# Revision Schedule

**SESTRAN**
**Edinburgh Orbital Bus Study – STAG Part 2 Environmental Appraisal Report**
May 2009

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**Figure 1.1 – Environmental Constraints**

# 1 Introduction

## 1.1 Background

1.1.1 This report is a STAG 2 Environmental Appraisal Report of the potential environmental impacts of the route options for the Edinburgh Orbital Bus Project (EOBP). It forms part of the overall STAG appraisal process which is outlined below.

## 1.2 The STAG Process

1.2.1 The Scottish Transport Appraisal Guidance (STAG) is a comprehensive method of assessment which is required to ensure that Scottish transport proposals accord with Government policy for Scotland which has three key aims: a strong economy; a clean environment; and an inclusive society. These aims are reflected in the appraisal process under five government (STAG) objectives; environment, safety, economy, integration and accessibility and social inclusion.

1.2.2 The appraisal uses a two-part appraisal process with the results set out in Appraisal Summary Tables (AST's). Part 1 is an initial appraisal and broad assessment of impacts designed to be used for approval in principle and to decide whether a proposal proceeds to Part 2 which is a detailed appraisal against the STAG objectives.

1.2.3 The Part 1 appraisal was previously carried out by Halcrow[1], and this report focuses on the STAG Part 2 Environmental issues of the EOBP options.

## 1.3 Background to the STAG appraisal of the Edinburgh Orbital Rapid Bus Transport Study

1.3.1 The current project comprises of the two preferred route options recommended by Part 1 of the appraisal process. A number of route option packages were initially identified at STAG 1 level and were appraised to establish a shortlist of preferred option packages for the Edinburgh Orbital Bus Rapid Transit Study. The shortlist of options is now:

- Route A5 – Bus Rapid Transit between Newbridge and QMU Musselburgh;
- Route B17/B18 – Bus Rapid Transit between Newbridge and Millerhill Park and Ride; and
- Route C5 – Bus Rapid Transit between Newbridge and ERI via Sherrifhall/Todhill Park and Ride.

[1] Edinburgh Orbital Bus Project STAG 1 Report, Halcrow, July 2008

## 1.4 The Environment Objective

1.4.1 For the purposes of the STAG appraisal process the environment objective is split into sub objectives as follows:

- Noise and Vibration;
- Air Quality - ($CO_2$, $PM_{10}$, $NO_2$);
- Water quality, drainage and flood defence;
- Geology;
- Biodiversity;
- Visual Amenity;
- Agriculture and Soils;
- Cultural Heritage; and
- Landscape.

1.4.2 There is a chapter for each of the above sub-objective headings and an appraisal is carried out on the 9 sections of the route consecutively under the chapter topic – and identifies where information is repeated. Geology, agriculture and soils have been combined into one chapter. The Scottish Government requires that the environmental appraisal of a proposal for which it is to provide funding, is well documented and auditable, and will comply with all statutory requirements.

1.4.3 The study is based on a desktop review of available technical reports, consultation responses and initial site survey information and therefore is a preliminary study. Further supporting information should be provided when or if the preferred option is developed through the Environmental Impact Assessment (EIA) process. The EOBP study corridor lies within the City of Edinburgh Council, Midlothian Council and East Lothian Council administrative areas. The proposed route options considered by this report will largely be located on existing transport routes.

1.4.4 The Appraisal Summary Tables (ASTs) that have resulted from this STAG environmental assessment are shown in the STAG Part 2 Appraisal Report.

## 1.5 Methodology

1.5.1 The STAG guidance should be used for all transport projects for which Scottish Government support or approval is required. STAG is also complementary to and not mutually exclusive from other guidance available to transport policy and investment. Each sub-objective section in this report follows the same format and assessment hierarchy in accordance with the STAG guidance, which consists of five stages as follows:

- Scoping – defining potential impacts and assessment methods. Within each sub-objective this includes specific methodologies and a definition of the EOBP study corridor.

- Baseline – information about the environment in the year of project commencement and foreseeable developments.
- Assessment – identifying the likely environmental impacts and magnitude of these impacts. All types of impacts are assessed which may be positive or negative, permanent or temporary, direct, indirect, short, medium or long term, secondary, cumulative and synergistic. For the purpose of this study the base year has been taken as 2023 and the assessment of effects is at construction, at year 1 and at year 15 unless other timescales are used for specific sub-objectives.
- Appraisal – determining the significance of the impacts. The STAG guidelines state that a seven-point scale should be used to determine the magnitude of effect as follows:
  - negative major;
  - negative moderate;
  - negative minor;
  - neutral;
  - positive minor;
  - positive moderate; and
  - positive major.

1.5.2 The recommended thresholds for significance of effect (a judgement of magnitude against sensitivity) are as follows:

- major negative impact;
- moderate negative impact;
- minor negative impact;
- no impact;
- minor positive impact;
- moderate positive impact; and
- major positive impact.

1.5.3 Reporting – The information is presented in the form of the AST with supporting information in order to highlight significant beneficial and adverse impacts, which should be considered in decision-making. Suggested mitigation measures (to avoid, minimise or offset adverse impacts) and residual impacts (those likely to remain after mitigation) are reported.

1.5.4 Due to the large scale of the EOBP Study corridor and for reference purposes the STAG 2 Assessment has been divided into the following 8 sections:

- Section 1: Newbridge – Edinburgh Airport/ Ingliston Park and Ride – Gogar;
- Section 2: Gogar – Hermiston Park and Ride – A720 Edinburgh City Bypass at A70/Water of Leith;

- Section 3: A720 Edinburgh City Bypass at A70/Water of Leith – Lothianburn Park and Ride;
- Section 4: Lothianburn Park and Ride – Straiton Park and Ride;
- Section 5: Straiton Park and Ride – A720 Edinburgh City Bypass Underpass;
- Section 6: A720 Edinburgh City Bypass underpass – Sheriffhall Park and Ride – Edinburgh Royal Infirmary (ERI);
- Section 7: Edinburgh Royal Infirmary – Queen Margaret University (QMU);
- Section 8: Sheriffhall Park and Ride to Millerhill Park and Ride; and
- Section 9: Sheriffhall Park and Ride to Edinburgh Royal Infirmary via the Shawfair development.

1.5.5 The assessment and appraisal has focussed on environmental receptors within 200m either side of the route options. The identified environmental constraints are shown in Figure 1.1.

## 1.6 Consultations

1.6.1 The statutory consultees recommended by STAG were consulted during the STAG 2 stage process. In addition a number of non-statutory bodies were also consulted. A summary of the responses is given in Table ENV1 below.

**Table ENV 1: Summary of Consultation Responses**

| Consultee | Consultation Stage | Letter Sent | Date Response Received | Name of Responder | Comments |
|---|---|---|---|---|---|
| City of Edinburgh Council – City Development | STAG 2 | 14/11/08 | 08/12/08 | Cliff Hutt | Nothing further to add since workshop. Provided details of various CEC contacts. |
| | | 11/12/08 | | | |
| Midlothian Council – Commercial Services | STAG 2 | 14/11/08 | | | |
| Midlothian Council – Strategic Services | STAG 2 | 14/11/08 | 24/11/08 | Jim Gilfillan | Requested better detailed plans and information – sent e-mail 24/11/08 |
| | | | 11/12/08 | Lindsay Haddow | |
| East Lothian Council – Economic Development Manager | STAG 2 | 14/11/08 | | | |
| East Lothian Council – Director of the Environment | STAG 2 | 14/11/08 | | | |
| NHS Travel Co-ordinator | STAG 2 | 14/11/08 | | | |
| Scottish Enterprise Edinburgh and Lothian | STAG 2 | 14/11/08 | | | |

| Consultee | Consultation Stage | Letter Sent | Date Response Received | Name of Responder | Comments |
|---|---|---|---|---|---|
| Scottish Natural Heritage (SNH) | STAG 2 | 14/11/08 | | | |
| Scottish Environment Protection Agency (SEPA) | STAG 2 | 14/11/08 | | | |
| The Scottish Government – Director General Environment | STAG 2 | 14/11/08 | 11/12/08 | Eleanor Vance | Should ensure that there are no significant impacts on the water environment both during and after construction. Also refer to noise mapping data. |
| The Scottish Government – General Economy | STAG 2 | 14/11/08 | 08/12/08 | Michael Bratcher | No comments to make as Transport Scotland will provide the Scottish Govts response. |
| Transport Scotland | STAG 2 | 14/11/08 | 09/12/08 | Veronica Allan | Phoned to discuss study. Need to examine STAG 1 Report before commenting on STAG2. Will provide accident and traffic information for the route |
| Health and Safety Executive (HSE) | STAG 2 | 14/11/08 | 05/01/09 | Dr G A Cook | Cannot provide useful comments on what should be included in the environmental statement (ES) of the proposed development. Although any ES should avoid including measures which conflict with the Health and Safety at Work etc Act 1974 |
| Scottish Water | STAG 2 | 14/11/08 | | | |
| Historic Scotland | STAG 2 | 14/11/08 | 19/12/08 | William Kidd | Requested copy of original letter and plan |
| Lothian Buses | STAG 2 | 14/11/08 | 15/12/08 | Bill Campbell | Detailed comments and suggestion on feasibility and patronage of route. |
| First | STAG 2 | 14/11/08 | | | |
| Stagecoach | STAG 2 | 14/11/08 | 18/12/08 | Steve Walker | Should look at congestion buses face coming from Fife on the new M9 spur and at Newbridge. Keen to develop services into Edinburgh Park from Fife into Haymarket. |
| National Express | STAG 2 | 14/11/08 | | | |
| MacEwans | STAG 2 | 14/11/08 | | | |
| Network Rail | STAG 2 | 14/11/08 | | | |
| Scotrail | STAG 2 | 14/11/08 | | | |
| Eve's Coaches of Dunbar | STAG 2 | 14/11/08 | | | |
| Munro's of Jedburgh | STAG 2 | 14/11/08 | | | |
| Scottish Rights of Way Society | STAG 2 | 14/11/08 | 24/11/08 | Jo Doake | Sent Map of all Rights of Way affected by area. |

| Consultee | Consultation Stage | Letter Sent | Date Response Received | Name of Responder | Comments |
|---|---|---|---|---|---|
| Sustrans | STAG 2 | 14/11/08 | 16/12/08 | Liz Drape | Concerns over sections of disused railway which Sustrans own at Newcraighall and Danderhall and Loanhead. |
| Property Manager Gyle/ Edinburgh Park | STAG 2 | 14/11/08 | 20/11/08<br><br>24/11/08 | Gordon Paterson | Requested better detailed drawings and information<br><br>GP and New Edinburgh (Developers) have concerns about route options at Edinburgh Park – requests meeting. Forwarded to Marwan |
| Property Manager Straiton Retail | STAG 2 | 14/11/08 | | | |
| Property Manager Fort Kinnaird | STAG 2 | 14/11/08 | | | |
| Property Manager Hermiston Gait (Invista Real Estate) | STAG 2 | 14/11/08 | 05/01/09 | | Received call from Andrew Johnston at Faber Maunsell (agents for Invista) requesting orginal letter and plan. Sent 05/01/09 |
| Property Manager ERI (NHS) | STAG 2 | 14/11/08 | 01/12/08 | James T McCaffery | Support principles of proposed scheme as it compliments NHS Lothian sustainable development principles and enhancement of public transport to their sites. Colleague John Jack would be happy to meet and discuss options and information NHS of volumes of patients attending sites and distribution of staff by postcode. |
| Property Manager QMU | STAG 2 | 14/11/08 | 08/01/09 | Joe Kelly | Phoned asking more information on what is required. |
| Shawfair Developments Ltd | STAG 2 | 14/11/08 | | | |
| Lothian and Borders Police | STAG 2 | 14/11/08 | 04/12/08 | David Gordon | Require better plan. Sent latest plan 11/12/08 |
| Lothian and Borders Fire and Rescue Service | STAG 2 | 14/11/08 | | | |
| Scottish Ambulance Service | STAG 2 | 14/11/08 | 28/11/08 | Stewart Murdoch | Requested better copy of plan – plan revised and sent 03/12/08 |

# 2 Noise and Vibration

## 2.1 Scoping

2.1.1 Assessments of the likely noise and vibration impacts for the route options were carried out based on an understanding of the traffic flow changes brought about by investment in providing a high segregation Bus Rapid Transit Orbital system. In addition, the impacts have been assessed based on the effects of the whole route (i.e. all sections combined). The following section summarises the results of the assessment.

## 2.2 Assessment and Appraisal

2.2.1 For the construction impacts, as a detailed design is not available and therefore the operations, plant etc. likely to be used cannot definitely be stated at this time, a detailed assessment can not be carried out. However, it is reasonable to assume the construction works, re-furbishment of road sections and other associated works will take place in or close to some residential and commercial areas. In addition, the level of impact will vary by the degree of construction works, with some options having a lower impact than other due to the lower construction works and their duration.

2.2.2 During operation, the transport modelling has estimated there could be significant reductions in traffic vehicle-kms due to modal shift from private cars to public transport. This varies along different sections but all sections experience modal shift, thereby improving noise/vibration across the local and wider network. Routes A5 and C5 produce the largest reductions in veh-kms (due to an extra circa 0.5m passengers per annum) and hence it is reasonable to score these options higher than Routes B17/B18.

2.2.3 From the above, it is reasonable to assume the impact on noise and vibration will be as in the Table below.

| Option | Construction | Operation |
|---|---|---|
| Route A5 – Bus Rapid Transit between Newbridge and QMU Musselburgh | ✗✗ | ✓✓ |
| Route B17/B18 – Bus Rapid Transit between Newbridge and Millerhill Park and Ride | ✗ | ✓ |
| Route C5 – Bus Rapid Transit between Newbridge and ERI via Sherrifhall/Todhill Park and Ride | ✗✗ | ✓✓ |

## 2.3 Summary

2.3.1 While there are anticipated to be noise/vibration impacts during the construction period, the operations period will produce a positive impact due to reduced veh-kms on the road network.

# 3 Air Quality

## 3.1 Scoping

3.1.1 As with the noise and vibration assessments, air quality is applicable across all sections and the likely air quality effects for the route options were carried out based on an understanding of the traffic flow changes brought about by the route options. The following section summarises the results of the assessment.

## 3.2 Assessment and Appraisal

3.2.1 For the construction impacts, as a detailed design is not available and therefore the operations, plant etc. likely to be used cannot definitely be stated at this time, a detailed assessment can not be carried out. However, it is reasonable to assume the construction works, re-furbishment of road sections and other associated works will take place in or close to some residential locations (e.g. Ratho Station) and commercial areas. In addition, the level of impact will vary by the degree of construction works, with some options having a lower impact than other due to the lower construction works and their duration.

3.2.2 During operation, the transport modelling has estimated there could be significant reductions in traffic vehicle-kms due to modal shift from private cars to public transport. This varies along different sections but all sections experience modal shift, thereby improving noise/vibration across the local and wider network. Routes A5 and C5 produce the largest reductions in veh-kms (due to an extra circa 0.5m passengers per annum) and hence it is reasonable to score these options higher than Routes B17/B18.

3.2.3 From the above, it is reasonable to assume the impact on noise and vibration will be as in the Table below.

| Option | Construction | Operation |
|---|---|---|
| Route A5 – Bus Rapid Transit between Newbridge and QMU Musselburgh | ✗✗ | ✓✓ |
| Route B17/B18 – Bus Rapid Transit between Newbridge and Millerhill Park and Ride | ✗ | ✓ |
| Route C5 – Bus Rapid Transit between Newbridge and ERI via Sherrifhall/Todhill Park and Ride | ✗✗ | ✓✓ |

## 3.3 Summary

3.3.1 While there are anticipated to be air quality impacts during the construction period, the operations period will produce a positive impact due to reduced veh-kms on the road network.

# 4 WATER QUALITY, DRAINAGE AND FLOOD DEFENCE

## 4.1 Section 1

### Scoping

4.1.1 This section investigates the potential for the proposed options to impact upon water quality, drainage, and flooding. The Baseline Data sub section identifies and describes the significant water resource features in proximity to the EOBP study options corridor. The baseline conditions were evaluated from a brief desktop investigation, OS mapping[2], flow and water quality data from the Scottish Environmental Protection Agency (SEPA) website, and ground water data from British Geological Survey maps. Identification of the range and location of potential impacts was based on a review of similar projects and the professional experience of the assessment team. Impacts on surface water resources were considered over a range of some 200m either side of the route options (and further downstream where required), whilst groundwater features and impacts were considered using regional information and an overview of current land use in the study corridors.

4.1.2 In terms of the magnitude of an impact, a "Negative Major" would, for example, be the degrading of water quality classification, and a "Negative Minor" could be measurable changes in some water quality parameters but no effect on overall classification. In regard to sensitivity of a receptor, it is proposed that a further subsequent assessment of the present water quality classification, the flow rates, and the amenity value of the water resource be made to derive an impression of the resilience of the water resource to cope with changes resulting from an impact. The assessment of potential impacts has assumed that standard mitigation measures have been "built in".

### Baseline

4.1.3 The water resources baseline data is given in Table W1.

**Table W1: Baseline Data**

| Receptor | Water Quality Classification | Flow Rate (m3/s) | Amenity Use | Overall Sensitivity |
|---|---|---|---|---|
| **Gogar Burn** | B (Moderate) [1] | 0.49 (Mean Flow of Gogar Burn at Turnhouse) [2] | N/A | Moderate |
| **Minor Unnamed Watercourses (Drainage** | N/A | N/A | N/A | Moderate |

[2] Ordnance Survey, August 2006, OS Explorer Map Sheet 66 - Edinburgh Musselburgh and Queensferry (scale 1:25,000)

| | | | | |
|---|---|---|---|---|
| **Channel)** | | | | |
| **Ground Water** | The Hydrogeological Map of Scotland and the Groundwater Vulnerability Map[3] of Scotland show no significant ground water resources within either of the site study corridors. Brief investigations for this study have not revealed any significant discharges to or abstractions from groundwater in these areas. No groundwater pollution incidents or areas of groundwater quality degradation have been noted by SEPA. A detailed investigation into any existing local groundwater pollution would be required as part of further preliminary design and environmental assessment of the preferred option during the EIA process if required. | | | |

The following notes relate to the table above; [1] Quality Classification is the River Classification; and [2] UK Gauging Stations the Gogar Burn in the SEPA east area
http://www.nwl.ac.uk/ih/nrfa/station_summaries/op/SEPA-east_map.html

4.1.4 Based on the requirements of the Water Framework Directive, which are broadly to prevent deterioration in the status of water bodies and to restore water bodies to good ecological status by 2015, any deterioration of water quality in the watercourses in question as a result of the preferred option is unlikely to be acceptable.

## Assessment

4.1.5 Any impacts occurring during the construction phase of the options are likely to be confined to the Gogar Burn and three unnamed watercourses (possibly man made) within the 200m corridor, two of which flow beneath the A8. These impacts are likely to be short term, fairly localised, and temporary in nature e.g. for the duration of construction. It is noted that given the history of flooding of the Gogar Burn, it is essential that the hydraulic capacity of the watercourse is not reduced during any phase of the construction works.

4.1.6 Further assessment would be required to identify the presence of any culverted watercourses.

## Appraisal

4.1.7 It is noted that the impacts described below are focussed on the Gogar Burn, and two unnamed watercourses which cross the A8 (in the vicinity of Ratho Station) and are located within the EOBP study corridor. The options cross and/or run immediately adjacent to the watercourses, although using existing water crossings (culverts, bridges) on the A8, and it is therefore unlikely that these watercourses will experience the impacts identified above.

4.1.8 The SEPA Indicative River and Coastal Flood Map[4] shows parts of the EOBP study corridor to be located in an area at risk of flooding from rivers (Gogar Burn). The map shows those areas estimated to have a 0.5% or greater chance of flooding each year. No flood defences are shown on this map.

4.1.9 Impacts on the Gogar Burn have been assessed as being of small minor negative impact significance. It is considered that the impact significance would increase to moderate / major negative impact, in the unlikely event that the hydraulic capacity of the river be reduced during the construction works.

[3] British Geological Society, Scotland Groundwater Vulnerability Map
[4] SEPA Water Classification Interactive Mapping 2006 http://www.sepa.org.uk/rqc/map.asp [accessed November 2008]

4.1.10 Any impacts occurring during the operational phase of the options are assessed as being of small minor negative impact significance. Any potential long-term pollution and maintenance impacts are considered to be addressed using standard mitigation measures. The hydraulic capacity of the Gogar Burn must be maintained, to minimise any impacts on upstream flooding. In terms of the disturbance and release of any groundwater contaminants, it is considered that the impact significance would range from no impact to small minor negative impact.

### Summary

4.1.11 The impacts of construction and operation on the hydrological resource are likely to be low providing that the necessary mitigation measures are put in place to avoid pollution of watercourses.

4.1.12 The hydraulic capacity of the Gogar Burn and an unnamed watercourse must be maintained, to minimise any impacts on upstream flooding. In particular, the design of any additional infrastructure required for the preferred option must preserve the hydraulic capacity of the Gogar Burn and an unnamed watercourse and the floodplains.

4.1.13 However the Gogar Burn and an unnamed watercourse are shown to be at risk from flooding events. Further assessment would be required to examine this issue further.

4.1.14 Since Section 1 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 4.2 Section 2

### Scoping

4.2.1 As section 1.

### Baseline

4.2.2 The water resources baseline data is given in Table W1.

**Table W1: Baseline Data**

| Receptor | Water Quality Classification | Flow Rate (m3/s) | Amenity Use | Overall Sensitivity |
|---|---|---|---|---|
| **Gogar Burn and Ponds at South Gyle** | B (Moderate) [1] | 0.49 (Mean Flow of Gogar Burn at Turnhouse) [2] | Provides fed to Ponds at Edinburgh Park | Moderate |
| **Murray Burn** | B (Moderate) | N/A | N/A | Moderate |
| **Union** | C Poor | N/A | Recreational/ | Moderate |

| | | | | |
|---|---|---|---|---|
| **Canal** | | | boating | |
| **Ground Water** | The Hydrogeological Map of Scotland and the Groundwater Vulnerability Map of Scotland show no significant ground water resources within either of the site study corridors. Brief investigations for this study have not revealed any significant discharges to or abstractions from groundwater in these areas. No groundwater pollution incidents or areas of groundwater quality degradation have been noted by SEPA. The Union Canal passes through an industrial Estate at Sighthill; a detailed investigation into any existing local groundwater pollution would be required as part of further preliminary design and environmental assessment of the preferred option during the EIA process if required. | | | |

The following notes relate to the table above; [1] Quality Classification is the River Classification and [2] UK Gauging Stations the Gogar Burn in the SEPA east area

4.2.3 Based on the requirements of the Water Framework Directive, which are broadly to prevent deterioration in the status of water bodies and to restore water bodies to good ecological status by 2015, any deterioration of water quality in the watercourses in question as a result of the preferred option is unlikely to be acceptable.

## Assessment

4.2.4 Any impacts occurring during the construction phase of the options are likely to be confined to the Gogar Burn, Murray Burn and Union Canal within the 200m EOBP study corridor. These impacts are likely to be short term, fairly localised, and temporary in nature e.g. for the duration of construction. It is noted that given the history of flooding of the Gogar Burn and Murray Burn, it is essential that the hydraulic capacity of the watercourse is not reduced during any phase of the construction works.

4.2.5 The Gogar Burn and Murray Burn both use culverts to cross beneath the A720 Edinburgh City Bypass. Further assessment would be required to identify the presence of any culverted watercourses.

## Appraisal

4.2.6 The SEPA Indicative River and Coastal Flood Map shows parts of the EOBP study corridor to be located in an area at risk of flooding from rivers (Gogar Burn and Murray Burn). The map shows those areas estimated to have a 0.5% or greater chance of flooding each year. No flood defences are shown on this map.

4.2.7 It is noted that the impacts described below are focussed on the Gogar Burn, Murray Burn and the Union Canal) which lies within the EOBP study corridor. The options do cross and/or run immediately adjacent to the watercourses, although using existing watercourse road crossings and it is therefore unlikely that this watercourse will experience the impacts identified earlier. Impacts on the Gogar Burn and Murray Burn have been assessed as being of small minor negative impact significance. It is considered that the impact significance would increase to moderate / major negative impact, in the unlikely event that the hydraulic capacity of the river be reduced during the construction works.

4.2.8 Any impacts occurring during the operational phase of the options are assessed as being of small minor negative impact significance. Any potential long-term pollution and maintenance impacts are considered to be addressed using standard mitigation measures. The hydraulic capacity of the Gogar Burn and Murray Burn must be maintained, to minimise any impacts on upstream flooding. In particular, the design of any embankments must preserve the hydraulic capacity of the Gogar Burn and Murray Burn floodplains. Should the hydraulic capacity of the river be reduced during the operation of the preferred option, i.e. a long-term impact, it is then considered that the impact significance would increase to negative moderate / major Impact. In terms of the disturbance and release of any groundwater contaminants, it is considered that the impact significance would range from no impact to small minor negative impact.

### Summary

4.2.9 The impacts of construction and operation on the hydrological resource are likely to be low providing that the necessary mitigation measures are put in place to avoid pollution of watercourses.

4.2.10 The hydraulic capacity of the Gogar Burn and Murray Burn must be maintained, to minimise any impacts on upstream flooding. In particular, the design of any additional infrastructure required for the preferred option must preserve the hydraulic capacity of the Gogar Burn and Murray Burn and their respective floodplains.

4.2.11 However both the Gogar Burn and Murray Burn are shown to be at risk from flooding events. Further assessment would be required to examine this issue further.

4.2.12 Since Section 2 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 4.3 Section 3

### Scoping

4.3.1 As section 1.

### Baseline

4.3.2 The water resources baseline data is given in Table W1.

**Table W1: Baseline Data**

| Receptor | Water Quality Classification | Flow Rate (m3/s) | Amenity Use | Overall Sensitivity |
|---|---|---|---|---|
| **Water of Leith** | A2 (Good) [1] | 1.34 (Mean Flow of Water of Leith at Colinton) [2] | Fishing (Designated Salmonid River), Recreation (walking/ cycling along banks) | Low |

| | | | | |
|---|---|---|---|---|
| **Braid Burn** | A2 (Good) | 0.18 (Mean Flow of Braid Burn at Liberton) | N/A | Low |
| **Swanston Burn** | C (Poor) | N/A | N/A | Low |
| **Ground Water** | The Hydrogeological Map of Scotland and the Groundwater Vulnerability Map of Scotland show no significant ground water resources within either of the site study corridors. Brief investigations for this study have not revealed any significant discharges to or abstractions from groundwater in these areas. No groundwater pollution incidents or areas of groundwater quality degradation have been noted by SEPA. There is a section of built up urban areas along the banks of the Water of Leith; a detailed investigation into any existing local groundwater pollution would be required as part of further preliminary design and environmental assessment of the preferred option during the EIA process if required. | | | |

The following notes relate to the table above; [1] Quality Classification is the River Classification and [2] UK Gauging Stations the Water of Leith in the SEPA east area.

4.3.3 Based on the requirements of the Water Framework Directive, which are broadly to prevent deterioration in the status of water bodies and to restore water bodies to good ecological status by 2015, any deterioration of water quality in the watercourses in question as a result of the preferred option is unlikely to be acceptable.

## Assessment

4.3.4 Any impacts occurring during the construction phase of the options are likely to be confined to the Water of Leith, Braid Burn and Swanston Burn within the 200m EOBP study corridor. These impacts are likely to be short term, fairly localised, and temporary in nature e.g. for the duration of construction. It is noted that given the history of flooding of the Water of Leith and Braid Burn, it is essential that the hydraulic capacity of the watercourse is not reduced during any phase of the construction works.

4.3.5 Further assessment would be required to identify the presence of any culverted watercourses.

## Appraisal

4.3.6 The SEPA Indicative River and Coastal Flood Map shows parts of the EOBP study corridor to be located in an area at risk of flooding from rivers (Water of Leith and Braid Burn). The map shows those areas estimated to have a 0.5% or greater chance of flooding each year. No flood defences are shown on this map.

4.3.7 It is noted that the impacts described below are focussed on the Water of Leith, Braid Burn and Swanston Burn and impacts for all watercourses have been assessed as being of neutral to small minor negative impact significance, as the route options would use existing section of road (hard shoulder) and watercourse crossings, although some minor remedial work may be required for the conversation (creation of emergency lay-bys and signage structures), in which case further studies would be required.

4.3.8 Any impacts occurring during the operational phase of the options are assessed as being of neutral impact significance. Any potential long-term pollution and maintenance impacts are considered to be addressed using standard mitigation measures. In terms of the disturbance and release of any groundwater contaminants, it is considered that the impact significance would range from no impact to small minor negative impact.

### Summary

4.3.9 The impacts of construction and operation on the hydrological resource are likely to be low providing that the necessary mitigation measures are put in place to avoid pollution of watercourses.

4.3.10 The hydraulic capacity of the Water of Leith and Braid Burn would be maintained, to minimise any impacts on upstream flooding. In particular, the design of any additional infrastructure required for the preferred option must preserve the hydraulic capacity of the Water of Leith and Braid Burn and their respective floodplains.

4.3.11 However the Water of Leith and Braid Burn are shown to be at risk from flooding events. Further assessment would be required to examine this issue further.

4.3.12 Since Section 3 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 4.4 Section 4

### Scoping

4.4.1 As section 1.

### Baseline

4.4.2 The water resources baseline data is given in Table W1.

**Table W1: Baseline Data**

| Receptor | Water Quality Classification | Flow Rate (m3/s) | Amenity Use | Overall Sensitivity |
|---|---|---|---|---|
| **Burdiehouse Burn (Aka Swanston Burn/LothianBurn)** | A2 (Good) [1]<br><br>B (Moderate) | N/A | N/A | High |
| **Pentland Burn** | N/A | N/A | N/A | High |
| **Unnamed Watercourses** | N/A | N/A | N/A | Moderate |

| | |
|---|---|
| **Ground Water** | The Hydrogeological Map of Scotland and the Groundwater Vulnerability Map of Scotland show no significant ground water resources within either of the site study corridors. Brief investigations for this study have not revealed any significant discharges to or abstractions from groundwater in these areas. No groundwater pollution incidents or areas of groundwater quality degradation have been noted by SEPA. The Burdiehouse Burn flows alongside and under the A720 Edinburgh City Bypass; a detailed investigation into any existing local groundwater pollution would be required as part of further preliminary design and environmental assessment of the preferred option during the EIA process if required. |

The following notes relate to the table above; [1] Quality Classification is the River Classification

4.4.3 Based on the requirements of the Water Framework Directive, which are broadly to prevent deterioration in the status of water bodies and to restore water bodies to good ecological status by 2015, any deterioration of water quality in the watercourses in question as a result of the preferred option is unlikely to be acceptable.

## Assessment

4.4.4 Any impacts occurring during the construction phase of the options are likely to be confined to the Burdiehouse Burn within the 200m EOBP study corridor. These impacts are likely to be short term, fairly localised, and temporary in nature e.g. for the duration of construction. It is noted that given the history of flooding of the Burdiehouse Burn, it is essential that the hydraulic capacity of the watercourse is not reduced during any phase of the construction works.

4.4.5 Part of the Burdiehouse Burn is culverted where it flows beneath the A720 Edinburgh City Bypass.

4.4.6 Further assessment would be required to identify the presence of any culverted watercourses.

## Appraisal

4.4.7 The SEPA Indicative River and Coastal Flood Map shows parts of the EOBP study corridor to be located in an area at risk of flooding from rivers (Burdiehouse Burn). The map shows those areas estimated to have a 0.5% or greater chance of flooding each year. No flood defences are shown on this map.

4.4.8 It is noted that the impacts described below are focussed on the Burdiehouse Burn which lies within the EOBP study corridor. The option would cross and run immediately adjacent to the Burdiehouse Burn and Pentland Burn, and it is therefore likely that these watercourses will experience the impacts identified earlier. It is noted that impacts to water resources features described below may lead to or be associated with other impacts, which are addressed separately in other sections of this report. For example no impacts on aquatic ecology have been considered in this section but are reviewed in the Biodiversity section.

4.4.9 The impacts on the Burdiehouse Burn have been assessed as being of moderate / major negative impact significance, as the new route alignment would run adjacently parallel to and

over sections of this watercourse which would lead to the construction of bridges or culverts over these watercourse. The route would also cross the Pentland Burn.

4.4.10 Any impacts occurring during the operational phase of the options are assessed as being of small minor negative impact significance. Any potential long-term pollution and maintenance impacts are considered to be addressed using standard mitigation measures. The hydraulic capacity of the Burdiehouse Burn must be maintained, to minimise any impacts on upstream flooding. In particular, the design of any embankments must preserve the hydraulic capacity of the Burdiehouse Burn floodplains. Should the hydraulic capacity of the river be reduced during the operation of the preferred option, i.e. a long-term impact, it is then considered that the impact significance would increase to negative moderate / major Impact. In terms of the disturbance and release of any groundwater contaminants, it is considered that the impact significance would range from no impact to small minor negative impact.

### Summary

4.4.11 The impacts of construction and operation on the hydrological resource are likely to be low providing that the necessary mitigation measures are put in place to avoid pollution of watercourses.

4.4.12 The hydraulic capacity of the Burdiehouse Burn must be maintained, to minimise any impacts on upstream flooding. In particular, the design of any additional infrastructure required for the preferred option must preserve the hydraulic capacity of the Burdiehouse Burn and their respective floodplains.

4.4.13 However the Burdiehouse Burn is shown to be at risk from flooding events. Further assessment would be required to examine this issue further.

4.4.14 Those options which have Section 4h rather than Section 4, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 4 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 4.5 Section 5

### Scoping

4.5.1 As section 1.

### Baseline

4.5.2 The water resources baseline data is given in Table W1.

**Table W1: Baseline Data**

| Receptor | Water Quality Classification | Flow Rate (m3/s) | Amenity Use | Overall Sensitivity |
|---|---|---|---|---|
| **Straiton Pond** | N/A | N/A | Local wildlife refuge – | Moderate |

| | | | | |
|---|---|---|---|---|
| | | | Local Nature Reserve | |
| **May Burn (aka Park Burn)** | C (Poor) | N/A | N/A | Moderate |
| **Ground Water** | The Hydrogeological Map of Scotland and the Groundwater Vulnerability Map of Scotland show no significant ground water resources within either of the site study corridors. Brief investigations for this study have not revealed any significant discharges to or abstractions from groundwater in these areas. No groundwater pollution incidents or areas of groundwater quality degradation have been noted by SEPA. There is an industrial estate upstream by the banks of the May Burn; a detailed investigation into any existing local groundwater pollution would be required as part of further preliminary design and environmental assessment of the preferred option during the EIA process if required. | | | |

The following notes relate to the table above; [1] Quality Classification is the River Classification

4.5.3 Based on the requirements of the Water Framework Directive, which are broadly to prevent deterioration in the status of water bodies and to restore water bodies to good ecological status by 2015, any deterioration of water quality in the watercourses in question as a result of the preferred option is unlikely to be acceptable.

## Assessment

4.5.4 Any impacts occurring during the construction phase of the options are likely to be confined to Straiton Pond and May Burn within the 200m EOBP study corridor. These impacts are likely to be short term, fairly localised, and temporary in nature e.g. for the duration of construction. Although there is no history of flooding of the Straiton Pond and May Burn, it is essential that the hydraulic capacity of the watercourse is not reduced during any phase of the construction works.

4.5.5 Note should be made of the existence of culverted sections of the May Burn beneath the EOBP study corridor. The condition of these culverts will require to be evaluated as part of the design process. Further assessment would be required to identify the presence of any culverted watercourses.

## Appraisal

4.5.6 It is noted that the impacts described below are focussed on the May Burn and Straiton Pond. The option runs immediately adjacent to part of the May Burn and Straiton Pond, and it is therefore a possibility that this watercourse and feature will experience the impacts identified earlier. It is noted that impacts to water resources features described below may lead to or be associated with other impacts, which are addressed separately in other sections of this report. For example no impacts on aquatic ecology have been considered in this section but are reviewed in the Biodiversity section.

4.5.7 The SEPA Indicative River and Coastal Flood Map shows that the EOBP study corridor is located in an area which is not at risk of flooding from rivers.

4.5.8 Impacts on the Straiton Pond and May Burn have been assessed as being of small moderate negative impact significance. It is considered that the impact significance would increase to moderate / major negative impact, in the unlikely event that the hydraulic capacity of the river be reduced during the construction works.

4.5.9 Any impacts occurring during the operational phase of the options are assessed as being of small minor negative impact significance. Any potential long-term pollution and maintenance impacts are considered to be addressed using standard mitigation measures. The hydraulic capacity of the Straiton Pond and May Burn must be maintained, to minimise any impacts on upstream flooding. In particular, the design of any embankments must preserve the hydraulic capacity of the Straiton Pond and May Burn floodplains. Should the hydraulic capacity of the river be reduced during the operation of the preferred option, i.e. a long-term impact, it is then considered that the impact significance would increase to negative moderate / major Impact. In terms of the disturbance and release of any groundwater contaminants, it is considered that the impact significance would range from no impact to small minor negative impact.

### Summary

4.5.10 The impacts of construction and operation on the hydrological resource are likely to be low providing that the necessary mitigation measures are put in place to avoid pollution of watercourses.

4.5.11 The hydraulic capacity of the Straiton Pond and May Burn must be maintained, to minimise any impacts on upstream flooding. In particular, the design of any additional infrastructure required for the preferred option must preserve the hydraulic capacity of Straiton Pond and the May Burn floodplain.

4.5.12 Those options which have Section 5h rather than Section 5, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 5 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 4.6 Section 6

### Scoping

4.6.1 As Section 1.

### Baseline

4.6.2 The water resources baseline data is given in Table W1.

**Table W1: Baseline Data**

| Receptor | Water Quality Classification | Flow Rate (m3/s) | Amenity Use | Overall Sensitivity |
|---|---|---|---|---|
| **Burdiehouse Burn** | A2 (Good) | N/A | N/A | Moderate |
| **Unnamed Watercourse** | N/A | N/A | N/A | Moderate |

| | | | | |
|---|---|---|---|---|
| **at Danderhall (Drainage Channel)** | | | | |
| **Ground Water** | The Hydrogeological Map of Scotland and the Groundwater Vulnerability Map of Scotland show no significant ground water resources within either of the site study corridors. Brief investigations for this study have not revealed any significant discharges to or abstractions from groundwater in these areas. No groundwater pollution incidents or areas of groundwater quality degradation have been noted by SEPA. The Burdiehouse Burn flows through a significant portion of urban Edinburgh before emerging within the study corridor; a detailed investigation into any existing local groundwater pollution would be required as part of further preliminary design and environmental assessment of the preferred option during the EIA process if required. | | | |

The following notes relate to the table above; [1] Quality Classification is the River Classification

4.6.3 Based on the requirements of the Water Framework Directive, which are broadly to prevent deterioration in the status of water bodies and to restore water bodies to good ecological status by 2015, any deterioration of water quality in the watercourses in question as a result of the preferred option is unlikely to be acceptable.

## Assessment

4.6.4 Any impacts occurring during the construction phase of the options are likely to be confined to Burdiehouse Burn within the 200m EOBP study corridor. These impacts are likely to be short term, fairly localised, and temporary in nature e.g. for the duration of construction. It should be noted that there is a history of flooding of the Burdiehouse Burn, therefore it is essential that the hydraulic capacity of the watercourse is not reduced during any phase of the construction works.

4.6.5 Further assessment would be required to identify the presence of any culverted watercourses.

## Appraisal

4.6.6 It is noted that the impacts described below are focussed on the Burdiehouse Burn. The options do not cross the Burdiehouse Burn, although would use an existing crossing point at Little France Crescent to access the Edinburgh Royal Infirmary, and it is therefore unlikely that this watercourse will experience the impacts identified earlier.

4.6.7 The SEPA Indicative River and Coastal Flood Map shows that part of the EOBP study corridor is located in an area which is at risk of flooding from rivers.

4.6.8 Impacts on the Burdiehouse Burn have been assessed as being of small minor negative impact significance. It is considered that the impact significance would increase to moderate / major negative impact, in the unlikely event that the hydraulic capacity of the river be reduced during the construction works.

4.6.9 Any impacts occurring during the operational phase of the options are assessed as being of small minor negative impact significance. Any potential long-term pollution and maintenance

impacts are considered to be addressed using standard mitigation measures. The hydraulic capacity of the Burdiehouse Burn must be maintained, to minimise any impacts on upstream flooding. In terms of the disturbance and release of any groundwater contaminants, it is considered that the impact significance would range from no impact to small minor negative impact.

### Summary

4.6.10 The impacts of construction and operation on the hydrological resource are likely to be low providing that the necessary mitigation measures are put in place to avoid pollution of watercourses.

4.6.11 The hydraulic capacity of the Burdiehouse Burn would be maintained, to minimise any impacts on upstream flooding as the route would use the existing water crossing.

4.6.12 Those options which have Section 6h rather than Section 6, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 6 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 4.7 Section 7

### Scoping

4.7.1 As Section 1.

### Baseline

4.7.2 The water resources baseline data is given in Table W1.

**1. Table W1: Baseline Data**

| Receptor | Water Quality Classification | Flow Rate (m3/s) | Amenity Use | Overall Sensitivity |
|---|---|---|---|---|
| **Burdiehouse Burn** | A2 (Good) | N/A | N/A | Moderate |
| **Brunstane Burn** | C (Poor) | N/A | N/A | Moderate |
| **Niddry Burn** | N/A | N/A | N/A | Low |

| | |
|---|---|
| **Ground Water** | The Hydrogeological Map of Scotland and the Groundwater Vulnerability Map of Scotland show no significant ground water resources within either of the site study corridors. Brief investigations for this study have not revealed any significant discharges to or abstractions from groundwater in these areas. No groundwater pollution incidents or areas of groundwater quality degradation have been noted by SEPA. There is a sections of built up areas along the banks of the Burdiehouse Burn and Brunstane Burn.; a detailed investigation into any existing local groundwater pollution would be required as part of further preliminary design and environmental assessment of the preferred option during the EIA process if required. The Edinburgh City Local Plan Finalised Draft (March 2007) identifies a Functional Flood Plain between Edinburgh Royal Infirmary and the Greendykes Housing Estate. |

The following notes relate to the table above; [1] Quality Classification is the River Classification

4.7.3 Based on the requirements of the Water Framework Directive, which are broadly to prevent deterioration in the status of water bodies and to restore water bodies to good ecological status by 2015, any deterioration of water quality in the watercourses in question as a result of the preferred option is unlikely to be acceptable.

## Assessment

4.7.4 Any impacts occurring during the construction phase of the options are likely to be confined to Burdiehouse Burn and Brunstane Burn within the 200m EOBP study corridor. These impacts are likely to be short term, fairly localised, and temporary in nature e.g. for the duration of construction. It is noted that given the history of flooding of the Burdiehouse Burn and Brunstane Burn, it is essential that the hydraulic capacity of the watercourse is not reduced during any phase of the construction works.

4.7.5 Note should be made of the existence of culverted sections of the Burdiehouse Burn and Brunstane Burn beneath the EOBP study corridor. The condition of these culverts will require to be evaluated as part of the design process.

4.7.6 Further assessment would be required to identify the presence of any culverted watercourses.

## Appraisal

4.7.7 The SEPA Indicative River and Coastal Flood Map shows parts of the EOBP study corridor to be located in an area at risk of flooding from rivers (Burdiehouse Burn and Brunstane Burn) The map shows those areas estimated to have a 0.5% or greater chance of flooding each year. No flood defences are shown on this map.

4.7.8 It is noted that the impacts described below are focussed on the Burdiehouse Burn and Brunstane Burn as sections of both watercourses lie immediately parallel to the EOBP study corridor. Impacts on the Burdiehouse Burn and Brunstane Burn have been assessed as being of small minor / moderate negative impact significance. It is considered that the impact significance would increase to moderate / major negative impact, in the event that the hydraulic capacity of the watercourses is reduced during the construction works. It is noted that impacts to water resources features described below may lead to or be associated with other impacts,

which are addressed separately in other sections of this report. For example no impacts on aquatic ecology have been considered in this section but are reviewed in the Biodiversity section.

4.7.9 Any impacts occurring during the operational phase of the options are assessed as being of small minor negative impact significance. Any potential long-term pollution and maintenance impacts are considered to be addressed using standard mitigation measures. The hydraulic capacity of the Burdiehouse Burn and Brunstane Burn must be maintained, to minimise any impacts on upstream flooding. In terms of the disturbance and release of any groundwater contaminants, it is considered that the impact significance would range from no impact to minor / moderate negative impact.

### Summary

4.7.10 The impacts of construction and operation on the hydrological resource are likely to be low providing that the necessary mitigation measures are put in place to avoid pollution of watercourses.

4.7.11 The hydraulic capacity of the Burdiehouse Burn and Brunstane Burn would be maintained, to minimise any impacts on upstream flooding as the route would use the existing water crossing.

4.7.12 However both watercourses are shown to be at risk from flooding events. Further assessment would be required to examine this issue further.

4.7.13 Since Section 7 is only applicable to Route A5, the above findings are only relevant to this option.

## 4.8 Section 8

### Scoping

4.8.1 As Section 1.

### Baseline

4.8.2 The water resources baseline data is given in Table W1.

**2. Table W1: Baseline Data**

| Receptor | Water Quality Classification | Flow Rate (m3/s) | Amenity Use | Overall Sensitivity |
|---|---|---|---|---|
| **Unnamed watercourse at Millerhill (Drainage Channel)** | **N/A** | **N/A** | **N/A** | **High** |

| | |
|---|---|
| **Ground Water** | The Hydrogeological Map of Scotland and the Groundwater Vulnerability Map of Scotland show no significant ground water resources within either of the site study corridors. Brief investigations for this study have not revealed any significant discharges to or abstractions from groundwater in these areas. No groundwater pollution incidents or areas of groundwater quality degradation have been noted by SEPA. A detailed investigation into any existing local groundwater pollution would be required as part of further preliminary design and environmental assessment of the preferred option during the EIA process if required. |

The following notes relate to the table above; [1] Quality Classification is the River Classification

4.8.3 Based on the requirements of the Water Framework Directive, which are broadly to prevent deterioration in the status of water bodies and to restore water bodies to good ecological status by 2015, any deterioration of water quality in the watercourses in question as a result of the preferred option is unlikely to be acceptable.

### Assessment

4.8.4 One drainage channel has been identified in this section of the EOBP study corridor. Further assessment would be required to identify the presence of any watercourses of water features.

### Appraisal

4.8.5 One drainage channel has been identified in this section of the EOBP study corridor. Further assessment would be required to identify the presence of any watercourses of water features.

### Summary

4.8.6 One drainage channel has been identified in this section of the EOBP study corridor. The impacts of construction and operation on the hydrological resource are likely to be low providing that the necessary mitigation measures are put in place to avoid pollution of groundwater.

4.8.7 Further assessment would be required to examine this issue further.

4.8.8 Since Section 8 is only applicable to Routes B17 and B18, the above findings are only relevant to these options.

## 4.9 Section 9

### Scoping

4.9.1 As Section 1.

### Baseline

4.9.2 The water resources baseline data is given in Table W1.

**Table W1: Baseline Data**

| Receptor | Water Quality Classification | Flow Rate (m3/s) | Amenity Use | Overall Sensitivity |
|---|---|---|---|---|
| **Burdiehouse Burn** | A2 (Good) | N/A | N/A | Moderate |
| **Unnamed Watercourse at Danderhall (Drainage Channel)** | N/A | N/A | N/A | Moderate |
| **Ground Water** | The Hydrogeological Map of Scotland and the Groundwater Vulnerability Map of Scotland show no significant ground water resources within either of the site study corridors. Brief investigations for this study have not revealed any significant discharges to or abstractions from groundwater in these areas. No groundwater pollution incidents or areas of groundwater quality degradation have been noted by SEPA. The Burdiehouse Burn flows through a significant portion of urban Edinburgh before emerging within the study corridor; a detailed investigation into any existing local groundwater pollution would be required as part of further preliminary design and environmental assessment of the preferred option during the EIA process if required. | | | |

The following notes relate to the table above; [1] Quality Classification is the River Classification

4.9.3 Based on the requirements of the Water Framework Directive, which are broadly to prevent deterioration in the status of water bodies and to restore water bodies to good ecological status by 2015, any deterioration of water quality in the watercourses in question as a result of the preferred option is unlikely to be acceptable.

## Assessment

4.9.4 Any impacts occurring during the construction phase of the options are likely to be confined to Burdiehouse Burn within the 200m EOBP study corridor. These impacts are likely to be short term, fairly localised, and temporary in nature e.g. for the duration of construction. It should be noted that there is a history of flooding of the Burdiehouse Burn, therefore it is essential that the hydraulic capacity of the watercourse is not reduced during any phase of the construction works.

4.9.5 Further assessment would be required to identify the presence of any culverted watercourses.

## Appraisal

4.9.6 It is noted that the impacts described below are focussed on the Burdiehouse Burn. The options do not cross the Burdiehouse Burn, although would use an existing crossing point at Little France Crescent to access the Edinburgh Royal Infirmary, and it is therefore unlikely that this watercourse will experience the impacts identified earlier.

4.9.7 The SEPA Indicative River and Coastal Flood Map shows that part of the EOBP study corridor is located in an area which is at risk of flooding from rivers.

4.9.8 Impacts on the Burdiehouse Burn have been assessed as being of small minor negative impact significance. It is considered that the impact significance would increase to moderate / major negative impact, in the unlikely event that the hydraulic capacity of the river be reduced during the construction works.

4.9.9 Any impacts occurring during the operational phase of the options are assessed as being of small minor negative impact significance. Any potential long-term pollution and maintenance impacts are considered to be addressed using standard mitigation measures. The hydraulic capacity of the Burdiehouse Burn must be maintained, to minimise any impacts on upstream flooding. In terms of the disturbance and release of any groundwater contaminants, it is considered that the impact significance would range from no impact to small minor negative impact.

## Summary

4.9.10 The impacts of construction and operation on the hydrological resource are likely to be low providing that the necessary mitigation measures are put in place to avoid pollution of watercourses.

4.9.11 The hydraulic capacity of the Burdiehouse Burn would be maintained, to minimise any impacts on upstream flooding as the route would use the existing water crossing.

4.9.12 Since Section 9 is only applicable to Route C5, the above findings are only relevant to this option.

# 5 GEOLOGY, AGRICULTURE AND SOILS

## 5.1 Section 1

### Scoping

5.1.1 The sub objectives of Geology and Agriculture and Soils have been combined in this section.

**Agriculture**

5.1.2 The EOBP study corridor lies within the urban fringe of Edinburgh and in open countryside and some agricultural land may be affected therefore agriculture has been included in the scope of this assessment.

**Geology and Soils**

5.1.3 The soils and underlying geology are important factors in determining many of the physical attributes of an area, such as the physical appearance of the environment, water quality and land use. Soils and the underlying bedrocks can contain valuable resources, including economically valuable mineral and water reserves. Consideration should be given to whether a planned development reduces or affects the resource base or inhibits future use of such resources. Proposed infrastructure works can impact on geological or geomorphological features, which are considered valuable in their own right (e.g. for academic or research purposes) or designated sites.

**Methodology**

5.1.4 At this stage no detailed investigation of geology or soils has been carried out. A desktop study was undertaken by Scott Wilson. The study drew upon geological mapping from the British Geological Survey (BGS)[5], Soils mapping produced by the MacAuley Institute[6], Minerals mapping produced by the Scottish Government and BGS[7] and Local Plans.

5.1.5 This report will serve to highlight any important issues, which may need further investigation. The level of confidence by which the predicted impact has been assessed is low i.e. the predicted impact and its level are best estimates. More information is likely to be required to improve the level of confidence.

### Baseline

**Geological Features**

5.1.6 There are no Sites of Special Scientific Interest (SSSI) designated for geological purposes or Regional Sites of Geological Significance (RIGS) identified in the Local Plans. Further consultation should be considered during the next stages of the project to identify whether the

[5] British Geological Society, S032E Edinburgh (Bedrock) 2003, S032E Edinburgh (Bedrock and Superficial) 2006
[6] Soil Survey for Scotland Edinburgh Sheet 66, Land Capability for Agricultural Macaulay Institute
[7] Minerals Guide to Central Government (Scottish Government/British Geological Society)
http://www.scotland.gov.uk/Publications/2008/05/27155411/0 [accessed November 2008]

route will affect any other non-designated sites of value as geological features and mineral reserves.

**Solid Geology Underlying Geology and Superficial Deposits**

5.1.7 The Bedrock in the EOBP study corridor consists of predominately Carboniferous rocks such as common Shale for brick coincident with areas of shallow coal.

**Drift Geology**

5.1.8 Areas of Glaciofluvial deposits are shown in the EOBP study corridor. The soil type consists of the Rowanhill/Giffnock/ Winton variety derived from drifts of material eroded from the underlying Carboniferous sandstones, Shales and Limestones.

**Made Ground**

5.1.9 The majority of the EOBP study corridor is located over ground that has been subject to previous development. The A8 road account for most of the made ground deposits between Newbridge and Gogar.

**Geomorphology**

5.1.10 The EOBP study corridor is located in the Lowland Plain (Lower Almond Farmlands) Landscape Character Types of the Lothian Landscape Character Assessment (LCA)[8]. The landform consists of a matrix of high quality agricultural land with a smoothly rolling large scale landscape.

**Contaminated Land**

5.1.11 It is expected that contaminated land may be present in the EOBP study corridor where there is made ground present. Former industries present within the EOBP study corridor may have produced, used and stored substances that are harmful to human health. However, further investigation will be required.

**Agricultural Land Classification**

5.1.12 The majority of land use adjacent to the route is agricultural land mainly used for arable purposes. Land quality is generally Class 2 (Macaulay Institute for Soil Research, 1986). Agricultural land designated as Class 2 is defined as 'Land capable of producing a wide variety of crops'. Land designated as Class 1, 2 and 3(1) is considered to be prime agricultural land.

## Assessment

**Construction**

5.1.13 Part of the route options for this section is the creation of bus lanes. It is assumed that this may involve some land take from the current road verge, etc.

[8] Scottish Natural Heritage and ASH Consulting Group (1998) Lothian Landscape Character Assessment

5.1.14 Any available topsoil (upper 0.5m approximately) should be excavated, stored and reused for covering verges, earthworks slopes and landscaping wherever possible. Any excess topsoil arising from excavation should be transferred offsite, for re-use if of suitable quality.

5.1.15 Any excavation material could be reused for fill in earthworks and landscaping and surplus removed from the site. Any contaminated material that is discovered during construction will require to be analysed to determine the hazard, suitability of re-use and whether unusable deposits should be disposed of at a licensed site.

**Effects on Underlying Geology**

5.1.16 Construction of bus lanes for the option is expected to involve shallow cuttings. It is not known at this stage the depth and extent of the works. The cuttings are expected to be made in drift deposits and are not expected to affect the underlying Bedrock. At present there is expected to be a neutral effect on the underlying geology and on water reserves.

**Operation**

5.1.17 Once the route options have been constructed it is expected that there will be no discernable effects associated with the geology along the route.

### Appraisal

5.1.18 The options would have a neutral impact on the Geology, Agriculture and Soils as the infrastructure for the options is currently intact. There may some additional works required for the creation of bus lanes in which case impacts are expect to be negative minor to negative moderate depending on the design and location.

5.1.19 The predicted impacts are expected to be local but are dependent on the final design of the preferred option and the materials chosen for construction. If mitigation measures in the form of best practice construction methods are utilised, the significance of any potential impact will be negative minor to no impact. No residual impacts are expected.

### Summary

5.1.20 No designated sites have been identified at this stage. The predicted effects are likely to be no impacts/negative minor impact and local, but further investigation will be required at the detailed design stage.

5.1.21 Since Section 1 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 5.2 Section 2

### Scoping

5.2.1 The sub objectives of Geology and Agriculture and Soils have been combined in this section.

### Agriculture

5.2.2 The EOBP study corridor lies within the built up area of Edinburgh and in open countryside and some agricultural land may be affected therefore agriculture has been included in the scope of this assessment.

### Geology and Soils

5.2.3 As Section 1.

### Methodology

5.2.4 As Section 1.

## Baseline

### Geological Features

5.2.5 As Section 1.

### Solid Geology Underlying Geology and Superficial Deposits

5.2.6 The Bedrock in the EOBP study corridor consists of predominately Dinanian Sedimentary Carboniferous and Upper Devonian.

### Drift Geology

5.2.7 As Section 1.

### Made Ground

5.2.8 The majority of the EOBP study corridor is located over ground that has been subject to previous development. The A720 Edinburgh City Bypass and local access roads account for most of the made ground deposits between Gogar and the Water of Leith.

### Geomorphology

5.2.9 As Section 1.

### Contaminated Land

5.2.10 As Section 1.

### Agricultural Land Classification

5.2.11 As Section 1

## Assessment

### Construction

5.2.12 Any available topsoil (upper 0.5m approximately) should be excavated, stored and reused for covering verges, earthworks slopes and landscaping wherever possible. Any excess topsoil arising from excavation should be transferred offsite, for re-use if of suitable quality.

5.2.13 Any excavation material could be reused for fill in earthworks and landscaping and surplus removed from the site. Any contaminated material that is discovered during construction will require to be analysed to determine the hazard, suitability of re-use and whether unusable deposits should be disposed of at a licensed site.

**Effects on Underlying Geology**

5.2.14 Construction of the route options is expected to involve shallow cuttings for the construction of a Bus Rapid Transit route. It is not known at this stage the depth and extent of the works. The cuttings are expected to be made in drift deposits and are not expected to affect the underlying Bedrock. At present there is expected to be a neutral effect on the underlying geology and on water reserves.

**Operation**

5.2.15 As Section 1.

**Appraisal**

5.2.16 The option would require the construction of significant sections of Bus Rapid Transit routes and possibly an underpass resulting in moderate to major adverse impacts during construction associated with groundbreaking work, and the potential removal of spoil. This issue would be temporary.

5.2.17 The predicted impacts are expected to be local but are dependent on the final design of the preferred option and the materials chosen for construction. If mitigation measures in the form of best practice construction methods are utilised, the significance of any potential impact will be negative minor to no impact. No residual impacts are expected.

### Summary

5.2.18 As Section 1.

## 5.3 Section 3

### Scoping

5.3.1 The sub objectives of Geology and Agriculture and Soils have been combined in this section.

**Agriculture**

5.3.2 The EOBP study corridor lies within the built up area of Edinburgh and in open countryside and some agricultural land may be affected therefore agriculture has been included in the scope of this assessment.

**Geology and Soils**

5.3.3 As Section 1.

### Methodology

5.3.4 As Section 1.

## Baseline

### Geological Features

5.3.5 There are no Sites of Special Scientific Interest (SSSI) designated for geological purposes identified in the Local Plans. A Regional Important Geological Site (RIGS) is located at Dreghorn Links. Further consultation should be considered during the next stages of the project to identify whether the route will affect any other non-designated sites of value as geological features and mineral reserves.

### Solid Geology Underlying Geology and Superficial Deposits

5.3.6 The solid geology in the EOBP study corridor consists of predominately Carboniferous Igneous Extrusive Lava.

### Drift Geology

5.3.7 Areas of sub alluvial and river terrace deposits are shown in the EOBP study corridor. Soil type consists mainly of the Rowanhill/Giffnock/Winton variety derived from drifts of material eroded from the underlying Carboniferous sandstones, Shales and Limestones.

### Made Ground

5.3.8 The majority of the EOBP study corridor is located over ground that has been subject to previous development. The A720 Edinburgh City Bypass account for most of the made ground deposits between the Water of Leith and Lothianburn.

### Geomorphology

5.3.9 The EOBP study corridor is located within the northern perimeter of the Uplands (Pentland Hills) Landscape Character Types of the Lothian Landscape Character Assessment (LCA). At their northern edge, the hills form a north-facing escarpment overlooking the City.

### Contaminated Land

5.3.10 As Section 1.

### Agricultural Land Classification

5.3.11 The majority of land use adjacent to the route is agricultural land mainly used for arable purposes. Land quality comprises of a mixture of the following: Class 3(1); 4(2); and 5(2) (Macaulay Institute for Soil Research, 1986). Agricultural land designated as Class 3 (1) is defined as 'Land capable of producing a moderate range of crops'. Land designated as Class 1, 2 and 3(1) is considered to be prime agricultural land.

### Assessment

**Construction**

5.3.12 There is unlikely to be any groundbreaking work as the proposed option for this section is the conversation of the hard shoulder to a bus lane. However, some minor remediation works may be required such as the creation of emergency lay bys and the erection of signage.

**Effects on Underlying Geology**

5.3.13 There is expected to be a neutral effect on the underlying geology and on water reserves.

**Operation**

5.3.14 As Section 1.

### Appraisal

5.3.15 The option would have a neutral impact on Geology, Agriculture and Soils as the infrastructure for the option is currently intact. There may some additional works required in which case impacts are expect to be negative minor. There is a Regional Important Geological Site (RIGS) located at Dreghorn, although impacts on this receptor would be neutral as the route options are focussed on the existing A720 Edinburgh City Bypass route corridor.

### Summary

5.3.16 A Regional Important Geological Site has been identified at this stage. The predicted effects are likely to range from no impacts to minor and local, but further investigation will be required at the detailed design stage.

5.3.17 Since Section 3 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 5.4 Section 4

### Scoping

5.4.1 The sub objectives of Geology and Agriculture and Soils have been combined in this section.

**Agriculture**

5.4.2 The EOBP study corridor lies within the outskirts of Edinburgh and in open countryside and some agricultural land may be affected therefore agriculture has been included in the scope of this assessment.

**Geology and Soils**

5.4.3 As Section 1.

### Methodology

5.4.4 As Section 1.

## Baseline

### Geological Features

5.4.5 As Section 1.

### Solid Geology Underlying Geology and Superficial Deposits

5.4.6 The solid geology in the EOBP study corridor consists of predominately Carboniferous igneous extrusive lava.

### Drift Geology

5.4.7 Areas of Glaciofluvial and lake deposits are shown in the EOBP study corridor. Soil type consists of the Rowanhill/Giffnock/Winton and alluvial variety derived from drifts of material eroded from the underlying Carboniferous sandstones, Shales and Limestones.

### Made Ground

5.4.8 The majority of the EOBP study corridor is located over ground that has been subject to previous development. The A720 Edinburgh City Bypass account for most of the made ground deposits between the Lothianburn and Straiton.

### Geomorphology

5.4.9 The study corridor is located within the Lowland River Valley (North Esk) Landscape Character Types of the Lothian Landscape Character Assessment (LCA). The landform consists of an undulating arable farmland landscape.

### Contaminated Land

5.4.10 It is expected that contaminated land may be present in the EOBP study corridor where there is made ground present. Former industries present within the study corridor may have produced, used and stored substances that are harmful to human health. However, further investigation will be required.

5.4.11 A gas pipeline is located between Lothianburn and Straiton located south of and running parallel to the A720 Edinburgh City Bypass.

### Agricultural Land Classification

5.4.12 The majority of land use adjacent to the route is agricultural land mainly used for arable purposes. Land quality comprises of a mixture of the following: Class 2; 3(1); 3(2); and 4(2) (Macaulay Institute for Soil Research, 1986). Agricultural land designated as Class 2 is defined as 'Land capable of producing a wide variety of crops', Class 3 is defined as 'Land capable of producing a moderate range of crops'. Land designated as Class 1, 2 and 3(1) is considered to be prime agricultural land.

## Assessment

### Construction

5.4.13 Any available topsoil (upper 0.5 m approximately) should be excavated, stored and reused for covering verges, earthworks slopes and landscaping wherever possible. Any excess topsoil arising from excavation should be transferred offsite, for resale if of suitable quality.

5.4.14 Any excavation material could be reused for fill in earthworks and landscaping and surplus removed from the site. Any contaminated material that is discovered during construction will require to be analysed to determine the hazard, suitability of re-use and whether unusable deposits should be disposed of at a licensed site.

5.4.15 The route options would have a moderate/major impacts on soils and geology as previously undeveloped arable land would required for the construction of the Bus Rapid Transit route.

### Effects on Underlying Geology

5.4.16 Construction of the route options is expected to involve shallow cuttings for the construction of a Bus Rapid Transit route. It is not known at this stage the depth and extent of the works. The cuttings are expected to be made in drift deposits and are not expected to affect the underlying Bedrock. At present there is expected to be a neutral effect on the underlying geology and on water reserves.

5.4.17 The route options have the potential to disturb the underlying geology.

### Operation

5.4.18 As Section 1.

## Appraisal

5.4.19 The route options would require the construction of 2km of Bus Rapid Transit route resulting in moderate to major adverse impacts during construction associated with groundbreaking work, and the potential removal of spoil. This issue would be temporary.

5.4.20 The predicted impacts are expected to be local but are dependent on the final design of the preferred option and the materials chosen for construction. If mitigation measures in the form of best practice construction methods are utilised, the significance of any potential impact will be negative minor to no impact. No residual impacts are expected.

## Summary

5.4.21 No designated sites have been identified at this stage. The predicted effects are likely to be no impacts/negative minor impact and local, but further investigation will be required at the detailed design stage.

5.4.22 Those options which have Section 4h rather than Section 4, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 4 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

# 5.5 Section 5

## Scoping

5.5.1 The sub objectives of Geology and Agriculture and Soils have been combined in this section.

**Agriculture**

5.5.2 The EOBP study corridor lies within the built up area of Straiton on the outskirts of Edinburgh and in open countryside and some agricultural land may be affected therefore agriculture has been included in the scope of this assessment.

**Geology and Soils**

5.5.3 As Section 1.

**Methodology**

5.5.4 As Section 1.

## Baseline

**Geological Features**

5.5.5 As Section 1.

**Solid Geology Underlying Geology and Superficial Deposits**

5.5.6 The solid geology in the EOBP study corridor consists predominately of Dinantian Sedimentary Carboniferous rock.

**Drift Geology**

5.5.7 Common Shale Bedrock deposits. Soil type consists of the Rowanhill/Giffnock/Winton variety derived from drifts of material eroded from the underlying Carboniferous sandstones, Shales and Limestones.

**Made Ground**

5.5.8 The majority of the EOBP study corridor is located over ground that has been subject to previous development. Straiton Retail Park and associated car parking areas and local access roads account for most of the made ground deposits between Straiton and the A720 Edinburgh City Bypass Underpass.

**Geomorphology**

5.5.9 As Section 4.

**Contaminated Land**

5.5.10 It is expected that contaminated land may be present in the EOBP study corridor where there is made ground present. Former industries such as coal mining (Loanhead) present within the

study corridor may have produced, used and stored substances that are harmful to human health. However, further investigation will be required.

**Agricultural Land Classification**

5.5.11 As Section 4.

## Assessment

**Construction**

5.5.12 Any available topsoil (upper 0.5m approximately) should be excavated, stored and reused for covering verges, earthworks slopes and landscaping wherever possible. Any excess topsoil arising from excavation should be transferred offsite, for re-use if of suitable quality.

5.5.13 Any excavation material could be reused for fill in earthworks and landscaping and surplus removed from the site. Any contaminated material that is discovered during construction will require to be analysed to determine the hazard, suitability of re-use and whether unusable deposits should be disposed of at a licensed site.

**Effects on Underlying Geology**

5.5.14 Construction of the route options is expected to involve shallow cuttings. It is not known at this stage the depth and extent of the works. The cuttings are expected to be made in either drift geology and/or made ground, and are not expected to affect the underlying Bedrock. At present there is expected to be a neutral effect on the underlying geology and on water reserves. The construction of the option may involve the importation of soil to fill in parts of the disused railway line to surface level. Additionally, some cuttings may be required, although it is not known as this stage the extent or depth of the works.

**Operation**

5.5.15 As Section 1.

## Appraisal

5.5.16 The option would require some road construction and alterations of existing roads and the widening of the disused railway, therefore are likely to be minor to moderate adverse impacts during construction associated with groundbreaking work, and the potential removal of spoil. This issue would be temporary.

5.5.17 The predicted impacts are expected to be local but are dependent on the final design of the preferred option and the materials chosen for construction. If mitigation measures in the form of best practice construction methods are utilised, the significance of any potential impact will be negative minor to no impact. No residual impacts are expected.

## Summary

5.5.18 No designated sites have been identified at this stage. The predicted effects are likely to be no impacts/negative minor impact and local, but further investigation will be required at the detailed design stage.

5.5.19 Those options which have Section 5h rather than Section 5, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 5 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 5.6 Section 6

### Scoping

5.6.1 The sub objectives of Geology and Agriculture and Soils have been combined in this section.

**Agriculture**

5.6.2 The EOBP study corridor lies within the built up area of Edinburgh and in open countryside and some agricultural land may be affected therefore agriculture has been included in the scope of this assessment.

**Geology and Soils**

5.6.3 As Section 1.

**Methodology**

5.6.4 As Section 1.

### Baseline

**Geological Features**

5.6.5 There are no Sites of Special Scientific Interest (SSSI) designated for geological purposes or Regional Sites of Geological Significance (RIGS) identified in the Local Plans. Further consultation should be considered during the next stages of the project to identify whether the route will affect any other non-designated sites of value as geological features and mineral reserves.

**Solid Geology Underlying Geology and Superficial Deposits**

5.6.6 The solid geology in the EOBP study corridor consists predominately of Dinantian Sedimentary Carboniferous rock with seams of Limestone and Silcia Sand also present.

**Drift Geology**

5.6.7 Areas of lake deposits are shown in the EOBP study corridor. Soil types consist of the Rowanhill/Giffnock/Winton variety derived from drifts of material eroded from the underlying Carboniferous sandstones, Shales and Limestones.

**Made Ground**

5.6.8 The majority of the EOBP study corridor is located over ground that has been subject to previous development. The disused railway line and road network account for most of the

made ground deposits along the route corridor between the A720 Edinburgh City Bypass Underpass and Edinburgh Royal Infirmary.

### Geomorphology

5.6.9 The EOBP study corridor is located within the Lowland River Valley (North Esk) Landscape Character, Coastal Margins (Musselburgh/ Prestonpans Fringe) and Urban Area Types of the Lothian Landscape Character Assessment (LCA). The lowland river valley landform consists of an undulating arable farmland landscape, whilst the area south of Musselburgh is described as having an industrialised character exacerbated by 'prominent bings, coal mining infrastructure, warehouse development; disused railways and pylon lines'.

### Contaminated Land

5.6.10 It is expected that contaminated land may be present in the EOBP study corridor where there is made ground present. Former industries and activities present (i.e. mining, disused railway) within the study corridor may have produced, used and stored substances that are harmful to human health. However, further investigation will be required.

### Agricultural Land Classification

5.6.11 The majority of land use adjacent to the route is agricultural land mainly used for arable purposes. Land quality comprises of a mixture of the following: Class 2; and 3(1) (Macaulay Institute for Soil Research, 1986). Agricultural land designated as Class 3 (1) is defined as 'Land capable of producing a moderate range of crops'. Land designated as Class 1, 2 and 3(1) is considered to be prime agricultural land.

## Assessment

### Construction

5.6.12 Any available topsoil (upper 0.5m approximately) should be excavated, stored and reused for covering verges, earthworks slopes and landscaping wherever possible. Any excess topsoil arising from excavation should be transferred offsite, for re-use if of suitable quality.

5.6.13 Any excavation material could be reused for fill in earthworks and landscaping and surplus removed from the site. Any contaminated material that is discovered during construction will require to be analysed to determine the hazard, suitability of re-use and whether unusable deposits should be disposed of at a licensed site.

### Effects on Underlying Geology

5.6.14 The construction of the route options may involve the importation of soil to fill in parts of the disused railway line to surface level. Additionally, some cuttings may be required, although it is not known as this stage the extent or depth of the works.

### Operation

5.6.15 As Section 1.

### Appraisal

5.6.16 The option would require the construction of significant sections of Bus Rapid Transit route resulting in moderate to major adverse negative impacts during construction associated with groundbreaking work, and the potential removal of spoil. This issue would be temporary.

5.6.17 The predicted impacts are expected to be local but are dependent on the final design of the option and the materials chosen for construction. If mitigation measures in the form of best practice construction methods are utilised, the significance of any potential impact will be negative minor to moderate. No residual impacts are expected.

### Summary

5.6.18 No designated sites have been identified at this stage. The predicted effects are likely to be no impacts/negative minor impact and local, but further investigation will be required at the detailed design stage.

5.6.19 Those options which have Section 6h rather than Section 6, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 6 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 5.7 Section 7

### Scoping

5.7.1 The sub objectives of Geology and Agriculture and Soils have been combined in this section.

**Agriculture**

5.7.2 The EOBP study corridor lies within the built up area of Edinburgh, urban fringe, and in open countryside and some agricultural land may be affected therefore agriculture has been included in the scope of this assessment.

**Geology and Soils**

5.7.3 As Section 1.

**Methodology**

5.7.4 As Section 1.

### Baseline

**Geological Features**

5.7.5 As Section 1.

### Solid Geology Underlying Geology and Superficial Deposits

5.7.6 The solid geology in the EOBP study corridor consists predominately of Dinantian Sedimentary Carboniferous rock with seams of Limestone and Silcia Sand also present.

### Drift Geology

5.7.7 Areas of Gluciofluvial and Lake deposits are shown in the EOBP study corridor. Soil type consists mainly of Rowanhill/Giffnock/Winton derived from drifts of material eroded from the underlying Carboniferous Sandstones, Shales and Limestones and Darvel Fluvioglacial Sands and Gravel and Brown Forest soils.

### Made Ground

5.7.8 About half of the EOBP study corridor is located over ground that has been subject to previous development. The existing road network account for most of the made ground deposits along the route corridor between the Edinburgh Royal Infirmary and Queen Margaret University.

### Geomorphology

5.7.9 The EOBP study corridor is located within the Coastal Margins (Musselburgh/ Prestonpans Fringe) and Urban Area Types of the Lothian Landscape Character Assessment (LCA). The area south of Musselburgh is described as having an industrialised character exacerbated by 'prominent bings, coal mining infrastructure, warehouse development; disused railways and pylon lines'.

### Contaminated Land

5.7.10 As Section 6.

### Agricultural Land Classification

5.7.11 The majority of land use adjacent to the route is agricultural land mainly used for arable purposes. Land quality comprises mostly of grade 3(1) (Macaulay Institute for Soil Research, 1986). Agricultural land designated as Class 3 (1) is defined as 'Land capable of producing a moderate range of crops'. Land designated as Class 1, 2 and 3(1) is considered to be prime agricultural land.

## Assessment

### Construction

5.7.12 Any available topsoil (upper 0.5m approximately) should be excavated, stored and reused for covering verges, earthworks slopes and landscaping wherever possible. Any excess topsoil arising from excavation should be transferred offsite, for re-use if of suitable quality.

5.7.13 Any excavation material could be reused for fill in earthworks and landscaping and surplus removed from the site. Any contaminated material that is discovered during construction will require to be analysed to determine the hazard, suitability of re-use and whether unusable deposits should be disposed of at a licensed site.

**Effects on Underlying Geology**

5.7.14 The construction of the parts of the option (ERI to Fort Kinnaird, Newcraighall) of a Bus Rapid Transit route. It is not known at this stage the depth and extent of the works. The cuttings are expected to be made in drift deposits and are not expected to affect the underlying Bedrock. At present there is expected to be a neutral effect on the underlying geology and on water reserves.

**Operation**

5.7.15 As Section 1.

### Appraisal

5.7.16 The option would require the construction of significant sections of Bus Rapid Transit routes resulting in moderate to major adverse impacts during construction associated with groundbreaking work, and the potential removal of spoil. This issue would be temporary.

5.7.17 The predicted impacts are expected to be local but are dependent on the final design of the preferred option and the materials chosen for construction. If mitigation measures in the form of best practice construction methods are utilised, the significance of any potential impact will be negative minor to no impact. No residual impacts are expected.

### Summary

5.7.18 No designated sites have been identified at this stage. The predicted effects are likely to be no impacts/negative minor impact and local, but further investigation will be required at the detailed design stage.

5.7.19 Since Section 7 is only applicable to Route A5, the above findings are only relevant to this option.

## 5.8 Section 8

### Scoping

5.8.1 The sub objectives of Geology and Agriculture and Soils have been combined in this section.

**Agriculture**

5.8.2 The EOBP study corridor lies within the urban fringe of Edinburgh and in open countryside and some agricultural land may be affected therefore agriculture has been included in the scope of this assessment.

**Geology and Soils**

5.8.3 As Section 1.

**Methodology**

5.8.4 As Section 1.

## Baseline

### Geological Features

5.8.5 As Section 1.

### Solid Geology Underlying Geology and Superficial Deposits

5.8.6 The solid geology in the study corridor consists of common Shale bedrock deposits (Carboniferous: mainly Lower and Middle Scottish Coal Measures and Limestone Coal Formation) with seams of Limestone and Silcia Sand also present.

### Drift Geology

5.8.7 Areas of Gluciofluvial and Lake deposits are shown in the EOBP study corridor. Soil type consists mainly of Rowanhill/Giffnock/Winton derived from drifts of material eroded from the underlying Carboniferous sandstones, Shales and Limestones; and Darvel Fluvioglacial Sands and Gravel and Brown Forest soils.

### Made Ground

5.8.8 The majority of the EOBP study corridor is located over ground that has been not been subject to previous development. There are former railway lines within the EOBP study corridor and the area has a history of mining activity. The local road network and disused rail features account for most of the made ground deposits along the route corridor between Sheriffhall Park and Ride and the proposed Millerhill Park and Ride.

### Geomorphology

5.8.9 The EOBP study corridor is located within the Coastal Margins (Musselburgh/ Prestonpans Fringe) and Urban Area Types of the Lothian Landscape Character Assessment (LCA). The area south of Musselburgh is described as having an industrialised character exacerbated by 'prominent bings, coal mining infrastructure, warehouse development; disused railways and pylon lines'.

### Contaminated Land

5.8.10 It is expected that contaminated land may be present in the study corridor where there is made ground present. Existing and former industries and activities (i.e. mining, former Dalkeith – Edinburgh railway line) present within the EOBP study corridor may have produced, used and stored substances that are harmful to human health. However, further investigation will be required.

### Agricultural Land Classification

5.8.11 The majority of land use adjacent to the Scheme is agricultural land mainly used for arable purposes. Land quality comprises mostly of grade 2 and 3(1) (Macaulay Institute for Soil Research, 1986). Agricultural land designated as Class 2 is defined as 'Land capable of producing a wide variety of crops', and Class 3 (1) is defined as 'Land capable of producing a moderate range of crops'. Land designated as Class 1, 2 and 3(1) is considered to be prime agricultural land.

### Assessment

#### Construction

5.8.12 Any available topsoil (upper 0.5m approximately) should be excavated, stored and reused for covering verges, earthworks slopes and landscaping wherever possible. Any excess topsoil arising from excavation should be transferred offsite, for re-use if of suitable quality.

5.8.13 Any excavation material could be reused for fill in earthworks and landscaping and surplus removed from the site. Any contaminated material that is discovered during construction will require to be analysed to determine the hazard, suitability of re-use and whether unusable deposits should be disposed of at a licensed site.

#### Effects on Underlying Geology

5.8.14 As the bus service would utilise the proposed local road network (which has not yet been and may not be constructed), there is expected to be a neutral effect on the underlying geology and on water reserves.

#### Operation

5.8.15 As Section 1.

### Appraisal

5.8.16 The route options would require the construction of significant sections of Bus Rapid Transit routes resulting in moderate to major adverse impacts during construction associated with groundbreaking work, and the potential removal of spoil. This issue would be temporary.

5.8.17 The predicted impacts are expected to be local but are dependent on the final design of the preferred option and the materials chosen for construction. If mitigation measures in the form of best practice construction methods are utilised, the significance of any potential impact will be negative minor to no impact. No residual impacts are expected.

### Summary

5.8.18 No designated sites have been identified at this stage. The predicted effects are likely to be no impacts/negative minor impact and local, but further investigation will be required at the detailed design stage.

5.8.19 Since Section 8 is only applicable to Routes B17 and B18, the above findings are only relevant to these options.

## 5.9 Section 9

### Scoping

5.9.1 The sub objectives of Geology and Agriculture and Soils have been combined in this section.

### Agriculture

5.9.2 The EOBP study corridor lies within the built up area of Edinburgh and in open countryside and some agricultural land may be affected therefore agriculture has been included in the scope of this assessment.

### Geology and Soils

5.9.3 As Section 1.

### Methodology

5.9.4 As Section 1.

## Baseline

### Geological Features

5.9.5 There are no Sites of Special Scientific Interest (SSSI) designated for geological purposes or Regional Sites of Geological Significance (RIGS) identified in the Local Plans. Further consultation should be considered during the next stages of the project to identify whether the route will affect any other non-designated sites of value as geological features and mineral reserves.

### Solid Geology Underlying Geology and Superficial Deposits

5.9.6 The solid geology in the EOBP study corridor consists predominately of Dinantian Sedimentary Carboniferous rock with seams of Limestone and Silcia Sand also present.

### Drift Geology

5.9.7 Areas of lake deposits are shown in the EOBP study corridor. Soil types consist of the Rowanhill/Giffnock/Winton variety derived from drifts of material eroded from the underlying Carboniferous sandstones, Shales and Limestones.

### Made Ground

5.9.8 The majority of the EOBP study corridor is located over ground that has been subject to previous development. The disused railway line and road network account for most of the made ground deposits along the route corridor between Sheriffhall P&R and Edinburgh Royal Infirmary.

### Geomorphology

5.9.9 The EOBP study corridor is located within the Lowland River Valley (North Esk) Landscape Character, Coastal Margins (Musselburgh/ Prestonpans Fringe) and Urban Area Types of the Lothian Landscape Character Assessment (LCA). The lowland river valley landform consists of an undulating arable farmland landscape, whilst the area south of Musselburgh is described as having an industrialised character exacerbated by 'prominent bings, coal mining infrastructure, warehouse development; disused railways and pylon lines'.

### Contaminated Land

5.9.10 It is expected that contaminated land may be present in the EOBP study corridor where there is made ground present. Former industries and activities present (i.e. mining, disused railway) within the study corridor may have produced, used and stored substances that are harmful to human health. However, further investigation will be required.

### Agricultural Land Classification

5.9.11 The majority of land use adjacent to the route is agricultural land mainly used for arable purposes. Land quality comprises of a mixture of the following: Class 2; and 3(1) (Macaulay Institute for Soil Research, 1986). Agricultural land designated as Class 3 (1) is defined as 'Land capable of producing a moderate range of crops'. Land designated as Class 1, 2 and 3(1) is considered to be prime agricultural land.

## Assessment

### Construction

5.9.12 Any available topsoil (upper 0.5m approximately) should be excavated, stored and reused for covering verges, earthworks slopes and landscaping wherever possible. Any excess topsoil arising from excavation should be transferred offsite, for re-use if of suitable quality.

5.9.13 Any excavation material could be reused for fill in earthworks and landscaping and surplus removed from the site. Any contaminated material that is discovered during construction will require to be analysed to determine the hazard, suitability of re-use and whether unusable deposits should be disposed of at a licensed site.

### Effects on Underlying Geology

5.9.14 The construction of the route options may involve the importation of soil to fill in parts of the disused railway line to surface level. Additionally, some cuttings may be required, although it is not known as this stage the extent or depth of the works.

### Operation

5.9.15 As Section 1.

## Appraisal

5.9.16 The option would require the construction of significant sections of Bus Rapid Transit route resulting in moderate to major adverse negative impacts during construction associated with groundbreaking work, and the potential removal of spoil. This issue would be temporary.

5.9.17 The predicted impacts are expected to be local but are dependent on the final design of the option and the materials chosen for construction. If mitigation measures in the form of best practice construction methods are utilised, the significance of any potential impact will be negative minor to moderate. No residual impacts are expected.

## Summary

5.9.18 No designated sites have been identified at this stage. The predicted effects are likely to be no impacts/negative minor impact and local, but further investigation will be required at the detailed design stage.

5.9.19 Since Section 9 is only applicable to Route C5, the above findings are only relevant to this option.

# 6 BIODIVERSITY

## 6.1 Section 1

### Scoping

6.1.1 This section deals with the potential ecological impacts associated with the route options for the EOBP.

6.1.2 This ecological appraisal is based on the Scottish Transport Appraisal Guidance (STAG) for conducting Stage 2 environmental assessments. It must be noted that this appraisal is solely based on a thorough desk-based study and consultation with relevant nature conservation groups. Information regarding species status and key environmental schemes and designations of relevance to the site was gained through consulting the Edinburgh Biodiversity Action Plan 2004 - 2009 (LBAP)[9], the UK BAP[10], Finalised Edinburgh Local Plan (March 2007)[11], Edinburgh Rural West Local Plan (June 2006)[12], Finalised Midlothian Local Plan Deposit version (May 2006)[13], East Lothian Local Plan (October 2008)[14], the Scottish Natural Heritage (SNH) Sitelink website[15] and the Forestry Commission Land Information Search website[16]. Sites deemed of relevance were those within 2km of the site boundaries for statutory designated sites, and within 1km for non-statutory sites and features. The National Biodiversity Network (NBN) Gateway website[17] was consulted to provide baseline information on protected species records close to the site areas.

6.1.3 It must be noted that no site visits by ecologists were undertaken as part of the site assessment procedure. If the development moves to a further stage of assessment, survey of the chosen route by an ecologist will be necessary to verify the presence of species of nature conservation importance such as protected species or invasive species prior to development.

### Baseline

6.1.4 The baseline conditions within the EOBP study corridor for the section between Newbridge and Gogar are presented below.

6.1.5 There are no statutory designated sites within 2km of this section of the EOBP. However, the Firth of Forth is located approximately 5 km to the north of the EOBP study corridor. The Firth of Forth is designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site due to its species rich coastal habitat and wintering waterfowl population. The Gogar Burn lies within the EOBP study corridor which links to the River Almond, which enters the Firth of Forth at Cramond.

[9] City of Edinburgh Council, November 2004, http://www.edinburgh.gov.uk/CEC/City_Development/Environment/Biodiversity_Action_Plan/biocontent2.html
[10] UK Biodiversity Action Plan: http://www.ukbap.org.uk/
[11] City of Edinburgh Council, March 2007, Finalised Edinburgh Local Plan
[12] City of Edinburgh Council, June 2006, Adopted Edinburgh Rural West Local Plan (including alteration October 2008)
[13] Midlothian Council, May 2006, Finalised Midlothian Local Plan Deposit version
[14] East Lothian Council, October 2008, Adopted East Lothian Local Plan
[15] Scottish Natural Heritage Sitelink website: http://www.snh.org.uk/snhi
[16] Forestry Commission GLADE mapping tool available at: http://www.forestry.gov.uk/forestry/infd-5ztnkv
[17] National Biodiversity Network Gateway: http://data.nbn.org.uk/

6.1.6 In terms of non-statutory sites of importance, there is an area of woodland classified within the Inventory of Ancient, Long-Established and Semi-Natural Woodlands located at Gogar (Grid reference NT 162 721). The Rural West Edinburgh Local Plan safeguards Gogarburn as a Local Authority designated Site of Importance for Nature Conservation (SINC) located at NT 164 472.

6.1.7 A search on the National Biodiversity Network (NBN) database showed that BAP species great crested newt and common toad are located within the EOBP study corridor at Ratho Station.

## Assessment

6.1.8 The impacts of section 1 of the EOBP study corridor are likely to be minimal due to the majority of the infrastructure required by this scheme being in place already. The provision of extended bus lanes and bus lay-bys will however have associated ecological impacts as follows.

6.1.9 The main impacts of this section of the EOBP study corridor would be associated with the ancient woodland at Gogar and the SINC at Gogarburn.

6.1.10 The loss of any mature trees may remove bat roosting potential within the area which would have a negative impact on the local bat population. Bat surveys would be required if any trees with bat roost potential were required to be felled during the construction phase. Mitigation measures would also be required to be put in place to identify alternative roost sites and possibly provide replacement roosting boxes if necessary. In the long-term, bats would be expected to relocate their roost sites to other suitable areas.

6.1.11 The removal of trees or scrub within this section of the proposed development as a result of widening of the road and provision of bus lay-bys will result in the loss of breeding bird habitat during the construction phase.

6.1.12 From desk-top research it appears that there is suitable badger sett and foraging habitat located at Gogar Golf Course. Further survey is essential to confirm the presence or absence of badgers along this route. Records from Scottish Badgers should be sought as part of further assessment procedures. Badger survey of the route would also inform mitigation options should there be any risk of impact upon this species.

6.1.13 There is potential for impacts on Gogarburn (which has been classed as a SINC by the Local Authority) during both the construction and operation stages as this section of the EOBP study corridor runs over Gogarburn which flows into the River Almond which flows into the Forth Estuary.

6.1.14 Although unconfirmed to date, there is the possibility that Japanese knotweed or giant hogweed could be spread throughout the site and surrounding area during construction and operation stages. This would breach legislation and incur a prosecution. If found on site, these plants will be subject to a specific eradication/management programme before works can commence.

## Appraisal

6.1.15 The appraisal examines section 1 of the EOBP study corridor between Newbridge and Ingliston. Without up-to-date survey information yielded from an ecological walkover survey, it

is only possible to appraise the options using the "precautionary principle", i.e. appraise the options as though the species would be affected, until proven otherwise.

6.1.16 The impact of any loss of habitat on breeding birds would be permanent direct negative and the magnitude is expected .to be negative minor as it is unlikely a large quantity of vegetation will be lost through this section of the route. Significance is assessed as being minor negative impact.

6.1.17 If structures supporting bat roosts are to be removed, this would have a short-term direct negative impact on the species involved. The magnitude of the impact would be expected to be negative moderate. Significance is assessed as being moderate negative impact.

6.1.18 If badgers were discovered in the EOBP study corridor, the construction of bus lay-bys and extended bus lanes would have a long-term direct negative impact. If good site management and any necessary mitigation is employed the magnitude of the impact is taken to be neutral. Significance is assessed as being "no impact".

6.1.19 The impact of the loss of habitat – especially riparian habitat along edges of Gogar Inventory Ancient Woodland site – along the route line would be permanent direct negative and the magnitude is expected to be negative moderate. Wherever possible, the removal of habitat/vegetation should be minimised and new native woodland/scrub species should be planted to complement any existing nature conservation interest. New planting would have a positive permanent, medium-term, direct impact of positive minor magnitude. Taken together, the significance of habitat loss on this road-side site and subsequent gains through landscape planting is assessed as negative moderate. It must be noted that loss of any ancient woodland will not be ameliorated by new planting – such loss should be avoided where possible. Ecological survey would quantify any loss involving ancient woodland.

6.1.20 The impact of spread of Japanese knotweed or giant hogweed would be permanent direct negative and the magnitude anticipated to be negative moderate although it is expected that through good site management and species eradication, the risk of negative impacts occurring would be removed. Consequently the eradication of these invasive plant species (if found on site) would have a positive permanent, long-term, direct impact of positive minor magnitude. Significance is assessed as being minor benefit.

**Caveat**

6.1.21 The impact of the options on protected species is only indicative and is not reliably quantifiable at this time. An ecological walkover survey will be required during further assessment procedures to fully assess the likely impacts and their significance based on field evidence.

## Summary

6.1.22 The most likely impact of this section of the EOBP study corridor on the ecological and nature conservation resources along the route are: the loss of areas of scrub and grassland habitat which have developed on site or adjacent to the site and will require clearing as part of the development works; loss of bat roosts within trees and structures to be demolished; the potential for pollutants entering sensitive and protected watercourses during both construction and operation stages; and the potential spread of invasive plant species.

6.1.23 There is the potential for significant impacts on protected species, such as bats and to a lesser extent badgers, otters and water voles and legal implications pertaining to invasive plant species for this section. However, the likelihood and significance of impacts will not be known until detailed ecological field surveys are carried out on site. Surveys of protected species, including detailed inspection of any structures and trees to be demolished should be conducted at an appropriate time of year to allow the results to be incorporated into the proposals.

6.1.24 Since Section 1 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 6.2 Section 2

### Scoping

6.2.1 This section deals with the potential ecological impacts associated with the section 2 of the EOBP study corridor between Gogar - Hermiston - A720 Edinburgh City Bypass at A70/Water of Leith.

6.2.2 The ecological appraisal is based on the Scottish Transport Appraisal Guidance (STAG) for conducting Stage 2 environmental assessments. It must be noted that this appraisal is solely based on a thorough desk-based study and consultation with relevant nature conservation groups. Information regarding species status and key environmental schemes and designations of relevance to the site was gained through consulting the Local Biodiversity Action Plan (LBAP), the UK BAP, Edinburgh Area Local Plan, the Scottish Natural Heritage (SNH) Sitelink website and the Forestry Commission Land Information Search website. Sites deemed of relevance were those within 2km of the site boundaries for statutory designated sites, and within 1 km for non-statutory sites and features. The National Biodiversity Network (NBN) Gateway website was consulted to provide baseline information on protected species records close to the EOBP study corridor.

6.2.3 A brief site visit was carried out to the proposed EOBP study corridor. However, no detailed surveys were carried out. If the development moves to a further stage of assessment, survey of the chosen route by an ecologist will be necessary to verify the presence of species of nature conservation importance such as protected species or invasive species prior to development.

### Baseline

6.2.4 The baseline conditions of section 2 of the EOBP study corridor are presented below.

6.2.5 There are no statutory designated sites within 2km of this section of the EOBP study corridor. However, the Firth of Forth is located approximately 5 km to the north of the EOBP study corridor. The Firth of Forth is designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site due to its species rich coastal habitat and wintering waterfowl population. The Gogar Burn lies within the EOBP study corridor which links to the River Almond, which enters the Firth of Forth at Cramond.

6.2.6 In terms of non-statutory sites of importance, there are two areas of woodland classified within the Inventory of Ancient, Long-Established and Semi-Natural Woodlands located at Milburn

tower (Grid reference NT 171 718) and at Barnton Mains Golf Course (Grid reference NT 192 691). The Rural West Edinburgh Local Plan safeguards Gogarburn as a Local Authority designated Site of Importance for Nature Conservation (SINC) located at NT 164 472. The Union Canal also lies within the development boundary and is also classed as a SINC. The Union Canal is one of Edinburgh's most important wildlife corridors. It is an important link to woodland, species rich grasslands and other watercourses. The entire stretch of the Union Canal receives protection from development in relevant local plans.

6.2.7 The following Edinburgh Biodiversity Action Plan species can be found along the Union Canal: water vole, hedgehog, brown hare, otter, badger, weasel, water shrew, Daubenton's bat, pipistrelle bat, sparrowhawk, skylark, kingfisher, swift, linnet, reed bunting, spotted flycatcher, tree sparrow, grey partridge, great crested grebe, bullfinch, song thrush, common toad, brown trout and large red damselfly.

6.2.8 Although unconfirmed to date, there is the possibility that Japanese knotweed or giant hogweed could be spread throughout the site and surrounding areas during construction and operation stages. This would breach legislation and incur a prosecution. If found on site, these plants will be subject to a specific eradication/management programme before works can commence.

## Assessment

6.2.9 The impacts of section 2 of the EOBP study corridor are likely to be minimal due to the majority of the infrastructure required by this scheme being in place already. The provision of extended bus lanes and bus lay-bys will however have associated ecological impacts as follows.

6.2.10 The main impacts of section 2 of the EOBP study corridor will be potential negative impacts on the Gogarburn and the Union Canal. Both of these watercourses are classified as SINCs by the Local Authority.

6.2.11 The removal of trees or scrub along the roadside to allow widening of the road and provision of bus lay-bys will result in the loss of breeding bird habitat during the construction phase.

6.2.12 Any mature trees to be demolished may provide suitable roost sites for bats. Any proposals requiring removal or disturbance to such trees may have negative impacts on any resident bat populations. Bat surveys would be required for any mature trees earmarked for demolition, and mitigation measures put in place to identify alternative roost sites and possibly provide replacement roosting boxes if necessary. In the long-term, bats would be expected to relocate their roost sites to other suitable areas.

6.2.13 From desk-based research it appears there is suitable badger sett and foraging habitat in close proximity to this section of the EOBP study corridor. Further survey is essential to confirm the presence or absence of badgers along the route. Records from Scottish Badgers should be sought as part of further assessment procedures. Badger survey of the route would also inform mitigation options should there be any risk of impact upon this species.

## Appraisal

6.2.14 The appraisal examines section 2 of the EOBP study corridor between Gogar and A720 Edinburgh City Bypass at A70 (Water of Leith). Without up-to-date survey information yielded

from an ecological walkover survey, it is only possible to appraise the options using the "precautionary principle", i.e. appraise the options as though the species would be affected, until proven otherwise.

6.2.15 The impact of any loss of habitat on breeding birds would be permanent direct negative and the magnitude is expected to be negative minor as there it is unlikely a large quantity of vegetation will be lost through this section of the EOBP study corridor. Significance is assessed as being minor negative impact.

6.2.16 If structures supporting bat roosts are to be removed, this would have a short-term direct negative impact on the species involved. The magnitude of the impact would be expected to be negative moderate.

6.2.17 If badgers are discovered in the EOBP study corridor, the construction of bus lay-bys and extended bus lanes would have a long-term direct negative impact. If good site management and any necessary mitigation is employed the magnitude of the impact is taken to be neutral. Significance is assessed as being "no impact".

6.2.18 There is likely to be a temporary, indirect negative effect on aquatic species within the Union Canal and Gogarburn and the magnitude of the effect is considered to be negative slight. There is also the potential for engineering works, such as bridges, bank reinforcement, sediment management and discarded construction waste e.g. plastics and pollution incidents to affect the quality of these watercourses and injure animal life in the water such as otters. The impact would be temporary, short-term, direct negative, although it is expected that good site management and mitigation (involving adherence to SEPA pollution prevention guidance notes (PPGs) and the Water Environment (Controlled Activities)(Scotland) Regulations 2005) would minimise the risk of this occurring, and consequently the magnitude of the impact is considered to be negative minor. Significance is assessed as being minor negative impact.

6.2.19 The impact of the loss of habitat along the route line would be permanent direct negative and the magnitude is expected to be negative moderate. Wherever possible, the removal of habitat/vegetation should be minimised and new native woodland/scrub species should be planted to compliment any existing nature conservation interest. New planting would have a positive permanent, medium-term, direct impact of positive minor magnitude. Taken together, the significance of any habitat loss and subsequent gains through landscape planting is assessed as negative moderate.

6.2.20 The impact of the spread of Japanese knotweed or giant hogweed would be permanent direct negative and the magnitude anticipated to be negative moderate although it is expected that through good site management and species eradication, the risk of negative impacts occurring would be removed. Consequently the eradication of these invasive plant species (if found on site) would have a positive permanent, long-term, direct impact of positive minor magnitude. Significance is assessed as being minor benefit.

## Summary

6.2.21 The most likely impact of this section of the EOBP study corridor on the ecological and nature conservation resources along the route are: the loss of areas of scrub and grassland habitat which have developed on site or adjacent to the site and will require clearing as part of the development works; loss of bat roosts within trees and structures to be demolished; the

potential for pollutants entering sensitive and protected watercourses during both construction and operation stages; and the potential spread of invasive plant species.

6.2.22 There is the potential for significant impacts on protected species, such as bats and to a lesser extent badgers, otters and water voles and legal implications pertaining to invasive plant species for this section. However, the likelihood and significance of impacts will not be known until detailed ecological field surveys are carried out on site. Surveys of protected species, including detailed inspection of any structures and trees to be demolished should be conducted at an appropriate time of year to allow the results to be incorporated into the proposals.

6.2.23 Since Section 2 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 6.3 Section 3

### Scoping

6.3.1 This section deals with the potential ecological impacts associated with the route options for the Edinburgh Orbital Bus Rapid Transport Study scheme Baseline. The key ecological features of this site are Craiglockhart Hill SSSI, Inventory of Ancient, Long-established woodland sites and a Local Nature Conservation Site.

6.3.2 The ecological appraisal is based on the Scottish Transport Appraisal Guidance (STAG) for conduction Stage 2 environmental assessments. It must be noted that this appraisal is solely based on a thorough desk-based study and consultation with relevant nature conservation groups. Information regarding species status and key environmental schemes and designations of relevance to the site was gained through consulting the Local Biodiversity Action Plan (LBAP), The UK BAP, Area Local Plan, the Scottish Natural Heritage (SNH) Sitelink website and the Forestry Commission Land Information Search website. Sites deemed of relevance were those within 2km of the site boundaries for statutory designated sites, and within 1km for non-statutory sites and features. The National Biodiversity Network (NBN) Gateway website was consulted to provide baseline information on protected species records close to the site.

### Baseline

6.3.3 The baseline conditions within the EOBP study corridor for the section between the A70/Water of Leith and the Lothianburn Park and Ride are presented below.

6.3.4 Craiglockhart Hill is designated as a SSSI for its species rich grassland which includes both acid and calcareous grassland. This site is approximately 1.9 km north of the proposed route. The Firth of Forth is located approximately 5km to the north of the EOBP study corridor. The Firth of Forth is designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site due to its species rich coastal habitat and wintering waterfowl population. The Water of Leith lies within the EOBP study corridor which flows into the Firth of Forth at the Port of Leith.

6.3.5 In terms of non-statutory sites of importance, there is an area of a woodland, classified within the Inventory of Ancient, Long-established and Semi-Natural Woodlands located on the north

side of the A720 Edinburgh City Bypass at Dreghorn (Grid Reference NT221 680) and another area located on the south side of the A720 Edinburgh City Bypass at White Hill Plantation (Grid Reference NT 216 678). The Edinburgh Local Plan safeguards the Water of Leith as a Local Nature Conservation Site (LNCS) and there is an area identified as a Greenbelt and an Area of Great Landscape Value along the southern stretch of the A720 Edinburgh City Bypass. There is also a Designated Conservation Area at Swanston.

## Assessment

6.3.6 The impacts of section 3 of the EOBP study corridor are likely to be minimal due to the majority of the infrastructure required by this scheme being in place already. The provision of extended bus lanes and bus lay-bys will however have associated ecological impacts as follows.

6.3.7 The main impacts of this section of the EOBP study corridor would be associated with the Ancient Woodland at Dreghorn and White Hill Plantation, the potential impacts on The Water of Leith, and the impingement of the development on the Greenbelt area and Area of Great Landscape value located along the southern side of the A720 Edinburgh City Bypass.

6.3.8 The loss of any mature trees may remove bat roosting potential within the area which would have a negative impact on the local bat population. Bat surveys would be required if any trees with bat roost potential were required to be felled during the construction phase. Mitigation measures would also be required to be put in place to identify alternative roost sites and possibly provide replacement roosting boxes if necessary. In the long-term, bats would be expected to relocate their roost sites to other suitable areas.

6.3.9 The removal of trees or scrub within this section of the proposed development as a result of widening of the road and provision of bus lay-bys will result in the loss of breeding bird habitat during the construction phase.

6.3.10 From desk-top research it appears that there is suitable badger sett and foraging habitat located at woodland surrounding Dreghorn Barracks and at White Hill Plantation. Further survey is essential to confirm the presence or absence of badgers along this route. Records from Scottish Badgers should be sought as part of further assessment procedures. Badger survey of the route would also inform mitigation options should there be any risk of impact upon this species.

6.3.11 There is potential for impacts on the Water of Leith (which is classed as a Local Nature Conservation Site in the Edinburgh Local Plan) during both the construction and operation stages as this section of the EOBP study corridor runs over the Water of Leith which flows into the Firth of Forth.

6.3.12 Although unconfirmed to date, there is the possibility that Japanese knotweed or giant hogweed could be spread throughout the site and surrounding area during construction and operation stages. This would breach legislation and incur a prosecution. If found on site, these plants will be subject to a specific eradication/management programme before works can commence.

## Appraisal

6.3.13 The appraisal examines section 3 of the EOBP study corridor between A720 Edinburgh City Bypass at A70/Water of Leith to Lothianburn Park and Ride. Without up-to-date survey information yielded from an ecological walkover survey, it is only possible to appraise the options using the "precautionary principle", i.e. appraise the options as though the species would be affected, until proven otherwise.

6.3.14 The impact of any loss of habitat on breeding birds would be permanent direct negative and the magnitude is expected to be negative minor as there it is unlikely a large quantity of vegetation will be lost through this section of the EOBP study corridor. Significance is assessed as being minor negative impact.

6.3.15 If structures supporting bat roosts are to be removed, this would have a short-term direct negative impact on the species involved. The magnitude of the impact would be expected to be negative moderate.

6.3.16 If badgers are discovered in the EOBP study corridor, the construction of bus lay-bys and extended bus lanes would have a long-term direct negative impact. If good site management and any necessary mitigation is employed the magnitude of the impact is taken to be neutral. Significance is assessed as being "no impact".

6.3.17 There is likely to be a temporary, indirect negative effect on aquatic species within the Water of Leith and the magnitude of the effect is considered to be negative slight. There is also the potential for engineering works, such as bridges, bank reinforcement, sediment management and discarded construction waste e.g. plastics and pollution incidents to affect the quality of these watercourses and injure animal life in the water such as otters. The impact would be temporary, short-term, direct negative, although it is expected that good site management and mitigation (involving adherence to SEPA pollution prevention guidance notes (PPGs) and the Water Environment (Controlled Activities)(Scotland) Regulations 2005) would minimise the risk of this occurring, and consequently the magnitude of the impact is considered to be negative minor. Significance is assessed as being minor negative impact.

6.3.18 The impact of the loss of habitat at the edges of the Inventory Ancient Woodland site at Dreghorn along the route line would be permanent direct negative and the magnitude is expected to be negative moderate. Wherever possible, the removal of habitat/vegetation should be minimised and new native woodland/scrub species should be planted to complement any existing nature conservation interest. New planting would have a positive permanent, medium-term, direct impact of positive minor magnitude. Taken together, the significance of habitat loss on this road-side site and subsequent gains through landscape planting is assessed as negative moderate. It must be noted that loss of any ancient woodland will not be ameliorated by new planting – such loss should be avoided where possible. Ecological survey would quantify any loss involving ancient woodland.

6.3.19 There will be no effect on the Craigmillar SSSI given the distance of this designated area from the proposed route.

6.3.20 The impact of the spread of Japanese knotweed or giant hogweed would be permanent direct negative and the magnitude anticipated to be negative moderate although it is expected that through good site management and species eradication, the risk of negative impacts occurring

would be removed. Consequently the eradication of these invasive plant species (if found on site) would have a positive permanent, long-term, direct impact of positive minor magnitude. Significance is assessed as being minor benefit.

### Summary

6.3.21 The most likely impacts of this section of the EOBP study corridor on the ecological and nature conservation resources along the route are: the loss of areas of scrub and grassland habitat which have developed on site or adjacent to the site and will require clearing as part of the development works; loss of bat roosts within trees and structures to be demolished; the potential for pollutants entering sensitive and protected watercourses during both construction and operation stages; and the potential spread of invasive plant species.

6.3.22 There is the potential for significant impacts on protected species, such as bats and to a lesser extent badgers, otters and water voles, and legal implications pertaining to invasive plant species for each route. However the likelihood and significance of impacts will not be known until detailed ecological field surveys are carried out on site. Surveys of protected species, including detailed inspection of any structures and trees to be demolished should be conducted at an appropriate tine of year to allow the results to be incorporated into the proposals.

6.3.23 Since Section 3 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 6.4 Section 4

### Scoping

6.4.1 The baseline conditions within the EOBP study corridor for section 4 between Lothianburn Park and Ride and Straiton Park and Ride are presented below.

6.4.2 This ecological appraisal is based on the Scottish Transport Appraisal Guidance (STAG) for conducting Stage 2 environmental assessments. It must be noted that this appraisal is solely based on a thorough desk-based study and consultation with relevant nature conservation groups. Information regarding species status and key environmental schemes and designations of relevance to the site was gained through consulting the Edinburgh Biodiversity Action Plan 2004-2009 (LBAP), the UK BAP, Finalised Edinburgh Local Plan (March 2007), Edinburgh Rural West Local Plan (June, 2006), Finalised Midlothian Local Plan Deposit version (May 2006), East Lothian Local Plan (October 2008), the Scottish Natural Heritage (SNH) Sitelink website and the Forestry Commission Land Information Search website. Sites deemed of relevance were those within 2km of the site boundaries for statutory designated sites, and within 1km for non-statutory sites and features. The National Biodiversity Network (NBN) Gateway website was consulted to provide baseline information on protected species records close to the EOBP study corridor.

6.4.3 It must be noted that no site visits by ecologists were undertaken as part of the site assessment procedure. If the development moves to a further stage of assessment, survey of the chosen route by an ecologist will be necessary to verify the presence of species of nature conservation importance such as protected species or invasive species prior to development.

## Baseline

6.4.4 The baseline conditions within the EOBP study corridor for the section between Lothianburn Park and Ride and Straiton Park and Ride are presented below.

6.4.5 There are no statutory designated sites within 2km of this section of the EOBP study corridor.

6.4.6 In terms of non-statutory sites of importance, there are several areas of woodland classified within the Inventory of Ancient, Long-established and Semi-Natural Woodlands located at Boghall Plantation, White Hill Plantation and two other unnamed sites at grid reference NT 264 672 and NT 257 681.

6.4.7 There are two burns that cross the A720 Edinburgh City Bypass which are the Swanston Burn and the Burdiehouse Burn. The Burdiehouse Burn is classified as a Local Nature Conservation Site, which runs through a Local Nature Reserve as shown on the Edinburgh City Local Plan.

## Assessment

6.4.8 The impacts of section 4 of the EOBP study corridor are likely to be minimal due to the majority of the infrastructure required by this scheme being in place already. The provision of extended bus lanes and bus lay-bys will however have associated ecological impacts as follows.

6.4.9 The main impacts of this section of the EOBP study corridor would be associated with the watercourses that run under the development area.

6.4.10 In addition, the loss of any mature trees may remove bat roosting potential within the area which would have a negative impact on the local bat population. Bat surveys would be required if any trees with bat roost potential were required to be felled during the construction phase. Mitigation measures would also be required to be felled during the construction phase. Mitigation measures would also be required to be put in place to identify alternative roost sites and possibly provide replacement roosting boxes if necessary. In the long-term, bats would be expected to relocate their sites to other suitable areas.

6.4.11 The removal of trees or scrub within this section of the proposed development as a result of widening of the road and provision of bus lay-bys will; result in the loss of breeding bird habitat during the construction phase.

6.4.12 From desk-top research it appears that there is suitable badger sett and foraging habitat located alongside to the proposed route of the EOBP study corridor. Further survey is essential to confirm the presence or absence of badgers along this route. Records from Scottish Badgers should be sought as part of further assessment procedures. Badger survey of the route would also inform mitigation options should there be any risk of impact upon this species.

6.4.13 There is potential for impacts on the Burdiehouse Burn and the Swanston Burn that run under the proposed development area.

6.4.14 Although unconfirmed to date, there is the possibility that Japanese knotweed or giant hogweed could be spread throughout the site and surrounding area during construction and operation stages. This would breach legislation and incur a prosecution. If found on site, these

plants will be subject to a specific eradication/management programme before works can commence.

## Appraisal

6.4.15 The appraisal examines section 4 of the EOBP study corridor between Lothianburn Park and Ride and Straiton Park and Ride. Without up-to-date survey information yielded from an ecological walkover survey, it is only possible to appraise the options using the "precautionary principle", i.e. appraise the options as though the species would be affected, until proven otherwise.

6.4.16 The impact of any loss of habitat on breeding birds would be permanent direct negative and the magnitude is expected to be negative minor as there it is unlikely a large quantity of vegetation will be lost through this section of the EOBP study corridor. Significance is assessed as being minor negative impact.

6.4.17 If structures supporting bat roosts are to be removed, this would have a short-term direct negative impact on the species involved. The magnitude of the impact would be expected to be negative moderate.

6.4.18 If badgers are discovered in the EOBP study corridor, the construction of bus lay-bys and extended bus lanes would have a long-term direct negative impact. If good site management and any necessary mitigation is employed the magnitude of the impact is taken to be neutral. Significance is assessed as being "no impact".

6.4.19 There is likely to be a temporary, indirect negative effect on aquatic species within Burdiehouse Burn and Swanston Burn and the magnitude of the effect is considered to be negative slight. There is also the potential for engineering works, such as bridges, bank reinforcement, sediment management and discarded construction waste e.g. plastics and pollution incidents to affect the quality of these watercourses and injure animal life in the water such as otters. The impact would be temporary, short-term, direct negative, although it is expected that good site management and mitigation (involving adherence to SEPA pollution prevention guidance notes (PPGs) and the Water Environment (Controlled Activities) (Scotland) Regulations 2005) would minimise the risk of this occurring, and consequently the magnitude of the impact is considered to be negative minor. Significance is assessed as being minor negative impact.

6.4.20 The impact of the loss of habitat along the route line would be permanent direct negative and the magnitude is expected to be negative moderate. Wherever possible, the removal of habitat/vegetation should be minimised and where possible, new native woodland/scrub species should be planted to compliment any existing nature conservation interest. New planting would have a positive permanent, medium-term, direct impact of positive minor magnitude. Taken together, the significance of habitat loss on this road-side site and subsequent gains through landscape planting is assessed as moderate negative.

6.4.21 The impact of the spread of Japanese knotweed or giant hogweed would be permanent direct negative and the magnitude anticipated to be negative moderate although it is expected that through good site management and species eradication, the risk of negative impacts occurring would be removed. Consequently the eradication of these invasive plant species (if found on site) would have a positive permanent, long-term, direct impact of positive minor magnitude. Significance is assessed as being minor benefit.

### Summary

6.4.22 The most likely impacts of this section of the EOBP study corridor on the ecological and nature conservation resources along the route are: the loss of areas of scrub and grassland habitat which have developed on site or adjacent to the site and will require clearing as part of the development works; loss of bat roosts within trees and structures to be demolished; the potential for pollutants entering sensitive and protected watercourses during both construction and operation stages; and the potential spread of invasive plant species.

6.4.23 There is potential for significant impacts on protected species, such as bats and to a lesser extent badgers, otters and water voles, and legal implications pertaining to invasive plant species for each route. However, the likelihood and significance of impacts will not be known until detailed ecological field surveys are carried out on site. Surveys of protected species, including detailed inspection of any structures and trees to be demolished should be conducted at an appropriate time of year to allow the results to be incorporated into the proposals.

6.4.24 Those options which have Section 4h rather than Section 4, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 4 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 6.5 Section 5

### Scoping

6.5.1 This section deals with the potential ecological impacts associated with the route options for the EOBP.

6.5.2 The ecological appraisal is based on the Scottish Transport Appraisal Guidance (STAG) for conducting Stage2 environmental assessments. It must be noted that this appraisal is solely based on a thorough desk-based study and consultation with relevant nature conservation groups. Information regarding species status and key environmental schemes and designations of relevance to the site was gained through consulting the Edinburgh Action Plan 2004-2009 (LBAP), the UK BAP, Finalised Edinburgh Local Plan (March 2007) Edinburgh Rural West Local Plan (June 2006), Finalised Midlothian Local Plan Deposit version (May 2006), East Lothian Local Plan (October 2008), the Scottish Natural Heritage (SNH) Sitelink website and the Forestry Commission Land Information Search website. Sites deemed of relevance were those within 2k of the site boundaries for statutory designated sites, and within 1km for non-statutory sites and features. The National Biodiversity Network (NBN) Gateway website was consulted to provide baseline information on protected species records close to the site areas.

### Baseline

6.5.3 The baseline conditions within the EOBP study corridor for the section between Straiton Park and Ride and the A720 Edinburgh City Bypass underpass.

6.5.4 Bilston Burn which is designated a SSSI is located is located approximately 2km south of the proposed development area. This site is designated because of its mixed deciduous woodland

that contains a mix of ash, oak and elm with a ground flora characteristic of ancient woodland. Ancient woodland is scarce and declining in the Lothian area and Bilston Glen is one of the few remaining examples in Midlothian (SNH websites).

6.5.5 In terms of non-statutory sites of importance, the Edinburgh Local Plan safeguards Burdiehouse Burn Valley Park is a Local Nature Reserve and a Local Nature Conservation Site. (Grid reference NT 275674). Straiton Pond is also a Local Nature Reserve and is located alongside the proposed development area at NT 282668.

6.5.6 No site visit has been carried. It is unknown whether there are any invasive plant species. Under the Wildlife and Countryside Act 1981 section 14 (as amended by the Nature Conservation (Scotland) Act 2004) it is an offence to plant or otherwise cause species listed in Schedule 9 (Part II) to grow in the wild. Species listed within Schedule 9 (Part II) of the 1981 Act include Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum manteggazzianum*). Both of these plant species carry with them the ability to undermine built structures and health risks respectively and both grow in industrial and urban environments akin to the EOBP study corridor. An ecological walkover survey would confirm presence or absence of these species.

## Assessment

6.5.7 The main impacts of section 5 of the EOBP study corridor will arise due to the requirement of the construction of a new section of road to be built. The provision of extended bus lanes and bus lay-bys will also have associated ecological impacts as follows.

6.5.8 The main impacts of this section of the EOBP study corridor will be associated with the Local Nature Reserve at Straiton Pond.

6.5.9 The loss of any mature trees may remove bat roosting potential within the area which would have a negative impact on the local bat population. Bat surveys would be required if any trees with bat roost potential were required to be felled during the construction phase. Mitigation measures would also be required to be put in place to identify alternative roost sites and possibly provide replacement roosting boxes if necessary. In the long-term, bats would be expected to relocate their roost sites to other suitable areas.

6.5.10 The removal of trees or scrub within this section of the proposed development as a result of widening of the road and provision of bus lay-bys will result in the loss of breeding bird habitat during the construction phase.

6.5.11 From desk-top research it appears that there is suitable badger sett and foraging habitat located surrounding the proposed development route. Further survey is essential to confirm the presence or absence of badgers along this route. Records from Scottish Badgers should be sought as part of further assessment procedures. Badger survey of the route would also inform mitigation options should there be any risk of impact upon this species.

6.5.12 Although unconfirmed to date, there is the possibility that Japanese knotweed or giant hogweed could be spread throughout the site and surrounding area during the construction and operation stages. This would breach legislation and incur a prosecution. If found on site, these plants will be subject to a specific eradication/management programme before works can commence.

## Appraisal

6.5.13 The appraisal examines section 5 of the EOBP study corridor between Straiton Park and Ride and the A720 Edinburgh City Bypass underpass. Without up-to-date survey information yielded from an ecological walkover survey, it is only possible to appraise the options using the "precautionary principle", i.e. appraise the options as though the species would be affected, until proven otherwise.

6.5.14 The impact of any loss of habitat on breeding birds would be permanent direct negative and the magnitude is expected to be negative minor as it is unlikely a large quantity of vegetation will be lost through this section of the route.

6.5.15 If structures supporting bat roosts are to be removed, this would have a short-term direct negative impact on the species involved. The magnitude of the impact would be expected to be negative moderate. Significance is assessed as being moderate negative impact.

6.5.16 If badgers were discovered in the EOBP study corridor, the construction of bus lay-bys and extended bus lanes would have a long-term direct negative impact. If good site management and any necessary mitigation is employed the magnitude of the impact is taken to be neutral. Significance is assessed as being "no impact".

6.5.17 The impact of the loss of habitat – especially the wetland areas at Straiton Pond – along the route would be permanent direct negative and the magnitude is expected to be negative moderate. Wherever possible, the removal of habitat/vegetation should be minimised and new native woodland/scrub species should be planted to complement any existing nature conservation interest. New planting would have a positive permanent, medium-term, direct impact of positive minor magnitude. If Straiton pond is to be lost as a result of the development a pond of equivalent biodiversity importance should be created nearby at a suitable location.

6.5.18 The impact of the spread of Japanese knotweed or giant hogweed would be permanent direct negative and the magnitude anticipated to be negative moderate although it is expected that through good site management and species eradication, the risk of negative impacts occurring would be removed. Consequently the eradication of these invasive plant species (if found on site) would have a positive permanent, long-term, direct impact of positive minor magnitude. Significance is assessed as being minor benefit.

## Summary

6.5.19 The most likely impacts of this section of the EOBP study corridor on the ecological and nature conservation resources along each route are: the loss of Straiton pond, the loss of areas of scrub and grassland habitat which have developed on site or adjacent to the site and will require clearing as part of the development works; loss of bat roosts within trees and structures to be demolished; the potential for pollutants entering sensitive and protected watercourses during both construction and operation stages, and the spread of invasive species.

6.5.20 There is the potential for significant impacts on protected species, such as bats and to a lesser extent badgers, otters and water voles, and legal implications pertaining to invasive plant species for each route. However, the likelihood and significance of impacts will not be known until detailed ecological field surveys are carried out on site. Surveys of protected species,

including detailed inspection of any structures and trees to be demolished should be conducted at an appropriate time of year to allow the results to be incorporated into the proposals.

6.5.21 Those options which have Section 5h rather than Section 5, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 5 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 6.6 Section 6

### Scoping

6.6.1 This section deals with the potential ecological impacts with the route options for the EOBP study corridor.

6.6.2 The ecological appraisal is based on the Scottish Transport Appraisal Guidance (STAG) for conducting Stage 2 environmental assessments. It must be noted that this appraisal is solely based on a thorough desk-based study and consultation with relevant nature conservation groups. Information regarding species status and key environmental schemes and designations of relevance to the site was gained through consulting the Edinburgh Biodiversity Action Plan 2004-2009 (LBAP), the UK BAP, Finalised Edinburgh Local Plan (March 2007), Finalised Midlothian Local Plan Deposit version (May 2006), East Lothian Local Plan (October 2008), the Scottish Natural Heritage (SNH) Sitelink website ad the Forestry Commission Land Information Search website. Sites deemed of relevance were those within 2km of the site boundaries for statutory designated sites and within 1km for non-statutory sites and features. The National Biodiversity Network (NBN) Gateway website was consulted to provide baseline information on protected species records close to the site areas.

### Baseline

6.6.3 The baseline conditions within the EOBP study corridor for the section between the A720 Edinburgh City Bypass underpass - Sheriffhall Park and Ride, and Edinburgh Royal Infirmary are presented below.

6.6.4 There are no statutory designated sites within 2km of this section of the EOBP study corridor.

6.6.5 In terms of non-statutory sites of importance, there are woodlands classified within the Inventory of Ancient, Long-Established and Semi-Natural Woodlands located at Drum Wood, Craigmillar and Edmonstone. Burdiehouse burn also runs through the development site and this site is classified as a Local Nature Conservation Site within the Edinburgh Local Plan.

### Assessment

6.6.6 The impacts of section 6 of the EOBP study corridor from the A720 Edinburgh City Bypass underpass to Edinburgh Royal Infirmary are likely to be minimal due to the majority of the infrastructure required by this scheme being in place already. However, the section from the A720 Edinburgh City Bypass underpass to Sheriffhall will require the construction of a new road and this will incur the risk of a greater environmental impact.

6.6.7 The main impacts of this section of the EOBP study corridor would be associated with the ancient woodland at Drum and on the Burdiehouse Burn that run through the proposed development area.

6.6.8 The loss of any mature trees may remove bat roosting potential within the area which would have a negative impact on the local bat population. Bat surveys would be required if any trees with bat roost potential were required to be felled during the construction phase. Mitigation measures would also be required to be put in place to identify alternative roost sites and possibly provide replacement roosting boxes if necessary. In the long-term, bats would be expected to relocate their roost site to other suitable areas.

6.6.9 The removal of trees or scrub within this section of the proposed development as a result of constructing new sections of road, widening of existing roads and provision of bus lay-bys will result in the loss of breeding bird habitat during the construction phase.

6.6.10 From desk-top research it appears that there is suitable badger sett and foraging habitat located in the surrounding area of the proposed development area. Further survey is essential to confirm the presence or absence of badgers along this route. Records from Scottish Badgers should be sought as part of further assessment procedures. Badger survey of the route would also inform mitigation options should there be any risk of impact upon this species.

6.6.11 There is potential for impacts on Burdiehouse burn (which has been classified as a LNC by the Local Authority) during both the construction and operation stages as this section of the EOBP study corridor runs over Burdiehouse Burn.

6.6.12 Although unconfirmed to date, there is the possibility that Japanese knotweed or giant hogweed could be spread throughout the site and surrounding area during construction ad operation stages. This would breach legislation and incur a prosecution. If found on site, these plants will be subject to a specific eradication/management programme before works can commence.

## Appraisal

6.6.13 The appraisal examines section 6 of the EOBP study corridor between A720 Edinburgh City Bypass Underpass - (Sheriffhall) – Edinburgh Royal Infirmary. Without up-to-date survey information yielded from an ecological walkover survey, it is only possible to appraise the options using the “precautionary principle”, i.e. appraise the options as though the species would be affected, until proven otherwise.

6.6.14 The impact of any loss of habitat on breeding birds would be permanent direct negative and the magnitude is expected to be negative minor as there it is unlikely a large quantity of vegetation will be lost through this section of the EOBP study corridor. Significance is assessed as being minor negative impact.

6.6.15 If structures supporting bat roosts are to be removed, this would have a short-term direct negative impact on the species involved. The magnitude of the impact would be expected to be negative moderate.

6.6.16 If badgers are discovered in the EOBP study corridor, the construction of bus lay-bys and extended bus lanes would have a long-term direct negative impact. If good site management

and any necessary mitigation is employed the magnitude of the impact is taken to be neutral. Significance is assessed as being "no impact".

6.6.17 The impact of the loss of habitat – especially loss of trees from the edges of Inventory Ancient Woodland site at Drum – along the route will be permanent direct negative and the magnitude is expected to be negative moderate. Wherever possible, the removal of habitat/vegetation should be minimised and where possible, new native woodland/scrub species should be planted to complement any existing nature conservation interest. New planting would have a positive permanent, medium-term, direct impact of positive minor magnitude. Taken together, the significance of habitat loss on this section and subsequent gains through landscape planting is assessed as moderate negative. It must be noted that loss of any ancient woodland will not be ameliorated by new planting and will involve a more significant impact – such loss would be avoided where possible. Ecological survey would quantify any loss involving ancient woodland.

6.6.18 The impact of the spread of Japanese knotweed or giant hogweed would be permanent direct negative and the magnitude anticipated to be negative moderate although it is expected that through good site management and species eradication, the risk of negative impacts occurring would be removed. Consequently the eradication of these invasive plant species (if found on site) would have a positive permanent, long-term, direct impact of positive minor magnitude. Significance is assessed as being minor benefit.

### Summary

6.6.19 The most likely impacts of this section of the EOBP study corridor on the ecological and nature conservation resources along the route are: the loss of areas of scrub and grassland habitat which have developed on site or adjacent to the site and will require clearing as part of the development works; loss of bat roosts within trees and structures to be demolished; the potential for pollutants entering sensitive and protected watercourses during both construction and operation stages; and the potential spread of invasive plant species.

6.6.20 There is the potential for significant impacts on protected species, such as bats and to a lesser extent badgers, otters and water voles, and legal implications pertaining to invasive plant species for each route. However the likelihood and significance of impacts will not be known until detailed ecological field surveys are carried out on site. Surveys of protected species, including detailed inspection of any structures and trees to be demolished should be conducted at an appropriate tine of year to allow the results to be incorporated into the proposals.

6.6.21 Those options which have Section 6h rather than Section 6, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 6 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 6.7 Section 7

### Scoping

6.7.1 This section deals with the potential ecological impacts with the route options for the EOBP scheme.

6.7.2 The ecological appraisal is based on the Scottish Transport Appraisal Guidance (STAG) for conducting Stage 2 environmental assessments. It must be noted that this appraisal is solely based on a thorough desk-based study and consultation with relevant nature conservation groups. Information regarding species status and key environmental schemes and designations of relevance to the site was gained through consulting the Edinburgh Biodiversity Action Plan 2004-2009 (LBAP), the UK BAP, Finalised Edinburgh Local Plan (March 2007), Finalised Midlothian Local Plan Deposit version (May 2006), East Lothian Local Plan (October 2008), the Scottish Natural Heritage (SNH) Sitelink website ad the Forestry Commission Land Information Search website. Sites deemed of relevance were those within 2km of the site boundaries for statutory designated sites and within 1km for non-statutory sites and features. The National Biodiversity Network (NBN) Gateway website was consulted to provide baseline information on protected species records close to the site areas.

## Baseline

6.7.3 The baseline conditions within the EOBP study corridor for the section between the Edinburgh Royal Infirmary and Queen Margaret University are presented below.

6.7.4 There is one statutory designated site within 2km of the route option study corridor. Arthur's Seat Volcano is designated a SSSI. The proposed route is approximately 1800 metres from the SSSI.

6.7.5 Arthur's Seat Volcano is designated a SSSI for it's geological, grassland and botanical interest. From an ecological aspect, the SSSI is important as it is largely composed of unimproved grassland. Depending on the underlying rock type the grassland can either be acid, neutral or calcareous. There are a mosaic of habitats which include sedge-rich marsh, gorse scrub and open water with associated aquatic plants. The SSSI is a rare example of lowland, unimproved grassland, a habitat that is rare and declining in the Lothians (SNH).

6.7.6 In terms of non-statutory sites of importance, there are three woodland areas within the Inventory of Ancient, Long-Established and Semi-Natural Woodland within close proximity to the scheme route. Drum Wood and Edmonstone Wood are south of the proposed route and Craigmillar is north of the proposed route.

6.7.7 The Burdiehouse Burn runs adjacent to the proposed route

6.7.8 The River Esk is located approximately 700 metres east of the end of the propose route.

6.7.9 No site visit has been carried out. It is unknown whether there are any invasive plant species. Under the Wildlife and Countryside Act 1981 section 14 (as amended by the Nature Conservation (Scotland) Act 2004) it is an offence to plant or otherwise cause species listed in Schedule 9 (Part II) to grow in the wild. Species listed within Schedule 9 (Part II) of the 1981 Act include Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzianum*). Both of these plant species carry with them the ability to undermine built structures and health risks respectively and both grow on industrial, urban habitats akin to the EOBP study corridor. An ecological walkover survey would confirm presence or absence of these species.

## Assessment

6.7.10 The main impacts of section 7 of the EOBP study corridor are likely to result from the requirement of the construction of new roads and the provision of extended bus lanes and bus lay-bys will however have associated ecological impacts as follows.

6.7.11 In addition, the loss of any mature trees may remove bat roosting potential within the area which would have a negative impact on the local bat population. Bat surveys would be required if any trees with bat roost potential were required to be felled during the construction phase. Mitigation measures would also be required to be felled during the construction phase. Mitigation measures would also be required to be put in place to identify alternative roost sites and possibly provide replacement roosting boxes if necessary. In the long-term, bats would be expected to relocate their sites to other suitable areas.

6.7.12 The removal of trees or scrub within this section of the proposed development as a result of widening of the road and provision of bus lay-bys will; result in the loss of breeding bird habitat during the construction phase.

6.7.13 From desk-top research it appears that there is suitable badger sett and foraging habitat located alongside to the proposed route of the EOBP. Further survey is essential to confirm the presence or absence of badgers along this route. Records from Scottish Badgers should be sought as part of further assessment procedures. Badger survey of the route would also inform mitigation options should there be any risk of impact upon this species.

6.7.14 Although unconfirmed to date, there is the possibility that Japanese knotweed or giant hogweed could be spread throughout the site and surrounding area during construction and operation stages. This would breach legislation and incur a prosecution. If found on site, these plants will be subject to a specific eradication/management programme before works can commence.

## Appraisal

6.7.15 The appraisal examines section 7 of the EOBP study corridor between Edinburgh Royal Infirmary and Queen Margaret University. Without up-to-date survey information yielded from an ecological walkover survey, it is only possible to appraise the options using the "precautionary principle", i.e. appraise the options as though the species would be affected, until proven otherwise.

6.7.16 The impact of any loss of habitat on breeding birds would be permanent direct negative and the magnitude is expected to be negative minor as there it is unlikely a large quantity of vegetation will be lost through this section of the EOBP study corridor. Significance is assessed as being minor negative impact.

6.7.17 If structures supporting bat roosts are to be removed, this would have a short-term direct negative impact on the species involved. The magnitude of the impact would be expected to be negative moderate.

6.7.18 If badgers were discovered in the EOBP study corridor, the construction of bus lay-bys and extended bus lanes would have a long-term direct negative impact. If good site management

and any necessary mitigation is employed the magnitude of the impact is taken to be neutral. Significance is assessed as being "no impact".

6.7.19 The impact of the loss of habitat along the route line would be permanent direct negative and the magnitude is expected to be negative moderate. Wherever possible, the removal of habitat/vegetation should be minimised and where possible, new native woodland/scrub species should be planted to compliment any existing nature conservation interest. New planting would have a positive permanent, medium-term, direct impact of positive minor magnitude. Taken together, the significance of habitat loss on this road-side site and subsequent gains through landscape planting is assessed as moderate negative.

6.7.20 The impact of the spread of Japanese knotweed or giant hogweed would be permanent direct negative and the magnitude anticipated to be negative moderate although it is expected that through good site management and species eradication, the risk of negative impacts occurring would be removed. Consequently the eradication of these invasive plant species (if found on site) would have a positive permanent, long-term, direct impact of positive minor magnitude. Significance is assessed as being minor benefit.

### Summary

6.7.21 The most likely impacts of this section of the EOBP study corridor on the ecological and nature conservation resources along the route are: the loss of areas of scrub and grassland habitat which have developed on site or adjacent to the site and will require clearing as part of the development works; loss of bat roosts within trees and structures to be demolished; the potential for pollutants entering sensitive and protected watercourses during both construction and operation stages; and the potential spread of invasive plant species.

6.7.22 There is potential for significant impacts on protected species, such as bats and to a lesser extent badgers, otters and water voles, and legal implications pertaining to invasive plant species for each route. However, the likelihood and significance of impacts will not be known until detailed ecological field surveys are carried out on site. Surveys of protected species, including detailed inspection of any structures and trees to be demolished should be conducted at an appropriate time of year to allow the results to be incorporated into the proposals.

6.7.23 Since Section 7 is only applicable to Route A5, the above findings are only relevant to this option.

## 6.8 Section 8

### Scoping

6.8.1 This section deals with the potential ecological impacts with the route options for the EOBP study corridor.

6.8.2 The ecological appraisal is based on the Scottish Transport Appraisal Guidance (STAG) for conducting Stage 2 environmental assessments. It must be noted that this appraisal is solely based on a thorough desk-based study and consultation with relevant nature conservation groups. Information regarding species status and key environmental schemes and designations of relevance to the site was gained through consulting the Edinburgh Biodiversity

Action Plan 2004-2009 (LBAP), the UK BAP, Finalised Edinburgh Local Plan (March 2007), Finalised Midlothian Local Plan Deposit version (May 2006), East Lothian Local Plan (October 2008), the Scottish Natural Heritage (SNH) Sitelink website ad the Forestry Commission Land Information Search website. Sites deemed of relevance were those within 2km of the site boundaries for statutory designated sites and within 1km for non-statutory sites and features. The National Biodiversity Network (NBN) Gateway website was consulted to provide baseline information on protected species records close to the EOBP study corridor.

6.8.3 It must be noted that no site visits by ecologists were undertaken as part of the site assessment procedure. If the development moves to a further stage of assessment, survey of the chosen route by an ecologist will be necessary to verify the presence of species of nature conservation importance such as protected species or invasive species prior to development.

## Baseline

6.8.4 The baseline conditions within the area for section 8 of the EOBP study corridor between Sheriffhall Park and Ride and Millerhill Park and Ride are presented below.

6.8.5 There is a statutory designated site approximately 800 metres from the proposed EOBP route option. Dalkeith Oakwood is a SSSI and is on of only two ancient park woodlands in Scotland and is unique in Lothians as an ecological and historical record (SNH). Associated with these ancient oaks is an unique beetle fauna, restricted to this habitat type and a rich lichen flora (SNH).

6.8.6 In terms of non-statutory sites of importance there is an area of woodland within the Inventory of Ancient, Long-Established and Semi-Natural Woodland approximately 800 metres from the proposed route.

6.8.7 No site visit has been carried out. It is unknown whether there are any invasive plant species. Under the Wildlife and Countryside Act 1981 section 14 (as amended by the Nature Conservation (Scotland) Act 2004) it is an offence to plant or otherwise cause species listed in Schedule 9 (Part II) to grow in the wild. Species listed within Schedule 9 (Part II) of the 1981 Act include Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzianum*). Both of these plant species carry with them the ability to undermine built structures and health risks respectively and both grow on industrial, urban ground akin to the EOBP study corridor. An ecological walkover survey would confirm presence or absence of these species.

## Assessment

6.8.8 Section 8 of the EOBP study corridor will require the construction of a new section of road across land that is protected as Greenbelt in the Midlothian Local Plan.

6.8.9 The loss of any mature trees may remove bat roosting potential within the area which would have a negative impact on the local bat population. Bat surveys would be required if any trees with bat roost potential were required to be felled during the construction phase. Mitigation measures would also be required to be put in place to identify alternative roost sites and possibly provide replacement roosting boxes if necessary. In the long-term, bats would be expected to relocate their sites to other suitable areas.

6.8.10 The removal of trees or scrub within this section of the proposed development as a result of the construction of a new road will result in the loss of breeding bird habitat.

6.8.11 From desk-top research it appears that there is suitable badger sett and foraging habitat surrounding the proposed development route. Further survey is essential to confirm the presence or absence of badgers along this route. Records from Scottish Badgers should be sought as part of further assessment procedures. Badger survey of the route would also inform mitigation options should there be any risk of impact upon this species.

6.8.12 Although unconfirmed to date, there is the possibility that Japanese knotweed or giant hogweed could be spread throughout the site and surrounding area during construction and operation stages. This would breach the legislation detailed above and incur a prosecution. If found on site, these plants will be subject to a specific eradication/management programme before works can commence.

## Appraisal

6.8.13 The appraisal examines section 8 of the EOBP study corridor between Edinburgh Royal Infirmary and Queen Margaret University. Without up-to-date survey information yielded from an ecological walkover survey, it is only possible to appraise the options using the "precautionary principle", i.e. appraise the options as though the species would be affected, until proven otherwise.

6.8.14 The impact of any loss of habitat on breeding birds would be permanent direct negative and the magnitude is expected to be negative minor as there it is unlikely a large quantity of vegetation will be lost through this section of the EOBP study corridor. Significance is assessed as being minor negative impact.

6.8.15 If structures supporting bat roosts are to be removed, this would have a short-term direct negative impact on the species involved. The magnitude of the impact would be expected to be negative moderate. Significance is assessed as being moderate negative impact.

6.8.16 If badgers are discovered in the EOBP study corridor, the construction of bus lay-bys and extended bus lanes would have a long-term direct negative impact. If good site management and any necessary mitigation is employed the magnitude of the impact is taken to be neutral. Significance is assessed as being "no impact".

6.8.17 This section of the route is approximately 800 metres from the Dalkeith Oakwood SSSI. However, it is not thought that the development will impact upon this designated feature as the development is unlikely to impact the SSSI during construction or operation. Significance is assessed as "no impact".

6.8.18 The impact of the loss of habitat along the route line would be permanent direct negative and the magnitude is expected to be negative moderate. Wherever possible, the removal of habitat/vegetation should be minimised and where possible, new native woodland/scrub species should be planted to compliment any existing nature conservation interest. New planting would have a positive permanent, medium-term, direct impact of positive minor magnitude. Taken together, the significance of habitat loss on this road-side site and subsequent gains through landscape planting is assessed as moderate negative.

6.8.19 The impact of the spread of Japanese knotweed or giant hogweed would be permanent direct negative and the magnitude anticipated to be negative moderate although it is expected that through good site management and species eradication, the risk of negative impacts occurring would be removed. Consequently the eradication of these invasive plant species (if found on site) would have a positive permanent, long-term, direct impact of positive minor magnitude. Significance is assessed as being minor benefit.

### Caveat

6.8.20 The impact of the options on protected species is only indicative and is not reliably quantifiable at this time. An ecological walkover survey will be required during further assessment procedures to fully assess the likely impacts and their significance based on field evidence.

### Summary

6.8.21 The most likely impacts of this section of the route on ecological and nature conservation resources along each route are: the loss of areas of scrub and grassland habitat which have developed on site or adjacent to the site and will require clearing as part of the development works; loss of bat roosts within trees and structures to be demolished; the potential for pollutants entering sensitive and protected watercourses during both construction and operation stages; and the potential spread of invasive plant species.

6.8.22 There is the potential for significant impacts on protected species, such as bats and to a lesser extent badgers, otters and water voles, and legal implications pertaining to invasive plant species for each route. However, the likelihood and significance of impacts will not be known until detailed ecological field surveys are carried out on site. Surveys of protected species, including detailed inspection of any structures and trees to be demolished should be conducted at an appropriate time of year to allow the results to be incorporated into the proposals.

6.8.23 Since Section 8 is only applicable to Routes B17 and B18, the above findings are only relevant to these options.

## 6.9 Section 9

### Scoping

6.9.1 This section deals with the potential ecological impacts with the route options for the EOBP study corridor.

6.9.2 The ecological appraisal is based on the Scottish Transport Appraisal Guidance (STAG) for conducting Stage 2 environmental assessments. It must be noted that this appraisal is solely based on a thorough desk-based study and consultation with relevant nature conservation groups. Information regarding species status and key environmental schemes and designations of relevance to the site was gained through consulting the Edinburgh Biodiversity Action Plan 2004-2009 (LBAP), the UK BAP, Finalised Edinburgh Local Plan (March 2007), Finalised Midlothian Local Plan Deposit version (May 2006), East Lothian Local Plan (October 2008), the Scottish Natural Heritage (SNH) Sitelink website ad the Forestry Commission Land Information Search website. Sites deemed of relevance were those within 2km of the site boundaries for statutory designated sites and within 1km for non-statutory sites and features.

The National Biodiversity Network (NBN) Gateway website was consulted to provide baseline information on protected species records close to the site areas.

## Baseline

6.9.3 The baseline conditions within the EOBP study corridor for the section between Sheriffhall Park and Ride and Edinburgh Royal Infirmary are presented below.

6.9.4 There are no statutory designated sites within 2km of this section of the EOBP study corridor.

6.9.5 In terms of non-statutory sites of importance, there are woodlands classified within the Inventory of Ancient, Long-Established and Semi-Natural Woodlands located at Drum Wood, Craigmillar and Edmonstone. Burdiehouse burn also runs through the development site and this site is classified as a Local Nature Conservation Site within the Edinburgh Local Plan.

## Assessment

6.9.6 The impacts of section 6 of the EOBP study corridor from the Sheriffhall Park and Ride to Edinburgh Royal Infirmary are likely to be minimal due to the majority of the infrastructure required by this scheme being in place already.

6.9.7 The main impacts of this section of the EOBP study corridor would be associated with the ancient woodland at Drum and on the Burdiehouse Burn that run through the proposed development area.

6.9.8 The loss of any mature trees may remove bat roosting potential within the area which would have a negative impact on the local bat population. Bat surveys would be required if any trees with bat roost potential were required to be felled during the construction phase. Mitigation measures would also be required to be put in place to identify alternative roost sites and possibly provide replacement roosting boxes if necessary. In the long-term, bats would be expected to relocate their roost site to other suitable areas.

6.9.9 The removal of trees or scrub within this section of the proposed development as a result of constructing new sections of road, widening of existing roads and provision of bus lay-bys will result in the loss of breeding bird habitat during the construction phase.

6.9.10 From desk-top research it appears that there is suitable badger sett and foraging habitat located in the surrounding area of the proposed development area. Further survey is essential to confirm the presence or absence of badgers along this route. Records from Scottish Badgers should be sought as part of further assessment procedures. Badger survey of the route would also inform mitigation options should there be any risk of impact upon this species.

6.9.11 There is potential for impacts on Burdiehouse burn (which has been classified as a LNC by the Local Authority) during both the construction and operation stages as this section of the EOBP study corridor runs over Burdiehouse Burn.

6.9.12 Although unconfirmed to date, there is the possibility that Japanese knotweed or giant hogweed could be spread throughout the site and surrounding area during construction ad operation stages. This would breach legislation and incur a prosecution. If found on site, these

plants will be subject to a specific eradication/management programme before works can commence.

## Appraisal

6.9.13 The appraisal examines section 6 of the EOBP study corridor between Sheriffhall and Edinburgh Royal Infirmary. Without up-to-date survey information yielded from an ecological walkover survey, it is only possible to appraise the options using the "precautionary principle", i.e. appraise the options as though the species would be affected, until proven otherwise.

6.9.14 The impact of any loss of habitat on breeding birds would be permanent direct negative and the magnitude is expected to be negative minor as there it is unlikely a large quantity of vegetation will be lost through this section of the EOBP study corridor. Significance is assessed as being minor negative impact.

6.9.15 If structures supporting bat roosts are to be removed, this would have a short-term direct negative impact on the species involved. The magnitude of the impact would be expected to be negative moderate.

6.9.16 If badgers are discovered in the EOBP study corridor, the construction of bus lay-bys and extended bus lanes would have a long-term direct negative impact. If good site management and any necessary mitigation is employed the magnitude of the impact is taken to be neutral. Significance is assessed as being "no impact".

6.9.17 The impact of the loss of habitat – especially loss of trees from the edges of Inventory Ancient Woodland site at Drum – along the route will be permanent direct negative and the magnitude is expected to be negative moderate. Wherever possible, the removal of habitat/vegetation should be minimised and where possible, new native woodland/scrub species should be planted to complement any existing nature conservation interest. New planting would have a positive permanent, medium-term, direct impact of positive minor magnitude. Taken together, the significance of habitat loss on this section and subsequent gains through landscape planting is assessed as moderate negative. It must be noted that loss of any ancient woodland will not be ameliorated by new planting and will involve a more significant impact – such loss would be avoided where possible. Ecological survey would quantify any loss involving ancient woodland.

6.9.18 The impact of the spread of Japanese knotweed or giant hogweed would be permanent direct negative and the magnitude anticipated to be negative moderate although it is expected that through good site management and species eradication, the risk of negative impacts occurring would be removed. Consequently the eradication of these invasive plant species (if found on site) would have a positive permanent, long-term, direct impact of positive minor magnitude. Significance is assessed as being minor benefit.

## Summary

6.9.19 The most likely impacts of this section of the EOBP study corridor on the ecological and nature conservation resources along the route are: the loss of areas of scrub and grassland habitat which have developed on site or adjacent to the site and will require clearing as part of the development works; loss of bat roosts within trees and structures to be demolished; the

potential for pollutants entering sensitive and protected watercourses during both construction and operation stages; and the potential spread of invasive plant species.

6.9.20 There is the potential for significant impacts on protected species, such as bats and to a lesser extent badgers, otters and water voles, and legal implications pertaining to invasive plant species for each route. However the likelihood and significance of impacts will not be known until detailed ecological field surveys are carried out on site. Surveys of protected species, including detailed inspection of any structures and trees to be demolished should be conducted at an appropriate tine of year to allow the results to be incorporated into the proposals.

6.9.21 Since Section 9 is only applicable to Route C5, the above findings are only relevant to this option.

# 7 VISUAL AMENITY

## 7.1 Section 1

### Scoping

7.1.1 This appraisal assesses the visual effects of the proposed transport options. Visual effects are how the landscape is experienced the modifications that the proposed development will make on views. The appraisal is based on the STAG Guidance for conducting Stage 2 environmental assessments. It is based on desk-top research and consultation with relevant statutory bodies. There has been no site visit by a landscape Architect for this study. In order to fully assess the options a site visit would be required.

**Methodology**

7.1.2 The methodology is based on best practice guidance from the Guidelines for Landscape and Visual Impact Assessment[18]. The assessment uses the following timescale:

1 Baseline - existing conditions before the proposal;

2 Operation - year 1 to show the preferred option as implemented;

3 Construction phase to show the temporary effects.

7.1.3 Potential mitigation measures should be considered at an early stage in the development of the project. These have been considered at a high-level and the residual effects (after mitigation) are those which have been recorded in this appraisal.

7.1.4 The Study Area for a full visual assessment would be the zone of visual influence (ZVI) of the proposed options as determined by a site visit. The ZVI is defined by physical conditions such as topography, built up areas and large areas of woodland. As this is a desk based study a notional ZVI of 200m from the route has been used. The visual effects are assessed as they relate to groups of receptors identified from the map.

### Baseline

7.1.5 There are residential, businesses, recreational and travelling receptors along the existing A8. Their sensitivity to visual change rating is a judgement determined by their proximity to the route and the extent to which they are screened by vegetation, barriers, topography etc. The importance of the view is taken into account e.g. whether the property is residential or business use. Travelling receptors experience transient views at speed whilst travelling through the area. The receptors who are likely to experience the greatest effects are the residential receptors adjacent or in close proximity to the proposal.

7.1.6 The A8 is an established main route into the City and has fast moving traffic. There are a number of settlements e.g. Ratho Station, Ratho, Kirkliston and scattered farmsteads and

[18] Guidelines for Landscape and Visual Impact Assessment Second Edition, The Landscape Institute/Institute of Environmental Management and Assessment (Spon Press 2002) (GLVIA)

houses close to the route many of which have become absorbed within more recent commercial developments. Edinburgh Airport and the Royal Highland Showground are adjacent to the route together with the recently developed office campus at Gogar. The area is currently undergoing redevelopment and further major development is proposed (See Section 9 Landscape)

7.1.7 The receptors identified in relation to this option are:

- Travelling receptors along the A8 which are the largest group. These receptors include business, commuting and recreational receptors. They will view the proposals at speed but slowing down as they approach the Gogar and Newbridge junctions. Low sensitivity
- Recreational receptors visiting the Airport and Royal Highland Showground. These developments are not adjacent to the proposals for this option. Low Sensitivity
- Residential receptors adjacent and near to the route. High/medium sensitivity depending on proximity to the proposals. Their sensitivity is reduced by being near to the existing route.
- Business/commercial receptors for whom views are less important. Low sensitivity.

## Assessment

7.1.8 This option comprises the provision of additional bus lanes at Gogar and approaching the junction of the Newbridge roundabout within the existing A8 transport corridor.

**Construction**

- Permanent and temporary effects would depend on the scale, siting and design of the works for each option. Construction works may comprise:
- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

7.1.9 The removal of vegetation would be the only potential permanent effect. This may adversely affect the views of any nearby residents but it is unlikely that this will affect the overall visual amenity of the wider landscape. Temporary changes to views may affect all receptors depending on the scale and location of the works but these will not affect overall visual amenity. The magnitude of construction effects for the option would be neutral.

## Operation

7.1.10 The overall visual effects of this option will be minimal because the bus priority will take place on an existing route and the infrastructure is already in place. The changes are likely to be the introduction of markings on the road, signage and any changes to the location and design of bus shelters and the introduction of additional busses on the route. These are small scale physical changes which are unlikely to significantly affect visual amenity. There may be a modal shift to public transport as result of the orbital route together with other transport proposals in the area which may result in a reduction of traffic but this is likely to be offset by planned development proposals. A small number of individual receptors living close to the proposals may experience adverse visual effects depending on the scale, siting and design of the proposals. The magnitude of the effects is likely to be neutral overall but individual receptors may experience some adverse effects. Neutral/negative minor

## Mitigation

7.1.11 Mitigation recommendations in relation to the route option would be careful siting and design of any associated structures to avoid negative effects. Planting to screen receptors adversely affected may be recommended depending on the detailed design.

### Residual effects

7.1.12 After mitigation there would be changes to views as described above. The overall residual effects will be known once the final design is completed but are likely to be minimal. Some individual receptors may experience adverse effects.

## Appraisal

### Construction

7.1.13 Construction effects are temporary except for the potential removal of mature vegetation from the site. Small changes to the vegetation pattern are unlikely affect visual amenity. Significance of impact: no impact.

### Operation

7.1.14 This option will result in small changes to views which are unlikely to affect overall visual amenity but may adversely affect some receptors. Significance of impact: no impact/ minor negative impact.

## Summary

7.1.15 This option will have minor visual effects but these are not likely to affect the overall visual amenity of the area. Some individual receptors may experience minor negative impacts.

7.1.16 Since Section 1 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

# 7.2 Section 2

## Scoping

7.2.1 As Section 1.

### Methodology

7.2.2 As Section 1.

## Baseline

7.2.3 There are residential, business, recreational and travelling receptors along the A720 Edinburgh City Bypass and all of the routes which are affected by the proposals. Their sensitivity to visual change rating is a judgement determined by their proximity to the route and the extent to which they are screened by vegetation, barriers, topography etc. The importance of the view is taken into account e.g. whether the property is residential or business use. Travelling receptors experience transient views at speed whilst travelling through the area. The receptors who are likely to experience the greatest effects are the residential receptors adjacent or in close proximity to the proposal.

7.2.4 The EOBP study corridor comprises the A720 Edinburgh City Bypass and existing routes within Edinburgh Park, Wester Hailes and Baberton together with a section across open fields between Hermiston and the A720 Edinburgh City Bypass. The A720 Edinburgh City Bypass is an established major route with fast moving traffic. The routes within Edinburgh Park are lined with business /commercial receptors. The affected routes within Wester Hailes and Baberton are within residential areas. Some of the routes are major arteries within these areas with existing fast moving traffic but there are also some sections on more local roads.

7.2.5 The off road section would be viewed from the residential area on the edge of Baberton, the Riccarton University Campus and adjacent roads and railways.

7.2.6 The receptors identified in relation to this option are:

- Travelling receptors along the A720 Edinburgh City Bypass and affected routes, which is the largest group. These receptors include business, commuting and recreational receptors. They will view the proposals at speed but slowing down as they approach junctions. Low sensitivity
- Residential receptors adjacent and near to the routes. High/medium sensitivity depending on proximity to the proposals. Their sensitivity is reduced by being near to existing routes.
- Business/commercial receptors for whom views are less important. Low sensitivity.
- Receptors from the nearby University campus. Low sensitivity.

## Assessment

### Construction

7.2.7 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

7.2.8 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

7.2.9 The removal of vegetation would be the only potential permanent effect. This may adversely affect the views of any nearby residents but it is unlikely that this will significantly affect the overall visual amenity of the wider landscape. Temporary changes to views may affect all receptors depending on the scale and location of the works but these will not affect overall visual amenity. The magnitude of construction effects for the option would be negative minor.

## Operation

7.2.10 The overall visual effects of this option will be relatively minor because most of the proposals will take place on existing routes where the infrastructure is already in place. However the off road section will introduce an additional visual feature into the open countryside. The changes on existing routes are likely to be the introduction of markings on the road, signage and any changes to the location and design of bus shelters and the introduction of additional busses on the routes. The interchanges will also result in alteration to views. There may be a modal shift to public transport as result of the orbital route together with other transport proposals in the area which may result in a reduction of traffic but this is likely to be offset by planned development proposals in the wider area. A small number of individual receptors living close to the proposals may experience adverse visual effects depending on the scale, siting and design of the proposals. The magnitude of the effects is likely to be negative minor overall but individual receptors may experience greater adverse effects. Negative minor.

## Mitigation

7.2.11 Mitigation recommendations in relation to the route option would be careful siting and design of any associated structures to avoid negative effects. Planting to screen receptors adversely affected may be recommended depending on the detailed design.

**Residual effects**

7.2.12 After mitigation there would be changes to views as described above. The overall residual effects will be known once the final design is completed but are likely to be negative minor. Some individual receptors may experience greater adverse effects.

### Appraisal

**Construction**

7.2.13 Construction effects are temporary except for the potential removal of mature vegetation from the site. Small changes to the vegetation pattern are unlikely to significantly affect visual amenity. Significance of impact: minor negative impact.

**Operation**

7.2.14 The overall visual effects of this option will be relatively minor because most of the proposals will take place on existing routes where the infrastructure is already in place. However the off road section will introduce an additional visual feature into the open countryside. The proposals may adversely affect some receptors depending on the detailed design. Significance of impact: minor negative impact.

### Summary

7.2.15 This option will have minor visual effects on the overall visual amenity. Some individual receptors may experience greater negative impacts depending on the detailed design.

7.2.16 Since Section 2 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 7.3 Section 3

### Scoping

7.3.1 As Section 1.

**Methodology**

7.3.2 As Section 1.

### Baseline

7.3.3 There are residential, business, recreational and travelling receptors along the A720 Edinburgh City Bypass and the remaining areas affected by the proposals. Their sensitivity to visual change rating is a judgement determined by their proximity to the route and the extent to which they are screened by vegetation, barriers, topography etc. The importance of the view is taken into account e.g. whether the property is residential or business use. Travelling receptors experience transient views at speed whilst travelling through the area. The receptors who are likely to experience the greatest effects are the residential receptors adjacent or in close proximity to the proposal.

7.3.4 The EOBP study corridor comprises the A720 Edinburgh City Bypass and some additional areas at Lothianburn. The A720 Edinburgh City Bypass is an established major route with fast moving traffic and the A702 at Lothianburn is one of the major arteries to the City. Much of the affected area is screened from adjacent areas by embankments, mounding and planting associated with the A720 Edinburgh City Bypass and therefore the ZVI will be relatively confined. However the Pentland Hills form a vantage point and there is some higher ground adjacent to the affected area.

7.3.5 The receptors identified in relation to this option are:

- Travelling receptors along the A720 Edinburgh City Bypass and affected routes, which is the largest group. These receptors include business, commuting and recreational receptors. They will view the proposals at speed but slowing down as they approach junctions. Low sensitivity
- Residential receptors adjacent and near to the routes. High/medium sensitivity depending on proximity to the proposals. Most of these receptors are screened from view. Their sensitivity is reduced by being near to existing routes.
- Business/commercial receptors for whom views are less important. Low sensitivity.
- Receptors from the Pentland Hills. These will be mainly recreational but the proposals will be some distance away. Low sensitivity.

## Assessment

### Construction

7.3.6 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

7.3.7 The removal of vegetation would be the only potential permanent effect. This may adversely affect the views of any nearby residents and travelling receptors but it is unlikely that this will significantly affect the overall visual amenity of the wider landscape. Temporary changes to views may affect all receptors depending on the scale and location of the works but these will not affect overall visual amenity. The magnitude of construction effects for the option would be negative minor.

## Operation

7.3.8 The overall visual effects of this option will be relatively minor because the proposals will take place on existing routes where the infrastructure is already in place. The changes on existing routes are likely to be the introduction of markings on the road, signage and any changes to the location and design of bus shelters and the introduction of additional buses on the routes. The proposed Park and Ride facility will be the most prominent feature as viewed from the A720 Edinburgh City Bypass owing to the topography. There may be a modal shift to public transport as result of the orbital route together with other transport proposals in the area which may result in a reduction of traffic but this is likely to be offset by planned development proposals in the wider area. A small number of individual receptors living close to the proposals may experience adverse visual effects depending on the scale, siting and design of the proposals. The magnitude of the effects is likely to be negative minor overall but individual receptors may experience greater adverse effects. Negative minor.

## Mitigation

7.3.9 Mitigation recommendations in relation to the route option would be careful siting and design of any associated structures to avoid negative effects. Planting to screen receptors adversely affected, particularly in the area of the Park and Ride facility, may be recommended depending on the detailed design.

### Residual effects

7.3.10 After mitigation there would be changes to views as described above. The overall residual effects will be known once the final design is completed but are likely to be negative minor. Some individual receptors may experience greater adverse effects.

## Appraisal

### Construction

7.3.11 Construction effects are temporary except for the potential removal of mature vegetation from the site. Small changes to the vegetation pattern are unlikely to significantly affect visual amenity. Significance of impact: minor negative impact.

### Operation

7.3.12 The overall visual effects of this option will be relatively minor because most of the proposals will take place on existing routes where the infrastructure is already in place. However the proposed Park and Ride facility will introduce an additional visual feature into an un-developed site. The proposals may adversely affect some receptors depending on the detailed design. Significance of impact: minor negative impact.

## Summary

7.3.13 This option will have minor visual effects on the overall visual amenity. Some individual receptors may experience greater negative impacts depending on the detailed design.

7.3.14 Since Section 3 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

# 7.4 Section 4

## Scoping

7.4.1 As Section 1.

### Methodology

7.4.2 As Section 1.

## Baseline

7.4.3 There are residential, business, recreational and travelling receptors along the A720 Edinburgh City Bypass and the remaining areas affected by the proposals. Their sensitivity to visual change rating is a judgement determined by their proximity to the route and the extent to which they are screened by vegetation, barriers, topography etc. The importance of the view is taken into account e.g. whether the property is residential or business use. Travelling receptors experience transient views at speed whilst travelling through the area. The receptors who are likely to experience the greatest effects are the residential receptors adjacent or in close proximity to the proposal.

7.4.4 The EOBP study corridor comprises the A720 Edinburgh City Bypass and some additional areas at Lothianburn. The A720 Edinburgh City Bypass is an established major route with fast moving traffic and the A702 at Lothianburn is one of the major arteries to the City. Much of the affected area is screened from adjacent areas by embankments, mounding and planting associated with the A720 Edinburgh City Bypass and therefore the ZVI will be relatively confined. However the Pentland Hills form a vantage point and there is some higher ground adjacent to the affected area.

7.4.5 The receptors identified in relation to this option are:

- Travelling receptors along the A720 Edinburgh City Bypass and affected routes, which is the largest group. These receptors include business, commuting and recreational receptors. They will view the proposals at speed but slowing down as they approach junctions. Low sensitivity
- Residential receptors adjacent and near to the routes. High/medium sensitivity depending on proximity to the proposals. Most of these receptors are screened from view. Their sensitivity is reduced by being near to existing routes.
- Business/commercial receptors for whom views are less important. Low sensitivity.
- Receptors from the Pentland Hills. These will be mainly recreational but the proposals will be some distance away. Low sensitivity.

## Assessment

### Construction

7.4.6 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

7.4.7 The removal of vegetation would be the only potential permanent effect. This may adversely affect the views of any nearby residents and travelling receptors but it is unlikely that this will significantly affect the overall visual amenity of the wider landscape. Temporary changes to views may affect all receptors depending on the scale and location of the works but these will not affect overall visual amenity. The magnitude of construction effects for the option would be negative minor.

## Operation

7.4.8 The overall visual effects of this option will be relatively minor because the proposals will take place on existing routes where the infrastructure is already in place. The changes on existing routes are likely to be the introduction of markings on the road, signage and any changes to the location and design of bus shelters and the introduction of additional buses on the routes. There may be a modal shift to public transport as result of the orbital route together with other transport proposals in the area which may result in a reduction of traffic but this is likely to be offset by planned development proposals in the wider area. A small number of individual receptors living close to the proposals may experience adverse visual effects depending on the scale, siting and design of the proposals but most of these receptors are screened from view by embankments, mounding and landscaping associated with the A720 Edinburgh City Bypass. If this area is eroded by any road widening associated with the segregated section, the screening will be reduced. The magnitude of the effects is likely to be negative minor overall but individual receptors may experience greater adverse effects. Negative minor.

## Mitigation

7.4.9 Mitigation recommendations in relation to the route option would be careful siting and design of any associated structures to avoid negative effects. Planting to screen receptors adversely affected may be recommended depending on the detailed design.

### Residual effects

7.4.10 After mitigation there would be changes to views as described above. The overall residual effects will be known once the final design is completed but are likely to be negative minor. Some individual receptors may experience greater adverse effects.

### Appraisal

**Construction**

7.4.11 Construction effects are temporary except for the potential removal of mature vegetation from the site. Small changes to the vegetation pattern are unlikely to significantly affect visual amenity. Significance of impact: minor negative impact.

**Operation**

7.4.12 The overall visual effects of this option will be relatively minor because most of the proposals will take place on existing routes where the infrastructure is already in place. The proposals may adversely affect some receptors depending on the detailed design. Significance of impact: minor negative impact.

### Summary

7.4.13 This option will have minor visual effects on the overall visual amenity. Some individual receptors may experience greater negative impacts depending on the detailed design.

7.4.14 Those options which have Section 4h rather than Section 4, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 4 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 7.5 Section 5

### Scoping

7.5.1 As Section 1.

**Methodology**

7.5.2 As Section 1.

### Baseline

7.5.3 There are residential, business, recreational and travelling receptors along the A720 Edinburgh City Bypass and the remaining areas affected by the proposals. Their sensitivity to visual change rating is a judgement determined by their proximity to the route and the extent to which they are screened by vegetation, barriers, topography etc. The importance of the view is taken into account e.g. whether the property is residential or business use. Travelling receptors experience transient views at speed whilst travelling through the area. The receptors who are likely to experience the greatest effects are the residential receptors adjacent or in close proximity to the proposal.

7.5.4 The EOBP study corridor comprises areas to the north and south of the A720 Edinburgh City Bypass within Straiton and Loanhead and the proposals include an off road segregated section across an area of open space. The area is within the urban fringe and is a highly fragmented

landscape. The area affected is partially screened from adjacent areas by planting associated with the A720 Edinburgh City Bypass and therefore the ZVI will be relatively confined.

7.5.5 The receptors identified in relation to this option are:

- Travelling receptors along the A720 Edinburgh City Bypass and affected routes, which is the largest group. These receptors include business, commuting and recreational receptors. They will view the proposals at speed. Depending on the scale and design of the proposals the site affected may be screened from view. Low sensitivity
- Residential receptors adjacent and near to the routes. High/medium sensitivity depending on proximity to the proposals. There are few receptors and these may be screened from view. Their sensitivity is reduced by being near to existing routes.
- Business/commercial receptors for whom views are less important. Low sensitivity.

## Assessment

### Construction

7.5.6 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

7.5.7 The removal of vegetation would be the only potential permanent effect. This may adversely affect the views of any nearby residents and travelling receptors but it is unlikely that this will significantly affect the overall visual amenity of the wider landscape. Temporary changes to views may affect all receptors depending on the scale and location of the works but these will not affect overall visual amenity. The magnitude of construction effects for the option would be negative minor.

## Operation

7.5.8 The overall visual effects of this option will be relatively minor because the proposals will take place in an area where there is already major infrastructure and an addition to this will not intrude significantly into the general views. However on a local scale the introduction of a paved

section into an open space will adversely affect the views within the open space. The changes are likely to be the introduction of additional hard surfacing into open space, fencing, markings on the road, signage and any changes to the location and design of bus shelters and the introduction of additional buses on the routes. There may be a modal shift to public transport as result of the orbital route together with other transport proposals in the area which may result in a reduction of traffic but this is likely to be offset by planned development proposals in the wider area. A small number of individual receptors living close to the proposals may experience adverse visual effects depending on the scale, siting and design of the proposals but many of these receptors may be screened from view by landscaping associated with the A720 Edinburgh City Bypass. The magnitude of the effects is likely to be negative minor overall but individual receptors may experience greater adverse effects. Negative minor.

## Mitigation

7.5.9 Mitigation recommendations in relation to the route option would be careful siting and design of any associated structures to avoid negative effects. Planting to screen receptors adversely affected may be recommended depending on the detailed design.

### Residual effects

7.5.10 After mitigation there would be changes to views as described above. The overall residual effects will be known once the final design is completed but are likely to be negative minor. Some individual receptors may experience greater adverse effects.

## Appraisal

### Construction

7.5.11 Construction effects are temporary except for the potential removal of mature vegetation from the site. Small changes to the vegetation pattern are unlikely to significantly affect visual amenity. Significance of impact: minor negative impact.

### Operation

7.5.12 The overall visual effects of this option will be relatively minor because major infrastructure is already a feature of the view and a small addition to this will not create significant adverse effects in the wider area. However an area of open space will be significantly changed and some receptors may be adversely affected depending on the detailed design. Significance of impact: minor/moderate negative impact.

## Summary

7.5.13 This option will have minor visual effects on the overall visual amenity. Some individual receptors may experience greater negative impacts depending on the detailed design.

7.5.14 Those options which have Section 5h rather than Section 5, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 5 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

# 7.6 Section 6

## Scoping

7.6.1 As Section 1.

### Methodology

7.6.2 As Section 1.

## Baseline

7.6.3 There are residential, businesses, recreational and travelling receptors along the proposed routes. Their sensitivity to visual change rating is a judgement determined by their proximity to the route and the extent to which they are screened by vegetation, barriers, topography etc. The importance of the view is taken into account e.g. whether the property is residential or business use. Travelling receptors experience transient views whilst travelling through the area. The receptors which are likely to experience the greatest effects are the residential receptors adjacent to the proposal or in close proximity.

7.6.4 The EOBP study corridor is located to the north of the A720 Edinburgh City Bypass, and between the underpass and the Edinburgh Royal Infirmary via Sheriffhall Park and Ride. The proposals include a segregated section on an existing minor road and railway line, bus lanes to the Edinburgh Royal Infirmary and an extension to the route along residential roads. The area is within the Greenbelt and the urban area.

7.6.5 The receptors identified in relation to this option are:

- Travelling receptors along the A720 Edinburgh City Bypass and affected routes, which is the largest group. These receptors include business, commuting and recreational receptors. They will view the proposals at speed. Depending on the scale and design of the proposals the site affected may be artially screened from view. Low sensitivity
- Residential receptors adjacent and near to the routes. High/medium sensitivity depending on proximity to the proposals. Their sensitivity is reduced by being near to existing routes.
- Business/commercial receptors for whom views are less important. Low sensitivity.
- Visitors to the Historic Garden/ Designed Landscape. These would be recreational receptors. Medium sensitivity.

## Assessment

### Construction

7.6.6 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;

- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

7.6.7 The removal of vegetation would be the only potential permanent effect. This may adversely affect the views of any nearby residents and travelling receptors but it is unlikely that this will significantly affect the overall visual amenity of the wider landscape. Temporary changes to views may affect all receptors depending on the scale and location of the works but these will not affect overall visual amenity. The magnitude of construction effects for the option would be negative minor.

## Operation

7.6.8 The overall visual effects of this option will be relatively minor because the proposals will take place on existing routes. The changes are likely to be the introduction of additional hard surfacing, fencing, markings on the road, signage and any changes to the location and design of bus shelters and the introduction of buses on the routes. There may be a modal shift to public transport as result of the orbital route together with other transport proposals in the area which may result in a reduction of traffic but this is likely to be offset by planned development proposals in the wider area. A small number of individual receptors living close to the proposals may experience adverse visual effects depending on the scale, siting and design of the proposals The magnitude of effects are likely to be negative minor overall but individual receptors may experience greater adverse effects. Negative minor.

## Mitigation

7.6.9 Mitigation recommendations in relation to the route option would be careful siting and design of any associated structures to avoid negative effects. Planting to screen receptors adversely affected may be recommended depending on the detailed design.

### Residual effects

7.6.10 After mitigation there would be changes to views as described above. The overall residual effects will be known once the final design is completed but are likely to be negative minor. Some individual receptors may experience greater adverse effects.

### Appraisal

#### Construction

7.6.11 Construction effects are temporary except for the potential removal of mature vegetation from the site. Small changes to the vegetation pattern are unlikely to significantly affect visual amenity. Significance of impact: minor negative impact.

#### Operation

7.6.12 The overall visual effects of this option will be relatively minor because the works will take place on existing routes. However some receptors may be adversely affected depending on the detailed design. Significance of impact: minor negative impact.

### Summary

7.6.13 This option will have minor visual effects on the overall visual amenity. Some individual receptors may experience greater negative impacts depending on the detailed design.

7.6.14 Those options which have Section 6h rather than Section 6, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 6 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 7.7 Section 7

### Scoping

7.7.1 As Section 1.

#### Methodology

7.7.2 As Section 1.

### Baseline

7.7.3 There are residential, businesses, recreational and travelling receptors along the proposed routes. Their sensitivity to visual change rating is a judgement determined by their proximity to the route and the extent to which they are screened by vegetation, barriers, topography etc. The importance of the view is taken into account e.g. whether the property is residential or business use. Travelling receptors experience transient views whilst travelling through the area. The receptors which are likely to experience the greatest effects are the residential receptors adjacent to the proposal or in close proximity.

7.7.4 The EOBP study corridor is located between the Edinburgh Royal Infirmary and Newcraighall on the edge of the urban/urban fringe area which is currently undergoing redevelopment. Where the options enter the built up areas the ZVI will be relatively confined but in the urban fringe and rural areas a wider view will be seen. The proposals include a segregated section currently within undeveloped areas of open land.

7.7.5 The receptors identified in relation to this option are:

- Travelling receptors along the affected routes which are the largest group. These receptors include business, commuting and recreational receptors. They will view the proposals at speed. Depending on the scale and design of the proposals the site affected may be artially screened from view. Low sensitivity
- Residential receptors adjacent and near to the routes. High/medium sensitivity depending on proximity to the proposals. Their sensitivity is reduced by being near to existing routes.
- Business/commercial receptors for whom views are less important. Low sensitivity.
- Recreational receptors visiting the open land. Medium sensitivity.

## Assessment

### Construction

7.7.6 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

7.7.7 The removal of vegetation would be the only potential permanent effect. This may adversely affect the views of any nearby residents and travelling receptors but it is unlikely that this will significantly affect the overall visual amenity of the wider landscape. Temporary changes to views may affect all receptors depending on the scale and location of the works but these will not affect overall visual amenity. The magnitude of construction effects for the option would be negative minor.

## Operation

7.7.8 There will be some visual effects caused by this option because it will include development of open land but it will be seen in the longer term as part of the overall redevelopment of the area. The changes are likely to be the introduction of additional hard surfacing, fencing, markings on the road, signage and any changes to the location and design of bus shelters and the introduction of buses on the routes. There may be a modal shift to public transport as result of

the orbital route together with other transport proposals in the area which may result in a reduction of traffic but this is likely to be offset by planned development proposals in the wider area. A small number of individual receptors living close to the proposals may experience adverse visual effects depending on the scale, siting and design of the proposals The magnitude of effects are likely to be negative minor overall but individual receptors may experience greater adverse effects. Negative minor.

## Mitigation

7.7.9 Mitigation recommendations in relation to the route option would be the retention of existing vegetation where possible careful siting and design of any associated structures to avoid negative effects. Planting to screen receptors adversely affected may be recommended depending on the detailed design.

### Residual effects

7.7.10 After mitigation there would be changes to views as described above. The overall residual effects will be known once the final design is completed but are likely to be negative minor. Some individual receptors may experience greater adverse effects.

## Appraisal

### Construction

7.7.11 Construction effects are temporary except for the potential removal of mature vegetation from the site. Small changes to the vegetation pattern are unlikely to significantly affect visual amenity. Significance of impact: minor negative impact.

7.7.12 Construction effects are temporary except for the potential removal of mature vegetation from the site. Small changes to the vegetation pattern are unlikely to significantly affect visual amenity. Significance of impact: minor negative impact.

### Operation

7.7.13 The overall visual effects of this option in the longer term will be relatively minor because the works will be perceived as part of the overall redevelopment of the area. However some receptors may be adversely affected depending on the detailed design. Significance of impact: minor negative impact.

## Summary

7.7.14 This option will have minor visual effects on the overall visual amenity. Some individual receptors may experience greater negative impacts depending on the detailed design.

7.7.15 Since Section 7 is only applicable to Route A5, the above findings are only relevant to this option.

# 7.8 Section 8

## Scoping

7.8.1 As Section 1.

### Methodology

7.8.2 As Section 1.

## Baseline

7.8.3 There are residential, businesses, recreational and travelling receptors along the proposed routes. Their sensitivity to visual change rating is a judgement determined by their proximity to the route and the extent to which they are screened by vegetation, barriers, topography etc. The importance of the view is taken into account e.g. whether the property is residential or business use. Travelling receptors experience transient views whilst travelling through the area.

7.8.4 The proposed options are located between and Sheriffhall Park and Ride and the site of the proposed Millerhill Park and Ride in an area of Greenbelt on the edge of the City. The proposals would run across open fields in a relatively flat area therefore would be quite visible.

7.8.5 The receptors identified in relation to this option are:

- Travelling receptors along the A720 Edinburgh City Bypass and nearby roads which is the largest group. These receptors include business, commuting and recreational receptors. They will view the proposals at speed. Depending on the scale and design of the proposals the site affected may be artially screened from view. Low sensitivity
- Residential receptors near to the routes. High/medium sensitivity depending on proximity to the proposals. There are very few receptors in this category. Their sensitivity is reduced by being near to existing routes.
- Business/commercial receptors for whom views are less important. Low sensitivity.
- Recreational receptors visiting the open space areas. Medium sensitivity.

## Assessment

### Construction

7.8.6 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;

- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

7.8.7 The removal of vegetation would be the only potential permanent effect. This may adversely affect the views of any nearby residents and travelling receptors but it is unlikely that this will significantly affect the overall visual amenity of the wider landscape. Temporary changes to views may affect all receptors depending on the scale and location of the works but these will not affect overall visual amenity. The magnitude of construction effects for the option would be negative minor.

**Operation**

7.8.8 There will be some visual effects caused by this option because it will include development of open land and the introduction of a bus lane will add to the clutter in the landscape. The changes are likely to be the introduction of additional hard surfacing, fencing, markings on the road, signage and any changes to the location and design of bus shelters and the introduction of buses on the routes. There may be a modal shift to public transport as result of the orbital route together with other transport proposals in the area which may result in a reduction of traffic but this is likely to be offset by planned development proposals in the wider area. A small number of individual receptors living close to the proposals may experience adverse visual effects depending on the scale, siting and design of the proposals. The magnitude of the effects is likely to be negative moderate overall but individual receptors may experience greater adverse effects. Negative moderate.

## Mitigation

7.8.9 Mitigation recommendations in relation to the route option would be the retention of existing vegetation where possible and careful siting and design of any associated structures to avoid negative effects. Planting to screen receptors adversely affected may be recommended depending on the detailed design.

**Residual effects**

7.8.10 After mitigation there would be changes to views as described above. The overall residual effects will be known once the final design is completed but are likely to be negative moderate/minor. Some individual receptors may experience greater adverse effects.

## Appraisal

**Construction**

7.8.11 Construction effects are temporary except for the potential removal of mature vegetation from the site. Small changes to the vegetation pattern are unlikely to significantly affect visual amenity. Significance of impact: Minor negative impact.

**Operation**

7.8.12 The addition of a bus lane into an open area will be relatively visible in the landscape. Some receptors may be adversely affected depending on the detailed design. Significance of impact: moderate negative impact.

### Summary

7.8.13 This option will have moderate visual effects. Some individual receptors may experience greater negative impacts depending on the detailed design.

7.8.14 Since Section 8 is only applicable to Routes B17 and B18, the above findings are only relevant to these options.

## 7.9 Section 9

### Scoping

7.9.1 As Section 1.

**Methodology**

7.9.2 As Section 1.

### Baseline

7.9.3 There are residential, businesses, recreational and travelling receptors along the proposed routes. Their sensitivity to visual change rating is a judgement determined by their proximity to the route and the extent to which they are screened by vegetation, barriers, topography etc. The importance of the view is taken into account e.g. whether the property is residential or business use. Travelling receptors experience transient views whilst travelling through the area. The receptors which are likely to experience the greatest effects are the residential receptors adjacent to the proposal or in close proximity.

7.9.4 The EOBP study corridor is located to the north of the A720 Edinburgh City Bypass, and between Sheriffhall Park and Ride and the Edinburgh Royal Infirmary. The proposals include bus lanes to the Edinburgh Royal Infirmary and an extension to the route along residential roads. The area is within the Greenbelt and the urban area.

7.9.5 The receptors identified in relation to this option are:

- Travelling receptors along the A720 Edinburgh City Bypass and affected routes, which is the largest group. These receptors include business, commuting and recreational receptors. They will view the proposals at speed. Depending on the scale and design of the proposals the site affected may be artially screened from view. Low sensitivity
- Residential receptors adjacent and near to the routes. High/medium sensitivity depending on proximity to the proposals. Their sensitivity is reduced by being near to existing routes.
- Business/commercial receptors for whom views are less important. Low sensitivity.

- Visitors to the Historic Garden/ Designed Landscape. These would be recreational receptors. Medium sensitivity.

## Assessment

### Construction

7.9.6 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

7.9.7 The removal of vegetation would be the only potential permanent effect. This may adversely affect the views of any nearby residents and travelling receptors but it is unlikely that this will significantly affect the overall visual amenity of the wider landscape. Temporary changes to views may affect all receptors depending on the scale and location of the works but these will not affect overall visual amenity. The magnitude of construction effects for the option would be negative minor.

## Operation

7.9.8 The overall visual effects of this option will be relatively minor because the proposals will take place on existing routes. The changes are likely to be the introduction of additional hard surfacing, fencing, markings on the road, signage and any changes to the location and design of bus shelters and the introduction of buses on the routes. There may be a modal shift to public transport as result of the orbital route together with other transport proposals in the area which may result in a reduction of traffic but this is likely to be offset by planned development proposals in the wider area. A small number of individual receptors living close to the proposals may experience adverse visual effects depending on the scale, siting and design of the proposals The magnitude of effects are likely to be negative minor overall but individual receptors may experience greater adverse effects. Negative minor.

## Mitigation

7.9.9 Mitigation recommendations in relation to the route option would be careful siting and design of any associated structures to avoid negative effects. Planting to screen receptors adversely affected may be recommended depending on the detailed design.

### Residual effects

7.9.10 After mitigation there would be changes to views as described above. The overall residual effects will be known once the final design is completed but are likely to be negative minor. Some individual receptors may experience greater adverse effects.

## Appraisal

### Construction

7.9.11 Construction effects are temporary except for the potential removal of mature vegetation from the site. Small changes to the vegetation pattern are unlikely to significantly affect visual amenity. Significance of impact: minor negative impact.

### Operation

7.9.12 The overall visual effects of this option will be relatively minor because the works will take place on existing routes. However some receptors may be adversely affected depending on the detailed design. Significance of impact: minor negative impact.

## Summary

7.9.13 This option will have minor visual effects on the overall visual amenity. Some individual receptors may experience greater negative impacts depending on the detailed design.

7.9.14 Since Section 9 is only applicable to Route C5, the above findings are only relevant to this option.

# 8 CULTURAL HERITAGE

## 8.1 Section 1

### Scoping

8.1.1 This section of the STAG Environmental Appraisal relates to the assessment of cultural heritage issues, with particular respect to local archaeology, listed buildings and the historic built environment within the EOBP study corridor of the route options.

8.1.2 Cultural heritage offers a tangible link to the past, which might be permanently affected by development. To prevent needless damage and destruction, care must be taken either through design or mitigation measures to ensure that negative impacts are kept to a minimum.

8.1.3 The scoping of cultural heritage issues relates to the proposed EOBP study corridor and the factors that are requiring assessment.

8.1.4 A 200m search zone was identified on either side of the route options. Three sources of information were used: Adopted Edinburgh Rural West Local Plan (June 2006); Finalised Edinburgh City Local Plan (March 2007); data from the Pastmap interactive website developed by Historic Scotland, RCAHMS; and the Association of Local Government Archaeological Officers UK[19]. These sources of information provided details of statutory and non-statutory designated sites within the study and of archaeological remains.

### Baseline

8.1.5 The baseline reported below relates to the existing situation, the year of opening and 15 years after opening. It is unknown as to what future designations will be made and what archaeological finds will be discovered. Cultural heritage appraisal is based on a desk study and consultations as described above. The constraints described below are shown in Figure 1.2.

**Statutory designations**

8.1.6 There are 3 Scheduled Ancient Monuments (SAMs) located just within a 200 metre search zone either side of the EOBP study corridor – Huly Hill Cairn and Stone Circle; Lochend Farm Standing Stone and; Gogar Mains Fort. There are 17 Listed Buildings within 200 metres of the A8 between Newbridge and Gogar, including the Grade A Listed Buildings at Ingliston House.

8.1.7 There are no Conservation Areas within the EOBP study corridor. There is a Historic Garden and Designed Landscapes (HGDL) at Newliston.

**Non-statutory designations**

8.1.8 There are a significant number of National Monument Records of Scotland sites (NMRSs) located within a 200m search zone of the EOBP study corridor.

[19] Pastmap http://jura.rcahms.gov.uk/PASTMAP/start.jsp [accessed November 2008]

8.1.9 There are areas of Ancient Woodland to the south of the A8 at Gogar.

**Archaeological remains**

8.1.10 The EOBP study corridor may contain uncharted archaeological remains due to proximity to historic settlements.

## Assessment

**Statutory designations**

8.1.11 There are a number of Listed Buildings adjacent to the A8 corridor that may experience minor negative impacts on their setting.

8.1.12 The construction of bus lanes and operation of bus services may have a negative moderate impact upon the Lochend Farm Standing Stone and Gogar Mains Fort SAMs. Further investigation would be required.

8.1.13 There are not expected to be any direct physical impacts on any Listed Buildings or SAMs.

**Non-statutory designations**

8.1.14 Non-statutory designations comprise NMRS sites. It is unlikely that any of the NMRS will experience direct short-term negative impacts as a result of any construction works. Additionally, it is likely that the settings of some of the NMRSs will be affected, but it is unlikely to be of any great significance, as the majority of the infrastructure required for the options are existing, therefore impacts to surrounding cultural heritage receptors are likely to be neutral to minor negative, depending on the design and location of the works.

**Archaeological remains**

8.1.15 The impact of the route options on uncharted archaeological remains is not quantifiable at this time, and survey work may be required during the subsequent stages of the project in order fully assess the likely impacts and their significance.

## Appraisal

8.1.16 The magnitude of construction and operational impacts on non-statutory sites and uncharted archaeological remains for the route options will be neutral or negative minor, as there may be changes to the receptors settings, while the significance of the impacts are judged to be direct small minor negative impact.

## Summary

8.1.17 The cultural heritage assessment identified those cultural and archaeological resources within the 200m EOBP study corridor along the route of the proposed option. There are 3 SAMs and 17 Listed Buildings located within this section of the EOBP study corridor.

8.1.18 There are unlikely to be any significant impacts to statutory designations due to the fact that the vast majority of the required infrastructure for the option is already in place, therefore the overall impact is thought range from neutral to minor.

8.1.19 Since Section 1 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 8.2 Section 2

### Scoping

8.2.1 This section of the STAG Environmental Appraisal relates to the assessment of cultural heritage issues, with particular respect to local archaeology, listed buildings and the historic built environment within the EOBP study corridor of the route options.

8.2.2 Cultural heritage offers a tangible link to the past, which might be permanently affected by development. To prevent needless damage and destruction, care must be taken either through design or mitigation measures to ensure that negative impacts are kept to a minimum.

8.2.3 The scoping of cultural heritage issues relates to the proposed EOBP study corridor and the factors that are requiring assessment.

8.2.4 A 200m search zone was identified on either side of the route options. Three sources of information were used: Adopted Edinburgh Rural West Local Plan (June 2006); Finalised Edinburgh City Local Plan (March 2007); data from the Pastmap interactive website developed by Historic Scotland, RCAHMS; and the Association of Local Government Archaeological Officers UK. These sources of information provided details of statutory and non-statutory designated sites within the EOBP study corridor and of archaeological remains.

### Baseline

8.2.5 As Section 1.

**Statutory designations**

8.2.6 There are 2 SAMs located within this section of the EOBP study corridor – the Union Canal and Baberton Mains enclosure.

8.2.7 Hermiston Juniper Green and Colinton Conservation Areas are located within the EOBP study corridor. There are 10 Listed Buildings, including eight Grade B Listed Buildings at Baberton Mains (1-8 Baberton Mains), within the 200m EOBP study corridor between Gogar and the A720 Edinburgh A720 Edinburgh City Bypass Bridge over the Water of Leith.

8.2.8 Millburn Tower HGDL is located within the EOBP study corridor near Gogar.

**Non-statutory designations**

8.2.9 There are a number of NMSR sites (approximately 20) located within the 200m EOBP study corridor.

8.2.10 There is an area of Ancient Woodland to the west of the A720 Edinburgh City Bypass at Gogar.

### Archaeological remains

8.2.11 The impact of the route options on uncharted archaeological remains is not quantifiable at this time, and survey work may be required during the subsequent stages of the project in order fully assess the likely impacts and their significance.

## Assessment

### Statutory designations

8.2.12 Construction impacts are likely to affect the setting of the Baberton Mains Fort SAM and some Listed Buildings at Baberton (1-8 Baberton Mains), resulting in a moderate negative impact to these receptors. The setting of the Hermiston Conservation Area is unlikely to be significantly affected as the receptor is screened by the Hermiston Park and Ride facility. The route options would have a minor/moderate impact on the setting of Millburn Tower HGDL.

8.2.13 The operational phase of the option will affect the setting of some statutory designations resulting in a moderate impact. There are not expected to be any physical impacts on any Listed Buildings or SAMs.

### Non-statutory designations

8.2.14 Non-statutory designations comprise NMRSs sites. It is unlikely that any of the NMRS will experience direct short-term negative impacts as a result of any construction works, such as the construction of a segregated Bus Rapid Transit route between Edinburgh Park and the Royal Bank of Scotland Headquarters and between Baberton and Hermiston. Additionally, it is likely that the settings of some NMRSs will be affected, but it is unlikely to be of any great significance, as the majority of the infrastructure required for the options are existing, therefore impacts to surrounding cultural heritage receptors are likely to be neutral to negative minor, depending on the design and location of the works.

### Archaeological remains

8.2.15 The impact of the route options on uncharted archaeological remains is not quantifiable at this time, and survey work may be required during the subsequent stages of the project in order fully assess the likely impacts and their significance.

## Appraisal

8.2.16 The magnitude of construction and operational impacts on non-statutory sites and uncharted archaeological remains for the route options will be neutral or negative minor, as there may be changes to the receptors settings, while the significance of the impacts are judged to be direct small minor negative impact.

## Summary

8.2.17 The cultural heritage assessment identified those cultural and archaeological resources within the 200m EOBP study corridor along the route of the proposed options. There is a SAM, 3 Conservation Areas, HGDL, and a number of Listed Buildings present within the section of the EOBP study corridor between Baberton and Hermiston.

8.2.18 The possibility of uncharted archaeological remains was also investigated and accepted, given the nature of the EOBP study corridor and the need for further study at the next stage.

8.2.19 Construction and operational effects were considered to have moderate negative impact on any cultural heritage and archaeological resources within the EOBP study corridor.

8.2.20 Since Section 2 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 8.3 Section 3

### Scoping

8.3.1 This section of the STAG Environmental Appraisal relates to the assessment of cultural heritage issues, with particular respect to local archaeology, listed buildings and the historic built environment within the EOBP study corridor of the route option.

8.3.2 Cultural heritage offers a tangible link to the past, which might be permanently affected by development. To prevent needless damage and destruction, care must be taken either through design or mitigation measures to ensure that negative impacts are kept to a minimum.

8.3.3 The scoping of cultural heritage issues relates to the proposed EOBP study corridor and the factors that are requiring assessment.

8.3.4 A 200m search zone was identified on either side of the route options. Two sources of information were used: Finalised Edinburgh City Local Plan (March 2007); data from the Pastmap interactive website developed by Historic Scotland, RCAHMS; and the Association of Local Government Archaeological Officers UK. These sources of information provided details of statutory and non-statutory designated sites within the EOBP study corridor and of archaeological remains.

### Baseline

8.3.5 As Section 1.

**Statutory designations**

8.3.6 There are no SAMs located within the 200m EOBP study corridor. There are 8 Listed Buildings located within this part of the within the EOBP study corridor, including 3 Grade A Listed Buildings at Bonaly.

8.3.7 There are two adjoining Conservation Areas located either side of the A720 Edinburgh City Bypass at Juniper Green and Colinton and a Conservation Area located at the eastern extent of this section at Swanston near Lothianburn. There are no HGDLs within this section of the EOBP study corridor.

**Non-statutory designations**

8.3.8 There are 15 NMRS within a 200m search zone of the EOBP study corridor.

8.3.9 There are areas of Ancient Woodland either side of the A720 Edinburgh City Bypass, with a significant section at Dreghorn.

**Archaeological remains**

8.3.10 It is likely that the EOBP study corridor may contain uncharted archaeological remains due to previous industrial history and proximity to historic settlements, specifically along the Water of Leith.

## Assessment

**Statutory designations**

8.3.11 The development of the option could potentially impact upon the setting of the some Listed Buildings and the Juniper Green, Colinton and Swanston Conservation Area due to the creation of emergency lay-bys and creation of signage structures, therefore the impact is considered to be neutral to negative minor depending on the design and location.

**Non-statutory designations**

8.3.12 There is unlikely to be any direct impacts on the NMRSs or areas of Ancient Woodland. The option would have a neutral impact.

**Archaeological remains**

8.3.13 The impact of the site options on uncharted archaeological remains is not quantifiable at this time, and survey work may be required during the subsequent stages of the project in order fully assess the likely impacts and their significance.

## Appraisal

8.3.14 The magnitude of construction and operational impacts on non-statutory sites and uncharted archaeological remains for the route options will be neutral or negative minor, as there may be changes to the receptors settings, while the significance of the impacts are judged to be direct small minor negative impact.

## Summary

8.3.15 The cultural heritage assessment identified those cultural and archaeological resources within the 200m EOBP study corridor along the route of the proposed options. There are 8 Listed Buildings and part of Juniper Green, Colinton and Swanston Conservation Area is located within the EOBP study corridor. There are no SAMs present within this section of the EOBP study corridor.

8.3.16 There are unlikely to be any significant impacts to statutory designations due to the fact that the vast majority of the required infrastructure for the option is already in place, therefore the impact is thought to be neutral.

8.3.17 Since Section 3 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

# 8.4 Section 4

## Scoping

8.4.1 This section of the STAG Environmental Appraisal relates to the assessment of cultural heritage issues, with particular respect to local archaeology, listed buildings and the historic built environment within the EOBP study corridor of the route options.

8.4.2 Cultural heritage offers a tangible link to the past, which might be permanently affected by development. To prevent needless damage and destruction, care must be taken either through design or mitigation measures to ensure that negative impacts are kept to a minimum.

8.4.3 The scoping of cultural heritage issues relates to the proposed EOBP study corridor and the factors that are requiring assessment.

8.4.4 A 200m search zone was identified on either side of the route options. Three sources of information were used: Finalised Edinburgh City Local Plan (March 2007); Finalised Midlothian Local Plan (June 2006); data from the Pastmap interactive website developed by Historic Scotland, RCAHMS; and the Association of Local Government Archaeological Officers UK. These sources of information provided details of statutory and non-statutory designated sites within the study and of archaeological remains.

## Baseline

8.4.5 As Section 1.

### Statutory designations

8.4.6 There are no SAMs or Listed Buildings located within the 200m EOBP study corridor.

8.4.7 Morton Conservation Area is located to the north of the A720 Edinburgh City Bypass. There are no HGDLs within the EOBP study corridor.

### Non-statutory designations

8.4.8 There are 2 NMRS within a 200m search zone of the EOBP study corridor.

8.4.9 There are no areas of Ancient Woodland within this section of the EOBP study corridor.

### Archaeological remains

8.4.10 It is likely that the EOBP study corridor may contain uncharted archaeological remains due to proximity to historic settlements.

## Assessment

### Statutory designations

8.4.11 The development of the route options could potentially impact upon the setting of both the Morton and Swanston Conservation Areas (see Section 3), however the impact of the option is considered to be minor.

**Non-statutory designations**

8.4.12 It is likely that the setting of some NMRSs will be affected, but it is unlikely to be of any great significance, and therefore the impact is considered to be neutral.

**Archaeological remains**

8.4.13 The impact of the site options on uncharted archaeological remains is not quantifiable at this time, and survey work may be required during the subsequent stages of the project in order fully assess the likely impacts and their significance.

### Appraisal

8.4.14 The magnitude of construction and operational impacts on non-statutory sites and uncharted archaeological remains for the route options will be neutral or negative minor, as there may be changes to the receptors settings, while the significance of the impacts are judged to be direct small minor negative impact.

### Summary

8.4.15 The cultural heritage assessment identified those cultural and archaeological resources within the 200m EOBP study corridor along the route of the proposed option. There are no SAMs or Listed Buildings present within the EOBP study corridor, although part of Morton Conservation Area is located within this corridor.

8.4.16 The possibility of uncharted archaeological remains was also investigated and accepted, given the nature of the EOBP study corridor and the need for further study at the next stage.

8.4.17 Construction and operational effects were considered to have a neutral to negative minor impact on any cultural heritage and archaeological resources within the EOBP study corridor.

8.4.18 Those options which have Section 4h rather than Section 4, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 4 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 8.5 Section 5

### Scoping

8.5.1 This section of the STAG Environmental Appraisal relates to the assessment of cultural heritage issues, with particular respect to local archaeology, listed buildings and the historic built environment within the EOBP study corridor of the route options.

8.5.2 Cultural heritage offers a tangible link to the past, which might be permanently affected by development. To prevent needless damage and destruction, care must be taken either through design or mitigation measures to ensure that negative impacts are kept to a minimum.

8.5.3 The scoping of cultural heritage issues relates to the proposed EOBP study corridor and the factors that are requiring assessment.

8.5.4 A 200m search zone was identified on either side of the route options. Three sources of information were used: Finalised Edinburgh City Local Plan (March 2007); Finalised Midlothian Local Plan (June 2006); data from the Pastmap interactive website developed by Historic Scotland, RCAHMS; and the Association of Local Government Archaeological Officers UK. These sources of information provided details of statutory and non-statutory designated sites within the EOBP study corridor and of archaeological remains.

## Baseline

8.5.5 As Section 1.

### Statutory designations

8.5.6 There are 3 Listed Buildings located within the 200m EOBP study corridor – Ashgrove House Cottage, Sundial and Boundary Wall and Gate Pier.

8.5.7 There are no SAMs, Conservation Areas or HGDLs within this section of the EOBP study corridor.

### Non-statutory designations

8.5.8 There are 5 NMRSs within a 200m search zone of the EOBP study corridor.

8.5.9 There are no areas of Ancient Woodland within this section of the EOBP study corridor.

### Archaeological remains

8.5.10 It is likely that the EOBP study corridor may contain uncharted archaeological remains due to previous history and proximity to historic settlements.

## Assessment

### Statutory designations

8.5.11 The route options would not directly impact on statutory cultural heritage features, due to the fact that the vast majority of the route would utilise existing areas of made ground. However, there could be a minor negative impact on the setting of 3 Listed Buildings within the EOBP study corridor. Therefore impacts are considered to range from neutral to minor.

### Non-statutory designations

8.5.12 There are also some non statutory designations (NMRSs) near the option that may experience impacts upon their setting although this would be a neutral - minor impact. The option has the potential to directly impact upon NMRSs therefore the impact could be negative moderate to major depending on the exact alignment.

### Archaeological remains

8.5.13 The impact of the route options on uncharted archaeological remains is not quantifiable at this time, and survey work may be required during the subsequent stages of the project in order fully assess the likely impacts and their significance.

### Appraisal

8.5.14 The magnitude of construction and operational impacts on non-statutory sites and uncharted archaeological remains for the route options will be neutral or negative minor, as there may be changes to the receptors settings, while the significance of the impacts are judged to be direct small minor negative impact.

### Summary

8.5.15 The cultural heritage assessment identified those cultural and archaeological resources within the 200m EOBP study corridor along the route of the proposed options. There are 3 Listed Buildings present within this section of the EOBP study corridor.

8.5.16 The possibility of uncharted archaeological remains was also investigated and accepted, given the nature of the EOBP study corridor and the need for further study at the next stage.

8.5.17 Construction and operational effects were considered to have a neutral to negative minor impact on any cultural heritage and archaeological resources within the EOBP study corridor.

8.5.18 Those options which have Section 5h rather than Section 5, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 5 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 8.6 Section 6

### Scoping

8.6.1 This section of the STAG Environmental Appraisal relates to the assessment of cultural heritage issues, with particular respect to local archaeology, listed buildings and the historic built environment within the EOBP study corridor of the route options.

8.6.2 Cultural heritage offers a tangible link to the past, which might be permanently affected by development. To prevent needless damage and destruction, care must be taken either through design or mitigation measures to ensure that negative impacts are kept to a minimum.

8.6.3 The scoping of cultural heritage issues relates to the proposed EOBP study corridor and the factors that are requiring assessment.

8.6.4 A 200m search zone was identified on either side of the route options. Three sources of information were used: Finalised Edinburgh City Local Plan (March 2007); Shawfair Local Plan (September 2003); data from the Pastmap interactive website developed by Historic Scotland, RCAHMS; and the Association of Local Government Archaeological Officers UK. These sources of information provided details of statutory and non-statutory designated sites within the study and of archaeological remains.

### Baseline

8.6.5 As Section 1.

### Statutory designations

8.6.6 There are approximately 15 Listed Buildings located within the 200m EOBP study corridor – The majority of which are located within the boundaries of Drum Estate, and some of which are categorised as Grade A Listed Buildings. Part of the Gilmerton Conservation Area is located within the EOBP study corridor.

8.6.7 The Drum Estate HGDL is located within the 200m EOBP study corridor. There are no SAMs located in the EOBP study corridor.

### Non-statutory designations

8.6.8 There are a number of NMRSs within a 200m search zone of the EOBP study corridor.

8.6.9 There are areas of Ancient Woodland located within the EOBP study corridor at Drum and at Edmonstone.

### Archaeological remains

8.6.10 It is likely that the EOBP study corridor may contain uncharted archaeological remains due to previous history.

## Assessment

### Statutory designations

8.6.11 There are a number of Listed Buildings adjacent to the route options which may experience construction impacts and impacts on their setting. In particular, there are two Listed Buildings (Edmonstone House Gates and Lodge) adjacent to Old Dalkeith Road which would require demolition. As such this would result in a major negative impact.

8.6.12 Gilmerton Conservation Area and Drum Estate HGDL are also likely to experience impacts upon their respective settings, in the case of Gilmerton Conservation Area, the impacts is thought to be minor in magnitude and significance.

8.6.13 A potential option is to create a new segregated Bus Rapid Transit route between Drum Street and Ferniehill Drive along the western edge of the Drum Estate. This would result in moderate to major negative impacts on the Drum Estate HGDL, and a Listed Building located on the perimeter of the estates grounds.

### Non-statutory designations

8.6.14 Non-statutory designations comprise NMRSs sites. It is unlikely that any of the NMRS will experience direct short-term negative impacts as a result of any construction works, such as the construction of a new Bus Rapid Transit route on the disused railway for part of the route option. Additionally, it is likely that the settings of all the NMRSs will be affected, but it is unlikely to be of any great significance, as the majority of the infrastructure required for the options are existing, therefore impacts to surrounding cultural heritage receptors are likely to be neutral to negative minor, depending on the design and location of the works.

8.6.15 The options would have a major adverse impact on an area of Ancient Woodland at Edmonstone as a result of tree felling for the proposed route options.

**Archaeological remains**

8.6.16 The impact of the site options on uncharted archaeological remains is not quantifiable at this time, and survey work may be required during the subsequent stages of the project in order fully assess the likely impacts and their significance.

### Appraisal

8.6.17 The magnitude of construction and operational impacts on non-statutory sites and uncharted archaeological remains for the route options will be neutral or negative minor, as there may be changes to the receptors settings, while the significance of the impacts are judged to be direct small minor negative impact.

### Summary

8.6.18 The cultural heritage assessment identified those cultural and archaeological resources within a 200m EOBP study corridor along the route of the proposed option. There are no SAMs within the EOBP study corridor, although there are a number of Listed Buildings, a Conservation Area, and a HGDL.

8.6.19 The possibility of uncharted archaeological remains was also investigated and accepted, given the nature of the EOBP study corridor and the need for further study at the next stage.

8.6.20 Construction and operational effects of the option were considered to have a moderate to major negative impact on cultural heritage and archaeological resources within the EOBP study corridor, as some Listed Buildings would require demolition, an area of HGDL would be directly infringed upon and an area of Ancient Woodland would require felling.

8.6.21 Those options which have Section 6h rather than Section 6, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 6 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 8.7 Section 7

### Scoping

8.7.1 This section of the STAG Environmental Appraisal relates to the assessment of cultural heritage issues, with particular respect to local archaeology, listed buildings and the historic built environment within the EOBP study corridor of the route options.

8.7.2 Cultural heritage offers a tangible link to the past, which might be permanently affected by development. To prevent needless damage and destruction, care must be taken either through design or mitigation measures to ensure that negative impacts are kept to a minimum.

8.7.3 The scoping of cultural heritage issues relates to the proposed EOBP study corridor and the factors that are requiring assessment.

8.7.4 A 200m search zone was identified on either side of the route options. Three sources of information were used: Finalised Edinburgh City Local Plan (March 2007); Shawfair Local Plan (September 2003); data from the Pastmap interactive website developed by Historic Scotland, RCAHMS; and the Association of Local Government Archaeological Officers UK. These sources of information provided details of statutory and non-statutory designated sites within the study and of archaeological remains.

## Baseline

8.7.5 As Section 1.

### Statutory designations

8.7.6 There are approximately 40 Listed Buildings located within this section of the 200m EOBP study corridor. Most are contained within two distinct clusters – Niddrie Cottages and properties on Whitehill Street.

8.7.7 There are no SAMs, Conservation Areas or HGDLs located within the EOBP study corridor.

### Non-statutory designations

8.7.8 There are a number of NMRSs within a 200m search zone of the EOBP study corridor.

8.7.9 There is an area of Ancient Woodland located at Newhailes within the 200m EOBP study corridor.

### Archaeological remains

8.7.10 It is likely that the EOBP study corridor may contain uncharted archaeological remains due to previous industrial history and proximity to historic settlements.

## Assessment

### Statutory designations

8.7.11 There are a number of Listed Buildings adjacent to the route options that may experience construction impacts and impacts on their setting, although these impacts are excepted to be negative minor.

8.7.12 There are not expected to be any significant physical impacts on any Listed Buildings.

### Non-statutory designations

8.7.13 Non-statutory designations comprise NMRS sites. It is unlikely that any of the NMRS will experience direct short-term negative impacts as a result of any construction works, such as the construction of a new Bus Rapid Transit route between Edinburgh Royal Infirmary and Fort Kinnaird. Additionally, it is likely that the settings of all the NMRSs will be affected, but it is unlikely to be of any great significance, as the majority of the infrastructure required for the options are existing, therefore impacts to surrounding cultural heritage receptors are likely to be neutral to negative minor, depending on the design and location of the works.

**Archaeological remains**

8.7.14 The impact of the site options on uncharted archaeological remains is not quantifiable at this time, and survey work may be required during the subsequent stages of the project in order fully assess the likely impacts and their significance.

### Appraisal

8.7.15 The magnitude of construction and operational impacts on non-statutory sites and uncharted archaeological remains for the route options will be neutral or negative minor, as there may be changes to the receptors settings, while the significance of the impacts are judged to be direct small minor negative impact.

### Summary

8.7.16 The cultural heritage assessment identified those cultural and archaeological resources within the 200m EOBP study corridor along the route of the proposed options. There are no SAMs within the EOBP study corridor, although there are a significant number of Listed Buildings and a Conservation Area.

8.7.17 The possibility of uncharted archaeological remains was also investigated and accepted, given the nature of the EOBP study corridor and the need for further study at the next stage.

8.7.18 Construction and operational effects were considered to have a neutral to negative minor impact on any cultural heritage and archaeological resources within the EOBP study corridor.

8.7.19 Since Section 7 is only applicable to Route A5, the above findings are only relevant to this option.

## 8.8 Section 8

### Scoping

8.8.1 This section of the STAG Environmental Appraisal relates to the assessment of cultural heritage issues, with particular respect to local archaeology, listed buildings and the historic built environment within the EOBP study corridor of the route options.

8.8.2 Cultural heritage offers a tangible link to the past, which might be permanently affected by development. To prevent needless damage and destruction, care must be taken either through design or mitigation measures to ensure that negative impacts are kept to a minimum.

8.8.3 The scoping of cultural heritage issues relates to the proposed EOBP study corridor and the factors that are requiring assessment.

8.8.4 A 200m search zone was identified on either side of the route options. Three sources of information were used: Finalised Edinburgh City Local Plan (March 2007); Shawfair Local Plan (September 2003); data from the Pastmap interactive website developed by Historic Scotland, RCAHMS; and the Association of Local Government Archaeological Officers UK. These sources of information provided details of statutory and non-statutory designated sites within the study and of archaeological remains.

## Baseline

8.8.5 As Section 1.

**Statutory designations**

8.8.6 There are 4 Listed Buildings located within the 200m EOBP study corridor – Newton Parish Church, Newton Parish Church Watch House, Millerhill Newton House, Chalfont (formerly Newton Manse).

8.8.7 There is one SAM (Newton Pit Alignment). There is also a HGDL (Newton House).

**Non-statutory designations**

8.8.8 There are five NMRSs within a 200m search zone of the EOBP study corridor.

8.8.9 There are no areas of Ancient Woodland located within the EOBP study corridor.

**Archaeological remains**

8.8.10 It is likely that the EOBP study corridor may contain uncharted archaeological remains due to previous history and proximity to historic settlements.

## Assessment

**Statutory designations**

8.8.11 There are some Listed Buildings adjacent the proposed route that may experience impacts on their setting. There are not expected to be any significant physical impacts on any Listed Buildings.

8.8.12 The SAM would experience moderate impacts on its setting. There would be a major impact on the Newton House HGDL, as the new Bus Rapid Transit route would require land take and severe this receptor. The construction of the Millerhill Park and Ride site would have a major negative impact these receptors.

**Non-statutory designations**

8.8.13 Non-statutory designations comprise NMRSs sites. It is unlikely that any of the NMRS will experience direct short-term negative impacts as a result of any construction works. Additionally, it is likely that the settings of all the NMRSs will be affected, but it is unlikely to be of any great significance, as the majority of the infrastructure required for the options are existing, therefore impacts to surrounding cultural heritage receptors are likely to be neutral to negative minor, depending on the design and location of the works.

**Archaeological remains**

8.8.14 The impact of the site options on uncharted archaeological remains is not quantifiable at this time, and survey work may be required during the subsequent stages of the project in order fully assess the likely impacts and their significance.

### Appraisal

8.8.15 The magnitude of construction and operational impacts on non-statutory sites and uncharted archaeological remains for the route options will be neutral or negative minor, as there may be changes to the receptors settings, while the significance of the impacts are judged to be direct small minor negative impact.

### Summary

8.8.16 The cultural heritage assessment identified those cultural and archaeological resources within the 200m EOBP study corridor along the route of the proposed route options. There is one SAM, 4 Listed Buildings, a HGDL, and 5 NMRSs present within the EOBP study corridor.

8.8.17 The possibility of uncharted archaeological remains was also investigated and accepted, given the nature of the EOBP study corridor and the need for further study at the next stage.

8.8.18 Construction and operational effects were considered to have a moderate to major negative impact on any cultural heritage and archaeological resources within the EOBP study corridor.

8.8.19 Since Section 8 is only applicable to Routes B17 and B18, the above findings are only relevant to these options.

## 8.9 Section 9

### Scoping

8.9.1 This section of the STAG Environmental Appraisal relates to the assessment of cultural heritage issues, with particular respect to local archaeology, listed buildings and the historic built environment within the EOBP study corridor of the route options.

8.9.2 Cultural heritage offers a tangible link to the past, which might be permanently affected by development. To prevent needless damage and destruction, care must be taken either through design or mitigation measures to ensure that negative impacts are kept to a minimum.

8.9.3 The scoping of cultural heritage issues relates to the proposed EOBP study corridor and the factors that are requiring assessment.

8.9.4 A 200m search zone was identified on either side of the route options. Three sources of information were used: Finalised Edinburgh City Local Plan (March 2007); Shawfair Local Plan (September 2003); data from the Pastmap interactive website developed by Historic Scotland, RCAHMS; and the Association of Local Government Archaeological Officers UK. These sources of information provided details of statutory and non-statutory designated sites within the study and of archaeological remains.

### Baseline

8.9.5 As Section 1.

### Statutory designations

8.9.6 There are approximately 15 Listed Buildings located within the 200m EOBP study corridor – The majority of which are located within the boundaries of Drum Estate, and some of which are categorised as Grade A Listed Buildings. Part of the Gilmerton Conservation Area is located within the EOBP study corridor.

8.9.7 The Drum Estate HGDL is located within the 200m EOBP study corridor. There are no SAMs located in the EOBP study corridor.

### Non-statutory designations

8.9.8 There are a number of NMRSs within a 200m search zone of the EOBP study corridor.

8.9.9 There are areas of Ancient Woodland located within the EOBP study corridor at Drum and at Edmonstone.

### Archaeological remains

8.9.10 It is likely that the EOBP study corridor may contain uncharted archaeological remains due to previous history.

## Assessment

### Statutory designations

8.9.11 There are a number of Listed Buildings adjacent to the route options which may experience construction impacts and impacts on their setting. In particular, there are two Listed Buildings (Edmonstone House Gates and Lodge) adjacent to Old Dalkeith Road which would require demolition. As such this would result in a major negative impact.

8.9.12 Gilmerton Conservation Area and Drum Estate HGDL are also likely to experience impacts upon their respective settings, in the case of Gilmerton Conservation Area, the impacts is thought to be minor in magnitude and significance.

8.9.13 A potential option is to create a new segregated Bus Rapid Transit route between Drum Street and Ferniehill Drive along the western edge of the Drum Estate. This would result in moderate to major negative impacts on the Drum Estate HGDL, and a Listed Building located on the perimeter of the estates grounds.

### Non-statutory designations

8.9.14 Non-statutory designations comprise NMRSs sites. It is unlikely that any of the NMRS will experience direct short-term negative impacts as a result of any construction works, such as the construction of a new Bus Rapid Transit route on the disused railway for part of the route option. Additionally, it is likely that the settings of all the NMRSs will be affected, but it is unlikely to be of any great significance, as the majority of the infrastructure required for the options are existing, therefore impacts to surrounding cultural heritage receptors are likely to be neutral to negative minor, depending on the design and location of the works.

8.9.15 The options would have a major adverse impact on an area of Ancient Woodland at Edmonstone as a result of tree felling for the proposed route options.

**Archaeological remains**

8.9.16 The impact of the site options on uncharted archaeological remains is not quantifiable at this time, and survey work may be required during the subsequent stages of the project in order fully assess the likely impacts and their significance.

## Appraisal

8.9.17 The magnitude of construction and operational impacts on non-statutory sites and uncharted archaeological remains for the route options will be neutral or negative minor, as there may be changes to the receptors settings, while the significance of the impacts are judged to be direct small minor negative impact.

## Summary

8.9.18 The cultural heritage assessment identified those cultural and archaeological resources within a 200m EOBP study corridor along the route of the proposed option. There are no SAMs within the EOBP study corridor, although there are a number of Listed Buildings, a Conservation Area, and a HGDL.

8.9.19 The possibility of uncharted archaeological remains was also investigated and accepted, given the nature of the EOBP study corridor and the need for further study at the next stage.

8.9.20 Construction and operational effects of the option were considered to have a moderate to major negative impact on cultural heritage and archaeological resources within the EOBP study corridor, as some Listed Buildings would require demolition, an area of HGDL would be directly infringed upon and an area of Ancient Woodland would require felling.

8.9.21 Since Section 9 is only applicable to Route C5, the above findings are only relevant to this option.

# 9 LANDSCAPE

## 9.1 Section 1

### Scoping

9.1.1 This appraisal assesses the landscape effects of the proposed transport options. The landscape effects are changes to the landscape resource. The appraisal is based on the STAG Guidance for conducting Stage 2 environmental assessments. It is based on desk-top research and consultation with relevant statutory bodies. There has been no site visit by a landscape Architect for this study. In order to fully assess the options a site visit would be required.

### Methodology

9.1.2 The methodology is based on best practice guidance from the Guidelines for Landscape and Visual Impact Assessment. The assessment uses the following timescale:

1 Baseline - existing conditions before the proposal;

2 Operation - year 1 to show the preferred option as implemented;

3 Construction phase to show the temporary effects.

9.1.3 This assessment uses the five point scale in accordance with the Design Manual for Roads and Bridges Volume 11: Environment Assessment, which is intended for the assessment of roads but provides a good general landscape classification. i.e. high quality, very attractive, good landscape, ordinary landscape and poor landscape.

9.1.4 Potential mitigation measures should be considered at an early stage in the development of the project. These have been considered at a high-level in this appraisal, and the residual effects (after mitigation) are recorded.

### Baseline

9.1.5 There are two Designed Landscapes near to the EOBP study corridor. Newliston is located to the west of the EOBP study corridor and Millburn Tower to the south. Three Areas of Outstanding Quality are located adjacent to the EOBP study corridor to the south (Gogar). The area is within the Greenbelt. (Edinburgh and Lothians Structure Plan 2015; Rural West Edinburgh Local Plan (Finalised) 2003; Draft Rural West Edinburgh Local Plan Alteration Oct 2008; West Edinburgh Planning Framework 2008).

9.1.6 The EOBP study corridor is located in an area of existing countryside and urban fringe between Newbridge and Gogar. The land is flat to gently undulating and has the major with transport corridor of the A8 within it and Edinburgh Airport and the Royal Highland Showground adjacent to it. This area is undergoing redevelopment particularly associated with Edinburgh Airport so there are recent changes to the landscape and layout including a new Park and Ride area and the development of a major office campus with associated landscaping and a new bridge. There are also other recently developed offices along the A8 route corridor. The Edinburgh

Tram route which is currently under construction runs from the Ingliston Park and Ride to the west of this section, parallel to the A8 and approximately 200m to the north of it. The M8 route corridor, Union Canal and a railway are located to the south of the A8.

9.1.7 The Lothians Landscape Character Assessment (SNH Feb 1997) classifies the landscape of the western section of the EOBP study corridor as Lowland Plains and the eastern section as Urban Landscape character types. Lowland Plains is described as a broad swathe of gently rolling drift covered plain forming the heart of the Lothians region characterised by the predominance of arable farmland. The EOBP study corridor is within Character Area 21 Lower Almond Farmlands. The Landscape Character Assessment provides a useful description of the current local landscape setting of the EOBP study corridor but as the area is currently undergoing redevelopment and further major redevelopment is proposed, it should be read in conjunction with the Development Plan and West Edinburgh Planning Framework.

9.1.8 Character Area 21 provides the western setting of the City with expansive views to the nearby coast and hills. The area has a strong field pattern with medium to large scale fields divided by bushy hedgerows, fences and occasional lengths of stone walls. Policy woodlands and shelterbelts associated with designed landscapes make a significant contribution to the landscape character of the wider area which also has scattered small settlements, farmsteads and houses many of which have become absorbed within more recent developments. On the western outskirts of Edinburgh the landscape is dominated by the airport and nearby industrial estates and commercial centres. There is a complex network of major roads, the M8, railway and canal routes which and sever the farmland and include numerous aqueducts, viaducts and road and rail bridges of various ages and styles. Further disruption is caused by pylon lines and prominent bings and quarries.

9.1.9 The Landscape Character Assessment identifies the continuing road corridor extension pressures and cumulative impacts of urban expansion as negative attributes and recommends careful siting and design to minimise further impacts and additional planting associated with new development proposals to help reinforce and repair damages and fragmented field patterns.

9.1.10 The Development Plan includes the EOBP study corridor within the Greenbelt but allocates large areas of land to the north for Proposed Airport expansion and International Business Gateway. The Existing showground is to be re-located to the south of the A8. Land is also safeguarded for the West Edinburgh Tram route and tram stop and there is provision for an Orbital Rapid Transport Route. Various sites around existing settlements are allocated for further housing and commercial development. The West Edinburgh Planning Framework allows for all of the area to the north of the A8 to be developed by 2030 with an extended airport boundary, International Business Gateway and tram depot.

9.1.11 The current landscape is attractive and forms the setting for the western approach to the City but it is increasingly undergoing redevelopment and fragmentation and the landscape character will be transformed when the proposed redevelopment is complete. As the landscape is currently within the Greenbelt and there are Historic Gardens and Designed Landscapes within the area, it would be classified as good/ordinary landscape.

## Assessment

9.1.12 This option comprises the provision of additional bus lanes at Gogar and approaching the junction of the Newbridge roundabout within the existing A8 transport corridor.

### Construction

9.1.13 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- On-site fabrication of major structures;
- Removal of trees and vegetation.

9.1.14 The removal of vegetation would be the only potential permanent effect and it is unlikely that this will permanently affect the landscape character. Temporary effects will not affect the landscape character. The magnitude of construction effects for the option would be neutral.

### Operation

9.1.15 The landscape effects of this option will be minimal because the bus priority will take place on an existing route and the infrastructure is already in place. The changes are likely to be the introduction of markings on the road, signage and any changes to the location and design of bus shelters. These are small scale physical changes which will not affect the landscape character. The magnitude of the effects is likely to be neutral.

### *Mitigation*

9.1.16 Mitigation recommendations in relation to the route option would be careful siting and design of any associated structures to avoid adverse effects. If the road is to be widened to accommodate additional lanes then any vegetation removed should be replaced with appropriate planting to link with the existing landscape structure.

### *Residual effects*

9.1.17 After mitigation there would be changes to the landscape as described above. The residual effects will be known once the final design is completed but are likely to be minimal.

### Appraisal

#### Construction

9.1.18 After mitigation there would be changes to the landscape as described above. The residual effects will be known once the final design is completed but are likely to be minimal.

#### Operation

9.1.19 This option will result in small changes to the landscape which is unlikely to affect the landscape character. Significance of impact: No impact.

### Summary

9.1.20 This option will have minor landscape effects but these are not likely to affect the landscape character.

9.1.21 Since Section 1 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 9.2 Section 2

### Scoping

9.2.1 As Section 1.

#### Methodology

9.2.2 As Section 1.

### Baseline

9.2.3 There is a Designed Landscape (Millburn Tower) and Conservation Area (Hermiston) near to the EOBP study corridor to the west. The area to the west of the A720 Edinburgh City Bypass is within the Greenbelt. (Edinburgh and Lothians Structure Plan 2015; Rural West Edinburgh Local Plan (Finalised) 2003; Draft Rural West Edinburgh Local Plan Alteration Oct 2008).

9.2.4 The EOBP study corridor is located on and around the A720 Edinburgh City Bypass which forms the edge of the built up area of the City. The land is flat to gently undulating and has major infrastructure corridors within it radiating from the City i.e. the M8 route corridor, other major roads, the Union Canal and two railways. The area has been subject to major redevelopment with the ongoing development of the Edinburgh Park Business Campus to the east, the recently developed business campus at Gogarburn and the Riccarton University campus to the west. A major upgrading of the A71 (Western section) is proposed.

9.2.5 The Lothians Landscape Character Assessment (SNH Feb 1997) classifies the landscape to the west of the A720 Edinburgh City Bypass as Lowland Plains and the area to the east as Urban Landscape character types. Lowland Plains is described as a broad swathe of gently rolling drift covered plain forming the heart of the Lothians region characterised by the predominance of arable farmland. The EOBP study corridor is within Character Area 21 Lower

Almond Farmlands. The Landscape Character Assessment provides a useful description of the current local landscape setting of the study corridor but as the area has recently undergone redevelopment it is somewhat outdated.

9.2.6 Character Area 21 provides the western setting of the City with expansive views to the nearby coast and hills. The area has a strong field pattern with medium to large scale fields divided by bushy hedgerows, fences and occasional lengths of stone walls. Policy woodlands and shelterbelts associated with designed landscapes make a significant contribution to the landscape character of the wider area which also has scattered small settlements, farmsteads and houses many of which have become absorbed within more recent developments. On the western outskirts of Edinburgh the landscape is dominated by the airport and nearby industrial estates and commercial centres. There is a complex network of major roads, the M8, railway and canal routes which and sever the farmland and include numerous aqueducts, viaducts and road and rail bridges of various ages and styles. Further disruption is caused by pylon lines and prominent bings and quarries.

9.2.7 The Landscape Character Assessment identifies the continuing road corridor extension pressures and cumulative impacts of urban expansion as negative attributes and recommends careful siting and design to minimise further impacts and additional planting associated with new development proposals to help reinforce and repair damages and fragmented field patterns.

9.2.8 The current landscape is attractive and forms the setting for the western approach to the City but areas have been redeveloped within it and fragmentation has occurred as a result of the development of infrastructure. As the landscape is within the Greenbelt and there are Designed Landscapes within it, the classification would be good/ordinary landscape.

## Assessment

9.2.9 This option comprises the provision of additional bus lanes on existing routes at the Gyle, the A71, Wester Hailes and Edinburgh Park; the conversion of the hard shoulder to a bus lane on existing routes through Edinburgh Park and Baberton; the development of two new interchanges and a segregated off road section across fields between Hermiston and Baberton.

### Construction

9.2.10 Permanent and temporary effects would depend on the scale, siting and design of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- Potential security lighting at night;

- The construction of temporary haul roads;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

9.2.11 The removal of vegetation would be the only potential permanent effect and it is unlikely that this will permanently affect the landscape character. The construction of the off road section is likely to have the most significant effects. Temporary effects will not affect the landscape character. The magnitude of construction effects for the option would be negative minor.

## Operation

9.2.12 The landscape effects of the on road sections of this option will be relatively minor because the development will take place on existing routes and the infrastructure is already in place. The changes for these sections are likely to be the introduction of markings on the road, signage and any changes to the location and design of bus shelters. The proposed interchanges would involve the provision of hard surfacing, shelters, fencing etc. but these are likely to be within existing built up areas. The section across open fields will further fragment the existing fragmented countryside and weaken the integrity of the Greenbelt at a vulnerable point between the A720 Edinburgh City Bypass which forms the western extent of the built up area and the Riccarton Campus. The magnitude of the effects is likely to be negative moderate.

## Mitigation

9.2.13 Mitigation recommendations in relation to the route option would be careful siting and design of any associated structures to avoid adverse effects. If roads are to be widened to accommodate additional lanes then any vegetation removed should be replaced with appropriate planting to link with the existing landscape structure. It is recommended that the proposed off road section should be planted to link with the existing landscape structure.

### Residual effects

9.2.14 After mitigation there would be changes to the landscape as described above. The residual effects will be known once the final design is completed but are likely to be negative moderate.

## Appraisal

### Construction

9.2.15 After mitigation there would be changes to the landscape as described above. The residual effects will be known once the final design is completed but are likely to be negative moderate.

### Operation

9.2.16 This option will result in a change to the landscape which is likely to fragment the landscape character and weaken the Greenbelt. Significance of impact: moderate negative impact.

### Summary

9.2.17 This option will have moderate landscape effects which will adversely affect the landscape character.

9.2.18 Since Section 2 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 9.3 Section 3

### Scoping

9.3.1 As Section 1.

### Methodology

9.3.2 As Section 1.

### Baseline

9.3.3 Pentland Hills Area of Great Landscape Value (AGLV) is located south of the A720 Edinburgh City Bypass and within the EOBP study corridor. The designated area extends to the north of the A720 Edinburgh City Bypass at Dreghorn Barracks (See Figure 1.2 Environmental Constraints). The area to the south of the A720 Edinburgh City Bypass together with the Water of Leith, are also designated as Greenbelt. Three Conservation Areas (Colinton, Juniper Green and Swanston) are also located within the EOBP study corridor.

9.3.4 The EOBP study corridor is located on and around the A720 Edinburgh City Bypass which forms the edge of the built up area of the City. The topography is undulating rising to the Pentland Hills. The western end of this section of the A720 Edinburgh City Bypass runs between the built up areas of Wester Hailes and Baberton before opening out on the south side to the open countryside of the Pentland Hills. The built up area to the north is well established.

9.3.5 The Lothians Landscape Character Assessment (SNH Feb 1997) classifies the landscape to the west of this section (Baberton) as Lowland Plains (see sections 1 and 2); the area to the north of the A720 Edinburgh City Bypass as Urban and the areas to the south of the A720 Edinburgh City Bypass as Uplands (Pentland Hills) Landscape character types. The Uplands are characterised by their altitude and have distinctive landcover of heather moorland, peatland and rough grassland. The EOBP study corridor is within Character Area 4 Pentland Hills.

9.3.6 The Pentland Hills have regional importance as a landscape feature in the Lothians because of their dominant location and visual prominence which forms a backdrop to the City. The northern edge forms an escarpment overlooking the City. The landcover has been modified over time by agricultural practices including grazing and burning. The lower slopes have improved fields, shelter belts and small woodlands. There are also patches of gorse. The hills are sparsely populated. There are large areas devoted to military training and recreation and a network of footpaths. The Pentlands slopes and summits are described as having high visual sensitivity which should be protected from further development.

9.3.7 Although the A720 Edinburgh City Bypass is not specifically designated, there is an AGLV's within part of study corridor together with three Conservation Areas. The landscape is attractive and forms the backdrop to the City and would be classified as very attractive/good landscape.

## Assessment

9.3.8 This option proposes the conversion of the hard shoulder to a bus lane, the extension of the route to Lothianburn and the development of a Park and Ride facility.

### Construction

9.3.9 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

9.3.10 The removal of vegetation would be the only potential permanent effect and it is unlikely that this will permanently affect the landscape character. Much of the potential vegetation that may be removed is relatively recently planted. Temporary effects will not affect the landscape character. The magnitude of construction effects for the option would be negative minor.

### Operation

9.3.11 The landscape effects of this option will be relatively minor because the development will take place on an existing route and the infrastructure is already in place. The changes for these sections are likely to be the introduction of markings on the road, signage and any changes to the location and design of bus shelters. The proposed Park and Ride facility would involve the provision of hard surfacing, shelters, fencing etc. the proposed location is in a prominent position owing to the topography. The magnitude of the effects is likely to be negative minor.

### *Mitigation*

9.3.12 Mitigation recommendations in relation to the option would be careful siting and design of any associated structures to avoid adverse effects. Any vegetation removed should be replaced with appropriate planting to link with the existing landscape structure.

***Residual effects***

9.3.13 After mitigation there would be changes to the landscape as described above. The residual effects will be known once the final design is completed but are likely to be negative minor.

### Appraisal

**Construction**

9.3.14 The significance of construction effects will be known once the final design is completed but are likely to be minor negative impact.

**Operation**

9.3.15 This option will result in a minor change to the landscape. Significance of impact: minor negative impact.

### Summary

9.3.16 This option will have minor landscape effects.

9.3.17 Since Section 3 is common to all options, it is reasonable to assume the above findings are applicable to all 4 options (i.e. Route A5, B17, B18 and C5).

## 9.4 Section 4

### Scoping

9.4.1 As Section 1.

### Methodology

9.4.2 As Section 1.

### Baseline

9.4.3 The areas to the north and south of this section are designated as Greenbelt. There are two areas Areas of Great Landscape Value (Pentland Hills and Mortonhall) and two Conservation Areas (Fairmilehead and Swanston) near to the EOBP study corridor.

9.4.4 The EOBP study corridor is located on and around the A720 Edinburgh City Bypass which forms the edge of the built up area of the City but at this point a green wedge of open land extends north into the City (Mortonhall, Braid Hills). The topography is undulating rising to the Pentland Hills to the southwest. The built up areas on the edge of the City to the north and at Straiton to the south are well established. There is a rural/ urban fringe area with scattered settlements to the south. There is a complex network of roads in this area and a major power line route adjacent to the A720 Edinburgh City Bypass. The adopted Midlothian Local Plan shows areas safeguarded for road schemes at Straiton and the committed Park and Ride facility is currently under construction.

9.4.5 The Lothians Landscape Character Assessment (SNH Feb 1997) classifies the landscape to the north of the A720 Edinburgh City Bypass as Urban and the areas to the south of the A720 Edinburgh City Bypass as Lowland River Valleys Landscape Character Type. These are well defined river valley landscapes of the lowlands distinguished by their landform with steep slopes carrying broadleaved woodland cover. The EOBP study corridor is within Character Area 13 North Esk.

9.4.6 North Esk is described as a steep sided valley opening out into a broad smooth undulating landscape broken by numerous streams. Woodland and improved pasture predominate in the rural areas near to the proposed option together with the policies of designed landscapes. There are scattered settlements including towns and villages which are surrounded by extensive 20th Century housing schemes. There are also areas of light industry, bings, reclaimed coal mines and sand and gravel pits. There is a network of major and minor roads feeding into Edinburgh. The pressures for development include the cumulative impact of urban fringe development. It is recommended that the existing woodland framework should be reinforced and extended as a setting for new development to improve integration.

## Assessment

9.4.7 This option proposes a segregated section along the A720 Edinburgh City Bypass and to Lothianburn, a bus lane from the A720 Edinburgh City Bypass to Straiton, together with the committed Park and Ride facility at Straiton.

### Construction

9.4.8 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

9.4.9 The removal of vegetation would be the only potential permanent effect and it is unlikely that this will permanently affect the landscape character. Much of the potential vegetation that may be removed is relatively recently planted. Temporary effects will not affect the landscape character. The magnitude of construction effects for the option would be negative minor.

**Operation**

9.4.10 The landscape effects of this option will be relatively minor because the development will take place on existing routes and the infrastructure is already in place. The changes for these sections are likely to be the introduction of markings on the road, signage and any changes to the location and design of bus shelters. If this section involves widening the existing road there may be adverse effects associated with the removal of vegetation and an intrusion of hard surfacing into landscaped areas. The magnitude of the effects is likely to be negative minor.

***Mitigation***

9.4.11 Mitigation recommendations in relation to the option would be careful siting and design of any associated structures to avoid adverse effects. Any vegetation removed should be replaced with appropriate planting to link with the existing landscape structure.

***Residual effects***

9.4.12 After mitigation there would be changes to the landscape as described above. The residual effects will be known once the final design is completed but are likely to be negative minor.

### Appraisal

**Construction**

9.4.13 The significance of construction effects will be known once the final design is completed but are likely to be minor negative impact.

**Operation**

9.4.14 This option will result in a minor change to the landscape. Significance of impact: minor negative impact.

### Summary

9.4.15 This option will have minor landscape effects.

9.4.16 Those options which have Section 4h rather than Section 4, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 4 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 9.5 Section 5

### Scoping

9.5.1 As Section 1.

### Methodology

9.5.2 As Section 1.

## Baseline

9.5.3 The areas to the north and south of this section are designated as Greenbelt.

9.5.4 The EOBP study corridor is located to the north and south of the A720 Edinburgh City Bypass which forms the edge of the built up area of the City but at this point the built up areas of Straiton and Loanhead extend south of the A720 Ediburgh City Bypass and the Greenbelt area is a narrow strip. The topography is undulating rising to the Pentland Hills to the southwest. The built up areas on the edge of the City to the north and at Straiton and Loanhead to the south are well established. There is a complex network of roads in this area causing the landscape to be very fragmented and a major power line route adjacent to the A720 Edinburgh City Bypass. The adopted Midlothian Local Plan shows areas safeguarded for road schemes at Straiton. To the east of Straiton Road there is an area of open space including a nature reserve and a public park.

9.5.5 The Lothians Landscape Character Assessment (SNH Feb 1997) classifies the landscape to the north of the A720 Edinburgh City Bypass as Urban and the areas to the south of the A720 Edinburgh City Bypass as Lowland River Valleys Landscape Character Type. These are well defined river valley landscapes of the lowlands distinguished by their landform with steep slopes carrying broadleaved woodland cover. The EOBP study corridor is within Character Area 13 North Esk.

9.5.6 North Esk is described as a steep sided valley opening out into a broad smooth undulating landscape broken by numerous streams. Woodland and improved pasture predominate in the rural areas near to the proposed option together with the policies of designed landscapes. There are scattered settlements including towns and villages which are surrounded by extensive 20th Century housing schemes. There are also areas of light industry, bings, reclaimed coal mines and sand and gravel pits. There is a network of major and minor roads feeding into Edinburgh. The pressures for development include the cumulative impact of urban fringe development. It is recommended that the existing woodland framework should be reinforced and extended as a setting for new development to improve integration.

9.5.7 This is an urban fringe area with existing major infrastructure. Although included in the Greenbelt the landscape is very fragmented. The landscape would be classified as ordinary landscape.

## Assessment

9.5.8 This option proposes a segregated section along roads and tracks within Loanhead and an extension of the route along the B701 at Mortonhall.

### Construction

9.5.9 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;

- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

9.5.10 The removal of vegetation would be the only potential permanent effect and it is unlikely that this will permanently affect the landscape character. Temporary effects will not affect the landscape character. The magnitude of construction effects for the option would be negative minor.

**Operation**

9.5.11 There will be some landscape effects caused by this option because the segregated section is located off the existing roads in an area of open land utilising existing tracks. The changes are likely to be the introduction of additional hard surfaces, fencing, markings on the road, signage and changes to the location and design of bus shelters. There may be adverse effects associated with the removal of vegetation and an introduction of hard surfacing into open space. The landscape is already fragmented in this area with the network of existing roads and major junctions and the introduction of new off road bus lanes will further fragment the landscape. The magnitude of the effects is likely to be negative moderate.

***Mitigation***

9.5.12 Mitigation recommendations in relation to the option would be careful siting and design of any associated structures to avoid adverse effects. Any vegetation removed should be replaced with appropriate planting to link with the existing landscape structure.

***Residual effects***

9.5.13 After mitigation there would be changes to the landscape as described above. The residual effects will be known once the final design is completed but are likely to be negative moderate.

## Appraisal

**Construction**

9.5.14 The significance of construction effects will be known once the final design is completed but are likely to be minor negative impact.

**Operation**

9.5.15 This option will result in a minor/moderate change to the landscape. Significance of impact: minor/moderate negative impact.

### Summary

9.5.16 This option will have minor/moderate landscape effects.

9.5.17 Those options which have Section 5h rather than Section 5, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 5 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 9.6 Section 6

### Scoping

9.6.1 As Section 1.

### Methodology

9.6.2 As Section 1.

### Baseline

9.6.3 This option is located within the designated Greenbelt. There is a Historic Garden and Designed Landscape (Drum Wood) within the EOBP study corridor. The EOBP study corridor is near to a Conservation Area (Ravenscroft).

9.6.4 The EOBP study corridor is located largely to the north of the A720 Edinburgh City Bypass in an agricultural area on the edge of the City in a narrow strip of Greenbelt between the established built up areas of the City and Bonnyrigg and Lasswade. The topography is undulating and there are extensive areas of broadleaved woodland to the southeast. There is a network of old rural roads and a railway line together with the more recent A720 Edinburgh City Bypass and a major power line route adjacent to it. There are areas of open space near to the EOBP study corridor. The Greenbelt area contains uses such as a butterfly farm, golf course, gravel pits etc.

9.6.5 The Lothians Landscape Character Assessment (SNH Feb 1997) classifies the landscape within the built up area of the City as Urban and the areas to the south of it as Lowland River Valleys Landscape Character Type. These are well defined river valley landscapes of the lowlands distinguished by their landform with steep slopes carrying broadleaved woodland cover. The study corridor is within Character Area 13 North Esk and the Urban classification which is not described in the document.

9.6.6 North Esk is described as a steep sided valley opening out into a broad smooth undulating landscape broken by numerous streams. Woodland and improved pasture predominate in the rural areas near to the proposed option together with the policies of designed landscapes. There are scattered settlements including towns and villages which are surrounded by extensive 20th Century housing schemes. There are also areas of light industry, bings, reclaimed coal mines and sand and gravel pits. There is a network of major and minor roads feeding into Edinburgh. The pressures for development include the cumulative impact of urban

fringe development. It is recommended that the existing woodland framework should be reinforced and extended as a setting for new development to improve integration.

9.6.7 The landscape around the EOBP study corridor is within the Greenbelt and has designations but also with existing major infrastructure. It would be classified as good landscape.

## Assessment

9.6.8 This option proposes a segregated section along an existing minor road and railway line, bus lanes along an existing major route within the urban area and an extension of the route along existing residential roads.

### Construction

9.6.9 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

9.6.10 The removal of vegetation would be the only potential permanent effect and it is unlikely that this will permanently affect the landscape character. Temporary effects will not affect the landscape character. The magnitude of construction effects for the option would be negative minor.

### Operation

9.6.11 There will be some landscape effects caused by this option because the segregated section is located on a minor road and railway line and will require some modification to be converted for buses. The changes are likely to be the introduction of additional hard surfaces, fencing, markings on the road, signage and changes to the location and design of bus shelters. There may be adverse effects associated with the removal of vegetation and an introduction of further hard surfacing. The magnitude of the effects is likely to be negative minor.

***Mitigation***

9.6.12 Mitigation recommendations in relation to the option would be careful siting and design of any associated structures to avoid adverse effects. Any vegetation removed should be replaced with appropriate planting to link with the existing landscape structure.

***Residual effects***

9.6.13 After mitigation there would be changes to the landscape as described above. The residual effects will be known once the final design is completed but are likely to be negative minor.

### Appraisal

**Construction**

9.6.14 The significance of construction effects will be known once the final design is completed but are likely to be minor negative impact.

**Operation**

9.6.15 This option will result in minor changes to the landscape. Significance of impact: Minor negative impact.

### Summary

9.6.16 This option will have minor landscape effects.

9.6.17 Those options which have Section 6h rather than Section 6, will use the existing hard shoulder and therefore while there might be similar environmental issues as in Section 6 above their impacts should be to a lesser extent. This means Routes A5, B18 and C5 would have slightly lower impacts than Route B17.

## 9.7 Section 7

### Scoping

9.7.1 As Section 1.

### Methodology

9.7.2 As Section 1.

### Baseline

9.7.3 Sections of this option are located within the designated Greenbelt.

9.7.4 The EOBP study corridor is located in the urban/urban fringe area between the Edinburgh Royal Infirmary and Newcraighall. The land is flat to gently undulating. This area is undergoing redevelopment so there are recent changes to the layout of built up areas and associated landscaping. The current landscape is open Greenbelt land on the edge of the built up area but the Edinburgh City Local Plan (Finalised Draft, March 2007) proposes large areas of open

space, housing development, a new school, business, commercial and industrial development along the proposed routes together with areas safeguarded for transport proposals. There is also an area of flood plain. (See Figure 1.2).

9.7.5 The Lothians Landscape Character Assessment (SNH Feb 1997) classifies the landscape within the built up area of the City as Urban and part of the EOBP study corridor is classified as the Coastal Margins. The urban classification is not described in the document. The Coastal Margins are where the Forth Estuary is the dominant influence. The landform is flat to gently undulating. The EOBP study corridor is located within Character Area 25, Musselburgh/Prestonpans Fringe.

9.7.6 Character Area 25 includes the lower flood plains of the River Esk. The landscape around the EOBP study corridor is described as arable with field boundaries of hedgerows and trees. The settled area is bounded by a dominant network of transport routes and contains a number of market towns now largely engulfed by modern housing developments. Cockenzie Power Station is the most dominant feature. There are also prominent bings, coal mining infrastructure, warehouse development, disused railways and pylon lines which create an industrialised character.

9.7.7 The landscape is relatively attractive but increasingly undergoing development. It is not specifically designated. The landscape would be classified as ordinary landscape.

## Assessment

9.7.8 This option proposes a segregated section along an existing track, wooded strip, and within an area of open space to Fort Kinnaird Park and Ride facility together with a loop from Musselburgh Park and Ride facility. There would be a possible interchange at Edinburgh Royal Infirmary and an extension of the route along Newcraighall road and existing residential roads and lanes.

### Construction

9.7.9 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

9.7.10 The removal of vegetation would be the only potential permanent effect and it is unlikely that this will permanently affect the landscape character. Temporary effects will not affect the landscape character. The magnitude of construction effects for the option would be negative minor.

**Operation**

9.7.11 There will be some landscape effects caused by this option because much of the segregated section is located on undeveloped areas including a woodland strip and over open land. However, as the area is undergoing redevelopment, the landscape in this area will change to a more urban character. The changes are likely to be the introduction of additional hard surfaces, fencing, markings on the road, signage and changes to the location and design of bus shelters. There may be adverse effects associated with the removal of vegetation and an introduction of further hard surfacing. The magnitude of the effects is likely to be negative moderate in the short term but negative minor when redevelopment takes place.

***Mitigation***

9.7.12 Mitigation recommendations in relation to the option would be careful siting and design of any associated structures to avoid adverse effects. Existing vegetation should be retained if possible and any vegetation removed should be replaced with appropriate planting to link with the existing landscape structure.

***Residual effects***

9.7.13 After mitigation there would be changes to the landscape as described above. The residual effects will be known once the final design is completed but are likely to be negative minor in the longer term.

## Appraisal

**Construction**

9.7.14 The significance of construction effects will be known once the final design is completed but are likely to be minor negative impact in the longer term.

**Operation**

9.7.15 This option will result in a moderate changes to the landscape in the short term but perceived as minor compared to redevelopment which is proposed. Significance of impact: Minor negative impact in the longer term.

## Summary

9.7.16 This option will have minor landscape effects in the longer term.

9.7.17 Since Section 7 is only applicable to Route A5, the above findings are only relevant to this option.

# 9.8 Section 8

## Scoping

9.8.1 As Section 1.

## Methodology

9.8.2 As Section 1.

## Baseline

9.8.3 The areas around the EOBP study corridor are designated as Greenbelt.

9.8.4 The EOBP study corridor is located to the north of the A720 Edinburgh City Bypass in a relatively narrow strip of Greenbelt between the well established built up areas of Edinburgh and Eskbank. The topography is flat to undulating. There is a network of old and new roads and railways in this area causing the landscape to be fragmented. There is also major power lines route adjacent to the A720 Edinburgh City Bypass and running north to south creating a cluttered character. The adopted Shawfair Local Plan (2003) shows road and rail proposals near to the EOBP study corridor. There is an existing Park and Ride facility (Sheriffhall) to the south of Danderhall with areas around it proposed for open space.

9.8.5 The Lothians Landscape Character Assessment (SNH Feb 1997) classifies the landscape within as the Coastal Margins where the Forth Estuary is the dominant influence. The landform is flat to gently undulating. The EOBP study corridor is located within Character Area 25, Musselburgh/Prestonpans Fringe.

9.8.6 Character Area 25 includes the lower flood plains of the River Esk. The landscape around the EOBP study corridor is described as arable with field boundaries of hedgerows and trees. The settled area is bounded by a dominant network of transport routes and contains a number of market towns now largely engulfed by modern housing developments. Cockenzie Power Station is the most dominant feature. There are also prominent bings, coal mining infrastructure, warehouse development, disused railways and pylon lines which create an industrialised character.

9.8.7 The landscape is relatively attractive with increasing redevelopment nearby. It is not specifically designated. The landscape would be classified as ordinary landscape.

## Assessment

9.8.8 This option proposes a segregated section which runs across open fields.

**Construction**

9.8.9 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;

- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

## Operation

9.8.10 There will be some landscape effects caused by this option because the segregated section is located on an undeveloped agricultural area. The landscape is already fragmented in this area by roads and railways and the introduction of an additional bus lane will further fragment the landscape. The changes are likely to be the introduction of additional hard surfaces, fencing, markings on the road, signage and changes to the location and design of bus shelters. There may be adverse effects associated with the removal of vegetation. The magnitude of the effects is likely to be negative moderate.

## Mitigation

9.8.11 Mitigation recommendations in relation to the option would be careful siting and design of any associated structures to avoid adverse effects. Existing vegetation should be retained if possible and any vegetation removed should be replaced with appropriate planting to link with the existing landscape structure.

### Residual effects

9.8.12 After mitigation there would be changes to the landscape as described above. The residual effects will be known once the final design is completed but are likely to be negative moderate.

## Appraisal

### Construction

9.8.13 The significance of construction effects will be known once the final design is completed but are likely to be minor negative impact.

### Operation

9.8.14 This option will result in a moderate changes to the landscape. Significance of impact: moderate negative impact.

## Summary

9.8.15 This option will have moderate landscape effects.

9.8.16 Since Section 8 is only applicable to Routes B17 and B18, the above findings are only relevant to these options.

## 9.9 Section 9

### Scoping

9.9.1 As Section 1.

### Methodology

9.9.2 As Section 1.

### Baseline

9.9.3 This option is located within the designated Greenbelt. There is a Historic Garden and Designed Landscape (Drum Wood) within the EOBP study corridor. The EOBP study corridor is near to a Conservation Area (Ravenscroft).

9.9.4 The EOBP study corridor is located largely to the north of the A720 Edinburgh City Bypass in an agricultural area on the edge of the City in a narrow strip of Greenbelt between the established built up areas of the City and Bonnyrigg and Lasswade. The topography is undulating and there are extensive areas of broadleaved woodland to the southeast. There is a network of old rural roads and a railway line together with the more recent A720 Edinburgh City Bypass and a major power line route adjacent to it. There are areas of open space near to the EOBP study corridor. The Greenbelt area contains uses such as a butterfly farm, golf course, gravel pits etc.

9.9.5 The Lothians Landscape Character Assessment (SNH Feb 1997) classifies the landscape within the built up area of the City as Urban and the areas to the south of it as Lowland River Valleys Landscape Character Type. These are well defined river valley landscapes of the lowlands distinguished by their landform with steep slopes carrying broadleaved woodland cover. The study corridor is within Character Area 13 North Esk and the Urban classification which is not described in the document.

9.9.6 North Esk is described as a steep sided valley opening out into a broad smooth undulating landscape broken by numerous streams. Woodland and improved pasture predominate in the rural areas near to the proposed option together with the policies of designed landscapes. There are scattered settlements including towns and villages which are surrounded by extensive 20$^{th}$ Century housing schemes. There are also areas of light industry, bings, reclaimed coal mines and sand and gravel pits. There is a network of major and minor roads feeding into Edinburgh. The pressures for development include the cumulative impact of urban fringe development. It is recommended that the existing woodland framework should be reinforced and extended as a setting for new development to improve integration.

9.9.7 The landscape around the EOBP study corridor is within the Greenbelt and has designations but also with existing major infrastructure. It would be classified as good landscape.

## Assessment

9.9.8 This option proposes a segregated section along an existing minor road and railway line, bus lanes along an existing major route within the urban area and an extension of the route along existing residential roads.

### Construction

9.9.9 Temporary effects would depend on the scale of the works for each option. Construction works may comprise:

- The movement of construction vehicles, machinery etc;
- Siting of the contractor's main offices and works compound areas;
- Fencing, road works, signing etc;
- Stripping of topsoil;
- Excavations;
- Transfer and storage of cut and fill material;
- The construction of temporary haul roads;
- Potential security lighting at night;
- The storage of construction equipment and materials;
- Removal of trees and vegetation.

9.9.10 The removal of vegetation would be the only potential permanent effect and it is unlikely that this will permanently affect the landscape character. Temporary effects will not affect the landscape character. The magnitude of construction effects for the option would be negative minor.

### Operation

9.9.11 There will be some landscape effects caused by this option because the segregated section is located on a minor road and railway line and will require some modification to be converted for buses. The changes are likely to be the introduction of additional hard surfaces, fencing, markings on the road, signage and changes to the location and design of bus shelters. There may be adverse effects associated with the removal of vegetation and an introduction of further hard surfacing. The magnitude of the effects is likely to be negative minor.

#### *Mitigation*

9.9.12 Mitigation recommendations in relation to the option would be careful siting and design of any associated structures to avoid adverse effects. Any vegetation removed should be replaced with appropriate planting to link with the existing landscape structure.

#### *Residual effects*

9.9.13 After mitigation there would be changes to the landscape as described above. The residual effects will be known once the final design is completed but are likely to be negative minor.

## Appraisal

### Construction

9.9.14 The significance of construction effects will be known once the final design is completed but are likely to be minor negative impact.

### Operation

9.9.15 This option will result in minor changes to the landscape. Significance of impact: Minor negative impact.

## Summary

9.9.16 This option will have minor landscape effects.

9.9.17 Since Section 9 is only applicable to Route C5, the above findings are only relevant to this option.