

6.5.5 The policy also identifies areas where development will be restricted:

- “in the countryside unless the proposals can be demonstrated to be essential in a particular rural location;
- where there is an unacceptable risk to the quality of ground or surface water;
- where the best and most versatile agricultural land would be significantly affected;
- to prevent sterilisation of workable mineral deposits;
- where there could be damage, destruction or loss to areas that should be retained for their biodiversity, historic, archaeological, architectural, and recreational value”.

6.5.6 This policy is addressed throughout the ES, but particularly in Sections 7, 9, 10, 11 and 17.

Chapter 6: Supporting Development

6.5.7 Policy P6/1 – Development Related Provision states that development will only be permitted where the additional infrastructure and community requirements generated by the proposals can be secured, which may be by condition or legal agreement or undertaking.

6.5.8 The Scheme would contribute significantly to providing the necessary infrastructure to support growth in the Cambridge Sub-Region (see Section 16).

6.5.9 Policy P6/3 – Flood Defence seeks to ensure that there are sufficient flood defence measures and design features incorporated within development proposals to ensure that there is not an unacceptable risk of flooding. The Scheme complies with this policy with respect to that part of the Scheme in areas liable to flood to the south of St Ives (see Section 17).

Chapter 7: Resources, Environment and Heritage

6.5.10 Policy P7/1 – Sites of Natural and Heritage Interest states that the following sites will be protected from the adverse effects of development:

- “habitats where a statutorily protected species is known to exist or has previously been recorded and has the potential to re-colonise;
- nationally registered historic parks and gardens;
- Regionally Important Geological Sites;
- Local Nature Reserves;
6.5.11 The Policy also states that in circumstances where development is necessary, disturbance should be minimised, and mitigating and compensatory measures, including replacement habitat creation and enhancement of existing features, will be required.

6.5.12 No internationally or nationally designated sites would be affected by the Scheme. The route passes through and adjacent to County and City Wildlife Sites and in some sections would involve land-take and removal of habitat from these areas. However, through habitat creation and other measures elsewhere along the route the impact can be reduced to minor short-term impacts in most cases, as detailed in Section 11.

6.5.13 Policy P7/2 Biodiversity states:

“all development will seek to conserve and enhance the biodiversity value of the areas which they affect. Landscape features of major importance to wild fauna and flora will be retained, managed and enhanced. Where damage is unavoidable agreements will be sought to re-create features on or off-site”.

6.5.14 The potential impact on these areas is assessed in Section 11 and appropriate mitigation measures proposed in line with Policy P7/1 and 7/2.

6.5.15 Policy P7/4 – Landscape states that:

“development must relate sensitively to the local environment and contribute to the sense of place, identity and diversity of the distinct landscape character areas.....”.

6.5.16 Although the Scheme would have some adverse impacts on the landscape primarily due to loss of vegetation and land-take, there are opportunities for replacement planting and positive enhancement measures. These measures have been formulated in consultation with the local authorities and have been designed to ensure that the Scheme as far as possible fits within the existing landscape character. A detailed assessment of the landscape and visual impact of the Scheme, taking into account these policy requirements has been undertaken in Section 13.

6.5.17 Policy P7/6 – Historic Built Environment states that local planning authorities will protect and enhance the quality and distinctiveness of the historic built environment.

6.5.18 The Scheme does not have significant adverse effects on the historic environment. The guided route passes through the western edge of a Conservation Area at Westwick and clips the edge of the Swavesey Conservation Area. The on street route passes through FOUR conservation areas in Huntingdonshire District. However it has been assessed that the Scheme would not have any significant adverse impacts on these features. The impact of the Scheme on conservation areas and listed buildings is assessed in full in Sections 9 and 10.

6.5.19 Policy 7/8: Safe and Healthy Air, Land and Water states that

“new development will be located and designed to minimise and where possible avoid air, land and water pollution. Individual and cumulative impacts of development will be taken into account in the consideration of Scheme and developers will be expected to take appropriate avoidance and mitigation measures”.

• County and City Wildlife Sites;
• Protected Roadside Verges”.
6.5.20 The proposals for drainage scheme and use of Euro IV vehicles minimise air and water pollution during operation and adherence to a Code of Construction Practice would ensure minimal impacts during construction. Sections 8, 12 and 17 address this policy consideration.

**Chapter 8: Movement and Access**

6.5.21 The plan sets out the following objectives for transport:

- "seeking to improve the links between land use and transport;
- encouraging sustainable modes of transport such as walking and cycling;
- requiring new development to make provision for integrated and improved transport infrastructure;
- ensuring the demand for car travel is managed through the introduction of appropriate measures;
- setting out the elements which will improve bus and community transport services;
- encouraging the transfer of freight to be undertaken by sustainable modes of transport."

6.5.22 The Scheme would make a substantial contribution towards meeting these objectives.

6.5.23 **Policy 8/6 – Improving Bus and Community Transport Services** states that high quality public transport will be developed within the urban areas of Cambridge and Peterborough and along corridors between cities and market towns. A High Quality Public Transport Service (HQPTS) is defined in the in the foot note to Policy 8/6 as one that:

- "provides at least a 10 minute bus frequency during the peak periods and a 20 minute frequency inter peak. If a parallel rail service of half hourly frequency is provided, the service would meet the high quality standard if the accompanying bus service was at least 15 minute frequency in the peak periods and 30 minute frequency inter peak. Weekday evening frequencies would run ½ hourly until 11pm, on Saturday, ½ hourly 7am until 6pm, then hourly and on Sunday hourly 8am until 11pm; and
- provides high quality, low floor/easy access buses, air conditioning, prepaid/electronic ticketing, real time information and branding to encourage patronage”.

6.5.24 The Scheme provides a new public transport corridor in accordance with the objectives of this policy and is consistent with this definition of HQPTS (see Section 4).

6.5.25 **Policy P8/7 – Improvements to Rail Services** states that “former rail routes with the potential for re-use as transport corridors will be identified in Local Plans and protected”. The Scheme utilises a disused rail corridor in accordance with the objectives of this policy.

6.5.26 **Policy P8/8 – Encouraging Walking and Cycling** seeks to promote the capacity, quality and safety of walking and cycling networks and seeks to provide safe and convenient pedestrian and cycle environments. The Schemes complies with this policy through provision of a pedestrian and cycle route alongside the route.

6.5.27 **Policy P8/10 – Transport Investment Priorities** identifies:
“a rapid transit system to serve key centres in the Cambridge Sub-Region, initially between Cambridge and Huntingdon utilising the former St Ives railway line and between Trumpington and Cambridge City Centre. The Scheme would improve access to major development sites.”

6.5.28 Para 8.41 states that:

“the Cambridge to Huntington Rapid Transit System(CHRT) is a major scheme for the Cambridge Sub-Region in terms of maximising public transport opportunities along the A14 corridor, particularly from the Longstanton/Oakington new settlement, and providing congestion relief. It will also be the fore-runner of other improvements to upgrade that section of the A14”.

6.5.29 Para 8.42 states that:

“track running sections of the CHRT using the former Cambridge – St Ives railway line and a section of line from the rail station to Trumpington will be integrated with road-running sections along radial routes to the city centre and between Huntingdon and St Ives.”

6.5.30 The Scheme accords with the policy and supporting text through the provision of a guided bus system along the route identified in the Structure Plan and by maximising public transport opportunities along the A14 corridor.

Chapter 9: Strategy for the Cambridge Sub-Region

6.5.31 The Strategy for the Cambridge Sub-Region acknowledges that a major problem in the area has been the lack of investment in infrastructure to support economic and population growth. Public transport infrastructure has improved, but is inadequate to meet current needs and falls a long way short of future requirements.

6.5.32 The Strategy for the Sub-Region incorporates key elements of the vision in the Regional Planning Guidance, including providing new homes, major employment and business development in locations well served by public transport, primarily in or close to Cambridge, in a new settlement and in the market towns. A number of policies within this chapter of the Plan identify the rapid transit scheme as an integral part of the strategy for the Cambridge Sub-Region.

6.5.33 Policy P9/3 seeks the development of a new settlement at Oakington/Longstanton “which can be well served by a rapid transit system based on the St Ives railway line”. The Scheme allows for a connection into the new settlement scheme in accordance with this policy.

6.5.34 Policy P9/8 – Infrastructure Provision states that a comprehensive approach will be adopted to secure infrastructure needed to support the development strategy for the Cambridge Sub-Region. Sources of funding and land holdings will be brought together within a co-ordinated infrastructure programme, including transport provision, to be delivered by a partnership (the Infrastructure Partnership) constituted by the local authorities and other key stakeholders. The Scheme is intended to be an important component of the infrastructure needed for the sub-region in accordance with this policy objective.

6.5.35 Policy P9/9 – Cambridge Sub-Region Transport Strategy requires:
“the provision of a network of high quality public transport services along key transport corridors connecting Cambridge with the Market Towns, other centres and major development sites”

6.5.36 The policy states that the first phase of this high quality network:

“will be a rapid transit system between Cambridge, St Ives and Huntingdon and between the city centre and Trumpington”.

6.5.37 The Scheme responds directly to this policy objective by providing the first phase of a network of high quality public transport, that is needed for the sub-region.

6.5.38 The policy also identifies the transport infrastructure requirements at key development sites, including rapid transit links to Cambridge Northern Fringe, South and West of Addenbrooke’s Hospital and South and East of Trumpington, a new settlement at Longstanton/Oakington and to support development at Huntingdon and St Ives market towns. The Scheme responds to this policy objective by allowing for links to these key development sites and areas.

6.6 County Local Plans

Cambridgeshire Local Transport Plan (2004-11) vii

6.6.1 This is the current Local Transport Plan (LTP), submitted to Government in July 2003. A positive decision from the Government on the level of funding was announced in December 2003. Funding under this plan will begin from April 2004 and the first Annual Progress Report (APR) reporting on this plan will be submitted in July 2005. The appendices include the bid for the CGB, made as part of the APR 2001-2002.

6.6.2 Within the framework of the Structure Plan, Cambridgeshire County Council’s Local Transport Plan (LTP) defines a countywide transport strategy to 2011 and has seven key objectives:

- “to make travel safer;
- to develop integrated transport;
- to promote sustainable transport such as public transport, walking and cycling;
- to maintain and operate efficient transport networks;
- to create a transport system accessible to all;
- to provide a transport system which meets the needs of the economy; and
- to protect and enhance the environment”.

6.6.3 Key points of the strategy for Cambridge and the surrounding area include:

- “reducing car dependence through demand management and investment in transport systems that encourage the use of alternatives to private cars;
- strengthening radial public transport links to the Sub-Region;
- developing bus and rail services and interchanges, including park and ride; and
- developing cycle routes within the city and linkages to nearby villages”.
6.6.4 Within the LTP the problems of the Cambridgeshire Sub-Region have been addressed in detail. The LTP specifically suggests that rapid transit between Cambridge and Huntingdon/St Ives would meet the aims of the strategy and would allow for significant improvements to be made in journey times and reliability.

**Cambridgeshire Local Transport Plan – 2001** and **Annual Progress Reports 2002 and 2003**

6.6.5 The Local Transport Plan (2001) covers the period to 2006. A bid for funding for the CGB was set out at Appendix 10 of The 2001-2002 Annual Progress Report (ARP). The APR described the key features of the proposals:

- “a 40km system comprising 23km of guided busway, supported by 17km of on street provision incorporating bus priority;
- quality infrastructure including park and ride sites at St Ives and Longstanton, CCTV, bus stops equipped with real time information and on-street ticketing;
- maximised benefits – speed and ride quality on segregated sections and flexibility of route between St Ives and Huntingdon; and
- quality partnerships underpinning open access arrangements to deliver a high quality fully flexible service, maximise interchange opportunities, patronage and modal shift.”

6.6.6 The Local Transport Plan APR 2001-2002 (Appendix 10) concluded that:

- “the guided bus scheme would provide a flexible transport system for the A14 corridor, utilising segregation where possible and bus priorities elsewhere;
- improvements on the A14 and the delivery of the proposed new settlement near Longstanton/Oakington were to be accompanied by the completion of a high quality public transport system;
- modelling work indicated that the scheme would be financially viable at the predicted operating level;
- the scheme would bring about journey time benefits to users and non users (principally car drivers on the A14 alike); and
- the scheme would result in accident savings on the A14.”

- The bid received a positive response from the Government, with recognition that if outstanding issues could be resolved, a decision on the funding of the Scheme could be made prior to the next APR settlement.

6.6.7 The Scheme accords with the County’s description of the Scheme as set out in the above extract from the 2001-2002 APR.

6.6.8 The 2002-2003 APR provides an up-date on progress of the projects and states that:

“Progress during 2003/2004 to date has focussed on refinement of the scheme, further modelling work and sensitivity analysis for DfT as part of the Annex E bid assessment and preparation for a comprehensive public consultation on the scheme during July 2003.”
6.6.9 The Scheme passes adjacent and through sites which have been subject to aggregate extraction and which are now largely restored i.e. at Fen Drayton and Meadow Lane, St Ives. In respect of the latter gravel extraction has taken place on a section of the old railway line.

6.6.10 The policies of this Plan promote sustainable waste management, and should be taken into account in considering the management and disposal of any waste that may arise, for example inert waste such as soils and rubble. Any waste that is removed from the site should be taken to a licensed waste site for management/disposal.

6.6.11 The Scheme seeks to address the policy objectives of this plan through responding to the waste hierarchy principles of prioritising reduction, re-use and recovery of materials over disposal of waste during the construction stage of the project.

6.7 Local Plans

6.7.1 The Scheme would run through three local authority areas. These are Huntingdonshire District Council, South Cambridgeshire District Council and Cambridge City Council. The policies in the three local plans that have been prepared by these authorities are assessed in turn below. This includes a review of those policies relating to improvements to public transport and sustainable development as well as reviews of the policies related to the land use designations that can be found along the proposed CGB route (as identified in the plans at Appendix 6A).

Cambridge City Council Local Plan (1996) xii

6.7.2 The Cambridge Local Plan (CLP) was adopted by Cambridge City Council in November 1996. A Deposit Draft Local Plan was published for public consultation in June 2003. Given that the emerging Local Plan is in early stages of preparation, this section has focused on the policies contained in the 1996 adopted Local Plan. Nevertheless, the Scheme is also assessed against some of the key policies of the emerging Plan.

6.7.3 One of the two stated objectives of the CLP is to enhance access to a range of opportunities. One of the stated means of achieving this is by:

"providing adequate local public transport and locating new facilities so they are accessible by public transport, foot and bicycle" (para. 2.38-2.40).

6.7.4 It is recognised that to address the adverse environmental impacts caused by increased commuting and congestion following the rapid economic growth of the late 1980s, provisions must be made to enable sustainable economic growth. Para. 2.41 of the CLP states that this should include well located and appropriate public transport. The CLP therefore advocates the potential for:

"an advanced public transport system” in Cambridge, including links to park and ride sites” (para. 2.51).

Transport

6.7.5 The transport strategy is an integral part of the overall strategy of the CLP. The essential elements of the transport strategy include:
“increasing the role played by public transport, particularly buses, including bus based park and ride and bus priorities;

• providing bus priorities, park and ride services and improved local rail services as alternatives to car use;

• improving public transport, making the best use of existing infrastructure and promoting infrastructure and service improvements where this adds to overall efficiency;

• making greater use of existing railway lines both for passengers and for freight.” (para. 14.26-28 and 14.31)

6.7.6 **Policy TR12** makes specific provision for the development of a advanced public transport system along the former Cambridge to St. Ives railway line. The proposals map also indicates the area to which this policy relates. The policy states that:

“Land will be safeguarded along a section of the redundant Bedford railway line to assist in the possible provision of an advanced public transport system. In addition land will be safeguarded along the former Cambridge to St. Ives railway line either for use in connection with an advanced public transport system or for the reuse of the line for rail passenger services. Priority will be given to investigating the possibility of providing a link between these two sections of safeguarded land with a view to providing a comprehensive advanced public transport system within the City.”

6.7.7 The Scheme complies with this policy. The text supporting this policy acknowledges that a light rail system would not be feasible along this route for financial and environmental reasons. It therefore recommends that there is an investigation of options for the route as a busway and/or cycleway.

6.7.8 Much of the proposed CGB route on the road within urban areas runs along the Bus Priority Corridor identified on the proposals map. **Policy TR31** states that the City Council will encourage the Highway Authority to implement bus priority measures, particularly to park and ride services, where operational benefits would result. **Policy TR32** states that the environmental impact and operational benefits of any bus priority measures must be evaluated. In addition, road widening for bus lanes would only be considered if there was no viable alternative. Sections 4 and 16 consider these policies and assesses the impact on any proposed bus priority measures associated with Scheme.

**The Natural Environment**

6.7.9 The proposed route passes through and abuts a number of planning designations, including a number of environmental designations, as shown on Figures in Appendix 6A. These are summarised in turn below.

6.7.10 **Policy NE1** states that the Council would not grant permission for development which would adversely affect the character of the Area of Best Landscape as defined on the Proposals Map. The Scheme passes through a designated Area of Best Landscape (ABL) to the west of Trumpington, and is assessed in Section 13. The assessment has concluded that although there would be landscape and visual impacts, the impacts on landscape character would be minor and that the ABL would not be significantly affected.

6.7.11 The proposed route would pass through a section of Green Belt between the southern edge of
the built-up area of Cambridge and Trumpington. Policy NE3 states that the special character of Cambridge is to be protected by the Green Belt. It should be noted that the proposed CGB route is allocated on the proposals map as the ‘Advanced Public Transport System’, and therefore the development plan considers the proposal to be appropriate development in the Green Belt.

6.7.12 Policy NE5 states that:

“any development which adversely affects the open character of structurally important open spaces shown on the Proposals Map or detracts from their relationship to the adjoining built-up area will not be permitted”.

6.7.13 The CGB route passes between but does not take land from an area of structurally important open space at Jesus Green and Midsummer Common and the CGB would not conflict with the objectives of this policy any more than existing buses that pass through this area, as detailed at Section 13.

6.7.14 Policy NE6 states that development will not be permitted which would result in the loss or partial loss of open spaces of environmental and/or recreational importance. The CGB Scheme passes alongside Christ’s Pieces, which is identified as public open space on the Proposals Map. The impact of the development in respect of this policy is assessed in Section 13. There would be only a minor loss of designated open space, which would not impact on the quality or integrity of the area.

6.7.15 Policy NE9 states that natural processes and nature conservation considerations will be an important consideration when planning applications are determined. The impact on nature conservation interests has been fully assessed in Section 11 and appropriate mitigation measures have been identified.

6.7.16 Parts of the southern section of the proposed route run through and take land and habitat from a designated City Wildlife Sites. Policy NE12 states that the City Council will seek to conserve the nature conservation interest of City Wildlife Sites. When considering development proposals affecting City Wildlife Sites, protection measures, replacement proposals and the wildlife significance of the site would be taken into account. The mitigation proposals for City Wildlife Sites are set out in Section 11.

6.7.17 Policy NE14 states that large-scale development on or likely to materially affect City Wildlife Sites will require a full environmental assessment. Features of environmental value should be retained during construction and operational phases of development. An assessment of the Scheme in the context of this policy is contained in Section 11.

6.7.18 The southern section of the CGB route to Trumpington is identified as a Wildlife Corridor on the proposals map. Policy NE15 seeks to balance the nature conservation value of wildlife corridors and other areas of nature conservation value with development needs and states:

“The City Council will, in partnership with others, take steps to protect and enhance the nature conservation value of green spaces, wetlands, watercourses and other features, including hedges and corridors. The impact of development proposals on the wildlife corridors illustrated on the Proposals Map will be an important factor to be taken into account in considering planning applications.”

6.7.19 In relation to wildlife corridors, paragraph 4.46 states that:
Paragraph 4.48 states:

“The Local Plan approach to wildlife corridors reflects Government guidance, which emphasises the need to strike a balance between the interest of nature conservation and development. Development may be compatible with the maintenance of a corridor in its existing form, or alternatively suitable measures should be incorporated to safeguard corridor features. In practice corridors may be enhanced in the longer-term by the provision of natural and semi-natural features associated with new development.”

6.7.21 The impact on this Wildlife Corridor is considered at Section 11 and mitigation measures are proposed to compensate for loss of land and habitat within this corridor.

6.7.22 The CLP contains a number of policies relating to the protection of trees. Policy NE16 states that the “City Council will use all powers at its disposal to protect trees it considers to be of amenity value”. Policy NE17 requires details to be provided of all trees on potential development sites. It states that development proposals should be designed to ensure the protection of existing trees. Policy NE18 states that developers of sensitive sites may be required to plant trees where these are required to improve the landscape or soften the impact of development.

6.7.23 An assessment of the Scheme in the context of policies relating to landscape and nature conservation policies and the loss of vegetation is contained in Sections 11 and 13. Mitigation measures, including new areas of planting to mitigate for loss along the route have been identified.

Built Environment

6.7.24 The proposed route runs through the centre of Cambridge. This area is designated a Central Area Office Restriction Zone and the Central Area for Shopping as well as being a Conservation Area. In the central area the Scheme would also run past a number of listed buildings. The proposed route would run along the edge of designated historic parks and gardens, areas of public open space and areas of structurally important public open space. The Scheme would not take any of these areas, with the exception of a small strip of land at Christ’s Pieces and the landscape and visual impact of this loss is assessed at Section 13.

6.7.25 The City of Cambridge contains an extensive Conservation Area. Most, but not all, listed buildings are within the Conservation Area.

6.7.26 The CLP contains a number of policies that seek to protect the historic built form, particularly in the City Centre. Policies BE2 and BE4 require new developments to have respect for and not to cause demonstrable harm to the existing townscape character. The Scheme does not involve any physical impact on listed or historic buildings, as detailed at Section 10. The assessment of the Scheme has taken into account the character of the townscape and surrounding area.

6.7.27 Policy BE29 resists the demolition or building or structures of the loss of mature gardens or trees that contribute to the character of conservation areas. Policy BE32 states that development in a Conservation Area would only be permitted if it would preserve or enhance the character or appearance of the area. The only development proposed to take place within
the City Centre Conservation Area would be the provision of stops and minor road widening works. It is intended that the stops would be of sustainable design and would not detract from the character or appearance of Conservation Areas.

6.7.28 **Policy BE33** seeks the conservation, preservation and continued appropriate use of buildings of special architectural or historic interest. **Policy BE35** seeks to safeguard the character and setting of listed buildings. The Scheme is in accordance with the objectives of these policies as described in Section 10, as there are no significant effects anticipated to listed buildings.

6.7.29 **Policy BE41** states that the City Council will require the submission of an archaeological assessment and evaluation before granting planning permission for any development on a site of archaeological interest. Archaeological investigations have been undertaken where appropriate and form part of the ES (see Section 9).

**Environmental Overview**

6.7.30 The Plan identifies traffic as the single most important source of atmospheric pollution in Cambridge. Relevant policies include EO1, EO2, EO3, EO7 and EO12:

6.7.31 Policy EO1 states:

“Planning permission will not be granted:

- (a) for residential development where the external environment is poor due to existing or anticipated noise, smell or air pollution; and
- (b) for new development, including changes of use, near to existing or proposed residential areas where that development would cause, or exacerbate existing noise, smell or air pollution affecting the residential environment.”

6.7.32 Policy EO2 states that planning permission will not be granted for development that is likely to give rise to a significant increase in air pollution. Section 8 assesses the impact of the Scheme in terms of air quality and Section 14 with respect to noise and demonstrates that the Scheme is unlikely to conflict with these policy objectives.

6.7.33 Policy EO3 states that:

“the City Council will require measures to be taken to safeguard rivers, streams and ground water from potential pollution arising from any new development to the satisfaction of the Environment Agency”.

6.7.34 Section 17 demonstrates that the Scheme is unlikely to conflict with the requirements of this policy.

6.7.35 Policy E07 states that the City Council will promote and make provision for energy and resource efficient development and means of transport. The CGB Scheme is consistent with the objectives of this Policy.

6.7.36 Policy E012 states that:

“proposals for development on land known or suspected to be contaminated, should be accompanied by a detailed site survey and by details of how the contamination will be dealt with to eliminate any future danger. Such details must be submitted before determination of any
planning application. Exceptionally, where the nature of possible contamination is well understood, planning permission for development may be granted subject to a planning condition or agreement restricting the implementation of the permission until such time as:

- detailed report on the nature of the contamination has been prepared; and
- acceptable remedial measures and a programme for their implementation have been agreed"

6.7.37 The requirements of this policy including recommendations on dealing with contaminated material are set out in Section 12.

**Cambridge City Local Plan Deposit Draft, June 2003**

6.7.38 The emerging Cambridge Local Plan was placed on deposit in June and July 2003. It is expected that the Plan will placed on 2nd Deposit in September 2004 as a Local Plan or Local Development Framework depending on guidance from Central Government.

6.7.39 The Local Plan sets out a strategy for delivering sustainable development in Cambridge. This includes the provision of appropriate infrastructure, in particular transport infrastructure to support new developments and promote more sustainable living patterns.

6.7.40 One of the key objectives of the Plan is to provide appropriate infrastructure, in particular transport infrastructure, to support new developments and promote more sustainable living patterns. The Scheme would make a substantial contribution to meeting this objective.

**Designing Cambridge**

6.7.41 **Policy 3/1 Sustainable Forms of Development** states that development will be permitted which demonstrates the principles of sustainable development. The Scheme accords with a number of the principles listed in the policy primarily reducing dependency on the private car and increasing opportunities for public transport, as assessed at Section 16.

6.7.42 **Policy 3/3 Air Quality Management Areas** states that development within such areas will only be permitted if:

- “it would have no adverse affect upon air quality within the Air Quality Management Area; or
- air quality levels within the Air Quality Management Areas would not have a significant adverse effect on the proposed use/users”.

6.7.43 The Scheme has been assessed in relation to the above policy in Section 8 and concludes that there are only likely to be slight or negligible adverse and positive effects on air quality.

6.7.44 **Policy 3/4 Setting of the City** states that development will be permitted on the urban edge if it conserves and enhances the setting and special character of Cambridge and amenity of the urban edge is improved. Section 13 of the ES assess this policy and demonstrates that the Scheme has been designed and mitigation measures proposed to help to integrate the Scheme with the different character areas on the urban edge.

6.7.45 **Policy 3/16 Safeguarding Features of Amenity or Nature Conservation Value** states that development resulting in the loss of features of amenity and/or nature conservation value will not be permitted unless there are demonstrable wider public benefits. Sections 11 and 13 address this policy. Although there are impacts on areas of nature conservation value their
loss is outweighed by the wider public benefits of the Scheme.

6.7.46 **Policy 3/19 Ancient Monuments/Archaeological Areas** states that proposals affecting Scheduled Ancient Monuments or other important archaeological remains and their settings must be accompanied by a full assessment of the nature and importance of the remains and the impact of the proposals on them as part of the application. A full assessment has been undertaken in accordance with this policy, as set out in Sections 9.

6.7.47 **Policy 3/20 Listed Buildings** emphasises the need to demonstrate a clear understanding of the building’s importance in the national and Cambridge context including an assessment of which external and internal features and aspects of its setting are important to the building’s special interest. The Scheme would not directly affect any listed buildings along the route. An assessment of the Scheme on the built heritage has been carried out in line with this policy and is set out in Section 10 and demonstrates no significant impact on listed buildings.

6.7.48 **Policy 3/21 Conservation Areas** states that developments within or which affect the setting of or impact on views into and out of Conservation Areas will only be permitted if they retain features such as spaces trees and hedges which contribute to the character of the area. Impact on views and setting of conservation areas have been assessed in Sections 10 and 13 and demonstrates no significant adverse impacts.

**Enjoying Cambridge**

6.7.49 This section of the Plan is based on the following objectives of relevance to the Scheme:

- “to ensure that the city has a strong green structure with an accessible network of green spaces rich in biodiversity.
- to protect open spaces and built facilities which contribute to the setting, character and enjoyment of the city”.

6.7.50 **Policy 5/1 Safeguarding Environmental Character** states that development will be permitted if it respects and enhances the distinctive character and quality of areas identified in the Cambridge Landscape Character Assessment (CLCA). The landscape and visual impact of the Scheme has been assessed in full and appropriate mitigation measures proposed in Section 13 and demonstrates that the Scheme respects the quality and character of the CLCA areas.

6.7.51 **Policy 5/2 Green Belt** states that there is a presumption against inappropriate development in the Cambridge Green Belt as defined on the Proposals Map. As the CGB route is identified within the Plan, it is not considered to be inappropriate development of the Green Belt.

6.7.52 Policy 5/3 Protection of Open Space states that:

“Development will not be permitted where it would be harmful to the character of or lead to the loss of, open space of environmental and/or recreational importance.”

6.7.53 CGB buses would run alongside Jesus Green, Midsummer Common and Christ’s Pieces, all of which are designated as Protected Open Space in the Deposit Draft Local Plan. A full assessment of landscape impact of the Scheme is described in Section 13. Although there would be a minor loss of the designated area it would not adversely affect its open character.

6.7.54 **Policy 5/6 Protection of Sites of Local Nature Conservation Importance** states that development will not be permitted if it will have an adverse impact on a Local Nature
Reserve (LNR), a County Wildlife Site, or a City Wildlife Site unless it can be clearly demonstrated that there are reasons for the proposal which outweigh the need to safeguard the substantive nature conservation value of the site and suitable mitigation measures are secured. The Scheme does adversely affect City Wildlife Sites, although suitable mitigation measures are proposed in Section 11.

6.7.55 **Policy 5/7 Species Protection** states that development will not be permitted which would harm plant and animal species, or their habitat, protected by English or European Law, unless the harm can be fully mitigated. Section 11 demonstrates that impacts of the Scheme on protected species and habitats can be satisfactorily mitigated where necessary in line with this policy.

**Connecting and Servicing Cambridge**

6.7.56 This chapter of the Structure Plan sets out five objectives for transportation policy in the city:

- “to minimise the distances people need to travel particularly by car;
- to maximise accessibility for everyone, particularly to jobs and essential services;
- to minimise adverse effects of transport on people and the environment;
- to ensure adequate provision of sustainable forms of infrastructure to support the demands of the city; and
- to promote a safe and healthy environment, minimising the impacts of development upon the environment”.

6.7.57 The Scheme would contribute significantly to meeting all of the above transport objectives, as assessed at Section 16.

6.7.58 **Policy 7/7 Land for Public Transport** demonstrates support for the principle of the Scheme by stating that:

“development will not be permitted where it would inhibit the expansion of high quality public transport, including the former rail route to Bedford and St Ives”.

**Implementation**

6.7.59 **Policy 8/2 Infrastructure Improvements** in the Implementation Chapter states that in order to secure the best use of land and the proper planning of the area and to mitigate the adverse impacts that new development may have on the local community and infrastructure of the City and the Cambridge Sub-Region, developments which directly improve or provide contributions for the improvement of physical and community infrastructure will be permitted. The Scheme would improve the physical infrastructure of the City and Sub-Region in accordance with this policy (Section 16).

**Area Action Plans**

6.7.60 The CLP includes Area Action Plans for East Cambridge, Southern Fringe and Northern Fringe, which set out the development principles for these areas, which will be incorporated in Area Development Frameworks in due course. Each of the identified Area Action Plans incorporate the proposed guided bus route (this is referred to throughout the Area Action Plan statements as a rapid transit system).
6.7.61 The Area Action Plan for East Cambridge states that this area should connect into a guided bus system. It is noted that a route to serve East Cambridge is not part of the current Scheme. The Action Plan for the Southern Fringe states that the scheme should serve the area from the north along the former Bedford rail corridor, with spurs to Addenbrooke’s Hospital and the Trumpington Park and Ride site and, if feasible, a new rail station should be provided to serve Addenbrooke’s. The Northern Fringe Area Action Plan states that development proposals in the area will be served by the guided bus system, which will follow the route of the disused St Ives railway line.

South Cambridgeshire Local Plan Deposit Draft, 1999 viii (proposed to be modified 2002 ix and 2003 x)

6.7.62 The South Cambridgeshire Local Plan (SCLP) was adopted in 1993. Whilst this remains the extant local plan the revised plan is at such an advanced stage of review that it is appropriate to base the planning policy assessment on the policies in the latest draft of the review. The latest draft is the Deposit Draft Local Plan, October 1999, as proposed to be modified 2002 and 2003. An Inquiry was held between June and September 2001 and the Inspector’s Report was published in January 2002. Subsequently, the Council published Proposed Modifications in October 2002 and Further Proposed Modifications in 2003.

6.7.63 The strategy for the Plan as amended by the Proposed Modifications (para 1.22) is:

- “to guide the provision of homes, jobs and shops together with recreation and transportation facilities to meet the needs of the people of South Cambridgeshire;
- to plan for the location of development which provides the opportunity for more people to satisfy their day-to-day needs locally or in locations from which modes of transport in addition to the private motor car can realistically be provided;
- to maintain and enhance the character and diversity of the built and natural environment; ensure that development meets the Approved 1995 Structure Plan objectives for sustainability and that the capacity of the environment to absorb development is not exceeded”.

6.7.64 The Scheme accords with strategy objectives by improving transport infrastructure in the Sub-Region and facilitating development as detailed at Section 16.

Transport

6.7.65 The objectives of the Transport Chapter of the SCLP (as amended by the Proposed Modifications) are:

- “to reduce the need to travel particularly by private car;
- to promote the use of more sustainable modes of transport such as public transport, walking and cycling by making such modes more accessible, safer and more attractive to use;
- to promote sustainable travel by ensuring that new development takes place in highly accessible locations.
- to limit the amount of car parking provided in new developments, where appropriate, to reduce over-reliance on the car.
- to improve personal safety and mobility for all users, including those with disabilities
• to safeguard land for highways and other transport proposals
• To reduce the environmental impact of travel and to limit the growth of road traffic
• to take account of the needs of those with special needs including those people with disabilities.
• to conserve energy and reduce air pollution by limiting the growth in road traffic and reducing the environmental impact of travel;
• to assist in reversing the decline in public transport; and
• to encourage use of modes other than the private car”. (para. 7.4)

6.7.66 The Scheme makes a significant contribution to meeting these objectives (Section 16).

6.7.67 Policy TP9 as set out in the Proposed Modifications October 2002 states that:

“The Council will seek, through its decisions on planning applications, to promote more sustainable transport choices to improve access to major trip generators by non-car modes, and to reduce the need to travel, especially by car.”

6.7.68 Policy TP9 further states that the Council will:

“seek to ensure that every opportunity is taken to increase accessibility to non-car modes by appropriate measures such as securing appropriate improvements to public transport service levels.”

6.7.69 The Scheme fully accords with the above objectives, as detailed at Section 16. Furthermore the SCLP makes several direct references to the Scheme:

6.7.70 Paragraph 7.53 (as amended by the Council’s Proposed Modifications, October 2002) states that:

“The CHUMMS preferred strategy envisages the re-use of the [Cambridge St Ives] corridor as part of a guided bus RTS linking Trumpington to Addenbrooke’s, Cambridge City Centre, Chesterton, Cambridge Northern Fringe, Histon, Oakington, Longstanton/Willingham, Swavesey/Over and St Ives, with possible later links to Godmanchester and Huntingdon.”

6.7.71 Paragraph 7.54 states that:

“An RTS of this kind would be a key element in planning for sustainable growth in the Cambridge Sub-Region. Because this type of system can be linked with bus preference schemes in city centre streets and feeder routes to outlying villages it is a flexible form of transport with the potential to provide fast and frequent service between a large number of destinations.”

6.7.72 Paragraph 7.54A states that:

“...it is possible that substantial elements of the cross-city system between Trumpington and Cambridge Northern Fringe will be in place before
2006, but other sections may be implemented after the end of the current plan period”.

6.7.73 Paragraph 7.54B states that:

“In cases where the RTS will benefit development sites by presenting an opportunity for modal shift from private to public transport the Council will use its powers under S106 of the Town and Country Planning Act to ensure that financial contributions are made at an appropriate level towards the development of relevant parts of the RTS.”

6.7.74 Paragraph 7.54C states that:

“As part of the material to be prepared for the Transport and Works Order the Council will expect to see full investigation of the potential of the former railway corridor for the provision of a parallel cycleway and pedestrian path.”

6.7.75 Policy TP15 (as amended by the Proposed Modifications) states that:

“The Council supports the creation of a Rapid Transit System (RTS) as a crucial element in planning for sustainable future growth in the Cambridge Sub-Region. The route of the former Cambridge-St Ives railway line will therefore be safeguarded from other development as a key element of the proposed RTS”.

6.7.76 The amended Longstanton village inset plan, of the SCLP, identifies the proposed route as a protected transport corridor in the area to the northeast of Longstanton. The route is also shown on the map of Oakington, including where it enters the Cambridge Green Belt.

Green Belt and Environment

6.7.77 The proposed route along the former St. Ives railway line passes through areas of Green Belt. Policy GB1 states that the setting and special character of Cambridge will be protected by a Green Belt and Policy GB2 states that planning permission will not be granted for inappropriate development in the Green Belt unless very special circumstances can be demonstrated. The Scheme is identified with the plan and is therefore considered to be an appropriate use within the Green Belt.

6.7.78 Policy SE15 is concerned with Protected Village Amenity Areas (PVAA) and states that development will not be permitted if it would be harmful to the distinctiveness and functioning laying behind their inclusion in PVAA. There is a minor loss of land from the PVAA on the edge of the allotments on Histon Road. This loss will not effect the distinctive qualities and functioning of this area.

6.7.79 Policy EN1 (as amended by the Proposed Modifications) states that:

“...the District Council will seek to ensure that the local character and distinctiveness of Landscape Character Areas is respected, retained and wherever possible enhanced”.

6.7.80 The policy recognises that landscape is a dynamic concept but states that planning permission will not be granted for development, which would have an adverse effect on the character and local distinctiveness of these areas. The CGB route passes through the Bedfordshire and Cambridgeshire Claylands Landscape Character Area (LCAs) as defined on the modified
proposals map. The landscape assessment at Section 13 has had regard to the character of LCAs and the design of the Scheme and mitigation measures ensure that local character and distinctiveness of areas is retained and wherever possible enhanced.

6.7.81 Policy EN3 (as amended by the Proposed Modifications) emphasises the need for the design of new development to be appropriate to the particular Landscape Character Area in which it is located. The Scheme would be designed to a high standard with screening and planting appropriate to the Landscape Character Areas as described in Section 13.

6.7.82 Policy EN5 states that the District Council

“will not grant planning permission for development which would adversely affect or lead to the loss of important areas and features of the historic landscape whether or not they are statutorily designated”.

6.7.83 An assessment of the impact on the historic landscape is set out in Section 13. This has concluded, with regard to this policy that the Scheme would have some impact on some features of historic landscape (including Westwick Conservation Area and Swavesey SAM). The impacts have not been assessed to be significant and appropriate mitigation measures have been identified.

6.7.84 Policy EN6 states that:

“The District Council will require trees, hedges and woodland and other natural features to be retained wherever possible in proposals for new development. Landscaping schemes will be required to accompany applications for development where it is appropriate to the character of the development, its landscape setting and the biodiversity of the locality.”

6.7.85 Landscape and Ecology Mitigation Plans have been prepared (see Section 13) to illustrate the approach to landscaping and respond to the loss of vegetation along the route.

6.7.86 Policy EN8 states that the District Council will encourage the planting and subsequent management of trees and hedges of appropriate native species in partnership with the County Council. Section 13 sets out the landscape strategy for the Scheme and describes the proposals to use natives species wherever appropriate to enhance biodiversity along the route.

6.7.87 Policy EN9 is concerned with Natural Areas (as amended by the Proposed Modifications) and states that:

“the District Council will seek to ensure that the distinctive habitats, natural features and species characteristic of these Natural Areas are respected, retained and wherever possible enhanced”.

6.7.88 The CGB route passes through the West Anglian Plain Natural Area. The impact on these designations has been assessed in Section 11 and habitats have been retained wherever possible and enhancement measures are proposed.

6.7.89 Policy EN10 sets out a hierarchy of identified nature conservation sites: Site of International Importance; Sites of Special Scientific Interest (SSSI) and County Wildlife Sites (CWS). The policy states that:
“In all its planning decisions affecting SSSI and CWS, the Council will safeguard (and wherever possible enhance) the intrinsic features of natural and/or geological interest”.

6.7.90 The Scheme passes through and takes habitat from several CWS as identified at Appendix 6A. The impact on these designations and recommended mitigation measures are set out in Section 11.

6.7.91 **Policy EN15** is concerned with Unidentified Nature Conservation Sites (as amended by the Proposed Modifications) and states that:

> “The Council will, wherever possible, seek to retain features and habitat types of nature conservation value where these occur on sites not specifically identified in the plan. Planning permission will be only permitted where the reasons for development clearly outweigh the need to retain the feature or habitat type and in such cases developers will be expected to provide appropriate mitigation measures.”

6.7.92 Habitat surveys and protected species surveys have been undertaken throughout the length of the route (within and beyond designated sites). Section 11 assesses impacts on nature conservation interests along the route and identifies appropriate mitigation measures. The loss of some features of nature conservation is outweighed by the need for development, in accordance with this policy.

6.7.93 **Policy EN16** states that:

> “the District Council will not grant planning permission for development which could adversely affect, either directly or indirectly, the habitats of animal and plant species which are protected by law unless the need for the development clearly outweighs the importance of conserving that habitat...”

6.7.94 Section 11 assesses the impact of the Scheme on ecology and concludes that some habitat would be lost but loss is addressed through the package of mitigation measures.

6.7.95 **Policy EN19** (as amended by the Proposed Modifications) states that:

> “The Council will protect, preserve an enhance known and suspected sites and features of archaeological importance and their settings...”

6.7.96 The policy emphasises the need for an appropriate level of archaeological assessment. Investigations have been carried out in accordance with advice from the County Council’s Principal Archaeologist as set out in Section 9.

6.7.97 **Policy EN23** states that:

> “Where planning permission is granted for any development which affects any aspect of the archaeological heritage which is considered to be important in terms of the above policies, the District Council will encourage, and in appropriate cases require by condition or planning obligation, developers to make provision for the deposit of records arising from excavations for public access and education on site and/or in the form of publications”.

6.7.98 Any important archaeological heritage that is affected is to be appropriately recorded in
accordance with the requirements of the County Council’s Principal Archaeologist.

6.7.99 **Policy EN41** states that where proposals

>“...would affect the curtilage or wider setting of a Listed Building the District Council will require the submission of sufficient illustrative and technical material to allow its impact to be clearly established”.

6.7.100 The District Council will resist and refuse applications which:

- “would dominate the Listed Building or its curtilage buildings in scale, form, massing or appearance,
- would damage the setting, well-being or attractiveness of a Listed Building,
- would harm the visual relationship between the building and its formal or natural landscape surroundings,
- would damage archaeological remains of importance unless some exceptional, overriding need can be demonstrated, in which case conditions may be applied to protect particular features or aspects of the building and its setting”.

6.7.101 No development is to take place within the curtilage of listed buildings and the assessment has demonstrated that the wider setting would not be adversely affected. Appropriate mitigation measures are proposed for any archaeological remains of importance. (see chapter 9, 10 and 13).

6.7.102 **Policy EN44** requires applications for development within or affecting the setting of conservation areas to provide sufficient material for the impact to be properly assessed. Sufficient information has been submitted to assess impact on conservation areas and to identify appropriate mitigation measures to preserve and enhance their appearance. Impacts on the setting of conservation areas and listed buildings are addressed in Chapter 10.

**Environmental Standards**

6.7.103 **Policy ES1** (as amended by the Proposed Modifications) states that

>“in considering proposals for redevelopment of potentially contaminated where planning permission is required, the District Council will require detailed site investigations and appropriate treatment, monitoring and after-use”.

6.7.104 An investigation has been undertaken in line with this policy and is set out in Section 12.

6.7.105 **Policy ES2** states that:

>“The District Council will seek to encourage all new road and footway lighting to be designed to a standard that there is no light spillage above the horizontal”.

6.7.106 This would be considered further as part of the detailed design of the Scheme informed by the findings of the visual assessment as set out in Section 13.

6.7.107 The SCLP emphasises that by guiding the location of new development, reducing the need to travel and promoting transport choices, land use planning will form an important element of
an integrated strategy to achieve air quality standards and guidelines.

**Policy ES4** (as amended by the Proposed Modifications) states that:

>Where a proposed development will significantly increase traffic flow or, by virtue of its process, introduce emissions to air, the applicant shall assess the impact of its operation on local air quality by undertaking an appropriate modelling exercise to allow comparison with the local authority’s air quality strategy.”

A full assessment has been undertaken in accordance with this policy as set out in Section 8.

**Huntingdonshire Local Plan, 1995**

The Huntingdonshire Local Plan (HLP) was adopted in 1995. An Alteration to the Huntingdonshire Local Plan was adopted on 18 December 2002; this covered housing and planning obligations and has not been reviewed as it is not directly relevant to the Scheme.

**Transport**

The HLP supports the provision and improvement of bus services. **Policy T21** states:

>“The District Council will support proposals which maintain or improve the present level of public transport services.”

The supporting text sets out the importance of bus services for the district and the difficulties in maintaining a minimum level of service. The Scheme would accord with objectives to improve public transport and Section 16 of the ES considers transportation issues.

**Environment**

**Policy EN2** states:

>“The District Council will require that any development involving or affecting a building of special architectural or historic interest has proper regard to the scale, form, design and setting of that building “.

The impact of the Scheme on buildings of historic interest has been assessed in Section 10 and concludes that no significant impacts are anticipated on buildings of special architectural interest.

**Policy EN5** states that:

>“Development within or directly affecting conservation areas will be required to preserve or enhance their character or appearance”.

The route passes through four conservation areas in Huntingdonshire District and the impact on these areas has been assessed in Section 10. The Scheme would not significantly adversely affect the street scene or views in the conservation areas.
6.7.117 **Policy EN9** states that:

“Development will not normally be permitted if it would impair important open spaces, trees, street scenes and views into and out of conservation areas”.

6.7.118 Impact on conservation areas has been assessed in Section 10 and has concluded that there would be no adverse impact on the street scene or views.

6.7.119 **Policy EN11** states that:

“The District Council will normally refuse planning permission for development that would have an adverse effect upon a Scheduled Ancient Monument or an archaeological site of acknowledged importance”.

6.7.120 Impact on archaeology has been assessed at Section 9 and concludes that there are no significant adverse affects on scheduled ancient monuments or sites of archaeological importance.

6.7.121 **Policy EN12** requires archaeological recording prior to development on sites of archaeological interest. **Policy EN13** requires archaeological assessments to accompany planning applications for developments in areas of archaeological potential, where relevant. The Scheme is in accordance with the objectives of this policy as described in Section 9.

6.7.122 **Policy EN14** states that:

“The District Council will not normally allow development on open spaces, frontages and gaps in the built up framework or immediately adjacent to the built up framework, which have intrinsic environmental qualities in themselves or by virtue of longer distance views which they allow”. Impact on open space is addressed in Section 13

6.7.123 **Policy EN15** states that:

“On the open spaces and gaps for protection identified on the inset maps development which would impair their open nature will not normally be allowed”. Impact on open space is addressed in Section 13. With respect to policies EN14 and EN15 some land and trees will be taken along Riverside and Hartford Road but through the proposed replacement of vegetation there will be no significant adverse impact on the quality of open space.

6.7.124 **Policy EN18** states that the District will seek to protect important site features including trees, woodlands, hedges and meadowland. It is unlikely that any protected trees would be affected. The impact of the Scheme on landscape features is assessed in Section 13. The Scheme would result in the loss of some hedgerows and semi-mature trees, although mitigation measures are proposed to compensate for the loss.

6.7.125 The proposed route runs through an Area of Best Landscape (ABL) to the west of Huntingdon as shown on Figure 1 in Appendix 6A. **Policy EN21** of the HLP states that permission would not normally be granted for development in Areas of Best Landscape that would adversely affect the character of the area. The Scheme does not significantly impact on the ABL and is in accordance with the objectives of this policy as described in Section 13.
6.7.126 Policy EN22 states that wherever relevant the determination of applications will take appropriate account of the interests of nature and wildlife conservation. The impact of the Scheme on nature and conservation interests has been fully assessed in Section 11.

6.7.127 Policy EN23 states that:

“development within or which has a significant adverse effect on the interests of wildlife in an area of special importance for nature conservation, will not normally be permitted”.

6.7.128 Impact on wildlife and designated sites of nature conservation importance has been assessed in Section 11. Although there would be some loss of land and habitat from a County Wildlife Sites to the east of St Ives mitigation measures are proposed to compensate for the loss.

6.8 Conclusions

6.8.1 The proposed CGB route runs through three district authority areas and has been assessed with regard to policies of these authorities. For South Cambridgeshire the policies in the Deposit 1999 Plan amended by the Proposed and Further Proposed Modifications 2002 and 2003 have been considered. In Cambridge City the Cambridge City Local Plan (1996) has been considered as well as policies in the recent Consultation Deposit Draft Local Plan (June 2003). In Huntingdonshire District policies of the adopted Local Plan, 1995 have been considered. Consideration has also been given to the relevant policies contained in Regional Planning Guidance for East Anglia (2000), the Cambridgeshire and Peterborough Structure Plan (Adopted 2003), the Cambridgeshire and Peterborough Waste Local Plan (2003) and the Cambridgeshire Aggregates (Minerals) Local Plan (1991).

6.8.2 The review of policy has concluded that the Scheme complies with a large numbers of policies of the structure plan and local plans and supports the objectives of government and regional guidance. In particular the Scheme supports Government, regional, county and local policy objectives through providing access to a more sustainable mode of transport within the Cambridgeshire Sub Region and by providing a key component of infrastructure to support growth within the sub-region. The Scheme also accords with policies of Local Plans to safeguard the disused railways corridors to the north and south of Cambridge for a rapid transit system.

6.8.3 The route runs through or near to some designated areas protected by policy including the Cambridge Green Belt, Areas of Best Landscape, City and County Wildlife Sites, Protected Open Space, Conservation Areas and Scheduled Ancient Monuments. The assessment of policy has concluded that the Scheme does not conflict with policies to protect Areas of Best Landscape or Green Belt. It has concluded that although there would be some minor visual and landscape impacts on the setting of some Conservation Areas (at Swavesey and Westwick) and on a Schedule Ancient Monument (at Swavesey) given the nature of these impacts and the scope for mitigation there are no significant conflicts with policies to protect these areas and features. There are some conflicts with policies to protect locally designated sites of nature conservation interest (City and County Wildlife Sites) although the Environmental Statement has identified appropriate mitigation to compensate for the loss of habitat within these sites.
Appendices

Appendix 6A  Planning Designations and Features
References

6. Cambridge to Huntingdon Multi-modal Study, Department of Transport Local Government and the Regions, August 2001
8. South Cambridgeshire Local Plan Deposit Draft 1999, South Cambridgeshire District Council, 1999
10. South Cambridgeshire Local Plan Proposed Modifications 2003, South Cambridgeshire District Council, 2003
23. Planning Policy Guidance Note 23 – Planning and Pollution Control, 1997
24. Planning Policy Guidance Note 23 – Planning and Pollution Control, Consultation Paper, HMSO, 2002
### National Policy Guidance: Planning Policy Guidance Notes (PPG)

<table>
<thead>
<tr>
<th>Policy Number</th>
<th>Policy Thrust</th>
<th>Scheme in accordance with policy</th>
<th>Scheme conflicts with policy</th>
<th>Partially in compliance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPG 1 (1997)</td>
<td>General Policy and Principles – promotes the integration of land use and transport and provision of more sustainable modes of transport to serve development.</td>
<td>✓</td>
<td></td>
<td></td>
<td>Scheme contributes to key policy objectives of integrating transport proposals with land use policies.</td>
</tr>
<tr>
<td>PPG 2 (1995)</td>
<td>Provides protection for Green Belt designations</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme is supported by the relevant structure and local plans. The CGB is therefore considered to be an appropriate use within Green Belt.</td>
</tr>
<tr>
<td>PPG7 (1997)</td>
<td>Provides guidance on environmental quality and economic and social development in the countryside and on the need to balance, economic, conservation and other factors in considering development in the countryside.</td>
<td></td>
<td>✓</td>
<td></td>
<td>The Scheme would contribute to the objectives of PPG7 to promote sustainable development in the countryside, to accommodate change while maintaining the quality of the environment and to facilitate economic activity in rural areas. There would be some minor conflicts with objectives to protect local nature conservation interest.</td>
</tr>
<tr>
<td>PPG9 (1994)</td>
<td>Provides guidance on the Government’s policies on nature conservation and how these policies are to be incorporated into land-use planning.</td>
<td></td>
<td></td>
<td>✓</td>
<td>There would be some minor conflicts with objectives to protect local nature conservation interest. Wherever possible, the Scheme incorporates mitigation measures to prevent or compensate for significant impacts on wildlife features in line with guidance in PPG9.</td>
</tr>
<tr>
<td>PPG 13 (2001)</td>
<td>Provides guidance of the relationship between land use and transport</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme fully accords with the objectives of PPG13 by improving access to sustainable transport modes in the sub-region.</td>
</tr>
<tr>
<td>PPG 15 (1994)</td>
<td>Planning and the Historic Environment and the Planning (Listed Buildings and Conservation Areas) Act 1990</td>
<td></td>
<td>✓</td>
<td></td>
<td>The guidance in PPG15 has been fully taken into account where the Scheme could potentially impact on listed buildings and other features of historic interest.</td>
</tr>
<tr>
<td>PPG16 (1990)</td>
<td>Archaeology and Planning</td>
<td>✓</td>
<td></td>
<td></td>
<td>The advice has been taken into account through site investigations of areas with potential archaeological interest and recommendations on mitigation measures.</td>
</tr>
<tr>
<td>PPG23 (1997)</td>
<td>Planning and Pollution Control</td>
<td>✓</td>
<td></td>
<td></td>
<td>The impact of the Scheme on air quality and any contaminated</td>
</tr>
<tr>
<td>Policy Number</td>
<td>Policy Thrust</td>
<td>Scheme in accordance with policy</td>
<td>Scheme conflicts with policy</td>
<td>Partially in compliance</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------------------------</td>
<td>---------------------------------</td>
<td>-----------------------------</td>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>PPG 24 (1994)</td>
<td>Planning and Noise</td>
<td>✓</td>
<td></td>
<td></td>
<td>The guidance has been taken into account with appropriate mitigation measures proposed.</td>
</tr>
<tr>
<td>PPG 25 (2001)</td>
<td>Development and Flood Risk</td>
<td>✓</td>
<td></td>
<td></td>
<td>The guidance has been taken into account for those parts of the route within the flood plain.</td>
</tr>
</tbody>
</table>

**National Studies**

Cambridge to Huntingdon Multi Modal Study (August 2001)

One of the key recommendations of the study was the provision of a guided bus system using the disused railway between Cambridge and St Ives with extensions to Trumpington and Addenbrookes Hospital and to Godmanchester and Huntingdon.

**Regional Planning Guidance**


The objectives of RPG6, including enhancing public transport provision and making maximum use of the existing infrastructure and having regard to its environmental impact, have been addressed.

**Cambridgeshire and Peterborough Structure Plan, Adopted October 2003 (subject to Legal Challenge)**

Policy P1/2 Environment Restrictions on Development. This states that no new development will be permitted within or which is likely to affect:
- Internationally and nationally important nature conservation areas
- Scheduled ancient monuments or other nationally important archaeological sites or their settings.
- Functional flood plains or other areas where adequate flood protection cannot be given and/or there is significant risk of increasing flood risk elsewhere

Although the route passes through the Flood Plain of the River Great Ouse, the Scheme would not have a significant impact on the existing flood regime. In addition internationally and nationally important nature conservation sites and scheduled ancient monuments are not significantly adversely affected.

Policy P6/1 Development Related Provision. This states that development will only be permitted where the necessary infrastructure to support growth in the region.

The Scheme would contribute significantly to providing the necessary infrastructure to support growth in the region.
<table>
<thead>
<tr>
<th>Policy Number</th>
<th>Policy Thrust</th>
<th>Scheme in accordance with policy</th>
<th>Scheme conflicts with policy</th>
<th>Partially in compliance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy P6/3</td>
<td>Seeks to ensure appropriate measures are adopted within developments to ensure no unacceptable risk of flooding</td>
<td>✓</td>
<td></td>
<td></td>
<td>necessary infrastructure to support growth in the region.</td>
</tr>
<tr>
<td>Policy P7/1</td>
<td>Sites of Natural and Heritage Interest. This states that specified international, national and local designations will be protected from the adverse effects of development.</td>
<td></td>
<td>✓</td>
<td></td>
<td>No internationally or nationally designated sites would be significantly affected by the Scheme. The proposal passes through and adjacent to County and City Wildlife Sites and in some sections would involve land take and removal of habitat from these areas. However, through habitat creation elsewhere along the route the impact can be reduced to minor short-term impacts in most cases.</td>
</tr>
<tr>
<td>Policy P7/2</td>
<td>Biodiversity. This policy supports conservation and enhancement of areas of importance for biodiversity.</td>
<td></td>
<td>✓</td>
<td></td>
<td>See policy P7/4 and P7/1</td>
</tr>
<tr>
<td>Policy P7/4</td>
<td>Landscape. This states that development must sensitively relate to the local environment.</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Although the proposal would have some adverse impacts primarily due to loss of vegetation, there are opportunities for replacement planting and positive enhancement measures. These measures have been formulated in consultation with local authorities and have been designed to ensure that the proposals fit within the existing landscape character.</td>
</tr>
<tr>
<td>Policy P7/6</td>
<td>Historic Built Environment. This states that planning authorities will protect and enhance the quality and distinctiveness of the historic and built environment.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The route passes adjacent to a scheduled ancient monument at Swavesy and on the periphery of a Conservation Area at Westwick. However, it has been assessed that the proposal would not have any significant adverse impacts on these features.</td>
</tr>
<tr>
<td>Policy 7/8</td>
<td>Safe and healthy air, land and water. This states that new development should minimise air, land and water pollution.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The proposed drainage scheme and use of Euro IV vehicles minimise air and water pollution during operation and adherence to COCP would ensure minimal impacts during construction.</td>
</tr>
<tr>
<td>Policy 8/6</td>
<td>Improving Bus and Community Transport Services. This emphasises the need to develop public transport between</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme provides a new public transport corridor.</td>
</tr>
</tbody>
</table>
### Policy Thrust

<table>
<thead>
<tr>
<th>Policy Number</th>
<th>Policy Thrust</th>
<th>Scheme in accordance with policy</th>
<th>Scheme conflicts with policy</th>
<th>Partially in compliance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>urban areas and corridors between cities and market towns.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy P8/7</td>
<td>Improvements to Rail Services. This encourages rail use and requires former rail routes with the potential for reuse as transport corridors to be identified in Local Plans and protected.</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>The Scheme utilises a disused railway corridor as a public transport corridor.</td>
</tr>
<tr>
<td>Policy P8/8</td>
<td>Seeks to encourage walking and cycling networks</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme would provide a route for walking and cycling adjacent to the guided route.</td>
</tr>
<tr>
<td>Policy P8/10</td>
<td>Transport investment priorities identifies the rapid transit system as a requirement to meet the needs of major developments.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme would improve access to major development sites.</td>
</tr>
<tr>
<td>Policy P9/3</td>
<td>New Settlement. This states that the new settlement at Longstanton/Oakington should be well served by a rapid transit system.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme allows for a future connection into the new settlement.</td>
</tr>
<tr>
<td>Policy P9/8</td>
<td>Infrastructure Provision. This states that a comprehensive approach will be adopted to secure the infrastructure needed to support the development strategy for the sub-region.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme is intended to be an important component of the infrastructure needed for the sub-region.</td>
</tr>
<tr>
<td>Policy P9/9</td>
<td>Cambridge Sub-Region Transport Strategy</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme would provide a key component of the strategy.</td>
</tr>
</tbody>
</table>

### County Local Plans

<table>
<thead>
<tr>
<th>Plan Description</th>
<th>Scheme in accordance with policy</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge Local Transport Plans – 2001 and 2003 and Annual Monitoring Reports</td>
<td>✓</td>
<td>The Scheme fully accords with the County’s objectives as set out in the LTP and most recent monitoring report.</td>
</tr>
<tr>
<td>Cambridgeshire Aggregates (Minerals) Local Plan (1991)</td>
<td>✓</td>
<td>No mineral reserves are affected by the Scheme.</td>
</tr>
<tr>
<td>Cambridge City Council Local Plan Adopted (1996)</td>
<td>✓</td>
<td>The Scheme is in accordance with waste policies of this Plan.</td>
</tr>
<tr>
<td>Policy TR12</td>
<td>✓</td>
<td>The Scheme complies with this policy.</td>
</tr>
<tr>
<td>Policy Number</td>
<td>Policy Thrust</td>
<td>Scheme in accordance with policy</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Policy TR32</td>
<td>Requires environmental impact and operational benefits evaluation for bus priority measures.</td>
<td>✓</td>
</tr>
<tr>
<td>Policy NE1</td>
<td>Seeks to protect Areas of Best Landscape from development that would adversely affect its character.</td>
<td>✓</td>
</tr>
<tr>
<td>Policy NE3</td>
<td>The special character of Cambridge is to be protected by the Green Belt</td>
<td>✓</td>
</tr>
<tr>
<td>Policy NE5</td>
<td>Development which would adversely affect the open character of structurally important open space will not be permitted.</td>
<td>✓</td>
</tr>
<tr>
<td>Policy NE6</td>
<td>Development will not be permitted which would result in the loss of open space of environmental and/or recreational importance</td>
<td></td>
</tr>
<tr>
<td>Policy NE9</td>
<td>Nature conservation will be an important consideration in determining planning applications.</td>
<td>✓</td>
</tr>
<tr>
<td>Policy NE12</td>
<td>The City Council will seek to conserve the nature conservation interest of City Wildlife Sites</td>
<td>✓</td>
</tr>
<tr>
<td>Policy NE14</td>
<td>Large-scale development on or likely to materially affect City Wildlife Sites will require full environmental assessment</td>
<td>✓</td>
</tr>
<tr>
<td>Policy NE15</td>
<td>Seeks to protect and enhance the nature conservation value of green spaces, wetlands, water courses and other features, including hedges and corridors</td>
<td></td>
</tr>
<tr>
<td>Policy NE16</td>
<td>Trees with amenity value will be protected.</td>
<td></td>
</tr>
<tr>
<td>Policy Number</td>
<td>Policy Thrust</td>
<td>Scheme in accordance with policy</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Policy NE17</td>
<td>Requires details of trees on development sites to be provided and where possible those trees protected.</td>
<td>✓</td>
</tr>
<tr>
<td>Policy NE18</td>
<td>Tree planting may be required to improve landscape and soften the impact of development.</td>
<td>✓</td>
</tr>
<tr>
<td>Policy BE2</td>
<td>Proposals must be designed to respect the character, opportunities and constraints of specific sites and surrounding areas</td>
<td>✓</td>
</tr>
<tr>
<td>Policy BE4</td>
<td>New developments should have respect for and not to cause demonstrable harm to the existing townscape character</td>
<td>✓</td>
</tr>
<tr>
<td>Policy BE29</td>
<td>Resists the demolition of buildings and structures or the loss of mature gardens or trees that contribute to the character of a conservation area</td>
<td>✓</td>
</tr>
<tr>
<td>Policy BE32</td>
<td>Development in a conservation area would only be permitted if it would preserve or enhance the character or appearance of the area</td>
<td>✓</td>
</tr>
<tr>
<td>Policy BE33</td>
<td>Seeks the conservation, preservation and continued appropriate use of buildings of special architectural or historic interest</td>
<td>✓</td>
</tr>
<tr>
<td>Policy BE35</td>
<td>Seeks to safeguard the character and setting of listed buildings</td>
<td>✓</td>
</tr>
<tr>
<td>Policy BE41</td>
<td>Requires submission of an archaeological assessment and evaluation for sites of archaeological interest.</td>
<td>✓</td>
</tr>
<tr>
<td>Policy EO1</td>
<td>Identifies that new development will not be permitted where it would cause or exacerbate noise, smell or air pollution for residential areas.</td>
<td>✓</td>
</tr>
</tbody>
</table>

Cambridgeshire County Council
Cambridgeshire Guided Busway

Environmental Statement
Section 6 – Planning Policy Context
<table>
<thead>
<tr>
<th>Policy Number</th>
<th>Policy Thrust</th>
<th>Scheme in accordance with policy</th>
<th>Scheme conflicts with policy</th>
<th>Partially in compliance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy EO2</td>
<td>Development that is likely to give rise to a significant increase in air pollution will not be permitted.</td>
<td>✓</td>
<td></td>
<td></td>
<td>As for EO1.</td>
</tr>
<tr>
<td>Policy EO3</td>
<td>Requires measures to safeguard rivers, streams and ground water from potential pollution.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The drainage strategy seeks to safeguard rivers and streams from potential pollution.</td>
</tr>
<tr>
<td>Policy EO7</td>
<td>Promotes energy and resource efficient development and means of transport.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The project seeks to meet objectives to provide more sustainable transport options for the Cambridge Sub Region.</td>
</tr>
<tr>
<td>Policy EO12</td>
<td>Development on contaminated land should be accompanied by a detailed site survey and details of proposed mitigation measures.</td>
<td>✓</td>
<td></td>
<td></td>
<td>Some site investigations have been undertaken on areas of potentially contaminated land and mitigation measures identified.</td>
</tr>
</tbody>
</table>

**Cambridge City Local Plan Deposit Draft June 2003**

<table>
<thead>
<tr>
<th>Policy Number</th>
<th>Policy Thrust</th>
<th>Scheme in accordance with policy</th>
<th>Scheme conflicts with policy</th>
<th>Partially in compliance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy 3/1</td>
<td>Sustainable forms of Development. Supports development that demonstrate the principles of sustainable development.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme accords with objectives to encourage sustainable forms of transport for the Cambridge Sub Region.</td>
</tr>
<tr>
<td>Policy 3/3</td>
<td>Air Quality Management Areas. This states that development will only be permitted where there is no adverse effect on air quality.</td>
<td>✓</td>
<td></td>
<td></td>
<td>There are only slight or negligible adverse impacts on air quality associated with CGB.</td>
</tr>
<tr>
<td>Policy 3/4</td>
<td>Development will be permitted if it conserves and enhances the setting of the special character of Cambridge and amenity of urban edges</td>
<td>✓</td>
<td></td>
<td></td>
<td>CGB passes through urban edges and has been designed and mitigation measures proposed to help to integrate the proposals into the different character areas.</td>
</tr>
<tr>
<td>Policy 3/16</td>
<td>Safeguarding Features of Amenity or Nature Conservation Value. Development that results in a loss of features of amenity or nature conservation value will not be permitted unless there are wider public benefits.</td>
<td>✓</td>
<td></td>
<td></td>
<td>There are impacts on areas of nature conservation value, but their loss is outweighed by the wider public benefits of the system.</td>
</tr>
<tr>
<td>Policy 3/19</td>
<td>Ancient Monuments/Archaeological Areas. This states that full assessments should be provided with schemes that affect archaeological remains or their settings.</td>
<td>✓</td>
<td></td>
<td></td>
<td>Areas of potential archaeological interest have been investigated and reported on in the ES.</td>
</tr>
<tr>
<td>Policy 3/20</td>
<td>Listed Buildings. This states that listed buildings should be considered in the importance of their Cambridge</td>
<td>✓</td>
<td></td>
<td></td>
<td>There is no significant impact on listed buildings in Cambridge.</td>
</tr>
</tbody>
</table>
### Policy Number

<table>
<thead>
<tr>
<th>Policy Number</th>
<th>Policy Thrust</th>
<th>Scheme in agreement with policy</th>
<th>Scheme conflicts with policy</th>
<th>Partially in compliance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy 3/21</td>
<td>Conservation Areas. This states that development that would affect the setting of or impact on views into or out of conservation areas will only be permitted if features are retained which contribute to the character or design, preserves or enhances the character, and uses will not lead to traffic impacts or other impacts that adversely affect the area.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme does not result in significant adverse effects on the setting of Conservation Areas and the design seeks to preserve and enhance areas.</td>
</tr>
<tr>
<td>Policy 5/1</td>
<td>Safeguarding Environmental Character. This states that development will be permitted if it respects and enhances the distinctive character and quality of areas identified in the Cambridge Landscape Character Assessment.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The CLCA has been taken into account in the ES and the Scheme respects the quality and character of areas of CLCA.</td>
</tr>
<tr>
<td>Policy 5/2</td>
<td>Presumption against inappropriate development in the Green Belt.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme is considered an appropriate use within the Green Belt as it is identified as a proposal of the relevant structure and local plans.</td>
</tr>
<tr>
<td>Policy 5/3</td>
<td>Development will not permitted which would be harmful to the character or lead to the loss of open space of environmental and/or recreational importance.</td>
<td></td>
<td></td>
<td>✓</td>
<td>The route passes adjacent to an area of protected open space on the southern section, however, it would not adversely affect its open character. There would be a minor loss of protected open space at Christ’s Pieces.</td>
</tr>
<tr>
<td>Policy 5/6</td>
<td>Development will not be permitted if it will have an adverse impact on sites of local nature conservation importance.</td>
<td></td>
<td>✓</td>
<td></td>
<td>The route passes through and takes land from City Wildlife sites. Mitigation measures are proposed including enhancement to other sites of interest</td>
</tr>
<tr>
<td>Policy 5/7</td>
<td>Development which would harm protected species will not be permitted unless harm can be fully mitigated.</td>
<td>✓</td>
<td></td>
<td></td>
<td>Measures would ensure that any harm to protected species would be fully mitigated.</td>
</tr>
<tr>
<td>Policy 7/7</td>
<td>Land for Public Transport. This states that development would not be permitted where it would inhibit the expansion of high quality public transport including the rail route to St Ives.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme is clearly in accordance with this policy.</td>
</tr>
</tbody>
</table>
### Policy Number | Policy Thrust                                                                                                                                                                                                 | Scheme in accordance with policy | Scheme conflicts with policy | Partially in compliance | Comments                                                                                                                                 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy 8/2</td>
<td>Infrastructure Improvements. This states that developments that directly improve or provide contributions for the improvement of physical and community infrastructure will be permitted.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme allows for significant infrastructure improvement in the Sub Region.</td>
</tr>
<tr>
<td>South Cambridgeshire Local Plan Deposit Draft 1999 (as proposed to be modified 2002, 2003)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy TP9</td>
<td>The Council will seek, through its decisions on planning applications, to promote more sustainable transport choices to improve access to major trip generators by non-car modes, and to reduce the need to travel, especially by car.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The CGB would improve access by non-car modes and reduce the need to travel by car.</td>
</tr>
<tr>
<td>Policy TP15</td>
<td>The Council supports the creation of a guided bus system</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme is in accordance with this policy</td>
</tr>
<tr>
<td>Policy GB2</td>
<td>States that inappropriate development will not normally be permitted in the Green Belt but exceptionally where it is considered to be appropriate it must be located and designed so as not to adversely affect the rural nature and openness of the Green Belt.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme is considered to be an appropriate use within the Green Belt.</td>
</tr>
<tr>
<td>Policy SE15</td>
<td>Protected Village Amenity Areas (PVAA) Development of PVAA will not be permitted if it would be harmful to the distinctive qualities and functioning laying behind their inclusion in PVAA.</td>
<td>✓</td>
<td></td>
<td></td>
<td>There is a minor loss of land from the PVAA on the edge of the allotments on Histon Road. This loss would not affect the distinctive qualities and functioning of this area.</td>
</tr>
<tr>
<td>Policy EN1</td>
<td>Seeks to ensure that the local character and distinctiveness of Landscape Character Areas (LCAs) is respected, retained and wherever possible enhanced.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The landscape assessment undertaken has regard to the character of LCAs and the design of the Scheme and mitigation measures ensure that local character and distinctiveness of areas is retained and wherever possible enhanced.</td>
</tr>
<tr>
<td>Policy EN3</td>
<td>Design of new development should be appropriate to the particular Landscape Character Area in which it is located.</td>
<td>✓</td>
<td></td>
<td></td>
<td>The Scheme would be designed to a high standard with appropriate screening and planting as appropriate to the Landscape Character.</td>
</tr>
<tr>
<td>Policy Number</td>
<td>Policy Thrust</td>
<td>Scheme in accordance with policy</td>
<td>Scheme conflicts with policy</td>
<td>Partially in compliance</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td>----------------------------</td>
<td>-------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Policy EN5</td>
<td>The District Council will not grant planning permission for development which would adversely affect or lead to the loss of important areas and features of the historic landscape whether or not they are statutorily designated.</td>
<td>✔</td>
<td></td>
<td></td>
<td>The Scheme would have some impact on some features of the historic landscape (including Westwick CA and Swavesey SAM). The impacts have not been assessed to be significant and appropriate mitigation measures have been identified.</td>
</tr>
<tr>
<td>Policy EN6</td>
<td>Trees, hedges and woodland and other landscape features should be retained wherever possible in proposals for new development. Landscape schemes will be required.</td>
<td>✔</td>
<td></td>
<td></td>
<td>The Scheme seeks to replace vegetation that is lost wherever this can be achieved. A landscape mitigation scheme has been prepared and submitted as part of the Environmental Statement.</td>
</tr>
<tr>
<td>Policy EN8</td>
<td>The planting and subsequent management of native species will be encouraged.</td>
<td>✔</td>
<td></td>
<td></td>
<td>Landscape mitigation measures involve the use of native species wherever appropriate and enhancement of biodiversity along the route.</td>
</tr>
<tr>
<td>Policy EN9</td>
<td>Seeks to ensure that the distinctive habitats, natural features and species characteristic of the Natural Areas are respected, retained and wherever possible enhanced.</td>
<td>✔</td>
<td></td>
<td></td>
<td>Habitats are retained wherever possible and enhancement measures are proposed as part of the mitigation.</td>
</tr>
<tr>
<td>Policy EN10</td>
<td>Sets out the Council’s intention to safeguard and wherever possible enhance designated nature conservation sites.</td>
<td></td>
<td></td>
<td>✔</td>
<td>Some County Wildlife Sites are adversely affected although mitigation measures are incorporated to enhance other designated sites.</td>
</tr>
<tr>
<td>Policy EN15</td>
<td>Seeks to retain and enhance features and habitat types of nature conservation value where these occur on sites not identified in the Plan. Planning permission will only be granted where reasons for development outweighs needs to retain the feature.</td>
<td>✔</td>
<td></td>
<td></td>
<td>The need for the development outweighs the loss of features and habitat types of conservation value.</td>
</tr>
<tr>
<td>Policy EN16</td>
<td>States that the District Council will not grant planning permission for development which could directly or indirectly affect the habitat of protected species unless the need for the development clearly outweighs the importance of conserving that habitat.</td>
<td>✔</td>
<td></td>
<td></td>
<td>Some habitat would be affected, but the loss would be addressed through mitigation. The need for the Scheme outweighs the importance of conserving the habitat.</td>
</tr>
<tr>
<td>Policy EN19</td>
<td>Identifies that sites and features of archaeological importance will be protected, preserved or enhanced.</td>
<td>✔</td>
<td></td>
<td></td>
<td>Measures to protect, preserve and enhance archaeological features are set out in the ES.</td>
</tr>
<tr>
<td>Policy Number</td>
<td>Policy Thrust</td>
<td>Scheme in accordance with policy</td>
<td>Scheme conflicts with policy</td>
<td>Partially in compliance</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------</td>
<td>-----------------------------</td>
<td>-------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Policy EN23</td>
<td>Where planning permission is granted for any development which affects any aspect of the archaeological heritage which is considered to be important, the District Council will encourage and in appropriate cases require by condition or planning obligation, developers to make provision for the deposit of records arising from excavations for public access.</td>
<td>✓</td>
<td></td>
<td></td>
<td>Any important archaeological heritage that is affected is to be appropriately recorded in accordance with the requirements of the County Council’s Principal Archaeologist.</td>
</tr>
<tr>
<td>Policy EN41</td>
<td>Requires submission of sufficient illustrations &amp; technical material for development that will affect the curtilage or setting of a listed building. Will refuse development which would damage the setting, well being or attractiveness of listed buildings or would harm the visual relationship between buildings and formal and natural landscape surroundings or would damage archaeological remains of importance.</td>
<td>✓</td>
<td></td>
<td></td>
<td>No development is to take place within the curtilage of listed buildings and the assessment has demonstrated that the wider setting would not be significantly adversely impacted. Appropriate mitigation measures are proposed for any archaeological remains of importance.</td>
</tr>
<tr>
<td>Policy EN44</td>
<td>Requires applications for development within or affecting the setting of conservation areas to provide sufficient material for the impact to be assessed. Requires proposals to proposals to preserve or enhance the special character and appearance of Conservation Area</td>
<td>✓</td>
<td></td>
<td></td>
<td>Sufficient information has been submitted to assess impact on conservation areas and to identify appropriate mitigation measures to preserve and enhance their appearance.</td>
</tr>
<tr>
<td>Policy EN46</td>
<td>Requires a high standard of design, planting and materials in Conservation Areas</td>
<td>✓</td>
<td></td>
<td></td>
<td>High standard of design is proposed for any features of the systems, including that part within conservation areas.</td>
</tr>
<tr>
<td>Policy ES1</td>
<td>Detailed site investigations and appropriate treatment, monitoring and after-use will be required for contaminated land.</td>
<td>✓</td>
<td></td>
<td></td>
<td>Investigations have been undertaken and reported on in the ES for potential areas of contaminated land.</td>
</tr>
<tr>
<td>Policy ES2</td>
<td>Road and footway lighting will be encouraged to be designed to a standard that ensures no light spillage above the horizontal.</td>
<td>✓</td>
<td></td>
<td></td>
<td>Lighting would be designed to accord with policy objectives.</td>
</tr>
<tr>
<td>Policy ES4</td>
<td>Where development will increase traffic flow or introduce</td>
<td>✓</td>
<td></td>
<td></td>
<td>Modelling has been undertaken and the results with reference.</td>
</tr>
</tbody>
</table>
### Policy Number | Policy Thrust | Scheme in accordance with policy | Scheme conflicts with policy | Partially in compliance | Comments |
--- | --- | --- | --- | --- | --- |
| | emissions to the air, appropriate modelling exercises should be undertaken to allow comparison to the local authority’s air quality strategy. | | | | to local authority’s air quality strategy are reported on in the ES. |

**Huntingdonshire Local Plan**

**Policy TP21** The District Council will support proposals which maintain or improve the present level of public transport services. ✓ The Scheme would result in improvements to the level and quality of public transport services.

**Policy EN2** Any development involving or affecting a building of special architectural or historic interest should have proper regard to the scale, form, design and setting of that building. ✓ No significant impacts are anticipated on buildings of special architectural or historic interest.

**Policy EN5** Development in conservation areas should preserve or enhance their character or appearance. ✓ The route passes through four conservation areas in St Ives and Huntingdon. However, the Scheme would not adversely effect the street scene or views into the conservation areas.

**Policy EN9** States that development will not normally be permitted if it would impair important open spaces, trees, street scenes and views into and out of conservation areas. ✓ The route passes through four conservation areas in St Ives and Huntingdon. However, the Scheme would not adversely impact on the street scene or views into the conservation areas. The Scheme would involve some land-take at Riverside Road and Harford Road and appropriate compensatory mitigation measures have been proposed.

**Policy EN11** Development that would have an adverse impact on scheduled ancient monuments or an archaeological site of acknowledged importance will not be permitted. ✓ There is no adverse impact on scheduled ancient monuments within the District.

**Policy EN12** Requires archaeological recording prior to development on sites of archaeological interest. ✓ A thorough archaeological assessment has been undertaken and identifies where recording prior to development is
<table>
<thead>
<tr>
<th>Policy Number</th>
<th>Policy Thrust</th>
<th>Scheme in accordance with policy</th>
<th>Scheme conflicts with policy</th>
<th>Partially in compliance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy EN13</td>
<td>Requires archaeological assessments to accompany planning applications for developments in areas of archaeological potential</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy EN14</td>
<td>Development will not normally be permitted where it has an adverse impact on open spaces, frontages, and gaps in the built up framework or immediately adjacent.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy EN15</td>
<td>Protected gaps and open spaces will be protected from development that would impair their open nature.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy EN18</td>
<td>States that the District will seek to protect important site features including trees, woodlands, hedges and meadowland</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy EN21</td>
<td>Areas of Best Landscape will be protected from development that would adversely affect the character of the area.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy EN22</td>
<td>States that wherever relevant the determination of applications will take appropriate account of the interests of nature and wildlife conservation.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy EN23</td>
<td>Development which adversely affects SSSIs, National Nature Reserves or Local Nature Reserve or significant adverse effects on wildlife in an area of special importance for nature conservation will not normally be permitted</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.8.4
7. AGRICULTURE

7.1 Introduction

7.1.1 This section of the Environmental Statement (ES) assesses the likely significant effects of the proposed Cambridgeshire Guided Busway (CGB) Scheme upon agricultural land and local farming activities. It includes an assessment of the impacts during construction, and operation of the Scheme. A full description of the Scheme is given in Section 4 of this ES.

7.2 Review of Development Proposals

7.2.1 The majority of the guided sections of the route would utilise non-agricultural land within the boundaries of two disused railway corridors: the disused St Ives rail corridor in the northern section, and the disused Bedford rail corridor to the south of Cambridge. CGB buses would also utilise existing highways between Huntingdon and St Ives and through Cambridge.

7.2.2 The Scheme would, however, require agricultural land-take outside the areas described above for a number of uses, including:

- widening of existing highways along part of Hartford Road, Huntingdon, and sections of the A1123 between Huntingdon and St Ives;
- new park and ride sites at St Ives and Longstanton;
- a kiss and ride site at Swavesey;
- two sections of guideway at Arbury Park and Addenbrooke’s Hospital;
- permanent access tracks to mitigate farm/field severence;
- landscaping and habitat replacement;
- balancing ponds;
- widening of the existing rail corridor to allow for construction of a maintenance track, drainage ditches and outfalls; and
- temporary construction sites and construction access routes.

7.3 Methodology

7.3.1 This assessment considers the quality and quantity of agricultural land that would be acquired for the Scheme, and hence lost to agricultural production. This has been achieved by collating baseline information on soils and agriculture/farming within a 1 km corridor (0.5 km either side of the line of the CGB route).

7.3.2 To accord with national, regional and development plan policy, this agricultural assessment has involved:

- consultation with the relevant authorities (see Section 7.4);
- a desk-based analysis of the likely soils and Agricultural Land Classification (ALC), using the MAFF Agricultural Land Classification of England and Wales Revised guidelines and criteria for grading the quality of agricultural land (October 1988); and
- a desk-based assessment of farms potentially affected by severance and/or fragmentation as a result of the Scheme.
7.3.3 The desk study of published information on soils and Agricultural Land Classification included utilisation of the *Forecast of the Best and Most Versatile Agricultural Land in Cambridgeshire* produced by the Farming and Rural Conservation Agency (FRCA), an Executive Agency of MAFF.

**Terminology**

7.3.4 For the purposes of this agriculture assessment, the following terminology has been adopted in order to describe the potential impacts of the Scheme:

- **Impact** (adverse or beneficial);
- **Nature of impact** (permanent, temporary, reversible, irreversible),
- **Significance of impact** (major, moderate, slight and negligible, as defined in Section 2); and
- **Geographical context** (international, national, regional, county, local).

7.4 **Consultation**

7.4.1 The Government Office for the East (GO-East) was consulted on the Cambridge to Huntingdon guided bus on the 7th July 2003. The Senior Rural Adviser for GO-East confirmed that the guided bus scheme did not raise any issues of concern, beyond GO-East’s scoping response to the previous superCAM proposals. Go-East’s scoping response to the superCAM proposals is summarised in Appendix 2A.

7.4.2 DEFRA has confirmed that the Department does not hold any detailed ALC information for land within the boundary of the proposed CGB Scheme. As part of the previous scoping exercise in connection with the superCAM proposals, MAFF (now superseded by DEFRA) provided a map which shows a ‘Forecast of the Best and Most Versatile Agricultural Land in Cambridgeshire’. A copy of this map is provided in Appendix 7A.

7.5 **Limitations, Constraints and Assumptions**

7.5.1 DEFRA does not hold any detailed ALC information for land within the boundary of the CGB corridor. The ALC grading of land affected by the Scheme has therefore been predicted by matching the published information on soils and provisional ALC against the guidance set out in MAFF Guidelines.

7.5.2 Due to the prevalence of, and thus very high likelihood of encountering, high quality agricultural land in Cambridgeshire (see Appendix 7A, Forecast of Best and Most Versatile Agricultural Land in Cambridgeshire) a desktop assessment rather than a detailed soil survey of agricultural land quality was deemed to be adequate for the purposes of this assessment. Go-East, in their response to the Scoping Report, confirmed that agricultural impacts had been adequately addressed using this approach (see summary in Appendix 2A).

7.5.3 The MAFF provisional ALC map of the Eastern Region covers the whole Scheme area. This map was drawn at a scale of 1:250,000, and was produced in the early 1970’s using a system of ALC that was comprehensively revised in October 1988. MAFF provisional ALC maps show a division of land into grades 1, 2, 3, 4 and 5, but there is no subdivision of grade 3 land into subgrade 3a or subgrade 3b.

7.5.4 Paragraph 2.18 of Planning Policy Guidance Note 7: The Countryside - Environmental Quality and Economic and Social Development(PPG7) states that:
The decision whether to utilise BMV [best and most versatile] land for development is for each local planning authority, having carefully weighed the options in the light of competent advice.

This places the onus of determining whether or not development of best and most versatile (BMV) agricultural can proceed upon the local planning authority. Therefore, the impact of the loss of best and most versatile agricultural land is assessed at the local level. Further information on Planning Policy Guidance Notes is provided in Section 6.

Areas of land lost from agricultural production as a result of the Scheme have been predicted from the Limits of Deviation, using worst case estimates.

Baseline

Published Soils Information

The most detailed source of soils information along the proposed route is the Soil Survey Map for Cambridge and Ely District, published by the Soil Survey of England and Wales in 1976, at a scale of 1 inch to 1 mile (1:63,360).

A soil association, referred to on the detailed Soil Survey map, is a map unit consisting of one or more main soil series occurring with smaller areas of others. This grouping of the series is usually based on similarity of parent material.

The main soil associations identified from the north end of the guideway (St Ives) to the south (Trumpington) are shown on the plans in Appendix 7B, and described in Appendix 7C.

Published Agricultural Land Classification Information

Definitions of the Agricultural Land Classification Grades taken from the MAFF ALC Guidelines are given as Appendix 7D. A bulletin produced by MAFF to accompany the provisional ALC map of the Eastern Region of England describes the soil types that fall within certain ALC grades. This information is summarised in Appendix 7E.

As described in the Cambridgeshire and Peterborough Structure Plan (Adopted 2003), Cambridgeshire has one of the largest areas of high-grade agricultural land in the United Kingdom. The proportion of high-grade agricultural land in Cambridgeshire in comparison with East Anglia, and England and Wales as a whole, is given in MAFF Technical Note No. TN/RP/01 TFS 846 of February 1993. This information, which is based on provisional Agricultural Land Classification (ALC) data, is reproduced in Table 7.1.
Table 7.1: ALC in Cambridgeshire compared with East Anglia and England and Wales

<table>
<thead>
<tr>
<th>MAFF ALC Grade</th>
<th>England and Wales</th>
<th>East Anglia</th>
<th>Cambridgeshire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>2.8</td>
<td>10.3</td>
<td>21.6</td>
</tr>
<tr>
<td>Grade 2</td>
<td>14.6</td>
<td>29.3</td>
<td>48.8</td>
</tr>
<tr>
<td>Subgrade 3a</td>
<td>16.3</td>
<td>17.2</td>
<td>8.9</td>
</tr>
<tr>
<td>Total Grades 1 + 2 + 3a</td>
<td>33.7</td>
<td>56.8</td>
<td>79.3</td>
</tr>
<tr>
<td>Subgrade 3b</td>
<td>32.6</td>
<td>34.3</td>
<td>17.8</td>
</tr>
<tr>
<td>Grade 4</td>
<td>19.8</td>
<td>8.8</td>
<td>2.9</td>
</tr>
<tr>
<td>Grade 5</td>
<td>13.9</td>
<td>0.1</td>
<td>0</td>
</tr>
</tbody>
</table>

As can be seen in Table 7.1, 70.4% of agricultural land in Cambridgeshire falls into MAFF ALC grades 1 and 2. This is four times greater than the national average. By dividing the total grade 3 land as one-third subgrade 3a and two-thirds subgrade 3b, it is estimated that 79.3% of agricultural land in Cambridgeshire falls within the ‘best and most versatile’ category (ALC grades 1, 2 and 3a). The prevalence of best and most versatile agricultural land in Cambridgeshire is substantiated by a forecast ALC map provided by MAFF/FRCA, a copy of which given as Appendix 7A. In this context, it would not be unexpected to encounter a high proportion of best and most versatile agricultural land in the sections of the Scheme that pass through agricultural areas.

The grading of agricultural land affected by the Scheme according to the current ALC grading system has been predicted, using the baseline information described above. The predicted grades are given in Table 7.2.

Table 7.2: Predicted ALC Grading of Agricultural Land Following Current MAFF ALC Guidelines in a 1km Corridor along the Route of the Proposed CGB

<table>
<thead>
<tr>
<th>Section of Route</th>
<th>Predicted ALC Grade (Following MAFF Guidance for ALC, October 1988)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1 (Huntingdon to St Ives Park &amp; Ride)</td>
<td>Between Hinchingbrooke Hospital and Huntingdon the CGB buses would run along the existing road. This area is classed as non-agricultural. The remainder of the proposed route between Huntingdon and St Ives Park &amp; Ride passes through urban areas and along existing highways. The land in these areas is predominantly non-agricultural. Agricultural land in strips along Hartford Road and the A1123 would be taken for road widening to provide new bus lanes. This would involve the loss of approximately 1.13ha of agricultural land of subgrade 3a (60%) and 3b (40%) quality.</td>
</tr>
<tr>
<td>Sections 2-5 (St Ives Park &amp; Ride to A14, north of Cambridge)</td>
<td>Land adjacent to the disused rail corridor between St. Ives and Fen Drayton is likely to comprise mainly subgrade 3b and Grade 4 land. Agricultural land between Fen Drayton and the A14 to the north of Cambridge City is a mix of grade 2+subgrade 3a(60%) and subgrade 3b(40%).</td>
</tr>
<tr>
<td>Section 6 (A14 to</td>
<td>This section of the Scheme comprises mainly non-agricultural/other</td>
</tr>
</tbody>
</table>
Section 7 – Agriculture

Farming Circumstances

7.6.8 Annex B9 of PPG7 (as amended March 2001), covering ‘Farm Size and Structure’, states that:

‘the loss of part of a holding can have important implications for the remainder. The effect of severance and fragmentation upon the farm and its structure may be relevant.’

7.6.9 A number of farm accesses are crossed by the CGB route, and these are summarized in Table 7.4.

7.7 Assessment

Construction Phase

7.7.1 During the construction of the Scheme, agriculture would be affected in two main ways: firstly, through the loss of land to agricultural production; and secondly, through disruption to farm access and agricultural capital/infrastructure, such as fences, hedgerows, water supply and land-drainage systems. Both impacts may be either temporary (during the construction phase only) or permanent.

Agricultural Land Quality

7.7.2 The CGB Scheme utilises existing highways and two sections of disused railway, to the north and south of Cambridge. This minimises the need for additional green-field/agricultural land in order to construct the Scheme. However, land-take would be required outside the existing boundaries of the highways and disused rail corridors, as described in Section 7.2.2.

7.7.3 The locations, proposed uses and approximate areas of land taken out of agricultural production for the construction of the Scheme is summarised in Table 7.3.

Table 7.3: Summary of Agricultural Land-Take for the Scheme

<table>
<thead>
<tr>
<th>Chainage</th>
<th>Proposed land use</th>
<th>Approximate area / ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1 - Huntingdon to St Ives Park &amp; Ride</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>Road widening along Hartford Road, Huntingdon</td>
<td>0.5</td>
</tr>
<tr>
<td>-</td>
<td>Road widening along A1123 Huntingdon Road</td>
<td>0.2</td>
</tr>
<tr>
<td>-</td>
<td>Road widening along A1123 Houghton Hill to High Leys</td>
<td>0.5</td>
</tr>
</tbody>
</table>
### Section 7 – Agriculture

<table>
<thead>
<tr>
<th>Chainage</th>
<th>Proposed land use</th>
<th>Approximate area / ha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 2 – St Ives to District Boundary (Fen Drayton)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 1+600</td>
<td>St Ives Park and Ride</td>
<td>7.0</td>
</tr>
<tr>
<td>1+900 - 2+200</td>
<td>Construction compound at Ouse Viaduct (temporary acquisition)</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Section 3 – District Boundary(Fen Drayton) to Swavesey Drain</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3+000 - 3+625</td>
<td>New private access to land north of guideway</td>
<td>0.8</td>
</tr>
<tr>
<td>3+000 - 3+625</td>
<td>New private access to land south of guideway</td>
<td>2.4</td>
</tr>
<tr>
<td>5+250 - 6+125</td>
<td>New private access</td>
<td>0.8</td>
</tr>
<tr>
<td>6+125 - 6+200</td>
<td>Swavesey Kiss and Ride and stop</td>
<td>0.1</td>
</tr>
<tr>
<td>6+375</td>
<td>New private access</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Section 4 – Swavesey Drain to Longstanton Park &amp; Ride</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7+450</td>
<td>Balancing Pond 1 with landscape/ecology mitigation area</td>
<td>0.8</td>
</tr>
<tr>
<td>7+600 - 7+900</td>
<td>Windmill Bridge construction compound (permanent acquisition for landscape/ecology mitigation)</td>
<td>2.6</td>
</tr>
<tr>
<td>7+900 - 8+475</td>
<td>Landscape/ecology mitigation area</td>
<td>2.6</td>
</tr>
<tr>
<td>9+100 - 9+500</td>
<td>Landscape/ecology mitigation area</td>
<td>0.8</td>
</tr>
<tr>
<td>9+850 - 10+300</td>
<td>Longstanton Park and Ride</td>
<td>7.0</td>
</tr>
<tr>
<td>-</td>
<td>Construction Route 4 (temporary acquisition)</td>
<td>3.4</td>
</tr>
<tr>
<td><strong>Section 5 – Longstanton Park &amp; Ride to A14</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10+800</td>
<td>Balancing Pond 2 with landscape/ecology mitigation area</td>
<td>0.3</td>
</tr>
<tr>
<td>10+825 - 11+150</td>
<td>Landscape/ecology mitigation area</td>
<td>0.6</td>
</tr>
<tr>
<td>11+400</td>
<td>Balancing Pond 3 with landscape/ecology mitigation area</td>
<td>0.5</td>
</tr>
<tr>
<td>12+100</td>
<td>Balancing Pond 4 with landscape/ecology mitigation area</td>
<td>0.3</td>
</tr>
<tr>
<td>13+850 - 14+125</td>
<td>Landscape/ecology mitigation area</td>
<td>2.2</td>
</tr>
<tr>
<td>15+400 - 15+900</td>
<td>New private access</td>
<td>0.4</td>
</tr>
<tr>
<td>18+600</td>
<td>Balancing Pond 6 with landscape/ecology mitigation area</td>
<td>0.8</td>
</tr>
<tr>
<td><strong>Section 6 – A14 to Cambridge Railway Station</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18+750 - 18+850</td>
<td>Landscape/ecology mitigation area</td>
<td>0.4</td>
</tr>
<tr>
<td>81+250 - 80+000</td>
<td>Guideway around Arbury Park</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Section 7 – Cambridge Railway Station to Trumpington</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41+750 - 41+875</td>
<td>Long Road plantation construction compound (temporary acquisition)</td>
<td>1.5</td>
</tr>
<tr>
<td>41+375</td>
<td>Balancing Pond 7 with landscape/ecology mitigation area</td>
<td>0.3</td>
</tr>
<tr>
<td>42+000</td>
<td>Balancing Pond 8 with landscape/ecology mitigation area</td>
<td>0.3</td>
</tr>
<tr>
<td>42+500</td>
<td>Balancing Pond 9 with landscape/ecology mitigation area</td>
<td>0.4</td>
</tr>
</tbody>
</table>
### Section 1 - Huntingdon to St Ives Park and Ride

**7.7.4** Approximately 1.2ha of agricultural land would be taken in strips for road widening along Hartford Road (approximately 0.5ha), A1123 Houghton Road (approximately 0.2ha) and A1123 Hill Rise to High Leys (approximately 0.5ha). It is predicted that the agricultural land-take is likely to involve approximately 0.7ha of subgrade 3a and approximately 0.5ha of subgrade 3b. The loss of the subgrade 3a land is a slight adverse, permanent impact at a local level, whilst the loss of this area of subgrade 3b land is a negligible impact on local agricultural interests.

### Section 2 - St Ives to District Boundary (Fen Drayton)

**7.7.5** The proposed St Ives Park and Ride site would involve the loss of approximately 7.0ha of open land on the site of a former landfill. Any agricultural land in this area is likely to be of a moderate to poor quality (ALC subgrade 3b or grade 4). Such land falls outside of the description of ‘best and most versatile’ (BMV) agricultural land, and the potential impact of the park and ride upon agricultural land is therefore negligible in local terms.

**7.7.6** A construction compound would be located at the Ouse Viaduct, which would involve the temporary loss of approximately 0.6ha of subgrade 3b land. This is a negligible impact on local agricultural interests.

### Section 3 - District Boundary (Fen Drayton) to Swavesey Drain

**7.7.7** The Swavesey Kiss and Ride site would involve approximately 0.1ha of land-take. This is likely to be subgrade 3a quality, at the lower end of the BMV scale. Considering the prevalence of BMV agricultural land in Cambridgeshire, and particularly the abundance of agricultural land in grade 1 and grade 2, the loss of a small area of subgrade 3a land is a slight adverse, permanent impact at the local level.

**7.7.8** Agricultural land would be taken for new private accesses; it is predicted that this would entail approximately 3.6ha of grade 3a land. The loss of an area of subgrade 3a land is a slight adverse, permanent impact at the local level.

### Section 4 - Swavesey Drain to Longstanton Park and Ride

**7.7.9** A temporary construction compound would be located at Windmill Bridge and, following construction, the land would be permanently acquired for landscaping and ecological mitigation. This would involve the loss of approximately 2.6ha of subgrade 3a land. This is

---

**Chainage** | **Proposed land use** | **Approximate area / ha**
--- | --- | ---
43+000 | Shelford Road construction compound (temporary acquisition) | 1.1

**Section 8 – Link to Addenbrooke’s Hospital**

**Guideway Sections**

- Land to accommodate maintenance track, drainage and outfalls adjacent to the disused rail corridor: **39.0**
- Total: **83.0**

---
a permanent, adverse impact of slight magnitude at the local level.

7.7.10 The Longstanton Park and Ride site is likely to involve the permanent and irreversible loss of approximately 7.0ha of agricultural land comprising soils in the Denchworth Association. Thus it is predicted that the site would involve the loss of a mix of subgrade 3a (approximately 3.5ha) and subgrade 3b (approximately 3.5ha). Subgrade 3a is at the lower end of the best and most versatile category, which ranges from grades 1-3a, and the loss of a small area of subgrade 3a land in the context of Cambridgeshire is a slight adverse, permanent impact at a local level. The loss of the subgrade 3b land is a negligible impact on local agricultural interests.

7.7.11 Some land would also be taken to provide a balancing pond and land for ecological mitigation. This totals approximately 4.2ha. It is predicted that approximately 2.5ha would fall into grade 2 or 3a. This loss of a small area of BMV agricultural land is a slight adverse, permanent impact at the local level.

7.7.12 A temporary construction haul road would be located in this section, away from the CGB corridor, to the north and west of Longstanton. This would involve the loss of approximately 3.4ha of agricultural land, comprising approximately 1.8ha of grade 2/3a (BMV) land. This is a slight adverse, permanent impact at a local level. The loss of the remainder of subgrade 3b land is a negligible impact on local agricultural interests.

Section 5 – Longstanton Park and Ride to A14

7.7.13 There would be a number of areas taken for ecological mitigation and balancing ponds within this section of the route. This totals approximately 4.7ha. It is predicted that approximately 2.8ha would fall into grade 2 or 3a. This loss of a small area of BMV agricultural land is a slight adverse, permanent impact at the local level.

7.7.14 A small area of agricultural land would be taken for provision of a private access (approximately 0.4ha). This is likely to be grade 2 or 3a land. The loss of this parcel of land in isolation is negligible in terms of land-quality.

Section 6 - A14 to Cambridge Railway Station

7.7.15 Agricultural land would be taken to provide a guideway along the edge of Arbury Park. This would involve the loss of approximately 3.0ha of grade 2 or 3a land. This loss of a small area of BMV agricultural land is a slight adverse, permanent impact at the local level.

7.7.16 Approximately 0.4ha would be taken for ecological mitigation in this section of the CGB route. This is likely to be grade 2 or 3a land. The loss of this parcel of BMV land in isolation is negligible.

Section 7 - Cambridge Railway Station to Trumpington

7.7.17 Approximately 1.0ha of agricultural land would be taken for ecological mitigation. Approximately 0.6ha would be grade 2 or 3a land. This loss of a small area of agricultural land is a slight adverse, permanent impact at the local level.

7.7.18 Approximately 2.6ha of agricultural land would be taken for temporary construction compounds at Long Road and Shelford Road. Approximately 1.4ha would be grade 2 or 3a land. This loss of a small area of agricultural land is a slight adverse, temporary impact at the local level.
Section 8 - Link to Addenbrooke’s Hospital

7.7.19 The proposed link to Addenbrooke’s Hospital is predicted to involve the permanent and irreversible loss of approximately 1.4ha of mainly grade 2 land. The loss of this BMV agricultural land is considered to be an adverse, permanent impact of a slight magnitude at the local level.

Other Agricultural Land-Take Outside of Rail Corridor

7.7.20 Agricultural land would be required immediately adjacent to the disused rail corridor to accommodate a maintenance track, drainage and outfalls. The extent of the widening varies along the route, and would total approximately 39ha, of which approximately 25ha is likely to fall into the BMV category (in this case a mix of grade 3 and subgrade 3a). This is a permanent adverse impact of a slight to moderate magnitude at the local level.

Cumulative Agricultural Land-Take

7.7.21 Overall, it is predicted that approximately 47ha of BMV agricultural land (in this case land in grade 2 and subgrade 3a) would be lost to agricultural production as a result of constructing the Scheme.

7.7.22 Of the BMV agricultural land-take, approximately 37ha would be permanently lost to agricultural production. This is a cumulative, permanent adverse impact of a moderate magnitude at a local scale.

7.7.23 The remaining 9ha of BMV agricultural land would be taken out of agricultural production on a temporary basis whilst the Scheme is constructed. This is accumulative, temporary adverse impact of a slight magnitude at the local level.

Farming Circumstances

7.7.24 Construction compounds and haul roads located on agricultural land may cause temporary access restrictions to fields, or parts of fields, during the construction phase. Where livestock is being grazed, access to animal drinking water supplies could be affected. Such a disturbance to agricultural activities is considered to be an adverse, temporary impact of potentially moderate magnitude at the local scale.

7.7.25 Windmill Bridge would be closed during the construction phase, as it is proposed to rebuild the bridge as part of the Scheme. This would involve the temporary closure of Longstanton Road, which is used as an access route to local farm holdings. This is considered to be an adverse, temporary impact of potentially moderate magnitude at the local scale.

7.7.26 There would be a temporary closure of the farm access across the railway during the construction of the bridge for the Addenbrooke’s link. This is considered to be an adverse, temporary impact of potentially moderate magnitude at the local scale.

Operational Phase

Agricultural Land Quality

7.7.27 It is assumed for the purposes of this assessment that there would be no further agricultural land-take after the construction phase is completed, and that the operation of the Scheme would have no impact on agricultural land quality.
### Farming Circumstances

**7.7.28** The main agricultural areas affected during the operational life of the Scheme are summarised below.

**Section 1 - Huntingdon to St Ives**

**7.7.29** There is some agricultural land take, in narrow strips, in route section 1 along part of the Hartford Road in Huntingdon, part of Huntingdon Road (A1123), and part of the A1123 at Houghton Hill to High Leys. This would not cause severance or fragmentation of any land within the farm holding, but water supply pipes, fencing, underground agricultural drainage system and/or ditches may be affected, and would require appropriate mitigation to be agreed with the landowners/farmers involved. This is assessed as being a temporary adverse impact of potentially moderate magnitude at a local level.

**Sections 2-5 - St Ives to A14 to the north of Cambridge**

**7.7.30** There are a number of private crossings affected by the Scheme in route sections 2 to 5, which may have some bearing on access for agricultural purposes. Crossings are shown in Appendix 4D, and the impacts are summarised in the Table 7.4.

#### Table 7.4: Impacts on Agricultural Crossings Along the CGB Route Between St Ives – Northern Cambridge and Proposed Mitigation

<table>
<thead>
<tr>
<th>Description of Crossing</th>
<th>Chainage</th>
<th>Impact Assessment and Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second Drove, St Ives</td>
<td>ch 1+550</td>
<td>This crossing is proposed to be retained through an underpass solution. The underpass would maintain access in the long-term. Whilst there would be temporary moderate adverse impact at the local level during the construction phase, the operational impact of the CGB is negligible.</td>
</tr>
<tr>
<td>Fen Drayton</td>
<td>ch 3+000 - 3+625</td>
<td>New access would be provided along disused rail corridor at Fen Drayton (extending outside the corridor). Whilst there would be temporary moderate adverse impact at the local level during the construction phase, the operational impact of the CGB is negligible.</td>
</tr>
<tr>
<td>Mow Fen Drove and Middle Fen Drove, Swavesey</td>
<td>ch 5+250 - 6+125</td>
<td>These are to be closed off. An alternative would be provided from Swavesey level crossing linking to both Mow Fen Drove and Middle Fen Drove. This is a temporary adverse impact of moderate magnitude at the local level during the construction phase, but the operational impact of the CGB is negligible.</td>
</tr>
<tr>
<td>Lairstall Drove, Swavesey</td>
<td>ch 6+600</td>
<td>A crossing over an existing level crossing would be closed off, but alternative access would be provided to the north of the level crossing. This is a temporary adverse impact of moderate magnitude at the local level during the construction phase, but access would be maintained at Swavesey in the long-term, and the impact during the operational phase is negligible.</td>
</tr>
<tr>
<td>Windmill Bridge</td>
<td>ch 7+900</td>
<td>A crossing to the west of Windmill Bridge would be closed off, but alternative access would be sought off a public highway. This is a temporary adverse impact of moderate magnitude at the local level during the construction phase, but with alternative access in place, the impact during the operational phase is negligible.</td>
</tr>
</tbody>
</table>
### Section 7 - Agriculture

#### 7.7 Crossing Details

<table>
<thead>
<tr>
<th>Description of Crossing</th>
<th>Chainage</th>
<th>Impact Assessment and Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histon</td>
<td>ch 15+400 - 15+900</td>
<td>The existing crossing would be closed off and an alternative access would be sought off Park Lane. This is a temporary adverse impact of moderate magnitude at the local level during the construction phase, but with alternative access in place, the impact during the operational phase is negligible.</td>
</tr>
<tr>
<td>Impington</td>
<td>ch 16+100</td>
<td>There is independent access to both areas of land on either side of the proposed guideway that would enable the closure of this crossing. With independent access available, the impact during the construction and operational phase is negligible.</td>
</tr>
</tbody>
</table>

#### 7.7.31 Cambridge Railway Station to Trumpington

No agricultural crossings are affected in this section of the CGB route.

#### 7.7.32 Link to Addenbrooke’s Hospital

A private crossing in the Pemberton land would be affected by the Scheme. Land adjacent to CGB route is allocated for development and would be developed separately through the Town and Country Planning process. If development does not take place, alternative access can be easily sought, as the land is all under a single ownership.

#### 7.8 Mitigation Measures

### Construction Phase

#### Agricultural Land Quality

7.8.1 It is predicted that construction of the Scheme would result in the total, permanent loss of 38ha of best and most versatile agricultural land, and the temporary loss of a further 9ha of best and most versatile agricultural land for haul roads, etc (see Table 7.3). It is inevitable that development involving agricultural land within Cambridgeshire would result in the loss of some best and most versatile agricultural land, as predicted in the Cambridgeshire Structure Plan (see Section 7.6.5). Although compensation would be agreed with farmers and landowners for the loss of land, it is not possible to mitigate the impacts of the removal of land from agricultural production as a result of the Scheme.

7.8.2 With regard to construction sites, care would be taken when stripping topsoil, and affected areas would be reinstated once construction has been completed so that the original quality of soil/agricultural land is restored. This would be carried out in accordance with the MAFF Code of Good Agricultural Practice for the Protection of Soil (Revised 1998).

#### Farming Circumstances

7.8.3 Liaison with farmers affected by temporary construction sites would be undertaken throughout the construction phase, in order to ensure access to agricultural fields is maintained and that livestock are provided with drinking water, where supply of water is affected by construction activities.
Operational Phase

Agricultural Land Quality

7.8.4 As additional land-take during the operation life of the Scheme is not anticipated, and because the daily operation of the Scheme would not affect agricultural land quality, no mitigation is necessary.

Farming Circumstances

Section 1 (Huntingdon to St Ives)

7.8.5 There would be no operational impacts in this section of the route.

Sections 2-5 (St Ives to A14 to the north of Cambridge)

7.8.6 The agricultural crossings adversely affected by the Scheme are identified in Table 7.4. Alternative access is proposed for all of the affected crossings.

Section 6 - A14 to Cambridge Railway Station

7.8.7 With regard to the link to Arbury Park, liaison with the landowners/farmers affected by the Scheme would be undertaken regularly in order to maintain the agricultural productivity of the farmland, as necessary.

Section 7 (Cambridge Railway Station to Trumpington)

7.8.8 No agricultural crossings are adversely affected along this section of the CGB route.

Section 8 (Link to Addenbrooke’s Hospital)

7.8.9 The link to Addenbrooke’s Hospital would cause the fragmentation of an agricultural field, but full access would be maintained.

7.9 Residual Effects

Construction Phase

7.9.1 It is predicted that construction of the Scheme would result in the total, permanent loss of 38ha of best and most versatile agricultural land, and the temporary loss of a further 9ha of best and most versatile agricultural land for haul roads, etc (see Table 7.3), as described in Section 7.5.

7.9.2 The residual loss of some best and most versatile agricultural land as a result of the proposed CGB must be seen in context. As described earlier, 70.4% of agricultural land in Cambridgeshire falls into MAFF ALC grades 1 and 2. This is four times greater than the national average. It is estimated that 79.3% of agricultural land in Cambridgeshire falls within the best and most versatile category (ALC Grades 1, 2 and 3a). There is a very high likelihood of encountering a high proportion of best and most versatile agricultural land within the CGB corridor, as there is elsewhere in the County.

7.9.3 There is, therefore, a residual, permanent adverse impact of moderate magnitude at the local level (the permanent loss of approximately 38ha of best and most versatile agricultural land), once the Scheme is completed.
7.9.4 It is possible to mitigate temporary adverse impacts on agricultural land quality and local farming caused by temporary construction compounds and haul roads, with the exception of the Windmill Bridge compound which would be acquired for ecological mitigation. Once these temporary sites have been restored appropriately, there would be no residual effects.

**Operational Phase**

**Agricultural Land Quality**

7.9.5 The quality of agricultural land alongside the CGB route would be unchanged during the operational life of the Scheme, and therefore no mitigation is proposed.

**Farming Circumstances**

7.9.6 Any disturbance to farming activities would be mitigated during the construction of the Scheme, and there would be no residual adverse impacts.
Appendices

Appendix 7A  Best and Most Versatile Agricultural Land in Cambridgeshire
Appendix 7B  Soil Associations and Predicted ALC Grades
Appendix 7C  Description of Soil Associations
Appendix 7D  Definition of MAFF ALC Grades
Appendix 7 E  Soil types per MAFF ALC Grade

References

1 Revised guidelines and criteria for grading the quality of agricultural land, MAFF (October 1988)
2 Forecast of the Best and Most Versatile Agricultural Land in Cambridgeshire, MAFF
3 Planning Policy Guidance Note 7: The Countryside - Environmental Quality and Economic and Social Development (Feb 1997)
6 Cambridge and Peterborough Structure Plan (Adopted 2003)
7 Code of Good Agricultural Practice for the Protection of Soil MAFF (Revised 1998)
### Summary of Agricultural Impacts

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of best and most versatile agricultural land</td>
<td>Loss of approximately 38ha of best and most versatile agricultural land</td>
<td>Adverse, permanent impact of a moderate magnitude on a local scale</td>
<td>No mitigation is possible</td>
<td>In the absence of mitigation, there would be a residual loss of 38ha of best and most versatile agricultural land</td>
<td>Adverse, permanent impact of a moderate magnitude on a local scale</td>
</tr>
<tr>
<td>Permanent accesses</td>
<td>Changes to access due to closure of crossings of disused railway and provision of alternative accesses</td>
<td>Negligible</td>
<td>Mitigation included in Scheme design</td>
<td>Changes to access due to closure of crossings of disused railway and provision of alternative accesses</td>
<td>Negligible</td>
</tr>
<tr>
<td>Potential impact of temporary construction sites on agricultural land quality</td>
<td>Temporary construction sites are proposed on agricultural land. The quality of the agricultural land/soils involved could be adversely affected</td>
<td>Adverse, temporary impact of moderate magnitude at a local level</td>
<td>Soil handling and reinstatement, in accordance with the MAFF Code of Good Agricultural Practice for the Protection of Soil (Revised 1998), to restore agricultural land to its former productivity</td>
<td>With proper mitigation there would be no long term impact on the quality of the agricultural land/soils</td>
<td>Negligible</td>
</tr>
<tr>
<td>Changes in farming circumstances during construction</td>
<td>Construction may cause temporary access restrictions to fields, or parts of fields. Where livestock is being grazed, access to animal drinking water supplies could be affected</td>
<td>Adverse, temporary impact of potentially major magnitude at the local scale</td>
<td>Liaison with affected farmers throughout the construction phase, to maintain agricultural access and livestock drinking water, etc.</td>
<td>Through appropriate liaison with the farmers, it is possible to mitigate potential impacts of construction activities</td>
<td>Negligible</td>
</tr>
</tbody>
</table>
Note: Abbreviations are as follows
+ve = positive, -ve = negative, D = direct, I = indirect, S = secondary, C = cumulative, ST = short-term, MT = medium-term, LT = long-term, P = permanent, T = temporary,
Abbreviations can be used in any viable combination, i.e. avoiding contradictions.
8. AIR QUALITY

8.1 Introduction

8.1.1 Air quality studies are concerned with the presence or absence of airborne pollutants. The Scheme has the potential to affect local air quality, mainly due to emissions from construction works and traffic, and thus an air quality assessment has been undertaken for the Scheme.

8.1.2 This section of the Environmental Statement (ES) describes the relevant air quality management policy and legislation, the methodology, existing or ‘baseline’ air quality situation and the findings of the assessment of potential air quality effects of the proposed Cambridgeshire Guided Busway (CGB) Scheme, together with proposed mitigation measures.

Air Quality Objectives and Limit Values

8.1.3 Air quality limit values and objectives are quality standards for clean air. They can be used as assessment criteria for determining the significance of any potential changes in local air quality resulting from the development.

8.1.4 European Union (EU) air quality policy sets the scene for national policy. The air quality ‘framework’ Directive on Ambient Air Quality Assessment and Management came into force in September 1996 and is intended as a strategic framework for tackling air quality consistently, through setting European-wide air quality limit values in a series of daughter directives, superseding and extending existing European legislation.

8.1.5 In a parallel national process, the Environment Act was published in 1995. The Act required the preparation of a national air quality strategy setting air quality standards and objectives for specified pollutants and outlining measures to be taken by local authorities (through the system of Local Air Quality Management (‘LAQM’)) and by others ‘to work in pursuit of the achievement’ of these objectives. A National Air Quality Strategy was published in 1997 and subsequently reviewed and revised in 2000, as the Air Quality Strategy for England, Scotland, Wales and Northern Ireland and an addendum to the Strategy was published in 2002. The objectives which are relevant to local air quality management have been set into Regulations.

8.1.6 Some pollutants have standards expressed as annual average concentrations due to the chronic way in which they affect 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, one hour or 15 minute average concentrations due to the acute way in which they affect health or the natural environment (i.e. after a relatively short period of exposure). Some pollutants have standards expressed in terms of both long-term and short-term concentrations (e.g. nitrogen dioxide and PM10).

8.1.7 Table 8.1 sets out these EU air quality limit values and national air quality objectives for the pollutants relevant to this study.
### Table 8.1 – EU Air Quality Limit Values and National Air Quality Objectives for Traffic Related Pollutants

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging Period</th>
<th>Objective/ Limit Value</th>
<th>Compliance Date</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon monoxide</td>
<td>Running 8 hour mean</td>
<td>11.6 mg/m³</td>
<td>31st Dec 2003</td>
<td>National</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 mg/m³</td>
<td>1st Jan 2005</td>
<td>EU</td>
</tr>
<tr>
<td>Benzene</td>
<td>Running annual mean</td>
<td>16.25 µg/m³</td>
<td>31st Dec 2003</td>
<td>National</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.0 µg/m³</td>
<td>1st Jan 2010</td>
<td>EU</td>
</tr>
<tr>
<td>1,3-Butadiene</td>
<td>Running annual mean</td>
<td>2.25 µg/m³</td>
<td>31st Dec 2003</td>
<td>National</td>
</tr>
<tr>
<td>Nitrogen dioxide (NO₂)</td>
<td>1 hour mean</td>
<td>200 µg/m³ (105ppb), not to be exceeded more than 18 times a year (99.8th percentile)</td>
<td>31st Dec 2005</td>
<td>National</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1st Jan 2010</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td>Annual mean</td>
<td>40 µg/m³</td>
<td>31st Dec 2005</td>
<td>National</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1st Jan 2010</td>
<td>EU</td>
</tr>
<tr>
<td>Particulate matter (PM₁₀)</td>
<td>Daily mean</td>
<td>50 µg/m³, not to be exceeded more than 35 times a year (90th percentile)</td>
<td>31st Dec 2004</td>
<td>National</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1st Jan 2005</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 µg/m³, not to be exceeded more than 7 times a year (98th percentile)</td>
<td>31st Dec 2010</td>
<td>National excluding London and Scotland*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Annual mean</td>
<td>50 µg/m³, not to be exceeded more than 7 times a year (98th percentile)</td>
<td>1st Jan 2010 (Stage 2)</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40 µg/m³</td>
<td>31st Dec 2004</td>
<td>National</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1st Jan 2005</td>
<td>EU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 µg/m³</td>
<td>31st Dec 2010</td>
<td>National excluding London and Scotland*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1st Jan 2010</td>
<td>EU</td>
</tr>
</tbody>
</table>
8.1.8 The Government states that performance against these objectives would be monitored where people are regularly present and might be exposed to air pollution and it is the responsibility of each district to undertake such duties. Each local authority is required to undertake a review and assessment of local air quality. The process considers the current air quality situation and the likely future air quality situation, assessing whether the prescribed objectives are likely to be achieved by their target dates.

**Dust Nuisance Standards**

8.1.9 Dust is the generic term which the British Standard document *BS 6069* (Part Two) uses to describe particulate matter in the size range 1-75 μm (micrometers) in diameter. Dust nuisance is the result of the perception of the soiling of surfaces by excessive rates of dust deposition. Under provisions in the Environmental Protection Act 1990, dust nuisance is defined as a statutory nuisance. There are currently no standards or guidelines for the nuisance of dust in the United Kingdom, nor are formal dust deposition standards specified. This reflects the uncertainties in dust monitoring technology, and the highly subjective relationship between deposition events, surface soiling and the perception of such events as a nuisance. However an informal criterion of 200-250 mg/m²/day (as a monthly average) is often applied in the UK as an indicator of potential nuisance.

**8.2 Review of Development Proposals**

8.2.1 The aspects of the Scheme that are most relevant to air quality are emissions from:

- the activities to take place during the construction of the CGB, including associated road traffic;
- buses associated with the operational Scheme; and
- changes to traffic as a result of the operational Scheme.

**8.3 Methodology**

8.3.1 The air quality assessment of the Scheme comprises:

- a review of existing air quality in Cambridge City, South Cambridgeshire and Huntingdonshire District Council areas;
- assessment of the potential changes in air quality arising from the construction and operation of the Scheme; and
- formulation of mitigation measures, where appropriate, to ensure that any adverse effects on air quality are minimised.

8.3.2 The existing air quality situation has been reviewed through data available from air quality monitoring and air quality review and assessments and discussions with the local authorities.

8.3.3 The construction effects have been assessed through a qualitative assessment of potential sources of air pollutant emissions from construction activities and through the formulation of appropriate mitigation and control measures to be placed within a formal Code of Construction Practice (CoCP) document (see Section 4.5).

---

1 any premises in such a state as to be prejudicial to health or a nuisance; smoke emitted from premises so as to be prejudicial to health or a nuisance; fumes or gases emitted from premises so as to be prejudicial to health or a nuisance; any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance; any accumulation or deposit which is prejudicial to health or a nuisance; etc.
8.3.4 Operational traffic effects have been assessed using a modelling approach agreed with the relevant Officers from Cambridge City, South Cambridgeshire District and Huntingdonshire District Councils - this model is ADMS-Urban. The areas to be modelled were identified by the District Officers as areas of concern with regard to air quality, with several of the identified areas predicted to exceed pollutant objective values, particularly the annual mean nitrogen dioxide objective. The identified areas include around selected junctions/roads in Cambridge City Centre, A14/Arbury area, Histon & Impington area (Station Road/Cambridge Road) and the Huntingdon Ring Road.

8.3.5 The assessment of potential residual effects has used a seven-level scale of significance as detailed in Table 8.2. These criteria have been applied to the quantified operational traffic effects.

<table>
<thead>
<tr>
<th>Significance Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Adverse Effect</td>
<td>Major detrimental effect on local air quality, in relation to short-term and long-term local air quality standards (national objectives and EC limit values). Predicted environmental concentrations (i.e. Scheme contribution plus background) exceed the standard with an increase in concentration between no-Scheme and with Scheme scenarios of greater than 10%.</td>
</tr>
<tr>
<td>Moderate Adverse Effect</td>
<td>Moderate detrimental effect on local air quality, in relation to short-term and long-term local air quality standards (national objectives and EC limit values). Predicted environmental concentrations (i.e. Scheme contribution plus background) exceed the standard with an increase in concentration between no-Scheme and with Scheme scenarios of between 2.5% and 10%.</td>
</tr>
<tr>
<td>Slight Adverse Effect</td>
<td>Slight detrimental effect on local air quality, in relation to short-term and long-term local air quality standards (national objectives and EC limit values). Predicted environmental concentrations (i.e. Scheme contribution plus background) exceed the standard with an increase in concentration between no-Scheme and with Scheme scenarios of less than 2.5%; or predicted environmental concentrations below the standard with an increase in concentration between no-Scheme and with Scheme scenarios of greater than 2.5%.</td>
</tr>
<tr>
<td>Negligible Effect</td>
<td>No appreciable impact on local air quality. Predicted environmental concentrations below the standard with an increase or decrease in concentration between no-Scheme and with Scheme scenarios of less than 2.5%.</td>
</tr>
<tr>
<td>Slight Beneficial Effect</td>
<td>Slight beneficial effect on local air quality, in relation to short-term and long-term local air quality standards (national objectives and EC limit values). Predicted environmental concentrations (i.e. Scheme contribution plus background) exceed the standard with a decrease in concentration between no-Scheme and with Scheme scenarios of less than 2.5%; or predicted environmental concentrations below the standard with a decrease in concentration between no-Scheme and with Scheme scenarios of between 2.5% and 10%.</td>
</tr>
</tbody>
</table>
| Moderate Beneficial        | Moderate beneficial effect on local air quality, in relation to short-
### Significance Criteria

<table>
<thead>
<tr>
<th>Significance Criteria</th>
<th>Description</th>
</tr>
</thead>
</table>
| Effect               | Term and long-term local air quality standards (national objectives and EC limit values). Predicted environmental concentrations (i.e. Scheme contribution plus background) exceed the standard with a decrease in concentration between no-Scheme and with Scheme scenarios of greater than 2.5%; or predicted environmental concentrations below the standard with a decrease in concentration between no-Scheme and with Scheme scenarios of between 10% and 25%.
| Substantial Beneficial Effect | Substantial beneficial effect on local air quality, in relation to short-term and long-term local air quality standards (national objectives and EC limit values). Predicted environmental concentrations below the standard with a decrease in concentration between no-Scheme and with Scheme scenarios of greater than 25%. |

### 8.4 Limitations, Constraints and Assumptions

#### 8.4.1 The assessment of traffic-related air quality impacts uses an urban-scale air dispersion model calculating concentrations representative of worst-case exposure locations in each of the modelling areas, thus providing a pessimistic basis for assessing the basis of the Scheme. This assessment of worst-case exposure locations was agreed with the relevant district Officers.

#### 8.4.2 The model inputs are specified in the assessment section along with any key assumptions. These assumptions include:
- The predicted operational traffic data are representative of traffic flows on the road network in and around Cambridge;
- Meteorological data used in the air quality modelling are representative of conditions at the sites to be modelled; and
- Grid source emissions taken from the National Atmospheric Emissions Inventory (NAEI) are representative of emissions over the Cambridge area.

#### 8.4.3 On the basis of these assumptions, it is considered that a robust assessment of air quality impacts has been carried out.

### 8.5 Baseline

#### 8.5.1 Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment in which the CGB route is to be located – these are present from sources such as industrial processes, commercial and domestic activities, agriculture, traffic and natural sources.

#### 8.5.2 An assessment has been undertaken of the baseline air quality situation through a review of the main pollution sources in the vicinity of the route (road traffic and industrial) and from the findings of the local authority air quality review and assessment reports. The CGB route falls within the county of Cambridgeshire, passing through the local authorities of Cambridge City, South Cambridgeshire and Huntingdonshire.
Road Traffic

8.5.3 In recent decades, transport atmospheric emissions, on a national basis, have grown to match or exceed other sources in respect of many pollutants, particularly in urban areas. Each local authority is required to periodically review and assess current and likely future air quality in its area.

8.5.4 Over the last 10 years there has been considerable traffic growth in Cambridgeshire. Traffic represents a significant proportion of the air pollution in Cambridge City Centre, accounting for a major part of the nitrogen oxides (NOx) and fine particle (PM$_{10}$) emissions, with diesel vehicles being the heaviest polluters. These traffic emissions disperse and dilute and in the case of NOx, react to form nitrogen dioxide (NO$_2$). In the vicinity of a major road, concentrations of pollutants are much higher nearer the source of traffic emissions i.e. at the kerbside.

8.5.5 In the latest local authority review and assessments, the main road links and junctions of concern within each local authority area have been identified, i.e. those carrying the largest volumes of traffic. The effects of these traffic emissions along with other relevant emissions on local air quality have then been assessed using a screening method to predict pollutant concentrations for comparison with the relevant objectives. Areas have also been identified where detailed assessment is required. The findings are discussed below.

Air Quality Monitoring

8.5.6 Ambient air quality monitoring is undertaken at a large number of locations throughout Cambridgeshire, principally as part of local authority and national networks. The main pollutants measured are NO$_2$ and PM$_{10}$, although some other Strategy pollutants are measured within the County.

Cambridge City

8.5.7 Cambridge City Council operates five automatic monitoring sites in the City – Parker Street, Gonville Place, Silver Street, Newmarket Road and Regent Street. These are supplemented by a network of 42 NO$_2$ diffusion tube sites located around the district, most of which have been in place since 1993. A number of these monitoring sites are located along the CGB route, including the automatic site on Regent Street (Parker Street and Gonville Place sites are also nearby) and a number of the diffusion tube sites. While the majority of these sites are roadside sites and hence are not representative of background air quality, the monitoring results help determine whether the relevant air quality objectives are likely to be met along the proposed route.

8.5.8 Table 8.3 provides recent monitoring data for the nearest NO$_2$ monitoring sites to the CGB route. The diffusion tube data have been validated through the co-location of diffusion tubes at the continuous monitoring sites to obtain adjustment factors.
Table 8.3 – Annual Mean NO₂ Concentrations at Monitoring Sites in Cambridge

<table>
<thead>
<tr>
<th>Monitoring Site</th>
<th>Grid Ref</th>
<th>Type of Site</th>
<th>Annual Mean NO₂ Concentrations (μg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2000</td>
</tr>
<tr>
<td><strong>Continuous:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regent Street</td>
<td>545289, 258118</td>
<td>Roadside</td>
<td>38.6</td>
</tr>
<tr>
<td>Parker Street</td>
<td>545366, 258391</td>
<td>Roadside</td>
<td>40.2</td>
</tr>
<tr>
<td>Gonville Place</td>
<td>545508, 257828</td>
<td>Roadside</td>
<td>34.8</td>
</tr>
<tr>
<td><strong>Diffusion Tubes:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emmanuel Street</td>
<td>545293, 258418</td>
<td>Roadside</td>
<td>59.1</td>
</tr>
<tr>
<td>Jesus Lane</td>
<td>545040, 258824</td>
<td>Roadside</td>
<td>38.3</td>
</tr>
<tr>
<td>Magdalene Street</td>
<td>544674, 258992</td>
<td>Roadside</td>
<td>37.0</td>
</tr>
<tr>
<td>Regent Street (office)</td>
<td>545289, 258118</td>
<td>Roadside</td>
<td>45.1</td>
</tr>
<tr>
<td>Victoria Avenue</td>
<td>545331, 259438</td>
<td>Roadside</td>
<td>47.2</td>
</tr>
<tr>
<td>Histon Road</td>
<td>544308, 259664</td>
<td>Roadside</td>
<td>44.3</td>
</tr>
<tr>
<td>Arbury Road</td>
<td>545848, 260268</td>
<td>Roadside</td>
<td>41.7</td>
</tr>
<tr>
<td>Parker Street</td>
<td>545370, 258399</td>
<td>Roadside</td>
<td>51.2</td>
</tr>
<tr>
<td>Oak Tree Avenue</td>
<td>545885, 260088</td>
<td>Roadside</td>
<td>29.4</td>
</tr>
<tr>
<td>Emmanuel Road</td>
<td>545405, 258521</td>
<td>Roadside</td>
<td>46.9</td>
</tr>
</tbody>
</table>

Source: Cambridge City Council

8.5.9 These monitoring data show that predicted annual mean NO₂ concentrations at the three continuous sites in the vicinity of the CGB route largely meet the relevant objective, although there was a small exceedance at Parker Street in 2000 and the recorded concentration was at the objective level at Gonville Place in 2002. Diffusion tubes however generally show higher readings with many showing exceedances of the annual mean NO₂ objective (40 μg/m³). Recorded concentrations have reached as high as 63.6 μg/m³ on Regent Street. However, it should be noted that all the identified diffusion tube sites are roadside sites, meaning that they are not representative of general background concentrations.

8.5.10 PM₁₀ monitoring is undertaken at four of the five continuous monitoring sites, the nearest of which to the CGB route are on Parker Street (Tapered Element Oscillating Microbalance (TEOM)) and Gonville Place (TEOM). Recorded PM₁₀ concentrations at these two sites are presented in Table 8.4.
Table 8.4 – PM$_{10}$ Pollutant Concentrations at Monitoring Sites in Cambridge (µg/m$^3$)

<table>
<thead>
<tr>
<th></th>
<th>Parker Street (roadside)</th>
<th>Gonville Place (roadside)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual Mean</strong></td>
<td>27.4 27.3 32.5</td>
<td>24.3 20.8 22.1</td>
</tr>
<tr>
<td><strong>Exceedances of 24-hour Mean (50 µg/m$^3$)</strong></td>
<td>8 8 18</td>
<td>5 1 4</td>
</tr>
</tbody>
</table>

Source: Cambridge City Council

8.5.11 These monitoring data show that both Parker Street and Gonville Place met the 2004 national annual mean PM$_{10}$ objective of 40 µg/m$^3$ between 2000 and 2002.

8.5.12 Cambridge City Council also monitor carbon monoxide and sulphur dioxide. There is a continuous CO monitor based at the Council offices in Regent Street. The highest recorded 8-hour running mean is 5 mg/m$^3$, which is well within the relevant Government objective. Sulphur dioxide (SO$_2$) monitoring is undertaken at two monitoring sites in Cambridge City, the only one of relevance to this study is on Parker Street. This street is predominantly used by buses moving in and out of the adjacent bus station and by taxis and vehicles loading/unloading within the core area. Recorded SO$_2$ concentrations at this site are well within the national 15-minute, hourly and daily SO$_2$ objectives.

8.5.13 While benzene monitoring is no longer undertaken within Cambridge City, benzene monitoring was undertaken during the first round of Review and Assessment using a continuous monitor, and a number of diffusion tubes. This monitoring concluded that the annual mean benzene objective would be met in the relevant years. Hence monitoring is no longer required.

*South Cambridgeshire District*

8.5.14 South Cambridgeshire District Council undertakes continuous monitoring of NO$_2$ and PM$_{10}$ at two sites, Bar Hill and Histon, both of which are roadside sites on the A14. This is supplemented by diffusion tube monitoring at 12 sites within the district. The diffusion tube results are corrected for bias using an adjustment factor calculated from a co-location study carried out on the continuous monitor at Bar Hill.

8.5.15 Table 8.5 shows recorded NO$_2$ concentrations for the nearest South Cambridgeshire monitoring sites to the CGB route. It should be noted that the A14 Histon continuous monitoring site has only been operational since February 2002, and hence only partial 2002 data are available.
Table 8.5 – Annual Mean NO₂ Concentrations at Monitoring Sites in South Cambridgeshire

<table>
<thead>
<tr>
<th>Monitoring Site</th>
<th>Grid Ref</th>
<th>Type of Site</th>
<th>Annual Mean NO₂ Concentrations (µg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2000</td>
</tr>
<tr>
<td>Continuous:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A14 Bar Hill</td>
<td>538685, 263759</td>
<td>Roadside</td>
<td>-</td>
</tr>
<tr>
<td>A14 Histon</td>
<td>543705, 261620</td>
<td>Roadside</td>
<td>-</td>
</tr>
<tr>
<td>Diffusion Tubes:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High St, Histon</td>
<td>TL 439 637</td>
<td>Roadside</td>
<td>-</td>
</tr>
<tr>
<td>The Coppice, Histon</td>
<td>TL 442 620</td>
<td>Background</td>
<td>21.5</td>
</tr>
<tr>
<td>Lone Tree Av, Histon</td>
<td>TL 441 618</td>
<td>Background</td>
<td>24.9</td>
</tr>
<tr>
<td>Millfield Farm, Histon</td>
<td>TL 443 622</td>
<td>Roadside</td>
<td>34.2</td>
</tr>
<tr>
<td>Rose &amp; Crown, Histon</td>
<td>TL 440 635</td>
<td>Roadside</td>
<td>29.0</td>
</tr>
</tbody>
</table>

* Monitoring data unavailable for these years

8.5.16 These monitoring data indicate that the annual mean NO₂ objective (40 µg/m³) is met at all the diffusion tube sites, some of which are roadside sites. Both the A14 continuous monitoring sites do however show exceedances for 2001/2002. This can be attributed to the fact that they are roadside sites located on one of the busiest roads in the County. This highlights the A14 as an area of potential concern, particularly with the Arbury Park development in place.

8.5.17 PM₁₀ is also monitored at the two A14 continuous sites, for which data are available for 2001 and 2002. These are shown in Table 8.6.

Table 8.6 – PM₁₀ Pollutant Concentrations at Monitoring Sites in South Cambridgeshire (µg/m³)

<table>
<thead>
<tr>
<th></th>
<th>A14 Bar Hill</th>
<th>A14 Histon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Mean</td>
<td>22.0</td>
<td>23.0</td>
</tr>
<tr>
<td>Exceedances of 24-hour Mean (50 µg/m³)</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: South Cambridgeshire District Council

8.5.18 These data show the annual mean PM₁₀ concentrations at both sites to be within the 2004 national annual mean PM₁₀ objective of 40 µg/m³.

8.5.19 Sulphur dioxide monitoring is also undertaken within South Cambridgeshire, although monitoring sites are at industrial processes and hence are not of direct relevance to this study.
Huntingdonshire District

8.5.20 Huntingdonshire District Council undertake air quality monitoring at two continuous and 19 diffusion tube sites across the district, some of which are located in St Ives and Huntingdon, which are areas through which CGB buses would pass. Within Huntingdon, it is proposed that the route would split into two branches, one running through Huntingdon Centre, and the other running on a section of the inner ring road. Within Huntingdon, the route runs from Hinchingbrooke Hospital past Huntingdon Station and through the town centre. Hence the monitoring sites of interest are those located closest to the proposed route. These include two in Huntingdon (one continuous site and one diffusion tube site) and one in St Ives. Both NO$_2$ and PM$_{10}$ are monitored at the continuous monitoring site, which is located at Pathfinder House on the Huntingdon Ring Road (roadside site).

8.5.21 Table 8.7 shows recorded NO$_2$ data at these three monitoring sites. Once again, the diffusion tube data have been validated through the co-location of diffusion tubes at the Huntingdon continuous monitoring site to obtain adjustment factors.

<table>
<thead>
<tr>
<th>Monitoring Site Grid Ref</th>
<th>Type of Site</th>
<th>Annual Mean NO$_2$ Concentrations ($\mu$g/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2000</td>
</tr>
<tr>
<td>Continuous:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huntingdon Ring Road</td>
<td>524059,</td>
<td>Roadside</td>
</tr>
<tr>
<td></td>
<td>524262,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>531211,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Background</td>
</tr>
<tr>
<td>Diffusion Tubes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huntingdon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>St Ives</td>
<td>531211,</td>
<td>Background</td>
</tr>
</tbody>
</table>

Source: Huntingdonshire District Council

8.5.22 These data show the annual mean NO$_2$ objective (40 $\mu$g/m$^3$) to be met at all three monitoring sites over the past three years. This includes both the sites located on Huntingdon Ring Road (roadside sites), part of which would be used by the CGB.

8.5.23 PM$_{10}$ monitoring is also undertaken at the Huntingdon Ring Road continuous monitoring station. Table 8.8 shows recorded concentrations for recent years.

| Table 8.8 – PM$_{10}$ Pollutant Concentrations at Continuous Monitoring Site on Huntingdon Ring Road ($\mu$g/m$^3$) |
|---------------------------------------------------------------|---------------------------------------------------------------|
| Annual Mean                                                  | Exceedances of 24-hour Mean (50 $\mu$g/m$^3$)                |
| 2000  | 2001  | 2002  | 13  | 12  | 10  |
| 28.3  | 27.1  | 25.0  |     |     |     |

Source: Huntingdonshire District Council

8.5.24 These data show the 2004 national annual mean PM$_{10}$ objective of 40 $\mu$g/m$^3$ has been met at the Huntingdon Ring Road monitoring site between 2000 and 2002.
The Local Authority Air Quality Review and Assessments

8.5.25 The five District Councils in Cambridgeshire have been working in partnership with the County Council to carry out their air quality review and assessment functions. The findings of the first two stages of the review and assessment process were published in their first document *A Review and Assessment of Air Quality in Cambridgeshire: Stages 1 and 2* in December 1998. This concluded that the relevant objectives would be met for all of the prescribed pollutants except for nitrogen dioxide, fine particles and sulphur dioxide. These three pollutants required further analysis in order to determine whether the national objectives would be met, which was undertaken in the third stage of review and assessment. The results of this work were published in June 2000, which concluded that all of the air quality objectives were likely to be met by their due dates with two exceptions:

- Sulphur dioxide and fine particles were being released from some coal-fired boilers at a factory in Wisbech. Fenland District Council were therefore obliged to declare two Air Quality Management Areas (AQMAs) in Wisbech and develop an Action Plan.

- Sulphur dioxide levels were above objective levels in parts of Cambridge City and South Cambridgeshire. Here, an agreement with the commercial operators to replace the boilers, considered to be mainly responsible for the SO₂ exceedance prevented the designation of an AQMA.

8.5.26 The five District Councils have since undertaken their Updating and Screening Assessments which involves screening each of the prescribed pollutants to see if they will require a more detailed assessment to determine if they are going to meet their respective objectives. The detailed assessment is due to be completed by April 2004.

8.5.27 The findings of the Updating and Screening Assessments for Cambridge City, Huntingdonshire and South Cambridgeshire are summarised below.

**Cambridge City Updating and Screening Assessment**

8.5.28 The Cambridge City Council area is surrounded by the South Cambridgeshire local authority area – the boundary is to the south of the A14 at the north of the city and the city encompasses Junction 11 and 13 of the M11 though not Junction 12.

8.5.29 The *Updating and Screening Assessment* concluded that relevant air quality objectives for carbon monoxide, benzene, 1,3-butadiene and lead would be comfortably met within the district and hence no further assessment is required for these pollutants.

8.5.30 As described above, NO₂ monitoring, undertaken at five continuous monitoring stations and numerous diffusion tube sites, shows many exceedances of the annual mean NO₂ objective in the City. Therefore, it is concluded that Cambridge City Council are required to undertake a detailed assessment for NO₂. It is expected that much of the City is likely to be declared an AQMA for NO₂.

8.5.31 PM₁₀ is monitored at four roadside sites within Cambridge City. The monitoring results combined with some screening assessment work conclude that a detailed PM₁₀ assessment is not required at this stage. PM₁₀ objectives for 2004 will be clearly met although 2010 objectives will not be met at busy junctions based on current input data.

8.5.32 With regard to SO₂, monitoring is undertaken at two sites within Cambridge City, one of which is in Parker Street in the City Centre, and the other at Marshalls Aerospace. Marshalls Aerospace was identified during the first round of Review and Assessment as having the
potential to emit sufficient quantities of SO₂ to place the air quality objectives at risk. However, it was concluded that provided Marshalls met the target of switching to low sulphur oil by 2003 the air quality objectives were likely to be met. This target has been reached with monitoring results showing that SO₂ concentrations have reduced greatly. Hence overall it is concluded that no further assessment is necessary.

**South Cambridgeshire Updating and Screening Assessment**

8.5.33 The South Cambridgeshire District Council area is primarily rural with a number of small industrial areas. The A14 is part of the road network in the district and is a strategic transport route carrying intercontinental freight to and from the port of Felixstowe, and the M11 links the north and Midlands with Stansted Airport and London. Both industrial processes and traffic emissions were reported in the third stage review and assessment to affect the air quality in the district.

8.5.34 The Updating and Screening Assessment concluded that relevant air quality objectives for carbon monoxide, benzene, 1,3-butadiene and lead would be comfortably met within the district and hence no further assessment is required for these pollutants.

8.5.35 The last round of Review and Assessment indicated that the heaviest traffic flows within the district are along the A14 between Bar Hill and Girton – this section of the A14 is approximately 2km to the south of the CGB route. As discussed above, monitoring is now undertaken at two continuous monitoring sites along the A14, data from which show NO₂ concentrations to be currently at or exceeding the annual mean NO₂ objective. This does not currently cause a problem in terms of exposure as there are no sensitive receptors in this area. However, this may become an issue with the Arbury Park development in place and will need to be considered in the assessment of the Scheme. Nonetheless, it is estimated that NO₂ concentrations on the A14 will meet the annual mean NO₂ objective in both 2005 and 2010. NO₂ diffusion tube monitoring data and screening assessment results (undertaken at busy junctions with more than 10,000 vehicles per day, including the A14 at the Girton Interchange) also show that the annual average NO₂ objective will be met in the district. Therefore, it was concluded that a detailed assessment is not required for NO₂ in South Cambridgeshire.

8.5.36 PM₁₀ monitoring results also show that further assessment is not required. This is reinforced by the screening assessment undertaken for roads/junctions with more than 10,000 vehicles per day, which shows that the relevant objectives will be met.

8.5.37 For SO₂, the local authority reports that the main source of emissions of this pollutant within the district is industrial pollution. These sources include Rugby Cement, Barrington and Marshalls Aerospace, Cambridge, both of which are Part A processes and are locations where SO₂ is monitored. This monitoring commenced during the last round of Review and Assessment when the sites were identified as being at risk of exceeding the SO₂ objectives. Monitoring data for these sites do however show the relevant objectives to be achieved, and hence there is no need for a detailed assessment.

**Huntingdonshire Updating and Screening Assessment**

8.5.38 The northern part of the Scheme, from St Ives through to Huntingdon, is located within Huntingdonshire District.

8.5.39 Firstly, the Updating and Screening Assessment concluded that relevant air quality objectives for carbon monoxide, benzene, 1,3-butadiene and lead would be comfortably met within the district and hence no further assessment is required for these pollutants.
With regard to NO₂, the Stage 3 Review and Assessment concluded that both air quality objectives were likely to be met by the end of 2005 but it was proposed to continue and supplement continuous air quality monitoring. Hence monitoring is now undertaken at two continuous monitoring sites and 19 diffusion tube sites. Monitoring results show that the annual average NO₂ objective is currently met and will continue to be met in 2005 and 2010 across the district. Therefore, Huntingdonshire District Council concluded that no further assessment is required for NO₂.

PM₁₀ monitoring also shows that the relevant PM₁₀ objectives will be met. This is reinforced by the screening assessment undertaken for roads/junctions with more than 5,000 vehicles per day, which shows that the annual average and 24-hour average PM₁₀ objectives will be met. Hence it was concluded that a detailed assessment is not required.

The sulphur dioxide review re-examined the two installations (one in the north and one in the west of the district) identified in the last round of Review and Assessment as having the potential to exceed the SO₂ objectives. This concluded that a detailed assessment is not required for SO₂.

Overview: Air quality along the route

On the whole, air quality along and in the vicinity of the Scheme reflects the proximity of the route to the main road network and the urban or rural nature of the immediate surroundings, though industrial pollution sources also affect the general background air pollution levels. Road transport is the principal pollution source affecting local air quality.

In terms of achieving the national air quality objectives, the main locations of concern, as identified by the relevant District Officers, are particular junctions and roads within the City of Cambridge (for example, Mitchams Corner, Milton Road, Histon Road, Gonville Place/Hills Road junction), around the A14/Arbury/Histon area and the section of the Huntingdon Ring Road to be used by CGB vehicles. The remainder of the Scheme is predominantly rural and therefore in areas which are not of concern with respect to achieving the air quality objectives.

The local authority review and assessment findings, concerned with seven priority pollutants, have reported that all objectives are expected to be met by their respective objective dates except for NO₂ in Cambridge City where exceedances have been predicted. Cambridge City Council is therefore required to undertake a detailed assessment for NO₂, due to be completed by April 2004. It is expected that much of the City will be declared an AQMA for NO₂.

Nonetheless, all three Districts are continuing to monitor the current levels to ensure predictions are correct and are developing air quality management strategies.

Consultation

Relevant Officers at Cambridge City, South Cambridgeshire and Huntingdonshire Councils were consulted in relation to the air quality assessment for the Scheme. It was agreed that ADMS-Urban (dispersion model) would be used to assess the traffic impacts of the Scheme. Areas to be modelled include selected junctions and roads in Cambridge City (where air quality is currently a concern), A14/Arbury/Histon area and around Huntingdon Ring Road. It was noted that at some of the junctions/roads in Cambridge City selected for modelling, residential properties are located very close to the road. This was accounted for in the modelling by selecting the front façades of the properties located nearest the road.
8.7 Relevant Guidance

8.7.1 The Government’s policy guidance note for local air quality management (PG03)\textsuperscript{xi} also provides guidance on the links between the air quality management system and Government transport and planning policy. The policy note also provides information to local authorities on the designation of air quality management areas and the formulation of air quality strategies to improve air quality.

8.7.2 PG03 also states that policies to improve air quality cannot be considered in isolation from those designed to reduce greenhouse gas emissions, as some policies to improve local air quality can often have the added benefit of producing additional carbon savings, and vice versa. For example, policies designed to reduce the impact that transport has on air quality by tackling congestion and encouraging a shift to public transport, walking and cycling should also reduce carbon dioxide emissions.

8.8 Assessment

Construction Effects

8.8.1 The construction of the Scheme involves the construction of the guideway corridor (between St Ives and northern Cambridge, from Cambridge Railway Station down to Trumpington, and the link to Addenbrooke’s Hospital), associated bridge works and park and ride sites and related minor works.

Construction Activities

8.8.2 The main pollutant arising during the construction of the development is fugitive dust which can result in dust nuisance. If the dust source is contaminated with hazardous or toxic materials then adverse health impacts are also a concern.

8.8.3 Fugitive dust arising from construction activities would be generally of particle size greater than the PM\textsubscript{10} fraction, described as coarse particles. Such dust emissions from construction activities are likely to be variable and would depend upon type and extent of the activity, soil conditions (soil type and moisture) road surface condition and weather conditions. Soils are inevitably drier during the summer period and periods of dry weather combined with higher than average winds have the potential to generate the most dust. The construction activities that are the most significant sources of fugitive emissions are:

- demolition activities, due to the breaking up and size reduction of concrete, stone and compacted aggregates;
- earth moving, due to the excavation, handling, storage and disposal of soil and subsoil materials;
- construction aggregate usage, due to the transport, unloading, storage and use of dry and dusty materials (such as cement powder and sand);
- movement of heavy site vehicles on dry untreated or hard surfaced areas; and
- movement of vehicles over surfaces contaminated by muddy materials brought off the site - for example, over public roads.

8.8.4 The contractor may also use a concrete batching plant. This would be contained within the space allocated for the site compounds, thus located away from residential areas. Utilisation of a concrete batching plant would assist in reducing construction traffic flows on the local road networks.
8.8.5 Dust nuisance relates to the amount of dust falling onto and soiling surfaces (or rate of dust deposition). Dust nuisance is the result of the perception of the soiling of surfaces by excessive rates of dust deposition. Under provisions in the *Environmental Protection Act 1990*\(^{iii}\), dust nuisance is defined as a Statutory (and other) Nuisance. There are currently no standards or guidelines for the nuisance of dust in the United Kingdom, nor are formal dust deposition standards specified. This reflects the uncertainties in dust monitoring technology, and the highly subjective relationship between deposition events, surface soiling and the perception of such events as a nuisance.

8.8.6 Construction phase dust impacts have been assessed by a review of likely construction activities, their potential to produce dust and their location in relation to potentially sensitive receptors.

**Northern Section**

8.8.7 The key construction activities undertaken along the northern section of the route are:

- CGB corridor construction - consisting of the twin track guideway, maintenance access track, emergency evacuation zone and a verge on each side along the disused railway line;
- construction of CGB stops;
- work to the existing River Great Ouse viaduct – east of St Ives Park and Ride site;
- construction of St Ives and Longstanton park and ride sites;
- road widening works in Huntingdon and between Huntingdon and St Ives;
- construction of Swavesey Kiss and Ride;
- Windmill Bridge works; and
- Histon & Impington car park (including demolition of former Station building).

8.8.8 The main dust generation sources during these construction works are likely to be:

- earthworks;
- foundations;
- pavement construction;
- surfacing;
- landscaping;
- access roads construction;
- roundabout construction;
- existing building demolition (Histon Station);
- site buildings construction;
- bridge construction and demolition; and
- materials stockpiling.

8.8.9 The proposed park and ride sites at St Ives and Longstanton are to be used as site compounds for the northern section. A further site compound would be located by Windmill Bridge to
the south of the guideway.

Southern Section

8.8.10 The key proposed construction activities for the southern section of the CGB route would be construction of the CGB corridor along the disused Bedford rail corridor, construction of the new Hills Road and Long Road underpasses and construction of the link to Addenbrooke’s Hospital (with a bridge over the railway) and CGB stops.

8.8.11 The main dust generation sources from these construction activities are likely to be:

- earthworks;
- foundations;
- surfacing;
- construction of Hills Road and Long Road underpasses;
- construction of overbridge on link to Addenbrooke’s hospital;
- access roads construction;
- buildings construction; and
- materials stockpiling.

8.8.12 There are two main site compound areas proposed for this section of the route. The first lies to the south of the Long Road embankment to the west of the CGB corridor. It would be accessed from Long Road. The second compound would be to the east of the corridor on land currently used for agriculture. Access to this compound would be from Shelford Road via the maintenance track along the eastern edge of the north end of the Trumpington cutting. Additionally, in order to construct the new Hills Road underpass, a temporary construction site would be required south of Hills Road. This site may also be used as a compound to access and construct the section between Hills Road and Long Road. To the north of Hills Road, disused sidings adjacent to Cambridge Railway Station accessed along Station Road would be utilised (see Section 4.5).

Dust Sensitive Receptors

8.8.13 The sensitivity of different land uses and facilities to dust can be categorised from low to high - examples are shown in Table 8.9.

<table>
<thead>
<tr>
<th>High Sensitivity</th>
<th>Medium Sensitivity</th>
<th>Low Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals and clinics</td>
<td>Schools</td>
<td>Farms</td>
</tr>
<tr>
<td>Hi-tech industries</td>
<td>Residential areas</td>
<td>Light and heavy industry</td>
</tr>
<tr>
<td>Painting and furnishing</td>
<td>Food retailers</td>
<td>Outdoor storage</td>
</tr>
<tr>
<td>Food processing</td>
<td>Greenhouses and nurseries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Horticultural land</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Offices</td>
<td></td>
</tr>
</tbody>
</table>

8.8.14 A large number of dust sensitive properties can be identified within 100m and 250m of the
CGB route and access roads, principally residences but also Addenbrooke’s Hospital and hi-tech industry at the Science Park. Airborne dust has a limited ability to remain airborne and readily drops from suspension as a deposit. Research undertaken by the United States Environmental Protection Agency (US EPA)\textsuperscript{iii} concluded that large particulate matter (particles over 30 \( \mu \)m in diameter), return to the surface quite rapidly. Under average wind conditions (mean wind speed of 2-6 m/sec), these particles, which comprise around 95\% of total dust emissions were found to return to the surface within 60-90m of the emissions source (Cowheard et al, 1990)\textsuperscript{iv}.

8.8.15 The US EPA research suggests that the potential for dust effects is greatest within 90m of construction activities. However, this potential risk can be reduced by effective use of dust control measures with the result that adverse effects are unlikely. The proposed mitigation measures for preventing dust nuisance on local receptors are outlined later in this section.

**Construction Traffic**

8.8.16 The operation of vehicles and equipment powered by internal combustion engines results in the emission of waste exhaust gases containing the pollutants NO\(_x\), PM\(_{10}\), VOCs, and CO. The quantities emitted depend on factors such as engine type, service history, pattern of usage and composition of fuel. The operation of site equipment, vehicles and machinery would result in emission to the atmosphere of unquantified levels of waste exhaust gases but such emissions are unlikely to be significant - particularly in comparison to levels of similar emissions from road traffic.

8.8.17 The main construction phase traffic impacts would be from traffic travelling to and from the route. The main identified construction access roads for both the northern and southern sections are outlined in Section 4.5.

8.8.18 To minimise vehicle-mileage for construction traffic, access points would be located at intervals of 4-6km along the route.

8.8.19 Due to the relatively low number of vehicles involved, construction traffic movements are unlikely to result in a significant effect on local air quality. Nonetheless, proposed mitigation measures for minimising local air quality effects on local receptors are outlined later in this section.

**Operational Effects**

8.8.20 The Scheme consists of a new two way guided vehicle corridor running along a disused railway line and on-street, following a route from Hinchingbrooke Hospital in Huntingdon to the Trumpington Park and Ride (near M11 junction). Therefore, the main source of emissions as a result of the Scheme is road traffic.

8.8.21 Traffic can affect local air quality in a number of ways. There are potential effects on local air quality from emissions from the guided buses themselves. In addition, the Scheme is also likely to change traffic flows on the local road network compared to the existing situation, which can, where flow changes are substantial, affect local air quality. Other potential sources of emissions to atmosphere associated with the Scheme are maintenance operations.

8.8.22 The main traffic-related pollutants of concern in the Cambridge area are NO\(_2\) and PM\(_{10}\) – these are the pollutants most likely to approach or exceed the national targets, the national air quality objectives, by the objective dates.
The CGB Buses and Route

8.8.23 While the CGB route would be open access, buses wishing to use the route would be required to meet the vehicle quality threshold of Euro IV vehicle emissions standard. This is the emission standard that all new heavy goods vehicles (HGVs) must comply with by 1st October 2006. Euro IV vehicles are significantly cleaner than their predecessors so early encouragement of the use of Euro IV vehicles should have a significant beneficial effect on air emissions from buses in Cambridge.

8.8.24 The CGB route represents an optimum alignment that minimises run time and impacts upon other traffic. The Scheme is designed with sufficient flexibility for buses to be able to run both on-street (running with the traffic as an un-segregated vehicle, or in a conventional bus lane) and off street (in guided mode, with total segregation from other vehicles). As such, the vehicles would run primarily with the existing traffic through the urban areas. Outside the urban areas, they would run primarily along the currently disused St Ives and Bedford rail corridors.

8.8.25 These measures are designed to improve the speed and reliability of journey times for CGB buses.

Assessment Methodology

8.8.26 A transport assessment is provided in Section 16. Traffic data from this study has been used for the air quality modelling undertaken in this assessment.

8.8.27 Traffic modelling has shown that flows along many roads in and around Cambridge would decrease as a result of the Scheme as traffic is diverted away from the major roads running into Cambridge. The resultant impact along these roads would be an improvement in air quality.

8.8.28 There are however some areas along the CGB route that are currently of concern with regard to air quality, as identified by the relevant districts in their review and assessment process. It was therefore mutually agreed with the relevant Officers from Cambridge City, South Cambridgeshire and Huntingdonshire District Councils to undertake detailed dispersion modelling for these areas using ADMS-Urban. This is the same model that was used by all three local authorities for their air quality review and assessments. These areas identified for modelling include several junctions/roads in Cambridge City Centre, A14/Arbury area, Histon/Impington area (Station Road/Cambridge Road) and Huntingdon Ring Road.

ADMS-Urban Model

8.8.29 The effects of existing and future road flows on local air quality have been assessed by quantifying the air pollutant concentrations at specified receptor locations close to roads and junctions of concern, for baseline and future, with and without Scheme scenarios. A full list of receptors and their geographical locations are shown in Appendices 8A and 8B respectively.

8.8.30 Concentrations of the two main traffic-related pollutants of concern, NO₂ and PM₁₀ have been predicted at these specified receptor locations for the baseline and future scenarios, with and without the Scheme in place.

Emission Factors

8.8.31 A key element of the model’s input data is the pollutant emissions data, which determines the total emissions generated by the traffic flow along each road link (whose location and length
are determined by the road alignment) and from other emissions sources. Emissions from traffic on the road links were calculated using the latest DMRB 2003 emission factors.

8.8.32 Emissions from non-traffic sources were taken from the 1km x 1km fixed emission grid sources, which account for road, transport (non-road), small (commercial and domestic) and industrial emissions. These data were obtained from the NAEI emissions database for 2000 (latest available) and used to represent 2001 emissions. These emissions were then corrected for future years using the factors given in the LAQM Technical Guidance. Correction factors are provided for years up to 2010 meaning that 2010 factors were used to calculate emissions for both 2011 and 2021. The model removes the vehicle contribution (from road links entered into the model) from the ‘all source’ values, thus ensuring that the vehicle contribution is not double-counted.

Traffic Data

8.8.33 The operational traffic scenarios modelled using ADMS-Urban are based on traffic figures from the transport assessment, including both baseline flows and ‘with Scheme’ flows for each of the assessment years. The 2021 flows include traffic generated by the proposed Northstowe development near Longstanton. Traffic data were input as average hourly flows of both light and heavy duty vehicles on each road link. Average speeds (for light and heavy duty vehicle components) were also required input into the model.

Street Canyon Effects

8.8.34 Street canyons are defined broadly as those streets where buildings are higher than the street width. Canyon heights have been entered into the model as the difference between the street level and maximum building height along that road link. Such canyon heights were obtained from the data used by the three local authorities in their last air quality review and where they were not included in the previous review, canyon heights have been estimated. The model treats canyon situations differently from non-canyon streets.

Meteorological Data

8.8.35 To assess pollutant concentrations over the different time periods defined by the air quality objectives, i.e. 1-hour, 24-hour and annual averages, files comprising sequential hourly meteorological data for 2001 were obtained from the Wattisham meteorological station – this station and year have been agreed by the district Officers as a suitable dataset for the study. Details of the Wattisham meteorological station are shown in Table 8.10.

<table>
<thead>
<tr>
<th>Description</th>
<th>RAF Flat Airfield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station ID</td>
<td>3144</td>
</tr>
<tr>
<td>Eastings</td>
<td>6026</td>
</tr>
<tr>
<td>Northing</td>
<td>2514</td>
</tr>
<tr>
<td>Latitude Deg Min</td>
<td>52 07 N</td>
</tr>
<tr>
<td>Longitude Deg Min</td>
<td>00 58 E</td>
</tr>
<tr>
<td>Station height AMSL (m)</td>
<td>89</td>
</tr>
<tr>
<td>Effective height of anemograph (m)</td>
<td>10</td>
</tr>
</tbody>
</table>

8.8.36 Each of the scenarios was modelled using meteorological data from 2001. Modelling the
2001 emissions scenario using 2001 meteorological data allowed a direct comparison between modelled and monitoring data for the model verification exercise (as discussed below).

8.8.37 A windrose for 2001 is shown in Appendix 8C. The polar scale on each windrose represents occurrence counts: the number of hours in the dataset that the wind is from that direction and at that windspeed. The prevailing winds are from the southwest.

Background Air Pollution Concentrations

8.8.38 Rural background concentrations must be added to the model to derive total pollutant concentrations suitable for comparison with air quality standards. A background file containing hourly sequential background monitoring data for 2001 for Automatic Urban Rural Network (AURN) Wicken Fen (for NOx, NO2 and ozone) and AURN Rochester (for PM10) was therefore created for use in the model. For future year scenarios (2006, 2011 and 2021), the hourly sequential background monitoring data for NOx and NO2 were corrected using the factors given in the LAQM Technical Guidance. For PM10 conversions, the 2001 values are firstly required to be broken up into primary, secondary and coarse components. Following consultation with National Environmental Technology Centre (NETCEN), it was considered appropriate to use hourly sequential PM2.5 monitoring data (from AURN Rochester site in 2001) to represent the coarse component. The primary and secondary components were then converted together using factors derived from background concentrations from the Air Quality Archive maps for each of the modelled years.

8.8.39 Looking at NETCEN background maps it was also determined that the rural background NOx and NO2 concentrations included in the model (taken from Wicken Fen) were lower than the actual concentrations outside Cambridge/Huntingdon. Given that the background values used in the model should reflect the true concentrations outside the modelling area, it was considered appropriate (following consultation with Cambridge Environmental Research Consultants - suppliers of ADMS-Urban) to add appropriate increments to NOx and NO2 concentrations. These increments were derived by comparing the minimum values from each of the three districts (obtained from NETCEN background maps) with the Wicken Fen monitoring site (annual average). The appropriate increment was then added to the background monitoring data for each modelling area and scenario.

Other Model Inputs

8.8.40 Other model parameters used are as follows. These parameters are the same as those used by the three local authorities in their Stage 3 Review and Assessment.

- Minimum Monin-Obukhov length (LMO) – 10m;
- Surface Roughness Length – 0.5m;
- Surface Roughness at Met Site – 0.15m; and
- Time Varying Emission Factors – the factors were obtained from Cambridge City Council from their modelling files for the Stage 3 review and assessment. It was agreed with the Officers from South Cambridgeshire and Huntingdonshire Councils that the same factors would be suitable for use in modelling their areas of concern (i.e. A14/Arbury/Histon area and Huntingdon Ring Road). These represent the change in traffic and emission sources by hour of the day and more accurately characterise peak hour emissions.
Modelled Network

8.8.41 Three separate road networks were used for the modelling of the areas of air quality concern – one covering Cambridge City, one covering A14/Histon area, and the other covering Huntingdon. Within each network, a number of receptors were selected for the model representing worst-case locations in terms of proximity to key selected junctions and roads. Receptor locations were all based on real properties, except for the Regional College CGB stop where the proposed stop was taken to be the receptor. Where properties were selected as receptors, the façade of the building nearest the road was used as the receptor point.

Modelled Scenarios

8.8.42 In each of the detailed modelling areas, the model has been run for a number of scenarios. These scenarios are:

- 2001 base scenario;
- 2006 baseline scenario (without the Scheme);
- 2006 with the Scheme;
- 2011 baseline scenario (without the Scheme);
- 2011 with the Scheme;
- 2021 baseline scenario (without the Scheme); and
- 2021 with the Scheme.

8.8.43 The model has been used to calculate annual NOx levels and daily and annual PM$_{10}$ levels – NOx was then converted to NO$_2$ using an appropriate NOx:NO$_2$ relationship (discussed below). Government guidance indicates that the hourly NO$_2$ objective is unlikely to be exceeded and therefore the model has not been used to predict hourly values. The predicted values have then been compared with the relevant annual and daily average air quality standards for NO$_2$ and PM$_{10}$.

Model Verification

8.8.44 Model verification refers to the comparison of modelled concentrations with measured concentrations. Modelling has been carried out at selected roadside monitoring site locations (agreed with District Officers) using 2001 emissions data and 2001 meteorological data to enable comparison with 2001 monitoring data. The verification has been carried out for annual average NOx and PM$_{10}$ modelled concentrations.

8.8.45 The monitoring sites used for verification of NOx and PM$_{10}$ in each of the modelled areas are as follows:

- Gonville Place, Regent Street and Silver Street roadside sites – used to verify NOx concentrations for areas of modelling undertaken within the City;
- Gonville Place roadside site – used to verify PM$_{10}$ concentrations for areas of modelling undertaken within the City;
- A14 Histon roadside site – used to verify NOx and PM$_{10}$ concentrations for modelling undertaken in the A14/Histon area; and
- Huntingdon Ring Road roadside site – used to verify NOx and PM$_{10}$ concentrations for modelling undertaken in Huntingdon.
8.8.46 Parker Street monitoring site was viewed to be inappropriate for use in the verification due to its location in close proximity to the bus station on Parker Street.

8.8.47 It was recommended by CERC that verification should be undertaken by comparing the total modelled concentrations with monitored values (rather than considering background and roadside components separately). Using the inputs described above, this comparison showed a good performance of the model, with modelled concentrations coming close to monitored values. Given this sound model performance, it was considered appropriate to calculate a multiplication factor (adjustment factor) to apply to the results to correct any slight over/underpredictions. Calculated adjustment factors applied to the results for each of the modelling areas are as follows:

- Cambridge City – applied NOx adjustment factor of 1.04 (based on Gonville Place, Regent Street and Silver Street monitors) and PM\(_{10}\) adjustment factor of 0.78 (based on Gonville Place monitor);
- A14/Histon – applied NOx adjustment factor of 1.03 and PM\(_{10}\) adjustment factor of 0.94 (both based on A14 Histon monitor); and
- Huntingdon – applied NOx adjustment factor of 0.91 and PM\(_{10}\) adjustment factor of 1.19 (both based on Huntingdon Ring Road monitor).

NOx:NO\(_2\) Conversion

8.8.48 The model predicts NOx concentrations which comprise principally nitric oxide (NO) and a small percentage of nitrogen dioxide (NO\(_2\)). The emitted nitric oxide reacts with oxidants in the air (mainly ozone) to form more nitrogen dioxide. Since only nitrogen dioxide is associated with effects on human health, the air quality standards for the protection of human health are based on NO\(_2\) and not total NO\(_x\) or NO. A suitable NO\(_x\):NO\(_2\) conversion needs to be applied to the modelled NO\(_x\) concentrations.

8.8.49 The Technical Guidance Note LAQM.TG(03)xvii notes that many approaches may be acceptable including derived empirical relationships and the Generic Reaction Scheme available within ADMS-Urban. It notes that empirical relationships may have a disadvantage because they rely on ozone concentrations remaining the same in the future. However, all the methods quoted in the guidance will have the same disadvantage unless future ozone concentrations are accurately known. For this assessment, two conversion schemes were assessed. Firstly, an empirical relationship derived from local monitoring results using the method proposed by Carshaw et alxviii. This method is more appropriate than, for instance, the Derwent Middleton equation as it is based on annual average NO\(_x\) and NO\(_2\) concentrations. The second approach used was the GRS method available within ADMS-Urban. After comparison of the results with monitored values, it was found that the derived empirical conversions performed better (for example, predicted NO\(_2\) concentrations (using Generic Reaction Scheme (GRS)) for modelled areas in Cambridge City would require an adjustment factor of 0.85, compared to the adjustment factor of 1.04 required for the predicted NO\(_x\) concentrations) and these were therefore selected for use in the assessment.

Exceedance of Daily PM\(_{10}\) Objectives

8.8.50 The Government technical guidance for air quality review and assessment provides a method for estimating the number (days) of exceedances of the daily average objective level of 50µg/m\(^3\). This is based on a relationship observed between the annual average level and the number of days of exceedance of the daily average level recorded at continuous monitoring sites in the Government’s air quality monitoring network between 1997 and 2001. This observed relationship has been applied to annual average PM\(_{10}\) concentrations.
Assessment: Section 1 – Huntingdon to St Ives Park and Ride

8.8.51 This section runs from Hinchingbrooke Hospital in Huntingdon to St Ives Park and Ride (through St Ives town centre). The identified area to be modelled within this section is the segment of the Huntingdon Ring Road along which CGB buses would run, including along the stretch of Brampton Road between Huntingdon Station and the inner ring road.

8.8.52 Selected receptors along Huntingdon Ring Road (receptors 27-35) are listed in Appendix 8A and shown in Appendix 8B. At the request of the Huntingdon Officer, receptors have been focused around junctions along the Ring Road where air quality is of most concern. Predicted ground level NO2 and PM10 concentrations at these receptors are shown in Appendix 8D.

The annual mean NO2 objective of 40 μg/m³ is exceeded at a number of the receptors in 2001, with the highest predicted concentration occurring at receptor 28 (84 Hartford Road), which has a predicted annual average of 43.7 μg/m³ in 2001. This receptor continues to exceed the annual mean objective in 2006 both with and without the Scheme (all other receptors are within the objective) but falls back within the objective in 2011 and 2021. Comparison of the do-minimum and do-something scenarios for each of the future years shows that the Scheme does not have a significant impact upon local air quality concentrations with changes forecast to range from –0.2 to +0.1 μg/m³. This indicates that air quality would improve slightly at some receptors (due to reduced traffic flows along some roads as a result of the Scheme) and get slightly worse at others. Overall, the Scheme has a negligible impact on NO2 concentrations at the modelled receptors.

8.8.53 The relevant air quality standard for annual PM10 is currently 40 μg/m³ (target year 2004) and the provisional standard is 20 μg/m³ for 2010. There are no predicted exceedances of the current 40 μg/m³ standard at any of the modelled receptors in this area. The 20 μg/m³ standard (provisionally applicable from 2010) is predicted to be exceeded in future years (2011 and 2021) at all receptors. Looking at the impact of the Scheme by comparing do-minimum and do-something scenarios, this shows that the CGB does not significantly affect annual mean PM10 concentrations in any of the future years with maximum changes of ±0.1 μg/m³ with the Scheme in place. All the Huntingdon receptors therefore show negligible effect in 2001 and 2006 (if comparing 2006 concentrations against the current 2004 standard), which becomes a slight adverse or slight beneficial effect at some receptors in 2006 (if comparing against the provisional 2010 standard), 2011 and 2021 due to exceedance of the 20 μg/m³ standard.

8.8.54 Comparison of the predicted number of exceedances of the PM10 24-hour mean (also shown in Appendix 8D) between do-minimum and do-something scenarios for 2006, 2011 and 2021 also shows the negligible impact of the Scheme with the number of exceedances remaining unchanged between do-minimum and do-something scenarios in all years at all receptors. The highest number of exceedances occurs at receptor 28 (84 Hartford Road) which is predicted to have 27 exceedances in 2001. This is within the current objective of 35 allowable exceedances of the PM10 24-hour mean. The provisional 2010 standard states that 24-hour mean for PM10 cannot be exceeded more than 7 times – the predicted results show this to be exceeded at all the Huntingdon receptors in 2011 and 2021. Hence as with annual mean PM10, the Scheme therefore shows a negligible effect in 2001/2006 and slight adverse effect in 2006/2011/2021.
Assessment: Section 2 – St Ives (start of guideway) to District Boundary (Fen Drayton)

This section runs from St Ives Park and Ride (500 spaces with sufficient land acquired to extend up to 1000 spaces in the future), where the guideway begins, to the district boundary at Fen Drayton. Given that the CGB buses would run on the guideway along this section, it is not anticipated to significantly affect local air quality. However, air quality is not viewed as a concern in these crossing areas and therefore impacts are unlikely to be significant. No air quality modelling has been undertaken within this section of the Scheme.

Assessment: Section 3 – District Boundary (Fen Drayton) to Longstanton Park and Ride

This section continues along the guideway, stopping at the Swavesey Stop. Again, the only potential air quality impacts would be at rural road crossings due to queuing but this is not viewed to be significant. Therefore no quantitative assessment has been undertaken in this section.

Assessment: Section 4 – Section around Longstanton

This section of the guideway runs around the north side of Longstanton where there would be a park and ride facility (350 spaces with land to increase capacity to 700 spaces). Again, this area was not identified as being of air quality concern and hence modelling has not been undertaken.

Assessment: Section 5 – Longstanton to A14

This section of the guideway contains two stops, at Oakington and Histon & Impington. While local air quality may be slightly affected in the immediate vicinity of rural road crossings during peak times, the only real area of air quality concern within this section is in Histon Village, particularly along Station Road/Cambridge Road from which the stop would be accessed. South Cambridgeshire District Council are concerned that while there would only be a small car park (40 spaces) at the Histon & Impington Stop, there would be a substantial number of vehicle movements through Histon and along Station Road, as a result of people accessing the stop to drop off/pick up. Hence detailed modelling has been undertaken for Station Road/Cambridge Road.

Selected receptors along Station Road/Cambridge Road (receptors 3-8) are listed in Appendix 8A and shown in Appendix 8B. Predicted ground level NO₂ and PM₁₀ concentrations at these receptors are shown in Appendix 8D.

The annual mean NO₂ objective is met at all the receptors along Station Road/Cambridge Road in all modelled years except for at the A14 Histon monitoring site in 2001 (thus agreeing with the monitoring results for this site). Of the ‘real’ residential receptors, the highest predicted concentration occurs at receptor 3 (76 Cambridge Road) which is the nearest residential property to the A14 in this area – this receptor has a predicted annual average of 35.9 µg/m³ in 2001. Comparison of the do-minimum and do-something scenarios shows that the Scheme does not have a significant impact upon local air quality in any of the future years with NO₂ concentrations forecast to change by ±0.2 µg/m³. This again indicates that the Scheme would have a beneficial effect on air quality at some receptors and a slightly negative effect at others. Overall, the Scheme has a negligible impact on NO₂ concentrations at the modelled receptors.

There are no predicted exceedances of the current annual mean PM₁₀ standard (40 µg/m³) or...
provisional 2010 20 μg/m³ standard (in 2011 and 2021 scenarios) at any of the modelled receptors in this area. Comparing the do-minimum and do-something scenarios shows that the Scheme does not significantly affect PM₁₀ concentrations in any of the future years with changes as a result of Scheme predicted to be less than 0.1 μg/m³ at all receptors. All receptors in this area therefore show negligible effect in all modelled years.

8.8.62 Comparison of the predicted number of exceedances of the PM₁₀ 24-hour mean between do-minimum and do-something scenarios for 2006, 2011 and 2021 also shows the negligible impact of the Scheme with the number of exceedances remaining unchanged between scenarios in all years at all receptors. The highest number of exceedances occurs at receptor 1 (A14 Histon monitor) which is predicted to have 7 exceedances in 2001. This is within both the current objective of 35 allowable exceedances of the PM₁₀ 24-hour mean and the provisional 2010 standard which states that 24-hour mean for PM₁₀ cannot be exceeded more than 7 times. Based on the number of exceedances of the 24-hour annual mean, the Scheme therefore shows a negligible effect in all modelled years.

Assessment: Section 6 – A14 to Cambridge Railway Station

8.8.63 Upon reaching the A14, the Scheme is intended to use two routes into Cambridge City Centre. The guideway splits just south of the A14, with the western branch running round Arbury Park to Histon Road, at which point it runs on-street. The eastern branch runs on-street along Milton Road. The guideway also continues east of the Milton Road along the route of the disused railway corridor to connect to a proposed development site at Chesterton Sidings.

8.8.64 This area has been identified by South Cambridgeshire as an area of potential air quality concern, particularly the proposed location of the Regional College Stop due to its close proximity to the A14. Detailed modelling has therefore been undertaken at the site of the proposed CGB Regional College stop to determine if predicted concentrations remain within air quality standards. The most westerly point of the CGB Regional College stop (nearest the A14) has been used as the receptor for the modelling.

8.8.65 Predicted annual mean NO₂ concentrations at the Regional College stop (receptor 2) (as shown in Appendix 8D) are within the annual mean NO₂ objective for all years modelled. The impact of the Scheme at this receptor is slightly beneficial as concentrations are reduced by 0.2 μg/m³ (in 2006 and 2011) with the Scheme in place. The impact of the Scheme on NO₂ concentrations is therefore negligible.

8.8.66 The current annual mean and 24-hour mean PM₁₀ objective (in terms of number of exceedances) and provisional 2010 standard are also met at the Regional College stop. Forecast concentrations do not change significantly between do-minimum and do-something scenarios, with changes as a result of the Scheme being less than ±0.1 μg/m³. Once again, the Scheme therefore shows a negligible effect in all modelled years.

8.8.67 Within Cambridge City, a number of specific junctions and roads have been identified by the Cambridge City Council as requiring detailed modelling to determine the impact of the Scheme at these locations. The modelling results for these roads/junctions are described below.

Histon Road Junction

8.8.68 Selected receptors at this junction are listed in Appendix 8A and shown in Appendix 8B. Predicted ground level pollutant concentrations at these receptors are shown in Appendix 8D.
8.8.69 Annual mean NO₂ concentrations at selected receptors at the Histon Road junction (receptors 21-26) are all predicted to remain within the current 40 µg/m³ objective in all modelled years. With the Scheme in place, annual mean NO₂ concentrations are forecast to remain unchanged or increase slightly (by up to 0.6 µg/m³) or decrease slightly by up to 0.2 µg/m³) at the selected receptors. The overall impact of the Scheme on NO₂ concentrations at the Histon Road junction is considered to be negligible.

8.8.70 There are also no predicted exceedances of the current annual mean PM₁₀ standard (40 µg/m³) or provisional 2010 20 µg/m³ standard at any of the modelled receptors in this area. Comparing the do-minimum and do-something scenarios shows that the Scheme does not significantly affect PM₁₀ concentrations in any of the future years, with receptor concentrations either remaining unchanged or changing by ± 0.1 µg/m³ with the Scheme in place. All receptors in this area therefore show negligible effect in all modelled years.

8.8.71 Comparison of the predicted number of exceedances of the PM₁₀ 24-hour mean between do-minimum and do-something scenarios for 2006, 2011 and 2021 again also shows the negligible impact of the Scheme with the number of exceedances remaining unchanged between scenarios in all years at the receptors. The highest number of exceedances is 3 (predicted at receptors 21 and 23 in 2001), which is within the current objective of 35 allowable exceedances and provisional 2010 standard of 7 allowable exceedances of the PM₁₀ 24-hour mean. As with annual mean PM₁₀, the Scheme therefore shows a negligible effect in all modelled years.

Mitcham’s Corner, Milton Road and Victoria Avenue

8.8.72 Selected receptors at this junction are listed in Appendix 8A and shown in Appendix 8B. Predicted NO₂ and PM₁₀ pollutant concentrations at these receptors are shown in Appendix 8D.

8.8.73 Annual mean NO₂ concentrations in the Mitcham’s Corner/Milton Road area (receptors 15-20) are predicted to remain within the current 40 µg/m³ objective at all selected receptors in all modelled years. Changes with the Scheme in place are not predicted to be significant with forecast concentrations either remaining unchanged (between do-minimum and do-something scenarios) or increasing/decreasing slightly (by up to 0.3 µg/m³). The impact of the Scheme on NO₂ concentrations at the selected receptors in the Mitcham’s Corner/Milton Road area is therefore considered to be negligible.

8.8.74 There are no predicted exceedances of either the current annual mean PM₁₀ standard (40 µg/m³) or provisional 2010 20 µg/m³ standard (in 2011 and 2021) at any of the modelled receptors in this area. Comparing the do-minimum and do-something scenarios shows that the Scheme does not significantly affect PM₁₀ concentrations in any of the future years, with receptor concentrations either remaining unchanged or decreasing by 0.1 µg/m³ with the Scheme in place. All receptors in this area therefore show negligible effect in all modelled years.

8.8.75 Comparison of the predicted number of exceedances of the PM₁₀ 24-hour mean between do-minimum and do-something scenarios for 2006, 2011 and 2021 again also shows the negligible impact of the Scheme with the number of exceedances remaining unchanged between scenarios in all years at the receptors. The highest number of exceedances is 4 (predicted at receptor 15, 145 Chesterton Road, in 2001), which is within the current objective of 35 allowable exceedances and provisional 2010 standard of 7 allowable exceedances of the PM₁₀ 24-hour mean. The Scheme therefore shows a negligible effect in all modelled years.
Hills Road Junction

8.8.76 Selected receptors at this junction are listed in Appendix 8A and shown in Appendix 8B(II). Predicted NO₂ and PM₁₀ pollutant concentrations at these receptors are shown in Appendix 8D.

8.8.77 Annual mean NO₂ concentrations at selected receptors around the Hills Road junction (receptors 9-14) are predicted to remain within the current 40 µg/m³ objective in all modelled years. Changes with the Scheme in place are not predicted to be significant with forecast concentrations either remaining unchanged (between do-minimum and do-something scenarios) or decreasing slightly (by 0.1 µg/m³). The impact of the Scheme on NO₂ concentrations around Hills Road junction is therefore considered to be negligible.

8.8.78 There are also no predicted exceedances of the current annual mean PM₁₀ standard (40 µg/m³) or provisional 20 µg/m³ standard (in 2011 and 2021) at any of the modelled receptors around Hills Road junction. Comparing the do-minimum and do-something scenarios shows that the Scheme does not significantly affect PM₁₀ concentrations in any of the future years with changes due to the Scheme forecast to be less than 0.1 µg/m³. All receptors in this area therefore show negligible effect in all modelled years.

8.8.79 Comparison of the predicted number of exceedances of the PM₁₀ 24-hour mean between do-minimum and do-something scenarios for 2006, 2011 and 2021 also shows the negligible impact of the Scheme with the number of exceedances remaining unchanged between scenarios in all years at all receptors. The highest number of exceedances is 5 (predicted at several of the receptors in 2001), which is within the current objective of 35 allowable exceedances of the PM₁₀ 24-hour mean and provisional 2010 standard which states that 24-hour mean for PM₁₀ cannot be exceeded more than 7 times. Based on the number of exceedances of the 24-hour PM₁₀ objective, the Scheme therefore shows a negligible effect in all modelled years.

8.8.80 The CGB route leaves Cambridge City Centre along Hills Road and upon reaching Station Road, runs towards Cambridge Railway Station. There are no air quality concerns within this area of Cambridge.

Assessment: Section 7 – Cambridge Railway Station to Trumpington

8.8.81 At Cambridge Railway Station the CGB route rejoins the guideway and runs south along the former Bedford rail corridor into Trumpington Village, terminating at the Trumpington Park and Ride. While running on the disused Bedford railway line, the Scheme would not significantly affect air quality due to the fact that buses would not be joining any existing traffic. Therefore, no quantitative assessment was necessary this section.

Assessment: Section 8 – Link to Addenbrooke’s Hospital

8.8.82 An additional stretch of guideway would be constructed which would link the CGB to Addenbrooke’s Hospital. While construction of this additional stretch of guideway may impact upon both Long Road Sixth Form College and Addenbrooke’s Hospital, it would have limited operational impacts. Again, no air quality concerns were raised regarding this section of the CGB and therefore no further assessment has been undertaken.

Maintenance of CGB

8.8.83 The majority of maintenance activities would be undertaken during operational hours with access via the maintenance track where present.
8.8.84 The Scheme proposes the construction of a depot for storage of maintenance vehicles, equipment and materials, and stabling of CGB buses. This depot would be located to the east of the St Ives Park and Ride site, adjacent to the other commercial and industrial facilities on Meadow Lane.

8.8.85 Maintenance activities are not likely to cause significant emissions to the atmosphere and therefore have not been assessed further.

8.9 Mitigation Measures

Construction Mitigation Measures

8.9.1 Most of the dust emitting activities during construction respond well to appropriate dust control/mitigation measures and adverse effects can be greatly reduced or eliminated. Effective dust mitigation measures prevent dust becoming airborne or contain dust to prevent dispersion beyond the emission source.

8.9.2 A Code of Construction Practice (CoCP) would be drawn up for agreement with the relevant local and county authorities prior to commencement of any works (see Section 4.5). The appointed contractor would also be required to participate in, and adhere to the principles of, the Considerate Contractor’s Scheme. It is anticipated that the Code would include the following dust measures:

- wheel washing facilities to prevent mud from construction operations being transported on to adjacent roads;
- ensuring that dusty materials are stored and handled appropriately (e.g. wind shielding or complete enclosure is used, drop heights of materials are restricted, watersprays are used where practicable to reduce dust emissions);
- vehicle speeds on haul roads and other unsurfaced areas of the site are restricted;
- hoarding and gates to prevent dust breakout;
- regular road sweeping during heavy vehicle access and egress to keep access roads free of mud, dust and other deleterious material; and
- appropriate site monitoring by visual checks is included within the site management practices.

8.9.3 These mitigation measures would control construction activities to reduce as far as possible the potential environmental impacts.

8.9.4 In addition to these standard dust control measures, there are a number of specific measures that may be undertaken to reduce dust impacts further:

- site design and management – site operations should be planned to position potentially problematic activities in terms of dust emissions away from areas close to neighbouring properties. Operations should also be planned to take account of local topography and prevailing wind patterns;
- greater provision of water sprays and wind/dust fences in dust sensitive locations; and
- temporary access roads – surfaces using unbound dry stone to be removed on completion unless otherwise requested by the landowner.

8.9.5 The traffic effect of construction of the Scheme is limited to a finite period and would be
along the traffic routes employed by haulage vehicles, construction vehicles and employees. The effects of the construction lorry movements on local air quality would be minimised through use of traffic management procedures, avoiding peak congestion periods, and through use of vehicles utilising particulate traps and running on ultra-low sulphur fuel. Implementation of an agreed CoCP would ensure that effects would be of limited duration and of marginal significance. As a result, construction effects on air quality are not considered to be significant.

**Operational Mitigation Measures**

8.9.6 Many roads in and around Cambridge would experience traffic decreases as a result of the operation of the Scheme, thus resulting in an improvement in air quality. Those sections of the route which have been identified as of potential concern in terms of air quality have been quantitatively assessed using detailed dispersion modelling. Results of this modelling showed that only very small effects on local air quality are predicted to occur as a result of the Scheme. Therefore no specific mitigation measures are proposed with respect to traffic related emissions.

8.10 **Residual Effects**

8.10.1 The main emissions from the Scheme are from construction activities and operational traffic.

8.10.2 The emissions from construction activities have been assessed through a review of the likely activities and through the formulation of appropriate mitigation to ensure any significant effects on local air quality are minimised. Given that construction activity related effects respond well to mitigation, the residual effects are considered to be negligible and would be of a temporary duration.

8.10.3 The emissions from operational traffic have been assessed in particular areas (identified as being of air quality concern) using an urban-scale air dispersion model. The traffic effects have been calculated for worst-case receptor locations and effects at other receptors should be lower. Ground level NO$_2$ and PM$_{10}$ concentrations are not predicted to be significantly affected by the Scheme with concentrations at many receptors remaining unchanged between do-minimum and do-something scenarios. Some receptors experience slight decreases in pollutant concentrations as a result of the Scheme (due to reduced traffic flows as the Scheme diverts traffic from the roads), while others experience slight pollutant increases. Overall the operational effects of the Scheme are expected to be negligible for NO$_2$ and either negligible, slight adverse or slight beneficial for PM$_{10}$ depending on the year and whether the provisional 2010 objectives (annual and 24-hour mean) are exceeded.
Appendices

Appendix 8A  Modelled Air Quality Receptors
Appendix 8B  Location of Air Quality Receptors
Appendix 8C  Windrose
Appendix 8 D  Air Quality Modelling Results

References

1. EC Directive 96/62/EC on Ambient Air Quality Assessment and Management (the Framework Directive)
2. Environmental Protection Act 1990 (c 43), HMSO, 1990
6. British Standard BS 6069
8. A Review and Assessment of Air Quality in Cambridgeshire: Stage 3, June 2000
11. Environmental Protection Act 1990
15. LAQM Technical Guidance
## Summary of Air Quality Impacts

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction PM₁₀ and dust</td>
<td>Potential for dust nuisance and vehicle and construction plant exhaust emissions</td>
<td>Slight Adverse</td>
<td>Follow measures set out in Code of Construction Practice</td>
<td>Negligible</td>
<td>-ve, D, MT, T</td>
</tr>
<tr>
<td>Traffic Impact</td>
<td>Vehicle exhaust emissions, mainly NOₓ and PM₁₀</td>
<td>Negligible (NOₓ)</td>
<td>None</td>
<td>Negligible</td>
<td>Negligible (NOₓ)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Negligible/Slight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adverse/Slight Beneficial (PM₁₀)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-ve, +ve, I, LT, P</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Abbreviations are as follows

+ve = positive, -ve = negative, D = direct, I = indirect, S = secondary, C = cumulative, ST = short-term, MT = medium-term, LT = long-term, P = permanent, T = temporary.

Abbreviations can be used in any viable combination, i.e. avoiding contradictions.
9. **ARCHAEOLOGY**

9.1 **Introduction**

9.1.1 This section comprises an archaeological assessment of the Cambridgeshire Guided Busway (CGB) Scheme.

9.1.2 The permanent works proposed are to include construction of guideways within the existing railway corridors, widening at various locations, park and ride sites, stops, kiss and ride sites, access roads, bridges, outfalls, ecological/landscape mitigation areas, balancing ponds and various other works. Temporary works include the construction of haul roads, site access areas, outfalls and work compounds.

9.1.3 The aims of this section are to assess the effects caused by the proposed permanent and temporary works, their impacts on archaeological resources, and to develop a strategy by which significant impacts may be mitigated. Built heritage issues are dealt with in Section 10.

9.2 **Review of Development Proposals**

9.2.1 The development proposals as they relate to this section of the ES can be broadly defined as comprising four main elements:

- that part of the Scheme that is to utilise existing highways;
- areas of new guideway construction;
- the provision of facilities forming part of the operation of the Scheme; and
- temporary works associated with construction.

9.2.2 Where the CGB buses run on existing roads impacts on the archaeological resource would be limited to road widening works proposed at a number of locations, works associated with the construction of stops and other minor works. Within those parts of the Scheme that are on the proposed guideway, archaeological resources would be affected by a variety of works. These include works associated with the construction of the guideway as well as associated infrastructure, for example park and ride and kiss and ride sites. In addition within this part of the route, temporary works associated with construction, such as construction sites may also impact on buried archaeological resources.

9.3 **Methodology**

9.3.1 This section uses the following terms:

- Effects - the physical effects of the proposed engineering works on archaeological resources.
- Impacts - the significance of the potential impacts on archaeological resources, described in terms such as major, moderate, minor, adverse, beneficial etc.

9.3.2 The archaeological assessment has been undertaken in the following main stages:

- collection and collation of data by desk study;
- discussions with the County Council’s Principal Archaeologist to determine and understand the effects of the Scheme;
9.3.3 Evaluation works were carried out in accordance with English Heritage’s guidance paper *Monitoring of Archaeological Excavations (1992)*.

9.3.4 The significance criteria used for the assessment of archaeological impacts vary from those used for other sections. The impacts have been assessed in terms of the significance criteria defined in Table 9.1.

### Table 9.1: Definition of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>No impact</td>
<td>Archaeological deposits would not be encountered</td>
</tr>
<tr>
<td>Minor impact</td>
<td>Archaeological deposits may be encountered but are unlikely to be of regional or national heritage significance and/or the engineering effect would affect/destroy a small area/element of heritage resources.</td>
</tr>
<tr>
<td>Moderate impact</td>
<td>Archaeological deposits/monument of regional heritage value would be encountered but the particular resource would not be completely destroyed/affected.</td>
</tr>
<tr>
<td>Major impact</td>
<td>Archaeological deposits/monument of heritage value would be encountered and the effect would almost completely destroy the particular resource.</td>
</tr>
<tr>
<td>Total impact</td>
<td>An archaeological monument of heritage value would be encountered and the effect would completely destroy the particular resource.</td>
</tr>
<tr>
<td>Cumulative impact</td>
<td>A series of significant archaeological monuments/deposits (of regional/national value) would be encountered and engineering impacts would therefore destroy/affect a series of individual heritage resources.</td>
</tr>
<tr>
<td>Strategic impact</td>
<td>An effect to a nationally important resource – such as a Scheduled Ancient Monument.</td>
</tr>
</tbody>
</table>

9.3.5 The destruction of archaeological resources as a result of ground excavation may be assessed as an adverse effect. However, the removal of an archaeological resource may also be considered to have a net beneficial effect in cases where the impact on the overall resource is low, and information gained through excavation benefits current knowledge and understanding.

9.3.6 For the purposes of this assessment, the following archaeological period ranges have been used:

**Prehistoric**

- Palaeolithic: 450,000-12,000BC
- Mesolithic: 12,000-4,000BC
9.3.7 In a number of instances an 'unknown date' has been given to an archaeological feature, particularly in cases where the feature has been identified through cropmarks, earthworks, or soilmarks, but there has been no detailed archaeological investigation.

9.4 Limitations and Assumptions

9.4.1 The assessment is based on the design details available at the time of the compilation of this section of the ES. However, reasonable assumptions have been made about the nature and effects of the proposed works on the basis of a knowledge of general engineering practice in projects of this type and in consultation with the project engineering team. It is considered that sufficient information has thus been available to define both the areas likely to be affected by the works and the likely nature and extent of potential impacts.

9.4.2 The scope of the works proposed for the Scheme can be classified in the general categories set out in Table 9.2. The assumed groundworks that are associated with these works are summarised in the table. Further details of the works proposed are given in Section 4 of this ES.

**Table 9.2: Summary of Proposed Groundworks**

<table>
<thead>
<tr>
<th>Category</th>
<th>Groundworks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGB corridor</td>
<td>The stripping of ballast and soft subsoils, the piling and compaction of fill on top in order to build up the guideway base. Groundworks would also include drainage ditches, fencing and various additional ad hoc works.</td>
</tr>
<tr>
<td>Embankment extension</td>
<td>The stripping of topsoil and soft subsoils, the piling and compaction of fill on top in order to build up the embankment. Retaining walls at the base to support the embankments may also be used.</td>
</tr>
<tr>
<td>Cutting extension</td>
<td>Removal of topsoil, subsoils, geological materials etc to specified depths. Retaining walls at the base of cuttings may also be used.</td>
</tr>
<tr>
<td>Park and ride and kiss and ride sites</td>
<td>Likely to involve the stripping of topsoil and soft subsoils, emplacement of fill and surfacing of the sites. The installation of underground services/utilities and drainage and foundations for structures are also likely within the sites.</td>
</tr>
<tr>
<td>Depot</td>
<td>Likely to involve the stripping of topsoil and soft subsoils, and piling or strip foundations.</td>
</tr>
<tr>
<td>Stops</td>
<td>At present the detailed design and construction methods of the stops are not determined. However, it is likely that the stripping of topsoil and soft subsoils</td>
</tr>
</tbody>
</table>
9.4.3 In some locations, previous archaeological investigations and chance discoveries in the vicinity of the Scheme are considered insufficient to provide a base for accurately predicting the archaeological potential of the CGB corridor. To address this issue, targeted archaeological investigations have been carried out, in consultation with the County Council’s Principal Archaeologist, as explained in Section 9.5.

9.5 Baseline

9.5.1 A summary of the key known archaeological sites identified from the desk study is provided in the first part of the baseline section, and is illustrated in the drawings in Appendix 9A. A summary of the data is provided in Appendix 9C. It should be noted that the areas of known significant archaeological potential encompass a much larger area than the individual known sites.

9.5.2 Following consultation with the County Council’s Principal Archaeologist, a programme of evaluation works was agreed, to investigate sites of potential archaeological impacts. The results of these evaluations are described in the second part of this baseline section.

Data Obtained from Documentary Sources

Section 1 - Huntingdon to St Ives Park and Ride

9.5.3 Within this section of the Scheme there is extensive evidence of activity and occupation from a variety of periods. There have been extensive finds of Palaeolithic material mainly derived from the extensive former gravel workings present in the area. These comprise both single finds that may be interpreted as chance loss material and groups of finds that may indicate areas of occupation. Neolithic and Bronze age finds have been made that may indicate chance losses or the location of occupation sites.

9.5.4 Roman finds comprise a range of material of a variety of types and forms including burials and cremations which indicate that some form of occupation was present in the area.

9.5.5 Evidence of Saxon and Medieval occupation is present throughout the area. This includes Huntingdon Castle, which is a Scheduled Ancient Monument in addition to other features that
attest to origins and development of the settlements during this period. The area contains a number of buildings whose origins can be traced from this period. Extensive areas of water meadows are present in the fields to the south of the corridor.

Section 2 - St Ives Park and Ride to District Boundary (Fen Drayton)
River Great Ouse Floodplain

9.5.6 There has been extensive evidence of Prehistoric activity/occupation associated with a Palaeochannel slightly to the north of Meadow Lane, St Ives. The findings in this area suggest some degree of multi-phase Prehistoric activity, attested by Palaeolithic, Neolithic and Bronze Age artefacts from the Palaeochannel. Significant features within this area include Iron Age stakeholes, pits, and ditches, and a Neolithic causewayed enclosure. These features are indicative of some sort of Neolithic and Iron Age settlement within the area.

9.5.7 Evidence of Roman occupation/activity has been found just to the south of the route, before it crosses the River Great Ouse. Excavations have revealed a Roman hut structure that may indicate some form of Roman settlement here.

Section 3 – District Boundary (Fen Drayton) to Swavesey Drain
Swavesey Priory and Surrounding Area

9.5.8 A number of highly significant Medieval features have been identified within 200m either side of the disused railway in the parish of Swavesey. These include Swavesey Priory, a late 11th century Benedictine Priory of which only earthworks and foundations remain (Sites and Monuments Record (SMR) 03488). The earthworks comprise a curving moat ditch around the northern perimeter (which measures approximately 0.9m by 0.9m), merging on the west with a stream flood bank. Although there are no visible foundations within the moat, the regular outlines of grass banks suggest that they are just below the surface. Traces of the banks north of the enclosure are discernible, but are truncated by the railway track. Swavesey Priory is a Scheduled Ancient Monument (Mon. CB38).

9.5.9 Additional features that may be of Medieval date include a cropmark and earthwork complex of possible ponds, ditches/moats, and linear features to the east of the Manor House (SMR 08897). It is highly likely that these features are part of the Priory but they lie outside the scheduled area. Furthermore, immediately north of the disused railway, possible Medieval features have been identified, that seem to represent either streets and house plots that were associated with the Medieval village, or are tracks and enclosures associated with the Priory (SMR 09128). A Medieval gravestone, located within the railway land, may suggest that a cemetery associated with the Priory may have existed here (SMR 03478).

9.5.10 The evidence suggests therefore, that the Medieval village extended north and south of the Priory, with the disused railway track directly truncating either part of the features associated with the Priory or part of the village. None of the Medieval features in this area have been excavated, making it difficult to see how the features relate to each other.

Section 4 – Swavesey Drain to Longstanton Park and Ride

9.5.11 Previous archaeological field evaluations undertaken at Hatton’s Farm, located in Longstanton Parish (500 to 1000m south of the CGB corridor), have revealed extensive evidence of late Iron Age and Roman multi-phased settlements. Excavation revealed seven definite Iron Age round houses, located in rectangular enclosures but in total, sixteen possible round houses could be distinguished. The area investigated was extremely feature dense and included a number of possible droveways and ditches (mainly on a north-south orientation) to
the west of the site, which can also be clearly seen from aerial photographs. Evidence suggests that the settlement continued to be used well into the Roman period.

9.5.12 An additional area was excavated to the south west of the site, revealing further features of a late Iron Age settlement complex. Over a distance of 20.5m within this area, up to 6 round houses were found to be represented by curvilinear eaves gully ditches. The pottery excavated from these features was dated to the 1st Century BC.

9.5.13 Further to the north of the site, a third Late Iron Age and Roman settlement was identified with far more dispersed features and no definite buildings were identified. The actual settlement appears to have lain on the western side of the excavation, whereas to the east the features mainly comprised a field system.

Section 5 – Longstanton Park and Ride to the A14(T)

Westwick Area

9.5.14 As the route passes through Oakington, it passes close to the original village of Westwick, where there are still extensive settlement remains, including various identified earthworks of ridges and furrows, raised trackways, scarp banks, ditches, ponds, house platforms and enclosures.

9.5.15 As the route leaves Oakington it enters a landscape with a high density of archaeological features. These include two groups of cropmarks that are truncated by the track (which may represent various incomplete enclosures), ring ditches, a rectilinear enclosure, ridge and furrow field systems, and three Bronze Age ploughed-down barrows.

Section 6 – A14(T) to Cambridge Railway Station

King’s Hedges/Arbury Camp

9.5.16 Just west of the Regional College, the route crosses the course of a Roman Road and this area is relatively rich in evidence of Roman activity and occupation. On the eastern side of the Roman road, at Kings Hedges Camp a cremation and nine Roman vessels were located in a small area of ditch lying adjacent to the Roman road. Further, extensive evidence of Roman activity/occupation indicative of a villa or farmstead has been located approximately 200m south of the route as its two routes branch east and south west.

9.5.17 To the south of the A14 lies Arbury Camp. Situated on nearly level ground at approximately 13m AOD, Arbury Camp is a large fortified circular ditched enclosure of about 5 hectares that is likely to be a Late Iron Age hillfort. Its earthworks have been severely levelled through extensive ploughing of the area and only its eastern side remains. Features on the eastern side include a much ploughed-down rampart 15m wide and up to 0.7m in height, a massive timber gateway entrance at the eastern side, and a ditch containing over 200 fragments of leather. There has been some evidence that the site was occupied before the construction of the enclosure, in the 2nd and 1st millennium BC. The enclosure itself seems to have been constructed and used before the Roman conquest. Arbury Camp and the fields to the east, which are an area designated for development, have been the subject of extensive programmes of archaeological investigation over a number of years.
Cambridge City

9.5.18 A summary of the general baseline conditions within Cambridge is provided in Table 9.3.

Table 9.3: Summary of Archaeological Baseline Conditions in the Core Area of Cambridge

<table>
<thead>
<tr>
<th>Period</th>
<th>Location</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>All periods</td>
<td>General</td>
<td>There is a paucity of finds along the existing highways. This is likely</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to reflect on the character of the road structure, with occupation to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the sides, and to the character of post construction engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>works and the limited opportunities for archaeological investigations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There appear to have been no archaeological excavations along the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>proposed route of CGB. Finds mostly relate to chance discovery.</td>
</tr>
<tr>
<td>Prehistoric</td>
<td>Near Castle Street and Shire</td>
<td>Neolithic axe</td>
</tr>
<tr>
<td></td>
<td>Hall</td>
<td></td>
</tr>
<tr>
<td>Roman</td>
<td>General</td>
<td>Ten find locations have been identified from the SMR. Most are located</td>
</tr>
<tr>
<td></td>
<td></td>
<td>from an area north west of Shire Hall relating to the main Roman road</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(the Huntingdon Road to Hill Road section) and the Castle Hill Roman</td>
</tr>
<tr>
<td></td>
<td></td>
<td>settlement.</td>
</tr>
<tr>
<td>Early Mid Saxon</td>
<td>Jesus Lane</td>
<td>Only two finds locations are known. They represent chance finds but may relate to local occupation.</td>
</tr>
<tr>
<td>Medieval</td>
<td>Historic core area</td>
<td>Remains related to Cambridge Castle, a Scheduled Ancient Monument, and to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the many medieval colleges.</td>
</tr>
<tr>
<td>Post Medieval</td>
<td>Through the full Historic core</td>
<td>There is a high potential for remains of this period to be present.</td>
</tr>
</tbody>
</table>

Sections 7 and 8 – Cambridge Railway Station to Trumpington and Addenbrooke’s Link

9.5.19 Cropmarks identified between Trumpington and Addenbrooke’s indicate extensive Iron Age and Roman activity within the area. Further evidence of Iron Age and Roman activity has been uncovered in Trumpington, where a Roman cemetery was revealed during the construction of the park and ride site and Iron Age pits were indicative of some form of settlement. A Roman settlement was located in the grounds of Addenbrooke’s Hospital.

Data Obtained from Evaluations

9.5.20 The rationale behind the implementation of the evaluation strategy was to investigate those elements of the Scheme where the proposed works were located outside of the existing boundary fence lines to the former mineral railway, where activity either associated with the construction or the permanent works for the Scheme has the potential to impact on buried archaeological resources.

9.5.21 The scope of these works was agreed with the County Council’s Principal Archaeologist, who also visited the sites during the fieldwork. The scope included locations for both the permanent and temporary works associated with construction, such as construction routes and construction sites. The results of these excavations have been used to inform the mitigation
strategy.

9.5.22 The exception to the general rationale was the works undertaken to the north of Swavesey Priory within the line of the former railway embankment, due to the high archaeological potential. At this location evaluation was undertaken to assess the likely potential for the survival of archaeological resources within the railway corridor itself.

9.5.23 The archaeological evaluations were undertaken at the following locations (the locations are shown in the drawings in Appendix 9B):

1. Access track to the north of Swavesey Priory
2. Land within the CGB corridor immediately north of Swavesey Priory
3. Swavesey Kiss and Ride site
4. Private access track at Swavesey
5. Balancing Pond 1
6. Windmill Bridge Construction Site
7. Longstanton Park and Ride
8. Construction Route 4
9. Balancing Pond 4
10. Location not disclosed
11. Balancing Pond 6
12. Arbury Park (parts of the route where previous works have not been undertaken)
13. Balancing Pond 7
14. Long Road Construction Site
15. Balancing Pond 8
16. Addenbrooke’s Link
17. Balancing Pond 9
18. Shelford Road Construction Site

9.5.24 The results of these evaluation works are summarised below.

Access Track to the North of Swavesey Priory

9.5.25 The evaluation comprised three 1.5m wide trenches, totalling 30m in length. All three revealed different sequences and all contained undated archaeological features, probably medieval, and related to the priory site. All features were sealed by 500 to 600mm of topsoil and other mixed layers. The findings of these evaluations are as follows:

- Trench 1: a large ditch (2.5m wide and c. 0.9m deep) with a beam slot parallel to it;
- Trench 2: Large feature, either a pit or the butt end of a large ditch;
- Trench 3: a smaller gully.

9.5.26 In view of the association of these archaeological features with the Scheduled Ancient
Monument to the south, the features should be considered to be of similar importance to those within the Scheduled area.

**CGB Corridor North of Swavesey Priory**

9.5.27 Evaluation in this area was undertaken to assess the impact of the construction of the disused railway corridor on the archaeological resource. Two 1x1m hand dug test-pits were dug in the two more accessible areas immediately south of the railway line. The easternmost showed no impact from railway construction, the westernmost had 200 – 250mm of material dumped on top, although with no apparent impact on the underlying deposits other than a possible slight truncation of the topsoil.

9.5.28 Undisturbed topsoil was 550mm thick overlying 200 – 300mm of subsoil. The upper 300mm of natural deposits was disturbed with undisturbed natural deposits at a depth of 1.00 – 1.10m.

9.5.29 In view of the association of these archaeological features with the Scheduled Ancient Monument to the south, the features should be considered to be of similar importance to those within the Scheduled area. However, the construction of the disused railway is likely to have compromised the integrity of any deposits that are present.

**Swavesey Kiss & Ride Site**

9.5.30 Two 1.5m wide trenches were dug, totalling 20m in length. Topsoil 200-300mm, subsoil 100 – 200mm. Subsoil was intermittent. The findings of these evaluations are as follows:

- **Trench 1:** A group of large sand/gravel extraction pits covering almost the entire trench. These are probably medieval but no dating evidence was found. A later phase was seen only in section, comprising ditches and also probably medieval. The base of the extraction pits were c. 1.20m below present ground surface. Waterlogged deposits were observed at the base of the pits with borderline organic preservation; and

- **Trench 2:** One post-medieval/modern pit and two earlier (probably medieval) ditches aligned NW-SE.

9.5.31 The likely association of these features with Swavesey Priory is significant and is likely to be indicative of peripheral activity connected with the Priory.

**Private access Track at Swavesey**

9.5.32 Four trenches, 1.5m and 2.3m wide, were dug, totalling 46m in length. The general sequence was topsoil (200 – 300mm), a layer of clay, probably dumped (300 – 400mm), subsoil (c. 200mm) above natural. The subsoil was intermittent.

9.5.33 The only features noted were tree throws and one post-medieval/modern linear feature.

9.5.34 The archaeological features located during the evaluation are not significant.

**Balancing Pond 1 and Windmill Bridge Construction Site**

9.5.35 The archaeological evaluation consisted of seven 2m wide trenches, totalling 310m in length, cut across the adjoining sites by machine with a toothless ditching bucket. The topsoil was generally 200mm to 350mm deep, 100mm to 300mm of subsoil was intermittently present. The underlying material was generally clay, with patchy gravel present on some areas.
Three archaeological features were identified; all were undated shallow isolated postholes containing charcoal. A tree throw also contained some cultural material in the form of charcoal and small fragments of pottery or fired clay. In addition there was a linear feature that may be a ditch, but is more likely to be a palaeochannel.

A range of material was recovered from the topsoil. The majority of this was 17th century or later. The only significant item recovered was a possible Palaeolithic flint handaxe.

No significant archaeological remains were located during the archaeological evaluation.

Longstanton Park and Ride

The archaeological potential of the park and ride has been assessed through geophysical survey and trial trenching. The trial trenching comprised sixteen 2m wide trenches totaling 760m in length. Topsoil ranged from 250mm – 300mm thick and there was an intermittent subsoil varying from 200mm – 300mm thick. The natural deposit was clay with patches of gravel, although no substantial areas of gravel were noted.

Few features were found other than field drains. These were mostly modern, although some did appear to be post-medieval and their origins may even be late medieval, particularly in Trench 16 where the field drain system was more intensive.

The most significant feature was a large Bronze Age pit (or just possibly linear feature) some 5.0m wide and 1.3m deep within Trench 9. Nearby, in Trench 12, were two ditches forming a ‘T’ junction. These are undated and could potentially be modern, but do appear to be sealed by the subsoil and so could be of some antiquity.

A number of other isolated features, mainly postholes, were sealed by the subsoil, but the only one that may be of more than minor importance is the butt end of a linear feature in Trench 1.

A number of the trenches were targeted on anomalies identified in the geophysical survey. These generally proved to be modern features or negative, with no features revealed in excavation at all.

The evaluation demonstrated the presence of Late Bronze Age/early Iron Age activity, in the form of a pit and associated features, which contributes the understanding of activity in the vicinity at this date. The medieval features located also have the potential to provide details of the organisation of the landscape during this period.

Construction Route 4

Seven two metre wide trenches were cut, totalling 170m in length. Topsoil was 250 – 350mm thick, subsoil was intermittent, but where present was c. 300mm thick. The underlying natural is 3rd Terrace river gravels east of the existing N-S track, Kimmeridge Clay to the west. Trenches were numbered 1 – 7, from east to west. The findings of these evaluations are as follows:

- Trench 1: three ditches, probably all Late Bronze Age/Early Iron Age. These are likely to relate to the complex known from aerial photographs and excavated on the golf course on the opposite side of the B1050 road;
- Trench 2: one undated posthole;
- Trench 3: extensive post-medieval/modern gravel and sand extraction pits;
9.5.46 The archaeological remains located are indicative of Late Bronze Age Activity and has the potential to provide information about the general character of activity at this date. The lack of data from the trenches on the clay may not be a true reflection of the archaeological potential when considered with the significant Saxon and Medieval remains located to the south.

Balancing Pond 4

9.5.47 To assess the archaeological potential of the site a single trench, 75 x 2m, was cut by machine with a toothless ditching bucket. The general depth to the underlying natural deposit was 450mm, at the north end, 750mm at the south end.

9.5.48 Four archaeological features were found, all sealed beneath the (presumably) medieval subsoil. All were linear, orientated southwest-northeast or southeast-northwest and with similar fills. Three of the four were fairly shallow, but one at the north end had a sharp V-shaped section and was 700mm deep below the sub-soil. Two of the features (including the V-shaped one) produced sherds of pottery from the Late Bronze Age/Early Iron Age.

9.5.49 The location of relatively intense Late Bronze Age/Early Iron Age activity on the Kimmerage Clay is particularly significant as the understanding of the nature of activity on these heavy soils is poorly understood.

Site No. 10

9.5.50 Four 1.8m wide trenches were cut, totalling 40m in length. Topsoil was 300 – 400mm thick, subsoil 200 – 400mm. The natural deposit was 3rd Terrace gravel throughout. The findings of these evaluations are as follows (trenches are numbered SE – NW):

- Trenches 1 & 2: No archaeology.
- Trench 3: Large circular chalk filled feature, probably a capped well.
- Trench 4: An Anglo-Saxon inhumation. Probably 6th century. Aligned roughly SW - NE. Accompanying grave goods include a gold bracteate, beads, wire rings, an iron knife and several as yet unidentified objects. A nearby small pit is probably associated with the burial.

9.5.51 Following consultation with the County Council’s Principal Archaeologist, the burial was excavated sufficiently to determine the method of burial and any identifiable aspects of the skeleton. The human remains were then carefully re-interred and marked in the ground. The grave goods exposed in this exercise were removed for conservation as they would not survive reburial.

9.5.52 The location of a Saxon burial is of particular significance. Isolated burials of this date are not unknown, but the burial is more likely to form part of a more extensive cemetery that was previously unknown.

Balancing Pond 6

9.5.53 Archaeological evaluation consisting of a single trench, 102.5 x 2m, was cut by machine with a toothless ditching bucket to assess the archaeological potential of the site. The general depth of top and subsoil was 450mm, at the WNW end, 700mm at the ESE end.
9.5.54 At the west northwest end, extending for c. 34m, was an area of dumped gravel and silty clay up to 800mm deep. Although most of the finds recovered were Roman, this was a modern feature. This was demonstrated by the absence of subsoil and that it had truncated ceramic field drains, fragments of which were recovered.

9.5.55 Two further possible features were investigated. One of these is probably natural, the other, a small gully, is probably medieval or later.

9.5.56 Two palaeochannels were identified towards the ESE end of the trench. One of these had a roman potsherd in an upper fill.

9.5.57 The presence of the palaeochannels that have been tentatively dated to the Roman period are unusual in that they can be dated and as such have the potential to contribute to understanding of the landscape during the Roman period.

**Arbury Park**

9.5.58 The evaluation comprised the opening of two 1.8m wide trenches were dug totalling 60m in length within an area that has not previously been evaluated. The recent topsoil was only 70mm thick lying over a recent gravel levelling/dumping deposit some 150 – 200mm thick. This sealed an earlier topsoil 200 – 300mm thick and a subsoil some 150 – 200mm thick. Natural deposits were a mixture of gravel and clay marl.

9.5.59 The western trench was severely disturbed by a large late 20th century pit, c. 20m across, that had been used to dispose of large amounts of rubbish. No further investigation was carried out in this trench.

9.5.60 The eastern trench contained two substantial NW – SE aligned ditches that are probably medieval or post-medieval in date.

9.5.61 The evaluation identified that the area of the investigation had been significantly disturbed by modern activity. When considered with the other archaeological works that have been undertaken in the area as well as areas of disturbance within the remainder of the corridor the principal area of significance is the eastern part of the evaluation area.

**Balancing Pond 7**

9.5.62 Balancing Pond 7 was evaluated by a single trench 40m long by 1.9m wide. Topsoil c.250 to 350mm thick, subsoil c. 100mm thick overlying gravel.

9.5.63 A single linear feature was aligned roughly east-southeast by west-northwest and was 1.08m wide and 0.42m deep with steep sides and a flat base. Prehistoric pottery was recovered from the fill.

9.5.64 The archaeological features located are significant in the context of understanding the hinterlands to the south of the Roman Town of Cambridge.

**Long Road Construction Site**

9.5.65 The Long Road Construction site was evaluated by three 1.9m wide trenches with a total length of 160m. The findings of these evaluations are as follows:

- Trench 2: 60m long, contained no archaeological features except a modern water main and associated disturbance. Topsoil c.250 to 300mm thick, subsoil c. 150mm thick overlying gravel.
- Trench 3: 45m long, contained no archaeological features. Topsoil c.250 to 300mm thick, subsoil c. 150mm thick overlying gravel.
- Trench 4: 55m long, contained no archaeological features except a modern land drain. Topsoil c.250 to 400mm thick, subsoil c. 150mm thick overlying gravel.

9.5.66 Although the evaluation did not locate any archaeological features, the site has the potential for archaeological resources to be present that are associated with the nearby cropmark complex.

**Balancing Pond 8**

9.5.67 Balancing Pond 8 was evaluated by a single trench 75m long by 1.9m wide.

9.5.68 The trench contained a number of probably relatively recent features including a ditch and two postholes. Topsoil c. 150 to 300mm thick, no distinct subsoil was present overlying gravel.

9.5.69 The ditch was aligned northwest by southeast and was 0.85m wide and 0.21m deep with gently sloping sides and a rounded base. No dating evidence was recovered and the lack of a distinct subsoil hinders interpretation, but the fill was similar to the topsoil and the impression was of a relatively recent feature.

9.5.70 The postholes also had no dating evidence but, as with the ditch, the similarity of the fill to the topsoil suggests a relatively recent origin.

9.5.71 The linear feature located is consistent with that identified from cropmarks and as such has the potential to provide information on the date and nature of these features.

**Addenbrooke’s Link**

**Addenbrooke’s Link West of Railway Line (north side of footpath)**

9.5.72 This site, north of Footpath FP47 (Cambridge), was evaluated by eight 1.9m wide trenches with a total length of 250m. Topsoil varied between 0.24 and 0.44m in depth, subsoil 0.03m and 0.25m. The findings of these evaluations are as follows:

- Trenches 13 and 17: contained no archaeological features.
- Trench 14: 30m long, contained two sterile pits, both of possibly natural origin.
- Trench 15: 30m long, contained an oval pit containing a sterile dark grey clay.
- Trench 16: 25m long, contained six features, one being a ditch and the others pits. No artefacts were recovered.
- Trench 18: 30m long, contained a probable pit with a sterile fill.
- Trench 19: 30m long, contained three probable pits, none containing artefacts.
- Trench 20: 50m long, contained two N-S aligned ditches. One contained Medieval/Early Post Medieval brick fragments, the other contained no artefacts.

**Addenbrooke’s Link East of Railway Line (north side of footpath)**

9.5.73 This site, to the north of Footpath FP47 (Cambridge), was evaluated by five 1.90m wide trenches with a total length of 125m. Due to the presence of redeposited overburden from the Addenbrooke’s Hospital site, three of the trenches were excavated double width and stepped.
The trenches at the far east and west of the area had only limited overburden, and were single width trenches. Topsoil varied between 0.20m and 0.40m, the redeposited marl overburden between 0m and 1.70m, and subsoil between 0.14m and 0.65m (the deeper subsoil representing old machine disturbance). The findings of these evaluations are as follows:

- Trench 21: 25m long, contained five probable linear features, of which three were excavated. Two of the excavated sections contained no artefacts, and the third contained a layer of probably early Post Medieval brick fragments along with residual Roman pottery.
- Trench 22: 25m long, contained two ditches and one probable ditch. One of these was excavated. No artefacts were recovered.
- Trench 23: 25m long, contained four ditches on two different alignments; one on each alignment was excavated. No artefacts were recovered.
- Trench 24: 25m long, contained seven features, all with distinct dark fills, consisting of three probable ditches and four pits. Four features were excavated, generating a large quantity of Roman pottery spanning the 1st to 4th centuries AD, with a general 2nd to 3rd century date.
- Trench 25: 25m long, contained at least five features, consisting of three ditches and two pits, all of which were sampled. A total of 79 sherds of Roman pottery were recovered, spanning the 1st to 3rd centuries.

Addenbrooke’s Link East of Railway Line (south side of footpath)

9.5.74 This site, to the south of Footpath FP47 (Cambridge), was evaluated by five 1.9m wide trenches with a total length of 188m. This included 8m of additional trenching at the suggestion of the County Council’s Principal Archaeologist. Topsoil varied between 0.26m and 0.36m in depth, subsoil between 0.13m and 0.25m. The findings of these evaluations are as follows:

- Trench 26: 25m long, contained two shallow ditches with sterile fills.
- Trench 27: 35m long, contained eleven features, of which ten were probable ditches, and four were excavated. No artefacts were recovered from this trench.
- Trench 27A: 8m long, excavated to establish the continuity of several ditches exposed in Trench 27. These features were present, and were base planned only.
- Trench 28: 40m long, contained seven features, five of which were ditches. Five features were excavated, and several pieces of Roman pottery were recovered.
- Trench 29: 80m long, contained seven features, several of which continued into Trench 28. Two features were sample excavated. One, a ditch, was relatively modern, with a field drain at its base.

9.5.75 The evaluation identified extensive archaeological remains which were concentrated to the east of the railway line, with a lower density to the west. The archaeological remains are likely to represent features associated with Roman domestic settlement particularly to the east of the railway line with peripheral activity to the west of the railway line.

Balancing Pond 9

9.5.76 Balancing Pond 9 was evaluated by two 1.9m wide trenches with a total length of 75m. The findings of these evaluations are as follows:
- Trench 6: 25m long, had been heavily disturbed by several modern features and no earlier features were observed. Topsoil c. 300 to 400mm thick, the subsoil was c. 100 to 150mm thick overlying gravel.
- Trench 7: 50m long, contained a number of possible features but upon investigation all appeared to be natural tree throws. Topsoil c. 300 to 400mm thick, the subsoil was c. 150mm thick overlying gravel.

9.5.77 Although the evaluation only located modern disturbance and tree throws the site is located in an area where cropmark evidence suggests that features may extend into the site. The tree throws may also provide data on the date of tree clearance in this area.

**Shelford Road Construction Site**

9.5.78 Shelford Road construction site was evaluated by five 1.9m wide trenches with a total length of 125m. The findings of these evaluations are as follows:
- Trench 8: 25m, long contained no archaeological features. Topsoil c. 300 to 350mm thick, the subsoil was c. 150mm thick overlying gravel.
- Trench 9: 25m long, contained no archaeological features. Topsoil c. 200 to 350mm thick, the subsoil was c. 150 to 200mm thick overlying gravel.
- Trench 10: 25m long, contained a single pit or posthole and two parallel ditches all of which are probably of relatively recent origin. Topsoil c. 350mm thick, the subsoil was c. 100 to 150mm thick overlying gravel.
- Trench 11: 25m long, contained no archaeological features. Topsoil c. 350mm thick, the subsoil was c. 100 to 0.20m thick overlying gravel.
- Trench 12: 25m long, almost entirely filled with a modern gravel quarry pit, no other features were observed. Topsoil c. 250 to 300mm thick, the subsoil was c. 100 to 200mm thick overlying gravel.

9.5.79 Although no dating evidence was obtained for the archaeological features located during the evaluation, their alignment is consistent with cropmark features that extend into the site.

9.5.80 The following areas were unavailable for evaluation due to access constraints, or were scoped out on the basis that previous works would have resulted in the destruction of archaeological remains:

Evaluations scoped out:
- St Ives Park and Ride, which is located within an area of previous sand and gravel extraction and landfill;
- construction routes where these follow the line of extant roads;
- the River Great Ouse crossing work site, as a method for the preservation in situ of the archaeological resource at this location has been designed; and
- areas where, due to the presence of existing trees or health and safety considerations, evaluation was not practicable at this stage. This included the road widening at Huntingdon and St Ives.

Areas that could not be accessed:
- Balancing Ponds 2 and 3;
9.6 Consultation

9.6.1 During the compilation of this section of the ES extensive consultation was undertaken with the County Council’s Principal Archaeologist and English Heritage. This included discussion of the nature of the archaeological resource, the design of the archaeological evaluations undertaken as part of the ES as well as the mitigation for the Scheme.

9.6.2 During the execution of the fieldwork for the evaluations the County Council’s Principal Archaeologist or a designated representative visited the works to familiarise themselves with the archaeology encountered and to provide advice and comment on the works.

9.7 Assessment

General Characteristics of Impacts

On-street Sections

9.7.1 The effects of the on-street works are expected to mainly arise where widening works take place, together with more minor effects from groundworks for the construction of stops and minor improvements of the roads along which the CGB buses would run.

9.7.2 Table 9.4 outlines the general character of the potential effects related to archaeological concerns.

<table>
<thead>
<tr>
<th>Direct Effects</th>
<th>Depth of Ground Penetration</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road widening works, roadside ditches, etc</td>
<td>Moderate depth, alongside existing roads</td>
<td>Potential for archaeological impacts but limited by narrowness of works and proximity to existing roads, with roadside tree roots etc</td>
</tr>
<tr>
<td>Relaying of footways.</td>
<td>Very shallow</td>
<td>Within modern soil formations</td>
</tr>
<tr>
<td>Resetting of kerbs and kerb lines.</td>
<td>Very shallow</td>
<td>Within modern soil formations</td>
</tr>
<tr>
<td>Local mending of manholes and routes of old service runs</td>
<td>Shallow to moderate depth mostly within the road corridors</td>
<td>Within zones of previous modern disturbance</td>
</tr>
<tr>
<td>Pad and strip foundations for facilities associated with the CGB pedestrian access and egress stops. Additional lighting at stops.</td>
<td>Shallow to moderate depth, depending on engineering soil parameters.</td>
<td>Potential for localised penetration to below levels of modern soils</td>
</tr>
<tr>
<td>Pad and foundations for street furniture, especially signage posts</td>
<td>Shallow to moderate depth, depending on engineering soil parameters.</td>
<td>Potential for localised penetration to below levels of modern soils. Facilities within</td>
</tr>
<tr>
<td>Direct Effects</td>
<td>Depth of Ground Penetration</td>
<td>Comment</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>posts</td>
<td>parameters.</td>
<td>pavements may be near built heritage resources.</td>
</tr>
<tr>
<td><strong>Indirect Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>From CGB vehicles</td>
<td>Minor within soil formations that act as a damper.</td>
</tr>
<tr>
<td><strong>Temporary Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>From construction plant</td>
<td>Minor and controlled by CoCP.</td>
</tr>
<tr>
<td>Accidental damage</td>
<td>From construction plant</td>
<td>Manual construction within pavement areas and by machine within modern soil formations</td>
</tr>
</tbody>
</table>

**Guideway Sections**

9.7.3 Inside the disused railway corridor it is assumed that archaeological deposits have largely been destroyed by previous construction works. In the areas where the CGB corridor (including embankment and ditches) exceeds the disused railway corridor there is some potential for archaeological remains to be present.

9.7.4 The groundworks for construction within the disused railway corridor would involve the stripping of ballast or topsoil and soft subsoils. For the ditches, the removal of additional subsoils is likely.

9.7.5 In areas where the CGB corridor is slightly wider than the existing railway corridor, the effect on the archaeological resource may be total or partial removal. With mitigation, this is expected to be minor adverse since only narrow strips are likely to be affected and the information recovered would contribute to understanding of the archaeological resources in the area affected and to long-term research and resource management objectives. The effects of the minor widening of the CGB corridor are therefore likely to have a minor adverse impact on archaeological resources.

9.7.6 In other areas, where associated works are required, such as at park and ride sites, kiss and ride sites, balancing ponds, construction compounds and haul routes, effects on archaeological resources may be more significant.

9.7.7 The following general classification of effects are applied to this assessment:

**Minor Effects**
- slight widening of the existing railway corridor;
- outfalls;
- lighting; and
- new boundary features.

**Moderate Effects**
- balancing ponds;
- stops where there are to be areas of new foundations;
• roads (temporary and permanent) where the works would involve landtake outside of the existing highway boundary;
• construction accesses, where these are not contained within existing roads; and
• extension of original railway corridor.

**Moderate to Major Effects**

• park and ride/kiss and ride sites;
• construction areas;
• Addenbrooke’s link; and
• construction of access routes where these are not within areas of existing roadways.

**Impacts on the Archaeological Resource**

**Section 1 – Huntingdon to St Ives Park and Ride**

**Permanent Works**

9.7.8 Within this section, the CGB buses would generally run on existing roads where impacts on archaeology would be nil. Localised areas of carriageway widening works are proposed, in Huntingdon and between Huntingdon and St Ives, as described in Section 4. The potential impacts on the buried archaeological resource from the works associated with the localised widening of the existing roads are assessed to be of minor significance, since the widening works comprise generally narrow strips alongside existing roads. In this situation, the archaeological resource is likely to have been previously disturbed by road construction and associated works and also by the roots of roadside trees, which are common along these sections.

9.7.9 The reopening of the Old Houghton Road would not impact on buried archaeological remains as previous construction works would have resulted in the destruction of the resource.

**Section 2 - St Ives Park and Ride to District Boundary (Fen Drayton)**

**Permanent Works**

9.7.10 The proposed St Ives Park and Ride would occupy a restored landfill on the site of a former mineral working. The proposed works would therefore not encounter archaeological remains. The construction works for the new park and ride are likely to have no impact on archaeology.

9.7.11 The effects of the widening of the CGB corridor are likely to have a minor adverse impact on archaeological resources.

9.7.12 Groundworks required for the River Great Ouse Viaduct involve the replacement of a single pier. The site of these works would already have been disturbed for the construction of the original viaduct and therefore the impacts of these works on archaeological resources are considered to be nil.

**Temporary Works**

9.7.13 The proposed construction site at the Ouse Viaduct would be constructed on imported fill
material laid over the existing ground surface. This would enable the preservation of any archaeological remains and no impacts are anticipated.

9.7.14 Construction routes along this section would be located on existing roadways and these would not impact on the archaeological resource.

Section 3 – District Boundary (Fen Drayton) to Swavesey Drain

Permanent Works

9.7.15 The works undertaken at Swavesey (see Appendix 9B) located a range of archaeological features, which may be associated with activity within the Priory or from other periods of activity. Subject to detailed design, the depth of deposits present over the archaeological features may be sufficient in certain locations to enable the preservation in situ of these.

9.7.16 Evaluation of the proposed access track north of Swavesey Priory identified 500 to 600mm of topsoil and subsoil over archaeological horizons. Construction of the access track in this area is considered unlikely to impact on the archaeological resources present.

9.7.17 Within the CGB corridor the evaluation showed that up to 500mm of material was present over the archaeologically sensitive horizons. It is concluded that the works as currently designed are not likely to impact on these archaeological resources.

9.7.18 Evaluation of the proposed kiss and ride site at Swavesey identified up to 500mm of topsoil and subsoil over archaeological horizons. Construction of the kiss and ride site in this area is considered unlikely to impact on the archaeological resources present.

9.7.19 From the general nature of the works in the Swavesey area it is assessed that there is a low potential for archaeological resources to be impacted. However, in view of the considerable importance of the archaeological resources at Swavesey, it is recognised that there is a potential for moderate to major adverse impacts.

9.7.20 Detailed design will need to ensure the preservation in situ of archaeological features at these locations. The implementation of a programme of detailed archaeological investigation in advance of construction would be required.

9.7.21 The northern boundary of the Scheduled Ancient Monument, which is concurrent with the southern boundary of the Scheme, is not likely to be adversely impacted as a consequence of construction activity. However, in view of the significance of this Monument, it is proposed that protection measures would be put in place to be implemented in advance of any construction related activity. These measures would be agreed with English Heritage and would be incorporated into the Code of Construction Practice (CoCP). Detailed design will need to ensure the preservation in situ of archaeological features at this location.

9.7.22 The evaluation undertaken at the access track east of Swavesey located only tree throws and a relatively modern linear feature probably a ditch. Topsoils and subsoils ranged from 700mm to 1000mm in depth and therefore significant impacts on archaeological resources present are not considered likely.

9.7.23 Other than in the Swavesey area, as described above, the effects of the minor widening of the CGB corridor are, with mitigation, considered likely to have a minor adverse impact on archaeological resources.
Temporary Works

9.7.24 No significant impacts from temporary works are anticipated in this section.

Section 4 – Swavesey Drain to Longstanton Park and Ride

Permanent Works

9.7.25 The archaeological potential of the park and ride has been assessed through geophysical survey and trial trenching, as described in Section 9.5. The evaluation located archaeological remains, which would be impacted by the construction of the park and ride site. The main feature of interest was a Bronze Age pit, which may be associated with a larger area of occupation. Construction of the park and ride site would thus have a potentially moderate adverse impact on archaeological resources in this area.

9.7.26 In general, the effects of the minor widening of the CGB corridor are, considered likely to have a minor impact on archaeological resources.

9.7.27 The works undertaken at Balancing Pond 1/Windmill Bridge construction site showed that a low level of archaeological resources was present. The location of the palaeochannel has the potential to provide palaeoenvironmental information. Impacts of construction works in this area are considered to be of minor significance.

Temporary Works

9.7.28 Evaluation works at Construction Route 4 identified a low level of archaeological resources but the area is known to contain extensive archaeological remains of Prehistoric and Romano-British age. Despite the low level of finds, impacts in this area are assessed as potentially moderate adverse.

Section 5 – Longstanton Park and Ride to the A14(T)

Permanent Works

9.7.29 For the majority of this section of the route, the proposed corridor does not substantially deviate from the original railway corridor. In the main, additional developed land would amount to approximately 1-2m either side. In general, the effects of the minor widening of the CGB corridor are, with mitigation, considered likely to have a minor impact on archaeological resources.

9.7.30 The Histon and Impington Stop would include the construction of a car park adjacent to and north of the guideway. However, this site is in an existing urban area with buildings and other structures. Although archaeological resources may have been truncated by previous construction works a programme of archaeological investigation will be carried out in advance of construction.

9.7.31 The evaluation identified unexpected human remains at Site 10 indicating the location of a previously unidentified Anglo-Saxon cemetery. Archaeological features were not located, except for a possible well, within the remainder of the area investigated.

9.7.32 The impact on these archaeological resources from the proposed Scheme would have a potentially major adverse impact.

9.7.33 The evaluation of Balancing Pond 4 identified a range of archaeological features of Late Bronze Age/Early Iron Age origin. Construction of the pond is likely to have a moderate
impact on archaeological resources. Evaluation of Balancing Pond 6 identified palaeochannels and other features. Construction of the pond is likely to have a minor impact on archaeological resources.

Temporary Works

9.7.34 No impacts from temporary works have been identified in this section.

Section 6 - A14 to Cambridge Railway Station

9.7.35 The main impacts in this section relate to the works at Arbury Park, which would require construction of a new section of guideway. Within the area evaluated, parts had been disturbed, probably by modern activity, whilst in other parts archaeological features survived, probably of medieval/post-medieval date. Previous archaeological works within the remainder of this part of the CGB corridor have identified extensive multi-period archaeological remains including Arbury Camp which is located to the north of the corridor. In view of the known archaeological significance of the area, the potential impact of the CGB works in this area is assessed as moderate adverse.

9.7.36 Proposed widening works along the east side of Histon road are located approximately 100-200m south of the area of archaeological importance at Arbury Camp and it is assessed that there is the potential for minor impacts on archaeological resources from these works.

9.7.37 Other impacts within this section relate to construction of the stops and here there are likely to be minor beneficial effects resulting from the gain of additional archaeological data in areas of small-scale impacts.

9.7.38 Widening works at Christ’s Pieces would be carried out by means of shallow construction techniques to avoid damage to trees, and are not expected to penetrate below the topsoil. It is concluded that the potential archaeological impacts from these works are negligible.

Section 7 - Cambridge Railway Station to Trumpington

Permanent Works

9.7.39 The CGB route generally lies within the corridor of the former Bedford to Cambridge railway line. In those sections where the CGB Scheme extends marginally beyond the original railway corridor there is likely to be some minor adverse effect to archaeological resources.

9.7.40 Archaeological evaluation of Balancing Ponds 7, 8 and 9 identified various prehistoric and undated features and artefacts of minor archaeological significance. Construction of the ponds is predicted to result in minor impacts on archaeological resources.

Temporary Works

9.7.41 Temporary works in this section comprise the Long Road and Shelford Road Construction compounds. Evaluation at the Long Road site identified no significant archaeological features. At the Shelford Road few features were identified. Impacts from these construction compounds are assessed as minor adverse.

Section 8 - Addenbrooke’s Link

Permanent Works

9.7.42 The proposed route passes through a general area where cropmarks suggest extensive areas of
Iron Age and Roman occupation. The archaeological evaluation identified that extensive archaeological remains are present along the corridor and particularly east of the existing Cambridge to London railway line.

9.7.43 Details of the proposed overbridge and embankment are not available at this stage of the design. It is assumed however, that deep piling would be involved and the stripping of topsoil and soft subsoils in order to create the base for the embankment.

Temporary Works

9.7.44 Construction of the guideway and maintenance track in this section has the potential for major adverse impacts on archaeological resources

9.8 Mitigation Measures

Introduction

9.8.1 Mitigation measures for the impacts on archaeological resources identified in the preceding sections are set out below. However, further consultations to design a detailed programme of archaeological mitigation would be undertaken with the County Council’s Principal Archaeologist in consultation with English Heritage. English Heritage will be consulted directly with regard to the Scheduled Ancient Monument.

9.8.2 The first stage in this process is the preparation of an archaeological project brief by CCC. The brief will form the basis on which a detailed specification for archaeological mitigation will be prepared. When compiled the detailed specification will be agreed with both the County Council’s Principal Archaeologist and English Heritage.

9.8.3 On the basis of the findings of the Archaeological (including the field evaluations undertaken as part of the compilation of the ES) and the identification of likely impacts, the mitigation options are:

- watching brief on site investigations;
- watching brief (during construction);
- archaeological excavation in advance of construction as detailed below;
- *in situ* preservation of archaeological features; and
- amendments to the Scheme during detailed design;

9.8.4 As a result of implementing these mitigation options adverse effects would be minimised or eliminated, given that findings and recovery of artefacts would improve knowledge and understanding of the archaeological resource.

Mitigation Design Stages

9.8.5 The design and implementation of the archaeological mitigation works can be split into the following broad phases:

- following the completion of the archaeological evaluations, a brief for the archaeological works has been prepared by CCC;
- a review of the requirements of the brief prepared by the County Councils Principal Archaeologist will be conducted;
• detailed discussions with the County Council’s Principal Archaeologist and English Heritage, regarding the scope of the works contained in the brief before further archaeological works are designed and implemented;

• if, on the basis of the previous evaluations there is a high risk of further archaeological material being affected, further archaeological works (excavation/evaluation/watching brief) are likely to be required;

• following the completion of the archaeological fieldwork ‘post excavation works’ will be conducted, which will include a summary report, an assessment of findings, research, and publication of the findings.

**Site Specific Options Identified**

**9.8.6** The results from the archaeological evaluations, which focused on specific locations along the CGB route, identified that archaeological features from a diverse range of periods are present along the corridor.

**9.8.7** It should be noted that the archaeological evaluations by their nature only investigated a small sample of the area of each site. Therefore, there is the potential for archaeological remains that have not been previously identified to be present. However, the presence of such remains cannot reasonably be identified at this stage. If, during the execution of the proposed archaeological mitigation such remains were located, changes to the mitigation strategy would be made to respond to the new findings.

**Swavesey**

**9.8.8** The works undertaken at Swavesey (see Appendix 9B) located a range of archaeological features which may be associated with activity within the Priory or from other periods of activity. The works identified that, subject to detailed design, the depth of deposits present over the archaeological features may be sufficient to enable the preservation *in situ* of these. Within the CGB corridor the evaluation showed that up to 600mm of material was present over the archaeologically sensitive horizons and that the works as currently designed are not likely to impact on these.

**9.8.9** Detailed design will need to ensure preservation in situ of archaeological features at these locations. The implementation of a programme of detailed archaeological investigation in advance of construction would be required to preserve by record the archaeological resource that are present.

**9.8.10** In order to ensure that the area of the Scheduled Ancient Monument, which is concurrent with the south boundary of the Scheme, is not adversely affected by construction activity protection measures would be required to be implemented in advance of any construction related activity. These measures would require the agreement of English Heritage and would be incorporated into the CoCP.

**9.8.11** The evaluation undertaken at the access track east of Swavesey located only tree throws and a relatively modern linear feature probably a ditch. A watching brief during construction to investigate and record any archaeological features not identified during the evaluation would be implemented.

**Balancing Pond 1/Windmill Road Bridge Construction Site**

**9.8.12** The works undertaken at Balancing Pond 1/Windmill Bridge Construction Site showed that Bronze Age activity was present. The location of the palaeochannel has the potential to
provide palaeoenvironmental information. A watching brief during construction should be implemented to record and investigate archaeological features not located during the evaluation and the palaeochannel.

Longstanton Park and Ride

9.8.13 The evaluation at the Longstanton Park and Ride Site identified Bronze Age activity. Further archaeological works in the form of detailed excavation should focus on the Bronze Age pit/possible linear feature and the nearby ditches. A programme of trenching should also be undertaken to investigate the arrangement of the medieval land division. Outside of the areas of detailed excavation a watching brief should be implemented to investigate and record any archaeological resource that are present.

Construction Route 4

9.8.14 The results of the evaluation of Construction Route 4 showed a concentration of archaeological features. A programme of detailed archaeological investigation should be undertaken to investigate the features located during the evaluation. Areas not subject to detailed investigation should be subject to a watching brief during construction. The implementation of these works would preserve by record the archaeological resource present.

Balancing Pond 4

9.8.15 At Balancing Pond 4, further detailed archaeological mitigation in advance of construction would be required to preserve by record the archaeological resource present.

Site 10

9.8.16 The evaluation located unexpected human remains at Site 10 indicating the location of a previously unidentified Anglo-Saxon cemetery. Archaeological features were not located, except for a possible well, within the remainder of the area investigated. A strategy of preservation in situ of the area of the cemetery would be adopted. Over the remainder of the works in this area, a watching brief should be implemented during construction to investigate and record any archaeological remains that may be encountered. In preserving the archaeological resource the following design issues would be considered:

- construction methodologies to ensure that plant is kept off of areas stripped of topsoil;
- a suitable buffer would be retained between the level of significant archaeological remains and the depth of soil to be removed (300mm is considered to be a suitable minimum);
- to ensure that no damage to the archaeological resource occurs through compression, appropriate geotextile and materials would be used to raise the level of the ground;
- drainage works would be designed not to impact upon the level of archaeological sensitivity;
- any landscaping, including tree planting, would be designed to ensure no immediate or future impact on the archaeological horizons; and
- monitoring of all ground reduction works would be undertaken by a suitably qualified archaeologist to ensure that archaeologically sensitive horizons are not impacted upon during construction.
Balancing Pond 6

9.8.17 The archaeological evaluation at Balancing Pond 6 identified a low level of archaeological activity and two palaeochannels. Further archaeological mitigation, in the form of detailed excavation should be undertaken to investigate the palaeochannels to preserve by record the archaeological resources present.

Arbury Park

9.8.18 Previous archaeological works within this part of the CGB route have identified extensive multi-period archaeological remains including Arbury Camp which is located to the north of the corridor. Further archaeological mitigation in the form of detailed archaeological excavation in the area between King’s Hedges Road to the south and the existing railway line where it is adjacent to the Cambridge Regional College to the north. A watching brief where detailed excavation is not undertaken, should be implemented. These works would preserve by record the archaeological remains that are present.

Balancing Pond 7

9.8.19 At Balancing Pond 7, archaeological excavation should be undertaken in advance of construction to preserve by record the archaeological resources present.

Long Road Construction Site

9.8.20 No significant archaeological features were located during the archaeological evaluation at Long Road Construction Site. However, due to the sample size adopted for the evaluation and the proximity of cropmark complexes there is the potential for archaeological resources to be present on the site. Further archaeological mitigation consisting of archaeological excavation should be implemented in advance of construction to preserve by record the archaeological remains present.

Balancing Pond 8

9.8.21 Archaeological excavation of the area should be implemented prior to construction to preserve by record the archaeological features present.

Balancing Pond 9

9.8.22 Archaeological excavation should be implemented in advance of construction to preserve by record the archaeological resource.

Addenbrooke’s Link

9.8.23 The Addenbrooke’s Link evaluation located extensive archaeological remains which is consistent with previous works in the areas which have identified extensive multi-period occupation. To the west of the existing Cambridge to London railway line, the evaluation located dispersed archaeological features with some of the trenches containing no archaeological remains. To the east of the railway line extensive and intensive archaeological features. A programme of detailed archaeological mitigation would be required in advance of construction to investigate and record the archaeological remains present. Within those areas where detailed excavation is not undertaken a watching brief during construction should be implemented to record any archaeological remains that may be present. In developing the detailed design of the archaeological mitigation preservation in situ of the archaeological resource should be considered particularly in those areas where the evaluation identified a considerable depth of overburden covering the archaeological remains.
Shelford Road Construction Site

9.8.24 A programme of archaeological excavation in advance of construction should be implemented to preserve by record the archaeological resources present.

Route Wide Mitigation

9.8.25 For those parts of the Scheme where the existing highway is to be utilised the Scheme would not impact on archaeological resources and mitigation would not generally be required. In some areas of recognised high archaeological potential, a watching brief would be implemented in accordance with the Institute of Field Archaeologists Standard and guidance for archaeological watching brief (1994)ii.

9.8.26 Within those parts of the CGB route where previous works have resulted in the destruction of the archaeological resource no further archaeological mitigation would be required. These include the areas of cutting and within the areas of mineral extraction in the St. Ives/Huntingdon area. The evaluation within the disused railway corridor at Swavesey showed that construction of the railway track bed at this location is likely to have buried any archaeological remains that may be present.

9.8.27 In other areas, except those described above which relate to specific locations along the CGB route, there is the potential for archaeological remains to be present. In these areas the design and implementation of a route-wide watching brief and a programme of archaeological mitigation would need to be considered in relation to the scale of the works and the archaeological potential.

9.9 Residual Effects

9.9.1 Archaeological resources that are located within the footprint of the CGB, including both temporary and permanent works, would be subject to a programme of archaeological mitigation measures including further investigation and documentation, or preservation in situ. Providing the mitigation measures specified above are implemented, the effects of the Scheme would be minor adverse.

9.9.2 Consultations to further develop a detailed programme of archaeological mitigation would be undertaken with the County Council’s Principal Archaeologist and English Heritage.

9.9.3 Within those parts of the Scheme where preservation in situ of the permanent works has been achieved, the archaeological resource would form a long term feature.
Appendices

Appendix 9 A  Known Archaeological Sites and Finds
Appendix 9 B  Archaeological Evaluation Sites
Appendix 9 C  Sites and Monuments Record Data
References

1 Monitoring of Archaeological Excavations, Model Specification Archaeological guidance paper 6, English Heritage, 1992
2 Institute of Field Archaeologists Standard and guidance for archaeological watching brief (1994 Revised September 2001)
### Summary of Archaeological Impacts

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>NW of Cambridge</td>
<td>Minor landtake for carriageway widening on the extant highway corridor - Huntingdon to St Ives</td>
<td>Minor –ve in areas of high archaeological potential</td>
<td>Archaeological watching brief</td>
<td>Mitigation would compensate for the loss of the archaeological resource</td>
<td>Minor -ve</td>
</tr>
<tr>
<td></td>
<td>The general works within the extant corridor, St Ives to A14, apart from Swavesey</td>
<td>None</td>
<td>Archaeological watching brief as required</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The works in extended lateral corridor</td>
<td>Minor –ve in areas of high archaeological potential</td>
<td>Archaeological watching brief</td>
<td>Mitigation would compensate for the loss of the archaeological resource</td>
<td>Minor -ve</td>
</tr>
<tr>
<td></td>
<td>Balancing Ponds</td>
<td>Minor -ve</td>
<td>Implementation of a programme of archaeological works either in advance of or during construction</td>
<td>Mitigation would compensate for the loss of the archaeological resource</td>
<td>Minor -ve</td>
</tr>
<tr>
<td></td>
<td>Outfall Sites</td>
<td>Minor –ve in areas of high archaeological potential</td>
<td>Archaeological watching brief</td>
<td>Mitigation would compensate for the loss of the archaeological resource</td>
<td>Minor -ve</td>
</tr>
<tr>
<td></td>
<td>Access Roads</td>
<td>Moderate -ve</td>
<td>Implementation of a programme of archaeological works either in advance of or during construction</td>
<td>As above</td>
<td>Minor -ve</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact in words</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------------------------</td>
<td>-----------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>St. Ives Park and Ride</td>
<td>None required</td>
<td>Negligible</td>
<td>None required</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Swavesey</td>
<td>Potential moderate to major -ve (depending on depth of works)</td>
<td>Moderate -ve</td>
<td>Implementation of a programme of archaeological works either in advance of or during construction</td>
<td>In situ preservation of the archaeological remains would form a long term feature</td>
<td></td>
</tr>
<tr>
<td>Longstanton Park and Ride</td>
<td>None required</td>
<td>Negligible</td>
<td>None required</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Histon and Impington Stop</td>
<td>None required</td>
<td>Negligible</td>
<td>Preservation in situ of Archaeological remains</td>
<td>In situ preservation of the archaeological remains would form a long term feature</td>
<td></td>
</tr>
<tr>
<td>Site 10</td>
<td>None required</td>
<td>Moderate</td>
<td>Implementation of a programme of archaeological works either in advance of or during construction</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Construction Sites</td>
<td>None required</td>
<td>Moderate</td>
<td>Implementation of a programme of archaeological works either in advance of or during construction</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Landscaping</td>
<td>None required</td>
<td>Negligible</td>
<td>None required</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Cambridge City</td>
<td>Negligible or slight in areas of high archaeological potential</td>
<td>Moderate</td>
<td>Archaelogical watching brief in areas of high archaeological potential</td>
<td>Mitigation would compensate for the loss of the archaeological resource.</td>
<td></td>
</tr>
</tbody>
</table>

**Section 9 – Archaeology**

**Description of impact**

**Description of residual impact (assuming mitigation implemented)**

**Characteristics**

Negligible, Minor, Moderate, Major, +ve, -ve, D, I, S, C, SF, MT, LT, P, T.
### Section 9 – Archaeology

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short description in words</strong></td>
<td><strong>Characteristics</strong></td>
<td><strong>Short description in words</strong></td>
<td><strong>Characteristics</strong></td>
</tr>
<tr>
<td><strong>Negligible, Minor, Moderate, Major</strong></td>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td></td>
<td>Negligible, Minor, Moderate, Major</td>
</tr>
<tr>
<td>Minor Road Works and lighting</td>
<td>Negligible</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>South of Cambridge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within extant railway corridor</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Addenbrooke’s new access road and over bridge</td>
<td>Major -ve</td>
<td>Implementation of a programme of</td>
<td>Mitigation would compensate for the loss of the archaeological</td>
</tr>
<tr>
<td></td>
<td></td>
<td>archaeological works either</td>
<td>resource.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in advance of or during</td>
<td>Minor -ve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>construction</td>
<td></td>
</tr>
<tr>
<td>Balancing ponds</td>
<td>Slight -ve</td>
<td>Archaeological watching</td>
<td>Minor -ve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>brief during construction</td>
<td></td>
</tr>
<tr>
<td>Construction sites</td>
<td>Slight -ve</td>
<td>Archaeological watching</td>
<td>Minor -ve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>brief during construction</td>
<td></td>
</tr>
</tbody>
</table>

Note: Abbreviations are as follows
+ve = positive, -ve = negative, D = direct, I = indirect, S = Secondary, C = cumulative, ST = short-term, MT = medium-term, LT = long-term, P = permanent, T = temporary.
Abbreviations can be used in any viable combination, i.e. avoiding contradictions.
10. **BUILT HERITAGE**

10.1 **Introduction**

10.1.1 This section of the Environmental Statement (ES) assesses the potential impacts of the Cambridgeshire Guided Busway (CGB) Scheme on built heritage, which can include buildings, structures, bridges, hard landscaping and above ground ruins.

10.1.2 Impacts on the built heritage assessed in this section concern potential physical effects on the built heritage within the urban and rural settings of the proposed CGB route. The possible effects concern loss or damage arising from the design or construction of the Scheme, including demolition or alteration to an element recognised as being of heritage value. It also includes potential long-term physical changes that the Scheme could cause. Air Quality issues are addressed in Section 8, visual and landscape impacts on the urban and rural built heritage are addressed in Section 13 of the ES and Noise and Vibration issues are addressed in Section 14.

10.2 **Review of Development Proposals**

10.2.1 The Scheme passes through some landscapes and townscapes of significant heritage value. There are numerous listed buildings and conservation areas, particularly within the historic core of Cambridge as well as the centres of St Ives and Huntingdon. Some villages near to the route are designated as conservation areas and also contain listed buildings. These designated features are identified in the plans in Appendix 6A.

10.2.2 Most of the route from St. Ives to Cambridge and from Cambridge Railway Station to Trumpington Park and Ride would utilise the disused railway corridors. Most of the original railway infrastructure has decayed or been removed but there are many remnant features of the railway that are still of local heritage interest. Some of the more important artefacts of heritage interest could be disposed of to accredited heritage organisations.

10.2.3 On other sections of the route, between Huntingdon and St Ives and through Cambridge, the CGB buses would run on normal roads, which would require some limited widening works in places, to allow for new bus lanes.

10.3 **Methodology**

10.3.1 The assessment of impact on built heritage is reported differently from other sections of the ES. The assessment is based on two areas, where the nature of impacts would differ. These are:

10.3.2 **On street route**, broken down for the Huntingdon to St Ives sections and the sections through Cambridge City,

10.3.3 **The guided section of the route**, principally through more open and rural areas.

10.3.4 The built heritage study has involved the following main processes and stages:

- **Collection and collation of data** and identification of those resources that would be affected within the short or long term. The principal data was obtained from the Department of Culture Media and Sport’s lists of listed buildings and historic maps. Information from this list has informed the summary of built heritage resources along the route, as summarised in Appendix 10A. In addition information from development plans of local planning authorities and from the
databases and maps held by those authorities along the route has been assembled to identify conservation areas and locally important (unlisted) built heritage features; 

- **Assessment of impacts on the built heritage.** The assessment involved identifying the effects (principally the proposed works associated with the Scheme) that could result in an impact on a built heritage resource.

- **Consideration of mitigation** or measures that minimise effects, that could be either an engineering design response or a resource protective measure.

### Summary of Terms

10.3.5 In this section the following terms are used:

- **‘Built Heritage’** - the upstanding physical resources resulting from construction. The term incorporates aspects relating to design, materials, construction, functions and historical associations. For the Scheme the resources can include buildings, walls, bridges, platforms, roads, rail tracks, street furniture, and hard landscaping.

- **‘Effects’** - the potential physical effects of the works on buildings and structures.

- **‘Impacts’** – the significance of the effects on the built heritage resource, described with terms such as major, minor, beneficial, adverse, as well as strategic and cumulative.

- **‘Robust’ and ‘Sensitive’** - terms applied here to the very general structural character of the built resources, made from the listed buildings database and field observations. This takes account of materials, the type of structure, major modifications, and past major changes of use. It has not been necessary for this assessment to undertake detailed inspection to fully appreciate structural and fabric condition and building parameters.

### Definition of an Effect Scale

The type of effects that may arise from the on road sections of the route and the guided section of the route are described in more detail within the impact assessment sub-sections. The significance criteria in Table 10.1 have been used to assess the significance of impacts.

#### Table 10.1 Significance Criteria for Built Heritage Issues

<table>
<thead>
<tr>
<th><strong>Severe Adverse</strong></th>
<th>Damage or Demolition of a Grade I or Grade II* Listed Building. Land take or damage resulting in the loss of integrity of a cultural heritage site of national importance. The resulting loss of integrity could involve a dramatic change in the setting or visual amenity of the feature/site.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major Adverse</strong></td>
<td>Extensive damage to the value of a Conservation Area, or extensive change to the setting of a Grade I or Grade II* Listed Building. Demolition of a Grade II Listed Building.</td>
</tr>
<tr>
<td><strong>Moderate Adverse</strong></td>
<td>Extensive change to the setting of a Grade II Listed Building. Encroachment upon a Conservation Area, historic parkland or other historic landscapes where the quality of the setting or its amenity would be noticeably impaired.</td>
</tr>
<tr>
<td><strong>Minor Adverse</strong></td>
<td>Slight change to the setting of a Grade II* II Listed Building. Encroachment upon a Conservation Area or historic parkland, but where no intrusive views are created or affects upon its integrity would result.</td>
</tr>
<tr>
<td><strong>Minor Beneficial</strong></td>
<td>Perceptible improvement in the setting of a Listed Building, Conservation Area or historic parkland or other historic features or structures.</td>
</tr>
</tbody>
</table>
10.3.6 The impacts may be of a direct character, whereby the Scheme involves engineering works on the fabric or structure of the resources, or indirect, where works take place nearby and affect the setting or cause subsequent slowly occurring changes. Such effects could be caused by shaking of the buildings from vibrations passing through the ground and air, and/or, from chemical interaction with the fabric derived from air-borne pollutants. Impacts can be single, cumulative or of a strategic importance.

10.4 Limitations, Constraints and Assumptions

10.4.1 In compiling the assessment it has been assumed that:

- The Scheme would support the County’s strategy (see Section 16 – Transport and Access) to remove unnecessary through traffic from the centre of Cambridge.

- On existing roads there would only be local ground penetration for construction of foundations at stops, where there would be canopies and other facilities.

10.5 Baseline

Introduction

10.5.1 A summary of the listed buildings along the route is described in Appendix 10A and summarized below. The Landscape and Visual Section (Section 13) also provides further details on the setting and key visual attributes of listed buildings and conservation areas.

10.5.2 In the Huntingdon to St. Ives section and within Cambridge City sections of the route, the built heritage resources are assumed to be those immediately bordering the roads along which the CGB buses would run. This excludes buildings off-set from roads, for example behind street fronting buildings or separated from the road by extensive gardens/grounds.

10.5.3 In the guideway sections, the resources include the remains of the railways themselves, individual buildings, clusters of buildings, and villages. For the purpose of this section, apart from the remains of the railways, including the Ouse Railway Viaduct and Histon Station, most of the built heritage resources lie at some distance from the CGB route and are not directly affected. Therefore they have not been separately identified in this section. However there are conservation areas which are situated along the CGB route and impacts on these designated features have been considered.

The On-Street Sections

Huntingdon to St Ives

10.5.4 This section extends from Hinchingbrooke Hospital to the St Ives Park and Ride site. Throughout this section the buses would run along the existing highway although some localised widening of the existing carriageway would be required on the Huntingdon Ring Road, on the south side of the B1514 Hartford Road and two sections of the A1123 Huntingdon Road/Houghton Road.

10.5.5 There is a diversity of heritage resources within this section. The route passes through the historic core of Huntingdon, passing close to a number of sites of historic importance, including Huntingdon Castle and Scheduled Ancient Monuments of upstanding remains and structures. Within St Ives the CGB route passes through the historic core of the town where there are a number of listed buildings along the line of the route.
10.5.6 The route passes through four conservation areas within this section as shown on the drawings in Appendix 6A. The conservation areas comprise (from west to east):

- Huntingdon Conservation Area 3. This conservation area is made up of two parcels and contains a considerable number of listed buildings, including at the southern limit of the area Huntingdon Castle which is a Scheduled Ancient Monument as well as two other monuments of the same statutory designation. The conservation area corresponds with the historic core of Huntingdon.

- Hartford Conservation Area 30. This conservation area contains eight listed buildings.

- Houghton and Wyton Conservation Area 8. This conservation area includes a large number of listed buildings.

- St Ives Conservation Area 4. This is an extensive conservation area that encompasses the urban setting and rural areas to the north of the River Great Ouse, as well as Hemingford Meadow to the south of the river. Within the Conservation Area listed buildings and Scheduled Ancient Monuments are present.

**City of Cambridge**

10.5.7 This part of the Scheme follows the existing highways. This section of the route has been described in terms of Modern and Historic Cambridge, reflecting the difference in character of the built heritage resources within these parts of the city.

10.5.8 **Modern Cambridge** comprises the urban landscape beyond the historic core area. It is substantially developed with 18th and 19th Century buildings fronting the arterial roads and with extensive areas of 19th and 20th Century domestic, commercial and light industrial infill. Areas of modern Cambridge to the south of the historic core are considered important in a historical context and therefore are within the City of Cambridge Conservation Area.

10.5.9 **Historic Cambridge** comprises the internationally important historic core of Cambridge, that extends from Castle Street/Victoria Road junction in the north to the south corner of Parker’s Piece in the south. The historic core area includes extant and former buildings of Roman, Late Saxon, Medieval and Post Medieval periods. Given the large numbers of built heritage resources, a number of which are of international value, the whole core area is part of the City of Cambridge Conservation Area. The Conservation Area extends beyond the Core taking in substantial areas that have been more recently developed.

10.5.10 The majority of Cambridge’s listed buildings are contained with the City of Cambridge Conservation Area, where the historic buildings and their setting as well as the landscape (both hard and soft) and street furniture all contribute to the character and heritage value of this conservation area.

10.5.11 There are a substantial numbers of listed buildings (see Appendix 10A), mostly of a grade II category, but with notable grade 1 buildings (along Jesus Lane) and grade II* buildings on Castle Street, Emmanuel Road, Magdalene Street and Huntingdon Road. The CGB would run past these buildings on these streets. Many of the listed buildings are not only of individual value but have a group value. These buildings are generally church buildings, college buildings, and more recent buildings with stone and brick load-bearing structures. General experience shows these normally have stone and brick footings founded at depth on soils of reasonable engineering performance, and therefore are robust.

10.5.12 Some church and college buildings and structures have a Medieval origin but have often
undergone considerable transformation, responding to decay and upgrading to new fashions. Poorly executed foundations, architectural detailing/ornamentation and stained glass windows can result in a less than robust situation.

10.5.13 Along Castle Street, Magdalene Street and Bridge Street there are significant numbers of commercial buildings constructed with timber frames. With the exception of the colleges these are the oldest buildings of historic Cambridge. These buildings are characterised by having original lath and plaster or later brick infill panels. Many have much later inserted shop fronts and other modernised street fronting facades. Often the modernising works have responded to distortion and decay of the wood frames and sill beams and for this reason this type of building is classed as sensitive.

The Guideway Sections

10.5.14 On both sides of the disused route from St Ives to North Cambridge, are villages and hamlets of Late Saxon –Medieval origin containing listed buildings. The centres of these villages and hamlets are often designated as conservation areas. There are no buildings or ruins of pre-Medieval age.

10.5.15 The CGB Limits of Deviation fall partly within two conservation areas, at Swavesey and Westwick. The Swavesey Conservation Area extends to take in the Swavesey Scheduled Ancient Monument (SAM), Castle Hill Earth SAM, St Andrews Church and the centre of Swavesey. The Limits of Deviation of the Scheme take in a small length of Station Road. At Westwick Conservation Area the centre line of the CGB route co-incides with the boundary of the Conservation Area. This conservation area extends to the east to take in the Manor House and grounds as well as the hamlet of Westwick.

10.5.16 The disused railway corridors contain many extant remains of the railways and railway installations, such as rails, sleepers, platforms, bridges, crossing gates etc. Railway houses at former station stops also remain, at Longstanton, Oakington and Histon & Impington. These remains are regarded as of some local interest, particularly the houses.

10.6 Consultation

10.6.1 In compiling this Section consultation has been undertaken with English Heritage in relation to Scheduled Ancient Monuments, Conservation Areas and listed buildings. Additionally, comments relating to listed buildings and Conservation Areas have also been received from the District Councils.

10.7 Relevant Policy and Guidance

10.7.1 The Scheme crosses several district boundaries where policies on the built environment are contained in the Local Plans of the District Authorities and the County’s Cambridgeshire and Peterborough Structure Plan. National policy (Planning Policy Guidance), in particular PPG 15, provides policy guidance with respect to the historic environment. Details on relevant planning policy and guidance for this section is contained in the Planning Policy Section (Section 6).

10.8 Impact Assessment

10.8.1 The built heritage impacts associated with the on street and guideway elements are assessed separately. For the guideway sections, the Scheme involves major engineering works, whilst in general, the on-street sections would only give rise to direct impacts where carriageway widening or other minor alteration works are required.
On-Street Sections (Huntingdon to St Ives and Cambridge City)

10.8.2 The precise location and extent of ground works for the Scheme would be defined at the detailed design stage. However general assumptions can be made about potential effects within the roads and adjacent land as described in Table 10.2.

**Table 10.2 – Character of potential effects along on-street sections**

<table>
<thead>
<tr>
<th>Direct Effects</th>
<th>Character of Effect</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road widening works</td>
<td>Excavation of ground surface and laying of engineered fill and tarmac surfacing; excavation of new roadside drains</td>
<td>Potential direct effects on heritage resources by demolition works if required or works affecting the setting of listed buildings. There are no listed buildings in the vicinity of the proposed road widening works</td>
</tr>
<tr>
<td>Relaying of footway and road surfaces</td>
<td>Very shallow excavation within the ground</td>
<td>Within modern soil formations. There would be local interface of pavement with known built heritage features</td>
</tr>
<tr>
<td>Pad and strip foundations for facilities associated with the CGB stops</td>
<td>Shallow to moderate depth, depending on engineering soil parameters</td>
<td>Potential local penetration to below levels of modern soils. No structural interaction necessary between new facilities and heritage resources</td>
</tr>
<tr>
<td>Superstructures of facilities and street furniture</td>
<td>Detailed designs to be developed in the future</td>
<td>Architectural designs to be compatible with adjacent and close by built heritage resources. No structural interaction necessary between new facilities and heritage resources</td>
</tr>
</tbody>
</table>

**Indirect effects**

<table>
<thead>
<tr>
<th>Character of Effect</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibration from CGB vehicles</td>
<td>Potential effects on buildings and structures</td>
</tr>
<tr>
<td>Air emissions from CGB vehicles</td>
<td>Potential effects on buildings and structures</td>
</tr>
</tbody>
</table>

**Temporary effects**

<table>
<thead>
<tr>
<th>Character of Effect</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibration from construction plant</td>
<td>Potential effects on buildings and structures</td>
</tr>
<tr>
<td>Air emissions from construction plant</td>
<td>Potential effects on buildings and structures</td>
</tr>
</tbody>
</table>
10.8.3 Table 10.2 shows that there are no direct effects on the structure or fabric of listed buildings and other buildings/structures of notable built heritage value, associated with the works or the operation of the Scheme for the on-street sections. For instance within the Huntingdon to St. Ives and Cambridge sections of the route there would be some localised widening of the existing carriageway as well as the reopening of the Old Houghton road, but neither of these activities would impact on the built heritage resources.

10.8.4 For the Scheme in Cambridge, at Castle Street, Drummer Street, St Andrews Street and Cambridge Railway Station stops there may be minor works associated with construction of the stops and adjusting the road and pavement alignment. These stops lie within or close to the City of Cambridge Conservation Area and some minor indirect adverse impacts may arise from their construction, if they are not sensitively designed to respect the character of the historic environment. The potential visual impacts of these stops, including any potential impact on the visual setting of listed buildings are considered in Section 13 of this ES. Castle Street Stop, although close to the Scheduled Ancient Monument, would not affect the monument and would not require Scheduled Ancient Monument Consent.

10.8.5 Minor road widening works are proposed at Christ’s Pieces, opposite the proposed Drummer Street CGB stop. However, the extent of the works proposed is very limited and would not have any significant impact on the built heritage resources of this area.

10.8.6 Within the on-street sections of the route between Huntingdon and St Ives and within the City of Cambridge existing car, bus, and lorry traffic generate vibration and pollutants which can adversely impact on the built heritage value of these areas. It has been assessed that impacts of this type arising from the Scheme would be negligible given the relatively small numbers of CGB buses, in relation to the overall volumes of traffic using the highways in these areas (also see Sections 8, 14 and 16). The Scheme is more likely to give rise to a beneficial indirect cumulative impact resulting from a reduction in traffic and congestion in the town and city centres, in conjunction with other transport initiatives proposed.

10.8.7 Any potential impacts during construction would be dealt with by procedures to be contained within the Code of Construction Practice (CoCP) and have been assessed to be not significant.

**Guideway Sections**

10.8.8 The proposed works and land take for the Scheme are described in Section 4 and have provided the basis to predict the impacts to built heritage resources. These are summarised in Table 10.3.

<table>
<thead>
<tr>
<th>Table 10.3 – Character of Potential Effects along guideway sections</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effects</strong></td>
</tr>
<tr>
<td>Direct effects</td>
</tr>
<tr>
<td>New track at grade</td>
</tr>
<tr>
<td>Widening of existing cuttings</td>
</tr>
<tr>
<td>Remodelling of embankment including culverts and small bridges</td>
</tr>
<tr>
<td>New structure on existing embankment</td>
</tr>
<tr>
<td>Effects</td>
</tr>
<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Repair and new bridge construction</td>
</tr>
<tr>
<td>Forming of lateral drainage</td>
</tr>
<tr>
<td>New balancing ponds</td>
</tr>
<tr>
<td>Forming of new road crossings</td>
</tr>
<tr>
<td>Creation of new car park</td>
</tr>
<tr>
<td>Provision of access roads and maintenance track</td>
</tr>
<tr>
<td>Formation of park and ride and kiss and ride sites</td>
</tr>
<tr>
<td>Demolition of or alteration of extant buildings</td>
</tr>
</tbody>
</table>

**Indirect effects**

- Landscaping: See Section 13
- Vibration: See Section 14
- Air pollution: See Section 8

**Temporary effects**

- Construction vibration: See Section 14
- Construction dust: See Section 8

**10.8.9** Within the guideway sections, particular consideration has been given to three locations where the works may impact on designated sites or features of local heritage interest:

- Swavesey Conservation Area;
- Windmill Bridge;
- Westwick Conservation Area; and
- Histon & Impington Station Building.

**10.8.10** At Swavesey the works involve the construction of the guideway, construction of a stop and a kiss and ride site and associated improvements to the highway. It is only the highway works along a short section of Station Road, to the west of the route that falls within the Swavesey Conservation Area. For the remainder of the Conservation Area the southern limits of the land to be acquired for the works adjoin the northern limits of the Conservation Area. The landscape and visual impacts of the CGB works are assessed further in the Visual and Landscape Section (Section 13), although with respect to the significance criteria of this section of the ES the impacts on the Conservation Area have been assessed to be minor adverse. The impacts of the CGB works on the SAM of Swavesey Priory are considered in the Archaeology Section (Section 9) of this ES.
10.8.11 At Oakington, the centre line of the CGB route coincides with the western boundary of the Westwick Conservation Area, and would impact on the parkland setting of the historic Manor House (which is also Grade II listed). The CGB works in this area would be carried out within the disused railway line corridor and are not considered to affect buildings or structures of importance in terms of the Conservation Area designation. However there are some effects in terms of landscape and visual setting and these have been addressed in the Visual and Landscape Section (see section 13). With respect to the significance criteria of this section of the ES the impacts on the Setting of the Conservation Area have been assessed to be minor adverse.

10.8.12 The demolition of the existing Windmill Bridge on Longstanton Road and its replacement with a new structure has been assessed to be a minor adverse impacts.

10.8.13 The proposed construction of a car park at Histon & Impington Stop would require the demolition of the former railway station building. Although not listed, the building is regarded as of local importance and the canopy of this building is managed by Histon and Impington Parish Council. This has also been assessed to be a minor adverse impact.

10.8.14 A beneficial minor impact would result to the River Great Ouse Viaduct and its related embankments by their reuse, with conservation and maintenance during operation, which would aid their long-term preservation and use.

10.8.15 In addition, the works would involve the removal of the former railway furniture which has also been assessed to be a minor adverse impact.

10.9 Mitigation Measures

On Street Sections

10.9.1 Within the Huntingdon to St Ives section of the CGB route, no direct impacts on built heritage resources have been identified and mitigation is therefore not required.

10.9.2 Within the City of Cambridge sections no significant direct adverse impacts on built heritage resources have been identified and no mitigation is required, although some indirect impacts have been assessed to arise from the construction of stops and street furniture. These impacts are considered at worst to be minor and can be mitigated by careful design that respects the settings of heritage features. The mitigation measures should aim to keep and enhance the character of the built heritage. Section 13 of this ES deals with townscape and visual impacts and provides further details on appropriate mitigation measures.

Guideway Sections

10.9.3 The following mitigation measures are proposed in response to the near total removal of railway heritage features within the disused rail corridor:

- full identification of resources during the process of detailed Scheme design and during the preparation of the site for construction;
- implementation of a mitigation strategy including documentation of the heritage resources, and the compilation of written, graphic and photographic records to accord with the standards for such works as defined by the Royal Commission on Historic Monuments England (RCHME) standards and Local Authority requirements;
- the salvage and storage of items that have a heritage interest to the CGB and local museums;
- the offering of heritage items to local railway interest groups and railway enthusiasts, where the items have no value to the Scheme or local museums;
- documentation of items and features uncovered from time to time during the construction of the new facilities.

10.9.4 The main salvage items may be crossing gates and fence posts. From time to time other track furniture may be encountered.

10.9.5 Mitigation measures, associated with the approach to landscaping and design, where the route affects the conservation areas of Swavesey and Westwick are described in the Visual and Landscape Section (Section 13).

10.10 Residual Impacts

On-Street Sections

10.10.1 The residual direct impacts from these sections of the Scheme once mitigation measures have been taken on board are considered to be negligible.

Guideway Sections

10.10.2 Residual direct impacts would result from the loss of some of the railway heritage resources, such as the station building at Histon & Impington Stop and Windmill Bridge, which would be totally removed by the Scheme. Even after mitigation this is considered to result in a residual minor adverse impact on the built heritage. Other impacts on the built heritage resource have been assessed to be of negligible significance following mitigation.

10.10.3 At Swavesey Conservation Area it has been assessed that the residual impact on the setting of this area having taken on board the mitigation measure, outlined in Section 13 would still be minor adverse. At Westwick Conservation Area the residual impact on the setting of this area having taken on board the mitigation measures, outlined in Section 13, have been assessed to be negligible.

10.10.4 There would be a long-term beneficial residual effect to the River Great Ouse Viaduct as this would be maintained to engineering standards required for use as an essential transport facility. This is considered as a residual beneficial impact of minor significance.
Appendices

Appendix 10A  Summary of Built Heritage Resources
## Summary of Built Heritage Impacts

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built Heritage – On-Street</td>
<td>Potential minor impacts associated with stops in historic areas</td>
<td>Minor –ve</td>
<td>High quality of design to respond to character of area</td>
<td>No impact if mitigation measures are implemented</td>
<td>Negligible</td>
</tr>
<tr>
<td>Built Heritage – Guideway</td>
<td>Works would remove the remaining traces of the heritage resource relating to the former railway line</td>
<td>Minor -ve</td>
<td>Full identification and documentation of the resource and the reuse of items as far as possible</td>
<td>The use of the River Great Ouse bridge would provide long term beneficial effects</td>
<td>Negligible</td>
</tr>
<tr>
<td>Structures</td>
<td>Demolition of the Railway Station at Histon &amp; Impington</td>
<td>Minor -ve</td>
<td>Implementation of a programme of recording in advance of the demolition of these structures</td>
<td>Permanent loss of historic building and structure</td>
<td>Minor –ve</td>
</tr>
<tr>
<td></td>
<td>Demolition of Windmill Bridge</td>
<td>Minor –ve</td>
<td>Implementation of a programme of recording in advance of the demolition of these structures</td>
<td>Permanent loss of historic building and structure</td>
<td>Minor –ve</td>
</tr>
<tr>
<td>Conservation Areas</td>
<td>Swavesey Conservation Area</td>
<td>Impact on setting from the guideway and associated highway works</td>
<td>Landscaping design measures (see Section 13)</td>
<td>Minor residual impact on setting</td>
<td>Minor -ve</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------</td>
<td>---------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservation Areas</td>
<td>Westwick Conservation Area</td>
<td>Impact on setting from the guideway and stop structures and removal of landscaping</td>
<td>Landscaping design measures (see Section 13)</td>
<td>Negligible residual impact on setting</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

Note: Abbreviations are as follows

+ve = positive, -ve = negative, D = direct, I = indirect, S = Secondary, C = cumulative, ST = short-term, MT = medium-term, LT = long-term, P = permanent, T = temporary, Abbreviations can be used in any viable combination, i.e. avoiding contradictions.
11. ECOLOGY

11.1 Introduction

11.1.1 This section of the Environmental Statement (ES) describes the effects of the proposed Cambridgeshire Guided Busway (CGB) Scheme on ecological resources.

11.1.2 This section is structured as follows:

- Following this introduction, Section 11.2 presents a description of the methodology that has been used in the assessment of ecological resources. Scheme-specific significance criteria, on which the assessment has been based, are defined, and limitations, constraints and assumptions are noted.
- Baseline data for the route are presented in Section 11.3 and the existing conditions are described along the length of the route. The outcome of consultations are also presented in this section.
- Details of consultations carried out are presented in Section 11.4.
- A review of the Biodiversity Action Plan for Cambridgeshire is described in Section 11.5.
- Section 11.6 presents the assessment of the likely effects of the Scheme on ecological resources. This includes a description of the anticipated effects of the Scheme, and assessment of the significance of these impacts according to the Scheme-specific significance criteria.
- Mitigation measures designed to reduce the impact of adverse effects, and enhancement measures to promote ecological resources, proposed to be included within the completed Scheme, are described in Section 11.7.
- Section 11.8 presents an assessment of the residual impacts of the Scheme on ecological resources, following application of the recommended mitigation.
- Section 11.9 contains a brief summary of this section which is followed by a table summarising the likely impacts and effects of the Scheme, proposed mitigation measures and residual impacts. Within this summary table, designated sites and protected species which would be affected by the Scheme have been highlighted.

11.2 Methodology

Baseline Data Collection

11.2.1 Information on ecological resources has been obtained from the following sources:

- data gathered through review of existing information available in publications, reports and from the Internet;
- consultations with statutory and non-statutory bodies with responsibility for nature conservation issues;
- original surveys; and
- aerial photographs.

11.2.2 Data obtained includes that previously gathered by consultations and survey work undertaken.
during 2002 for the superCAM proposal. These data broadly cover that part of the route from St Ives to Trumpington. The findings of the surveys previously undertaken form a significant proportion of the baseline survey data collated for the current Scheme, as the route of the current proposal includes the entirety of that included within the previous proposal.

11.2.3 Additional baseline information has been obtained from WSP Environmental in respect of ecological survey work which they have been undertaking in the Longstanton area. These data include the findings of ecological surveys undertaken in respect of badgers, reptiles, water voles and otters.

11.2.4 More recent consultations have been undertaken and additional information has been acquired from the following organisations:

- English Nature
- The Wildlife Trust for Cambridgeshire
- Cambridgeshire County Council
- Cambridgeshire Badger and Otter Group

11.2.5 New field surveys have been carried out during July, August and September 2003 to verify the condition of existing ecological resources along the length of the Scheme, to update previous survey data, to provide new information for those sections of the route not previously surveyed, and to provide further detail in respect of protected species potentially present along various parts of the Scheme.

11.2.6 Surveys undertaken in the preparation of this Environmental Statement (including those carried out during 2001 and 2002) have covered those issues where significant potential exists for the Scheme to adversely affect ecological resources. These surveys include:

- Extended Phase 1 Habitat Surveys;
- Survey of birds present along the length of the route;
- Bat surveys;
- Badger surveys;
- Water vole surveys;
- Reptile surveys;
- Great crested newt surveys;
- Invertebrate surveys.

11.2.7 Extended Phase 1 Habitat Surveys were undertaken based on the standard methodology according to the Joint Nature Conservation Committee’s (JNCC) guidelines. A survey of the length of the disused railway between St. Ives and Trumpington was carried out in July and August 2001. A further survey was undertaken of the Scheme during July, August and September 2003. The surveys included the CGB route itself up to and including the limits of deviation (LOD) for the Scheme, in addition to land extending immediately either side of the LODs where possible in order to cover all areas which may be affected, and to characterize and inform the context of the habitats present. The Phase I Surveys undertaken included an assessment of birds present along the length of the route.

11.2.8 Maps showing the findings of the Phase 1 Habitat Surveys are presented in Appendix 11A (Figures 1-20), and in addition a set of key plans is included to illustrate the sections of the
route covered by each figure. The Phase 1 Habitat plans show the disused railway track-bed highlighted in grey. This is not a standard JNCC classification, but has been applied to the track-bed, which includes a variety of habitat types, which were not possible to mark individually on the plans. These habitats include areas of bare ground, short ephemeral and perennial vegetation, areas of grassland, and tall herbas and ruderal species. Areas of scrub and hedgerow have been marked separately.

11.2.9 The target notes (as indicated in Appendix 11B) refer to those areas along the route which were used as markers for describing the route and habitats present, in addition to referring to some particular features of note. Target notes have not been used in the traditional sense (ie: referring to all features and species of note) due to the extensive area covered, and the number of features which would require such notes. The features and species have been described fully within the text. Maps showing the locations of the accompanying target notes are presented in Appendix 11B. Additionally, the results of protected species surveys are presented in Appendix 11C.

11.2.10 Information pertaining to badger surveys is located within a separately bound appendix for confidentiality reasons (Appendix X). A full report detailing the methodology of and results of the invertebrate survey is included in Appendix 11D.

11.2.11 During each of the above surveys, particular regard was given to the potential presence of rare or protected species. Habitats or features of potential importance to those species were noted and recommendations for further detailed study made. Following the identification of potential habitats and features made during the Phase I Surveys, specialist surveys were subsequently carried out. These are described in the following paragraphs.

11.2.12 Potential bat roosts were identified during the Phase I Surveys undertaken for the Scheme, and subsequent specialist surveys for bats have been carried out at these locations to assess their status. Surveys for bats were undertaken at those sites identified as potential roosts during September 2002 and in August and September 2003. These surveys, which comprised emergence surveys using ultrasonic detection equipment (a heterodyne bat detector - BatBox III), enable verification of potential roost sites, and also enable an assessment of numbers and species of bats present in those roosts or foraging in the wider area to be determined. An assessment of the behaviour of any bats detected can also be made.

11.2.13 Surveys for signs of water voles have been undertaken along wet ditches and streams crossed by the route. The surveys for water voles were undertaken during July, August and September 2003 and have included searches for signs of the presence of water voles including droppings, burrow entrances, feeding platforms or footprints, and also listening out for the distinctive sounds that water voles make when they enter the water. As well as looking for signs of water voles, each wet ditch and stream has also been assessed for its potential to support this species.

11.2.14 Much of the length of the route has potential for the occurrence of reptiles. Specialist surveys have therefore been carried out at identified sites where suitable habitat exists along the route. Surveys were undertaken during September 2002 and September 2003. Artificial refugia (sheets of roofing felt, carpet and corrugated metal) were placed at these identified sites and were left to settle for at least 10 days (substantially more during the 2003 surveys). Each was subsequently checked on ten days during suitable weather conditions, and species and numbers of individual reptiles were recorded. Using existing guidance, this has enabled an estimate of population sizes to be made in order that the significance of potential impacts on reptiles can be determined.

11.2.15 Waterbodies alongside and immediately adjacent to the route were initially assessed during
the surveys of 2001 for their potential to support great crested newts. Following these assessments it was originally deemed that the waterbodies had very low potential. However, following consultations and the receipt of further information regarding great crested newts in the area, surveys of these waterbodies have been carried out in respect of the possible presence of great crested newts. These surveys have used netting, bottle trapping and use of artificial refugia to investigate the potential presence of this species. Surveys were undertaken in September 2002 and August 2003, with refugia checked during September 2003 on ten occasions. The surveys were undertaken, as far as was possible, in accordance with English Nature’s standard guidanceiii, although a number of limitations have been noted with regard to these surveys (see paragraph 11.2.22). Notes concerning the presence of any other amphibians present were also made.

11.2.16 A survey of terrestrial invertebrates along the length of the route, and in particular at specific locations where potential for the occurrence of invertebrates was noted during Phase I Surveys, has been undertaken. The preliminary findings of this survey have been incorporated within this Environmental Statement in paragraphs 11.3.174 to 11.3.183. The full report is included in Appendix 11D.

11.2.17 Throughout this section, English and scientific names of plants are provided according to the New Flora of the British Islesiv. A full species list of plants identified during the surveys undertaken in preparation of the Environmental Statement is provided in Appendix 11E.

Assessment of Significance

11.2.18 The ecological resources present have been considered in respect of the design and construction of the Scheme. The likely impacts and effects on the ecological resource resulting from the Scheme have been identified and assessed in accordance with a series of Scheme-specific significance criteria (Table 11.1).

11.2.19 Assessment of the significance of the effects of the Scheme on ecological resources has initially been made assuming that no mitigation measures would be applied. This gives an indication of the need for mitigation and enables a subsequent assessment of the effectiveness of that mitigation to be made in assessing residual effects of the Scheme. In addition to the required mitigation, residual effects include consideration of ecological enhancement measures that would be included as part of the completed Scheme. Residual effects are presented in tabular format (see summary table at the end of this section).

11.2.20 Scheme-specific significance criteria have been defined in order to assess the potential effects of the proposed works on the ecological resources present. These have been designed giving consideration to the following:

- the size, value and sensitivity of the ecological resource;
- the severity of potential impacts;
- the ability of the ecological resource to recover from temporary effects; and
- the potential for effective implementation of appropriate mitigation or amelioration options.

11.2.21 Determination of the levels of potential impact has been made in accordance with the general definitions of significance criteria. Descriptions of the categories of significance assigned to effects on ecological resources are presented in Table 11.1:
Table 11.1 – Significance of Ecological Impacts

<table>
<thead>
<tr>
<th>Degree of Effect</th>
<th>Definition of Significant Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe Adverse:</td>
<td>Extensive or acute disturbance occurring at a site of National importance, which results in the lowering of its ecological value. Direct or indirect adverse impact on a biological Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) or Special Area of Conservation (SAC) to the extent that its designation is potentially compromised, or the populations it supports are reduced such that its designation is potentially compromised. Adverse effects on nationally or internationally protected species endangering their conservation status.</td>
</tr>
<tr>
<td>Major Adverse:</td>
<td>Loss of a County or City Wildlife Site. Limited disturbance on a site of National importance where recovery of key ecological issues on which the site designation is based is expected following completion of the works concerned. Lesser effects than severe adverse on nationally rare, Red Data Book (RDB), or protected species where mitigation measures are unlikely to fully alleviate adverse impacts.</td>
</tr>
<tr>
<td>Moderate Adverse:</td>
<td>Extensive or acute effects or loss of part of a County or City Wildlife Site. Lesser effects than major adverse on nationally rare (RDB) or protected species where mitigation measures are anticipated to alleviate adverse impacts.</td>
</tr>
<tr>
<td>Slight Adverse:</td>
<td>Less extensive or acute disturbance than moderate adverse to any designated site including limited or temporary effects. Slight impacts on protected species, effects on wildlife without special protection, or nationally scarce (RDB) species where mitigation measures are anticipated to alleviate adverse impacts.</td>
</tr>
<tr>
<td>Negligible:</td>
<td>Any impacts on resources considered to be of negligible ecological value, or effects on species or resources of value the effects of which, when they occur, are likely to be imperceptible.</td>
</tr>
<tr>
<td>Beneficial:</td>
<td>Any measures that are expected to result in an improvement of the quality of ecological resources following their completion. These can, for example, include creation of new habitat features or introduction of measures that would achieve improvements in quality at existing ecological site. Design features or management activities, which would make a long-term contribution to ecological objectives, such as Habitat or Species Action Plans, or measures to ensure the long-term protection of species under threat which may not be adversely affected by the Scheme, are also included in this category.</td>
</tr>
</tbody>
</table>

Limitations, Constraints and Assumptions

Great crested newts

11.2.22 During the initial surveys undertaken, an assessment of the potential suitability of waterbodies to support great crested newts was made. The results of these initial surveys undertaken during 2001 revealed that those waterbodies along and adjacent to the route had low potential.

11.2.23 Further surveys carried out during 2002 verified the low suitability of the waterbodies, and no great crested newts were detected. However, during 2003 a terrestrial record of a great crested newt along the route-line was obtained. Further surveys have been carried out during 2003. The optimum time of year for surveying water bodies for the presence/absence of great crested newts is set out in English Nature’s Great Crested Newt Mitigation Guidelines (2001) (iii). This states that at least four repeat visits should be made to a water body between mid-March and Mid June, using at least three different sampling methods, to fully assess the potential presence of great crested newts at this site. Surveys were undertaken of the CGB
route during August, which is considered an optimal time for the presence/detection of larvae in the water bodies, but only one visit per pond was possible. The artificial refugia were additionally checked during September, which is considered to be an optimal time for the detection of larvae in terrestrial habitats. It is acknowledged that the surveys undertaken to date are not strictly in accordance with the guidelines. However, from the results of the surveys and assessments made, it is considered that the potential of the waterbodies remains low.

11.2.24 It is possible that small numbers of great crested newts may be present in some of the water bodies at some times of the year. Further confirmatory surveys of these water bodies will therefore be required in the future to verify the immediate situation in respect of great crested newts.

Invertebrates

11.2.25 The invertebrate surveys undertaken in 2003 were subject to some seasonal limitations which were compounded by the unusually dry and hot weather during the summer of 2003. However, the surveys included an assessment of habitats and invertebrate potential, and coupled with the results enable a sufficient assessment of effects to be made.

11.3 Baseline

Designated Sites

11.3.1 Sites designated for their importance for nature conservation have been identified through consultation with appropriate statutory and non-statutory bodies. In accordance with the structure of the ES, the findings of consultations are described in Section 11.4. However, as these designated sites are a key component of the ecological baseline, their detailed description has been moved forward into the following Sections.

11.3.2 Designated sites fall within the following broad categories:

- **Special Areas of Conservation and Special Protection Areas** – these internationally important sites are defined according to EU Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (the Habitats Directive) and EU Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive). Port Holme cSAC is situated approximately 150m south of the CGB route at Huntingdon. This is the only such site in the vicinity of the Scheme.

- **Sites of Special Scientific Interest** (SSSI) – these nationally important sites are defined by English Nature and represent the UK’s national network of nature conservation sites. They are defined according to established criteria and may, but need not necessarily, contain species that receive protection in their own right. Such sites also include good examples of typical natural habitat types present within the UK. The nearest biological SSSIs to the proposed route are Port Holme SSSI and cSAC, Houghton Meadows SSSI and Hemingford Grey Meadows SSSI to the west of St. Ives, the closest of which is approximately 150m from the route at Huntingdon. Traveller’s Rest Pit SSSI and Histon Road SSSI are designated for their geological interest. The latter site is immediately adjacent to the route along Histon Road, and is currently overlain with allotment gardens. At Trumpington the nearest SSSI to the CGB route is Cherry Hinton Pit SSSI, approximately 1.5km to the east of Addenbrooke’s Hospital.

- **Local Nature Reserves** – this is a statutory designation applied to sites of local importance under the National Parks and Access to the Countryside Act 1949.
Whilst there are no existing Local Nature Reserves (LNRs) along the CGB route, the Nine Wells site to the south of Cambridge (and the route) is currently proposed as an LNR and is due to be declared in the near future. The site is located south of the route at Hobson’s Brook/Addenbrooke’s Link, and is approximately 600m from the route.

- **County Wildlife Sites and Cambridge City Wildlife Sites** – these County and city-level designations are applied to sites which are of lesser nature conservation importance to, or which have not been designated as SSSI. They have been identified by the Wildlife Trust for Bedfordshire, Cambridgeshire, Northamptonshire and Peterborough as representative of areas of acknowledged ecological importance which are likely to contain habitats or species of local ecological importance for which special nature conservation measures may be recommended. Several such County and City Wildlife Sites occur along the line of the route and in its vicinity. These are described below, from Huntingdon to Trumpington:

**County Wildlife Sites (CWS)**

11.3.3 Citation sheets describing the ecological resources of these sites and identifying their boundaries are presented for reference in Appendix 11F. Potential adverse effects on these sites have been addressed within Section 11.6.

11.3.4 **Riverside Park** – An area of public open space on the northern bank of the River Great Ouse. The site comprises mostly species-poor semi-improved grassland, with a former river channel lined with mature white willow trees *Salix alba*. These include at least nine mature pollards, with additional mature pollards along the southwestern boundary of the site. The site additionally comprises small areas of swamp vegetation, scrub, marshy grassland, tall herb vegetation, and permanently flooded ditches.

11.3.5 **Westside Pollard Willows** – This site lies south of the River Great Ouse, and includes a series of low-lying hay meadows and pastures immediately adjacent to the River. The fields are improved, but some species which are characteristic of flood meadows are present (at low frequency) in some of the fields to the west. Many of the boundaries contain mature pollarded willow trees.

11.3.6 **Meadow Lane Gravel Pits** – Two separate areas forming a complex of gravel pits to the west of the River Great Ouse extending to the A1096 east of St Ives. This site contains at least twelve dragonfly species including one that is Nationally Rare. The site qualifies as a County Wildlife Site on the basis of its invertebrates and Nationally Scarce plant species, and is also of importance for birds.

11.3.7 **River Great Ouse** – A major lowland river with generally high water quality and natural channel form, designated over an approximately 35km length through Cambridgeshire. The site additionally supports Nationally Scarce plant species and populations of a Nationally Rare dragonfly.

11.3.8 **Fen Drayton Gravel Pits** – An extensive gravel pit complex to the east and southeast of the River Great Ouse. The site is rich in wintering wildfowl, breeding waders, and invertebrates, with eighteen dragonfly species recorded at the site. The site qualifies as a CWS on the basis of its invertebrate population and its population of Nationally Scarce plant species and may further qualify for birds. The CGB route follows the line of the disused railway west to east along a line running through the centre of this site between its component water bodies.

11.3.9 **Swavesey Meadows** – A relatively large area of semi-improved grassland to the south of the
line of the proposed route. This site contains a large number of pollarded willow trees.

11.3.10 **Middle Fen** – A large area of semi-improved grassland and other habitats within the Great Ouse floodplain extending from the boundaries of Fen Drayton Gravel Pits County Wildlife Site to Mare Fen County Wildlife Site. This site contains Nationally Scarce plant species.

11.3.11 **Mare Fen** – An area of permanent pasture within the Great Ouse floodplain, the southernmost tip of which forms the closest point to the line of the Scheme at a distance of approximately 10m from its northern edge. This site contains Nationally Scarce plant species.

11.3.12 **Over Railway Cutting** – The south-facing slope of the dismantled railway, comprising a mixture of grassland and scrub communities, has been proposed as a CWS on the basis of a breeding colony of grizzled skipper (*Pyrgus malvae*) butterfly. This species has suffered declines in the UK in recent years. The population at this location is one of only four in Cambridgeshire and is considered to be the best in the County (*Pers comm* Sharon Hearle).

11.3.13 **Trumpington Dismantled Railway** – The section of disused railway from Long Road to Hauxton Road (approximately 2km in length) is designated a County Wildlife Site. This designation is placed primarily because of the site’s supporting a population of the Nationally Scarce species spreading hedge-parsley *Torilis arvensis*, which was recorded from here by the Wildlife Trust in 1991. In addition, the site qualifies as neutral grassland and contains scrub blocks of further local ecological value.

**Cambridge City Wildlife Sites (CCWS)**

11.3.14 **King’s Hedges Triangle/Scrub** – A roughly triangular area of neutral grassland and scattered scrub immediately adjacent to and south of the line of the disused railway east of the A14 underbridge and north of Kings Hedges Road.

11.3.15 **Bin Brook** – An approximately 2km designated length of watercourse supporting breeding populations of water voles. In addition this site contains mature pollarded willows that are ecologically valuable in association with other habitats present.

11.3.16 **Drain at Garret Hostel Lane** – An approximately 15m length of drain supporting a thriving water vole population, in close proximity to the City Centre.

11.3.17 **Little St Mary’s Churchyard CCWS** – A very small churchyard area containing a Nationally Scarce moss species. This site lies 50m to the west of the line of the route within Cambridge city.

11.3.18 **Emmanuel College Gardens** – Although recent surveys have not been carried out at this site by the Wildlife Trust because of lack of access, this formal garden area has been retained as a Cambridge City Wildlife Site.

11.3.19 **Cambridge Botanic Gardens** – This site is listed as a CCWS as a result of important populations of invertebrates and bryophytes present.

11.3.20 **Empty Common** – An area of dense scrub immediately north of and adjacent to Bentley Road Paddocks CCWS. Habitats at this site are also important as they are associated with the adjacent chalk stream (Hobson’s Conduit).

11.3.21 **Bentley Road Paddocks** – An area of neutral grassland adjacent to a chalk stream (Hobson’s Conduit). At its closest point, this site is located approximately 25m to the west of the line of the route at approximately 50m north of the Long Road underbridge.
11.3.22 **Triangle North of Long Road** – A mixed site comprising calcareous and neutral grasslands which has been subject to some disturbance, known to have contained nationally scarce plant species in the past.

11.3.23 **Long Road Plantation** – An approximately 60m length of broadleaved tree planting adjacent to the south side of Long Road, immediately to the west of the line of the proposed route.

11.3.24 **Hobson’s Brook/Vicar’s Brook** – This chalk stream site has been subdivided into four separate City Wildlife Site-designated sections. Within this assessment it has been treated as a single site, although where potential effects may take place, the appropriate section of the site has been indicated within the text. Hobson’s Brook/Vicar’s Brook City Wildlife Site is designated on the basis of it being a chalk stream, and containing pollarded willow trees.

11.3.25 **Red Cross Lane Drain** – An approximately 6m wide swathe of drain and associated neutral and calcareous grassland extending for a total length of approximately 20m, 10m to the south of the route at its closest point.

11.3.26 **Hedgerow West of Babraham Road** – An important hedgerow approximately 15m to the south of the proposed line of the route south of Addenbrooke’s Hospital.

**Ecological Issues Within The Entire CGB Corridor**

11.3.27 The Scheme comprises sections that either run along the route of the disused railway, or along existing roads. The CGB corridor is briefly described from north-west to south-east, in the following paragraphs.

11.3.28 The section of the route between Huntingdon and St Ives runs on existing roads. This section commences at the Hinchingbrooke Hospital with surrounding land comprising some built-up land with areas of open parkland/grassland and trees. The wider area around the hospital is the Hinchingbrooke Country Park and contains areas of open grassland, woodland and large areas of open water. The route in this section continues along existing roads.

11.3.29 As the route continues into Huntingdon, the surrounding area becomes increasingly built-up until it joins the B1514, where the eastern side of the road/route comprises the Riverside Park CWS. The western side of the route comprises built development, primarily residential dwellings. As the route continues along the A1123, much of the surrounding area comprises open land including arable fields, open water/marinas, with hedgerows and trees forming the margins of the road.

11.3.30 Towards Houghton the margins comprise residential dwellings, whilst further east the surrounding area becomes open again, with the St Ives Golf Course to the south of the road, and the leisure centre complex to the north. The area becomes increasingly built-up again with residential dwellings towards St Ives, and along the route into the town centre. Much of this section in St Ives consists of built land comprising commercial and residential buildings in St Ives town centre, and residential buildings and gardens along the Ramsey Road leading out from the A1123. In general, this section is of less ecological value than the disused rail corridor, although the route crosses several wet ditches and streams in this area and is fringed along much of its length by trees and hedgerows.

11.3.31 The parts of the Scheme which run along the route of a disused railway comprise the section of the route between St. Ives and Cambridge, and from Cambridge Station to Trumpington. The St Ives line has been disused for scheduled passenger services since the 1970s and was last used for freight in some of its sections as late as 1993. Along the majority of its length, rails and sleepers are still in place. Vegetation cover along the route generally varies from open grassland to dense growth of scrub and formative woodland. Almost without exception,
this vegetation has formed through processes of natural succession over the disused railway corridor. Its mixed structure to an extent reflects the varied substrate composition that consists of clinker and sandy gravel with negligible added topsoil.

11.3.32 The more developed vegetation in general exists to the sides of the disused rail corridor where it has been able to become established for a longer period. Parts of the route are overgrown. Vegetation within the central section of the line of the route is younger and has not been established for more than thirty years. The disused rail line is generally subject to very low levels of human disturbance.

11.3.33 The vegetation that has developed provides an important local resource for nesting and breeding birds. The mosaic of different habitats present within relatively short distances, the variety of substrates, and the corridor function of the route, make the route an excellent resource for invertebrates, particularly butterflies and dragonflies. This value is enhanced by the fact that the corridor is essentially double-hedged along much of its length and therefore serves as a windbreak and refuge for flying invertebrates.

11.3.34 The linear structure of the corridor and its value for flying invertebrates make this section of the route an excellent potential foraging site for bats, although the relatively young age of much of its vegetation means that potential bat roosts in trees tend not to be located close to the line of the route. The variety of substrates and residual abandoned structures such as station platforms provide good potential habitats for reptiles, and grass snakes have been observed to be present. In addition, common lizards and grass snakes are recorded as being present within CWS designated areas in the Cambridge to Trumpington section of the route, and also in the Longstanton area. During reptile surveys of the route common lizards have been found at several locations along the route.

11.3.35 Overall, parts of the route on disused railway line provide a linear corridor for the movement of wildlife between sites and through the wider countryside, and form a significant local ecological resource within an otherwise largely agricultural landscape.

11.3.36 At its westernmost extent, the disused railway passes through a landscape dominated by open water features, in particular, large water bodies formed from earlier and ongoing gravel extraction operations. The route in this area falls within large areas designated for nature conservation importance, specifically Meadow Lane Gravel Pits CWS and Fen Drayton Gravel Pits CWS. These habitats are extensively used by large numbers of waterfowl and are nature conservation features of local importance valued by the public for bird watching and countryside walking where public access exists. These water bodies occur in close proximity to the River Great Ouse, which is itself designated as a CWS and is a valuable resource for a wide variety of wildlife, in particular birds, water voles, bats, and invertebrates. Middle Fen CWS and Mare Fen CWS, areas of wet pasture, lie to the north of the line of the route at Swavesey while to the south lie the semi-improved grassland of Swavesey Meadows CWS.

11.3.37 In its central section between the preceding area and Cambridge, the route generally passes through open agricultural land and scattered development. In this section it comprises a mosaic of open and dense woodland, scrub, grassland, wetland and mixed communities. These areas are in general not of special individual ecological merit but are important in the context of the wider countryside as well as being important resources for local wildlife.

11.3.38 Through Cambridge and along some of the road sections towards Huntingdon, the route is largely urban with minimal associated ecological resources. Once south of Cambridge, the area becomes less urban, with more open agricultural land to the south of Cambridge. Ecological resources present in this section are those associated with the Bin Brook CCWS (supporting breeding water voles). Towards Trumpington the line of the disused railway
provides unmanaged scrub and woodland areas that provide a refuge for local wildlife in comparison with surrounding habitat types.

11.3.39 Extensive lengths of hedgerow of varying ecological quality but which are dominated by native species, particularly hawthorn, dog rose and elder, occur along the length of the route. Assessments have been carried out of these in relation to the criteria for determining historic hedgerows as presented in the Hedgerow Regulations 1997viii. The following sections of hedgerow along the length of the route have been identified as of particular ecological value in this regard:

- double hedgerow along the closed-off section of the Old Houghton Road;
- hedgerow running along the course of the navigation drain west of Swavesey Priory, north of the line of the proposed route;
- short fragment of former hedgerow and associated scrub immediately west of the crossing point of the Swavesey Drain and the line of the route;
- hedgerow associated with the Beck Brook to the east of the route at Longstanton where the brook has not been realigned into an unnatural channel;
- hedgerow associated with deciduous woodland blocks between Bridge Road, Impington and the A14 underbridge, on the north side of the course of the disused railway;
- hedgerows at King’s Hedges Triangle CCWS;
- several of the hedgerows on the boundary of the Arbury Park site; and
- approximately 50m length of hedgerow west of Babraham Road (designated as a CCWS), located approximately 15m south of the proposed line of the route south of Addenbrooke’s Hospital;

11.3.40 The effects of the Scheme on trees with Tree Preservation Orders (TPOs) have been addressed in the Landscape Section (Section 13).

Site-Specific Ecological Issues

Section 1 – Huntingdon to St Ives Park and Ride

11.3.41 (See Phase 1 Habitat Survey Figures 1 – 3 in Appendix 11A. Alphanumeric codes refer to those Target Notes (TN) which are marked on Figure 1 in Appendix 11B.)

11.3.42 From Hinchingbrooke Hospital in Huntingdon CGB buses would run on existing roads along the B1514 to the Old Houghton Road. The route would continue along the Old Houghton Road, and join with the A1123. The route would carry on along the A1123 until the Ramsey Road, where it would continue into St Ives town centre. Once through St Ives, the route would join with the disused railway. Within this section the whole route would run on existing roads primarily within urban areas surrounded by buildings, where little ecologically valuable habitat is present. The built-up character of this section lessens in the western direction along the A1123 and on parts of the B1514, where more semi-natural habitats with more ecological value are present.

11.3.43 For the most part of this section the route would use existing roads. However, road widening works would be undertaken in places for the provision of additional bus lanes. Habitats present have been mapped in areas where works are proposed. (Figures 1-3 Appendix 11A) and the route through this section is described in full below.
11.3.44 TN1 - From the Hinchingbrook Hospital and Huntingdon Ring Road the route follows the B1514 north-eastwards towards the junction with the Old Houghton Road. The surroundings comprise predominantly built land, both industrial/commercial and residential. Along Hartford Road the River Great Ouse flows to the east, separated by an area of amenity grassland with scattered mature trees. This area is designated as open space in the Local Plan, and also as a County Wildlife Site – Riverside Park. At the south of this site the road crosses a stream/wet ditch which joins the River Great Ouse. Here, east of the road, there is a car park area for the sailing club. The area to the western side of the road comprises mostly houses and other buildings. From the Riverside Park continuing north, this section of the road runs adjacent to houses and gardens until the Old Houghton Road junction.

11.3.45 TN2 - Most of the Old Houghton Road is currently closed off, and has dense hedgerows on both sides and a fringe of grasses. At the point where the road is closed off, the road is crossed by a wet ditch which runs south, between a boundary separating a grazed field and houses with gardens. The open section of this road is bordered by residential plots, and is mainly lined with trees and planting. The area on either side of the closed section of the road consists of grazed fields. From the Old Houghton Road, the route joins the A1123. At this location Hartford Marina is located on the south side of the road, with large expanses of water surrounded by areas of trees and marginal vegetation. A large old water-filled pit is present on the north side. A dry ditch, grassy fringe and hedgerows and trees border these areas along the roadside, species on the northern side including lime, elder, blackthorn, field maple, white willow, ash, osier, crack willow and goat willow, with mainly white willow on the south side, and grazed fields to the south, further west of the marina.

11.3.46 TN3 - At Hartford Marina, the margins of the road comprise hedgerows and trees including elm, hawthorn, ash, sycamore and oak. On the southern side of the road, a wooded copse continues for a short distance, with additional species including horse chestnut. The dry ditch continues along the road margin.

11.3.47 On the northern side of the road, immediately opposite the Wyton Lakes Holiday Park, a relatively new garden centre is situated. It has a large car park area, with newly planted trees. To the west of this lies a field of tall ruderal plants, mainly dock species. Trees lining the roadside here include ash, poplar and elm.

11.3.48 To the west of the Holiday Park the area becomes wooded, predominantly consisting of willows, with a fringe of tall herbs and ruderals along the roadside boundary.

11.3.49 The Wyton Lakes Holiday Park is situated on the south of the road. The park comprises large areas of open water surrounded by trees, hedgerows and an area of woodland to the west. A dry ditch runs along the boundary of the park with the road, along which are a number of mature crack willow trees. These were considered suitable as potential bat roosts, and hence a subsequent evening emergence survey was carried out (see paragraphs 11.3.144 to 11.3.154).

11.3.50 TN4 - At this location along the southern side of the road, the hedgerow continues, although it becomes less dense, with fewer trees present. A field extends to the south of this hedgerow. On the northern side of the road, a field has been ploughed and left fallow. It has a woodland edge on the west side and a fringe of tall herbs and ruderals along the roadside margin. Continuing east, a paddock grazed by horses is present, and immediately east of this, an area is present which is well vegetated with tall herbs and ruderal species and fewer trees and scrub. The whole area is marshy, and is likely to be wet at least during the winter months. A ditch leaves this area to the east, although due to the dense vegetation, it was not possible to determine if the ditch at this point contained water. The ditch continues underneath Splash Lane in culvert, and appears to cross south underneath the road in culvert. At this location the ditch contained water and is located within the grassy and ruderal vegetation at the margin of
the road.

11.3.51 TN5 - The wet ditch continues along the northern side, becoming deeper and more open, from being shallow and heavily vegetated towards the Splash Lane culvert. A song thrush was observed at this location. The northern margin of the road, adjacent to the wet ditch is more open, with a grass fringe, and taller herb and ruderal vegetation bordering the ditch. The ditch and its banks are well vegetated with species including great reedmace, meadowsweet, water mint, fool’s water-cress, creeping thistle, rosebay willowherb, common nettle and purple loosestrife. At the time of the survey there was very little surface water visible, owing to a covering of duckweed. This area was considered to provide some potentially suitable habitat for water voles. The wet ditch then crosses in culvert underneath the A1123 to continue along the southern side. Scrub continues along the northern side, and on the northern side (to the west of the ditch crossing) fields are present adjacent to the road, and trees continue along this boundary. A bullfinch was observed at this location.

11.3.52 TN6 - Continuing east from this location the northern side of the road comprises a line of trees (willows) and a fringe of tall grasses and ruderal species form the boundary with the road. The ditch eventually gradually dries further eastwards, but the wet section contained marginal and emergent vegetation including reedmace and fool’s water-cress. Further east, the ditch was dry at the time of survey. The habitat becomes more open further eastwards, and forms part of the site designated for conservation and as an open area as set out in the Huntingdonshire Local Plan. The trees, hedgerow and ditch continue along the southern margin of the road.

11.3.53 A large pond is situated on the northern side of the A1123 at this point. The pond appeared to be well maintained with mown grass surrounding the pond, and scattered trees and marginal vegetation along large sections of the banks. Much of the water surface was covered with duckweed. The marginal vegetation included creeping thistle, dock, purple loosestrife, sedges, reedmace, and watermint. Submersgent vegetation included Canadian pond weed, water lilies and a species of algae. Many willow trees were present along the margins of the pond. Large fish were observed in the pond on several occasions, and people were seen using the pond for fishing. The pond habitat may have some suitability for great crested newts, and surveys of the pond were undertaken (see paragraphs 11.3.161 to 11.3.165). However, the presence of large fish does reduce the suitability somewhat and no evidence of great crested newts or other amphibians was found. A ditch leaves this pond to the west, which may contain water, but at the time of survey was very well vegetated and no water could be seen. After a short distance, the ditch becomes a dry and bare channel as it curves around towards the entrance to Houghton Hall. This area containing the pond is also classified in the Huntingdonshire Local Plan as conservation and open space area.

11.3.54 TN7 - The Houghton Mill area is designated in the Huntingdonshire Local Plan as a conservation area. On the southern side of the road, a wet ditch is present, continuing along this side of the road for some distance. On the east side of the St Ives Road, this ditch is situated within an area of tall herbs and ruderal species, and is fringed by rosebay willowherb, meadowsweet, ragwort, common nettles and grasses. The grass area is mown adjacent to the roads. Trees including aspen and horse chestnut, and a hedgerow are present on the south side of the ditch, with houses and gardens immediately behind. The ditch generally has very steep banks which are well vegetated with the ruderal species and some marginal vegetation including branched bur-reed in the channel. The water depth was shallow at the time of survey, approximately 30cm, with the surface almost completely covered with duckweed. There was no flow. As the ditch crosses westwards in culvert underneath the St Ives Road it emerges in a wooded and heavily shaded section behind the sports club and car park. The substrate appeared for the most part to be very silty and soft. Further west, houses and gardens form the southern boundary to the ditch. The channel is up to 2m wide in parts, and
locals informed us that it can become full during the winter months. Fish were observed in
the channel, and during the great crested newt surveys several fish were caught. The ditch
does provide potentially suitable habitat for water voles, and possibly great crested newts,
although none were found during the specialist surveys.

11.3.55 TN8 - Continuing east from the Houghton Mill area, a hedgerow and dry roadside ditch
continue along both the northern and southern margins. On the northern side, fields are
present which were grazed by sheep at the time of survey. Immediately east of these fields,
there is a cemetery.

11.3.56 TN9 - Continuing eastwards, the fields to the north of the road are grazed, with a paddock
present. Houses are present on the south side of the road, some of which have drainage
ditches to the front, which may be wet in the winter, but were dry at the time of survey. The
houses along this section contain various planted vegetation in the gardens including
managed elm and ornamental species including snowberry. A tree belt is present on the
southern side of the road, which forms a wooded area interspersed with houses on both the
northern and southern margins, and includes species of hornbeam and wych elm. Further
eastwards this tree belt lessens in height and forms a hedgerow. Species present included
blackthorn, field rose, elder, sycamore and field maple. Adjacent to the road at this point the
hedgerow continues alongside a field of set-aside.

11.3.57 TN10 - At the junction with the B1090, the hedgerow widens to become a tract of woodland.
The immediate margins of the road at this point form a grassy fringe, and an arable field is
present on the northern side of the road.

11.3.58 Continuing east, Houghton Grange is situated on the south side of the road. At the entrance to
Houghton Grange, two houses are present which may provide some bat roost potential. These
were not surveyed due to access limitations. They would not be affected by the works. The
driveway leading into Houghton Grange is tree lined, and may provide bat foraging
opportunities.

11.3.59 TN11 - The tract of mixed woodland which includes ash and oak narrows to become a
hedgerow along the southern margin. From the arable fields immediately north of the road,
the vegetation becomes more dense with a hedgerow on the northern margin.

11.3.60 On the southern side of the road at this location, a water tower is present within an opening in
the vegetation. On the day of survey a yellowhammer was heard in this area. From this point
along the road, the hedgerow and ditch continue on both the south and also the north margins,
immediately north of which is an arable field (currently set-aside), and the fields of the
Leisure Centre. Several planted lombardy poplar trees are present on the south of the
hedgerow, extending into an area of mixed horse chestnut and pine trees immediately south
of the hedgerow boundary.

11.3.61 TN12 - Continuing eastwards, the northern margin of the road at this section consists mainly
of houses with gardens containing a mixture of native and ornamental planted species.
Further east along the southern side of the road, a dry roadside ditch and hedgerow continue
along this southern margin and form the boundary with the St Ives Golf Course. Several
mature ash trees are present within this section of the hedgerow which had some potential to
provide roost sites for bats. A subsequent evening emergence survey of these trees was
carried out (see paragraphs 11.3.144 to 11.3.154). The vegetation composition of the ditch
suggests that it is predominantly a dry ditch, which may contain water only at times of high
rainfall. Vegetation present consists of ivy, common nettle, clustered dock, creeping
buttercup, cleavers, bramble, hogweed, wood avens, comfrey, hedge woundwort and rough
grasses. The hedgerow comprises predominantly English elm and hawthorn with some
scattered ash trees. The ditch is approximately 1-1.5m deep and 0.5-0.7m wide. At the traffic lights with Hill Rise the ditch goes into culvert for a short section. Continuing eastwards from High Leys, the road is bounded by buildings, predominantly residential dwellings, which continue along the Ramsey Road towards St Ives town centre. As the route passes through St Ives town centre, it runs on existing roads, all of which are currently surrounded by industrial, commercial and residential buildings.

Section 2 - St Ives Park and Ride to District Boundary (Fen Drayton).

11.3.62 (See Phase 1 Habitat Survey Figures 4&5 in Appendix 11A. Alpha-numeric codes refer to those target notes which are marked on Figure 2 in Appendix 11B.)

11.3.63 St Ives Park and Ride is immediately to the north of the disused railway, east of the A1096 at St. Ives. To the north of the proposed St Ives Park and Ride, and to the south of the line of the route, this area falls within Meadow Lane Gravel Pits County Wildlife Site. The area of the proposed park and ride itself is not designated and comprises open pasture with some damper more central areas evidenced by the presence of soft-rush stands in its central and eastern areas and more established scrub to the west. To the south of Meadow Lane within this area there are two stands of large willow trees along the south of the Lane, along with a species poor hedgerow along the northern section of the lane. South of this field (TN13), the disused railway has been removed and is replaced by an area of mixed grassland and scrub communities with the large open water bodies of Meadow Lane Gravel Pits CWS to the south. This open area is dominated by butterfly bush, bramble and dog rose. Denser scrub to the northern and southern sides of this area also include elder, hawthorn, privet and goat willow. Herbs were abundant amongst the grassland and included dock, St. John’s wort, yarrow, bittersweet, wild carrot, teasel and rosebay willow-herb. The grasses red fescue, cock’s foot and perennial rye-grass were abundant amongst black medick and white clover.

11.3.64 This area provides an excellent habitat for butterflies. Species observed included peacock, brimstone, small white, meadow brown, gatekeeper, small tortoiseshell and small copper. Common blue damselflies were also observed in this area.

11.3.65 The fringing vegetation on the edge of Meadow Lane Gravel Pits CWS at a large gravel pit lake south of the line of the route (TN15) included crack willow, white willow, hawthorn and elder. Purple loosestrife, water forget-me-not, great willower and figwort were observed along the banks with emergent reed canary-grass, water mint, greater reed mace and common reed. This vegetation additionally provides a visual screen to wildfowl present within those water bodies. Birds observed within the gravel pits included mute swan, mallard, tufted duck and Canada goose.

11.3.66 To the east of a small rabbit-grazed area of grassland including teasel and ragwort (TN16), the line of the route passes through a depression extending approximately 150m in which an ephemeral pond had formed. This pond was part-dry at its northwestern end at the time of the initial surveys, in 2002 but did still contain an area of open water. During the subsequent surveys in late 2002 and 2003, this area had completely dried. To the immediate northeast of this area along its length a bund dominated by bare ground and ruderal vegetation exists. Species present on the bund included common thistle, ragwort, scentless mayweed, mugwort, weld, evening primrose, burdock, teasel, scarlet pimpernel, hard rush, St. John’s wort and butterfly bush. The butterflies peacock, small white and common blue, and large red damselfly were observed here. The pond was heavily vegetated with floating pondweed, reed mace and common water-plantain were dominant. During the surveys in 2003, it was noted that whilst the pond had dried, vegetation indicating damp conditions was present including rush species. Brown hawker dragonfly were observed foraging within this area. Some pond-netting samples were initially taken from this pond when it contained water in view of its
potential for amphibians, in particular great crested newt. No amphibians were found although damselfly larvae (fam. Libellulidae) and alderfly larvae were present with chironomid larvae and tubificid worms. At all other times of survey this area was dry and hence no further amphibian surveys could be undertaken. Birds present at this location included goldfinch, blue tit, magpie and robin.

11.3.67 Across a single track road, southeast of TN16, a second linear pond (TN17) was present during the initial surveys of 2001, and at this time extended for approximately 100m, beyond which the habitat became progressively drier whilst remaining in a gully between banks of raised ground on either side. Vegetation within the gully progressed from wetland through wet grassland to grassland and scrub over a distance of approximately 300m. Plant species present on the slopes included evening primrose, purple deadnettle and common mallow, with greater reed mace, fool’s watercress, common water-plantain and water forget-me-not dominating the open water and wetland areas. At its south-western limit this habitat has progressed to a drier community with abundant hard rush, with regenerating sycamore and goat willow at its fringes. During subsequent surveys in late 2002 and 2003, the habitat in this area had changed; the pond is still present (as a fishing pond), but the area has dried further, and the channel of water along the south now contains juvenile willow scrub, and whilst water is likely to be present in the channel, it is not accessible due to the vegetation growth. A small pond is present at the easternmost part of this channel, but the remainder of the area comprises sandy substrate, with a large raised bank along the northern edge. The bank is gradually becoming vegetated with ruderal regenerating vegetation, and cover is sparse, although has increased throughout the course of the surveys undertaken. The pond has been surveyed for great crested newts (see paragraphs 11.3.161 to 11.3.165). In addition, this area was included as one of the sites in the September 2002 reptile surveys, but no reptiles were found (see paragraph 11.3.158).

11.3.68 Rising a steep slope of bare ground at its far south-eastern end, the route rises to join a single-track that crosses the River Great Ouse valley on a metal bridge approximately 200m in length (TN18). A path runs along the eastern bank of the River Great Ouse at this point. Approximately 100m south of the bridge an exposed bank of the river provided an ideal location to observe Odonata (dragonflies and damselflies) associated with the river. Migrant hawker, banded demoiselle, common blue damselfly and scarce chaser were all seen at this point. The scarce chaser is a relatively rare species nationally, though tends to be locally abundant where it occurs. It is strongly associated with river corridors. Special attention was given to differentiating this species from the black-tailed skimmer which is superficially very similar and which was found at locations immediately east of the River Great Ouse.

11.3.69 The immediate area of the proposed crossing of the Great Ouse is surrounded by scrub and river-fringing vegetation, including on its northern side two large ash and to the south a band of willow beside an adjacent gravel pit lake to the southwest. A single oak approximately 10m in height exists within this southern area. This vegetation provides a range of habitats for common birds and other wildlife but there are no suitable nesting banks for kingfisher in the immediate locale, as there are upstream and downstream of this point.

11.3.70 From the Great Ouse to Swavesey Meadows CWS (TN27) the route passes through Fen Drayton Gravel Pits CWS.

11.3.71 Beyond the western end of the bridge (TN19) the route is generally on slight embankment, following a metalled road of approximately 8-10m width. From this point for a distance of approximately 200m the northeastern side of the line of the route comprises dense willow carr behind a fringe of reeds. A line of tall willows, ash and hawthorn, some of which has been recently planted, on the south-western side of the route separate the adjacent fields which contain a single lake and smaller pond, the latter of which was noted as likely to dry
out at some times of year, and during subsequent surveys this was the case. No great crested newts were found within this pond when assessed during 2002, and as it had dried at the time of the subsequent surveys, no further survey could be undertaken. Great willowerb, yellow toadflax, meadowsweet, ladies bedstraw, purple vetch, knapweed and red clover were prominent within the flora on the road banks.

11.3.72 A double hedgerow of hawthorn, white willow and oak, with associated footpath joins the southwestern side of the route (TN 20). Although small, these oak trees were considered potential bat roosting sites. To the northeastern side of the route the bramble-dominated road bank drops to a band of common reed and horsetail fringing goat willow carr at the edge of adjacent improved grassland.

11.3.73 A dusk visit was made during the spring/summer 2002 to the area TN17-20 to check potential bat roosts for signs of emerging bats. Although foraging bats were identified by ultrasonic detection (pipstrelle 45, serotine and one other unidentified Myotid species), no signs of emergence at this point were evident. Based on the findings of this survey, and the timing of detection of foraging bats, it has been concluded that the bats present within this area roost at locations distant from the route corridor rather than at sites adjacent to it, and hence no further survey of this area was undertaken.

11.3.74 The habitats adjacent to the route within this section are considered highly suitable for small birds, in particular, warblers. Observations were made of woodpigeon, carrion crow, wren, whitethroat, blue tit, willow warbler and (flying at a distance) oystercatcher. Invertebrates observed in this section of the route included the butterflies peacock, large white and gatekeeper, and abundant common blue damselfly.

Section 3 - District Boundary (Fen Drayton) to Swavesey Drain

11.3.75 (See Phase 1 Habitat Survey Figures 5-8 in Appendix 11A. Alpha-numeric codes refer to those target notes which are marked on Figure 2 in Appendix 11B.)

11.3.76 The section of the route, extending from TN20 to the crossing of the Moore Brook (TN21), is similar to TN19 with a band of willow carr to the northeast side of the route separating it from adjacent open farmland, and a band of scrubby willow and hawthorn with occasional hazel to the south-west separating the route from a large area of open water. Plants at the water’s edge included common reed, purple loosestrife and water forget-me-not. A pair of great spotted woodpeckers were observed in a poplar tree along the Moore Brook.

11.3.77 Beyond the Moore Brook (TN22), a small overgrown pond dominated by greater reedmace, with relatively dry margins lies immediately south of the line of the route adjacent to a gravel pit lake with several small islands, inlets and promontories. This area, extending to TN24, forms Fen Drayton Nature Reserve, which is managed by Cambridgeshire Wildlife Trust. Planted willows and a hawthorn hedge, which becomes better established to the east of this area, separate the path from these open water areas. Willows, bramble and hawthorn dominate scrub habitats adjacent to the northern side of the route at this point. Herbs present included common mallow, yarrow, spear thistle, teasel, ragwort, burdock, horseradish, broad-leaved plantain and bladder campion. Occasional elder and field maple occur to the eastern end of this area amongst the more mature hawthorn.

11.3.78 Reed warblers were observed adjacent to the route, with common sandpiper, lapwing, grey heron and common tern (with young) seen flying. Birds present on the water in the adjacent gravel pit lake were mute swan (with young), cormorant, Canada goose, black-headed gull, tufted duck, mallard, great crested grebe and numerous coot (estimated 100+ individuals).
Red admiral butterflies, common blue damselfly and migrant hawker dragonflies were seen at this point. On the north side of the route, on exposed banks at the lake edge, black-tailed skimmer and common darter dragonflies were observed.

Beyond this point (TN 23) the route crosses a brook, which passes between gravel pit lakes to the north and south of the route. A hedge dominated by ash, hawthorn, oak, field maple and elder runs along and overhangs the eastern side of the brook, with occasional hawthorn forming a gappy hedge along its western edge.

The brook itself contains common reed and floating pondweed, and has potential value as a habitat for water voles, although no evidence of their presence in the immediate locality was found at the time of the surveys. Additionally, the brook was surveyed for great crested newts, although very little open water was present at the time of the survey, and the channel was densely vegetated. No amphibians were found during the surveys (see paragraphs 11.3.161 to 11.3.165).

Between this point and TN24 a total of three kingfishers were heard and observed flying along habitat adjacent to the northern and southern sides of the route. Whitethroat and reed warbler were seen in reedbed vegetation adjacent to the route. On open water to the south of the route common tern, coot, great crested grebe, tufted duck, mallard, cormorant and mute swan (over 50 individuals) were observed. A single teal was also seen flying overhead. In addition, a kingfisher was observed flying over the smaller Oxholme Lake.

Invertebrates observed at this location included peacock, brown hawker and common blue damselfly. This area was included as one of the reptile survey ‘hotspots’ both in September 2002 and during the surveys undertaken in September 2003. One common lizard was found here during the reptile surveys. Additionally, during September 2002 a juvenile smooth or palmate newt was found underneath one of the refugia used. In addition, the smaller Oxholme lake was surveyed both years for great crested newts, although no other evidence of amphibians was found (see paragraphs 11.3.161 to 11.3.165).

An area of gravel pit lakes very similar to those at TN22 and TN23 lies immediately the east at TN24. A large pond lies to the immediate north of the route, dominated by common reed and surrounded by goat willow and white willow. A dry ditch extends along the length of the route adjacent to its northern edge. Hedges on the north side of the route include hawthorn, elder, willow and bramble. More open land to the south between the path and the gravel pit lake has been planted with a variety of native saplings, including white willow, hawthorn, alder, dog rose and field maple.

Birds observed along this section of the route included a single kingfisher, plus grey heron and reed warbler.

To the east of Holywell Ferry Road (TN25) the gravel pit lake complex continues. This section, however, does not have general public access (although it was noted that fishing does take place here) and is consequently generally more tranquil, particularly towards the eastern sections farthest from the gravel workings immediately north of Fen Drayton Nature Reserve, and substantially more overgrown. In general, the track along this section is narrower than previously, un-metalled, and more constrained by hedges dominated by hawthorn, ash and elder, on both sides.

The gravel pit lakes appear generally more diverse areas with wider areas of adjacent grassland and emergent vegetation and well-established marginal aquatic communities including often extensive stands of greater reedmace, figwort, floating pondweed, redshank, water mint, purple loosestrife and hard rush.
11.3.88 Birds present in habitats adjacent to the route included wren, blue tit and blackbird, with mute swan, tufted duck, pochard, great crested grebe and common tern occurring within adjacent water bodies. Peacock, large white and meadow brown butterflies were observed in open grassland adjacent to gravel pit lakes, with common blue damselfly and black-tailed skimmer also evident.

11.3.89 Travelling eastwards from this point (TN26), the route moves up onto the disused railway embankment (with rails and sleepers present) travelling east to the road crossing at Church End, Swavesey. The route is quite constrained throughout this section, with substantial scrub growth dominated by bramble and dog rose but also including cherry, white willow and elder between well-established hawthorn hedges on both sides. Frequent common reed-fringed areas occur at the base of the embankment on both sides, but particularly on the north. Evidence of fox was noted at this point. This area (at Church End) was included within the reptile surveys during both 2002 and 2003, and common lizards were found to be present. Herbs present included rosebay willow-herb, bittersweet, great willowherb, ragwort, teasel and yarrow.

11.3.90 Along this stretch of the route, linnet, reed warbler, whitethroat, woodpigeon, blackbird, bullfinch, goldfinch and blue tit were observed, with swallow flying feeding on insects in open areas on the embankment. In addition, three turtle doves were observed within hedges adjacent to the southern side of the route.

11.3.91 Invertebrates observed included wall brown, ringlet, gatekeeper, meadow brown, speckled wood and peacock butterflies, reflecting the greater levels of local shading and maturity of vegetation on the embankments.

11.3.92 Further east, a small navigation drain crosses the route (TN27), to the immediate west of which is a long, overgrown pond dominated by dense common reed. To the north, this drain represents the confluence of two streams, while to the south a single watercourse extends away from the route. This point represents the southernmost edge of Middle Fen CWS. Approximately 10m to the north along the line of the western of the two streams lies the southernmost point of Mare Fen CWS, a large area of grassland within the flood plain of the Great Ouse subject to inundation and containing Nationally Scarce plant species. Within the drain itself the water surface in both directions was largely covered with duckweed at the time of the surveys. This area provides potential habitat for amphibians although for safety reasons access was not practicable to assess their presence. Emergent vegetation includes common reed, reed sweet-grass, arrowhead and purple loosestrife, with hawthorn and bramble dominating hedgerows adjacent to the stream. In addition, a stand of regenerating elm was present immediately adjacent to the route on the north side. Great crested newts surveys have however been possible within the confluence of the drains to the west, although no evidence of amphibians was found (see paragraphs 11.3.161 to 11.3.165). In addition, this watercourse was additionally considered to be suitable habitat for water voles, and a record of water voles present further south along this watercourse (away from the line of the route) is held by the Wildlife Trust (see Section 11.4). No evidence on water voles was found at the confluence, however, the banks are densely vegetated and were not fully accessible at the time of survey, and this area is considered to provide suitable habitat for water voles.

11.3.93 To the south of the route at this point an area of semi-improved grassland has been designated as Swavesey Meadows County Wildlife Site.

11.3.94 Immediately beyond Over Road (TN28) the line of the disused railway is considerably more open in character. Immediately beyond the road this generally open character continues up to the point where the route crosses Swavesey Drain. The route along this stretch has wide grassy margins providing good potential reptile habitat. Ash, alder, willow, sycamore, plum,
dogwood and birch are present within gappy hedges at the edges of the route, with St. John’s wort, rosebay willow-herb, evening primrose, greater mullein and bird’s foot trefoil frequent within grassland areas.

11.3.95 Whitethroat, sedge warbler, blackbird, goldfinch, woodpigeon, blue tit, great tit, chaffinch, pheasant, magpie and yellowhammer were observed along this stretch of the route. Invertebrates recorded included the butterflies ringlet, meadow brown, speckled wood, gatekeeper, large white and peacock, with abundant common blue damselfly.

Section 4 – Swavesey Drain to Longstanton Park and Ride

11.3.96 (See Phase 1 Habitat Survey Figures 8-10 in Appendix 11A. Alpha-numeric codes refer to those target notes which are marked on Figures 2 & 3 in Appendix 11B.)

11.3.97 The Swavesey Drain itself (TN29) is a deep-cut stream lined with gappy hawthorn, beside which a grassy bund runs along its western side. On its approach to the line of the route the Swavesey Drain lies within a trapezoidal channel and is largely devoid of bankside or emergent vegetation. The water is clear with a fairly open surface with some duckweed. At the easternmost point where the route crosses the drain, the emergent vegetation becomes more suitable, particularly immediately south of the route, and includes common water starwort, water cress, great willowherb, meadowsweet, and reed sweet grass, with tall herbs and ruderals further up the banks. Species include abundant nettles, cleavers and great willowherb, with trees and scrub along the route. The stream has potential for improvement for use by water voles, and, assessment of the stream during surveys undertaken in 2003 revealed suitability for water voles. During one site visit, a small mammal was heard chewing within the bankside vegetation approximately 75m from the confluence with the railway. One hole was found within the opposite bank at this point, and possible water vole droppings were seen, although close inspection was not possible.

11.3.98 However, access to this drain is generally not possible due to the steepness of the banks. In addition therefore, no access could be gained in order to survey the watercourse for great crested newts, although the habitat itself is not considered to be particularly suitable, due to the flow of the water, and the lack of emergent and aquatic vegetation.

11.3.99 A small pond to the north of the line of the route, west of the Swavesey Drain crossing, appeared heavily choked with common reed, and with several small regenerating willows around its perimeter. During all subsequent surveys, this pond has dried further, and in September 2003 formed an area of juvenile scrub and some vegetation indicative of damp conditions, but no standing water is present.

11.3.100 From the Swavesey Drain to the B1050 (TN30), the route runs through a very open area of ideal reptile habitat, and the presence of reptiles (common lizards) at other sections along the route indicate that it is likely that reptiles would be present in this area. This extends for some 2km through open agricultural land. Field scabious, ladies bedstraw, rosebay willow-herb, yarrow, ragwort, wild carrot, marjoram, knapweed and oxeye daisy were abundant amongst the grassland in this area. Gappy hedges bounding the north and south sides of the route include hawthorn, dog rose, elder, crab apple and sloe. A fox and numerous rabbits were observed along this length of the route. Birds recorded in this section included six yellowhammer, whitethroat, woodpigeon, willow warbler, house sparrow, song thrush, green woodpecker, magpie, blue tit, great tit, long-tailed tit, greenfinch and carrion crow. Invertebrates included meadow brown, gatekeeper, large white, small white, peacock, speckled wood, wall brown and common blue butterflies, banded demoiselle, common blue damselfly and common darter.
11.3.101 Windmill Bridge, in the centre of this section on Longstanton Road, has some, though low, potential for roosting bats. Further surveys were undertaken of this bridge. Evening emergence surveys were undertaken during September 2002 and August 2003. These surveys revealed foraging 45Khz pipistrelle bats, and possibly an individual brown long-eared bat flying over. The bridge was considered to provide a possible transient roost site following the 2002 survey for 45Khz pipistrelles, but during the second survey in 2003, no evidence of roosting bats was found (see paragraphs 11.3.144 to 11.3.154).

11.3.102 For a distance of approximately 100m to the west from the bridge, this section of the dismantled railway has been designated as Over Railway Cutting CWS on the basis of its population of grizzled skipper butterfly. This colony is one of only four in Cambridgeshire and is considered to be the best in the County (Pers comm Sharon Hearle). Additionally this area represents a particular reptile ‘hotspot’ and surveys during both 2002 and 2003 revealed the presence of common lizards in this area.

11.3.103 To the south of the line of the route, immediately west of housing adjacent to the B1050, an area of isolated damp grassland is dominated by dense common reed growth. This area is not accessible from the adjacent land. It is possible that this area represents the remains of an overgrown pond formerly associated with the rail line.

Section 5 - Longstanton Park and Ride to A14

11.3.104 (See Phase 1 Habitat Survey Figures 10-16 in Appendix 11A. Alpha-numeric codes refer to those target notes which are marked on Figure 3 in Appendix 11B.)

11.3.105 After crossing the B1050 (TN32) the route becomes rapidly overgrown and close to impassable. A thick growth of bladder senna, dog rose and bramble, with spear thistle, nettle and abundant wild marjoram extends for approximately 150m before opening out into an open grassed track with minimal fringing scrub cover, bounded by open fields. Sparse hawthorn scrub in this area includes more oak than had previously been encountered.

11.3.106 Birds within this section of the route included goldfinch, carrion crow, green woodpecker, blackbird, chaffinch, yellowhammer (nine individuals counted), magpie, woodpigeon, linnet, whitethroat, great tit, willow warbler, long-tailed tit, song thrush and pheasant. Wall brown, peacock, meadow brown, large white, gatekeeper, speckled wood and small tortoiseshell butterflies were observed.

11.3.107 With open arable land on either side (TN33), the route progresses west to east comprising grassland with scattered patches of scrub and isolated trees. Species present include dog rose, hawthorn, nettle, rosebay willowherb, field scabious, and elder, with occasional oak trees.

11.3.108 Further to the east (TN34), a relatively long stretch of the route passes through a very open area of fields and the adjacent airfield, with occasional isolated scrub patches on its margins and wide, open land extending to both sides. Some trees present are relatively mature and have some potential as roosting sites for bats, however, no evidence of the presence of bats or holes or crevices in which they may roost were found. The Beck Brook and its associated mature hedgerow passes alongside the route within this section. Habitats present provide excellent potential reptile habitat, however, no signs indicating the presence of reptiles were apparent. Species present included crack willow, reed sweet-grass, yellow toadflax, rosebay willowherb, field scabious, yarrow, wild carrot, St John’s wort, great mullein, hawthorn and sloe, with occasional patches of bramble and oak trees. The section to the north of the Station Road was included within the reptile surveys, and 1 common lizard was found during the 2002 surveys of this area.
11.3.109 Within the area between Longstanton and Oakington (TN32 – TN 34) information has been received from separate surveys in the area and verified by further survey, that water voles are present along the Rampton ditch, where evidence is present of burrows, feeding stations, latrines, and other signs of feeding. In addition, verificatory surveys of this area also revealed the indicative ‘plop’ noise made by an individual entering the water. The information received also revealed that an otter print had been found at this location. However, no other signs of otters were found during the verificatory surveys.

11.3.110 Further information received has also identified the presence of both common lizard and grass snake within the habitats to the west of the route-line. This would be expected, and during further surveys of this section of the route, a possible common lizard was heard within the vegetation just north of Rampton ditch.

11.3.111 The information received from the Wildlife Trust also contained a record (April 2003) for a great crested newt within terrestrial habitat at the Rampton ditch.

11.3.112 Birds observed within this section of the route included whitethroat, collared dove, wood pigeon, kestrel, green woodpecker, yellowhammer, pheasant, and a peregrine falcon observed flying across the route evidently travelling between other sites. Butterflies seen included peacock, meadow brown, speckled wood, gatekeeper, wall brown and large white.

11.3.113 The generally open character of this area continues on the southern side of Station Road/Oakington Road, with the Beck Brook running immediately alongside the north of the route for the first part of its length.

11.3.114 From the Girton Road to the Station Road, Impington crossing (TN35) the route becomes substantially more enclosed by adjacent industrial and residential development to either side of the route. On entering the edge of Impington more mature trees are generally those on the northern side of the route at the edge of gardens. An area of community woodland (native planting) exists to the south of the line of the route immediately east of the stables across the line from the end of St Audrey’s Close, which have the potential to become a valuable ecological resource given time and appropriate management. Species present in this section included bladder senna, ash, sycamore, silver birch, bramble, hawthorn, crab apple, field maple, dog rose and Italian alder. Fewer birds were apparent in this area, those present including starling, collared dove, house sparrow, goldfinch, wood pigeon, song thrush, greenfinch, bullfinch and whitethroat. Invertebrates observed included the butterflies brimstone, large white, small blue, meadow brown, speckled wood and gatekeeper and the dragonflies common darter and migrant hawker.

11.3.115 Immediately east of the Station Road crossing there is an area of existing woodland bounded by a spur off Station Road, Bridge Road, and the disused railway line. This woodland is dominated by large and regenerating sycamore, but also contains holly, beech, elm and horse chestnut. Its understorey includes elder, ivy, bramble and some herbs, in particular wild carrot and wild arum, plus garden escapes flowering currant Ribes sp. and Mahonia sp.

11.3.116 From Station Road to the A14 underbridge (TN36) the route becomes more open along the southern edge, with a dense, deciduous woodland edge along the northern margin of the route. A lake to the south of the route at its approach to the A14 underbridge, which was constructed as part of the A14’s drainage strategy, is slowly developing into an area of ecological value. Already the lake and its margins provide excellent invertebrate and bat foraging habitat, especially in association with the nearby woodland areas. The pond contained clear water and numerous small fish were observed in shoals close to the shore. An evening emergence survey for bats was undertaken during September 2002, and revealed the presence of foraging bats over and around the lake, although no roost sites were identified.
Species present in this area included hawthorn, ash, turkey oak, wild service tree, willow, common reed, sycamore, oak and Norway maple. Birds observed included mallard, coot, mute swan and great crested grebe on the pond, and wood pigeon, green woodpecker, blue tit, wren and song thrush in the wider area. The butterflies Essex skipper, large white, gatekeeper, peacock and meadow brown were seen as were migrant hawker, brown hawker, black-tailed skimmer and common darter dragonfly and common blue damselfly.

Section 6 - A14 to Cambridge Railway Station

11.3.117 (See Phase 1 Habitat Survey Figures 16 & 17 in Appendix 11A. Alpha-numeric codes refer to those target notes which are marked on Figures 3 & 4 in Appendix 11B.)

11.3.118 From the A14 underbridge to Milton Road (TN37) the habitat within the disused railway corridor is of fairly open character with long grass and scrub margins which extend into adjacent habitats where these are not residential and commercial properties or roads. Species present within this section include bramble, butterfly-bush, hawthorn, dog rose, birch, mugwort and wild carrot with notable garden escapes including Cupressus conifers, damson, Cotoneaster and everlasting sweet pea that appear to have become naturalised. Birds observed included blue tit, collared dove, goldcrest, magpie, starling, blackbird, carrion crow, robin, song thrush, goldfinch and house sparrow. The butterflies meadow brown, peacock, large white, ringlet and small tortoiseshell, and dragonflies migrant hawker, common darter and black-tailed skimmer, and common blue damselfly, were also present.

11.3.119 To the east of the A14 underbridge, adjacent to and on the south side of the disused railway between it and King’s Hedges Road, lies the King’s Hedges Triangle/Scrub CWS. This small area of grassland and scrub has been designated as a CWS on the basis of its neutral grassland and associated hedgerows.

Arbury Park

11.3.120 One section of the CGB guideway would be constructed along the margin of the Arbury Park proposed development area. This site has been subject to separate surveys as part of an Environmental Statement for the proposed development. Results of the habitat surveys and ecological assessment undertaken as part of this ES have identified the existing Arbury Park site as comprising an agricultural field, rank grassland areas with several hedgerows crossing the site. Several hedgerows within the site have been identified as important under the Hedgerow Regulations and link with the Kings Hedges Triangle important hedgerow. The site is bounded to the north by the disused railway line. Additional surveys of the site were undertaken including surveys for reptiles, breeding birds, and water voles.

11.3.121 The results of the breeding bird survey revealed poor numbers of individuals and species, although a number of species listed on the Red and Amber list of bird species were recorded.

11.3.122 The reptile survey revealed the presence of a small population of common lizards, and common frog were additionally recorded.

11.3.123 No suitable habitat for water voles was found present within the site.

11.3.124 The route would continue from Arbury Park down the Histon Road. At the northern end of the road, the eastern margin comprises a hedgerow, beyond which are allotment gardens (underneath which is the Histon Road Geological SSSI see Section 12). Continuing south the margins of the road comprise buildings, predominantly residential.
Science Park to Chesterton Sidings

11.3.125 The area of disused railway which passes alongside the Science Park comprises grassy banks with scattered scrub. The substrate here is quite sandy, and the northern side comprises embankments at the boundary with the Science Park. This area provides suitable habitat for a variety of fauna including birds, invertebrates and reptiles. This area was therefore included in the reptile surveys, and common lizards were found during both the 2002 and 2003 surveys.

11.3.126 The Chesterton Sidings section of the disused railway is narrow, with a similar habitat composition to the Science Park section, including scrub (both mature and saplings), rank vegetation, grassland, and bare ground. Further from the main road, the corridor becomes more open with grassland and bare ground dominant. Again, the area provides good invertebrate, small bird and reptile habitat, in particular.

City Centre

11.3.127 As the route continues south onto the existing roads from the disused railway at the Science Park, it would run on Milton Road. The margins of this road comprise planted Cherry trees, which form an avenue along this section of the road. They are of low ecological value.

11.3.128 Within Cambridge city the route passes adjacent to the northernmost point of the designated section of the Bin Brook CCWS, and approximately 50m from the Drain at Garret Hostel Lane CCWS, both of which contain breeding populations of water voles. In addition, the route passes 50m to the east of Little St Mary’s Churchyard CCWS and adjacent to the Cambridge Botanic Garden CCWS and Emmanuel College Gardens CCWS.

11.3.129 The route would continue through the city alongside Christ’s Pieces. This is an area of parkland, with a line of mature trees along the margin of the road.

11.3.130 Other than the above sites, no significant ecological resources are present along the proposed route of the Scheme through Cambridge city.

Section 7 - Cambridge Railway Station to Trumpington

11.3.131 (See Phase 1 Habitat Survey Figures 18-20 in Appendix 11A. Alpha-numeric codes refer to those target notes which are marked on Figure 4 in Appendix 11B.)

11.3.132 The line of the disused railway continues to the south of Cambridge (TN 38) as a mosaic of habitat types dominated by formative scrub and open grassland.

11.3.133 Empty Common CCWS lies approximately 35m from the line of the route at its closest point. This area of scrubland associated with the adjacent chalk stream (Hobson’s Conduit) is of value as a scrub habitat. It lies adjacent to and is contiguous with Bentley Road Paddocks CCWS.

11.3.134 Bentley Road Paddocks CCWS is located approximately 25m to the west of the line of the route approximately 50m north of the Long Road underbridge. This site, separated from the line of the route by an area of playing fields and tennis courts, comprises neutral grassland and is also associated with a chalk stream (Hobson’s Conduit).

11.3.135 Isolated land enclosed by and including the operating railway and line of the disused railway immediately north of Long Road (TN 39) is designated as Triangle North of Long Road CCWS. This site contains a mixture of habitat types including calcareous and neutral grasslands and is known to have contained nationally scarce plant species in the past.
11.3.136 The route passes south beneath Long Road, which is heavily vegetated with mature deciduous woodland dominated by oak and ash on both embankments. The southern embankment of Long Road to the west of the line of the disused railway has been designated as Long Road Plantation CCWS on the basis of its broadleaved woodland.

11.3.137 Immediately south of this area the route passes through open farmland and across Hobson’s Brook. The section of disused railway from Long Road to Hauxton Road (approximately 2km in length) is designated as Trumpington Dismantled Railway CWS. This designation is placed primarily because the site supports a population of the nationally scarce species spreading hedge-parsley *Torilis arvensis* that was recorded from here by the Wildlife Trust in 1991 (see paragraph 11.3.184). In addition, the site qualifies as neutral grassland and contains scrub blocks of further local ecological value.

11.3.138 Hobson’s Brook is itself designated a CCWS along most of its length on the basis of it being a chalk stream, and containing pollarded willow trees. In the section where it is crossed by the line of the route (Hobson’s Brook Mid CCWS) the stream banks are dominated by mesotrophic grassland species with patches of tall herb. Marginal and emergent vegetation within the brook itself include water forget-me-not and water figwort in addition to other common species.

11.3.139 Continuing beyond the Hobson’s Brook crossing, still within the Trumpington Dismantled Railway CWS, (TN40), to the east, agricultural land of low inherent ecological value is present on the near and far sides of the operating railway line which runs to the east of the disused line. This farmland comprises open arable land on which a *Brassica* crop is currently planted. The existing railway line severs this agricultural land but does not form a corridor of vegetation at this point, and the whole area remains extremely open in character. Notwithstanding the presence of perennial flax, the area is generally of very low ecological value. Hedges and adjacent woodland areas at the extreme edges of the agricultural land do have some value as refuge for wildlife and potential nesting habitat for birds, but are generally also of low ecological value.

11.3.140 Further south, after passing into a cutting between residential areas of Trumpington (TN41), the line of the disused railway (still part of the CWS) becomes densely vegetated and almost impassable. Species present within this section include white poplar, sycamore, oak and ash. Sparrowhawk were observed with a nest and recently-fledged young within the cutting section, while yellowhammer, skylark and meadow pipit were observed in the open agricultural areas. Common frogs were present in large numbers in a ditch running alongside the disused railway line within the cutting at the time of survey.

**Section 8 – Link to Addenbrooke’s Hospital**

11.3.141 The link between the Addenbrooke’s Hospital and the disused rail line follows a footpath through an area of agricultural land. The habitat comprises a complex of open, arable land. To the east lies the Hospital Grounds and to the west, the existing rail line and then more arable land. The arable land contained no features of note, but the CGB crosses Hobson’s Brook CWS mid-section which flows northwards, the Addenbrooke’s link commencing at this point where the Brook is crossed: Linnet, meadow pipit and woodpigeon were present in these areas.

11.3.142 Extensive rabbit activity was noted in the existing mainline rail embankment (London to Cambridge line) running north-south from the western end of the tree line to the north of the link.
Species-Specific Ecological Issues

Badgers

11.3.143 Badgers are strictly protected in the UK by the Badgers Act 1992 and the Wildlife & Countryside Act 1981, making it an offence to intentionally kill, injure or disturb badgers, or to damage, or prevent access to and from a badger sett. This protection exists largely for animal welfare reasons in reaction to illegal gassing of badgers in their setts and badger baiting activities, and as such protection covers not only the animals themselves but also their setts. All information pertaining to badgers has been dealt with in a confidential appendix (Appendix X) bound separately from this report.

Bats

11.3.144 All native species of bat are strictly protected in the UK by the Wildlife & Countryside Act 1981 and also under the Conservation (Natural Habitats &c) Regulations 1994. This protection makes it illegal to intentionally kill, injure, capture or disturb bats, and to damage, destroy or prevent access to roost sites.

11.3.145 For this reason, potential bat roosting sites along the length of the Scheme have been identified. Dusk assessments of these potential roost sites have been subsequently undertaken using ultrasonic detection equipment to identify any emergent bats.

11.3.146 Bat roosting sites tend to be of two broad types:

- buildings and structures, such as in this case, former station platforms and bridges, that, should they provide roosts, are most likely to provide overwintering (hibernation) sites; and
- roosting sites within standing dead or hollow trees, trees with holes made by woodpeckers or similar, or trees with open, broken crowns. These sites are most likely to serve as summer overnight roosting sites or nursery roosts for bats with young.

11.3.147 The potential of existing structures and mature trees to be used as bat roosting sites has been assessed during the course of the surveys undertaken.

11.3.148 The structures affected by the Scheme are generally either unsuitable for use as roosts or, in the case of most bridges, have been sufficiently maintained so as to prevent the appearance of structural cracks or crevices that may make then suitable as bat roosting sites. Not all parts of all structures, however, were able to be visually examined, for example, due to overgrowing vegetation, and therefore some potential does remain for such structures to support roosting bats. However, checks for emergent bats have been made of those locations considered to have the greatest potential. One structure – Windmill Bridge, Longstanton Road has been identified as possibly representing a transient roost site for 45kHz pipistrelles. Activity was detected during an evening emergence survey undertaken during September 2002. A repeat survey undertaken during August 2003 did not detect use of the bridge as a roost site, but the area was being used for foraging by 45kHz pipistrelles, and possibly also a brown long-eared bat. It was concluded that the bridge may be used as a transient roost site.

11.3.149 An emergence survey was also undertaken at four culverts along the route at Fen Drayton, during September 2003. Both 45kHz and 55kHz pipistrelle bats were recorded at these locations although no roost site was identified. The bats were recorded foraging along the route-line, and alongside the route. It is likely that, based on the behaviour of the bats (passing in quick succession), a roost site is located only a short distance from this area.
11.3.150 An evening emergence survey was also carried out in August 2003 at the River Great Ouse Bridge. No bat roost was detected, with only foraging Daubentons’ bats recorded over the river surface.

11.3.151 Potential tree roost sites are less frequently encountered along the line of the disused railway section of the route than those that occur in hedgerows and woodland adjacent to or at some distance from the route itself. This is likely to be a function of the comparatively young age of the vegetation along the length of the route, and the fact that most larger trees within the route corridor are of more rapidly-growing species, notably sycamore, which are generally unsuitable for use by roosting bats. Along the sections of the route that would run along existing roads, some mature trees that may provide roost sites are present. Where trees that have the potential to serve as bat roosting sites have been identified, assessments have subsequently been made to determine whether or not they are used. Dusk surveys have established that while the disused railway corridor of the route is extensively used by foraging bats (including pipistrelle, serotine, and myotis species), none of the trees within this section with potential to serve as roosts were actually used. Although this may at first appear surprising, the number of such potential roost sites within the route corridor is very small, with the bulk of such trees at the western end of the route near St. Ives. An examination of the availability of potential roost sites within the wider area of the disused railway corridor shows significantly larger numbers of more mature trees with the potential to provide roost sites associated with hedgerows north and south of the route and beside gravel pit lakes between St. Ives and Longstanton, as well as in association with mature woodland blocks north and south of the route between Longstanton and Cambridge.

11.3.152 Along the route section between St Ives and Huntingdon, several potential tree roosts have been identified. These are three mature ash trees along the boundary of the St Ives Golf Course and the A1123, up to six mature crack willows along the boundary of the A1123 with the Wyton Lakes Holiday Park, and a mature oak tree within the Old Houghton Road double hedgerow. Evening emergence surveys have been undertaken on the trees at the golf course and at the Holiday Park. Results of these surveys revealed that foraging occurs, and that the ash trees at St Ives Golf Course and willow trees at Wyton Holiday Park may provide transient roost sites.

11.3.153 An evening emergence survey was also undertaken during September 2003 at a single mature oak tree along the Old Houghton Road. No bats were recorded emerging from the tree. Much bat activity was detected during this survey, with both 45kHz and 55kHz pipistrelle bats commuting and foraging along the hedgeline which borders the south of the Old Houghton Road, in which the oak tree is located.

11.3.154 The habitats present along much of the CGB route are likely to provide good foraging areas for bats.

Birds

11.3.155 All species of bird are protected while breeding in the UK under the Wildlife & Countryside Act 1981 (xii). In addition, several species that have been recorded in the vicinity of the Scheme receive special protection by law:

- **bittern** – this species receives special protection under Schedule 1 of the Wildlife & Countryside Act 1981. Records have been received of overwintering bittern within the gravel pit lakes at the Fen Drayton Nature Reserve.

- **kingfisher** – this species is afforded special protection by the Wildlife & Countryside Act 1981(xii) and the EU Birds Directive (vi). Kingfisher are known to be present and to breed within the Great Ouse corridor and have been
observed during the surveys undertaken for this Environmental Statement at locations on the River Great Ouse upstream and downstream of the proposed crossing point, as well as foraging at the fringes of the associated water bodies on either side of the proposed route east of this point. In addition, kingfisher are known to breed along some stretches of the Hobson’s Brook. However, within the section at Trumpington, the habitat is not suitable for breeding. They may forage in this area during the winter;

- peregrine – a single peregrine was observed in high-level flight passing over the line of the proposed route. This species is considered an incidental sighting and not to have originated locally or to be in any way likely to be affected by activities within the route corridor.

11.3.156 A wide range of less scarce bird species has been observed along the length of the route. These are using habitats within the route corridor for breeding and feeding. These species include several which have been included on the Royal Society for the Protection of Birds (RSPB) Red List of birds that are considered to be at particular risk and of conservation concern as follows:

- turtle dove – UK numbers have declined dramatically in the last 28 years. A Biodiversity Action Plan has been prepared for this species by RSPB and English Nature. This species was observed roosting in hedges along the route of the corridor and individually and in pairs on telegraph wires close to the route, probably in preparation for migration. No specific habitats within the route corridor are considered to be an essential resource for this species;

- song thrush – a species whose numbers are considered to be in serious decline in the UK. This species was observed foraging along the length of the route in hedges and adjacent habitats. It is highly likely to use hedges along the length of the route as nesting habitat;

- bullfinch – a species that had dramatically declined in numbers in the UK over the last 25 years and for which a species Biodiversity Action Plan (BAP) has been prepared by RSPB and English Nature. Bullfinches are relatively abundant within the route corridor and were observed feeding in trees and scrub vegetation (2001) and on emergent tree buds (2002). In addition, this species is likely to use hedgerow and scrub habitats within the route corridor as nesting habitat.

- yellowhammer – this species was identified along the route on the A1123, and at areas along the disused railway, and is likely to be using the farmland and wooded areas along this section of the route.

- starling – starling were occasionally observed in small flocks either perched on telegraph wires or foraging immediately adjacent to the route. It is possible that starlings use parts of the vegetation along the route as nesting habitat;

11.3.157 Bird species that are of lesser, but nevertheless of some conservation concern because of declines in numbers within the UK are included on the RSPB’s Amber List. Of those species listed, the following were found within the route corridor:

- teal – observed at a distance on water bodies adjacent to the route corridor;

- pochard – observed at a distance on water bodies adjacent to the route corridor;

- kestrel – observed hovering above grassland areas within the route corridor and perched on fence-posts at and adjacent to the corridor. The colonising habitats typically occurring within the disused railway corridor, in particular in the more open areas, are ideal foraging habitat for this species although this species is
likely to nest elsewhere where more mature trees or other appropriate structures occur;

- oystercatcher – observed flying above and across the route corridor in passage between water bodies. This species is not associated with habitats within the route corridor;

- lapwing – individuals and small numbers of lapwing were seen feeding in fields and open grassland areas adjacent to the route corridor. This species is not directly linked to habitats within the route corridor itself;

- green woodpecker – several sightings were made and numerous calls detected from this species present within over a wide area that included the route corridor. Green woodpecker are likely to be feeding in fields and marginal scrub areas on either side of the route and to nest within woodland blocks outside the route corridor;

- sand martin – this species was occasionally observed feeding in flight on small flying invertebrates within the route corridor, in the St. Ives waterbodies section of the route. No suitable nesting habitats for this species were found along the length of the route, but a large mound of sand to the west of the continuation of Holywell Ferry Road north of the line of the proposed route (within operational gravel works), at a distance of approximately 250m from the route, did support a sand martin colony and is considered likely to be the source of this species in the locality;

- swallow –numerous swallows were observed feeding in flight on small flying invertebrates at locations within and adjacent to the disused railway corridor all along its route. No suitable nesting habitats for this species were observed along the route.

### Reptiles

**11.3.158** All British native reptile species are afforded at least some level of protection under the Wildlife & Countryside Act 1981 (as amended) \(\text{xiii}\). Common lizards, grass snakes, adders and slow worms are protected from killing and injury only. Protection is not extended to their habitat. Large sections of the length of the route have the potential to support reptiles, and grass snakes have been observed crossing the line of the route as incidental sightings by those working on the Scheme. A thorough search of suitable habitats and possible refugia was undertaken during the 2001 surveys, although no evidence of reptiles was found. Common lizards and grass snakes have, however, been recorded as being present within CWS designated areas in the Cambridge to Trumpington section of the route, and there is every reason to expect these animals to be present in suitable habitats throughout the length of the route. Surveys were therefore undertaken during September 2002 and September 2003 at selected locations providing particularly suitable habitat. These surveys confirmed the presence of common lizards at many locations along the route, though no other species of reptile were found. Of those areas surveyed, common lizards were found present at the following locations (see Figures 1-4 Appendix 11C):

- Fen Drayton;
- Adjacent to the River Great Ouse at the railway/route crossing;
- Swavesey Priory;
- Over;
- Oakington;
During both surveys, only low and very low population levels were recorded. These levels have been determined based on a scoring system which is used in order to establish the size of reptile populations\textsuperscript{xiv}. The system is based on the ‘maximum number of animals seen by observation and/or placed under refugia at a density of up to 10/ha, by one person in one day.’ This system is not ideally applicable to linear sites such as the railway, but it has enabled an estimate to be made of the likely population levels of common lizards found at each hotspot. Based on a calculation of the density of refugia placed, in all cases, the results give rise to only low and very low population sizes. The weather was unusually hot and dry during September 2003, and is likely to have resulted in a reduction in activity of many reptiles. The lower numbers of reptiles found in 2003 compared to those during 2002 is attributed to this hot weather. Taking this into account, population sizes are still considered to be low and very low.

The results confirm that reptiles are present along the route where suitable habitat exists. Although common lizard was the only species recorded during the surveys, incidental information suggests that grass snakes are also present. Reptiles are able to travel over quite large distances between foraging, hibernation and refuge areas, and hence may be present in transit within parts of the route that are otherwise unsuitable for them.

Amphibians

Smooth and palmate newts are only protected against sale under the Wildlife & Countryside Act 1981 (as amended)\textsuperscript{(xii)}. However, great crested newts receive full protection under both the Wildlife & Countryside Act 1981 (as amended)\textsuperscript{(xii)} and also under The Conservation (Natural Habitats &c.) Regulations 1994\textsuperscript{ xv}.

Ponds and ditches along the length of the Scheme were identified during the course of the 2001, 2002 and 2003 surveys and assessed for their likely potential for use by great crested newts. All ponds and ditches within the vicinity of the route are considered likely to have value for common amphibians such as common frog and toad, but have lower potential suitability to support great crested newts. Great crested newts receive special protection and for this reason warrant special consideration. Pond netting was carried out during 2001 on selected ponds that would be affected by the Scheme, where safe access was feasible. No evidence of great crested newts was found at these locations. Additional surveys were undertaken during September 2002 and August and September 2003. No evidence of the presence of great crested newts was found. The only evidence of the presence of any species of newt was one juvenile smooth or palmate newt, which was found underneath a refuge placed during the reptile surveys of 2002 at Fen Drayton.

Common frogs were observed during the course of the surveys and it is considered highly likely that this species occurs in the majority of ponds throughout the length of the Scheme.

A single record is held by the Wildlife Trust of a great crested newt within terrestrial habitat at the Rampton Ditch. This record is from April 2003 (see Figure 3 Appendix 11C).

Many of the water bodies surveyed, including those that would be lost to the Scheme, are sub-optimal for use by great crested newts. It is possible, however, that small numbers of great crested newts may be incidentally present within water bodies and terrestrial habitat in proximity to the route. Prior to any works, further great crested newt surveys of those waterbodies identified should be undertaken in accordance with the guidelines (English Nature 2001). This would enable an appropriate mitigation strategy to be implemented as
may be necessary.

Water Voles

11.3.166 Water voles themselves are not specially protected, but the Wildlife and Countryside Act 1981 (as amended) (xiii) allows for the protection of their habitat such that Section 9 - 4(a) makes an offence ‘damage to, destruction of, obstruction of access to any structure or place used by a scheduled animal for shelter or protection’, additionally Section 9 - 4(b) makes an offence the disturbance of an animal occupying such a structure or place’. There is no provision for such activities undertaken as part of development works to be licensed as with other species such as great crested newts. Therefore, any such works undertaken which may result in effects on water voles habitat must ensure that ‘due attention is paid to the presence of water voles, and appropriate actions taken to safeguard the places they use for shelter and protection’.

11.3.167 Thorough searches were made for signs of the presence of water voles at ditches and other watercourses in close proximity to and which cross beneath the line of the route. Evidence of water voles (see Figures 2 & 3 in Appendix 11C) was found at Rampton Ditch where it passes beneath the disused railway line between Longstanton and Oakington. Numerous signs of water voles were found in this ditch. These included hearing the characteristic sound made by an individual water vole entering the ditch at the time of the survey, plus observations of two to three probable burrows, a possible feeding station and either a nest or a tunnel through the bankside grass. Due to the low water levels and the recent mowing of one of the banks, it is considered likely that the majority of activity has now shifted to a contiguous section of the ditch, where this runs parallel to the disused rail line, as water levels there had remained high.

11.3.168 In addition, during surveys of the Swavesey Drain, TN29, a small mammal was heard chewing within the bankside vegetation, approximately 75m from the confluence with the route. A hole was also noted within the bank at this point, and droppings likely to be those of water vole were present.

11.3.169 The Wildlife Trust hold records (from 2001) of the presence of water voles along the Swavesey Drain further to the south of the route at Over, Longstanton Road. A record from 2000 is held of water voles along the Beck Brook at Oakington.

11.3.170 No evidence was found of the presence of this species at the other streams and ditches that were surveyed, but, thorough assessments were made of the habitat suitability for water voles at these locations. It is considered highly likely that water voles are present within some of these ditches and streams and in the wider stream network, along the disused railway line and along the route between St Ives and Huntingdon, particularly along the A1123.

11.3.171 Breeding water voles are known to occur at the Bin Brook CWS and the Drain at Garret Hostel Lane CWS to the west of and extending within Cambridge city.

Otter

11.3.172 No evidence of the presence of otters has been found throughout all surveys undertaken of the route, and consultations with the relevant nature conservation organizations have not revealed any records for otters within the area. However, survey information received from WSP Environmental (i) includes evidence of otters on the Rampton Ditch in close proximity to the route. Otter footprints were found in this area. However, further survey of this area did not find additional evidence of otters.
**Invertebrates**

11.3.173 The scarce chaser dragonfly is a locally occurring, but nationally rare, species of dragonfly that is present and was observed foraging at the Great Ouse margins downstream of the bridge and proposed crossing point of the route and this river. Special attention was given during the course of the surveys to distinguish males of this species from the similarly coloured black-tailed skimmer dragonfly that is present on water bodies to the east and widespread in association with pond margins alongside the route.

11.3.174 Scarce chaser is a species typically associated with river floodplains, water meadows and, occasionally, gravel pits (Brooks & Lewington, 1999) with a flight season from May to August. It shows a preference for backwaters and slower-flowing areas of rivers, though tends to avoid heavily shaded areas. Common reeds are typically used for larval emergence supports. Adult males are strongly territorial, and tend not to stray far from these regularly patrolled areas.

11.3.175 Following terrestrial and some aquatic invertebrate surveys of the route during autumn 2003 results have been obtained. The full survey report is presented in Appendix 11D. Those results of particular importance are summarised below.

11.3.176 In addition to the scarce chaser dragonfly, a number of other nationally scarce invertebrate species have been recorded along the route – mostly within the County Wildlife Sites at the western end of the route.

11.3.177 The Riverside Park CWS is likely to have County significance in respect of saproxylic fauna found in the mature pollards of the site. This includes the presence of a nationally scarce beetle *Eledona agricola*.

11.3.178 The Meadow Lane Gravel Pits CWS is considered likely to be of County significance with a diverse aquatic and wetland fauna present including water beetles. In one of the linear pools present five nationally scarce species of water beetle were recorded, one of which *Chaetarthria seminulum* was recorded nowhere else along the route.

11.3.179 An outstanding assemblage of scarce chaser dragonfly was recorded at the Meadow Lane CWS, and additionally at the River Great Ouse. The remaining fauna recorded here was considered to be of County significance.

11.3.180 At the Fen Drayton Gravel Pits CWS further outstanding assemblages of the scarce chaser dragonfly were recorded. Additionally good assemblages of water beetles were recorded, including 12 nationally scarce species and one red data book species. The site is considered to be of County significance.

11.3.181 The Over Railway cutting contains the grizzled skipper butterfly, which is of County significance, in addition, a nationally scarce beetle *Trichosirocalus barnevillei* was recorded during the surveys.

11.3.182 These findings refer to those which are considered to be of County significance. In addition a number of results were obtained which indicate that many of the sites surveyed also have several Nationally Scarce species present and a number of sites are of local significance based on the invertebrates present (see Appendix 11D).

11.3.183 Recommendations have been made for further survey in certain locations which have been based on the significance of invertebrate potential and/or the likely significance of impacts. The surveys would be required at the detailed design stage, and in each case, a level of priority for the survey has been given (see Invertebrate Survey Report Appendix 11D).
Nationally Scarce Flora

11.3.184 Four species of nationally scarce (defined as species recorded from between 16 and 100 ten-kilometre OS grid squares in Britain) plant have been recorded as present within the Cambridge to Trumpington section of the route on the line of the disused railway. These are:

- perennial flax *Linum perenne* – a native perennial species typically found growing in scattered locations in calcareous grassland (this species was formerly recorded from the disused railway line between Shelford Road and Long Road). Perennial flax shows a very local distribution nationally, mainly in the east of Britain;

- spreading hedge-parsley *Torilis arvensis* – an annual which is considered likely to be introduced and which is associated with arable land, which has suffered recent declines as a result of herbicide usage. This species is found mainly as a casual in southern England. As is the case for many annual species, this plant is expected to vary substantially in numbers and distribution each year. This species was formerly recorded within the disused railway line between Shelford Road and Long Road but was concluded to be probably locally extinct from ecological studies undertaken for an earlier version of the Scheme (Adams Loxton Partnership, 2000)\textsuperscript{xviii}. This species is the primary reason for designation of the Trumpington Dismantled Railway CWS;

- twiggy mullein *Verbascum virgatum* – a biennial native species, typically found in waste places and dry banks. This plant is a poor competitor and tends only to be found in suitable sparsely vegetated areas often as a coloniser of disturbed habitats and a garden escape (recorded in the past from the Triangle North of Long Road CCWS). Twiggy mullein is noted as a fairly frequent casual in waste places throughout Britain; and

- dittander *Lepidum latifolium* – a rhizomatous native perennial species typically associated with coastal areas and naturalised on waste areas throughout inland Britain. This species was first recorded as locally present during surveys undertaken in 2000 for an earlier version of the Scheme (Nathaniel Lichfield & Partners, 2002)\textsuperscript{xx}.

- **NB:** the term ‘casual’ refers to an alien plant which has not become naturalised.

11.4 Consultation

11.4.1 Consultations have been undertaken and the primary bodies consulted in respect of ecological resources included:

- English Nature;

- The Wildlife Trust for Bedfordshire, Cambridgeshire, Northamptonshire and Peterborough;

- Cambridgeshire County Council and in addition the relevant District Councils;

- Cambridgeshire Badger and Otter Group.

11.4.2 Consultations with the Wildlife Trust have revealed the presence of a number of locally designated sites which lie within or adjacent to the proposed route. These include County Wildlife Sites and Cambridge City Wildlife Sites. These sites have already been described in this ES as part of the description of baseline conditions (See Section 11.3).

11.4.3 Species records received from the Wildlife Trust include records for water voles, bittern, and
great crested newts, within the Scheme area, which have been described elsewhere in this section.

11.4.4 Additionally, consultation with English Nature has revealed that a number of records of protected species are held for areas around the route. Many of these are not within the route-line, and are located in areas which would be unaffected by the Scheme. However, some of the records have been verified by the original surveys undertaken, and include those within areas which may be affected by the Scheme. These have been discussed elsewhere in this section.

11.4.5 Consultation with the Cambridgeshire Badger and Otter Group is described within Appendix X.

11.5 Relevant Guidance

11.5.1 Details of the relevant ecological policies are noted in Section 6 of this ES, Planning Policy Context.

Biodiversity Action Plans (BAP)

11.5.2 A BAP has been produced for Cambridgeshire which includes the following species and habitat action plans which are relevant to the Scheme:

**Species Action Plans**
- great crested newts;
- song thrush;
- water vole;
- otter;
- pipistrelle bat;

**Habitat Action Plans**
- arable land;
- drainage ditches;
- parks, shelterbelts and open spaces;
- ponds;
- roadside verges;
- scrub;
- veteran trees and parkland;
- broadleaved, mixed and yew woodland;
- rivers and streams;
- standing open water and canals;
- ancient and/or species rich hedgerows;
- cereal field margins;
coastal and floodplain grazing marsh;
• lowland calcareous grassland; and
• reedbeds.

11.5.3 For each of these species and habitats, a set of targets and objectives has been identified within the BAP. Where possible, the mitigation measures and compensatory measures proposed in respect of the Scheme would aim to be consistent with these targets, and during the detailed design stage, all efforts would be made to ensure that these measures are in accordance with the BAP targets. Where these BAP targets have been affected and there is potential for meeting targets it has been noted within the Summary Table at the end of this section.

11.6 Assessment

Designated Sites

11.6.1 There are several biological SSSIs in proximity to the Scheme, the nearest of which is Port Holme SSSI which is also a candidate Special Area for Conservation (cSAC). This site lies immediately south of the A14 at Huntingdon. No works are proposed to this section of the route, and this site should not be affected by the Scheme. All other biological SSSIs within the surrounding area of the route-line do not lie within close proximity to any areas which would be affected by the works, and hence there would be no impacts on any of these sites. No nationally or internationally designated sites would be affected by the Scheme.

11.6.2 The nearest geological SSSI in proximity to the Scheme is adjacent to Histon Road at an area of allotments. The effects on this site have been addressed within Section 12.

11.6.3 A number of County Wildlife Sites and Cambridge City Wildlife Sites would be affected by the Scheme, a rough estimate of the area of these sites to be lost has been made and equates to approximately 16.8 hectares. The specific effects on these sites are detailed below.

11.6.4 Road widening works are proposed along the B1514 in Huntingdon for the inclusion of a new bus lane. Landtake would be required along the western margin of the Riverside Park CWS. This would therefore result in the loss of the vegetation and habitat here, and it is likely that the semi-mature trees which line this margin would be lost, in addition to a species-poor managed hedge. The effects would be unlikely to jeopardise the designation of the area. There is also a risk of potential indirect effects such as from pollution during both construction and operation. Given the designated status of this area, and without mitigation, these effects would be moderate adverse.

11.6.5 The River Great Ouse in this section would not be directly affected by the Scheme. This site lies to the south of the CGB route and associated works. However, there are risks of indirect effects such as from potential pollution, and without mitigation, and given the designated status of this site, the effects could therefore be potentially slight adverse.

11.6.6 Between the proposed St. Ives Park and Ride site and the River Great Ouse the route runs along the northern boundary of the southern section of Meadow Lane Gravel Pits CWS. The major part of this site would not be affected by the Scheme, although some infilling of a fishing pond would be required. The remainder of the land take required would take place at the northern edge of some water bodies adjacent to the line of the disused railway where embankments of the new guideway would require some infilling of the lake margins. This would not cause effects that would jeopardise the designation of this site. However, potential exists for indirect adverse effects to occur such as those caused by pollution from surface...
runoff or through the accidental spillage of materials, both during construction and operation of the Scheme. Without mitigation, and given the designated status of the site, these are considered to represent moderate adverse effects of the Scheme.

11.6.7 At the River Great Ouse CWS, although the river crossing would use an existing bridge structure (hence posing substantially less risk of adverse effects on ecological resources than would a brand new, additional crossing point in the vicinity), reinforcement of this structure is required together with works on at least one of the existing bridge piers to accommodate the new proposed bridge. These works would require the temporary acquisition of land around the northern and southern sides of the bridge on both banks that would require localised clearance of vegetation. Scrub communities and some trees including a single large oak and possibly willows fringing the adjacent gravel pit lake to the south-west (none of which provide potential bat roost sites) would be cleared. Although the major proportion of the land affected would be returned to its current use following completion of the works, given the designation applied to the River Great Ouse, without mitigation this is considered to be a moderate adverse effect.

11.6.8 The route runs along the line of the disused railway west to east roughly along a centre-line through Fen Drayton Gravel Pits CWS over a distance of approximately 3.6km. This part of the route would not require direct land take from water bodies on either side of the route and the large size of this designated area means that the effects of construction and operation of the proposed route would not cause effects of sufficient magnitude to adversely affect the designation of this area. In addition, much of the line of the route through Fen Drayton Gravel Pits CWS currently comprises a concrete road. This road does not provide any ecological value and the area that it covers has been discounted from the calculations of area to be lost as a result of the Scheme for this reason. However, land take would occur at the fringes of the guideway corridor and this has been included within the calculations. Furthermore, potential exists for indirect adverse effects to occur, such as those caused by pollution from surface runoff or through the accidental spillage of materials, both during construction and operation of the Scheme. Without mitigation, given the designated status of the site, these are considered to represent a moderate adverse effect of the Scheme.

11.6.9 The major part of Swavesey Meadows CWS, which abuts the southern side of the disused railway, would not be affected by the Scheme, but some land take would be required from the northern boundary of this site as a result of the Scheme. This represents a moderate adverse effect of the Scheme.

11.6.10 Similarly, Middle Fen abuts the route and for a distance of approximately 25m some hedgerow would be removed from the boundary of this site. The direct land take required for this, without mitigation, represents a moderate adverse effect of the Scheme.

11.6.11 Mare Fen CWS to the north of the line of the proposed route at Swavesey would not be directly affected by the Scheme, but potential exists for indirect effects to take place here and at Middle Fen CWS through pollution from surface runoff through accidental spillage of materials. Given the designation of this area without mitigation such effects at both sites are considered to be moderate adverse effects of the Scheme.

11.6.12 The Scheme would result in the total removal of the Over Railway Cutting CWS. Over Railway Cutting CWS is designated in respect of the presence of a large population of grizzled skipper butterfly. This area would be lost entirely as a result of the Scheme. Without mitigation this is considered to be a major adverse effect of the Scheme.

11.6.13 The route runs adjacent to the northern boundary of the King’s Hedges Triangle/Scrub CWS immediately east of the A14 underbridge. This site is located immediately east of the
proposed junction of the route between the west-east Milton Road section and north south section into the east of Cambridge. The junction itself lies within the field to the west of the designated area. The hedgerow forming the northern boundary of this site (approximately 25m in length) would be retained, and hence the effects of the Scheme on this site would be negligible.

11.6.14 The route passes immediately adjacent to the northeastern extreme point of the designated section of the Bin Brook CCWS and approximately 50m northeast of the Drain at Garret Hostel Lane CCWS. Within this section of the route CGB buses would use existing roads and no construction works would be required for the route at this point. No direct or indirect impacts would therefore take place at either of these sites. Effects on these sites are therefore considered to be not significant.

11.6.15 The route also passes within 50m of Little St Mary’s Churchyard CCWS and adjacent to the Cambridge Botanic Gardens CCWS and Emmanuel College Gardens CCWS. Again, at these locations the CGB vehicles would make use of existing roads and no construction works would be required. No impacts would occur at these sites. Effects on these sites are therefore considered to be not significant.

11.6.16 Empty Common CCWS and Bentley Road Paddocks CCWS are separated from the line of the route by an area of intervening playing fields and tennis courts. These sites would both be unaffected by the Scheme. Effects of the Scheme at both sites are therefore considered to be not significant.

11.6.17 For a length of approximately 60m, the route passes along the western perimeter of the Triangle North of Long Road CCWS. Land take would occur from this site as a result. The major part of the site, however, including the majority of the areas of calcareous and neutral grasslands for which the site is designated, would not be adversely affected. However, in the absence of mitigation, this area of loss of a designated site is considered a moderate adverse effect of the Scheme.

11.6.18 Access routes from Long Road to the line of the proposed route would be required, but these would be located outside the area of existing broadleaved woodland forming the Long Road Plantation CCWS. Some losses would, however, occur at the Long Road underbridge where more extensive works would be required. These losses are considered to give rise to slight adverse effects on ecological resources.

11.6.19 Hobson’s Brook CCWS passes beneath the line of the route at an existing bridge beneath the line of the disused railway. Some land take of emergent and bankside vegetation would be required from this site, and in addition, impacts may occur on the wildlife corridor function of the Brook. However, this is not anticipated to cause a loss of the integrity of the CCWS designation. Because of the designation applied to the site, however, such land take is considered to be a moderate adverse effect of the Scheme. Potential exists for indirect effects to also take place within Hobson’s Brook through the introduction of pollution through surface runoff or accidental spillage of materials. Without mitigation, this has potential to cause serious and widespread effects on the site and is therefore considered a potential moderate adverse effect.

11.6.20 The Nine Wells site (due to be declared a Local Nature Reserve [LNR]) is located to the south of the route, and would not be affected by the Scheme.

11.6.21 Direct land take would occur from the Trumpington Dismantled Railway CWS as a result of the Scheme. Whilst it is possible that much of the vegetation on the upper slopes of the cutting would be able to be retained, due to uncertainties of whether this would be possible or
not, a worst case scenario of complete loss of the cutting has been assumed for the purposes of this assessment. Due to the designated status of this site, without mitigation, this is considered to be a major adverse effect of the Scheme.

11.6.22 Red Cross Lane Drain CCWS would not be affected by the Scheme. Effects on this site are therefore considered to be not significant.

11.6.23 The Hedgerow West of Babraham Road CCWS lies at a distance of approximately 20m from Addenbrooke’s Hospital. Works would not occur that would result in adverse effects on this site. Effects on this site are therefore considered to be not significant.

Ecological Issues within the Entire Route Corridor

11.6.24 The principle significant route-wide impact of the Scheme relates to the extensive removal of native, naturally colonised habitats along the entire length of the route. These habitats are of varying quality but overall provide a significant ecological resource and additionally function as a corridor for the movement of wildlife through the wider countryside. The vegetation within the Limits of Deviation would be removed as a result of the Scheme. Therefore the function of the wildlife corridor and this area of native habitat would be lost. It is proposed that much of the vegetation would be re-instated following completion of the Scheme and the introduction of appropriate landscape and ecological treatment measures associated with it. However, even given the inclusion of specific ecological design measures and an ecological management strategy, without the acquisition of additional land for the purpose, such landscape treatment cannot alone equate to the value of the ecological resource that is removed. Consequently, because of the scale of removal of this resource, without direct mitigation this loss is considered to be a major adverse effect of the Scheme.

Site-specific Ecological Issues (Excluding Designated Sites)

Section 1 – Huntingdon to St Ives Park and Ride

11.6.25 From the Hinchingbrooke Hospital to the ring road the route would run along the existing roads, and no further works would be required. No effects would therefore result and impacts would be not significant.

11.6.26 The Scheme would include a small amount of landtake at the junction of the ring road with Hartford Road which would result in the loss of the roadside verge and possibly the tree which is present here. It may be possible that the tree can be retained, although works may affect the branches and roots. Therefore it is assumed for the purposes of this assessment that the tree would be lost. This would be a negligible effect of the Scheme.

11.6.27 From 144 Hartford Road to the junction with the Old Houghton Road the CGB vehicles would run on the existing road. There would be no effects for this section, and impacts would therefore be not significant.

11.6.28 At the junction with the Old Houghton Road a small section of widening is proposed on the western side of the B1514 Hartford Road. Two mature trees are present along the road here, and although they would not require removal as a result of the widening works it is likely that some pruning would be required. The effects of this would be negligible.

11.6.29 From the junction with the Old Houghton Road with the B1514/Hartford Road, the route would run along the Old Houghton Road until it joins the A1123 at Hartford Marina. This would require works to re-open the closed section of this road, which has become vegetated in parts following natural colonisation since closure. This section also contains a double hedgerow with some mature trees alongside the road. The works would result in the losses of
the grass and herb vegetation, but the hedgerow would be unaffected. The loss of this vegetation and habitat and loss of function as a wildlife corridor would result in slight adverse impacts. In addition, this section provides habitat for birds, some of which would be lost, resulting in some loss of foraging and resting habitat; this would be a negligible impact.

11.6.30 Additional road widening works are proposed along the southern margin of the A1123 from the Old Houghton Road to approximately 150m east of the Hartford Marina. The works would be confined to the existing highway boundary, but would result in losses of some of the vegetation along this margin. This includes grass verges in places, with some trees and parts of the hedgerows and a wooded ‘copse’ area. It is likely that some of the trees and hedgerows would be lost as a result of the widening, however, in some sections pruning of the tree branches would be sufficient to allow the works to proceed. This would be the case along the Wyton Lakes Holiday Park where the willow trees which border the Holiday Park have been identified as possible transient bat roost sites. The losses of vegetation and possible losses of the corridor function of the roadside margins, as a result of the widening, would represent a moderate adverse effect. The impacts on the potential bat roosts have been addressed in paragraphs 11.6.64 to 11.6.67.

11.6.31 Further eastwards at the junction of the A1123 with the B1090, road widening is proposed along the northern side of the A1123 eastwards until the start of the residential dwellings, to accommodate a new bus lane. The landtake required for these works would result in the loss of the trees and a hedgerow which are present along this margin, and additionally possibly some of the field margins within this area. Loss of these habitats and associated species, in addition to the impacts on the function of this hedgerow as a wildlife corridor would be slight adverse in the absence of any mitigation measures.

11.6.32 The widening works would then continue along the southern side of the road, from the western edge of the St Ives golf course, to the junction with High Leys. The landtake required for these works would result in the loss of the trees, hedgerow and grass fringes along this section. This would result in impacts on the function of the vegetation/habitats as a wildlife corridor, in addition to the loss of habitat and species. The impacts would be considered to be slight adverse in the absence of any mitigation measures.

11.6.33 Mature ash trees along this section at the golf course are likely to provide transient roost sites for bats (the impacts on bats have been considered in paragraphs 11.6.64 to 11.6.67).

11.6.34 From the junction with High Leys through to St Ives town centre, the CGB vehicles would run on existing roads, and no works are proposed. No effects are therefore anticipated and the impacts would be not significant.

11.6.35 From St Ives town centre to St Ives Park and Ride, the CGB vehicles would run on existing roads, and no works are proposed. No effects are therefore anticipated within this section. The impacts would therefore be not significant.

Section 2 – St Ives to District Boundary (Fen Drayton)

11.6.36 St Ives Park and Ride would require land take from a field of low ecological value. This is not considered to be a significant adverse ecological effect. However, widening works are proposed along Meadow Lane which would result in the loss of the hedgerow and large willow trees. Without mitigation, should this loss take place, this is considered to be a slight adverse effect of the Scheme.

11.6.37 To the immediate east of the Great Ouse crossing, construction of the route would require the removal of ditches on both sides of the disused railway line. These are currently of
importance for nesting birds and also provide foraging habitats for kingfisher and other species. Without mitigation this loss is considered to be a moderate adverse effect of the Scheme.

Section 3 – District Boundary (Fen Drayton) to Swavesey Drain

11.6.38 Hedges on both sides of the route up to Holywell Ferry Road would be removed as a result of the Scheme. Without mitigation, this loss is considered to be a slight adverse effect of the Scheme.

11.6.39 From Holywell Ferry Road to the east relatively continuous double hedgerows of varying thickness would be lost for a distance of approximately 850m as a result of direct land take for the Scheme. In addition, some losses of bankside vegetation at the fringes of gravel pit lakes to either side of the route are likely to be affected. These losses occur partially within areas designated as a County Wildlife Site. As a result of this designation, without mitigation these losses are considered to comprise a moderate adverse effect of the Scheme.

11.6.40 Adjacent to Swavesey Priory, existing vegetation on the fringes of the disused railway corridor would be removed. This would give rise to slight adverse effects on ecological resources.

11.6.41 To the east of Station Road, Swavesey, land would be required in respect of the Kiss and Ride site and stop. Land take would predominantly occur within a paddock area and within landscaped land associated with the entrance to the MG Owners Club. Ecological effects of these losses are considered to be not significant.

11.6.42 The provision of an access track from Over Road at Swavesey would result in the loss of a section of hedgerow to the north of the route. Without mitigation, this is considered to be a slight adverse effect of the Scheme.

Section 4 – Swavesey Drain to Longstanton Park and Ride

11.6.43 The area of a proposed new balancing pond (Balancing Pond 1) to the east of the Swavesey drain and on the southern side of the disused railway corridor is situated within existing arable/agricultural land. The Swavesey Drain would itself be unaffected by these proposals. The impacts are considered to be negligible.

11.6.44 At the crossing of the Swavesey Drain, part of the area of fragmented hedgerow of importance at the point of crossing could be largely retained.

11.6.45 Further losses of hedgerows against the northern and southern edges of the disused railway corridor would occur for approximately 1500m (to the B1050 crossing). Without mitigation, these losses are considered to be slight adverse effects of the Scheme.

11.6.46 An area of former pond, now overgrown with reeds, is included in the land take for the Scheme as it is within the boundary of ownership of the former railway line. An area of land is to be acquired adjacent to the pond and route for ecological and landscape mitigation purposes. The land is currently part of an agricultural field and its loss would not be significant. No construction works would take place within this area and for this reason impacts on this resource would be not significant.

Section 5 – Longstanton Park and Ride to A14

11.6.47 To the east of the B1050, land is required to construct and provide access to a new stop location and park and ride site. An old oak tree within the line of a hedgerow to the north of
the proposed stop location at this point would not be affected by the Scheme. The majority of this land take would occur within agricultural land adjacent to the route and it is therefore considered that effects of the loss of this on ecological resources would be not significant.

11.6.48 Discontinuous hedgerows would be removed from the northern and southern edges of the route between this point and the Oakington Road. These are predominantly located on the northern edge of the line of the route and long lengths of this section of the route do not have continuous hedgerows. Nevertheless, without mitigation these losses are considered to be a slight adverse effect of the Scheme.

11.6.49 In between the Park and Ride site and the location of a sewage treatment works, two new proposed balancing ponds are to be located within agricultural land (Balancing Ponds 2 & 3). No adverse effects are likely to result from these balancing ponds, and hence the impacts would be not significant. An area of land adjacent to Balancing Pond 2 is to be acquired for ecological and landscape mitigation, this is currently agricultural land and its use for this purpose would not be a significant effect. Additionally to the east of the sewage works another new balancing pond is proposed, again within agricultural land (Balancing Pond 4). No adverse effects are likely to result from this balancing pond, and the impacts would therefore be not significant.

11.6.50 At Oakington Road, to the south of the route, an area of land would be acquired for ecological and landscape mitigation. This area is currently agricultural land, and the effects of this would be not significant. As the route continues to the Girton crossing, with the exception of the overall loss of habitat within the railway corridor, no site-specific effects in this section are anticipated.

11.6.51 East of Girton Crossing, west of Impington, the route would continue along the rear of existing properties. This would result in the extensive loss of mature trees in this location. Additionally gappy hedgerows and scrub to the south of the route along this length would also be lost. This would give rise to slight adverse effects on ecological resources.

11.6.52 Between Bridge Road and the A14 underbridge, there would be significant ecological losses occurring through loss of hedgerows and the fringes of woodland blocks to the north of the route. The maintenance track is to be located on the northern side of the route within this stretch and this would result in the loss of mature trees. These losses are considered at worst to give rise to moderate adverse effects on ecological resources without mitigation.

**Section 6 – A14 to Cambridge Railway Station**

11.6.53 A new balancing pond is proposed on the northern side of the line of the route immediately west of the A14 underbridge within an area of agricultural land (Balancing Pond 6). Effects of the construction of this on ecological resources are considered to be not significant.

**Arbury Park**

11.6.54 The route would continue south along the western margin of the Kings Hedges Triangle (see paragraph 11.3.14) and would then proceed along the southern edge of the Arbury Park area, along the northern margin of the Kings Hedges Road. The landtake required for the Scheme in this area would result in some loss of the hedgerow which is present along this margin. Not only would this lead to losses of the vegetation/habitat, but additionally the function of the hedgerow as a wildlife corridor. Without mitigation, this is considered to be a slight adverse effect. The Hedgerow Regulations would apply to the loss of this hedgerow, which stipulate that permission for the removal of the hedge would need to be sought from the local planning authority before any part of the hedgerow could be removed.
11.6.55 South of Arbury Park CGB buses would continue along the Histon Road, where road widening works would be required in order to accommodate two new bus lanes. This widening works would be required on both sides of the road, and would result in the loss of the hedgerow along the eastern side of this road, leading to a loss of habitat and corridor function. On the western side of the road the widening would result in some losses of trees and scrub, in particular as a result of the new bus link. The effects are considered to be slight adverse. The effects on the Histon Road Geological SSSI are dealt with in Section 12.

Science Park to Chesterton Sidings

11.6.56 The Scheme would lead to the loss of vegetation along this section of the route. This has been assessed as part of the overall habitat loss along the route (see paragraph 11.6.24)

City Centre

11.6.57 South of Cambridge Science Park, the route proceeds along Milton Road. Widening works would be required along a section of the road. These works would result in the loss of a single tree along the road margin. This trees has little ecological value, and the impact of this loss is considered to be negligible.

11.6.58 The remaining effects of the Scheme within this section of the route relate entirely to designated sites, and have been addressed above within the Designated Sites Section of this assessment (paragraphs 11.6.1 to 11.6.23).

Section 7 – Cambridge to Trumpington

11.6.59 Construction access routes from Long Road to the line of the proposed route would be required, but these would be located outside the area of existing broadleaved woodland forming the Long Road Plantation CCWS. Some losses would, however, occur at the Long Road underbridge where more extensive works would be required. These losses are considered to give rise to slight adverse effects on ecological resources.

11.6.60 Land take would be required within areas of agricultural land adjacent to the route within this section for temporary construction purposes, and for the location of two new balancing ponds (Balancing Ponds 7 & 8). These losses are considered to be not significant in terms of their effects on ecological resources.

11.6.61 A new balancing pond is proposed immediately west of the route at the Addenbrooke’s Link/Hobson’s Brook crossing (Balancing Pond 9). The pond would be located within agricultural land, and would not result in any adverse ecological effects. The impacts would be not significant.

11.6.62 The Hedgerow West of Babraham Road CCWS would not be affected by the Scheme. Effects on this site would therefore be not significant.

Section 8 – Link to Addenbrooke’s Hospital

11.6.63 The proposed link to Addenbrooke’s Hospital would be entirely located within agricultural land of negligible ecological value. Effects of this on ecological resources are considered to be not significant.
Species-Specific Ecological Issues

**Bats**

11.6.64 The mature crack willow trees along the boundary of the A1123 with the Wyton Lakes Holiday Park would be retained, however, some pruning may be required as a result of the proposed widening works in this location. Should the presence of any roost sites be confirmed, the disturbance would be a moderate adverse effect in the absence of mitigation measures.

11.6.65 The mature ash trees along the boundary of the A1123 with the Golf Course would be lost as part of the land take required for the construction of an additional lane to accommodate a new bus lane. This would result in the loss of a potential roost, which would potentially be a major adverse effect in the absence of mitigation measures.

11.6.66 The Windmill Bridge at Longstanton Road would be demolished as part of the Scheme, which would result in the loss of the possible/transient bat roost. This would potentially be a major adverse effect of the Scheme in the absence of any mitigation works.

11.6.67 In addition to the above, extensive losses of ideal bat foraging habitats would occur throughout the length of the Scheme. Bat foraging habitat is not protected, but without mitigation, such losses are nevertheless considered to cause a slight adverse effect on local bat populations.

11.6.68 It is proposed that the route would not be lit along its length other than at those locations where street lighting already occurs, and at stops (excluding the Nature Reserve Request Stop), road junctions and the park and ride sites where lighting would be required for safety reasons. Different bat species have different responses to introduced lighting. However, it is considered that not lighting the route wherever possible prevents further augmentation of potential adverse effects on foraging bats along the length of the Scheme. Where lighting is to be introduced, it would be designed to minimise effects and disturbance to nocturnal species such as bats, by limiting the upwards spread of the light, and using low-level lighting where possible (see Section 4.2).

**Birds**

11.6.69 Species-specific effects on important bird species present within the route corridor are as follows:

- bittern – the works within the Fen Drayton nature reserve would not directly impact upon the areas likely to be used by bitterns. It is highly unlikely that bittern are present within the vicinity of the route, and most likely that they would be overwintering in the larger areas of reed bed further north and south of the route. No records are held for bittern breeding at this site, and the construction and operation of the Scheme would be localised along the disused railway. Effects on this species would be negligible.

- kingfisher – although no potential nesting sites for kingfisher would be directly affected by the Scheme, disturbance of this species in the vicinity of the Great Ouse river corridor is highly likely to take place during construction activities. Such disturbance would be temporary and would be removed entirely following completion of the Scheme. Without mitigation, this could give rise to localised major adverse effects on this species;

- peregrine, oystercatcher – effects of the Scheme on these incidentally observed species would be not significant;
• turtle dove – given that no specific habitats within the route corridor are considered to be an essential resource for this species, effects of the Scheme on turtle dove are considered to be not significant;

• song thrush – loss of potential nesting and feeding areas for this species would occur throughout the length of the route. Although similar habitats do occur within hedgerows associated with agricultural boundaries adjacent to the route, and gardens in urban areas, the mosaic of habitats such as that present in the disused railway corridor represents a potentially valuable resource for this species that would be extensively affected. Without mitigation, the Scheme is considered to give rise to moderate adverse effects on this species;

• yellowhammer – loss of potential nesting and feeding areas for this species may occur along the A1123 where widening works are proposed, and at certain locations along the disused railway, where land take would result in the loss of vegetation. Given its Red List status, the effects on this species are considered to be moderate adverse;

• bullfinch – loss of feeding, roosting and nesting habitats within the disused railway corridor, in particular, extensive loss of native hedgerow species, are liable to give rise to moderate adverse effects on this species without appropriate mitigation;

• teal, pochard – these species are more strongly associated with the gravel pits and other waterbodies within the vicinity of the route rather than habitats associated with the route corridor itself. As a result, effects of the Scheme on these species are considered to be not significant;

• kestrel – loss of the formative and open grassland habitats within the line of the disused railway represent a loss of foraging habitats for this species, although no potential nesting sites would be affected. Substantial suitable foraging areas, however, occur for this species in fields and along their margins throughout the wider countryside in the vicinity of the Scheme. As a result of this, effects on kestrel are considered to be localised and slight adverse;

• lapwing – this species is largely associated with wet open grassland in the vicinity of the Scheme and not with those habitats generally occurring within the route corridor. As a result, effects of the Scheme on this species are considered to be not significant;

• green woodpecker – loss of scrub habitats and the general mosaic of habitats within the route corridor would give rise to a loss of potential feeding sites for this species. However, extensive potential feeding sites exist on adjacent land, particularly grassland areas, adjacent to the line of the route. Effects of the Scheme on this species are therefore considered to be, at worst, slight adverse;

• sand martin, swallow – although no suitable nesting habitats would be removed, loss of the linear corridor and, in particular, double-hedgerow lengths of the route in association with water bodies, where significant populations of the small flying invertebrates on which these birds feed can accumulate, represents a loss of feeding habitat for sand martins and swallows. However, it is likely that the availability of suitable nesting sites in the vicinity of the disused railway corridor is a more significant constraint on the numbers of these species (and in particular sand martin) than foraging habitat availability. Consequently, effects on these species are considered at worst to be slight adverse;
starling – this species do use habitats within the disused railway corridor although they forage over a wider area including the adjacent grassland and are not strictly dependent on the disused railway habitats for foraging or roosting resources. As a result, effects on starlings are considered to be of slight adverse significance;

goldfinch – habitats between the A14 crossing and Milton Road contain locally important feeding resources for this species, which are also present within formative habitats elsewhere along the route. These habitats are relatively infrequent within urban areas but are present in wasteland areas outside the route corridor at locations along its length. Without mitigation, however, effects on this species of the widespread loss of such habitats within the disused railway corridor are considered to give rise to moderate adverse effects.

11.6.70 In addition to the above, all species of breeding bird and their nests and eggs are protected in the UK by the Wildlife & Countryside Act 1981 (xii). Clearance of vegetation during the bird breeding season, i.e. during the period March to July inclusive, could therefore give rise to major adverse effects on ecological resources.

Reptiles

11.6.71 Significant potential exists along the route for reptiles to be present, and surveys of particularly suitable habitat have been undertaken and revealed the presence of reptiles (common lizards) at a number of these 'hotspot' locations. There have also been reports/records of grass snake, and in addition, it would be expected that slow worm and possibly also adder may occur at suitable habitat locations along the route, particularly as reptiles may move over large areas between foraging and resting/hibernation sites. However, these species were not found during the surveys undertaken. These species are not likely to be entirely restricted to the immediate area of the disused railway line but would additionally be expected to forage over suitable adjacent habitats. Without mitigation, the loss of reptile habitat along the length of the entire route is therefore considered to be a moderate adverse effect of the Scheme.

Amphibians

11.6.72 Removal of ponds at selected locations along the length of the Scheme without their replacement is likely to have effects on local amphibian populations present. Effects on non-protected local amphibian populations would be slight adverse.

11.6.73 The waterbodies that were not able to be surveyed were assessed visually for their likely value, in particular for great crested newts. In general these waterbodies were not optimally suitable for this species. However, there is some potential that this great crested newts may be incidentally present, and further survey and appropriate measures would need to be provided to ensure adverse effects do not occur. Without such measures, there is potential for moderate adverse effects to occur.

Water Voles

11.6.74 Evidence of water voles has been found at several sites, in addition to records from the Wildlife Trust indicating the presence of water voles at additional sites (see Section 11.4). The works proposed to the route, at the locations where the route crosses those streams/ditches identified as having water voles present, would lead to the destruction and damage, and potential disturbance to the water voles. In the absence of mitigation, these effects would be moderate adverse.
11.6.75 In addition, a number of other streams and ditches have been identified as potentially suitable for the presence of water voles. Potential exists for moderate adverse effects on water voles to take place through impediment of their movements along existing watercourses or through the removal of vegetation with the potential to support expanding water vole populations present.

11.6.76 Known breeding populations of water voles are present at the Bin Brook CWS and the Drain at Garret Hostel Lane CWS. These populations would not be affected by the Scheme, which requires no works in either area, impacts would therefore be not significant.

Otters

11.6.77 No significant effects are anticipated on otters as a result of the Scheme.

Invertebrates

11.6.78 At the Riverside Park CWS a nationally scarce beetle was found in association with the mature willow pollards within the park. The pollards should be retained, and hence should not be affected by the Scheme, therefore the effects on this species would not be significant.

11.6.79 At the Meadow Lane Gravel Pits CWS the works would involve some infilling of the lake margins in places. This may result in losses of habitat suitable and used by the nationally scarce water beetles found in this area. The margins of the lakes would be restored following completion of construction works and hence the effects are considered to be slight adverse in the absence of any mitigation. In addition, a linear pool in this area may be lost as a result of the Scheme, which would have adverse effects on five nationally scarce species of water beetles recorded here. The effects of this without mitigation would be slight adverse.

11.6.80 The works within this CWS may additionally impact on the scarce chaser dragonfly and would be slight adverse without mitigation.

11.6.81 At the River Great Ouse there is some potential for the removal of habitats that may be used by the scarce chaser dragonfly, although more suitable habitats than those within the area required for construction of the proposed crossing of this watercourse do exist both upstream and downstream of this location. These effects are likely to be temporary and full recovery can be expected following completion of the works. The Scheme is therefore anticipated to give rise, at worst, to temporary slight adverse effects on this species.

11.6.82 At the Fen Drayton Gravel Pits CWS no land take from the lakes would occur and therefore effects on the scarce chaser dragonfly and nationally scarce water beetles would be negligible.

11.6.83 The Scheme would result in the loss of the Over Railway Cutting CWS and would therefore result in the loss of the grizzled skipper habitat. In the absence of any nearby suitable habitat, this would be a moderate adverse impact without mitigation.

11.6.84 The survey results indicate that at the remaining areas along the route, the invertebrates present give rise to local significance at best. Effects on these would be likely to occur through the general habitat loss and disturbance occurring along the route and would range from slight adverse at worst to negligible without mitigation.

Nationally Scarce Flora

11.6.85 Within the Cambridge to Trumpington area, potential effects could arise on four species of nationally scarce plant as follows:
• perennial flax *Linum perenne* – where plants of this species are present within the footprint of the Scheme they would be lost. Without mitigation, this loss is considered a moderate adverse effect of the Scheme;

• spreading hedge-parsley *Torilis arvensis* – where plants of this species are present within the footprint of the Scheme they would be lost. This would prevent further natural seeding of this annual species on suitable existing habitats and without mitigation, this loss is therefore also considered a moderate adverse effect of the Scheme;

• twiggy mullein *Verbascum virgatum* – where individual plants of this species are present within the footprint of the Scheme they would be lost, giving rise to moderate adverse effects;

• dittander *Lepidum latifolium* - without mitigation where individual plants of this species are present within the footprint of the Scheme they would be lost, giving rise to moderate adverse effects.

### Construction Impacts

11.6.86 The construction of the Scheme would result in the loss of vegetation from the route-line and those areas required for construction, access routes and compounds. Due to engineering constraints, it is unlikely that any vegetation within these areas would be able to be retained, and hence one of the most significant construction impacts would be the extensive losses of vegetation associated with this. This has been stated elsewhere as a major adverse effect (see paragraph 11.6.24).

11.6.87 Additionally, effects of the temporary disturbance of wildlife in the general area of the Scheme would take place along the length of the route. Aside from the specific effects on ecological resources of particular concern as described in the sections above, these activities would give rise to both temporary adverse effects on local ecological resources which could be expected to cease following construction works and, without appropriate mitigation, effects that would be more long-lasting following completion of construction. Such effects include:

• temporary disturbance as a result of construction noise and vibration;

• temporary visual disturbance as a result of the presence and movement of people and construction vehicles;

• damage to, or loss of value to, ecological resources through the accidental or uncontrolled movements of construction personnel or vehicles, or littering;

• effects of the accidental spillage of materials or pollution of watercourses from haul routes, vehicles, or storage compounds;

• dust or emissions from construction vehicles affecting areas of vegetation or water bodies that would otherwise not be adversely affected by the Scheme.

11.6.88 Such activities, without mitigation, are considered to have the potential to give rise to moderate adverse effects on ecological resources.

### Mitigation Measures

11.7 **Mitigation Measures**

11.7.1 The detailed design and implementation of the mitigation measures would be addressed at the detailed design stages. The design and implementation of these measures with respect to protected species and designated sites, would be agreed with English Nature and the Wildlife
Overview

11.7.2 The ecological mitigation and enhancement strategy for the Scheme has been designed to achieve the following key objectives:

- where land take from designated areas of acknowledged nature conservation value would cause adverse effects on ecological resources: to provide areas of replacement habitat in other locations that are currently not of high ecological value and that can, through appropriate initial design, and the implementation of a site-specific management plan, develop into features that have the potential to replace the lost resources in the long term;

- where land take from non-designated areas of nature conservation value would cause adverse effects on ecological resources: to provide replacement habitats that can, through appropriate initial design and the implementation of a Scheme-wide management plan, develop into features that can, as far as is possible, replace the lost resources;

- where moderate or major effects on a protected species or a species of particular conservation concern are anticipated as a result of the Scheme: to provide such measures as are necessary according to the law and practicable within the scope of the Scheme to ameliorate and/or remove the risk of such effects taking place. Such measures may take the form of replacing essential lost resources, or the provision of fencing or other ecological design measures as appropriate;

- to take such measures as are necessary according to the law and practicable within the scope of the Scheme, to minimise the risk of causing adverse effects on ecological resources either through the detailed design of the Scheme or through the timing, phasing or method of construction proposed to be undertaken;

- to take all practicable opportunities to include ecological design measures within the proposed engineering and landscape works associated with the Scheme so as to maximise the potential ecological value of the completed Scheme. The interlinking of visual, amenity and ecological objectives within the landscape design of the Scheme is an integral component of achieving this objective;

- to provide an ecological management strategy for the Scheme at the detailed design stage which would be adhered to during construction and operation of the completed design. Additionally, this strategy could form the basis of any future management agreement with other bodies for the management, maintenance and/or monitoring of any areas of ecological importance which have been established or protected through the Scheme design.

11.7.3 Inevitably, where losses occur to ecological resources as a result of the Scheme, there would be some cases where mitigation cannot achieve full amelioration of adverse effects caused, particularly in the short term. In such cases (in particular in relation to losses from CWS and CCWS areas), appropriate compensatory measures would be required. The Scheme includes provision of landscape and ecological compensation areas (see Appendix 13E) aimed at compensating for losses of ecological resources – more specifically those associated with the CWS and CCWS areas. The area covered by these compensation areas (13.4ha) is approximately 3.4 hectares less than that removed (approximately 16.8ha). Further compensatory measures would be the subject of ongoing discussions with English Nature, and with the Wildlife Trust. The specific form of any such measures that would be implemented have not been determined at this stage and would be the subject of subsequent
agreement. It is envisaged that such measures would be detailed in the proposed ecological management strategy.

11.7.4 The long-term maintenance and monitoring of the mitigation measures would be addressed in an ecological management plan for the Scheme, which would set out the long-term management objectives, requirements for monitoring, and maintenance works required.

11.7.5 The aim of all planting undertaken would be to use native and locally characteristic species wherever possible. This would be important for the maintenance of characteristic flora and habitats of the area. In addition, as far as is possible, it is recommended that dead wood resulting from tree felling activities be used and placed in appropriate areas to provide habitat and to construct hibernacula for reptiles and amphibians. Where appropriate and practicable soil material stripped/removed during construction works should be retained and stored, and re-used in appropriate areas to aid in habitat creation in mitigation and compensation areas. Soil removed for example, from the track bed would contain a seed bank, which if transferred to other sites, would help to speed up the natural re-colonisation processes and the establishment of locally characteristic and native species and habitats.

Designated Sites

11.7.6 Mitigation measures addressing ecological losses that would take place within designated areas are identified with respect to the affected sites as follows. Mitigation measures are shown on the Ecological and Landscape Mitigation Plans (Appendix 13E). These drawings highlight areas of mitigation and additionally compensation. The treatment of the Ecological and Landscape Compensation (ELC) areas is discussed in Section13. The locations of these areas are also referred to in the context of the site-specific mitigation along the route described below.

11.7.7 At the Riverside Park CWS, some landtake would be required in order to construct the new bus lane. The land required would be that along the western margin of this site, and would include the loss of the semi-mature trees present. The mature trees/pollards elsewhere within the CWS would be retained. It is proposed to acquire additional land around the proposed balancing pond (Balancing Pond 1 – ELC Area B) in between the Swavesey Drain and Longstanton Road in order to compensate for the losses to this designated site, and that habitat creation works would be undertaken in order to provide replacement habitat. In addition, replacement trees would be planted along the new margin with the CGB route of the same species composition as those species removed, which should maintain the green corridor along this section (see Appendix 13E).

11.7.8 At the crossing of the River Great Ouse land that was acquired temporarily for construction and access purposes would be replanted to maintain the continuity of the river corridor and to improve the visual, amenity and ecological value of this area (see Appendix 13E). The river corridor beyond this necessarily acquired area would be fenced to prevent encroachment into potentially sensitive areas. Opportunities would be taken for the incorporation of features of potential future ecological importance such as, for example, providing bricks designed to be able to provide roosting sites for bats within the bridge structure.

11.7.9 At the affected northern edge of the southern section of Meadow Lane Gravel Pits CWS, new lakeside planting comprising native species would be introduced to mitigate the loss of any vegetation required at this point for construction of the Scheme. Measures would be introduced at this point as at locations all along the route to protect against pollution from surface runoff or the accidental spillage of materials entering this site. This has been dealt with in Section 17.
11.7.10 Within the area of Fen Drayton Gravel Pits CWS the key principle for minimising potential adverse effects is to minimise land take of the Scheme so as not to impinge upon adjacent habitats present outside the line of the disused railway as far as is possible. Measures are required to prevent the occurrence of pollution originating from surface runoff or through accidental spillage of materials, and such measures would be introduced along the entire length of the Scheme. This has been dealt with in Section 17. New species-diverse hedges and other native planting would be provided to replace hedgerows lost along the Fen Drayton CWS section. Planting on the southern side of the route may be preferentially undertaken through management agreement rather than through compulsory purchase given the nature reserve status of this area (see Appendix 13E). Additional habitat creation measures would be undertaken within the Ecological and Landscape Compensation Areas (Appendix 13E).

11.7.11 Along the CGB route at Swavesey Meadows and at the margins of Middle Fen, replacement planting would be carried out to include native species of a similar composition to vegetation removed.

11.7.12 Land would be acquired outside the line of the disused railway corridor at Over Railway Cutting CWS and measures would be applied to this area as advanced works in order to prepare appropriate replacement habitats for grizzled skipper in the same vicinity and of similar topography to those that would be lost (see Appendix 13E – ELC Area D). These habitats would primarily aim to provide wildflower-rich grassland with, in particular, wild strawberry, cinquefoils and low-growing, especially rosaceous, herbs. In addition the aim would be to recreate the microclimatic conditions favoured by the grizzled skipper. This area would subsequently be used as a receptor site for translocated turves of grassland from the lost site. A programme of monitoring would be carried out of the receptor site to evaluate the success of this operation and to provide ongoing feedback in respect of the management of the site in the long term. The specific design of this area would be informed by discussions with and advice from both the Wildlife Trust and the local Butterfly Conservation Group. A suitable management regime would additionally be implemented on remaining and re-instated embankments of the Scheme in this area. These measures would form a key component of an ecological management plan for this area.

11.7.13 The hedgerow along the edge of the King’s Hedges Triangle would be retained.

11.7.14 At the Bin Brook CCWS and the Drain at Garret Hostel Lane CCWS, no measures are required, as no adverse effects would occur at either location.

11.7.15 Little St Mary’s Churchyard CCWS, the Cambridge Botanic Gardens CCWS and Emmanuel College Gardens CCWS would also be unaffected by the Scheme and no mitigation would be required at these locations.

11.7.16 Empty Common CCWS and Bentley Road Paddocks CCWS would not be affected by the Scheme and no mitigation measures are therefore required at either location.

11.7.17 Little scope exists within the Scheme to provide direct mitigation of land take at the Triangle North of Long Road CCWS, owing to the adjacent land uses outside the designated area. However, land acquired to mitigate for losses elsewhere along the route would provide compensation for losses (See Appendix 13E). Embankments of the Scheme at this point would be constructed in such a way as to promote the development of calcareous and neutral grassland through natural colonisation processes and also to provide areas where Nationally Scarce species such as the twiggy mullein that has been recorded from this site can become established.

11.7.18 At Long Road Plantation some existing woodland protection measures would be undertaken,
along with replacement screen planting and species rich grassland creation on the embankments of the CGB. In addition, habitat creation and planting within Ecological and Landscape Compensation areas along the route would help to mitigate for losses to this site (see Appendix 13E).

11.7.19 At Hobson’s Brook CCWS, little scope exists for the provision of mitigation measures in respect of the direct land take required for the Scheme. However, the requirement for land take at this point would be kept to a minimum to ensure no more land take than is necessary for the Scheme occurs. Measures would be put in place, to ensure that indirect effects through pollution of the watercourse do not take place. Drainage from the line of the Scheme would therefore be diverted into a newly constructed balancing pond in the locality and not discharged directly to the watercourse. This part of the Brook is currently crossed by a track, and is culverted underneath this section. It is proposed that the design would take into consideration the corridor function of the Brook and ecological resources present and that the wildlife corridor function of the Brook be maintained and enhanced. Replanting of marginal vegetation along the banks following completion of the construction works would be undertaken to include locally native species similar to those already present along this stretch of the Brook. It may additionally be beneficial to allow some natural recolonisation.

11.7.20 The loss through land take of the Trumpington Dismantled Railway CWS would be partially mitigated by the creation of replacement habitats around new balancing ponds in the area. Individual plants and seeds of the Nationally Scarce Species present in this area would be collected and translocated or spread at the new balancing pond sites to encourage the continuation of these species in this area. An appropriate management regime would be applied to the site to encourage the continued long-term presence of these species. In addition, embankments of the Scheme along this length would be allowed to develop through natural colonisation processes so as to encourage these resources to become re-established. Measures applied to Ecological and Landscape Compensation areas would additionally help to compensate for losses to this designated site. A suitable management regime would be implemented to reinstated embankments in this area.

11.7.21 Red Cross Lane Drain CCWS and the Hedgerow West of Babraham Road CCWS would not be affected by the Scheme and therefore no mitigation measures are required at these locations.

Route-wide Ecological Issues

11.7.22 Land of varying ecological value would be lost through the direct land take of the disused railway corridor along the entire length of the Scheme and areas along the A1123 and B1514. A proportion of this land would be replaced through direct mitigation addressing land lost from within areas designated as County Wildlife Sites. A further proportion of this land would be replaced through provision of new hedgerows to replace those lost from either side of the route along its length. Further replacement would be able to be achieved through works undertaken in association with the ecological and landscape compensation areas (see Appendix 13E). In addition to the above, measures would be provided within land proposed primarily for the siting of balancing ponds. Where a balancing pond is proposed, additional land would be acquired for ecological enhancement purposes and to provide areas that can be allowed to develop largely through natural colonisation processes to at least partially replace the function of the disused railway corridor.

11.7.23 All breeding birds are protected by the Wildlife & Countryside Act 1981 (xii) and for this reason any necessary vegetation clearance would be required to take place outside of the bird breeding season. The peak-breeding season falls between March and July (inclusive), but it should be recognised that some bird species have been known to breed outside of this period.
and that active nests are protected at whatever time of year they are encountered.

**Site-Specific Ecological Issues (Non-designated Sites)**

**General Measures**

11.7.24 Planting measures would be provided throughout the wider route corridor. These would be designed and their management proposed with ecological as well as landscape and visual objectives in mind.

11.7.25 The balancing ponds and the surrounding land acquired would additionally provide suitable receptor sites for any reptiles and amphibians which may need to be translocated out of the construction areas, and the ecological design of these areas would include provision of suitable habitats for both groups. The detailed design of the balancing ponds and the surrounding land would be dealt with at the detailed design stage. However, the ecological aims for these areas would be to design the ponds themselves sympathetically to include features beneficial to wildlife. Such measures would need to be in accordance with the drainage design, but could include a variety of shallow and steep margins, scalloped edges and a variety of perimeter shapes, and areas for the establishment of marginal vegetation. There would be potential for translocation of marginal and aquatic vegetation from ponds which would be lost. In addition, the marginal areas of the balancing pond land would be subject to a variety of treatments to fit in with the surrounding land and mitigation objectives in relation to replacement planting. In many cases, the aim would be to allow for planting of native and locally characteristic species in addition to allowing natural recolonisation where appropriate, including the re-use of soil material taken from the route-line. A mosaic of different habitat types would be formed, and in addition in appropriate areas, features for reptiles and great crested newts such as hibernaculae, would be incorporated in order for these areas to act as receptor sites for any individuals translocated from within the route-line. The areas around the balancing ponds would be ideal sites for the re-use of dead wood resulting from tree felling activities, and would provide habitat for invertebrates, amphibians and reptiles, in addition to providing a substrate for fungi and lichens.

11.7.26 The key aim of the mitigation measures is to maintain the continuity of habitat which the current habitats provide, and to provide replacement habitats in-keeping with the character of local habitats and locally native species. Many of the habitats which would be affected, and for which restoration and re-creation works would be undertaken, are listed in the Cambridgeshire BAP. Therefore at the detailed design stage, the design and implementation of habitat creation measures should aim to be consistent with and help meet some of the BAP targets for each of the relevant habitat types.

11.7.27 The new and replacement habitats would be subject to a management plan, in order to ensure appropriate maintenance of these areas. An ecological management plan would be produced for the sites, and measures would include subsequent monitoring and management of habitats to ensure that the mitigation objectives continue to be met.

11.7.28 The Scheme includes the designation of the maintenance track as a bridleway to the north of Cambridge and a cycleway to the south. It is noted that this would lead to increased human disturbance along the route compared to that at present, and that this may reduce the extent of recolonisation and regeneration of flora and fauna.

11.7.29 Mitigation measures are shown on the Ecological and Landscape Mitigation Plans (Appendix 13E). These drawings highlight areas of mitigation and compensation. The specific treatment of the compensation areas would be agreed at the detailed design stage. Proposals for potential and appropriate treatment of these areas are made in the following text. The
locations of these areas are also referred to with reference to the site-specific mitigation along the route:

**Section 1 – Huntingdon to St Ives Park and Ride**

11.7.30 Along the sections of the A1123 where widening works would be undertaken, habitats should be created in order to replace those removed. This would include the planting of replacement hedgerows and trees, and provision of a fringe of grasses and herb species along the boundary of the road/base of the hedgerows. Wherever possible, attempts should be made to minimise land take as far as possible, and to retain mature trees. In particular, all efforts should be made to retain the mature willows and trees/woodland along the Wyton Lakes Holiday Park, and the three mature ash trees along the boundary with the St Ives Golf Course, in respect of the potential for these trees to provide transient bat roost sites.

11.7.31 No adverse effects would occur along the route between St Ives centre and the junction with the A1123, therefore no mitigation measures are proposed for this section.

**Section 2 – St Ives to District Boundary (Fen Drayton)**

11.7.32 At the proposed St. Ives Park and Ride site, following land take from the shore of the gravel pit lakes to the south of the CGB corridor, the re-established lakeside would be re-profiled in similar form to that existing. Waterside and adjacent habitats would be partially replanted with areas provided which would be encouraged to naturally re-colonise to similar habitats as are currently present in this area. The loss of a fishing pond, which would be filled in as a result of the Scheme, would be mitigated by the appropriate design and creation of the balancing ponds. These would be designed to maximise opportunities for wildlife. In addition the site would be designed to replace the lost grassland, native hedgerow and scrub community, and provide additional replacement ponds. It is proposed that such replacement habitats would be provided within the area in which the proposed park and ride site would be located (see Appendix 13E).

11.7.33 An area is proposed for landscape measures to provide visual screening of the park and ride site from adjacent properties. Vegetation provided in this area would be of varying structure and dominated with locally native and characteristic species and would provide a hedgerow-type habitat similar to those removed. Efforts would be made to retain mature trees along Meadow Lane, and hedges and planting throughout the developed site would be designed with a view to their ecological value (see Appendix 13E).

11.7.34 New ditches and associated vegetation would be provided to replace those removed on both sides of the proposed route. These would be designed and planted so as to maximise their potential value for foraging, roosting, and breeding birds. Consideration would be given to the provision of features such as artificial kingfisher or sand martin nesting banks in association with the re-profiling of the embankments of the Scheme at this section.

11.7.35 Further replacement hedgerow planting and lakeside vegetation would be carried out (see Appendix 13E) on both sides of the completed Scheme.

**Section 3 – District Boundary (Fen Drayton) to Swavesey Drain**

11.7.36 An existing copse located adjacent to the route would be managed and rejuvenated with additional planting as part of the Ecological and Landscape Compensation measures (ELC Area A, Appendix 13E)

11.7.37 At Swavesey Priory, new native screening vegetation would be provided to replace patchy scrub that would be lost here and to provide some local visual amenity improvement works.
(see Appendix 13E). The extent to which works can be carried out is potentially constrained by archaeological considerations.

Section 4 – Swavesey Drain to Longstanton Park and Ride

11.7.38 Immediately south of the route in between the Swavesey Drain and Longstanton Road, additional land would be acquired around the perimeter of a proposed new balancing pond (Balancing Pond 1 – ELC Area B, Appendix 13E). This additional land would be designed to provide a mosaic of different habitat types and would be allowed to develop largely through natural colonisation processes. Improvement works could also be provided along the Swavesey Drain itself, which has been previously realigned into a trapezoidal channel and is largely devoid of vegetation. These improvements would include measures for the promotion of water voles at this location. Water voles have been recorded further south along the Swavesey Drain, and surveys revealed possible signs of water voles approximately 75m from the disused railway, and special attention would be given to works here to minimise losses of suitable habitat at the crossing of the Swavesey Drain.

11.7.39 A construction compound located south of the route to the west of the Windmill Bridge would be retained following completion of construction and used for ecological and landscape compensation. The treatment of the area (ELC Area C, Appendix 13E) may include woodland and scrub planting with some natural regeneration.

11.7.40 Replacement hedgerow would be provided from this point to the B1050 (see Appendix 13E), on both sides of the Scheme. This represents approximately 1500m of continuous native hedgerow.

11.7.41 An existing reed bed would be retained and enhanced within the Scheme, in addition to an area of adjacent arable land which would be subject to landscape and ecological enhancement measures (ELC Area F, Appendix 13E). A further area of land would be acquired extending westwards from this reed bed, for ecological and landscape mitigation purposes (ELC Area E, Appendix 13E). The treatment of these areas may include tree and scrub planting, with the inclusion of open areas to encourage natural regeneration, with some works undertaken to clear areas of the reedbed to open the existing pond and provide open water areas, which have become densely vegetated.

Section 5 – Longstanton Park and Ride to A14

11.7.42 At the Longstanton Park and Ride, landscape and ecological enhancement measures would be applied. The measures proposed include provision of new ponds/balancing ponds, wet ditches/channels, wetland planting, new hedgerow planting, species rich grassland creation, shrub planting, and specimen tree planting. It is important that the planting and habitat creation works undertaken in this area use locally native and characteristic species.

11.7.43 Replacement hedgerows would be provided along the northern edge of the route corridor in order to replace lost habitat and re-establish connections between remaining hedgerows in the surrounding agricultural landscape (Appendix 13E).

11.7.44 Additional land is proposed to be acquired in the area to the north of Longstanton for landscape and ecological compensation purposes (ELC Area H, Appendix 13E). The precise treatment of this area is to be agreed at the detailed design stage. However it is proposed that the habitats created replicate and replace some of those lost from designated sites in particular. Treatment may include topsoil strip to allow natural regeneration and additionally re-use of material removed from the disused railway to aid in the establishment and regeneration of those habitats lost.
11.7.45 Additional land take is proposed for ecological purposes in association with the three proposed balancing ponds at this location (Balancing Ponds 2, 3 & 4 – ELC Areas G, I & J, Appendix 13E). These areas would be designed so as to provide a mosaic of different habitat types and to allow natural colonisation processes to occur. Habitat suitable for great crested newts would also be provided by including suitable features within the detailed design of the pond margins itself, and by providing suitable surrounding terrestrial habitat to include areas for refuge and hibernaculae.

11.7.46 Additional landtake is proposed (ELC Area K, Appendix 13E) immediately south-west of the route at the Oakington Stop. This area is proposed for ecological and landscape mitigation works, allowing natural regeneration. It is proposed that if possible, this area of land is allowed to recolonise naturally, and eventually be used as a reptile receptor site once works commence.

11.7.47 At Beck Brook replacement planting would be carried out, this would include shrub and groundcover planting, and tree planting, in addition to areas of species rich grassland along the CGB. The Brook itself would be protected and some aquatic planting would be undertaken.

11.7.48 The potential loss of trees from the woodland fringes along this section at Histon (see Appendix 13E) would be mitigated through the siting of the maintenance track on the south side of the line of the route. Any trees and mature vegetation removed would be replaced by new planting of hedgerows and shrub and groundcover planting within this section. Existing woodland areas on both the north and south of the CGB route would be protected (see Appendix 13E).

11.7.49 A new balancing pond would be constructed (Balancing Pond 6) in this area and localised ecological and landscape improvements would be included. This would include planting of native trees in the area around the balancing pond (ELC Area L, Appendix 13E). An additional area of land would be acquired to the north of the route and east of the A14 underbridge, for ecological and landscape mitigation purposes (ELC Area M, Appendix 13E). Treatment of this area may include some woodland planting with areas of open space and scrub. Care would need to be taken in this area to avoid any disturbance to archaeological features, which could result from planting works.

Section 6 – A14 to Cambridge Railway Station

Arbury Park

11.7.50 In order to mitigate for the partial loss of hedgerow along Kings Hedges Road, along the margin of the Arbury Park site, new hedgerow planting would be undertaken along the margin of the route (see Appendix 13E). The hedgerow would comprise locally native and characteristic species to provide a species-diverse hedgerow, and should attempt to replace like-for-like those sections lost. A management regime would be applied to this area to encourage development of a structurally diverse hedgerow of high ecological quality in the long term. Some of the sections of hedgerow along this road are classified as important under the Hedgerows Regulations 1997 (viii), and hence would need to be replaced with like for like hedgerow (see Appendix 13E).

Science Park to Chesterton Sidings

11.7.51 The habitat loss in this section would be mitigated for by the replacement planting and habitat creation works undertaken along the route within this area. Mitigation measures in respect of breeding birds and reptiles have been dealt with in paragraphs 11.7.60 and 11.7.62.
City Centre

11.7.52 All mitigation measures in respect of the route in the City Centre section relate to CCWS and hence have been dealt with in the designated sites section.

Section 7 – Cambridge to Trumpington

11.7.53 Additional land is proposed to be acquired around a balancing pond (Balancing Pond 7) for ecological and landscape compensation (ELC Area N, Appendix 13E). This would be designed to create a mosaic of habitats, including areas for natural recolonisation.

11.7.54 Additional areas of land would be acquired in association with two proposed balancing ponds (Balancing Ponds 8 & 9, Appendix 13E), to provide compensation for lost CWS-designated land (see paragraph 11.7.20) and also to act as a translocation receptor site for nationally scarce flora that would be moved from affected areas in this location. These areas (ELC Areas O & P, Appendix 13E) would be created with a range of substrates suitable for natural recolonisation of similar composition to those currently present within the dismantled railway corridor. Individual plants and seeds of the Nationally Scarce Species present in this area would be collected and translocated/spread at the new site to encourage the continuation of these species in this area. An appropriate sympathetic management regime would be applied to the site to encourage the continued long-term presence of these species. In addition, embankments of the completed Scheme along this length would be allowed to develop through natural colonisation processes so as to encourage these resources to become re-established and facilitate the natural spread of these nationally scarce species through their normal dispersal mechanisms along the corridor of the Scheme.

Section 8 – Link to Addenbrooke’s Hospital

11.7.55 No mitigation measures are proposed in this section as no adverse effects are likely to occur as a result of the link.

Species-Specific Ecological Issues

11.7.56 Information regarding the potential requirements for licences for protected species is presented in Appendix 11G.

Bats

11.7.57 Before construction commences further verificatory checks for emergent bats during spring/summer would be undertaken at potential roost sites prior to demolition/felling in case these have become used as bat roosts in the interim period. In the event that a roost site is confirmed, a consultation would need to be held with English Nature, and the removal of any trees or structures being used as a roost site or disturbance to a roost site would need to be undertaken under licence from English Nature, and a mitigation strategy agreed before any works can take place.

11.7.58 Further additional verificatory checks, including dawn surveys, should be carried out at Windmill Bridge, the ash trees alongside the St Ives Golf Course, and the willow trees at the Wyton Lakes Holiday Park, as possible transient roost sites were identified. If any of these are identified as a roost site, then the measures as set out above would apply.

11.7.59 Extensive losses of bat foraging habitat would take place as a result of the clearance of vegetation on the disused railway corridor for the Scheme. Replacement planting and design of the Scheme should be undertaken in such a way as to maximise the potential to replace its function as a foraging habitat for bats. Measures that would be introduced to achieve this are
as follows:

- planted vegetation would comprise native species, and would be designed to provide linear habitats of varied structure and species composition. Double-hedgerows would be preferential to hedgerows on one side of the route only;

- dead and dying standing and fallen timber would be retained within landscaped areas and land where ecological objectives have been set. Such features provide ideal substrates for invertebrates and are already widespread within many section of the disused railway, for example, where wooden railway sleepers remain in-situ;

- a varied mosaic of patches of different habitat types is preferable to extensive areas of single habitats in providing a diversity of host species for flying invertebrates on which bats would feed. Ideally, the design of these should maximise the length of edge habitats, and should include wetland and open water such as ponds, ditches and Riverside features;

- use of lighting would be minimised and, where possible, avoided. Although the response of different species of bat to lighting varies considerably, in general introduced lighting is an undesirable factor. There are some areas which are already lit (i.e: street crossings) and lighting would be required at the stops and park and ride sites. However, it is proposed that the type of lighting to be used, be chosen and designed to minimise light spillage and spread, in order to minimise disturbance;

- bat boxes and purpose-designed artificial bat roosting structures can provide alternative roosting sites to trees and buildings for bats. In cases where mature trees with standing dead timber are felled, bat boxes would be introduced onto remaining mature trees.

**Birds**

11.7.60 All breeding birds are protected by the Wildlife & Countryside Act 1981 (xii) and for this reason all necessary vegetation clearance would be carried out outside the period March to July inclusive.

11.7.61 The extensive clearance of vegetation providing potential nesting sites for many bird species would, to a large extent, be replaced by new planting of hedgerows along the length of the route, compensatory planting measures, and new vegetation that would be planted and allowed to develop through natural colonisation processes in areas acquired for specific ecological mitigation purposes. The following further specific mitigation and enhancement measures would be introduced in respect of birds:

- artificial nesting banks for kingfisher and sand martin would be provided where this is practicable on embankment edges and other selected areas in the St. Ives waterbodies section of the route. Consultation on the precise design and location of these features would be carried out with the Wildlife Trust prior to their implementation;

- plant species introduced in areas with ecological objectives would include and encourage, through natural recolonisation, the presence of a diversity of native species including nectar-rich, berry-bearing, and seed and bud-bearing species so as to encourage the species of common bird that are currently found within the disused railway corridor. Monitoring would be carried out of these species and appropriate management changes made to maximise the value of such habitats;
lighting, which would give rise to unnecessary disturbance of birds along the route and in adjacent habitats, would only be provided at those areas which are already lit, and at those areas where it is necessary for safety reasons such as the stops, park and ride sites, and road junctions. It is proposed that the type of lighting to be used, be chosen and designed to minimise upward light spillage and spread in order to minimise disturbance;

- a range of nesting boxes appropriate to the species present within the disused railway corridor would be introduced. Nest boxes targeting species which are desired to be encouraged throughout Cambridgeshire would also be included where this is appropriate and feasible.

### Reptiles

11.7.62 It is likely that reptiles are present within most of the suitable habitats along the length of the route – especially within those habitats along the disused railway, in particular but not exclusively in areas of patchy open grassland and scrub. Given the findings of the surveys and incidental records of the presence of common lizard and grass snake in CWS designated areas between Cambridge and Trumpington, and within habitat at Longstanton, a number of measures should be incorporated in order to mitigate adverse effects on this group, particularly in relation to the construction area.

11.7.63 Measures would be taken to translocate any individual reptiles present within construction areas along the length of the route to appropriate receptor areas created in association with new habitats along the length of the Scheme. The precise mechanism for this would be specified in the ecological management strategy for the Scheme and implemented following agreement with the appropriate bodies, in particular English Nature.

11.7.64 The following specific measures would be implemented in respect of reptiles:

- new habitats established within areas for ecological mitigation would provide a range of features of potential value for reptiles, such as a variety of patchy areas of varied substrate, to include sandy and stony bare ground and sparsely-vegetated ground;

- a range of native habitats would be provided to maximise invertebrate diversity as a food source for reptiles;

- hibernaculae, suitable for the use of reptiles and amphibians, constructed of piles of wood and stone, would be provided at the edges of the route corridor and in ecological areas for the benefit of these species;

- edge habitats fringing the length of the Scheme would be designed to be of potential benefit as refuges and feeding areas for reptiles and amphibians;

- a watching brief would be put into place during construction works to ensure that any reptiles found incidentally during the course of construction works were found and that these could be moved to areas that would not be affected by construction works.

### Amphibians

11.7.65 Further surveys of water bodies should be carried out during the spring and summer prior to construction works. These should be undertaken in accordance with English Nature’s Guidelines (iii) to confirm that great crested newts are not present at any ponds potentially affected by works. In the eventuality that great crested newts are present, a mitigation strategy for their translocation from affected areas during construction would need to be agreed with
English Nature and subsequently implemented. In order to protect against this eventuality, areas where habitat creation measures are proposed would include ponds and other measures for amphibians so that appropriate translocation receptor sites would be available should they be required at that time.

11.7.66 Measures for amphibians would be essentially the same as those for reptiles above, but in addition, small ponds would be provided in areas where larger ponds are proposed, to encourage amphibians and other wildlife. A range of grassland, scrub and woodland habitats would be introduced and hibernaculae suitable for the use of amphibians would be provided in association with such ponds.

**Water Voles**

11.7.67 The CGB route crosses several minor watercourses along its length and the presence of water voles has been found at several of these locations. Potential also exists for this species to occur at other streams and ditches which cross the line, with suitable habitat present at many locations. The following measures are recommended in relation to the presence of water voles:

- An appropriate mitigation strategy will be produced in agreement with English Nature, and measures to minimise habitat loss, damage and disturbance should be implemented prior to construction. Measures should also be implemented during construction and operation to minimise the risks of pollution of the watercourses, and habitat creation and enhancement works should aim to provide species and conditions suitable for water voles.
- Further verificatory checks prior to construction taking place of all of these crossing points are recommended. This is to protect against the possibility of affecting water voles that may have occupied the locations of these crossing points in the period after the surveys associated with this Environmental Statement;
- Culverts permitting the passage of water beneath the line of the route should be of sufficient size to allow for the passage of water voles;
- Fringing vegetation at the sides of watercourses and against the edge of the new embankment at the point of crossing should be sufficiently dense to provide cover so as not to impede the movement of water voles, but should not be excessively shaded by overhanging vegetation or trees. A target of at least 60% vegetation cover should be aimed for in planting schemes;
- Plants provided as part of river rehabilitation works should include species known to be of value to water voles for food or cover. Reference should be made to the Water Vole Conservation Handbook (xvi) in guiding the design of planting schemes.

**Invertebrates**

11.7.68 At the Riverside Park CWS the mature pollards would be retained, no other mitigation measures are proposed.

11.7.69 At the Meadow Lane Gravel Pits CWS, following completion of the construction works, the lakeside should be re-established and re-profiled in a similar form to that which exists. Partial re-planting would be undertaken and some areas would be left to allow for natural re-colonisation. Vegetation should be translocated from those waterbodies to be lost and should be re-planted in the new waterbodies created, preferably within the park and ride site.
11.7.70 Reinstatement following completion of the construction works in the area of the River Great Ouse crossing affords an opportunity to provide habitats that are potentially more favourable for use by the scarce chaser dragonfly than those currently present. The following measures are therefore recommended:

- provision of occasional clumps of common reed within these areas and at river banks to provide emergence supports for larvae;
- the planting scheme applied to the river banks should allow for the creation of damp open areas subject to infrequent inundation, with some scrub and tree vegetation but not to the extent to create heavily shaded areas, to provide optimal territory for adult dragonflies;
- fringing terrestrial habitats should be designed to include measures to support a variety of small flying invertebrates, for example, by including a range of native species, retaining dead and decaying wood within these areas, giving consideration to the provision of small ponds, and including nectar-bearing and fruit-bearing species.

11.7.71 All such measures involving works to the river should be discussed and agreed with the Environment Agency.

11.7.72 At the Fen Drayton Gravel Pits CWS no additional mitigation measures are proposed other than those already discussed in relation to habitat re-creation works.

11.7.73 At the Over Railway Cutting, additional land would be acquired immediately north of the existing CWS and would be subject to habitat creation and management works in order to provide suitable replacement habitat for the grizzled skipper (ELC Area D, Appendix 13E). The specific design of the treatment to be carried out would be agreed with the Wildlife Trust, and works would be carried out in advance of the construction works to ensure that the replacement habitat is established prior to the loss of the existing habitat.

11.7.74 For the remaining invertebrate interest along the route, the mitigation measures already proposed in respect of habitat loss and disturbance would additionally help to mitigate for effects on the invertebrates present in these areas. The design and implementation of new habitats and compensation areas would include provision for invertebrates taking into account the species-specific requirements relevant to each specific location.

Nationally Scarce Flora

11.7.75 Specific areas would be acquired for the translocation of individual nationally scarce plants (perennials, biennials) and to which seed collected from such plants can be scattered (annuals, biennials, in particular) and individual plants/turves re-planted. The following specific measures to encourage the individual plants concerned would also be applied in respect of their specific requirements:

- perennial flax *Linum perenne* – further surveys to determine the locations of any individual plants that may be present of this species would be carried out during June prior to site clearance and individual plants marked in the field. During the following October-November, again prior to site clearance, marked plants would be translocated from these locations to areas appropriately prepared as receptor sites in the local vicinity;
- spreading hedge-parsley *Torilis arvensis* – further surveys would be carried out between July and September to assess and mark the locations of any individual plants. Further visits would be carried out in the October prior to site clearance
to collect seed from these plants and to spread this seed at areas suitably prepared in the local vicinity;

- twiggy mullein *Verbascum virgatum* – further surveys would be undertaken during the period June-September prior to site clearance to identify locations where individuals of this species occur and to mark those locations. During October-November marked plants would be translocated and seed collected for spreading at appropriate receptor sites in the local area;

- dittander *Lepidum latifolium* – surveys would be carried out during July-August to identify and mark locations at which this species occurs. During October-November these plants and their rhizomes would be translocated to suitably prepared receptor sites in the local area.

11.7.76 It is envisaged that the local receptor sites for the above would be appropriate for reception of any or all of the above species, as each show broadly similar habitat requirements.

11.7.77 For all of the areas to which the above species are proposed to be translocated or re-seeded, an appropriate management regime would be provided through a site-specific ecological management strategy to encourage the long-term suitability of habitat conditions for these species. A programme of regular monitoring of these species would be put in place to assess the long-term effectiveness of mitigation and to feed back to the management measures locally applied, so as to encourage the long-term viability of these species in this location.

11.7.78 All works proposed would need to be agreed with English Nature and the Wildlife Trust, and the detailed methods agreed at the detailed design stage.

**Construction Impacts**

11.7.79 The following measures would be implemented to mitigate impacts on ecological resources that may arise through construction activities:

- strict control of contractors, clear definition of duties and responsibilities, and effective fencing of construction areas to prevent encroachment into sensitive areas, to ensure that damage to, or loss of value to, ecological resources through the accidental or uncontrolled movements of construction personnel or vehicles, or littering, is kept to a minimum;

- construction workers would be subject to the requirements of the Environment Agency in respect of good practice with respect to the implementation of pollution prevention measures. Application of such measures would ensure that effects of the accidental spillage of materials or pollution of watercourses from haul routes, vehicles, or storage compounds do not occur;

- strict controls on dust and other emissions from construction vehicles would be ensured as part of the Code of Construction Practice that would be required of construction workers (see Section 4.5).

**Residual Effects**

11.8.1 Inevitably, with a scheme of this scale, which is largely constructed through areas that have become of ecological value through natural colonisation processes that have operated along the length of the disused railway since its closure, overall impacts on ecological resources would be adverse, ranging from major and moderate through to slight and negligible in some cases. These are resolved in full in the summary matrix table at the end of this section. Adverse effects would apply on a range of common wildlife throughout the length of the
11.8.2 A number of protected species and groups would additionally be affected adversely as a result of the Scheme. Measures have been proposed within this ES to help redress the balance, through the creation of new areas of wildlife habitat, provision of suitable areas for the relocation of translocated plants and animals of particular importance, and measures to ensure the protection of species of concern/protected by legislation. These measures would be carried out at all locations along the length of the route in accordance with an ecological management plan.

11.8.3 It is anticipated that the Scheme would give rise to a range of immediate impacts on ecological resources, ranging from major adverse to negligible. Major adverse effects would be reduced to, at worst, moderate adverse with the successful application of the above measures and the establishment of new habitats with time (see summary table).

11.9 Summary

11.9.1 The ecological resources within the vicinity of the Scheme have been assessed through a combination of review of existing available information, obtained through consultation with appropriate bodies, and original surveys undertaken over the length of the route. This has enabled a baseline understanding of the ecological resources present along the line of and within the wider area around the CGB route.

11.9.2 The effects of the Scheme on ecological resources have been evaluated using Scheme-specific significance criteria, and a range of mitigation measures have been proposed in order to minimise potential adverse effects. In addition, creative conservation measures have been proposed along the length of the CGB route.

11.9.3 Inevitably, with a scheme of this scale, the overall impact on ecological resources would be significantly adverse, with effects applying to a range of both common and protected wildlife throughout the length of the Scheme. Effects would range from major and moderate adverse to slight adverse and negligible in some cases. In addition, there would be direct effects of land take at a number of designated sites (County and City Wildlife Sites) along the length of the route, in particular, between Huntingdon and Longstanton, and between Cambridge and Trumpington. Measures have been proposed within this ES to help redress the balance, through the creation of new areas of wildlife habitat and provision of suitable areas for the relocation of translocated plants and animals of particular importance. These measures would be carried out at all locations along the length of the route in accordance with an ecological management plan.

11.9.4 As identified in the Residual Effects in paragraph 11.8, in overall terms it is anticipated that the Scheme would give rise to immediate major and moderate adverse effects in the short term on ecological resources that would be reduced to, at worst, moderate adverse and slight adverse over time with the successful application of the mitigation and creative conservation measures, and the establishment of new habitats with time.
Appendices

Appendix 11 A  Phase 1 Habitat Survey
Appendix 11 B  Target Notes
Appendix 11 C  Protected Species Summary Map
Appendix 11 D  Invertebrate Survey Report
Appendix 11 E  Plant Species List
Appendix 11 F  Designated Sites Citation Sheets
Appendix 11G  Protected Species Licensing Information
References

i WSP Environmental Ltd (2003) Survey information


ix Huntingdonshire District Council (1995) Huntingdonshire Local Plan

x WSP Environmental Ltd (2001) Arbury Camp Environmental Statement


xv The Conservation (Natural Habitats &c.) Regulations 1994


xx Cambridgeshire Biodiversity Action Plan

Sharon Hearle (Butterfly Conservation) Personal Communication
### Summary of Ecological Impacts

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristic</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land take required along the route</td>
<td>Extensive removal of native, naturally-colonised habitats along the entire length of the route</td>
<td>Major –ve D, P</td>
<td>Provision of linear, native, mixed habitat types along the majority of the length of the route and at other selected locations that can be allowed to develop through natural recolonisation processes, managed in accordance with an ecological management plan.</td>
<td>Residual effects would remain slight in the short term, becoming negligible and locally beneficial through long-term management.</td>
<td>Slight –ve ST Negligible and Beneficial LT</td>
</tr>
<tr>
<td>Section 1 Huntingdon to St Ives Park and Ride</td>
<td>The proposed road widening would result in the losses of trees, hedgerow and open space. There may be potential risks of pollution.</td>
<td>Moderate –ve D, I, P</td>
<td>Habitat re-creation elsewhere along the route, in association with balancing ponds to replace the habitat lost. Measures to prevent pollution.</td>
<td>The impacts are unlikely to affect the designation of the site, but some residual effects are likely to remain.</td>
<td>Slight –ve D, I, P</td>
</tr>
<tr>
<td>Land take required for road widening along the western margin of Riverside Park CWS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Section 2 St Ives Park and Ride to District Boundary (Fen Drayton)</td>
<td>The provision of the park and ride site at this location would lead to the loss of habitats of value locally</td>
<td>Slight –ve D, P</td>
<td>Provision of new habitats as part of mitigation of Scheme-wide losses</td>
<td>slight adverse over the short term becoming negligible through long term management</td>
<td>Slight –ve ST Negligible LT</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>St. Ives Park and Ride</strong></td>
<td>land take from the southern section of Meadow Lane Gravel Pits CWS water bodies to south of route</td>
<td>Moderate –ve D, P</td>
<td>Reinstatement of lakeside vegetation to provide new habitats and a visual screen to waterfowl against disturbance. Required land take for stability gives opportunity for new lakeside vegetation to be more extensive than that currently existing.</td>
<td>slight adverse over short term becoming beneficial in long term</td>
<td></td>
</tr>
<tr>
<td><strong>Meadow Lane CWS potential pollution</strong></td>
<td>Potential for extensive adverse effects at Meadow Lane Gravel Pits CWS through pollution</td>
<td>Major –ve D, I, P</td>
<td>Introduction of pollution prevention measures to remove the risk of pollution occurring through surface runoff or accidental spillage of materials.</td>
<td>Some residual effects are likely to remain, it would not be possibly to completely remove the risk of pollution.</td>
<td>Slight –ve P</td>
</tr>
<tr>
<td><strong>River Great Ouse crossing</strong></td>
<td>Land required for permanent and temporary acquisition associated with Great Ouse CWS crossing.</td>
<td>Moderate –ve D, T &amp; P</td>
<td>land acquired temporarily would be replanted to maintain the continuity of the river corridor and to improve its visual, amenity and ecological value. Fringing trees would be retained and construction area strictly fenced. Opportunities would be taken for the incorporation enhancements e.g. bat bricks.</td>
<td>slight adverse over short term becoming beneficial in long term</td>
<td>Slight –ve ST Beneficial LT</td>
</tr>
<tr>
<td><strong>Fen Drayton Gravel Pits</strong></td>
<td>Land take along line of the route within Fen Drayton Gravel Pits CWS</td>
<td>Moderate –ve D, P</td>
<td>Minimisation of land take. Introduce pollution control measures to prevent the occurrence of pollution that could give rise to more extensive</td>
<td>The residual impacts would be lessened, however, due to the designated status of the site, the land take and risks</td>
<td>Moderate –ve D, I, P</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristic</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td>Characteristic</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------</td>
<td>---------------</td>
<td>---------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Removal of ditches either side of the route east of the Great Ouse crossing.</td>
<td>This would result in loss of vegetation and associated habitats, impacting on a range of fauna</td>
<td>Moderate –ve D, P</td>
<td>New ditches and associated vegetation would be provided to replace those removed. These would be designed to maximise their value for foraging, roosting, and breeding birds. Possible provision of artificial kingfisher or sand martin nesting banks.</td>
<td>slight adverse in short term becoming beneficial in long term once established, and designed to include ecologically beneficial features.</td>
<td>Slight –ve ST Beneficial LT</td>
</tr>
<tr>
<td>Section 3 District Boundary (Fen Drayton) to Swavesey Drain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Removal of hedges on both sides of the route up to Holywell Ferry Road</td>
<td>This would result in the loss of habitat and wildlife corridors</td>
<td>Slight –ve D, P</td>
<td>New species-diverse hedges provided where possible.</td>
<td>In the short term adverse effects would remain, until the new hedgerows become established. In the long term the residual effects would be lessened to negligible.</td>
<td>Slight –ve ST Negligible LT</td>
</tr>
<tr>
<td>Loss of hedgerows along the route eastwards from Holywell Ferry Road for approx. 850m, partially within CWS-designated</td>
<td>This would result in the loss of habitat and wildlife corridors</td>
<td>Slight –ve D, P</td>
<td>Further replacement hedgerow planting and lakeside vegetation.</td>
<td>In the short term adverse effects would remain, until the new hedgerows become established. In the long term the residual</td>
<td>Slight –ve D, P Negligible LT</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------</td>
<td>----------------</td>
<td>--------------------------------</td>
<td>-------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Short description in</strong></td>
<td></td>
<td><strong>Description of residual impact (assuming mitigation implemented)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>words</strong></td>
<td></td>
<td><strong>Characteristics</strong></td>
<td><strong>Short description in</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Negligible, Slight, Moderate, Major</strong></td>
<td></td>
<td><strong>words</strong></td>
<td><strong>Negligible, Slight, Moderate, Major</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td></td>
<td></td>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td></td>
</tr>
<tr>
<td>Direct land take of hedgerow at northern boundary of Swavesey meadows CWS</td>
<td>This would result in the loss of habitat and wildlife corridors</td>
<td>Moderate –ve D, P</td>
<td>Replanting of new hedgerow, dominated by locally native species in this location.</td>
<td>In the short term adverse effects would remain, until the new hedgerows become established. In the long term the residual effects would be lessened to negligible.</td>
<td></td>
</tr>
<tr>
<td>Direct land take of hedgerow at southern boundary of Middle Fen CWS</td>
<td>This would result in the loss of habitat and wildlife corridors</td>
<td>Moderate –ve D, P</td>
<td>Replanting of new hedgerow, dominated by locally native species in this location.</td>
<td>In the short term adverse effects would remain, until the new hedgerows become established. In the long term the residual effects would be lessened to negligible.</td>
<td></td>
</tr>
<tr>
<td>Indirect effects of pollution at Middle Fen CWS</td>
<td>Moderate –ve I</td>
<td>Pollution control measures would serve to protect Mare Fen CWS from adverse effects.</td>
<td>Slight –ve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect effects of pollution at Mare Fen CWS</td>
<td>Moderate –ve I</td>
<td>Pollution control measures would serve to protect Mare Fen CWS from adverse effects.</td>
<td>Slight –ve becoming negligible in LT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of scrub vegetation adjacent to Swavesey Priory</td>
<td>This would result in the loss of habitat</td>
<td>Slight –ve D, P</td>
<td>New native screening vegetation would be provided.</td>
<td>Negligible in LT</td>
<td></td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>--------------------------------</td>
<td>------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Temporary land acquisition east of Station Road, Swavesey, and some permanent acquisition for road crossing and Kiss and Ride.</td>
<td>There would be no adverse effects</td>
<td>Negligible</td>
<td>None</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Section 4 Swavesey Drain to Longstanton Park and Ride</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New balancing pond in between Swavesey Drain and Longstanton Road</td>
<td>There would be no adverse effects resulting from the balancing pond</td>
<td>Negligible</td>
<td>Improvements to the Swavesey Drain including introduction of measures for water voles</td>
<td>Habitat enhancement works have the potential to be beneficial in the long term.</td>
<td></td>
</tr>
<tr>
<td>Loss of approx. 1500m of hedgerow to B1050 crossing</td>
<td>This would result in the loss of habitat and wildlife corridor function</td>
<td>Slight –ve D, P</td>
<td>Replacement hedgerows provided</td>
<td>Slight –ve becoming negligible in LT</td>
<td></td>
</tr>
<tr>
<td>Loss of Over Railway Cutting CWS through direct land take.</td>
<td>This would result in the complete loss of this CWS and the habitat supporting the population of grizzled skipper butterfly.</td>
<td>Major –ve D, P</td>
<td>Acquisition of additional land for new flower-rich grassland habitat creation and for use as a translocation receptor site.</td>
<td>Moderate –ve ST Slight –ve/negligible LT</td>
<td></td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-----------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Former pond and associated reed bed</td>
<td>This area would be retained and no adverse effects would occur.</td>
<td>Negligible</td>
<td>An existing reed bed would be retained and enhanced through the provision of a new linear reed bed feature running alongside the Scheme at this point. Additional land would be acquired to the west of the reed bed for ecological and landscape mitigation measures.</td>
<td>Habitat enhancement works would help mitigate for losses along the route, and have the potential to be beneficial in the long term.</td>
<td></td>
</tr>
<tr>
<td>New stop and Park and Ride location east of the B1050</td>
<td>No significant adverse effects are anticipated on ecological resources in this area.</td>
<td>Negligible</td>
<td>Application of ecological enhancement measures within retained land.</td>
<td>Opportunities for ecological enhancement works may be beneficial in the long term.</td>
<td></td>
</tr>
<tr>
<td>Section 5 Longstanton Park and Ride to A14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of discontinuous hedgerows up to Oakington Road.</td>
<td>This would result in the loss of habitat and wildlife corridor function.</td>
<td>Slight –ve D, P</td>
<td>Provision of replacement hedgerows.</td>
<td>In the short term adverse effects would remain, until the new hedgerows become established. In the long term the residual effects would be lessened to negligible.</td>
<td></td>
</tr>
<tr>
<td>New balancing pond construction, requiring some hedgerow removal.</td>
<td>This would result in the loss of some habitat and wildlife corridor function.</td>
<td>Slight –ve D, P</td>
<td>Additional land take for ecological purposes around the proposed balancing ponds and provision of new habitats.</td>
<td>Some adverse effects may remain in the short term. However, once the hedgerows and additional ecological enhancement</td>
<td></td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>---------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Vegetation losses beyond Girton Road crossing.</td>
<td>This would result in the loss of habitat and wildlife corridor function.</td>
<td>Slight –ve D, P</td>
<td>New replacement planting</td>
<td>Once the vegetation becomes established the effects would be negligible.</td>
<td></td>
</tr>
<tr>
<td>Histon Woodland</td>
<td>Woodland protection measures would be implemented to minimise losses to the Histon Woodland</td>
<td>Negligible</td>
<td>Woodland protection measures and hedgerow planting along the route.</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Loss of mature trees and hedgerows between Bridge Road and the A14 underbridge.</td>
<td>This would result in losses of habitat and some wildlife corridor function.</td>
<td>Moderate –ve D, P</td>
<td>Any trees and mature vegetation removed would be replaced by new planting. Additional land to be acquired to establish new linear connections between remaining woodland blocks.</td>
<td>Once new planting becomes established the effects would be reduced to negligible in the long term, and potentially beneficial with the creation of new linear connections between the remaining woodland areas.</td>
<td>Slight –ve becoming negligible or beneficial in LT</td>
</tr>
<tr>
<td>New balancing pond west of the A14 underbridge.</td>
<td>No adverse effects are anticipated.</td>
<td>Negligible</td>
<td>A new pond would be constructed or enhancement measures would be provided to the existing ponds in this area.</td>
<td>The establishment of new habitats would help to mitigate for losses elsewhere along the route</td>
<td>Beneficial</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 6 A14 to Cambridge Railway Station</strong></td>
<td>Removal of parts of the hedgerow along Kings Hedges Road</td>
<td>This would result in some losses of habitat and wildlife corridor function.</td>
<td>Slight –ve D, P Minimisation of land take and replacement of lost hedgerow with new, native-species rich hedgerow. The effects would be reduced to negligible in the long term with the establishment of new hedgerow. Slight –ve becoming negligible in LT</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 7 Cambridge Railway Station to Trumpington</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bin Brook CCWS</td>
<td>Negligible</td>
<td>No adverse effects would occur at this site</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain at Garret Hostel lane CCWS</td>
<td>Negligible</td>
<td>No adverse effects would occur at this site</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little St Mary’s Churchyard CCWS</td>
<td>Negligible</td>
<td>No adverse effects would occur at this site</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emmanuel College Gardens CCWS</td>
<td>Negligible</td>
<td>No adverse effects would occur at this site</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambridge Botanic Garden CCWS</td>
<td>Negligible</td>
<td>No adverse effects would occur at this site</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empty Common CCWS</td>
<td>Negligible</td>
<td>No adverse effects would occur at this site</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------</td>
<td>----------------</td>
<td>---------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Bentley Road Paddocks CWS</strong></td>
<td>Negligible</td>
<td>No adverse effects would occur at this site</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Land take from Hobson’s Brook CCWS</strong></td>
<td>This may result in some losses of habitat and wildlife corridor function.</td>
<td>Moderate –ve D, P</td>
<td>Land take to be minimised as much as possible at the Hobson’s Brook crossing point. Replanting of marginal vegetation</td>
<td>Effects would be reduced to slight adverse in the short term becoming negligible in the long term following the establishment of replacement marginal vegetation.</td>
<td></td>
</tr>
<tr>
<td><strong>Risk of indirect effects of pollution entering Hobson’s Brook CCWS</strong></td>
<td>There are risks of pollution to Hobson’s Brook CCWS which would adversely effect the ecological resource.</td>
<td>Potentially Major –ve I, P</td>
<td>Introduction of pollution control measures. Diversion of drainage to a new balancing pond in this location.</td>
<td>With the inclusion of pollution control measures the effects would be reduced to slight adverse.</td>
<td></td>
</tr>
<tr>
<td><strong>Long Road Plantation CCWS and access routes from Long Road to the line of the CGB route.</strong></td>
<td>Some losses of vegetation may occur</td>
<td>Slight –ve I, D, P</td>
<td>Minimisation of land take, replacement planting at suitable locations where appropriate</td>
<td>Effects would be reduced in the long term following the establishment of replacement vegetation.</td>
<td></td>
</tr>
<tr>
<td><strong>Land take from the western perimeter of Triangle North of Long Road CWS</strong></td>
<td>This would result in some losses of habitat.</td>
<td>Moderate –ve D, P</td>
<td>Minimise land take, and re-establish new embankments of the completed Scheme to promote the future occurrence of neutral and calcareous grassland ion these areas.</td>
<td>The effects would be reduced to slight adverse in the long term with the establishment of new habitats.</td>
<td></td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------</td>
<td>----------------</td>
<td>---------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Application of ecological enhancement measures to land surrounding balancing ponds.</td>
<td>Application of ecological enhancement measures would help to mitigate for losses elsewhere along the route, and may be beneficial in the long term.</td>
<td></td>
</tr>
<tr>
<td>New balancing ponds in agricultural land.</td>
<td>No adverse effects are anticipated.</td>
<td>Negligible</td>
<td></td>
<td>Beneficial LT</td>
<td></td>
</tr>
<tr>
<td>Wholesale loss of Trumpington Dismantled Railway CWS through direct land take.</td>
<td>This would result in the losses of habitats and the wildlife corridor function of this site.</td>
<td>Major –ve D, P</td>
<td>Replacement habitat created around nearby balancing ponds, translocation of Nationally Scarce flora to appropriate receptor sites. Additional compensation measures to be agreed.</td>
<td>Moderate -ve becoming negligible in LT subject to the inclusion of appropriate compensation measures and the application of an effective long-term management plan</td>
<td></td>
</tr>
<tr>
<td>Section 8 Addenbrooke’s Link</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Link to Addenbrooke’s Hospital across agricultural land.</td>
<td>No adverse effects are anticipated.</td>
<td>Negligible</td>
<td>None</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Red Cross Lane Drain CCWS</td>
<td>Negligible</td>
<td>No adverse effects would occur at this location</td>
<td></td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Hedgerow West of Babraham Road CCWS</td>
<td>Negligible</td>
<td>No adverse effects would occur at this location</td>
<td></td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Species-specific Effects Bats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C:\APPLE_SHARE\ES ISSUE REV 02.DOC
Cambridgeshire County Council
Cambridgeshire Guided Busway
Environmental Statement
Section 11 – Ecology

Page 288
Ove Arup & Partners Ltd
Issue February 2004
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effects on bat roosts at Houghton Grange Golf Course</td>
<td>Three mature Ash trees containing possible transient roosts would be lost.</td>
<td>Potentially Major –ve D, P</td>
<td>• further verificatory checks for emergent bats during spring/summer to be carried out at any large trees prior to their felling; • Apply for licence for removal of trees containing roosts.</td>
<td>Effects would be reduced to slight adverse in the short term and negligible in the long term provided that appropriate mitigation measures are implemented where appropriate.</td>
<td>Slight –ve becoming negligible in LT</td>
</tr>
<tr>
<td>Effects on bats at Wyton Lakes Holiday Park</td>
<td>Mature willow trees containing possible transient roosts may be subject to disturbance</td>
<td>Potentially Moderate –ve D, T</td>
<td>• further verificatory checks for emergent bats during spring/summer to be carried out at any large trees prior to their felling; • Apply for licence for disturbance to roosts</td>
<td>Effects would be reduced to slight adverse in the short term and negligible in the long term provided that appropriate mitigation measures are implemented where appropriate.</td>
<td>Slight –ve becoming negligible in LT</td>
</tr>
<tr>
<td>Effect on bat roost at Windmill Road Bridge</td>
<td>The bridge would be demolished resulting in the loss of a possible transient roost</td>
<td>Potentially Major –ve D, P</td>
<td>• further verificatory checks for emergent bats during spring/summer to be carried out at the bridge • Apply for licence for removal of bridge</td>
<td>Effects would be reduced to slight adverse in the short term and negligible in the long term provided that appropriate mitigation measures are implemented where appropriate.</td>
<td>Slight –ve becoming negligible in LT</td>
</tr>
<tr>
<td>Effects on bat foraging habitats</td>
<td>Losses of bat foraging habitat would occur.</td>
<td>Slight –ve D, I, P</td>
<td>• New native planting of linear habitats; • Retain dead and dying standing and fallen timber;</td>
<td>Becoming negligible in the long term with the establishment of replacement vegetation and habitats. Locally beneficial.</td>
<td>Negligible, Beneficial</td>
</tr>
</tbody>
</table>

**MITIGATION AND COMPENSATION WORKS SHOULD AIM**
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Negligible, Slight, Moderate, Major</td>
<td></td>
<td></td>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td></td>
<td></td>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
<tr>
<td></td>
<td>Provide a varied mosaic of patches of different habitats including wetland and open water features;</td>
<td></td>
<td></td>
<td>TO BE CONSISTENT WITH AND HELP MEET SOME OF THE BAP TARGETS SET FOR BATS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avoid use of lighting;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inclusion of bat boxes and other artificial bat roosting structures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>beneficial where bat roosts are scarce and new roosts provided</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds</td>
<td>Kingfisher – temporary disturbance effects.</td>
<td>Major –ve I, T</td>
<td>Disturbance should not take place during the breeding season. Artificial nesting banks for kingfisher would be provided where this is practicable on embankment edges.</td>
<td>Effects have the potential to be beneficial in the long term with the provision of suitable habitat features for kingfishers.</td>
<td>Beneficial</td>
</tr>
<tr>
<td></td>
<td>Some disturbance may result from construction activities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peregrine oystercatcher, turtle dove, teal, pochard, lapwing</td>
<td>Negligible</td>
<td>None</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No adverse effects are anticipated.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Song thrush, yellowhammer, bullfinch, starling</td>
<td>Moderate –ve D, P</td>
<td>New habitat creation to encourage natural recolonisation, the presence of a diversity of native species including nectar-rich, berry-bearing, and seed and bud-bearing species, and habitats favourable for invertebrates;</td>
<td>Effects would be reduced to slight adverse in the short term and potentially beneficial in the long term with the provision and establishment of suitable habitat features.</td>
<td>Slight –ve to locally beneficial</td>
</tr>
<tr>
<td></td>
<td>Some losses of potential nesting and feeding areas.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MITIGATION AND COMPENSATION WORKS SHOULD AIM TO BE CONSISTENT WITH AND HELP MEET SOME OF THE BAP TARGETS SET FOR BATS**
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short description in words</td>
<td>Negligible, Slight, Moderate, Major</td>
<td>- New planting to include shrubby species that may provide nesting sites;</td>
<td>SOME OF THE BAP TARGETS AND OBJECTIVES SET FOR SONG THRUSH</td>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td></td>
<td>Characteristics</td>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T</td>
<td>- Avoid use of lighting;</td>
<td></td>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Introduction of a range of nest box structures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kestrel, green woodpecker</td>
<td>Some loss of foraging habitats.</td>
<td>Local and slight –ve D, P</td>
<td>Provision of areas of scrub and patchy grassland within ecological areas, creating replacement foraging habitats.</td>
<td>Effects would be reduced to negligible with the replacement of foraging habitats.</td>
<td>Negligible</td>
</tr>
<tr>
<td>Sand martin, swallow</td>
<td>Some loss of foraging habitats.</td>
<td>Slight –ve D, P</td>
<td>Inclusion of measures along the length of the route and in ecological areas to encourage small flying invertebrates.</td>
<td>Effects would be reduced to negligible with the replacement of foraging habitats.</td>
<td>Negligible</td>
</tr>
<tr>
<td>Effects on breeding birds.</td>
<td>There is the potential for major adverse effects on breeding birds if vegetation clearance were to be undertaken during the breeding season.</td>
<td>Major –ve D, I, P</td>
<td>Vegetation clearance would be carried out outside the period March to July inclusive.</td>
<td>Effects on breeding birds would be negligible provided that the vegetation clearance is undertaken outside of the breeding season.</td>
<td>Negligible</td>
</tr>
<tr>
<td>Reptiles</td>
<td></td>
<td></td>
<td>- Implement an exercise to translocate individual reptiles present within the construction area.</td>
<td>Effects would be reduced to negligible with the implementation and application of the mitigation measures.</td>
<td>Negligible</td>
</tr>
<tr>
<td>Effects on reptiles</td>
<td>Losses of reptile habitat.</td>
<td>Moderate –ve D, I, P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------</td>
<td>---------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Appication of the mitigation measures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction areas to appropriate receptor sites;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. New habitats would include a range of features of potential value for reptiles;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Provide a range of native habitats to maximise invertebrate diversity as a food source for reptiles;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Hibernaculae, constructed of piles of wood and stone, provided at the edges of the route corridor and in ecological areas;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Edge habitats fringing the length of the completed Scheme designed to be of benefit as refuges and feeding areas for reptiles;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Watching brief would be put into place during construction works to ensure that any reptiles found incidentally during the course of construction works are moved to areas that would not</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table: Impact of Guided Busway on Amphibians and Water Voles

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amphibians</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effects on amphibians</td>
<td>There is the potential for losses of amphibian (including great crested newt) habitat.</td>
<td>Potentially Moderate –ve</td>
<td>Confirmatory surveys to be carried out at affected ponds during the spring prior to construction works. In the eventuality that great crested newts are present, a strategy would be agreed with English Nature for their exclusion from affected areas. Habitat treatment measures as for reptiles, but in addition, small ponds would be provided to encourage amphibians, in order to encourage these species and also provide potential translocation receptor areas. A range of grassland, scrub and woodland habitats would be introduced and hibernaculae suitable for the use of amphibians would also be provided in association with ponds.</td>
<td>Effects would be reduced to negligible provided that the appropriate measures as set out are applied should amphibians (great crested newts in particular) be present. In the long term effects may be beneficial with the establishment of suitable habitats.</td>
</tr>
<tr>
<td><strong>Water Voles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effects on water voles</td>
<td>Losses of water voles habitat, impedance of movement along watercourses.</td>
<td>Moderate –ve D, I, P, T</td>
<td>• further verificatory checks prior to construction; • culverts permitting the</td>
<td>Effects would be reduced to negligible with the application of the appropriate mitigation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Negligible, locally beneficial</td>
</tr>
</tbody>
</table>
## Section 11 – Ecology

### Impact name

<table>
<thead>
<tr>
<th>Description of impact</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
</table>
| **Short description in words** | passage of water beneath the line of the route should be of sufficient size to allow for the passage of water voles;  
fringing vegetation would be sufficiently dense to provide cover, but not cause excessive shading;  
plants provided as part of river rehabilitation works would include species of known value to water voles for food or cover;  
special measures would be provided to encourage the presence of water voles at the Swavesey Drain. | appropriate mitigation measures. In the long term effects may be beneficial with the establishment and enhancement of suitable habitat and features. |
| **Characteristics** | Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T, | Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T, |
| ** watercourses.** | | **MITIGATION AND COMPENSATION WORKS SHOULD AIM TO BE CONSISTENT WITH AND HELP MEET SOME OF THE BAP TARGETS AND OBJECTIVES SET FOR WATER VOLES** |

### Invertebrates

<table>
<thead>
<tr>
<th>Possible effects on nationally scarce invertebrates and invertebrates of County significance.</th>
<th>Slight and Moderate – ve T</th>
<th>Slight and Moderate – ve T</th>
</tr>
</thead>
</table>
| There would be some losses of invertebrate habitat, and localised short term reduction in habitat quality in some areas. | • restoration of and re-profiling of lake margins  
• translocation of aquatic and marginal vegetation from ponds lost to newly created ponds  
• creation of areas of slow-flow | Effects would be reduced following the application of mitigation measures. Effects may be beneficial in the long term following the establishment of new habitats. |
| • | | **Negligible becoming beneficial in LT** |

---

C:\APPLE_SHARE\ES ISSUE REV 02.DOC

Page 294

Ove Arup & Partners Ltd

Issue February 2004
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short description in words</strong></td>
<td>Characteristics</td>
<td></td>
<td>Characteristics</td>
</tr>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
<td>+ve, -ve, D, I, S, C,</td>
<td>at the edges of the river channel; provision of occasional clumps of common reed to provide emergence supports for larvae;</td>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>ST, MT, LT, P, T,</td>
<td></td>
<td>• river bank planting Scheme would include damp open areas subject to infrequent inundation, without heavily shaded areas;</td>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• fringing terrestrial habitats would include measures to support a variety of small flying invertebrates.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Habitat creation and management at newly acquired land at Over Railway Cutting to provide suitable habitats for the grizzled skipper butterfly</td>
<td></td>
</tr>
<tr>
<td><strong>Nationally Scarce Plant Species</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effects on the nationally scarce perennial flax Linum perenne, spreading hedge parsley</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adverse effects would occur with the loss of habitats areas where these plants are present</td>
<td></td>
<td>• further surveys during the appropriate flowering periods prior to site clearance of each shuttle siding site;</td>
<td></td>
</tr>
<tr>
<td><strong>Moderate – ve for each species</strong></td>
<td></td>
<td></td>
<td>Effects would be reduced following the application of appropriate mitigation measures with the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------</td>
<td>--------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>spreading hedge-parsley Torilis arvensis, twiggy mullein Verbascum virgatum and dittander Lepidum latifolium</td>
<td>these plants are present.</td>
<td>of these species to identify and mark the locations of any individual plants that may be present; • translocation of perennial and biennial species to a suitably prepared local receptor site; • collection and spreading of seed from annual and biennial species to suitably prepared areas; • application of an appropriate management regime to receptor areas of translocated plants and seed; • monitoring measures to feed back to the site management plan.</td>
<td>measures, with the potential to become beneficial in the long term as a result of long-term management.</td>
</tr>
<tr>
<td>Construction effects: • visual disturbance; • damage from accidental or uncontrolled movement of construction personnel or vehicles, or</td>
<td>A range of adverse effects would occur as a result of temporary construction works.</td>
<td>Moderate –ve T • containment of construction works in sensitive areas; • restriction of working hours, especially at sensitive time periods or locations; • strict control of contractors, clear definition of duties and</td>
<td>Effects would be reduced to negligible following the application of appropriate mitigation measures. Negligible</td>
</tr>
</tbody>
</table>

Note: The table entries are extracted from the image and formatted according to the guidelines provided.
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>littering;</td>
<td>• accidental spillage</td>
<td>clear definition of duties and</td>
<td>implementation of pollution prevention measures;</td>
</tr>
<tr>
<td></td>
<td>of materials or pollution;</td>
<td>responsibilities, and effective</td>
<td>• strict controls on dust and other emissions from</td>
</tr>
<tr>
<td></td>
<td>• dust or emissions from</td>
<td>fencing of construction areas to</td>
<td>construction vehicles.</td>
</tr>
<tr>
<td></td>
<td>construction vehicles.</td>
<td>prevent encroachment into sensitive areas;</td>
<td></td>
</tr>
</tbody>
</table>

Note: Abbreviations are as follows
+ve = positive, -ve = negative, D = direct, I = indirect, S = Secondary, C = cumulative, ST = short-term, MT = medium-term, LT = long-term, P = permanent, T = temporary,
Abbreviations can be used in any viable combination, i.e. avoiding contradictions.
12. GROUND CONTAMINATION

12.1 Introduction

12.1.1 This section of the Environmental Statement (ES) describes the soil and groundwater resources on and within the vicinity of the proposed Cambridgeshire Guided Busway (CGB) Scheme and assesses the impact of the Scheme on the prevailing soil and groundwater conditions within the area. The effects of the Scheme upon agricultural soils are assessed in Section 7 and are not considered further here. The potential occurrence and impact upon the development of any existing ground contamination along the route is also assessed.

12.1.2 Adverse environmental effects on geological resources arising from the development encompasses loss of mineral resources or damage to geological features of significance. Adverse environmental effects associated with ground contamination principally concern:

- pollution of groundwater;
- pollution of surface waters;
- human health and safety on and off site;
- corrosion of construction materials; and
- plant growth restrictions.

12.1.3 This section describes the methods used to assess the impacts, the baseline conditions currently existing along the CGB corridor, the potential direct and indirect impacts of carrying out the Scheme arising from ground conditions along the corridor, the mitigation measures required to prevent, reduce or offset the impacts, and the residual impacts.

12.2 Review of Development Proposals

12.2.1 A description of the Scheme has been given in Section 4 and a plan indicating the main features with respect to this ground resources assessment along the proposed route is included as Appendix 12A. The aspects of the Scheme most relevant to the soil conditions, groundwater and contamination assessment relate to disturbance of the baseline ground conditions for the construction of a number of structures along the route.

12.2.2 Specific areas of ground disturbance are described in the following paragraphs. For all those parts of the route that follow the disused railway lines, some shallow earthworks to construct the guideway and stops would be required. No significant earthworks would generally be required along any of the on-street sections, except as described below.

Section 1 – Huntingdon to St Ives Park and Ride

12.2.3 The CGB buses would run along existing roads for the whole of this section and no significant earthworks would be required except for:

- widening of the Hartford Road on the east side of Huntingdon with an approximate 3m land take from adjacent open land;
- widening of the A1123 Huntingdon Road at the junction with Hartford Road;
- widening of the A1123 on the west side of St Ives with an approximate 3m land take from the adjacent golf course at High Leys and from open land up to Houghton Hill; and
St Ives Park and Ride site. The earthworks for this are likely to include removal of the upper 0.4m of soils to create a level formation upon which the car park pavement would be built, drainage would be installed and spread footings for the foundations of buildings and other structures associated with the car park would be constructed. Foundations would be to a depth of 2m to 3m below surface but the use of piles has not been ruled out at this stage.

12.2.4 As outlined in Section 4.5, Construction Methodology, a construction compound serving the northern sections of the route would be located at the St Ives Park and Ride site.

12.2.5 It is proposed to locate a depot for stabling of vehicles and for storage of plant and materials for track maintenance operations at the St Ives Park and Ride site. The depot would have a refuelling facility for maintenance vehicles and petrol interceptors would be installed within the drainage network.

Section 2 – St Ives to District Boundary (Fen Drayton)

12.2.6 This section follows the disused railway corridor and would require construction of the guideway and maintenance track, and a new private access to the land to the north of the guideway between the River Great Ouse and Moore Brook. Some minor disturbance of the ground within the vicinity of the bridge over the River Great Ouse would occur during replacement of the deck and pier. A construction area would be required for cranes and other plant. However, only minimal disturbance of the existing soils would occur due to the placement of an aggregate layer over a geotextile membrane.

Section 3 – District Boundary (Fen Drayton) to Swavesey Drain

12.2.7 Along this section of the route, in additional to construction of the guideway, significant disturbance of surface soils may occur during construction of the Nature Reserve request stop and the Swavesey Kiss and Ride and stop. New vehicular accesses would be constructed for Mow Fen Drove and Middle Fen Drove, parallel to and north of the guideway and from Over Road, Swavesey, to Lairstall Drove.

Section 4 – Swavesey Drain to Longstanton Park and Ride

12.2.8 For most of this section, the corridor (including embankment and ditches) would exceed the width of the existing railway corridor by up to 4 metres. The corridor would be widened into open land.

12.2.9 New permanent 4m wide access roads would be constructed south of Windmill Bridge, for farm access, and from the B1050 to access a warehouse.

12.2.10 Disturbance of the ground would occur during the rebuilding of Windmill bridge and the excavation of a balancing pond along this section of the route. The balancing pond would require the excavation and removal of soils to an approximate depth of 1.5m.

12.2.11 The main construction compound for the northern sections of the route would be located at the Longstanton Park and Ride site. A further smaller compound would be located off Windmill Bridge on Longstanton Road at Over, during the construction phase.

12.2.12 A park and ride site would be located on the B1050 at Longstanton. There would initially be spaces for 350 cars, with capacity to increase this to 700 spaces. Disturbance of the ground would occur during construction of the passenger waiting facilities and to create a formation level for the car park. Petrol interceptors would be installed within the drainage network to
prevent pollution of the balancing ponds.

Section 5 – Longstanton Park and Ride to the A14

12.2.13 Disturbance of the ground would occur during the excavation of four balancing ponds along this section of the route. The balancing ponds would require the excavation and removal of soils to an approximate depth of 1.5m.

12.2.14 A new track would be constructed, running parallel to and south of the proposed guideway, to provide access to the stables at Histon.

12.2.15 Stops at Histon & Impington and Oakington would require land outside the railway corridor.

12.2.16 Demolition of the former Histon Station building and earthworks to provide a level formation would be required at this location to construct the Histon & Impington car park, with up to 40 spaces.

Section 6 – A14 to Cambridge Railway Station

12.2.17 Some minor, shallow earthworks to construct the guideway and stops would be required at Arbury Park on land which has remained largely undeveloped to the present day. However, it is possible that some hydrocarbon-impacted ground could be encountered during the shallow earthworks for the guideway construction within the vicinity of the former bus depot in the south west corner of the Arbury Park site.

12.2.18 Road widening and new traffic signals are proposed at the junction of Histon Road with the A14 and at the junction between Histon Road and King’s Hedges Road. This would include some land-take to the east of the Histon Road from the northern part of the adjacent allotment gardens site. Land-take from the southern part of the allotment gardens site is not proposed.

12.2.19 The route would extend up to the boundary of Chesterton Sidings. Therefore, no ground disturbance would occur within the vicinity of the Chesterton Sidings site, and this site has not been considered further as part of this assessment.

Section 7 – Cambridge Railway Station to Trumpington

12.2.20 In addition to construction of the guideway and maintenance track, significant disturbance of the ground would be required to construct the following:

- three balancing ponds;
- the new underpass to take the guideway under Hills Road Bridge; and
- the new maintenance track underpass through the embankment at Long Road bridge.

12.2.21 During the construction period, works compounds would be located at Hills Road Bridge, to the south of the Long Road embankment and also at Shelford Road.

Section 8 – Link to Addenbrooke’s Hospital

12.2.22 Significant disturbance of the ground would be required to construct the proposed embankment and bridge across the active railway line, along the existing right of way.
Environmental Aspects of Scheme Design

12.2.23 The following features have been incorporated into the design of the Scheme, in order to prevent degradation of ground resources along the route:

- use of oil / petrol interceptors at park and ride and car park sites;
- development of procedures and protocols for the handling and transportation of contaminated materials;
- off-site disposal of contaminated spoil material at appropriately licensed landfill sites;
- a Code of Construction Practice (CoCP) would be developed in consultation with the local authorities with the objective of ensuring that developers and contractors undertake the works in a considerate and environmentally sensitive manner.

12.3 Methodology

General Approach

12.3.1 The assessment of the effects of the Scheme arising from the underlying ground conditions has considered the extent, method and programme of the proposed earthworks, foundations and additional infrastructure that would be required along the route.

12.3.2 The baseline assessment of ground conditions along the route corridor comprised an initial desk-based scoping study followed by a ground investigation, undertaken between November 2001 and April 2002, which targeted areas of potential contamination, as identified by the desk study. This work was carried out for the previous superCAM scheme.

12.3.3 Consultations have also taken place with the Environment Agency (EA) and the Local Authorities during the course of the preparation of this assessment.

Desk Study

12.3.4 An initial baseline assessment of ground conditions along several proposed route options was undertaken in October 2001 as part of the Scoping Study for the proposed superCAM scheme (see Appendix 12B). During this study, areas of potential ground contamination, which could impact upon the construction and operation of the proposed superCAM scheme were identified. The scoping assessment comprised a desk study of available geological, hydrogeological and Ordnance Survey (OS) maps, an aerial photographic interpretation and the findings from a walkover survey of the route. The desk study included reference to the following information sources:

- British Geological Survey (BGS) 1:50,000 Series Drift Edition Geological Map, Sheet 187;
- OS 1:25,000 Series, Sheet 225;
- BGS 1:625,000 hydrogeological map of England and Wales;
- BGS 1:100,000 hydrogeological map of Cambridge to Maidenhead;
- the EA website; and
- BGS Geo-data index.
12.3.5 The methodology and results of the scoping assessment are described further in Appendix 12B. Additional work has been undertaken where necessary to update this study, including in relation to the extended CGB route from Huntingdon to St Ives.

12.3.6 Along many parts of the route, the baseline assessment did not identify any areas of particularly high environmental sensitivity with respect to ground resources or any areas where significant issues regarding ground contamination may arise. However, the findings of the scoping assessment identified:

- the potential for ground contamination at the proposed park and ride site and maintenance facilities, which is located on a former landfilled area close to the St Ives by-pass;
- the potential for contamination of the ballast and track bed material along the disused railway corridor, St Ives to North of Cambridge and from Cambridge Railway Station to Trumpington;
- the potential for significant impacts upon a Site of Special Scientific Interest (SSSI), designated for its geological importance, at Histon Road in the north of Cambridge;
- the potential for significant impacts upon the quality of the ground resources within the area of the railway crossing to Addenbrooke’s Hospital.

12.3.7 In addition to the above, historic and current potentially contaminative land-uses were identified at a number of other locations within the vicinity of the route (see Appendix 12B). However, it was assessed that there was a low risk of contaminated soils and groundwaters being disturbed during the earthworks at these locations and these locations have not been considered further by this assessment.

12.3.8 Since undertaking the initial baseline assessment in October 2001, a further 6km has been added to the route between St Ives and Huntingdon. The entire length of this extension is aligned along the existing road network and implementation of the Scheme would not require any substantial earthworks apart from limited road widening works (see Section 12.2). Therefore, it has been concluded that intrusive contamination investigation of ground underlying the Huntingdon route extension is not required for this assessment.

**Ground Investigation**

12.3.9 The ground investigation comprised the collection of soil samples for chemical analysis from areas identified during the desk study as having the potential to have been impacted by contamination (see paragraph 12.3.6). Information generated during the ground investigation has been used to make an assessment of the current ground conditions within these areas. In particular, ground investigation information as described in the following paragraphs has been reviewed. A plan showing the location of the relevant trial pits and boreholes is presented as Appendix 12C.

12.3.10 The ground investigation information for the baseline assessment of ground conditions at the St Ives Park and Ride site comprised:

- Engineer’s logs and observations from three trial pits (TP1, TP2 and TP3), excavated to a maximum depth of 4.5m below ground level (bgl). Of these trial pits, two were excavated on the landfilled area (TP2 and TP3) and one was excavated adjacent to the landfilled area on the disused railway corridor;
- Driller’s logs from one borehole (BH1), drilled to a depth of 9.45m bgl adjacent to the landfilled area on the disused railway corridor;
- Results of headspace testing for volatile hydrocarbons, using a portable Flame Ionisation Detector (FID), on soil samples collected from trial pits in the landfilled area at approximate 0.5m intervals;
- Results of chemical analyses of a total of three soil samples (from TP2 at a depth of 1.0m, TP2 at a depth of 2.0m and TP3 at a depth of 1.6m) within the landfilled area;
- Results of chemical analyses of two groundwater samples collected from TP2 and TP3; and
- Results of gas monitoring during excavation of TP2 and TP3.

12.3.11 The ground investigation information for the baseline assessment of ground conditions along the disused railway corridor comprised:

- Engineer’s log from a trial pit (TP10) located on the corridor, adjacent to the MG Owners’ Club at Swavesey;
- Engineer’s logs from a further five locations along the disused railway line north of Cambridge (TP6, TP31, TP33, TP34 and TP35)
- Results of chemical analyses of the following samples: two samples collected from ballast along the disused railway corridor (at TP31 and TP33); one sample from the track bed layer below the ballast (at TP34); two samples from Made Ground below the track bed (at TP6 and TP35); and two samples from Made Ground from TP10 adjacent to the MG Owner’s Club.

12.3.12 The results of the chemical analyses on soil samples were compared in the first instance to Soil Guideline Values (SGVs) for industrial/commercial end uses, that have been published for seven metals by the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (England and Wales) as part of the Contaminated Land Exposure Assessment model (CLEA). i

12.3.13 Where CLEA SGVs are not available for a determinand, the Dutch Intervention Values ii have been used. Sulphate attack on concrete has been assessed against guidance provided in BRE Special Digest 1 Concrete in Aggressive Ground iii. 

12.3.14 The chemical testing results for groundwater have been compared against the Dutch Intervention Values. Where the Dutch values do not specify a threshold value, the Water (Water Quality) Supply Regulations iv 1989 have been used.

**Assessment Criteria**

12.3.15 Assessment of the significance of soil and groundwater contamination within the application site, and its implications on development, has considered the current UK legislation and guidance.

12.3.16 The assessment of potential and residual effects has used a 7-level scale of significance as detailed in Table 12.1.
Table 12.1 – Description of 7-Level Scale of Significance Criteria

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Adverse Effect</td>
<td>Major or long-term moderate detrimental effect to human health. Major temporary or permanent reduction in the quality of a potable groundwater or surface water resource of local, regional or national importance. Permanent or major temporary detrimental effect on animal or plant populations. Permanent detrimental effect to nationally important geological feature. Permanent and major detrimental effect upon the integrity of built structures.</td>
</tr>
<tr>
<td>Moderate Adverse Effect</td>
<td>Long-term slight or short-term moderate detrimental effect to human health. Slight or moderate, local-scale reduction in the quality of potable groundwater or surface water resources of local, regional or national importance, reversible with time. Reversible widespread reduction in the quality of groundwater or surface water resources used for commercial or industrial abstractions. Medium-term, reversible detrimental effect on animal or plant populations. Medium-term, reversible detrimental effect to nationally important geological feature. Permanent, moderate detrimental effect upon the integrity of built structures.</td>
</tr>
<tr>
<td>Slight Adverse Effect</td>
<td>Short-term slight detrimental effect to human health. Temporary, slight or moderate detrimental effect in the quality of groundwater or surface water resources that are used for, or have the potential to be used for, commercial or industrial abstractions. Short-term, reversible detrimental effect on animal or plant populations. Short-term, reversible detrimental effect to nationally important geological feature. Permanent, slight detrimental effect upon the integrity of built structures.</td>
</tr>
<tr>
<td>Negligible Effect</td>
<td>No appreciable impact on human, animal or plant health, potable groundwater or surface water resources or geological feature of importance.</td>
</tr>
<tr>
<td>Slight Beneficial Effect</td>
<td>Slight reduction in risk to human, animal or plant health. Slight, local-scale improvement to the quality of potable groundwater or surface water resources. Moderate, local-scale improvement to groundwater or surface water resources that are used for, or have potential to be used for, industrial or commercial abstractions.</td>
</tr>
<tr>
<td>Moderate Beneficial Effect</td>
<td>Moderate reduction in risk to human, animal or plant health. Moderate local-scale improvement to the quality of potable groundwater or surface water resources. Significant local-scale, or moderate wide-scale, improvement to the quality of groundwater or surface water resources used for commercial or industrial abstraction only</td>
</tr>
<tr>
<td>Substantial Beneficial Effect</td>
<td>Major reduction in risk to human, animal or plant health. Significant local-scale / moderate to significant regional scale improvement to the quality of potable groundwater or surface water resources.</td>
</tr>
</tbody>
</table>
12.4 **Limitations, Constraints and Assumptions**

12.4.1 The assessment has assumed that no disturbance of the ground would occur along those parts of the route that use the existing road network, except as described in Section 12.2. Furthermore, the assessment assumes that only the upper 1m of ground would be disturbed along the parts of the corridor that follows the disused railway line, except at those locations as described in Section 12.2. Along those parts of the corridor that are located on previously undeveloped land, it is assumed that the upper 1.0m of the ground could be disturbed by construction of the Scheme.

12.5 **Baseline**

12.5.1 The geology and ground conditions along the route as a whole are described in Appendix 12B. The following Sections describe the geology and hydrogeology at locations along the route that may be affected by ground contamination.

**St Ives Park and Ride site**

**Geology and Ground Conditions**

12.5.2 Geological maps show the site to be underlain by 1st Terrace River Gravels. These deposits are generally between 2.0m and 5.0m thick and comprise chalky silty sand with sub-angular to sub-rounded flint gravel. The Gravels are, in turn, underlain by 58m to 69m of grey mudstones belonging to the Oxford Clay Formation.

12.5.3 It is known that gravel extraction has occurred at this site and, according to EA records, the site was subsequently infilled with ‘inert’ landfill materials. The River Terrace Gravels shown on geological maps are therefore likely to be largely absent across the site.

12.5.4 The ground conditions encountered during the 2001 ground investigation on the landfilled area show that the Made Ground is over 4.5m thick and natural ground was not noted at the base of either of the two trial pits. A shallow layer of grassed topsoil was found to overlie the Made Ground at both locations. The Made Ground generally comprised clays and sandy clays with occasional flint, brick and concrete fragments. At trial pit 2 (TP2), in the western half of the site, rare fragments of domestic waste were noted (e.g. a toothpaste tube, plastic bottle and newspaper), in addition to some peat and rare timber fragments. At TP3, in the centre of the site, occasional gravel- and cobble-sized fragments of flint, brick, timber, plastic, ceramic tiles and metal were noted within the Made Ground.

12.5.5 On the corridor, adjacent to the southern boundary of the landfilled area, the Made Ground comprised sand with some flint and quartz gravel over sandy clay at TP1. At BH1, the Made Ground comprised 1.7m of railway ballast with ash and occasional fragments of railway sleepers. Natural alluvial clays were logged at approximately 2m bgl at both TP1 and BH1. The River Terrace deposits, comprising very gravelly sands, were encountered at between 2.8m bgl and 3.2m bgl. At BH1, the River Terrace deposits were found to be 4.6m thick and were underlain by Oxford Clay, comprising very stiff grey clay, which was encountered at 7.4m bgl to the base of the borehole at 9.45m bgl.

**Hydrogeology**

12.5.6 Perched water within the Made Ground was noted below 1.7m at TP2 in the west of the landfilled area and below 2.9m at TP3 in the centre of the area. Along the corridor, at TP1, groundwater ingress in to the trial pit coincided with the top of the River Terrace Gravels. Groundwater was not recorded at any depth at BH1.
12.5.7 The River Terrace Gravels form a thin, permeable layer, overlying the relatively impermeable Oxford Clay. Groundwater occurs widely within the River Terrace Gravels, often within 1.0m to 1.5m from the surface. It is expected that the level of groundwater within the gravels would fluctuate seasonally and also reflect short-term variations in rainfall, possibly with groundwater being locally close to surface during wet periods.

12.5.8 The EA have classified the River Terrace Gravels as a ‘minor aquifer’, being able to support locally important abstractions. However, the extensive gravel extraction that has occurred within this area would have locally reduced the importance of this aquifer as a groundwater resource.

12.5.9 The Oxford Clay is classified as a ‘non-aquifer’, being of low permeability and unable to support sustained groundwater abstractions.

12.5.10 The site does not lie within the Source Protection Zone of any potable groundwater abstractions.

Hydrology

12.5.11 The site is bounded to the north and south by former gravel pits which are now flooded. A small lake, possibly another flooded gravel pit, is located approximately 100m to the west of the site.

12.5.12 The River Great Ouse flows in an easterly direction approximately 800m south east of the site. This has been classified by the EA as being of ‘Good’ river water quality. A tributary of the River Great Ouse, ‘Old River’, flows southward approximately 500m south of the site.

Contamination

12.5.13 Gravel extraction is known to have occurred in this area and the gravel pit was subsequently backfilled with ‘inert’ waste. The subsurface conditions encountered during the ground investigation indicate that the majority of the waste was demolition / construction rubble, although there is evidence that some quantities of domestic waste may also have been tipped at the site.

12.5.14 Headspace testing of soil samples collected at approximate 0.5m intervals at TP2 and TP3 (to detect volatile hydrocarbon vapours), did not produce any significantly elevated results. The highest reading was 100ppm (averaging at 40ppm) recorded at 1.6m bgl within the Made Ground at TP3. All other readings were generally recorded as being less than 10ppm. Methane and carbon dioxide were not detected at any time during the excavation of the trial pits within the landfilled area. In view of the inorganic nature of the bulk wastes deposited, it is not anticipated that significant quantities of landfill gases are being generated.

12.5.15 The results of the chemical analyses undertaken on three soil samples from the landfilled area are presented in Table A of Appendix 12D. These indicate that the ground is not significantly impacted by contamination. No asbestos was detected and the concentrations of all but one of the determinands tested were found to be less than the relevant published screening values for the three samples analysed. The one result above a screening value was total PAH concentration at 2.0m at TP2, which was found to be slightly elevated above the Dutch Intervention Value. However this is not assessed to represent significant contamination for the existing or proposed end use. An elevated sulphate concentration was reported for a sample from Made Ground at TP2.

12.5.16 Chemical analyses of two samples of perched water collected from the Made Ground within the landfilled area indicate that perched water has not been significantly impacted by
contamination, see Table B of Appendix 12D. In general, concentrations of determinands were reported to be less than the screening value used. However, for the sample from TP2 in the west of the site, the concentrations of chromium and phenols were reported to be slightly in exceedance of the Dutch Intervention Values. Elevated total PAH concentrations, between 1.6 µg/l and 2.8 µg/l were also reported for both samples.

**MG Owners’ Club, Swavesey**

**Background**

12.5.17 A trial pit was excavated on the CGB corridor adjacent to the MG Owners’ Club at Swavesey. During its excavation, solvent-type odours were detected within the Made Ground and two soil samples were collected for chemical analysis.

12.5.18 The MG Owners’ Club stocks spares and car bodies for car enthusiasts and displays a number of pre- and post-war MG cars. It is possible that some repair work was undertaken on the site. The club has been established since 1973, although the current buildings appear to have been constructed much more recently. It is considered unlikely that the current activities at the facility would significantly impact upon the ground within this area. However, ground contamination could have occurred prior to the new facilities being built or previous to that when the site was used as a station yard. It is also possible that the solvent odours within the Made Ground at TP10 are from another source, such as a spill on the line itself during operation of the disused railway corridor.

**Geology and Ground Conditions**

12.5.19 The published geology for the section of the route adjacent to the MG Owners’ Club at Swavesey shows the site to be underlain by River Terrace Gravels, over 20m to 52m of Ampthill Clay. The Ampthill Clay is underlain by mudstones of the Oxford Clay Formation.

12.5.20 The trial pit (TP10) excavated on the route adjacent to the southern boundary of the MG Owner’s Club encountered Made Ground down to 0.8m bgl, comprising 0.3m of railway ballast, underlain by 0.5m of clayey sand. Re-worked Ampthill Clay was encountered from 0.8m to 2.2m bgl, below which very gravelly sands (possibly reworked River Terrace deposits) were present to 2.4m bgl. A solvent-type odour was detected from 0.3m down to 2.4m bgl. A stiff dark grey clay was logged from 2.4m bgl to the base of the trial pit at 3.5m bgl.

**Hydrogeology**

12.5.21 The hydrogeology of the River Terrace Gravels is the same as described above for the proposed St Ives Park and Ride site. The Ampthill Clay is relatively impermeable and is classified as a non-aquifer by the EA.

12.5.22 The importance of the River Terrace Gravels as a groundwater resource is likely to have been greatly reduced by the extensive gravel extraction that has occurred within the area. This part of the route does not fall within a Source Protection Zone of any potable groundwater abstraction boreholes.

**Hydrology**

12.5.23 The nearest surface water course is Navigation Drain, which is located approximately 250m to the north west of this part of the route, joining the River Great Ouse approximately 1km to the north west. A series of flooded gravel pits are located approximately 800m to the west of the area.
12.5.24 The nearest stretch of watercourse with a River Quality classification from the EA is the River Great Ouse, which is rated as being of ‘Good’ quality.

Contamination

12.5.25 The desk study did not identify this area of the route as having a significant risk of ground contamination. However, during the excavation of TP10 during the ground investigation, solvent odours were noted from 0.3m down to 2.4m bgl, within Made Ground and re-worked Ampthill Clay and River Terrace deposits.

12.5.26 The chemical analyses results are presented in Table A of Appendix 12D. The laboratory results for two soil samples from TP10 indicated that the concentrations of all determinands in both samples were less than the published screening guidelines, with the exception of the total PAH concentration at 0.4m bgl, which was reported to be slightly in exceedance of the Dutch Intervention Value. Slightly elevated Total Petroleum Hydrocarbons (TPH) concentrations (130mg/kg and 310mg/kg) were reported for both samples but did not exceed the Dutch Intervention Value in either case.

Former Railway Line

Geology

12.5.27 The geology along the route varies considerably from St Ives to Trumpington and is described in Appendix 12B. Solid geology outcrops over approximately 20% of the route and comprises sandstones, clays, limestone and Chalk Marl. For the remainder of the route, the solid geology is overlain by drift deposits and by recent alluvial deposits along the Cam Valley, River Great Ouse Valley and tributary valleys to the Great Ouse at Westwick and Swavesey. The drift deposits overlying the solid geology comprise predominantly River Terrace deposits and approximately 75% of the route falls within an area which has been assessed by the BGS as an economic resource for sand and gravel deposits. However, only certain parts of these sand and gravel deposits have been identified for extraction within the Cambridgeshire County Council (CCC) Aggregates Local Plan’.

12.5.28 The Engineer’s logs for trial pits excavated along the disused railway corridor indicate that the ground conditions generally comprise approximately 0.2m of ashy sand and ballast material. Below the ballast material, between 0.25m and 1.2m of very gravely (flint) sands, described as the track bed, were encountered. Natural ground, comprising alluvial clays and glacial sands and gravels, were encountered below the track bed. The solid geology was not encountered at any locations along the disused railway corridor, particularly within the vicinity of former rail sidings and stations.

Contamination

12.5.29 The former use of the corridor as a railway line could have led to shallow contamination of the ground. The railway line has been disused for over 10 years and hydrocarbon contamination would have been reduced by biodegradation and soil leaching. However, six samples for chemical analysis were collected from railway ballast and the track bed along the route during the ground investigation to confirm that the ground was not significantly impacted by contamination from past railway activities.

12.5.30 The results of the chemical testing are presented in Table A of Appendix 12D. A broad range of determinands was included in the analyses. Concentrations of all determinands in the six samples were found to be less than appropriate published screening values. The past railway activities are therefore assessed not to have impacted significantly upon the soils along the route. However, it is likely that localised areas of impacted track bed materials would be
present along some parts of the disused railway corridor.

**Geological Site of Special Scientific Interest at Histon Road**

12.5.31 A Site of Special Scientific Interest, designated for its geological importance, is located in the south west corner of the King’s Hedges allotment gardens, adjacent to the Histon Road in north Cambridge. The citation sheet produced by English Nature for this SSSI is included as Appendix 12E. The site covers an area of 0.6ha and is shown to extend up to the eastern boundary of Histon Road. It is understood that the geology at this site comprises fluvial silts, marls and gravels that together form an almost complete record of the second half of the Ipswichian Interglacial; a period of time represented at only one other site outside East Anglia. The site is classified as an integrity site, comprising a finite or irreplaceable geological feature. The deposits are unexposed. The management of integrity sites focuses on preservation, with restrictions against man-made changes which are likely to damage the interest. Threats to conservation of integrity sites include the direct or indirect effects of human developments on active geomorphological sites.

**Railway Crossing South of Addenbrooke's Hospital**

12.5.32 A bridge is required to cross the Cambridge to London railway line along Section 8 of the route, between Addenbrooke’s Hospital and Section 7. Trial pitting was carried out in this area in November 2001.

**Geology**

12.5.33 Sections 7 and 8 of the Scheme would be founded on River Terrace deposits associated with a former alignment of the River Cam. These deposits are now drained by Hobson’s Brook. The geological maps indicate that the River Terrace deposits that underlie much of the proposed route are absent to the east of the existing railway line on Section 8. However this is not supported by observations made during the 2001 site investigation.

12.5.34 Borehole logs from the 2001 site investigation along Section 8 of the route show that the River Terrace deposits typically vary in thickness between 1.8m and 2.5 m thickness, thinning out to 0.3m towards Addenbrooke’s in the east. The River Terrace deposits are overlain by less permeable clayey superficial deposits, possibly alluvium, which occur below the topsoil in the top 1m to 1.5m of the soil profile.

12.5.35 The River Terrace deposits within the area of the proposed Section 8 railway crossing are underlain by Chalk Marl of the Lower Chalk Formation. This is a grey, soft marly chalk that contains no flints. The unit is in the region of 20m thick.

12.5.36 The Chalk Marl is not well jointed and, near the surface, the chalk will be weathered. The hydrogeological map shows the base of the Lower Chalk to be at around 0 to +5m AOD. Underlying the Chalk is 40 m of Gault Formation, which comprises blue grey clays.

**Hydrogeology**

12.5.37 The Chalk aquifer is designated a major aquifer by the EA. However, the Lower Chalk is generally less permeable than the Upper and Middle Chalk, due to a greater proportion of Marl and generally more poorly developed fissures. It is therefore likely to be of less significance for abstraction purposes than other parts of the Chalk aquifer.

12.5.38 The Gault Clay has low permeability and can be considered to be the base of the Chalk aquifer. It is classified by the EA as a non-aquifer, being unable to support any sustained abstractions. Non-aquifers are of low permeability and inhibit the movement of groundwater.
Borehole and trial pit logs indicate groundwater to be present in the River Terrace deposits at around 1.5m to 2m below ground level. Groundwater flow is expected to be to the north-west, following the course of Hobson’s Brook, and supporting flow in the Brook. The River Terrace deposits are likely to be in hydraulic continuity with the underlying Chalk aquifer.

The site does not lie within any Source Protection Zones. The BGS Geoscience data index does not indicate the presence of any water wells within 500m of the site.

**Hydrology**

The major surface water feature in the vicinity of the proposed overbridge is Hobson’s Brook. The Brook flows in a northerly direction close to the western edge of the proposed route.

The area is dissected by a number of drains, indicating that natural drainage is poor. This is probably due to the relatively low permeability of the superficial deposits in the top 1 to 1.5m of the soil profile, the very flat topography and relatively high water table.

Springs at Nine Wells, about 800m south of the route, discharge into a narrow channel which feeds into Hobson’s Brook to the west.

**Contamination**

Contamination testing has not been carried out within the vicinity of the Addenbrooke’s Hospital link. However, it is considered unlikely that the ground in this area has become significantly contaminated during its current or past uses as agricultural land.

**Consultation**

The EA were consulted in February 2002 regarding the proposals for the superCAM between St Ives and Trumpington. Their response of 22nd April 2002 included the following comments of relevance to this section:

- “...we would need the applicant to show that the project has no negative impact on water resources during the period of construction as well as during the following long term operation”;
- “there must be an investigation and risk assessment undertaken within areas of suspected or known, land and groundwater contamination. (Several of which are mentioned in the scoping report). Our concerns lie with the risk of contaminated groundwater migrating into areas of uncontaminated groundwater as a result of development”; and
- “any contamination arising from the development and associated activities must have due regard to groundwater and environmental protection”; and
- “…it may be worth mentioning that if disused underground tanks (e.g. for fuel oil) are discovered in the locations being developed, it is likely that they will need, after being made safe, to be removed together with any contaminated ground beneath them.”

English Nature have also been consulted regarding geological SSSI that is located adjacent to the proposed Histon Road widening works. An initial response was received by e-mail on 22nd January 2004 which provided a generic list of activities that may result in damage to the SSSI as follows:
12.6.3 English Nature have yet to provide a site-specific response with regard to the road widening proposals.

12.7 Assessment

12.7.1 Effects of the development upon the quality of the soil and groundwater resources on land affected by the CGB, and effects on humans and environmental receptors arising from disturbance of the ground, could occur:

- during construction of the Scheme; and
- during operation of the Scheme.

Construction Effects

General

12.7.2 Construction of the Scheme would not use, damage or additionally limit any designated mineral resource.

12.7.3 It is assessed that construction of the Scheme would have a negligible effect upon the soil and groundwater resources along the route, except as described otherwise in the sections below.

12.7.4 It is assessed that the prevailing ground conditions would have negligible effects upon the health of construction workers and users of the CGB along the majority of the route, except as described in the sections below.

12.7.5 Some soils impacted by contamination may not be suitable for re-use elsewhere within the Scheme and would require off-site disposal to a suitably licensed landfill. However, it is considered that the volume of impacted soils and the traffic movements associated with their off-site disposal are insignificant when compared to the overall volumes of waste and number of traffic movements associated with construction of the Scheme.

St Ives Park and Ride site

12.7.6 The ground investigation has indicated that the former gravel pit was backfilled with mainly inert construction waste. The backfill material does not appear to be significantly impacted by contamination, although there were slightly elevated concentrations of chromium and phenols reported for a sample from the western half of the site. It is possible that other areas of localised contamination may be present within the backfilled material.

12.7.7 The earthworks for the car park areas of the park and ride facility would have minimal penetration into the ground. It is proposed that the existing surface would be ‘skimmed’ to an approximate depth of 0.4m to create a level formation on which to build the car park.
12.7.8 All structures (e.g. the control centre and maintenance facilities) would be constructed on foundations that are likely to extend to depths of 2m to 3m below ground level. Foundations to a depth of 3m would have negligible effects upon the quality of soils and controlled waters within the vicinity of the park and ride site. However, the use of piled foundations into the underlying Oxford Clay Formation had not been ruled out at the time of this EIA. It is assessed that piled foundations would also have a negligible effect upon the quality of soils and controlled waters because the piles would not penetrate the full depth of the Oxford Clay and, therefore, there would be no risk of new contaminant migration pathways being established between the surficial landfill materials at the site and water-bearing strata underlying the Oxford Clay.

12.7.9 Exposure to air of any contaminated soil encountered during the earthworks could result in contaminants migrating off site by becoming airborne in dust, volatilising to air, or entering the surface water via run-off from the construction area. Construction workers could also come in to direct contact with contaminants or inhale contaminated dust whilst contaminated soils are exposed to air. For this reason, it is assessed that the construction of the park and ride site at St Ives could potentially have a short term, slight adverse effect upon the health of construction workers, visitors to the construction site and users of adjacent areas.

**MG Owners' Club**

12.7.10 Although a stop is proposed at Swavesey, this would not be within the immediate vicinity of the area of hydrocarbon impacted ground. During construction of the guideway through this section, up to 0.5m of surface material would be removed and a guideway sub-base with drainage would be constructed from this level.

12.7.11 Within the upper 0.5m at this location, slightly elevated hydrocarbon concentrations were reported. As outlined above for the proposed park and ride site, exposure of contaminated soils to air can increase the risk to sensitive receptors. Sensitive receptors, in this case, would be construction workers and the River Terrace Gravel aquifer. It is assessed that construction of the Scheme within this area could (potentially) have a short term, slight adverse effect upon the health of construction workers. Spills or leaks of fuels or chemicals during construction could potentially have a medium term, slight adverse effect upon the quality of the gravel aquifer.

12.7.12 Due to the slightly elevated PAH concentration reported within the Made Ground, material removed from the surface during construction of the guideway within this area would not be re-used elsewhere on the Scheme. This would result in a long term, slight beneficial effect upon the quality of the ground resources in this area.

**Former Railway Line**

12.7.13 The ballast and track bed materials do not appear to have been impacted by significant contamination from the past railway use along much of the corridor. There would therefore be negligible construction or operational effects from existing levels of contamination. However, it is likely that some localised areas of impacted ground would be encountered during the construction of the guideway along the disused railway. It is assessed that, in these areas, construction of the Scheme could potentially have a short term, slight adverse effect upon the health of construction workers, as described in paragraph 12.7.11.

12.7.14 It is assessed that the construction of the Scheme would have negligible effects upon the baseline condition of the ground resources along the disused railway.
Geological SSSI at Histon Road Allotments

12.7.15 There is a geological SSSI immediately adjacent to Histon Road at the King’s Hedges allotment gardens. It is proposed to widen the Histon Road to the immediate north of the SSSI boundary. Land take is not required within the boundary of the SSSI and construction activities would not encroach over the boundary. There are no geological exposures at the SSSI which could be adversely affected by dust from the nearby construction works. Dewatering works would not be required during construction of the new road or installation of the associated traffic signals and services and therefore the water table within the vicinity of the SSSI would not be altered. It is assessed that the road widening at Histon Road would have negligible effect upon the geological SSSI.

Link to Addenbrooke’s Hospital

12.7.16 The Addenbrooke’s Hospital link is underlain in part by River Terrace Gravels and by a major Chalk aquifer below the gravels. Overlying soils have been found to comprise up to 1.5m of low permeability clays.

12.7.17 Pollution incidents that could potentially occur during construction include spills and leaks of chemicals and fuels that may be stored or used on the site. Some degree of protection from minor pollution incidents would be provided by the superficial soils. However, where excavation of these soils occurs, the vulnerability of the Gravel and Chalk aquifer to pollution incidents would be increased. It is assessed that a large-scale spill could have a long term, major adverse effect upon the major Chalk aquifer and long term, slight adverse effect upon the minor Gravel aquifer. A pollution incident could also impact upon surface water bodies if contaminants migrated laterally through the soil or within groundwater and surface run-off to the surface drainage network and Hobson’s Brook. It is assessed that this would be a short term, slight adverse effect.

Construction Compounds

12.7.18 The locations of the proposed construction compounds are described in Section 12.2 and shown graphically in Appendix 12A.

12.7.19 The construction process is likely to involve the use and storage of hydrocarbon fuels and other chemicals within the construction compounds along the route. These liquids could leak or spill into the ground and impact upon the quality of the minor gravel aquifer that underlies all of these locations. At St Ives Park and Ride site, spilt or leaked contaminants could migrate laterally through the soil or within surface run-off towards the adjacent flooded gravel pits. At the Shelford Road and Long Road construction compounds such leaks and spills could impact upon the quality of the major Chalk aquifer, which lies close to the surface at these locations, resulting in a medium to long term, slight to major adverse effect, depending on the severity of the incident. At all other proposed compound locations, the minor gravel aquifer could be impacted, resulting in a medium to long term, slight to moderate adverse effect, depending on the severity of the incident. Depending on the severity of such incidents, it is assessed that these could result in a short term to medium term, slight to major adverse effects upon ground and surface water resources in the area.

Operational Effects

General

12.7.20 Operation of the Scheme would not use, damage or additionally limit any designated geological or mineral resource.
12.7.21 During operation of the Scheme, in areas of car parking and maintenance facilities, oil interceptors would be incorporated at strategic locations within the drainage system to prevent the discharge of contaminants in surface water run-off to surface water courses. It is assessed that operation of the car parks and maintenance facilities would have a negligible effect upon the soil and groundwater resources along the route.

12.7.22 During operation of the Scheme, buses would operate either along paved roads or along guideways. Run off from the impermeable surfaces of the guideways would be channelled to balancing ponds via interceptors, but would not be prevented from infiltrating the ground within the permeable area between the guideways. If a significant spill or leak occurred from a vehicle operating along the guideway, it is possible that soils below the permeable area between the guideway could become locally impacted and it is assessed that this would have a slight adverse effect upon the quality of the soil resource in this area but would be likely to have a negligible effect upon the underlying groundwater resource. In the absence of major spills or leaks occurring along the route, it is assessed that operation of the Scheme would have a negligible effect upon the underlying soil and groundwater resources.

12.7.23 It is assessed that the prevailing ground conditions would have negligible effects upon the integrity of sub-surface structures, provided that these are adequately designed and constructed.

12.7.24 It is assessed that the ground conditions along the route would not lead to the accumulation of asphyxiating, toxic or explosive concentrations of ground gases and would therefore have a negligible effect upon human health or built structures, except as described below.

**St Ives Park and Ride**

12.7.25 Elevated sulphate concentration have been found to be present in localised parts of the site and this could cause certain below ground building materials to deteriorate, resulting in a long term, slight adverse effect upon the integrity of these materials.

12.7.26 During operation of the park and ride and maintenance facilities, approximately half of the site would be covered by hard standing. This would significantly lower the infiltration rate of rainwater into the backfill material and reduce the potential for existing contamination to migrate off-site, resulting in a long term, slight beneficial effect.

12.7.27 It is proposed that the maintenance facilities would also be used to refuel the maintenance vehicles and bulk storage of fuel would occur. Spills or leaks from storage tanks and associated pipework could lead to contamination of the ground. Although the landfilled material comprises mainly low permeability clays, it is possible that contamination from a significant leak or spill could enter the lakes to the north and south of the site via lateral migration through soil or as surface water run-off, resulting in a medium term, moderate adverse effect.

12.7.28 Elevated ground gas concentrations were not detected at the site during the 2001 ground investigation. However, it is possible that pockets of elevated concentrations of ground gases (principally methane and carbon dioxide) could be present within the landfilled materials at the site. Paving over the site could reduce surface emission of such ground gases and lead to higher concentrations at the edges of the paved area which is assessed to be a long term, slight adverse effect. There is a low potential that ground gases could accumulate in poorly ventilated ground floor areas within the proposed buildings at the site. In sufficient concentrations, ground gases can be asphyxiating, toxic or explosive and could result in permanent, major adverse effects upon the health of users of the completed park and ride site and upon the integrity of built structures at the site.
MG Owners’ Club

12.7.29 During operation of the Scheme, the risk of contaminants migrating laterally towards the gravel aquifer would be reduced due to the increased area of hard standing which would have a long term, slight beneficial effect upon this aquifer.

Geological SSSI at Histon Road

12.7.30 It is assessed that operation of the Scheme would have a negligible impact upon the geological SSSI at Histon Road.

Addenbrooke’s Hospital Railway Crossing

12.7.31 The buses would operate on a concrete guideway. Spills or leaks occurring from the bus engines would therefore be prevented from infiltrating the ground. Operation of the buses would have a negligible effect upon the ground resources along the route, including the major Chalk aquifer underlying this part of the route.

12.8 Mitigation Measures

12.8.1 Some localised areas of slight contamination have been identified, within the proposed St Ives Park and Ride site and adjacent to MG owners’ club and others are likely to be encountered at some locations along the disused railway corridor. The potential adverse health and safety risks associated with this contamination would be mitigated by the adoption of Health and Safety procedures, appropriate to the particular site and contamination requirements, to protect construction workers. Such Health and Safety procedures would be detailed in the CoCP (see Section 4.5), which would be applied to all construction works.

12.8.2 The CoCP would also require the implementation of measures to reduce the impacts of the construction process upon the ground resources within the construction compounds and along the full length of the route. Such measures would include, in particular:

- procedures and protocols to prevent construction workers, visitors to the construction area, and occupiers and visitors to neighbouring areas from being exposed to contaminated materials;
- limiting dust generation during excavation, handling and storage of potentially contaminated materials;
- control of surface water run-off;
- sampling and testing of excavated soils for waste disposal categorisation
- sampling and testing of soils imported from elsewhere into the construction area to ensure suitability for proposed end use;
- systems to record and monitor the movement and deposition of waste material leaving the site;
- handling and storage procedures, in line with best practice guidance, for the use of fuels and chemicals used during construction.

12.8.3 The CoCP would be developed and agreed with the Local Authorities, in consultation with the EA, prior to commencement of construction activities.

12.8.4 If any underground storage tanks are encountered during construction of the Scheme, these would be removed in accordance with best practice guidelines and any impacted soils
surrounding the tanks would be excavated and removed to a suitably licensed landfill site.

12.8.5 During operation of the Scheme, the effect of aggressive ground conditions upon below ground building fabrics would be mitigated by the incorporation of suitably resistant materials in to the design of the structures.

12.8.6 Bulk storage of fuels would be required at the St Ives Park and Ride maintenance facility. Construction of the tanks and surrounding area would conform with statutory regulations and best practice guidance issued by the EA and the Health and Safety Executive.

12.8.7 Emergency response procedures should be developed for major accident/fuel spill incidents to prevent fuels and other chemicals from infiltrating permeable ground.

12.9 Residual Effects

12.9.1 It is assessed that the mitigation measures outlined above would be sufficient to ensure that all potential adverse effects resulting from existing ground contamination along the corridor would be reduced to a negligible level. With implementation of the mitigation measures, all construction and operational impacts of the Scheme upon the quality of ground resources along the route would have negligible effects.

12.9.2 The mitigation measures proposed would be sufficient to reduce all adverse effects from operation of the St Ives Park and Ride site to a negligible level. Impacts upon ground resources along the guideway during the operation of the Scheme would be negligible.

12.9.3 It is assessed that there would be negligible effects resulting from contamination along the corridor with implementation of the mitigation measures and, therefore, there would be no cumulative effects of contamination upon the Scheme or of the Scheme upon the quality of the ground resource.

12.10 Summary

12.10.1 Along the majority of the route, the baseline assessment did not identify any significant existing ground contamination issues. However, four features along the route were identified where potential impacts may arise as follows:

- the proposed St Ives Park and Ride site;
- ballast and track bed material along the disused railway corridor sections of the route;
- an area of hydrocarbon impacted soils on the route at Swavesey; and
- an area of high groundwater vulnerability at the Addenbrooke’s railway crossing.

12.10.2 A preliminary ground investigation has been undertaken along the route and this included some contamination testing of soils and perched groundwater at all of the above locations, with the exception of the Addenbrooke’s crossing.

12.10.3 It has been assessed that the Scheme would not use, damage or additionally limit any significant geological or mineral resource. Along the majority of the route, construction and operation of the Scheme would have negligible effect upon the soil and groundwater resources. The prevailing ground conditions would have negligible effect upon human health and the integrity of built structures along the majority of the route.
12.10.4 It has been assessed that any adverse effects upon human health during the construction and operational phase from localised areas of contamination that may be encountered along the route could be fully mitigated.

12.10.5 At a number of locations along the route it has been assessed that construction and operation of the Scheme could potentially adversely effect the soil and groundwater resources. However, it has been further assessed that these effects can be fully mitigated.
Appendices

Appendix 12A Main Features Relating to Ground Resources and Contamination
Appendix 12B Ground Resources Scoping Baseline Assessment
Appendix 12C Ground Resources and Contamination Sample Locations
Appendix 12D Ground Resources and Contamination Results Tables
Appendix 12E English Nature Citation for Histon Road Geological SSSI
References

1 Department for Environment, Food and Rural Affairs and The Environment Agency (2002), The Contaminated Land Exposure Assessment (CLEA) Model, CLR7 to CLR10, The Environment Agency
2 Dutch Ministry of Housing, Spatial Planning and Environment, Directorate-General for Environmental Protection, Department of Soil Protection (2000), Circular on Target Values and Intervention Values for Soil Remediation
3 Concrete in Aggressive Ground, Building Research Establishment Special Digest 1
5 Cambridgeshire Aggregates (Minerals) Local Plan 1991, Cambridgeshire County Council
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health of construction workers, construction site visitors, users of adjacent sites</td>
<td>Potential health impacts from direct contact with contaminated soils and groundwater, from ingestion of airborne soil particulates or inhalation of vapours and dusts.</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Slight –ve, I, ST, Health and safety procedures and protocols to prevent exposure and limit dust generation</td>
<td>No impact</td>
<td>Negligible</td>
</tr>
<tr>
<td>Degradation of quality of groundwater and surface water resources during construction.</td>
<td>Possible leaks and spills of fuels and other liquid chemicals stored in the construction compounds and used during construction of the guideway could impact upon the quality of soils and groundwater. Uncontrolled discharge of surface water run-off from areas of impacted ground exposed during construction.</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Slight to major –ve, I, MT to LT, Storage of all liquid chemicals to conform with Government regulations and best practice guidance. Oil interceptors would be included in the drainage design of car parks and other areas where oil may spill/leak onto ground. Procedures to control surface water run-off</td>
<td>No impact</td>
<td>Negligible</td>
</tr>
<tr>
<td>Degradation of soil quality during operation.</td>
<td>Major spills or leaks from vehicles along the guideway could infiltrate the permeable area between guideways and impact upon underlying soils.</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Slight –ve, I, MT, Development of response procedures to recover fuel if major spills occur along guideway and prevent fuels infiltrating permeable ground.</td>
<td>No impact</td>
<td>Negligible</td>
</tr>
<tr>
<td>Lower infiltration rate of rainwater</td>
<td>Placement of hardstanding over localised areas of contamination which previously were unsurfaced would lead to a lower rate of infiltration of rainwater and</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Slight +ve, I, LT, None required</td>
<td>Placement of hardstanding over localised areas of contamination which previously were unsurfaced would lead to a lower rate of infiltration of rainwater and</td>
<td>Slight +ve, I, LT</td>
</tr>
</tbody>
</table>
## Ground Contamination

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removal of contaminated soils</td>
<td>Grossly contaminated soils encountered during the construction phase would be excavated and removed resulting in a beneficial impact upon the quality of the ground resources</td>
<td>None required</td>
<td>Grossly contaminated soils encountered during the construction phase would be excavated and removed resulting in a beneficial impact upon the quality of the ground resources</td>
</tr>
<tr>
<td>Damage to subsurface structures</td>
<td>Aggressive ground conditions at St Ives Park and Ride site could affect integrity of sub surface building materials</td>
<td>Incorporation materials suitably resistant to into the design of any sub surface structures.</td>
<td>No impact</td>
</tr>
</tbody>
</table>

**Note:** Abbreviations are as follows

+ve = positive, -ve = negative, D = direct, I = indirect, S = Secondary, C = cumulative, ST = short-term, MT = medium-term, LT = long-term, P = permanent, T = temporary,

Abbreviations can be used in any viable combination, i.e. avoiding contradictions.
13. LANDSCAPE AND VISUAL ASSESSMENT

13.1 Introduction

13.1.1 This section of the Environmental Statement (ES) comprises a landscape/townscape and visual impact assessment for the proposed Cambridgeshire Guided Busway (CGB) Scheme, from Huntingdon to Trumpington. From north to south, the route extends from Hinchingbrooke Hospital on the south western side of Huntingdon, via St Ives, and then through the city of Cambridge to Trumpington and Addenbrooke’s.

13.1.2 Site surveys, desktop studies, and statutory and non-statutory consultations have been undertaken to determine the character and quality of the existing landscape and townscape. This forms the basis for the assessment of the potential impacts of the Scheme, which is aligned partly along disused St Ives and Bedford rail corridors and partly along and within existing and in some places widened urban, suburban and country roads.

13.2 Methodology

13.2.1 The approach for the CGB landscape and visual assessment incorporates the guidance contained in the following reference publications:

- ‘Design Manual for Roads and Bridges’;

13.2.2 The following publications have also been used to assist in the assembly of landscape character areas and to help determine potential mitigation:

- ‘Cambridgeshire Landscape Guidelines’;
- ‘Huntingdonshire Landscape and Townscape Assessment’;
- ‘The Character of England: Landscape, Wildlife and Natural Features’;
- ‘Cambridge Landscape and Character Assessment’.

13.2.3 The baseline landscape has been described according to a series of Landscape Character Areas (LCA’s). (See Appendix 13A). Zones of Visual Influence plans (ZVI) have been defined within which visual receptor groups have been identified. (See Appendix 13B and 13C).

13.2.4 The landscape character areas are used to divide up the route sections for the landscape section of the ES and the general route sections divisions are not used.

Scope and Principles of the Landscape/Townscape and Visual Assessment

13.2.5 The initial part of the CGB route runs west to east from Hinchingbrooke Hospital on existing roads, through Huntingdon to and through the centre of St Ives. The existing physical conditions along most of this part of the route would not be affected as the proposals fall within the existing highways or within proposed and approved highway works not arising from the Scheme.

13.2.6 For this section, where there would be no physical impact on landscape elements within or immediately adjacent to the highway boundary, a landscape/townscape assessment has not been carried out. This is because the effects would only be limited to the view of the CGB buses where other vehicles, including heavy goods vehicles and buses are already visible. In
these areas the effects, from the outset, are considered to be negligible and thus do not require a landscape/townscape or visual assessment.

13.2.7 After passing through the centre of St. Ives, the route moves onto the guideways through countryside areas to the northern edge of Cambridge where it passes back onto roads. An assessment is carried out for this central section of the Scheme, as well as for those areas where there would be physical impacts within Cambridge itself.

13.2.8 From the centre of Cambridge, the route runs southwards, moving once more onto guideways to Addenbrooke’s Hospital and to Trumpington. An assessment is carried out for this part of the route as well.

13.2.9 The proposals are located both within countryside/landscape areas as well as within townscape areas. As countryside/landscape and townscape are fundamentally different in their natural/physical/cultural characteristics, the assessment procedures used for countryside/landscape and townscape differ to some extent, although the principles of the assessment remain the same.

13.2.10 Landscape and visual impact assessment procedures require the effects on landscape character and quality and visual effects to be dealt with separately. This has been done for the whole route whether the Scheme passes through landscape/countryside or urban/suburban areas.

13.2.11 The route has been divided up into 3 main sections: Landscape and Visual Section 1: Huntingdon to St. Ives (on existing roads), Landscape and Visual Section 2: St Ives to Cambridge and Cambridge to Trumpington (on guideway) and Landscape and Visual Section 3: Cambridge City. A summary of the process is as follows:

- **Baseline landscape character description of the route**
  - Landscape and Visual Section 1: Huntingdon to St. Ives (on existing roads);
  - Landscape and Visual Section 2: St Ives to Cambridge and Cambridge to Trumpington (on guideway);
    - Descriptions according to different landscape character zones.
  - Landscape and Visual Section 3: Cambridge City
    - Descriptions according to different townscape character zones.

- **Visual Baseline**
  - Landscape and Visual Section 1: Huntingdon to St Ives (on existing roads);
    - Descriptions according to different route areas.
  - Landscape and Visual Section 2: St Ives to Cambridge and Cambridge to Trumpington (on guideway);
    - Descriptions according to different route areas.

- **Landscape/Townscape Assessment**: Huntingdon to Cambridge and Cambridge to Trumpington:
  - Landscape and Visual Section 1: Huntingdon to St. Ives (on existing roads);
- Landscape impacts and potential mitigation described within separate areas.
- Landscape and Visual Section 2: St Ives to Cambridge City and Cambridge City to Trumpington (on guideway);
  - Landscape impacts and potential mitigation described within separate landscape character areas.
- Summary of the Key Landscape Impacts
- Summary of the Landscape Mitigation.

- **Visual Assessment**: Huntingdon to Cambridge City and Cambridge City to Trumpington
  - Landscape and Visual Section 1: Huntingdon to St. Ives (on existing roads);
    - Visual impact assessment divided up into route sections and according to receptor groups, e.g. residents with a description of potential mitigation.
  - Landscape and Visual Section 2: St Ives to Cambridge and Cambridge to Trumpington (on guideway);
    - Visual impact assessment divided up into route sections and according to receptor groups, e.g. residents with a description of potential mitigation.
  - Summary of the Significant Visual Impacts
  - Summary of the Visual Mitigation.

- **Section 3: Cambridge City Landscape/Townscape and Visual Assessment (all on existing roads)**
  - Townscape and visual assessment and potential mitigation according to main areas which are subdivided into individual roads/streets.

- **Mitigation**
  - Huntingdon to St. Ives
  - St Ives to Cambridge North
  - Cambridge City
  - Cambridge City South to Trumpington

- **Residual Effects**
  - Landscape Residual Effects
  - Visual Residual Effects

**Landscape Character**

13.2.12 Landscape character refers to the different character areas, which may be identified within any given area taking account of local topography, vegetation and habitat, built form, settlement patterns, land use, local materials, hydrology and other landscape and cultural/historical features. The main different character areas along the CGB route are identified in plans in Appendix 13A.
Classification of Existing Landscape/ Townscape Quality

13.2.13 The landscape quality assessment of the site is based on a five-point scale as recommended in the ‘Design Manual for Roads and Bridges’ (DMRB, Section 3, Part 5: paragraph 3.9). The assessment is based on the consideration of visual and physical attributes of the landscape, including ecological interest and cultural/heritage associations. The five levels of the DMRB scale are described below. The assessment is carried out with regard to the local context and the importance of elements within the local context.

**Highest Quality-Very Important**

- landscapes/townscapes of exceptional scenic quality, harmonious, and unified with pleasing landscape/urban patterns and combinations of landscape and/or townscape features. Absence of intrusive man-made elements; and/or

- designated landscapes of international importance or national importance due to:
  - exceptional visual or unspoilt qualities;
  - historic landscape interest;
  - important ecological sites or habitats;
  - other exceptional cultural/heritage interest etc.

**Very Attractive-Important**

- landscapes/townscapes of high scenic quality and/or urban patterns with little intrusion from intrusive man-made elements; and/or

- designated landscape of regional, county or district importance due to:
  - visual or unspoilt qualities;
  - high value ecological sites or habitats;
  - archaeological features;
  - other features of cultural/heritage interest etc.

**Good Landscape/Townscape-Moderately Important**

- an underlying attractive landscape and/or urban environment but with possible intrusion due to man-made elements or loss of quality through the lack of quality of the built environment; and/or

- landscape may or may not be designated, but may be of local importance due to its location or proximity to built up areas or may contain some notable or residual historic features, habitats, or features of local ecological value, which may also form links between other sites.

**Ordinary Landscape/Townscape-Minor Importance**

- landscape of no particular scenic/urban quality, and which incorporates intrusive man-made elements; and/or

- landscapes dominated by development or visually downgraded by poor quality built form and infrastructure; and/or

- landscapes not designated without any ecological or historic interest.
Poor Landscape/Townscape-Not Important

- landscapes downgraded by intrusive elements and/or dominated by intrusive features, poor quality urban features and patterns and infrastructure; and/or
- vacant or poorly maintained land; and/or
- undesignated areas with no historic or ecological interest etc.

Assessment of Environmental Sensitivity to Change

13.2.14 The ability of the landscape and townscape to accept changes of the type(s) proposed, with the introduction of new features or the loss of existing components is assessed by a rating of relative sensitivity. This value, attached to the assessment of each character area location, indicates the likely severity of potential impacts from the Scheme from Low, through Medium to High.

Visual Impact

13.2.15 The potential visual impact is assessed in parallel with the landscape assessment, since visual factors help in determining landscape quality. The predicted visual impact of the Scheme is compared to the existing situation within the landscape.

13.2.16 The existing visual and landscape baseline has been considered for both the macro and micro scale.

13.2.17 At the macro-scale, a Zone of Visual influence (ZVI) has been established, which ultimately defines the extent of the Scheme landscape survey corridor. Key medium to long distance views from the Scheme on guideway are identified. This indicates view corridors and viewing locations back from the landscape to the route itself. The survey takes account of local topography, built form and vegetation. The ZVI for the CGB route has been illustrated in Appendix 13B.

13.2.18 At the micro-scale, the corridor of the guideway has been assessed in detail to identify the exposure of the proposal to adjacent land users, and as influenced by local topography, built form and in particular the screening effect of local vegetation. This information has been illustrated on the maps provided in Appendix 13C. The drawings should be viewed in conjunction with the ‘Schedule of Landscape Features’, which is located in Appendix 13 D.

Impact Significance Criteria

13.2.19 The landscape and visual significance of the effects have been assessed according to an eight-point scale. The significance has been determined according to the magnitude and scale of the effects and the extent to which people would be affected.

13.2.20 The capacity of landscape/townscape character area or visual receptors to accept change of the type and scale proposed are assessed on the basis of a eight-point scale as follows:

13.2.21 Severe (Adverse) Impact - Where the proposals would cause a highly detrimental effect to the view and/or landscape/townscape area.

13.2.22 Effects assigned this level of importance are key factors in the decision-making process. They would principally occur where very important resources are subject to extreme adverse impacts and are generally but not exclusively associated with sites and features of international or national importance and resources/features which are extremely rare and which, if lost, cannot be replaced or relocated.
13.2.23 **Major (Adverse or Beneficial) Impact** - Where the presence of the proposals causes a significant detrimental effect (or benefit) to the existing view or landscape/townscape area.

13.2.24 Assignment of this level would principally occur where very important resources coincide with major impacts or where important resources are impacted in the extreme and as such are likely to be important considerations at a sub-national or regional scale. Depending on the importance attached to the environmental factor during the decision making process, however, such issues could be key determinants. Mitigation measures and detailed design work are unlikely to remove all the adverse effects at this level of significance.

13.2.25 Beneficial effects may occur where the value of the environmental resource is substantially increased.

13.2.26 **Moderate (Adverse or Beneficial) Impact** - Where the presence of the proposals causes a noticeable detrimental effect (or benefit) to the existing view or landscape or townscape area.

13.2.27 Effects at this level of significance would principally occur where moderately important resources are only moderately or slightly affected or where lesser resources are impacted in the extreme. Whilst important at a local scale they are unlikely to be key decision making issues. They represent issues where effects would be experienced but mitigation measures and detailed design work may ameliorate/enhance some of the consequences upon impacted communities or interests. Some residual effects would still arise.

13.2.28 Beneficial effects may occur where the value of the resource is increased.

13.2.29 **Slight (Adverse or Beneficial) Impact** - Where the presence of the proposals causes a minor detrimental effect (or benefit) to the existing view or landscape/townscape area.

13.2.30 Assignment of this level of significance would principally occur where less important environmental resources experience more limited effects. Such effects may be raised as local issues but are unlikely to be of importance in the decision making process. Nevertheless, they are of relevance in the detailed design of the Scheme and consideration of mitigation or compensation measures.

13.2.31 Beneficial effects may occur if the value of the resource experiences a limited increase.

13.2.32 **Negligible Impact** - No discernible detrimental effect (or benefit) to the existing view or landscape/townscape area.

13.2.33 No significance is assigned to those impacts that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

**Mitigation**

13.2.34 The mitigation of potential effects has been subject to an iterative process whereby, where possible, effects have been ameliorated through changes in the design of the Scheme. In other words, aspects of the Scheme such as adverse land-take, access and alignments may have been altered in order to minimise negative effects or to enhance positive effects. Further mitigation is also proposed whereby potential adverse effects identified in the EIA are ameliorated by measures proposed in the mitigation section of the ES.

13.2.35 Landscape mitigation proposals have been closely coordinated with ecological and nature conservation objectives. The mitigation proposals are set out in Appendix 13E, titled ‘Landscape and Ecological Mitigation Plans’. The proposals have been formulated in consultation with the ‘Landscape Design Task Group’, with officers from all the local
authorities through which the Scheme runs. See Section 13.4).

13.2.36 In order, to better describe the mitigation proposals relative to the effects, the suggested mitigation opportunities are noted immediately after the effects and listed at the end of the section.

13.2.37 Enhancement of the landscape is a key principal of mitigation. Apart from reinstating, where appropriate, landscape that would be damaged or lost, opportunities have been taken to enhance the landscape and viewer enjoyment. One of the main landscape objectives thus is to provide visual diversity along the route, for views towards the route corridor and for CGB passengers to appreciate their journey through the Cambridgeshire countryside. The mitigation proposals are designed to protect and enhance, as far as possible, the range of landscape character and habitat along the route. New areas of planting and seeding would be introduced to mitigate the effects of the Scheme, as far as possible, and also enhance ecological interest and promote biodiversity. Existing drainage pattern and profiles would be enhanced where these are affected by the route to better promote and enhance local ecology and landscape character. Measures would be taken to provide protection where vegetation of visual or ecological value would be at risk by construction activities of the Scheme, which abut the works boundaries.

13.2.38 The landscape mitigation proposals are defined by a set of Landscape and Ecological Mitigation Plans. (See Appendix 13E). The objectives of the mitigation proposals are numbered from 1 to 15 and are noted in the legend for the plans.

13.3 Limitations, Constraints and Assumptions

13.3.1 The following limitations and assumptions apply to the landscape and visual impacts of the Scheme:

- The baseline visual envelope is based on late autumn field survey, with vegetation in full leaf; it is assumed that no additional visual receptors would be exposed by leaf fall in the wintertime;
- Where access to third party land was constrained, informed assumptions regarding the baseline conditions and potential impacts were derived from the local landscape context using aerial photographs.

13.4 Baseline

Overview of Landscape along the Route

13.4.1 The CGB route runs between the historic towns of Huntingdon and St. Ives along the shallow floodplains of the River Great Ouse. To the east of St Ives, clay extraction has produced a series of lakes and wetlands, with recently established local conservation value. (See Figure 1b, Appendix 13A) Between the historic settlements of Swavesey, Histon and Impington, the CGB route follows the disused railway line, primarily dissecting agricultural land and the margins of bordering villages with small-scale industrial units.

13.4.2 Entering the fringes of Cambridge from the north alongside Cambridge Science Park and the A14 (T) road, the CGB route passes through the post-war fringes of the city along either

---

2 The Guidelines for Landscape and Visual Assessment states that 'environmental enhancement should be a primary objective for every landscape and visual impact assessment.' Furthermore, the document states that 'enhancement is closely linked to mitigation, but explores the scope for a development project to contribute positively to the landscape of the development site and its wider setting.' (The Landscape Institute and Institute of Environmental Assessment, 1995, Guidelines for Landscape and Visual Assessment, E and FN Spon, page.54.)
Milton or Histon Roads, and into the historic centre of Cambridge. (See Figure 1c, Appendix 13A).

13.4.3 Within the City Centre, the CGB route passes through a succession of streets, flanked by impressive traditional college buildings, with extensive grounds extending into formal public open spaces. (See Figure 1c, Appendix 13A).

13.4.4 The route joins the disused Cambridge to Bedford railway corridor at Cambridge Station leading from the south of the city to the existing Trumpington Park and Ride facility where the route would end. (See Figure 1c, Appendix 13A). This facility is located close to Junction 11 of the M11 motorway. This short section of the route passes once more into agricultural lands, although remaining within the fringe settlements of the city. The proposals include a link to Addenbrooke’s Hospital located east of the main route as it heads towards the existing Trumpington Park and Ride site.

Baseline Landscape and Townscape Character Areas, Landscape Quality and Sensitivity to Change

13.4.5 The landscape character of the route and surroundings has been assessed with reference to the relevant literature, as well as from site visits, photographs as well as vertical aerial photographs.

Overall Landscape Environment

13.4.6 The Cambridgeshire countryside has typically been classified on a broad scale that relates primarily to geological drifts underlying its various districts. On the surface, the extensive flat landscape is locally varied through various intensities of human development, by different forms of settlement and cultivation, which are strongly related to the natural and artificial land drainage patterns.

13.4.7 The whole of the route is aligned on low lying land with the section of route west of Huntingdon at its highest elevation at approximately 20-30 metres AOD.

13.4.8 Height variation in the Cambridge region is generally minimal and there is little variation in the height of the gentle landscape through which the CGB route would pass along the existing alignment. An elevational range of 10m across the whole of the route reflects a change from the floodplain wetland of the River Great Ouse at the north-west end relative to the higher ground on which Cambridge City has been built. This, however, can be contrasted with the expansive fenlands, to the north of the site, where levels of 2-3m above sea level may be found for many kilometres. In fact, the parallel alignment of the disused railway and the A14 Roman Road, some 5km to the south, significantly marks the southern extent of the Fen Washlands, with their distinctive network of artificial open drainage ditches. Thus, from the disused railway line, the land generally rises southwards to reveal extensive views towards higher ground beyond the A14 Roman Road. By comparison, the land to the north of the disused line, which is largely below the level of the trackbed is partly obscured from view. At the southern end of the route between Trumpington and Addenbrooke’s Hospital, flat arable fields are overlooked by higher ground to the south-east, made up by the extension of the Chiltern Hills, with gentle crests at about 50m AOD.

13.4.9 In general, Cambridgeshire is renowned for its subtle topography, producing open views with relatively little vegetation. The Cambridgeshire countryside is nevertheless diverse, corresponding to localised geology, drainage, soils and land use. Both the Countryside Agency and Cambridgeshire County Council have published independent landscape assessments that broadly classify the countryside surrounding Cambridge City into Character
Areas. Descriptions of the countryside context of the northwest sections of the CGB corridor between Cambridge and St. Ives, and the southern route to Trumpington, are summarised in Appendix 13D.

13.4.10 The ‘Cambridgeshire Landscape Guidelines’ shows the route passing through three different character areas as follows. \textsuperscript{1c} (See Figure 1a, Appendix 13A).

**Ouse Valley**

13.4.11 The route passes through the Ouse Valley between Huntingdon and St. Ives and southwards towards the village of Swavesey.

13.4.12 The Ouse Valley comprises light and well-drained gravel soils. Ancient, medieval as well as most modern towns were and are situated on river crossings including Huntingdon and St. Ives. The River Great Ouse meanders its way in a shallow valley and bisects the claylands ‘that form the western edge of Cambridgeshire.’\textsuperscript{3} The margins of the river comprise ‘a mosaic of flood plains and grazing meadows, working and disused gravel pits and lakes, sprawling housing areas and industrial estates. Elsewhere the Ouse Valley is characterised by thick hedges, trees and fields.’\textsuperscript{4}

**Western Claylands**

13.4.13 The main part of the route on guideway passes through the Western Claylands from Swavesey to the northern edge of Cambridge.

13.4.14 This gently undulating landscape is subdivided by the River Great Ouse valley. The area is characterised by ‘large-scale arable farmland with open fields, sparse trimmed hedgerows and watercourses often cleared of bankside vegetation.’\textsuperscript{5} There area is characterised by scattered woodlands, which are ‘important in visual and nature conservation terms, but they tend to be isolated incidents in an area dominated by arable farmland.’\textsuperscript{6}

13.4.15 The landscape has been affected by modern agricultural practices and ‘mechanisation has led to the removal of hedgerows and amalgamation of fields.’\textsuperscript{7} Many gaps appear in the hedgerows. ‘Marginal land has been brought into production by drainage and other soil improvements’, and large farm units have created a need for large storage units, ‘which can be prominent in the landscape. Small villages and hamlets are scattered throughout the area, usually in sheltered places with existing trees.’\textsuperscript{8}

**Chalklands**

13.4.16 The route passes through the chalklands on the southern edge of Cambridge towards Trumpington.

13.4.17 This is a ‘broad-scale landscape of large fields, low mechanically trimmed hedges and few trees.’\textsuperscript{9} The majority of this landscape is devoted to the growing of cereal crops despite the frequently poor, thin soils’.\textsuperscript{10}

\textsuperscript{3} Cambridgeshire Landscape Guidelines, page 57.
\textsuperscript{4} Ibid.
\textsuperscript{5} Ibid., page 53.
\textsuperscript{6} Ibid.
\textsuperscript{7} Ibid.
\textsuperscript{8} Ibid., page 54.
\textsuperscript{9} Ibid., pages 49-50.
\textsuperscript{10} Ibid., page 49.
13.4.18 In order to facilitate the assessment, the route is divided into the three sections. These sections relate to where the route is aligned on existing roads as compared with where it passes on the disused railway line and also relates to whether the route passes through urbanised areas or where it largely runs through countryside. The sections are as follows:

- Section 1: Huntingdon to St. Ives;
- Section 2: St. Ives to Cambridge and Cambridge to Trumpington;
- Section 3: Cambridge City.

13.4.19 The Character Areas for the CGB corridor have been developed from consideration of the general landscape character guidelines as mentioned above and tabled in Appendix 13D as well as by field and aerial surveys. The extent of character areas has been mapped in Appendix 13A.

**Landscape and Visual Section 1: Huntingdon to St Ives** (See Figure 1b, Appendix 13A.)

13.4.20 The first part of the route passes through the western fringes of the historic town of Huntingdon. The section within and on the boundaries of the Hinchingbrooke Hospital grounds is characterised by the low-rise hospital buildings with institutional landscape planting and open car park areas to the east and a low rise, 2-storey satellite housing estate to the west. The route joins the B1514 passing the car park of the historic Hinchingbrooke House, which has been developed into a conference centre and a school to the west and playing fields to the east before passing under the A14. Mature trees are an important feature in this area. (The area including the route and the hospital up to the A14 is designated in the Huntingdonshire District Local Plan, (HDLP), as an ‘Area of Best Landscape’. x See Figure 1, Appendix 6A).

**Landscape Value Rating:** Ordinary Landscape/Townscape – Minor importance

**Sensitivity:** Low

13.4.21 The character of the townscape east of the A14 moving towards the town centre may be described as urban fringe. The historic core of the town is contained by the B1514 ring road. The historic core is generally characterised by narrow streets and low-rise properties of various ages. The route passes through two conservation areas designated within the town centre. (See Figure 1, Appendix 6A).

**Landscape Value Rating:** Good Landscape/Townscape to Poor Landscape/Townscape – Moderately Important to Not important

**Sensitivity:** Medium to Low

13.4.22 From here, the route passes along the B1514 on the south eastern flank of the town. The B1514 is flanked by housing to the north, with a line of mature trees alongside the Huntingdon Ring Road and mainly by the River Great Ouse floodplain to the south. Areas to the west are characterised by a fairly large open air car park which is fringed by a row of semi mature trees which help to contain the car park. Further to the west the football fields are also fringed by a row of semi mature trees. The trees are important urban features and help to soften the edges of the busy road corridor and views from the housing on the northern side of the road. (The B1514 forms the edge of ‘Area of Best Landscape’ as designated in the HDLP. The area is also designated as ‘Open Spaces and Gaps for Protection.’ xii (See Figure 1, Appendix 6A.)

**Landscape Value Rating:** Good Landscape – Moderately Important to Ordinary Landscape –Minor importance
Sensitivity: Medium-Low

13.4.23 Moving eastwards the B1514 passes on the edge of the River Great Ouse floodplain. A dense hedgerow creates the boundary to the southern side of the road and an open length of field which runs along the northern edge of the floodplain. The hedge is an important feature here. The development on the northern side of the road is characterised by large detached houses and mature garden trees and hedging. (The B1514 forms the edge of ‘Area of Best Landscape’ as designated in the HDLP. The area is also designated as ‘Open Spaces and Gaps for Protection. (See Figure 1, Appendix 6A.)

Landscape Value Rating: Good Landscape to Moderately Important to Ordinary Landscape – Moderate to Minor importance

Sensitivity: Medium-Low

13.4.24 Further to the east the route passes through an area towards Hartford with properties of various ages ranged on both sides of the road. Part of this area is designated as a conservation area. (See Figure 1, Appendix 6A). West bound vehicles would use the Old Houghton Road which closed to vehicles at present. Properties with large vegetated gardens face the road on the south western side whilst the closed route comprises the old running surface bounded by hedgerows on both sides of the road.

Landscape Value Rating: Ordinary Landscape – Minor importance

Sensitivity: Low

13.4.25 From Huntingdon the route passes along the A1123 Houghton Road, within the designated ‘Area of Best Landscape’, along the northern edge of the village of Houghton, part of which falls within a conservation area which bounds the A1123. Some areas alongside the route are also designated ‘Open Spaces & Gaps for Protection.’ (See Figure 1, Appendix 6A). On the northern side of the road, west of Houghton the area is characterised by rising farmland, whilst to the south the area falls within the floodplain and the road is fringed by willow.

Landscape Value Rating: Good Landscape to Moderately Important to Ordinary Landscape – Moderate to Minor importance

Sensitivity: Medium-Low

13.4.26 Farmland characterises the area immediately north east of Houghton whilst the south eastern side of the road is characterised by open land areas of private estates, and a golf course. These areas fall within a designated ‘Area of Best Landscape’, the boundary of which is the A1123. (See Figure 1, Appendix 6A). The road side is fringed by a drainage ditch and dense hedgerow planting as well as a variety of mature and semi-mature trees including oaks, poplars and ash specimens.

Landscape Value Rating: Good Landscape – Moderately Important

Sensitivity: Medium to Low

13.4.27 Houghton Road passes into St Ives through an area of suburban development. Moving into the town centre the route passes through low rise, more urban residential areas and then through areas with a mix of business and residential properties. The route then passes through part of the historic core, which forms part of a designated conservation area, (see Figure 2, Appendix 6A), and on to the southern edge which includes the main bus station, large car park and Waitrose supermarket.

General Landscape Value Rating: Good Landscape – Moderately Important to Ordinary Landscape – Minor importance
**General Sensitivity:** Medium - Low

**Historic Townscape Value Rating:** High Quality - Very Important

**Sensitivity:** Medium

**Landscape and Visual Section 2: St. Ives to Cambridge and Cambridge to Trumpington**

**River Great Ouse Floodplain** (See Figure 1c, Appendix 13A.)

13.4.28 The broad valley of the River Great Ouse, is a designated as an ‘Area of Best Landscape’ (Huntingdonshire District) and identified as a ‘Landscape Character Areas’ (South Cambridgeshire District). This distinguishes the Huntingdon - St. Ives – Swavesey end of the CGB corridor. (See Figure 2, Appendix 6A) This flat valley is defined by a chain of historic settlements, which include Holywell, and St. Ives, Swavesey and Fen Drayton. They face or are located along the riverbanks with associated floodplain meadows and pasture fields, and a series of clay extraction lakes, making open water a significant focus of the landscape. Willows dominate the mature riverside landscape and the regenerating banks of the extraction lakes help to establish nature conservation value through the combination of natural regeneration and native planting. Livestock farming still occupies the floodplain pastures of the valley, and some hawthorn hedgerows often containing mature hedgerow trees, (commonly oaks), which divide the medium-sized plots. Statuesque thatching reeds are a prominent feature of the water margins and open ditches. Towards St. Ives, some commercial development has located on the floodplain fringes, in addition to the prominent extraction works north of the route.

13.4.29 The disused railway line, built on embankment, is largely assimilated within this wetland environment, although the crossing of the River Great Ouse over an elongated viaduct is a significant bridging point and landscape feature. Mature trees, a mix of willows and oaks and ash, consistent with the lakeside vegetation throughout, distinguish sections of the route here.

13.4.30 Sections of the route from St. Ives form part of the extensive network of public footpaths, which include the arterial Ouse Valley Way through the gravel extraction lakes of the Ouse Valley floodplains east of St. Ives. The existing disused railway forms the boundary to the northern edge of the Swavesey conservation area. Immediately south of the boundary is the site of the 11th century Benedictine Priory. Immediately south of this open site lies St. Andrews Church, which contains 11th and 12th century wall fragments and quoins of the nave and chancel of the original Benedictine Priory. Parts of the church date from the 13th century with restorations being made up until the 19th century. The church is Listed grade I. Manor Farmhouse is located across Station Road to the south east. The buildings and garden walls date from the early 17th century with 19th century alterations. The garden wall is Listed garden II. The Swavesey Conservation Area Appraisal describes the church area as being somewhat separated from the village and as having ‘a quiet solitude which should be preserved.’

**Landscape Value Rating:** Very Attractive - Important

**Sensitivity:** Medium

**Traditional Farming Settlements** (See Figure 1c, Appendix 13A.)

13.4.31 Beyond the immediate riverside floodplain of the River Great Ouse and east of Swavesey village, the landscape to the south of the route becomes a dryer agricultural landscape, based around a series of historic settlements, including Fenstanton, Longstanton and Oaklington. Prominent remains, such as the Benedictine Priory site, which borders the route at Swavesey...
and Manor Houses at Fenstanton and Longstanton, emphasize the age of these villages that are often focused around preserved village greens, which are generally surrounded by mature trees. This farmed landscape varies from small traditional fields around the village borders with hedgerows, some of which are of particular ecological value, (see Section 11.3), to larger arable fields between the villages, with sparse boundary vegetation.

**Landscape Value Rating:** Very Attractive-Important to Good Landscape- Moderately Important

**Sensitivity:** Low – Medium

**Expanded Horticultural Settlements (See Figure 1c, Appendix 13A.)**

13.4.32 Settlements across the north of the route such as Over, Willingham and Rampton have developed from historic cores alongside the Fen borders into horticultural settlements, based on a loose grid residential layout with radiating orchards and allotments. Prominent tree belts of poplars and conifers have been planted to protect the numerous orchards, which project significantly across an otherwise flat landscape.

**Landscape Value Rating:** Good Landscape – Moderately Important

**Sensitivity:** Low- Medium

**Southern Fen Washlands (See Figure 1c, Appendix 13A.)**

13.4.33 Just north of the villages of Over and Willingham are the southern extensions of the Fen Washlands at a sunken levels of only 2-3m above sea level, which lies below the 5m level of the River Great Ouse Floodplain. Although this character area does not abut the route directly, the washes have determined the development of the northern settlements along the route, which they border, and also explain the diminution of views to the north of the route.

**Landscape Value Rating:** Good Landscape-Moderately Important to Ordinary Landscape – Minor Importance

**Sensitivity:** Medium - Low

**Southern Farmland Plateau (See Figure 1c, Appendix 13A.)**

13.4.34 A tongue of the higher ground to the south of the A14 (T) fills the landscape between Longstanton and Swavesey, close to the CGB route indicated on Figure 13.1. Agriculture over this area is notably more extensive, characterised by larger fields belonging to large isolated farmsteads.

**Landscape Value Rating:** Ordinary Landscape- Minor Importance

**Sensitivity:** Low

**Green Belt City Fringes (See Figure 1c, Appendix 13A.)**

13.4.35 Settlements on the urban fringes of Cambridge City have developed along arterial roads into the centre, including Histon and Impington to the north and Trumpington to the south. In their development, they have incorporated contemporary industry and commercial growth directly along the routes, which includes industrial and hotel development along the disused line at Histon, College and a Plant Research Centre on the road to Trumpington.

**Landscape Value Rating:** Good Landscape – Moderately Important

**Sensitivity:** Medium
Contemporary Fringe and Satellite Development (See Figure 1c, Appendix 13A.)

13.4.36 To both the north and south of Cambridge, some major organisations have been located on Greenfield sites at the city edge. Most significantly these include Cambridge Science Park to the north and Addenbrooke’s Hospital to the south.

13.4.37 A guideway link is proposed at Arbury Park, on the edge of King’s Hedges Road. The proposed link is located immediately within open farmland, opposite the suburban fringe of housing on King’s Hedges Road. Application has been made for a mixed use development to be developed in the farmland and there has been a resolution by the local planning authority to approve the proposals. A number of hedgerows are located on the fringe of King’s Hedges Road and are regarded as having particular ecological value. (See Section 11.3).

Landscape Value Rating: Good Landscape – Moderately Important

Sensitivity: Low

Wooded Chiltern Edge (See Figure 1c, Appendix 13A.)

13.4.38 A small fragment of the Chiltern Hills, (an area of regional landscape value), overlooks the southeast corner of route. Extensive agriculture gently rising to 50m is punctuated with mature woodland clumps.

Landscape Value Rating: Good Landscape-Moderately Important

Sensitivity: Medium

Landscape and Visual Section 3: Cambridge City

13.4.39 The CGB buses would run on guideways through to Milton Road and the boundary of Chesterton Sidings. This area is characterised by light industrial warehousing, open car park hard standings and yards ranged on either side of the disused railway corridor.

13.4.40 The CGB buses would thus pass onto existing roads and proceed south towards Cambridge City Centre along Histon Road (from the end of the Arbury Park guideway) and Milton Road (from Kings Hedges Road). From Histon Road, the CGB route follows Castle Street, Magdalene Street and Jesus Lane. From Milton Road buses would continue along Victoria Avenue. A one-way system would operate around Emmanuel Road, Drummer Street and St Andrew’s Street. Buses would then run south along St Andrew’s Street onto Hills Road, turning left along Station Road to Cambridge Railway Station, where they would pick up the guideway. (See Section 4).

13.4.41 With the exception of the arterial Milton and Histon Roads, all of the Cambridge streets surveyed along the route fall within the wider conservation area of Cambridge. The designation gives protection to both buildings and trees.

13.4.42 Townscape has been rated on the same 1-5 scale as landscape, as set out in Paragraph 13.2.13.

Traditional tree-lined residential street (See Figure 1c, Appendix 13A.)

Station Road/ Shaftesbury Avenue/ Brooklands Avenue/ Hills Road North/ Emmanuel Road

13.4.43 The area is characterised by large semi-detached houses set back from wide roads behind walled forecourt gardens, many now providing parking to commercial administration and
university use. Mature street trees, predominantly limes, often overhang either side of the street from within property boundaries and provide the dominant street character. A number of traditional city churches are located along these roads.

**Townscape value rating:** Good Townscape-moderately important

**Sensitivity:** Medium

**On-street mixed retail and domestic properties** (See Figure 1c, Appendix 13A.)

Castle Regent Street / Bridge Street / Magdalene Street / Histon Road - south

### 13.4.44

The area is characterised by frontages of terraced historic town properties, on average 3 storeys high (although varying in ages and styles), lining intensive shopping pavements of varying widths beside narrow, historic streets. The areas are largely devoid of any street vegetation.

**Townscape value rating:** Good Townscape-moderately important

**Sensitivity:** Medium - High

**Central historic college streetscape** (See Figure 1c, Appendix 13A.)

St. Andrews Street / Emmanuel Street / Jesus Lane / Drummer Street

### 13.4.45

Dominated by impressive college buildings that are set into landscaped grounds within walled enclosures, the wide streets have a unique profile, attributable to the historic university status of the City of Cambridge. Overhanging mature ornamental trees from within university grounds relieve imposing boundary college walls up to 3m in height against the pavement. All of the college streets within the current survey fall within Cambridge City Council’s conservation area. There are several pieces of historic public open space within the centre of Cambridge, the proximity of which contributes to several streets within the survey corridor.

**Townscape value rating:** Highest Quality townscape-Very Important

**Sensitivity:** High

**Contemporary office and residential block development** (See Figure 1c, Appendix 13A.)

Hills Road – south/ Park Street- Round Park Street/ Castle Hill/ Histon Road - south

### 13.4.46

These streets are characterised by a variety of large individual contemporary office and residential units, set back at varying depths from wide road sections producing a mixed streetscape. Street trees are associated with the forecourt of the various developments.

**Townscape value rating:** Ordinary Townscape – Minor Importance

**Sensitivity:** Low

**Suburban residential fringe development** (See Figure 1c, Appendix 13A.)

Histon Road/Cambridge Road – north and Milton Road

### 13.4.47

On the northwest outskirts of Cambridge, towards Arbury Park, fringe housing along Histon Road and Milton Road becomes increasingly leafy and suburban in character. Boundary walls and fencing give way to hedgerows as the pavements widen and residential properties are set increasingly further apart and back from the roadside.
**Townscape value rating:** *Ordinary Townscape–Minor Importance*

**Sensitivity:** Low

Railway Station and associated industrial development (See Figure 1c, Appendix 13A.)

13.4.48 Station Road which leads up to Cambridge Railway Station is tree lined and characterised by large detached housing to the north and larger buildings to the south. The station forecourt contains a small roundabout and is notable for large numbers of bicycles parked outside the low arched Victorian building. Areas around the station are characterised by industrial type development.

**Townscape value rating:** *Good Townscape–moderately important to Poor Townscape–Not Important*

**Sensitivity:** Medium to Low

**Existing Visual Context**

13.4.49 Some vegetation alongside the disused railway and within the landscape limits short to medium views. However, from the exposed sections along the northern rural section of the route, it is possible to see distant views towards higher ground to the south of the A14 (T) Roman Road, as depicted by directional arrows on Figures 2a to 2c, Appendix 13B. However, the extent of views to the north of the route are limited by the depression of the Fen Washlands, relative to the railway line, beyond the village settlements of Over and Willingham. Potential views southwards from Trumpington are contained within the hilly outcrop of the Chilterns to the southeast.

13.4.50 Figures 3a to 3i, Appendix 13C, illustrate the landscape features along the CGB route, including the extent of line-side vegetation in relation to the visual exposure of the current alignment to identified receptors, including residents and walkers.

13.4.51 The Schedule of Landscape Features in Appendix 13D gives details of the landscape features annotated in the figures.

**Detailed Visual Baseline Survey in Sections**

13.4.52 The following baseline survey discusses the guideway route within 8 zones. Within this section, further Landscape Character Areas, (LCA’s) have been identified. These LCA’s are used to define the areas for impact and mitigation. (See Figures 1a and 1b, Appendix 13A, Figures 2a to 2c, Appendix 13B which indicate Zones of Visual Influence and Figure 3a to 3i, Appendix 13C for Landscape Features, Views and Visual Receptors.) The term ‘Land Use’ used below refers to adjacent and neighbouring land uses.

**Landscape and Visual Section 1: Huntingdon to St Ives**

13.4.53 As mentioned previously in paragraphs 13.2.5 and 13.2.6 an assessment has not been undertaken where the landscape/townscape would be unaffected by physical changes and/or where buses and other vehicles already use roads which would be used by CGB buses. Thus, a visual baseline and visual impact assessment has not been undertaken for most of the route from Hinchingbrooke Hospital, Huntingdon to and through St.Ives, except where physical impacts such as the removal of vegetation would occur and the visual conditions may be altered.
The B1514 Huntingdon (See Figure 1b, Appendix 13A)

13.4.54 Widening is proposed on the northern side of the B1514 Huntingdon Ring Road and the eastern side of the B1514 Hartford Road side of the road to accommodate a bus lane.

13.4.55 Land Use: The northern side of Huntingdon Ring Road is characterised by an open elongated area of land with a row of mature horse chestnut and ash trees. The eastern edge of Hartford Road is bounded by a public car park, a sailing club car park, football fields and an open space amenity area used mainly by walkers. The north western edge of Hartford Road is characterised by a variety of residences ranging from two storey terraces with small front gardens to larger two storey detached houses with larger gardens.

13.4.56 LCAs: River Great Ouse Floodplain to the south.

13.4.57 Roadside: To the north of Huntingdon Ring Road the area is characterized by an open area with a change in level and a row of mature trees and to the east on Hartford Road, the road boundaries are characterised by rows of a variety of semi mature trees and a hedgerow adjacent to the open space area.

Old Houghton Road (See Figure 1b, Appendix 13A)

13.4.58 The road at present is not used as a through route for buses and part of the road which is now used only by pedestrians and cyclists would be opened up to west bound bus traffic.

13.4.59 Land Use: Residential and agricultural.

13.4.60 LCAs: River Great Ouse Floodplain to the south.

13.4.61 Roadside: Properties with large vegetated gardens and road stopped up and used by walkers. In this section the road is fringed by a hedgerow on either side.

Huntingdon Road, the A1123: Hartford Marina (See Figure 1b, Appendix 13A)

13.4.62 The Scheme includes widening on the southern side adjacent to the marina boundary

13.4.63 Land Use: Residential to the north and leisure, marina/public house top the south

13.4.64 LCAs: Residential and recreational and semi industrial.

13.4.65 Roadside: To the south the road is fringed by a hedge and individual trees and willow scrub.

Houghton Road the A1123: Hill Rise/St Ives Golf Club (See Figure 1b, Appendix 13A)

13.4.66 The Scheme includes a new bus lane located within the east bound side of the A1123. Potential Receptors: Residents on the north side of the A1123, pedestrians, golfers, pedestrians, cyclists and motorists

13.4.67 Land Use: Residential, agricultural and amenity(golf).

13.4.68 LCAs: Open agricultural areas, residential and estate grounds.

13.4.69 Roadside: To the south the road is fringed by a hedge and large trees.
Landscape and Visual Section 2: St Ives to Cambridge and Cambridge to Trumpington

St Ives to District Boundary (Fen Drayton) (See Figures 1c, Appendix 13A, Figure 2a, Appendix 13B and Figure 3a Appendix 13C)

13.4.70 **Land Use:** Historic Market town/ Clay extraction lakes including Nature Reserve/ River Floodplain

13.4.71 **LCAs:** River Great Ouse Floodplain.

13.4.72 **Trackside:** Regenerating willow scrub characteristic of the lake margins also lines much of the trackside along this section in combination with established and recently planted hedgerows that reinforce this screening effect. The lakes to the south of the route may be glimpsed through this vegetation, which also includes some mature specimen oak and willow trees along the trackside. The numerous mineral extraction and processing works to the north of the route are relatively concealed by lineside vegetation.

13.4.73 **Trackbed:** The track bed is characterized by sand and gravels with short ephemeral and ruderal colonization. From the River Great Ouse crossing the track bed is made of concrete.

13.4.74 **Exposure:** The disused railway line is largely absorbed within this heavily vegetated environment with few receptors in the immediate environment. The Wilderness cottages, at the far northern end of the proposed guideway, opposite St. Ives, are residential receptors that face directly onto the existing line. The historic village of Holywell, on the opposite banks of the River Great Ouse is subject to medium views of the current line. Several public footpaths are located north and south of the line as well. (See Appendix 4D.)

District Boundary (Fen Drayton) to Longstanton (See Figures 1c, Appendix 13A, Figure 2b, Appendix 13B, and Figures 3a,b and c Appendix 13C)

13.4.75 **Land Use:** Clay extraction lakes/ Agriculture/ Village settlements

13.4.76 **LCAs:** River Great Ouse Floodplain/ Traditional Farming Settlements/ Southern Fen Washlands

13.4.77 **Trackside:** Passing initially in between the most recent flood clay extraction lakes of Fen Drayton, the trackside remains dominated by regenerating willow scrub and hedgerows continuing from section one. The younger vegetation, although less dense, provides a substantial cover between the lakes and the trackside. Secondary lines of native young trees have been planted between the lakeside and the tracks as enhancement to the nature reserve, and tall reeds fill open ditches. Willow scrub and reeds continue to line the northern trackside through Swavesey, with hawthorn scrub to the south. East of Swavesey, the tracks become enclosed by dense hawthorn-dominated lineside scrub on both sides, with occasional gaps. Towards Longstanton, where the line is briefly in cutting at the foot of a localised hill, the banksides are covered with dense hawthorn scrub.

13.4.78 **Trackbed:** The original tracks are exposed beyond Fen Drayton where the existing line narrows, with encroaching lineside scrub on either side.

13.4.79 **Exposure:** Around the Swavesey road junction, some properties, both residential and industrial, have views of the existing tracks. The tracks are also used as an informal path along this section. Otherwise, the passing of the route through agricultural land is without major receptors, with the possible exception of a few of isolated farmsteads around the village edges, with medium views of the line and some views from the footpaths and
bridleways which cross over the line towards Swavesey.

Section through Longstanton (See Figure 1c, Appendix 13A, Figures 2b and 2c, Appendix 13B and Figure 3c, Appendix 13CA)

13.4.80 **Land Use:** MOD Barracks/ Agriculture/ Village Settlement with industry/ Golf Course

13.4.81 **LCA:** Traditional Farming Settlements & Southern Fen Washlands

13.4.82 **Trackside:** The track is consistently lined for much of this section with dense hawthorn mix hedgerow, up to 5m in height, that borders farmland to the north and screens the MOD Oakington Barracks site to the south. There are exposed sections of track to the west of Westwick and bordering the Longstanton Golf Course. Isolated mature specimen trees are a feature of this section.

13.4.83 **Trackbed:** Within the confines of the hedgerow boundary, the trackbed has become locally overgrown with brambles, rose hip and some ruderal herbs. Otherwise, the track is covered with long grass and accessible by both vehicles and pedestrians.

13.4.84 **Exposure:** Some medium views of the exposed alignment may be seen from isolated properties along the Longstanton-Willingham Road, to the south of the track, shared by participating golfers and from the rights of way which cross the golf course. Longstanton settlement itself is enclosed within dense tree cover.

Longstanton to A14(T) (See Figure 1c, Appendix 13A, Figure 2c, Appendix 13B and Figures 3c to 3f, Appendix 13C)

13.4.85 **Land Use:** Cambridge outskirts/ Oakington, Histon and Impington settlements/ Agriculture/ Industry

13.4.86 **LCAs:** Traditional Farming Settlements/ Green Belt City Fringes/ Contemporary Fringe and Satellite Development/ Southern Fen Washlands.

13.4.87 **The Westwick Conservation Area is centred on the small settlement of Westwick which lies immediately north east from the village of Oakington across the disused railway line. The southern boundary of the conservation area runs along the northern edge of the disused railway line on the eastern side of Station Road. Here the boundary is characterised by a row of two-storey cottages. The boundary then crosses over Oakington Road and runs down the middle of the line of the disused railway for a distance of approximately 600 metres. The eastern boundary then passes northwards through the open parkland which includes Beck Brook and scattered mature parkland to trees to Westwick Hall. The area also includes Westwick Farm which lies further to the west across Oakington Road.**

13.4.88 **Trackside:** Passing through a succession of adjacent landscapes, the changing trackside grades from open agricultural borders between Oakington and Histon, through village residential edges to the hard edge of industrial buildings through Histon, and finally passing along mature woodland belts at Impington.

13.4.89 **Trackbed:** The trackbed is correspondingly varied exposed agricultural sections between Oakington and Histon, along local paths behind housing at Histon, becoming increasingly overgrown with trackside scrub and brambles behind factory units. East of the at-grade crossing at Impington, the initially overgrown track opens out to a grassy trackbed to beyond the A14 road bridge.

13.4.90 **Exposure:** This section of the track passes at close quarters to a number of potential...
receptors, which include the back of several residential properties in Histon and Impington and to public rights of way located either side of the track and alongside the track itself. Less sensitive receptors include factory units at Histon and Oakington and the A14 road bridge.

**A14(T) to Cambridge Railway Station** (See Figure 1c, Appendix 13A, Figure 2d of Appendix 13B and Figures 3f and 3h, Appendix 13C)

13.4.91 The Cambridge streets that are proposed for the city section of the route have not been appraised for visual impact, the extent of which is automatically defined by the street profiles. The comments that follow therefore relate to the section of the disused line between the A14 and Milton Road.

13.4.92 **Land Use:** Hi-tech business/Residential/Commercial/Educational

13.4.93 **LCA’s:** Contemporary Fringe and Satellite Development

13.4.94 **Trackside:** East of the A14, the tracks are loosely vegetated with lineside scrub right through to Milton Road. Brambles with some hawthorn, which partly overgrows the tracks, dominate this vegetation. Some trees provide additional screening of the Cambridge Science Park for a large section along the northern boundary. Garden trees intermittently enforce the boundary with housing to the south of the line. On the approach to Milton Road, the trackside vegetation thins out to expose fencing on either side. This thin trackside vegetation continues alongside the railway boundaries at Chesterton.

13.4.95 **Trackbed:** The track is locally overgrown.

13.4.96 **Exposure:** Several of the residences, which back onto the track from the south are exposed to the line, through gaps in garden vegetation and fencing. Otherwise the line is well contained within the fringe development on the Cambridge outskirts. Open and partial views are apparent to the tracks from either side of the corridor at Chesterton. At Arbury Park, open views are apparent from housing fronting King’s Hedges Road.

**Cambridge Railway Station to Trumpington** (See Figure 1c, Appendix 13A, Figure 2df of Appendix 13B and Figures 3h and 3i, Appendix 13C)

13.4.97 **Land Use:** Residential/Commerce and industry/Transport corridors

13.4.98 **LCAs:** Contemporary Fringe and satellite development/Green Belt city fringes/Wooded Chiltern Edge.

13.4.99 **Trackside:** The tracks pass from within highly built up industrial properties in the station area, to being fully exposed within extensive agriculture to the south of Cambridge alongside Trumpington. In-between, as the track passes under Long Road Bridge, the trackside boundary with agriculture and recreational fields is substantially vegetated on the western side with mature trees that provide dense screening to the line. The Cambridge to London railway runs in parallel immediately to the east of the track. At the Long road bridge, substantial mature ash-dominated woodland of high landscape value, flanks the road embankment, and briefly screens both the operational and disused lines. On entering Trumpington, the line is in cutting once again, below heavily vegetated banks and the line is visually screened from the back of residential housing on either side.

13.4.100 **Trackbed:** Alongside Cambridge University Press, the disused track forks to the west of the operational London line. There is patchy scrub growth along this section of trackbed, although the overall profile is apparently wider due to the operational London line alongside. South of Long Road, the exposed track is bordered by arable fields.
13.4.101 **Exposure:** In the exposed sections through arable fields, to the south of Long Road, the track is visible to Trumpington residences and public rights of way users on the village outskirts. Otherwise there are few additional sensitive receptors to the north of this road, as the disused line meets the operational track into Cambridge. (See Figure 1c, Appendix 13A and Figure 3i, Appendix 13C)

**Link to Addenbrooke’s Hospital** (See Figure 1c, Appendix 13A and Figure 3i, Appendix 13C)

13.4.102 **Land Use:** Residential/ Institution premises

13.4.103 **LCAs:** Wooded Chiltern Edge/ Contemporary Fringe and Satellite Development.

13.4.104 **Trackside:** Long Road, the public footpath and field track immediately to the south are existing links with Addenbrooke’s Hospital. Long Road is substantially vegetated on either side by mature ash-dominated woodland of some landscape value. This woodland effectively provides a barrier along the southern edge of the road. Along the northern edge of the road, the woodland thins eastwards to be replaced by residences. In contrast both the public footpath and existing farm track to the south between the disused line and Trumpington are fully exposed within the open arable landscape.

13.4.105 **Exposure:** Long Road is heavily screened by woodland along the southern verge, with housing and trees to the north. The public right of way and farm track are equally exposed to the disused line as the Trumpington properties.

13.5 **Consultation**

13.5.1 Consultation has been carried out with all the local authorities on landscape and design/mitigation issues and with regard to the ES. A ‘Landscape Design Task Group’ was set up in August 2003 consisting of members of the local authorities. Subsequent meetings have been held to design landscape and ecological measures, which would mitigate the potential negative effects of the proposals and to meet other landscape character and biodiversity objectives. (See Section 3.6).

13.6 **Relevant Guidance**

13.6.1 The Scheme spans several district boundaries with a range of landscape and townscape related policies which themselves relate to the Cambridgeshire and Peterborough Structure Plan, (Adopted 2003), which in turn respond to National policy guidelines with respect to the environment.

13.6.2 Details of the relevant landscape and townscape related policies are noted in Section 6, Planning Policy Context.

13.7 **Assessment and Mitigation**

**Introduction**

13.7.1 Except for the City Centre Section landscape and visual impact and mitigation issues are discussed separately in this section. Furthermore, in order to relate the mitigation potentials directly to the impacts at various locations along the route, the mitigation potentials are noted immediately after each section on impacts as well as the individual residual effects that would occur after mitigation. The impact assessment has been undertaken from north to south along the route relative to the landscape character areas defined in this section of the ES. A
summary of impacts and potential mitigation is then noted at the end of the landscape and then the visual sections. (See also Figures in the Landscape and Ecological Mitigation Proposals in Appendix 13E.)

13.7.2 The following sections comprise the Landscape/Townscape assessment for Landscape and Visual Sections 1 and 2 which is then followed by the visual impact assessment

**Landscape/Townscape Assessment: Huntingdon to Cambridge and Cambridge to Trumpington**

**Characteristics of the Potential Landscape Impacts**

13.7.3 The key sources of impacts would be as a result of:

- Loss of vegetation and landscape and visual character along roads which are widened between Huntingdon and St Ives;
- Removal of line-side and additional boundary vegetation, within former rail boundary;
- Additional land take for:
  - A 3 metre minimum/4 metre maximum maintenance track provision along one side of the guideways;
  - Park and Ride sites at St. Ives and Longstanton;
  - New CGB Stop locations along the route;
  - Kiss & ride facility at Swavesey;
  - Car park adjacent to the Histon and Impington Stop
- Temporary construction sites and temporary and permanent access;
- New engineered structures such as bridges, culverts etc;
- Movement of CGB buses through the landscape;
- Cars stopping at ‘at-grade crossings’.
- Additional signage, some of which may be lit, within landscape and townscape areas;
- Lighting which would be provided at:
  - All CGB stops on the guideway except at the Nature Reserve Request Stop.
  - Access routes to stops, where risk assessments show that these are necessary.
  - At each intersection where the guideway intersects with the public highway. At these location the guideway would be lit for 50m either side of the crossing. Traffic lights would be provided at these locations as well.

13.7.4 The effects of lighting are discussed in the section on ‘Potential Visual Effects and Mitigation Opportunities’, paragraph 13.7.240.

13.7.5 The scarcity of woody vegetation over much of the Cambridgeshire countryside heightens the
value of remnant trees and hedgerow features that occur along the route. Areas of denuded open agricultural landscape also emphasise the value of mature trees and hedgerow that are more prevalent within and adjacent to nearby settlements.

**Landscape and Visual Section 1: Huntingdon to St. Ives**

**Hinchingbrooke Hospital – Huntingdon Town Centre** (See Figure 1, Appendix 1A and Figure 1b, Appendix 13A)

13.7.6 The CGB buses would travel on existing roads between Hinchingbrooke Hospital and Huntingdon Town Centre.

**Landscape Impacts**

13.7.7 Between Hinchingbrooke Hospital and Huntingdon Town Centre there should be no landscape impacts as the buses would travel within the existing highway.

13.7.8 Predicted effects: Negligible

**B1514 – Huntingdon Ring Road** (See Figure 1, Appendix 1A and Figure 1b, Appendix 13A)

**Landscape Impacts**

13.7.9 The proposals include carriageway widening on the northern side of Huntingdon Ring Road. This would encroach in two areas of land, which separate Nursery Road and Hartford Road. A cross section shows Huntingdon Ring Road at an elevated level, which then drops down to a lower level to Hartford Road. This lower level accommodates a row of mature horse chestnut, ash and Norway maple trees which are important features within the road corridor.

13.7.10 The widening proposals utilise the upper level but this means that a small retaining wall and safety barrier would be required along side the roadside edge. The widening would also require the raising of the canopies of the trees as well as significant pruning of the tree canopies, which may affect their visual character. It is likely that a Norway maple located on the western end of the proposals would be lost.

13.7.11 Predicted effects: Moderate adverse.

**Mitigation Opportunities**

13.7.12 The retaining wall to be faced in a suitable material such as brick. The lifting of the canopies would be undertaken by a professional tree surgeon and any trees lost should be replaced with large stock specimen trees of an appropriate species to be agreed with the local authority.

13.7.13 Residual effect: Slight adverse decreasing over time.

**B1514 - Hartford Road** (See Figure 1, Appendix 1A and Figure 1b, Appendix 13A)

**Landscape Impacts**

13.7.14 After leaving the town centre the route passes onto the Hartford Road. Widening occurring on the eastern side of the road would likely affect a number of semi-mature *Prunus* and ash trees located alongside the long stay car park. These trees fall within a conservation area and are therefore protected by a blanket Tree Preservation Order (TPO). Widening would also remove a line of semi mature ash, Norway maple and sycamore trees located at the edge of
the sports fields. A mature elm, hedgerow with some elder, hawthorn, and blackberry, which is located alongside the open ground to the south of the road would require removal. Replacement tree and hedge planting would be required as part of the mitigation.

13.7.15 The vegetation described above has an important role in defining the Ouse floodplain and creating an attractive fringe to the road and the designated Area of Best Landscape. (See Figure 1, Appendix 6A). It is considered that in this locality that the significance of the loss of this vegetation is moderate adverse.

Additional Landscape Impacts
- Slight loss of space on an area mainly used for jogging and dog walking in open space area alongside the road.
- Loss of visual amenity which affects landscape character and quality.

13.7.16 Predicted effects: Moderate adverse.

Mitigation Opportunities
- The trees and the hedge should be replaced where they are removed for the widening. These should be replaced with large stock specimen trees and native hedge planting in order to mitigate the loss.

13.7.17 Residual effect: Slight adverse decreasing over time.

Hartford Road / Old Houghton Road Junction (See Figure 1, Appendix 1A and Figure 1b, Appendix 13A)

13.7.18 The proposals include widening on the northern side of Hartford Road. Widening is in the vicinity of two horse chestnut trees, which are protected by TPO.

Landscape Impacts
13.7.19 Widening is within in the highway corridor and separated from the trees by a width of open ground and a timber boundary fence. Widening is likely to require minor pruning of some of the lower branches of the trees.

13.7.20 Predicted effects: Slight adverse.

Mitigation Opportunities
13.7.21 Pruning to be undertaken by a professional tree surgeon.

13.7.22 Residual effect: Negligible.

Hartford Road - Old Houghton Road (See Figure 1, Appendix 1A and Figure 1b, Appendix 13A)

13.7.23 The Old Houghton Road would be used for west-bound CGB buses. Part of the road is at present stopped up immediately after the junction with The Grove. The most northern section of the road falls within a conservation area.

Landscape Impacts
13.7.24 It is apparent from on site surveys that Old Houghton Road is used by local people as an
amenity walk to and from the marina off the River Great Ouse. There would be a slight loss of amenity brought about by running buses periodically down this route. The quality of the fabric and setting of Conservation Area and the Area of Best Landscape through which the route would run would not be significantly affected. (See Figure 1, Appendix 6A).

**Additional Landscape Impacts**

- The route is lined by significant hedgerow planting. The hedgerows would not be affected.

13.7.25 Predicted effects: Slight adverse.

**Mitigation Opportunities**

- Creation of an appropriate footpath and cycleway for amenity users on the Old Houghton Road.

13.7.26 Residual effect: Slight adverse.

**Huntingdon Road, the A1123, Hartford Marina** (See Figure 1, Appendix 1A and Figure 1b, Appendix 13A)

13.7.27 The Scheme includes widening on the southern side of Huntingdon Road where the existing road is characterised by a grass verge and a drainage ditch with tree and scrub planting. Between Old Houghton Road and the entrance to the marina, most planting is located on the marina side of the drainage ditch. East of the entrance to the marina some planting including coppiced willows is located on the road side of the drainage ditch.

**Landscape Impacts**

13.7.28 Proposals would require the loss of some vegetation west of the marina entrance and the pruning of other specimens and scrub. A 12-14 metre high ash tree would be required to be removed. A retaining wall is also likely to be required along part of the drainage ditch. The proposals would require the removal and cutting back of willows alongside the road, for stretch of road east of the marina. Pruning is already being carried out as part of highway maintenance.

13.7.29 Predicted effects: Slight adverse.

**Mitigation Opportunities**

13.7.30 Replace lost vegetation with appropriate species.

13.7.31 Residual effect: Negligible

**Houghton Road the A1123: Sawtry Way to Hill Rise/St Ives Golf Club** (See Figure 1, Appendix 1A and Figure 1b, Appendix 13A)

13.7.32 The proposals include widening of the A1123 starting at the junction of Sawtry Way with the A1123 Houghton Road. Widening is proposed on the northern side of the A1123 into an arable open field, which is defined by a drainage ditch. The widening swops over to the southern side due to the location of residential properties on the northern side. The widening on the southern side then extends from the rising ground of Houghton Hill to the west to High Leys which lies some 90 metres east of the Hill Rise junction with the A1123 Houghton Road. The landscape features detached and semi-detached residential properties on the northern side of the road and the golf course, a number of larger estates and their gatehouses
and a water storage facility on the southern side. The proposals for widening of the road include a new dual cycle lane and footpath alongside and within the golf course boundary and at the entranceway to the property ‘The How’.

Landscape Impacts

13.7.33 The southern boundary of the highway is characterised by a ditch approximately 1.5 metres deep and a substantial, mature mixed species hedgerow and a few semi-mature and mature trees, (ash, sycamore and oak), which delineate the highway/golf course boundary. A row of mature poplars approximately 20-22 metres tall and a number of other trees are set a small distance south of the hedge. A large, mature horse chestnut and a laurel hedge characterised the boundary of the eastern part of the front boundary of ‘The How’. The hedge as well as the poplars and other vegetation combine to provide a strong physical and visual vegetative feature along the road. The hedges and associated trees would be lost.

13.7.34 It is likely that the hedge and associated trees, would be lost, but not the poplars. This loss would alter the character of the road corridor and affect the landscape character of the edge of the golf course and of ‘The How’s’ entrance. The significance of the effect is considered negative.

13.7.35 It is considered that should the poplar trees be lost as well as the hedge, this would significantly increase the impact.

Additional Landscape Impacts

• Potential loss of amenity.
• Loss of a drainage ditch and agricultural land on the northern side.

13.7.36 **Predicted effects:** Moderate adverse.

Mitigation Opportunities

• Mitigation requires the replacement of the hedge and associated trees, replacement of the lost mature horse chestnut with a large stock specimen tree and replacement laurel hedgerow at ‘The How’.

• However, it appears that there may not be enough space to place a replacement hedge and footpath/cycleway and ditch along this boundary without affecting the poplar trees. A detail design study would be carried out to find at a solution that retains the poplars and allows for the replacement hedge.

13.7.37 **Residual effect:** Slight adverse in the long term if mitigation follows the above. Moderate adverse if the poplars are lost.
**Landscape and Visual Section 2: St. Ives to North Cambridge and Cambridge Railway Station to Trumpington**

River Great Ouse Floodplain (St. Ives to Swavesey) (See Figure 2, Appendix 1A, Figure 1c, Appendix 13A and Figures 3a and 3b, Appendix 13C)

**Landscape Impacts**

13.7.38 The loss of young, regenerating, willow-dominated vegetation from the banks of the River Great Ouse floodplain extraction lakes is the predominant impact of the proposals in the St. Ives section of the route. Some additional semi-mature willows, oak and ash trees that line the concreted track along the Fen Drayton section could also be lost as part of engineering reprofiling of the trackbed, and structural works on either side of the River Great Ouse Crossing.

13.7.39 Towards Swavesey, beyond the willowy margins of the extraction lakes, a denser lineside scrub encloses the route and the bordering landscape becomes increasingly agricultural. Traditional hedgerows connect with the local lineside vegetation, consisting of a mix of hawthorn, elm and blackthorn, with traditional open field drains alongside which would be lost.

**Additional Landscape Impacts**

- To the south of the CGB corridor at St. Ives, the marginal areas to the adjacent lake are to be reprofiled. Embankment works along this section of the approach to the west of the River Great Ouse crossing would include the loss of lakeside vegetation and marginal aquatic plants.

- The St. Ives Park and Ride site is to be located to the north of the guideway and would occupy a current open meadow to the north-east of The Wilderness. This would result in a loss of some of the existing surrounding vegetation. The existing vegetation currently provides screening and the setting for the residential Wilderness properties.

- There would be a loss of mature hedgerow planting along Meadow Lane, which is located on the northern side of the proposed park and ride site.

- Mature riverside vegetation including oaks, willow and ash trees are to be removed in structural works to the River Great Ouse Crossing, as part of the proposals, which include temporary land take for construction.

- Feature reed-filled ditches which line the tracks along this section would be affected within the extent of trackbed work associated with the River Great Ouse crossing at St. Ives and also in the provision of a maintenance track alongside at Swavesey.

- The Nature Reserve Request Stop should provide a significant benefit by providing access to the area for walkers and bird watchers.

- Some traditional field hedgerows lining the tracks immediately to the west of Swavesey that have some local historic landscape and agricultural value would be lost.

- Several public rights-of-way, including the Ouse Valley Way currently cross or run adjacent to the disused railway corridor. There would be temporary diversions and stoppings up during construction. This would temporarily affect landscape amenity.
Stop at Swavesey.

The provision of a traffic controlled at-grade crossing with 50 metres of lighting and a Kiss & Ride site opposite the houses on Over Road, at the Over Road junction, Swavesey. This would impact upon the landscape and historical character and setting of the northern approach into this historic village, and the historical setting of the Benedictine Priory site which are all located within a conservation area. (Refer to description in 13.4.30).

Provision of a new private access tracks.

13.7.40 **Predicted effects:** Generally Moderate adverse. Moderate beneficial in terms of landscape amenity for the Nature Reserve Request Stop by providing an access to the area for the public.

**Mitigation Opportunities**

- The reprofiled formation for the St. Ives section of the route along the lake to the south of the guideway would require new bankside and marginal planting to preserve the regenerating character of the existing lakes environment. The opportunity to enhance both the nature conservation and recreational value of the reclaimed gravel extraction lakes within the wider setting of the protected River Great Ouse Floodplain, is to be maximised in conjunction with ecological habitat creation proposals.

- Screen planting and a variety of habitat types to enhance landscape character and reduce impact of the park and ride site.

- Between the River Great Ouse crossing and Swavesey, proposals would include replacing the landscape features of hedgerows, lakeside scrub and drainage ditches. This would enhance landscape and ecology.

- The Nature Reserve Request Stop would be integrated into the wetland landscape by replacing and enhancing existing planting.

- Rejuvenate a small copse with additional planting at Mow Fen Drove. (Ecological and Landscape Compensation Area A, Ch. 5+275.00, Appendix 13E)

- At Swavesey, the Benedictine Priory, to the south of the disused railway corridor would require sensitive treatment along the CGB corridor boundary to protect the historic setting.

- The Swavesey Stop would be integrated into the local context with planting.

- The Swavesey Kiss and Ride site would be integrated into the local landscape with appropriate screen planting.

- Minimise the impact on existing vegetation of the proposed new access tracks.

13.7.41 **Residual effect:** Slight to moderate adverse effects with the St Ives Park and Ride, with some benefit, with ecologically orientated replanting of re-profiled embankments and habitat creation of water features and improved lighting. Moderate adverse effects to the northern most area of the conservation area at Swavesey caused by the guideway, CGB buses and the kiss and ride facility. Moderate beneficial effect by providing amenity access at the Nature Reserve Request Stop.

**Traditional Farming Settlements Character Area (See Figures 2 and 3, Appendix 1A**,
Figure 1c, Appendix 13A and Figures 3b to 3f, Appendix 13C)

Landscape Impacts

13.7.42 As a consequence of the engineering works, sparse trackside vegetation consisting of young tree saplings of birch, ash and alder would be cleared along this otherwise relatively exposed section of the route to Histon through flat agricultural landscape. Towards Longstanton, the track becomes enclosed in cutting with rambling bankside scrub of hawthorn, blackthorn, dog rose and elder, all of which would be cleared. Further eastward, the width of the lineside vegetation reduces as the trackbed levels to grade with the B1050 road at-grade crossing. The landscape value of the trackside vegetation along this section is not significant.

13.7.43 A park and ride site is proposed at Longstanton on the site of existing agricultural land and a depot, close to Longstanton Golf Course. Access to the facility is proposed from the B1050. There would be some loss of mature poplar trees and a mixed species hedge, which form an attractive and distinctive edge to the existing agricultural field/depot boundary. A small portion of a dense hedge would be lost to the access onto the B1050. The affect on landscape character brought from construction of the park and ride site is considered to be moderate/major adverse.

13.7.44 The section of the CGB corridor between Longstanton and Histon is generally exposed and at grade. Boundary vegetation within the corridor would be removed.

Additional Landscape Impacts

- A balancing pond is located in a small area of land to the south of the tracks, at chainage 7+600.00, with a slight loss of agricultural land. Balancing ponds are considered positive landscape/ecological features when they are designed appropriately.
- A large area of land located immediately east of the proposed balancing pond would be used temporarily for a construction compound and haul road. This is on agricultural land.

13.7.45 Predicted effects: Slight adverse. Longstanton Park and Ride is major adverse.

Mitigation Opportunities

13.7.46 (See Section 13.7 for further details and refer to Appendix 13E for locations.)

- Replacement lineside planting would be provided alongside the route in character with the boundaries with the traditional agricultural landscape.
- The area for the balancing pond would be large enough to create natural profiles with shallower areas, which would accommodate marginal and aquatic plant species. This would contribute to biodiversity and ecological objectives whilst at the same time creating attractive landscape features.
- Areas of landscape and ecological mitigation including balancing ponds would be provided south of and adjacent to the guideway at the following locations:
  - Chainage 7+425.00 – 7+610.00 – Balancing Pond and Ecological and Landscape Compensation Area B;
  - Chainage 7+600.00 - 7+900.00 – Ecological and Landscape Compensation Area C
- Chainage 9+110.00 – 9+650.00 – Ecological and Landscape Compensation Area E
- Chainage 9+500.00 – 9+650.00 – Balancing Pond and Ecological and Landscape Compensation Area F
- Chainage 13+840.00 – 14+120.00 – Ecological and Landscape Compensation Area K

- Appropriate landscape design of the Park and Ride facility at Longstanton to integrate this new facility into the existing landscape. The Park and Ride facility would include a greater variety of planting and the creation of wetlands and ecological/visually attractive landscape features. Balancing ponds, swales and ditches could provide the necessary drainage and at the same time be used for emergent and aquatic planting.

13.7.47 Residual effects: Longstanton Park and Ride is moderate adverse. Generally slight adverse in the long term.

Expanded Horticultural Settlements Character Area (Swavesey to Oakington – North of Proposed Guideway) (See Figures 2 and 3, Appendix 1A, Figure 1c, Appendix 13A and Figures 3b to 3f, Appendix 13C)

Landscape Impacts

13.7.48 The Horticultural Settlements Character Area lies to the north of the proposed CGB route for the same section as the defined Traditional Farming Settlements Character Area. The effects of vegetation removal from this section of track, which include agricultural hedgerow boundaries on the north side of the corridor have therefore been considered above under ‘Traditional Farming Settlements Character Area’. Landscape impacts include:

- Three balancing ponds are proposed to the north of the corridor between B1050 at Swavesey to Histon. These are at chainage 10+800.00, 11+425.00 and 12+125.00. Primarily occupying agricultural land, the proposed pond sites would not result in any major loss of existing habitat, but instead would introduce new ecological as well as attractive features into the landscape.

- The additional land take beyond the disused rail corridor that is required for the provision of a maintenance track would impact upon the traditional agricultural land bordering the northern boundary. This would affect established hedgerows and several open fields drains.

- Boundary vegetation within the corridor would be removed.

- Semi-mature/mature parkland trees and other line side trees in the grounds of Westwick Hall, are protected by a blanket TPO as the area falls within the Westwick Conservation Area. The southern boundary of the conservation area falls on the centre line of the existing railway corridor. Parkland trees on the east side of Beck Brook would be unaffected but some of the smaller line-side trees would be as a result of the construction. The effects would result mainly from the provision of the Oakington Stop facilities as well as the general route alignment.

- Alterations in landscape character and quality to the Conservation Area at Westwick brought about by the junction arrangement, the proposed Oakington Stop and increased lighting.
• Engineering works (retaining wall) would impinge on Beck Brook adjacent to the Oakington Stop.

13.7.49 **Predicted effects**: Moderate Adverse at Westwick Conservation Area.. Slight adverse to negligible in the long term.

**Mitigation Opportunities**

13.7.50 (See Section 13.7 for further details and refer to Appendix 13E for locations.)

• Opportunity to develop balancing ponds as landscape and ecological features.

• Replacement lineside planting would be provided alongside the route in character with the boundaries of the traditional agricultural landscape to the north.

• Areas of landscape and ecological mitigation including balancing ponds would be provided north of and adjacent to the guideway at the following locations:
  - Chainage 7+900.00 – 8+400.00 - Ecological and Landscape Compensation Area D;
  - 10+750.00 – 10+825.00 Balancing Pond and Ecological and Landscape Compensation Area G;
  - 10+825.00 – 11+130.00 - Ecological and Landscape Compensation Area H;
  - 11+375.00 – 11+440.00 – Balancing Pond and Ecological and Landscape Compensation Area I, and
  - 12+025 – 12+150.00 – Balancing Pond and Ecological and Landscape Compensation Area J.

• Protection measures during construction for existing mature boundary trees. Where trees would be lost these would be replaced with appropriate large stock specimen trees.

• The proposed retaining wall alongside Beck Brook would be screened with appropriate species.

• Integrate Oakington Stop with appropriate planting.

13.7.51 **Residual effects**: Slight adverse to negligible in the long term.

**Southern Fen Washlands** *(See Figures 2 and 3, Appendix 1A and Figure 1c, Appendix 13A)*

**Landscape Impact**

13.7.52 This landscape character area, although within sight of the CGB route, does not directly border the corridor. No direct or indirect impacts are predicted upon the character of this landscape.
Southern Farmland Plateau (See Figures 2 and 3, Appendix 1A and Figure 1c, Appendix 13A)

Landscape Impact

13.7.53 This landscape character area, although within sight of the proposed CGB route, does not directly border the corridor. No direct or indirect impacts are predicted upon the character of this landscape.

Greenbelt City Fringes (North Cambridge) (See Figure 3, Appendix 1A, Figure 1c, Appendix 13A and Figures 3f and 3e, Appendix 13C)

Landscape Impacts

13.7.54 At Park Lane Girton a private access track would be provided on the southern side of the guideway for some 500 metres to the east of Girton crossing.

13.7.55 Built-up areas border the majority of the CGB route from the settlements of Impington and Histon to North Cambridge. This part of the Cambridgeshire Green Belt contains significant blocks of sensitive semi-mature woodland, some with TPO protection.

13.7.56 The guideway section from Park Lane to St Audrey’s Close would be opened up by loss of vegetation along the tracks, altering the landscape character and quality by opening up views.

13.7.57 The narrow section of disused rail track adjacent to housing in Histon is largely exposed and relatively free of lineside vegetation. Overgrown young scrub vegetation would be removed from the narrow tracks behind industrial properties west of Station Road. A proposed noise/visual barrier, (see Section 14), to protect the properties from views to the guideway and vehicles would temporarily affect the visual character of the immediate to the south of the track may be directly affected by the proposals.

13.7.58 The demolition of the two storey Victorian railway station and replacement with a car park for 40 cars would change the landscape character of the immediate area.

13.7.59 The provision of the Histon & Impington Stop, the guideway and the maintenance track would result in some loss of woodland and mature trees protected by TPO’s.

13.7.60 The greatest potential impact of the proposed CGB route through Histon and Impington would result from land-take to provide the maintenance route alongside the operational track and guideway. (The visual implications are discussed below in the section on visual effects ‘Receptors: - Histon Residences.’)

13.7.61 Additional landscape impacts would be:

- Loss of trees along the DIY store boundary with the provision of the west bound Histon & Impington Stop facilities.
- Boundary vegetation within the corridor
- To the east of the B1049, and on the northern side of the route, significant belts of semi-mature trees up to 30m in height characteristically bound the fields. A tree belt also extends along the trackside. These collectively ash-dominated woodland strips also include groups of mature turkey oaks. Engineering proposals may impinge upon these areas.
• The Copse at Impington would be slightly compromised in the current proposals. Whilst a maintenance track is to be provided along the northern edge of the corridor, it is proposed that as much of the woodland as possible should remain unaffected.

13.7.62 **Predicted effects:** Moderate/major adverse effects depending on the design of the at-grade crossing and the number of mature trees affected.

**Mitigation Opportunities**

13.7.63 (See Section 13.7 for further details and refer to Appendix 13E for locations.)

- Where a noise barrier is provided, (see Section 14), landscape screen planting would be provided where required;
- Where properties back onto the CGB corridor, property boundary screen planting would be provided where required;
- Replacement lineside planting would be provided
- Lost trees between Histon & Impington and the A14(T) section would be replaced with large stock specimen trees. Woodland areas close to the works would be protected so that construction effects would be minimized. Temporary land-take beyond the immediate alignment would allow for the strengthening of the woodland edge with appropriate planting and arboricultural works. (Refer to Appendix 13E).
- The corridor width would be minimised, as far as possible and tree protection implemented for those areas close to the works.
- A hedgerow would be provided between the maintenance track and the proposed access track to break down the visual width of the corridor.

13.7.64 **Residual effects:** Moderate to slight adverse reducing to slight adverse in the long term.

**Contemporary Fringe And Satellite Development Character Area – (Cambridge North)** (See Figure 3, Appendix 1A, Figure 1c, Appendix 13A and Figures 3f and 3g, Appendix 13C)

**Landscape Impacts**

13.7.65 On the fringes of the city, the route passes through large scale contemporary out-of-town developments including Cambridge Regional College and Cambridge Science Park and associated infrastructure. These developing environments have a low sensitivity to change but their boundaries with the Cambridgeshire countryside require some landscape treatment to preserve adjacent Green Belt landscape character in particular.

13.7.66 Along the northern section, as the route passes under the A14 (T) and through Cambridge Science Park, the vegetation to be cleared from the route is primarily overgrown scrub. This extends along the boundary with Cambridge Science Park to the north and an area of housing and commercial premises to the south. Woody vegetation along this section of the route makes an important contribution in providing a green corridor to the north of Cambridge. The complete removal of this vegetation would create a loss to the visual amenity of the immediate area.

13.7.67 The widening of the transport corridor along King Hedges Road would diminish landscape character. Parts of a hedgerow of historic importance would be removed towards the Kings...
13.7.68 Additional landscape impacts would be:
- The balancing pond, to the west of the A14 (T) overbridge at Chainage 18+625.00, would result in a small loss of agricultural land. All balancing ponds including this one, are considered to be positive landscape and ecological features.
- Location of the Regional College Stop and Science Park Stop may provide a positive focal point on the edge of the campus.

13.7.69 **Predicted effects:** Slight adverse to negligible. Balancing pond is slight beneficial. Slight to moderate adverse effect at King’s Hedges Road due to Arbury Park link.

**Mitigation Opportunities**

13.7.70 (See Section 13.7 for further details and refer to Appendix 13E for locations.)
- Provide replacement and enhancement planting to the south of the route at the Science Park and along king Hedges Road.
- Ensure detail design of balancing pond provides appropriate visual and ecological enhancement for the particular area. (Ecological and Landscape Compensation Area L.)
- Integrate the CGB stops into the local context of College and Science Park with appropriate planting.
- Ecological and Landscape Area M
- Protection of existing hedgerows within the CGB corridor along the Arbury Park link., where possible.

13.7.71 Residual effects: Negligible.

**Contemporary Fringe And Satellite Development Character Area – (South Cambridge)** (See Figure 4, Appendix 1A, Figure 1c, Appendix 13A and Figures 3h and 3i, Appendix 13C)

**Landscape Impacts**

13.7.72 South of the Railway Station, the route passes directly alongside Cambridge University Press. There are no significant landscape impacts of this section of the CGB route contained within the existing rail boundaries.

13.7.73 **Predicted residual effect:** Negligible – No mitigation required.

**Greenbelt City Fringes Character Area (South Cambridge)** (See Figure 4, Appendix 1A, Figure 1c, Appendix 13A and Figures 3h and 3i, Appendix 13C)

**Landscape Impacts**

13.7.74 The route passes through an Area of Best Landscape defined in the Proposals Map of the Cambridge City Local Plan. (See Appendix 6A.)

13.7.75 As the route passes beneath Long Road, the remnant oak-ash woodland, which flanks this
road has group TPO protection for its local landscape value. Some trees would be lost for the
construction of a new underpass for the maintenance track access to the west of the guideway. Trees on the eastern side would be protected and strengthened.

13.7.76 The Scheme passes through Trumpington in a deep cutting backed by housing. The cutting has substantial lineside vegetation on the embankment slopes, which include some large ash and willow trees. Loss of vegetation at the top of the slopes would affect the visual amenity, landscape character and quality for the residents of properties that back onto the cutting.

13.7.77 The provision of the Trumpington Stop and lighting would have a slight effect on the immediate landscape character setting.

13.7.78 Three balancing ponds are proposed. These are at Chainages 41+400.00, 42+000.00 and 42+450.00. These are considered positive features in the agricultural landscape.

13.7.79 **Predicted effects:** Slight to moderate adverse. Major adverse at Trumpington cutting.

**Mitigation Opportunities**

13.7.80 (See Section 13.7 for further details and refer to Appendix 13E for locations.)

- Appropriate planting along the route to maintain landscape character.
- Replacement planting of any trees lost within the corridor, from the edges of tree belts and garden plants in the Trumpington section.
- Where properties back onto the CGB corridor, property boundary screen planting would be provided where required;
- Areas of landscape and ecological mitigation including balancing ponds would be provided adjacent to the guideway at the following locations:
  - Chainage 41+400.00 – Balancing Pond and Ecological Landscape Compensation Area N;
  - Chainage 42+00.00 – Balancing Pond and Ecological Landscape Compensation Area O;
  - Chainage 42+450.00 – Balancing Pond and Ecological Landscape Compensation Area P;
- Detail of balancing ponds would be designed to enhance landscape character and ecological potentials.
- Replacement planting for ecological purposes would be provided along the cutting. (see Section 1.)
- Trumpington Stop to be integrated into the local landscape with appropriate planting.

13.7.81 **Residual effects:** Slight adverse in the long term depending on the amount of vegetation removal. Slight beneficial with maturation of balancing ponds.

**Wooded Chiltern Edge Character Area** (See Figure 4, Appendix 1A, Figure 1c, Appendix 13A and Figure 3i, Appendix 13C)

**Landscape Impacts**

13.7.82 The agricultural land to the southeast of the route borders the tip of this character area, which
extends from the wooded Chiltern Hills to the southeast of Cambridge, through which the Addenbrooke’s link is proposed over the operational railway line. Since the proposed land take would involve the removal of agricultural land alongside an existing operational railway line, the sensitivity of this landscape is reduced.

13.7.83 Additional Landscape Impacts would be:

- The loss of arable land for the bridge and embankment for the crossing over the operational railway line and temporary construction sites, would cause severance to the existing agricultural landscape.

13.7.84 Predicted effects: Moderate adverse.

Mitigation Opportunities

- Hedge and screen planting would be provided to integrate bridge and embankments to reduce the prominence of the crossing.

13.7.85 Residual effects: Slight adverse in the long term.

Summary of the Key Landscape Impacts

13.7.86 A summary of the key landscape impacts are as follows:

- Loss of vegetation along the CGB corridor.
- Loss of trees protected by TPO’s.
- Loss of amenity tree planting and hedgerow along the B1514 at Huntingdon, resulting in a diminution in landscape character and landscape quality.
- Loss of hedge, trees and potential loss of row of poplars along A1123 at St Ives golf course and ‘The How’.
- Removal/ severance of traditional farming hedgerows at Swavesey and Longstanton
- Temporary stoppings up and diversions during construction of existing public rights of way which run in parallel with, and across the disused rail corridor.
- Temporary land take for construction sites.
- Change in character due to new structures being introduced into the landscape including overbridge, stops, at-grade crossings and park and ride sites.
- Introduction of balancing ponds.

Summary of the Landscape Mitigation Recommendations

13.7.87 A schedule of landscape mitigation proposals is included after the visual effects section. The mitigation locations that are identified may be located in Appendix 13E.

13.7.88 The following key recommendations for mitigation, based on the impacts identified and in line with the landscape design principles in Section 4 are as follows:

- Replace hedgerow and trees along B1514 at Huntingdon.
- Realign proposed footway/cycleway at golf course on Houghton Road to maintain row of mature poplars. Replace hedge and other planting lost. Replace
mature horse chestnut with appropriate large stock specimen trees and laurel hedge.

- Replacement planting in character with surrounding areas alongside the CGB route.
- Lakeside/marginal planting alongside the gravel extraction lakes to restore the nature conservation potential of this habitat area.
- Replace/create open waterside/trackside drains between the River Great Ouse and Swavesey.
- Sensitive layout and landscape schemes for park and ride sites and stops to maximise their integration into the setting environment.
- Landscape design of embankment approaches to new elevated structures to maximise integration into the setting environment.
- Combined landscape and ecological mitigation for new balancing ponds and existing water features.
- Combined landscape and ecological compensation areas along the route.
- Replacement of removed mature/semi-mature trees along the route, with large stock specimen trees.
- Protection of retained trees in identified areas during construction.
- Reinstate temporarily acquired agricultural land to previous condition post construction period.
- Detailed tree surveys to be undertaken at protected sites as required by the planning authority.
- The design of the Stops would follow the recommendations of the Visual Design Guidelines, which is the subject of discussion with the local authorities along the route.

Visual Assessment

General

13.7.89 Considering the length of the route as a whole, the number of visual receptors exposed to the Scheme is low. In part, this is due to the rural setting and a pattern of scattered settlements. Existing lineside vegetation also provides some screening to rural sections of the route. The greater visual impacts of the operational CGB are likely to result from the introduction of park and ride sites, new stops, lighting within residential areas, particularly within settlements and removal of vegetation.

13.7.90 Visual intrusion would also be caused by CGB buses on the guideway within countryside areas as well as where the route passes close to properties. Visual intrusion would be greater with ‘double-decker’ buses as these vehicles would be likely to be visible above hedgerows and other planting. The lit upper windows would also be likely to cause visual intrusion at night to properties located close to and facing the route. (See Appendix 13C.)

Lighting

13.7.91 Lighting which would have a visual effect would be provided as follows:
13.7.92 Any lighting added to a previously dark area could produce a sky glow and consequently, some adverse impact could be experienced.

**Key Receptors**

13.7.93 The following key receptors have been identified along the route:

- Residents
- Walkers/cyclists/equestrian
- Motorists
- Workers
- College/school students

13.7.94 The visual impacts have been assessed along the route. (Appendix 13B.)

**Landscape and Visual Section 1: Huntingdon to St.Ives**

**B1514 Hartford Road and Old Houghton Road** (See Figure 2a, Appendix 13B)

13.7.95 The proposed CGB buses will travel on existing roads between Hinchingbrooke Hospital and St Ives. It is considered that where the route passes on existing roads with existing bus and other heavy traffic and there would be no loss of vegetation the visual effect would be negligible. These areas include most of the route from Hinchingbrooke Hospital to St. Ives unless noted below.

**Potential Receptors: Residents on Hartford Road, facing onto the B1514**

13.7.96 Widening would occur on the northern side of Huntingdon Ring Road. Bus traffic would be brought slightly closer to the properties and visual intrusion would increase as one of the trees on the traffic island separating Hartford Road and Huntingdon Ring Road would be removed. These trees, which partially screening views would require their canopies to be raised and pruned to accommodate buses in the proposed bus lane.

13.7.97 **Predicted effects**: Slight adverse.

**Mitigation Opportunities**

13.7.98 Replacement tree planting with appropriate large stock specimen trees. Tree surgery to be undertaken by a specialist tree surgeon to ensure trees that have their crowns lifted and pruned retain there appropriate character.
13.7.99 Residual effect: Slight adverse.

Potential Receptors: Residents on the B1514 Hartford Road and users of the area

13.7.100 The character and quality of views would be adversely affected for residents and users as the character and quality of the roadside would be diminished. Of most importance are the residents who would use and view the space daily from their properties.

13.7.101 The removal of trees and hedgerow on the B1514 towards the ring road would diminish visual amenity of the road corridor and open up the road corridor for users of the open space to the south where the hedgerow is removed. Views that would be relatively more exposed are towards the River Great Ouse in the distance with the following features in the middle ground:

- the car park to the west;
- sailing club and car park;
- sports fields;
- length of open space grass areas adjacent and parallel to the B1514.

13.7.102 Predicted effects: Moderate adverse.

Mitigation Opportunities

13.7.103 Replacement tree and native hedge planting. Tree planting of large stock specimen trees.

13.7.104 Residual effect: Slight adverse decreasing over time.

Potential Receptors: Residents on Old Houghton Road and users of the road

13.7.105 The boundaries of the residential properties on the western side of Old Houghton Road are screened with mature trees, hedging and shrubs and views to the CGB vehicles should not cause more than slight disturbance. Views would become more open during the winter months. The effect is considered to be slight adverse.

13.7.106 It is apparent that Old Houghton Road is used by local people as an amenity walk to and from the marina off the River Great Ouse. The loss of visual amenity brought about by running buses periodically down this route is considered to be slight adverse.

13.7.107 The route is lined by significant hedgerow planting. The hedgerows would be unaffected by the proposals.

13.7.108 Predicted effects: Slight adverse.

Mitigation Opportunities

13.7.109 None proposed

13.7.110 Residual effects: Slight adverse.

Houghton Road the A1123: Hill Rise/St Ives Golf Club (See Figure 1a, Appendix 13A and Appendix 13B.)

13.7.111 Widening on the southern side of the A1123 alongside the St Ives golf course would have an
effect on residents on the northern side of the road and users of the area.

**Potential Receptors: Residents on the north side of the A1123 and users of the area**

13.7.112  The character and quality and amenity of views would be diminished for all the above-mentioned users as the character and quality of the golf course boundary would be diminished. There would be some loss of visual amenity for residents on the A1123 by the removal of a mature hedgerow and potentially a row of mature poplars located to the south of the hedge. The removal of the hedge would open up views to the highway corridor to golfers with an increase in visual intrusion caused by views of the road corridor and traffic.

13.7.113 **Predicted effects:** Moderate adverse.

*Mitigation Opportunities*

- Mitigation requires the replacement of the hedge and associated trees, replacement of the lost mature horse chestnut with a large stock specimen tree and replacement laurel hedgerow at ‘The How’.

- However, it appears that there may not be enough space to place a replacement hedge and footpath/cycleway and ditch along this boundary without affecting the poplar trees. A detail design study would be carried out to find a solution that retains the poplars and allows for the replacement hedge.

13.7.114 **Residual effect:** Slight adverse decreasing to negligible over time.

**Landscape and Visual Section 2: St Ives to Cambridge and Cambridge to Trumpington**

**St. Ives to District Boundary (Fen Drayton)** (See Figure 2b, Appendix 13B and Appendix 13C.)

13.7.115 Sources of visual impact:

- New signalised junction on the St. Ives Bypass;
- Minor junction improvements on A1096 with Meadow lane to park and ride

13.7.116 The removal of vegetation would open views to:

- St. Ives Park and Ride site and lighting;
- River Great Ouse crossing;
- Construction compounds and associated plant;
- Operational CGB buses.

**Potential Receptors: Residents/Shoppers - St. Ives**

13.7.117 At the far end of the route from St. Ives Station Road, shoppers may be exposed to partial views of the park and ride facility seen across the A1096 road. Depending upon the detailed design of lighting proposals for the park and ride site, these measures may add to night-time glow.

13.7.118 **Predicted effects:** Slight adverse

*Potential Receptors: - Users of public rights of way, Visitors to the Fen Drayton*
Nature Reserve

13.7.119 Public rights of way which would be exposed to views of the route include:

- the Ouse Valley Way, which crosses beneath the existing viaduct crossing and other footpaths, (see Figure 1, Appendix 4D);

13.7.120 The CGB route and vehicles would be more visible to views following the removal of lineside vegetation from sections of the existing route. Walkers would potentially be most significantly affected during construction operations of the park and ride facilities, as well as bridge and embankment works in association with the River Great Ouse crossing. However, most of the effects would be temporary.

13.7.121 **Predicted effect:** Moderate adverse.

**Potential Receptors:** - Residents of Wilderness Cottages

13.7.122 Residents of Wilderness Cottages would be receptors of both the proposed guideway and the park and ride facility at St. Ives.

13.7.123 The boundary vegetation currently surrounding these properties would be reinforced in order to reduce the visual impact of the park and ride development. The visual impacts of constructing both the park and ride as well as the CGB route would have a moderate to major impact upon these residents.

13.7.124 Lighting at the park and ride site would increase night-time visual intrusion. Lighting columns would be visible during the daytime as well.

13.7.125 **Predicted effect:** Major to moderate adverse

**Potential Receptors:** - Local Industry, Meadow Lane

13.7.126 The visual impacts of the CGB Scheme during construction and operation would be negligible above the impacts of the existing operations.

13.7.127 Predicted effect: Negligible

**Potential Receptors:** - Farmers

13.7.128 The floodplain of the River Great Ouse is primarily grazed to the north of the existing tracks, with some small intermittent arable fields to the south. The visual exposure of the tracks, even with the removal of lineside vegetation, to occasional farm workers is considered to be low.

13.7.129 **Predicted effect:** Slight adverse to negligible.

**Potential Receptors:** - Motorists

13.7.130 Drivers along the A1096 would have views of the CGB development at the St. Ives end of the route, which include minor junction improvement works with Meadow Lane and construction of both CGB and the St. Ives Park and Ride. However the transient exposure time of these receptors, means these impacts would be negligible.

13.7.131 Predicted effect: Negligible.
Mitigation Opportunities

13.7.132 The following mitigation measures are proposed:

- Landscape screen planting at the boundary of residential properties to mitigate the visual impact of the proposals.
- A lighting strategy to minimise the potential impact of night time glare and intrusion from lighting of the park and ride facility.
- Boundary planting around the whole site would need to be designed in order to visually integrate this facility into the wider St. Ives setting, whilst retaining a visible connection with St. Ives.
- Screening of the construction compound on the St Ives Park and Ride site to mitigate the visual effects of construction activities on the site.

13.7.133 Residual Effects: Slight to moderate adverse.

District Boundary (Fen Drayton) to Longstanton (See Appendix 13B and Appendix 13C.)

13.7.134 Sources of visual impact:

- CGB buses;
- At-grade crossings and stops;
- Removal of lineside vegetation;
- Balancing pond;
- Construction Compound and plant south west of Windmill Bridge.

Potential receptors: - Walkers/ Cyclists/Equestrians

13.7.135 Public rights of way which would be exposed to views of the route include:

- the public rights of way to the west and east of Swavesey would be exposed to the CGB route at the existing crossings, with the removal of lineside vegetation.
- the footpath/bridleway between Fen Drayton and the Nature Reserve;
- footpaths associated with the Nature Reserve connecting with the right of way along the disused rail corridor to Holywell Ferry Road. Overall the temporary exposure of the Scheme to these receptors would have a slight adverse visual effect.

13.7.136 The Nature Reserve Request Stop may be considered by some visitors to be an intrusive element in the landscape. However, others would view the Stop as being positive as it would allow visitors to access the nature reserve by public transport.

13.7.137 Predicted effect: Slight adverse.

Potential Receptors: - Recreational Users of the Lakes

13.7.138 Anglers and windsurfers using the lakes in the area would be able to get open and partial views of the CGB route and vehicles. However, the low frequency of these occasional receptors makes the residual impact upon this group low.
Anglers using the lakes in the area would be able to get open and partial views of the CGB route and vehicles.

**Predicted effect:** Slight/moderate adverse.

**Potential receptors:** - Motorists

Motorists travelling on Station Road, Swavesey and the B1050 at Longstanton, would be subject to traffic control measures at at-grade crossings with the CGB route. The temporary exposure of motorists to the CGB buses and traffic control measures in conjunction with the roadside stops at Swavesey and Longstanton, would have a low impact on passing motorists in the long-term. During construction, this impact would be increased.

**Predicted effect:** Negligible.

**Potential receptors:** - St. Andrews Church and Vicarage

Residents and visitors to St. Andrews Church and Vicarage at Swavesey, shown at the most northern end of Swavesey, adjacent to the Benedictine Priory on the western side of the track would be exposed to the passing of the CGB vehicles along exposed boundaries of the historical setting. The proposed location of the stop at Swavesey would have additional visual effect upon local residents and visitors to the historic Benedictine Priory site, which, without mitigation, would be moderate to major.

**Potential receptors:** - Residents of properties immediately north west of the junction on Station Road, Swavesey

The proposed Kiss and Ride facility would increase traffic and thus visual intrusion for residents at the houses along Over Road and especially those immediately opposite the proposed Kiss and Ride site. In this location, Over Road is already supplied with street lighting but the extent of this is likely to increase. The effect is likely to be slight. However, at night the headlights of turning vehicles would affect the properties facing the proposed Kiss and Ride facility.

**Predicted effect:** Moderate to major adverse.

**Potential receptors:** - MG Owners Club, Swavesey (See Figure 3b, Appendix 13C for location)

The Scheme, including the stop and the kiss and ride, on the visual amenity of the MG Owners Club would not result in any significant adverse impacts.

**Predicted effect:** Negligible.

**Potential receptors:** - Warehouses Longstanton, B1050

Workers at both warehouses to the south west of the crossing are receptors that would incur negligible visual impact from the operation of the CGB Scheme.

**Predicted effect:** Negligible.

**Potential receptors:** - Farmers

The section of the farmed landscape between Swavesey and Longstanton would have increased exposure to the existing alignment from the removal of vegetation along the CGB route.
route, which could potentially impact upon farm workers. However the occasional and temporary nature of these potential receptors is likely to make the significance of visual impacts upon farm workers negligible.

13.7.151 Predicted effect: Negligible.

**Mitigation Opportunities**

13.7.152 The following mitigation measures are proposed:

- The materials used in the Nature Reserve Request Stop should be specified to help integrate the stop into its location. The stop would be designed according to the Visual Design Guidelines, which is subject to discussion with the local authorities.
- Replacement planting of removed bankside vegetation to reduce the impact on the recreational users of the Fen Drayton lakes site and Nature Reserve.
- Sensitive landscape planting around the Benedictine Priory to protect its historical setting.
- Screen and integrate the Kiss & Ride facility with planting.
- Screening and integration of the Swavesey Stop with planting.

13.7.153 **Residual effect:** Moderate adverse at historical sites. Moderate adverse for the Kiss & Ride facility. Slight to Negligible elsewhere.

**Section round Longstanton** (See Appendix 13B and Appendix 13C.)

13.7.154 Sources of visual impact:

- Removal of lineside vegetation;
- Road at-grade crossing;
- Longstanton Park and Ride and stop and lighting;
- Operational CGB buses.

**Potential Receptors: - All Byway Users**

13.7.155 Users of Byway 4 Rampton and Byway 7 Longstanton would be greatly exposed to the CGB Scheme following the removal of lineside vegetation. The low exposure time of these receptors would make the impacts low.

13.7.156 **Predicted effect:** Slight adverse.

**Potential receptors: - Farmers**

13.7.157 Workers on the mainly agricultural land around Longstanton, would be exposed to the operational CGB vehicles, as well as Longstanton Park and Ride, with the lineside vegetation removed. However, the significance of these impacts is greatly reduced by the infrequent exposure of this receptor group to the route.

13.7.158 **Predicted effect:** Slight adverse to negligible.

**Potential receptors:** - Residents of Orchard Cottage, Gresley House, The Mount
(commercial), Railway Cottages and Farmsteads

13.7.159 Orchard Cottage, to the southeast of the current junction of the disused rail corridor with the B1050, would be exposed to both the Scheme, from which the lineside vegetation is to be removed, as well as the adjacent proposed park and ride site at Longstanton. Occupants of Gresley House, immediately to the south of the route, would also be directly exposed to the CGB vehicles. To the north of the route, residents of the Railway Cottages would be directly exposed to the operational track, with medium effect, as well as the effect of queuing traffic associated with the at-grade crossings. Lighting would also have a negative visual effect. Farmsteads on raised ground to the southeast of Over, with current middle distant views of the disused rail corridor have a low degree of visual impact from the Scheme.

13.7.160 **Predicted effect:** Moderate to major adverse.

**Potential receptors:** - Southwell, Kaybee(Stanton House)

13.7.161 The effect of location of a large roundabout and access route into the park and ride facility is considered to be significant for the two properties, Southwell and Kay-bee on the western side of the B1050. This would be brought about by an increase in visual intrusion caused by an increase in traffic as well as lighting and signage.

13.7.162 **Predicted effect:** Major adverse.

**Potential receptors:** - Motorists

13.7.163 Motorists passing along Station Road (B1050), in Longstanton would be temporarily exposed to the CGB Scheme and traffic control measures at the at-grade crossing, as well as new access to the Park and Ride facility. However, the temporary exposure of this receptor group to the Scheme, would limit this to a slight effect.

13.7.164 **Predicted effect:** Slight/Negligible.

**Potential receptors:** - Golfers

13.7.165 Players at the golf course at Longstanton would be exposed to the CGB Scheme and medium views of the park and ride facility. However, the occasional exposure of this receptor group to the Scheme would reduce the significance of the potential visual impact upon this receptor group to slight.

13.7.166 Predicted effect: Slight adverse.

**Mitigation Opportunities**

13.7.167 The following mitigation is proposed:

- Screen planting along the boundaries of lineside properties
- Screen planting around properties adjacent to Longstanton Park and Ride.
- Screen planting for residential properties at and adjoining the entrance to the park and ride site.
- Lighting to be designed to create as little intrusion as possible.

13.7.168 **Residual effect:** Slight/moderate adverse for properties on B1050. Slight adverse to negligible for other issues.
Longstanton To A14 (T) (See Appendix 13B and Appendix 13C.)

13.7.169 Sources of visual impact:
- CGB buses;
- Removal of mature/semi-mature lineside and additional vegetation;
- Proposed Balancing Ponds;
- Oakington Stop;
- Histon & Impington Stop.

Potential receptors: - Lineside Residents, Westwick

13.7.170 To the north west of Station Road at-grade crossing at Westwick, residents of the lineside property would have views to the CGB route, as well as the additional impacts from exposure to lighting of the junction, the stop and construction operations at this at-grade crossing. The adjacent cottages on the western side of the road would be affected but to a lesser extent. Street lighting may be deemed by residents to be an intrusion but may also be seen to be a positive feature providing improved safety and security for the residents, their properties and visitors.

13.7.171 Predicted effect: Moderate adverse.

Receptors: - Westwick Hall

13.7.172 The removal of lineside vegetation would expose the residents of Westwick Hall to the north of the corridor, to filtered views of the Scheme.

13.7.173 Predicted effect: Moderate adverse.

Receptors: - Walkers

13.7.174 Users of the public footpath passing through the grounds of Westwick Hall and through agricultural land to the north of the CGB route would be exposed to the operational vehicles for the majority of this link through open arable land. The transient exposure of these sensitive receptors would have a slight effect.

13.7.175 Local residents and walkers utilising the network of public rights of way to the south west of Histon, would be exposed to the Scheme. The footpath along the southern edge of the CGB route would be most affected by the adjacent guideway and buses moving past. (See Appendix 4D.)

13.7.176 Predicted effect: Slight adverse to moderate adverse.

Receptors: - Oakington Residences

13.7.177 Residents of properties to the north of Oakington Village, that face northeast towards the existing disused rail corridor, would be exposed to medium views of the CGB Scheme, once lineside vegetation is removed. Otherwise, the properties in Oakington are generally screened from visual exposure to the alignment by mature vegetation surrounding the village.

13.7.178 Predicted effect: Slight adverse.
Receptors: - Histon Residences

13.7.179 Residents to the south of Pease Way, Melvin Way, St. Audreys Close and Manor Park, all face onto the existing disused rail corridor through Histon, with views out into the open countryside beyond. The southernmost of these residents would be directly exposed to the Scheme, particularly following the removal of existing lineside vegetation. The degree of impact upon the residents of these properties would depend on the amount of vegetation removed. The proximity to the CGB route to residential receptors is likely in most cases to produce a moderate to major effect.

13.7.180 **Predicted effect:** Moderate to major adverse.

Receptors: - Impington Residences

13.7.181 Residents of Pepys Terrace, Villa Road and Villa Place, Impington back onto the southern side of the CGB route. The removal of existing scrubby lineside vegetation from the existing rail corridor would directly expose these residents to the CGB Scheme. The properties of Villa Place would additionally be affected by the construction of a stop at Histon and Impington at the Station Road crossing.

13.7.182 **Predicted effect:** Moderate to major adverse.

Receptors: - Swallow Hotel

13.7.183 Visitors to the Swallow Hotel to the south of the Scheme, east of Histon and Impington would be exposed to middle distance views of the Scheme across agricultural land. However, this impact would be minimised by the temporary exposure of this receptor group.

13.7.184 Predicted effect: Negligible.

Receptors: - Line-side Commercial/ Warehouses Histon

13.7.185 Workers in the large commercial and warehouse units that flank the existing narrow disused rail corridor through Histon, would not be significantly affected by the CGB route proposals due to the limited views out onto the alignment from these buildings.

13.7.186 Predicted effect: Negligible.

Receptors: - Users of Community Woodland

13.7.187 There would be a slight physical reduction in this recreational space caused by the route along the edge of the immature community woodland. Views to the route and vehicles would occur for users of this public open space, who are mainly residents of the residential areas to the north. Existing views out into the open countryside would also be slightly diminished by the Scheme.

13.7.188 **Predicted effect:** Slight adverse.

Receptors: - Motorists

13.7.189 Passing motorists using New Road –Park Lane, Station Road, Bridge Road, and the elevated A14(T), may be temporarily exposed to the Scheme. The at-grade crossing and stops at Station Road, Histon, are additional sources of visual impact to motorists. The temporary exposure of these receptors would reduce the potential effects of these impacts upon this user group.
13.7.190 Predicted effect: Negligible.

Mitigation Opportunities

- Screen and integrate CGB stops.
- Environmental barriers are proposed to mitigate noise to properties on Pease Way, Melvin Way and St Audreys Close. Further barriers are proposed at Villa Road and Villa Place. It is intended that these barriers are integrated with appropriate planting. Apart from the acoustic mitigation, the barriers would also mitigate views to the Scheme.

13.7.191 Residual effect: Slight/Moderate adverse.

A14 (T) To Milton Road, Chesterton Sidings and Arbury Park (See Appendix 13B and Appendix 13C.)

13.7.192 Sources of impact:

- Removal of lineside vegetation;
- CGB vehicles;
- CGB stops at Arbury Park, Arbury Park North, Regional College and the Cambridge Science Park;
- Arbury Park guideway;
- At-grade crossings; and
- Histon Road/King’s Hedges Road and Milton Road junctions.

Receptors - Regional College Students/ Cambridge Science Park Workers

13.7.193 Students and workers at Cambridge Regional College and the Cambridge Science Park which currently access the institution from King’s Hedges Road, would be subjected to views of the Scheme both in getting to the site, and from within the grounds. The visual exposure of the Scheme to these receptors would result in an improvement to the visual appearance of the currently unmanaged alignment. The positive benefit that the two stops locations would offer to both the Science Park and the Regional College, the visual impact of the proposals overall upon this working user group would contribute positively to the overall image of both facilities, and result in a positive visual effect.

13.7.194 Predicted effect: Negligible to slight/moderate beneficial.

Receptors: - Residents King’s Hedges Road

13.7.195 Residents in housing to the south of the disused railway between the A14 (T) and Milton Road crossing and along King’s Hedges Road would be directly exposed to the Scheme, which is to pass alongside the rear gardens of residential properties.

13.7.196 Predicted effect: Moderate to major adverse.

Receptors: - Motorists

13.7.197 Motorists using both the arterial King’s Hedges Road, and branches of the residential cul-d-sacs, and the A14 (T) and the Histon Road junction would have views of the Scheme. However, the impact of this exposure, considered against the developing context of this
fringe area to the north of Cambridge City would be low to negligible.

13.7.198 Motorists using Milton Road would be visual receptors to the CGB traffic controlled junction. The visual impact of this additional junction upon the existing arterial Milton Road would have a low to negligible effect on road users.

13.7.199 Predicted effect: Negligible

Receptors: - Industrial/ Warehouse Workers

13.7.200 Workers occupying the warehouse units to the south of the existing disused track, would have negligible exposure to the operational CGB Scheme as well as the Milton Road junction, due to limited views from these premises.

13.7.201 Open and partial views to the guideway would be apparent from yards and car parking areas north and south of the tracks at Chesterton Sidings.


Mitigation Opportunities

13.7.203 The following mitigation is proposed:

- Screen planting of residential properties directly backing onto the CGB route
- Screen and integrate stops.

13.7.204 Residual effect: Negligible/slight adverse.

Cambridge Railway Station To Trumpington  (See Figure 2d, Appendix 13B and Figure 3h to 3i, Appendix 13C.)

13.7.205 Sources of impact:

- Construction compounds;
- Balancing ponds;
- CGB stops at Cambridge Railway Station and Trumpington;
- Lineside vegetation removal;
- CGB buses.

Receptors: - Cambridge Station Visitors and Workers

13.7.206 Visitors and workers at Cambridge Railway Station would be exposed to the Scheme as it transfers from on-street to guideway. The visual impact of this additional public transport service through this transport interchange environment would be negligible. Similarly, workers in the industrial and office premises in the Railway Station area would be unaffected by exposure to the Scheme alongside existing rail services.

13.7.207 Predicted effect: Negligible.

Receptors: - Cambridge University Press (CUP)

13.7.208 Workers and visitors at the Cambridge University Press buildings to the west of the alignment would be exposed to the Scheme alongside the site boundary of the CUP complex.
The visual impact of the operational line to these workers is significantly reduced by the proximity of the CGB route to the existing London Rail link, which currently runs alongside the disused rail corridor. The overall impact upon this receptor group would therefore be slight to negligible.

13.7.209 **Predicted effect:** Slight adverse to negligible.

**Receptors:** - Residents – Trumpington

13.7.210 Residents to the southeast of Trumpington would be partially exposed to the Scheme. Properties along Foster Road would have partial middle distance views of the Scheme over open fields.

13.7.211 Those properties that flank either side of the existing disused rail corridor in the cutting through Trumpington would be subjected to partial obscured views only of the CGB buses, which would run at the foot of their gardens. The effect of these proposals upon residents would depend upon the degree of the removal of vegetation from the bankside.

13.7.212 Properties along Shelford Road, Trumpington would be partially exposed to the temporary construction compound to the south of the CGB corridor. The same properties would also be exposed to the proposed stops on either side of the tracks at Trumpington.

13.7.213 **Predicted effect:** Slight to moderate adverse.

**Receptors:** - Walkers

13.7.214 Walkers along footpaths, to the west of the CGB route would be exposed to the Scheme, across open arable fields. The significance of this visual impact is considered negligible for the temporary exposure of these receptors. Walkers using the footpath between Trumpington and Addenbrooke’s would be exposed to the length of the CGB route from the south of Long Road to Trumpington. This temporary exposure would have a slight to moderate effect upon this receptor group, which would be temporarily increased during construction.

13.7.215 **Predicted effect:** Slight to moderate adverse (temporary).

**Receptors:** - Farmers

13.7.216 Farm workers on the agricultural land extending between Trumpington and Addenbrooke’s would be temporarily exposed to the Scheme. The infrequent and temporary exposure to this receptor group would yield a negligible impact upon this receptor group.

13.7.217 Predicted effect: Negligible.

**Receptors:** - Addenbrooke’s Hospital Patients, Visitors and Staff

13.7.218 The Addenbrooke’s group of receptors would be exposed to medium to long distance glimpsed views of the operational CGB through boundary vegetation and over agricultural fields. The exposure to these receptors would be negligible above the effects of the existing operational railway line in the more immediate foreground view.

13.7.219 Predicted effect: Negligible.

**Receptors:** - Sports Grounds Players

13.7.220 Players using the several sports grounds, which border the CGB route between Cambridge
Station and Trumpington, would be exposed to partial views of the Scheme for limited periods of time through boundary screening vegetation surrounding most of the grounds. The overall impact upon this receptor group would be low to negligible.

13.7.221 **Predicted effect:** Slight adverse to negligible.

**Receptors:** - Motorists

13.7.222 Drivers along Long Road, may incur glimpsed views of the construction compound to the south west of the railway bridge through roadside trees, during the works alongside the rail line. The temporary impact upon these receptors however would be negligible.

13.7.223 **Predicted effect:** Negligible.

**Mitigation Opportunities**

13.7.224 The mitigation proposals are as follows:

- Screen and integrate Trumpington Stop;
- Reinstatement of planting along guideway route.
- Property boundary screening in Trumpington cutting.

13.7.225 **Residual effects:** Negligible.

**Link To Addenbrooke’s Hospital** (Appendix 13B and Appendix 13C.)

13.7.226 **Sources of impact are:**

- New bridge;
- Construction sites;
- Addenbrooke’s link;
- CGB buses.

**Receptors:** - Addenbrooke’s Hospital Patients, Visitors and Staff

13.7.227 Addenbrooke’s Hospital patients, visitors and staff would be exposed to medium views of the CGB route from Cambridge to Trumpington, mainly due to the prominence of the bridge crossing of the current operational railway line. This would have a slight adverse impact during construction reducing to negligible during operation.

13.7.228 **Predicted effect:** Slight adverse to negligible.

**Receptors:** - Walkers

13.7.229 The public footpath would be subject to a temporary diversion during construction. The path would be reinstated along the maintenance track over the main railway line. Users would be directly exposed to the guideway route and the CGB buses.

13.7.230 **Predicted effect:** Moderate adverse. Major adverse when vehicles pass by.

**Receptors:** - Rail passengers

13.7.231 The impact of the Scheme upon existing rail passengers may be discounted as nil due to the
relative speed and temporary nature of the exposure on the approach to Cambridge City.

13.7.232 Predicted effect: Negligible.

Receptors: - Farmers

13.7.233 Farm workers operating in the arable fields through which the Addenbrooke’s link is to pass would be temporarily exposed to the line and bridge. Construction operations in the short term may increase the visual impact of the proposals upon this receptor group.

13.7.234 Predicted effect: Negligible.

Receptors: - Trumpington Residents

13.7.235 Residents of housing to the west of Trumpington village, whilst not significantly affected by middle distance views of the Addenbrooke’s Link, would be affected to a greater extent, by exposure to the construction operations for the bridge with a low impact. Residents on Shelford Road are likely to have views of the construction site beyond their property boundaries.

13.7.236 Predicted effect: Slight adverse (temporary).

Mitigation Opportunities

- Screen planting of the guideway and the approach embankments to the bridge to reduce visual impact upon receptors and walkers in particular.

13.7.237 Residual effects: Negligible.

Summary of Significant Visual Impacts

13.7.238 Key visual impacts of the Scheme are:

- Loss of visual amenity caused by loss of trees along southern edge of B1514.
- Loss of hedge and trees on A1123 at the St. Ives golf course.
- St. Ives Park and Ride affecting immediate views from adjacent residences and medium views from St. Ives, and with potential night time light pollution.
- Loss of lakeside vegetation affecting views from St. Ives and adjacent residents.
- Views of the guideway and buses by users of public rights of way.
- Views from Benedictine Priory to the Scheme along the boundary of the Priory grounds.
- Views of Longstanton Park and Ride and associated access.
- Direct views of the Scheme from lineside residences.
- Views by Histon and Impington residences, which back onto the CGB corridor.
- Views from properties immediately backing onto the CGB corridor off King’s Hedges Road.
- Views of the Trumpington and Addenbrooke’s link.
- Change in views for residents at Trumpington cutting through the loss of vegetation.
- Views of the Scheme and buses by walkers at the Addenbrooke’s link.
- Views of the Scheme by users of areas surrounding the Scheme.

**Summary of Visual Mitigation Recommendations**

**13.7.239** The following recommendations for mitigation, based on the impacts identified form the basis for a route wide mitigation strategy:

- Design pedestrian cycle/footpath at A1123, St Ives golf course, layout to retain trees, replant hedge to retain visual amenity.
- Visual connection to be created between St. Ives High Street and Park and Ride over A1096 road, to project positive image of the Scheme to St. Ives residents.
- Sensitive layout and boundary screen planting around Park and Ride sites, including access roads and low-key lighting strategy.
- Replacement planting of removed vegetation blocks.
- Screen boundary planting for exposed lineside properties.
- Integrate new structures into setting environment, such as Addenbrooke’s bridge, CGB stops and road junctions with new planting.

**Mitigation of Lighting Effects**

**13.7.240** In order to minimise light pollution, the lighting strategy should comply with Cambridgeshire County Council’s policies and the guidance notes produced by the Chartered Institute Of Building Services Engineers (CIBSE) and The Institution of Lighting Engineers (ILE) and some or all of the following criteria:

- All street lanterns would be full cut-off and preferably with flat glass. Where indirect type lighting columns are used, care should be taken to select luminaires where there is no upward spill light.
- All lanterns around the perimeter of stops, maintenance and construction sites should be positioned so that they face into the site.
- Columns would be kept as low as practically possible to prevent views of the lanterns from surrounding areas.
- Where required, shields and anti glare screens would be used.
- Where possible luminaires should not be located on the ground but would be situated so that the majority of the light is directed downward.
- Light sources selected should be low wattage as far as practically possible.
- Controls would be included so that some non-essential lighting is switched off at pre-selected times, while the street lighting and security lighting should be designed to switch to a lower at-grade during the appropriate hours. This could be done by switching each luminaire/lantern so that uniformity of distribution could be maintained.

**13.7.241** A detailed assessment of the issue should be made at detail design stage, when a full external lighting strategy should be developed to address all the relevant criteria.
Landscape and Visual Section 3: Cambridge City

Landscape/Townscape and Visual Assessment: City Centre Unguided Scheme

13.7.242 The following section identifies the potential impacts and the potential mitigation for the Cambridge City centre section. Due to the interactive nature of townscape character and visual factors both townscape and visual impacts are assessed together.

13.7.243 The streets and roads have been characterised according to various townscape character areas as noted below and as shown on Figure 1c, Appendix 13A.

- Traditional tree-lined residential street;
- On-street mixed retail and domestic properties;
- Central historic college streetscape;
- Contemporary office and residential block development;
- Suburban residential fringe development;
- Railway station and associated industrial.

13.7.244 Much of the route passes through the historic areas of Cambridge, which is designated and protected as a conservation areas. (See Figure 3, Appendix 6A).

The Scheme

13.7.245 CGB buses are run unguided on-street through the city of Cambridge from the north fringe of Cambridge along Histon and Milton Roads, through to Station Road, where the route becomes guided once more south of Cambridge Railway Station.

13.7.246 By utilising existing highways through the City Centre, the construction implications of the Scheme in this area are limited. The major sources of change to the City Centre involve the following modifications to the public highway:

- Road widening/ pavement reduction.
- New CGB stops.

13.7.247 A small number of existing trees within and beyond the highway boundaries, however would be affected.

13.7.248 The potential landscape and visual impacts upon the street/townscape of Cambridge is therefore limited, particularly in the historical City Centre.

13.7.249 The City Centre works have been assessed in three separate sections as follows:

Histon Road Corridor

Histon Road: (Suburban residential) (See Appendix 13A and Appendix 13B)

- The existing carriageway between Blackhall Road and King’s Hedges Road, is to be significantly widened along all of the east and part of the west kerb of Histon Road to accommodate CGB vehicles in dedicated lanes. Substantial hedgerows currently flank both verges, primarily composed of hawthorn, (Crataegus monogyna), and blackthorn, (Prunus spinosa). A band of semi-mature mixed native trees merge into the hedgerow along the eastern kerb,
separating the road from the allotment gardens to the east. Whilst the allotment plots themselves would not be affected by the carriageway widening, the removal of this boundary and planting would increase exposure of the allotment users to the highway corridor. New boundary vegetation of a similar composition to the original hedgerow belt would need to be planted as landscape mitigation for this impact, whilst minimising land take from the allotment gardens. Where space is limited, timber fencing may be required to help screen views. Climbers on the fencing would help integrate the timber fencing.

13.7.250 **Predicted effect:** Slight adverse.

**Castle Hill:** (Contemporary office and residential block development – within Conservation Area) *(See Appendix 13A and Appendix 13B)*

- CGB stops to be located on both sides of Castle Hill outside Shire Hall would not adversely impact upon the streetscape of this area in which there is much contemporary development and already existing bus stops.

13.7.251 **Predicted effect:** Negligible.

**Kings Hedges Road:** (Suburban residential)

- A bus only lane is proposed opposite the right-hand junction entrance into King’s Hedges Road from Histon Road. This would cut through the foot of an existing farm meadow to the disused Cambridge Road link. This new link would have minimum landscape and visual impact, with receptors limited to road users. This is an area of disturbed land dominated by highway junctions.

- The boundary of the allotment site on the south eastern corner of Kings Hedges Road and Histon Road would have vegetation removed with carriageway widening on the south side King’s Hedges Road. However, the removal of a short section of hedgerow would have a minor impact upon the allotments. Replacement boundary vegetation would be required as mitigation.

13.7.252 **Predicted effect:** Slight adverse.

**Mitigation Opportunities**

13.7.253 Replacement of hedgerows and screen planting of allotment.

13.7.254 **Residual Impacts:** Slight adverse to negligible.

**Milton Road Corridor** *(See Appendix 13A and Appendix 13B)*

**Milton Road:** (Suburban residential fringe development)

- CGB buses pass from guideway onto the existing road network at the south eastern corner of the Cambridge Science Park as it meets Milton Road. This junction arrangement would require the removal of part of a hedgerow and a semi mature London plane tree.

- Widening would also be required immediately to the south on Milton Road within the grass verge adjacent to Vindis VW Garage. This verge includes a row of immature standard trees.

13.7.255 **Predicted effect:** Slight adverse.
Mitigation Opportunities

13.7.256 Replacement of lost trees with large stock specimens.

13.7.257 **Residual Impact:** Slight adverse effect, reduced to negligible in the long-term.

**Cambridge City Centre (See Appendix 13A and Appendix 13B)**

St. Andrews Street: (Central Historic College Streetscape – within Conservation Area)
- Minor carriageway widening, alongside the eastern kerb of St. Andrews Street on the corner with Emmanuel Street would not have any perceptible adverse landscape or visual impacts.
- A CGB stop within an existing loading bay on the semi-pedestrianised retail section of St. Andrews Street would not cause any adverse impacts upon the existing streetscape. The mixed frontage of contemporary shopping units and modified historic retail frontages is able to accommodate some change.

13.7.258 **Predicted effect:** Negligible.

Drummer Street: (Central Historic College Streetscape – within Conservation Area) *(See Appendix 13A and Appendix 13B)*
- The modification to the boundary of Christ’s Pieces would not have a significant impact upon the existing streetscape and the setting, sense of place *genius loci* of the public park and streetscape unless the mature trees within the park are affected. These trees, which are located within the park boundary are protected by TPO and are located within a conservation area. The removal and replacement of the railings themselves should not have a significant effect provided that the original style of park railings are retained along the new boundary. However, it must be stated that the area is robustly protected by policies, which protect the open space areas of the city. It is assumed that construction methods would take account the importance of the trees and they would remain in place.
- The CGB stop on the southern kerb of Drummer Street corner with Emmanuel Street would not have any adverse impact upon the existing streetscape of Drummer Street, which is already dominated by buses and stops. The new CGB stops should readily be integrated into the visual character of the area. Slight beneficial effects may occur if the stops are generally upgraded according to the Visual Design Guidelines.

13.7.259 **Predicted effect:** Slight adverse. (Major/Severe adverse if trees in Christ’s Pieces are affected and if replacement railings are not in keeping with the historical setting.)

**Mitigation Opportunities**

13.7.260 Provide traditional style park railings along new boundary.

13.7.261 **Residual Impact:** Slight adverse.

**Summary of City Centre Landscape and Visual Impacts**

13.7.262 The Scheme in the city centre would have a limited townscape and visual impact upon the
overall Cambridge City environment and its conservation areas. This is in accord with the assessment of Built Heritage. (Refer to the Built Heritage section, Section 10). This is because most of the routes and areas are already affected by bus and other traffic and street furniture.

13.7.263  Summary of the Predicted Effects: Slight adverse.

Summary of City Centre Mitigation Proposals

13.7.264  Mitigation proposals should include:

- Replacement of the allotment boundary hedgerow along Histon Road boundary hedgerow to screen road corridor and traffic from allotments.
- Where possible, replacement of street trees lost to carriageway widening along Milton Road.

Overall City Centre Residual Effects

13.7.265  Summary of the Residual Effects: Slight adverse to negligible

13.8  Mitigation

13.8.1  The issues of landscape and ecology are closely linked and thus the landscape and ecological mitigation proposals have been coordinated to provide the most appropriate design/mitigation measures for the Scheme. The landscape and ecological mitigation proposals are illustrated in Appendix 13E. The proposals have been formulated in consultation with the ‘Landscape Design Task Group’, with officers from all the local authorities through which the Scheme runs.

13.8.2  The Scheme aims to respond to the changing environment along the route adapting to local surroundings by taking account of local authority landscape assessments, the Cambridgeshire Landscape Guidelines and Local Biodiversity Action Plans. Detailed measures, including site-specific particulars, management programmes and maintenance works would be matters for future consultation with the local planning authorities.

13.8.3  Landscape and ecological principles would be achieved through mitigation proposals. (See Section 4). These proposals reflect and enhance the range of landscape characters and habitats along the route through:

- The use of appropriate native species planting to enhance biodiversity;
- Relocating or recreating important habitats (Where translocation measures are proposed appropriate procedures would be followed and agreed with relevant organisations);
- Ensuring sufficient land take along the guideway corridor for planting purposes;
- Reflecting local character in replacement planting;
- Maximising the use of water retaining bodies as both landscape and ecological features;
- Allowing for natural regeneration at certain locations.

13.8.4  Staking for advanced nursery stock planting and protection in certain areas against trampling would be required.
13.8.5 Depending on the type of planting to be undertaken different soiling regimes are required. Where suitable, topsoil removed during stripping of site areas would be stored and could be used. In other areas the use of imported topsoil would be restricted to avoid introduction of seeds and maximise natural recolonisation. Special treatments for planting and soil profiling would be required at balancing ponds to incorporate marginal and aquatic plants.

13.8.6 The mitigation proposals have considered the reflection, protection and enhancement of areas with different landscape characters and habitat. Where vegetation would be lost, consideration has been given to replacing the type and character of this vegetation as well enhancing visual diversity along the route.

13.8.7 Landscape mitigation measures have also taken account of the following principles:

- Where property boundary screening is required the preference is for vegetative solutions or fencing softened by vegetation.
- Where properties require noise mitigation, timber acoustic fencing would be used with planting on either side.
- Replacement vegetation would use a range of nursery stock and other plant sources. Where visually important large trees would be lost, these would be replaced with large specimen nursery stock. Marginal aquatic planting and damp grassland planting would use translocated stock as far as possible.
- Drainage ditches that are affected would be replaced or relocated and reprofiled to promote biodiversity. Translocated stock would be used as far as possible.
- In some areas natural regeneration would be encouraged.
- Balancing ponds to be designed as landscape and ecological features.
- Landscape and ecological interpretation to be provided at appropriate stop locations.
- Provision of an appropriate ecological management plan for the Scheme.

13.8.8 A set of landscape and ecological objectives have been established in order to mitigate the effects and to help integrate the proposals into the landscape as well as enhance landscape and ecological character and quality. (See Appendix 13E).

Overall Proposed Landscape and Visual Mitigation Measures

13.8.9 A list of landscape and ecological mitigation measures are indicated on the ‘Landscape and Ecological mitigation Plans located in Appendix 13E. The main mitigation measures are listed sequentially below and the locations are identified relative to figure numbers and approximate chainages, which are marked on the plans.

Landscape and Visual Section 1: Huntingdon to St Ives

13.8.10 Replacement tree and tree surgery along the B1514 Huntingdon Ring Road at Huntingdon.

13.8.11 Replacement tree and hedge planting alongside the B1514 Hartford Road at Huntingdon.

13.8.12 Creation/reinstatement of appropriate footway and cycleway along Old Houghton Road, Hartford for local residents.

13.8.13 At Houghton Hill, Houghton Hill Farm on the northern side of the A1123, replacement drainage ditch with profile that would accommodate suitable planting for visual and
Replacement hedge along A1123 at the St. Ives golf course and replacement of any lost trees and hedge at ‘The How’.

**Landscape and Visual Section 2: St Ives to Cambridge North**

13.8.15 St Ives Park and Ride - reprofiling lakesides, similar to existing. Acquisition of land to replace lost grassland, native hedge and two pond ‘ditches’ of local value. Proposals include screen and integration planting to mitigate views from properties and to integrate the Scheme into the local landscape, species rich grassland and large areas of aquatic planting. (Chainages 1+000.00 to 1+900.00)

13.8.16 River Great Ouse Crossing - Replanting of temporary acquired land to maintain and enhance quality and character of the Ouse corridor with aquatic planting and additional native tree feature and screen planting. (Chainage 2+050.00)

13.8.17 General replacement of ditches to replace those lost on both sides. Reprofiled and replant for birds e.g. kingfisher. (See for example Figure 04, Chainage 3+100.00 – 3+290.00). Outfall areas to lakes generally integrated into the landscape with aquatic planting and native scrub. (Chainage 3+075.00)

13.8.18 General replacement of hedges that are affected with new native hedge planting with individual native tree planting. (See for example Chainage 2+550 – 2+925.00).

13.8.19 Replacement ditch planting and lakeside vegetation and native scrub. (See for example Chainage 3+450.00).

13.8.20 Integration planting for Nature Reserve Request Stop. (Chainage 3+950.00).

13.8.21 New hedge planting with individual native tree planting. (See for example Chainages 3+975.00 – 4+800.00).

13.8.22 Ecological and Landscape Compensation Area A: Rejuvenation of an existing copse with additional native planting in an area north of the guideway. (Chainage 5+250.00).

13.8.23 Swavesey Benedictine Priory – To the north of guideway new native screen/hedge planting. (Chainage 5+850.00 – 6+100.00)

13.8.24 Integration planting for the stop at Swavesey. (Chainage 6+150.00)

13.8.25 Screen planting is proposed around the Kiss & Ride facility at Swavesey. (Chainage 6+150.00)

13.8.26 Ecological and Landscape Compensation Area B - Balancing Pond 1: Balancing Pond - Additional land acquired around balancing pond to the south of the guideway to enhance ecological and landscape character and quality. Habitat creation including scrub and species rich grassland. (Figures 11 and 12, Chainage 7+425.00 - 7+625.00).

13.8.27 Ecological and Landscape Compensation Area C: Establishment of an area of scrub and natural regeneration with tree groups on the area used for a construction compound to enhance ecological value and landscape character. (Figure 12 and 12a, Chainage 7+625.00 – 8+000.00).

13.8.28 Replacement native scrub and species rich grassland on either side of the Over Cutting and
immediately west and east of the cutting. (Figures 12, 13 and 14, Chainage 7+600.00 - 9+000.00)

13.8.29 Ecological and Landscape Compensation Area D: Additional land acquired on the northern side of Over Cutting for ecological purposes and particularly butterfly habitat with grassland and small areas of scrub to be agreed with nature conservation authorities. (Chainages 7+900.00 – 8+475.00).

13.8.30 Ecological and Landscape Compensation Area E: A 20 metre width of additional land acquired for landscape and ecological mitigation west of Longstanton. A mosaic of tree and scrub planting with open areas left for natural regeneration to improve landscape and ecological character along this length of the route. (Chainages 9+100.00 – 9+500.00).

13.8.31 Immediately east of the above mentioned area an existing reed bed and pond would be retained and enhanced. Proposals would include removal of some existing scrub to create more diverse habitat. (Figure 15, Chainages 9+500.00 – 9+650.00).

13.8.32 Replacement native scrub. (Chainages 9+125.00 – 9+800.00).

13.8.33 Ecological and Landscape Compensation Area F: Some scrub and reed clearance to open up existing pond and provide open water areas which have been become densely vegetated. (Chainages 9+500.00 – 9+650.00).

13.8.34 Replacement hedgerow along the northern side of the guideway opposite and eastwards at Longstanton to replace lost habitat, to create an appropriate visual boundary feature and to create visual and ecological connectivity. (Chainages 9+825.00 – 10+775.00).

13.8.35 Longstanton Park and Ride: Screen and integration planting and species rich grassland and water areas to help integrate the car park into the landscape and to enhance ecological character. Screen planting to shield views from Orchard Cottage and Gresley House.

13.8.36 Screen planting to enhance existing boundary planting and/or visual barrier/fence to screen views to proposed new roundabout from Southwell and Kay-Bee along the B1050.

13.8.37 Hedgerow and species rich grassland. (Chainage 10+775 – 11+450.00).

13.8.38 Ecological and Landscape Compensation Area G: Balancing Pond 2 - Additional land acquired around balancing pond. Pond and areas to be designed to provide a variety of habitats and grassland and some natural regeneration to allow natural colonisation and habitat for great crested newts. (Chainage 10+800.00).

13.8.39 Ecological and Landscape Compensation Area H: Natural recolonisation with possible re-use of material removed from the railway. (Chainage 10+840.00 – 11+140.00)

13.8.40 Ecological and Landscape Compensation Area I: Balancing Pond 3 - Additional land acquired on the northern side of the guideway to provide land for ecological mitigation with grassland and some natural regeneration. Balancing pond to be profiled to enhance aquatic and marginal planting. (Chainage 11+375.00 – 11+450.00).

13.8.41 Integration planting at the sewage works. (Chainage 11+450.00 – 11+600.00).

13.8.42 Hedge and trees and species rich grassland. (Chainage 11+600.00 – 12+950.00).

13.8.43 Hedge planting on south and native scrub and trees. (Chainage 12+950.00 – 13+400.00).
13.8.44 Ecological and Landscape Compensation Area J: Balancing Pond 4: Additional land acquired on the northern side of the guideway to provide land for ecological mitigation. Balancing pond to be profiled to enhance aquatic and marginal planting and amosaic of scrub and grassland with some natural regeneration. (Chainage 12+025.00 – 12+150.00).

13.8.45 Hedgerow planting along northern side of the guideway as it approaches Westwick. (Chainages 13+475.00 – 13+825.00).

13.8.46 Integration planting for stop at Oakington. (Chainage 13+850.00).

13.8.47 Ecological and Landscape Compensation Area K: Additional land acquired south of the guideway for ecological mitigation. This would increase biodiversity and improve landscape character and quality and may include translocated species from the Trumpington cutting. Areas also for natural recolonisation following topsoil strip to encourage grassland regeneration. Site to provide receptor site for reptiles. (Chainage 13+850.00 – 14+125.00).

13.8.48 Protection of existing vegetation on north side along Beck Brook, with enhancement of aquatic planting. (Chainage 13+800.00 – 14+250.00).

13.8.49 A variety of landscape treatments including native tree planting on either side of the guideway to increase visual and landscape character. (Chainage 14+125.00 – 15+300.00).

13.8.50 Screen planting at the Girton Crossing to help integrate the junction at the eastern edge of Histon. (Chainage 15+310 – 15+485.00).

13.8.51 Screen planting and/or screen fencing to provide visual screen along boundaries of properties on the northern side of the guideway at Histon. (Chainages 15+485 – 16+00.00).

13.8.52 Hedgerow along the southern side of guideway between the guideway and the new access track. The hedgerow would break up the apparent scale of the corridor. (Chainage 15+425.00 – 15+925.00).

13.8.53 Woodland strengthening along the southern edge of the guideway. Land would be temporarily acquired to enable works within a 10 metre strip to enhance and strengthening the immature existing woodland. (Chainage 15+925.00 – 16+275.00).

13.8.54 Shrub, groundcovers and climbers to enhance industrial edge boundaries. Hedge and native tree planting on southern side screening properties. (Chainage 16+275.00 – 17+225.00).

13.8.55 Tree and feature planting along boundaries and within proposed car park on the northern side of the guideway immediately west of the proposed Histon & Impington Stop. (Chainage 17+325.00).

13.8.56 Integration planting at Histon and Impington Stop. (Chainage 17+300.00).

13.8.57 Woodland strengthening and protection at Impington Woods and protected woodlands further to the east. A 10 metre strip of woodland would be temporarily acquired to enable arboricultural works and strengthening of the woodland edge. (17+375.00 – 17+450.00, 17+500 – 17+825.00 and 17+925.00 – 18+250.00).

13.8.58 Screening by boundary screen planting and/or acoustic/visual barriers at properties on the southern side of the guideway at Pepys Terrace. (Chainage 17+425.00 17+525.00).

13.8.59 Hedge and native tree planting. (Chainage 17+550.00 – 18+200.00).
13.8.60 Species rich grassland. (18+200.00 – 18+600.00).

13.8.61 Aquatic planting to ditch outlet. (Chainage 18+525.00 – 18+600.00).

13.8.62 Ecological and Landscape Compensation Area L: Balancing Pond 5 - Additional land acquired for landscape and ecological enhancement of balancing pond and surrounding area. (Chainage 18+450.00 – 18+675.00).

13.8.63 Ecological and Landscape Compensation Area M: Woodland planting, woodland strengthening and scrub planting in a triangular area between the A14(T) and Arbury Park on the northern side of the guideway. (Chainage 18+725.00 – 18+850.00).

13.8.64 Screen and integration planting to help break up road/guideway corridor at Arbury Park.

13.8.65 Protection of existing hedge. (Chainage 80+00.00 – 81+300.00).

13.8.66 Screen planting alongside the southern edge of the guideway along King’s Hedges Road to help screen guideway. (Chainage 18+875.00 – 19+210.00).

13.8.67 Integration and feature planting at the Regional College Stop. (Chainage 19+350.00).

13.8.68 Urban screen planting to screen guideway and vehicles to the rear of properties on King’s Hedges Road, Garry Drive and Lovell Road (Chainage 19+425.00 – 19+8750).

13.8.69 Integration and feature planting at the Cambridge Science Park Stop. (Chainage 20+050.00).

13.8.70 Urban screen planting along the southern side of the guideway to Chesterton Sidings. (Chainage 20+300.00 – 20+848.00).

**Landscape and Visual Section 3: Cambridge City**

13.8.71 Trees at Christ’s Pieces: Prior to any design development of the highway at Drummer Street, an investigation would be made on the potential impact on tree roots of the protected trees in Christ’s Pieces. A risk assessment methodology, which should include a method for investigating the extent of tree roots should be drafted in consultation with the City’s arboriculturalist. The risk assessment report should note any potential damage to the trees. No works would be designed or undertaken which would place the trees at risk and diminish their visual amenity and continued well-being.

13.8.72 Railings at Christ’s Pieces: Should the railings at Christ’s Pieces be required to be set back, then this should be done without risk to the trees mentioned above. The relocation of the railings should be included in the risk assessment. The character and quality of the railings should remain as existing although different footings may be required in order not to damage the trees and tree roots. It is considered that minor pruning of tree limbs may be acceptable in order to relocate the railings but that this would have to be done in liaison with the Cambridge City Council’s arboriculturalist.

**Landscape and Visual Section 2: Cambridge City South to Trumpington**

13.8.73 Ecological and Landscape Compensation Area N: Balancing Pond 7: Additional land acquired for enhancing ecological and landscape character of balancing pond and surrounding area to the south of the guideway. (Chainage 41+400.00).

13.8.74 Ecological and Landscape Compensation Area O: Balancing Pond 8: Additional land acquired for enhancing ecological and landscape character of balancing pond and surrounding...
area to the south of the guideway. (Chainage 42+000.00).

13.8.75 Integration planting at Trumpington Stop. (Chainage 42+750.00).

13.8.76 Ecological and Landscape Compensation Area P: Balancing Pond 9: Additional land acquired for enhancing ecological and landscape character of balancing pond and surrounding area to the south of the guideway. (Chainage 42+450.00).

13.8.77 Property boundary screening with planting along garden boundaries for properties on both sides of the Trumpington cutting. (Chainage 43+250.00 – 43+600.00).

13.8.78 Replacement native scrub planting and tree planting at Trumpington cutting. (Chainage 43+50.00 – 43+600.00).

13.8.79 Addenbrooke’s link with hedgerow planting and native tree and shrub planting on bridge embankment to help integrate the link into the local landscape and provide ecological and visual continuity. (Chainage 60+000.00 – 60+800.00).

13.9 Residual Effects

Summary of the Residual Landscape Impacts

13.9.1 The summary of the residual landscape effects are as follows:

- Changes in landscape character and views due mainly to park and ride sites, stops, and buses, some of which may be double decker on guideway sections.
- Loss of mature and semi-mature lineside trees and hedgerows

Landscape Residual Effects

13.9.2 The summary of the residual landscape effects for the different character areas is as follows. (For LCA’s see Appendix 13A)

Landscape and Visual Section 1: Huntingdon to St Ives

13.9.3 Slight to moderate adverse decreasing over time as replacement tree and hedge planting matures. Slight adverse at A1123, St Ives golf course.

Landscape and Visual Section 2: St Ives to Cambridge and Cambridge to Trumpington (Figure 1b, Appendix 13A)

River Great Ouse Floodplain (St. Ives to Swavesey)

13.9.4 Slight adverse effect with some benefit, with ecologically orientated replanting of re-profiled embankments and habitat creation of water features.

Traditional Farming Settlements Character Area (Swavesey to Impington - South of the Proposed Track).

13.9.5 Slight adverse. Moderate adverse at Longstanton Park and Ride.

Expanded Horticultural Settlements Character Area (Swavesey to Histon – North of Proposed Route)

13.9.6 Slight adverse.
Southern Fen Washlands Character Area

13.9.7 None.

Southern Farmland Plateau Character Area

13.9.8 None.

Greenbelt City Fringes Character Area (North)

13.9.9 Moderate to slight adverse.

Contemporary Fringe And Satellite Development Character Area – (Cambridge North)

13.9.10 Negligible to slight beneficial due improvements to current access provision.

Contemporary Fringe And Satellite Development Character Area – (Cambridge South)

13.9.11 Slight adverse to negligible, depending on the amount of vegetation removal through Trumpington.

GREEN BELT CITY FRINGES (SOUTH)

13.9.12 Moderate adverse.

Wooded Chiltern Edge Character Area

13.9.13 Moderate adverse.

Visual Residual Effects

13.9.14 The overall visual effect ranges from moderate to slight adverse to negligible.

Summary of the Visual Residual Effects: Huntingdon – Trumpington

13.9.15 The visual residual effects as noted above are listed below as follows:

Section 1: Huntingdon to St Ives (Figure 2a, Appendix 13B)

13.9.16 Residual Effects: Slight adverse decreasing over time as replacement tree and hedge planting matures.

Section 2: St Ives to Cambridge and Cambridge to Trumpington

St. Ives To District Boundary (Fen Drayton) (Figure 2b, Appendix 13B and Figure 3a, Appendix 13C)

13.9.17 Residual Effects: Slight to moderate adverse.

District Boundary (Fen Drayton) To Longstanton (Figures 2b and 2c, Appendix 13B and Figures 3b and 3c, Appendix 13C)

13.9.18 Residual effect: Moderate adverse at historical sites. Slight adverse to negligible elsewhere..
Section at Longstanton (Figure 2c, Appendix 13B and Figure 3c, Appendix 13C)


Longstanton To A14 (T) (Figure 2c, Appendix 13B and Figures 3c to 3f, Appendix 13C)

13.9.20 Residual effect: Moderate/slight adverse.

A14 (T) To Milton Road/Chesterton Sidings (Cambridge Railway Station) (Figure 2d, Appendix 13B and Figures 3f and 3g, Appendix 13C)

13.9.21 Residual effect: Negligible.

Cambridge Railway Station To Trumpington (Figure 2d, Appendix 13B and Figures 3h to 3i, Appendix 13C)

13.9.22 Residual effects: Negligible. Slight to moderate adverse at Trumpington cutting.

Links To Addenbrooke’s Hospital (Figures 2d, Appendix 13B and Figure 3i Appendix 13C)

13.9.23 Residual effects: Negligible.

Landscape and Visual Section 3: Overall City Centre Residual Effects

13.9.24 The overall City Centre residual effects are considered to be slight adverse to negligible.

13.10 Summary

13.10.1 It is in the nature of linear infrastructure projects to interact with different landscape and townscape areas in different ways. This is not only due to the fact that although the landscape may be defined within different character areas the actual ‘close-in’ physical nature of each part of the route may differ. This is largely due to changes in topography, vegetation, quality and character as well as the nature, character and quality of the built environment. Thus, the CGB route, which includes stops, park and ride facilities and lighting would affect different areas in different ways. The landscape and visual effects of the Scheme would be greatest during construction and in the early operational phases but most of these negative effects would diminish over time with, for example, the establishment, re-establishment and enhancement of planting along various parts of the route. Some elements of the infrastructure, such as lighting would not diminish over time and thus it is important that due consideration is given to minimising light spillage where additional lighting is used at at-grade crossings, stops and park and ride facilities.

13.10.2 In some areas the loss of vegetation would give rise to immediate moderate adverse effects, but on the whole the majority of these effects would be slight adverse. The implementation of mitigation measures should, however, diminish most of these effects over time.

13.10.3 The key residual landscape impacts of the proposed CGB route, primarily result from the provision of additional facilities and associated land take at points along the route, rather than from the installation of the CGB guideways.

13.10.4 The protected landscape and wildlife value at the St. Ives end of the route, as part of the River Great Ouse floodplain is one of the areas most significantly affected by the provision of the
St. Ives Park and Ride facility, the track formation and bridge crossing. Mitigation replanting involving habitat creation, would over time, reduce this impact.

13.10.5 At Histon, the route passes directly alongside residential properties. Locally important trees in Histon and Impington would be lost as a result of the engineering proposals. This locally significant impact could be mitigated in the long term by appropriate replacement tree planting.

13.10.6 The scale of proposals for providing a link option to Addenbrooke’s hospital as an bridge to cross the operational rail line to the west of Trumpington would have permanent impacts upon the current landscape setting. With this exception, none of the predicted landscape effects of the proposals are of major significance in the long term. The majority of the impacts would be reduced over time by appropriate mitigation and in some areas there may be positive improvements to the landscape.

13.10.7 The main visual receptors to the CGB Scheme would be the residents of lineside properties and walkers, cyclists and equestrians using the existing routes in the general vicinity of the Scheme. For these receptors, the potential visual exposure to the operational CGB vehicles is the key impact. The most affected area would be at Histon and Impington, where the route passes directly alongside the gardens of residential properties. However, it is proposed that an environmental noise barrier is used to help mitigate noise to these properties and these barriers would also help to screen views. The acoustic barriers would be integrated into the surroundings with planting. (See Section 14 ‘Noise and Vibration). At other points along the route there would be additional visual impacts upon receptors resulting from the associated built structures. The potential visual impact of the more significant constructed developments along the route, such as the St. Ives Park and Ride and the Addenbrooke’s overbridge link, is significantly reduced by the low number of sensitive receptors within both areas.

13.10.8 There would be an impact of night-time lighting especially at park and ride facilities and stops and at grade crossings. In order to mitigate light spillage, all street lanterns would be full cut-off and preferably with flat glass. Where indirect type lighting columns are used, care would be taken to select luminaires where there is no upward spill light.

13.10.9 With appropriate screen planting most potential impacts would be mitigated over time and indeed a route wide strategy of appropriate replacement planting could in some areas improve views of the existing alignment, through both the urban and rural sections.
Appendices

Appendix 13A  Landscape Character Areas
Appendix 13B  Zones of Visual Influence
Appendix 13C  Landscape Features and Visual Receptors
Appendix 13D  Schedule of Landscape Features
Appendix 13E  Landscape and Ecological Mitigation Plans
References

11 Ibid.
12 Ibid.
13 South Cambridgeshire District Council, ‘South Cambridgeshire Local Plan Proposed Modifications 2003’, South Cambridgeshire District Council, 2003
14 South Cambridgeshire District Council, ‘The Swavesey Conservation Area Appraisal’.
15 Cambridgeshire County Council, ‘Cambridgeshire and Peterborough Structure Plan’ (Adopted October 2003), Cambridgeshire County Council, 2003
### Summary of Landscape and Visual Impacts

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Short description in words</th>
<th>Characteristics</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Short description in words</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landscape/Townscape Character and Quality (Excluding Cambridge City sections)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Landscape and Visual Section 1: Huntingdon to St Ives – CGB on highway</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Hinchingbrooke Hospital and Huntingdon Town Centre</td>
<td>Scheme on existing highway: no effects on landscape/townscape features within and outside the highway boundary</td>
<td>None</td>
<td></td>
<td>None</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>B1514 Huntingdon Ring Road</td>
<td>Loss of one mature tree, crown lifting and pruning for row of mature trees. Retaining wall.</td>
<td>Moderate –ve, D, P, LT</td>
<td></td>
<td>Replacement large stock specimen tree. Tree surgery by professional tree surgeon</td>
<td>Change in tree shape remains but improves.</td>
<td>Slight –ve, LT</td>
</tr>
<tr>
<td>B1514 Hartford Road from car park to 144 Hartford Road</td>
<td>Loss of amenity planting, (including trees in a conservation area and therefore protected by TPO), alongside Council car park, sailing club car park, sports fields and loss of hedge alongside length of grass open space area gives loss of landscape character and quality</td>
<td>Moderate –ve, D, P, LT</td>
<td></td>
<td>Replacement trees and hedge at appropriate size and densities.</td>
<td>Planting would mature over time decreasing impact.</td>
<td>Slight -ve to negligible, LT.</td>
</tr>
<tr>
<td>Old Houghton Road</td>
<td>Loss of amenity brought about by reopening up of the road to westbound CGB vehicles.</td>
<td>Slight –ve, D, P, LT</td>
<td></td>
<td>Design westbound carriageway with an appropriate footway and cycleway.</td>
<td>Amenity would be permanently affected as buses would pass and disturb walkers/cyclists.</td>
<td>Slight –ve, D, P, LT.</td>
</tr>
<tr>
<td>Huntingdon</td>
<td>Removal of trees and roadside</td>
<td>Slight – ve, D, P, L</td>
<td></td>
<td>Replace planting</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

**nerve, -ve, D, I, S, C, ST, MT, LT, P, T,**
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Road, A1123, Hartford Marina</strong></td>
<td>vegetation</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>A1123 St Ives golf course and entrance to ‘The How’</strong></td>
<td>Widening for CGB vehicles and a new cycleway would require removal of hedgerow, drainage ditch and mature trees with loss of landscape character and quality. It is assumed that the row of poplar trees south of the hedge are not affected</td>
<td>Moderate –ve, D, P, LT</td>
<td>Replace hedge at golf course. Replace lost laurel hedge and mature horse chestnut tree at the entrance to ‘The How’. Redesign edge of corridor to ensure retention of poplars with a replacement hedge. Slight - ve, D, P, LT.</td>
</tr>
<tr>
<td><strong>Landscape and Visual Section 2: St. Ives to North Cambridge and Cambridge Railway Station to Trumpington</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>St Ives – Swavesey (River Great Ouse Floodplain Landscape Character Area): CGB on Guideway:</strong></td>
<td>Loss of lakeside vegetation and semi-mature species affecting landscape character and quality through construction and re-profiling.</td>
<td>Moderate –ve, D, LT, P.</td>
<td>Replace and enhance vegetation with landscape character and ecological objectives. Loss of character and ecology enhanced over time by enhanced planting Slight-ve becoming Slight +ve, D, P. LT.</td>
</tr>
</tbody>
</table>

---

**Description of impact Description of residual impact (assuming mitigation implemented)**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>St Ives Park and Ride</td>
<td>Loss of space and surrounding screening vegetation to ‘Wildnerness’ properties.</td>
</tr>
<tr>
<td>River Ouse Crossing temporary land take for construction</td>
<td>Loss of mature riverside vegetation.</td>
</tr>
<tr>
<td>Public footpaths including River Ouse Way</td>
<td>Footpaths and by-ways require temporary diversion and stopping up during construction.</td>
</tr>
<tr>
<td>Reed filled ditches in the River Great Ouse area</td>
<td>Loss of ditches and vegetation.</td>
</tr>
<tr>
<td>Fen Drayton Nature Reserve</td>
<td>Holywell Ferry Stop would be a feature in this area and would provide access for walkers and nature enthusiasts</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Swavesey area lineside scrub/hedgerow connections</td>
<td>Loss of scrub and hedgerow connection</td>
</tr>
<tr>
<td>Swavesey Conservation Area northern part</td>
<td></td>
</tr>
<tr>
<td>Loss of field boundary hedgerows east of Swavesey</td>
<td>Traditional hedgerows would be lost.</td>
</tr>
<tr>
<td>Over Road junction increased lighting and Kiss and Ride and Stop</td>
<td>Increase in lighting would slightly affect character of Benedictine Priory site. However new lighting may actually be an improvement. Kiss and Ride reduces local landscape character and quality. At night, vehicle headlights intrusive to properties facing the Kiss and Ride.</td>
</tr>
<tr>
<td>General loss of habitat along the route</td>
<td></td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Swavesey – Impington (Traditional Farming Settlements Character Area - South of the proposed Tracks): CGB on Guideway</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Deep cutting immediately east of Windmill on Gravel Bridge Road</strong></td>
<td>Dense bankside scrub lost</td>
</tr>
<tr>
<td><strong>B1050 junction with guideway</strong></td>
<td>Lighting of junction with slight loss of landscape character and quality. Road lighting may, however be considered by residents to be beneficial for safety/security reasons.</td>
</tr>
<tr>
<td><strong>Longstanton Park and Ride</strong></td>
<td>Large car park and access with loss of poplars and with lighting that would affect landscape character and landscape quality.</td>
</tr>
<tr>
<td><strong>Rampton Road area and West of Westwick Village</strong></td>
<td>Loss of vegetation – Hedgerow and trackside scrub</td>
</tr>
<tr>
<td><strong>Balancing pond at Chainage 7+600.00</strong></td>
<td>Introducing water into the landscape would benefit landscape and ecological character.</td>
</tr>
</tbody>
</table>

**Short description in words**

existing copse. Chainage 5+275.00
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Short description in words</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>General loss of habitat along the route</td>
<td>Short description in words</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Ecological and Landscape Compensation Areas B, C, E, F and K: ChainageS 7+425.00 – 7+625.00, 7+625.00 – 7+925.00, 9+100.00 – 9+500.00, 9+500.00 – 9+650.00, 13+840.00 – 14+120.00.</td>
<td>Slight -ve, D, LT, P. Replace hedgerows, replace drains, and merge agricultural land. Effects diminish over time as hedgerows mature.</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Slight, LT, P, T</td>
</tr>
<tr>
<td>Balancing Ponds at chainages 10+800.00, 11+425.00, 12+125.00</td>
<td>Loss of agricultural hedgerow boundaries, drains and agricultural land</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Ensure profiles of pond suit landscape and ecological planting. Benefits would improve over time.</td>
<td>Introducing water into the landscape would benefit landscape and ecological character</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Slight, LT, P, T</td>
</tr>
<tr>
<td>Beck Brook, Westwick Hall parkland</td>
<td>Loss of trees adjacent to brook protected by blanket TPO and Stop.</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Limit loss of trees as far as possible and replace lost trees with appropriate numbers and sized specimens. Integrate Stop planting with planting. Effects should diminish over time as replacement trees and Stop planting matures.</td>
<td>Limit loss of trees adjacent to brook protected by blanket TPO and Stop.</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Slight, LT, P, T</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------</td>
<td>----------------</td>
<td>--------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Westwick Conservation Area – southern part</td>
<td>Loss of character with buses passing by and Stop facility</td>
<td>Moderate –ve, D, LT, P.</td>
<td>Planting to mitigate visual effects.</td>
<td>As planting matures effects should diminish. Slight –ve, D, LT, P.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties on Oakington Road, Westwick</td>
<td>Stop and improved lighting at junction would slightly affect landscape character of conservation area. However, improved lighting may improve the current situation for residents and the area reducing sky glow.</td>
<td>Slight –ve/+ve, D, LT, P.</td>
<td>Integrate Stop with planting</td>
<td>Negative effects should diminish over time. Slight-ve/negligible.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Areas along the route</td>
<td>Temporary land required for drainage proposals</td>
<td>Slight –ve, D, ST/MT, T</td>
<td>Reinstall appropriate vegetative cover and return to existing.</td>
<td>Effects should diminish over time. Negligible.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General loss of habitat along the route</td>
<td></td>
<td></td>
<td>Balancing Ponds and Ecological and Landscape Compensation Areas D, G, H, I and J: Chainages 7+870.00 – 8+475.00, 10+800.00, 10+825.00 – 11+145.00, 11+400.00 and 12+100.00.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greenbelt City Fringes Character Area North: CGB on Guideway</td>
<td>Slight loss of landscape character by opening up of guideway.</td>
<td>Moderate-ve, D,LT,P</td>
<td>Environmental noise/visual barrier helps to contain views. Planting to integrate</td>
<td>Planting should help to minimise effects over time Slight-ve, D, L.T.P.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>between Park Lane and St Audreys Close.</td>
<td>Loss of landscape character caused by widening of trafficked corridors</td>
<td>Moderate –ve, D, LT, P.</td>
<td>Replant hedge between private track and maintenance track to reduce apparent width of corridor</td>
<td>Effect diminishes as hedgerow matures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private track at Girton</td>
<td>Loss of landscape character caused by widening of trafficked corridors</td>
<td>Moderate/major –ve, D, LT, P.</td>
<td>Detail design to try and reduce tree loss. Replace lost trees with appropriate specimens</td>
<td>Loss of amenity diminishes as new planting matures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Histon &amp; Impington Stop at Impington Woods north of the guideway</td>
<td>Loss of woodland protected by blanket TPO and loss of landscape character and quality.</td>
<td>Moderate/major –ve, D, LT, P.</td>
<td>Design car aprk to fit in with area utilising boundary tree and hedge planting and internal planting</td>
<td>Loss of character slightly diminishes over time as planting matures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Histon and Impington Stop car park</td>
<td>Loss of station building and diminution in townscape character and quality with replacement car park</td>
<td>Moderate –ve, D, LT, P.</td>
<td>Design car aprk to fit in with area utilising boundary tree and hedge planting and internal planting</td>
<td>Loss of character slightly diminishes over time as planting matures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Villa Place, Villa Road and Pepys Terrace Properties, Impington, west of Cambridge Road</td>
<td>Loss of boundaries and planting with loss of landscape character and quality.</td>
<td>Moderate –ve, D, LT, P.</td>
<td>Noise/visual barrier with planting.</td>
<td>Effects decrease as planting matures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIY centre, south of guideway west of Cambridge Road</td>
<td>Potential loss of mature trees.</td>
<td>Moderate –ve, D, LT, P.</td>
<td>Design detail to protect trees if possible, otherwise replace trees as appropriate. This may be difficult as trees may</td>
<td>Effect diminishes over time.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Characteristics: +ve, -ve, D, I, S, C, ST, MT, LT, P, T,
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics (Negligible, Slight, Moderate, Major)</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodland belts on northern side of guideway – east of Impington woods.</td>
<td>Loss of mature ash and turkey oaks up to 30m tall in protected woodland to the east of Impington.</td>
<td>Major-ve, D, LT, P.</td>
<td>Minimise loss of trees and protect those in close proximity to works and strengthen woodland edge with additional planting</td>
<td>Effects diminish over time as new woodland edge planting matures.</td>
</tr>
<tr>
<td></td>
<td>straddle private boundary.</td>
<td></td>
<td>Moderate –ve, D, P, LT if many trees lost.</td>
<td></td>
</tr>
<tr>
<td>Contemporary Fringe and Satellite development Character areas/Cambridge North : CGB on Guideway</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A14(T) to Cambridge Science Park</td>
<td>Loss of dense scrub creates a general loss of visual amenity</td>
<td>Slight –ve, D, LT, P.</td>
<td>Replant edges and boundaries with appropriate hedges and semi natural/amenity and scrub planting according to character of local area on both sides of the guideway.</td>
<td>Effects diminish as planting matures.</td>
</tr>
<tr>
<td>Balancing ponds immediately south east of A14(T)</td>
<td>Balancing pond is a positive landscape/ecological feature</td>
<td>Slight +ve, D, LT, P.</td>
<td>Ensure profiles allow for appropriate planting.</td>
<td>Benefits increase over time</td>
</tr>
<tr>
<td>Stops at College and Science Park</td>
<td>Stops may create beneficial focus points in the landscape.</td>
<td>Slight +ve, D, LT, P.</td>
<td>Stops to be designed with appropriate integration/amenity planting.</td>
<td>Effects mature over time</td>
</tr>
<tr>
<td>Properties on King’s Hedges Road opposite the Arbury Park link</td>
<td>The link would remove parts of a hedgerow of historic importance and the combined width of the corridor and the widening proposals would alter the</td>
<td>Slight/Moderate –ve, D, LT, P</td>
<td>Planting to help integrate and break up the apparent width of the corridors</td>
<td>Planting matures</td>
</tr>
</tbody>
</table>

---

**Description of impact**

- **Negligible**: Minor or insignificant impact.
- **Slight**: Small impact that is noticeable but not critical.
- **Moderate**: Impact that is noticeable and has some significance.
- **Major**: Significant impact that is highly visible and may require mitigation.

**Characteristics**

- **+ve**: Positive impact.
- **-ve**: Negative impact.
- **D**: Direct.
- **I**: Indirect.
- **S**: Secondary.
- **C**: Community.
- **ST**: Short term.
- **MT**: Medium term.
- **LT**: Long term.
- **P**: Permanent.
- **T**: Transitory.
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General loss of habitat along the route</td>
<td></td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>Balancing Pond and Ecological and Landscape Compensation Area M L, G, H, I and J: Chainages 18+800.00</td>
<td></td>
</tr>
<tr>
<td>Three balancing ponds</td>
<td>Balancing ponds enhance landscape and ecological character</td>
<td>Slight +ve, D, P, LT.</td>
<td>Ensure profiles allow for appropriate planting.</td>
<td>Positive effects increase over time. Slight +ve, D, P, LT.</td>
</tr>
<tr>
<td>Trumpington Cutting</td>
<td>In the ‘worst case’ situation the loss of all vegetation at the cutting would diminish landscape character and quality</td>
<td>Major –ve, D, LT P.</td>
<td>Retain as much vegetation as possible and replant with similar species as present including large stock trees</td>
<td>Effects decrease over time as planting matures Slight – ve, D, LT, P.</td>
</tr>
<tr>
<td>General loss of habitat along the route</td>
<td></td>
<td></td>
<td>Balancing Pond and Ecological and Landscape Compensation Area N, O and P: Chainages 41+400.00, 42+025.00 and 42+475.00</td>
<td></td>
</tr>
<tr>
<td>Wooded Chiltern Edge Character Area: CGB on Guideway</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addenbrooke’s Link</td>
<td>Alteration of landscape character by provision of link and elevated bridge crossing the main line railway, across agricultural land</td>
<td>Moderate –ve, D, P, LT</td>
<td>Integrate bridge earthworks with planting. Raised footpath may allow for some better elevated views</td>
<td>Effects decrease over time Slight –ve, D, LT, P.</td>
</tr>
</tbody>
</table>
## Visualization Assessment—(Excluding Cambridge City sections)

Note: The use of double-decker vehicles would increase visual intrusion for a longer period of time as planting would take longer to mature to screen the buses.

### Landscape and Visual Section 1: Huntingdon to St. Ives

#### B1514 Hartford Road: CGB on Highway

- **B1514 Huntingdon Ring Road**
  - **Description of impact:** Removal of one tree and raising of tree canopy and pruning reduces screening with increased intrusion also caused by buses being slightly closer to properties on Hartford Road
  - **Characteristics:** Slight –ve, D, LT, P.
  - **Short description of mitigation:** Replacement planting and tree surgery by professional tree surgeon
  - **Description of residual impact (assuming mitigation implemented):** Raised canopy remains and therefore slight increase in intrusion
  - **Characteristics:** Slight –ve, D, LT, P.

- **B1514 east side removal of trees and hedgerow**
  - **Description of impact:** Loss of visual amenity to residents and other users of highway and local green spaces
  - **Characteristics:** Moderate/slight –ve, D, LT, P.
  - **Short description of mitigation:** Replacement planting.
  - **Description of residual impact (assuming mitigation implemented):** Effects reduce over time
  - **Characteristics:** Slight -ve/negligible, D, LT, P.

- **Old Houghton Road**
  - **Description of impact:** Road opened up to west bound CGB vehicles. Loss of visual amenity for pedestrians and local residents
  - **Characteristics:** Slight –ve, D, LT, P.
  - **Short description of mitigation:** Appropriate footpath and cycle route design.
  - **Description of residual impact (assuming mitigation implemented):** Buses would still cause occasional visual intrusion.
  - **Characteristics:** Slight –ve, D, LT, P.

- **Houghton Road: Hill Rise/St Ives golf club**
  - **Description of impact:** Loss of visual amenity caused by loss of hedge and trees to local residents, golfers, and road users
  - **Characteristics:** Moderate/slight –ve, D, LT, P.
  - **Short description of mitigation:** Appropriate design of elements to retain poplar trees and replant hedge.
  - **Description of residual impact (assuming mitigation implemented):** Effects should reduce over time as planting matures.
  - **Characteristics:** Slight –ve, D, LT, P.

### ST Ives to District Boundary (Fen Drayton): CGB on Guideway

- **St Ives Park and Ride**
  - **Description of impact:** Views from residents and shoppers within St Ives.
  - **Characteristics:** Slight –ve, D, P, LT
  - **Short description of mitigation:** Planting to screen and channel views. Lighting
  - **Description of residual impact (assuming mitigation implemented):** Planting matures over time and park and ride would become
  - **Characteristics:** Slight – ve, D, LT, P
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short description in words</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
<td>would always be visible, less apparent</td>
<td>Negligible, Slight, Moderate, Major +ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
<tr>
<td>St Ives Park and Ride and Guideway</td>
<td>Views from residents at Wilderness Cottages. To car park and lighting</td>
<td>Major/moderate –ve, D, P, LT.</td>
<td>Reinforce existing planting to screen views. Lighting design at Park and Ride to minimise night-time visual intrusion</td>
<td>Mitigation effects increase over time as planting matures</td>
</tr>
<tr>
<td>St Ives Park and Ride and Guideway</td>
<td>Walkers/cyclists/equestrians/visitors affected by CGB vehicles and lighting, Park and Ride</td>
<td>Moderate –ve.</td>
<td>Lighting design at Park and Ride to minimise night-time visual intrusion</td>
<td>Planting helps to screen CGB vehicles.</td>
</tr>
<tr>
<td>Swavesey Kiss &amp; Ride</td>
<td>Increase in visual intrusion caused by vehicles during the day and at night by car lights and lighting for properties on Over Road.</td>
<td>Moderate/Major+ve, D, LT, P.</td>
<td>Integrating and screen planting at proposed location</td>
<td>Screen planting limited because need for sight lines and safety/security.</td>
</tr>
</tbody>
</table>

**District Boundary Fen Drayton to Longstanton: CGB on Guideway**

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fen Drayton Nature Reserve</td>
<td>Nature Reserve Request Stop may be seen by some users to be intrusive.</td>
<td>Minor –ve/Negligible, D,L,T, P.</td>
<td>Integrate into locality with appropriate design</td>
<td>Stop integrated.</td>
</tr>
<tr>
<td>St Andrews Church and Vicarage, Swavesey and Benedictine Priory site all in conservation area</td>
<td>Visual intrusion caused by CGB vehicles and by Stop to residents and visitors.</td>
<td>Moderate/major-ve , D, LT, P.</td>
<td>Planting except around stop.</td>
<td>Planting helps to integrate stop.</td>
</tr>
</tbody>
</table>

**General:** Slight-ve. **Historical sites:** Moderate –ve.
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section at Longstanton: CGB on Guideway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1050</td>
<td>Orchard Cottage, Thadays Cottage, Gresley House and Railway Cottages- Visual intrusion of CGB vehicles queuing cars and lighting at junction.</td>
<td>Screen CGB vehicles with line side planting and along property boundaries</td>
<td>Planting partially reduces visual impact</td>
</tr>
<tr>
<td>Roundabout and access to Longstanton Park and Ride</td>
<td>Southwell, Kaybee Increased visual intrusion by traffic and lighting especially for the two properties on western side of B1050 and Gresley House on the eastern side where property boundary may be affected</td>
<td>Visual barrier and planting at Southwall and Kaybee. and Gresley House.</td>
<td>Effects partially reduced but barriers may be perceived to cause visual obstruction</td>
</tr>
<tr>
<td>Longstanton Park and Ride</td>
<td>Orchard Cottage, Gresley House, The Mount: Visual effects of park and ride and moving vehicles and lighting</td>
<td>Screen and integrating planting.</td>
<td>Effects reduce over time as planting matures but night-time effects remain</td>
</tr>
<tr>
<td>Station Road junction and Stop: Oakington</td>
<td>Properties and walkers at Westwick with views of CGB vehicles, stop and lighting at stop and junction.</td>
<td>Planting would help to integrate stop.</td>
<td>Lighting at junction may be positive by increasing safety and security for residents and also because may produce less night glow.</td>
</tr>
</tbody>
</table>

---

**Description of impact**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

**Transfer characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Section at Longstanton: CGB on Guideway**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
</tbody>
</table>

---

**Characteristics**

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible, Slight, Moderate, Major</td>
</tr>
<tr>
<td>+ve, -ve, D, I, S, C, ST, MT, LT, P, T,</td>
</tr>
<tr>
<td>Impact name</td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>Westwick Hall</td>
</tr>
<tr>
<td>Oakington Village</td>
</tr>
<tr>
<td>Histon Residences</td>
</tr>
<tr>
<td>Impington Residences</td>
</tr>
<tr>
<td>A14(T) to Milton Road/Cambridge Railway Station: CGB on Guideway</td>
</tr>
</tbody>
</table>

Description of impact Description of residual impact (assuming mitigation implemented)
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short description in words</td>
<td></td>
<td></td>
<td>Short description in words</td>
</tr>
<tr>
<td>Science Park</td>
<td>Stops can be a positive feature.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kings Hedges Road Residents</td>
<td>Exposure of guideway and Science Park Stop to residents</td>
<td>Moderate/Major</td>
<td>-ve</td>
<td>Screen planting</td>
</tr>
<tr>
<td>south of CGB guideway.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Negligible, Slight,</td>
<td>D, LT, P</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate, Major</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ve, -ve, D, I, S, C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST, MT, LT, P, T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arbury Park Link</td>
<td>Properties on King’s Hedges Road opposite the Arbury Park link.</td>
<td>Slight/Moderate</td>
<td>-ve</td>
<td>Planting to help integrate and break up the apparent width of the corridor and screen CGB vehicles</td>
</tr>
<tr>
<td></td>
<td>Visual impact of increased traffic and road/guideway corridor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slight, D, LT, P</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambridge Railway Station to</td>
<td>Middle distance views from properties on Foster Road to guideway, CGB vehicles and stop</td>
<td>Slight/moderate</td>
<td>-ve, D, LT, P</td>
<td>Screen and integrating planting</td>
</tr>
<tr>
<td>Trumpington south east</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>In the ‘worst case’ situation the loss of all vegetation at the cutting would open up views across the cutting for residents of properties along cutting edges</td>
<td>Major –ve, D, LT P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trumpington Cutting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Retain as much vegetation as possible and replant with similar species as present including large stock trees</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Effects decrease over time as planting matures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slight – ve, D, LT, P/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addenbrooke’s Hospital Link: CGB</td>
<td>Realignment of footpath along maintenance track would expose walkers to direct views of guideway and vehicles. Elevated views as the track passes on a</td>
<td>Moderate –ve, D, LT, P</td>
<td></td>
<td>Walkers enjoy more elevated views.</td>
</tr>
<tr>
<td>on Guideway</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addenbrooke’s guideway route and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bridge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>-----------------------</td>
<td>---------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>City Centre Section</td>
<td>Limited landscape/townscape and visual effects as CGB vehicles travel on existing highway already taking bus and other traffic. Some vegetation loss along Histon Road, adjacent to boundary of the allotment gardens, hedgerows along the southern edge of King Hedges Road.</td>
<td>Slight –ve, D, LT, P. Replace lost vegetation at appropriate sizes and densities</td>
<td>Planting matures and affects reduce over time</td>
<td></td>
</tr>
<tr>
<td>City Centre Section</td>
<td>Removal of existing bus stops and replacement with contemporary design stops and rationalisation of bus interchange at Emmanuel St would improve visual character between St Andrews Road and Christ’s Pieces</td>
<td>Slight +ve,D,LT,P.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Christ’ Pieces Character and amenity with regard to repositioning railings</td>
<td>Widening would require the repositioning of railings with slight loss of protected open space.</td>
<td>Slight –ve, D, LT, P.</td>
<td>Loss of amenity space should be limited and railings repositioned sensitively and without affecting the trees in the park.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>new bridge may be seen to be positive.</td>
<td></td>
<td>Affects diminish post construction</td>
<td></td>
</tr>
</tbody>
</table>

**LANDSCAPE/TOWNSCAPE AND VISUAL EFFECTS (Cambridge City sections)**

- **City Centre Section**
  - Limited landscape/townscape and visual effects as CGB vehicles travel on existing highway already taking bus and other traffic. Some vegetation loss along Histon Road, adjacent to boundary of the allotment gardens, hedgerows along the southern edge of King Hedges Road.
  - Slight –ve, D, LT, P. Replace lost vegetation at appropriate sizes and densities.
  - Planting matures and affects reduce over time.

- **City Centre Section**
  - Removal of existing bus stops and replacement with contemporary design stops and rationalisation of bus interchange at Emmanuel St would improve visual character between St Andrews Road and Christ’s Pieces.
  - Slight +ve,D,LT,P.
  - N/A
  - Slight +ve, D, LT, P

- **Christ’ Pieces Character and amenity with regard to repositioning railings**
  - Widening would require the repositioning of railings with slight loss of protected open space.
  - Slight –ve, D, LT, P.
  - Loss of amenity space should be limited and railings repositioned sensitively and without affecting the trees in the park.
  - Affects diminish post construction.
  - Negligible.
<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Christ’s Pieces</td>
<td>Any loss of the trees in Christ’s Pieces would be considered severe and unacceptable. The effect would be major/severe</td>
<td>major/severe -ve, D, LT, P. if this would occur</td>
<td>Risk assessment and change of Scheme in this area so as not to affect trees if the risk assessment deems the trees may be at risk</td>
<td>NA</td>
</tr>
</tbody>
</table>

Note: Abbreviations are as follows

+ve = positive, -ve = negative, D = direct, I = indirect, S = secondary, C = cumulative, ST = short-term, MT = medium-term, LT = long-term, P = permanent, T = temporary.

Abbreviations can be used in any viable combination, i.e. avoiding contradictions.
14. NOISE AND VIBRATION

14.1 Introduction

14.1.1 This section of the Environmental Statement (ES) assesses the potential noise and vibration impacts from the proposed Cambridgeshire Guided Busway (CGB) Scheme.

14.1.2 The Scheme is designed such that the same vehicles would be used on the roads and the guideway. In noise terms, this means that on the guideway the new vehicles would be the only noise source, whereas on the roads the vehicles would be mixed in with existing traffic flows.

14.1.3 Different methodologies are generally used for transportation noise assessments undertaken on highways to those undertaken on guided systems. Vehicle volumes on new roads are high and regular, whereas on guided bus systems, vehicles are regular but relatively infrequent. This approach is supported by research, which has shown different human sensitivities to these two sources at the same noise energy levels.

14.1.4 Terminology used in this section is described in the Glossary at the front of the ES.

14.2 Assessment Methodology

14.2.1 The potential noise and vibration impacts are mostly in relation to the occupiers of residential properties, a small number of commercial receptors and Hinchingbrooke and Addenbrooke's Hospitals.

14.2.2 Representative sites have been chosen to reflect the levels of background noise likely to occur within each of the eight route sections. Noise monitoring has been undertaken to measure the ambient noise levels at these locations, as described in Section 14.4. These measurements provide the baseline for the assessment of operational noise impacts arising from the Scheme.

14.2.3 The assessment of noise impacts has considered both the construction and operational phases of the Scheme. The approach to the assessment of each phase has been different, due to the nature of the noise generating activities involved in construction and operation of the Scheme, and the availability of information for the assessment. The methodologies employed in the assessment of noise and vibration, in the construction and operational phases respectively, are described below.

Construction

Noise

14.2.4 BS 5228 Part 1 (1997) Noise and Vibration Control on Construction and Open Sites sets down best practice procedures to reduce the noise exposure temporarily experienced by noise sensitive receivers close to construction sites. The Standard includes guidance on methods of noise prediction, and advice on effective procedures for liaison between site operators, developers and local authorities. It describes mitigation procedures and refers directly to the control of activities generating noise and vibration on site.

14.2.5 It is not anticipated that the proposed construction activities would merit an assessment using numerical criteria. Given the limited amount of detail available regarding construction methods at this stage, a qualitative assessment has been made, using assumptions based on typical construction operations.
14.2.6 As construction is a temporary noise source, it can often be acceptable to allow average construction noise levels during a typical daytime operating period to exceed the ambient noise by up to 10 dB(A).

**Vibration**

14.2.7 There is no standard methodology available for prediction of vibration from construction works other than for percussive piling, contained within BS 5228 Part 1 (1997). Whilst significant piling is not anticipated, the guidance in BS5228 : Part 4 : 1992 'Code of Practice for Noise and Vibration Control Applicable to Piling Operations' should be followed for any piling activity. General annoyance from vibration for long-term construction programs may be assessed using BS 6472 (1992) *Evaluation of human exposure to vibration in buildings*.

14.2.8 Disturbance caused by perceptible vibration is quantified using the Vibration Dose Value (VDV), which takes account of the level of vibration generated by each event, the duration of each event and the total number of events within the day (07:00 to 23:00 hrs) and night (23:00 to 07:00 hrs).

14.2.9 The criteria applicable to residential buildings and occupied non-residential buildings are shown in Table 14.1. ‘Special’ buildings should be considered individually.

**Table 14.1: Criteria for assessing disturbance in residential premises BS: 6472**

<table>
<thead>
<tr>
<th>Probability of adverse comment</th>
<th>VDV ms(^{1.75}) 16 hr Daytime (0700 – 2300 hrs)</th>
<th>VDV ms(^{1.75}) 8 hr night-time (2300 – 0700 hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>0.2 – 0.4</td>
<td>&gt;0.13</td>
</tr>
<tr>
<td>Possible</td>
<td>0.4 – 0.8</td>
<td>&gt;0.26</td>
</tr>
<tr>
<td>Probable</td>
<td>0.8 – 1.6</td>
<td>&gt;0.51</td>
</tr>
</tbody>
</table>

14.2.10 Damage to buildings due to vibration from construction activities is rare. The nominated contractor must, in accordance with statutory legislation, use ‘Best Practicable Means’ to control vibration levels and should ensure that the peak component particle velocity measured at the base of any building, in accordance with British Standard 7385:Part 2:1993, does not routinely exceed a level of 10 mm/s (section 7.4.1 of BS 7385 cites data that indicates 12.5 mm/s as the level below which the probability of damage approaches zero).

14.2.11 General guidance on all aspect of groundborne vibration can be found in the Association of Noise Consultants (ANC) publication *Measurement and Assessment of Groundborne Noise and Vibration*.

**Operation**

**Noise**

14.2.12 The operational effects have been assessed in relation to the separate elements of the Scheme such as guided sections, on-street sections and park and ride sites.

**Guided Sections**

14.2.13 The noise effects from the operation of the guided buses have been assessed by comparison of predicted equivalent continuous noise levels with measured ambient noise levels at representative locations along the new route.
14.2.14 Using measurements taken from the Leeds guided bus system noise levels have been calculated at the nearest noise sensitive receivers. The predicted L_{Aeq(1hr)} has been calculated for daytime, (07:00-23:00) and night-time periods. The night-time period is 06:00-07:00 and 23:00-00:00, since the CGB is timetabled to run from 06:00 until 00:00 hrs. The flows used in the assessment are taken from the demand model (see Section 16) that gives bus numbers for each route section. For daytime, the 2021 high A.M. peak hour values are used for the northern section, and the 2016 high A.M. peak hour values are used for the southern section, since it is expected that there would be lower frequencies in this section. For the night-time hour of 23.00 - 00.00 the corresponding off peak hourly flows are used. Predictions have been carried out using a simple distance calculation assuming the noise source is a moving point source.

On-Street Sections

14.2.15 The fundamental recommendation of the Department of Transport Design Manual for Roads and Bridges, Volume 11, Environmental Assessment (DMRB)\textsuperscript{vi}, with regard to traffic noise is that the assessment of environmental impacts should be based on a comparison between the noise levels that would be caused by the Scheme and those that would arise if the Scheme were not implemented (the 'do nothing' option).

14.2.16 The noise impact associated with any change in traffic growth can be calculated in accordance with the methodology of the Department of Transport publication Calculation of Road Traffic Noise (CRTN, 1988)\textsuperscript{vii}. In accordance with this guidance, consideration is only given to existing routes where the predicted change in traffic volume is at least an increase of 25% or decrease of 20%, i.e. where the noise level is expected to change by at least 1 dB(A).

14.2.17 Research shows that whilst many people are just able to distinguish a change of 1 dB in a pure and continuous tone, changes in the level of broadband noise, similar to that of road noise, are not so easily perceived. A survey of exposure to traffic noise did not identify different levels of general dissatisfaction until the levels were at least 3 dB apart (Harland, D.G. & Abbott, P.G., 1977)\textsuperscript{viii} and hence the effects arising from changes of less than 3 dB are, therefore, considered to be not significant. Increases of less than 3 dB do, however, contribute to a creeping growth in the ambient noise level, which can lead to a gradual deterioration in the quality of the environment. Generally, a change of greater than 3 dB is considered to be noticeable.

Park and Ride Sites

14.2.18 There is no guidance that deals specifically with noise from car parks, but reference can be made to the World Health Organisation's Guidelines for Community Noise\textsuperscript{ix}. This recommends that an internal steady noise level of 30 dB L_{Aeq(8 hr)} or below and 45 dB L_{Amax} for single sound events should be achieved "if negative effects on sleep are to be avoided".

14.2.19 When assessing the potential for people to be "seriously annoyed" during the daytime period it is recommended that a level of 55 dB L_{Aeq(16 hr)} should not be exceeded on balconies, terraces and outdoor living areas. For new developments the recommended level reduces to 40 dB L_{Aeq(16 hr)}.\textsuperscript{v}

14.2.20 Off site impacts of the park and ride sites are in relation to changes in levels of traffic on existing roads, and have been assessed in accordance with the DMRB, as described above.

Assessment of Significance

14.2.21 In assessing the significance of an increase in ambient noise levels, the criteria specified in Table 14.2, based on the guidance in the DMRB, are generally accepted. It is accepted
practice for infrastructure projects that for an impact to have an effect it needs to occur at either a sensitive receptor (e.g. school, hospital) or a cluster of 5 or more houses.

### Table 14.2: Significance of different noise increases

<table>
<thead>
<tr>
<th>Increase in Noise Level</th>
<th>Significance Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>+/- 3dB</td>
<td>Negligible</td>
</tr>
<tr>
<td>3-5 dB</td>
<td>Slight Effect</td>
</tr>
<tr>
<td>5-10 dB</td>
<td>Moderate Effect</td>
</tr>
<tr>
<td>10-15 dB</td>
<td>Major Effect</td>
</tr>
<tr>
<td>15+ dB</td>
<td>Major Effect</td>
</tr>
</tbody>
</table>

**Other Regulations**

14.2.22 New and altered roads and guided transport systems are also regulated by the *Noise Insulation Regulations 1975* and the *Noise Insulation (Railways and other Guided Transport Systems) Regulations 1996*. These Regulations provide a basis for providing noise insulation to qualifying properties adversely affected by noise. They are not a normal part of the Environmental Assessment process and it is highly unlikely that, given the projected vehicle movements, any property would qualify under these Regulations.

**Vibration**

14.2.23 Criteria for operational activities are also based on the guidance criteria contained in BS 6472 as discussed under Construction, above.

### 14.3 Baseline

14.3.1 Noise measurement locations were selected for each of the eight CGB route sections to represent the existing noise environment in residential areas or similar noise-sensitive receptors adjacent to the CGB corridor. A noise survey was conducted for the northern section of the route in 2001 and 2003. Measurements were taken during the early morning and late evening. Survey times were selected to obtain the lowest existing ambient noise conditions during the proposed period of the CGB operation (06:00 - 24:00 every day). A single mid-day measurement has also been made to establish the typical noise environment during the day for street running sections.

14.3.2 Noise measurements were carried out using a Brüel & Kjær 2260 real time analyser to obtain \( L_{Aeq}, L_{A90}, L_{A10} \) and \( L_{Amax} \) measurement parameters. Fifteen-minute samples were made in each hour between 05:30 - 09:30 and between 20:30 - 00:30. A single 15 minute sample was also taken between 11:00 - 16:00.

14.3.3 All measurements were free-field at approximately 1.2 m above ground level unless otherwise stated. The microphone was protected with a windscreen and the meter was calibrated before and after each survey period.

14.3.4 A noise survey was conducted by Ashdown Environmental for sections 7 and 8 of the route, which comprised, 15-minute measurements at seven locations. Measurements at 6 of the locations were in the shortened measurement procedure as outlined in CRTN. Measurements at the seventh location were continuous 15-minute samples taken over a 24-hour period. Measurements were taken at a height of between 1.2 and 1.5 m at a distance more than 3.5 m away from any reflecting surfaces.
14.3.5 A summary of the aural environment at noise monitoring points in each of the route sections is provided below. Locations of noise monitoring points are marked on the plans in Appendix 14 A and full survey results can be found in Appendix 14 B.

Section 1: Huntingdon to St Ives Park and Ride

14.3.6 Location 1 - Huntingdon Railway Station Car Park: Steady noise from A14 with occasional train pass-bys and local traffic in car park.

14.3.7 Location 2 - On B1514 opposite Excelcare Residential Home: Intermittent road traffic.

14.3.8 Location 3 - Roadside A1123 St Ives: Intermittent road traffic.

14.3.9 Location 4 - West of A1096: Intermittent road traffic, high HGV content.

Section 2: St Ives Park and Ride to District Boundary (Fen Drayton)

14.3.10 Location 5 - 24 Rookery Close, St Ives: Dominated by steady traffic noise from Harrison Way, which leads to the A14. Late evening baseline data can be assumed to be as for The Wilderness location as the early morning and mid-day measured noise data is very similar.

14.3.11 Location 6 - The Wilderness, St Ives: Road traffic on nearby Harrison Way was the dominant noise source.

14.3.12 Location 7 - River View, St Ives: Road traffic on Low Road was the dominant noise source. Harrison Way traffic noise was also audible.

14.3.13 Location 8 – Needingworth: The noise environment on Needingworth High Street included local and distant road traffic noise and occasional aircraft.

14.3.14 Location 9 – Holywell: There were no major noise sources close by. However traffic noise from the A14 was just audible. Early morning ambient noise levels are not expected to be significantly lower than late evening levels.

Section 3: District Boundary (Fen Drayton) to Swavesey Drain

14.3.15 Location 10 - Fen Drayton Nature Reserve: No major noise sources nearby but distant traffic noise was audible. Birdsong contributed to the noise environment but did not dominate; no significant drop in ambient noise levels expected during early morning or late evening.

14.3.16 Location 11 - 47 Station Road, Swavesey: This was one of the nearest residential properties to the railway crossing. Road traffic on Station Road was the main noise source; other occasional noise sources included birdsong and farm machinery.

14.3.17 Location 12 - Railway crossing, Swavesey: Road traffic on Over Road was the main noise source. Over Road is used as an access route to the A14. Farm machinery and a nearby engineering workshop also contributed to the noise environment during the day. Occasional jet aircraft were also audible.

Section 4: Swavesey Drain to Longstanton Park and Ride

14.3.18 Location 13 - Brookfield Farm and 1 Magdalene Close, Longstanton: There are no major noise sources nearby these locations, only distant traffic noise, most likely from the A14 and occasional traffic on local roads. The early morning measurements at Magdalene Close are...
representative of the Brookfield Farm location. The mid-day and late evening measurements at Brookfield Farm are representative of the Magdalene Close location.

14.3.19 **Location 14 - Digital Park, Longstanton:** Local traffic noise included cars on Station Road and diesel vans using the nearby tyre yard, in addition to distant traffic noise, probably from the A14.

**Section 5: Longstanton Park and Ride to A14**

14.3.20 **Location 15 - Oakington Station:** The station building is now residential; traffic on Station Road to and from the A14 was the main noise source. HGVs using a nearby yard also contributed to the noise environment during the morning and daytime survey periods.

14.3.21 **Location 16 - 32 Manor Park, Histon:** Measurements were taken approximately 10 m from the CGB route; local traffic on the surrounding streets and distant traffic noise from the A14 were the main noise sources. Noise from the SCA recycling plant was also audible during most of the measurements.

14.3.22 **Location 17 - 14 Villa Place, Histon:** Local traffic on the surrounding streets and distant traffic noise from the A14 were the main noise sources; buses on Station Road were also audible.

14.3.23 **Location 18 - Histon Station:** This building has been converted to office space and residential; traffic, including buses, on Station Road was the main noise source. Occasional aeroplanes were also audible.

14.3.24 **Location 18a – Pepys Terrace:** Rear gardens facing the guideway. Road traffic noise from the elevated Histon Road and from extract noise from the light industrial estate at Kendal Court.

**Section 6: A14 to Cambridge Railway Station**

14.3.25 **Location 19 - Buchan Street:** A residential street off King’s Hedges Road not far from Arbury Park farm; the dominant noise source was traffic using King’s Hedges Road and the A14.

14.3.26 **Location 20 - 11 Garry Drive:** A residential road, which was also representative of the Science Park noise environment, was dominated by traffic noise from King’s Hedges Road.

14.3.27 The early morning and late evening baseline data from Buchan Street and 11 Garry Drive was representative of residential receptors in the City Centre; therefore, a single mid-day measurement has been made for the locations below.

14.3.28 **Location 21 - Carisbrooke Road/Badminton Close:** This is predominately a residential area. Histon Road is a heavily used road, running north from the City Centre. Road traffic, including HGVs, was the dominant noise source throughout the measurement. A petrol driven pressure washer was in use further down Badminton Close; it is assumed that this is not a normal occurrence.

14.3.29 **Location 22 - Birch Close/Milton Road:** Road traffic, which included HGVs, was the dominant noise source and was influenced heavily by the traffic lights sequence at the junction with Union Lane and Arbury Road. Arbury Road was closed during the survey for water main repairs.

14.3.30 **Location 23 - Midsummer Common/Victoria Avenue:** This is one of the main routes
across the River Cam, and is in constant use. Pedestrian crossings interrupt the traffic flow. Road traffic, including HGVs, was the dominant noise source. Midsummer Common is a large area of common land, close to the City Centre and a popular recreation area that is also occasionally used to graze cattle.

14.3.31 **Location 24 - Emmanuel Road:** Emmanuel Road has restricted access to private vehicles and is only used by buses, taxis, emergency and delivery vehicles. Although traffic flows are quite low compared to other similar parts of the city, the high content of HGV/buses means that $L_{A_{eq}}$ and $L_{A_{90}}$ levels are similar to those from the other measurement locations. Pedestrians use Christ’s Pieces heavily as it is the main route between the bus station and the Grafton Shopping Centre.

14.3.32 **Location 25 - Regent Street:** Regent Street is the main road running through the City Centre and has a mix of commercial and residential property and is used constantly by pedestrians. Road traffic, including HGVs, was the dominant noise source. Traffic flow is interrupted by the traffic lights at Parker’s Piece and cars attempting to turn against the flow of traffic into Park Terrace.

14.3.33 **Location 26 - Hills Road/Russell Street:** The noise environment is very similar to Regent Street but there are more side roads off Hills Road; traffic flows are higher than those on Regent Street due in part to the vehicles en-route to and from the railway station.

14.3.34 **Location 27 - Station Road/Tenison Road:** The majority of buildings on Station Road are occupied by offices; buildings on Tenison Road are mainly residential. Road traffic, including HGVs, was the dominant noise source due to constant traffic to and from the Station and use of Tenison Road as a popular short cut.

**Section 7: Cambridge Railway Station to Trumpington**

14.3.35 Noise monitoring was undertaken at 7 locations south of the railway station.

14.3.36 Noise levels along the CGB route running from Cambridge Railway Station out towards Long Road are dominated by noise from the existing mainline railway running close by and road traffic noise on Long Road. On the approach to Trumpington just to the south of Foster Road, the disused railway line runs into steep cutting passing close to the rear of residential properties in Cranleigh Close and Lantree Crescent. Existing ambient noise levels measured in this area are typically between 48 dB(A) and 58 dB(A). Adjacent to Hauxton Road and Shelford Road, these levels increase to 67 dB(A) and 66 dB(A) respectively. Night-time noise levels measured in Cranleigh Close gave a value of 49 dB(A) between the hours of 23:00 and 00:00. In the absence of other major noise sources this is felt to be representative of levels of noise in Lantree Crescent.

**Section 8: Link to Addenbrooke's Hospital**

14.3.37 No noise measurements were taken along the route for the link to Addenbrooke's Hospital, which does not pass any residential properties.

**14.4 Predicted Effects**

**Construction Noise**

14.4.1 Potential impacts due to construction noise are most likely to occur during construction of the new park and ride sites at Longstanton and St Ives, adjacent to the temporary access roads, and construction of over bridges.
14.4.2 Activities which could give rise to local disturbance include:

- the movement of materials either around or to and from the site;
- movement of heavy plant, initially when brought to site and once operational;
- construction of overbridges; and
- demolition of existing structures.

14.4.3 Piling is possible at a number of locations including the Great Ouse Viaduct, Hills Road Bridge, and the new railway overbridge for the link to Addenbrooke's Hospital. Some bridge works may require night working under track possessions from Network Rail. This activity can potentially be very noisy and therefore where possible continuous flight auger and cast in-situ piles should be used instead.

14.4.4 Preliminary predictions of the construction noise for the new railway overbridge for the link to Addenbrooke’s Hospital indicate that daytime noise levels would be of the order of 70dBLAEq and nighttime levels of the order of 65 dBLAEq at a distance of 50 metres from the activity. This activity would be more than 500 metres from the nearest receptor, by which distance the noise levels would reduce to 45/40 dBLAEq by day and night respectively, of similar magnitude to ambient noise levels.

14.4.5 Demolition of the former Histon Railway Station could also give rise to daytime noise levels up to 70dBLAEq at the rear of properties in Villa Place. This is assessed as a moderate adverse impact.

14.4.6 Road widening and alteration works would take place at a number of locations in Huntingdon, St Ives and Cambridge including the Harrison Road/Meadow Lane roundabout associated with improvements to Meadow Lane. Construction noise would be similar to the ambient traffic noise at most locations. Disruption to traffic flows during off-peak periods could potentially lead to construction activities during unsocial hours.

14.4.7 Construction of the guideway and maintenance track would take some 8 months, though work in the vicinity of any sensitive locations would be much shorter than this. This would be mainly civil engineering works in clearing and preparing the foundations and the forming of the concrete guideway and maintenance track.

14.4.8 At this stage there is insufficient information to carry out detailed numerical assessment of construction noise or vibration levels. However it is considered that, with the temporary nature of the works, construction noise and vibration would have an overall negligible effect on all areas, with the exception of Villa place where mitigation is proposed (see Section 14.7).

14.4.9 After completion of the main civil engineering works there would be activities relating to installing the cabling and communications systems and landscape and other mitigation factors along the route. These do not involve large plant and are relatively low noise activities.

**Operational Noise**

14.4.10 The tables below show the results of noise level predictions from CGB buses in each of the route sections. In order to understand the combination of noise levels in the tables, it should be remembered that noise levels in decibels follow the laws of logarithmic addition.
Section 1: Huntingdon to St Ives Park and Ride

14.4.11 Throughout this section CGB buses would run on existing roads. These movements are not predicted to increase road traffic volumes on any part of this route by more than 25%, and the Scheme is therefore considered to have a negligible effect on the noise environment for this section of the route.

Section 2: St Ives Park and Ride to Fen Drayton (District Boundary)

Maintenance Depot and Stabling Facility

14.4.12 This would be located to the east side of the park and ride site proposed for St Ives, adjoining commercial and industrial uses on Meadow Lane. Its main function would be re-fuelling, a control centre, and a depot for vehicles, equipment and materials for maintenance of the guideway. It is situated well away from the nearest residential properties, the Wilderness and River View, and is unlikely to produce audible noise at the site boundary.

Parking

14.4.13 The main sources of on-site noise would be the starting/stopping of cars and movement of the CGB buses around the site. The proposed park and ride would be located adjacent to Harrison Way, a major commuter route into St Ives. Residential properties at the Wilderness and River View are already heavily affected by road traffic noise on the A1096 and therefore, the effect of on-site noise on the surrounding area is considered negligible.

Off-site

14.4.14 The largest percentage increases in traffic growth occur on Meadow Lane, the access road to the St Ives Park and Ride site. Traffic increases greater than 25% occur, resulting in noise level increases between 1 and 2 dB (A) the effect of which is considered negligible.

14.4.15 The nearest noise sensitive receivers to the route in St Ives are located to the north in Rookery Close, to the west in the Wilderness and to the south at River View. The noise contribution as a direct result of the Scheme has been calculated and the results are shown in Table 14.3. These show no increase, and therefore the effects on surrounding area are considered negligible.

Table 14.3: Results of CGB noise level predictions for route section 2

<table>
<thead>
<tr>
<th>Location</th>
<th>Measured Ambient $L_{A_{eq}}$ dB</th>
<th>CGB Only $L_{A_{eq}}$ dB</th>
<th>Predicted with CGB $L_{A_{eq}}$ dB</th>
<th>Noise Change dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>Rookery Close</td>
<td>55</td>
<td>51</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Wilderness</td>
<td>55</td>
<td>42</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>River View</td>
<td>64</td>
<td>59</td>
<td>26</td>
<td>26</td>
</tr>
</tbody>
</table>

Section 3: District Boundary (Fen Drayton) to Swavesey Drain

14.4.16 This is a sparsely populated area where the closest residential properties are located over 1 km to the north and to the south in Holywell and Fen Drayton respectively. The noise effect of Scheme in this area is considered negligible.

14.4.17 At Swavesey, where the proposed kiss and ride site and stop are located, predicted increases in traffic on Over Road or Station Road as a result of the development are negligible. The
closest residential properties are located approximately 60 m to the north and 125 m to the south of the guideway.

14.4.18 The results in Table 14.4 show no increase in noise exposure at these properties, therefore the effects on the surrounding area are considered negligible.

14.4.19 The main village of Swavesey is located 500 m to the south.

### Table 14.4: Results of CGB noise level predictions for route section 3

<table>
<thead>
<tr>
<th>Location</th>
<th>Measured Ambient ( L_{Aeq} ) dB</th>
<th>CGB Only ( L_{Aeq} ) dB</th>
<th>Predicted with CGB ( L_{Aeq} ) dB</th>
<th>Noise Change dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>Over Road</td>
<td>63</td>
<td>54</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>The Vicarage Swavesey</td>
<td>63</td>
<td>54</td>
<td>38</td>
<td>38</td>
</tr>
</tbody>
</table>

Section 4: Swavesey Drain to Longstanton Park and Ride

Park and Ride

14.4.20 The capacity of the park and ride would initially be 350 spaces with the potential to increase to 700 spaces. The closest noise sensitive receiver is Orchard Cottage, off Station Road, to the west of the site. Due to the distance involved, noise effects from the site on the surrounding area are considered negligible.

Off-site

14.4.21 Predicted traffic increases where they occur on Station Road are less than 25%. This is equivalent to an increase between 0-1 dB(A) and therefore the off-site effect of the park and ride at Longstanton is considered negligible.

14.4.22 The CGB route passes to the north of Longstanton, crossing the B1050. The results in Table 14.5 show a maximum noise increase at Railway Cottages of 1 dB(A) during the daytime and 2 dB(A) between the hours of 23:00-00:00. No other properties are affected at this location and therefore, the overall effects of the Scheme are considered negligible.

### Table 14.5: Results of CGB noise level predictions for route section 4

<table>
<thead>
<tr>
<th>Location</th>
<th>Measured Ambient ( L_{Aeq} ) dB</th>
<th>CGB Only ( L_{Aeq} ) dB</th>
<th>Predicted with CGB ( L_{Aeq} ) dB</th>
<th>Noise Change dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>Railway Cottages</td>
<td>65</td>
<td>58</td>
<td>59</td>
<td>56</td>
</tr>
<tr>
<td>Thodays Cottage</td>
<td>65</td>
<td>58</td>
<td>45</td>
<td>42</td>
</tr>
<tr>
<td>Orchard Cottage</td>
<td>65</td>
<td>58</td>
<td>39</td>
<td>36</td>
</tr>
</tbody>
</table>
Section 5: Longstanton Park and Ride to A14

14.4.23 Predicted noise levels from the operation of the Scheme are shown in Table 14.6. Increases in noise levels are predicted at the former station house on Oakington Road but increases of 1 dB are imperceptible and therefore the effects are considered negligible.

14.4.24 On the approach to Histon, the CGB route runs to the rear of properties in Pease Way, Melvin Way, St Audrey’s Close and Manor Park Road. The largest predicted increases occur at properties located in Pease Way, Melvin Way and St Audrey’s Close, adjacent to the disused railway line and Villa Place. The figures for Melvin Way in Table 14.6 are also representative of Pease Way and St Audrey’s Close. Daytime levels are predicted to increase by 12 dB and 13 dB, the effects of which are considered major adverse, and 8 dB to 13 dB during the night-time hour, the effects of which are considered moderate to major adverse.

Table 14.6: Results of CGB noise level predictions for route section 5

<table>
<thead>
<tr>
<th>Location</th>
<th>Measured Ambient L_{Aeq} dB</th>
<th>CGB Only L_{Aeq} dB</th>
<th>Predicted with CGB L_{Aeq} dB</th>
<th>Noise Change dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>43 Oakington Rd</td>
<td>66</td>
<td>60</td>
<td>59</td>
<td>56</td>
</tr>
<tr>
<td>47 Oakington Rd</td>
<td>66</td>
<td>60</td>
<td>39</td>
<td>36</td>
</tr>
<tr>
<td>14 Melvin Way</td>
<td>39</td>
<td>40</td>
<td>51</td>
<td>48</td>
</tr>
<tr>
<td>32 Manor Park</td>
<td>39</td>
<td>40</td>
<td>35</td>
<td>32</td>
</tr>
<tr>
<td>6 Villa Place</td>
<td>46</td>
<td>43</td>
<td>59</td>
<td>56</td>
</tr>
</tbody>
</table>

Section 6: A14 to Cambridge Railway Station

14.4.25 After passing under the A14, the CGB route would split. The western route would run parallel with King’s Hedges Road to the junction with Histon Road. The eastern route would continue along the disused railway corridor to Milton Road where the guideway continues towards Chesterton Sidings and CGB buses join Milton Road for on-street running towards Cambridge City Centre.

14.4.26 The eastern section of the guided busway would run along the boundary of the proposed mixed development at Arbury Park. The ES for the Arbury Park development identifies road traffic noise from the A14 as having a major impact on this site, and incorporated noise mitigation in its design and layout. The guided busway would have a negligible effect on this proposed development given the high ambient noise not only for the A14, but significant traffic flows on King’s Hedges Road.

14.4.27 The western section of the CGB route would pass the Regional College and Science Park. Given the high quality construction of these buildings it is not anticipated that noise from CGB buses would have any effect on the internal noise climate.

14.4.28 Predicted noise levels given in Table 14.7, show that a maximum increase of 2dB occurs in Garry Drive adjacent to the disused railway corridor. Increases of up to 3dB are considered to have a negligible effect on the surrounding noise sensitive receivers.

14.4.29 At Histon and Milton Roads the CGB buses would run on the existing road network through to the centre of Cambridge and therefore is not considered a new noise source at this point. Zero percent traffic growth is assumed for the centre of Cambridge, and as a result, increases of more than 25% or a reduction of 20% are unlikely. The Scheme is therefore considered to have a negligible effect on the noise environment for this section of the route.
Table 14.7: Results of CGB noise level predictions for route section 6

<table>
<thead>
<tr>
<th>Location</th>
<th>Measured Ambient $L_{Aeq}$ dB</th>
<th>CGB Only $L_{Aeq}$ dB</th>
<th>Predicted with CGB $L_{Aeq}$ dB</th>
<th>Noise Change dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge Regional College</td>
<td>53</td>
<td>-</td>
<td>38</td>
<td>34</td>
</tr>
<tr>
<td>Science Park</td>
<td>53</td>
<td>-</td>
<td>44</td>
<td>40</td>
</tr>
<tr>
<td>Buchan St/King’s Hedges Rd (10m)</td>
<td>64</td>
<td>54</td>
<td>50</td>
<td>46</td>
</tr>
<tr>
<td>Buchan St/King’s Hedges Rd (40m)</td>
<td>64</td>
<td>54</td>
<td>44</td>
<td>40</td>
</tr>
<tr>
<td>Buchan St/King’s Hedges Rd (60m)</td>
<td>64</td>
<td>54</td>
<td>38</td>
<td>34</td>
</tr>
<tr>
<td>11 Garry Drive</td>
<td>53</td>
<td>47</td>
<td>50</td>
<td>46</td>
</tr>
<tr>
<td>116 Lovell Road</td>
<td>53</td>
<td>47</td>
<td>40</td>
<td>36</td>
</tr>
</tbody>
</table>

Section 7: Cambridge Railway Station to Trumpington

14.4.30 From Cambridge Railway Station, the CGB route would initially run parallel to the mainline railway. There are noise sensitive receivers on both the east and west sides. Properties to the west are protected by a row of industrial and commercial buildings, and directly to the east there are residential properties and Hills Road Sixth Form College. Predicted noise increases from the operation of the Scheme are shown in Table 14.8. A 24-hour hour survey has been conducted at one location and levels from this survey indicate that ambient noise levels do not drop significantly between 23:00 and 00:00 hours. Predictions for 22 Lantree Crescent, 48 Lantree Crescent and 11 Cranleigh Close do not take account of the screening provided by the railway cutting. Therefore despite its proximity, the operation of the Scheme would not increase ambient noise levels at these locations. The effect on the surrounding noise sensitive receivers is therefore considered negligible.

14.4.31 Trumpington Park and Ride has a vehicular capacity of 1000 spaces and is already operational. There are no noise sensitive receivers within 100m of the existing Park and Ride site and therefore the potential impact of the increased level of activity of people coming and going to and from the site is considered negligible.

Table 14.8: Results of CGB predicted noise levels for route section 7

<table>
<thead>
<tr>
<th>Location</th>
<th>Measured Ambient $L_{Aeq}$ dB</th>
<th>CGB Only $L_{Aeq}$ dB</th>
<th>Predicted with CGB $L_{Aeq}$ dB</th>
<th>Noise Change dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>Hills Rd Sixth Form College</td>
<td>55</td>
<td>-</td>
<td>23</td>
<td>-</td>
</tr>
<tr>
<td>4 Homerton Street</td>
<td>55</td>
<td>-</td>
<td>24</td>
<td>-</td>
</tr>
<tr>
<td>1 Fitzwilliam Road</td>
<td>55</td>
<td>-</td>
<td>23</td>
<td>-</td>
</tr>
<tr>
<td>66 Foster Road</td>
<td>44</td>
<td>-</td>
<td>23</td>
<td>-</td>
</tr>
<tr>
<td>100 Foster Road</td>
<td>44</td>
<td>-</td>
<td>27</td>
<td>-</td>
</tr>
<tr>
<td>114 Foster Road</td>
<td>44</td>
<td>-</td>
<td>27</td>
<td>-</td>
</tr>
<tr>
<td>Sedley Taylor Road</td>
<td>52</td>
<td>-</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>Shelford Road</td>
<td>66</td>
<td>-</td>
<td>43</td>
<td>-</td>
</tr>
<tr>
<td>22 Lantree Crescent</td>
<td>50</td>
<td>49</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>48 Lantree Crescent</td>
<td>50</td>
<td>49</td>
<td>43</td>
<td>43</td>
</tr>
</tbody>
</table>
Section 8: Link to Addenbrooke's Hospital

14.4.32 To the south of Long Road Bridge in the southern section of the route, a link is proposed to the boundary of Addenbrooke's Hospital. There are no noise sensitive receivers up to the boundary with Addenbrooke's Hospital where the Scheme terminates, and therefore no noise effects.

14.5 Summary of Effects

14.5.1 Table 14.9 summarises the predicted impacts along each section of the route in terms of the significance criteria outlined in Section 14.2.

Table 14.9: Unmitigated predicted effects of daytime and night-time (23:00 – 00:00 only) operation of Scheme

<table>
<thead>
<tr>
<th>Location</th>
<th>Measured Ambient LAeq dB</th>
<th>CGB Only LAeq dB</th>
<th>Predicted with CGB LAeq dB</th>
<th>Noise Change dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>11 Cranleigh Close</td>
<td>49</td>
<td>49</td>
<td>37</td>
<td>37</td>
</tr>
</tbody>
</table>

Vibration

14.5.2 Measurements on the Leeds guided bus system confirmed that no perceptible vibration would occur 4 metres beyond the guideway. Allowing for the maximum amplification by suspended timber floors (4 times threshold values), the maximum predicted vibration dose values inside residential properties (even those closer than 4 m to the guideway) would be well below the trigger levels for adverse comment (see Section 14.2).

14.5.3 Observations of the Leeds guided bus system also indicated that buses entering the guideway did not give rise to an adverse affect. The shallow angle and width of the entrance funnel is such that there is a soft connection of guide wheels and guide kerbs.

14.5.4 Operational vibration would therefore have a negligible effect.

14.6 Proposed Mitigation

Construction Noise

14.6.1 The effects of construction noise can be minimised by following the recommendations contained within BS 5228 to use best practical means to control noise. The quietest plant would be selected wherever possible, shielding provided to those noise sensitive receivers likely to be affected and effective site management implemented for optimum noise control and methods of working. Details of piling methods under consideration are unknown.
However, where appropriate, auger piling would be used, which is significantly quieter than percussive piling methods.

14.6.2 A Code of Construction Practice would be agreed between the Contractor and the Local Authority (see Section 4.5) setting out the measures that would be taken to minimise site noise.

14.6.3 Typical working hours for construction sites would be as defined in Section 4.5. The construction of the Scheme may necessitate out of hours working. The mechanism for agreeing this work is also described in Section 4.5.

**Operational Noise**

14.6.4 To mitigate the predicted effects in route section 5, a noise barrier would be required on the following parts of the CGB route:

- the north-eastern edge of the guideway from Girton Crossing to approximately ch 16+000, in order to protect properties adjacent to the disused railway in Pease Way, Melvin Way and St Audreys Close; and
- the southern edge of the guideway, starting at approximately ch 17+100 to 17+500 (as far as Kendall Court), protecting properties to the south of the guideway in Villa Place.

14.6.5 The form that these barriers would take would be a matter for detailed design.

14.6.6 The provision of a noise barrier is predicted to provide an attenuation of 10 dB, thus reducing the predicted noise changes to 3 dB or less. After mitigation all operational noise impacts would be negligible.

**Vibration**

14.6.7 As there are no predicted vibration impacts there is no requirement for mitigation.

14.7 **Residual Effects**

14.7.1 The predicted residual noise and vibration effects of the Scheme are negligible.

14.8 **Summary**

14.8.1 The effects of the Scheme, both operationally and during construction have been assessed, and were found to be negligible for the majority of the route, before mitigation.

14.8.2 Adverse effects have been identified for sections of the route where the Scheme is to operate close to noise sensitive receivers. These effects would be removed with the provision of noise barriers, constructed to an appropriate height and design along identified sections of the route.

14.8.3 Vibration is not considered a potentially significant impact during either the operational or construction phases.
Appendices

Appendix 14 A  Noise Survey Locations
Appendix 14 B  Noise Survey Results
References

3 BS 6472 : (1992) Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz).
6 Department of Transport Design Manual for Roads and Bridges, Volume 11, Environmental Assessment (DMRB).
7 Department of Transport publication Calculation of Road Traffic Noise (CRTN, 1988).
### Summary of Noise and Vibration Impacts

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction noise and vibration</strong></td>
<td>Construction noise and vibration</td>
<td>Moderate -ve, ST, T</td>
<td>Some disturbance where close to housing/or where necessity to work anti-social hours</td>
</tr>
<tr>
<td><strong>Noise from buses on guideway</strong></td>
<td>Noise from buses on guideway not in close proximity to houses</td>
<td>Negligible</td>
<td>Non required</td>
</tr>
<tr>
<td></td>
<td>Noise from buses on guideway in close proximity to houses (approximately 1km of CGB route)</td>
<td>Major -ve, LT, P</td>
<td>Noise barriers</td>
</tr>
<tr>
<td><strong>Operational vibration</strong></td>
<td>No significant effect</td>
<td>Negligible</td>
<td>Non required</td>
</tr>
</tbody>
</table>

Note: Abbreviations are as follows
+ve = positive, -ve = negative, D = direct, I = indirect, S = Secondary, C = cumulative, ST = short-term, MT = medium-term, LT = long-term, P = permanent, T = temporary. Abbreviations can be used in any viable combination, i.e. avoiding contradictions.
15. **SOCIO-ECONOMIC ASSESSMENT**

15.1 **Introduction**

15.1.1 This section of the Environmental Statement (ES) examines the likely socio-economic impacts that could occur as a result of the proposed Cambridgeshire Guided Busway Scheme (CGB). These impacts would potentially accrue to a range of interests, including commuters, businesses and communities in general.

15.1.2 The section is structured as follows:

- baseline conditions along the Cambridge-Huntingdon corridor as well as the regional and local economic context;
- description of potential journey time savings associated with the Scheme;
- consideration of the benefit to communities, as well as the effects on local businesses and employees;
- benefits in terms of construction jobs and jobs created by the operation of the Scheme;
- summary of the potential local negative impacts and mitigation measures that would be necessary to address these impacts.

15.2 **Baseline**

15.2.1 The A14 is the principal east-west route between the east coast ports to Europe and the M1/M6 motorways. It is also part of the strategic north-south route via its connection with the M11 at Cambridge. Furthermore, it acts as a local distributor and access road, particularly for trips to Cambridge and Huntingdon. However, it currently has widespread congestion at peak times.

15.2.2 The congestion on the A14 inhibits the operations of one of the most dynamic local economies in Europe. In addition, there are other negative impacts in terms of inconvenience, pollution, safety, impact on bus services and constraint on labour catchments which reduces access to job opportunities.

**Existing and Potential Local Public Transport Services**

15.2.3 The Cambridge to Huntingdon Multi Modal Study (CHUMMS)\(^1\) information pack states that public transport carries only 5% of passenger journeys in the Cambridge-Huntingdon corridor. Journey times by bus between Huntingdon and Cambridge are more than an hour at peak times, and service reliability is adversely affected by congestion on the A14. It also identifies that, if nothing is done, bus journey times and service reliability would deteriorate further due to increasing congestion. For public transport to play a significant role in the future, it asserts that an improvement in journey times, service levels and overall quality would be needed, and this would require significant investment.

15.2.4 In December 2001, Steer Davies Gleave (SDG) published a report for Cambridge City Council and Cambridgeshire County Council examining bus provision in Cambridge\(^2\). Its aim was to examine the potential for improving bus provision in the centre of Cambridge for the short and long term.

15.2.5 In terms of demand, there are approximately 36,000 bus passenger movements in Cambridge
per day. Local stage-carriage bus trips (81%) dominate the market, although park & ride (15%) is also important. About 1,300 (3.5%) trips per day are made on long distance coaches to/from Cambridge. Of the trips in Cambridge, approximately 27,000 board or alight in the City Centre. For local services the proportional breakdown by origin and destination is:

- 36% of all passengers board in the City Centre;
- 37% alight in the City Centre;
- 27% of local trips start and end outside the City Centre.

15.2.6 The SDG report also provides an assessment of the likely changes in supply and demand over the next 10 years. It states that the current level of bus use is relatively low and that, in the context of forecast population growth and job creation levels, a significant increase in the use of bus services is both necessary and achievable but only if the quality and quantity of bus services is significantly increased.

15.2.7 Economic growth in the city and regional economy may be slightly lower than in previous years (reflecting global and national trends). However, labour supply is expected to increase across the region in line with national trends in Economic Activity Rates (EARs). A significant proportion of this trend is due to an increase in all women of working age who are in or looking for work. As well as the effect of higher EARs, labour supply can be expected to increase locally in areas such as Longstanton/Oakington, Addenbrooke’s and west Cambridge due to higher dwellings completions, so that job growth and labour supply would become more evenly balanced than in the past. The proposed Scheme would serve these areas.

15.2.8 Growth in jobs and labour supply in these areas, coupled with national and local policies to reduce dependence on private car travel, could help initiate growth in public transport demand. If supply were able to fully respond to these ambient conditions, SDG consider that demand could grow by as much as 60% over the next 10 years\(^7\). If supply remains at its current level and with its current operational problems, growth could be below 10%. The SDG report identifies the Cambridge-Huntingdon corridor as a section that would require significant new services. It therefore concludes that growth in supply of up to 40% would be justified in response to the growth in demand. A mid-growth scenario would imply something in the region of a 20% increase in supply (and 30% increase in demand).

15.2.9 As part of the public consultation exercise for the CHUMMS study, a questionnaire was distributed to members of the public. Their comments were recorded in respect of each mode of transport. The most frequent comments on rail, and bus and coach are shown below:

**Rail:**
- No direct train between Huntingdon and Cambridge;
- Unreliable frequency;
- Disused railway line not used;
- Cambridge station is too far from the City Centre;
- Poor interchange with buses.

**Bus and Coach**
- Bus service is unreliable;
- Poor service to outlying villages;
• Buses get caught in traffic congestion;
• Poor school bus service;
• More park and ride services needed further out of Cambridge;
• Too few park and ride sites around Cambridge;
• Poor service to hospitals at Addenbrooke’s and Fulbourn.

15.2.10 The recommendation, given in the final CHUMMS report published in August 2001, was for a guided bus-based public transport system, complemented by on-line widening of the A14 (with local bypasses) with other traffic improvement measures, to best address the transport problems in the Cambridge-Huntingdon corridor (also see Section 3.3).

15.3 Economic Context

Regional Context

Regional Economic Strategy

15.3.1 The key document covering economic issues in the East of England is the Regional Economic Strategy (RES) produced by the East of England Development Agency (EEDA) in June 2001. Its central target is for the East of England to become one of Europe’s top-20 regions by 2010, in terms of Gross Value Added (GVA) per head. To achieve this, it has identified the need for economic growth. This would require an improvement in business performance and appropriate investment in skills and infrastructure.

15.3.2 The RES has several main themes for economic growth. These include:

• Competitive business and organisations for a world-class region – this recognises that existing and emerging clusters of businesses in Cambridge add great value to the regional economy and generate competitive advantage.
• Regeneration Plus – supporting our people and communities – this looks to open up areas vulnerable to structural economic decline by generally diversifying local economies through business-led sectors and clusters, and more specifically by assisting businesses.
• Leading-edge infrastructure and high-quality environment – this recognises the historic lack of investment in the transport infrastructure of the East of England. It is key that this infrastructure is integrated with business and housing land. In particular, it recognises that this is best done by making public transport a priority.

15.3.3 As well as recognising the impact of commuting on the regional economy, the RES provides support for market towns, recognising their role in supporting the rural economic regions. It seeks to make them the focus for economic development in areas in need of regeneration, both economically and socially. Updating work for the revised RES is currently under way.

Infrastructure Benchmarking Study

15.3.4 A more specific Infrastructure Benchmarking Study produced for EEDA by Steer Davies Gleave in December 2000 sought to assist EEDA in developing its policies on infrastructure and its associated investment strategy. One of the main findings of the study was that transport investment can play a critical role in supporting and expanding clusters of businesses by expanding labour catchments and enhancing intra-area interactions. It was
considered that transport investment would become increasingly important as regions compete for mobile investment.

15.3.5 Several international case studies were considered as part of the wider study. The following observations were made:

- The single most important determinant of continued success in high technology business clusters is the ability to grow the skilled labour market together with support services; factors that affect the ability to attract and retain people will have adverse impacts on the sustained growth of the cluster.

- In Silicon Valley (USA), high costs of housing expand the size of the business cluster catchment, but this has limits in terms of travel times and costs. Costs and availability of housing and ease of travel will become more important in sustaining large established clusters of businesses.

- In high growth areas where infrastructure investment has been limited in the past, infrastructure constraints are perceived to be holding back future growth.

15.3.6 A key finding was that the role of investment in additional infrastructure in enabling and sustaining economic development was found to be greatest in areas where the economy is already performing well, and so making intensive use of the stock of infrastructure available.

15.3.7 The study concludes that in the East of England the provision of additional built infrastructure is likely to have the greatest impact within the high growth areas in assisting cluster development and geographic expansion of existing clusters, and in creating development corridors and triangles. It says that in high growth areas such as the Cambridge Sub-Region, there is an opportunity to create development corridors based on economic interactions. However, strong road and rail links are required to enable these corridor developments to expand to the cluster areas. Furthermore, housing, including affordable housing, must be linked to public transport improvements and east-west links need to be developed to increase locational choice for both businesses and workers, and to promote regional cohesion.

15.3.8 This emphasis on allowing the forces and processes to continue driving growth is tempered by the need to achieve this in a sustainable manner that safeguards the environment and enhances quality of life.


15.3.9 In December 2003, the government published a White Paper on The Future of Air Transport, which sets out the strategic framework for the development of airport capacity in the United Kingdom over the next 30 years, against the wider context of the air transport sector. It does not authorise or preclude any specific development in itself, but it sets out the policy framework which will inform future planning application decisions and against which relevant public and private bodies can build plans.

15.3.10 The conclusion of the White Paper is that the key priority is to make maximum use of existing runways at major South East airports, although this alone will not be enough to meet predicted demand. Therefore, the White Paper supports first increasing terminal capacity to cater for an increase from the current 19 million passengers per annum to 34 million passengers per annum. The White Paper also supports development of a second wide-spaced runway at Stansted Airport, expected around 2011-2012, which will increase capacity to 46 million passengers per annum.

15.3.11 The package of road schemes announced by the government in July 2003, included
improvements which will allow Stansted to better cope with the increased passenger numbers generated by this expansion. These include the widening of the M25 and M11, and the upgrade of the A120. The document also suggests that the following surface transport issues be considered:

- Increased capacity on the West Anglia Main Line, including platform extension and additional track along some key sections;
- peak capacity at Liverpool Street and Tottenham Hale;
- increased capacity on the M11, between the M25 and the airport;
- as well as enhancements to local roads, and public transport improvements.

15.3.12 The South East consultation document states that, airport-related employment could increase from around 10,000 jobs currently to around 57,000 by 2030. This would affect the spatial distribution of employees around the wider London/ Cambridge/ Stansted Sub Region, as staff would need to be drawn from a wider catchment.

15.3.13 The White Paper did not support the expansion of capacity at Alconbury for freight and passenger traffic, but does recognise the potential for relocation there of aircraft maintenance operations, in view of the potential loss of Cambridge Airport as a base for maintenance.

Sub-Regional Context

Roger Tym & Partners (2001) Implementing the Cambridge Sub-Regional Strategyvii, and Update (February 2002)viii

15.3.14 The focus for this study, published in October 2001, was the examination of the full range of infrastructure and community facilities that will enable the development of homes and jobs to take place. It states that, in order to successfully implement the Sub-Regional Strategy, transport infrastructure improvements will be required at a cost of between £980 million and £1,040 million. It states that, due to these high cost levels, transport infrastructure will need to be funded by private funds, specifically through the Private Finance Initiative (PFI). An update, published in February 2002, states that the sub-region is suffering from an “infrastructure deficit” and that “a comprehensive range of infrastructure must be in place to support the additional population and economic activity planned for the sub-region”.

The Cambridgeshire & Peterborough Structure Plan (Adopted 2003)

15.3.15 Key features of the Structure Plan are discussed in the Planning Policy section (Section 6) of the Environmental Statement


15.3.16 The GCP was established in January 1998 as an alliance of public and private sector interests. The challenge was to produce a vision and a balanced framework to provide the overall direction for the area and shape the plans and strategies of the main agencies operating within the Greater Cambridge sub-region, which stretches beyond the county boundary. The Action Plan, conceived in July 2000 and updated annually, identified a number of concerns and priorities including:

- unbalanced growth, leading to overheating of the local economy, contributing to recruitment problems, long distance commuting and traffic congestion;
- infrastructure deficit in terms of transport and education, social facilities and affordable housing, which needs a comprehensive and integrated solution;
the whole of the Greater Cambridge area is not yet seen as a sub-regional entity; this inhibits the attraction of inward investment and hinders the spread of growth from Cambridge and Huntingdon;

as a result of this and other concerns, sharing of the economic benefits of growth across the wider population has been restricted.

15.3.17 The Action Plan’s top priority for planning and investing in growth is to invest in physical and social infrastructure.

London – Stansted – Cambridge Sub-Regional Study (2000)x

15.3.18 The London – Stansted – Cambridge Sub-Regional Study’s purpose is to advise the East of England Regional Planning Body and the Mayor of London on future strategic land-use development and transport options for the area. It is not a plan in itself.

15.3.19 The study states that there exists the potential for significant economic growth of regional and national importance in the study area. For this potential to be realised, a positive approach to planning is required. This will include developing East-West connections and more peripheral routes rather than purely radial routes into London. Authorities should plan positively for growth rather than defensively against overspill from London.

Local Economic Context

15.3.20 Local policies recognise that Cambridge has a buoyant economy, but they also acknowledge that there are problems as well as opportunities posed by the further growth of Cambridge, on housing provision, employment and infrastructure. Particular areas for concern are the effects of this continued growth on outlying rural settlements and an increase in congestion levels because of a growth in car use.


15.3.21 The Cambridge City Council Economic Policy Statement states that there is growing confidence in the economic future of the Eastern Region in general. Prospects for Information and Communications Technology (ICT), biotechnology, pharmaceuticals and other hi-tech sectors remain good within the Greater Cambridgeshire area. However, across the region, the Statement identifies a remaining shortage of clerical/administrative staff as well as managerial staff and IT specialists.

15.3.22 The Statement expects continued job growth in Cambridge and South Cambridgeshire until 2006. Cambridge is traditionally a net importer of workers. As such, the imbalance between the number of jobs in the city and its resident workforce has exacerbated traffic problems. A mismatch between local labour force skills and new and changing employment growth may result in an increase in longer distance commuting and an increase in migration. This will therefore have further negative impacts on the traffic and congestion problem.

15.3.23 Economic policy can be broken down to cover 3 main objectives. These are:

- Objective 1 – “To help develop the recognised local, sub-regional and international roles of Cambridge, building on the City’s strengths”;
- Objective 2 – “To promote opportunity and social inclusion within the City by working in partnership with government bodies, the voluntary sector and other agencies. In particular to focus efforts on those experiencing most disadvantage”;
Objective 3 – “To help secure and maintain quality physical environment and infrastructure that is attractive to and supports business”.

**Huntingdonshire Local Economic Strategy, Medium Term, 2002-2007**

15.3.24 The Local Economic Strategy identifies specific actions that need to be taken forward for the economic growth of Huntingdonshire including the development of infrastructure and facilities that add value to the local economy. These actions are seen as being essential for securing the long-term growth and assisting in the structure and functioning of the Huntingdonshire economy. The Strategy states that

“The Council’s priority is to ensure that the economy continues to grow in a sustainable manner, and that increased economic activity is complemented by appropriate infrastructure development.”

**South Cambridgeshire District Council Economic Development Strategy (2003)**

15.3.25 The South Cambridgeshire District Council Economic Development Strategy identifies objectives concerned with maintaining growth in this area of Cambridgeshire. The strategy states that:

“Ensuring adequate infrastructure is implemented alongside housing and employment growth is essential if economic development is not to be hampered”.

15.3.26 One of the objectives of the Strategy is for the Council to:

“take an active role in the stakeholder partnership to co-ordinate delivery of infrastructure in the Cambridge Sub-Region”

and to:

“work towards sustainable transport solutions ... with the emphasis on alternatives to the car”.

**Summary**

15.3.27 The Scheme is consistent with regional, county and local economic guidance. In addition, it is recognised that for Cambridge to maintain its strong economic position, there is a need to provide better infrastructure to support growth in the market towns on the edge of the Cambridge Sub-Region, including St Ives and Huntingdon.
15.4 Socio-economic Analysis

Changes in Population and Workforce

15.4.1 Table 15.1 shows Cambridge City, South Cambridgeshire and Huntingdonshire, are forecast to grow respectively by 19%, 33% and 6% between 1999 and 2016. This compares to an average across Cambridgeshire and Peterborough of 17%.

Table 15.1: Population Forecasts, ‘000s

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge City</td>
<td>110.4</td>
<td>108.9</td>
<td>116.0</td>
<td>123.4</td>
<td>131.5</td>
<td>19%</td>
</tr>
<tr>
<td>South Cambridgeshire</td>
<td>129.9</td>
<td>130.1</td>
<td>146.7</td>
<td>159.6</td>
<td>172.6</td>
<td>33%</td>
</tr>
<tr>
<td>Huntingdonshire</td>
<td>157.2</td>
<td>157.0</td>
<td>166.8</td>
<td>166.9</td>
<td>166.0</td>
<td>6%</td>
</tr>
<tr>
<td>East Cambridgeshire</td>
<td>67.9</td>
<td>73.2</td>
<td>72.0</td>
<td>75.7</td>
<td>79.3</td>
<td>17%</td>
</tr>
<tr>
<td>Fenland</td>
<td>81.9</td>
<td>83.5</td>
<td>89.6</td>
<td>91.5</td>
<td>92.8</td>
<td>13%</td>
</tr>
<tr>
<td>Peterborough</td>
<td>154.7</td>
<td>156.1</td>
<td>169.1</td>
<td>175.4</td>
<td>181.8</td>
<td>18%</td>
</tr>
<tr>
<td>Cambridgeshire and Peterborough</td>
<td>702.0</td>
<td>-</td>
<td>760.2</td>
<td>792.5</td>
<td>824.0</td>
<td>17%</td>
</tr>
</tbody>
</table>

Source: Cambridgeshire & Peterborough Structure Plan, Technical Report in support of the Deposit Draft plan
Note: 2001 population figures are taken from Census 2001 data, and not from the Structure Plan technical appendices. They are included here for reference purposes only.

15.4.2 For Cambridgeshire and Peterborough, the population of working age (i.e. 16-65 years old) is forecast to grow by 15.1%. Growth in total population is 17.4%. Because of this, the population of working age declines slightly as a proportion of total population, however the forecast of absolute growth of the working age population is almost 70,000 over the period (see Table 15.2).

Table 15.2: Population of Working Age Forecasts, Cambridgeshire and Peterborough

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2016</th>
<th>% Change 1999-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>42,600</td>
<td>47,500</td>
<td>11.5%</td>
</tr>
<tr>
<td>5-10</td>
<td>54,600</td>
<td>57,900</td>
<td>6.0%</td>
</tr>
<tr>
<td>11-15</td>
<td>42,600</td>
<td>45,800</td>
<td>7.5%</td>
</tr>
<tr>
<td>16-19</td>
<td>38,000</td>
<td>40,000</td>
<td>5.3%</td>
</tr>
<tr>
<td>20-24</td>
<td>52,500</td>
<td>59,800</td>
<td>13.9%</td>
</tr>
<tr>
<td>25-39</td>
<td>159,500</td>
<td>168,200</td>
<td>5.5%</td>
</tr>
<tr>
<td>40-64</td>
<td>211,100</td>
<td>262,800</td>
<td>24.5%</td>
</tr>
<tr>
<td>Working Age</td>
<td>461,100</td>
<td>530,800</td>
<td>15.1%</td>
</tr>
<tr>
<td>65-74</td>
<td>54,600</td>
<td>82,400</td>
<td>50.9%</td>
</tr>
<tr>
<td>75+</td>
<td>46,700</td>
<td>59,800</td>
<td>28.1%</td>
</tr>
<tr>
<td>Total</td>
<td>702,200</td>
<td>824,200</td>
<td>17.4%</td>
</tr>
<tr>
<td>% Working Age</td>
<td>65.7%</td>
<td>64.4%</td>
<td>-1.9%</td>
</tr>
</tbody>
</table>

Source: Cambridgeshire & Peterborough Structure Plan, Technical Report in support of the Deposit Draft plan
15.4.3 Forecasts of labour supply and demand show how addressing issues of labour market capacity will be critical to the future development of the region. In Cambridge City and South Cambridgeshire, growth in labour demand between 2001 and 2016 is forecast to be marginally greater than growth in labour supply, thus maintaining the existing labour shortage (23,200 workers by 2016). This points to a slight increase in in-commuting of workers from outside these districts.

15.4.4 By 2016 labour supply in Huntingdonshire is forecast to outstrip labour demand by 8,300 workers. The level of out-commuting is forecast to reduce by more than half from 2001, however the figures imply that roughly 10% of workers in Huntingdonshire will still need to access available jobs outside Huntingdonshire. This is shown in Table 15.3.

Table 15.3: Labour Demand and Supply Forecasts

<table>
<thead>
<tr>
<th></th>
<th>Labour Demand and Supply</th>
<th>Labour Demand and Supply (000s)</th>
<th>Change 2001-2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge City &amp; South Cambridgeshire</td>
<td>Demand</td>
<td>149.9</td>
<td>155.5</td>
</tr>
<tr>
<td></td>
<td>Supply</td>
<td>126.6</td>
<td>134.0</td>
</tr>
<tr>
<td>Huntingdonshire</td>
<td>Demand</td>
<td>66.5</td>
<td>72.2</td>
</tr>
<tr>
<td></td>
<td>Supply</td>
<td>85.4</td>
<td>90.9</td>
</tr>
<tr>
<td>East Cambridgeshire</td>
<td>Demand</td>
<td>20.1</td>
<td>22.8</td>
</tr>
<tr>
<td></td>
<td>Supply</td>
<td>34.4</td>
<td>37.6</td>
</tr>
<tr>
<td>Fenland</td>
<td>Demand</td>
<td>31.2</td>
<td>31.7</td>
</tr>
<tr>
<td></td>
<td>Supply</td>
<td>40.5</td>
<td>43.1</td>
</tr>
<tr>
<td>Peterborough</td>
<td>Demand</td>
<td>91.6</td>
<td>96.4</td>
</tr>
<tr>
<td></td>
<td>Supply</td>
<td>76.5</td>
<td>79.2</td>
</tr>
<tr>
<td>Cambridgeshire &amp; Peterborough</td>
<td>Demand</td>
<td>359.2</td>
<td>378.6</td>
</tr>
<tr>
<td></td>
<td>Supply</td>
<td>363.3</td>
<td>384.7</td>
</tr>
<tr>
<td>Cambridge Sub-Region</td>
<td>Demand</td>
<td>-</td>
<td>244.1</td>
</tr>
<tr>
<td></td>
<td>Supply</td>
<td>217.0</td>
<td>230.9</td>
</tr>
</tbody>
</table>

Source: Cambridgeshire & Peterborough Structure Plan, Technical Report in support of the Deposit Draft plan

15.4.5 Economic Activity Rates (EARs) show the percentage of the resident population in a given area which is in the labour force. The EARs for Cambridgeshire and Huntingdonshire, taken from 2001 Census data, are shown in Table 15.4. Activity rates in Cambridge City are very low compared with neighbouring districts within the region (60.5%). This is greatly affected by the policy of Cambridge University of not allowing students to take paid employment during term time, however the Scheme will improve the potential for other residents of Cambridge to access jobs further afield within the region, encouraging economic activity. Other districts, apart from Fenland, show high EARs, indicating the strength of the economy.
Table 15.4: Economic Activity Rates

<table>
<thead>
<tr>
<th></th>
<th>Population aged 16 - 74</th>
<th>No. economically active</th>
<th>Economic Activity Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peterborough</td>
<td>111,688</td>
<td>77,323</td>
<td>69.2%</td>
</tr>
<tr>
<td>Cambridge</td>
<td>85,345</td>
<td>51,592</td>
<td>60.5%</td>
</tr>
<tr>
<td>East Cambridgeshire</td>
<td>53,138</td>
<td>38,456</td>
<td>72.4%</td>
</tr>
<tr>
<td>Fenland</td>
<td>59,756</td>
<td>39,487</td>
<td>66.1%</td>
</tr>
<tr>
<td>Huntingdonshire</td>
<td>113,549</td>
<td>84,775</td>
<td>74.7%</td>
</tr>
<tr>
<td>South Cambridgeshire</td>
<td>94,803</td>
<td>70,840</td>
<td>74.7%</td>
</tr>
<tr>
<td><strong>East of England</strong></td>
<td></td>
<td></td>
<td><strong>69.3%</strong></td>
</tr>
<tr>
<td><strong>England &amp; Wales</strong></td>
<td></td>
<td></td>
<td><strong>66.5%</strong></td>
</tr>
</tbody>
</table>

*Source: 2001 Census*

15.4.6 The employment breakdown by occupation, in Appendix 15A, Table 1, shows the forecast change in composition of employment by occupation. In Cambridge City and South Cambridgeshire, the current predominance of highly skilled workers, particularly managers and administrators, is forecast to increase, with a 14.8% growth between 2001 and 2016. At the same time, low skilled and unskilled jobs are forecast to fall over the same period. In Huntingdonshire the profile is similar, with the number of managers, administrators and more highly skilled workers rising, and lower skilled jobs falling. However, growth in the higher skilled jobs is forecast to be at a lower rate (only 5.8% for managers and administrators over the period 2001-2016), reflecting the overall mix of jobs in the local economy.

15.4.7 This is supported by the Employment Breakdown by Sector Appendix 15A, Table 2, which shows the forecast change in the industry sectoral composition of the economy. It is apparent that the ‘Business’ and ‘Other Services’ sectors dominate the economy, representing 29.8% of the forecast growth in Cambridge City and South Cambridgeshire between 2001 and 2016. Non-marketed services are also forecast to grow, by 7.2%, and are strongly represented in overall terms, with 49,200 jobs at present. Growth is forecast in Huntingdonshire in the same sectors, which also reflect the strength of the economy.

15.4.8 Tables 1 and 2 (in Appendix 15A) indicate that key skill level sectoral growth in Cambridge City, South Cambridgeshire and Huntingdonshire is below that of the Cambridge Sub-Region. The Cambridge Sub-Region includes Cambridge and surrounding Market Towns, including Huntingdon and St Ives.

15.4.9 The areas of these districts which fall within the Cambridge Sub-Region are where the focus of the economy is located, and it is important to emphasise that the movement of commuters will tend to be towards, and within, the Sub-Region. As such, facilitating this movement (and the forecast increase in movements) sustainably will require improvements in the transport infrastructure network.

15.4.10 The employment data used in preparing Tables 1 and 2 (in Appendix 15A) are taken from the Cambridge and Peterborough Structure Plan Technical Reports. The forecasts were primarily carried out for Cambridgeshire and Peterborough as a whole. At a sub-county level, industrial sectors are assumed to grow at the same rate across the whole area. Depending on the existing industrial mix, therefore, different districts will grow at different rates. Sub-county level predictions should be treated as indicative, and not as an accurate forecast.
Travel to Work Patterns

15.4.11 Data on travel to work patterns is only available from the 1991 Census. Whilst this information is dated, it does give an indication of relative flow levels and modal split. Table 15.5 shows the commuting levels into and out of Cambridge from the 1991 Census.

Table 15.5: Commuting Flows to and from Cambridge Employment Service Area, 1991

<table>
<thead>
<tr>
<th>ESAs in Cambridgeshire</th>
<th>Number commuting into ESA</th>
<th>Numbers commuting out of ESA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ely</td>
<td>4,150</td>
<td>450</td>
</tr>
<tr>
<td>Haverhill</td>
<td>1,830</td>
<td>60*</td>
</tr>
<tr>
<td>Huntingdon &amp; St Ives</td>
<td>6,820</td>
<td>1,290</td>
</tr>
<tr>
<td>Newmarket</td>
<td>2,860</td>
<td>650</td>
</tr>
<tr>
<td>Royston</td>
<td>3,250</td>
<td>1,460</td>
</tr>
<tr>
<td>St Neots</td>
<td>830</td>
<td>150</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19,740</strong></td>
<td><strong>4,060</strong></td>
</tr>
</tbody>
</table>

Source: 1991 Census

* The Cambridge ESA (now defunct) lies entirely in Cambridgeshire. The figures for Haverhill ESA refer to people commuting to and from Cambridge to the part of Haverhill ESA that lies in Cambridgeshire (note this does not include Haverhill itself, neither do Newmarket or Royston ESAs include those towns). These figures should be treated as indicative of the relationship between in- and out-commuting to and from Cambridge.

15.4.12 The Table shows that in 1991 there were nearly five times as many people commuting towards the Cambridge Employment Service Area (ESA) within Cambridgeshire, as were commuting outward. The major in-commuting origin was Huntingdon and St Ives ESA, with over 6,800 daily commuters to Cambridge. However, despite the fact that out-commuting was low, there was still a significant level of movement from Cambridge to both Huntingdon & St Ives and Royston ESAs.

15.4.13 Appendix 15A Table 3 shows modes of travel to work by Local Authority residents. This data is taken from 2001 Census results. The data shows that car use is very high in Huntingdonshire (65%) and South Cambridgeshire (63%), compared to the national average (55%). Train patronage in the same area is very low (2.7-2.8% compared with 4.1% nationally). The proportion of people who walk to work is very low, suggesting that distance to work is higher than average. The Scheme will help people to access jobs by a more sustainable mode.

15.4.14 Table 15.6 shows that in 1998 a considerable majority of trips (81%) into Cambridge were made by car. As parking restrictions have been tightened since then, an increasing number of people now choose to drive to a park & ride site and travel in by bus. In 1998, park and ride Users made up 2% of all commuters into Cambridge. Buses had the second highest percentage of travel at 10%. Table 15.6 shows that the greatest number of in-commuting journeys to Cambridge are made by private car.

Table 15.6: Vehicles and People crossing the Cambridge Radial Cordon

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Vehicles 12-hr flow</th>
<th>% 12-hr flow</th>
<th>People 12-hr flow</th>
<th>% People/vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Cycles</td>
<td>2,054</td>
<td>1%</td>
<td>2,094</td>
<td>1%</td>
</tr>
<tr>
<td>Cars and Taxis</td>
<td>143,984</td>
<td>81%</td>
<td>177,688</td>
<td>74%</td>
</tr>
<tr>
<td>Light Goods</td>
<td>17,630</td>
<td>10%</td>
<td>21,154</td>
<td>9%</td>
</tr>
</tbody>
</table>
Summary

15.4.15 The baseline economic conditions in Cambridgeshire are generally favourable, with a strong economy and an emphasis in the growth areas such as business and other services. However, there are indications that the physical development capacity of the Cambridge Sub-Region is starting to struggle to support the levels of economic and population growth that are required. This is supported by the report produced by Roger Tym & Partners that has highlighted the need for potentially over £1 billion of transport infrastructure to be built.

15.5 Predicted Effects

Journey Time Savings

15.5.1 Journey time benefits are calculated using Values of Time (VoT) (disaggregated by mode of transport) to give a monetised value for travel time saved by a project’s implementation. VoT values are taken from the Government-published Transport Economics Note. The Transport Economic Efficiency (TEE) table compiled for the ‘Annex E’ submission gives journey time benefits as £62 million for guided bus users, £12 million for conventional bus users, and £55 million for private car users. Total journey time saving benefit, discounted over 30 years, at a 3.5% discount rate, is £128,470,00011.

Socio-Economic Benefits to Communities along the A14

15.5.2 There are three critical areas in which the proposed CGB would provide additional social benefits: access to education, town centres, and economic opportunities. These benefits are considered below.

Access to Education

15.5.3 The CGB has the potential to influence access to schools. Since secondary schools have wider catchment areas than primary schools, these benefits would be experienced mainly by families with children aged 11 to 16. Table 15.7 below shows secondary schools whose catchment areas are crossed by the CBG route, and the numbers of pupils at those schools in 2001.

15.5.4 The table shows that in 2003 over 8,000 children attended secondary schools on or near to a stop on the CBG route (up to roughly a ten to fifteen minute walk and, in some cases, significantly less). Existing public bus services to these areas are infrequent and do not serve the desired locations with sufficient regularity or speed to be realistically used by schoolchildren on a daily basis. The lack of school bus services was one of the key

11 Discounted present values in 1998 values and prices
weaknesses of the current transport infrastructure identified by the public in the CHUMMS study. The CBG route offers the potential for some of the children living in the catchment areas of these schools to use CGB as a school bus. A further 6,000 pupils attended schools with a catchment area wholly or partly covered by the CGB route.

Table 15.7: Pupils on Roll of Secondary Schools on or near a CGB stop

<table>
<thead>
<tr>
<th>School</th>
<th>Pupils on Roll in January 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinchingbrooke S, Huntingdon</td>
<td>1,881</td>
</tr>
<tr>
<td>St Ivo S, St Ives</td>
<td>1,819</td>
</tr>
<tr>
<td>Swavesey VC, Swavesey</td>
<td>949</td>
</tr>
<tr>
<td>Impington VC, Impington</td>
<td>1,322</td>
</tr>
<tr>
<td>Chesterton CC, Cambridge</td>
<td>956</td>
</tr>
<tr>
<td>Coleridge CC, Cambridge</td>
<td>431</td>
</tr>
<tr>
<td>Parkside CC, Cambridge</td>
<td>603</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,961</strong></td>
</tr>
<tr>
<td><strong>All pupils in Cambridgeshire</strong></td>
<td><strong>31,024</strong></td>
</tr>
</tbody>
</table>

% of Cambs. Pupils attending a school on or near the proposed CGB route: 26%

Source: Cambridgeshire CC
Note: CC=Community College; VC=Village College; S=School.

15.5.5 In addition, there are a number of Sixth Form and Further Education Colleges in the vicinity of the CBG route. They are as follows:

- Huntingdonshire College - 10,000 full-and part-time students
- Cambridge Regional College - 3,000 full-time students
- Hills Road Sixth Form College - 1,500 full-time students
- Long Road Sixth Form College - 1,650 full-time students

15.5.6 The catchment areas of these colleges are larger than the secondary schools, and this gives rise to an additional 16,000 students needing to access colleges in Cambridge and Huntingdon from across the region. The presence of the Scheme would be of particular benefit to students at Long Road Sixth Form College and Cambridge Regional College, as there would be CGB stops located immediately near to the colleges.

15.5.7 Not all students attending the schools and colleges above would live along the CBG route. However there would be an opportunity for pupils to be dropped off at CGB stops, which would reduce the number of car journeys into Cambridge and Huntingdon, where the schools are located. There would also be a potential for school shuttle buses to link rural villages to the CGB stops or for services to use, or join, the guideway.

Access to Town Centres

15.5.8 The Scheme would serve the Town Centres of Huntingdon, St Ives and Cambridge City Centre. The Scheme would improve public transport access to these centres, thereby offering a greater opportunity for those without access to a car to use services such as leisure and entertainment facilities and the wide choice of shops and other services, which are only
available in town and City Centres. In addition, it would offer a mode choice for those who would normally use a car to access these services.

15.5.9 This assessment has shown that the potential socio-economic benefits to individuals in the communities served by CGB would be demonstrated mainly in terms of improved access to services, secondary schools, shopping centres, leisure and entertainment. Specifically it would:

- enable residents in rural areas to more easily access these services at peak and semi-peak travel times, with improved journey time reliability;
- provide an improvement in public transport for those without access to a car, in terms of both journey times and frequency of service, in comparison with existing bus services;
- enable residents of Cambridge access to the Market Towns and wider countryside; and
- greatly improve off-peak public transport provision, allowing rural residents to use public transport to visit town and City Centres during evenings and at weekends. Similarly, it would allow residents of town and city centres to visit rural areas during off peak hours. Existing off-peak bus services are infrequent.

**Access to Economic Opportunities**

15.5.10 The DTLR Index of Multiple Deprivation (IMD) 2000 is a ward-level Index which ranks every ward in England as a composite of six separate Domain Indices (Education Skills and Training, Employment, Income, Housing, Health Deprivation and Disability, and Geographical Access to Services).

15.5.11 The area served by the Scheme is broadly prosperous, however there are some wards where access to economic opportunities may be lacking. Four wards on, or in close proximity to, the CBG route fall in the top third of the Index of Multiple Deprivation.

<table>
<thead>
<tr>
<th>WARD</th>
<th>IMD Ranking (out of 8414 wards)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huntingdon North, Huntingdon</td>
<td>2,313</td>
</tr>
<tr>
<td>Kings Hedges, Cambridge</td>
<td>1,802</td>
</tr>
<tr>
<td>East Chesterton, Cambridge</td>
<td>2,419</td>
</tr>
<tr>
<td>Arbury, Cambridge</td>
<td>2,175</td>
</tr>
</tbody>
</table>

*Note: Rank 1 is the most deprived, rank 8,414 the least deprived*

15.5.12 Four wards; Kings Hedges (1,747), Arbury (1,964), Castle (2,713) and Huntingdon North (2,779) fall into the top 33% of the Index of Income Deprivation. Arbury also falls in the top 33% of wards (2,280) in the Index of Employment Deprivation.

15.5.13 The Scheme would facilitate access to and from Cambridge as described above, and would make a positive contribution to improving access to employment and other economic opportunities.

**Access to Tourism, Leisure and Recreation**

15.5.14 The Scheme would allow local residents easier access to the many leisure and cultural amenities of Cambridge, the market towns, and the surrounding countryside. Such amenities
on or near the CBG route include:

- Retail outlets, leisure centres, and libraries in Huntingdon, St Ives, and Cambridge;
- A multiplex cinemas in Huntingdon and Cambridge;
- Hinchingbrooke House, a Tudor country house open to the public on Sundays in summer;
- Hinchingbrooke Performing Arts Centre, set in the grounds of Hinchingbrooke House;
- Open spaces in the countryside surrounding the CBG route, including the River Great Ouse and Hereford Marina;
- Several folk and music festivals in Cambridge in the summer months;
- The Backs area by the River Cam;
- Venues such as Cambridge Corn Exchange; The Boat Race, The Junction, three theatres, and the West Road Concert Hall;
- Several museums in Cambridge;
- The University Botanic Gardens in Cambridge

15.5.15 As well as allowing residents easier access to this wide range of amenities, the Scheme would enable some of the significant numbers of tourists who already visit Cambridge annually to access the attractions and built heritage of the market towns and surrounding countryside (see Built Heritage in Section 10).

Impacts on Local Businesses and Employees

15.5.16 The Scheme would make access to jobs easier, which should assist recruitment in the Sub-Region where some employers experience skill shortages. As shown in the baseline assessment above, this is most prevalent in the highly skilled sectors, which continue to grow at a fast rate. Employers will face difficulty filling these positions in the medium term. By improving the accessibility of employment areas, such as Cambridge Science Park, the Scheme could potentially contribute to alleviating staff shortages. It also has the potential to reduce the stress associated with commuting, which should assist the efficiency and effectiveness of businesses locally, although these effects are likely to be of comparatively minor importance.

15.5.17 The CBG route would connect the several of the major areas of employment in the Sub-Region. Among these are Hinchingbrooke Hospital, Huntingdon Town Centre, St Ives Town Centre, Histon Vision Park, Cambridge Regional College, Cambridge Science Park, St John’s Innovation Centre, Castle Park, Cowley Road, Cambridge Business Park, Cambridge City Centre, and the Addenbrooke’s Hospital site. The Scheme would improve accessibility to all of these key sites.

15.5.18 The improvement in public transport infrastructure brought about by the Scheme has the potential to encourage investment in the Sub-Region. An effective public transport system is needed if Cambridgeshire is to maintain its economic success in core growth sectors such as high technology and knowledge-based industries. Although there are several science/business parks in Cambridge there is a shortage of employment land within the city. Therefore there is a need to provide sites in the more outlying areas of the Sub-Region, and to provide these areas with the infrastructure to enable access. For instance, high-tech and
Research and Development (R&D) activities are included in proposals for the Northstowe development near Longstanton, which would be linked to Cambridge by the CGB. The development of the Addenbrooke’s 2020 Vision is expected to create in the region of 5,500 new jobs on site. In addition, the Arbury Park development is expected to create in the region of 1,071 jobs.

15.5.19 The Cambridgeshire and Peterborough Structure Plan (2003) has allocated employment land for development that could create nearly 68,000 jobs up to 2016. Only 11,600 of these are forecast to be in Cambridge City, whilst South Cambridgeshire and Huntingdonshire are forecast to contain almost 38,000. Movement to the jobs in these districts would be assisted by the Scheme. Of these totals, 3,000 jobs are estimated to be created at Addenbrooke’s Hospital and 3,500 jobs at the proposed Northstowe development near Longstanton, both of which lie on the Scheme route.

15.6 Employment Benefits

Construction

15.6.1 An effect of the Scheme would be the creation of direct construction jobs. This is calculated using standard construction output figures as published by the Office for National Statistics (ONS) in the Monthly Digest of Statistics in August 2003xvi.

15.6.2 Average value of output per construction worker is calculated using the volume of output from all UK construction over the last four quarters and the number of UK construction jobs filled during that same period. This is shown in Table 15.9

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Total no. of UK construction jobs</th>
<th>Value of UK Construction Output (£m)</th>
<th>Ave. value of output per construction worker (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002 (Q2)</td>
<td>1,090,000</td>
<td>16,042</td>
<td>14,717</td>
</tr>
<tr>
<td>2002 (Q3)</td>
<td>1,091,000</td>
<td>16,334</td>
<td>14,972</td>
</tr>
<tr>
<td>2002 (Q4)</td>
<td>1,106,000</td>
<td>16,671</td>
<td>15,073</td>
</tr>
<tr>
<td>2003 (Q1)</td>
<td>1,086,000</td>
<td>16,236</td>
<td>14,950</td>
</tr>
<tr>
<td>Total</td>
<td>4,373,000</td>
<td>65,283</td>
<td>59,713</td>
</tr>
</tbody>
</table>

Source: ONS Monthly Digest of Statistics, August 2003

15.6.3 As shown in the table, in the last three quarters of 2002 and the first quarter of 2003 combined, the average value of output of each construction worker in the UK was approximately £59,700. This output is applied to the forecast costs of the Scheme to calculate the number of construction jobs likely to be created by the Scheme.

15.6.4 The capital cost for the Scheme in the Annex E submissionxvii to the Department for Transport (DfT) in July 2002 was £86.5m.

15.6.5 Therefore the number of full time equivalent (FTE) construction jobs can be calculated as follows:

\[
\text{Construction Spend} \div (\text{Output per construction worker} \times \text{No. of construction job years}) = \text{No. of FTEs created}
\]

\[
\begin{align*}
\text{Construction Spend} & = £86,486,000 \\
\text{(Output per construction worker)} & = £59,713 \\
\text{(No. of construction job years)} & = 1,448.4 \\
\text{No. of FTEs created} & = 145
\end{align*}
\]
15.6.6 This shows that 145 Full Time Equivalent (FTE) direct construction jobs could be created by the Scheme.

15.6.7 In addition, there would be indirect employment associated with the supply of materials for the construction of the Scheme and with the expenditure of construction employees’ salaries in the local economy (the latter is induced employment, but is considered together with indirect employment). This is calculated using the agreed methodology created by English Partnerships and the Regional Development Agencies in 2001xviii. This reflects closely HM Treasury’s Green Bookxix and is the agreed method for calculating additional impacts of schemes.

15.6.8 The first factor to take into account is leakage. This is the proportion of outputs that will benefit those outside of the region, i.e. the amount of jobs created outside of the region as a result of the construction of the Scheme. With the strength of the construction industry in the Cambridgeshire Sub-Region, it is viewed that the leakage effect will be low, at 10% of direct construction employment. As such:

\[
\text{No. of FTEs created}\quad 145 \\
- \text{Leakage}\quad 10\% \\
= \text{Gross Local Direct Effects}\quad 130
\]

15.6.9 The next effect is deadweight, which is construction output that would have occurred without the Scheme being built. In a project of this nature, this would represent approximately 25% of the gross local direct effects. As such:

\[
\text{Gross Local Direct Effects}\quad 130 \\
- \text{Deadweight}\quad 25\% \\
= \text{Gross Additional Local Direct Effects}\quad 98
\]

15.6.10 The third effect is displacement. This is defined as the proportion of Scheme construction outputs accounted for by reduced outputs elsewhere in the Sub-Region. Again, for a project such as this, a typical figure would be 25% of the gross additional local direct effects. As such:

\[
\text{Gross Local Direct Effects}\quad 98 \\
- \text{Displacement}\quad 25\% \\
= \text{Net Additional Local Direct Effects}\quad 73
\]

15.6.11 Finally, an employment multiplier is used to calculate the number of indirect jobs created. An agreed multiplier of 1.2 is to be adopted. This is a typical multiplier used for projects of this type. Therefore:

\[
\text{Net Additional Local Direct Effects}\quad 73 \\
x \text{Indirect Employment Multiplier}\quad 1.2 \\
= \text{No. of Indirect Construction Jobs}\quad 88
\]

15.6.12 As is shown, the number of FTE indirect construction jobs forecast to be created is 88 jobs.

**Operational**

15.6.13 There would be a number of direct jobs created with the operation of the CGB. This is broken down as shown in Table 15.10:
Table 15.10: FTE jobs created associated with the operation of the CGB

<table>
<thead>
<tr>
<th>Operations</th>
<th>Details</th>
<th>Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations Including drivers,</td>
<td>Including drivers, conductors, staffing of some stops, etc. This is</td>
<td>20-25</td>
</tr>
<tr>
<td>conductors, staffing of some</td>
<td>based on a ten minute CGB service with 4 buses diverting onto CGB.</td>
<td></td>
</tr>
<tr>
<td>stops, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td>Include 6 staff for the vehicles and 8 for the guideway</td>
<td>14</td>
</tr>
<tr>
<td>Ticketing facilities</td>
<td>It is planned that ticketing facilities would be unmanned, however</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>there would still be a small level of employment associated with the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>servicing and maintenance of these facilities</td>
<td></td>
</tr>
<tr>
<td>Park and Ride Sites</td>
<td>Site staffing; 4 staff per site² to allow 6 or 7 day</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>operation plus sickness, holiday etc and opening from 0600 to 0000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>daily. This assumes staffed park and ride sites at St Ives and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Longstanton.</td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>Management of the operation</td>
<td>10</td>
</tr>
<tr>
<td>Total FTE jobs created</td>
<td></td>
<td>55-60</td>
</tr>
</tbody>
</table>

15.6.14 Therefore, the overall FTE jobs created by the Scheme would total 55-60 jobs.

15.6.15 There would also be marginal induced employment associated with the salary expenditure of the above employees in the local economy. This is known as induced employment. Using the agreed multiplier of 1.1 to calculate this, the total induced employment created would be up to 61-66 FTE jobs.

15.6.16 These figures for construction costs and direct employment levels in Section 15.6 are the most up-to-date available, as at 27th November 2003. It should be noted that the figures calculated in the above sections are liable to change.

15.7 Potential Negative Impacts and Proposed Mitigation Measures

15.7.1 The following potential negative socio-economic impacts associated with the Scheme have been identified:

15.7.2 **General Access Restrictions:** there would be some minor restriction to crossing access between communities along the route, and these are described in the Transport and Access Section 16. *Mitigation: alternative provision for private accesses that cross the CGB route.*

15.7.3 **Construction Disruption:** There would be some impacts on local residents. *Mitigation: Addressed in relevant section of E.S.*
15.8 Summary

15.8.1 The key findings from the socio-economic impact assessment are as follows:

15.8.2 The Scheme is consistent with regional, county and local economic guidance. In addition, it is recognised that for Cambridge to maintain its strong economic position, there is a need to provide better infrastructure to support growth in the market towns on the edge of the Cambridge Sub-Region, including St Ives and Huntingdon.

15.8.3 The Cambridgeshire and Peterborough Structure Plan\textsuperscript{xxi} seeks to continue economic growth of the Cambridge Sub-Region through the development of more dispersed clusters of growth industries. One example is the proposed Northstowe development near Longstanton that has been identified by the Structure Plan as a site for a high tech employment cluster and provision of local services. The Scheme would have the potential to link this employment and other key employment areas, and research and education establishments in Cambridge.

15.8.4 Forecasts of labour demand and supply show the critical need to address issues of labour market capacity in the region. Currently, many of the jobs in Cambridge City are being filled by in-commuters, many of whom come along the A14 corridor from South Cambridgeshire and Huntingdonshire. Growth of the population of working age in Cambridge City is being encouraged in policy, at the same time as a reduction in population in Huntingdon, to meet labour demand growth and reduce in-commuting along the A14 corridor. The skills breakdown is predominated by highly skilled workers, particularly managers and administrators. The Scheme would assist workers to access jobs in this City Centre and elsewhere on the route by a sustainable means of transport.

15.8.5 The total journey time saving benefit arising from the Scheme, discounted over 30 years, at a 3.5% discount rate, is forecast to be £128,470,000.

15.8.6 There is potential for the Scheme to improve access to education and town centres (and the attendant economic opportunities) for people living on or near the route, or requiring access to destinations on or near the route. The Scheme would link a series of major employment sites in the sub region. It would also improve access to leisure, cultural and tourist facilities in Cambridge, the market towns and the surrounding countryside for local residents and tourists.

15.8.7 It is estimated that 73 FTE direct construction jobs would be created through the construction of the Scheme, taking into account leakage, deadweight and displacement effects (see Section 15.6). In addition, 88 FTE indirect construction jobs are forecast to be created.

15.8.8 55-60 FTE direct operational jobs are forecast to be created through the operation of the Scheme. In addition, around 61-66 induced FTE jobs would be created through spending by employees in the local economy.

15.8.9 The potential negative impacts of the Scheme are likely to be minor. There may be minor access restrictions to crossing access for communities. It is considered that the re-routing of these accesses would mitigate these impacts to a large extent.
Appendices

Appendix 15 A  Socio-economic Data Tables

References

6 Department for Transport, The Future Development of Air Transport in the UK: South East, 2002
7 Roger Tym & Partners, Implementing the Cambridge Sub-Regional Strategy 2001
8 Roger Tym & Partners, Implementing the Cambridge Sub-Regional Strategy: Update, February 2002
xii Huntingdonshire District Council, Local Economy Strategy: Medium Term 2002-2007, 2002
xiii South Cambridgeshire District Council, Economic Development Strategy, June 2003
xv DETR Indices of Deprivation 2000, 2000 (now administered by ODPM)
xvii Cambridgeshire County Council/ WS Atkins Ltd, Cambridgeshire to Huntingdon Rapid Transit: Appraisal, 2002
xx This is in line with current Cambridge park and ride staffing regimes
xxi Cambridgeshire County Council, Cambridgeshire and Peterborough Structure Plan, adopted 2003
## Summary of Socio-economic Impacts

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Short description in words</th>
<th>Characteristics</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Short description in words</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journey Time Savings</td>
<td>Total discounted journey time saving benefit £128.5m</td>
<td>Moderate +ve</td>
<td>Direct, LT</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Impacts on Residents of the A14 corridor:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Access to Economic Opportunities</td>
<td>4 wards in proximity to the route are in the top 33% of deprived wards as defined in the IMD 2000.</td>
<td>Slight +ve</td>
<td>Direct, LT</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>- Access to Education</td>
<td>8,329 children attend schools located on or near the CBG route. Two Further Education colleges would have stops near the CBG route.</td>
<td>Moderate +ve</td>
<td>Direct, LT</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>- Access to Town Centres</td>
<td>The Scheme would link St Ives and Huntingdon with Cambridge, improving public transport access to these facilities.</td>
<td>Major +ve</td>
<td>Direct, LT</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>- Access to Tourism, Leisure and Recreation</td>
<td>The Scheme would allow residents and tourists improved access to a wide range of leisure and cultural activities in Cambridge, the market towns, and surrounding countryside.</td>
<td>Moderate +ve</td>
<td>Direct, LT</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Impacts on Local Business and Employees</td>
<td>Makes access to employment easier, which should benefit the region where some employers experience labour and skills shortages. Improved public transport infrastructure should benefit</td>
<td>Major +ve</td>
<td>Direct, LT</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------</td>
<td>-----------------</td>
<td>---------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>the sub-region</strong></td>
<td>the sub-region by encouraging investment along the CBG route. Scheme links several key employment sites in sub-region.</td>
<td>Slight +ve</td>
<td>n/a</td>
<td>Slight restrictions to crossing access between communities along the route. See Transport and Access Section 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Employment Benefits:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- <strong>Construction</strong></td>
<td>73 direct FTE jobs created</td>
<td>Slight +ve</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>88 indirect FTE jobs created</td>
<td>Direct and Indirect, MT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- <strong>Operation</strong></td>
<td>55-60 direct FTE jobs created</td>
<td>Slight +ve</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>61-66 induced FTE jobs created</td>
<td>Direct and Indirect, LT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General Access Restrictions</strong></td>
<td>Some minor restriction to crossing access between communities along the route. See Transport and Access Section 16</td>
<td>Slight -ve Direct, LT</td>
<td>Alternative provision for private access.</td>
<td>Negligible -ve Direct, LT</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Construction Disruption</strong></td>
<td>Short term construction disruption likely to be negative impact</td>
<td>Moderate -ve Direct, ST</td>
<td>To be considered at construction stage</td>
<td>Moderate -ve Direct, ST</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Abbreviations are as follows

+ve = positive, -ve = negative, D = direct, I = indirect, S = Secondary, C = cumulative, ST = short-term, MT = medium-term, LT = long-term, P = permanent, T = temporary.

Abbreviations can be used in any viable combination, i.e. avoiding contradictions.
16. TRANSPORT AND ACCESS

16.1 Introduction

16.1.1 This section of the Environmental Statement (ES) assesses the impact which the Cambridgeshire Guided Busway (CGB) Scheme would have on its users, on other forms of transport and on the wider transport network. The Scheme would traverse a number of footpaths, bridleways and byways. It would also cross a number of public roads and private rights of way. Where the CGB buses would run on the existing highway system, some alterations would be made, such as minor engineering works and traffic management measures. Consideration is therefore given to the potential impact of the Scheme on other road users, including pedestrians, cyclists, and equestrians. The positive and negative impacts of the Scheme on these users are assessed, for both construction and operational phases, and mitigation measures are described where appropriate. The impact of the Scheme on accessibility to the transport system is also considered, including the identification of the benefits to both users and non-users of the Scheme.

16.2 Methodology

16.2.1 In order to carry out this assessment, reference has been made to the advice contained in the Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment. Part 8 of Section 3 deals with pedestrians, cyclists, equestrian and community effects, and Part 9 deals with impacts on vehicle travellers. DMRB was prepared generally with conventional roads in mind, so the methodology has been amended to allow for the somewhat different nature of the proposal being assessed, using a combination of quantitative and qualitative techniques. Where quantitative techniques were employed, models used peak hour traffic flows to generate “worst case” forecasts. The groups affected, and the nature of the potential impact affecting each group is summarised in Table 16.1.

<table>
<thead>
<tr>
<th>Group Affected</th>
<th>Operational Phase Impacts</th>
<th>Temporary Construction Phase Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGB bus and other public transport users</td>
<td>Improved service levels, quality and reliability. Reduced journey times and user stress.</td>
<td>Delays to journey due to queuing and/or slow moving heavy goods vehicles (HGV) or roadworks</td>
</tr>
<tr>
<td>Other motorised users</td>
<td>Improved journey times on some roads due to reduced congestion. Delays to some journeys due to queuing at guideway crossings; driver stress, severance of byways, delays due to priority measures for buses.</td>
<td>Delays to journey due to queuing and/or slow moving HGVs or roadworks; driver stress, severance of byways</td>
</tr>
<tr>
<td>Pedestrians, equestrians and cyclists</td>
<td>Changes in amenity; route modifications; changes to journey times. Improved links and access to the rights of way network and local amenities.</td>
<td>Changes in amenity; route modifications; changes to journey times; temporary diversions and stopping up of rights of way</td>
</tr>
<tr>
<td>Communities</td>
<td>Improved accessibility by public transport and non-motorised users; changes in traffic flows and community severance.</td>
<td>Changes in traffic flows and community severance</td>
</tr>
</tbody>
</table>
16.2.2 The assessment provides a comparison with the “Do Minimum” which includes:

- The *Cambridge to Huntingdon Multi Modal Study* (CHUMMS) A14 widening preferred option is implemented as programmed;
- The *Cambridgeshire and Peterborough Structure Plan (Adopted 2003)* (2003 Structure Plan) development allocations including the Northstowe new settlement;
- Bus services would run between the new settlement and Cambridge. Other public transport would serve all other areas which have access to guided bus in the model;
- The 2003 Structure Plan service frequency for high quality public transport (see Section 6);
- The existing park and ride service at Trumpington continues to operate at its current frequency.

16.2.3 The basis of the modelling structure was the land use and transport model (MENTOR). This model dynamically balances land use provision (housing and employment related) with transport provision and assesses the resultant land-use utilisation. The model is capable therefore of taking a given land use pattern (for example the introduction of a new settlement) and the transport infrastructure associated with it, and predicting the extent to which a settlement forms (i.e. what proportion of the assigned housing is occupied) and the demand for transport that results.

16.2.4 The demand for transport that was predicted by the land use model was then assigned to the various transport modes available, in competition, on the basis of their relative cost and perceived attractiveness. CGB was assessed as a separate transport mode and was available to both people with and without access to a car.

16.2.5 Once the demand had been assessed by transport mode, highway demands were assigned to the CGB SATURN highway network model to obtain 2016 a.m. peak hour traffic flows. The transport modelling process provided forecasts of both highway and public transport demands.

16.2.6 CGB bus flows were obtained from a model of bus service operations. The predicted traffic flows into and out of the proposed park and ride sites were obtained from the SATURN model. Tests were run with and without CGB in place.

16.2.7 The outputs of the SATURN model gave details about changes in traffic flows, public transport use and journey time changes for all modes. These outputs were subsequently entered into the Department for Transport’s TUBA software, which provided an economic analysis of the effects of the changes in the transport network resulting from the introduction of CGB. For details of the modelling assumptions refer to Section 16.3.

**Motorised Users**

**Delays**

16.2.8 On the guideway, junctions with public highways would be signal controlled, with priority given to the CGB buses. Other road users, mainly car drivers, could be affected by the Scheme due to increases in journey times linked to delays at the junctions with the public highway and in locations where changes in vehicle patterns could create new pressures on
existing junctions close to the route. In Cambridge, Huntingdon and St Ives, delays could affect non-bus traffic, as a result of the priority given to buses in the form of bus lanes and priority at junctions.

16.2.9 In terms of this assessment, delays at junctions would be a function of any of the following factors:

- frequency of the CGB bus service;
- traffic levels;
- traffic signal timing; and
- bus priority measures.

16.2.10 Traffic data has been collected for the proposed junctions with the public highway and the assessment of delay and traffic queuing at each junction is set out later in this section.

16.2.11 Table 16.2 summarises the quantitative assessment which has been undertaken. The qualitative assessment has adopted a seven-point scale: major negative, moderate negative, slight negative, negligible, slight positive, moderate positive, major benefit. The significance has been determined according to the magnitude and scale of the effects, and the extent to which people would be affected.

<table>
<thead>
<tr>
<th>Location</th>
<th>Methodology/Modelling Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>St Ives Meadow Lane/A1096 roundabout</td>
<td>Roundabout Capacity Assessment using ARCADY 5</td>
</tr>
<tr>
<td>Station Road/St Ives P+R/A1096 junction</td>
<td>Signalised Junction Capacity Assessment using LINSIG 1.2</td>
</tr>
<tr>
<td>Station Road, Swavesey</td>
<td>Signalised Junction Capacity Assessment using LINSIG 1.2</td>
</tr>
<tr>
<td>B1050 Station Rd, Longstanton - crossing</td>
<td>Signalised Junction Capacity Assessment using LINSIG 1.2</td>
</tr>
<tr>
<td>B1050 Station Rd, Longstanton – P+R roundabout</td>
<td>Roundabout Capacity Assessment using ARCADY 5</td>
</tr>
<tr>
<td>Station Rd, Oakington</td>
<td>Signalised Junction Capacity Assessment using LINSIG 1.2</td>
</tr>
<tr>
<td>New Road, Histon</td>
<td>Signalised Junction Capacity Assessment using LINSIG 1.2</td>
</tr>
<tr>
<td>Cambridge Road, Histon</td>
<td>Signalised Junction Capacity Assessment using LINSIG 1.2</td>
</tr>
<tr>
<td>King’s Hedges Road</td>
<td>Signalised Junction Capacity Assessment using LINSIG 1.2</td>
</tr>
<tr>
<td>Milton Road guided bus crossing</td>
<td>Signalised Junction Capacity Assessment using LINSIG 1.2</td>
</tr>
</tbody>
</table>

16.2.12 Average a.m. peak hour delay per vehicle in seconds and worst average queue in vehicles were extracted from the junction assessment model outputs. The model assumed that the CGB bus would have a “hurry call” facility which would change the signals in its favour on approach to minimise delays to the CGB bus. A separate phase is included in the signal model for non-motorised users.
16.2.13 Where a new signal controlled junction is proposed, where previously traffic had been free-flowing, drivers’ tolerance of delays is likely to be less than in an urban area where signal control is the norm. Accordingly, the bands shown in Table 16.3 have been adopted to denote the significance of these adverse impacts.

**Table 16.3 Significance of delays**

<table>
<thead>
<tr>
<th>Delay per vehicle in seconds</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 30</td>
<td>Slight adverse</td>
</tr>
<tr>
<td>Between 30 and 90</td>
<td>Moderate adverse</td>
</tr>
<tr>
<td>Over 90</td>
<td>Major adverse</td>
</tr>
</tbody>
</table>

16.2.14 Where new bus lanes are to be provided, this would involve carriageway widening and there would be no reduction in capacity for other road users. Hence there would be no impact on traffic on such roads.

**Driver Stress**

16.2.15 The DMRB deals with the issue of driver stress, which has three main components: frustration, fear of potential accidents and route uncertainty. Stress may therefore arise through the introduction of delays, through having to negotiate unfamiliar road layouts and geometry; through junction frequency; poor visibility; and as a result of changes in speed and/or flow per lane. In the case of the Scheme, journey delays are the main factor to be addressed, as there would be no significant change to the layout of existing roads. Should there be uncertainty about route direction in addition to delay, the effect would be to increase stress by one point, as shown in Table 16.4.

**Table 16.4 Assessment of driver stress levels**

<table>
<thead>
<tr>
<th>Significance of increase in driver stress</th>
<th>Effect of delay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without route uncertainty</td>
</tr>
<tr>
<td>Slight</td>
<td>None</td>
</tr>
<tr>
<td>Moderate</td>
<td>Slight</td>
</tr>
<tr>
<td>Major</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

**Pedestrians, Equestrians and Cyclists**

**New and Improved Facilities**

16.2.16 The provision of parking facilities for cyclists at stops and the proposed use of the maintenance track alongside the guideway for non-motorised users are significant benefits of the Scheme. The level of benefit would depend on the potential usage and a qualitative approach has been adopted for this assessment. The assessment takes into account the fact that on road measures include provision for cyclists.

**Obstruction/Delays**

16.2.17 The basis of this assessment is the potential change to the usage of the public rights of way network only, as any impacts on these users on the road network would be the same as for motorised users detailed above. Limited data are available on levels of use for rights of way and, as a result, no modelling has been possible and a qualitative approach has been followed.
16.2.18 The Scheme has the potential to affect recreational users of the countryside, such as ramblers, equestrians and cyclists. Where the guideway would cross a right of way, it could create an obstacle or the need to wait for bus traffic to pass. In some cases a diversion to a right of way might be necessary. The principal nature of the impact would be in additional time taken and the physical difficulty in crossing the line of the guideway. This may be more significant for those whose mobility is impaired. The significance of delays to non-motorised users is shown in Table 16.5.

Table 16.5 Assessment of impact of delays to non-motorised users

<table>
<thead>
<tr>
<th>Guided bus frequency (per hour)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5</td>
<td>negligible</td>
</tr>
<tr>
<td>6 - 10</td>
<td>slight</td>
</tr>
<tr>
<td>Over 10</td>
<td>moderate</td>
</tr>
</tbody>
</table>

16.2.19 Where a footpath or bridleway runs alongside, or crosses, the guideway, noise from CGB buses may have a potential impact on non-motorised users. This could particularly affect equestrian users. The impact of noise is dealt with in Section 14.

16.2.20 The maintenance track, which intersects with and links a number of existing public rights of way would also provide an opportunity for improved amenity for recreational users, particularly in the rural sections of the route.

16.2.21 The CGB bus would offer all the communities along its route an additional form of transport, which could promote the accessibility and social inclusion of residents of those settlements, particularly those without access to a car. This would be a significant intangible benefit, which would be influenced by the numbers of people able to take advantage of the opportunity, frequency of service, and distance from home to CGB bus stop. A qualitative approach has been adopted for this assessment. There is the potential for severance to be caused by additional traffic of cars using the park and ride sites – this has been assessed using the LINSIG model, as noted in Table 16.3.

16.3 Limitations, Constraints and Assumptions

16.3.1 The key assumptions used in modelling traffic flows and the performance of junctions with and without the guided bus in place are described below:

- Traffic data is based on the *Cambridgeshire County Council Traffic Monitoring Report* supplemented by specific data collection at certain points where the guided bus would cross existing highways;
- The MENTOR land-use model consists of a database of planning data at ward level (dwellings, commercial and retail floorspace). For the base year 1991 Census Data were used. To move the model forward through time, known specific land-use changes were added by year and by zone to allow forecasts to be made. The 2003 Structure Plan provides for a new settlement of 6,000 dwellings to be built at Longstanton/Oakington, and recognises that it could ultimately grow to between 8,000 and 10,000 dwellings. This new settlement, to be known as Northstowe, is not part of the CGB proposals, but this transport and access assessment assumes that it would be built. For the purpose of this
assessment, it has been assumed that by 2016 there would be 6,000 completed dwellings, and this figure would increase to approaching 9,000 by 2021;

- The SATURN model allows highway infrastructure changes to be tailored and developed for future year forecasts. The network encompasses the entire Cambridge sub-region. As well as forming the framework for the highway assignment model, the network also allows appropriate distances for both walk and cycle modes to be extracted. The highway networks used in both CHUMMS and the 2003 Structure Plan tests are essentially the same. The highway network assumes that the infrastructure improvements detailed in the CHUMMS Preferred Plan are implemented;

- The MENTOR land use model summarised local people’s travel movements in the study area. Commercial vehicle and through trips were added to the highway network. This supplementary traffic was added in the base year and formed part of the highway model validation matrix. For future year assessment the supplementary matrix was assumed to grow in line with national (TEMPRO) forecasts;

- The operations model predicted the number and frequency of the CGB buses between stops, based on vehicle speeds, hours of operation etc as outlined below:
  - on guideway speed 88.5 kph (55 mph)
  - on road (urban) 15.84 kph (12mph)
  - on road (rural) 63 kph (39.1 mph)
  - an 18 hour daily operation has been assumed

- Frequencies as set out in Table 16.6 of this ES were derived by adopting double-decker vehicles on the guideway to the north of Cambridge and single-decker vehicles on the southern section of guideway. Double-decker vehicles were taken as having a capacity of 80 and single-decker vehicles a capacity of 50.

- Existing bus services are represented in the model in terms of access to public transport however service routes are not explicitly modelled.

16.3.2 The Scheme description and construction programme is set out in Section 4 of this ES.

16.3.3 Signalisation at junctions is assumed to include hurry call facilities for the CGB bus to give it priority over other traffic and minimise delays to the bus. A separate phase is included in the signal model for non-motorised users and this phase is called in each cycle of the signals. This is a conservative assumption as actual frequency of calling pedestrian phases of signals would depend on demand; there is however insufficient data available to make a robust prediction of non-motorised flows in the study area.

16.3.4 The predicted frequency of the guided bus in each direction is shown in Table 16.6. The table shows results from modelling of three scenarios based on different levels of traffic growth and the rate of development of the new settlement at Northstowe.
### Table 16.6 Predicted frequency of CGB buses in the AM peak hour (each direction)

<table>
<thead>
<tr>
<th></th>
<th>Off Peak</th>
<th>2016 Low</th>
<th>2016 High</th>
<th>2021 High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huntingdon – St Ives P&amp;R</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>St Ives P&amp;R – Longstanton P&amp;R</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Longstanton P&amp;R - Drummer Street</td>
<td>9</td>
<td>13</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>Drummer Street - Trumpington P&amp;R</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

### Table 16.7 Land use and traffic growth assumptions used in CGB modelling

<table>
<thead>
<tr>
<th>Year</th>
<th>Central Forecast</th>
<th>Low Forecast</th>
<th>High Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>Northstowe:</td>
<td>Northstowe:</td>
<td>Northstowe:</td>
</tr>
<tr>
<td></td>
<td>No Dwellings</td>
<td>No Dwellings</td>
<td>No Dwellings</td>
</tr>
<tr>
<td>2011</td>
<td>Northstowe:</td>
<td>Northstowe:</td>
<td>Northstowe:</td>
</tr>
<tr>
<td></td>
<td>3,000 dwellings</td>
<td>No Dwellings</td>
<td>3,000 dwellings</td>
</tr>
<tr>
<td>2016</td>
<td>Northstowe:</td>
<td>Northstowe:</td>
<td>Northstowe:</td>
</tr>
<tr>
<td></td>
<td>6,000 dwellings</td>
<td>3,000 dwellings</td>
<td>6,000 dwellings</td>
</tr>
<tr>
<td>2021</td>
<td>Northstowe:</td>
<td>Northstowe:</td>
<td>Northstowe:</td>
</tr>
<tr>
<td></td>
<td>9,000 dwellings</td>
<td>6,000 dwellings</td>
<td>9,000+ dwellings</td>
</tr>
</tbody>
</table>
16.4 Baseline Conditions and Scheme Design

Introduction

16.4.1 This section outlines the baseline conditions for each section of the CGB route and outlines the Scheme design in this context. The Scheme would traverse 6 public highways and impact upon 9 public footpaths, 3 bridleways, 3 byways open to all traffic and a number of private means of access. Additionally, the CGB buses would run on existing roads through Cambridge, Huntingdon and St Ives. There are also prospective footpaths in the St Ives area to be provided under planning obligations under Section 106 of the *Town and Country Planning Act 1990* (Section 106).

16.4.2 Community severance is described in DMRB as the separation of residents from facilities in their communities by new roads and traffic flows. In the context of the Scheme, a shortage of transport opportunities, particularly in the smaller villages (where there are infrequent bus services, a lack of access to a car and few job opportunities or accessible community services), contributes to rural deprivation.

16.4.3 Baseline traffic flows on the local network in 2016 are identified in the appropriate parts of Section 16.5.

Section 1: Huntingdon to St Ives Park and Ride

16.4.4 The proposed CGB route begins at Hinchingbrooke Hospital, operating as a conventional on-street bus service. The CGB route runs via Huntingdon railway station and bus station, and along Hartford Road and the A1123 to St Ives bus station. A new CGB stop would be provided at Station Road St Ives near the existing bus station. The route uses public roads and no public footpaths or bridleways would be affected.

16.4.5 The main highway and junction improvements proposed as part of the Scheme in this section are:

- an additional traffic lane on the Ring Road linking the two sections of Hartford Road;
- widening of B1514 Hartford Road to provide a new westbound bus lane from Hartford Road to the Ring Road;
- widening of B1514 Longstaff Way/Hartford Road at the junction with Old Houghton Road;
- reopening of Old Houghton Road as a bus only road (westbound) with pedestrian and cyclist uses;
- widening of sections of the A1123 to provide for a westbound bus lane between Old Houghton Road and approximately 150m east of Hartford Marina;
- widening of the A1123 Houghton Road between B1090 Houghton Hill junction and High Leys junction to provide an eastbound bus lane and an extended right turn lane at Hill Rise junction;
- new traffic signal controlled junction crossing of A1096 St Ives Bypass; and
- bus priority at existing signalised junctions.
Section 2: St Ives Park and Ride to District Boundary (Fen Drayton)

16.4.6 This part of the CGB route follows the disused railway corridor from a proposed park and ride site, to the east of the A1096, at St Ives, to the district boundary between Huntingdonshire and South Cambridgeshire. The character of the area is generally rural. The corridor, which would include a 4m wide maintenance track, interfaces with existing routes as follows:

- access to St Ives Park and Ride site from Meadow Lane via Harrison Way roundabout;
- prospective footpaths between St Ives and the Ouse Viaduct to be provided by a developer under Section 106 agreements;
- Footpath 13 (F13) (Fenstanton): the guided bus route crosses the River Great Ouse over a viaduct. F13 (Fenstanton) follows the east bank of the river, and goes under the viaduct;
- F12 (Fenstanton) Fen Lane: stops at the disused railway line but does not cross it;
- F15 (Fenstanton) runs from a point almost at the end of F12(Fenstanton), parallel to the disused railway line as far as Moore Brook (west side);

Section 3: District Boundary (Fen Drayton) to Swavesey Drain

16.4.7 The CGB route follows the disused railway corridor. A new crossing would be located at Holywell Ferry Road (where a request stop is proposed to serve the nature reserve) and a new traffic signal controlled junction would be provided at Over Road, Swavesey. A drop-off point would be provided (kiss and ride) near the Swavesey Stop, on Over Road. The corridor, which would include a 4m wide maintenance track, interfaces with other routes as follows:

- F14 (Fen Drayton) runs along the east side of Moore Brook and stops short of the disused railway line on the southern side;
- BOAT 5 (Fen Drayton) Holywell Ferry Road is a track carrying agricultural traffic and visitors to the nature reserve. It crosses the disused railway line;
- B7 (Fen Drayton) runs along the north side of the disused railway line from Moore Brook for approximately 700m at which point it traverses the line and proceeds southwards;
- B16 (Fen Drayton) runs along the southern side of the disused railway line, starting at the point at which B7 crosses the line for 300m to Holywell Ferry Road;
- F6 (Swavesey) is a track which crosses the disused railway line. Mow Fen Drove, a Swavesey byway under the Swavesey Byeways Act 1984, is a private means of access as well as a footpath;
- B5 (Swavesey) is a track which crosses the disused railway line. Middle Fen Drove, a Swavesey byway under the Swavesey Byeways Act 1984, is a private means of access as well as a bridleway;
- At Station Road, Swavesey, the line crosses the road to Over. The area is built up but at a low density;
- F9 (Swavesey) is a dirt track which crosses the disused railway line. Lairstall Drove, a Swavesey byway under the Swavesey Byways Act 1984, is a private means of access as well as a footpath.

Section 4: Swavesey Drain to Longstanton Park and Ride

16.4.8 The CGB route follows the disused railway corridor and passes beneath Windmill Bridge on Gravel Bridge Road. This bridge is to be reconstructed to allow double-decker vehicles to pass beneath it.

16.4.9 The CGB route crosses Station Road Longstanton, which is part of the B1050 road linking Longstanton and Willingham. At Longstanton, the stop for the guided bus is to be just over 300 m to the east of the guideway junction with the B1050. A park and ride site is proposed to the south of the guideway and to the east of the B1050, with provision initially for 350 cars, and expansion to 700.

16.4.10 The access to the park and ride site is from a roundabout on the B1050, some 150 metres south of this road’s junction with the guideway. Where the B1050 crosses the proposed guideway a new traffic signal controlled junction would be provided. There are no existing rights of way on this section of the route and a maintenance track would be provided.

Section 5: Longstanton Park and Ride to A14

16.4.11 The CGB route follows the disused railway corridor throughout this section. Traffic signal controlled crossings would be provided at Station Road, Oakington, and Park Lane and Station Road, Histon. A maintenance track would be provided along this section of the route. Stops are proposed to the east of Station Road at Oakington and on either side of Station Road at Histon and Impington, where parking for up to 40 cars is also proposed.

16.4.12 The following rights of way traverse or adjoin the proposed guided bus route:

- BOAT7 (Longstanton) known as Rampton Road and BOAT 4 (Rampton) are byways open to all traffic which links Oakington to Rampton;
- Station Road Oakington links this village to Cotttenham;
- F1 (Histon) runs parallel to the disused railway corridor for a distance of about 1100 metres, through open countryside;
- Park Lane is a minor road on the western approach to Histon, linking it to Girton and Oakington, which is crossed by the disused railway line. It lies just outside the built-up area of Histon;
- F4 (Histon) crosses the disused railway line, linking the village to Girton. It is on the edge of the village, and connects with a network of footpaths (F3 and F17). F17 (Histon) runs along the edge of the built-up area of Histon, close to the CGB route;
- Station Road, Histon and Impington is traversed by the line of the disused railway.
Section 6: A14 to Cambridge Railway Station

16.4.13 The CGB route follows the disused railway corridor to a point east of the Regional College where there is a junction. One arm of the junction continues along the disused rail corridor to Milton Road, with the other continuing southwest to Arbury Park. Buses would run on the guideway between the A14 and Arbury Park/Milton Road. Carriageway widening on Milton Road between Lovell Road and the disused rail corridor would provide a northbound bus and cycle lane. Carriageway widening would also enable construction of bus and cycle lanes on Cambridge Road/Histon Road. A 4m wide maintenance track (3m wide round Arbury Park) would be provided along the guideway sections of the route. Stops are proposed to serve the Regional College and Science Park, with two stops within the Arbury Park development.

16.4.14 For the purposes of this ES the City Centre network is defined as the on-street running sections encompassing:

- Histon Road corridor;
- Milton Road corridor;
- City Centre (Emmanuel Street, Drummer Street, and St. Andrews Street);
- Hills Road corridor; and
- Station Road.

16.4.15 Byway 3 (Milton), known as Mere Way, and Lost Highway 117 run to the west of the Regional College site and passes under the A14, providing access to farmland north of the A14.

16.4.16 The Histon Road corridor provides a key link from the Regional College and the proposed Arbury Park development (to be located between the A14, Histon Road and Kings Hedges Road) to the City Centre.

16.4.17 Milton Road is a key public transport corridor into the City Centre, in particular servicing the Cowley Road Park and Ride site. The corridor also provides a link between the City Centre and the outlying Science Park. It would also provide access to a major development proposed at Chesterton Sidings which includes a transport interchange. Milton Road currently has southbound bus lanes for most of its length, providing inbound priority for buses. It suffers from slow moving traffic during morning and evening peak hours.

16.4.18 The focus of the existing bus services into and out of the City is Emmanuel Street, Drummer Street, St. Andrews Street and Emmanuel Road. As part of the Cambridge Transport Strategy, traffic management measures are in place and are being extended to prevent non-essential traffic from passing through the area, while improving accessibility, and providing priority, for public transport and cyclists. Drummer Street is to have kerb realignment for a short length to allow two way bus operations and stops to be accommodated on both sides of the street.

16.4.19 Hills Road Corridor is another radial route into the City, and frequently suffers from slow moving traffic. A city centre-bound bus lane has been provided along several sections of this road.
Section 7: Cambridge Railway Station to Trumpington

16.4.20 From Cambridge Railway Station the CGB route would rejoin a guided section, 4 km in length, along the former Cambridge to Bedford railway line. This would follow the transport corridor identified in the *Cambridge Local Plan* and would include space for an adjacent maintenance track south of Hills Road Bridge. The guideway would link into the existing Trumpington Park and Ride site, where provision would be made for a new entrance. A stop would be provided to serve Trumpington.

16.4.21 This section of the route would have no new road junctions, save for that at the entrance to the park and ride site. Two public footpaths are affected – F46 and F47 (Cambridge), while F118 (Cambridge) links housing in Trumpington with the disused railway line.

Section 8 – Link to Addenbrooke’s Hospital

16.4.22 A guideway link would also be provided to Addenbrooke’s Hospital, south of Cambridge. This would require the construction of a new bridge over the mainline railway. Footpath F47 (Cambridge) runs along the CGB corridor.

16.5 Assessment of Impacts

16.5.1 This section considers the impact of the Scheme at a general level, including changes to public transport accessibility, as reflected in predicted usage figures, and at a site specific level (effects on motorised and non-motorised users and local communities). Consideration is given to permanent effects and temporary works and construction requirements.

Policy Integration

16.5.2 National transport policy has sought to encourage movement from car based travel to more sustainable transport modes for some time, including increased use of walk, cycle and bus modes. Planning Policy Guidance (PPG) seeks to reduce the growth and number of journeys, to encourage alternative means of travel, to lessen environmental impact and to reduce reliance on the private car. The Road Traffic Reduction Act 1997 required Local Authorities to reduce the level of traffic on roads.

16.5.3 The Government’s White Paper on the future of transport *A new deal for Transport: better for everyone* published in July 1998, highlights the need for radical change in transport policy and believes the way forward is an integrated transport policy. The main essence of the White Paper is integration. The policy states that this means:

- Integration within and between different types of transport – so that each contributes to its full potential and people can move easily between them;
- Integration with the environment – so that transport choices support a better environment;
- Integration with land-use planning – at a national, regional and local level, so that transport and planning work together to support more sustainable travel choice and reduce the need to travel; and
- Integration with policies for education, health and wealth creation – so that transport helps to make a fairer, more inclusive society.

16.5.4 The White Paper therefore sets the framework to:

- promote the public interest;
• produce better public transport, with easier, more reliable connections;
• improve choice between different modes;
• enhance public transport networks;
• encourage more through-ticketing;
• provide better travel information;
• ensure more reliable and frequent services;
• give the passenger a bigger voice in public transport.

16.5.5 The White Paper made specific reference to the importance of bus-based services in improving the public transport network. It states that:

“effective local bus services will be an essential part of the new policy. Better bus services in urban and rural areas will help to improve alternatives to the car and reduce social exclusion.”

16.5.6 It goes on to state that:

“As part of the New Deal for transport we want better buses - clean, comfortable and convenient. Bus lanes and other priority measures will help to get buses running on time. A first-rate and modern bus industry will make an important and cost-effective contribution to tackling congestion and pollution at the local level. By giving buses greater priority and improving information and networks, we can encourage more people to use buses. Increasing passenger numbers could transform the economics of bus operations, opening new horizons in quality, reliability and network expansion.”

16.5.7 The example is given of the Leeds guided bus whose benefits include:
• quicker journeys in the morning peak;
• passengers think the service has improved;
• new and increased patronage.

16.5.8 The daughter document to the White Paper From workhorse to thoroughbred: a better role for bus travel noted that:

“the bus can offer an almost universal form of public transport: flexible, adaptable, straightforward, able to meet a wide range of transport needs. It can offer choice, both as an alternative to the car, and as an opportunity for those who do not have a car. It can help tackle the problems of congestion in towns and lack of access in the countryside.”

16.5.9 It recognised that changes are needed to realise this potential. The policy consultation paper promoted:
• the need to secure greater accountability to the wider travelling community;
• the need to give elected local authorities powers - and resources - to promote higher quality bus services;
• the use of new, comfortable, accessible vehicles;
the provision of more bus lanes and traffic management measures to help the bus combat the congestion caused by the car;

- simple and flexible ticketing systems; and clear, reliable timetable information.

16.5.10 In his foreword the Deputy Prime Minister concludes that:

"we must give buses top priority in meeting transport needs in our communities."

16.5.11 By providing improved infrastructure, segregation and priority, by improving quality and standards through Quality partnerships with operators, by providing improved ticketing and real time information, the CGB Schemes is designed with the priorities of the White Paper in mind and is consistent with its policy objectives.

16.5.12 The impact of the Scheme on planning policies relating to transport and accessibility is covered in Section 6.

**General Impacts**

**Accessibility**

16.5.13 The Scheme would increase the range of transport choices, reduce journey times and improve journey time reliability for people living in Huntingdon and St Ives, Cambridge, and in villages along the route, such as Swavesey, Longstanton, Willingham, Oakington, and to a lesser degree, Histon, which already enjoys a good level of public transport provision. Settlements not currently directly connected to each other by public transport, such as Longstanton and Oakington, would be linked by the CGB service.

16.5.14 The Scheme would connect areas of higher unemployment with the major employment centres, reducing the difficulties of unemployed people gaining access to the workplace and overcoming social exclusion. It would provide a sustainable mode of transport to the major new residential areas to the north and south of Cambridge, including the new settlement at Northstowe, urban expansion on the Cambridge northern fringe at Arbury Park and, to the south, at Clay Farm, Trumpington. In addition it would provide a high level of public transport access to a number of key employment sites and regional facilities, including the Cambridge Regional College at King’s Hedges, Cambridge Science Park, Addenbrooke’s Hospital and the retail and employment centres of Cambridge, Huntingdon and St Ives. This is discussed further in Section 15.

16.5.15 The Scheme would offer improved access to recreational opportunities in the rural part of the corridor, including the nature reserve at Fen Drayton and the River Great Ouse. The provision of a route for non motorised users along the maintenance track would facilitate access to the wider public rights of way network for these users as well as those travelling on the CGB bus. This would be a significant benefit for both local residents and visitors to the area.

16.5.16 As the route follows a disused railway corridor with limited crossing points, and given the predicted frequency of buses, no additional adverse community severance effects are forecast.

**Patronage of the Guided Bus**

16.5.17 A forecast has been made of patronage of the CGB bus in *Moving Transport Forward*\(^{ii}\), Cambridgeshire County Council’s Annex E bid for funding to central Government. This was based on a transportation model covering the Cambridge Sub-Region which was capable of
testing both public transport and highway improvements. A guided bus patronage model was developed from the transportation model. Calculations were made of the numbers of passengers (AM peak in 2016), and their origin and destination by stop.

16.5.18 Salient points from the assessment were that, in the 2016 morning peak hour, the model predicted:

- The total number of passengers using the CGB bus would be 3340;
- 2027 users of the system would not have access to a car. The model does not say how these users travel now, however it is expected that some would currently car share i.e. they are car passengers, some would be drawn from existing bus services, attracted by quicker and more reliable journeys and some would be new trips;
- Around 1312 passengers are forecast to come from car-available households who elect to either walk to their local stop or drive to a park and ride site and continue their journey by public transport. This group represents a modal shift from car to public transport;
- 368 trips would be made from the facilities in St Ives, travelling to stops in Cambridge and Huntingdon;
- 738 trips would be from Longstanton, the majority travelling to stops in Cambridge. 262 of these would go to Emmanuel Street;
- Trumpington would be used by 164 people mostly travelling to Drummer Street and the Railway station.

16.5.19 It is forecast that by 2016, up to 21,500 trips per day made in the A14 corridor would be by CGB bus. This would lead to a reduction in the number of vehicles using the A14. The benefits which would be realised would largely be related to reductions in the congestion experienced by travellers overall and consequential improvements to journey times. When expressed as a value in monetary terms, the Moving Transport Forward submission seeking funding for the Scheme concluded that the value of time saved to users of the CGB bus would be £231,665,000 calculated over a 30 year period, and shown in 1998 values.

16.5.20 The economic appraisal of the Scheme shows that it would yield a Benefit Cost Ratio of 2.4:1, which demonstrates that it represents a good value for money transport infrastructure investment.

Guided Bus and Other Public Transport Users

16.5.21 CGB users would benefit from a frequent service with reliable journey times meeting the high quality public transport standard set out in the Structure Plan 2003. It would pass conveniently through residential areas and offer connections to key facilities and amenities in the local area. Where existing public transport users transfer to services on the guided bus route, they would experience improved reliability of journey times. Typical estimated CGB journey times are shown in Table16.8.
Table 16.8 CGB Journey Times

<table>
<thead>
<tr>
<th>Route Section</th>
<th>Time to following stop / minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huntingdon - Cambridge City Centre</td>
<td>44</td>
</tr>
<tr>
<td>St Ives - Cambridge Science Park</td>
<td>18</td>
</tr>
<tr>
<td>Longstanton - Cambridge Science Park</td>
<td>9</td>
</tr>
<tr>
<td>Longstanton - Addenbrooke's</td>
<td>27</td>
</tr>
<tr>
<td>Trumpington Park and Ride - Addenbrooke's</td>
<td>4</td>
</tr>
</tbody>
</table>

16.5.22 The guideway would be available to accommodate buses meeting the quality threshold which would be able to join the guideway from the surrounding road network, allowing some existing services to use the guideway for part of their routes. These feeder services would minimise the requirement for interchange and allow users of existing buses to derive benefit from the guideway.

16.5.23 Direct services linking the bus stations in Cambridge, Huntingdon and St Ives and the railway stations at the two former locations (plus future provision for connection to Chesterton sidings) would facilitate longer distance journeys by public transport users and interchange between public transport modes.

16.5.24 Further provision for interchange is made by the inclusion of park and ride sites at St Ives and Longstanton, the kiss and ride site at Swavesey and the managed parking provision at Histon. At all stop locations, the County Council would monitor parking demand and would control on-street parking through the use of Traffic Regulation Orders should problems be identified.

Pedestrians, Equestrians and Cyclists

16.5.25 For operational reasons and to ensure maximum efficiency of service, the number of breaks in the guideway needs to be kept to a minimum as a break in the guideway means vehicles have to slow down, to speeds which could be as low as 20mph. Where there is no break in the guideway, non-motorised users would encounter 180mm steps down and up either side of the track and a central reservation between the two tracks, widened to facilitate crossing. While this could create some difficulty for people with disabilities negotiating the guidance kerbs, it would not be significantly different to negotiating a standard road kerb. Pedestrians, equestrians and cyclists may experience slight delays at crossing points.

16.5.26 The British Horse Society (BHS) has been consulted and considers that any reasonably competent rider should have little problem negotiating a crossing of the guideway. Suitable fencing and 'chicanes' plus appropriate warning signs would be provided to facilitate crossing by equestrians.

16.5.27 Cyclists, who are also able to use bridleways, would need to dismount to cross the guideway in a safe manner. Sustrans supports improvements to public transport between Huntingdon and Cambridge and believes that there is a strong case for developing a high quality cycle route between Huntingdon, St Ives, Oakington, the Science Park and Cambridge as well as the Trumpington to Cambridge Station route.

16.5.28 Access for maintenance would be provided via a maintenance track running adjacent to the guideway. This is also to be used as a bridleway to the north of Cambridge and as a cycleway to the south. This would introduce new facilities for pedestrians, cyclists and equestrians, which would serve travel to work, recreational and other uses. It would have the potential to yield significant benefits to non-motorised users by providing new links and more direct...
routes in the public rights of way network. In particular it would promote access to the countryside and provide an alternative sustainable transport mode for people living in both the rural and urban areas.

16.5.29 Secure cycle parking facilities would be provided at stops on the guideway section (except for the Nature Reserve request stop). This would encourage users of this mode to use the public transport system and should also lead to a general increase in cycle usage.

Construction Impacts

16.5.30 Haul roads would be created to allow construction traffic to access the CGB corridor without having to go through sensitive built-up areas. The temporary impact which arises as a result is assessed in the following sections.

16.5.31 Delays to journeys could occur during construction where rural roads cross the line of the Scheme. Whilst the guideway is being laid, temporary lane closures may be needed. Installation would be done outside of peak hours, with each side of the carriageway crossed separately to avoid road closures. Users of the public rights of way would be affected by temporary closures or diversions. There is also potential for some community severance, but the planning of the construction process has been undertaken with the aim of avoiding this impact.

Section 1 – Huntingdon to St Ives Park and Ride

Motorised Users

16.5.32 The proposed level of service along this section of the route (up to 4 buses per hour in each direction in 2016) would ensure that it would have a minimal impact on other road users. In Huntingdon the on-road measures to accommodate CGB buses would not result in any reallocation of road space. However, the Scheme could potentially impact upon three junctions: the signalisation of the Old Houghton Road /B1514 junction; a new junction on the St Ives bypass; the existing Meadow Lane/A1096 roundabout.

16.5.33 The reopening and signalisation of the Old Houghton Road/B1514 junction would improve journey times for buses with limited impact on traffic on this road. Delays to vehicles in the AM peak in 2016 and 2021 are assessed as slight adverse based on the results shown in Table 16.9.

Table 16.9 Delays at Hartford Road Junction with Scheme

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th>2021 am peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>Hartford Road Western Arm. Ahead</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Hartford Road Western Arm. Right</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hartford Road Eastern Arm Ahead, Left</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
16.5.34 A new traffic-controlled junction would allow the guided bus to cross the A1096 St Ives bypass, shortening the travelling distance between the St Ives bus station and the proposed Park and Ride. It would also yield benefits for other buses which currently must negotiate the one way system in St Ives before entering the bus station, reducing journey times and improving reliability. On this section of route there are expected to be up to 6 buses per hour in each direction in 2016. Combined with high levels of traffic on the bypass, (3544 vehicles two-way in the AM peak), this would result in delays to other motorised users as shown in Table 16.10. The model predicts no change to the AM peak flow on A1096 in 2016 with the Scheme in place.

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th>2021 am peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>Old Houghton Road Left, Right</td>
<td>Vehicle detection to minimise delay</td>
<td>0.3</td>
</tr>
</tbody>
</table>

16.5.35 LINSIG results show that the signalised junction would result in vehicle delays in the 2016 AM peak, increasing in the period to 2021. Based on the average delays per vehicle this would be assessed as a moderate adverse impact. However, this length of the A1096 currently experiences slow moving traffic in both the am and pm peak periods, caused primarily by the roundabouts either end restricting free flow movement and hence capacity. In this context the additional level of delay on the bypass would not be significant.

16.5.36 Examination of results for the PM peak period shows similar levels of delay and would also be assessed as moderate adverse. As noted in 16.5.34 this length of A1096 currently experiences slow moving traffic and in this context the additional level of delay would not be
significant.

16.5.37 The distance between the A1096 Meadow Lane roundabout and the A1096 Guided Bus crossing is approximately 260 metres, providing a queuing capacity between the two junctions of 43 vehicles. The highest a.m. peak hour average level of queuing with the Scheme in place is 26 vehicles in 2021 on the A1096 southbound arm of the junction. For the equivalent p.m. period, the highest A1096 southbound queue length would be 38 vehicles in 2021. These results indicate that there would be sufficient capacity for vehicles to queue to prevent the A1096 junction affecting the operation of the adjacent roundabout.

16.5.38 As detailed in 16.3.3, the junction modelling includes the operation of the pedestrian/cyclist phase of the signals in each cycle. In the event that the level of demand does not require this frequency of operation the delays shown above would be reduced.

16.5.39 Apart from the moderate increase in wait times for drivers, it is not anticipated that other factors such as route uncertainty or poor visibility would affect motorised users. The impact on driver stress would therefore be slight adverse.

16.5.40 Meadow Lane/A1096 Harrison Way roundabout is the junction from which cars would access the Park and Ride site and hence the impact on the roundabout of this traffic has been assessed. Tables 16.11 and 16.12 below show the assessment of the roundabout in the 2016 am peak without and with the Scheme.

**Table 16.11 Delays at A1096 Meadow Lane Roundabout, St Ives without Scheme**

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th>2021 am peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>A1096 North</td>
<td>22</td>
<td>6.9</td>
</tr>
<tr>
<td>Meadow Lane Eastern Arm</td>
<td>4</td>
<td>0.1</td>
</tr>
<tr>
<td>A1096 South</td>
<td>19</td>
<td>8.3</td>
</tr>
<tr>
<td>Meadow Lane Western Arm</td>
<td>40</td>
<td>11.2</td>
</tr>
</tbody>
</table>
Table 16.12  Delays at A1096 Meadow Lane Roundabout St Ives with Scheme

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th>2021 am peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>A1096 North</td>
<td>28</td>
<td>8.9</td>
</tr>
<tr>
<td>Meadow Lane Eastern Arm</td>
<td>4</td>
<td>0.1</td>
</tr>
<tr>
<td>A1096 South</td>
<td>22</td>
<td>9.5</td>
</tr>
<tr>
<td>Meadow Lane Western Arm</td>
<td>44</td>
<td>12.7</td>
</tr>
</tbody>
</table>

16.5.41 Table 16.11 illustrates that in 2016 without the Scheme in place that there would be queuing and delays at this junction. Table 16.12 shows that with the Scheme in place there would be slight increases in average queue length and average vehicle delay (of up to 6 seconds), which would amount to a slight adverse impact. The same degree of impact would apply in 2021, albeit with an increase in delay times (with and without the Scheme).

16.5.42 The minor increase in journey time, and the absence of any change in the layout of the roundabout suggests that there would be no adverse driver stress.

Pedestrians, Equestrians and Cyclists

16.5.43 This section of the route would have no impact on users of the public right of way network.

16.5.44 Heavy pedestrian flows between the Park and Ride site and Station Road are not anticipated as the CGB bus would pick up passengers at the stop on Station Road. However the provision of a signalised toucan crossing on A1096 as part of the Scheme would benefit those pedestrians and cyclists who currently need to cross this road.

Communities

16.5.45 The opportunity for residents of all communities on this stretch of the route to travel between Huntingdon and Cambridge using a frequent and reliable public transport system without having the uncertainty of travel on the A14 represents a significant intangible benefit. For example, the patronage model suggests that some 534 people would use the CGB bus stops at Huntingdon and St Ives in the peak hour in 2016. Additional traffic which might be generated by the St Ives Park and Ride site would not result in community severance, rather the implementation of the Scheme should reduce severance through the provision of signalised crossing facilities as noted above.

Construction Impacts

16.5.46 Construction traffic associated with the works at the western end of the guideway, including the park and ride site and viaduct over the River Great Ouse would access the development from the A1096 Meadow Lane roundabout. Predicted additional traffic per day would be 120 vehicles. Queue lengths at the roundabout are predicted to be virtually the same as those
which would be found in 2006 were the Scheme not to be built. The effect is therefore assessed as negligible. Similarly there would be a negligible effect on non-motorised users.

16.5.47 No settlement severance would be caused by construction traffic. A temporary diversion may be required for the right of way along Meadow Lane (F5 (St Ives)), though the impact would be negligible.

Section 2 – St Ives Park and Ride to District Boundary (Fen Drayton)

Motorised Users

16.5.48 This is a rural section of the route with no interface with other public roads. A private access is required to the land north of the guideway between the River Great Ouse and Moore Brooke. This access would run in a westerly direction from Holywell Ferry Road on the north side of the guideway to join with bridleway B7 (Fen Drayton). The access continues along the bridleway to where it turns north. The private access continues parallel to the guideway and stops opposite footpath (FP) 12 (Fenstanton). This diversion is assessed as having negligible impact.

Pedestrians, Equestrians and Cyclists

16.5.49 The Scheme would not result in the need for any permanent footpath diversions and the lines of existing Public Rights of Way would be maintained. The provision of a bridleway along the maintenance track would provide a high quality route for non-motorised users in the Ouse Valley. This would be a significant beneficial impact.

16.5.50 F13 (Fenstanton) would need to be temporarily diverted during the construction phase. This path forms part of the Ouse Valley Way.

16.5.51 F12 and F15 (Fenstanton) would link into the maintenance track, thereby strengthening the network and improving access in this section of the river valley. The Scheme would necessitate minor modifications to the route a prospective Section 106 footpath to be created to the west of the Ouse Viaduct – see Section 4.4.

16.5.52 The provision of public transport access to the Fen Drayton nature reserve could bring more walkers into the area and the provision of the maintenance track would improve access by walkers and cyclists.

Communities

16.5.53 The park and ride site at St Ives would offer the local community new opportunities for interchange and good access to public transport.

Construction Impacts

16.5.54 There would be about 120 lorry movements per day servicing construction activity on this section of the route. At the western end of the section, construction vehicles may use Meadow Lane, Second Drove and the track adjacent to the gravel works which leads onto the disused railway corridor. There would be no adverse effect on motorised users during construction of this section of the route. However, footpaths and bridleways which the Scheme would cross may need to be closed or diverted temporarily on safety grounds. The routes affected would be F5 (St Ives), and F12, F13 and F15 (Fenstanton). It is anticipated that the period of closure would be short and this temporary impact is assessed as slight adverse.
16.5.55 The proposed construction activity would not have any effect on community severance.

Sections 3 – District Boundary (Fen Drayton) to Swavesey Drain

Motorised Users

16.5.56 There would be an impact on public highways: one byway, BOAT 7 (Holywell Ferry Road), which is open to motorised users and on which there would be negligible impact, and Station Road, Swavesey. The level of CGB bus service is expected to be in the region of 7 per hour in each direction in the peak period in 2016.

16.5.57 On Station Road, Swavesey, the AM peak traffic flow in 2016 is predicted to be 925 vehicles with guided bus in place. The impact on delays to other motorised users, at less than 10 seconds, is assessed as slight adverse (Table 16.13). The same degree of impact would apply in 2021.

Table 16.13 Delays at Station Road, Swavesey with Scheme

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th>2021 am peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>Station Road South</td>
<td>5</td>
<td>1.5</td>
</tr>
<tr>
<td>Guided Bus West</td>
<td>Vehicle detection to minimise delay</td>
<td>0.2</td>
</tr>
<tr>
<td>Station Road North</td>
<td>8</td>
<td>4.8</td>
</tr>
<tr>
<td>Guided Bus East</td>
<td>Vehicle detection to minimise delay</td>
<td>0.2</td>
</tr>
</tbody>
</table>

16.5.58 Vehicular access to the Swavesey byways (Mow Fen Drove, Middle Fen Drove and Lairstall Drove) would be severed where the guideway crosses them, however alternative access arrangements have been agreed and the impact is assessed as slight adverse. Non-motorised use of these routes would still be possible.

Pedestrians, Equestrians and Cyclists

16.5.59 B7 (Fen Drayton) is well used by walkers, cyclists and horse riders, including visitors to the Nature Reserve. No break in the guide way is proposed and the impact of the Scheme on the existing B7 would be negligible. The potential benefit of the maintenance track in opening up new routes would apply as it would to walkers/cyclists.

16.5.60 Through Swavesey the route traverses two footpaths and one bridleway. Impacts on the users of these routes would be slight adverse. Private Means of Access crossing the guideway would be stopped up and alternative routes would be provided.
16.5.61 The rights of way do not run parallel to the guideway, but cross it, hence impacts on the amenity of users would be focussed on the crossing points and, given service levels, are expected to be only slight adverse.

16.5.62 The provision of a bridleway along the length of the maintenance track would greatly enhance the opportunities for walking, cycling and equestrian use in the countryside, by linking villages with a new, direct and safe route. This is assessed as a significant beneficial impact.

16.5.63 The impact of the Scheme on the existing bridleway would be negligible with horses able to negotiate crossing the guideway without difficulty. The potential benefit of the maintenance track, as a bridleway, in opening up new routes would apply as it would to walkers and cyclists.

Communities

16.5.64 The village of Fen Drayton would see some benefit from the introduction of a new public transport service, although for this settlement the benefits are limited in scale. Fen Drayton is less than 2 km from the route, but has a relatively small population. It would benefit from a segregated, traffic free, pedestrian, cycle and equestrian route on the maintenance track. Severance would not be an issue for this community.

16.5.65 Residents from Swavesey and Over would benefit from the Scheme. Much of Swavesey and Over lie within walking distance of the proposed stop in Station Road, Swavesey, and would certainly be within cycling distance of the stop.

16.5.66 The kiss and ride site at Swavesey is at the end of the village, beyond any point where severance could occur and would provide an opportunity for transport interchange.

16.5.67 Improved accessibility for these communities is assessed as a significant beneficial impact.

Construction Impacts

16.5.68 Footpaths F6, and F9 (Swavesey) and bridleways B5, B7 and B16 (Swavesey) would be stopped up temporarily. It is anticipated that the period of closure would be short and this is assessed as having a slight adverse impact.

16.5.69 Works associated with the crossing of Station Road, Swavesey would be short term in nature and the effect is assessed as negligible.

16.5.70 Construction route 2 would take construction traffic from the A14 south of Fen Drayton towards Swavesey then left at Bancroft’s Bridge onto Holywell Ferry Road (BOAT5). Construction traffic would therefore be kept out of Fen Drayton, Swavesey and Over. The work proposed would not have any community severance effect. Approximately 90 lorry movements per day may be expected to use this construction route.

Sections 4 – Swavesey Drain to Longstanton Park and Ride

Motorised Users

16.5.71 There would be an impact on a public highway, the B1050 Station Road Longstanton. The level of the CGB bus service is expected to be in the region of 7 per hour in each direction in the peak period in 2016.

16.5.72 Delay to road users forecast for the crossing of the B1050 at Longstanton is shown in Table
16.14. On the B1050, the AM peak traffic flow in 2016 is predicted to be 1963 vehicles with the Scheme in place. The impact on delays to other motorised users is assessed as slight adverse and this assessment would also apply in 2021.

**Table 16.14  Delays at B1050 Longstanton with Scheme**

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th></th>
<th>2021 am peak</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>Station Rd South</td>
<td>9</td>
<td>5.4</td>
<td>9</td>
<td>5.8</td>
</tr>
<tr>
<td>Guided Bus West</td>
<td>Vehicle detection to minimise delay</td>
<td>0.6</td>
<td>Vehicle detection to minimise delay</td>
<td>0.7</td>
</tr>
<tr>
<td>Station Rd North</td>
<td>14</td>
<td>7.9</td>
<td>17</td>
<td>9.5</td>
</tr>
<tr>
<td>Guided Bus East</td>
<td>Vehicle detection to minimise delay</td>
<td>0.6</td>
<td>Vehicle detection to minimise delay</td>
<td>0.7</td>
</tr>
</tbody>
</table>

16.5.73 The entrance to the park and ride site at Longstanton would be served from a new roundabout some 150 metres south of the guideway crossing. Table 16.15 shows the results of an ARCADY analysis.

**Table 16.15  Delays at B1050 Longstanton Park and Ride Roundabout with Scheme**

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th></th>
<th>2021 am peak</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay Per Vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
<td>Average Delay Per Vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>B1050 Northern Arm</td>
<td>17</td>
<td>6.2</td>
<td>26</td>
<td>10.3</td>
</tr>
<tr>
<td>Longstanton Park and Ride</td>
<td>3</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>B1050 Southern Arm</td>
<td>14</td>
<td>9.2</td>
<td>20</td>
<td>6.8</td>
</tr>
</tbody>
</table>

16.5.74 The ARCADY output shows that the amount of traffic approaching the northern B1050 arm and the B1050 southern arm in the am peak leads to minor queuing and delays. These additional delays on the network are assessed as a slight adverse impact in both 2016 and 2021.

16.5.75 With the low levels of delay/queuing at both the level crossings and the entrance to the park and ride site, it is anticipated that the changes represented by the introduction of signal-controlled crossing or roundabout would not have an appreciable adverse impact on driver stress.
Pedestrians, Equestrians and Cyclists

16.5.76 In this section, the Scheme would have no impact on public Rights of Way.

16.5.77 The provision of a bridleway along the length of the maintenance track would greatly enhance the opportunities for walking, cycling and equestrian use in the countryside, by linking villages with a new direct and safe route. This would be a significant beneficial impact.

Communities

16.5.78 Residents from Willingham and Longstanton would greatly benefit from the Scheme. The stop adjacent to the park and ride site would be accessible to people on foot from Longstanton and the new settlement at Northstowe, and Willingham. Willingham, Longstanton and Northstowe residents would be within easy cycling distance of the stop.

16.5.79 The Scheme would provide a high degree of public transport accessibility to the proposed new settlement, entirely in accordance with government and local planning policies (see Section 6). It would also render the facilities of the new settlement accessible to other settlements along the route corridor, to their benefit.

16.5.80 The park and ride site at Longstanton is located at the northern end of the village, where north-south pedestrian movement is low. Therefore, although the construction of a roundabout on Station Road would introduce a slight barrier to movement, the demand for such movement is slight. It is considered that severance here would be negligible.

16.5.81 The Scheme offers significant benefits to the future residents of the planned settlement at Northstowe, in terms of its accessibility and links (by public transport and non-motorised modes) to the local area and to the employment opportunities, facilities and amenities of Cambridge.

16.5.82 The proposals would not give rise to community severance.

Construction Impacts

16.5.83 Works associated with the crossing of Station Road, Longstanton would be short term in nature and the effect is assessed as negligible. The need to reconstruct the Windmill Bridge would however require the road to be closed for approximately eight months with diversions in place via Swavesey or Willingham, creating some community severance. This is assessed as a moderate adverse impact.

16.5.84 Construction vehicles associated with the building of the Longstanton park and ride facility would access the site from a new roundabout on the B1050, and the likely daily traffic is predicted to be about 50 lorry movements. As a main site compound is proposed to be located on this site, the impacts could extend over most of the construction period. Table 16.16 indicates the predicted length of queues which would be caused by the additional traffic. The effects are considered to be negligible.

16.5.85 Construction route 3 would use the B1050 from A14, via Gravel Bridge Road, to a site compound at Windmill Bridge. It is anticipated that there would be about 60 lorry movements per day on this route. Construction traffic would be kept out of Longstanton, Willingham and Over. The work proposed would not have any community severance effect.

16.5.86 Construction Route 4 would use the route of Construction Route 3 but would turn off north of Longstanton to the park and ride. The effects would be similar to Construction Route 3.
Table 16.16 Longstanton Park and Ride Roundabout – construction traffic impact (AM peak 2006)

<table>
<thead>
<tr>
<th>Arm</th>
<th>Average Delay per vehicle (secs)</th>
<th>Worst Average Queue Length (vehicles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1050 Northern Arm</td>
<td>9</td>
<td>2.9</td>
</tr>
<tr>
<td>Longstanton P &amp; R</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>B1050 Southern Arm</td>
<td>8</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Section 5 Longstanton Park and Ride to A14

Motorised Users

16.5.87 Three public highways would be affected in this section:
- Station Road, Oakington;
- Park Lane/New Road, linking Histon to Girton and Oakington; and
- Station Road, Histon and Impington, a mainly residential street through the southern end of the village.

16.5.88 Each junction would be traffic signal controlled, with priority given to the guided bus. It is predicted that 20 buses would pass in each direction along this section of route in the morning peak hour in 2016.

16.5.89 To the east of Longstanton, Byway 7 (Rampton Road) would be crossed by the route and effectively severed for motorised users. This severance would be significant for the limited motorised traffic which currently makes use of this route. The severed section would be downgraded to a bridleway.

16.5.90 At Oakington it is proposed to provide a stop at the former station, in Station Road. No parking facilities would be offered. While the frequency of service at this point would be high, road traffic flows are predicted to be relatively low, with 616 vehicles in the AM peak period. The results of a LINSIG analysis are shown in Table 16.17.

Table 16.17 Delays at Station Rd Oakington Signals with Scheme

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th>2021 am peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>Station Rd East</td>
<td>5</td>
<td>1.3</td>
</tr>
<tr>
<td>CGB North</td>
<td>Vehicle detection to minimise delay</td>
<td>0.7</td>
</tr>
<tr>
<td>Station Road West</td>
<td>7</td>
<td>4.1</td>
</tr>
<tr>
<td>CGB South</td>
<td>Vehicle detection to minimise delay</td>
<td>0.7</td>
</tr>
</tbody>
</table>
16.5.91 LINSIG shows that the Station Road signals work satisfactorily in the AM peak in both 2016 and 2021. The relatively low flows during this period on Oakington Rd mean that delay and queue lengths are minimal. The impact on delays to other motorised users is assessed as slight adverse.

16.5.92 At Park Lane, Histon, the output from the LINSIG model shows that, when compared to Oakington, delays would be less, however the impact is also assessed as slight adverse (see Table 16.18).

### Table 16.18 Delays at Park Lane, Histon with Scheme

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th>2021 am peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>CGB South</td>
<td>Vehicle detection to minimise delay</td>
<td>0.6</td>
</tr>
<tr>
<td>New Road West</td>
<td>4</td>
<td>1.3</td>
</tr>
<tr>
<td>CGB North</td>
<td>Vehicle detection to minimise delay</td>
<td>0.6</td>
</tr>
<tr>
<td>New Road East</td>
<td>4</td>
<td>1.7</td>
</tr>
</tbody>
</table>

16.5.93 The SATURN model predicts that the flow of traffic on Park Lane would be 912 vehicles in the AM peak in 2016 with guided bus in place. The do-minimum AM peak flow on Park Lane in 2016 would be 953 vehicles.

16.5.94 Station Road, Histon and Impington is predicted to carry 673 vehicles in the AM peak in 2016 with the Scheme in place. This represents a decrease of 44 vehicles over the do-minimum. Average delays would be small. Accordingly, the impact on other motorised users is assessed as slight adverse in both 2016 and 2021. The results of the analysis are shown in Table 16.19.

16.5.95 It is also proposed to provide parking at the Station Road Stop for about 40 cars. The management of this car park would be such that it would be unattractive to long distance/long stay commuters. It is anticipated that this would have a negligible effect on other motorised users. See paragraph 16.5.15 for proposals for addressing on-street parking.
### Table 16.19  Delays at Station Road, Histon and Impington with Scheme

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th>2021 am peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>Station Road South</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>CGB West</td>
<td>Vehicle detection to minimise delay</td>
<td>0.6</td>
</tr>
<tr>
<td>Station Road North</td>
<td>4</td>
<td>1.8</td>
</tr>
<tr>
<td>CGB East</td>
<td>Vehicle detection to minimise delay</td>
<td>0.6</td>
</tr>
</tbody>
</table>

16.5.96 It is not anticipated that the changes represented by the introduction of a signal-controlled crossing would have an appreciable impact on driver stress.

16.5.97 A private access to stables in Histon would be crossed by the guideway and it is proposed that this is replaced by a separate dedicated access from Park Lane. The impact of this is assessed as negligible.

**Pedestrians, Equestrians and Cyclists**

16.5.98 The impact on the footpaths in this section would be more noticeable due to the high level of service (20 buses per hour in each direction in the morning peak period). F1 (Histon) is not directly affected by the Scheme, but runs parallel to it for a considerable distance. No break in the guideway would be provided for F4 (Histon), but pedestrian crossings would be permitted.

16.5.99 The provision of the maintenance track would yield significant benefits for rights of way users, offering convenient links between rights of way where none currently exist.

**Communities**

16.5.100 The villagers of Oakington would benefit from the proposed service, which would be easily accessible to most villagers whether on foot or bicycle. The residents of Histon/Impington would also benefit, but to a lesser degree given their proximity to Cambridge, existing levels of public transport and the wider range of job opportunities and community facilities and services already found there.

16.5.101 The impact of a 40 space car park in Histon and Impington would have a negligible effect on community severance, since vehicle turning movements would be few, and pedestrian movements also few. The car park would make the Scheme more accessible to residents of this extended settlement.
Construction Impacts

16.5.102 There would be short-term work outside peak hours when roads traversing the guideway would be reduced to one lane. This would affect Station Road, Oakington, Park Lane, Histon, and Station Road, Histon and Impington. Due to the short term nature of the work, the impact is assessed as negligible.

16.5.103 There would need to be a temporary closure during construction of BOAT 4 (Rampton) and BOAT 7 (Longstanton) which would then be downgraded to bridleways where they cross the guideway and on their immediate approaches. F1 and F4 (Histon) would need to be temporarily closed, but it is anticipated that the period of closure would be short, and the effect is assessed as slight adverse.

16.5.104 The route for construction traffic would run from the A14 Dry Drayton Road to Oakington. The route would divert around the southern corner of Oakington, and thence into Park Lane, Histon, thereby avoiding having any effect on community severance. This route would be expected to carry about 70 lorry movements per day.

Section 6 – A14 to Cambridge Railway Station

Motorised Users

A14 to Guideway Junction

16.5.105 This section mostly runs off road and would not impact on motorised users. Mere Way, B3 (Cambridge) would cross the CGB route at the junction of the Arbury Park and Milton Road guideways, and would make use of the break in the guideway that this junction requires. Impact on this public right of way is therefore assessed as negligible.

Histon Road Corridor

16.5.106 Proposals for improvement in this section are:

- signal controlled junction of King’s Hedges Road and Histon Road to give priority to buses.
- an inbound and outbound bus lane on Histon Road between King’s Hedges Road and Blackhall Road.

16.5.107 While these would improve bus journey times by the creation of more dedicated road space, congestion for other vehicles is likely to increase marginally as a result of bus priority at signalised junctions. The impact of this is assessed as slight adverse. No road space used by other vehicles would be removed.

16.5.108 The impacts of the Scheme on traffic on King’s Hedges Road are shown in Table 16.21. The increase in delay due to the Scheme is assessed as having only a slight adverse impact in 2016 and 2021. The AM peak traffic flow on King’s Hedges Road in 2016 is predicted to be 763 vehicles with the Scheme in place.

16.5.109 Examination of the PM peak period indicates that the impacts would similarly be assessed as slight adverse.
### Table 16.20  Delays at King’s Hedges Road without Scheme

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th>2021 am peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>CGB East</td>
<td>Vehicle detection to minimise delay</td>
<td>1.3</td>
</tr>
<tr>
<td>CGB West</td>
<td>Vehicle detection to minimise delay</td>
<td>1.3</td>
</tr>
<tr>
<td>Kings Hedges Rd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Ahead</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Kings Hedges Rd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Right</td>
<td>6</td>
<td>1.6</td>
</tr>
<tr>
<td>Kings Hedges Rd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Ahead</td>
<td>5</td>
<td>3.4</td>
</tr>
<tr>
<td>Kings Hedges Rd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Left</td>
<td>1.5</td>
<td>2.0</td>
</tr>
<tr>
<td>College Access</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left Out</td>
<td>48</td>
<td>1.7</td>
</tr>
<tr>
<td>College Access</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right Out</td>
<td>46</td>
<td>2.1</td>
</tr>
</tbody>
</table>

### Table 16.21  Delays at King’s Hedges Road with Scheme

<table>
<thead>
<tr>
<th>Arm</th>
<th>2016 am peak</th>
<th>2021 am peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Delay per vehicle (secs)</td>
<td>Worst Average Queue Length (vehicles)</td>
</tr>
<tr>
<td>CGB East</td>
<td>Vehicle detection to minimise delay</td>
<td>1.3</td>
</tr>
<tr>
<td>CGB West</td>
<td>Vehicle detection to minimise delay</td>
<td>1.3</td>
</tr>
<tr>
<td>Kings Hedges Rd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Ahead</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Kings Hedges Rd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Right</td>
<td>10</td>
<td>2.1</td>
</tr>
<tr>
<td>Kings Hedges Rd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Ahead</td>
<td>5</td>
<td>3.4</td>
</tr>
</tbody>
</table>
### Milton Road Corridor

16.5.110 Works proposed along this corridor are:

- new signal-controlled junction of guideway with Milton Road;
- a new bus and cycle lane along the frontage of the car showrooms on the approach to the guideway.
- bus priority at the Milton Road/King’s Hedges Road, Milton Road/Arbury Road and Milton Road/Gilbert Road signal controlled junctions;

16.5.111 The effect of these changes is likely to be improved journey times for buses, but little difference in journey times for other traffic. The signal controlled crossing at Milton Road between the stops at the Cambridge Science Park and Chesterton Sidings/ on-road running down Milton Road has been assessed using LINSIG. The results are shown in Table 16.22. Traffic in this locality is already constrained by signal controlled junctions at Golden Hind and the Science Park, hence traffic flows are already slow moving. The crossing would lead to localised short queues and some marginal additional delay. The impact is classified as slight adverse. The AM peak traffic flow on Milton Road in 2016 is predicted to be 1876 vehicles with the Scheme in place, a reduction of 43 vehicles compared to the do-minimum scenario.

### Table 16.22 Delays at Milton Road with Scheme (AM peak 2016)

<table>
<thead>
<tr>
<th>Arm</th>
<th>Average Delay per vehicle (secs)</th>
<th>Worst Average Queue Length (vehicles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milton Road North</td>
<td>8</td>
<td>4.8</td>
</tr>
<tr>
<td>CGB East</td>
<td>Vehicle Detection to minimise delay</td>
<td>0.5</td>
</tr>
<tr>
<td>Milton Rd South</td>
<td>7</td>
<td>3.9</td>
</tr>
<tr>
<td>CGB West</td>
<td>Vehicle Detection to minimise delay</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Cambridge City Centre

16.5.112 The County Council recognises that significant congestion for buses occurs in the City Centre. Significant improvements are required both to deal with the current situation, as well as future growth in bus use. This is likely as a result of changes in the city centre, such as the proposed Grand Arcade shopping centre, and general pressure brought about by growth of the city. To satisfy Structure Plan expectations, including CGB, a 40% increase in buses can be expected by 2011 (Environment and Transport Area Joint Committee Paper October 2003).8

16.5.113 The County Council therefore has formulated a Bus Management Strategy for Cambridge City Centre”. The overall strategy is based on giving priority to buses and supporting physical measures, such as the imposition of traffic management measures, with changes to operating regimes, to be agreed with the various operators. This would create conditions which would make the bus a more attractive option for travellers. The Scheme would benefit from this work and would contribute to raising the quality of services on offer to the general public.

16.5.114 As part of the Cambridge City Centre Bus Management Strategy, traffic management proposals have been prepared for the County Council as part of the Cambridge Transport Strategy, and include physical measures such as relocating the long distance bus stops and taxi rank in Drummer Street, limited widening of the highway in Drummer Street to allow opposing buses to pass each other, and a removal of stops on the north side of Emmanuel Street.

16.5.115 Service movements per hour through the city centre hub were recently assessed at 439. The estimated number of movements generated by the Scheme is 24 in 2021, or just over 5% of the current total. The number of CGB bus movements is therefore predicted to be less than 5% of the future total number of bus movements in the City Centre.

16.5.116 In the context of the measures outlined above and forecast increases for general bus traffic in Cambridge, the impact of the introduction of the Scheme is assessed as negligible.

Pedestrians, Equestrians and Cyclists

16.5.117 As detailed in above, the impact on Byway 3 (Mere Way) would be minimal and the impact on pedestrians, equestrians and cyclists is assessed as negligible.

16.5.118 In urban areas, where there is an appreciable shift from car to bus, pedestrians benefit through there being less traffic, and this would be the case in central Cambridge. In the case of cyclists, the design of bus and cycle lanes to ensure that adequate road space is available for both types of users would ensure that cyclists also benefit. In addition, segregation of different types of traffic would result in reduced conflict and potential for accidents, to the benefit of cyclists and pedestrians. Impact is therefore assessed as beneficial.

Communities

16.5.119 The Scheme offers improved accessibility for occupiers of the new residential development at Arbury Park as well as the extensive residential area off King’s Hedges Road. In addition, it offers improved accessibility to the Regional College and other key employment sites such as the Science Park and the major development site at Chesterton Sidings, which would also offer the potential for improved transport interchange.
Construction Impacts

16.5.120 Construction traffic would leave the A14, at the Histon and Milton junctions, and proceed to King’s Hedges Road. Access to the disused railway would be taken just west of the Regional College. Volumes of traffic are expected to be about 90 movements a day over the construction period. The impact of this is assessed as negligible. Similar movements are anticipated at Cambridge Rail Station, with negligible impact.

16.5.121 Byway 3 (Milton) would need to be temporarily closed. The period of the closure would be short and the effect of this on users is assessed as slight adverse.

Section 7 – Cambridge Railway Station to Trumpington

Motorised Users

16.5.122 It is intended that the Scheme would be integrated with the planned redevelopment of the railway station. Hence there should be no conflict with other users of the station forecourt. Beyond the forecourt, the section is segregated, passing under Hills Road and having a direct access to the Park and Ride site at Trumpington. There would therefore be no impact on other motorised users.

Pedestrians, Equestrians and Cyclists

16.5.123 F46 and 47 (Cambridge) are crossed by the guideway, where it is proposed to have a break in the guideway to allow for the Addenbrooke’s link junction. F118 (Cambridge) would link housing in Trumpington to the guideway. Providing a link between the existing rights of way and a cycleway along the maintenance track would greatly improve access for non-motorised users. In particular it would provide a direct route between the residential area of Trumpington and the Addenbrooke’s Hospital site, as well as a longer distance route between these areas and the city centre.

Construction Impacts

16.5.124 Construction traffic would come from M11 Junction 12, along Hauxton Road, and thence into Long Road to a contractor’s site compound on Long Road, or from Hauxton Road into Shelford Road to access land at Trumpington. The daily number of lorries would be around 90. Approximately 55 lorry movements per day might be expected to use the Long Road access to the construction site. The impact on other motorised users would be negligible.

16.5.125 The method of construction of the underpass under the existing railway bridge has not yet been finalised however, should the method chosen involve lane closures on the bridge, the potential for impact on traffic has been assessed as moderate adverse. Further refinement of the construction method, traffic management proposals and optimisation of the timing of the signals at either end of the bridge would be required before commencement of construction.

16.5.126 Footpath 46 (Cambridge) would be subject to temporary closures. A temporary diversion would be put in place before construction commences for FP47 (Cambridge). After construction the path would be re-instated with a 2 metre minimum width. The period of closure would be short and the effect on non-motorised users is assessed as negligible.

16.5.127 No community severance would arise from the construction proposals.
Section 8 – Link to Addenbrooke’s Hospital

Motorised Users

16.5.128 There would be no impact on other motorised users as no roads are crossed.

Pedestrians, Equestrians and Cyclists

16.5.129 The link across to Addenbrooke’s would follow the line of the existing footpath. Provision of pedestrian and cycle facilities as part of the Scheme would result in a significant improvement for non-motorised users, providing direct access from Trumpington to the hospital campus.

16.5.130 The level crossing of F47 (Cambridge), at the junction of the live railway would be terminated. F47 (Cambridge), would cross the live railway using the overbridge that is to be provided as a link to Addenbrooke’s Hospital. At the anticipated level of service, and taking account of the presence of the Cambridge to London railway, the effect on the amenity of non-motorised users would be negligible.

Communities

16.5.131 A major benefit of the Scheme would be improved access to Addenbrooke’s Hospital which is a facility of regional importance, providing key health care services and an important source of employment. This would particularly benefit many of the vulnerable groups who need to access the facility but who do not have access to private means of transport.

Construction impacts

16.5.132 A temporary diversion would be put in place before construction commences for FP47 (Cambridge). The period of closure would be short and the effect on non-motorised users is assessed as negligible.

16.5.133 About 80 lorry movements per day may be associated with the construction of the Addenbrooke’s link. Approximately half of these vehicles would access the east side of the railway alignment from Long Road and Robinson Way to a haul road parallel to Robinson Way. The effect on other motorised users would be negligible.

16.6 Mitigation Measures

Operation

16.6.1 Mitigation of the slight adverse impact on public rights of way would be considered in the design of footpath crossings, and would take the needs of the less able into account, as well as ensuring that pedestrians are not unduly disadvantaged and can cross the guideway safely. At all crossing points, a marked route would be provided across the guideway and warning signs erected, both to warn bus drivers of an approaching crossing and pedestrians/cyclists /equestrians of the presence of the guide way and vehicles. Where bridleway crossings are involved, the design should incorporate fencing and chicane/gateway features, as well as anti-skid surfacing, to control the movement of horses across the guideway.

16.6.2 The use of the maintenance track by non-motorised users would greatly expand the opportunities for recreation in the area and would more than compensate for the limited adverse impacts on non-motorised users which have been identified.
Construction

16.6.3 Full details of how the Scheme would be constructed are not available at this stage, but certain basic principles would be applied to mitigate the temporary impacts of construction on other users of the roads and other rights of way. This would be guided by a Code of Construction Practice. Temporary haul roads have been incorporated into the Scheme to avoid as far as possible taking construction traffic through built-up areas (see section 4.5). In addition, where the development crosses a road or right of way, work should be carried out as expeditiously as practical.

16.6.4 Agreements would be reached with affected parties to facilitate private means of access. In the case of roads, temporary traffic lights and single lane working are likely: full closures may be necessary for short periods, which would be accompanied by diversions.

16.6.5 Where public rights of way are affected, the options are for temporary diversions or temporary stopping up. Diversions would be incorporated where possible to minimise the number of closures of public rights of way. The diversions would be minor and short term, and would have little impact. The duration of temporary diversions or closures would be minimised through careful planning and programming of the works.

16.6.6 As noted in 16.5.123, refinement of the construction method, traffic management proposals and optimisation of the timing of signals for would be carried out before commencement of construction of the underpass beneath Hills Road railway bridge to mitigate the impact on traffic using the bridge.

16.7 Residual Effects

Motorised Users

16.7.1 Motorists using the rural roads traversed by the guided bus would be inconvenienced by signal-controlled crossings introduced along the route. In the main, such impacts would be slight adverse. This has to be seen in the context of the do-minimum alternative, which is for traffic levels throughout the county to increase, which would be accompanied by further delays and would be clearly unsustainable. Decongestion benefits would apply to motorised users on the A14 and its side roads, as a result of reductions in private vehicle trips as travellers shift mode to the guided bus.

16.7.2 The long term benefits of the CGB Scheme are highlighted in the Annex E submission for funding of the development proposal. It is forecast that by 2016, up to 21,500 trips per day made in the A14 corridor would be by guided bus. The resulting journey time benefits for users and non-users would be significant.

Pedestrians, Equestrians and Cyclists

16.7.3 The Scheme would offer a number of significant benefits to non-motorised users across a wide area. The use of the maintenance track as a new route which can act as a cycleway, footpath and bridleway between Cambridge and St Ives would create a new route for both recreational use and travel to work, or to access other facilities in settlements along it. The provision of a cycleway along the southern section of the route between the City of Cambridge and Trumpington would bring similar benefits. Secure facilities for cyclists, incorporated into the Scheme, would help to promote use of this mode.

16.7.4 Adverse impacts on non-motorised users would be limited and localised. Users of the public rights of way system in the countryside would be marginally inconvenienced where their...
routes were bisected by the guide way, both during the construction and operational phases. Generally speaking, public rights of way are lightly used, and where they are affected, levels of service mean that impacts on users have been assessed as slight adverse.

Communities

16.7.5 The introduction of a new transport service linking Cambridge, St Ives and Huntingdon, as well as the smaller settlements in between, represents a significant opportunity for greater social inclusion, giving people without access to a car, a reliable and frequent means of travel between these points. The Scheme would result in greatly improved public transport accessibility for a number of communities along the route.

16.7.6 In particular the guided bus would provide an attractive and sustainable transport option for residents of the planned settlement at Northstowe and the new development at Arbury Park.

16.7.7 In addition it would provide links to key employment areas and community facilities, such as the Regional College at King’s Hedges, Cambridge Science Park and Addenbrooke’s Hospital, as well as the city centre. Opportunities to access other public transport would be provided by linking with other bus and rail stations and planned interchange points such as Chesterton Sidings.

16.7.8 The impact of the proposal, in terms of transport and accessibility, are summarised in the table at the end of this section:
References

i. Design Manual for Roads and Bridges Volume 11 Environmental assessment, Department of Transport (1993 as amended)

ii. Cambridge to Huntingdon Multi Modal Study, Mouchel (August 2001)

iii. Cambridgeshire and Peterborough Joint Structure Plan, Cambridgeshire County Council and Peterborough City Council (October 2003)

iv. Transport User Benefit Analysis v1.5c, Department for Transport (2003)


vi. Town and Country Planning Act Ch8, HMSO (1990 as amended)

vii. Cambridge City Local Plan, Cambridge City Council (November 1996)


ix. Road Traffic Reduction Act Ch54, HMSO (1997)


xi. From workhorse to thoroughbred – a better role for bus travel, Department for Transport (1999)


xiii. Central Bus Management, Cambridgeshire County Council Cambridge Environment and Transport Joint Committee (October 2003)
## Summary of Transport and Access Impacts

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGB users</td>
<td>reduced journey times and increased reliability</td>
<td>Major +ve D P</td>
<td>None specified</td>
<td>reduced journey times and increased reliability</td>
<td>Major +ve D P</td>
</tr>
<tr>
<td>Other public transport users</td>
<td>reduced journey times and increased reliability</td>
<td>Major +ve D P</td>
<td>None specified</td>
<td>reduced journey times and increased reliability</td>
<td>Major +ve D P</td>
</tr>
<tr>
<td>Motorised users - links</td>
<td>delays to other traffic on links</td>
<td>Slight -ve D P</td>
<td>None specified</td>
<td>delays to other traffic on links</td>
<td>Slight -ve D P</td>
</tr>
<tr>
<td>Motorised users - junctions</td>
<td>delays to other traffic at junctions</td>
<td>Slight –ve D P</td>
<td>Vehicle detections on junction approaches</td>
<td>delays to other traffic at junctions</td>
<td>Slight –ve D P</td>
</tr>
<tr>
<td>Driver stress</td>
<td>changes to levels of congestion and route uncertainty</td>
<td>Slight –ve I ST</td>
<td>None specified</td>
<td>changes to levels of congestion and route uncertainty</td>
<td>Slight –ve I ST</td>
</tr>
<tr>
<td>Motorised users - decongestion</td>
<td>reduced congestion on certain routes</td>
<td>Slight +ve D P</td>
<td>None specified</td>
<td>reduced congestion on certain routes</td>
<td>Slight +ve D P</td>
</tr>
<tr>
<td>Pedestrians, equestrians and cyclists (PECs) – facilities</td>
<td>improvements to links over a wide area for all PECs</td>
<td>Major +ve D P</td>
<td>None specified</td>
<td>improvements to links over a wide area for all PECs</td>
<td>Major +ve D P</td>
</tr>
<tr>
<td>PECs – delays</td>
<td>delays experienced by walkers, cyclists and horseriders at rights of way crossings</td>
<td>Slight –ve D P</td>
<td>None specified</td>
<td>delays experienced by walkers, cyclists and horseriders at rights of way crossings</td>
<td>Slight –ve D P</td>
</tr>
<tr>
<td>PECs - amenity</td>
<td>changes to the amenity of walkers, cyclists and horseriders on existing rights of way</td>
<td>Major +ve D P</td>
<td>None specified</td>
<td>changes to the amenity of walkers, cyclists and horseriders on existing rights of way</td>
<td>Major +ve D P</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>---------------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Community severance</td>
<td>severing existing public rights of way</td>
<td>Slight –ve D P</td>
<td>Footpath diversions and signage</td>
<td>Diverted routes for some public rights of way</td>
<td>Negligible</td>
</tr>
<tr>
<td>Community accessibility</td>
<td>improved access for communities along the route to a wide range of facilities and employment opportunities</td>
<td>Major +ve D P</td>
<td>None specified</td>
<td>improved access for communities along the route to a wide range of facilities and employment opportunities</td>
<td>Major +ve D P</td>
</tr>
</tbody>
</table>

Note: Abbreviations are as follows
+ve = positive, -ve = negative, D = direct, I = indirect, S = Secondary, C = cumulative, ST = short-term, MT = medium-term, LT = long-term, P = permanent, T = temporary,
Abbreviations can be used in any viable combination, i.e. avoiding contradictions.
17. **WATER RESOURCES**

17.1 **Introduction**

17.1.1 This section of the Environmental Statement (ES) addresses the impacts of the proposed Cambridgeshire Guided Busway (CGB) Scheme in respect of hydraulics, hydrology and flood defence. This section does not address groundwater or ground contamination, which are covered in Section 12 – Ground Contamination, nor does it cover water habitats, which are discussed in Section 11 – Ecology.

17.2 **Review of Development Proposals**

17.2.1 A general description of the Scheme, including the surface water drainage features proposed, is given in Section 4 of the ES. The route and the relevant watercourses can be seen in Appendix 17A.

17.2.2 A number of features have been incorporated into the Scheme design in order to prevent adverse impacts on water resources. The measures included in the design to mitigate impacts on the water environment are:

- use of oil/petrol interceptors at strategic locations such as car park sites to clean surface water prior to discharge to an appropriate outfall location;

- use of Sustainable Urban Drainage Systems (SUDS) in the form of infiltration trenches to provide flow attenuation and mimic existing runoff conditions. The proposed infiltration trenches would be located below the guideway and would be filled with a granular material and covered with a permeable surface. Any surface water runoff falling upon the impermeable areas of the guideway, would enter the infiltration trench where it would be stored and attenuated. Initial calculations have shown that there is sufficient volumetric capacity within the dual infiltration trenches to accommodate the surface water runoff from the impermeable areas, across a range of 1 in 100 year rainfall event durations. For further details, including an initial analysis of storage requirements at the preliminary design see the Preliminary Design of Surface Water Drainage report which is included here for reference in Appendix 17B;

- ditches at the base of embankments for attenuation of embankment run-off;

- all discharge points into drains, watercourses, rivers or sewers would be hydraulically controlled using a control device such as a Hydro-Brake or an orifice plate to achieve the greenfield rate requirement (agreed with the Environment Agency to be 2 litres per second);

- use of off-line balancing ponds along the extent of the route to provide further storage and attenuation if required. The location of the balancing ponds can be seen in Appendix 17A. The ponds would be integrated into the landscape to suit the local flooding regime including the floodplain;

- location of the maintenance track at the foot of the embankment, where possible, within the flood plain area, to prevent the reduction of flood storage capacity;

- hydraulic continuity of watercourses/drainage to be maintained as per existing; and

- use of material of similar permeability to existing, when raising or altering embankment cross sections, to mitigate against any obstruction of flow.
17.3 **Methodology**

17.3.1 The assessment methodology for the EIA as a whole, including significance descriptors, is described in Section 2. This section describes the specific methods of assessing the impacts related to the water environment. The work has included the following:

- consultation with statutory and key non-statutory bodies;
- a walk over survey of the proposed CGB route;
- review of existing baseline data including reports, maps, surveys, the internet;
- identification of hydrological, hydrogeological, flood risk and drainage issues;
- assessment of impacts, including during construction and during operation;
- proposal of possible mitigation measures and identification of options where appropriate; and
- assessment of residual effects after mitigation.

17.3.2 There are a number of reports related to the Scheme which were reviewed for this section including *Arbury Park – Environmental Statement* and the *CRTS (Trumpington to City Centre) – Environmental Statement*.

17.3.3 The *UK Climate Impacts Program (UKCIP)* has developed climate change scenarios for the UK, which present information on the possible changes in the UK climate over the 21st century. Climate change effects resulting from the release of greenhouse gases could potentially increase the amount of rainfall and the risk of flooding. *PPG25 Development and Flood Risk* acknowledges the potential impact of climate change and this impact would be considered if a flood risk assessment were to be required. The EA considers that the Scheme as proposed would have negligible impact with regard to flood risk, as stated in their letter of 29th September 2003 (see Appendix 17C). For this reason climate change impacts are not considered further.

17.4 **Baseline**

**Flooding**

17.4.1 The River Great Ouse runs south of Huntingdon and St Ives in a west to east direction. The floodplain of the Great Ouse extends widely over the areas south and east of Huntingdon. The River Cam runs northwards through Cambridge and to the south and west of Trumpington. The proposed guideway would cross the River Great Ouse, Moore Brook, Swavesey Drain, Beck Brook, River Cam and Hobson’s Brook (see Appendix 17A). Within Huntingdon, St Ives and Cambridge the route is proposed to run on the existing road network, which is drained by a traditional highway drainage system and is assumed to have been constructed to adoptable highway standards.

17.4.2 The limit of the 1% annual probability (1 in 100 year) flood, as taken from the Environment Agency (EA) indicative floodplain maps, is shown in Appendix 17D. This indicates that route sections 1 to 5 along the disused railway corridor between Huntingdon and Histon are in the indicative flood envelope of the River Great Ouse, Moore Brook, Swavesey Drain, Beck Brook and flooded sand and gravel pits. The 1% annual probability (1 in 100 year) flood envelope between Cambridge and Trumpington tightly follows the path of the River Cam and Hobson’s Brook.

17.4.3 The EA have advised that flood levels taken during the 25 March 1947 flood are the highest
currently recorded and that these should be adopted for design and impact assessment purposes (see EA letter, Appendix 17C). The existing railway embankment is below the 1947 flood levels for approximately 3.5 km of its length between a point south of Over to south of Holywell. The EA have aerial photographs taken during or soon after the 1947 flood showing the line open to steam trains, from which it could be surmised that the railway line was not closed as a result of the flood. The EA have advised that they consider the existing railway embankment to be sufficiently permeable so as not to restrict the passage of floodwater.

**Surface Water Drainage**

17.4.4 The CGB route crosses over several watercourses, which are mentioned below in the respective route sections. The majority of watercourses are privately owned, as are numerous associated structures, including headwalls, culverts and bridges. South Cambridgeshire District Council and Huntingdonshire District Council have a maintenance responsibility for the majority of watercourses in order to ensure that the drains are free-flowing and localised flooding is minimised. In addition, the EA have responsibility for the main rivers and the Internal Drainage Boards (IDBs) for a small number of drains.

17.4.5 The general topography slopes to the northeast and the watercourses in the region of the Scheme are generally at or near maximum capacity. Surface pumping exists to assist with surface water drainage. The River Great Ouse also has sluice gates to control and restrict the flows of water.

**Section 1: Huntingdon to St Ives Park and Ride**

17.4.6 Between Huntingdon and St. Ives, the route would run on the existing road network, which is drained by a traditional highway drainage system.

**Section 2: St Ives Park and Ride to District Boundary (Fen Drayton)**

17.4.7 The route passes over a small fishing pond just east of St Ives Park and Ride. The Scheme proposes to infill this prior to construction of the guideway. Adjacent to the route are several waterbodies that were previously sand and gravel pits. The route then passes over the River Great Ouse, which flows from the south of St Ives in a west to east direction. It then crosses Moore Brook, which is currently maintained by Huntingdonshire District Council. Moore Brook flows north and joins the River Great Ouse.

**Section 3: District Boundary (Fen Drayton) to Swavesey Drain**

17.4.8 The route in this section passes over several drains including one at Covell’s bridge and Swavesey drain at the boundary with Section 4. The drains are generally at maximum capacity and are maintained by South Cambridgeshire District Council. Swavesey IDB maintains the Swavesey Drain. Discussions with south Cambridgeshire District Council revealed that the drain at Covell’s Bridge has recently flooded up to the base of the rail when the embankment was breached. Existing drainage is by natural infiltration and where there are embankments, toe drains allow water to flow into the watercourses.

**Section 4: Swavesey Drain to Longstanton Park and Ride**

17.4.9 In this section, the route passes over several drains and an IDB watercourse known as Reynolds Ditch, maintained by Old West IDB. South Cambridgeshire District Council maintains the other drains in this section. Existing drainage is by natural infiltration and where there are embankments, toe drains allow water to flow into the watercourses.
Section 5: Longstanton Park and Ride to A14

17.4.10 This section includes Beck Brook, as well as several drains which are crossed by the route. South Cambridgeshire District Council has maintenance responsibility of the majority of watercourses in this region except for Beck Brook, which is a Main River, and therefore the responsibility of the EA. Existing drainage of the disused railway is by natural infiltration and, where there are embankments, toe drains allow water to flow into the watercourses.

Section 6: A14 to Cambridge Railway Station

17.4.11 This section includes guideways to Chesterton Sidings and to Arbury Park, which do not cross any watercourses. Within Cambridge, the CGB buses would run on the existing road network, which is drained by a traditional highway drainage system. The route also crosses the First Public Drain, which is maintained by South Cambridgeshire District Council.

Section 7: Cambridge Railway Station to Trumpington

17.4.12 Parts of this section are drained by a new highway drainage system. The only main rivers (for which the EA have responsibility) are the River Cam and Hobson’s Brook, both west of the route. Hobson’s Brook crosses the route shortly before Trumpington Stop. There are also a number of open drains in this relatively flat area.

Section 8: Link to Addenbrooke’s Hospital

17.4.13 This section crosses agricultural land that currently drains to ground. There are also a number of open drains in this relatively flat area.

Water Quality

17.4.14 The Environment Agency classifies water quality in rivers and canals using the General Quality Assessment scheme (GQA). The Chemistry GQA describes quality in terms of three chemical measurements: biochemical oxygen demand, ammonia and dissolved oxygen. These are considered to detect the most common types of organic pollution from sewage treatment works, agriculture and industry. A grade is assigned to each length of river according to the lowest standard achieved by any of the three measurements, averaged over three years. The standards are summarised as follows:

A - very good quality (suitable for all fish species)
B - good quality (suitable for all fish species)
C - fairly good quality (suitable for high-class coarse fisheries)
D - fair quality (suitable for coarse fisheries)
E - poor quality (likely to limit fish populations)
F – bad quality (very polluted rivers)

17.4.15 The Environment Agency also specifies water quality constraints for discharge of trade effluent under the Water Resources Act 1991.°

17.4.16 There are several water-sampling points in the study area as provided by the Environment Agency’s website. The locations of the sampling points are shown in the Figures in Appendix 17A and the test results are in Appendix 17E. The summary of the water quality in each route section is outlined below, for the years 1993 to 2002.
Section 1: Huntingdon to St Ives Park and Ride

17.4.17 The River Great Ouse passes through Huntingdon from the south and flows east towards St. Ives. There are sample points (SP) at Brampton Brook (SP1) and Alconbury Brook (SP2), just west of Huntingdon. These have a Chemistry GQA rating of E (poor) and C to D (fair to fairly good) respectively over the period 1993 to 2002.

17.4.18 Further east there is a sample point between Brampton Brook and the Marina (SP3), which has been given a Chemistry GQA rating of C (fairly good) between 1993-2000 and D (fair) for 2001-2002.

17.4.19 Sample point SP4, between the Marina and Hemingford Grey Mill, has allocated a Chemistry GQA rating of C (fairly good) between 1993-2000 and D (fair) for 2001-2002.

Section 2: St Ives Park and Ride to District Boundary (Fen Drayton)

17.4.20 The River Great Ouse passes south of St Ives and flows in a west to east direction. The river is crossed by the route in this section. Sample point SP5 in the River Great Ouse downstream of St Ives had a Chemistry GQA rating of C (fairly good) during 1993-1998 and 2000-2002. In 1999, SP5 was rated B (good) according to the GQA grading system.

17.4.21 A sampling point in Marley Gap Brook (SP6) has been rated as C (fairly good) for years 1994 -1999 and D (fair) for years 1993 and 2000-2002 according to the Chemistry GQA system.

Section 3: District Boundary (Fen Drayton) to Swavesey Drain

17.4.22 Available water quality data along this section are from sampling points along the River Great Ouse, Marley Brook Gap and Longstanton Brook, which is north of the proposed route and downstream of St Ives. Sampling points SP5 and SP6 on the Ouse, detailed above, are physically closest to the route. SP7 and SP8 both lie downstream of the route.

17.4.23 SP7 was rated C (fairly good) for the years 1993-1997 and 2001-2002 and B (good) for the years 1998-2000 according to the Chemistry GQA system.

17.4.24 The samples at SP8, which is located at Longstanton Brook, indicate that the Chemistry Grade has improved from a rating of D to E (fair to poor) between the years 1993-2000 to grade C (fairly good) in 2001-2002.

Section 4: Swavesey Drain to Longstanton Park and Ride

17.4.25 There are no water quality sampling points immediately adjacent to this section.

Section 5: Longstanton Park and Ride to A14

17.4.26 There are no water quality sampling points immediately adjacent to this section.

Section 6: A14 to Cambridge Railway Station

17.4.27 There are 3 sampling points (SP9, SP10 and SP11) downstream of the River Cam, west and north of Cambridge Railway Station, with SP11 being closer to the proposed route.

17.4.28 Water quality at SP9, SP10 & SP11 has been rated A (very good) during 2001-2002 and B to C (good to fairly good) between 1993-2000.
Section 7: Cambridge Railway Station to Trumpington

17.4.29 There are two sampling points (SP12 and SP13) to the west of Trumpington, along Bourn Brook.

17.4.30 According to the Chemistry GQA system, sampling Point SP12 has improved from C-D (fairly good) to B (good) between 2000-2002.

17.4.31 Water quality at sampling point SP13, which is next to the M11 road bridge, has improved from E (poor) during 1997-1999 to C (fairly good) between 2000-2002.

17.4.32 There are several sampling points in the area south of Trumpington that are taken from the River Cam, River Rhee and River Granta. The water quality along the River Cam is considered to be good, however the test results for the other sampling points vary between E (Poor) to C (Fairly Good).

Section 8: Link to Addenbrooke’s Hospital

17.4.33 The closest sampling point to this section lies along the River Cam (SP11), downstream of Trumpington. The water quality results show that the quality has improved from B to C (good to fairly good) between 1993-2000 to A (very good) during 2001-2002.

17.5 EA and IDB Consultation Responses

17.5.1 The Environment Agency is the principal flood defence operating authority in England and Wales, responsible for issuing flood warnings to the public and providing flood defences. The EA has therefore been consulted on flooding impact risk and they have raised no concerns over the flooding issues with respect to the Scheme. The Environment Agency considers that the development would not significantly impact the existing flooding regime.

17.5.2 The EA have confirmed in writing (see letter dated 29th September 2003 in Appendix 17B) that:

- the 1947 flood levels are the highest currently recorded and that these should be adopted for design and impact assessment purposes;
- the EA considers that the CGB, as currently proposed, would not impact the existing flood regime;
- the EA does not require a flood risk assessment to be undertaken;
- the EA recognise that the proposed construction of a Sustainable Drainage System and the appropriate maintenance of the existing cross culverts under the railway would provide some means of mitigation with regards to flooding, where such measures are within the floodplain; and
- the EA agrees in principle to the appropriate raising or changing of the embankment cross sections, as proposed by the Scheme, as long as it is carried out with a material of similar permeability. Compensatory floodplain storage would not be required.

17.5.3 Furthermore, the Agency has confirmed (see letter dated 14th October 2003 in Appendix 17C) that road widening at the bus lanes on Hartford Road, Huntingdon, and Houghton Road, St Ives, are acceptable to the EA.

17.5.4 The Internal Drainage Boards were also consulted over the Scheme, and a meeting was held.
in November 2002 to determine all the IDB catchment areas and discuss the approach to the attenuation of run-off to these catchments.

17.6 Relevant Guidance

17.6.1 The Scheme involves works close to watercourses which are designated either main rivers or ordinary watercourses. Main rivers are under the control of the EA, which is the relevant Operating Authority. In the case of ordinary watercourses, the Local Authorities or the Drainage Boards are the Operating Authorities.

17.6.2 The Environment Agency will be the main statutory committee concerned with the hydrological/drainage aspects of the application. It has powers under the Water Resources Act 1991, Land Drainage Act 1991 and the Environment Act 1995 which provide, among others, for:

- general supervision over all aspects of flood defence;
- improving and maintaining those waterways which are a part of the designated 'main river' system;
- regulating activities in and alongside river systems and defences on main river and other waterways, except those within an internal drainage district; and
- duties to conservation.

17.6.3 Local authorities have powers to undertake flood defence works under the Land Drainage Act 1991 on watercourses which have not been designated as main and which are not within internal drainage board areas.

17.6.4 A drainage board has powers under the Land Drainage Act 1991 to undertake works on any watercourse within its district, other than 'main river'. These form the major network into which other 'field' ditches, maintained by the landowner/farmer, and storm sewers from urban areas can successfully drain.

17.6.5 Land drainage consent would be required for any works (including temporary) within 8m of the banks of any main rivers.

17.6.6 Under new powers given to the Environment Agency in the Anti-Pollution Regulations (1999) the agency is able to stop construction activities at any time should a significant risk be posed to the environment.

17.6.7 Flooding is a planning issue under PPG25 and also under Local Plans and Structure Plan policies.

17.7 Assessment

17.7.1 The effects resulting from the Scheme have been listed below and are discussed in detail in the sections that follow:

- construction effects;
- operational effects;
- flood risk effects; and
- drainage effects.
Construction Effects

Pollutants from Construction Processes

17.7.2 The proposed route would pass over a number of water bodies such as watercourses, drainage ditches and a pond. Development would take place, therefore, directly above watercourses, drains and other bodies of water.

17.7.3 The major concerns with regard to the water environment would be any potential for pollution from silt and spillage of fuels or chemicals arising from the refuelling, cleaning and movement of construction vehicles, temporary construction areas and general construction activities. The pollution may impact on the water quality of both surface and groundwater. The potential effect is evaluated as moderate adverse.

Bridge Works Affecting Over Watercourses

17.7.4 There are a number of existing bridges along the route; all of which would be retained (see Section 4). The River Great Ouse viaduct requires works to replace the deck and one of the piers. These works may result in the release of chemicals and or sediments into the River Great Ouse, which is a County Wildlife Site (CWS). The potential effect is evaluated as major adverse.

17.7.5 The construction of an underpass beneath the Long Road embankment would take place in the vicinity of Hobson’s Brook. Construction works may result in the release of chemicals and or sediments into the Brook, which is located approximately 400m west of the bridge. The potential effect is evaluated as slight adverse.

17.7.6 Works required to other bridges along the CGB route would not affect watercourses.

Dewatering

17.7.7 It is likely that all structures at the St Ives Park and Ride site would be constructed on foundations that are likely to extend to depths of 2m to 3m below ground level. Given the relatively high water table in the area, it is possible that dewatering may be required for the establishment of foundations for the park and ride buildings. This dewatering may affect ground water levels and surface water quality in the local area. Deep foundations are highly unlikely to be required for the buildings proposed, and therefore it is assumed that only a limited level of dewatering would be required. The significance of this effect is considered to be slight adverse.

Potential for Leachates from Ground Contamination and Landfill Sites

17.7.8 Leachates are pollutants draining from a landfill site or a contaminated site, in liquid form. These can pollute groundwater, watercourses or ponds, if preventive measures are not taken.

17.7.9 It is known that gravel extraction has occurred at the St Ives Park and Ride site and, according to EA records, the site was subsequently infilled with ‘inert’ landfill materials (this is covered in more detail in Section 12). Rainfall falling onto this site may produce leachates, which can pollute watercourses and aquifers.

17.7.10 A ground investigation, which comprised the collection of soil samples for chemical analysis from areas identified during a desk study, has been carried out and is described in Section 12.

17.7.11 The ground investigation information provided an assessment at the following locations.
Chemical analyses on soils at the St Ives Park and Ride site has shown that the ground is not significantly impacted by contamination. Chemical analyses of two samples of perched water collected within the landfilled area indicate that perched water has not been significantly impacted by contamination. However, for one of the samples, the concentrations of chromium and phenols were slightly in exceedance of the Dutch Intervention Values.

Chemical analyses on two soils at the MG Owners Club site has shown that the ground is not significantly impacted by contamination.

Chemical analyses on six soils along the disused railway corridor has shown that the ground is not significantly impacted by contamination from past railway activities. However, it is likely that localised areas of impacted track bed materials will be present along some parts of the disused railway corridor.

The impact, therefore, from leachates during infilling and excavation has been evaluated as slight adverse.

**New Outfalls**

For the proposed drainage scheme, new outfall points to discharge surface water run-off into receiver drains would be required. These works may result in the release of chemicals and or sediments from the construction process entering the watercourses. With appropriate construction methodologies this potential effect has been evaluated as slight adverse.

**Operational Effects**

**Additional Run-off**

The increased area of impermeable surfaces from the new buildings, park and ride sites, kiss and ride site, guideway and car parks would increase the amount of surface water run-off.

The EA Development Control section requires that the runoff from all new areas of the Scheme be restricted to a greenfield rate in order to minimise the effect.

The increase in runoff from new hard standing areas would be mitigated by the use of Sustainable Urban Drainage Systems (SUDS). SUDS aim to control or reduce the amount of run-off entering the surface water system by allowing water to infiltrate into the ground or by storing the water and discharging into the sewers at the greenfield rate. These may take the form of infiltration devices, filter strips and swales, permeable surfaces, ditches and balancing ponds. An additional benefit of using methods such as porous paving and swales on or around the park and ride sites to facilitate infiltration, is that small concentrations of hydrocarbons would be broken down by natural processes in the soil.

It is proposed that infiltration trenches filled with lightly compacted granular material and covered with a porous surface would be located between the tracks. The runoff from impermeable areas (e.g. the guideway) would then be discharged at the permissible rate of discharge using a flow control device such as a Hydro-Brake or an orifice plate.

The quality and quantity of this runoff could have negative effects on the waterbodies along...
the route but the additional volumes anticipated are small, spread over a long distance and
discharged to several points. In view of the measures incorporated within the design to
control these discharges, the impacts are assessed as negligible.

**Contamination from Vehicles and Other Operational Activities**

**Spillage of Contaminants**

17.7.22 There is the potential for spillages of contaminants from machinery or vehicles to have a
detrimental effect on the quality of water entering the surface water system.

17.7.23 Vehicles using the park and ride or kiss and ride sites may have petrol or oil leaks that may be
picked up by surface water run-off and contaminate the local water environment. This impact,
which is potentially major, would be mitigated by the use of petrol/oil interceptors which
have been incorporated into the design. SUDS methods such as porous pavements and
swales, which break down small concentrations of hydrocarbons could additionally be used to
mitigate against spillages. Therefore, this impact has been evaluated as negligible.

17.7.24 Any herbicides used for the maintenance of the guideway may enter the local watercourses
via surface water run-off.

17.7.25 The potential impact from operation of vehicles and guideway maintenance is evaluated as
minor adverse.

**Flood Risk Effects**

**Change in flood storage volumes**

**Guideway**

17.7.26 A substantial section of the proposed route lies within the floodplain of the River Great Ouse
and the River Cam, including St Ives Park and Ride and Oakington Stop. Although there
may be a minimal loss in flood storage as a result, the EA have agreed that the Scheme would
not impact the existing flood regime. In addition, the EA has also stated that it does not
require a flood risk assessment to be undertaken and that provision of compensatory
floodplain storage volume would not be required.

17.7.27 Works are required to the existing bridge over the River Great Ouse near St. Ives. The
existing substructure would be retained to support the deck with the exception of one pier,
which is to be replaced. This impact therefore has been evaluated as negligible.

17.7.28 Provision of new ditches or widening/cleaning of existing drainage ditches on either side of
the route would provide compensatory flood storage volume, as would the proposed
stormwater drainage attenuation ponds, where such measures are within the floodplain.

**Maintenance Track**

17.7.29 A maintenance track would be provided alongside the proposed guideway sections. Where
possible, it is proposed to locate the maintenance track at the toe of the embankment on one
side, so that it would cause no change in the flood storage capacity. The following points
need to be considered:

- The maintenance track could introduce an area of reduced permeability into the
  flood plain. However with suitable design using permeable surface materials
  this can be mitigated. This impact has therefore been evaluated as negligible.
Parts of the maintenance track would flood for a number of days every year. During the winter particularly the fields within the floodplain may be under water. This would not prevent the CGB buses from operating but may preclude on-going maintenance tasks and the use of the maintenance track as a bridleway.

17.7.30 Where the guideway crosses a watercourse the maintenance track would need to be located at the same level as the guideway and parallel with the main track. The height of the embankment would be raised in some locations (and as a result, widened) to lift the alignment above the floodplain. This is a necessity in order to provide a continuous maintenance track for the majority of the route. A detailed assessment of such locations has been undertaken in the Arup Report *Embankment Design to Minimise Impact on Flooding*, January 2003, which is attached as Appendix 17F. The report illustrates that with the adoption of either gabion walls and/or reinforced soil slopes it is possible to maintain existing flood storage at these locations.

17.7.31 The EA agrees in principle to the appropriate raising or changing of the embankment cross sections, as proposed by the Scheme, as long as it is carried out with a material of similar permeability. The EA have advised that compensatory floodplain storage would not be necessary, and a Flood Risk Assessment would not be required (see letter dated 29th September 2003 in Appendix 17C).

St Ives Park and Ride and Replacement Embankment

17.7.32 The site of the St Ives Park and Ride site is within the flood plain of the River Great Ouse. The average level of the existing ground at this location is 6.5m AOD. The finished level of the proposed parking area would be approximately 6m AOD and therefore the St Ives Park and Ride site would not result in an associated reduction in flood plain storage volume.

17.7.33 Less than twenty years ago, a railway embankment existed at the St Ives end of the CGB route. Therefore, the portion of the proposed new embankment, which is equivalent in height and width to the original, can be seen as a reinstatement rather than a new embankment in flood storage terms.

17.7.34 As the reduction in flood storage volume is small relative to the existing floodplain and is spread over a large area, the impact has been evaluated as negligible.

Oakington Stop

17.7.35 The Oakington Stop is located at the edge of the floodplain of Beck Brook. The impact of this is considered to be negligible.

Landscape Proposals

17.7.36 Initial discussions have taken place with the EA about landscape proposals that lie within flood risk areas. The main concerns have been that watercourses and flood flow-routes be maintained. Discussions with the EA would take place at all stages of the design process to ascertain that landscape proposals would not increase the risk of flooding.

Development Over Water Bodies

17.7.37 The CGB route would pass over a number of water bodies such as watercourses, drainage ditches and a pond. The guideway embankment would be reinstated between Fen Drayton and St. Ives and therefore development would take place directly above awarded drains and drainage ditches. The embankment would be constructed from material of similar
permeability to the existing structure, so as not to impede or slow down the flow of water through the embankment. All the existing culvert sub-structures would be extended and new decks constructed to accommodate the guideway and maintenance track. The impact of the new culverts are assessed as negligible in flood storage terms.

17.7.38 The route passes over a small fishing pond just east of St Ives Park and Ride. It is proposed that the pond would be filled in to allow the construction of the guideway. This would result in a slight loss of flood storage volume, which would correspond to the volume of water that could be stored between the level of the pond and the 1% indicative floodplain level. The impact of infilling the lake has been assessed as slight adverse.

**Effects on Flow Paths**

17.7.39 It is proposed that the embankment would need to be appropriately raised or changed in a number of locations to accommodate sections of the maintenance track. The EA view the existing railway embankment as permeable and agrees in principle to the appropriate raising or changing of the embankment cross sections, as proposed by the Scheme, as long as it is carried out with a material of similar permeability so as not to obstruct any flow paths. The impact has therefore been evaluated as negligible.

17.7.40 Existing culverts through the embankment would be extended to suit the proposed embankment width. The unblocking and/or reinstatement of existing cross culverts under the route would provide increased flowpaths for floodwater and drainage runoff. The impacts of these works are assessed as slight beneficial.

17.7.41 Impacts on Beck Brook resulting from the replacement of the existing bank with a retaining wall for the Oakington Stop are considered negligible.

**Drainage Effects**

**Development Over Drainage Ditches**

17.7.42 The construction of the Scheme would affect existing drains, but new drainage ditches would be constructed along the edges of the CGB corridor. These drains would be designed in an appropriate manner to ensure they function efficiently and are sized to a sufficient capacity.

**New Outfalls**

17.7.43 The Scheme would involve the construction of drainage outfalls to the lakes and watercourses on either side of the route. New outfalls would also be connected to the existing highway drainage in some sections. It is proposed that by using appropriate construction methodologies, including Sustainable Urban Drainage Systems and attenuation methods where appropriate, the impact of any new outfalls would be negligible.

**17.8 Mitigation Measures**

**Construction Effects**

**Best Practice Guidelines**

17.8.1 All construction site works would be undertaken in accordance with the Environment Agency’s pollution prevention guidelines and in particular the EA Pollution Protection Guide 6 *Working at Construction and Demolition Sites*. Good construction practice would ensure that impacts during construction are minimised.
Pollutants from Construction Processes

17.8.2 A Code of Construction Practice (CoCP) would be produced to outline methods and constraints and ensure that the environment is protected (see Section 4.5).

17.8.3 All construction works would include temporary bunds, settlement ponds or silt traps to store site run-off and protect water bodies and aquifers. Settlement ponds are beneficial not only for decreasing silt loads to receiver drains but also as they allow for the isolation and on-site treatment of accidental spillages before they pose a threat to the aquatic environment.

17.8.4 Construction vehicles would be well maintained (as would be outlined in the CoCP) to reduce the risk of hydrocarbon contamination. Construction materials would be managed and stored in a way that minimises the risk to the water environment (e.g. chemicals would be stored in bunded areas).

Bridge Works Affecting Watercourses

17.8.5 Any works adjacent to or over any main or normal rivers would be carried out having regard to:

- the Land Drainage Act (1991);
- the Water Resources Act (1991); and
- Planning Policy Guidance 25: Development and Flood Risk

17.8.6 As well as meeting all regulatory requirements, care would be taken to avoid contamination by chemical agents or silt.

Dewatering

17.8.7 Advice from the Environment Agency would be sought in relation to the most appropriate method for dewatering and reference would be made to Pollution Prevention Guidance Note (PPG 23). Any water removed as a result of dewatering would be routed to a temporary retention pond before being discharged into the surface water drainage system.

Leachates from Ground Contamination

17.8.8 It is likely that ground contamination land would be identified along certain sections of the length of the existing rail corridor. Such material would be excavated and disposed of at an appropriate site in accordance with Environment Agency requirements. Further details regarding ground contamination can be found in Section 12. The impact from leachates is therefore evaluated as negligible.

Operational Effects

Additional Run-off

17.8.9 Mitigation measures incorporated into the design would ensure that impacts from additional run-off would be negligible.

Contamination from Vehicles or Track Maintenance

17.8.10 The St. Ives guideway maintenance and stabling depot is to be located to the east side of the park and ride and would include:
- a re-fuelling facility;
- stabling for vehicles; and
- storage space for equipment and materials for guideway maintenance.

17.8.11 The depot may have contaminants that could be picked up by surface water run-off and contaminate the local water environment. The depot would be sited on impervious bases and surrounded by impervious bund walls. The volume of the bunded compound should be 10% greater than the capacity of the tanks being stored.

17.8.12 Mitigation measures incorporated into the design, such as petrol and oil interceptors and porous pavement would be used to clean the surface water prior to discharge. The impact is therefore evaluated as negligible.

**Flood Risk Effects**

17.8.13 Mitigation measures incorporated into the design would ensure that flood risk effects would be negligible.

**Drainage Effects**

17.8.14 Mitigation measures incorporated into the design would ensure that drainage effects would be negligible.

17.9 **Conclusions**

17.9.1 Mitigation measures have been proposed for each of the effects identified in the assessment of potential effects. These mitigation measures would ensure that the Scheme does not have any adverse effects to the hydrological regime of the area.

17.10 **Residual Effects**

17.10.1 The mitigation measures proposed in this section aim to minimise the effect of the development or in some instances have a beneficial effect on the hydrological regime of the area. For example, the unblocking of existing cross-culverts or the cleaning of ditches may improve the existing drainage paths for surface water run-off.

17.10.2 The mitigation measures would ensure that the residual effects from the development would be negligible.

17.11 **Summary**

17.11.1 This section of this ES has identified the potential effects that the Scheme would have on the water environment and for each of these effects mitigation measures have been proposed to reduce their impact. The methodology for the assessment is outlined and the policy context related to hydrological and fluvial issues is defined. The baseline with regard to flooding, surface water and water quality is defined. In addition, the baseline describes historic flooding that has occurred along the route, and the sections of the route that are within the 1% annual probability (1 in 100 year) flood envelope. The existing surface water drainage system is described in each of the sections of the route including descriptions of any drains, rivers and other bodies of water that the route either crosses or passes close to. The current water quality for each section is defined using the general quality assessment scheme (GQA).

17.11.2 The predicted effects are categorised as construction, operational, flood and drainage effects.
The main concerns are additional run-off generated by increased areas of hard standing and the possible release of contaminants during construction and operational activities. Mitigation means are proposed for the potential effects identified and it is concluded that assuming their means are implemented then the effects on the water environment would be negligible.
Appendices

Appendix 17A  Watercourses and Sampling Points
Appendix 17B  Report on Preliminary Design of Surface Water Drainage
Appendix 17C  Environment Agency Correspondence
Appendix 17D  Indicative Floodplain Map
Appendix 17E  Water Quality Data
Appendix 17F  Report on Embankment Design to Minimise Impact on Flooding

References

2 Arbury Park – Environmental Statement (WSP)
3 CRTS (Trumpington to City Centre) – Environmental Statement, Nathaniel Litchfield Partners
4 UK Climate Impacts Program (UKCIP)
5 PPG25 Development and Flood Risk
8 The Environment Act (1995)
10 EA Pollution Protection Guide 6 ‘Working at Construction and Demolition Sites.’
11 Planning Policy Guidance 25 (PPG25)
12 Pollution Prevention Guidance Note (PPG 23): Maintenance of Structures Over Water
### Summary of Water Resources Impacts

<table>
<thead>
<tr>
<th>Impact name</th>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pollutants from construction</td>
<td>Pollutants to the water environment from construction processes</td>
<td>I, ST, Moderate, -ve</td>
<td>Include temporary bunds, settlement ponds, silt traps to store site runoff</td>
<td>No impact Negligible</td>
</tr>
<tr>
<td>Pollutants from bridge works</td>
<td>Contamination due to renovation of existing bridge deck and pier over the River Great Ouse</td>
<td>I, ST Major, -ve</td>
<td>Works to be carried out having regard to the Land Drainage Act (1991). Care would be taken to avoid contamination by chemical agents or silts</td>
<td>No impact Negligible</td>
</tr>
<tr>
<td>Pollutants from bridge works</td>
<td>Contamination due to works at Long Road Bridge</td>
<td>I, ST Slight, -ve</td>
<td>Works to be carried out having regard to the Land Drainage Act (1991). Care would be taken to avoid contamination by chemical agents or silts</td>
<td>No impact Negligible</td>
</tr>
<tr>
<td>Spillage of Contaminants</td>
<td>Impact to local water environment from contaminants picked up from surface water runoff</td>
<td>I, T Negligible</td>
<td>Mitigation incorporated into design. Use good practice. Oil/petrol interceptors and porous pavements could be used to control effect of contaminants.</td>
<td>No impact Negligible</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Characteristics</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------</td>
<td>--------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>Dewatering</td>
<td>Dewatering for the establishment of foundations</td>
<td>I, ST</td>
<td>All dewatering works would refer to Pollution Prevention Guidance Note PPG23. Water removed could be routed to a temporary retention pond prior to discharge.</td>
<td>No impact</td>
</tr>
<tr>
<td>Leachates</td>
<td>Leachate emissions from infilling and excavation</td>
<td>I, ST</td>
<td>Appropriate ground investigations to be carried out to inform mitigation required. Removal of material to landfill site. On site treatment for any effluent waters. Measures to be agreed with the EA.</td>
<td>No impact</td>
</tr>
<tr>
<td>New outfalls</td>
<td>Chemicals and sediments from the construction process entering the watercourse via new outfalls</td>
<td>D, ST</td>
<td>Use appropriate construction methodologies as per the CoCP.</td>
<td>No impact</td>
</tr>
<tr>
<td>Operational</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional run-off</td>
<td>Additional runoff. Impact to fen pools</td>
<td>D, P</td>
<td>Mitigation incorporated into design. Restrict runoff to greenfield rate. SUDS would be used to control runoff rate and water quality.</td>
<td>No impact</td>
</tr>
<tr>
<td>Additional runoff from guideway</td>
<td>Additional runoff from guideway</td>
<td>D, P</td>
<td>Mitigation incorporated into design. SUDS would be used to control runoff rate.</td>
<td>No impact</td>
</tr>
</tbody>
</table>
### Contamination from vehicles

<table>
<thead>
<tr>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact from operation, washing facilities and track maintenance</td>
<td>I, P Minor, -ve</td>
<td>Maintenance depot to be sited on impervious base, and fuel storage areas to be surrounded by impervious bund walls.</td>
<td>No impact Negligible</td>
</tr>
</tbody>
</table>

### Flood Risk Impacts

<table>
<thead>
<tr>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in flood storage volume due to maintenance track</td>
<td>D, P Negligible</td>
<td>Mitigation incorporated into design. Use good practice. Maintain existing drainage ditches.</td>
<td>No impact Negligible</td>
</tr>
<tr>
<td>Change in flood storage volume due to St Ives Park and Ride</td>
<td>D, P Negligible</td>
<td>Mitigation incorporated into design. Use good practice. Maintain existing drainage ditches.</td>
<td>No impact Negligible</td>
</tr>
</tbody>
</table>

### Impact to flow paths

<table>
<thead>
<tr>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact to flow paths caused by possible rebuilding of embankment</td>
<td>D, P Negligible</td>
<td>Mitigation incorporated into design. Use good practice. Any rebuilding of embankment to be carried out with material of similar permeability.</td>
<td>No impact Negligible</td>
</tr>
</tbody>
</table>

### Drainage Effects

<table>
<thead>
<tr>
<th>Description of impact</th>
<th>Characteristics</th>
<th>Short description of mitigation</th>
<th>Description of residual impact (assuming mitigation implemented)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact to the water environment due to development over drainage ditches</td>
<td>D, ST Major, -ve</td>
<td>Mitigation incorporated into design. Use good practice. Development of new field drains.</td>
<td>No impact Negligible</td>
</tr>
<tr>
<td>Impact name</td>
<td>Description of impact</td>
<td>Short description of mitigation</td>
<td>Description of residual impact (assuming mitigation implemented)</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>Additional runoff</td>
<td>Additional runoff due to Park and Ride schemes</td>
<td>Mitigation incorporated into design. Use good practice. SUDS to be used to attenuate additional runoff and control runoff rate.</td>
<td>No impact</td>
</tr>
</tbody>
</table>

Note: Abbreviations are as follows
+ve = positive, -ve = negative, D = direct, I = indirect, S = Secondary, C = cumulative, ST = short-term, MT = medium-term, LT = long-term, P = permanent, T = temporary,
Abbreviations can be used in any viable combination, i.e. avoiding contradictions.
18. INTERACTIONS AND CUMULATIVE EFFECTS

18.1 Introduction

18.1.1 It is a requirement of the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2000 (the Rules) that an Environmental Impact Assessment (EIA) should consider cumulative and interactive effects, in addition to the direct effects arising from the Scheme. Annex 6 of the Guide to TWA Procedures sets out the required content of an Environmental Statement (ES), which includes:

'A description of the likely significant effects of the project on the environment, which should cover the direct effects and any indirect, cumulative, short term, medium term and long term, permanent and temporary, positive and negative effects of the project...'

18.1.2 Interactive and cumulative effects can be defined as follows (also see Section 2.10):

- Interactive effects arise where effects from one environmental ‘topic’ impinge on another (for example the effect of increased traffic on noise, or changes in water quality on ecology). These effects are also sometimes referred to as indirect effects.
- Cumulative effects arise where other proposed developments in the surrounding area give rise to effects which, in combination with the Scheme, would be likely to generate different and potentially significant impacts.

18.1.3 Both interactive and cumulative effects may be positive or negative.

18.1.4 A number of instances of cumulative and interactive effects have been highlighted in this ES and are summarised in the sections below.

18.2 Interactive Effects

18.2.1 Key interactions between the environmental topics identified in this ES are as follows:

- interactions between traffic and noise;
- interactions between traffic and air quality;
- interactions between soils/contamination and water quality;
- interactions between water and ecology; and
- interactions between landscape and ecology.

18.2.2 The above interactions have been assessed in the relevant sections of this ES, and are summarised in Table 18.1.

Table 18.1: Summary table of key interactions

<table>
<thead>
<tr>
<th>Nature of Interaction</th>
<th>Summary</th>
<th>Relevant Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic &amp; noise</td>
<td>Traffic noise is not predicted to increase significantly above current levels.</td>
<td>Sections 14 and 16</td>
</tr>
<tr>
<td>Traffic &amp; air quality</td>
<td>Air quality effects from traffic – no</td>
<td>Sections 8 and 16</td>
</tr>
</tbody>
</table>
18.2.3 In addition, mitigation measures proposed for certain topics may give rise to interactive effects and impacts on other topics. An example of this type is the impact of the land take required for landscape and ecological mitigation on agricultural land. Impacts of this type have been assessed in the appropriate sections of the ES.

18.3 Cumulative Effects

18.3.1 The assessment of cumulative effects considers the potential combined effects of the Scheme and other proposed developments that have been granted planning permission. Proposed developments were identified by reviewing data on extant permissions.

18.3.2 Information on extant permissions and submitted development applications for developments as at 5 January 2004 has been reviewed. The following criteria were taken into consideration in determining the significance of development applications:

- Proximity of the Scheme;
- Size of the individual development proposals;
- Cumulative effects from groups of applications; and
- Geographical context (rural/urban)

18.3.3 The significant applications identified are shown in Table 18.2.
### Table 18.2: Significant planning applications in the vicinity of the Scheme

<table>
<thead>
<tr>
<th>Location</th>
<th>Reference</th>
<th>Description</th>
<th>Approved Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinchingbrooke Park Road, Huntingdon</td>
<td>H/02/00443/OUT</td>
<td>Residential Development (8.15 hectares)</td>
<td>Y</td>
</tr>
<tr>
<td>Hinchingbrooke Hospital, Huntingdon</td>
<td>H/01/00959/</td>
<td>Erection of Ambulatory care and diagnostic centre parking</td>
<td>Y</td>
</tr>
<tr>
<td>St Peters Road, Huntingdon</td>
<td>H/03/03487/FUL</td>
<td>Erection of 25 units to be used for B2 and/or B8 and or B8 with ancillary showroom and/or</td>
<td>Pending Consideration</td>
</tr>
<tr>
<td>Houghton Hill, Huntingdon</td>
<td>H/02/12719/OUT</td>
<td>Residential development including construction of new access (10.42 hectares)</td>
<td>Pending consideration</td>
</tr>
<tr>
<td>Longstanton</td>
<td>S/00682/95</td>
<td>Bypass, residential development, business park and extension to village green</td>
<td>Y</td>
</tr>
<tr>
<td>Longstanton</td>
<td>S/03/01721/RM</td>
<td>227 dwellings and ancillary works</td>
<td>Application</td>
</tr>
<tr>
<td>Longstanton</td>
<td>S/03/02084/RM</td>
<td>97 dwellings, ancillary works and landscaping of new village green</td>
<td>Application</td>
</tr>
<tr>
<td>Longstanton</td>
<td>S/03/02135/RM</td>
<td>Erection of 91 dwellings, landscaping, landscaping of new village green</td>
<td>Application</td>
</tr>
<tr>
<td>Chivers Way, Histon</td>
<td>S/03/01559/FUL</td>
<td>Erection of 57 dwellings (including 17 affordable dwellings)</td>
<td>Application</td>
</tr>
<tr>
<td>Chivers Way, Histon</td>
<td>S/03/01627/FUL</td>
<td>Erection of 3 buildings to form 6 office units (class B1a) and conversion of existing building into 3 office units (class B1a)</td>
<td>Application</td>
</tr>
<tr>
<td>Arbury Camp, Cambridge</td>
<td>S/01/02379/OUT</td>
<td>Residential and B1 development</td>
<td>Y</td>
</tr>
<tr>
<td>Arbury Park</td>
<td>SA/0004/00</td>
<td>Mixed use and housing allocation (20ha for housing at 45 dwellings per hectare), northwest Cambridge, abutting the proposed CGB route at Kings Hedges Road</td>
<td>Y</td>
</tr>
<tr>
<td>Kings Hedges Road, Cambridge</td>
<td>S/02/01956/FUL</td>
<td>3 New Road Junctions and associated infrastructure along Kings Hedges Road to provide access to proposed mixed-use development on Arbury Camp site. Highways improvements between, Howgate Road and Northfield Avenue, Kings Hedges Road, Cambridge</td>
<td>Y</td>
</tr>
<tr>
<td>Arbury Camp, Kings Hedges Road</td>
<td>S/03/00157/OUT</td>
<td>Primary school and ancillary development</td>
<td>Y</td>
</tr>
<tr>
<td>Arbury Camp, Kings Hedges Road</td>
<td>S/03/00158/OUT</td>
<td>Historical resource and cultural centre and ancillary development</td>
<td>Y</td>
</tr>
<tr>
<td>Kings Hedges Road</td>
<td>S/03/00352/FUL</td>
<td>Highway infrastructure</td>
<td>Y</td>
</tr>
<tr>
<td>St Andrews Street, Cambridge</td>
<td>C/00/00903/FUL</td>
<td>Extension to Lion Yard Shopping Centre</td>
<td>Application</td>
</tr>
<tr>
<td>St. Andrew’s Street, Downing Street, Corn exchange Street</td>
<td>C/99/0513/FUL</td>
<td>Covered shopping arcade and new department store for Robert Sayle.</td>
<td>Y</td>
</tr>
</tbody>
</table>
18.3.4 The key combined effects of the Scheme with new developments in the surrounding area would be traffic generation and the indirect (interactive) impacts associated with this, such as noise and air pollution. In determining these cumulative effects, the following factors were considered:

- Context – traffic related impacts resulting from new developments would depend on existing traffic flows, which vary between urban and rural areas;

- CGB Scheme – certain elements of the Scheme, such as park and ride sites, kiss and ride sites and car parks, would generate traffic on surrounding local roads, which would combine with additional traffic generated by other new developments in the area. However the operation of the guideway would remove some existing trips form the road network and there would therefore be

<table>
<thead>
<tr>
<th>Location</th>
<th>Reference</th>
<th>Description</th>
<th>Approved Y/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>and Petty Cury</td>
<td>C/01/01097/GD</td>
<td>Crown Court</td>
<td>Y</td>
</tr>
<tr>
<td>East Road, Cambridge</td>
<td>C/02/01063/GD</td>
<td>Erection of Civil Justice centre (3,340sq.m.gross) with associated car parking (22 spaces) service yard area, new vehicular access and hard and soft landscaping</td>
<td>Y</td>
</tr>
<tr>
<td>Station Road, Cambridge</td>
<td>C/01/00556/FUL</td>
<td>Erection of a five storey Class B1 building (7775 sqm) with basement car and cycle parking, associated landscaping and servicing for GO East (includes demolition of existing building)</td>
<td>Y</td>
</tr>
<tr>
<td>Sites around Cambridge Station</td>
<td>C/01175/00</td>
<td>382 Dwellings, 1.92 ha office space</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>CA/00005/00</td>
<td>Housing allocation</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>C/00582/00</td>
<td>Student housing (133 units) plus retail</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>C/00355/98</td>
<td>Mixed use, leisure, hotel, retail, dwellings</td>
<td>N</td>
</tr>
<tr>
<td>Hills Road / Cherry Hinton Road</td>
<td>C/98/00355/FUL</td>
<td>Cattle Market redevelopment</td>
<td>Y</td>
</tr>
<tr>
<td>Clifton Road, Cambridge</td>
<td>C/01/00250/OUT</td>
<td>262 Dwellings, community hall, access roads, cycle routes and provision of small informal play facilities and equipment</td>
<td>Y</td>
</tr>
<tr>
<td>Homerton Street</td>
<td>C/00/00582/FUL</td>
<td>133 Flats, Student Rooms, Restaurant, Health and Fitness suite, Conference Room, Community Room, Commercial and Retail</td>
<td>Y</td>
</tr>
<tr>
<td>Brooklands Avenue</td>
<td>C/00/01175/OUT</td>
<td>382 dwellings and 15,840 m2 GFA B1</td>
<td>Y</td>
</tr>
<tr>
<td>Robinson Way, Cambridge</td>
<td>C/03/00942/FUL</td>
<td>6 storey building for the provision of an elective care unit, and medical genetics &amp; diabetes centre</td>
<td>Y</td>
</tr>
<tr>
<td>Addenbrookes Hospital</td>
<td>C/01/00502/FUL</td>
<td>Cancer Research UK Laboratory Complex</td>
<td>Y</td>
</tr>
<tr>
<td>Magistrates Court, Trumpington</td>
<td>C/00/00628/OUT</td>
<td>Replacement of existing court complex on top of Lion Yard car park</td>
<td>Y</td>
</tr>
<tr>
<td>Trumpington</td>
<td>C/00/00629/OUT</td>
<td>6,000 m2 building link to Grand Arcade (John Lewis Partnership service building)</td>
<td>Y</td>
</tr>
</tbody>
</table>
no cumulative traffic effects from new developments in the vicinity of the guideway.

- Proximity to the Scheme – traffic generated by the Scheme would impact in localised areas. However, over the wider area, the Scheme aims to remove car traffic from the road network and reduce vehicle journey times and would therefore help to alleviate congestion generated by other developments.

18.3.5 The transport impacts of the Scheme have been assessed using a transportation land use model which makes provision for the allocated development sites and includes the traffic generated by them on the transport network. Section 16, Transport and Access therefore takes account of potential cumulative effects to arise in terms of traffic impacts from developments. Air quality and noise effects are generally derived from traffic data predicted in the Transport and Access section (Section 16). Cumulative impacts are therefore also taken account of in Sections 8 and 14 respectively.

18.3.6 Cumulative effects within individual specialist sections of the ES have been considered where relevant. These include:

- **Agriculture** – the assessment considers individual impacts of agricultural land take, and the cumulative loss over the Scheme as a whole.

- **Air Quality** – the model used takes account of the existing and future baseline, thereby incorporating the cumulative impact of the Scheme with predicted future changes in air quality into the results.

- **Ecology and Landscape** – mitigation has been designed to take account of the cumulative loss of ecology and landscape resources across the Scheme as a whole.

- **Transport** - the model used takes account of the existing and future baseline, incorporating the cumulative impact of the Scheme with predicted traffic growth into the results.

18.4 Summary

18.4.1 The Scheme gives rise to a number of interactive, or indirect effects which are described throughout the Assessment sections (7 to 17). Indirect effects can also be found in the impact summary tables at the end of each Section. Where necessary, for example for ecology and landscape, joint mitigation measures have been designed to take account of indirect effects.

18.4.2 Cumulative impacts, resulting from the combination of effects arising from the Scheme and other proposed developments in the area, have been considered in the appropriate sections, particularly Air Quality (Section 8), Noise and Vibration (Section 14) and Transport and Access (Section 16).
References

1 Cambridgeshire and Peterborough Joint Structure Plan, Adopted October 2003