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A68(T) Dalkeith Northern Bypass Environmental Mitigation Report

W A Fairhurst & Partners



FAIRHURST
CONSULTING STRUCTURAL
AND CIVIL ENGINEERS

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Environmental Mitigation Report

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1. INTRODUCTION

- 1.1 The proposed A68 Dalkeith Northern Bypass has been subject to an earlier extensive and detailed environmental appraisal, which commenced in 1988 and culminated in the production of Stage 3 Scheme Environment and Engineering Assessment Reports in January 1996. During this period, six different route options were considered from engineering, economic and environmental perspectives. This appraisal process resulted in the current route being selected as that offering most benefit in terms of relief of traffic congestion, noise, community severance and improvements to local air quality within Dalkeith town centre, whilst having acceptable environmental impacts on the area through which the new road would pass.
- 1.2 The scheme was progressed to the point of preparing draft contract documents for road construction. However, in June 1997, the Scottish Executive announced that it would undertake a Strategic Roads Review, in order to set priorities for improvements to the trunk road network over the next decade. The outcome of this review was that the A68 Dalkeith Northern Bypass would not immediately proceed to construction, but would be held in abeyance so that it could be considered, alongside other emerging priorities, for inclusion in a future trunk road programme.
- 1.3 In June 2005 the Scottish Ministers announced their intention to proceed with the bypass and Fairhurst were commissioned to progress the scheme with the aim of commencing construction in the summer of 2006.
- 1.4 It was recognised that almost a decade had passed since the last environmental appraisal of the route had been undertaken. The 1996 Stage 3 Scheme Report was also undertaken on the dual, rather than single carriageway scheme, although the impacts were considered to be slightly greater overall for the dualling scheme.
- 1.5 As the road corridor had already been compulsorily purchased, and also safeguarded in Local Plans, changes to the earlier environmental appraisal were anticipated to be limited. However, the Scottish Executive decided to

carry out a full review of the baseline environmental data and previously proposed mitigation measures along the road corridor and immediate surrounding area on which the 1996 study was made. Mitigation and best practice have changed considerably since 1996 and therefore the Scottish Executive wished to ensure that both baseline and proposed mitigation is following best practice. W A Fairhurst were commissioned to undertake the new study in August 2005.

- 1.6 Any changes identified (such as the presence of previously unrecorded protected species, or new designated sensitive areas) would then feed directly into a schedule of mitigation measures and environmental commitments, that would be incorporated into the Design and Construction Contract. The updated baseline and mitigation measures are contained in this document, the Environmental Mitigation Report.
- 1.7 Commitments made at the two Public Local Inquiries into the scheme, held in 1992 and 1996, will also be honoured and have been included within this document.
- 1.8 This report also includes the outcome of updated consultations with statutory and non-statutory organisations who have recently been invited to comment on the scheme.
- 1.9 This report should be read in conjunction with the Stage 3 Scheme Assessment Reports – Environment and Engineering, produced by W A Fairhurst in January 1996.

Background to the Scheme

- 1.10 In September 1985, the Scottish Office Development Department (SODD) published the findings of feasibility studies into the A7 Western Bypass and A68 Northern Bypass. In December of that year W A Fairhurst was appointed to progress both schemes to contract stage.
- 1.11 In January 1987, W A Fairhurst recommended an alignment for the A68 bypass which was adopted by the SODD as the preferred scheme. In May of that year, Draft Main Line and Side Road Orders were published by the Scottish Office. A

number of objections to the scheme were received. The Cockburn Association put forward an alternative alignment, known as the Cockburn Association Line. A third alternative, the Meeting of the Waters Line was developed by the SODD and their consultants, W A Fairhurst.

1.12 In February 1988, the SODD commissioned W. A. Fairhurst to prepare an Environmental Appraisal of the three alternative alignments for the bypass:

1. The Draft Order Line as published by the SODD in May 1987 as their preferred route;
2. The Meeting of The Waters Line; and
3. The Cockburn Association Line.

The current route was not included in this appraisal.

1.13 The Meeting of The Waters Line (MOTW) was found to offer the best balance between environmental improvements within Dalkeith and adverse effects on Dalkeith Park. However, this line still imposed detrimental environmental impacts at certain locations. Further investigative work was undertaken to minimise the impacts of the MOTW Line, which resulted in the current line, known as the Langside South Line, being put forward (refer to Drawing No. 21440/00/001). This was selected as the preferred option in September 1989.

1.14 A New Draft Main Line Order was published for the Preferred Line in May 1990, and a Public Exhibition was held in June of that year where the Preferred Draft Order Line was displayed.

1.15 Draft Slip Road and Side Road Orders and Compulsory Purchase Orders were published in May 1991. Objections to the Preferred Draft Order Line were received and consultations were undertaken to inform the affected parties and to gauge opinion on an alternative, the S2 Line, put forward by an Objector.

1.16 In May 1992 a Public Local Inquiry was held. The evidence presented considered the Former Draft Order Line, the Preferred Draft Order Line, the S2 Line and the Do-Nothing Option. The Reporter concluded in favour of the Preferred Draft Order Line and made recommendations to address issues raised by Objectors.

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- 1.17 The scheme was presented as a Single Carriageway, with provision for upgrading to Dual Carriageway standards when required.
- 1.18 In July 1993, the Secretary of State issued the decision confirming the line of the bypass and in November of that year Road Orders and Compulsory Purchase Orders were made.
- 1.19 In October 1994, the Scottish Office announced that the bypass would be constructed as a dual carriageway. In August 1995 W A Fairhurst were commissioned to upgrade the design to dual carriageway standards in accordance with the Design Manual for Roads and Bridges (DMRB) and to provide a Stage 3 Scheme Assessment Report. W A Fairhurst were also asked to prepare Revised Road Orders, together with a Compulsory Purchase Order and any outstanding objections to the Orders were to be resolved.
- 1.20 In December 1995 Draft Statutory Orders were published to allow dualling of the bypass.
- 1.21 A second Public Local Inquiry was held in June 1996 to determine whether the single carriageway could be upgraded to a dual carriageway. In 1997, the Secretary of State granted permission for a dual carriageway and Compulsory Purchase Orders for the additional land requirements.
- 1.22 In April 1997, W A Fairhurst published Draft Tender Documents for the Design, Construction and Maintenance Contract, including the required mitigation measures. However, in June 1997, the Scottish Executive announced that it would undertake a Strategic Roads Review; therefore the scheme was put on hold whilst this review was undertaken. The outcome of this review was that the A68 Dalkeith Northern Bypass would not immediately proceed to construction, but would be held in abeyance so that it could be considered, alongside other emerging priorities, for inclusion in a future trunk road programme. Therefore the Orders for the dual carriageway scheme were never made.

Previous Environmental Studies

- 1.23 At the time of the 1995 proposals, the Roads (Scotland) Act 1984 determined the need for environmental assessment of certain road construction projects within the scope of EC Directive 85/337/EEC Environmental Impact Assessment (EIA). The proposed bypass did not fall within Annex I of the Directive which states that publication of an Environmental Statement is mandatory. As the proposed road did not affect or lie within 100m of any designated areas, publication of an Environmental Statement was deemed not to be required under Annex II of the Directive, which applied to projects with significant environmental effects for which an Environmental Statement may be required. This Directive and domestic legislation has been subsequently updated by Directive 97/11/EC and the Environmental Impact Assessment (Scotland) Regulations 1999.
- 1.24 However, as good practice, the National Roads Directorate undertook full assessment and reporting of environmental impacts and required mitigation for all road projects and as such a non-legislative Environmental Assessment process was undertaken for this scheme between 1988 and 1996.
- 1.25 The SODD commissioned W A Fairhurst to prepare an Environmental Appraisal of the three alternative alignments, the original Draft Order Line, MOTW Line and Cockburn Association Line, in February 1988. The methodology used was the Scottish Transport Environmental Appraisal Manual (STEAM), which also satisfied all the requirements of an Environmental Assessment, as set down in the Environmental Assessment (Scotland) Regulations 1988.
- 1.26 All three routes were subject to an initial desk top analysis, followed by on site surveys. The relevant Local Authorities were consulted, as were the Department of Agriculture and Fisheries, The Nature Conservancy Council, The Countryside Commission for Scotland, the Scottish Wildlife Trust, the SODD Historic Buildings and Monument Directorate, the Scottish Railway Path Project and the cycling organisation SPOKEs.

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- 1.27 Further investigative work to minimise the environmental impacts of the route led to the current, Langside South Line being adopted as the preferred option.
- 1.28 In 1990 W.A. Fairhurst undertook an Environmental Appraisal in accordance with the STEAM framework of the Preferred Draft Order Line (the Langside South Line) and a comparison with Former Draft Order Line, Cockburn Association Line and MOTW Line. The findings of this study are presented in the reports *A68 Trunk Road Dalkeith Northern Bypass Environmental Appraisal W. A. Fairhurst May 1990* and *A68 Trunk Road Dalkeith Northern Bypass STEAM Framework W. A. Fairhurst May 1990*.
- 1.29 In August 1995 when W. A. Fairhurst were commissioned to upgrade the design to dual carriageway standards in accordance with DMRB (Design Manual for Roads and Bridges), the original Environmental Assessment was reviewed and updated in accordance with Volume 11 (Environmental Assessment) of the DMRB. The new DMRB methodology required a more detailed assessment of topics than previously covered by STEAM and introduced new subjects to be considered.
- 1.30 In May of that year, W. A. Fairhurst also prepared a Summary Environmental Appraisal of an Objectors Line (dual carriageway) which had been put forward by the Dalkeith Park Campaign Group. The findings of this study are documented in the report *A68(T) Dalkeith Northern Bypass Summary Environmental Appraisal of Objectors Line W. A. Fairhurst May 1996*.
- 1.31 The various alignments considered are illustrated in Drawing No. 21440/E/00/002.
- 1.32 A separate study, *A68 Dalkeith Bypass Working Note on Air Pollution at Dalkeith Oakwoods SSSI W. A. Fairhurst April 1996*, was undertaken into the potential impacts of air pollution from the new road on the Dalkeith Oakwood SSSI, 200m to the south of the road.
- 1.33 A separate study, *A68 Dalkeith Northern Bypass Noise Report, W A Fairhurst, April 1996* provided certain specific information relating to the assessment on the effects of traffic noise and construction noise and the basis for the provision of construction noise insulation grants.
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Report Scope and Structure

- 1.34 The aim of this Environmental Mitigation Report is to provide details of any changes in environmental baseline conditions that have occurred along the route corridor and immediate surrounding area since the 1996 Stage 3 Scheme Assessment Report. Updated environmental mitigation required for the scheme is also detailed and the report also considers, where appropriate, any changes as a result of the adoption of a single rather than dual carriageway scheme. These are not anticipated to be significant, given that the footprint of the single carriageway road is almost identical to that of the dual. This is discussed in more detail in the relevant sections.
- 1.35 This updated mitigation report is not intended as a complete revision of the previous environmental assessment work, but is an update of specific aspects of the baseline which may have changed and to ensure the environmental mitigation proposed is fully detailed and current. The Road Orders for the scheme have been made and the land compulsorily purchased, hence the opportunity for making anything other than minor changes to the layout and detail of the scheme design is extremely restricted. Any changes in baseline conditions identified that require mitigation have, through consultation and agreement with affected parties and the statutory bodies, been incorporated into the Design and Construction Contract.
- 1.36 Any deviations from the Specimen Design that is put forward for a Contractor to base a detailed design on will require the Contractor to undertake an environmental appraisal of the proposed changes in order to demonstrate that the potential negative impacts are no more detrimental than those already identified.
- 1.37 The structure of this report is not intended to comply with that set out in the Design Manual for Roads and Bridges Volume 11 – Environmental Assessment, nor does it seek to comply with the format of a full Environmental Statement, as described in SEDD Circular 15/1999 Environmental Impact Assessment (Scotland) Regulations 1999 and SEDD PAN 58 Environmental Impact Assessment (September 1999).

- 1.38 The general format adopted by this Environmental Mitigation Report is as follows.
- 1.39 Eleven of the 13 subject headings set out in DMRB Volume 11 are to be considered, to enable consistency with the 1996 Stage 3 Scheme Assessment. Air quality and Policies and Plans are not included as these could only be taken into account at the time the route was conceived.
- 1.40 In each section, a brief summary of the earlier findings is given. Reference should be made to the 1996 Stage 3 Scheme Assessment Environment Report for full details.
- 1.41 The methodology adopted by the current study is set out. Any changes identified to baseline conditions along the route corridor and immediate surrounding area (the extent of the study area considered varies according to the subject) are described.
- 1.42 The agreed mitigation measures to be implemented during the Design and Construction Contract are set out; a detailed description of these will be incorporated within the Contract Employer's Requirements and Specification. A Schedule of Environmental Commitments is given in Section 4 of this report.

Sources of Information

- 1.43 The following sources of published information and organisations were consulted and/or updated for the preparation of this report:

Table 1.1: Sources of Information

Environmental Assessment Area	Document Type	Best Practise Guidance Used
General Planning and Mitigation	Environmental	<ul style="list-style-type: none"> ▪ <i>Environmental Impact Assessment (Scotland) Regulations 1999</i> ▪ <i>EEC Environmental Impact Assessment Directive (85/337/EEC)</i> ▪ <i>EU Environmental Impact Assessment Directive (97/11/EC)</i> ▪ <i>Circular 15/99. The Environmental Impact Assessment (Scotland) Regulations 1999.</i> The Scottish Executive ▪ <i>Planning Advice Note (PAN) 58: Environmental Impact Assessment,</i> Scottish Executive 1999 ▪ <i>A Handbook on Environmental Impact Assessment – Guidance for Competent Authorities, Consultees and Others involved in the Environment Impact Assessment Process in Scotland.</i> SNH 2002
	National Planning Policy Guideline	<ul style="list-style-type: none"> ▪ <i>NPPG5: Archaeology and Planning.</i> The Scottish Office Development Department, 1994 ▪ <i>NPPG14: Natural Heritage.</i> The Scottish Office Development Department, 1999 ▪ <i>NPPG15: Rural Development.</i> The Scottish Office Development Department, 1999 ▪ <i>NPPG18: Planning and the Historic Environment.</i> The Scottish Office Development Department, 1999
	DMRB	<ul style="list-style-type: none"> ▪ <i>Design Manual for Roads and Bridges (DMRB) Volume 11.</i> 1993 (as amended) ▪ <i>Design Manual for Roads and Bridges (DMRB) Volume 10.</i> 1993 (as amended)
	Plans	<ul style="list-style-type: none"> ▪ <i>Shawfair Local Plan.</i> Midlothian Council, September 2003 ▪ <i>Edinburgh and the Lothians Structure Plan 2015</i> ▪ <i>Finalised East Lothian Local Plan 2005</i> ▪ <i>Midlothian Local Plan.</i> Midlothian Council, December 2003
Landscape and Visual Impact	Guidance	<ul style="list-style-type: none"> ▪ <i>The Landscape Institute and The Institute of Environmental Management and Assessment - Guidelines for Landscape and Visual Effects Assessment (Second Edition)</i>
Ecology and Nature Conservation	Plans	<ul style="list-style-type: none"> ▪ <i>SSSI and SWT Wildlife Site boundary provided by Lothian Wildlife Information Centre</i> ▪ <i>Woodland Sites provided by Lothian Wildlife Information Centre</i>
	Guidance	<ul style="list-style-type: none"> ▪ <i>Guidelines for Baseline Ecological Assessment.</i> The Institute of Environmental Assessment (EIA) 1995 ▪ <i>Draft Guidelines for Ecological Evaluation and Assessment.</i> The Institute of Ecology and Environmental Management, 2000 ▪ <i>River Crossings and Migratory Fish: Design Guidance.</i> Scottish Executive April 2000 ▪ <i>Guidelines for Ecological Impact Assessment – Consultation Draft July 2005,</i> IEEM. ▪ <i>Recommendations for Badger Fencing – Publication No. 4,</i> September 2000, Scottish Badgers ▪ <i>DMRB Volume 10 Environmental Design and Management, Section 4, Nature Conservation</i>

Environmental Assessment Area	Document Type	Best Practise Guidance Used
Land Use	Plans	<ul style="list-style-type: none"> ▪ Edinburgh and the Lothians Structure Plan 2015 ▪ Finalised East Lothian Local Plan 2005
	Guidance	<ul style="list-style-type: none"> ▪ SDD Circular 18/1987 on Development Involving Agricultural Land. ▪ National Planning Guideline on Agricultural Land 1987
	Regulation/Legislation	<ul style="list-style-type: none"> ▪ The Land Reform (Scotland) Act 2003 (Part One)
Archaeology and Cultural Heritage	Plans	<ul style="list-style-type: none"> ▪ Locations of historical sites provided by East Lothian Council
	Other	<ul style="list-style-type: none"> ▪ Mitigation Strategy Report and Evaluation Report prepared by CFA Archaeology Ltd
Geology, Soils and Contaminated Land	Plans	<ul style="list-style-type: none"> ▪ Possible contamination sources provided by East Lothian Council ▪ Soil Survey of Scotland: Sheet NT36, 1:25000, 1971
	Guidance	<ul style="list-style-type: none"> ▪ DMRB Volume 4a, Geotechnics and Drainage ▪ British Standards Institute. <i>Code of Practice for Earthworks</i> (AMD4251). BS6031:1981 ▪ British Standards Institute. <i>Investigating Potentially Contaminated Sites – Code of Practise</i>. BS10175:2001 ▪ British Standards Institute. <i>Code of Practice for Site Investigations</i>. BS5930:1999 ▪ <i>Pollution Prevention Guidelines</i> (PPG's) SEPA/EA various dates ▪ <i>The Soil Code (revised)</i>, MAFF 1998
	Regulation/Legislation	<ul style="list-style-type: none"> ▪ <i>Environment Protection Act</i> (1990) Part IIA ▪ <i>Control of Pollution Act</i>. 1974

Environmental Assessment Area	Document Type	Best Practise Guidance Used
Water Quality and Drainage	Guidance	<ul style="list-style-type: none"> ▪ <i>Report C521: Sustainable Urban Drainage Systems: design manual for Scotland and Northern Ireland.</i> CIRIA 2000 ▪ <i>Report 142, Control of pollution from highway drainage discharges.</i> CIRIA 1994 ▪ <i>Report 168, Culvert Design Guide.</i> CIRIA 1997 ▪ <i>Flood Estimation Handbook,</i> CEH Institute of Hydrology, 1999 ▪ <i>Climate Change Scenarios for the United Kingdom, The UKCIP02 Scientific Report,</i> Hulme, 2002 ▪ <i>Low Flow Estimation in Scotland.</i> Institute of Hydrology, 1994 ▪ <i>River Crossings and Migratory Fish: Design Guidance.</i> Scottish Executive April 2000 ▪ <i>Watercourses in the Community, A Guide to Sustainable Watercourse Management in the Urban Environment</i> SEPA June 2000 ▪ <i>Ponds, Pools and Lochans, Guidance on Good Practice in the Management and Creation of Small Water Bodies in Scotland.</i> SEPA. June 2000 ▪ <i>Design Manual for Roads and Bridges (DMRB), Volume 4a, Geotechnics and Drainage.</i> ▪ <i>Drainage Assessment – A Guide for Scotland.</i> Sustainable Urban Drainage Scottish Working Party (SUDSWP) 2005. ▪ <i>Pollution Prevention Guidance Notes (PPG's).</i> SEPA/EA, various dates ▪ <i>SPP7: Planning and Flooding.</i> The Scottish Office Development Department (March 2003)
	Regulation/Legislation	<ul style="list-style-type: none"> ▪ <i>Water Framework Directive (2000/60/EC)</i> ▪ <i>Water Environment and Water Services (Scotland) Act 2003</i> ▪ <i>Water Environment (Controlled Activities) (Scotland) Regulations 2005</i> ▪ <i>Control of Pollution Act. 1974</i>
	Other	<ul style="list-style-type: none"> ▪ <i>SEPA Policy on the Culverting of Water Courses.</i> SEPA August 1998

Noise and Vibration	Guidance	<ul style="list-style-type: none"> ▪ <i>Calculation of Road Traffic Noise (CTRN)</i>, Department of Transport, Welsh Office, 1988 ▪ Design Manual for Roads and Bridges (DMRB) Volume 11, 1993 (as amended) ▪ World Health Organisation (WHO) <i>Guidelines for Community Noise</i> (1999) ▪ BS:8223:1999 <i>Sound Insulation and noise reduction for building – Code of Practice</i> ▪ BS:6472:1992 <i>Guide to evaluation of human exposure to vibration in buildings</i> ▪ BS:5228:1997 <i>Noise and vibration control on construction and open sites</i> ▪ BS: 7445:1991 <i>The description and measurement of environmental noise.</i> ▪ BRE Digest 403 <i>Damage to structures from ground borne vibration</i> (1995) ▪ CIRIA Practice Note on Temporary Screening ▪ PAN 56 <i>Planning and Noise</i> (1999)
	Regulation/Legislation	<ul style="list-style-type: none"> ▪ <i>The Noise Insulation (Scotland) Regulations</i>, 1975 ▪ <i>Memorandum on the Noise Insulation (Scotland) Regulations</i>, 1975

Consultation

- 1.44 As part of the new data-gathering process, consultations have taken place with a wide range of statutory and non-statutory bodies, including SNH, SEPA, Historic Scotland, Midlothian and East Lothian Councils, local access and recreational/sporting organisations and nature conservation groups. A summary of all the consultation organisations and responses is given in Appendix A.

2. DESCRIPTION OF PROPOSED SCHEME

Outline of scheme

- 2.1 The scheme comprises approximately 5.2km of new trunk road linking the Edinburgh City Bypass (A720) and the existing A68 trunk road at Fordel Mains (refer to Drawing Nos. 21440/E/00/001 and 21440/E/00/003). For most of its length the road is an S2 carriageway, with a climbing lane (WS 2+1) on the eastbound side between Salter's Road and Fordel Mains. New junctions will be constructed at Millerhill, Salter's Road and Fordel. A major structure will bridge the River Esk, and there will be new overbridges constructed within Dalkeith Park (Home Farm access), at Salter's Road, the B6414 crossing and at Southfield Road.
- 2.2 The bypass commences at the western end as a new grade separated junction on the Edinburgh City Bypass (A720) near Newton Farm, between Old Craighall Junction and Sheriffhall Roundabout. The new grade separated junction will be illuminated. The existing underpass on the Right of Way to Newton Church will be extended and the Right of Way maintained.
- 2.3 The single carriageway road then passes through arable land in a cutting bounded by earth before entering the western side of Dalkeith Park. The road continues in a cutting for a short distance, then at grade, before continuing on a new embankment, with maximum height approximately 7.95m, before bridging the River Esk just north of Pickle Dirt. Through Dalkeith Park, special fencing will be provided to prevent the wildlife within the Park from gaining access to the bypass.
- 2.4 The River Esk Bridge is the major structure within the scheme, crossing above the Esk at a height of some 15m above water level over a distance of 95m. The single-carriageway, two span bridge will be supported by a single pier located to the west side of the river. A new access track will be constructed on the west side of the bridge which will pass in front of the abutment. This track, with a compacted gravel surface, will maintain access for estate vehicles including logging trucks, stock, pedestrians, equestrians and cyclists. The track will be fenced alongside the river and gated at either end, to assist stock movements. On the eastern side of the river, the existing track which runs at the bottom

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- of the existing rock face will be widened and fenced primarily to maintain access for cattle through the estate, but will also be suitable for equestrian use. This access below the bridge will also provide wildlife passage next to the river on both banks.
- 2.5 The road continues in a false cutting, 4m deep, and passes beneath the Home Farm access road which connects Dalkeith House with Home Farm. A new overbridge takes the Home Farm access over the bypass, maintaining the present horizontal alignment, but with a slightly greater width than the existing road. The road across the new overbridge will be 4.7m wide; with a 0.5m footway on either side (i.e. 5.7m in total between the bridge parapets). The existing tarmac road is approximately 3.0m in width. Over the extent of the bridge approach ramps, a 2.0m wide grass verge on the west side and a 1.0m grass verge on the east side will be provided for equestrian use. A new access track will be constructed along the south side of the bypass to connect the Home Farm access road with the north end of Sandyriggs Wood to enable access for estate vehicles and equestrian users.
- 2.6 The new road continues east in cutting, passing beneath Salter's Road (A6094) (Drawing No. 21440/E/00/001). Two new grade separated junctions and link roads allow access from Salter's Road to both sides of the bypass. Two new roundabouts will be constructed on Salter's Road. The junctions on the bypass are configured so that right turning movements are not permitted.
- 2.7 Over the length which it is affected by the proposed bypass, Salter's Road will be widened to a 7.3m wide carriageway. To the south of the bypass intersection, between New Farm and Smeaton Head, Salter's Road will be straightened and a new ghost-island junction provided to allow for access to the land east of Salter's Road. Through this section, the Dalkeith Park estate wall will be reconstructed slightly further to the west from its existing position. The former access road to Old Dalkeith Colliery, which now gives access to a formal travelling peoples site, will be realigned. To the north, improvements will be made to the junction of the Salter's Road (A6094) and Smeaton Station Road to improve visibility. Pedestrian facilities will be maintained on the west side of the realigned section of Salter's Road, with a wide 2.0m footway. A footway will also be provided on the east side of the realigned section where a new ghost island is created at the junction of a new farm access track to the fields east of Salter's Road.
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- 2.8 Continuing southeast, the bypass carriageway widens from 7.3m to 11.0m to allow for the formation of a south bound climbing lane which continues to the junction at Fordel Mains. The bypass rises up on an embankment with a maximum height of 7.1m across arable land restored after recent opencast coal mining, until the western boundary of Langside Farm. The Smeaton - Thornybank cycle track (part of National Cycle Route 1) continues beneath the bypass in an underpass on the alignment of a disused railway line. The underpass will have 2.8m headroom and mounting blocks will be provided at either end for equestrian users.
- 2.9 At Langside Farm, the bypass goes back into cutting until just south of Hadfast Road (C43). The B6414 Elphinstone to Langside Head Road crosses the bypass over a new bridge. This road will have a 6.0m wide carriageway with pedestrian facilities maintained on the west side of the road. Hadfast Road is realigned through a cutting and a new junction formed at the B6414 to the northeast of the bypass. Hadfast Road will be 6.0m wide without footways. New access roads to Langside Farm and Easter Cowden were created during Advance Works during the mid-1990's, the redundant sections of road that will be severed by the new bypass having been grubbed-up and returned to agricultural use.
- 2.10 Continuing southeast from Easter Cowden, the bypass runs at grade for a short section, before rising up on a new embankment to a height of approximately 15.5m to cross Bellyford Burn. The existing Right of Way along the east side of the burn will be maintained by an underpass at this point. The proposed underpass is 5.0m wide x 3.7m high with the approach ramps being to a maximum gradient of 1 in 12 with a 1m wide strip provided for equestrian users on one side. Continuing southeast the bypass goes back into a cutting through the area of the recently restored Oxenfoord (Hungry Hill) opencast coal mine and continues in cutting until it rejoins the existing A68 just east of Fordel Mains. Inveresk Road (A6124) and Southfield Road (U59) cross the bypass as a new overbridge; access to the bypass is made via new grade separated junctions and link roads. Fuffets Road is severed. The redundant portions of the existing A68 and Fuffets Road will be grubbed up and returned to agricultural use.
- 2.11 Continuing from the new junction at Fordel Mains the bypass continues in cutting to tie-in to the existing A68 to the south east of Fordel Mains farm. Stone from the existing wall on the east side of the A68 will be re-used to construct the new boundary wall on the east side of the bypass at this location.
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2.12 Junctions at the A720 Edinburgh City Bypass, A6094 Salter's Road and A6124, Inveresk Road are to be lit on grounds of safety, as agreed at the 1996 Public Local Inquiry.

3. BASELINE STUDIES

3.1 Archaeology and Cultural Heritage

Introduction

3.1.1 This section provides a summary of the Archaeological and Cultural Heritage features which exist within the A68 corridor, in the area between Fordel Mains and the Edinburgh Bypass.

Previous Investigation

3.1.2 The archaeological and heritage features of the area were assessed as part of an Environmental Appraisal of the A68 Dalkeith Northern Bypass, in May 1992 and during 1994 and 1995. The appraisal followed guidelines set out in the Design Manual for Roads and Bridges, Volume 11 Environmental Assessment. Other sources of information and guidance utilised were:

- Planning Advice Note (PAN) 42, Archaeology – the Planning Process and Scheduled Monument Procedures
- National Planning Policy Guideline (NPPG) 5, Archaeology and Planning
- various local plans and
- consultations with Historic Scotland.

3.1.3 The bypass route traverses a landscape containing a considerable number of archaeological sites and monuments.

3.1.4 The following findings on archaeology and heritage in the area were described in the A68(T) Dalkeith Northern Bypass, Stage 3 Scheme Assessment Report, Environment, November 1995.

3.1.5 A desk-top study was undertaken for the Environmental Appraisal of the A68 Dalkeith Northern Bypass in May 1992. Following this and consultations with the Scottish Office five significant sites were identified within the locality of the proposed route:

- a complex pit alignment at Castlesteads

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- a Roman temporary camp at Smeaton
 - the Smeaton brick and Tile works
 - a cropmark enclosure at Langside
 - a stone cist cemetery at Newfarm

3.1.6 Discussions between Historic Scotland and the Scottish Office Roads Directorate led to an agreement on a Project Outline, which comprised the excavation of four of these sites in accordance with the Stage 3 Works as set out in DMRB Volume 11, Section 3 Part 2 between October and January 1994, with the exception of the stone cist cemetery at Newfarm.

3.1.7 The remainder of the proposed route underwent general evaluation between September and November 1994 to identify any further features. This evaluation consisted of an initial desk-top study and a subsequent field walking of the road corridor.

3.1.8 154 trenches were excavated along the length of the route following the general evaluation. Further archaeological features were identified including ring-groove ditch as Castlesteads, traces of rig and furrow and a sand pit at Newfarm, a stone field boundary at Easter Cowden Cottages and working related to Fuffet Coal Pit. Further evaluation was carried out on these areas.

3.1.9 Table 1 lists the sites identified during the 1994-5 evaluation and excavations and subsequent works in 1996-7, running from north-west to south-east along the route.

Table 3.1.1: Archaeological sites known or identified along the proposed route

Area	Site	NMRS ref	NGR	Fieldwork
Newton	pit alignment	NT36NW 52	NT 3349 6993	Evaluation
Castlesteads	pit alignment	NT36NW 53	NT 3376 6952	Excavation
	Rig	NT36NW 544	NT 3384 6952	
	ring-groove houses	NT36NW 147	NT 3397 6935	Excavation
	stone paving	NT36NW 165	NT 3410 6930	Excavation
Smeaton	Roman Temporary Camp	NT36NW 33	NT 3454 6916	Excavation
		NT36NW 441	NT 3460 6935- NT 3495 6910- NT 3480 6880	Watching brief (1997)
	Brick and Tile Works	NT36NW 109	NT 3480 6900	Excavation
Newfarm	cist cemetery	NT36NW 5	NT 3495 6909	Not located in road corridor; excavated 1996
	quarry pit and rig-and-furrow		NT 3468 6890	Evaluation
Langside	Gravel pit	NT36NE 67	NT 3604 6820	None
	modern pits		NT 3571 6830	Evaluation
Easter Cowden	field boundary		NT 3617 6796	Evaluation
	linear cropmark	NT36NE 14	NT 3645 6790	None
	Fuffet Coal Pit engine house	NT36NE 92	NT 3693 6743	Excavation
Fordel Mains	ditch		NT 3728 6726	Evaluation

3.1.10 The route of the proposed bypass runs through a Scheduled Ancient Monument (NT36NW 53, SAM 5705). This was targeted for set-piece excavation in 1994. The pit alignment and associated features in this section of the road corridor were fully excavated (refer to Appendix B). A Scheduled Monument Consent will be required from Historic Scotland before road construction commences.

The mitigation measures proposed from this investigation were a watching brief to be undertaken during topsoil stripping at Castlesteads, the area of the Roman Temporary Camp, at Smeaton Brick and Tile works and adjacent to the River Esk. Trial trenching

and subsequent excavation if appropriate was recommended at Castlesteads stone pavement.

Current Methodology

3.1.11 Mitigation of adverse impacts on archaeological and cultural heritage sites along the proposed route of the A68 Bypass has been based on the findings of the previous investigation and further consultation with Historic Scotland, Midlothian Council and East Lothian Council archaeological specialists.

3.1.12 Historic Scotland commissioned CFA to undertake a new desk study in August 2005. The purpose of this Mitigation Strategy Report was to:

- summarise the findings of the previous fieldwork;
- to determine the percentage of each parcel of land to have been evaluated previously with the aim of increasing the evaluation level within appropriate areas to 10%; and
- to recommend any further archaeological work required in advance of the construction of the bypass.

This review has included:

- a revised desk-based assessment to identify sites and areas of archaeological or historic interest within and adjacent to the road corridor that either were not required to be examined in 1994-5, or had not been located at that time;
- calculation of areas excavated by land parcel based on descriptions in the previous fieldwork reports and parcel areas as defined in the Compulsory Purchase Order; and
- consultation with Historic Scotland and Midlothian Council's Archaeologist.

3.1.13 Full details of the evaluation and proposed mitigation are given in the document A68 Dalkeith Northern Bypass, Newton Farm to Fordel Mains, Mitigation Strategy Report, Report Number 1101, CFA Archaeology Ltd. September 2005 (Appendix C).

3.1.14 A summary of the findings of this report is given below.

Route Evaluation

(Refer to Drawings 21440/E/02/001 and 21440/E/02/002)

3.1.15 Additional sites have been identified along the route since the 1994 – 1995 desk based assessment. These are listed in Table 3.1.2.

Table 3.1.2: Additional Archaeological sites identified along the proposed route

Area	Site	NMRS ref	NGR	Status
Newton House	Designed landscape		NT 3315 6960	Inventory site
Castlesteads	Pit: square	NT36NW 150	NT 3391 6945	
Dalkeith House	Designed landscape	NT36NW 7.01	NT 3380 6740	Inventory site
Dalkeith Estate	Boundary wall	NT36NW 7.02	NT 3367 6761- NT 3495 7011	Listed A
Smeaton	Linear cropmarks, pits, rig	NT36NW 198	NT 3479 6945	
Newfarm	Linear cropmark	NT36NW 146	NT 3470 6870	
Langside	Pear-shaped enclosure	NT36NE 51	NT 3626 6817	SAM 6211
Easter Cowden	Settlement, field boundary, rig	NT36NE 15	NT 3655 6757	SAM 6210
	Linear cropmarks	NT36NE 60	NT 3786 6676	

The two new Scheduled Ancient Monuments (SAM 6210 and 6211) are within 100 metres of the road alignment, although are not directly impacted by it.

Mitigation

3.1.16 The following mitigation has been agreed between Historic Scotland, Midlothian Council and the Scottish Executive following recommendations made in CFA Archaeology's mitigation strategy report:

- A metal detecting survey is proposed for all suitable land along the road corridor in advance of any intrusive archaeological works taking place.

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- A walkover survey is recommended to be conducted of the road corridor between its western end and Salter's Road in order to identify historic landscape features of the Newton House and Dalkeith House Designed Landscapes.
 - Trial trenching – the previous investigation works carried out in 1994 -1995 investigated 4% of the land within the Compulsory Purchase Order (CPO) boundary. It is recommended that trial trenching be conducted to bring the intrusive evaluation of suitable land up to a sample of 10% of each land parcel.
 - Further mitigation – based on the findings of the metal detecting survey, walkover and trial trenching, further mitigation may be required in relation to any significant archaeological discoveries.
 - Set-piece excavation – further set-piece excavation is recommended for Smeaton Roman Temporary Camp along the length of the camp ditch within the road corridor, with the aim of recovering datable artefacts.

Landscape and visual impacts on the two new Scheduled Ancient Monuments will be mitigated to some extent by appropriate planting along the road corridor. More detail is given in section 3.4.

Impacts/Mitigation arising or required during construction

3.1.17 The main impacts which can be anticipated from the actual construction works themselves, relate largely to the requirement for excavated material to be gained from borrow pits or deposited in spoil heaps, and from the location of site compounds.

3.1.18 It is a requirement of the road construction contract that the contractor should liaise with Historic Scotland and the relevant Local Authority so that any such sensitive sites are identified and will remain undisturbed.

3.1.19 The Special Requirements for Historic Scotland will be applied to the works contract.

3.1.20 The construction contractor will be required to consult with Historic Scotland in connection with dismantling of the "A" Listed Dalkeith Estate boundary wall where it is breached by the bypass. All stone arising from the removal of sections of the wall will be set aside for use in the re-construction of the re-aligned section of wall along the west side of Salter's Road. This work will need to be undertaken in a manner to avoid

damage to the remaining stonework. Further detail is given in Section 3.2, Disruption due to Construction.

3.1.21 Following the completion of the extended evaluation of the scheme, areas may be identified which will require monitoring in accordance with the Special Requirements.

Conclusion

3.1.22 The area crossed by the A68 Dalkeith Northern Bypass contains a significant number of archaeological sites, one of which is a Scheduled Ancient Monument (SAM), although this was fully evaluated by set-piece excavation and additional evaluation trenching in 1994.

3.1.23 Extensive field investigations, excavations and evaluations have already been undertaken over the area affected by the proposed route of the A68 Bypass. Further areas have been identified for investigation and this work will be undertaken and completed before the main construction contract commences in July 2006. In addition, it will be necessary to ensure that works conducted in the road construction will not impinge on known sites of archaeological interest.

3.2 Disruption due to Construction

Introduction

- 3.2.1 The construction of a road scheme has the potential to generate additional environmental impact to that which is associated with the road and its operation.
- 3.2.2 Typical construction impacts are generally localised increases in noise and vibration, dust and loss of amenity. Impacts associated with site traffic are generally of particular concern to local people.
- 3.2.3 Construction impacts affect residents, road users and the natural environment.

Previous Investigation

- 3.2.4 Disruption due to construction was considered in the STEAM and Stage 3 Assessment Reports. A number of sensitive sites were identified, namely residential properties, wildlife sites, archaeological sites and areas used by the general public.
- 3.2.5 It was found that the areas where the most people would be affected were at the new junctions at Fordel Mains, Salter's Road and the City Bypass. The disruption would affect all users of roads at these locations as there would be diversions in place and some resulting delays.
- 3.2.6 A small number of residential properties (5) were found to be located within 100m of the road. Newfarm was considered to be the worst affected property.
- 3.2.7 Key ecology and archaeological sites were also identified as sensitive locations and watching briefs for these sites were recommended (refer to Drawing No. 21440/E/02/001 – Archaeological Sites and Figure 1 statutory and non-statutory sites of nature conservation interest.)
- 3.2.8 The disruption to farmland was also reported. There was a requirement to separate the construction land from the farmland and to make good any damage and to restore any field drainage systems without delay, and to treat and restore agricultural soils with care.

Any works requiring temporary soil stripping were to be carried out such that the soils were set aside so they could be restored to their agricultural location.

Current Methodology

3.2.9 The review of this environmental effect was undertaken in accordance with *Design Manual for Roads and Bridges* Volume 11 Methodology.

Route Evaluation

3.2.10 There are now six residential properties within the 100m band, although one, the farmhouse at Langside is currently unoccupied (Refer to Drawing No. 21440/E/06/003).

3.2.11 The worst affected property is likely to be Newfarm. Extensive works are proposed in and around Newfarm. This property will be affected by construction noise and dust and disturbance associated with the main line of the road, the realignment of Salter's Road and the new junction comprising the two new roundabouts and their slips. The property will eventually be located within a triangle of land to the south of the new road and will be bounded by Salter's Road, the A68 and the southern junction slip road. Hence construction work will occur all around the property. Whilst access to the property will be maintained at all times, it can be anticipated that the occupiers will be inconvenienced by delays occurring during periods when the traffic management is operational.

3.1.12 Other properties in the 100m band are Smeaton Head Farm Cottage, Castlesteads, Langside Farmhouse, Easter Cowden Cottage and Fordel Mains Farmhouse.

3.2.13 Sections of two public rights of way, the Smeaton-Thornybank bridle/cycle route and footpath and the Thornybank and Whitehall and Fordel PFS right of way will be affected by the construction of the route. Temporary accesses will be provided during construction, but the amenity of these routes will be diminished during this period.

3.2.14 Sensitive ecological features are the Esk corridor and the blocks of woodland, in particular the Esk riparian woodland which is ancient and Sandyriggs Wood. The River Esk corridor comprising the river and the riparian woodland is high quality habitat and an important wildlife corridor. As such it is sensitive to pollution to both the aquatic and terrestrial habitats, disruption caused by temporary severance and damage from dust.

Both the Esk corridor and Sandyriggs Wood support protected species which are to be safeguarded and retained.

3.2.15 Archaeological sites within or close to the corridor have been identified (refer to A68 Dalkeith Northern Bypass Mitigation Strategy Report No. 1101). The road runs through a Scheduled Ancient Monument (SAM 5705) and there are a number of others close by. A Scheduled Monument Consent for working in SAM 5705 will be required to be obtained from Historic Scotland, however, it is not envisaged that consent will be refused given that the area within the road corridor was fully excavated in 1994. An extended evaluation of the corridor is to be undertaken in winter 2005 -2006, and further sites may be discovered.

Mitigation

3.2.16 The mitigation of noise and vibration impacts on these sensitive locations will largely be determined by conditions placed on the contractor by the Local Authority. Working hours will be set and maximum noise limits will also be agreed and specified within the construction contract documents.

3.2.17 Whilst the contractors working methods are not currently known, the contractor will be required to demonstrate that working practices close to these sensitive locations include measures to limit the impact of noise, dust and disturbance. Measures that may need to be considered are the careful location of fixed plant, the switching off of plant when not in use, the provision of acoustic screening or sound enclosures, use of mufflers on pneumatic tools and non-reciprocating constructional plant.

3.2.18 Haul roads will require regular dampening during dry periods to prevent fugitive dust. Stockpiles will be carefully sited to prevent dust or surface water run-off affecting the sensitive locations and will be planted where appropriate. Any work undertaken near protected wildlife species and their habitats should be carried out using hand tools. Trenches and other voids which might trap mammals should be covered overnight and pipe ends or boreholes should be capped. During construction of the River Esk Bridge, free passage for wildlife should be maintained along the banks of the river. Some of these measures will be required under protected species licences.

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- 3.2.19 Midlothian and East Lothian Council Environmental Health officers will set the requirements for the control of noise and vibration during road construction. Additional noise insulation of dwelling houses may be required during the construction period. The basis for the provision of noise insulation grants is Regulation 5 of the Noise Insulation (Scotland) Regulations 1975 and the Roads Directorate Section Instruction No. 2/92.
- 3.2.20 The location of the site compound is a matter for agreement between the contractor and local landowners. However, it is a requirement of the construction contract that the contractor comply with the requirements of SNH, SEPA, Historic Scotland and Midlothian and East Lothian Councils, which will include the avoidance of any sensitive sites of ecological or archaeological interest, or residential areas.
- 3.2.21 The use of the existing road network for site access will be a matter for agreement with the appropriate Roads Authority, i.e. Midlothian or East Lothian Council for the local road network and the Scottish Executive Enterprise, Transport and Lifelong Learning Department (SEETLLD) and Amey Infrastructure Services Ltd.
- 3.2.22 The construction of the new road and its junctions will cause disruption to users of the existing road network. The construction contractor will be required to ensure that disruption to road users and others will be kept to a minimum. Traffic management will be agreed with the Local Roads Authority and the Police and this will be designed to minimise delays and congestion. Traffic management on the A720 will be agreed with the Scottish Executive and its Managing Agent.
- 3.2.23 The construction contractor will need to make adequate provision of an appropriate standard for all vehicular, pedestrian and animal traffic to all existing roads, footways, accesses, premises adjacent to and/or affected by the works, including the two public rights of way affected. Access tracks within Dalkeith Park will also have to remain open during the construction period. Temporary diversions are likely to be required. Any new accesses required to gain entry from the existing roads will require an assessment of the potential environmental impacts associated with the new access and it will be ensured that adverse environmental impacts are avoided.
- 3.2.24 The public will be kept informed on the scope of the scheme construction works and their progress by provision of publicity/information boards on the approaches to the site at the A720 Edinburgh City Bypass (westbound and eastbound), Salter's Road and the

existing A68 Trunk Road at Fordel Mains. The progress information will be updated monthly throughout the construction period.

3.2.25 The estimate of the likely quantities of surplus material and borrow indicates that there will be a requirement for exporting and importing quantities of material. An estimated 455,850m³ of material will require excavation; of this amount 83,702m³ of material will be unacceptable for use on this scheme and will require disposal off site. An estimated 457,650m³ of material will be required for upfilling, this material will be available from excavations with the balance being imported on site. The use of the road network for site access will be a matter for agreement with the appropriate Roads Authority; i.e. Midlothian or East Lothian Council for the local road network and SEETLLD and Amey Infrastructure Services Ltd. The selection of areas for materials stockpiling should avoid sensitive locations such as areas adjacent to watercourses, areas of existing trees and sensitive habitats and archaeological sites. The contractor will be responsible for undertaking the works in such a manner so as to minimise the effects of dust, noise, water pollution arising from the movement of materials on and offsite to the satisfaction of the Local Authorities.

3.2.26 Prior to the excavation and treatment of any potentially contaminated materials within the road corridor, the construction contractor will be required to consult with SEPA and the relevant Local Authority. SEPA will also require to be consulted regarding the re-use or disposal of any waste materials arising from the site.

3.2.27 Measures to protect wildlife and nature conservation interests will comprise the construction of permanent and temporary deer/otter/badger fencing across Dalkeith Park Estate prior to the park walls being breached and works commencing in the park. Exclusion zones will be set up around sites known to support protected species, and working within the exclusion zone will be limited to hand working. Details of these requirements are set out in the strategy to support the disturbance licences. Drawing No. 21440/E/03/005 illustrates the location of the proposed permanent wildlife fencing. Requirements for temporary wildlife fencing are detailed in the contract documents.

3.2.28 The contractors working on the construction methodology for the new structure crossing the River Esk and the realigned access tracks will be required to provide a method statement detailing provision for and methods of working to ensure that free passage of wildlife is maintained along the banks of the River Esk during the construction period.

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- 3.2.29 The protection of water both surface and groundwaters will be subject to SEPA's Special Requirements and Pollution Prevention Guidelines. Temporary lagoons or settlement tanks will be required and will be designed to intercept surface run-off, contain spillages and ensure that adverse impacts on the quality of local watercourses and shallow groundwater are prevented. Designated areas for fuel oils and chemicals will be set aside and these will always be bunded. Where land drains are encountered during construction, these will be intercepted and connected to an outfall via a drainage system.
- 3.2.30 The risk of flooding to susceptible areas will not be increased and appropriate measures will be taken by the construction contractor to prevent this occurring.
- 3.2.31 The construction contractor will also be required to consult with SEPA regarding the requirement for any licences, registrations or other approvals as required under the Water Environment (Controlled Activities) Regulations 2005.
- 3.2.32 All vegetation removal (including trees/shrubs and herbaceous/grass cover) will only be removed outside of the bird breeding season (March to August inclusive), as required by law. Trees considered to be of potential for roosting bats will be dismantled in October/November if possible to avoid the more sensitive times of the year associated with hibernating or breeding. Trees will be dismantled in accordance with the Bat Conservation Trust's best practice.
- 3.2.33 Any archaeological features within the road corridor will be subject to the Special Requirements for Historic Scotland. This will require vulnerable areas to be identified and access to these areas should be restricted during the construction period. Monitoring of topsoil stripping may also be required during the construction contract.
- 3.2.34 Outwith the road corridor Scheduled Monuments and other archaeological sites will be avoided. Site compounds, material storage areas or temporary haul roads will be subject to the standard planning process and such sites or features will be sited away from known archaeological interest.
- 3.2.35 The construction contractor will be required to consult with Historic Scotland in connection with dismantling of the "A" Listed Dalkeith Estate boundary wall where it is

breached by the bypass. All stone arising from the removal of sections of the wall will be set aside for use in the re-construction of the re-aligned section of wall along the west side of Salter's Road. This work will need to be undertaken in a manner to avoid damage to the remaining stonework and temporary fencing/supports may be required to achieve this.

3.2.36 Stone arising from the dismantling of other existing stone walls at Fordel Mains will also be set aside for re-use in the construction of new walls at this location.

3.2.37 The construction contractor will also be required to consult and comply with the relevant landowners with regard to the provision of temporary stockproof fencing and the provision of gates and animal accesses to minimise disruption to farming activities during the works. The location and erection of any fencing works in environmentally sensitive areas will need to be agreed with the Consulting Engineer before work is commenced.

3.3 Ecology and Nature Conservation

Introduction

3.3.1 The ecology and nature conservation interests of the A68 Dalkeith Bypass corridor are considered in this section.

Previous Investigation

3.3.2 Ecological studies undertaken in 1995/96 to support the Stage 3 Scheme Assessment Report comprised a desktop collection and review of existing ecological records and sites, consultation with statutory and other relevant organisations, a Phase 1 habitat survey and Phase 2 surveys for otters and badgers.

3.3.3 The assessment was undertaken in accordance with the procedures set out in Volume 11 of the *Design Manual for Roads and Bridges* (DMRB) and *Guidelines for Baseline Ecological Assessment* (Institute of Environmental Assessment).

3.3.4 The study identified Dalkeith Park, and in particular the River Esk and its riparian woodland as being the ecologically sensitive section of the study area.

3.3.5 It was found that there are no designated sites of nature conservation interest within or immediately adjacent to the route corridor. The closest site was identified as Dalkeith Oak Wood Site of Special Scientific Interest approximately 200m to the south of the new route. Studies confirmed that this sensitive site would not be affected directly or indirectly by the new route.

3.3.6 The River Esk is a non-statutory Scottish Wildlife Trust site. It is an area of long-standing semi-natural habitat and is an important wildlife corridor. The River Esk is also a designated salmonoid river under EC Directive 78/659/EEC (The Freshwater Fish Directive) and The Surface Waters (Fishlife) (Classification) (Scotland) Direction 1999. As such, the water quality of the Esk must comply with the physical and chemical standards set out by the legislation in order to demonstrate that the fish population is safeguarded from harmful pollution.

3.3.7 Surveys for protected species confirmed that otters were present in the Esk. Badgers were not found in the road corridor and their populations were found to be low in the wider locality.

3.3.8 The initial studies confirmed that outside of Dalkeith Park, the scheme had only limited impact on habitats and protected species.

Current Methodology

3.3.9 A review of the existing ecological data for the scheme confirmed the need to repeat baseline and species surveys and indeed to extend the survey to additional protected species that may now be in the study area.

3.3.10 The review was undertaken in accordance with DMRB guidance, and the current best practice set out in the *Guidelines for Ecological Impact Assessment* (IEEM, July 2005 Draft).

3.3.11 The surveys were undertaken by qualified ecologists either from within W.A. Fairhurst & Partners or their approved sub-consultants, The Wildlife Partnership and Grampian Badger Surveys.

3.3.12 The ecological reassessment comprised the following;

- a desktop review of information on sites of nature conservation interest and protected species within the road corridor or the adjacent 1km buffer, to determine if any new sites or species have been identified;
- consultation with Scottish Natural Heritage, the Forth District Salmon Fisheries Board and the Scottish Wildlife Trust;
- a repeat Phase 1 habitat survey;
- a repeat badger survey;
- a repeat otter survey
- a survey for kingfishers within the River Esk corridor
- a survey for water voles;
- a survey for bats.

Copies of the protected species surveys are presented in Appendix C.

3.3.13 A summary overview of the wildlife interests of the study area is presented in the following section.

Route Evaluation

3.3.14 There have been no new statutory or non-statutory sites of nature conservation designated in the study area since 1994-95, and the boundaries of existing sites remain unaltered (refer to Figure 1).

3.3.15 The Phase 1 habitats within the study area (refer to Drawing 21440/E/03/002) also remain largely unchanged. Areas of open cast mining have been worked and have been or are being returned to agriculture.

3.3.16 Dalkeith Park remains the area with the highest quality habitat, which is predominantly the Esk corridor.

3.3.17 Outwith the park the wider agricultural landscape is homogenous and of limited value for wildlife. The fields do not have conservation headlands, and hedgerows are standardly single species quickthorn.

3.3.18 Woodland is a key habitat in the study area and 7 areas of woodland are to be affected by the road scheme (refer to Figure 2 and Drawing 21440/E/03/002);

1. Castle Steads - Long established mixed Norway Spruce, oak and sycamore plantation,
2. West bank of River Esk - Narrow strip of ancient oak woodland at bank top, adjacent to a relatively recent "other Roy wood" (Scots pine plantation on the site of a former ancient woodland),
3. East bank of River Esk - Narrow strip of semi-natural mixed woodland,
4. Line of 5 trees at the eastern boundary of Dalkeith Park, north of Sandyriggs Wood,
5. Sandyriggs Wood - Long established mixed plantation woodland, consisting of oak, larch, sycamore, beech and Scots pine,
6. Langside - Oak cultivar plantation woodland,

-
7. Row of trees - Mature/semi-mature beech trees and saplings in an exposed location near to Fordel Mains.

3.3.19 Otters and badgers are now more widespread in the study area, but water voles are not present.

3.3.20 A herd of approximately 80 roe deer is maintained within Dalkeith Park. These deer are able to move relatively freely within the whole of the walled parkland at present. Deer were also recorded at Langside (sighting) and at the Bellyford Burn, the Penicuik to Musselburgh foot and cycleway, and the Smeaton electricity substation (slots).

3.3.21 Records of birds within the study area confirm that the habitats support species which are locally common and representative of that habitat.

3.3.22 Key habitats for birds within the road corridor are woodland and scrub, and the River Esk. Within areas of woodland and scrub, songthrush, robin wren, lesser spotted woodpecker, blackbird, dunnock, great tit, blue tit, chaffinch and starling have been recorded. Other species frequently recorded in the road corridor are collared dove and magpie.

3.3.23 Raptors and owls reported in Dalkeith Park are tawny and barn owl, sparrowhawk, and common buzzard. In 2005 buzzards were recorded breeding in woodland to the west of Sandyriggs Wood. A rookery is also present in the southern section of Sandyriggs Wood.

3.3.24 Pied wagtails and kingfisher are reported in the Esk corridor.

Mitigation

3.3.25 Much of the ecological mitigation has been built into the line of the new bypass, particularly so at the Esk where the least damaging crossing point was selected. The road crosses at a point where the riparian ancient woodland is at its narrowest, and where the majority of the trees lost will be commercial woodland. The road bridges over the River Esk listed wildlife site (Refer to Drawing 21440/E/03/005).

3.3.26 However, additional proposals have been designed to reduce the impact of the scheme on protected species, to repair habitats damaged by the scheme, and to create new habitats.

Deer

3.3.27 The Dalkeith herd of roe deer continually move through the park and their routes regularly cross the line of the new road. The herd is largely contained within the park by the park wall, and hence the deer are unlikely to be able to significantly alter their movement patterns to avoid the new road.

3.3.28 A fence to exclude deer from the road is proposed. Two underpasses, one either side of the River Esk and an overbridge close to Sandyriggs Wood will provide safe crossing points which the deer can use.

3.3.29 The Deer Commission for Scotland recognises that roadside deer fencing is the primary method that should be employed to reduce deer crossings and the resultant road traffic accidents. Their guidance advises that the fencing should be of adequate specification in terms of height and mesh size, and be of sufficient length to prevent end runs. The fencing should also be used to channel deer to safe crossing points, such as an overbridge or underpass.

3.3.30 The deer fencing will run either side of the new road for its length across the park and will tie into the Park walls at either end, and into the Esk bridge in the centre. The fence will be returned to the wingwall of the overbridge to guide the deer towards this crossing point.

3.3.31 The two underpasses will be located at bank top height either side of the Esk. On the East bank the existing track will be used. This is a route which is already used by deer and other mammals. The existing semi natural woodland outwith the scheme will be retained and no new planting will be introduced into this area. Any peripheral disruption to habitats will be left and allowed to regenerate naturally.

3.3.32 On the west bank, the underpass is again located on an existing track which is used as a mammal track. The planting immediately around the entrances to the underpass will be grassland, but this will be set within an area of native shrub planting.

3.3.33 It is anticipated that the deer will be led to the underpasses via the tracks. The underpasses themselves are almost straight and the deer will be able to see through them. The underpasses are also short, approximately 10m in length. These are all features which will encourage deer to use underpasses.

Badgers

3.3.34 A fence to exclude deer from the new road is proposed across Dalkeith Park. This fence is to be designed to a specification which will also exclude badgers and otters from the road (Refer to Drawing Nos. 21440/E/03/004 and 21440/E/03/005). Two underpasses and an overbridge will provide safe crossing points across the new road

3.3.35 Outwith the park badger fencing is proposed along most of the scheme (Refer to Drawing No. 21440/E/03/005 and specification in Appendix A of Recommendations for Badger Fencing, Scottish Badgers, Publication No.4, September 2000). Three badger tunnels under the new road will provide safe crossings and increase connectivity between badger clans. These crossings are all located on known mammal runs. Their approaches will be tied into the badger fencing to guide the animals into the crossings. The entrances to the badger tunnels will be designed so that water soaks away and does not flood into the tunnel. Two pedestrian/cyclist/ equestrian underpasses can also be used by badgers and other animals including deer. Badger tunnels will be designed in accordance with guidance in Volume 10 of DMRB, HA/92 Mitigating against effects on Badgers and will be in accordance with SNH's requirements (Refer to Drawing No21440/E/03/013 for standard detail of badger underpass).

Bats

3.3.36 Although bat roosts were not found in the corridor of the road, it was considered that some of the trees could potentially shelter bats. These trees have been identified and will be dismantled in accordance with the Bat Conservation Trust's guidance. The trees will be taken down in autumn or spring, if possible. This avoids periods when the bats are particularly vulnerable. The works will be supervised by an appropriately qualified ecologist. If bats are encountered appropriate measures will be taken to protect them and secure the roost and the standard licensing procedure will then be followed.

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- 3.3.37 It is proposed, with the agreement of the landowner, that bat roost sites will be attached to surrounding trees in the Esk corridor, to provide mitigation for the loss of potential tree roost sites. The artificial roost sites should be of the type Schwegler woodcrete 2F-DFP, which are boxes favoured by Daubenton's bat and Nathausius' pipistrelle bat.
- 3.3.38 Mitigation for damage to foraging routes will comprise the planting of broad-leaved trees on the embankment of the road (refer to landscape Drawing Nos. 21440/E/04/013-021 Landscape Layout Sheets 1-9). Additional planting around Langside is also necessary to compensate for the loss of a significant woodland feature in what is otherwise a sparse bat foraging area.
- 3.3.39 Hop-over points should be provided where key flight routes are severed by the road. The locations of these are shown on Drawing No. 21440/E/03/005. A hop-over point can be provided by preserving existing tall trees close to the road boundary or by planting trees and managing them so that they develop as tall tree cover.
- 3.3.40 The planting of these hop-overs will also repair flight lines used by owls and other birds.

Otters

- 3.3.41 Otters are currently known to use the River Esk corridor and are widespread in the wider Lothians area. The new bridge over the Esk is designed such that there is no construction within the river and bankside access will be retained along both banks. Revetment works may be required on the west bank of the Esk to protect against scouring in the event of a 1 in 200 year flood occurring, but it is not envisaged that these works will extend into the river itself. Rock outcrops on the east bank of the Esk and hence it is not envisaged that any treatment will be required on this side.
- 3.3.42 One of the park access tracks will be realigned adjacent to the west bank of the Esk. This is a diversion of a track which runs higher up the side of the Esk valley through the woodland. The track will be diverted to the line of an existing track approximately 15m west of the river bank. The improved access track planned for the east bank of the Esk will require re-profiling of the slope; however, this track will be some 3.5 to 4.0m above normal water level and set back approximately 8m east of the river itself. Free passage of wildlife will thus be maintained. If this necessitates the widening of the existing track to accommodate estate vehicles, then the widening will be undertaken on the side of the

existing track which is away from the river bank. Both of these tracks will be fenced, but the fencing will be designed so that it does not restrict otters.

3.3.43 Road side fencing through Dalkeith Park will exclude otters from the new road reducing the risk of otter mortalities.

3.3.44 New culverts on the Bellyford Burn and Smeaton Burn will be designed with otter ledges which will facilitate otter movement along smaller watercourses. Ledges should be accessible from the river banks. Culvert design should be in accordance with 'best practice' (refer to DMRB Volume 10, Section 4, Part 4) which permits the dry passage of otters under both normal and spate conditions in the river. If this is not possible, then an alternative route should be provided.

3.3.45 A 260m long section of the Bellyford Burn, on the southside of the bypass, will need to be diverted. The construction contractor will be required to consult with SNH and SEPA regarding the design of the diversion to ensure that it conforms with current best practice, where feasible. This is likely to include a suitable gradient such that there is not excessive erosion or sediment deposition and the incorporation of meanders where appropriate. The cross section of the diverted burn will need to follow the characteristics of the surrounding watercourses with minimal engineering that allows natural hydromorphological processes and habitats to develop. Further detail on the diversion is given in Section 3.9, Water Quality and Drainage.

Fish

3.3.46 Potential impacts on the salmonoid population of the River Esk and fish life in the Smeaton and Bellyford Burns will be mitigated by the following measures: location of outlets/discharges so as not to impact on spawning gravels and water quality through scour and erosion or deposition of silt-laden or contaminated water, avoidance of in-river structures, appropriate timing of in river works, avoidance of the use of gabions, appropriate culvert design and the minimisation of water pollution risks by adoption of best practice working methods during construction and suitable drainage design. Culverts will be designed in accordance with *River Crossings and Migratory Fish* (Scottish Executive, April 2000) and with SEPA current guidance. Where appropriate, culverts should include natural-looking boulders to aid the regulation of water flow and natural stream beds should be preserved where possible. Cascades and erosion

protection on all watercourses, if required, will be constructed using natural stone and will mimic the natural features of the watercourses, or as agreed with SEPA. Further detail on mitigation during construction is given in section 3.2, whilst culvert and drainage design is considered in Section 3.9.

Birds

3.3.47 The survey confirmed that the habitat at the bridge crossing point is unsuitable as a breeding site for kingfishers. The species is present in the Esk valley in Dalkeith Park, but it is considered that birds will still be able to use the Esk corridor, flying underneath the new bridge. No specialised mitigation is therefore proposed.

3.3.48 The scheme does not affect any structures that are used by barn owls, and there are no trees with sizable cavities suitable for nesting tawny or barn owls within the road corridor.

3.3.49 These two owl species have very different habitat requirements. Barn owls are birds of open country, farmland, mashes, rough pasture, and meadows whilst tawny owls require woodland habitat. It is unlikely that the road scheme will have an adverse effect on either of these species as a result of habitat loss. The native shrub and woodland planting proposed will provide more than adequate compensation for the loss of trees associated with the scheme. The planting also seeks to restore woodland edges and provides hop over points for bats. It can be anticipated that these hop over points will also encourage birds commuting along woodland edges to fly higher over the road reducing the risk of collision.

Habitats

3.3.50 Landscape proposals have been designed to repair habitat edges, particularly woodlands. The new tree and shrub planting will comprise native species of local provenance. This will maintain the genetic integrity of oak in the park. Within the areas of ancient woodland in Dalkeith Park any oak will be encouraged to naturally regenerate through future management techniques.

3.3.51 Four types of woodland/shrub planting are proposed within the landscape strategy. Three of these, the native woodland planting, the wet woodland, and the native shrub planting will develop to provide good wildlife habitat. The landscape proposals additionally propose significant lengths of new or replacement hedgerow planting, and again this will comprise native species which will benefit wildlife.

3.3.52 The SUDS ponds have been designed to be multi-functional, providing a water control quality function, a landscape function and a nature conservation function. Amphibians in particular will benefit from the creation of these ponds.

3.3.53 The SUDS ponds will remain partially wet throughout the year. These ponds can be designed to encourage amphibians and dragonflies by the creation of gentle (1:4 to 1:10) slopes on their south-facing sides and the planting of native aquatic and emergent species including species with flexible leaves which are suitable for newts to use as ovidepositing sites.

Construction Impacts

3.3.54 The construction of the scheme has the potential to cause adverse impact on nature conservation features or species, through damage to habitat, disruption of foraging patterns and direct damage to the species itself.

3.3.55 The protection of water courses and in particular the River Esk is of key importance. These protection measures are set out in sections 3.2 and 3.9. The Esk valley is also an important wildlife corridor and the construction contractor will be required to provide a method statement setting procedures whereby the functioning of the wildlife corridor will not be disrupted.

3.3.56 Measures to protect species will comprise temporary fencing and the identification of exclusion zones. Where licences are required to disturb species these will be supported by an appropriate mitigation statement. Temporary fencing will be required during the construction period to prevent deer escaping from Dalkeith Park onto the adjacent road network where they could increase the risk of traffic accidents.

3.3.57 Timing of works can reduce impact on species. Trees and shrubs will be removed outside of the bird breeding season, and any trees that have the potential to support

bats will be removed in accordance with the Bat Conservation Trust's guidance with the work being timed to exclude the most sensitive periods of the bat year where possible.

Conclusion

3.3.58 The road scheme will not affect any statutory sites of nature conservation, and will have limited impact on the non statutory River Esk listed wildlife site.

3.3.59 Mitigation proposals have been designed to safeguard protected species close to the road and to reduce the risk of mammal fatalities on the road and road traffic accidents caused by collision with mammals. These measures comprise exclusion fencing, and the provision of underpasses/ tunnels and an overbridge. In addition to protecting species, the crossing points will enable mobile species of mammal to maintain their normal patterns of movement in safety.

3.3.60 Compensation for the loss of potential bat roosts will be provided by the provision of bat boxes.

3.3.61 The landscape planting is designed to repair woodland edges, create hop over points for bats and birds, and to provide compensatory woodland and shrub planting.

3.3.62 The SUDS ponds will provide new wetland habitat which will be of particular value to amphibians.

3.3.63 Construction impacts on habitats and species are to be mitigated through the implementation of a range of protection measures, which have been identified in this and other sections of the report. Pollution protection will be important where the construction works affect, or are close to sensitive aquatic habitats.

3.3.64 Temporary/permanent fencing is required to safeguard protected animals and their places of shelter and to prevent deer from escaping from Dalkeith Park.

3.3.65 The works will also be timed, where possible to avoid sensitive times of year for birds and bats, and the contractor will be required to demonstrate that the construction work in the Esk valley does not compromise the function of the Esk valley to act as a wildlife corridor.

3.4 Landscape and Visual Effects

Introduction

3.4.1 An analysis of the landscape and visual qualities within the study area has been undertaken to assist in the assessment of landscape and visual effects that might arise from the proposed bypass east and north of Dalkeith, south of Edinburgh.

Previous Investigations

3.4.2 The Landscape and Visual assessment undertaken in 1996 used methodology set out in the Design Manual for Roads and Bridges, Volume 11 Environmental Assessment to support the Stage 3 Scheme Assessment Report. The 1996 assessment comprised of a desk top study and site survey work, followed by a subjective analysis of the study area, the route alignment (vertical and horizontal) and any appropriate mitigation measures to be undertaken to address significant effects.

3.4.3 The landscape and visual assessment included the following elements;

- Landscape character;
- Landscape quality
- Views of the area by road users, pedestrians and residents
- Assessment of the scheme's impact on all of the above

3.4.4 This assessment now also considers the findings from the original assessment, comparing the bypass proposal under the following evaluation criteria;

- any significant changes in the baseline;
- revised scheme design from dual to single carriageway bypass
- inclusion of SuDs features (linear and attenuation basins)
- mitigation proposals to address significant changes in predicted effects
- updated guidance in best practice for LVIA, as stated below;

The current methodology for DMRB Vol 11 and The Landscape Institute and The Institute of Environmental Management & Assessment - Guidelines for Landscape and Visual Effects Assessment (Second Edition), as stated below.

3.4.5 Recent Government guidance has highlighted greater public perception of issues concerning the protection of landscape character and quality including the visual amenity of an area, when considering the effect of development on landscapes.

3.4.6 **Landscape Effects** associated with a development relate to changes to the physical landscape, the character and quality of the landscape resource and how it is perceived and experienced by its users. Landscape assessment considers different aspects of the landscape as outlined below:

- **Elements** - Individual elements such as hills, valleys, woods, trees and hedges, ponds, buildings and roads (including prominent or eye-catching features that are quantifiable and can easily be described),
- **Characteristics** - Elements or combinations of, that contribute to the particular character of an area (including intangible characteristics such as tranquillity, wildness and cultural associations), and
- **Character** - A distinct, recognisable and consistent pattern of elements that creates distinctiveness and a sense of place. Character can be identified on maps and describes areas of similar character (including designated landscapes, conservation sites and other acknowledged special areas of interest).

3.4.7 **Visual Effects** relate closely to landscape effects, but concern changes that arise in the composition of available views. Visual assessment incorporates people's perception and response to changes in visual amenity. Effects may result from new landscape elements that cause visual intrusion or new features that obstruct views across the landscape. However, both Landscape and Visual Effects can be positive or negative.

Current Methodology

3.4.8 This landscape and visual assessment has been undertaken based on methodology established in the Landscape Institute and Institute of Environmental Management Assessment 'Guidelines for Landscape and Visual Impact Assessment' (2nd Edition published by Spon, 2002).

The assessment consisted of a preliminary desk study reviewing the baseline information from 1996 and the updated environmental survey work which has

contributed to this Environmental Mitigation report. The original photo viewpoints were reviewed following a comprehensive photographic survey from which an updated analysis of the baseline conditions could be undertaken within the broader landscape context in both physical and visual terms.(Landscape and Visual Effects)

3.4.9 A site survey was undertaken in September 2005 to identify residential properties, public highways, footpaths, bridleways and other public amenity areas from which the development proposals would be visible (illustrated on the Visual Analysis 21440/E/04/003) Photographs were taken from 8 identified viewpoints similar to those taken in 1996 so that some continuity of the original visual assessment could be retained.(illustrated on the Photo Viewpoint Location Plan 21440/E/04/002). Photographs were taken with a 50mm lens and 35mm film and have been used as the basis of the Visual Assessment. Each viewpoint also contains details of a visual analysis from the identified receptor (see Drawings 21440/E/04/004– 011Viewpoints A-H).

3.4.10 Landscape Character Assessment

The assessment analyses the value and sensitivity of the landscape, which is a measure of its capacity to accommodate change without loss of character. The magnitude of landscape effects depends upon the extent to which the landscape changes are perceptible in the wider context. This includes the relationship of the site to the following documents;

- Shawfair Local Plan. Midlothian Council, September 2003
- Edinburgh and the Lothians Structure Plan 2015
- Finalised East Lothian Local Plan 2005
- Midlothian Local Plan. Midlothian Council, December 2003

As the proposed development will result in a permanent change in the landscape, the long-term residual changes have been assessed in detail.

3.4.11 Landscape Sensitivity and Magnitude of Effects

Recent guidelines highlight that both landscape and visual impacts are dependent upon the sensitivity of the landscape resource or visual receptors and the magnitude of

effects. The sensitivity of the landscape resource and the degree to which a particular landscape type or area can accommodate change arising from a particular development, without detrimental effects on its character, is influenced by the following:

- Existing land use,
- The pattern and scale of the landscape,
- Visual enclosure/openness of views, and distribution of visual receptors,
- The scope of mitigation measures, (to be in character within the existing landscape), and
- The value placed on the landscape.

3.4.12 Value

The guidelines recommend the development of thresholds of impact significance as a way of standardising the conclusions of landscape and visual impact assessments so that they are consistent within themselves and different categories of impact. Table 3.4.1, below, explains how criteria are applied to arrive at an assessment of landscape value. The analysis of landscape value or importance aims to reflect the perceived value of the landscape at a specific scale, identify the group to which it is important and why it is important.

Table 3.4.1 - Criteria for assessing landscape value

Value		Typical Criteria	Typical Scale	Typical Examples
High	Exceptional	High importance & rarity No potential for substitution or very limited potential	International National	World Heritage Site National Park AONB / NSA / ESA
	High	High importance & rarity Limited potential for substitution	National Regional Local	National Park AONB / NSA / ESA National Scenic Area AGLV
Moderate	Medium	Medium importance & rarity Limited potential for substitution	Regional Local	AGLV Regional Scenic Area etc
	Medium-Low	Medium importance & rarity Some or good potential for substitution	Regional Local	Undesignated but value expressed for instance in demonstrable use
Low	Poor	Low importance and rarity	Local	Areas identified as having some redeeming feature or features and possibly

Value		Typical Criteria	Typical Scale	Typical Examples
				identified for improvement
	Very Poor	Low importance and rarity	Local	Areas identified for recovery

3.4.13 Table 3.4.1 establishes general guidance on the perceived level of importance. A landscape character area may have international, national, regional or local level planning and environmental designations, which may reinforce the associated value by the general public. In addition landscapes that are not of a quality to warrant national or regional designation may be of great local value, in particular natural features and semi natural vegetation in urban areas. The baseline condition of the landscape resource and its perceived value is illustrated within the following drawings; Landscape Quality; Landscape Character Zones; Designated Landscapes Drg. No 21440/E/04/022 – 024. The landscape quality within the baseline has not significantly changed from the previous assessment apart from the reinstatement/ restoration of the opencast mines, which has improved the overall quality from poor to ordinary. The proposed changes to land use around Salter’s Road from agriculture to business/ industrial will have future implication to overall quality within the locality.

Visual Sensitivity and Magnitude of Effects

3.4.14 There is no standard methodology for the quantification of the scale or magnitude of landscape effects. Generally decisions can be based on the scale or degree of change to the landscape resource, the nature of the effect and its duration – temporary or permanent. For visual effects the sensitivity of the visual receptors are classified as follows:

High Sensitivity: Residential properties/Public Rights of Way – footpaths/bridleways and waterways – where the landscape to be changed is an important element in the view

Moderate Sensitivity: Roads/Other non residential buildings – Sporting/recreational facilities/where the landscape to be changed is an important element in the view;

Residential properties/PROW / where the landscape to be changed is less important element in the view.

Low Sensitivity: Roads/Other non residential buildings – Sporting / recreational facilities / where the landscape to be changed is a less important element in the view;

Residential properties PROW/ where the landscape to be changed is an unimportant element in the view

3.4.15 Magnitude for visual impacts are classified as follows,

High Magnitude - Majority of viewers affected / the proposals dominate the view and fundamentally change its character and components.

Moderate Magnitude - Many viewers affected / the proposals are noticeable in the view, affecting its character and altering some of its components and features.

Low Magnitude - Few viewers affected / the changes are only a minor element of the overall view that are likely to be missed by the casual observer and/or scarcely appreciated.

3.4.16 Magnitude is determined by the distance of the receptor, the extent of change in the field of vision, the proportion or number of viewers affected and the duration of activity apparent from each viewpoint, or a sequence of points that may have transient views e.g. along a road. In visual assessment, greater weight is given to visual effects upon public viewpoints, than upon private properties.

3.4.17 The landscape resource refers to landscape elements or assemblage of elements that will be directly or indirectly affected by the proposed development. They may include topography, geological or man-made elements, woodland, trees and hedgerows, land use and combinations of elements that create distinctive landscape character.

3.4.18 Evaluation of the sensitivity to change combines a review of value or importance of the main elements, which together comprise each character area together with their 'susceptibility' to change of the type of development proposed.

Table 3.4.2 - Landscape Magnitude of Change Criteria

Magnitude	Criteria
None/Negligible	No part/ (only a small part) of the development, or work, or activity associated with it is discernible
Slight	Proposals constitute only a minor component of the wider view, which might be missed by the casual observer/ or receptor. Awareness of the proposal would not have a marked effect on overall quality of the scene
Moderate	The proposals may form a visible & recognisable new element within the overall scene and may be readily noticed by a receptor
Substantial	The proposals forms a significant & apparent part of the scene that affects and changes its overall character within the context of the wider area
Severe	The proposals forms a dominant major alteration to key elements considered to be totally uncharacteristic of the existing scene that affects and changes its overall character within the context of the wider area

3.4.19 An evaluation of the magnitude of the proposed changes on the elements of the landscape was carried out through a review of the nature and scale of the change, together with its duration and degree of permanence, using the criteria outlined above.

Significance of Effects

3.4.20 Significance is not absolute and can only be defined in relation to each development and its location. The two principle criteria determining significance are the **scale/magnitude/effect** and the **environmental sensitivity of the location/receptor**. A higher level of significance is generally attached to large-scale effects and effects on sensitive or high-value receptors; thus small effects on highly sensitive sites can be more important than large effects on less sensitive sites.

3.4.21 Overall effects may be adverse, neutral (no change) or beneficial, and are assigned a level on the scale: No change – Slight – Moderate - Substantial, taking into account mitigation measures and different stages of the project lifecycle. Intermediate levels,

such as slight to moderate, may also apply. The following Table 3.4.3 assigns criteria to each level, as applied in this assessment.

Table 3.4.3 - Criteria for Assessing Significance of Effects

Level	Typical Criteria
Substantial Adverse	Cannot be fully mitigated. Possible cumulative effects at complete variance with character landform, scale and pattern
Moderate Adverse	Out of scale with landscape resource, leaving an adverse effect on a landscape of recognised quality
Slight Adverse	Does not quite fit into the landform and scale of the landscape affecting an area of recognised landscape character
No change	Does not affect the landscape or complements the scale, landform and pattern of the landscape, maintaining existing quality
Slight Beneficial	Potential to improve landscape quality and character fitting scale, landform, and pattern
Moderate Beneficial	Potential to improve landscape quality and character to enable restoration of previously removed valued features
Substantial Beneficial	Environmental fit responds well within the site context, improving the quality of the valued landscape through the removal of damage caused by existing land uses or addition of beneficial features

Presentation of Results

3.4.22 The result of the landscape assessment establishes the sensitivity of the identified landscape resources. The information is summarised and presented in tabular form, which allows objective judgement of the overall significance of effects.

3.4.23 The visual assessment considers the site and its surroundings, focussing on a 1km corridor either side of the proposed route. Observers beyond a 5km distance are generally considered unable to perceive details of a site's development. In the case of the proposed development of the Dalkeith Northern Bypass, field survey site analysis that followed a theoretical visual mapping exercise, determined that a 2km corridor is sufficient for the purpose of identifying potential visual effects, as shown in WAF Drawing No. 21440/E/04/003 'Visual Analysis Plan'. The plan illustrates the extent of visibility of

the development proposal from identified receptors when considering intervening topography, existing vegetation, physical barriers and the road construction.

3.4.24 The results of the above visual assessment identified a number of representative viewpoints, which illustrate previously highlighted ‘major views’ within the study area. The visual effects of the development upon these viewpoints, in terms of the degree of visual change that would be generated have been analyzed and illustrated in WAF Drawing No. 21440/E/04/004 – 011 Photo Viewpoints A - H. Photo Viewpoints, identified in Photo Viewpoints Location Plan 21440/E/04/002, have been assessed from an average human height of approximately 1.8m above ground level. The Photo Viewpoints establish the updated baseline position from which the visual effect of the proposed scheme is undertaken, taking into account factors such as local topography, vegetation and existing development. They also consider the effect of the proposed mitigation measures, as illustrated within the Landscape Layout Sheets 1-9 (Drawing. No.21440/E/04/013 -021)

3.4.25 An analysis table and location plan accompanies each Photo Viewpoint. The table describes the location of each viewpoint, its sensitivity, the existing envelope compared with visual effects generated by the scheme during construction, operation (day of opening) and 15 years from operation, in terms of magnitude of impact and the overall significance of the effects. The methodology set out above was used in determining both landscape and visual effects.

Route Evaluation

Landscape Character

3.4.26 The section re-examines the effect on the landscape character and includes original assessment baseline, which has been reviewed and updated following the field survey; photographic assessment including aerial photographic information.

3.4.27 The study area is strongly defined on all sides. To the south and west by Dalkeith, Dalkeith Park, the existing A68 and the D’Arcy – Cousland Ridge and to the north and east by Whitecraig, Carberry Tower, Cousland and the D’Arcy – Cousland Ridge. The area contains a number of designated landscapes; these details are supported by drawings 21440/E/04/022-25.

Designated Landscape Areas

3.4.28 Within the study area there are six regional landscape designations relating to landscape quality as stated within the original assessment and these are as follows.

- i) Edinburgh Green Belt
- ii) Dalkeith Park Area of Great Landscape Value
- iii) Fordel Mains Area of Great Landscape Value
- iv) Dalkeith Park
- v) Carberry Tower
- vi) Oxenfoord Castle

Existing Landscape Character

3.4.29 The study area can be divided into five distinct character zones, running south-east from the Edinburgh City Bypass to Fordel Mains, which are consistent with the original baseline assessment.

AREA A; Identified by the break in contours from the dominant slope, the area is characterised by rich fluvio-glacial and alluvial soils, extensive mature shelter belts and the parkland landscape of Dalkeith.

The rich soils are of high value for agriculture, resulting in large well maintained, bordered by strong shelter belts.

Dalkeith Park is the major landscape element within the area, utilising initially the land enclosed by the Rivers North and South Esk and later influencing the landscape beyond the rivers. Its inclusion within the Inventory of Designed Gardens and Landscapes is wholly justified and further enhanced by numerous listed buildings and structures.

Further to this it is an area which has largely avoided any encroachment or incursions into the park, other than for three lines of overhead pylons which cut across the area to the north of the Meeting of the Waters.

AREA B; Comprises a large central belt, which is largely worked for agriculture. The area relates closely to the north-west facing slope running down from the D'Arcy – Cousland Ridge. The slope is further characterised by numerous ledges, relating to the complex folding and faults of the underlying geology that enable uninterrupted distant views without any foreground disruption.

In areas where mature vegetation occurs, the woodland imposes itself upon the quality of the surroundings and due to the dominant slope, can be seen from a distance.

The area is further enhanced by the Parkland at Carberry Tower which, sitting on the side of Carberry Hill, frames the northern border of the study area.

Also within the area exists the evidence of a past industrial age together with the detracting form of electricity pylons, sub station and associated overhead lines. These are detractor elements on the character and quality of the area whilst the derelict vegetated railway lines are being utilised for public use and are as such of value in terms of a wildlife corridor and recreational resource.

AREA C; The initial impression of this area belies its more interesting formation. Formed by glacial drainage channel the area skirts around and through the limestone D'Arcy – Cousland Ridge, creating a v-shaped valley that overshadows the tiny Bellyford Burn which runs along its bottom. It is an irregular form within a generally ordered landscape.

As the channel passed over the limestone it created a narrower valley, where, with alluvial deposits present woodland has flourished and created a micro-environment. Beyond the gorge the valley is an imposing landscape, bare of any substantial vegetation.

The opencast area between Cowden Bog Wood and Southfield has been restored and the altered landform to the east of the Bellyford Burn has a less detracting effect on the overall quality of the area. The finished restoration of the area removes the topographical irregularities known as 'Hungry Hill', leaving a more uniform, north-west facing slope, upon which the line of the proposed A68 bypass will then be imposed.

AREA D; The D’Arcy – Cousland Limestone Ridge dominates and overlooks the study area. Views north westerly towards Edinburgh, the Pentland Hills and the Firth of Forth are dramatic. The ridgeline also forms the horizon in views eastwards from Dalkeith Park, the City Bypass and beyond.

The area runs from the village of Cousland south-west across the existing A68 to just north of D’Arcy farm. It is characterised by large open fields and includes a few established shelter belts. The area also contains a network of major and minor roads, linking settlements which enjoy the magnificent views.

AREA E; The south-eastern facing slope of the D’Arcy – Cousland ridge is characterised by numerous small incised stream valleys cutting into the overlying boulder clay.

This more fertile drift layer also supports large areas of established shelter belts and woodland planting which have formed the setting for the Parkland landscapes at Oxenfoord Castle and Preston Hall.

Historical & Cultural Influences

3.4.30 Scheduled Ancient Monuments

Scheduled Ancient Monuments exist at Dalkeith House and at the Old Cow Bridge, within Dalkeith Park. Both of these features are over a kilometre from the line of the proposed road, and their setting would not therefore be affected.

Two additional SAM sites near Easter Cowden (6210) and Langside (6211), south and north of the proposed route respectively. Both features are within 100 metres from the road alignment, but associated landscape and visual effects have been minimised around Langside due to the road being in cutting and new planting. Easter Cowden will be affected due to the elevated section of the road over the Bellyford Burn, roadside planting will assist in reducing the visual effects from the traffic, acoustic effects will be more difficult to address.

3.4.31 Designed Landscapes

The Designed Landscapes of Newton House and Dalkeith House are located within the study area and are likely to be affected in terms of its setting; directly (Dalkeith House) and indirectly (Newton House); due to the proximity of the proposed route and the anticipated landscape and visual effects as stated later within this section.

3.4.32 Listed buildings

There are a significant number of listed buildings within Dalkeith Park. Both of these features are listed 'A'. 'B' listed buildings include the Kings Gate, Dark Walk Gates and the Laundry Bridge. None of these are sufficiently close to the proposed route to be affected by it, however, Smeaton House, at Home Farm, is also a 'B' listed building. Its location some 600m from the proposed route, and its setting within the policy woodland of Home Farm will not be affected by the proposals.

3.4.33 Conservation Area

The historic core of Dalkeith is a Conservation Area (designated 'Outstanding'), the boundary of which extends northwards into Dalkeith Park as far as the Meeting of the Waters (the junction of the Rivers North and South Esk). The northernmost point of the conservation area is some 200 metres to the south of the new road line, with the woodland lining the River Esk providing protection against noise and visual impacts. It is anticipated that there would be little, if any effect of the new road on this area, therefore.

3.4.34 Archaeological Sites

The area around Dalkeith has a long history of settlement dating from the Iron Age and a large number of archaeological remains are known to exist across a wide area to the north and east of Dalkeith with a particular concentration around Eastfield, to the west of Whitecraig.

The early stages of consultation with the Scottish Office prior to the publication of Draft Orders for the original, single carriageway scheme, identified various known archaeological sites located in the vicinity of the proposed trunk road, including:

- A complex pit alignment at Castle Steads
- An area of probable rig and furrow cultivation to the northwest and southeast of pit alignment.
- A Roman temporary camp at Smeaton, in particular a substantial area of the interior and parts of the northwest and southeast ditches.
- The Smeaton brick and tile works, located north of Smeaton head and adjacent to the northern end of Sandyriggs Wood.
- A crop mark enclosure at Langside
- A stone cist cemetery at Newfarm.

The revised assessment Section 3.1 Archaeology and Cultural Heritage provides a more comprehensive summary of the main issues associated with the proposed development proposals.

3.4.35 Land Cover

The likely effects of the scheme on a number of important ecological areas and species has been discussed in detail within the previous Section 3.3 (Ecology and Nature Conservation). Mitigation measures have also been put forward to ensure limited damage to affected areas. Construction of the road could lead to additional adverse effects on these areas with the requirement for working areas, storage compounds and so on. The following typical features which contribute to the landscape character are summarised below;

- Ecologically rich broadleaf woodlands within settled areas, farm boundaries and often within the open landscape(River Esk Riparian Woodland)
- Unique physical features of woodland, characteristic patterns of land use and settlement has created a recognised landscape character. (Woodland – Cowden Clough, Sandyriggs, within Dalkeith Park)
- Existing valued woodland, hedgerows and other roadside/ planting continues to mature to provide seasonal screening within the landscape context of the proposed route of the A68. The associated tree and scrub planting maturing along the disused railway, now a recreational route, again contributes to limiting views east/west toward the road proposals. (Smeaton – Thornybank cycle track).

3.4.36 Landform

The landform of the area is dominated by the D'Arcy – Cousland Limestone Ridgeline and the valleys of the Rivers Esk. The area contains combination of syncline and anticline, running in a south-west/north-east direction which is strongly evident in the geology of Scotland generally.

The slope falling north-westwards towards the river valleys is made up of a series of smaller slopes and ledges which characterise the land between Carberry Tower and Dalkeith.

Additionally, below the base of the D'Arcy – Cousland Ridge, Bellyford Burn lies at the bottom of a glacial meltwater channel which has strongly influenced the landform surrounding Cousland.

Artificial man-made landforms are dominated by industrial relics, particularly Smeaton Bing which dominates a large part of the study area south of Carberry Tower.

On a smaller scale, the now dismantled Dalkeith/Whitecraig/Pencaitland Railway has left behind numerous cuttings and embankments; some heavily vegetated, which wind across the landscape on engineered gradients.

Adjacent to Smeaton railway junction, and centrally located within the study area, major earthworks have created large platforms for electricity substations which serve the numerous overhead lines which criss-cross the area.

The river valleys of the North and South Esk are strong visual and topographical boundaries between Dalkeith and South Edinburgh. This separation has been strengthened by the building of the City Bypass, which passes through the study area on embankment.

Drawing no. 21440/E/04/025 illustrates the general landform features of the study area.

POTENTIAL EFFECTS

Effects upon Landscape Character

- 3.4.37 The magnitude of the effects of the proposed development upon the surrounding landscape depends on the extent to which the landscape changes are perceptible in the wider context. Effects may be beneficial (positive) or adverse (negative), permanent or temporary and reversible or irreversible. In general a development's landscape setting reduces the magnitude of any potential effects. The result of the landscape assessment analyses the sensitivity of the identified landscape resources and the overall significance of the effects.
- 3.4.38 The landscape character of the study area is based upon the underlying geology and subsequent historic land use, which has heavily influenced the evolved landscape baseline, parkland and extensive agriculture, in which this development proposal sits.
- 3.4.39 The proposed scheme, principally, runs down the slope cutting through the character areas, though avoiding the more public areas of Dalkeith Park and accommodates existing recreational routes potentially severed by the road construction (10 in total are potentially severed). The original scheme has changed from dual to single carriageway. In general, the principal alignment and new junction arrangements are similar to the original proposal and subsequently there are no significant changes to the original summary on landscape character effects. The most significant revision to the road proposals is the inclusion of SUDs features and attenuation basins/ponds which are outside of the original development footprint. These have the potential to accentuate the road development. Mitigation will look to address any potential adverse effects.
- 3.4.40 Area A: The design of the road responds to the unique character of the Dalkeith Park setting retaining open views where possible and providing visual screening by subtle combination of landform and landscape design. The effect upon the valuable screening woodland/plantations associated with the River Esk and the required elevated bridge structure and existing migratory routes for mammals and other protected species will need careful design consideration to minimise significant adverse landscape effects. The additional overbridge provision linking Home Farm and Dalkeith House will also be seen

to detract from the overall higher landscape quality of the landscape context and setting at this location along the route.

- 3.4.41 Area B: The differing landform (plateaus) within this area provides a combination of road sections in elevation and cutting. The resulting effects require careful landscape design features which assist in masking the new landform and traffic movements whilst responding to the existing agricultural features. Reinstatement of previously lost linear features would be encouraged.
- 3.4.42 Area C: The existing landform runs perpendicular to the route alignment which creates a significant elevated section of road at Hungry Hill. This new landform will be prominent within this open agricultural setting. Reinstatement of previously lost features would be encouraged.
- 3.4.43 Area D: This is the most elevated part of the study area where the proposed route rejoins the A68 existing alignment at Fordel Mains. This 'viewing platform' is highly visible and views across the agricultural landscape down into Dalkeith Park should be retained where possible. The design of the road needs to reflect the unique character of Fordel Mains setting, to retain open views where possible and provide visual screening of vehicular movements by subtle combination of landform and landscape design. The provision of highway lighting will be a significant adverse landscape effect to this rural area.
- 3.4.44 Area E: The effect upon the valuable mature woodland/plantation at Fordel Mains is minimised by careful design of the road cutting. Replacement specimen tree planting looks to reinstate a woodland edge and retain the existing valuable landscape features, whilst retaining valuable views from the road corridor, which contribute to the unique character of Fordel Mains.
- 3.4.45 As previously stated the character areas relate strongly to the underlying geology, which runs in a south-west/north-easterly direction, perpendicular to the proposed road scheme. The landscape design along the route will need to respond to the differing character areas providing a careful balance between retaining valued views across the landscape setting and screening any adverse effects of the proposed road scheme and areas of perceived low landscape quality.

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- 3.4.46 Past transport corridors have attempted to respect the topography, as seen by the current A68(T) and the now vegetated, dismantled mineral railways, some of which are now designated recreational routes and these maturing landscape features contribute to the valuable wooded features both in terms of the updated landscape and visual baseline conditions.
- 3.4.47 Any new road route seeking to effectively bypass Dalkeith to the north will find difficulty in avoiding severing the various zones of landscape character. Consultation with Scottish Natural Heritage (SNH), Dalkeith Park (Buccleuch Estates) and Midlothian Council assisted in gaining valuable design guidance when considering detailed 'macro' mitigation within the differing landscape character types along the proposed road corridor.
- 3.4.48 Mitigation, in terms of engineering solutions and landscape proposals, will therefore be important in trying to fit the scheme into the landform and blend it into the surrounding landscape context through the inclusion of additional, more detailed survey and aerial photographic data of existing landscape features, now illustrated within the Landscape Layout Sheets 1-9 Drawing No. 21440/E/04/013 – 021. New and existing features link together for a better environmental 'fit' to maximise any ecological, cultural and landscape benefits to include the new SuDs features and associated habitat creation opportunities highlighted during the consultation process with stakeholders.

3.4.49 **Visual Effects**

Visual effects relate closely to landscape effects, but are mainly concerned with changes that arise in the composition of available views, from identified receptors. Visual assessment concerns people's perception and response to changes in visual amenity. Effects may result from new landscape elements that cause visual intrusion or new features that obstruct views across the landscape as well as loss of existing features. Both landscape and visual effects can be positive or negative. The desk study highlights the approximate visibility of the development when taking into account landform and landcover; identifying principal representative viewpoints and sensitive visual receptors. The assessment criteria for visual effects concentrated upon the below stated:

1. Visual Analysis (identification of potential sources of effects) - extent to which the road will be visible (where cuttings/embankments are 4m above/below existing

topography) from identified receptors; residential properties, public buildings (workplaces), recreational resources and designated landscapes are illustrated on Drawing No. 21440/E/04/003 Visual Analysis.

2. Landscape sensitivity of visual receptors– capacity of landscape resource to accept change.
3. Scale or magnitude of visual effects and resulting significance.
4. Mitigation – effects reduced/ road integration into landscape setting. The landscape and visual effects of the proposed scheme have been assessed taking into account any mitigation 15 years after the scheme opens.

3.4.50 Photo Viewpoints A – H Drawing Nos. 21440/E/04/004 – 011 analyses the extent of development and effects in the context of the surrounding landscape and describe changes anticipated as a result of the proposed road development. The sensitivity of the viewpoint and the overall magnitude and significance of any effect are also addressed.

3.4.51 The potential effects upon settlements, individual properties, P.R.O.W. and roads within an established Visual Envelope of the site as summarised on Visual Analysis Plan 21440/E/04/003, which illustrates visibility of the development (partial/open views) and the magnitude of impact from the identified receptors as stated above.

Views from Residential Areas /Individual Dwellings

3.4.52 Within the three settlements bordering the proposed A68 between the A720 Edinburgh Bypass and Fordel Mains, there are receptors that have a range of partial and open, mid, short and long distance views of the road, due to the intervening combination of landform, landcover and built form. Variations in the visual envelope of the option are a result of the existing landform and significant vegetation, which restrict views of the road in places and have been updated following a photographic site survey and visual analysis (See Visual Analysis Drawing No.21440/E/04/003 & Photo Viewpoints Drawing No. 21440/E/04/004 – 011). There will however be seasonal variations in the extent of screening of the road by the existing vegetation.

3.4.53 This route option will be visible from surrounding residential and urban areas and individual dwellings scattered within open countryside, as discussed further below;

Smeaton and Smeaton Shaw

3.4.54 The proximity of the farm buildings lend themselves to open views of lighting and associated columns in and around the Salter's Road junction. Possible light pollution issues will need to be addressed with mitigation planting and detailed lighting specification of appropriate lamp design. (See Photo Viewpoint C for similar view towards the A68 from between the two dwellings). The receptors are of a similar elevation to that of a road therefore the only visual intrusion is that of vegetation around the junctions and from Smeaton, the wall alignment moving to accommodate the junction, resulting in the magnitude of impact being slight/ moderate in both cases.

Castle Steads and Pickle Dirt

3.4.55 The individual dwelling of Castle Steads is not directly affected by the road proposal (close cuttings, a bridge structure over the Esk), but access tracks within the vicinity will have partial/full views of the bridge. Due to the nature of the recreational land use of Pickle Dirt the magnitude of effects on this receptor is perceived as moderate. This is reflected by the sensitivity of the receptor, the likely visual effects and the number of users affected, both will be affected differently but the magnitude of effects will be moderate.

New Farm and Langside

3.4.56 Both residencies of Newfarm and Langside, due to their proximity to the road and within an open agricultural setting will have a magnitude of effect which is substantial/severe. Effects upon Newfarm are more significant because of the proximity of the Salter's Road junction (80m to the A68 Bypass and 45m to the closest Salter's Road roundabout), these effects increase also with additional lighting. These individual dwellings experience views of the junction and the main route resulting in severe magnitude of effects. (See Photo Viewpoint B, C & D)

Easter Cowden and Southfield

3.4.57 The agricultural dwellings at Easter Cowden and Southfield are likely to have limited views towards the new road proposal. The visual envelope towards the road from Southfield is restricted due to the intervening landform and landcover within the agricultural landscape. Easter Cowden is located closer to the road but the orientation of the buildings limits direct views to a southerly direction. The significance of the new landform embankment will result in a moderate magnitude of effects (See Photo Viewpoints A & G).

Views from Transport Routes

3.4.58 The potential for visual effects on public highways have been assessed. (It should be noted that views from roads are considered transient due to the nature of receptors). The following major and minor highways have been identified as crossing, or passing near to the proposed A68 and so are likely to experience visual effects as a result of the road.

A720 Edinburgh Bypass

3.4.59 The A720 runs north/south and intersects with it west of the new route. Full views of the junction and associated roundabout and lighting will be visible and where the A68 passes under the road, views will be possible. The introduction of the off slip road for vehicles travelling in a southerly and northern direction onto the A720, will add to the visible road infrastructure when viewed from the north and south. Vehicles will be travelling at such a speed that any changes will be less prominent. Associated roadside infrastructure planting will minimise the visual envelope. The high sensitivity of the receptors along this route combined with distance and elevation the magnitude of visual effects will be substantial (See Photo Viewpoint H).

A6094

3.4.60 The road runs north to south parallel to the A720 Edinburgh Bypass along the length of the Dalkeith Park boundary road. Views from the road south of the Salter's Road junction are predominantly open. This is due to the open nature of the junction and the

surrounding landscape which is mainly agricultural. Associated roadside infrastructure planting and cuttings will minimise the visual envelope. North of the Salter's Junction views are partial due to high hedgerow planting. Junction lighting will be prominent in this area of an evening. The high sensitivity of the receptors along this route combined with distance and elevation the magnitude of visual effects will be moderate (See Photo Viewpoint C & D).

A68

3.4.61 The A68 currently runs east to west across the site, with the new alignment joining east by Fordel Mains and Fordel Dean. Views along this road are limited due to mature hedgerow planting. Views are possible along the eastern section where the two roads interchange. The internal section of the junction is open and views are prominent of the new road alignment. Vehicles in this area are stationary and clearly more visible. Associated roadside and junction infrastructure planting will again minimise the visual envelope (Similar views can be seen in Photo Viewpoint E). The ancillary roads, which service the new A68 trunk road, will affect agricultural dwellings in Fordel Mains and receptors to the south due to the proposed road lighting. The moderate/high sensitivity of the receptors along this route combined with distance and elevation the magnitude of visual effects will be moderate/slight (See Photo Viewpoints A & E).

B6414 and Minor Roads connecting Cousland/Langside

3.4.62 These existing roads around Langside Head will be severed by the new road proposals and subsequently realigned within a new junction layout. Photo Viewpoint B illustrates the visual envelope towards the proposed junction. Full/ partial views are possible towards the new road which is within a cutting. Mitigation planting design will introduce new linear features within the open agricultural setting. The new bridge structure will be the most significant visual element associated with the new junction and mitigation planting will look to minimise any adverse effects. The moderate/high sensitivity of the receptors along this route combined with distance and elevation the magnitude of visual effects will be substantial/ moderate (See Photo Viewpoints B & E).

Recreational areas/ Routes/ Public Rights of Way

3.4.63 The two most significant routes that will be affected by the road proposals are **Smeaton – Thorny Bank Cycletrack (disused railway)** and **Bellyford Burn (PROW)**. The cycleway is well used and due to its location and elevation potential views towards the new road passing through New Farm and Dalkeith Park will be limited due to the maturing planting along either side of the disused railway. The route will be retained accommodated via an underpass with mitigation planting assisting in screening the abutments (See Photo Viewpoints C & F). The moderate/high sensitivity of the receptors along this route combined with distance and elevation the magnitude of visual effects will be slight/ moderate. Bellyford Burn (PROW) runs through open agricultural landscape, but the mature hedgerows adjacent to the route assists in minimising the visual envelope towards the new road embankment and abutments. The moderate/high sensitivity of the receptors along this route combined with distance and elevation the magnitude of visual effects will be slight/ moderate.

Mitigation Measures

3.4.64 The purpose of mitigation is to avoid, reduce and, where appropriate, provide remediation/compensation to alleviate any significant negative environmental effects associated with proposed development. This section describes in general terms a range of possible landscape and visual mitigation measures that may be used to offset identified adverse effects arising from the proposed bypass. Primary mitigation measures generally relate to basic design elements such as;

- Sensitive location and siting of potentially visible elements.
- Site layout and access of accommodation routes.
- Choice of site level or vertical alignment of overbridges and elevated road sections.
- Appropriate form, materials and design of built structures.
- Lighting and signage.
- Ground modelling around new SUDs features.
- Protection of existing/valuable features and sensitive choice of new designed features and detailing.

These principles were incorporated into the original scheme design and further developed taking into consideration the constraints and opportunities identified during the assessment process to provide the optimum environmentally integrated design relating to the revised highway proposals, but more significantly the inclusion of the SuDs features.

Secondary mitigation measures seek to address significant negative effects of the final preferred development as identified during the landscape and visual assessment, taking into account design criteria raised during the consultation with stakeholders.

Mitigation Strategy

3.4.65 The mitigation strategy provided below sets out the primary and secondary mitigation principles, which were considered during scheme design development. Such measures have been illustrated within the Landscape Layout Sheets 1-9 Drawing No. 21440/E/04/013 – 021 and within the Schedule of Environmental Commitments. Photo Viewpoints A-H Drawing No. 21440/E/04/004-011 also stated mitigation measures during the full project life cycle to address short, mid and long term adverse effects, associated with the proposed road development.

Generally

1. Route selection will seek to minimise identified potential adverse effects on the existing landform and avoid disruption of major topographical, ecological and other significant landscape features, especially within Dalkeith Park and at Fordel Mains.
2. Find an alignment that uses the existing landform and retains existing vegetation (landcover) to good effect, thereby minimising the scale of earthworks and enhancement planting in particular at Hungry Hill.
3. Design and siting of new structures (bridges/gantries/signage) and slope profiles to follow existing natural topography where possible, and integrate new features into the surrounding landscape context. (e.g. woodland, hedges, water features). Previously detailed survey information of the receiving landscape was not shown on the mitigation plans.

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4. Retain the least amount of highway land by returning land to its former use, where this does not conflict with the need to provide mitigation by planting, mounding, earth shaping and new water features. The inclusion of the SUDs ponds allowed for more sensitive integration of the road scheme maximising the Environmental 'fit'.
 5. Use existing landform to minimise noise and visual intrusion, for example by placing a road in a cutting or behind rising ground, to protect identified receptors at New Farm, Langside and within Dalkeith Park.
 6. Develop new landforms, such as mounds and false cutting, to screen the road from the identified sensitive receptors, eg Home Farm, Dalkeith House, Castle Steads and Langside.
 7. Strive for a balance between horizontal and vertical road alignment, which minimises earthworks, but provides the best integration with natural landform and the best screening for the identified receptors.
 8. Develop site restoration, landscape features and planting proposals that link with/reinforce positive features of the landscape character which differs noticeably along the proposed bypass route from Fordel Mains down to the City Bypass.
 9. Following consultation with SNH the Buccleuch Estate and Midlothian Council the detailed mitigation strategy was developed further to consider issues in relation to the following:
 - Route alignment, bridge design, recreational access, and SuDs attenuation basins, within Dalkeith Park to respond to the Estates masterplan.
 - Ecological mitigation to address protected species, links to valuable existing features and wildlife corridors.(Otters/ Badgers/Bats and deer fencing/ planting requirements within Dalkeith Park)
 - Design features that address adverse effects of the road scheme, but reinforce the existing landscape characters along the bypass route.

3.4.66 Residual Effects

The combination of visual and landscape effects associated with the proposed development route options established previously highlights the 'significance' of effects. When mitigation has been taken into account the associated residual effects can be stated.

3.4.67 For the purposes of this assessment a 'significant effect' whether adverse or beneficial occurs where a sensitive viewpoint or landscape resource is subject to a substantial – moderate change/effect.

The A68 Dalkeith Northern Bypass has the potential for significant effects on the landscape resource - directly within the proposed development footprint and indirectly upon the wider site context. Mitigation measures look to avoid or minimise where practicable, identified adverse effects.

Generally, the scheme has the greatest effects on landscape and visual receptors at the western end of the route within Dalkeith Park as stated within original assessment. This relates to the sensitivity of the landscape resource or visual receptor being affected (historical and cultural importance) and the scale or magnitude of effect on the receptors (as illustrated in Visual Analysis, Landscape Character Zones and Landscape Quality) leading to an assessment of 'significance' of landscape and visual effects. Very prominent engineered structures including bridges, earth embankments, slipways and highway lighting etc. are introduced where the routes cross the River Esk Valley (bridge) and at two major new road junctions at Salter Road A6094/ Fordel Mains. The new 'gateway' features to the Dalkeith Park, a combination of new detailing of the historic stone wall either side of the new bypass route complemented with native specimen tree planting to reinforce a woodland edge will provide a significant visual feature for road users. It may be difficult to integrate these into the surrounding landscape or to fully mitigate any adverse effects, however the proposed route alignment compared to the original dual carriageway scheme is less significant and any effects are likely to be lesser due to the sensitive design of the road and landscape mitigation proposals, which respond to the existing valued features along the route providing the best environmental fit.

The effects of lighting upon the identified receptors and surrounding landscape resource will relate to the preferred route alignment and new junction layouts. The lighting provision along the new A68 route at the junction with the A720, with additional ancillary lighting at major junctions (Salter Road A6094/ Fordel Mains) lighting and potential light pollution will be an effect requiring mitigation, which has not changed from the original assessment.

Modern lighting columns and lamp detailing can improve visibility for road users without significant light pollution. A revised lighting strategy will respond to the site context where a precedent has been established lighting provision will be considered to an acceptable standard for road safety and light pollution guidelines. Within a more rural setting (at Fordel Mains) further consideration will be required with regard to a comprehensive mitigation strategy if lighting provision is required in line with national guidelines, which have been improved significantly since the original assessment.

3.4.68 Visual Effects

The existing topography will be affected by the proposed bypass in a number of ways in relation to the introduction of new cuttings, embankments, bridges and slip roads (above 4m AOD) as stated in the DMRB guidelines. Most significantly the crossing points over the new bypass route, the junctions at A720, A6094, B6414 and the existing A68 at Fordel Mains, which require bridge structures and highway lighting will have a significant visual and environmental effect on nearby receptors; topography; trees and woodland; valuable habitats; landuse; road/rail networks; PROW and drainage. The associated 'significant' visual effects are limited to isolated agricultural dwellings adjacent to the proposed route alignment at New Farm Langside Head, Langside and Easter Cowden. In the short-term the resulting landform will significantly alter existing views to the skyline and established visual envelopes from the identified receptors along the proposed route at Dalkeith Park, Hungry Hill, near Easter Cowden and Fordel Mains, especially surrounding new junctions, would be out of scale and at variance with the local pattern and landform, resulting in a **Moderate adverse** effect on the recognised landscape character due to the magnitude of change and the sensitivity of the receptors. Overall, due to the scale of the likely short-term effects and any long-term benefits of the maturing infrastructure planting, the residual effect would be predominantly **Slight adverse** (See Photo Viewpoints A-H).

3.4.69 Landscape Effects

Significant vegetation and other valuable features/habitats contribute towards the recognised landscape character type and perceived scenic value along the route. The visual envelope of the linear development also relates closely to the surrounding landform / landcover and landuse. The proposed route will remove agricultural land, existing valuable landcover in the form of ancient woodland, valued woodland plantations (mixed/broadleaved), Sites of Nature Conservation Interest (associated habitats) and mature roadside planting. The character within Dalkeith Park will be affected by the re-alignment and construction of the listed stone wall structure and the inclusion of new embankments (false cutting) and the overbridge linking Home Farm and Dalkeith House. In the short-term the likely residual effects would be **Moderate adverse**. The scheme will not quite fit into the existing landform or scale of the landscape character and will affect its perceived value/quality. The associated ecological benefits of the native woodland/ shrub/ hedgerow and tree planting within a mosaic of conservation grassland/wetland which responds to the existing character and enhances previously lost landscape features removed by agricultural land management. With maturity the wetland/grassland, land modelling and roadside enhancement planting, the long-term effect would be **Slight adverse** for a majority of the route.

Conclusion

3.4.70 The proposed road passes through various landscape character zones which have demanded differing design responses for the road and appropriate mitigation strategy as agreed during the consultation process, as illustrated within the Landscape Layout Sheets 1-9 Drawing No. 21440/E/04/013 – 021 and within the Schedule of Environmental Commitments and Employers Requirements. The detailed landscape features and planting mixes illustrated within the Landscape Layout Sheets 1-9 provide a comprehensive design palette, which allows an improved ‘environmental fit’ of the road proposal within the complex site context.

3.4.71 Mitigation Evaluation – City Bypass to Salter’s Road

At the junction of the A68 with the City Bypass –

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- Screen woodland with specimen tree planting along the western slope of the new embankment (north/south of the junction)
 - Native shrub planting with specimen tree planting (north/south of the junction)
 - Road in cutting and associated landscape planting proposals look to address vehicular movements and highway lighting effects.
 - Retained underpass for non vehicular access

City Bypass to Dalkeith Park Boundary – (similar to previous mitigation apart from:)

- Native hedgerow planting with specimen tree planting within grassland (north/south of the bypass)
- Road in cutting and associated landscape planting proposals look to address vehicular movements and open character of agricultural setting.

Dalkeith Park to Salter's Road – (similar to previous mitigation apart from:)

- Native hedgerow planting with specimen tree planting (top of cutting) (north/south of the bypass)
- Road in cutting and associated SuDs attenuation basin/landscape planting proposals look to sensitively address vehicular movements and open character of parkland setting. (Off site planting)
- Ecological mitigation routes at River Esk and new overbridge linking Home Farm. Landscape planting proposals look to sensitively address vehicular movements and open character of parkland setting
- Sandyriggs Wood- reinstatement of native woodland along western boundary to address loss of vegetation due to junction design (Off site planting).

3.4.72 Salter's Road to Langside Farm

At the junction of the A68 with the Salter's Road – (similar to previous mitigation apart from:)

- Native hedgerow with specimen tree planting on top of slope of the new cutting (north/south of the junction)
- Native shrub planting with specimen tree planting (north/south of the overbridge)
- Road in cutting and associated landscape planting proposals look to address vehicular movements and highway lighting effects.
- Smeaton Burn – recreational and ecological mitigation route. Screen woodland and specimen tree planting screen views north towards sub-station. Scattered native shrub and specimen tree planting along southern slope retains open views of rural setting

3.4.73 Langside Farm to Easter Cowden – (similar to previous mitigation apart from:)

- Native hedgerow on top of slope of the new cutting (northern slope) with scattered specimen tree planting
- Native hedgerow with scattered specimen tree planting on top of slope of the new cutting (southern slope) with native shrub planting
- Langside Farm – Ecological mitigation route to tie-in with existing hedgerow at East Cowden. East of new overbridge road in cutting, sloped grassland with and specimen tree planting within hedgerow at top of slopes creating new field boundary

3.4.74 Easter Cowden to Fordel Mains– (similar to previous mitigation apart from:)

- Native hedgerow with specimen tree planting bottom of slope of the new embankment (northern) ties in with mitigation badger fencing along new field boundaries.
- Re-profiled embankment slope (southern) returned back to agricultural grassland
- Native shrub planting blocks with scattered specimen tree planting to address vehicular movement whilst still retaining views out onto the open countryside from the road embankment to the south.
- Bellyford Burn – re-aligned watercourse with recreational and ecological mitigation routes.
- New SuDs attenuation basin with associated habitat improvements, scattered wetland woodland and specimen tree planting adjacent to Bellyford Burn (Off site planting)
- East of Hungry Hill - Native hedgerow with scattered specimen tree planting on top of slope of the new cutting (north/ south slopes)

3.4.75 Fordel Mains to Tie-in - (similar to previous mitigation apart from:)

- Revised slope design of road cutting (more shallow) around the new junction to Fordel Bank Plantation - Native hedgerow with scattered specimen tree planting on top of slope of the new cutting (north/ south slopes).

3.4.76 The road passes through Dalkeith Park, breaching the integrity of the estate, but not to the same extent as the re-aligned electricity pylons crossing the estate. The historic link between Dalkeith Park and Home Farm is maintained, through the careful positioning of

the overbridge, which includes the provision for a mammal migratory route and complimentary landscape planting (hedge and specimen trees).

3.4.77 The low elevation of the road (i.e. in cutting) and associated landform design address the adverse visual effects which allow the retention of the existing rural character along the majority of the route.

3.4.78 The main landscape character effects occur at Dalkeith Park, with the removal of an extensive length of the boundary wall at Salter's Road, loss of valued woodland and the introduction of the new landform (false cutting) within the parkland setting. The new landform/ landcover associated with the road and underpass provision at Hungry Hill and the prominent 'rural' position of the lit junction at Fordel Mains also contribute towards the visual and landscape effects.

3.4.79 The most significant visual intrusion results primarily from the proposed road lighting of the junctions with the City Bypass (A720), Salter Road (A6094) and Fordel Mains; from junctions located close to properties such as New Farm, Langside and Easter Cowden Cottages. The reintroduction of previously removed agricultural linear features (i.e hedgerows and specimen tree planting) responds to the landscape character whilst addressing the adverse visual effects of the vehicular movements and road lighting at night.

In general, the various effects (landscape character/ visual) will be mitigated by means of the sensitive road structures design, embankment/cutting slope design together with all of the landscape design features will attempt to blend the road proposals into its surroundings. However the residual effects of the road lighting and design constraints associated with the slope design will mean the long-term effect would be **Slight adverse** for a majority of the route.

3.5 Land Use

Introduction

3.5.1 This section re-examines the impact of the road corridor on land use, and more specifically on agricultural holdings.

Previous Investigation

3.5.2 The land use was assessed in 1992 as part of the STEAM Framework document and was updated in 1995 under the Design Manual for Roads and Bridges, Volume 11 Assessment.

3.5.3 This original assessment confirmed that the route largely runs through open countryside with few residential properties.

3.5.4 The route did not require the demolition of properties and would be built on agricultural land, the majority of which was of lower quality (Grade 3.1).

Current Methodology

3.5.5 A desk top review of relevant maps, aerial photographs and planning proposals plans was undertaken to gather information on land use. This was followed by site visits to confirm the findings of the desktop study.

Route Evaluation

3.5.6 The main current and proposed land uses are shown on drawing 21440/E/05/001. The greater majority of the land through which the bypass passes is still agricultural land.

3.5.7 Where it was identified that construction of the bypass would lead to the creation of potentially unviable farming units, such as at Langside and Easter Cowden, these properties were purchased by the Scottish Executive, the boundaries adjusted, and then resold for use as agricultural land. The major severance issues in relation to agricultural land have thus been mitigated.

3.5.8 The open cast minerals sites identified in the early studies have been worked and the land reinstated to agricultural land.

3.5.9 Business and general industrial development is proposed at Salter's Road on land which is currently a combination of agricultural land and reinstated mineral workings.

Mitigation

3.5.10 The main impact of the scheme on land use still remains its impact on agriculture. Hence the mitigation comprises accommodation works that have been agreed with the affected farmer/land owners.

3.5.11 The farming/land use pattern has largely remained unchanged since 1995. Hence the majority of the accommodation works agreed in 1995 still meet landowners' requirements. Improved access along the east bank of the Esk has been agreed to accommodate the increased equestrian movements in that area.

3.5.12 The precise access arrangements agreed with landowners are set out in the Schedule of Environmental Commitments (Section 4).

Conclusion

3.5.13 The land for the road scheme has already been acquired by compulsory purchase, and the route safeguarded in local planning policy.

3.5.14 Improved accommodation works have and will continue to ease the route into the established pattern of land use.

3.6 Traffic Noise and Vibration

Introduction

3.6.1 Traffic noise and vibration are key impacts which directly affect local people. This section covers the implications of noise generated by traffic on the new road on residential properties close to the scheme and on public outdoor locations.

3.6.2 Noise and vibration associated with the construction of the road scheme also contributes to the overall disruption that local people may experience, and this issue has also been considered.

Previous Investigation

3.6.3 Traffic noise and vibration was assessed and reported in the STEAM and 1995 Stage 3 Assessment Reports. An additional noise report was compiled in April 1996 by W.A. Fairhurst and Partners which augmented the existing study and identified properties which may be affected by construction noise.

3.6.4 Traffic noise assessments were carried out at 14 identified locations within 300m of the new road. The assessment found that at the majority of these properties an increase in noise of 10 dB(A) or less would occur. The travellers site and Newfarm would experience increases of more than 10 dB(A), and it was concluded that the northern and eastern elevations of Newfarm would qualify for noise insulation.

3.6.5 Fordel Mains Farm cottage and the four other cottages at Fordel Mains would benefit from a decrease in noise levels of between 5 and 10 dB(A).

3.6.6 Noise levels within Dalkeith Park, close to the route were predicted to increase substantially (12 dB(A), decreasing to around 7 dB(A) at a distance of 200m from the road.

3.6.7 The provision of false cuttings within Dalkeith Park was recommended to protect the park from excessive levels of traffic noise.

3.6.8 No other barriers were proposed. The worst affected property, Newfarm was the only property eligible for noise insulation.

3.6.9 Acceptable levels of construction noise were to be achieved through the contractor's compliance with the Midlothian Council's conditions for controlling noise and vibration.

Current Methodology

3.6.10 The review of the assessment of traffic noise and vibration was undertaken in accordance with Design Manual for Roads and Bridges Volume 11 Methodology (Appendix E: Environmental Noise Impact Assessment: A68 Dalkeith Northern Bypass).

3.6.11 Noise levels were measured at 17 locations in the road corridor; this included the 14 locations included in the original surveys, plus 3 locations in outdoor areas used by the public, namely Dalkeith Park, Smeaton Cycle Path and the footpath at the Bellyford Burn (Refer to Drawing Nos. 21440/E/06/001 and 002).

3.6.12 The calculation of predicted noise levels associated with traffic on the scheme were undertaken using the "Road Noise 2000" noise mapping software produced by W.S. Atkins.

3.6.13 Traffic data used in the assessment was from the Dalkeith Sub Area traffic model (DALSAM), factored to 18 hr flows, with the assessment years being 2007 and 2022 for the Do Minimum scenario and the Do Something Scenario.

Route Evaluation

3.6.14 The full report and the results of the noise assessment are presented in Appendix E in the report 'Environmental Noise Input Assessment for A68 Dalkeith Northern Bypass' and summarised in the following paragraphs.

3.6.15 The survey confirmed that three locations would either experience a reduction of 1 dB(A) or no change in the 2022 Do-something scenario compared with 2022 Do-nothing. Five locations would be expected to experience a change of between 1 and 3 dB(A). Eight locations would experience an increase of between 4 and 7 dB(A), and two locations

would experience increases of 14 and 16 dB(A). In the worst case an increase of 23 dB(A) is predicted at Easter Cowden Cottages.

3.6.16 Changes in nuisance or “botheredness” associated with the initial increase in traffic noise, range from 20% to more than 50%.

3.6.17 Newfarm is the only property that qualifies for noise insulation and the only façades qualifying are the west and north.

3.6.18 Ambient noise levels within the majority of Dalkeith Park are expected to be minimally affected and traffic induced vibration is unlikely to be an issue.

3.6.19 Whilst it is recognised that noise from construction activities will be noticeable at some residential properties it is considered that the construction noise and vibration will be controlled by hours of working and the maximum noise levels which will be conditions set and monitored by Midlothian and East Lothian Councils.

Mitigation

3.6.20 The provision of false cuttings within Dalkeith Park will assist in minimising traffic noise intrusion within in this sensitive area (Refer to Drawing No. 21440/E/06/002 for sections of cut and fill).

3.6.21 The provision of a barrier to screen the noise at the worst affected properties, Easter Cowden Cottages and West Cottage has been considered. However, it has been found that a barrier would only provide limited benefit for the ground floors of these properties, and would not benefit the first floor rooms. Further investigation will also be undertaken into the potential benefit of providing noise barriers at the Travelling People’s site and at Newfarm.

3.6.22 The barrier would generate its own impact in terms of visual intrusion and it is not considered that this would outweigh any benefits in terms of noise reduction. Hence a barrier at this location is not proposed. However, the road in this location will be at grade or in cutting and the landscaping proposals include a hedgerow and a row of specimen ash trees which will assist in masking levels of traffic noise at the properties.

3.6.23 Construction noise and vibration will be controlled by hours of working and the maximum noise levels which will be conditions set and monitored by Midlothian and East Lothian Councils. The construction contractor will be required to notify all local residents affected by noise generating activities prior to undertaking such work and will provide a named contact to respond to any noise, vibration or nuisance concerns.

3.7 Pedestrians, Cyclists, Equestrians and Community Effects

Introduction

- 3.7.1 This section describes the changes relating to public access and amenity in the A68 corridor and how any adverse effects will be mitigated. Only severance resulting from the new road is considered, and not relief from existing severance within Dalkeith Town Centre, as any beneficial changes will not have any direct influence on the detailed design of the scheme.
- 3.7.2 Amenity is described in terms of relative pleasantness of a journey and is concerned with the degree and duration of people's exposure to traffic including fear, safety, noise, dirt and air quality, and the impact involving visual intrusion associated with the scheme and its structures.

Previous Investigation

- 3.7.3 The 1995 study assessed the number of pedestrians, cyclists and equestrians using facilities in the area of the proposed A68 through a desk-top review, site surveys, and consultations with relevant organisations as well as a review of area maps, the Midlothian 1991 Census Fact Sheets and Lothian Regional Council School Rolls and Boundaries.
- 3.7.4 The first part of the assessment considered journey length and local travel patterns, whereas the second part focused upon amenity.
- 3.7.5 In relation to potential issues of severance, the 1995 study found that there would be no severance caused to community facilities from the proposed A68 Bypass, as existing links for vehicles would be retained by the incorporation of bridges into the scheme design.
- 3.7.6 There would potentially be a reduction of amenity to users of various Public Rights of Way and informal paths where these were to be severed by the scheme. However, this would be overcome by providing underpasses, overbridges and new access tracks for cyclists, equestrians and pedestrians at strategic crossing points along the route.

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- 3.7.7 The 1995 study also found that local travel patterns were unlikely to change following the construction of the scheme because of the size of the district centre and the few alternative options available.
- 3.7.8 Pedestrian travel patterns were not expected to alter following construction of the bypass. However, it was anticipated that journey times would reduce due to less waiting time at crossings at the road in Dalkeith town centre.
- 3.7.9 The second part of the assessment focused on improvements in amenity. It found that the proposed bypass would result in moderate improvements to the amenity of pedestrian and cyclist users of the existing A68 through the removal of traffic. However, at the Smeaton Bridle/Cycle Route and footpath, the two informal footpaths either side of the River Esk and the Fordel to Cousland (Bellyford Burn PROW) footpath, there would be some reduction in visual amenity and an increase in noise disturbance.

Current Methodology

- 3.7.10 As discussed, the current study only considers the adverse effects of the scheme in relation to severance and loss of amenity along the route corridor. The mitigation measures proposed and agreed during earlier consultations have been reviewed to ensure that these are still appropriate. The findings of the two public local inquiries and the commitments made at these will also be taken into account.
- 3.7.11 The baseline conditions identified during the 1995 study have been updated by consultation with bodies including SNH and Midlothian and East Lothian Councils, who have statutory responsibility for public access in the affected area.

Route Evaluation

- 3.7.12 The Dalkeith Country Park and the wider area of the Dalkeith Park Estate, which is open to the public, is a popular recreational destination used on a regular basis by walkers, cyclists, equestrians, school groups and anglers. A number of access and recreational organisations, most of which provided comment on the scheme during earlier consultations, were also approached (Appendix A).

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- 3.7.13 Equestrian interests have been represented by the British Horse Society (BHS), Edinburgh Equestrian Centre at Home Farm and the Dalkeith Park Equestrian Club.
- 3.7.14 The Cycle Touring Club (CTC)/Spokes (Lothian Branch) and Sustrans provided comment on issues affecting cyclists.
- 3.7.15 The Esk Valley Trust, a charitable organisation founded in 2001 which aims to promote the creation of a long distance path along the Esk Valley and to preserve the beauty, history and character of the area, were also consulted.
- 3.7.16 The comments received are given in Appendix A, Summary of Consultees Responses.
- 3.7.17 Midlothian Council, East Lothian Council, BHS, CTC and Scottish Rights of Way Society (Scotways) provided plans showing the locations of public access routes, both designated Public Rights of Way and informal paths and tracks used on a regular basis by cyclists, equestrians and pedestrians. This information has been compiled and is illustrated in Figure 21440/E/07/001.
- 3.7.18 No new Public Rights of Way have been designated since the 1995 Study. No changes to these routes have been identified; with the exception of a short length (c. 200m) of path running alongside the Bellyford Burn at the point the bypass crosses the Right of Way. This path was diverted following the completion of opencast mining operations at Hungry Hill. A number of informal public access tracks, not specifically considered in the 1995 study, have been identified. These mainly relate to equestrian usage.
- 3.7.19 The Land Reform (Scotland) Act 2003 (Part One) came into effect on 9 February 2005. This introduced a general statutory right of responsible public access to most land and water, for passage, relevant educational activities and recreational pursuits including walking, cycling and horse-riding.
- 3.7.20 One of the key aims of the Land Reform Act is to create a network of “Core Paths” throughout Scotland, to facilitate public access. Guidelines for the nomination of Core Paths have been set out by the Scottish Executive and a three year consultation period, which commenced in February 2005, is currently underway. The Core Path plan will have regard to likely usage and desirability of paths, balanced with landowner interests. Local Authorities have a (non-statutory) duty to implement and maintain these core
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paths, and to assert, protect and keep open any route or waterway or other means by which access rights can reasonably be exercised.

3.7.21 The A68 northern bypass will cross 10 existing public access routes and slightly reduce the land area available for public access, including the section of the Dalkeith Park Estate which lies within the road corridor. In addition, there will be an increase in noise levels from bypass traffic and a reduction in visual amenity where the new bypass crosses or runs close to existing tracks and paths (refer to section 3.6).

Mitigation

3.7.22 Existing Public Rights of Way (PROW) are to be maintained by the use of overbridges and underpasses at strategic crossing points along the route. Where feasible, the design specifications of these structures have been carried out in accordance with DMRB standards and relevant current guidance produced by recreational organisations.

3.7.23 Each of the crossing points, travelling from West to East, is discussed in turn below:

Newton Church PROW

The existing underpass beneath the City bypass will be extended and the PROW maintained.

Castlesteads Park to Newton Church private estate roads

Two estate roads (non-designated) on the west side of the River Esk, currently used by visitors to the Dalkeith Park Estate, will be severed by the bypass. The loss of these routes will be compensated for by creation of a new access track suitable for estate vehicles, stock, pedestrians, cyclists and equestrians on the west bank of the Esk which will pass beneath the new bridge. Access north- south and south-north either side of the Esk through Dalkeith Park will therefore be provided.

Smeaton Bridge to Pickle Dirt track

The existing track (non-designated) on the east bank of the River Esk will be widened to maintain access. The track will be suitable for equestrian use. The bypass will be screened from the track by planting with trees and native shrubs.

Home Farm to Dalkeith Park private estate road

An overbridge will be constructed on the present horizontal alignment, but with a slightly greater width. A new access track will be constructed along the south side of the bypass to connect the Home Farm access road with the north end of Sandyriggs Wood to enable access for estate vehicles and equestrian users.

Old Dalkeith Colliery Road

This provides access to both the Travelling People's Site and the Smeaton-Thornbank Cycle Track (NCR1). The road will be realigned in order to maintain access. Pedestrian facilities will be maintained on the west side of the realigned section of Salter's Road with a 2.0m wide footway. The junction of Smeaton Station Road and Salter's Roads will be realigned to improve visibility and hence safety for all road users. (Smeaton Station Road also currently provides an alternative access to the Smeaton-Thornbank cycletrack).

Smeaton-Thornbank Cycletrack

The route will be maintained by an underpass on the alignment of the disused railway line. Mounting blocks will be provided at either end for equestrian users (Landscaping proposals?).

B6414 Elphinstone to Langside Head Road

An over bridge will be constructed with pedestrian facilities maintained on the west side of the road.

Langside Head and Easter Cowden Access Roads

New access roads to these properties were created during the Advance Works during the mid-1990's. The redundant sections of road have been grubbed up and returned to agricultural use.

Bellyford Burn PROW

The existing PROW will be maintained by an underpass that is suitable for cyclists, pedestrians and equestrians.

Inveresk Road (A6124) and Southfield Road (U59)

Access is maintained by construction of a new bridge over the bypass.

3.7.24 In addition, one metre wide strips for use by cyclists are also to be provided along both sides of the bypass between Fordel Mains in the east and Salter's Road in the west. New signing at Salter's Road will inform cyclists travelling west that they will be able to travel as far as the Edinburgh City Bypass interchange, but will not be able to use the City Bypass itself.

3.7.25 New cycle tracks and footpaths that form part of the scheme will be designed in accordance with the DMRB and "Cycling by Design" (Scottish Executive, 1999) and will include appropriate signing, dropped kerbing and road markings. There will be a construction contract requirement to consult with Sustrans with regard to the design of combined footways/cycle tracks and crossing points forming part of National Cycle Route 1 (Smeaton-Thornbank Cycletrack). Midlothian and East Lothian Councils will be consulted regarding the signing of cycle facilities as appropriate. Where possible, footways and cycle tracks will be outwith road verges and pedestrian barriers will be incorporated to encourage crossing of the road at designated crossing points. Suitable provision will also be made in the construction contract for the use of existing roads and tracks by non-motorised users.

3.7.26 Adverse impacts on amenity will be addressed by the use of appropriate landscaping and planting to minimise the visual intrusiveness of the road (refer to section 3.4).

Impacts/Mitigation arising and required during construction

3.7.27 The effects of the bypass construction on pedestrians, cyclists, equestrians and the community will in general relate to localised increases in noise, loss of amenity and disruption to access routes.

3.7.28 Sections of two PROW the Newton Church PROW and the Bellyford Burn PROW will be temporarily affected during construction of the road. The Smeaton-Thornbank cycle track (NCR1) will also be affected, as will existing paths and tracks in the Dalkeith Park Estate (refer to Drawing No. 21440/E/07/001).

3.7.29 Mitigation measures that will be employed to minimise these adverse impacts are discussed in section 3.2. In general terms, the contractor will be required to make adequate provision for the maintenance of public access over the two rights of way

affected, the Smeaton-Thornycroft cycletrack and routes within the Dalkeith Park Estate, by means of acceptable alternative routes and/or diversions.

3.7.30 Traffic management will be agreed with the Local Roads Authority and this will be designed to minimise delays and congestion to all road users. The mitigation of noise and vibration impacts at these locations will largely be determined by conditions placed on the contractor by the Local Authority. Working hours will be set and maximum noise limits will also be agreed.

3.7.31 The public will be kept informed on the scope of the scheme construction works and their progress by provision of publicity/information boards on the approaches to the site at the A720 Edinburgh City Bypass (westbound and eastbound), Salter's Road and the existing A68 Trunk Road at Fordel Mains. The progress information will be updated monthly throughout the construction period.

Conclusion

3.7.32 The construction of the new bypass will unavoidably result in the severance of a number of existing public access routes, many of which are used on a regular basis for recreational activities, particularly within the Dalkeith Park Estate.

3.7.33 The construction of underpasses, over bridges and new access tracks at strategic crossing points along the length of the route will enable public access to be maintained, although some minor temporary and unavoidable disruption to access and a localised loss of amenity will occur during the road construction period.

3.8 Vehicle Travellers

Introduction

3.8.1 With any road scheme the implications of the scheme for vehicle travellers are pre-eminent, and this section assesses the impact of the scheme on vehicle travellers in terms of view from the road and driver stress.

Previous Investigation

3.8.2 Previous studies confirmed that drivers' views would change significantly. The A68 currently runs through the built up area of Dalkeith and the new route is through an essentially agricultural landscape.

3.8.3 Where the sections of the road are in cutting, particularly at the western end of the scheme, drivers' views would be enclosed, but longer-distance views were predicted for westbound traffic at Fordel mains. Dramatic views northwards towards Arthur's Seat, Edinburgh and the Firth of Forth were considered important in terms of sense of place.

3.8.4 Travelling westbound the views were predicted to be more limited with Smeaton Bing and the D'Arcy-Cousland Ridge being dominant features.

3.8.5 The assessment of driver stress considers frustration owing to drivers being unable to drive at the speed that is consistent with their wishes in relation to the standard of the road, fear of accidents and uncertainty of the route.

3.8.6 Previous assessments of driver stress therefore varied with the standard of the road. There are fewer opportunities for overtaking on single carriageway roads as compared with dual carriageways, and the fear of accidents is lower with dual carriageways as compared with a single carriageway.

3.8.7 However, compared with the stress levels associated with driving through a built up area with 30mph speed limits (i.e. the current situation), both previous assessments confirmed that driver stress would be reduced.

Current Methodology

3.8.8 As with previous studies this current assessment followed the procedure set out in DMRB Volume 11.

Route Evaluation

View from the road

3.8.9 The change in the vehicle travellers' view from the road will not be significantly different from that described in the 1995 assessment.

3.8.10 The main change in view is that the new road runs through open countryside/parkland and not through the built up area of Dalkeith town.

3.8.11 The existing long-distance high quality views at the eastern end of the scheme, from the high point at Fordel Mains will be retained, but as the new road runs down the slope towards Salter's Road the views will be more restricted to farmland. The views from lower level sections of the existing A68 (below 90m AOD) are also restricted, but this time by the built environment.

3.8.12 By Home Farm, the drivers' views will be of the side slopes of the false cutting and their associated planting, and of the accommodation of the bridge to Home Farm. The road emerges from the cutting to cross the Esk on a new structure where views will be of the wooded Esk Valley and farmland. The route passes through the woodland belt at Castlesteads, leaves Dalkeith Park Estate and runs through open arable land to the City Bypass.

3.8.13 The western end of the existing A68 leaves Dalkeith over Lugton Bridge and runs adjacent to the perimeter wall of Dalkeith Park Estate to join the City Bypass at Sheriffhall. Views from this section of the road are closed on the north side by the park wall. Views southwards are more open across farmland towards the Esk (refer to Appendix D, Visual Impact Assessment).

Driver stress

- 3.8.14 The existing A68 between Fordel Mains and the City Bypass is generally of poor alignment with only limited opportunity to overtake. Through Dalkeith the route is subject to a 30mph speed limit, and traffic is further slowed in the town centre by signalised junctions, pedestrians and parked vehicles.
- 3.8.15 Although the route is signed, drivers not familiar with the route in the town centre are likely to be distracted by pedestrians and other traffic and hence may be inclined to take wrong turns.
- 3.8.16 Avoiding parked vehicles and other road users at peak times in the Dalkeith centre, combined with general traffic congestion leads to driver frustration and increased risk of accident.
- 3.8.17 DMRB Volume 11 Part 6 Tables 1 to 3 give guidance on the appropriate levels of stress to be used for assessment purposes.
- 3.8.18 Referring to Table 3 of this guidance it can be deduced that driver stress on the existing A68 outside of the 30mph area is assessed as moderate, whilst within the town centre driver stress is assessed as high. With the implementation of the new bypass, A68 flows in Dalkeith will reduce and driver stress can be predicted to be reduced to moderate.
- 3.8.19 The new bypass is 5.2km in length which is some 4.3km shorter than the existing comparable route. The road will be built to current standards both in terms of alignment and safety and will be subject to a 60mph speed limit. Approximately 85 % of the route is marked to provide opportunity to overtake. Vehicles travelling westbound along the City Bypass will have a slightly longer trip (7.6km as opposed to 7.1km), but their journey time will be reduced.
- 3.8.20 The new A68 route is direct, requiring no turns until drivers reach the junction with the A720 Edinburgh City Bypass. All junctions will be clearly signed. Hence the route will be easily navigated by drivers who are not familiar with the area.

3.8.21 With the improved forward visibility, and opportunity to drive at a constant speed and overtake slow moving traffic the level of driver stress over the whole route will be moderate.

Mitigation

3.8.22 The landscape strategy for the scheme is designed to both assist in blending the new road into the landscape setting and create visual interest for vehicle travellers. The new 'gateway' feature to the Dalkeith Park, i.e. new detailing of the historic stone wall complemented with native specimen tree planting, will serve to reinforce vehicle travellers' sense of place. Details of landscape proposals are presented in section 3.4 of this report.

3.9 Water Quality and Drainage

Introduction

3.9.1 This section considers the water quality and drainage issues for the surface waters associated with the construction of the A68(T) Dalkeith Northern Bypass.

3.9.2 The proposed A68(T) crosses the following three watercourses (Drawing No. 21440/E/08/001):

1. River Esk (Mainline Road Chainage 1400).
2. Smeaton Burn (Chainage 2200), a minor tributary of the River Esk.
3. Bellyford Burn (Chainage 4540), a tributary of the River Tyne.

3.9.3 The existing A68 crosses the Cotty Burn approximately 300 metres to the south east of the proposed A68(T) tie in.

3.9.4 The proposed surface runoff drainage system serving the new bypass incorporates Sustainable Drainage Systems (SUDS) and is divided into the following four sections:

- Proposed junction with Edinburgh City bypass and the proposed road from chainages 600 to 1200 discharging into the River Esk via filter drains and a SUDS attenuation basin.
- Chainage 1200 to 4550 discharging into the River Esk via filter drains and a SUDS attenuation basin.
- Chainage 4550 to 5700 discharging into the Bellyford Burn via filter drains and a SUDS attenuation basin.
- Chainage 5700 to 6000 connecting via filter drains into the existing A68(T) surface water drainage network for discharge to the Cotty Burn.

Previous Investigation

- 3.9.5 An assessment into the impact of the proposed A68(T) on the surface water and groundwaters was previously undertaken and is fully reported in the Stage 3 Scheme Assessment Report (Environment) of January 1996.
- 3.9.6 The Forth River Purification Board advised in 1995 that they considered the River Esk and Bellyford Burn to be Class 1 water quality watercourses. Under SEPA's river water quality classification scheme based on 2004 river water quality data, the River Esk is now considered to be Class A2 (Good Quality) and the Bellyford Burn is now considered to be Class C (Poor Quality)¹. Smeaton Burn and Cotty Burn are not classified.
- 3.9.7 The 1995 study also noted that the River Esk is a salmonoid river and is considered to be of regional and national importance for nature conservation and it is necessary to minimise pollution risk to reduce the impact of the new bypass.
- 3.9.8 This study was based on the provision of a dual carriageway for the A68(T) and it was proposed to use filter drains and catchpits along the full length of the A68(T). The preliminary surface water drainage system proposed to discharge the road surface runoff from the A68(T) into all four watercourses described above. The study concluded that there would be no significant effects upon the water quality of the various watercourses within the study area.
- 3.9.9 The impact on the natural environment at the construction stage of the project was also considered with particular reference to the potential spillage of contaminated material into the local watercourses. The report concluded that measures will need to be adopted to reduce the risk of pollution from any site operations entering the river.
- 3.9.10 Working within the River Esk was also considered and it was recommended that this should be undertaken between mid-May and mid-August to reduce the risk of disturbance to salmon and to maintain river flows.

¹River Classifications Scheme, SEPA website: www.sepa.org.uk/data/classification/river_classification

3.9.11 The Bellyford Burn was also considered and the importance of maintaining the movement of water within the burn and that contamination of the watercourse is prevented by careful site working practices.

3.9.12 Although only limited information on groundwaters in the area was available, the January 1996 report concluded that the proposed A68(T) would not have any affect on groundwater quality. Further detail on the hydrogeology and groundwater quality is given in section 3.10.

Current Methodology

3.9.13 Consultations with Midlothian Council, East Lothian Council and SEPA were undertaken. They identified a number of aspects relating to hydrology and drainage. These included:

- Flood risk assessment and drainage impact assessment in relation to the new roads should be undertaken.
- Prevention of adverse effects on the watercourse from the road outfalls and introduction of a limited discharge.
- Provision of attenuation storage at the road outfalls.

3.9.14 The Water Environment (Controlled Activities) Regulations 2005 (CAR) will come into force on the 1st April 2006. This new legislation will have a significant impact on developers, engineers, planners and owners involved in existing or future water abstractions, discharges, impoundments, river works or any other activity that will affect the water environment.

3.9.15 Regulatory pressure is being increasingly focused on engineering activities under the ambit of the Water Framework Directive (WFD). Consideration of the environmental and social impacts of engineering activities in the vicinity of the water environment will play an important consideration in future planning, design and implementation of engineering works in Scotland.

3.9.16 The WFD through the Water Environment and Water Services (Scotland) Act 2003 provides regulatory controls over a wide range of activities in order to protect and improve Scotland's water environment.

3.9.17 In connection with works to existing watercourses, references were made to SEPA's publication entitled 'Ponds, Pools and Lochans'² which provides advice on how to maximise ecological values and the amenity potential of urban watercourses, particularly regarding SUDS. SEPA also referred to River Restoration Centre works and techniques³. SEPA discourage culverting of the watercourses, however, if culverting is required design should be in accordance with 'best practice' which permits the passage of fish and other aquatic fauna under normal conditions. SEPA requires the free passage of fish at all time and the natural stream bed should be maintained where possible.

Surface Water Features

3.9.18 The following watercourses are situated within the scheme area and shown on Drawing No. 21440/E/08/001, from west to east are:

- River Esk
- Smeaton Burn, tributary of the River Esk
- Bellyford Burn, tributary of the River Tyne

The River Esk

3.9.19 The catchment area of the River Esk as far downstream as the proposed bridge on the proposed A68(T) is approximately 310 km². The towns of Dalkeith, Bonnyrigg, Lasswade, Loanhead, Newtongrange, Gorebridge and Penicuik fall within the catchment area of the Esk. The River Esk is made up of the River North Esk and the River South Esk which have their confluence in Dalkeith Country Park approximately 250m upstream of the proposed bridge. The North River Esk rises in the Pentland Hills to the west. The Glencorse and Loganlea reservoirs are situated in catchment of the North Esk. The South Esk River rises in the Moorfoot Hills to the south. It includes Portmore Loch and the reservoirs at Gladhouse, Edgelaw and Roseberry.

² Ponds, Pools and Lochans, SEPA

³ River Restoration Centre

Smeaton Burn

3.9.20 The catchment area of the Smeaton Burn as far downstream as the proposed culvert beneath the proposed A68(T) is approximately 3.6 km². The land is predominantly agricultural. The burn flows into the River Esk to the north.

Bellyford Burn

3.9.21 The catchment area of the Bellyford Burn as far downstream as the proposed culverts beneath the proposed A68(T) is approximately 1.9 km². The land consists of agricultural land. The Bellyford Burn is a tributary of the River Tyne. It flows in a north easterly direction towards the Tyne Water.

Route Evaluation

3.9.22 The water quality assessment has been carried out in accordance with the Design Manual for Road and Bridges (DMRB), (1998); volume 11; Environmental Assessment, section 3; Environmental Assessment Techniques, Part 10; Water Quality and Drainage. Details of the methodology and assessment criteria adopted are included in detail in Appendix F.

3.9.23 Surface water pollution prevention and mitigation measures have been developed based on the following:

- Discussions with SEPA
- Current good practice for road drainage including DMRB (2001); Volume 4; Geotechnics and Drainage, section 2; Drainage, Part 1, HA 103/01, Vegetative Treatment Systems for Highway Runoff
- Sustainable Drainage Systems (SUDS) as set out in CIRIA Report C521 “Sustainable Urban Drainage Systems – Design Manual for Scotland and Northern Ireland”⁴
- Guidance contained within the SEPA publications entitled: “Watercourses in the Community” and “Ponds, Pools and Lochans”⁵

⁴ Report C521, Sustainable Urban Drainage Systems – Design Manual for Scotland and Northern Ireland, CIRIA (2000)

Road Surface Runoff Drainage Strategy

3.9.24 An overall drainage strategy will be developed in accordance with CIRIA Report C521 “Sustainable Urban Drainage Systems - Design Manual for Scotland and Northern Ireland”⁶.

3.9.25 The road drainage strategy will develop a positive integration of SUDS features, with the three principle objectives of SUDS, including:

- *Amenity and wildlife* - to integrate with the overall habitat and environmental strategies.
- *Water quantity* - to control the effects of road runoff on the receiving watercourses and therefore mitigate the downstream flood risk.
- *Water quality* - to protect downstream water from point source, diffuse and accidental contamination.

3.9.26 The drainage design should take into account the Water Framework Directive (WFD) and Water Environment and Water Services (Scotland) Act 2003 (WEWS Act), and the likely implications of this legislation with respect to nature conservation and water resources.

3.9.27 Designers should be aware that sites/structures would require a Controlled Activity Regulation (CAR) license, which will require them to:

- Demonstrate that the proposed approach and any works to the existing watercourses e.g. dredging, widening or general engineering works represents the best environmental option with softer engineering preference to harder engineering options
- Demonstrate they understand the likely impact of the proposed works on the hydromorphology and related aquatic habitats
- Include mitigation for the impacts identified above.

⁵ Watercourses in the Community, A guide to sustainable watercourse management in the urban environment, SEPA (2000).

Mitigation

Surface Runoff Quantity

3.9.28 The uncontrolled discharge of surface runoff from road drainage to existing watercourses during storm events has the potential to cause localised flooding and increased risk of flooding downstream with consequential damage and disturbance to residential and commercial properties.

3.9.29 During consultation with SEPA, it was pointed out that numerous properties adjacent to the River Esk in Musselburgh are at frequent risk of flooding and it is imperative that the runoff impacts of this new A68(T) do not exacerbate this risk.

3.9.30 SEPA do not place specific limits on rates of discharge from roads. However, references were made to section 3 of the recently published “Drainage Assessment – A Guide for Scotland (2005)” produced by the Sustainable Urban Drainage Scottish Working Party (SUDSWP). Further consultation with Midlothian Council led to the 2 year “Greenfield” rate of discharge being recommended with attenuation basins sized to cater for 1 in 100 year flood events. These recommendations are in line with DMRB requirements. Further attenuation would be provided in the designed freeboard to accommodate a 1 in 200 year flood event.

Surface Runoff Quality

3.9.31 The SUDS features proposed for the road will comply with CIRIA Report C521 and will follow the “management train approach” as shown in Table 3.9.1.

Table 3.9.1 - Surface Water Management Train for A68(T)

Treatment Level	SUDS Technique (Mitigation measure)
Management and Prevention	Good Housekeeping,
Source Control	Filter drains Catch pits Road gullies

Treatment Level	SUDS Technique (Mitigation measure)
Site Controls	Spillage containment Siltation forebays Attenuation

3.9.32 Where possible the SUDS proposals will use source control methods to provide localised attenuation and treatment of surface water runoff from the road prior to discharge into the watercourses. Attenuation basins will be used for the control and treatment of runoff from the road. These will be designed to retain water for a prolonged period during and after storm events, providing conditions for settlement of suspended solids and other pollutants and attenuation of storm water runoff.

3.9.33 The objective of the mitigation measures outlined below is to convey surface water runoff from the road surface to a receiving watercourse without detrimental effect on water quality and associated ecosystems. Mitigation measures include those that aim to prevent, reduce or offset potential effects and thus reduce the risk of causing deterioration in water quality. Further details of the mitigation measures described can be found in CIRIA Report C609, Sustainable Drainage Systems – Hydraulic, structural and water quality advice⁷.

Filter Drains

3.9.34 Filter drains will be used along the length of the proposed road including approach roads at the junctions. Filter drains consist of a perforated pipe laid in a trench backfilled with gravel and will be constructed along the terrestrial part of the road.

3.9.35 Filter drains will be used to convey road surface runoff to the discharge point and to filter out pollutants including suspended solids, hydrocarbons, iron, copper and zinc. They will also provide attenuation of flows by reducing the velocity of the runoff.

3.9.36 Piped carrier drains are required in some locations to transfer discharge from filter drains to ditches. There will not be any provision for filter drains on the bridge decks of structures across the River Esk as this is not technically feasible. It is anticipated that combined gullies/kerb/channel drains, specifically designed for use in bridge decks will be used.

⁷ Report C609, Sustainable Drainage Systems – Hydraulic, structural and water quality advice, CIRIA, 2004

Catchpits

3.9.37 Catchpits consist of manholes with shallow depth (about 200mm) sumps. They are designed to trap sediments and other debris and retain a proportion of the suspended solids present in the runoff. Catchpits will be located at regular spacing, not more than 100m with longer intervals in exceptional circumstances along the filter drains and at the junctions of carrier drains.

Road Gullies

3.9.38 Road gully pots will be used at the kerbed sections of the roads such as junctions. Gully pots function in a similar manner to catchpits and consist of an inlet grille at road level, a pot and an outlet pipe. The pot extends below the level of the outlet pipe.

Oil or Chemical Spillage Containment

3.9.39 The design will include provision to prevent accidental release of hydrocarbons into the receiving watercourse including a baffle or similar to facilitate retention of a minimum spillage volume of 7.5m³. This could be in the form of a long lined swale or a storage feature. During an emergency event the outlet would be blocked while the surface of the road is washed and drained. The spillage would then be pumped into a tanker for safe transportation and disposal.

Attenuation Basins

3.9.40 Attenuation basins including settlement forebay for coarse silts will be provided for attenuation and treatment of the road runoff, prior to discharge into the watercourse.

3.9.41 Attenuation basins are designed to retain surface runoff and discharge to an acceptable limit.

3.9.42 Settlement forebay would provide conditions for settlement of suspended solids and other pollutants whiles attenuation basin would provide attenuation of stormwater runoff.

3.9.43 Maximum depths during extreme storm events will be up to 1.5m. Shallow sided slopes provide a gradual transition from ground level to the base of the structure with a low flow channel conveying normal flows.

Culverts

3.9.44 SEPA discourage culverting of the watercourses, however, if culverting is required design will be in accordance with best practice, which permits the passage of fish and other aquatic fauna under normal conditions.

3.9.45 In connection with works to existing watercourses, during consultation with SEPA references were made to SEPA's publication entitled 'Ponds, Pools and Lochans' which provides advice on how to maximise ecological values and the amenity potential of urban watercourses, particularly regarding SUDS. SEPA also referred to River Restoration Centre works and techniques.

3.9.46 The culvert will be designed for the 100 year peak with allowance for freeboard. The culverts will also convey the 1 in 200 year flood return period without causing significant backing up or afflux immediately upstream.

3.9.47 The design of the culverts will conform to the design Guidance Booklet: "River Crossings and Migratory Fish" – A Consultation Paper produced by the Scottish Executive (April 2000) and will also include a natural bed invert. Culverts will be designed to encourage use by wildlife such that all species associated with the watercourse could pass freely.

Assessment of Impact of the Surface Runoff from the proposed A68(T) on Water Quality

3.9.48 This section describes predicted impacts and effects with and without the incorporation of mitigation measures described above. The drainage design will adopt current Highway Agency standards and aim to achieve water quality objectives now applicable in the UK as a result of the Water Framework Directive. Water quality impacts relate to:

- During construction
- Road surface runoff.
- Accidental spillage on the road.
- Flooding.
- Physical impacts of new structures within watercourse and floodplain.

3.9.49 According to DMRB, the impact of routine road runoff can be assessed using the concentrations of dissolved copper and total zinc in receiving waters as indicators. These metals have been used as indicators of the level of impact as they are generally the main metallic pollutants associated with road drainage and can be toxic to aquatic life.

3.9.50 The assessment method takes into account water quality and Environmental Quality Standards (EQS) for the Protection of all Freshwater Life relating to the receiving watercourses. EQS are principally ecological standards, specified for a range of parameters at levels required to protect aquatic life.

3.9.51 EQS for freshwater vary with water hardness, as hardness affects the solubility of metals. The relevant EQS for the protection of freshwater aquatic life provided by SEPA are given in Table 3.9.2. The revised values given for zinc are not yet statutory but are used by Regulatory Authorities.

Table 3.9.2 - Environmental Quality Standards for the Protection of all Freshwater Life

Parameter	Hardness	EQS
Copper (dissolved)	0-50 mg/l CaCO ₃	1 µg/l
	50-100 mg/l CaCO ₃	6 µg/l
	100-150 mg/l CaCO ₃	10 µg/l
	150-200 mg/l CaCO ₃	10 µg/l
	200-250 mg/l CaCO ₃	10 µg/l
	>250 mg/l CaCO ₃	28 µg/l
Total Zinc (revised values)	0-50 mg/l CaCO ₃	8 µg/l
	50-100 mg/l CaCO ₃	15 µg/l
	100-150 mg/l CaCO ₃	15 µg/l
	150-200 mg/l CaCO ₃	50 µg/l
	200-250 mg/l CaCO ₃	50 µg/l
	>250 mg/l CaCO ₃	50 µg/l

Source: SEPA, 2003

3.9.52 The assessment requires data on the concentrations of dissolved copper and total zinc in each watercourse upstream of the outfall locations, and an indication of receiving

water hardness. Water quality sampling for the receiving watercourses was undertaken by Bodycote and summarised in Table 3.9.3.

Table 3.9.3 - Receiving watercourse quality data

Receiving Watercourse	Dissolved Copper	Total Zinc	Hardness
River Esk	3 µg/l	< 8 µg/l	174 mg/l
Bellyford Burn	<1 µg/l	< 8 µg/l	336 mg/l

3.9.53 The assessment also requires an estimate of the road surface area to be drained to each outfall, the run-off coefficient of the road scheme, traffic flow data and the 95 percentile flow (Q_{95}) of the receiving watercourse.

3.9.54 The annual average daily traffic figures are for the design year 2021 assuming high traffic growth rates. Details of the calculations are given in Appendix F.

Impacts/Mitigation arising/required during Construction

3.9.55 The risk associated with the following can also result in pollution of the nearby watercourses:

- Risk associated with general site clearance, this could arise from stripping vegetation and topsoil from the working area leaving exposed ground surfaces susceptible to erosion.
- Risk associated with high silt loadings, this could arise from construction traffic movements over exposed wet temporary haul roads, thereby disturbing exposed ground and releasing silt into the surface water runoff.
- Untreated, large stockpiles of topsoil on site can slough off into watercourses during rainfall, thereby creating pollution.
- Accidental spillage of fuel and oils from the engineering plant and machinery and concrete liquors contaminating the nearby watercourses.

3.9.56 The early establishment of temporary drainage facilities will reduce the risk of pollution problems during construction. In addition, construction operations should adopt best

working practices. Guidance on surface water protection during development is provided by SEPA in the form of Pollution Prevention Guidelines (PPG). These notes provide a basis for the assessment of impacts and the design of surface water treatment, in addition to consultation with the local SEPA Environmental Protection Team. Relevant PPGs comprise:

- PPG 1: General Guide to the Prevention of Water Pollution;
- PPG 2: Above Ground Oil Storage Tanks;
- PPG 5: Works in, near or liable to affect watercourses; and
- PPG 6: Working at Construction and Demolition Sites.

3.9.57 Further measures should be taken during the construction period to ensure that the Contractor gives due consideration to the recommendations contained within the above guidelines. Design recommendations are also required for proper pollution mitigation with regards to the type of facilities required and the methodology adopted.

Road Surface Runoff

3.9.58 The Construction Industry Research and Information Association (CIRIA) Report 142 describes road surface runoff as a complex matrix of inter-related substances. It divides pollutants from road drainage discharges into the following six categories:

Sediments – ‘Sediment is simply defined as material that settles to the bottom of a liquid’

Hydrocarbons – ‘In the report the term hydrocarbons is used to mean organic compounds containing only carbon and hydrogen, particularly the petrochemical derived group which includes petrol, fuel, oils, lubricating oils and hydraulic fluids’.

Metals – ‘The above report indicates that the majority of studies on metals in highway runoff have concentrated on lead, cadmium, copper, zinc and iron’.

Salt and nutrients – ‘Salt and nutrients are defined as those generally neutral materials that occur as soluble compounds and have a direct polluting effect upon vegetable matter either by reducing or extinguishing conditions conducive to propagation or by accelerating growth to the detriment of the balance of the environment’.

Microbial – ‘Microbial activity is mainly associated with the particulate material derived from the decay of organic matter or finely divided solids that harbour bacteria or viruses. Significant microbial populations are transported with wind blown soils’.

Others – ‘Substances which do not readily fit into the other classes. Examples of these material are pesticides and herbicides.’

3.9.59 High concentrations of pollutants can accumulate during prolonged dry spells or drought, and are then released by rainfall and consequently impact on water quality due to low flows in the watercourses at this time.

3.9.60 DMRB Volume 11 recommends initial assessment of the concentrations of dissolved copper and total zinc concentrations in receiving waters in order to assess the impact of road runoff and to determine whether mitigation is needed.

Proposed Road Outfall Locations

3.9.61 The proposed A68(T) corridor lies within the catchment area of the River Esk and the River Tyne. The pollution may be more pronounced in the small tributaries because of the small flows in the tributaries which offer little or no dilution.

3.9.62 The proposed outfalls for proposed surface runoff drainage system are located at approximate mainline chainages 1250, 1450 and 4500. These outfalls are described below:

- *Outfall at Chainage 1250* – The road runoff and proposed junction with Edinburgh bypass will discharge into the River Esk on the left bank of the river. At this location the bank is relatively flat.
- *Outfall at Chainage 1450* – The road runoff will discharge into the River Esk on the right bank of the river. At this location, the riverbank is a rock cliff approximately 7 to 8 m high. The river flows in northerly direction.
- *Outfall at Chainage 4500* – The proposed road outfall will be located to the north of the proposed road and discharge into the Bellyford Burn running in northerly direction discharging into the River Tyne to the north.

Water Quality Assessment of Receiving Watercourses

3.9.63 The impact of the dissolved copper and total zinc from surface water runoff on the receiving watercourses has been assessed without mitigation measures included.

3.9.64 The application of SUDS to the design of the drainage system will reduce the concentrations of pollutants and suspended solids entering the watercourses as outlined in Section 3.9.32. The predicted residual impacts on water quality with the mitigation measures in place has also been assessed and the calculations included in Appendix F.

3.9.65 The impact of the surface water runoff without and with mitigation measures is summarised in Table 3.9.4.

Table 3.9.4 – Summary of Impact

Outfall Location & Chainage	Impact	
	Without Mitigation	With Mitigation
1250, River Esk (left bank)	Slight Significance	Slight Significance
1450, River Esk (right bank)	Slight Significance	Slight Significance
4500, Bellyford Burn	Moderate Significance	Negligible Significance

Accidental Spillage on the Road (Permanent works)

3.9.66 Spillages resulting from individual accidents are potentially the most serious source of contaminants associated with roads. Accidental spillages can range from minor losses of fuel from vehicles to major losses from fractured tanker vehicles, but their effects can be serious because of the unpredictable nature of materials involved.

3.9.67 CIRIA Report 142 explains that the liquids which are carried in large quantities present a high potential for serious pollution following accidental spillage including:

- Petrol, diesel fuel, oils, other liquid hydrocarbons and chemicals,
- Acids and caustic solutions,
- Toxic wastes,
- Inert slurries,

- Sewage sludge,
- Products that can cause high biological loadings e.g. sugar and dairy products.

3.9.68 A risk assessment of a serious spillage causing pollution has been undertaken according to DMRB. The method is based on a number of assumptions such as emergency service response times and runoff coefficients, and therefore provides an estimate of the risk. Predicted traffic flows are based on the 2021, 18 hour AADT flows for the construction of the new bypass. It is assumed that the emergency services would take less than 20 minutes to respond. Detailed calculations are provided in Appendix F.

3.9.69 Table 3.9.5 shows a summary of the spillage risk assessment on the River Esk and Bellyford Burn without mitigation and with mitigation measures included.

Table 3.9.5 –Summary of Spillage Risk Assessment without mitigation

Outfall Chainage & Location	Threshold of Acceptability	Without Mitigation		With Mitigation	
		Spillage Risk	Within Acceptable Limits?	Spillage Risk	Within Acceptable Limits?
1250 River Esk (left bank)	1 in 50 years	1 in 1,048 years	Yes	1 in 2,481 years	Yes
1450 River Esk (right bank)	1 in 50 years	1 in 1,473 years	Yes	1 in 3,487 years	Yes
4500 Bellyford Burn	1 in 50 years	1 in 5,414 years	Yes	1 in 12,815 years	Yes

Existing Floodplain and Flooding

3.9.70 In consideration of planning authority requirements, and in accordance with Scottish Planning Policy 7 (SPP7): Planning and Flooding an assessment of the flood risk was carried out. As part of the initial assessment, the flood levels for 200year and 200year including climate change in the River Esk at the proposed A68(T) bridge crossing was estimated using Manning’s equation.

3.9.71 Although Volume 4 DMRB (1995) recommendations for hydrological assessments are based on the Flood Studies Report (FSR) (1975), this assessment of the design floods has been carried out in accordance with the Flood Estimation Handbook (FEH). The predicted flood levels are shown on Table 3.9.6.

Table 3.9.6 - Predicted Flood Levels

Proposed Crossing	Predicted Flood Level (mAOD)	
	1 in 200 year return period	1 in 200 year return period + Climate Change
River Esk Bridge	18.97	19.14

3.9.72 The proposed bridge crossing will not have any impact on the existing floodplain or flooding downstream as the new bridge opening will be designed to convey the 1 in 200 year return period plus an allowance for climate change. The bridge design will also ensure that there is no significant backing up or afflux immediately upstream.

Physical Impact on the Existing Watercourses

3.9.73 The proposed A68(T) crosses the River Esk, Smeaton Burn and Bellyford Burn along its route:

River Esk Bridge Crossing

3.9.74 A new bridge is proposed to cross the River Esk from Chainages 1350 to 1430. The River Esk Bridge is the major structure within the scheme, crossing above the Esk at a height of some 15m above water level over a distance of 95m. The single-carriageway, two span bridge will be supported by a single pier located of the west side of the river. The use of an open bridge structure will allow for continued migratory routes for mammals and other protected species and minimise any physical impact on the River channel.

Smeaton Burn Culvert Crossing

3.9.75 A new culvert under the A68(T) is proposed at chainage 2200 to cross the Smeaton Burn. The proposed culvert will be approximately 50m in length and will follow the existing route of the Smeaton Burn.

3.9.76 The culvert will be designed for the 100 year peak with allowance for freeboard. The culvert will also convey the 1 in 200 year flood return period without causing significant backing up or afflux immediately upstream.

Bellyford Burn Culvert Crossing

3.9.77 A new culvert under the A68(T) is proposed at chainage 4540 to cross the Bellyford Burn. The proposed culvert will be approximately 95m long and will follow a straight line on contrast to the exiting burn with two 90 degrees bend.

3.9.78 The culvert will be designed for the 100 year peak with allowance for freeboard. The culvert will also convey the 1 in 200 year flood return period without causing significant backing up or afflux immediately upstream.

Bellyford Burn Diversion

3.9.79 Due to the nature of the horizontal alignment of the proposed roads and the line of the existing Bellyford Burn, it is proposed to divert approximately 265m length of the Bellyford Burn as an open channel and culvert crossing.

3.9.80 It will be necessary to predict the effect of the proposed diversion on the water levels upstream and downstream. To facilitate this a hydraulic model of the section of the watercourse under study will be required.

3.9.81 The Bellyford Burn diversion proposal should be based on the widely accepted recommendations of the River Restoration Centre as well as SEPA's publication 'Watercourses in the Community' and HR Wallingford's publication 'River Diversions, A Design Guide'.

3.9.82 The proposed channel diversion should be designed to mimic the existing natural section of the Burn, the flow regime as well as fluvial geomorphology of the watercourse.

Erosion Protection

3.9.83 Where required, erosion protection will be used to minimise damage to the banks and bed of receiving watercourses at the outfalls from the SUDS basins. Soft engineering techniques will be introduced to minimise the environmental impacts.

Evaluation

3.9.84 The evaluation which is made here is limited to the water quantity and quality effects and the physical impact of the proposed A68(T) Dalkeith Northern Bypass on the local watercourses. For ecological impacts and assessments, reference should be made to Chapter 3.3.

Water Quantity and Quality

3.9.85 The proposed SUDS approach is essential to control the road surface runoff discharge at the outfalls and to reduce or eliminate the impact on the water quality thus maximising the benefits of the SUDS approach.

3.9.86 The analysis shows that the introduction of SUDS and DMRB mitigation measures will reduce the impact of the road runoff on the peak flows in the watercourse. The mitigation measures will also reduce or eliminate impact of the road runoff on the water quality and will avoid cumulative effects downstream.

3.9.87 The spillage risk assessment for comparison with the threshold of acceptability for watercourse category "All other receiving watercourses" are within the 1 in 50 years acceptability for with and without mitigations. However, the assessment shows a significant reduction with the implementation of the SUDS measures.

Physical Impacts

3.9.88 The proposed road alignment will have the following physical impacts on the local watercourses:

- The Smeaton Burn will be culverted under the A68(T) at Chainage 2200.
- The Bellyford Burn will be culverted under the A68(T) at Chainage 4540.
- The line of the existing Bellyford Burn will be diverted upstream of the new culvert.

3.9.89 It is not anticipated that the proposed River Esk bridge crossing will have any physical impact on the river channel flow.

Health and Safety Consideration

3.9.90 As part of the design and in accordance with DMRB, 2001, Volume 4a, a health and safety risk assessment would be carried out in relation to the road operators and those implementing the design as a result of designing or specifying vegetative systems.

Effect of Climate Change

3.9.91 It is generally accepted that future climate in the UK is likely to be different compared to present day and it will vary from one part of the UK to another. However, there is uncertainty over the magnitude of future climate change. In response to the lack of definitive projections, the UK Climate Impacts Programme (UKCIP) which is funded by the Department of the Environment has been investigating the potential impacts of climate change in the United Kingdom. It has produced assessments of the potential impacts based on rates of increase in global greenhouse gas emissions consistent with the projections of the Intergovernmental Panel on Climate Change (IPCC).

3.9.92 In 1998 the UKCIP published their Technical Report No. 1 entitled "Climate Change Scenarios for the United Kingdom". Revised scenarios referred to as the UKCIP02 scenarios were published at the end of April 2002. The UKCIP02 scenarios are based on new global emission scenarios published in 2000 by the Intergovernmental Panel Report on Emission Scenarios, and utilise global climate modelling carried out by the

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- Hadley Centre of the Meteorological Office, using their most recently developed climatic models.
- 3.9.93 In 2003, Babtie Group carried out a review of the implications of projected climate change in relation to the levels of protection offered by Scottish river and coastal flood prevention schemes. The work built on earlier work carried out by Babtie Group for the Scottish Executive (SE) using the UKCIP98 Climate Scenarios (Babtie Group, 2001), and updates the report from that study in the light of the information presented in the UKCIP02 Report on Climate Change Scenarios for the UK (Hulme et al, 2002).
- 3.9.94 In 2005, SE published a report entitled 'Scottish Road Network Climate Change Study', (SRNCCS) which recommended that consideration should be given to revising the parameters for the design storm. The report stated that this could be done on an immediate basis by simply changing the design storm from 1 in 1 year to 1 in 2 years for design and 1 in 5 years to 1 in 10 years for surcharge, whilst continuing to take account of any available historical information.
- 3.9.95 The above report recommended that where a choice of drainage system is available, preference should be given to systems that provide capacity and take account of sustainable drainage techniques.
- 3.9.96 No particular recommendations were made in relation to the volume of the attenuation basins and limit of discharge at the outfalls.

3.10 Geology, Geomorphology, Soils and Contaminated Land

Introduction

3.10.1 This section considers the known geology, mineral resources and ground conditions beneath and adjacent to the land affected by the new bypass. It takes into account the effects of the former land uses to date including issues related to quarrying, land filling and coal mining in the area, and assesses the impact of the proposed A68 bypass on these.

Previous Investigation

3.10.2 The A68(T) Dalkeith Northern Bypass, Stage 3 Scheme Assessment Environment Report, produced in January 1996 used the following sources of information to gain a comprehensive picture of the ground conditions underlying and adjoining the land affected by the bypass as detailed below:

- A topographical survey was undertaken in March 1995.
- Historical Ordnance Survey maps (1854 – 1969) of the proposed route were consulted to identify previous land use and landforms on the line of and adjacent to the road.
- An assessment of the agricultural quality of the land affected by the bypass.
- The following British Geological Survey (BGS) maps were consulted:
 - 1:50,000 Solid Edition, Edinburgh Sheet 32E
 - 1:63,360 Drift Edition, Edinburgh Sheet 32

These plans provided details of superficial and solid geology prevalent in the area.

- Report Ref EN89/872 provided by the BGS on the geological conditions and mining activities of a strip extending 200 metres either side of the proposed bypass route.
- The Mineral Valuer Scotland provided a report on risk damage by subsidence due to underground mining. (Ref OGD(M) 460/89).
- Archaeological surveys provided additional information on historic land uses.
- A walkover survey was carried out.

3.10.3 The following conclusions were drawn in the 1996 A68(T) Dalkeith Northern Bypass, Stage 3 Scheme Assessment Environment Report, based on the above information. Drawing numbers relate to drawings in the original report:

Geology: The route of the proposed bypass passes from northwest to southeast over first the Middle and Lower Coal Measures, Millstone Grits of the Passage Group and then alternating sequences of Limestone Bands and Lower Limestone Group strata interspersed with rocks of the Limestone Coal Group (Drawing No. 21440/G1). The solid geology is overlain by alluvium and fluvio-glacial sands and gravels in and around Dalkeith Park, with boulder clay or outcropping limestone bedrock elsewhere (Drawing No. 21440/G2).

The proposed bypass does not affect any geological SSSIs or Regionally Important Geological Sites (RIGS). Gas spike surveys were recommended where the proposed bypass crosses over coal-bearing strata. Geotechnical investigations were recommended to be carried out in the infilled gravel pit under the B6416 new alignment and the infilled opencast east of Bellyford Burn. It was also recommended to investigate the infilled reservoir at Langside, although this site has since been subject to construction of a new access road to Langside and will no longer be affected by the A68 construction works.

Mining and Quarrying

The Coal seams of the Lower and Middle Coal Measures have been worked extensively at moderate depths in the northwest part of the route and outcrop between Salter's Road and the former Dalkeith Colliery. These seams continue at increasing depths to the north south and west of the proposed bypass, where they have until recently been extensively exploited by British Coal at Dalkeith, Smeaton and Newton Collieries. Coal seams in the Limestone Coal Group outcrop between Langside and Easter Cowden (the old Fuffet Coal Pit) and in this area may have been worked at shallow depths. Further detail on the results of previous studies on mining stability issues are given in the *Summarising Geotechnical Report*, W A Fairhurst & Partners, August 2005.

Opencasting was undertaken at Newfarm to the south of Salter's Road and at Oxenfoord (Hungry Hill) in the 1990's to exploit the remaining coal reserves beneath the route of proposed bypass prior to its construction.

Most coals of the Limestone Coal Group outcrop and are at shallow depths in the Langside area and several seams have been worked extensively. This section of the bypass route was the subject of a grouting contract carried out in the summer of 1996.

The North Greens Limestone has historically been quarried in the Fordel Mains area and is still being quarried at Cousland Quarry to the east of the proposed bypass. Former limestone quarries are located at Cowden Cleugh, Easter Cowden and Fordel in the vicinity of the route. The latter encroaches on the footprint of the new road. A small gravel pit was historically located at Langside (by Hadfast Road), whilst a clay pit was located adjacent to the Smeaton Brick and Tile Works (refer to Drawing no. 21440/E/13/001).

Drawing no. 21440/E/12/001 illustrates the approximate location of coal seams and known mine workings within 30m of rockhead, and the location of the former quarries and opencast sites.

Agricultural Land Quality: The proposed route will affect 37.15 hectares of agricultural land. The anticipated surplus of excavated material including topsoil should be considered for re-use to improve adjacent fields. No detailed assessment of soils on the route was required to be carried out.

Contamination: Based on an assessment of potentially contaminated land, the results of which are detailed in the original report and summarised on Drawing No. 21440/G3, the following mitigation measures were recommended:

- Details of the opencast operators' proposals for identifying contaminated ground and proposals for remediation should be obtained;
- Soil and groundwater sampling and chemical analysis should be undertaken on the site of the former Smeaton Mine and railway line and Hungry Hill quarry (open-cast coal workings), with the Hungry Hill quarry investigation including additional water testing on the spring and Bellyford Burn. It was also recommended to investigate the infilled reservoir at Langside, but as detailed above this site is no longer affected by the A68 works.

3.10.4 If the results of the above investigations indicated the presence of contaminated materials then the following mitigation measures were proposed:

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- Contaminated materials disposed of to a suitably licensed landfill.
 - Construction workers advised as to the need for adequate health and safety precautions and appropriate systems of work.

Current Methodology

3.10.5 Mitigation of adverse effects on or relating to geology, geomorphology, soils and contaminated land along the proposed route of the A68 Dalkeith Bypass has been based on the findings of the previous investigation, and updated assessment as required.

3.10.6 No soil survey data was considered in the earlier report. Soil Survey of Scotland (1971) data has since been obtained from the Macaulay Land Use Institute, and summarised on drawing number 21440/E/11/001. Soil types recorded on the proposed route largely reflect the characteristics of the underlying parent rocks and superficial deposits, with freely drained sandy and gravelly brown earth soils of the Darvel Association in and around Dalkeith Park and till derived brown earths and gleys of the Rowanhill Association to the south and east.

3.10.7 No new geological designations have been made since the previous report. Recommendations in the original report relating to geotechnical investigation and gas surveys of areas underlain by coal bearing strata are addressed in a supplementary ground investigation currently being undertaken. This investigation involves boreholes, trial pits and trenches along the proposed bypass route to provide geotechnical, geochemical and ground gas data as required.

Subsequent to the production of the 1996 A68(T) Dalkeith Northern Bypass, Stage 3 Scheme Assessment Environment Report, the introduction in 2000 of Part IIA of the Environment Protection Act 1990 altered the legislative background to contaminated land in Scotland and placed a statutory duty on Local Authorities to identify contaminated land within their areas and to act as an enforcement authority as appropriate to ensure remediation. Midlothian and East Lothian Councils, and SEPA were also consulted as part of this review. Responses to requests for information from the Local Authorities indicated that there were no areas on the route of the proposed bypass which were currently designated as Contaminated Land under Part IIA.

To enable an updated assessment of the potential environmental constraints highlighted in the Stage 3 Scheme Assessment Report, based on the provisions of this new contaminated land regime, an Envirocheck Report (Ref. EC12659621) was commissioned from the Landmark Information Group in July 2005 comprising historical Ordnance Survey mapping and other data pertinent to the assessment of environmental constraints on the project.

- 3.10.8 Ordnance Survey map sheets covering the site location and environs were supplied in the Envirocheck Report. Map sheets consulted were produced between 1855 and 1999 at scales of 1:2,500, 1:10,560 and 1:10,000.
- 3.10.9 Additional potentially contaminated sites have been identified along the route since the 1995 assessment described in the Stage 3 Scheme Assessment Report. The principal areas of concern identified in both assessments are listed below.
- 3.10.10 The first area of note is a section of approximately 600m in length comprising the sites of the former Fuffet coal pit, rifle range and Oxenfoord open cast. The second major section of the route to be potentially affected by contamination is approximately 950m in length running from Salter's Road towards the south west, comprising the restored Newfarm opencast, railway embankments, the former Dalkeith Colliery site with areas of made ground and unknown infill and just off route the electricity substation on the former colliery site.
- 3.10.11 Elsewhere on the proposed alignment, a former gravel pit by the Hadfast Road and an infilled quarry near Fordel Mains between Southfield Road and Inveresk Road have been infilled with materials of an unknown provenance or nature.
- 3.10.12 To the south of the route, the site of a disused quarry and nearby waterworks at Easter Cowden lie within a valley draining into the Cowden Cleugh site with its associated former quarry, mine and refuse tip. This site lies within 200m of the proposed junction of the bypass with the B6414 and although it drains into the already identified restored opencast near Smeatonhead, may be a source of landfill or mine gases through other pathways.

3.10.13 SEPA note that the Bellyford Burn is reduced in water quality class (Classified as C – Poor Quality by SEPA in 2004) for a part of its length due to the influence of iron caused by ferruginous springs in the upper reaches, possibly from abandoned mine workings.

3.10.14 The River Esk was classified by SEPA in 2004 as being of A2 (Good Quality), and is a Designated Salmonid River, however the River North Esk (at Dalkeith Gauging Station) was classified as being of C (Poor Quality) overall, on account of its poor chemical quality, in particular iron content, while the River South Esk (at Dalkeith) was classified as being of B (Fair Quality) overall, on account of its poor chemical quality, again relating in particular to iron content. Further discussion on water quality is given in Section 3.9.

Mitigation

3.10.15 Based on the recommendations of the 1995 Stage 3 Scheme Assessment Report and recent desk study review, the following measures are proposed to ensure that Geology, Geomorphology and Soils are not impacted detrimentally upon or that contaminated land will not impact detrimentally upon the road development. The current supplementary intrusive investigation listed in 3.10.7 above has been designed in accordance with BS5930:1999 and BS10175:2001 and includes provision for geochemical testing of soils and groundwaters from sites on the proposed route identified in the original report or the current review as being potentially contaminated. With the exception of the final five points which by necessity are part of the construction phase, these recommendations are to be carried out pre-construction:

- Excavation of trial pits on potentially contaminated sites along the route to enable soil sampling and chemical analysis.
- Excavation of trial pits along the route to enable in-situ testing, soil sampling and geotechnical analysis to establish the engineering properties of soils and superficial deposits.
- Cable percussion boring along the route to enable in-situ testing, soil sampling, chemical and geotechnical analysis.
- Rotary drilling and coring along the route to establish rock properties and identify the presence of underground coal workings.
- Installation of gas and groundwater monitoring standpipes and the establishment of a gas and groundwater monitoring and sampling scheme.

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- Collection and analysis of surface water samples to establish and monitor water quality status in surface water features with regard to potential dispersal of contamination.
 - Investigation of former coal workings as necessary to establish work required for further consolidation works.
 - Investigation of the compactive state of the backfill in the opencast coal areas.
 - Consultation with SEPA, Midlothian or East Lothian as appropriate regarding the excavation and treatment of any potentially contaminated materials.
 - Consultation with SEPA regarding the disposal of waste materials that cannot be re-used or recycled.
 - Removal of contaminated materials to an appropriately licensed landfill as necessary.
 - Construction workers to be advised as to the need for adequate health and safety precautions.
 - Appropriate systems of work put in place to ensure that the dispersal of any potentially contaminated materials is minimised.

An inquiry to the Coal Authority has been made to determine the possibility of future deep mining along the bypass route.

The estimate of the likely quantities of surplus material and borrow indicates that there will be a requirement for export and import of significant quantities of material. An estimated 455,847m³ of material will require excavation with an estimated 213,702m³ of excavated material being unacceptable for reuse on site from a geotechnical perspective. From the of unacceptable material ,130,000m³ can be used for landscaping areas leaving 83,702m³ to be disposed of from site. The disposal of this material will be the responsibility of the construction contractor. If it is unsuitable for use in other construction projects then it will require disposal at a suitably licensed landfill. The choice of disposal method will be a commercial decision made by the construction contractor. An estimated 457,653m³ of material will be required for upfilling, 213,702m³ of this material is available on site, and the remainder will be imported from a suitable source. As a necessary part of movement and redistribution of materials, soils handling, storage and replacement are to be undertaken in accordance with current best practice.

Impacts/Mitigation arising/required during construction

3.10.16 The main impacts on or relating to Geology, Geomorphology, Soils and Contaminated Land which can be anticipated from the construction works themselves relate to potentially unstable ground conditions and the possibility of dispersal of contaminated materials into the wider environment, addressed by the supplementary intrusive investigation. Potential degradation or loss of soil resource through excavation, storage and handling is addressed by adherence to current best practice. Details of these mitigation measures are summarised in the Schedule of Environmental Commitments.

Conclusion

3.10.17 The area crossed by the A68 Dalkeith Northern Bypass contains a range of anticipated ground conditions and a number of potentially contaminated sites. Geotechnical investigations have already been undertaken in recent years particularly relating to investigation of infilled opencast sites or investigation and grouting of mine workings. Further requirement for investigation and monitoring has been identified and this work will be undertaken and completed prior to the main construction contract commencing in July 2006.

4. SCHEDULE OF ENVIRONMENTAL COMMITMENTS

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Archaeology and Cultural Heritage	750 Newton and Castlesteads	To compensate for the potential loss of pit alignment, rig and furrow.	Set piece excavation. Excavation trenching to increase sample to 10%.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland
	1150 -1300 Castlesteads	To compensate for the potential loss of ring-grooves and stone-paved sites.	Excavation trenching to increase sample area for region of high archaeological potential.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland
	1050 and 1900	To minimise adverse impact on Dalkeith Estate boundary wall	Stone to be retained from dismantled sections of the wall for re-use in the new gateway feature. Remaining sections of wall to be safeguarding by use of temporary fencing, support as required.	During construction	None	Historic Scotland

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Archaeology and Cultural Heritage	Dalkeith Park	To compensate for potential loss of features within the designed landscape	Recording and evaluation of features; presentation of a strategy for further work	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland
	1550 -1850 Smeaton	To compensate for the potential loss of Roman Temporary Camp.	Excavation required with the aim of recovering datable artefacts.	Pre construction.	Further mitigation maybe required based on findings.	Historic Scotland
	Newton House	To compensate for the potential loss of Smeaton Brick and Tile Works.	Watching brief by a representative of Historic Scotland required in unexcavated areas.	During Construction	Further mitigation maybe required based on findings.	Historic Scotland
			Trenching to increase sample to 10%.	Pre construction.	Further mitigation maybe required based on findings.	Historic Scotland
		To compensate for the potential negative impacts on part of the Historic Gardens and Designed Landscape.	Walkover to identify historic landscape features.	Pre construction	Based on walkover appropriate recording of landscaped features.	Historic Scotland
	Archaeology and Cultural Heritage	Newfarm Junction	To compensate for the potential loss of cist cemetery.	Trenching to increase sample to 10%.	Pre construction	Further mitigation maybe required based on findings.
To compensate for the potential loss of archaeological features along Old Dalkeith Colliery Road.			Area with potential to contain undetected buried archaeological remains. Trenching to increase sample to 10%.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Archaeology and	1500 – 2500 Salter's Road North Link	To compensate for the potential negative impacts on part of the Historic Gardens and Designed Landscape.	Trenching to increase sample area.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland
	2300	To compensate for the potential loss of undetected buried archaeological remains.	Trenching to increase sample to 10%.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland
		To compensate for the potential negative impacts on part of the disused coal mine and dismantled railway.	Evaluation trenching.	Pre construction	Further mitigation maybe required based on findings	Historic Scotland
	2450 -2700	To compensate for the potential loss of undetected buried archaeological remains.	Trenching to increase sample to 10%.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland
	2800 -3250	To compensate for the potential loss of undetected buried archaeological remains.	Trenching to increase sample to 10%.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland
	Langside	To compensate for the potential loss undetected buried archaeological remains.	Trenching to increase sample to 10%.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Cultural Heritage	Easter Cowden	To compensate for the potential loss of land drains and bog oak which has been identified.	Trenching to increase sample to 10%.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland
	Link to Southfield Road	To compensate for the potential loss of undetected buried archaeological remains.	Trenching to increase sample to 10%.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland
	5200-5300 Fordel Mains Junction	To compensate for the potential loss of field drains and possible settlement.	Trenching to increase sample to 10%.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland
	5550-5700	To compensate for the potential loss of field drains and undetected buried archaeological remains.	Trenching to increase sample to 10%.	Pre construction	Further mitigation maybe required based on findings.	Historic Scotland
Disruption due to Construction	'Salter's Road South' 000 – 320 and 'Salter's Road Roundabout Link' 000 – 340 / Sandyriggs Wood	Road safety and safeguarding protected species by the provision of special fencing.	Badger Fencing	Prior to the scheme opening.	Six monthly or more frequent if damage is reported by adjacent Landowner.	None
	Generally	To safeguard sensitive archaeological and cultural heritage sites	Careful siting of temporary accesses, stockpiles, storage areas and site compounds	During construction	To be monitored by Environmental Advisor	Historic Scotland

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Disruption due to Construction	Generally	To minimise construction noise	The contractor is responsible for the full assessment of the effects of construction noise on properties adjacent to the route, taking into account the Works programme, operations and machinery to be used to the satisfaction of Midlothian Council and East Lothian Council. Contractor to notify residents likely to be affected prior to undertaking such activities and to provide a named contact.	Pre construction to Post construction	Pre and Post construction noise surveys.	East Lothian and Midlothian Council Environmental Health

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Disruption due to Construction		To minimise impacts on air quality	The contractor will be required to consult and comply with the requirements of Midlothian Council and East Lothian Council Environmental Health regarding air quality and the reduction of dust nuisance.	During construction	As required by Midlothian Council and East Lothian Council Environmental Health	Midlothian Council and East Lothian Council Environmental Health
	Generally	To minimise delays and congestion	Traffic Management Scheme	During construction	Relevant Road Authority and Police	Relevant Road Authority and Police
	Generally	To avoid severance of land	Any accesses required for construction to be in agreement with adjacent landowners. Temporary fencing and gates to be in agreement with adjacent landowners.	During construction	None	Relevant Landowners

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Disruption due to Construction	Generally	To minimise disruption to public access	The contractor is to ensure adequate alternative provision for all vehicular, pedestrian and animal traffic to all existing roads, footways, accesses, premises adjacent to and/or affected by the construction works.	During construction	None	None
	1390 Esk Bridge	To protect the wildlife corridor and the species that use it.	Additional pre-construction surveys as requested by SNH; appropriate working methods and standard licensing procedures (if required) to be followed	Immediately before and during construction	To be monitored by Environmental Advisor	SNH
	1390 Esk Bridge	To protect salmonids within the River Esk	Appropriate working methods timed to avoid disturbance to salmon.	Avoid working in river bed mid-May to Mid August	To be monitored by Environmental Advisor	FDSFB

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Disruption due to Construction	Generally	To protect bats	Trees with bat potential will be removed in advance of works. If potential bat roosts or bats identified, further inspections to be undertaken and licences obtained as appropriate.	Tree felling to occur ideally Spring and Autumn	Licensed ecologist to monitor work	None
	Generally	To protect breeding birds	Trees/shrubs to be removed in advance of works	Trees/shrubs to be removed September to February inclusive	None	None
	Generally	To safeguard existing habitats	Potential adverse impacts arising from location of temporary accesses, site compounds, stockpiles and storage areas to be minimised by avoidance of ecologically sensitive areas.	During construction	To be monitored by Environmental Advisor	SNH

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Disruption due to Construction	Generally	To protect the River Esk, Smeaton Burn and Bellyford Burn aquatic habitats	Compliance with SEPA Special Requirements regarding water quality and drainage; water tables to be maintained as far as possible; water quality monitoring to be undertaken.	During construction.	Water quality to be monitored as required by SEPA during construction, completion and maintenance of the Works.	SEPA
	General consideration for Water Quality and Drainage issues	To avoid pollution of the local watercourses during site clearance, spillage of the fuel and oils from the civil engineering plant and machinery and concrete or grout liquors, high silt loadings, untreated large stockpiles of topsoils. To avoid the increase in risk of flooding downstream	Use of temporary SUDS facilities e.g. lagoons or settlement tanks). Site roads to be kept free from mud and dust deposits. Bunded storage areas for fuels, oil and chemicals. Operations should adopt best working practices. Further guidance and details from SEPA's Pollution Prevention Guidelines (PPG1, PPG2, PPG5 & PPG6).	During construction	Measures should be taken during the construction period to ensure that the contractors are adhering to the recommendations contained within the guidelines	SEPA, FDSPB, SNH, East and Midlothian Councils

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Ecology and Nature Conservation	1060 – 1320 / Dalkeith Park	Road safety and safeguarding protected species by the provision of special fencing.	Fencing for Deer, Badgers and Otters	Permanent and temporary fencing to be installed prior to breaching park boundary walk.	Ongoing monitoring throughout construction period and post construction six monthly, or more frequent if damage is reported by adjacent owner.	None
	1480 – 1920 / River Esk to Sandyriggs Wood	Road safety and safeguarding protected species by the provision of special fencing.	Fencing for Deer, Badgers and Otters	Permanent and temporary fencing to be installed prior to breaching park boundary walk.	Ongoing monitoring throughout construction period and post construction six monthly, or more frequent if damage is reported by adjacent owner.	None
	2100 – 2860 / Sandyriggs Wood to Langside	Road safety and safeguarding protected species by the provision of special fencing.	Badger Fencing	Prior to the scheme opening.	Six monthly or more frequent if damage is reported by adjacent landowner.	None
	3380 – 5140 / Langside to Bellyford Burn	Road safety and safeguarding protected species by the provision of special fencing.	Badger Fencing	Prior to the scheme opening.	Six monthly or more frequent if damage is reported by adjacent landowner.	None

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Ecology and Nature Conservation	5180 – 5320	Road safety and safeguarding protected species by the provision of special fencing.	Badger Fencing	Prior to the scheme opening.	Six monthly or more frequent if damage is reported by adjacent landowner.	None
	5380 – 6000 / Fordel Mains	Road safety and safeguarding protected species by the provision of special fencing.	Badger Fencing	Prior to the scheme opening.	Six monthly or more frequent if damage is reported by adjacent landowner.	None
	3960	Road safety and maintenance of badger routes across the road.	Badger Underpass	Prior to the scheme opening.	Six monthly or more frequent if damage is reported by adjacent landowner.	Relevant Landowner
	5450	Road safety and maintenance of badger routes across the road.	Badger Underpass	Prior to the scheme opening.	Six monthly or more frequent if damage is reported by adjacent landowner.	Relevant Landowner
	5880 / Fordel Mains	Road safety and maintenance of badger routes across the road.	Badger Underpass	Prior to the scheme opening.	Six monthly or more frequent if damage is reported by adjacent landowner.	Relevant Landowner

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Ecology and Nature Conservation	1080 & 1130 / Dalkeith Park	To provide safe passage for bats and owls through maintenance of existing woodland close to road boundary and its reinforcement with native tree planting.	Hop Over Points	To be included in landscape contract.	As required by landscape contract.	None
	1320 & 1480 / River Esk	To provide safe passage for bats and owls through maintenance of existing woodland close to road boundary and its reinforcement with native tree planting.	Hop Over Points	To be included in landscape contract.	As required by landscape contract.	None
	1390 Esk Crossing	To provide artificial bat roosts for Daubenton's and Pipistrelle bats to compensate for any loss of potential tree roost sites.	Artificial Bat Roosts	During or immediately after construction of the new bridge	As required by contract.	SNH, Relevant Landowner
	3090 & 3150 / Langside	To provide safe passage for bats and owls through maintenance of existing woodland close to road boundary and its reinforcement with native tree planting.	Hop Over Points	To be included in landscape contract.	As required by landscape contract.	None

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Ecology and Nature Conservation	2200 Smeaton Burn Culvert	To maintain passage of otters	Otter ledge to be included in culvert design	Construction	In accordance with standard maintenance procedures	None
	Smeaton Burn Culvert (access track)	To maintain passage of otters	Otter ledge to be included in culvert design	Construction	In accordance with standard maintenance procedures	None
	4540 Bellyford Burn Culvert	To maintain passage of otters	Otter ledge to be included in culvert design	Construction	In accordance with standard maintenance procedures	None
	Generally	To minimise impacts on existing areas of semi-natural vegetation	Road design to ensure protection, where possible, of existing woodlands, scrublands, grasslands, riparian and wetland habitats where possible.	Tender stage and during construction	In accordance with contract requirements	None
	River Esk 1250 & 1450 Bellyford Burn 4500	To create new wildlife habitat in the area of new attenuation ponds	Inclusion and selection of native aquatic and marginal plant species to allow natural colonisation of the ponds/wetland to occur.	Tender stage and during construction	In accordance with contract requirements	SNH, relevant Landowner
Landscape and Visual Impact	150 – 350 Edinburgh City Bypass A720	Woodland mitigates the lighting in and around the area reducing the visual	Screening woodland with specimen tree planting	Construction	As required by landscape contract.	None

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Landscape and Visual Impact		impact of traffic and light pollution				
	450 – 600 Edinburgh City Bypass A720	Woodland North-west of the Edinburgh City Bypass A720 screens the road and its traffic from Newton House and adjacent areas.	Screening woodland with specimen tree planting	Construction	As required by landscape contract.	None
	800 – 1100 Edinburgh City Bypass A720	Planting on the West of the Edinburgh City Bypass A720 screens the road and its traffic from Newton House and adjacent areas.	Screening woodland with specimen tree planting	Construction	As required by landscape contract.	None
	2250 – 2850 Smeaton	Woodland planting mitigates the visual impact of the Electricity Substation upon the landscape and its surrounding area.	Screening woodland with specimen tree planting	Construction	As required by landscape contract.	None
	4500 – 4800 Bellyford Burn	Native woodland planting mitigates the visual impact of the elevated road and traffic upon the landscape and its surrounding area.	Native woodland planting block linked to existing features with hedgerows	Construction	As required by landscape contract.	None
	1100 – 1300 Dalkeith Park	Wetland habitat in woodlands and grasslands mitigates SUDS and ecological issues and responds to the landscape and its surrounding setting.	Wetland habitat in woodlands and grasslands linked to existing valued features	Construction	As required by landscape contract.	Relevant Landowner

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Landscape and Visual Impact	650 – 1300 Castle Steads	The hedge along the north and south embankment screens the road mitigates the visual impact of the road from Castle Steads and surrounding areas.	Native hedgerow and shrubs with specimen tree planting	Construction	As required by landscape contract.	None
	1450 – 1900 Dalkeith Park	The hedge along the north and south embankment screens the road mitigating the visual impact of the road from Pickle Dirt, Cecil's field, New Farm and surrounding areas.	Native hedgerow and shrubs with specimen tree planting	Construction	As required by landscape contract.	None
	1900 – 2050 New Farm/ Salter's Road 0 – 150 South Interchange Salter's Road	The hedge along the south embankment screens the visual impact of traffic and light pollution of the bypass from New Farm and surrounding areas. The proposed hedge ties into existing hedge row planting.	Native hedgerow and shrubs with specimen tree planting	Construction	As required by landscape contract.	None
	0 – 250 North Interchange Salter's Road	The hedge extends along the eastern side of the slip road mitigating the visual impact of traffic and light pollution of the road from surrounding area	Native hedgerow and shrubs with specimen tree planting	Construction	As required by landscape contract.	None

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Landscape and Visual Impact	3350 – 4500 Langside – Easter Cowden	The hedge along the north and south embankment screens the road, mitigating the visual impact of the road from the Easter Cowden and surrounding areas.	Native hedgerow and shrubs with specimen tree planting	Construction	As required by landscape contract.	None
	5150 – 5800 Fordel Mains	The hedge along the north and south embankment screens the road, mitigating the visual impact of the road and lighting from surrounding areas. Proposed hedge row ties into the existing woodland edge.	Native hedgerow and shrubs with specimen tree planting	Construction	As required by landscape contract.	None
	5800 – 6050 Fordel Mains	Specimen tree planting to restore woodland edge adjacent to the new road.	Specimen tree planting of appropriate species to reflect character of area	Construction	As required by landscape contract.	None
	1050 – 1100 Dalkeith Park	Specimen tree and native shrub planting to restore woodland edge adjacent to the new road	Specimen tree and native shrub planting of appropriate species to reflect character of area	Construction	As required by landscape contract.	None
	1250 – 1500 Dalkeith Park	Specimen tree and native shrub planting to restore woodland edge adjacent to the new road	Specimen tree and native shrub planting of appropriate species to reflect character of area	Construction	As required by landscape contract.	None

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Landscape and Visual Impact	1050 –Dalkeith Park	New 'gateway' feature to Dalkeith listed boundary wall	Listed structure and reinstatement of valued historical feature	Construction	As required by landscape contract.	Historic Scotland, Relevant Landowner and Midlothian Council
	1900 Salter's Road	Re-aligned and reinstated boundary wall to Dalkeith Park	Listed structure and reinstatement of valued historical feature	Construction	As required by landscape contract.	Historic Scotland, Relevant landowner and Midlothian Council
Land Use	Newton Farm	To avoid severance of field to east of City Bypass	New accesses are required to each portion of field, new fencing and walls to be erected, gates repositioned.	During construction	None	Relevant Landowner
	Buccleuch Estates	To avoid severance of various field units.	New access required and existing access grubbed up and returned to arable use. Field gates, fences and walls as well as hedging and landscape fences to be erected.	During construction	None	Relevant Landowner

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
	Smeaton Farm	To avoid creation of potentially unviable parcels of land from bypass/slip roads at Salter's Road Junction.	New access required. Field gates, fences and walls to be erected.	During construction	None	Relevant Landowner
	Home Farm	To avoid severance of field to west of River Esk.	New access is required (diversion of existing track beneath River Esk overbridge).	During construction	None	Relevant Landowner
		To avoid severance of fields to west of River Esk.	Reorganisation of field boundaries.	During construction	None	Relevant Landowner
	Fordel Park	To avoid severance of one field close to the existing A68.	Reorganisation of field boundaries, erecting of random rubble walls.	During construction	None	Relevant Landowner
	Fordel Mains	To avoid the creation of potentially unviable parcels of land from bypass/slip roads at Fordel Mains junction.	New access required. Field gates, fences and walls as well as hedging and landscape fences to be erected. Redundant portions of A6124, A68 and Fuffets Road to be grubbed up and returned to agricultural use.	During construction	None	Relevant Landowner

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
	Southfield	To avoid severance of two field units.	New accesses are required to each portion of field, new fencing and walls to be erected, gates repositioned.	During construction	None	Relevant Landowner
	Easter Cowden/Langside	To avoid severance of various field units.	New accesses are required to each portion of field, new fencing and walls to be erected, gates repositioned.	During construction	None	Relevant Landowner
	Generally	To minimise loss of topsoil excavated from fields used during construction of the Works and which are to be returned to the landowner on completion.	Careful storage of topsoil in separate mounds distinct to each affected area, for return to that same area. Mounds not to exceed 2m in height and shall be kept free of weed growth.	During construction	None	Relevant Landowner

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
		To offset loss of surplus excavated subsoil and/or topsoil	Consideration of re-use on site where feasible and with the agreement of the relevant landowners, to provide relaxed sideslopes of earthworks or to improve levels generally on the land adjacent.	During construction	None	SEPA Relevant Landowner
		To minimise disturbance and/or damage to existing field drainage systems, during construction	Tracing locations of damaged drains and provision of replacement pipes linking to a suitable outfall to ensure an acceptable field drainage system exists.	During Construction	None	Relevant Landowner

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
		To reduce redundant sections of existing carriageway	Areas of redundant carriageway are wherever possible to be excavated to the full depth of road construction, excavated material disposed of off-site to Contractors tip, backfilled with subsoil/topsoil to appropriate levels and returned to agriculture or planted/seeded as desired.	During Construction	None	Relevant Landowner
Traffic Noise and Vibration	Newfarm	To minimise traffic noise	Provision of noise insulation to the relevant British Standards to the doors and windows on all facades of the property, to mitigate impacts of traffic noise on Salter's Road.	Pre construction to Post construction	Pre and Post traffic noise surveys as per contract and local authority requirements.	Midlothian Council Environmental Health

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Pedestrians, Cyclists and Equestrians	Dalkeith Park Estate	To avoid disturbance to existing tracks and paths used by pedestrians/equestrians and others.	Access to be maintained throughout the construction period. Provision by the Contractor of acceptable alternative route and/or diversion.	Pre construction and during construction	None	Dalkeith Country Park Ranger, Edinburgh Equestrian Centre
	Smeaton bridle route/cycle route NCR 1/footpath	To avoid disturbance to existing route	The Contractor is responsible for the construction of suitable alternative route and protection of existing route from construction Works. Provision of dismounting blocks for equestrian use to either side of underpass.	Pre construction and during construction	None	Midlothian Council Sustrans

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
	Bellyford Burn	To avoid disturbance to existing route	Minimise disturbance to existing track along Bellyford Burn during construction period. Access is to be maintained throughout the construction period. Temporary provision by the Contractor of alternative route.	During Construction	None	Midlothian Council
Community Severance	Salter's Road Junction	To prevent disturbance to community during construction works.	Adequate provision for people passing along Salter's Road (pedestrian, cyclists, equestrians and motorists)	During construction	None	Midlothian Council
	Langside Head	To prevent disturbance to community during construction works.	Adequate provision for people using the B6414 at Langside Head (pedestrian, cyclists, equestrians and motorists)	During construction	None	Midlothian Council
	Fordel Mains	To minimise disturbance to community during construction works.	Adequate provision for people in the Fordel Mains area (pedestrian, cyclists, equestrians and motorists)	During construction	None	Midlothian Council

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Vehicle Travellers	Whole Scheme	To create visual interest in road travellers' views	Landscape planting (refer to landscape plans)	Post Construction	Refer to landscape requirements	None
	1070 & 1920	To reinforce sense of place and entry and exit point of road through designed parkland	Gateway feature as included in construction contract documents	Construction	None	None
Water Quality and Drainage	Generally	To minimise adverse impacts on the water environment	Consult with SEPA in relation to obtaining any necessary licences and registrations under the Water Environment (Controlled Activities) Regulations 2005.	Pre-construction and during construction	As required by SEPA	SEPA
Water Quality and Drainage	River Esk Outfall (Chainage 1250)	To avoid pollution of the local watercourse from road surface runoff. This includes sediment, hydrocarbons, metals, salts and nutrients microbial and other harmful elements such as pesticides and herbicides. In addition spillages resulting from individual accidents. To avoid the increase in risk of flooding downstream	SUDS mitigation including, filter drains, catchpits, gully pots, swales, siltation ponds, extended detention basins and oil or chemical, containment	Operational road	Further mitigation maybe required based on findings.	SEPA, SNH and Midlothian Council

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Water Quality and Drainage	River Esk Outfall (Chainage 1450)	As above	As above	As above	As above	As above
	Bellyford Burn Outfall (Chainage 4500)	As above	As above	As above	As above	As above
	Smeaton Burn culvert crossing (Chainage 2200)	To minimise impact on passage of fish and other aquatic fauna	Culvert design to conform to Guidance Booklet: "River Crossings and Migratory Fish" – A Consultation Paper	Operational road	None	SEPA, FDSFB
	Smeaton Burn culvert crossing (access track)	To minimise impact on passage of fish and other aquatic fauna	Culvert design to conform to Guidance Booklet: "River Crossings and Migratory Fish" – A Consultation Paper	Operational road	None	SEPA
	Bellyford Burn culvert crossing (Chainage 4540)	As above	As above	As above	None	As above
	Bellyford Burn diversion channel	To minimise the impact of the diversion channel on wildlife and watercourse habitat	New channel to be designed to mimic the existing natural channel, flow regime and fluvial geomorphology.	Operational road	None	SEPA, FDSFB

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Geology, Geomorphology, Soils and Contaminated Land	Generally	To prevent the release of contaminated materials into the environment.	Use of procedures adopted under the contract Employers Requirements to deal with any hazardous ground encountered and the removal of potentially contaminated materials.	Pre construction	None	SEPA, Midlothian Council, East Lothian Council.
		To avoid harmful impacts to people and wildlife.	Use of procedures adopted under the contract Employers Requirements to deal with any hazardous ground encountered and the removal of potentially contaminated materials.	During construction	None	SEPA, Midlothian Council, East Lothian Council.
Geology, Geomorphology, Soils and Contaminated Land		To prevent contaminated run-off or groundwater entering and polluting local water supplies.	Containment, removal and disposal off site of any contaminated water.	During construction	None	SEPA, Midlothian Council, East Lothian Council.
		To minimise the effect of any disturbance caused to sensitive environmental features.	Environmental appraisal of groundwork to be undertaken	Pre construction	Further mitigation maybe required based on findings.	SEPA, Midlothian Council, East Lothian Council.

Issue	Approximate Chainage/Location	Mitigation Objective and Commitment	Mitigation Measure	Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Geology, Geomorphology, Soils and Contaminated Land		To avoid loss of soil structure, fertility and biological status, and to prevent erosion or loss of the soil resource.	Adherence to current best practice in relation to soil handling, storage and placement.	During Construction	Periodic supervision of soil moving activities.	SEPA, Midlothian Council, East Lothian Council.
	Between Salter's Road and Chainage 2800	To minimise the potential for contamination to nearby ground and water from the former Newfarm opencast site, coal mining and infilling of void space, former brick and tile works, railway land, and electricity sub station.	Trial pitting and soil sampling to establish the presence or absence of contamination. Investigation in to the potential for gas generation.	Pre construction	Further mitigation maybe required based on findings.	SEPA, Midlothian Council.
	Between Langside and Chainage 3550	To minimise the potential for contamination to nearby ground and water from infilled land.	Boreholes with combined gas and groundwater monitoring wells established.	Pre construction	Further mitigation maybe required based on findings.	SEPA, Midlothian Council.
	Between Bellyford Burn and Southfield Road	To minimise the potential for contamination to nearby ground and water from the former Fuffet coal pit, Hungry Hill quarry, and a rifle range.	Trial pitting and soil sampling to establish the presence or absence of contamination. Boreholes with combined gas and groundwater monitoring wells established.	Pre construction	Further mitigation maybe required based on findings.	SEPA, Midlothian Council.

Glossary

AADT	Annual Average Daily Traffic
AP	All-Purpose trunk road
BGS	British Geological Survey
BHS	British Horse Society
CAR	Controlled Activity Regulation
CEH	Centre for Ecology and Hydrology
CFA	Centre for Field Archaeology
C/L	climbing lane
CO	Carbon monoxide
CO ₂	Carbon dioxide
CTC	Cycle Touring Club
CTRN	Calculation of Road Traffic Noise
D2AP	dual two lane carriageway, all purpose road
DALSAM	Dalkeith Local Sub-Area (Traffic) Model
DMRB	Design Manual for Roads & Bridges
D/C	Dual carriageway
EC	European Community
EIA	Environmental Impact Assessment
FDSFB	Forth District Salmon Fisheries Board
FEH	Flood Estimation Handbook
FSR	Flood Studies Report
HC	Hydrocarbons
HGV	heavy goods vehicles

LA	Local Authority
LNR	Local Nature Reserve
MOTW	Meeting of the Waters Line
N/A	information not available or not applicable
NAQS	National Air Quality Strategy
NESA	Scottish Executive Network Evaluation Program
NNR	National Nature Reserve
NO ₂	nitrogen dioxide
NPPG	National Planning Policy Guidance
PAN	Planning Advice Note
PM10	particulate matter generally 10 microns or less in size
PPG	Pollution Prevention Guidelines
RIGS	Regionally Important Geological Site
S2	single carriageway, two lane road
S4	single carriageway, four lane road
SAM	Scheduled Ancient Monument
S/C	Single Carriageway
Scotways	Scottish Rights of Way Society
SODD	Scottish Office Development Department
SEDD	Scottish Executive Development Department
SEPA	Scottish Environment Protection Agency
SNH	Scottish National Heritage
SPP	Scottish Planning Policy

SSSI	Site of Special Scientific Interest
STEAM	Scottish Traffic and Environmental Appraisal Manual
SUDS	Sustainable Urban Drainage Systems
WFD	Water Framework Directive
WEWS	Water Environment and Water Services
WS2	Wide Single 2 lane Carriageway
WS(2+1)	Wide Single Carriageway with 2 lanes in one direction, 1 lane in other

APPENDIX A

Summary of Consultees Responses

(Held in abeyance pending consent to publish)

APPENDIX B

Archaeological Surveys

APPENDIX C

Ecological Surveys

APPENDIX D

Visual Impact Assessment

(Contained within Drawings Folder)

APPENDIX E

Noise and Vibration Report

APPENDIX F

Water Quality Calculations

