1. INTRODUCTION

Scott Wilson was commissioned by Transport Scotland to prepare an Environmental Statement (ES) in accordance with the Environmental Impact Assessment (Scotland) Regulations 1999. This was published in January 2007 and is referred to as the A77 Symington and Bogend Toll Environmental Statement, January 2007 (ES).

The main aims of the EIA process are:

- To ensure that there will be a full consideration of the likely environmental effects of the Scheme in a way that enables both the importance of the environmental effects and the scope for mitigating these to be properly evaluated; and
- To allow the public, statutory agencies and other bodies to comment on the proposals, taking account of their environmental concerns.

Following ongoing consultation after publication of the ES, the Scheme has been refined and improved, and this addendum is provided as an update on the current ES as published. In addition, the further development of the drainage design for the Scheme has led to further environmental studies. This Addendum has been prepared to provide updates to a number of ES chapters in light of the design changes incorporated as a result of consultation comments and the additional information available. Information relating to background of the Scheme can be found in Section 2.

2. A77 SYMINGTON AND BOGEND TOLL SCHEME DESCRIPTION

2.1 Background to the Scheme

The A77 dual carriageway at Symington and Bogend Toll is located in South Ayrshire between Kilmarnock and Prestwick. It forms part of the Glasgow - Stranraer Trunk Road (M77/A77), which is the main road link from Glasgow and the Central Belt to Ayrshire and on to ports serving Northern Ireland. The Trunk Road also serves to access Glasgow International Airport from the southwest and Glasgow Prestwick International Airport, which carries increasing levels of passenger and freight transport, from the north. In addition to its essential strategic role, the A77 within the Study Area serves as part of the local road network, providing access to the local centres of Ayr, Prestwick, Troon and Kilmarnock for employment, shopping and recreation activities.

The A77/M77 route is an important part of the Scottish Trunk Road network and efficient operation of the road is essential for the economic development of southwest Scotland and maintaining distribution links between Scotland and Ireland.

With the completion of the M77 extension from Malletsheugh to Fenwick in 2005, the 6.3km of dual carriageway between Dutch House Roundabout and Spittalhill Interchange now has the lowest level of road layout standard between Glasgow and Ayr. To the north of Spittalhill Interchange, the route is a fully grade-separated dual carriageway, with the section north of Kilmarnock being constructed to motorway standard. South of Dutch House Roundabout, the route is dual carriageway with major junctions formed by at-grade roundabouts with other junctions and accesses kept to an absolute minimum. In addition, the sections to the north and south of the Study Area have a higher standard of vertical alignment resulting in generally greater forward visibility.

The A77 within the Study Area is characterised by the presence of direct access to the carriageway. There are six major/minor priority junctions with associated openings in the central reserves, principally at B730 Bogend Toll and at Symington village, which is served by two junctions. Overall there are 13 crossing points in the central reserve and some 19 private accesses to farms, dwellings and businesses, as well as numerous field accesses.

There has been much concern expressed in recent years over the safety of the junctions accessing the dual carriageway, in particular the number and severity of accidents within the study area. With reference to the accident statistics, a substantial reduction can be achieved by reducing the number of conflicting vehicle movements at junctions and accesses and at the associated central reserve openings. This can be achieved by closing the central reserve, providing grade-separated junctions at selected locations and closing many of the remaining junctions and accesses onto the A77. It is anticipated that the ongoing expansion of Glasgow Prestwick International Airport and the recent completion of the M77

Extension will result in additional traffic using the M77/A77 route, reducing the average gap between vehicles and making turning manoeuvres more difficult.

In March 2001, the Minister for Transport announced a junction improvement scheme to provide a roundabout on the A77 at Symington. South Ayrshire Council was instructed to carry out public consultations, which lead to an exhibition of proposals in Symington in August 2001. Following that, a number of scheme options were analysed by the Council and reported to the Scottish Executive (Now Scottish Government) such that three outline strategies were considered:

- At-grade roundabout(s) on the A77;
- Discrete grade separation of existing junctions;
- Combination of an at-grade roundabout and grade separation.

South Ayrshire Council's feasibility study work cumulated in a further public exhibition of a Preferred Scheme in Symington in July 2004, this time a grade-separated solution. The Scheme was well received by the local community who were generally supportive and made constructive comments on how the proposals should be developed.

In October 2004, Scott Wilson Scotland Ltd was commissioned by the Trunk Roads Design & Construction Division of the Scottish Executive (now represented by Transport Scotland, the national transport agency for Scotland) to further develop and assess improvement options within the study area and to progress a Preferred Scheme towards construction. The study area is shown in Figure 1.1 – Scheme Location Plan.

The Scheme has been developed in accordance with Standard TD 37/93 *Scheme Assessment Reporting* of the Design Manual for Roads and Bridges (DMRB). Details of the Scheme, its development and the Scheme objectives are discussed in Chapter 2. Due to the extensive feasibility work carried out by South Ayrshire Council on options for the Scheme, a formal preliminary Assessment Report was not required for Stage 1 Assessment. Nevertheless, the previous work was reviewed at the Stage 2 Assessment; the review being carried out by means of a STAG Part 1 Appraisal in accordance with the Scottish Transport Appraisal Guidance, September 2003.

The design team originally investigated a number of possible solutions. Subsequent engineering and environmental investigations have identified that some of the strategies are unsuitable for further consideration and one option has been chosen as the best overall solution for the upgrading of the A77, which is the Scheme that is the subject of the ES.

2.2 Purpose of the Environmental Statement

The purpose of the Environmental Statement is to provide supporting information for the publication of statutory orders and to comply with the Scottish Ministers' determination that the Scheme should be the subject of an EIA. Throughout the ES, the A77 Symington and Bogend Toll improvement proposals are referred to as the Scheme. It should be noted that the improvement layout shown in this ES is a

conceptual design and would be subject to further detailed design prior to construction on site. The main aims of the EIA process are:

- To ensure that there will be a full consideration of the likely environmental effects of the Scheme in a way that enables both the importance of the environmental effects and the scope for mitigating these to be properly evaluated; and
- To allow the public, statutory agencies and other bodies to comment on the proposals, taking account of their environmental concerns.

3. SCHEME CHANGES

Following ongoing consultation after publication of the ES, the Scheme has been refined and improved. As a result, since publication of the original ES, the following changes described below have been incorporated in the Scheme. The majority of the changes are minor in nature, however all have been reviewed with regard to each individual chapter of the ES in order to identify whether the changes raise any new issues or have any impacts that require to be looked at in more detail and/or mitigation procedures incorporated.

Each of the changes to the original Scheme are identified below:

Brocket Access – Improve merge – This involves slightly widening the entrance to improve access arrangements, and involves a minor amount of landtake on the grass verge and field on one side. The current land is agricultural, however the amount of land involved is very small**.**

Hillhouse Access – Improve merge – This involves slightly widening the entrance to improve access arrangements, and involves a minor amount of landtake on the grass verge and field on one side, removal of a small hedge, and temporary removal and then reinstatement of two entrance feature posts. The current land is the grassed boundary of agricultural land, however the amount of land involved is very small.

Rosemount Access – Improve merge and diverge – This involves slightly widening the entrance to improve access arrangements before entering the main gate, and involves a minor amount of landtake on the grass verge on both sides. The current verge is a decorative boundary to the entrance separating the gatehouses from the main road, and the amount of land involved is very small**.**

Underwood Junction – Improve merge and diverge – This involves slightly widening the junction to improve merging manoeuvres, and involves a minor amount of landtake on the grass verge and field on one side. The current land is the grassed boundary of agricultural land, however the amount of land involved is very small.

Low Wexford Access – Improve merge and diverge – This involves widening the entrance to improve access arrangements, and involves a minor amount of landtake on the grass verge and fields on both sides. The current land is the grassed boundary of agricultural land, however the amount of land involved is small.

Langlands Access – Close access & new access track – The existing Langlands access will be closed with a new private access into the property being built from the C138 access road.

Fairfield Access – Close access & new access track – The existing Fairfields access will be closed with a new private access into the property being built from the B730 access road.

Hansel Village – This involves two main changes – There are two existing entrances to the village from the A77. The south entrance, which is currently the main entrance, will be closed to vehicles, while the lesser northern entrance will be improved. In addition, a new link will be built within the Village to enable access across to the residential properties in the southern part of the site. The new link will be adjacent to commercial and administration buildings. In conjunction with the closure of the main entrance, the existing bus lay-by to the south will be relocated to the position of the entrance to improve pedestrian access. The improvements to the north entrance will involve widening the merge and providing a new 'deceleration' diverge lane. The existing entrance wall and gate features will be partially removed and then reinstated along a new line. There will be some minor hedge removal, with the vast majority of boundary trees being retained.

Helentongate Junction – improve merge – This involves slightly widening the junction to improve merging manoeuvres, and involves a minor amount of landtake on the grass verge on one side. The current land is the grassed boundary of agricultural land, however the amount of land involved is very small.

Symington Junction – adjust layout – This junction has some minor alterations both widening and narrowing sections of the road. It involves a minor amount of landtake, but essentially the overall design is unaltered.

Bogend Toll Junction – adjust layout – This junction has some minor alterations both widening and narrowing sections of the road. It involves a minor amount of landtake, but essentially the overall design is unaltered.

Hillhouse and Rosemount – new bus lay-bys – New bus lay-bys have been incorporated, northbound and southbound, and are identified on the updated Scheme design drawings.

Muirend and Whitelees – new bus lay-bys – New bus lay-bys have been incorporated, northbound and southbound, and are identified on the updated Scheme design drawings.

Brocket to Hansel – new footway – Improve pedestrian links and accessibility to public transport.

Low Wexford and Underwood – lay-bys closure – Closure of existing lay-bys south of Low Wexford and south of Underwood.

Bogend Toll – adjust layout – Minor alteration of roundabouts in terms of position, but essentially the overall design is unaltered.

Bogend Toll and Symington Junctions – Creation of attenuation ponds – Provision of attenuation ponds as part of Sustainable Urban Drainage Measure (SUDS) with associated drainage outfalls and access roads. The current land is agricultural and involves a moderate amount of landtake.

Trynlaw Link Road – adjust layout – Realignment of access road. It involves a small amount of landtake but essentially the overall design is unaltered.

Helentongate Access – adjust layout – Realignment of access road. The current land is agricultural and involves a moderate amount of landtake, but essentially the overall design is unaltered.

Access Whitelees Link Road – adjust layout – Slight realignment of access road and junction. It involves a small amount of landtake, but essentially the overall design is unaltered.

Templands Access – adjust layout – Realignment of access road. The current land is agricultural and involves a moderate amount of landtake, but essentially the overall design is unaltered.

Stockbridge – New footway Stockbridge – Improve pedestrian links and accessibility to public transport.

In addition, the drainage proposals have been developed as the Scheme has progressed and these have been incorporated into the overall design.

4. ADDITIONAL ASSESSMENT

The following information explains how each of the chapters of the ES has been revised as a result of Scheme development and where this can be found within this document, or where the original text of the Chapter can be found if no changes were required.

ES Chapter 1 - Introduction - *No changes required. Original text is still relevant and is reported in Chapter 1 of the A77 Symington and Bogend Toll Environmental Statement, January 2007.*

ES Chapter 2 – Scheme Description - *There have been some minor alterations to the text of Chapter 2 in respect of Hansel Village works description in Section 2.4.3, and there has been a requirement to include more information on Figure 2.3 – Scheme Design to reflect the Scheme changes and development in road drainage features. A revised version of Figure 2.3 – Scheme Design and added text is reported in Appendix A of this document.*

ES Chapter 3 – Air Quality - *Changes in the internal road layouts and access/arrangements for Hansel Village have been made since the ES was completed therefore there may be minor increase in impact on air quality during construction but this is considered negligible. Therefore no changes required. Original text is still relevant and is reported in Chapter 3 of the A77 Symington and Bogend Toll Environmental Statement, January 2007.*

ES Chapter 4 – Cultural Heritage - *No changes required. Original text is still relevant and is reported in Chapter 4 of the A77 Symington and Bogend Toll Environmental Statement, January 2007.*

ES Chapter 5 – Disruption Due to Construction - *Although there are additional works, they will be incorporated into the existing programme of works. There may be additional noise and disturbance, however this will be temporary in nature and as minor works, impact is considered to be negligible. Therefore, no changes required. Original text is still relevant and is reported in Chapter 5 of the A77 Symington and Bogend Toll Environmental Statement, January 2007.*

ES Chapter 6 – Ecology and Nature Conservation - *No changes required. Original text is still relevant and is reported in Chapter 6 of the A77 Symington and Bogend Toll Environmental Statement, January 2007.*

ES Chapter 7 – Landscape and Visual Effects - *The amendments in this Addendum to the landscape and visual effects assessment relate to the expansion of the methodology used for the assessment, and changes to the likely significance of effects as a result of development to the drainage design and design changes since the original ES was published in January 2007. In particular, ES Table 7.3- Visual Baseline and Visual Effects has been completely revised, and Figure 7.3 – Viewpoint Locations has been updated. A revised version of Chapter 7 – Landscape and Visual Effects is reported in Appendix B of this document. Note that this version is the report text only and does not include chapter diagrams.*

ES Chapter 8 – Land Use - *There is a minor amount of additional landtake where the accesses slightly widen on the adjacent agricultural land, but this is very minor in nature. The only change required is the figure of landtake in Table 8.5 – Permanent Land Take, where the agricultural landtake figure is increased from 8ha to 8.3ha. A new table has been attached in Appendix C of this document.*

ES Chapter 9 – Noise and Vibration - *The Addendum affects the following aspects of this ES chapter:*

1 *Correction within the methodology and throughout the text to confirm that the average household size used in the assessment was 2.4. Rather than 2.36 as reported in the Environmental Statement as published.*

2 *Correction of the results of the assessment of the significance of the traffic noise impact (Tables 9.17, 9.21 and 9.22). No change in the predicted traffic noise levels has occurred.*

3 *Correction of the assessment of the likelihood of properties qualifying for additional insulation works under the Noise Insulation (Scotland) Regulations 1975.*

4 *Changes in the internal layout and access/exit arrangements have been made at Hansel Village since the completion of the ES, based on the results of the consultation process. The volume of the traffic affected is considered very low, therefore the noise levels at residential properties within Hansel Village is likely to be negligible. No changes are required to original ES in this regard.*

It should be noted that only minor text alterations have been required to this ES chapter and those sections of text that have been revised are reported in Appendix D of this document.

ES Chapter 10 – Pedestrians, Cyclists, Equestrians and Community Effects - *Original text is still relevant and is reported in Chapter 10 of the A77 Symington and Bogend Toll Environmental Statement, January 2007. Tables 10.5 and 10.6 have been updated and will replace those in the Environmental Statement, and are added in Appendix E.*

ES Chapter 11 – Vehicle Travellers - *No changes required. Original text is still relevant and is reported in Chapter 11 of the A77 Symington and Bogend Toll Environmental Statement, January 2007.*

ES Chapter 12 – Water Resources - In this Addendum, *the ES chapter has been updated to reflect the changes as a result of development to the drainage design since the original ES was published in January 2007, including the drafting of two new diagrams reporting the drainage design features at the Symington and Bogend Toll junctions. A revised version of Chapter 12 – Water Resources is reported in Appendix F of this document. Revised versions of Figures 12.2. and 12.3 have been included within Appendix F of this document.*

ES Chapter 13 – Geology and Soils - No changes required. *Original text is still relevant and is reported in Chapter 13 of the A77 Symington and Bogend Toll Environmental Statement, January 2007.*

ES Chapter 14 – Policies and Plans - No changes required. *Original text is still relevant and is reported in Chapter 14 of the A77 Symington and Bogend Toll Environmental Statement, January 2007.*

ES Chapter 15 – Summary of Effects of Mitigation - The Addendum *replaces text and Table 15.1 in the ES to reflect the developed scheme design. Amended sections of Chapter 15 – Summary of Effects and Mitigation are reported in Appendix G of this Document.*

Non-Technical Summary - *This Addendum includes some additional text in the description relating to Hansel Village, a revised Water Resources section of the Non-Technical Summary, and updated Figures 1.1 and 1.2, which are reported in Appendix H.*

5. CUMULATIVE IMPACT

The total works have been reviewed in respect of whether together the cumulative effect of the lists of work will have any additional environmental impact. After review we can conclude the following, in respect of the road design changes.

The programme of works will not be extended in time as the works will be incorporated into those taking place, therefore additional disruption due to noise or dust during construction will be negligible and temporary in nature.

The additional landtake involves minor grass boundaries of land and is small in nature, and therefore a negligible addition to the overall works.

The new roads within Hansel Village and to Langlands are minor access roads, one being a private access to a private dwelling only, and the other a minor access through an existing built-up area.

There is no additional impact on landscape, ecology, archaeology, water resources, and community and the impacts on air quality and noise, during and after construction, are considered negligible in nature.

The mitigation table has been updated in consideration of the works proposed and added as Appendix G in this document.

APPENDICES

Appendix A	**Figure 2.3 (Scheme Design) & Scheme Description (Additional Text)**
Appendix B	**Landscape and Visual Amenity Chapter (Revised Chapter & Revised Figure 7.3)**
Appendix C	**Land Use (Revised Table)**
Appendix D	**Noise and Vibration (Amendments)**
Appendix E	**Pedestrians, Cyclists, Equestrians and Community Effects. (Updated tables 10.5 & 10.6)**
Appendix F	**Water Resources (Revised Chapter)(Figure 12.2 and 12.3)**
Appendix G	**Summary of Effects and Mitigation (Amendments)**
Appendix H	**Non Technical Summary– Water Resources (Revised Section) & updated text on Hansel Village works description and Updated Figures 1.1 and 1.2**

APPENDIX A

2 SCHEME DESCRIPTION & FIGURE 2.3 (SCHEME DESIGN)

Section 2.4.3 - Hansel Village

Existing text will be replaced by the following.

There are two existing entrances to Hansel Village from the A77. The south entrance, which is currently the main entrance, will be closed to vehicles, while the lesser northern entrance will be improved. In addition, a new link will be built within the Village to enable access across to the residential properties in the southern part of the site. The new link will be adjacent to commercial and administration buildings. In conjunction with the closure of the main entrance, the existing bus lay-by to the south will be relocated to the position of the entrance to improve pedestrian access. The improvements to the north entrance will involve widening the merge and providing a new 'deceleration' diverge lane. The existing entrance wall and gate features will be partially removed and then reinstated along a new line. There will be some minor hedge removal, with the vast majority of boundary trees being retained.

The existing Langlands access will be closed with a new private access into the property being built from the C138 side road. Fairfield House access from the B730 will be closed and replaced with a new access created from the B730.

Attenuation ponds (four in total) and associated drainage outfalls will be provided at the two grade separate junctions (Bogend Toll and Symington) as part of the recommended Sustainable Urban Drainage System (SUDS) measures.

APPENDIX B

7 LANDSCAPE AND VISUAL EFFECTS & FIGURE 7.3 (VIEWPOINT LOCATIONS)

7.1 Introduction

This chapter summarises the key potential landscape and visual impacts likely to occur as a result of the proposed Scheme, including a consideration of opportunities to improve the Scheme's appearance and mitigate potential adverse landscape and visual impacts. Residual landscape and visual effects, those that remain after mitigation (as at year 15), are included.

There were no technical or access difficulties encountered when visiting the site. Visual assessments were undertaken on Tuesday 3rd October 2006 in bright sunshine, with fine visibility; and Wednesday 22nd October 2006, in poorer visibility and periodic rain. On both occasions, long distance views were good (although intermittent on the 22nd October site visit), the period of assessment was throughout the morning and early afternoon, traffic conditions were relatively light and there were no obstructions during the visit.

The surveys were undertaken at a period in the year when some deciduous trees had begun to lose their leaves, but were not yet fully denuded. Therefore, there was some element of permeability to the canopies of trees and some shrub species. It is anticipated that there will be greater visibility of the proposed works during the winter, as approximately 70% of the local tree cover is deciduous, including all of the hedgerow trees, and so their screening effect will diminish during the winter, then increase in the spring and summer months.

No technical or access to data difficulties were experienced, all background documentation being within the public domain. No technical difficulties or access to land issues were experienced whilst undertaking the site surveys and data accumulation throughout the assessment process.

7.2 Methodology

The assessment incorporates the identification of landscape and visual impacts, predicts the magnitude of those effects, and assesses their significance.

The methodology for this assessment is based on the Design Manual for Roads and Bridges Volume 11 and the Environmental Impact Assessment (Scotland) Regulations 1999 as amended and best practice guidance from the following sources:

- 'Guidelines for Landscape and Visual Impact Assessment' Second Edition, The Landscape Institute/Institute of Environmental Management and Assessment (Spon Press 2002)-(GLVIA);

- Landscape Character Assessment' Guidance for England and Scotland, Carys Swanwick and Land Use Consultants (SNH and the Countryside Agency, 2002); and
- PAN 58 Environmental Impact Assessment.

In accordance with the GLVIA, impacts upon the landscape character and visual amenity are assessed separately. Landscape effects are the changes to the physical landscape (which is considered an environmental resource); visual effects are the modifications to views and how the landscape is experienced. The process adopted for this assessment is outlined below:

7.2.1 Baseline

This baseline assessment includes presentation of relevant information about the site in the year of Scheme commencement and about foreseeable future conditions, i.e. planned and committed developments, in order to determine how the Scheme will affect the existing situation. Both the landscape and visual baselines are examined.

The study involved a desk review of relevant information such as designations from the Local Plan relating to landscape and visual issues, and a field survey. Information was collected about the landscape patterns, vegetation, extent of visibility, land use etc. and the sensitivity of landscape and visual receptors.

The study area for the visual analysis is determined by the zone of visual influence (ZVI), the extent to which the section of the road is a significant feature in the view, shown in Figure 7.2. Following initial desk-based drafting, the ZVI was refined by site visit, so that local variations in topography could be taken into account. Minor areas of planting which act as a partial screen were not included. The landscape analysis looks at a wider area to show how the route interacts with the wider landscape context and geographical features.

The landscape baseline examines the landscape character as identified in the relevant SNH Landscape Character Assessment study, including an assessment of landscape value (based on the presence of designations and a subjective assessment), and sensitivity (based on a subjective assessment of the capacity of the landscape to absorb development).

This assessment uses the five-point scale to describe the quality of the landscape in accordance with the Design Manual for Roads and Bridges Volume 11; Environment Assessment i.e. high quality, very attractive, good landscape, ordinary landscape and poor landscape.

The visual baseline identifies the extent of visibility, the location of receptors, their approximate distance from the Scheme and the current condition of the landscape as it affects visual amenity. An assessment of the level of sensitivity of the receptors is then made based on these factors.

7.2.2 Assessment

The landscape effects comprise the sources, nature and degree of change to the landscape resource. The sensitivity assessment is taken from the baseline assessment. A rating for the magnitude of the effect is based on a judgement of the scale, nature, i.e. adverse or beneficial, and the duration of the effects on the key elements and features that define the landscape character. The magnitude is then set against the sensitivity of receptors to produce the significance of the effects, which is a professional judgement.

The visual effects are the changes to the views of groups of receptors identified during the field survey. The level of sensitivity is taken from the baseline study. The magnitude of visual effect is the degree of change to the existing view including intrusion into or obstruction of the view. The same procedures are adopted as for assessing the landscape effects but the judgements are made as they relate to the visual amenity of the groups of receptors.

The stages used for the assessment are as follows:

- Existing Conditions, 2006 – No Proposal (06NP): to show the present baseline in the year that the assessment work was undertaken, representing the existing conditions around the proposed Scheme;
- Construction Phase – to show the temporary impacts including the removal of vegetation specifically for construction, and the installation of temporary works compounds, temporary road access/traffic control, road works, turning areas, signing and lighting;
- Planning Year, 2009 – With Proposal (09WP): to show the Scheme as implemented including mitigation measures, (one year after the completion of the Scheme);
- Future Baseline Condition, 2024 – No Proposal (24NP): To assess future conditions at year 15 should the proposals not be implemented; and
- Proposed Development, 2024 – With Proposal (24WP): To show the established Scheme fifteen years after completion, when vegetation has reached some level of maturity and therefore mitigation measures will have become effective.

7.2.3 Mitigation

Mitigation comprises suggested measures to reduce or remove significant adverse impacts. Mitigation proposals are recommended for both landscape and visual effects, and illustrated in Figure 2.3. The residual effects after mitigation measures are fully effective at year 24WP are recorded.

The mitigation proposals are an integral part of the overall construction project, and are included in order to reduce the intrusion of the proposed infrastructure into the accepting landscape structure. The associated planting and landform as shown in Figure 2.3, will minimise potential adverse impact of the scheme where possible.

7.3 Consultations

For a complete summary of the organisations, which have been consulted, see Chapter 1.

The following organisations have been consulted and gave comment in relation to landscape and visual issues:

- Scottish Natural Heritage – The assessment refers to the Ayrshire Landscape Assessment.
- South Ayrshire Council – SAC contributed towards the Stage 2, Part 2 Environmental Report, with respect to the improvement proposals.
- Farming and Wildlife Advisory Group (FWAG) Scotland – Mitigation should include the creation of wildlife habitats and the use of native species of local origin.
- Forestry Commission Scotland – Within the Scheme boundaries there are no known areas of woodland, which are the subject of any grant scheme or felling licence.

7.4 Baseline

7.4.1 Planning, Context, Landscape and Visual Designations

Information was obtained from the following plans:

- Ayrshire Joint Structure Plan (2000);
- Ayrshire Joint Structure Plan (to be approved March 2007);
- South Ayrshire Local Plan (2002); and
- Finalised South Ayrshire Local Plan (to be adopted 2007).

Although the study area is not specifically designated for landscape quality, the attractive landscape is recognised and protected by a number of general policies relating to the landscape. The A77 is part of an important tourist route to the Firth of Clyde and Irvine Bay and is a main arterial access for Prestwick Airport.

The revised Ayrshire Joint Structure Plan (JSP), submitted to Scottish Ministers in June 2006, for approval in March 2007, indicates that the area southwest of Kilmarnock, through which the A77 passes, is within the proposed Green Belt and covered by policies ENV1, ENV2 and ENV3.

Policy “ENV1 – Landscape Quality” acknowledges the attractive and high quality environment and landscape character of Ayrshire and seeks to maintain and enhance it.

Policy “ENV2 – Landscape Protection” recognises the landscape character as a key element in promoting development and providing an attractive setting for existing communities and new investment’. Positive landscape management to

achieve improved landscape quality and landscape protection is proposed in relation to new development including improvements to infrastructure.

Policy "ENV3 – Core Investment Area Landscape" proposes landscape protection and potential development should protect the character and landscape settings of communities and give access to open space as part of the wider structure of green space.

The existing South Ayrshire Local Plan will be superseded by the revised and finalised Local Plan, to be adopted in February 2007, prior to commencement of works. The environmental objectives of the South Ayrshire Local Plan include the preservation of "the landscape character generally, and provide a setting for settlements; in particular to ensure the integrity of the landscape and environment".

7.4.2 Trees

There are no Tree Preservation Orders within the Scheme boundaries. However, Coodham Estate is covered by Tree Preservation Order T.P.O. 3/98- Coodham Estate, and there are a number of areas of mixed species and single species woodlands / plantations within the near vicinity of the site. Although these are not directly affected by the works, they serve to limit views both into and out of the site.

There are two designed landscapes adjacent to the A77 road corridor along the site area. Coodham Hall is included in the Inventory of Gardens and Designed Landscapes in Scotland, and there is also a designed landscape at Rosemount, which is not included in the Inventory. The trees within these two designed landscapes are not near areas of the site that would require works to the trees. Part of Coodham Estate is identified as a provisional wildlife site.

7.4.3 Landscape Character Areas

The Ayrshire Landscape Assessment commissioned by SNH (1998), identifies the site within the 'Ayrshire Basin' Regional Character Area and the 'Ayrshire Lowlands and Lowland Hills' Landscape Classification Types, see Figure 7.1 – Landscape Character Areas.

The Ayrshire Lowlands (G) Landscape Classification Type occupies much of the Ayrshire Basin, and is characterised by:

- Comparatively large scale landscapes;
- Extensive areas of agricultural lowland, being predominately arable in nature south of Kilmarnock;
- Many of the hedgerows are in good condition, with an intact matrix of hedgerow trees;
- Most of the farm locations are historic, self-contained farmsteads, within a hinterland of managed fields with occasional copses;
- Localised variation is often due to topographical or geological differences, although in general, there is little deviation due to the generally fertile soil conditions, and regular field pattern; and

- Large-scale woodland is rare within areas of this landscape character, tree cover being generally being limited to isolated copses. However, the retention of hedgerow trees gives the area a more wooded overall appearance than may be expected considering the limited tree stands.

Landscape value

Landscape value is determined by statutory and local planning agencies. The value of the landscape as a resource is again imposed at international, national, regional and local levels, although the absence of a formal designation does not infer that the landscape is of a low quality or value, just that it has not been formally designated. Similarly, there is little link between the assessed quality of a landscape and its designated value, as quality is only one criterion in assessing the value of the landscape character, together with a number of other criteria such as accessibility, local, regional, national or international rarity.

The quality of a landscape character is primarily an estimation of its intrinsic aesthetic appeal to the varied receptors experiencing the landscape, and its evaluation is undertaken against a 5-point scale. Obviously, as the value is being assessed on a subjective basis, the assessment is largely dependant upon the appeal of the landscape character to a particular assessor; therefore there may be a degree of variance in the value awarded to a particular landscape character. However, the assessment is as far as possible undertaken in an objective manner, the results of which position the landscape character on the following scale:

- **High Quality** – The landscape features combine to create an outstanding and stimulating composition, both aesthetically and scenically. A landscape may also be designated of high quality, should it be an outstanding example in the area of a well maintained "pure" or "undiluted" landscape or collection of features;
- **Very Attractive** – The landscape combines to create a composition that is both aesthetically and scenically pleasing; or is a good example of a well cared for "pure" landscape or set of features;
- **Good Landscape** – The landscape composition is aesthetically and scenically unremarkable; or the features are of a neutral or mixed character;
- **Ordinary Landscape** – Landscape features combine to create a composition that is scenically and aesthetically poor; or an example of an unstimulating landscape or with few or poorly related / unrelated features;
- **Poor Landscape** – The landscape creates an aesthetically and scenically very poor composition; or which is an example of monotonous or visually unattractive character, visually conflicting features, or an example of a degraded landscape or collection of features.

Landscape Sensitivity to Change

The methodology utilised in this assessment to determine the "Sensitivity to Change" of a landscape, conforms to the current best practice terminology set out in the GLVIA. The sensitivity to change relates specifically to the nature of

development included within the proposals, and how sensitive the landscape is to the intrusion of development of the nature proposed.

Where development proposals span more than one landscape character, the sensitivity with respect to the proposed change, may differ between the various landscape characters. The extent to which the various landscape components may tolerate the proposed change, is assessed both at construction and during operation, considering the following factors:

- The nature of the proposed change;
- The ability of the receiving change to accept the proposed change; and
- The ability of the wider landscape and its components to accept the proposed change.

Landscape sensitivity has been evaluated within the study area, on a relative basis, and is described using the following 3-point scale:

- **High Sensitivity –** A landscape of particularly distinctive character, that may be susceptible to relatively small changes of the nature proposed;
- **Medium Sensitivity –** A landscape whose characteristics are of a moderate value, that are reasonably tolerant of change of the nature proposed; and
- **Low Sensitivity –** A landscape whose components are relatively unimportant, and which is relatively tolerant of change of the nature proposed.

Magnitude of the Proposed Change

The magnitude of proposed change is assessed with respect to the following 4-point scale, relating to the likely extent of the proposed change and how it will affect the accepting landscape. This assessment has been carried out for both the construction and operational periods of the proposed development.

- **High –** It is predicted that a substantial or notable change in landscape characteristics will occur over an extensive area of landscape, through to a considerable change with respect to a particular area or feature of the landscape;
- **Medium –** A moderate change within a localised area of the landscape;
- **Low –** A small or almost imperceptible change to the landscape and its components; and
- **Negligible –** No discernable change in the landscape or its component features.

Significance of Effects

The evaluation of the potential effects is based on the following criteria;

- The extent to which existing landscape features and components are lost or modified due to the proposed development (such as the construction of new landform features, or the removal of woodland);

- The imposition of new forms and features within the landscape that affects elements determining the current landscape character; and
- The extent to which new of extensions to existing development of the proposed type, would alter the balance and therefore, the perception of the receiving landscape character.

Effects on landscape character, value and quality can be both beneficial (positive) and adverse (negative). Obvious detrimental effects are those where landscape features considered to be beneficial to the character of the landscape are completely removed. In some instances the removal of landscape features that are considered to deteriorate the landscape character, may be a beneficial effect, such as the removal of a contaminated landfill, being replaced by a landscape feature more in keeping with the surrounding areas.

In cases where new elements are introduced into the landscape, again the effects may be beneficial or adverse – the introduction of new woodland planting may be beneficial, the introduction of a new windfarm may be considered alien and have an adverse effect.

The findings of the evaluation are illustrated using a descriptive scale ranging from major beneficial, to major adverse as follows:

- **Major Beneficial Effect –** The proposals constitute a major improvement, or a restructuring of a degraded landscape;
- **Moderate Beneficial Effect –** The proposals will greatly enhance the form and pattern of the landscape, and they regenerate degraded landscapes in line with national objectives;
- **Minor Beneficial Effect** – The proposals fit in well with, and complement the existing landscape character, incorporating suitable measures to mitigate any adverse effects of the development, enhancing the ability of the development to blend in with the accepting landscape.
- **None (no effect) –** The proposals complement the existing landscape character, in scale, landform and the landscape pattern. The proposals incorporate mitigation measures that will successfully enhance the absorption of the proposed development into the surrounding landscape. The development will avoid conflict with national, regional and local countryside protection policies;
- **Minor Adverse Effect –** The proposals do not fully integrate the development into the surrounding landscape either in landform, scale or associated landscape features. Also there is not scope for satisfactory mitigation proposals to be undertaken to obscure these adverse effects;
- **Moderate Adverse Effect –** The proposals are out of scale with the landscape, or conflict with the local landscape pattern or landform, and this cannot be successfully mitigated to avoid scarring the landscape. Some features important to the landscape character will be lost as a result of the development. The proposals conflict with countryside protection policies; and

- **Major Adverse Effect –** The proposals are at considerable odds with the landform, scale and pattern of the landscape. The proposals are likely to degrade, diminish or even completely destroy the integrity of elements and features of the landscape that are important to the definition of the landscape character, and the proposals are in serious conflict with countryside protection policies, or adversely effect areas of nationally recognised and designated landscape.

The assessment of the landscape character within the study area has been undertaken using a combination of desk-based and field investigations. Existing policies, guidance and past experience have been in evaluating the existing landscape character, and assessing the potential effects of the proposed development.

7.4.4 The Landscape Baseline

The A77 corridor passes across an area of Lowland Hills (P) Character Classification Type, occurring on a series of low hills, reflecting the presence of igneous intrusions in the surrounding coal measures. The hills are a significant feature of the Ayrshire Basin and are characterised by:

- Low, gradual slopes, mostly under 150m AOD; and
- The groundcover is generally sparse, with some minor woodland planting, and areas of poorer, more species rich grassland. This provides some diversity from the surrounding farmed field pattern.

Road developments such as the A77 are identified in the Ayrshire Landscape Assessment as elements that have changed the landscape character through the scale of their construction works and volumes of traffic generated. They have also changed the way in which motorists perceive the landscape by increasing traffic speeds and creating a 'corridor effect.' The character of the A77 corridor, its access roads and the surrounding landscape can be seen in Figures 7.4 sheets 1-3 (the viewpoint locations shown on Figure 7.3)

The relevant guidelines identified by the Landscape Character Assessment are as follows:

- The landscape design should reflect and enforce the character of the landscape traversed; and
- The scenic qualities of the certain landscapes might be acknowledged by innovative road engineering, which avoids crude cutting and filling.

The Assessment also suggests that a phased programme of tree replanting should be encouraged, especially to replace felled trees, and in association with new development, in order to maintain and restore the historic legacy of trees. A policy of establishing an integrated pattern of new small woodlands and woodland belts in the most open areas is also to be encouraged.

The landscape baseline is described in Table 7.1. This table also includes professional judgements about the quality and sensitivity of the landscape in order

to give an indication of the capacity of the landscape to absorb the development. Images of typical landscape character are shown in Figure 7.4.

The study area conforms to the Ayrshire Lowlands Landscape Classification Type although there is an insignificant intrusion of the Lowland Hills Landscape Classification Type, which does not represent a change in the local landscape character. Therefore the baseline has been assessed as one area.

Table 7.1: Landscape Baseline

Landscape Components	Characteristics
Geology	Dominated by The carboniferous Westphalian "Coal Measures" of Ayrshire basin, with sporadic intrusions of resistant carboniferous lavas (basalt and spilite). The ridge underlying the belt of Lowland Hills (P) landscape character type is comprised of this lava rock.
Landform	The site lies within the Ayrshire Basin, a large expanse of coal measure lowland, bordered to the east and south by low hills. The basin is wide, level, and is mostly cultivated land, extending east from the Firth of Clyde and Irvine Bay areas. Within the basin area, there are a number of basalt, sandstone, limestone, millstone grit and volcanic intrusions, one of which crosses the road corridor.
Land Use / Landscape Pattern	The proposed Scheme is surrounded by fertile farmland of the Ayrshire Basin, small residential developments and lightly wooded slopes. The Lowland Hill section of the road corridor is partly wooded with Hansel Village to the south, as the road corridor crosses the ridge caused by the underlying volcanic intrusion.
Vegetation	The area surrounding the site is dominated by cultivated farmland, with a formal field system delineated by hedgerows with hedgerow trees. There are scattered copses of minor woodland and larger groups of trees associated with the settlements and the lowland hill ridge.
Planned and committed developments which will affect landscape	*South Ayrshire Local Plan 2002* There do not appear to be any policies that advocate development within the site area, or immediate surroundings, that would visually impact upon the landscape setting of the site. Planning applications. There are no planning applications that affect the visual appearance of the site, or will be affected by the proposals.
Value	Although there are no statutory designations applying to the location of the Scheme, the regional landscape is considered to be of high scenic value, due to its formal field pattern and retention of hedgerows and hedgerow trees. *Good Landscape*

Landscape Components	Characteristics
Sensitivity	Although classified as a Good Landscape, it has been changed by development in the past therefore the landform, houses and field patterns are of varying age. The localised landscape has previously experienced impacts from the major roads (A77, A735, A736 and the A76), which have served to conflict with the general pastoral character of the area, and set a precedent for further similar development. Further sympathetic change will not significantly alter its character. *Medium*

7.4.5 Landscape Visual Amenity

Receptors

Landscape visual receptors vary greatly in their composition, and although generic groups are usually present in all assessments, such as houses, roads, footpaths and other areas from which residents, road users, walkers and workers would be likely to experience a change in existing views as a result of the construction and operation of the proposals. In some cases, other receptors may be included, who may be either transitional in nature, or structures / landscape features whose setting may be considered to be affected by the proposed development.

Potential receptors that were identified to be within the visibility envelope were validated by site survey, the considerations including:

- Receptor type and number (dwelling / public footpath / school etc);
- Existing view of the area affected by the proposal;
- Distance of view, and relative height of the proposed development within the view;
- Percentage of the proposed development visible from the receptor location;
- Viewpoint elevation with respect to development – e.g. Looking down on the Scheme, and especially “do the structures skyline?”;
- Angle of development visibility to usual view experienced (acute/perpendicular/ parallel)
- Type of view (foreground/mid-ground/background) and position of the development within the view; and
- An analysis of the potential effects during construction and decommissioning, as well as five years into operation.

7.4.6 Visual Evaluation and Impact Assessment

The evaluation of the magnitude of change in views, and the receptor sensitivity to change based on the site investigations are represented by a descriptive scale with four thresholds: high, medium, low and no change.

The magnitude of change considers the extent of the visible development, the percentage of an existing landscape view that will be occupied by the development, the influence of the development within the view, and the viewing distance between the receptor and portion of the development viewed.

Sensitivity to change

The sensitivity of a receptor to change of the type proposed in the overhead line development, considers several factors relating to the receptor, as follows:

- The nature of the receptor. The location, primary use (e.g. a dwelling is more likely to be sensitive to landscape change than a factory), and number of individuals likely to occupy or use the receptor, as well as the reason for visiting the receptor.
- The current level of amenity at the receptor, including existing elements of the receptor setting an the various components of the view, the scale and composition of the landform, colour, topography, development patterns, and other elements such as movement in the landscape; and
- The nature of the view within which the newly introduced development will be sited, including direction, distance, extent and duration of the view, and the presence of any existing focal points / features.

It is a generally accepted that in cases where receptors already have views of infrastructure similar to that being proposed, then the receptor is desensitised to the advent of new installations, and therefore less sensitive to the proposed new development.

In this assessment, receptor sensitivity has been ranked as follows:

- **High Sensitivity –** a view seen by a large number of individuals, or from an area or location specifically identified as an acknowledged viewpoint e.g. appears in tourist literature. Views from residential properties, or those of a relatively long duration;
- **Medium Sensitivity –** Less important viewpoints than those described above, shorter duration views from secondary or tertiary circulation routes, or areas where people do not visit specifically for the enjoyment of the landscape; and
- **Low Sensitivity –** Viewpoints not visited with the express purpose of landscape enjoyment, locations with short or fleeting view duration, or locations with views of similar infrastructure to the type proposed, or locations visited occasionally by few people.

Magnitude of Change

The potential magnitude of change for visual receptors differs from that for landscape character, as it is a change in how the aesthetic element of the landscape is experienced, rather than the physical build-up of the landscape itself. It is evaluated as follows:

- The potential for the appearance of the new development to integrate into the overall appearance of the existing landscape view, in terms of scale, mass, form, texture etc.;
- The scale of changes in the view arising from the loss or addition of elements into the view, including the visible extent of the proposed development;
- The duration and reversibility of the proposed effect;
- The angle of view from which the new development will be experienced, in relation to the whole angle of view most commonly seen from the receptor in question;
- The visibility and prominence of the new development within the existing view;
- The relative number of users experiencing the change in view from the receptor location; and
- The distance of the receptor from the proposed development.

In this assessment, the magnitude of change is ranked as follows:

- **High Magnitude –** A major loss or alteration to key elements of an existing view, that would cause a large change in its character following the development construction;
- **Medium Magnitude –** Where a development would cause a loss or alteration of one or more key elements of an existing view, causing a partial change in its character following development construction;
- **Low Magnitude –** Where the development will result in limited change to key elements of the existing view, that would be discernible following development construction; and
- **Negligible –** where the development would cause little or no distinguishable change to the existing view.

7.4.7 Visual Baseline

The visual receptors for this study have been identified by site survey. The zone of visual influence (ZVI) is shown in Figure 7.2. Landform, trees, woodland plantations, infrastructure corridors, buildings and structures, all determine the extent of visibility of the proposed development. Within the ZVI, visibility of the Scheme work areas is locally limited by vegetation. The site assessment was undertaken in October when there was still good leaf-cover. The assessment of visual impact was estimated for winter conditions as a “worst case scenario”.

Figure 7.2 also shows viewpoints from which the location photographs were taken to depict the visual baseline. These photographs are presented in Figure 7.4. Viewpoints were chosen to include those principal receptors, which have been identified by site survey and are listed in Table 7.3, and illustrate areas of most extreme impact due to the proposals.

Table 7.3 presents the visual baseline together with the predicted environmental effects. The list of receptors includes their locations, their approximate numbers, approximate distance from the proposed development and a judgement of their level of sensitivity. Each receptor's sensitivity to visual change is rated according to the following criteria:

- The receptor's proximity to the scheme;
- The extent to which the receptor's view is screened, (by vegetation - including during winter die back, barriers, topography etc);
- Whether the receptor is residential or commercial; and
- The importance of the receptor's unique view.

Generally, the land north of the A77 corridor rises to a ridge just north of the corridor for the lengths that will be subject to the proposed major works, thereby enclosing views of the site from the north. The land south of the A77 corridor is relatively flat with minor ridges, with an extensive hedgerow and tree field pattern, thereby considerably limiting the potential views into the site. There are very few locations within the Ayrshire Basin providing elevated views of the site.

Whilst the land is generally flat, the road corridor is locally hidden along a minor depression, thereby reducing views of the site to being those within this depression. Views outside this depression are long-distance views, where the minor areas of the Scheme, such as the central reserve gap and access closures, will not be seen. The only elements of the Scheme visible from these long-distance viewpoints will be the road crossing bridges and the hedgerows adjacent to the new access roads.

The visual baseline can be summarised as follows:

- The largest group of receptors will be those using the A77, many of whom use the road on a daily basis as an arterial route for access throughout Ayrshire. This frequency of use will increase this group's familiarity with the road corridor and their ability to identify change;
- There are a small number of residential receptors (mainly farmsteads) in close proximity to the A77 dual carriageway and the various side roads. Currently, each of these receptors experience small sections of the proposed works areas;
- There are residential and commercial receptors within Hansel village, south of the A77. Currently, there is extensive woodland in a belt separating the Hansel Village buildings from the road corridor, effectively screening these receptors views of the Scheme;
- There will be limited, partial views of the western most areas of the Scheme from the A77 to Ayr, south of the roundabout marking the western limit of the site area. These views are glimpsed and of the Brocket area only; it is unlikely that any of the works will be seen during construction, and the works will not be visible from these receptors following completion;

- There are residential receptors at Bogend Toll, Trynlaw and Stockbridge, who have extensive views of the site area east of Hansel Village, who will be significantly affected by the proposed works;
- There are important views from the A77 when travelling southwest. In particular, as vehicles progress past Hansel Village (to the south of the A77), and across the Ayrshire Basin out towards the Firth of Clyde and Arran;
- Users of the B730 south of the Bogend Toll junction have some limited visibility of the site of the proposed Whitelees link road. These glimpsed views are only partial due to both the localised topography and the extensive hedgerow and tree lines on the western hedge line to the B730; and
- There are partial, distant views from hilltops to the east and south of the Scheme, mostly obscured by intervening topography and vegetation.

Presently the A77 road corridor is lit in the evenings and at night along the site area. This establishes a precedent to light the corridor, and the lighting continues into adjacent settlements. Access roads off the main road corridor, to individual dwellings and minor groups of buildings, are not generally lit.

7.5 Environmental Effects

7.5.1 Effects of Construction

The construction process is itself temporary; therefore construction related effects will also be temporary. Detailed information about the effects on the landscape resource and the visual impacts on individual receptor groups is given in Tables 7.2 and 7.3 respectively. The following activities during the construction period will cause landscape and visual effects:

- Siting of the contractor's main offices and works compound areas;
- The movement of construction vehicles, machinery, etc;
- Traffic Management in order to facilitate the undertaking of the side road "stopping up" and central reservation works;
- General site clearance and topsoil strip of the major works sites at Symington and Bogend Toll. The vegetation will be cut back and cleared where the new link roads and A77 crossing structures are located;
- Fencing, signage, roadwork, etc;
- Security lighting at night;
- Construction of embankments and structures; and
- Remedial earthworks to marry the structures and link roads into the adjacent landform.

Landscape Effects

The landscape effects of the construction works are described in Table 7.2.

Visual Effects

The visual effects of the construction works are described in Table 7.3.

In summary, the effects of the proposed development at construction are a moderate adverse effect on the landscape and a moderate to substantial adverse upon visual amenity.

7.5.2 Effects of Operation

A description of the Scheme is given in Chapter 2. The Scheme design and Landscape Plan shows the proposed road alignment and details of planting proposals (see Figure 2.3). Cross sections presented in Figure 7.5 show the vertical alignment of the Scheme.

Landscape Effects

The sensitivity of the landscape resource, magnitude of landscape effects and significance of landscape effects have been assessed, and this information is summarised in Table 7.2. The landscape effects are presented below.

The A77 – A78 junction is already a well-defined and prominent feature in the landscape. The primary impacts will occur on the Symington and Bogend Toll stretch of the A77, where there will be new connector roads and bridges, and the link road at Whitelees. These new structures require the formation of embankments over existing low-lying fields both south and north of the road corridor.

The design and location of additional luminaires will be selected to minimise light cast outside the road corridor, in order to reduce the impact of the additional lighting.

The Scheme proposes minor alterations to the central reservation and some side roads to be stopped up as part of the proposed Scheme. There are also localised changes in access routes from some houses and farmsteads in the vicinity of the new junctions. These accesses will feed the new link roads rather than exiting directly onto the A77 carriageways.

New drainage elements included in the Scheme will have no landscape or visual effects as the residual structures are all sub-surface. However, attenuation ponds may be visible to some immediately adjacent receptors. Should this be the case, new planting around the ponds will mitigate these views.

The Scheme includes two new bridges over the A77 corridor, at Symington and Bogend Toll, which will remain significant but local features in the landscape following completion of the proposals. The design of the bridges will be in keeping with the local landscape scale and context. Mitigation planting will help to absorb the scale of the new bridges and reduce their impact on the local landscape character.

There will be some cutting back and removal of existing vegetation for preparation of the site works, which will slightly diminish the volume of hedgerow in the area. However, this will be kept to a minimum and affected hedgerows restored as part of the mitigation planting proposals.

As the majority of the Scheme is located at the periphery of the village of Symington, it will have negligible impact on the fabric of the townscape. However, the Scheme does include alterations to existing accesses to the village, including a new bus turning area, which will have negligible effects on the localised townscape, and no effect on the surrounding landscape.

Overall, the Scheme will be introduced into a landscape pattern already changed and fragmented by the original A77 corridor development. The general effect of the Scheme will increase the amount of hardscape and infrastructure, in the construction of the link roads and the bridge structures. In light of the precedent set by previous A77 expansions, the development will not alter the character of the landscape. With appropriate mitigation, these proposed developments will be successfully absorbed into the existing landscape character.

The magnitude of the landscape effects will initially, (at 09WP), be moderate to severe. However, eventually, the significance of the effect on landscape character will be minor at 24WP, (i.e. 15 years from the Scheme completion) when mitigation measures have taken effect and new vegetation will be well established. The significance of the landscape effects will be negligible at year 09WP and negligible at year 24WP.

Visual Effects

The visual effects, the magnitude of these effects and their significance for the visual receptors are listed in Table 7.3. The visual effects can be summarised as follows:

- There are a small number of residential receptors living within close proximity to the Scheme, who will experience moderate to substantial changes to their middle and close distance views during the construction period. However, upon completion of construction, the Scheme includes mitigation measures to lessen any new adverse visual effects; and
- There are a large number of traveling receptors (cars and cyclists), who will view the Scheme from the road. These receptors will experience slight changes to their middle and close distance views. However, these views are already affected by existing infrastructure, and adverse visual effects will be mitigated by new vegetation;
- There are a small number of residential receptors located in the village of Symington who will experience moderate changes to their middle and long distance views. However, their views south and towards the locations of the major works, are already significantly reduced by existing tree planting, and new planting will further mitigate any residual adverse visual effects;
- There are a small number of residential receptors at Knockendale, north east of Symington, who could experience minor to moderate changes to their

medium and long-distance views of the Bogend Toll overbridge, should existing screen planting be lost during the works. These adverse visual effects will be lessened by mitigation planting measures; and

- Additional lighting to the main structures and new link roads will slightly increase the existing level of lit road corridor. This is an increase in a feature for which there is already a precedent. However, this additional lighting may increase the overall impact of the highway lighting, as it will be on elevated sections of carriageway, therefore increasing its prominence as a feature in the landscape.

The significance of the visual effects is given in Table 7.3. The overall significance of the environmental effects are as follows:

- Effects of construction: the overall effects on visual amenity will be Moderate to **Substantial Adverse**.
- Effects of Operation: the overall significance of the visual effects for the whole Scheme will be **Moderate Adverse** at year 09WP and **None** at year 24WP (there will be some both minor adverse and minor beneficial effects).

7.6 Mitigation

The mitigation proposals are in accordance with the principles contained within the following guidelines:

- Scotland's Native Trees & Shrubs, (Scottish Executive, 2001);
- Cost Effective Landscape: Learning from Nature (Scottish Executive, 1998);
- DMRB Volume 10; and
- The Ayrshire Landscape Character Assessment.

Replacement planting and additional screen planting is proposed to set the Scheme into both the landscape and the existing vegetation patterns, and to soften its visual impact. This comprises extensive tree, shrub and hedgerow planting along the proposed embankments, slip roads and link roads. Proposed species include a mix of native broadleaf and native coniferous species to maintain the existing landscape character of hedgerows, trees and mature copses. All proposed trees and shrubs are to be native species of local provenance. The proposed landscape treatment is shown in Figures 2.3 and 7.5.

The mitigation-planting scheme will be constructed by the Design and Build Contractor and the Contractor will carry out much of the detailed design at a later stage. However, the following specific elements will be required to be addressed by the agreed contract design and details to be provided by the Contractor:

- New bridges: the form and principal dimensions of the structures will be prescribed in the Contract. Proposed mitigation will include the use of high quality, sympathetic facing materials to complement the existing built features in the area and to improve the appearance of the Scheme.

- New Lighting - mitigation: the use of high quality minimum spillage lighting to minimise light pollution, visual intrusion, and improve the appearance of the Scheme.
- New signage - mitigation: new signage should be grouped on a minimum number of poles where possible.
- Construction compounds - mitigation: location and scale of the construction compound to be determined by the Contractor. The compound area will be restored following completion of the Scheme.

The implementation of the agreed mitigation contract will be monitored on an agreed programme once works commence. It is likely that visits every 2 or 4 weeks will be required to ensure that the mitigation contract is undertaken as approved, and that the new planting successfully addresses the mitigation issues.

7.7 Residual Impacts

At year 24WP, when mitigation planting will be fully effective, there will be minor residual impacts. The Scheme will introduce local changes into the landscape pattern. There will be ongoing visual effects including the increase in ambient light levels and new directional signage.

7.8 Summary

The proposed Scheme is located along the A77 road corridor from Dutch House roundabout to Spittalhill junction, incorporating works to the central reservation, two new grade separated junctions and revised accesses to local settlements. The landscape is that of wide plain dominated by arable cultivation and a mature hedgerow matrix, transected by the A77 road corridor.

There are no areas designated for their landscape value within the boundaries of the proposed Scheme, although the attractiveness of the landscape character is recognised and protected within regional structure local development plans. The region is considered to be overall of *good landscape value*.

The landscape pattern has previously experienced change by development of the roads, associated buildings and a footbridge spanning the road corridor; consequently, with mitigation, the addition of the new Scheme roads could be successfully absorbed into the surrounding landscape.

Although substantial at construction, the significance of the landscape effects will be minor beneficial and moderate adverse at 09WP. At 24WP there will be both minor adverse and minor beneficial effects. The overall significance of the landscape effects will be negligible at 09WP and 24WP.

The proposed Scheme will be most visible from the A77 road corridor, can be observed from some of the minor road network surrounding the site, is overlooked by some residential and commercial receptors within adjacent settlements and lies close to several stand-alone residential receptors.

There are a small number of visual receptors that will initially experience substantial adverse effects during the construction period, followed by medium-term moderate adverse, degrading to minor adverse once mitigation measures mature. A large number of visual receptors with low sensitivity will experience only minor adverse effects at 24WP.

Table 7.2: Summary of Landscape Effects

Quality of the Landscape	Good
Sensitivity of the landscape	Medium
Landscape Effects during construction	**Minor Works:** Removal of breaks in central reserve of road, reinstatement to match existing. Removal of minor access roads from A77, turn-off areas to be reinstated to match existing. Removal of signage along the verges and within the central reservation. **Major Works:** The construction of 2 new bridges over the road corridor, including associated lighting at Bogend Toll and Symington south. Safety railings and abutment structures to new bridges, creation of new link roads and new planting. Considerable disturbance of the local landscape character will be experienced during the construction programme.
Magnitude of effects during construction	**Minor Works:** During the construction phase, there will be minimal landscape effect, as accesses are removed and the areas reinstated. There will be some disruption to the landscape character caused by construction traffic, but this is temporary, and following completion of the minor works, the effect will be Low beneficial. **09WP:** *Low – Minor Beneficial* **Major Works:** During the construction phase, the major works will require removal and mounding of soil, and considerable earthworks to construct the elevated link roads and bridge abutments. The bridge structures will remain a significant feature in the landscape, one that is not in sympathy with the present landscape character of the Ayrshire Basin. Link roads will also require considerable earth moving, but on completion the new planting, including hedgerows and hedgerow trees will minimise any adverse impact of these roads, as they are in keeping with local character. **09WP:** *High – Substantially adverse* **Overall 09WP:** *Moderately Adverse*
Landscape Effects during operation	**Minor Works:** The result of the minor construction works will enhance the linear continuity of the road corridor, and reduce the peripheral accesses onto the road corridor. **Major Works:** The significant massing of the new bridging structures and associated highway infrastructure will introduce a new landscape feature into the local landscape character.
Magnitude of effects during construction	**Minor Works:** Following completion of the construction phase, there will be minimal effect on the landscape; the long term effect on the local landscape character being Low beneficial. **24WP:** *Low – Minor Beneficial* **Major Works:** The long term significance of the major works, especially the new bridges, will be the introduction of a significant new feature into the landscape, one that is not in sympathy with the

	present landscape character of the Ayrshire Basin. However, this feature is not without precedence in the local area (see the existing bridges at Hansel Village). In the long term, the associated link roads will be largely in keeping with local character. **24WP:** Low -*Minor Adverse* **Overall 24WP:** *None*			
Mitigation (not including mitigation of the effects on individual visual receptors - see Table 7.3)	Tree and hedgerow planting will soften the impact of the new roads, link the new roads and features with the existing landscape character, field boundary pattern and reduce the visual intrusion of the new structures. Where possible, new features such as link roads will align with the existing field structure, the new pavement running alongside existing landscape features such as hedgerows. Adjacent existing features will be enhanced in line with the existing landscape character by gapping up hedges and planting hedgerow trees.			
Significance of Effects	**Construction, 2006 (06NP)** *Substantially adverse*	**2009 (09WP)** *Moderately adverse*	**2024 (24NP)** *Minor beneficial*	**2024 (24WP)** *None*
Residual Effects	The new roads, bridges, and embankments will cause localised changes in the landscape pattern. However, mitigation works, including new vegetation will establish and help absorb adverse effects.			

Table 7.3: Visual Baseline and Visual Effects (continued over)

Location of Receptors	Approx Nos.	Baseline Conditions	Approx. Distance from Proposed Scheme at closest visible point	Level of Sensitivity	Visual Effects	Magnitude of Effects at 09WP	Mitigation	Significance of Effects				
								Construction	O9WP	24NP	24WP	Residual Effects at 24WP
Houses fronting or adjacent to the new highway bridges and embankments – Bogend Toll – i.e. Bogend Toll,	20	Residential receptors located at A77-B730 junction and immediately adjacent to Bogend Toll access structures.	50m	High	New embankments and bridge structures. Remedial earthworks, new landscaping and new highway lighting. Temporary works and associated compound. All visible from close range.	*Moderate adverse*	Provision of new screen planting. Use of high quality sympathetic facing materials on bridge. New access route	*Substantial adverse*	*Moderate Adverse*	*Negligible beneficial*	***Minor adverse***	The new route and structures will be visible, though screened by new planting. The bridge will remain visible.
Houses fronting or adjacent to the new highway bridges and embankments – Symington south access – i.e. Jeanfield. Danepark, Trynlaw and Stockbridge	8	Residential receptors located at Symington South access junction, immediately adjacent to access structures.	50m	High	New embankments and bridge structures. Remedial earthworks, new landscaping and new highway lighting. Temporary works and associated compound. All visible from close range.	*Moderate adverse*	Provision of extensive new screen planting. Use of high quality sympathetic facing materials on bridge. New access route	*Substantial adverse*	*Moderate Adverse*	*Negligible beneficial*	***Minor adverse***	The new route and structures will be visible, though screened by new planting. The bridge will remain visible.
Coodham Estate (included in the inventory of gardens and designed landscapes in Scotland)	-	Site areas are visible from within Coodham Estate woodlands, but heavily screened in public access areas.	50m	Medium	Minimal visual effects due to the considerable screening afforded by the existing woodland.	*Negligible adverse*	Provision of additional screen planting to embankments	*Minor adverse*	*Negligible adverse*	*None*	***Negligible adverse***	Minor views of the bridge structure may bee visible from areas within Estate woodlands, with minimal public access.
Whitelees Properties (inc. Balbir's restaurant)	16	Existing access is from the A77.	500m	High	Minimal visual effects from the new bridges. Closure of direct accesses onto the A77 from these properties and the construction of a new access road to the rear will all impact upon the visual amenity of these properties.	*Moderate adverse minor beneficial*	New planting to the new access roads (towards Bogend Toll), and removal of the pavement to the former access, reinstatement with new footpath and	*Moderate adverse*	*Minor adverse*	*None*	***Minor beneficial***	New access road to the south of the properties. Improved appearance of the properties

Location of Receptors	Approx Nos.	Baseline Conditions	Approx. Distance from Proposed Scheme at closest visible point	Level of Sensitivity	Visual Effects	Magnitude of Effects at 09WP	Mitigation	Significance of Effects				
								Construction	O9WP	24NP	24WP	Residual Effects at 24WP
							grass verge.					from the A77.
Symington Town	-	No existing views to the site of any proposed development due to existing landform, hedgerows and tree planting.	500m	High	Sites are not presently visible from Symington properties due to existing vegetation and landform. However, considerable visual impact on receptors accessing Symington – either residential, or visiting. Also following clearance of vegetation to facilitate construction, the sites will become visible to residential properties along the southern fringe of the town.	*Moderate adverse*	Provision of extensive new screen planting. Use of high quality sympathetic facing materials on bridges. New access route	*Substantial adverse*	*Moderate Adverse*	*Negligible beneficial*	***Negligible adverse***	The new route and structures will be visible, though screened by new planting. The bridges will remain visible.
Knockendale	8	Residential receptors located in small hamlet north east of Symington	500m	High	No direct visibility of works sites, as located just west of ridge that screens sites. Some view of working area at Bogend Toll, should screen planting be lost during works.	*None*	Monitor works to ensure no removal of existing screen planting opens new views of the sites and works.	*None*	*None*	*None*	***None***	None
Muirend House and Helentongate	4	Residential properties, with existing accesses onto the A77 to be retained	750m	High	Neither site will have substantial views of either bridge crossing. Both properties will retain their accesses to the A77, and they will have direct views of minor works to remove central reservation accesses and stopping up works to the Trynlaw A77 access.	*Minor beneficial*	None	*Minor adverse*	*Minor beneficial*	*None*	***Minor beneficial***	An improvement to the linear character of the A77 road corridor. The removal of some signage, and minor screened views of the road bridges.
Farmstead south of Trynlaw	11	Residential and business properties in a complex south of the A77 corridor – south of	Immediately adjacent to new access road	High / medium	The properties are located with a new access running along their northern boundary. They will have direct views of the new access road south of Symington, serving Trynlaw.	*Moderate adverse*	Planting to the Symington south access bridge and embankments, the Trynlaw access road and the Helentongate	*Significant adverse*	*Moderate adverse*	*Negligible beneficial*	***Negligible adverse***	The access roads, bridges and embankments will continue to

Location of Receptors	Approx Nos.	Baseline Conditions	Approx. Distance from Proposed Scheme at closest visible point	Level of Sensitivity	Visual Effects	Magnitude of Effects at 09WP	Mitigation	Significance of Effects				
								Construction	O9WP	24NP	24WP	Residual Effects at 24WP
		Trynlaw			The properties will have direct views of the Symington south access and road bridge.		access road.					be a feature in the visual amenity, although their impact will continue to reduce as the associated hedgerows and trees mature.
Hansel Village	-	Mixture of residential, seasonal holiday homes and business premises, set in a wooded estate.	Immediate to minor access improvements	High / Medium	The central reservation access is to be stopped up and reinstated to marry into adjacent, although access onto the westbound carriageway is to be retained to both existing village entrances.	*Minor adverse / minor beneficial*	Reinstatement to areas of stopped up access.	*Minor adverse*	*Minor beneficial*	*Minor beneficial*	***Minor beneficial***	Removal of break in central reservation, resulting in access from the southbound carriageway of the A77 only.
Brocket properties	3	Existing properties on southern kerbline of A77, with fields and Rosemount woodland to south	0m	High	Minor changes to views north – stopping up of accesses and central reservation gaps.	*Minor beneficial*	Locations of removed central reservation breaks and access points to be reinstated to match adjacent	*Minor adverse*	*Minor beneficial*	*None*	***Minor beneficial***	Improved continuity in road corridor.
Rosemount (designed landscape not included on register of gardens and designed landscapes in Scotland)	10	No existing view of any site areas on the A77.	400m	High / Medium	Views of proposals largely obscured by existing mature tree cover.	*Negligible beneficial*	Locations of removed central reservation breaks and access points to be reinstated to match adjacent.	*Substantial adverse*	*Negligible beneficial*	*None*	***Negligible beneficial***	Improved continuity in road corridor.
Hillhouse	2	Views south over the A77 corridor, to the Brocket properties and Rosemount woodland	300m	High	Likely to see stopped up accesses, removed central reservation gaps.	*Negligible beneficial*	Locations of removed central reservation breaks and access points to be reinstated to match adjacent	*Minor adverse*	*Negligible beneficial*	*None*	***Negligible beneficial***	Improved continuity in road corridor.
Vehicular users of the	-	Existing road corridor,	0m	Medium	A fleeting view of the new junctions and associated link	*Minor*	Landscaping and use of high quality	*Substantial*	*Minor*	*None*	***Negligible beneficial***	A change in the existing

Location of Receptors	Approx Nos.	Baseline Conditions	Approx. Distance from Proposed Scheme at closest visible point	Level of Sensitivity	Visual Effects	Magnitude of Effects at 09WP	Mitigation	Significance of Effects				
								Construction	O9WP	24NP	24WP	Residual Effects at 24WP
A77		providing fleeting glimpses of the works areas.			roads, bridges and landscaping.	*adverse*	sympathetic facing materials on bridges.	*adverse*	*adverse*			road pattern will be discernible. The impact of this change will diminish over time.
Vehicular users of B730	-	Existing road travelling roughly perpendicular to A77 corridor, over varying topography, giving prolonged glimpses in places of the site of the Whitelees and Helentongate link roads	Views at 1200m and 2600m	Medium	Glimpsed views will reduce the impact of the proposed works. The vehicles are in motion, towards the B730/A77 junction at Bogend Toll. Unlikely to experience impact other than when works are being undertaken, excepting the introduction of the new roundabout.	*Minor adverse*	Hedgerow planting with hedgerow trees to the link roads.	*Moderate adverse*	*Minor adverse*	*None*	***Negligible beneficial***	Slight increase in the amount of hedgerows and hedgerow trees
Burnbank	1	Exiting views towards the A77 corridor	1000m to both bridge crossings, 450m to Whitelees and Helentongate link roads	High	Burnbank will have extensive views over the construction and compound areas for the bridged crossings and link roads south of the A77.	*Moderate adverse*	Plant up embankments for the bridged crossings. Hedgerow planting with hedgerow trees to the link roads.	*Substantial adverse*	*Moderate adverse*	*None*	***Minor adverse***	The new routes and structures will be visible, though screened by new planting. The bridges will remain visible.
Baillieston, Underhills, Heughmill, Craigie Mains and users of access roads to these properties	12	Existing elevated views over woodland towards A77 and location of Helentongate / Whitelees link roads	1600m	Moderate	The Helentongate and Whitelees link roads will be visible under and following construction, although the bridged A77 crossings should be hidden, excepting middle distance glimpses of the access roads from the B730.	*Minor adverse*	Gap up existing hedgerows south of proposed link roads, and plant hedgerow trees	*Moderate adverse*	*Minor adverse*	*None*	***Negligible adverse***	As the hedges and trees mature, the impact of the new link roads will reduce until they become part of the existing landscape structure.

Location of Receptors	Approx Nos.	Baseline Conditions	Approx. Distance from Proposed Scheme at closest visible point	Level of Sensitivity	Visual Effects	Magnitude of Effects at 09WP	Mitigation	Significance of Effects				
								Construction	O9WP	24NP	24WP	Residual Effects at 24WP
Craigie Hill, High Langcraig, Laigh Langcraig, and Witch Knowe transmitter access road.	5	Some long-distance elevated views of the Helentongate and Whitelees link roads, very long distance views of Symington South bridge	3000m	Moderate	Some construction work may be visible, especially from some of the more elevated sections of access road.	*Negligible adverse*	Hedgerow and tree planting at Bogend Toll	*Minor adverse*	*Negligible adverse*	*None*	***Negligible beneficial***	The long term impact of the works will be to increase the level of hedgerow and tree planting visible from these locations
Muirhouse, dwellings on the road to Stafflar.	5	The access to Coodham Estate that is to be closed is visible	500m	High	The access will be closed, pavement removed to be reinstated.	*Minor beneficial*	None	*Minor adverse*	*Minor beneficial*	*None*	***Minor beneficial***	The continuity of the A77 corridor will be enhanced.

APPENDIX C

8 LAND USE

Replace existing Table 8.5 with below:

Table 8.5: Permanent Land Take

Land Use	*Area (approx)*	*Purpose*
Residential	Negligible	Junction Improvement
Agricultural	8.3ha	Junction Improvement
Commercial	N/A	N/A

APPENDIX D

Updates to the Environmental Statement, January 2007

9 NOISE AND VIBRATION

9.1 Introduction

This Addendum amends the Environmental Statement noise and vibration chapter taking into account the development of the scheme design. The Addendum also affects the following aspects:

Changes to the methodology and throughout the text to confirm that the average household size used in the assessment was 2.4. Rather than 2.36 as reported in the Environmental Statement as published.

Changes to the results of the assessment of the significance of the traffic noise impact (Tables 9.17, 9.21 and 9.22). No change in the predicted traffic noise levels has occurred.

Changes to the assessment of the likelihood of properties qualifying for additional insulation works under the Noise Insulation (Scotland) Regulations 1975.

9.2 Methodology

Household Size

The final paragraph in section 9.2.6 – Road Traffic Noise Impact Assessment, is deleted and replaced with:

These relationships between traffic noise and the level of nuisance experienced by occupants of residential properties have been used to calculate the nuisance level at each property in each scenario. In addition, this has been converted into the number of people likely to be bothered by road traffic noise for each scenario using the national average household size of 2.4 people.

The 10th paragraph in section 9.2.7 Road Traffic Noise Significance Criteria is deleted and replaced with:

The significance of the impact of the Scheme on traffic noise nuisance levels at all the residential properties in the Study Area is assessed based on the change in traffic noise nuisance levels due to the Scheme. The change in the number of people in the study area likely to be bothered by road traffic noise due to the Scheme is determined in both 2009 (09WP-09NP) and 2024 (24WP-24NP), based on the national average household size of 2.4. A decrease in the overall number of people bothered by traffic noise would indicate a net benefit to the community as a whole (even though some properties may experience an increase in traffic noise levels).

Significance of Traffic Noise Effects

The 13th and 14th paragraphs of section 9.2.7 Road Traffic Noise Significance Criteria are deleted and replaced with:

With the Scheme in operation, both the long-term steady state nuisance level in 2024 (24WP), using Figure 9.2, and the nuisance level following the abrupt increase in traffic noise in the year of opening (09WP), using Figure 9.3, have been calculated for each property. The highest of these two nuisance levels is then chosen and the change from the year of opening baseline (09NP) determined.

The 5th paragraph in section 9.2.8 Road Traffic Vibration Impact Assessment is deleted and replaced with:

At each property in the Study Area where traffic noise levels are predicted to be 58 dB, LA10,18h or more the percentage of people likely to be bothered very much or quite a lot by vibration is calculated, based on the nuisance levels in Figure 9.2, reduced by 10%. The vibration nuisance level at each property is converted to the number of people likely to be bothered based on the national average household size of 2.4.

9.4 Baseline

The 4th paragraph in section 9.4.2 Predicted Baseline Traffic Noise and Vibration Levels is deleted and replaced with:

The number of residential properties, and therefore the number of people likely to be bothered by noise and vibration in the long term is provided in Tables 9.10 and 9.11, based on an average household size of 2.4 and the steady state relationship between traffic noise and bother in Figure 9.2.

The 5th paragraph in section 9.4.2 Predicted Baseline Traffic Noise and Vibration Levels is deleted and replaced with:

A total of approximately 425 residential properties are located within 300m of the length of existing A77 affected by the Scheme, the upgraded junctions and surrounding affected roads (Symington Road, Symington Road North and Brewlands Road). Assuming an average household size of 2.4, a maximum of 1020 people are considered in the noise and vibration impact assessment.

9.5 Environmental Effects

The 4th paragraph in section 9.5.3 Effects of Operation is deleted and replaced with:

The number of residential properties, and therefore the number of people likely to be bothered by noise or vibration is provided in Tables 9.15 and 9.16, based on an average household size of 2.4. In 2009 (09WP) the number of people bothered by traffic noise at properties which experience an abrupt increase in traffic noise is based on the immediate nuisance impact relationship (Figure 9.3). However, at

properties which experience an abrupt reduction in road traffic noise DMRB requires that the number of people bothered by noise is determined using the long-term nuisance relationship (Figure 9.2), ensuring a pessimistic overall assessment.

Table 9.17 is deleted and replaced with:

Table 9.17: Predicted Traffic Noise Impact - Operation

Noise Band $L_{A10,18h}$ dB	2009 (09WP)		2024 (24WP)	
	No. residential properties	No. people bothered	No. residential properties	No. people bothered
<50	145	54	96	9
50<60	178	90	216	35
60<70	63	51	73	38
≥70	39	56	40	55
TOTAL	**425**	**251**	**425**	**137**

The 7th paragraph in section 9.5.3 is deleted and replaced with:

In the short term, the magnitude of the immediate impact is ranked as moderate, an additional 131 people (13%) are predicted to be annoyed following the abrupt change in traffic noise levels.

Table 9.21 is deleted and replaced with:

Table 9.21: Change in Traffic Noise Nuisance Impacts (Operation – Baseline)

Noise Band $L_{A10,18h}$ dB	Change in no. people bothered 2009 (2009WP-2009NP)	Change in no. people bothered 2024 (2024WP-2024NP)
<50	+41	-1
50<60	+58	0
60<70	+27	+5
≥70	+5	+1
TOTAL	**+131**	**+5**

Table 9.22 is deleted and replaced with:

(Please see over)

Table 9.22: Significance of the Predicted Traffic Noise Impact (table is to the requirements of DMRB)

		Baseline 2009 Traffic Noise Band $L_{A10,18h}$ dB									
		<50		50<60		60<70		≥70		TOTAL	
		Operation	Baseline	Operation	Baseline	Operation	Baseline	Operation	Baseline	Operation	Baseline
Increase in traffic noise level is based on worst-case, i.e. comparison between 09NP to 24WP for operation, 09NP to 24NP for baseline.											
Increase in Traffic Noise $L_{A10,18h}$, Properties	<1	0	0	6	0	4	6	16	3	26	9
	1<3	150	150	154	186	25	44	23	36	352	416
	3<5	0	0	18	0	5	0	0	0	23	0
	5<10	0	0	5	0	6	0	0	0	11	0
	10<15	0	0	0	0	0	0	0	0	0	0
	≥15	0	0	0	0	0	0	0	0	0	0
Increase in nuisance is based on worst-case i.e. comparison between 09NP to 09WP or 09NP to 24WP for operation, 09NP to 24NP for baseline.											
Increase in Nuisance Level % points, Properties	<10%	36	150	21	186	25	50	28	39	110	425
	10<20%	114	0	113	0	2	0	10	0	239	0
	20-<30%	0	0	43	0	7	0	1	0	51	0
	30-<40%	0	0	6	0	6	0	0	0	12	0
	≥40%	0	0	0	0	0	0	0	0	0	0
Decrease in traffic noise is based on worst-case (least benefit) i.e. 09NP to 24WP for operation, 09NP to 24NP baseline.											
Decrease in Traffic Noise $L_{A10,18h}$, Properties	<1	0	0	2	0	5	0	0	0	7	0
	1<3	0	0	1	0	3	0	0	0	4	0
	3<5	0	0	0	0	0	0	0	0	0	0
	5<10	0	0	0	0	0	0	0	0	0	0
	10<15	0	0	0	0	0	0	0	0	0	0
	≥15	0	0	0	0	0	0	0	0	0	0
Decrease in traffic nuisance is based on worst-case (least benefit) i.e. 10NP to 25WP for operation, 09NP to 24NP baseline.											
Decrease in Nuisance Level % points, Properties	<10%	0	0	3	0	8	0	0	0	11	0
	10<20%	0	0	0	0	0	0	0	0	0	0
	20-<30%	0	0	0	0	0	0	0	0	0	0
	30-<40%	0	0	0	0	0	0	0	0	0	0
	≥40%	0	0	0	0	0	0	0	0	0	0

Noise Insulation (Scotland) Regulations 1975

The 3rd paragraph in section 9.5.4 is deleted and replaced with:

Initial predictions indicate that, of the 425 residential properties considered, 31 may meet the Noise Insulation (Scotland) Regulations criteria to qualify for additional noise insulation measures. It should be noted that this is based on a conservative definition of what parts of the scheme fall under the regulations. All the identified properties are located in the vicinity of the two new junctions and associated access roads at Symington and Bogend Toll.

The 14th paragraph in section 9.5.4 is deleted and replaced with:

In addition, the DMRB methodology requires a worst-case assessment of the significance of the change in traffic noise and nuisance levels by considering the greatest level of traffic noise and nuisance experienced in the first 15 years after Scheme opening. Table 9.22 illustrates the results for the properties in each of the four noise bands for the baseline scenario in 2009 (09NP), as required in DMRB.

The 15th paragraph in section 9.5.4 is deleted and replaced with:

Following the DMRB assessment based on the worst case change in traffic noise in the first 15 years after opening, 11 properties experience a decrease in traffic noise, all of which experience a negligible or minor decrease. These properties are located at Bogend Toll, Hansel Village, Stockbridge and Symington Road North. 412 properties experience an increase in noise levels in the long term, at 11 of which the increase is ranked as substantial, all of which are located in close proximity to Brewlands Road. 412 properties experience a worst case increase in nuisance. At 12 properties, all located along Brewlands Road, the increase is ranked as substantial (30<40%). At two properties the worst case change in noise level and nuisance is 'no change'.

9.6 Summary

The 7th paragraph in section 9.8 is deleted and replaced with:

In 2009, the year of opening, the number of people predicted to be 'bothered very much or quite a lot' by traffic noise increases by 131 people, out of a total population in the study area of 1020, due to the abrupt change in road traffic noise levels. In the long term by 2024 the Scheme results in a negligible increase of 5 people predicted to be bothered by traffic noise, compared to the baseline situation without the Scheme in 2024.

Noise Insulation (Scotland) Regulations 1975

The 8th paragraph in section 9.8 is deleted and replaced with:

A conservative estimate of the number of properties, which may meet the criteria for additional noise insulation works under the Noise Insulation (Scotland) Regulations, of 31 properties, has been made.

APPENDIX E

10 PEDESTRIANS, CYCLISTS, EQUESTRIANS AND COMMUNITY EFFECTS

Replace existing tables 10.5 & 10.6 with the following:

Table 10.5: Effects of Construction

Feature	*Type of Community Effect*	*Magnitude of the Effect*	*Sensitivity of the Community Receptor*	*Significance of the Effect*	*Significant/Not Significant*	*Nature*
B730 Bogend Toll Junction.	Temporary disturbance to access to/from B730.	Moderate	Medium	Moderate	Significant	Temporary, Adverse, Reversible
Whitelees Link Road between Bogend Toll and Whitelees	Temporary disturbance to unclassified road at Whitelees to the A77.	Moderate	Medium	Moderate	Significant	Temporary, Adverse, Reversible
New accesses to Helentongate farm compound and Jeanfield.	Temporary disturbance to existing accesses.	Moderate	Medium	Moderate	Significant	Temporary, Adverse, Reversible
Trynlaw Link Road from Symington Road North to Trynlaw.	Temporary disturbance to existing junction at Trynlaw.	Moderate	Medium	Moderate	Significant	Temporary, Adverse, Reversible

Hansel Village road, improvements to access and new internal link road	Temporary disturbance to existing access	Moderate	Medium	Moderate	Significant	Temporary Adverse Reversible
Symington Junction on the north side of Symington Road South.	Temporary disturbance to A77 during construction of overbridge.	Severe	Medium	Moderate	Significant	Temporary, Adverse, Reversible
Minor access improvements at Brocket, Rosemount, Low Wexford and Underwood	Temporary disturbance to existing accesses.	Moderate	Medium	Moderate	Significant	Temporary Adverse Reversible

Table 10.6: Effects of Operation (continued over)

Feature	Type of Community Effect	Magnitude of the Effect	Sensitivity of the Community Receptor	Significance of the Effect	Significant/ Not Significant	Nature
New grade separated junctions and new cycleway	New shared provision for pedestrians and cyclists	Moderate	Medium	Minor	Significant	Permanent, direct
B730 Bogend Toll Junction	New overbridge and slip roads	Moderate	Low	Moderate	Significant	Permanent, direct
Whitelees	New stretch of carriageway between Bogend Toll and Whitelees	Moderate	Low	Moderate	Significant	Permanent, direct
Hansel Village	New stretch of internal link road	Moderate	Low	Moderate	Significant	Permanent, direct
Jeanfield	New stretch of road at Jeanfield to new bridge over A77.	Moderate	Low	Moderate	Significant	Permanent, direct
Trynlaw	New stretch of road from Symington Road North to Trynlaw.	Moderate	Low	Moderate	Significant	Permanent, direct
Symington	New junction on the north side of Symington Road South.	Moderate	Low	Moderate	Significant	Permanent, direct

Bogend Toll	Permanent closure of central reservation.	Moderate	Low	Moderate	Significant	Permanent
Feature	*Type of Community Effect*	*Magnitude of the Effect*	*Sensitivity of the Community Receptor*	*Significance of the Effect*	*Significant/ Not Significant*	*Nature*
Access point south of Bogend Toll on southbound carriageway.	Permanent closure of junction.	Moderate	Low	Moderate	Significant	Permanent
Whitelees	Permanent closure of access point and central reservation.	Moderate	Low	Moderate	Significant	Permanent
Helentongate	Permanent closure central reservation.	Moderate	Low	Moderate	Significant	Permanent
Symington Road North	Permanent closure of access point and central reservation	Moderate	Low	Moderate	Significant	Permanent

Trynlaw	Permanent closure of access points on both sides of carriageway and central reservation.	Moderate	Low	Moderate	Significant	Permanent
Feature	*Type of Community Effect*	*Magnitude of the Effect*	*Sensitivity of the Community Receptor*	*Significance of the Effect*	*Significant/Not Significant*	*Nature*
Jeanfield	Permanent closure of access point and central reservation.	Moderate	Low	Moderate	Significant	Permanent
Symington Road South	Permanent closure of access point to A77.	Moderate	Low	Moderate	Significant	Permanent
Hansel Village	Permanent closure of central reservation.	Moderate	Low	Moderate	Significant	Permanent
Underwood Junction	Permanent closure of central reservation.	Moderate	Low	Moderate	Significant	Permanent
Rosemount	Permanent closure of central reservation.	Moderate	Low	Moderate	Significant	Permanent

Brocket	Permanent closure of central reservation.	Moderate	Low	Moderate	Significant	Permanent

APPENDIX F

12 WATER RESOURCES

12.1 Introduction

12.1.1 Purpose and Scope of the Assessment

This Chapter addresses the potential effects on water resources as a result of the proposed Scheme. Water resources include surface waters (e.g. rivers, burns, static water bodies, tidal waters, etc.) and groundwater (e.g. shallow and deep aquifers). The assessment process comprised of characterisation of the existing water resources, identification and prediction of potential effects, and recommendations for any secondary mitigation measures (i.e. those not already included in the Scheme outline design or thought of as standard practice) required to offset any significant residual effects.

12.1.2 Planning Framework

Apart from general statutory and planning requirements for a scheme of this nature, the water resources aspects are regulated by a number of EU, Scottish and Local instruments, comprising but not limited to:

- EU Directive 2000/60/EC (Water Framework Directive (WFD)), transposed into the Water Environment and Water Services Act (Scotland) 2003;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2005 in respect of discharges to surface or groundwater;
- SPP 7 (Planning and Flooding), policy for flood prevention and planning controls;
- SEPA Policy No.22 (Flood Risk Assessment Strategy);
- SEPA Policy No. 41 (A SEPA – Planning Authority Protocol, Development at Risk of Flooding: Advice and Consultation);
- SEPA Policy No. 19 (Groundwater Protection Policy for Scotland) and
- The Local Authority's Structure Plan and Local Plan.

The resultant influence of this statutory and planning regime is discussed in Section 12.4.7 in deriving a set of key issues and constraints for the water resource aspects of this Scheme.

12.1.3 Study Area

The sections of the A77 under consideration are situated to the southwest of Kilmarnock in relatively flat countryside, and they predominantly run through agricultural areas. The general topography is such that the A77 and the surrounding land falls from Kilmarnock towards the sea. All surrounding surface water features tend to drain in parallel with the road towards the sea, and there are

no watercourses shown on 1:50,000 mapping that actually cross the road alignment.

In the context of these proposals, there are five water resources features that have been identified as part of this assessment. Within the 250m boundary considered either side of the proposed Scheme there are three surface watercourses, one small lake, and the remaining feature identified is the groundwater beneath the proposed Scheme. All of these features are shown on Figure 12.1- Watercourses.

12.1.4 Water Resources Related Proposals

A full description of the Scheme is included in Chapter 2 of the original ES, but details that will have an effect on this assessment are highlighted / expanded upon under the following headings.

General Scheme Overview

In the context of water resources it is important to note that the proposals do not involve extensive works along the full length of the A77, rather a series of works at certain junctions and accesses. A number of the work items involve closing up existing gaps in the central reservations and therefore the extent of the work is minor in nature and will be fully confined within the boundaries of the existing carriageway. The major works are restricted to two discrete areas:

- The provision of a new grade separated junction with an overbridge at Symington, connecting access roads, and a new link road to service the Trynlaw Cottages,
- The provision of a new grade separated junction with an overbridge at Bogend, roundabouts to connect into the existing road network, and a new link road to service Whitelees.

Existing Road Drainage and Outfalls

To put the new proposals into context, it is necessary to understand the existing road drainage in the vicinity of the proposed junctions. No formal drainage plans exist for the A77 or the surrounding roads, and the information available has been collected by South Ayrshire Council during maintenance operations. As a result of the limited drainage plans, a drainage survey was commissioned in mid 2008 to check the existing drainage infrastructure along the main line and the locations of the outfalls of the Scheme Most drains appear to be 150mm diameter clay pipes, and the only outfalls that are known about are:

- From Symington Road South draining into the unnamed watercourse flowing through the edge of Symington to the north of the A77; and this appears to drain the section of road from the A77 back to the first house along Symington Road South,
- From the remaining section of Symington Road South and a section of Symington Road North, draining into the unnamed watercourse flowing through the edge of Symington to the north of the A77,

- The section of the A77 at the proposed Symington junction drains to an outfall near Danepark, which in turn passes into the unnamed watercourse to the north of the A77,
- Unclassified road running southeast from the A77 past Helentongate drains into the Pow Burn,
- B730 from the A77 junction at Bogend running south drains to the Pow Burn,
- B730 from the A77 junction at Bogend running north is understood to drain into Coodham Lake.

In addition, the Council has noted that there have been localised flooding issues at some of the houses along Symington Road South and Symington Road North, and that this is connected to the road drainage discharges and to the failure of riparian owners to maintain the watercourse channel.

Despite the lack of information, it seems likely, given the topography around the proposed junction at Symington, that most of the existing road drainage outfalls into the unnamed watercourse that runs through the edge of Symington to the north of the A77, with a smaller portion draining into the Pow Burn to the south of the A77. At the proposed junction at Bogend it seems likely that some of the existing road drainage outfalls into the tributary of the Pow Burn to the south of the A77, and the rest drains north towards either Coodham Lake or the outflow from Coodham Lake.

Proposed Road Drainage and Outfalls

As is standard for all new roads schemes, SEPA has requested that Sustainable Urban Drainage System principles are applied. SEPA has noted that the format of the drainage scheme should be in accordance with the technical guidance set out in CIRIA Report C521 “Sustainable Urban Drainage Systems (SUDS) – a design manual for Scotland and Northern Ireland”. In response to this the road drainage design incorporates two levels of treatment, the first being via filter drains or swales running alongside each new section of road and the second being SUDS ponds. It is noted that both of these features will also offer attenuation of the surface water runoff, allowing the designers to control the rate of discharge from the new sections of road.

All new sections of road at the junctions will be kerbed, and hence drainage will be achieved via gully pots, which will also remove some of the larger solids from the runoff. Flow from the gully pots will then be directed into a two-pipe perforated drain arrangement where flow will filter down from a perforated upper pipe through the drainage media to be collected by a semi perforated pipe at the bottom of the filter drain. From there most of the runoff will pass to the SUDS ponds provided. The side roads being created will be drained to swales running alongside the carriageway, and from there direct to drainage outfalls. This single level of treatment along the side roads reflects the much smaller numbers of vehicles using these roads. The following two sections describe the road drainage proposals for each of the proposed junctions.

Symington Junction (see Figure 12.2)

Most of the runoff from the north side of the A77 will be captured in filter drains at the side of the roads and in the shallow ditches / swales at foot of road embankments and directed to a SUDS pond to be located in the “dead area” in the middle of the junction. From there the runoff will drain into the existing A77 carriageway drain, which outfalls to the unnamed watercourse to the north of the A77 in the vicinity of Danepark. A short section (approx. 150m) of the shallow ditch / swale at the foot of the embankment will be drained direct to the existing outfall along Symington Road South due to relative ground levels. In addition, a short section (approx. 60m) on the LHS of the access junction onto the A77 will be drained via a filter drain straight into the existing carriageway drainage due to relative ground levels.

On the south side of the A77 the runoff will be captured in filter drains alongside the new junction and these will drain into a SUDS pond in the “dead area” in the middle of the junction. The flows from the SUDS pond will then drain along to the existing road drain running down the unclassified road past Helentongate and into the existing Pow Burn Outfall. Both of the new access roads (i.e. to Jeanfield and Helentongate) will be drained via shallow ditches / swales into the existing road drainage system and into the Pow Burn.

Bogend Junction

To the north of the A77 the runoff will be captured in filter drains from the roads and in shallow ditches / swales at the foot of the road embankments and directed to a SUDS pond in the “dead area” in the middle of the junction. From here the runoff will drain to the existing Coodham Lake Outfall.

To the south of the A77 the runoff will be captured in filter drains from the roads and in shallow ditches / swales at the foot of the road embankments and directed to a SUDS pond adjacent to the proposed roundabout. From here the runoff will drain to the existing Pow Burn Outfall. The only exceptions to this will be a short length of road to the south of the proposed roundabout, which will drain via a filter drain direct to the outfall (due to relative ground levels), and the Whitelees Access Road, which will drain via a swale to a separate outfall into the Pow Burn near Whitelees.

Watercourse Crossing

The only proposed crossing of an existing water resources feature is a new culvert under the Whitelees Access Road to retain the continuity of an existing drainage ditch.

12.2 Methodology

The assessment methodology used in this Chapter is based on the generic methodology presented within Chapter 1 of the original ES. Into this methodology, the guidance and techniques presented within the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 10 “Road Drainage and the Water Environment” have been incorporated. The following section gives further detail in regard to how the potential effects on the water resources, which may arise from the construction and operation of the Scheme, were assessed.

12.2.1 Baseline Conditions

Water resources features around the Scheme were identified initially from Ordnance Survey maps, a desktop review of previous reports, and survey data collected for the study area during the preparation of the ES. This initial desktop review was supplemented by consultations with statutory organisations and further consideration of available data. The study area assessed extends 250m either side of the Scheme (and further downstream where required) for surface water features, whilst groundwater features were considered over 1km either side of the Scheme.

Surface Waters

Geomorphological and Hydrological Data

Geomorphological conditions of each watercourse were evaluated from Ordnance Survey mapping, data collected during the field surveys for this ES and the information within Chapter 13 Geology and Soils of the original ES.

Hydrological data was collected for the surrounding watercourses from the National River Flow Archive, which is accessed through the SEPA website. Where data was not available an assessment of the flow was made using standard hydrology techniques. It is noted that these flows have been derived for the purposes of this assessment only, and the designers will be responsible for assessing the flows and providing adequate attenuation within the road drainage system.

Where available, flood mapping was also collected for the surrounding watercourses to enable an assessment of whether the proposals may affect any identified floodplains.

River Water Quality Data

SEPA have developed a River Water Quality Classification system, which is applied to all significant watercourses in Scotland. This system is based on an assessment of chemical and biological indicators. The Water Quality Classification system categorizes rivers into A1 – excellent, A2 – Good, B – Fair, C – Poor, and D – Seriously Polluted, and a full description of this system is available on the SEPA website.

The evaluation of baseline water quality in this Chapter for the Pow Burn is based on the classification advised by SEPA. The evaluation of the baseline water quality for the other watercourses crossing or in close proximity to the proposed Scheme is based on a visual / qualitative assessment using the River Classification Scheme criteria. This assessment is based on the presence of List A (faeces, toilet paper, oils, non natural foam, sewage or oily smells) and List B (builders waste, gross litter (furniture, motor vehicles, road cones, etc.) contaminants (see Table 1 Aesthetic Contaminants – River Classification Scheme). The evaluation also takes into account the setting of each of these watercourses e.g. the presence of surrounding infrastructure that may influence water quality.

For the purposes of this assessment, the present water quality objectives for all of the watercourses in this area are assumed to be the preservation of the current Water Quality Classifications. It is noted that the creation of River Basin Management Plans for the Water Framework Directive will influence future water quality objectives, however it is understood that the water quality objectives for individual watercourses have not yet been developed.

Groundwater

Groundwater data was sourced from:

- Consultations with SEPA in regard to any areas of groundwater pollution or groundwater abstraction within the study area;
- Geology and Soils Chapter of the original ES;
- Details from the Ground Investigations undertaken for the detailed design of the Scheme (including borehole and trial pit logs, groundwater level measurements, etc.)
- The following mapping derived by SEPA for the characterisation of groundwater for the WFD – "Groundwater Vulnerability Map", "Superficial Aquifer Map", and the "Bedrock Aquifer Map"; and
- The original, and now partially superseded, "Groundwater Vulnerability Map of Scotland" (1995) and "Hydrogeological Map of Scotland" (1988) published by the British Geological Survey.

12.2.2 Impact Identification

Identification of the possible range and location of potential impacts was based on:

- The guidance within DMRB Volume 11, Section 3, Part 10 "Road Drainage and the Water Environment";
- The professional experience of the assessment team;
- Consultation with relevant statutory and non-statutory organisations;
- Desk and site based research;
- An EIA scoping report and a DMRB Stage 2 report previously prepared; and
- Liaison with other chapter authors, and in particular the authors of the Ecology and Geology and Soils chapters.

From this work a distilled list of impacts thought to have potential to cause adverse effects on the water resource features was derived (see Section 12.5). It is noted that environmental effects on the water resource features may also lead to other impacts (such as changes to the aquatic ecology), which are addressed separately in the ES (i.e. not within this Chapter).

12.2.3 Impact Assessment

Impact assessment was based on the generic assessment methodology presented in Chapter 1 of the ES and the guidance within DMRB Volume 11, Section 3, Part 10 "Road Drainage and the Water Environment".

Impact Magnitude

The **magnitude** of a potential effect on the water resources features was evaluated using the criteria provided in Table 5.4 "Estimating the Magnitude of an Impact on an Attribute" (DMRB), with the addition of the following criteria to cover areas not specifically dealt with in the DMRB criteria. It is noted that impact magnitudes described below are all phrased assuming adverse impacts, but these general classifications have also been used to describe beneficial impacts from the Scheme:

Severe – (equivalent to "Major Adverse" in DMRB) – results in loss of attribute and / or quality and integrity of attribute. Additional criteria:

- Degrading of the existing water quality classification;
- Significantly increased flooding of residential or commercial properties ((this is in lieu of the DMRB increase in flood level >100mm);
- Loss of or serious effect on the integrity of a internationally or nationally designated aquatic ecological resource;
- Gross changes to geomorphological or hydraulic characteristics e.g. loss of natural bank and bed over a length of 50m or more, reduction in flow capacity of an existing river channel by 20% or more; and
- Widespread effect on groundwater movement with a gross change to overall groundwater transfer from up gradient to down gradient resources. Widespread and gross effects on groundwater quality.

Moderate – (equivalent to "Moderate Adverse" in DMRB) – results in effect on integrity of attribute or loss of part of attribute. Additional criteria:

- Degrading of either the combined water quality or biological quality indicators one or more classifications, but no change in overall classification;
- Slight increased flooding of residential or commercial properties (this is in lieu of the DMRB increase in flood level >50mm);
- Slight impact on an internationally or nationally designated aquatic ecological resource, or a loss or serious effect on the integrity of a nationally or locally important aquatic ecological resource that is not designated;
- Significant, but not gross, changes to geomorphological or hydraulic characteristics e.g. loss of natural bed and bank over a length of 20m or more, reduction in the area of an existing watercourse channel by less than 20%; and
- Widespread effects on groundwater movement with a measurable, but not gross, effect on overall groundwater transfer from up gradient to down gradient resources. Widespread, but not gross, effects on groundwater quality.

Slight – (equivalent to "Minor Adverse" in DMRB) – results in some measurable changes in attributes quality or vulnerability. Additional criteria:

- Degrading of two or more water quality or biological quality indicators, but with no change in either overall or the individual water or biological quality classifications;
- Some increased flooding in rural areas immediately adjacent to proposed Scheme, but not affecting property, infrastructure, or ecological resources (this is in lieu of the DMRB increase in flood level >10mm);
- Slight impact on a nationally or locally important aquatic ecological resource, or the loss of a moderate area of an abundant aquatic ecological resource;
- Minor changes to some geomorphological or hydraulic characteristics e.g. loss of natural bed and bank over a length of less than 20m, reduction in the area of an existing watercourse channel by less than 5%; and
- Localised effect on groundwater movement but no measurable effect on overall groundwater transfer from up gradient to down gradient resources. Widespread or localised, measurable but not gross, effects on groundwater quality.

Negligible – (equivalent to "Negligible" in DMRB) – results in effect on attribute, but of insufficient magnitude to affect the use or integrity. Additional criteria:

- Degrading of one individual chemical or biological quality indicator, but with no change in either the overall or the chemical or biological quality classifications;
- Minor / no increased flooding in rural areas (this is in lieu of the DMRB increase in flood level <10mm);
- Slight impact on a small area of an abundant aquatic ecological resource;
- Highly localised but not measurable changes in some geomorphological or hydraulic characteristics; and
- Highly localised effect on groundwater movement but no effect on overall groundwater transfer from up gradient to down gradient resources. Widespread or localised, but not measurable, effects on groundwater quality.

Sensitivity of Receptor

The **sensitivity** of a water resources feature is a synthesis of its environmental importance, socio-economic value, recreational value, and also its resilience to cope with change. The sensitivity of a water resources feature was evaluated using the guidance provided in Tables 5.1 "Water Features: Attributes and Indicators of Quality" & 5.3 "Estimating the Importance of Water Environment Attributes" (DMRB). From this guidance the following objective tests have been used in this Chapter to assess sensitivity:

- The environmental importance e.g. if the water resources feature has a designation at an international level (e.g. Special Area of Conservation) or if the water body has A1 water quality and is therefore a valuable pristine habitat, then this would tend to increase the sensitivity value of the receptor;

- The socio-economic value of the water body e.g. if the water body has notable aquatic ecological resources (e.g. an important local or national fishery) or if the groundwater is in a drinking water protected area as defined in the SEPA WFD Protected Areas Register, then this would tend to increase the sensitivity value of the receptor;
- The recreational value of the water body e.g. if an area is a SEPA designated bathing area or if a watercourse is an important local fishery this would tend to increase the sensitivity value of the receptor; and
- The size of the water body and its ability to buffer flow and water quality changes e.g. if a water body has high dilution characteristics compared to a small proposed discharge then its sensitivity value would tend to decrease.

In accordance with the generic methodology, sensitivity has been scaled from Negligible to Low to Medium to High to Very High. In this Chapter a Negligible or Low sensitivity attribute are both considered to be equivalent to the Low Importance stated in Table 5.3 (DMRB). To ensure the transparency of this assessment, a description of how the sensitivity of each water body was derived is included in the "Baseline" Section of this Chapter.

Impact Significance

Overall Significance is a product of both the sensitivity of the receptor and the magnitude of the effect. Significance is scaled from Negligible to Minor, and Moderate, to Substantial. In assessing the product of sensitivity and magnitude the Matrix of Significance presented in Chapter 1 of the original ES has been adopted. Therefore, only impacts that are moderate or substantial are considered to be Significant. The significance of a potential effect on the water resources features has been evaluated using the guidance provided in Table 5.6 "Definitions of Overall Assessment Scores" (DMRB).

It is noted that primary mitigation (see section below for details) is deemed to have been included when making the initial assessment of impact significance.

It is also valuable to attribute a level of confidence to the predicted impact assessment. Unless otherwise stated the impacts described in this Chapter are given at a high confidence level. Where impacts are given at a low confidence level, a reason shall be stated for this i.e. lack of detailed design data.

Mitigation

Mitigation measures considered appropriate for the avoidance and minimisation of effects on water resource features will be proposed in accordance with the generic guidance provided in Chapter 1 of the original ES.

Primary mitigation has been included in the "Environmental Effects" section of this Chapter, and these measures represent what are considered to be standard mitigation measures that would be applied to the construction and operation of such a scheme. These primary mitigation measures may be standard conditions

that would be applied by SEPA or measures that a designer or contractor would be expected to take based on current best practice.

Mitigation measures noted subsequently in the "Mitigation" section, are those that are considered necessary for this Scheme in particular in order to offset any significant potential environmental effects, but that would not necessarily have been included as a matter of course in the design of such a Scheme.

12.2.4 Assessment Years

The baseline established for this assessment has been assumed to remain constant up to the time when the Scheme is put in place (2009), and this is because the full implementation of the Water Framework Directive will not have been completed (i.e. the publishing of the first round of River Basin Management Plans and setting of specific environmental objectives). For the purposes of this assessment the baseline has also been assumed to remain constant till the point when the Scheme has completed its first 15 year period of operation (2024). The reason for this is that it is difficult at this stage to identify what specific objectives will be set under the River Basin Management Plans. However, it is recognised that there is the potential for the baseline water quality of the water resources features to improve over the next 20 years based on the overall aim of the Water Framework Directive to protect and enhance the water environment.

12.3 Consultations

Table 12.1 provides a summary of the water environment related issues highlighted during the consultation exercise completed for this ES.

Table 12.1: Consultations

Organisation	Statutory (S) / Non Statutory (NS)	Response with regard to the water environment
Scottish Executive Environment Group – Climate Change & Air Division	S	No specific concerns were raised. It was stated that: Should ensure no significant impact on water environment during or after construction All pollution risks and associated preventative and mitigation measures should be identified SUDS should be adopted where applicable, and long term and temporary disposal of foul water should be considered The Water Environment (Controlled Activities) Regulations 2005 should be adhered to and method statements prepared for all aspects of site work that might impact on water quality
The Scottish Wildlife Trust	S	Raised concern that salty drainage water from the A77 is thought to have previously caused damage to trees along the boundary of the Coodham Estate
South Ayrshire	S	Noted that there are a number of watercourses

Council – Planning and Transportation		adjacent to the A77 draining into Dow's Burn and the Pow Burn. Sought re-assurance that any works would not increase potential flooding downstream, and that if any additional discharge were to be attenuated to the "greenfield" condition, then this would be sufficient. Noted that SUDS are proposed.
Scottish Environment Protection Agency (SEPA)	S	Require the use of SUDS for both completed road and construction drainage. Noted that the road drainage SUDS may require CAR licensing. Noted that there may be discharge pipes serving septic tanks in the area, which have not been considered.

Copies of relevant correspondence were included in Appendix 3 of the original ES. The significant issues raised during these consultations have been assessed within this Chapter.

12.4 Baseline

12.4.1 Pow Burn

This is the principal watercourse within the study area; its catchment is located to the south of the A77 and runs adjacent to the road alignment. It has a catchment area in the order of 14km^2, which gives an average daily flow in the region of 24,600m^3/d. The catchment is predominately agricultural land. The watercourse falls from 90mAOD to 0mAOD and enters the sea approximately 2.5km downstream from the end of the proposed works. Adjacent to the A77 the burn channel was observed as varying between 2-4m wide and the watercourse is relatively shallow and slow flowing with a cobble substrate and earthen banks with scattered areas of woodland and scrub vegetation.

In terms of water quality, the river is monitored by SEPA and possesses classifications from C "Poor" at Bogend to B "Fair" downstream at Langlands (2005 data). According to the National Water Quality Classification 2004 report by SEPA, the stream biology of the Pow Burn has improved from class "C" to class "B" from 2003. The improvement is linked to enhanced sewage treatment at Hansel Village, but it is still subject to diffuse pollution from farm run-off.

From the Ecology Chapter it is noted that the Pow Burn is a non-statutory site protected through South Ayrshire Council's Wildlife Strategy. The Ecology Chapter also notes the presence of brown trout and the limited presence of otters in the Pow Burn. However, it also notes the likely effects on the water quality of the burn from the adjacent agricultural operations (e.g. grazing, runoff, etc.). The Pow Burn has been assessed as being of "Regional" importance in the Ecology Chapter.

There is also a 1 in 100 year flood map published by South Ayrshire Council, which shows the predicted extent of the flooding for this watercourse. This shows that flooding is restricted to an area of the Pow Burn adjacent to Bogend about 350m to the south of the A77, and an area adjacent to Symington about 1km south of the A77. In both cases the flooding does not show an impact on residential or industrial properties, and the flooding is of agricultural land adjacent to the watercourse.

Table 12.2 below outlines the characteristics of the Pow Burn.

Table 12.2: Pow Burn

Receptor	Environmental Importance	Socio-Economic Value	Recreational Value	Size of Water Body	Overall Sensitivity
Pow Burn	Water Quality B / C – assessed as being of Regional Ecological Importance due to otter activity and presence of brown trout	No specific local fishery identified and no use for abstraction	No specific local fishery identified	Ability to buffer small discharges	**Medium**

12.4.2 Dow's Burn

This watercourse is located at the southwest end of the study area, and its catchment is centred on the A77. It has a catchment area in the order of 1.6km^2, which gives an average daily flow in the region of 2500m^3/d. The catchment is predominately agricultural land. The watercourse falls from 50mAOD to 0mAOD and enters the sea approximately 2km downstream from the proposed works. Adjacent to the A77 the burn channel is approximately 1.5m wide and the watercourse is relatively shallow and fast flowing with a substrate of cobbles, occasional boulders, gravel and silt.

In terms of water quality, the river is not monitored by SEPA and therefore a classification has had to be assigned for the purposes of this assessment. Based on the agricultural nature of the catchment, the proximity to the A77, the fact that burn is understood to receive surface water drainage discharges from the A77, and the water quality of the nearby Pow Burn, this watercourse has been assigned a classification of B "Fair" / C "Poor" for the purposes of this assessment.

From the Ecology Chapter it is noted that Dow's Burn does not possess any form of nature conservation designation, and it possesses no particular ecological interest (e.g. no otter activity, etc.). It has not been classified.

There is also a 1 in 100 year flood map published by South Ayrshire Council, which shows the predicted extent of the flood plain for this watercourse. This shows that flooding is restricted to a narrow strip adjacent to the A77 and to the south out with the proposed scheme corridor. Flooding does not show an impact on residential or industrial properties, and the flooding is of agricultural land adjacent to the watercourse.

Table 12.3 below outlines the characteristics of Dow's Burn.

Table 12.3: Dow's Burn

Receptor	Environmental Importance	Socio-Economic Value	Recreational Value	Size of Water Body	Overall Sensitivity
Dow's Burn	Water Quality B / C - No formal designations	No specific local fishery identified and no use for abstraction	No specific local fishery identified	Low ability to buffer flows	**Medium**

12.4.3 Unnamed Burn to North of A77

This watercourse runs parallel with and to the north of the A77 between Symington and Monktonhill, and its catchment is also located to the north of the A77. It has a catchment area in the order of 4km^2, which gives an average daily flow in the region of 6500m^3/d. The catchment is predominately agricultural land. The watercourse falls from 80mAOD to 0mAOD and enters the sea approximately 2km downstream from the end of the proposed works. Adjacent to the A77 the burn channel is approximately 1.5m wide and the water depth is relatively shallow (in general <80mm) and slow flowing, with some areas very heavily vegetated to the point of obscuring the channel.

In terms of water quality, the river is not monitored by SEPA and therefore a classification has had to be assigned for the purposes of this assessment. Based on the agricultural nature of the catchment, the proximity to the A77, the fact that burn does receive road surface water drainage discharges, and the water quality of the nearby Pow Burn, this watercourse has been assigned a classification of B / C "Fair" / "Poor" for the purposes of this assessment.

From the Ecology Chapter it is noted that this watercourse does not possess any form of nature conservation designation, and it possesses no particular ecological interest (e.g. no otter activity, etc.). It has not been classified.

There is also a 1 in 100 year flood map published by South Ayrshire Council, which shows the predicted extent of the flood plain for this watercourse. This shows that flooding is restricted to the area downstream of Danepark. The flooding is not shown to impact on residential or industrial properties, and the flooding is of agricultural land adjacent to the watercourse.

Table 12.4 below outlines the characteristics of the Unnamed Burn.

Table 12.4: Unnamed Burn to North of A77

Receptor	Environmental Importance	Socio-Economic Value	Recreational Value	Size of Water Body	Overall Sensitivity
Unnamed burn to the north of the A77	Water Quality B / C – No formal designations	No fishery or other social / economic use	No fishery or other social / economic use	Low ability to buffer flows	**Medium**

12.4.4 Coodham Lake

Coodham Lake forms a major body of water within the area under consideration and was part of the designed landscape of the former estate. As part of the conversion of the estate into a luxury housing development, the lake has recently been dredged for silt removal in an effort to restore it to its former quality. Large numbers of waterfowl were observed using the lake, including herons feeding indicating the presence of fish. Otters have also been observed using the lake, all of which indicate it is a water body with some ecological value. The Ecology Chapter identified the combined Coodham Lake and Estate as a site of "Regional Importance" for wildlife.

In terms of water quality, the lake is not monitored by SEPA and therefore a classification has had to be assigned for the purposes of this assessment. Based on the wooded and self contained nature of the catchment (i.e. bounded by local roads) and the reasonable ecological value assigned, this water body has been assigned a classification of "Fair" under the Standing Waters Classification Scheme for the purposes of this assessment.

Table 12.5 below outlines the characteristics of the Coodham Lake.

Table 12.5: Coodham Lake

Receptor	Environmental Importance	Socio-Economic Value	Recreational Value	Size of Water Body	Overall Sensitivity
Coodham Lake	Water Quality – Fair - No formal designations - Signs of otter activity and use by waterfowl and considered to be of Regional Ecological Importance	No specific local fishery identified and no use for abstractions	No fishery or other social / economic use	Small – relatively low ability to buffer flows	**Medium**

12.4.5 Groundwater

The following groundwater data has been gathered:

- From the Groundwater Vulnerability Map of Scotland (BGS 1995) – the geological classification of the area is moderately to weakly permeable strata with overlying superficial deposits;
- From the Hydrogeological Map of Scotland (BGS 1988) – the region is underlain mainly by carboniferous westphalian rock which is noted as potentially supporting locally important aquifers only;
- From the Geology and Soils Chapter it is noted that the drift deposits are almost exclusively glacial till and boulder clay with low permeability. The underlying solid deposits are of Carboniferous Measures "Barren Red Measures" (i.e. red sandstones (moderately to weakly permeable)) to the south of Symington. Under the proposed Symington Junction the solid geology changes to an igneous dolerite sill (impermeable), and then under the proposed Bogend Junction the solid geology changes to basalt of the Dalmeny type (moderately permeable). BGS reports state that the depth to the solid geology is expected to be less than 5m, but may lie between 2 – 10m below the surface,
- The Geology and Soils Chapter also notes the presence of an old filling station near Jeanfield and an old landfill at Helenton Mains in respect of sites with potential contamination (it is noted that none of these sites will be disturbed during the proposed works),
- The SEPA "Bedrock Aquifers" classification confirms the information from the solid geology maps, i.e. that much of the route lies over bedrock with "Inter granular fracture flow with moderate productivity", but there are localised areas where the bedrock is noted as "Fracture flow with low productivity". The SEPA "Superficial Aquifers" map does not show any superficial aquifers in the study area. The SEPA "Vulnerability of Groundwater in the Uppermost Aquifer" map records the area as "Category 4, predominantly 4b" where categories range from 1 (least vulnerable) to 5 (most vulnerable); and

- The recently completed geotechnical investigation recorded groundwater in monitoring boreholes at between 2.5 – 4m below ground level at the proposed location of the Symington Junction, whilst at the proposed location of the Bogend Junction the groundwater level was recorded at 20m below ground level. The drift deposits at the proposed Symington Junction are described as sandy gravelly clays, with the solid deposits being an extensive layer of mudstone encountered at about 13m below ground level. The drift deposits at the proposed Bogend Junction are described as a sandy gravelly clay, with the solid deposits being a weathered basalt at about 14m below ground level,
- The area is not a Drinking Water Protected Area although it is identified as a Groundwater Body, as defined in the SEPA WFD Protected Areas Register. Information from the local Environmental Health Officer has confirmed that there are no private water supplies within the study area.

SEPA have confirmed that there is no current licensing system in Scotland for groundwater discharges or abstractions and that they do not undertake any groundwater monitoring within the study area.

Table 12.6 below outlines the characteristics of the local groundwater.

Table 12.6: Local Groundwater

Receptor	Environmental Importance	Socio-Economic Value	Recreational Value	Size of Water Body	Overall Sensitivity
Ground water	Not a groundwater protected zone but uppermost aquifers are classed as vulnerable by SEPA.	No specific groundwater abstractions identified within the study area, but locally moderate yields are possible.	Not applicable	Mixed due to different bedrock types.	**Medium**

12.4.6 Planning

Overarching Legislation

The WFD, enacted in Scotland by the Water Environment & Water Services Act (2003) aims to: protect and enhance the status of aquatic ecosystems; prevent further deterioration to such ecosystems; promote sustainable use of available water resources; and contribute to the mitigation of floods and droughts. A review of the SEPA website identified the area as being a designated groundwater body, however no areas were identified as “Waters Used for the Abstraction of Drinking Water”, “Water Dependant Conservation Areas”, “Areas Designated to Protect Economically Significant Aquatic Species and Bathing Water Directive Beaches”, and “Nutrient Sensitive Areas”.

In terms of groundwater, Scotland currently has no system for reporting the overall condition of groundwater. The Directive requires the reporting and recording of groundwater status, and SEPA have targeted the introduction of such a scheme by 2009. As with surface water bodies, good quality groundwater bodies will be protected and poorer quality groundwater bodies will be targeted for restoration.

SPP7

SPP7 provides the current context for planning controls on flood risk. SPP7 states as general principles that new developments should not: materially increase the risk of flooding elsewhere; add to the area of land which requires protection by flood prevention measures; affect the ability of the functional flood plain to attenuate the effects of flooding by storing flood water; interfere detrimentally with the flow of water in the flood plain; or compromise future options for future shoreline or river management.

Structure and Local Plans

These documents were reviewed in terms of policies affecting water resources features and the following policies are highlighted.

Ayrshire Joint Structure Plan

The joint Ayrshire Councils shall "actively seek to improve the urban and rural environment of Ayrshire, and, …shall not be supportive of development proposals which have significant adverse effects by means of…unacceptable pollution of air, water or land…"

"In allocating land for development, local plans shall seek to ensure that sites…do not have an adverse affect on land, air and water quality."

12.5 Environmental Effects

As a result of the consultations, site visits and desktop studies, the issues requiring consideration in this assessment were distilled down to those in Table 12.7 below.

Table 12.7: Water Resource Issues

General Issue	Specific Issues	Receptor/s
Surface Water Quality	Sediment mobilisation and spillage or discharge of other pollutants in watercourses (Construction Phase)	All Watercourses
	Discharge of road runoff to watercourses (Operational Phase)	All Watercourses
	Other road and infrastructure maintenance (Operational Phase)	All Watercourses
Flooding	Flood risk to surrounding land from development (Construction Phase)	Surrounding land & infrastructure
	Flood Risk to surrounding land from development (Operational Phase)	Surrounding land & infrastructure

General Issue	Specific Issues	Receptor/s
Geomorphology and Hydrology	Working within or immediately adjacent to watercourses (Construction Phase)	All watercourses
	New structures within or immediately adjacent to watercourses (Operation Phase)	All watercourses
	Alteration to land drainage patterns (Construction and Operation Phase)	All watercourses
	Runoff from the Scheme into watercourses (Operation Phase)	All watercourses with outfalls
Ground Water	Potential disturbance of groundwater movement (Construction Phase)	Groundwater
	Potential contamination of groundwater (Construction Phase)	Groundwater
	Potential disturbance of groundwater movement from the new road construction (Operational Phase)	Groundwater
	Potential contamination of groundwater (Operational Phase)	Groundwater

12.5.1 Effects of Construction

Surface Water Quality

The following assessment considers the potential for sediment release and spillage / discharge of pollutants (e.g. oils, fuels, chemicals) to surrounding waters during the construction phase, and the potential impacts that such a release may have on surface water quality.

Receptor(s)	All Watercourses
Relevant Scheme Information	Given the nature of the project there will be significant earth / rock moving activities during construction. This presents a significant risk of surface water runoff eroding bare slopes or material stockpiles, which can lead to increased suspended solids in watercourses. The construction phase also presents the potential for fuels, oils, and other chemicals to be spilled via an accident, improper usage, or poor storage. These could reach the receptors directly via discharge of polluted runoff or via seepage into the shallow groundwater. Construction workforce sewage and washing effluent would be contained and taken offsite. The risk of spillage to watercourses is considered to be negligible and this potential impact is therefore not considered further.
Sensitivity of Receptor(s)	**Medium** (see "Baseline" section)
Magnitude (and Type) of Effect	**Slight Adverse** (localised, temporary) – risk of significant discharge of polluting substances into a watercourse should be minimised through the application of the primary mitigation noted below. None of the works involve work over or immediately adjacent (i.e. closer than 20m) to mapped watercourse channels. Therefore the main potential source of polluting substances is likely to be through discharges into

	existing drains. Some local instances of suspended solid releases into watercourses may be experienced given the nature of the work. However, with primary mitigation applied, the extent and frequency of such a release should be minimised and the effects should be temporary in nature. Therefore no long-term impact on the water quality classification should be experienced.
Primary Mitigation Included	Consideration should be given to creating the treatment ponds at the outset of construction work, and these can then be used to treat construction stage site runoff prior to discharge. The Contractor shall implement best practice guidance as detailed in PPG's published by SEPA and CIRIA Report C532, as a minimum. The Contractor shall produce a site management plan covering the areas noted above, and all staff on site should be trained in the relevant best practice techniques. In particular, construction materials should be stored away from watercourses, plant should be stored and maintained away from watercourses, silt fences or similar should be considered around exposed ground and stockpiles, and early re-vegetation of the completed elements of the Scheme should be undertaken to reduce silt laden runoff.
Overall Significance	**Minor Adverse** (this concurs with the assessment in the Ecology Chapter, see section 6.7.3, which concludes that potential impacts on aquatic ecological features are not significantly negative)

Flooding

This part of the assessment considers whether or not the construction activities within the Scheme corridor would affect the flood risk within the identified floodplains.

Receptor(s)	Rural areas, residential properties, and other infrastructure located adjacent to the identified watercourses, including areas upstream and downstream
Relevant Scheme Information	During the construction works there will be no works required within or immediately adjacent to (i.e. within 20m) the identified watercourses, and therefore no direct effects on the capacity of watercourse channels. The earth moving activities to form the new junctions and access roads will not be within areas of identified flooding i.e. taking up space on the flood plain.
Sensitivity of Receptor(s)	Rural land is considered as having a **Low** sensitivity to increased flood risk, but individual residential property is considered as having a **High** sensitivity to increased flood risk.
Magnitude (and Type) of Effect	**Negligible Adverse** (localised and temporary) – with the primary mitigation measures included, the Contractor should be able to complete the works without increasing the risk of flooding to rural areas or residential property.
Primary Mitigation Included	The contractor should ensure that runoff from the site is monitored and that, as noted in the Surface Water Quality assessment above, consideration should be given to directing the construction stage runoff to the SUDS ponds for attenuation purposes before being discharged.

Overall Significance	**Negligible** for rural land and **Negligible** for residential properties

Geomorphology and Hydrology

This assessment considers the potential effects of the construction works on the structure of the bed and bank of each watercourse and the flow conveyance of each watercourse.

Receptor(s)	All Watercourses
Relevant Scheme Information	No crossings of the identified watercourses are planned as part of the construction works. There are not any new outfalls being constructed directly into watercourses, all drainage infrastructure will utilise existing outfalls.
Sensitivity of Receptor(s)	**Medium** (see "Baseline" section)
Magnitude (and Type) of Effect	**Negligible Adverse** (localised and temporary) for the watercourses as there should be no direct intrusion into watercourse channels or their surrounding banks. Surface water runoff from the site should be retained within existing natural catchments (i.e. split to the north and south of the A77 by the existing carriageway), and as long as they are controlled in accordance with the primary mitigation identified below there should be no inappropriately large point discharges.
Primary Mitigation Included	Where the works come close to an existing watercourse channel, the contractor should set out exclusion zones around each watercourse where there is the danger that machinery or construction material could encroach on the banks of a watercourse. These zones should be identified in the construction method statements, which should be highlighted to all site personnel. Surface water runoff from the site should be controlled on a catchment-by-catchment basis, i.e. runoff should be maintained within its natural catchment. As identified in the previous section, the contractor should ensure that runoff from the site is monitored and it is recommended that it is passed through the treatment ponds for attenuation purposes before being discharged. Discharge rates should be monitored and these should not exceed the allowable runoff rates for the completed scheme. The Contractor will need to liase with SEPA regarding the need for temporary discharge licences under the Controlled Activity Regulations.
Overall Significance	**Negligible Adverse** for the watercourses

Ground water

This assessment considers the potential effects of the construction works on the **movement** of the groundwater.

Receptor(s)	Ground Water
Relevant	Refer to Section 12.1.4 and Figures 12.2 & 12.3 for a description of the

Scheme Information	works at the two proposed junctions.
Sensitivity of Receptor(s)	**Medium** (see "Baseline" section)
Magnitude (and Type) of Effect	**Negligible** (localised, temporary) – at the proposed Bogend Junction all sections of new road are to be at grade or on low embankments with the exception of a short length of road (approx. 70m) of shallow cutting. Additionally the foundations for the proposed overbridge will protrude below ground level. However, the measured groundwater surface is at around 20m below ground level so no changes to groundwater movement are anticipated. **Slight** (localised, temporary) – at the proposed Symington Junction all new sections of road will be at grade or on embankments i.e. no cuttings potentially into the groundwater. There will likely be a local intrusion into the groundwater in the superficial deposits from the foundations for the overbridge, as the groundwater surface is at 2.5 – 4m below ground-level in this vicinity. However, an intrusion of such a limited plan area is not anticipated to significantly affect overall groundwater movement. There may however be a minor localised change in groundwater movement if dewatering techniques are employed to enable the foundations for the overbridge to be constructed.
Primary Mitigation Included	The Contractor should include a procedure in his method statements for controlling groundwater in the overlying drift deposits in sections where groundwater will be encountered during the works. This should include a SEPA approved strategy for disposing of groundwater from such operations e.g. treatment and attenuation before discharge to a local watercourse or ground recharge. Both of these may require a licence under the Controlled Activities Regulations.
Overall Significance	**Negligible to Minor Adverse** for the groundwater

This assessment considers the potential effects of the construction works on the **quality** of the groundwater.

Receptor(s)	Ground Water
Relevant Scheme Information	The construction works will involve earth moving plant and other machinery, and this presents a risk of spillage of fuels, oils, and other chemicals, which can seep into the shallow groundwater and potentially any fractures in the underlying bedrock. The project will also likely require at least two major construction compounds, providing welfare facilities for the Contractor, and these may retain a store of fuels, oils, and other chemicals.
Sensitivity of Receptor(s)	**Medium** (see "Baseline" section)
Magnitude (and Type) of Effect	**Negligible** (localised, temporary) – at the proposed Bogend Junction as the measured groundwater surface is at around 20m below ground level with a substantial thickness of low permeability drift deposits overlying a moderately permeable basalt rock. With the primary mitigation

	measures in place (see below) and continually monitored, the likelihood of significant quantities of contaminants being released should be low. Therefore, it is considered that, although there may be a residual risk of some small spills of oil or fuel from plant, the effects of these will be highly localised and are unlikely to reach the groundwater surface in any significant quantity. **Slight** (localised, temporary) – at the proposed Symington Junction as the measured groundwater surface is at around 2.5 – 4m below ground level with only a thin layer of low permeability drift deposits overlying a mudstone of reasonable depth. With the primary mitigation measures in place (see below) and continually monitored, the likelihood of significant quantities of contaminants being released should be low. Therefore, it is considered that the effects of small spills, whilst still being localised in extent, may have a slightly greater impact on groundwater quality compared to the Bogend Junction given the proximity of the groundwater to the surface.
Primary Mitigation Included	The Contractor should manage the works in accordance with the best practice guidance provided in the SEPA Pollution Prevention Guidelines and CIRIA Report C532 "Control of Water Pollution from Construction Sites". In particular the Contractor should provide bunds around all fuel, oil, and other chemical stores; centralise and minimise the number of these stores; complete all servicing, fuelling, and storage of vehicles at construction compounds; provide dedicated wash down areas for concrete and other delivery vehicles. The Contractor should implement drainage control measures at the site to prevent areas of standing surface water or groundwater that could become contaminated and leach into the shallow groundwater. Where collection of water at the site is unavoidable (e.g. large excavations), provision should be made for this water to be passed through some form of treatment before discharge. The Contractor would need to liase with SEPA regarding any proposed discharge from excavations in respect to the new Controlled Activities Regulations (2005).
Overall Significance	**Negligible to Minor Adverse** for the groundwater

12.5.2 Effects of Operation

Surface Water Quality

Discharge of Road Runoff

General

The main contaminants that might be carried into the watercourses from road run-off include suspended solids (including grit, mud, metal particles), copper and zinc (from deterioration of vehicles), organic materials and hydrocarbons (such as rubber, bitumen, grease, oil and fuel) and salt.

DMRB Volume 11, Section 3, Part 10, HA 216/06 provides a number of assessment methods to gauge the potential impact of run-off from roads on the water environment. This Advice Note also provides guidance on suitable mitigation measures that can be applied when the above assessments indicate a risk of pollution to the water environment.

Assessment of Potential Impacts of Routine Runoff

With regard to the potential contamination from discharge of routine road runoff into a watercourse, the Advice Note requires that a "Simple Assessment" be made initially to determine whether the watercourse is at high or low risk of pollution. This assessment involves examining the relationship between the predicted volume of runoff from the proposals, the assessed low flow within the watercourse, and the daily flow of vehicles (full details of the methodology are within HA 216/06). If this "Simple Assessment" puts a watercourse in the "low risk" category then no further assessment is required, and the guidance states that the simple assessment method "…produces conservative estimates, so that if it indicates low risk, there is a high level of confidence that there will be minimal impact". Should the "Simple Assessment" indicate that the watercourse is at "high risk", then the "Detailed Assessment" method needs to be used. This method compares the pre and post Scheme levels of Copper and Zinc within the watercourse against the relevant Environmental Quality Standard.

Based on the road layout and drainage design provided the "Method A" calculations have been undertaken. The road areas, drainage routes, and outfall locations are shown on Figures 12.2 & 12.3. The daily volume of river flow (at low flow conditions (Q_{95})) in each of the watercourses receiving a proposed discharge was calculated using standard low flow hydrology techniques, and these are; Pow Burn = 2287m^3/d, Unnamed Watercourse = 564m^3/d. The traffic flows (two way AADT) were taken from the traffic modeling for the future condition in 2024, and the maximum flows at each side of the junctions were assessed, see below:

- South side of Symington Junction = 2000 vehicles
- North side of Symington Junction = 2000 vehicles
- South side of Bogend Junction = 1700 vehicles
- North side of Bogend Junction = 1700 vehicles

It is noted that all of the proposed roads (including the access roads) on each side of the junctions have been assumed to have the volume of traffic noted above. This is a conservative approach as the traffic volume on a number of the side roads leading off the main junctions is considerably less as they only provide access to small settlements. Using this approach simplifies the calculations without compromising the quality of the assessment.

The "Method A" calculations were also undertaken to look at the potential cumulative effects of runoff from the existing A77 and the proposed junctions, as the new surface water drainage system will outfall into the existing drainage system (albeit after two levels of SUDS treatment). To do this an assumption had to be made about the existing drainage arrangements, as the local authority have

incomplete records of road drainage for the A77. In considering the cumulative effects on the Pow Burn the southern half of the A77 carriageway (some 10m in width) over a distance of 1000m centred on each junction was considered in addition to the area of proposed roadway from the new junctions. For the unnamed burn the northern half of the A77 carriageway (some 10m in width) over a distance of 1000m centred on the Symington Junction only was considered in addition to the area of proposed roadway from the new Symington Junction. The calculations were then completed using the A77 mainline traffic flows projected for 2024, which are 27,000 AADT. This is a conservative approach as the traffic flows are much lower than this on the junctions and side roads.

Using "Method A" and having investigated both the proposed discharges in isolation and attempting to undertake a cumulative assessment with the existing discharges from the A77, all calculations showed a "Low Risk" of pollution from routine runoff for both of the watercourses considered.

It is noted that the northern sections of the existing Bogend Junction appear to drain to the "Coodham Outfall", and under the proposals this outfall is to be retained to serve the existing and proposed sections of roadway around this junction. It is noted that all new sections of road, as well as some of the existing sections in the vicinity of the proposed roundabout, will pass through two levels of SUDS treatment before being discharged to this outfall under the proposals. The DMRB provides no method of assessing discharge to a standing water body.

De-icing salts will commonly be used on road between the months of November and March. It is noted that the concurrent flows in watercourses are relatively high during these months, and therefore the salts would be subject to reasonable dilution and dispersion on entering a watercourse. From PPG 10 it is noted that the "…use of salt on highways is unlikely to lead to levels in the water environment that could affect aquatic life or drinking water supplies". There is no specific assessment within the Advice Note for the potential impacts of de-icing salts on watercourses.

Assessment of Potential Impacts from Spillages

With regard to the potential contamination of a watercourse from an accidental spillage on the remodelled sections of the A77, the Advice Note requires an "Assessment of Pollution Impacts from Accidental Spillages" to be undertaken. This involves consideration of the probability of a spillage accident with an associated risk of serious pollution occurring. It is stated in the Advice Note that watercourses should be protected such that the risk of a serious pollution incident has an annual probability less than 1%.

The assessment method was followed for both the Pow Burn and the Unnamed watercourse, both of which currently receive road drainage discharges and will continue to do so under the new proposals. Given that there are no complete plans for the existing road drainage network, an informed assumption regarding the length of road draining to each of the identified watercourses is necessary to enable the calculations to be undertaken for the complete reach of each watercourse under consideration. To try and ensure the calculations are

reasonably conservative it has been assumed, based on a review of local topography, alignment of drainage ditches around the A77, and the proximity of each watercourse to the A77, that:

The southern half of the A77 for 2km centred around the Bogend Junction drains to the Pow Burn, whilst the northern half of the A77 for 2km centred around the Bogend Junction drains to Coodham Lake Outfall,

The southern half of the A77 for 3km from just north of Symington to a point in line with Rosemount drains to the Pow Burn, whilst the northern half of the A77 for 3km from just north of Symington to a point in line with Rosemount drains to the Unnamed Burn to the north.

The annual probability of a spillage incident was calculated for both the existing road layout and then the road layout after the proposed improvements, the results of which can be seen in Table 12.8 below. Dow's Burn has been ignored in this assessment, as no significant works are proposed to the A77 in this vicinity. No assessment of the spillage risk to Coodham Lake can be made using this method, as it is not suitable for standing waters.

Table 12.8: Risk of Pollution

Watercourse	Risk Probability Existing Case	Risk Probability After Proposed Improvements
Pow Burn	0.063%	0.061%
Unnamed Burn	0.038%	0.032%

In both cases the probability is significantly less that 1%, therefore no additional protection measures are required. It should be noted that the proposed road improvements are predicted to have a slight positive impact, in that they reduce the risk of an accidental spillage incident occurring. This concurs with the overall aim of the scheme, which is to reduce accidents by reducing the number of side roads coming onto the A77.

The calculations have assumed that all road runoff drains to surface water, but by inspection the risk will be equally low if all or part of the runoff were to go into the groundwater. The calculations for the situation after the proposed improvements do not take into account the risk reduction factors that would be applicable to new sections of road, which drain to two levels of SUDS treatment. This adds a further element of conservatism to the assessment.

Based on the above assessments the following summary of the effects on surface water quality has been derived.

Receptor(s)	All Watercourses & Coodham Lake
Relevant Scheme Information	Refer to Section 12.1.4 for details of the existing surface water drainage infrastructure and the proposed arrangements for surface water drainage from the two new junctions.
Sensitivity of Receptor(s)	**Medium** (see "Baseline" section for the Pow Burn and the Unnamed Burn)
Magnitude (and Type) of Effect	**Pow Burn - Negligible (permanent)** see Table 5.4 of HA 216/06 (i.e. low risk from Method A and risk of pollution from accidental spillage <0.5%) **Unnamed Watercourse – Negligible (permanent)** see Table 5.4 of HA 216/06 (i.e. low risk from Method A and risk of pollution from accidental spillage <0.5%) **Coodham Lake – Moderate (permanent)** based on the assessments undertaken for the other surface water resources and the fact that it is a discharge, albeit after two levels of SUDS treatment, to a standing water body with a regional importance ecologically
Primary Mitigation Included	The new sections of road are to incorporate SUDS principles, by providing two levels of treatment and attenuation to the road runoff. The proposed road alignment and profile has been designed to improve safety and hence reduce the risk of serious accidents and attendant spillages.
Overall Significance	**Pow Burn – Negligible Adverse** **Unnamed Watercourse – Negligible Adverse** **Coodham Lake – Minor Adverse** This agrees with the assessment in the Ecology Chapter, which concludes that there are unlikely to be significant effects on water habitats from discharge of road runoff

Other road and infrastructure maintenance

This assessment considers whether the maintenance of the road, gullies, and soft landscaping is likely to have any effect on the water quality of the surrounding watercourses. There is no specific guidance within DMRB HA 216/06 on assessing the potential impacts from this source of pollution.

Receptor(s)	All Watercourses & Coodham Lake
Relevant Scheme Information	During the operation of the Scheme the principal maintenance activities are likely to be road pavement maintenance (anticipated to be minimal during first 10years), cleaning debris from culverts (possibly annual), inspection and repair of overbridges (including crash barriers, etc) and maintenance of roadside verges (e.g. clearing debris, removing invasive species, etc). There will be a slight increase in the area of road embankments created by virtue of the new overbridges and the embanked access roads leading to / from these.

Sensitivity of Receptor(s)	**Medium** (see "Baseline" section)
Magnitude (and Type) of Effect	**Negligible Adverse** (localised, temporary) – given the location of the proposed junctions none of the road maintenance will be directly over or immediately adjacent to the identified watercourses. Therefore the only potential source of pollution would be the release of chemicals from infrastructure maintenance into drains, and this is not considered to have a major effect as polluted water would have to pass through the two levels of SUDS treatment before reaching any of the identified water resources. In addition the standard practices highlighted below in the primary mitigation section, should reduce the risk of a major spillage to a low level.
Primary Mitigation Included	Works to road infrastructure should be completed under an approved method statement and should include best practice measures (including the SEPA Pollution Prevention Guidelines) to reduce the risk of significant of major spillages to watercourses.
Overall Significance	**Negligible Adverse**

Flooding

This part of the assessment considers whether or not the completed junction improvements within the Scheme corridor would affect the flood risk within the identified floodplains.

Receptor(s)	Rural areas, residential properties, and other infrastructure located adjacent to the identified watercourses.
Relevant Scheme Information	The proposed works do not include permanent works within or immediately adjacent to (i.e. within 20m) the identified watercourses, and therefore there should be no direct effects on the capacity of watercourse channels. None of the proposed infrastructure lies within the indicative extents of the 1:100year flood envelope as defined by the mapping provided by South Ayrshire Council or the 1:200 year flood envelope from the SEPA indicative flood map. Therefore the development is not considered to be occupying space on the flood plains of identified watercourses. The scheme will discharge surface water runoff from new lengths of road into existing watercourses, albeit after treatment and attenuation. Note – the effects of road drainage on the hydrology of the burns is also separately considered in the assessment of Geomorphology and Hydrology below.
Sensitivity of Receptor(s)	Rural land is considered as having a **Low** sensitivity to increased flood risk, but individual residential property is considered as having a **High** sensitivity to increased flood risk.
Magnitude (and Type) of Effect	**Negligible Adverse** (localised, temporary) – given that there will be no construction works within the identified watercourses or within identified flood zones. With regard to discharges of road runoff from the proposed sections of road, these will be attenuated and the designers should

	ensure that discharges from the treatment ponds are in accordance with the guidance provided in CIRIA Report C697 for rates of Greenfield runoff. Given that there will be attenuation from both the filter drains and the treatment ponds and some infiltration into the ground there is not anticipated to be a problem with designing the surface water drainage system to control runoff rates to an acceptable level.
Primary Mitigation Included	As noted above, the designers should ensure that the rates of release of the surface water runoff from the treatment ponds are in accordance with the guidance provided in CIRIA Report C697 for acceptable rates of Greenfield runoff acceptable. The allowable rates for the Pow Burn and the Unnamed Burn will be different, given their differing hydrology.
Overall Significance	**Negligible Adverse**

Geomorphology and Hydrology

This assessment considers the potential effects of the proposed works on the structure of the bed and bank of each watercourse and the flow conveyance of each watercourse.

Receptor(s)	All Watercourses
Relevant Scheme Information	The proposed works do not involve any permanent works within or adjacent to the identified watercourses. Additionally, there are not any new drainage outfalls to the identified watercourses as part of the proposals, and the road drainage will pass to existing drainage outfalls.
Sensitivity of Receptor(s)	**Medium** (see “Baseline” section)
Magnitude (and Type) of Effect	**No effects**
Primary Mitigation Included	No primary mitigation is considered to be necessary at this stage.
Overall Significance	**No effects**

Runoff from the Scheme into watercourses

This assessment considers the potential effects of the surface water runoff from the Scheme on the geomorphology and hydrology of the watercourses they discharge into.

Receptor(s)	All Watercourses
Relevant Scheme Information	The proposed Scheme will increase the impermeable surface area to be drained, due to the additional link roads and junctions. The surface water drainage proposals for the new sections of road include filter drains and treatment ponds, see Section 12.4.1 for further details. Both of these features will provide attenuation of the runoff before discharge to existing outfalls.
Sensitivity of Receptor(s)	**Medium** (see "Baseline" section)
Magnitude (and Type) of Effect	**Negligible** (localised, temporal) - on the basis that the primary mitigation measures noted below are adopted, as the surface water runoff should be able to be controlled to an acceptable percentage of the concurrent flow in each watercourse using the attenuation provisions included in the scheme design.
Primary Mitigation Included	The designers should ensure that the rates of release of the surface water runoff from the treatment ponds are in accordance with the guidance provided in CIRIA Report C697 for allowable rates of Greenfield runoff. The allowable discharge rates into the Pow Burn and the Unnamed Burn will be different, given their differing hydrology.
Overall Significance	**Negligible Adverse** (temporal i.e. during and immediately after rainfall)

Alteration to land drainage patterns (overland flow)

This assessment considers the potential effects of the presence of the proposed junctions and side roads on the natural surface drainage patterns of the surrounding land. Given the similarities in effects between construction and operational phases, namely potential severance of overland flow between upslope and down slope, both phases have been considered in this assessment.

Receptor(s)	Watercourses
Relevant Scheme Information	During construction there will be the creation of new embankments and excavation for bridge foundations, and during operation there will be the presence of these new embankments (see Section 12.1.4 for full scheme details).
Sensitivity of Receptor(s)	The ultimate receptors will be the watercourses, and therefore sensitivity is **Medium** (see "Baseline" section).
Magnitude (and Type) of Effect	**Negligible Adverse** (localised, permanent) – the presence of the existing A77 carriageway influences the pattern of overland flow and effectively provides a dividing line between water draining south to the Pow Burn and that draining north to the unnamed burn. The proposed junctions and side roads do isolate small parcels of land between the proposed embankments for the new roads and the existing A77 carriageway.

	However, the areas enclosed are relatively small in comparison to the overall catchments of the two identified watercourses. In addition, toe drains are provided at the foot of each new embankment and the design of the surface water drainage system, which keeps runoff to the north and south of the A77 separate, and ensures that overland flow remains in the same catchment as it is at present.
Primary Mitigation Included	Overland flows will be collected in toe drains at the foot of embankments and discharged to nearest watercourse or drainage feature as existing, thereby retaining the water within its current drainage catchment and minimising hydrological changes to each watercourse.
Overall Significance	**Negligible Adverse**

Ground water

This assessment considers the potential effects on groundwater **movement** from the presence of the Scheme.

Receptor(s)	Ground Water
Relevant Scheme Information	Refer to Section 12.1.4 and Figures 12.2 & 12.3 for a description of the works at the two proposed junctions.
Sensitivity of Receptor(s)	**Medium** (see "Baseline" section)
Magnitude (and Type) of Effect	**Negligible** (localised, permanent) – at the proposed Bogend Junction all sections of new road are to be at grade or on low embankments with the exception of a short length of road (approx. 70m) of shallow cutting. Additionally the foundations for the proposed overbridge will protrude below ground level. However, the measured groundwater surface is at around 20m below ground level so no changes to groundwater movement are anticipated. **Slight** (localised, permanent) – at the proposed Symington Junction all new sections of road will be at grade or on low embankments. There will likely be a local intrusion into the groundwater in the superficial deposits from the foundations for the overbridge, as the groundwater surface is at 2.5 – 4m below ground - level in this vicinity. However, an intrusion of such a limited plan area is not anticipated to significantly affect overall groundwater movement in the area.
Primary Mitigation Included	No primary mitigation is considered to be necessary at this stage.
Overall Significance	**Negligible to Minor Adverse** for the groundwater

This assessment considers the potential effects on groundwater **quality** from the operation of the road.

Receptor(s)	Ground Water
Relevant Scheme Information	The main operational element of the Scheme that has the potential to affect the groundwater quality will be the surface water runoff from the road, which is being drained via kerbs and gullies into filter drains and then into treatment ponds. The other potential source for pollution is from vegetation maintenance alongside the road, where herbicides are used to control weeds along linear infrastructure features.
Sensitivity of Receptor(s)	**Medium** (see "Baseline" section)
Magnitude (and Type) of Effect	**Negligible / Slight Adverse** (widespread, permanent) – for the proposed Bogend Junction following Method C within HA216/06 puts the groundwater below the proposed Scheme site at low risk of impact (Table 5.4 of HA216/06). The calculated risk of pollution from accidental spillages is <0.5%, which places the groundwater at a negligible risk of impact (Table 5.4 of HA216/06). Overall magnitude assigned based on the combination of these two assessments. **Slight / Moderate Adverse** (widespread, permanent) – for the proposed Symington Junction following Method C within HA216/06 puts the groundwater below the proposed Scheme site at Medium risk of impact (Table 5.4 of HA216/06). The calculated risk of pollution from accidental spillages is <0.5%, which places the groundwater at a negligible risk of impact (Table 5.4 of HA216/06). Overall magnitude assigned based on the combination of these two assessments. It is noted that the Method C assessments were both completed using the full A77 traffic flows predicted for 2024, and given that the new drainage infrastructure only drains the side roads and junctions the traffic flows on these roads would be much less than this.
Primary Mitigation Included	The scheme design already incorporates linear soak-away features (i.e. filter drains) and two levels of SUDS treatment for the road runoff.
Overall Significance	**Negligible / Minor Adverse** for the Bogend Junction (which concurs with Table C.3 of HA216/06 based on the aquifer as a minor aquifer) **Minor / Moderate Adverse** for the Symington Junction (which concurs with Table C.3 of HA216/06 based on the aquifer as a minor aquifer)

12.5.3 Significance of Environment Effect

The significance of the environmental effects has been summarised in each of the above tables.

12.6 Mitigation

Primary mitigation, as defined in the assessment methodology (Section 12.2.3), has been included in each of the above assessments, and no specific requirement for secondary mitigation measures has been identified at this stage.

12.7 Residual Impacts

Residual impacts (including primary mitigation measures) have been determined in the tables in Section 12.5. It is noted that no significant residual impacts have been predicted at this stage.

12.8 Summary

This chapter addresses the potential effects on water resources as a result of the proposed Scheme. In the context of these proposals the significant water resources are the surface watercourses, surface water bodies and the groundwater. The assessment of effects was divided into four main areas, and these were: Surface Water Quality; Flooding; Geomorphology and Hydrology; and Groundwater. The predicted residual impacts ranged from Negligible to Minor / Moderate Adverse. Therefore, based on the assessment tools provided in DMRB HA216/06 and the additional assessments undertaken as part of this Chapter, it is considered unlikely that the proposed development would lead to any significant residual impacts on water resources features.

APPENDIX G

15 SUMMARY OF EFFECTS AND MITIGATION

The 1st paragraph in section 15.1 of the ES is deleted and replaced with:

Table 15.1 below reports the environmental effects associated with the Scheme, proposed mitigation where appropriate, and the identification of residual effects. Amendments have been made with respect to the impacts and mitigation linked to Ecology, Land Use, Landscape and Visual Effects and Water Resources.

ES Table 15.1 is deleted and replaced with:

(Please see over)

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
Air Quality				
Construction	Up to substantial adverse dust effects from junction and access road construction activities. No assessment of the impact from construction traffic possible, but unlikely to be significant.	Standard good practice mitigation as defined in the contractors contract documents	Up to moderate adverse dust effects from construction activities. Short term, reversible effects.	Moderate adverse within 50 m of junction and access road construction works.
Operational Traffic	Negligible beneficial at 25 properties, negligible adverse at 112 properties, 144 properties with no change	None recommended	-	Negligible
Cultural Heritage				
Site 8	Negligible effect on setting of Negligible significance.	None proposed	Negligible effect on setting of Negligible significance.	Negligible effect on setting of Negligible significance.
Site 9	Negligible effect on setting of Negligible significance.	None proposed	Negligible effect on setting of Negligible significance.	Negligible effect on setting of Negligible significance.
Site 10	Moderate effect on setting of Minor significance.	None proposed	Moderate effect on setting of Minor significance	Moderate effect on setting of Minor significance
Site 14	Moderate effect on setting of	None proposed	Moderate effect on setting of	Moderate effect on setting of

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
	Minor significance		*Minor significance*	*Minor significance*
Site 17	*Negligible effect on setting of Negligible significance.*	*None proposed*	*Negligible effect on setting of Negligible significance.*	*Negligible effect on setting of Negligible significance.*
Site 18	*Negligible effect on setting of Negligible significance.*	*None proposed*	*Negligible effect on setting of Negligible significance.*	*Negligible effect on setting of Negligible significance.*
Site 39	*Negligible effect on setting of Negligible significance*	*None proposed*	*Slight effect on setting of Negligible significance*	*Slight effect on setting of Negligible significance*
Site 44	*Negligible effect on setting of Negligible significance*	*None proposed*	*Slight effect on setting of Negligible significance*	*Slight effect on setting of Negligible significance*
Unknown archaeological sites	*Possibility that potential archaeological resources could be damaged during groundbreaking and construction activities. Potentially significant direct impacts would occur.*	*It is recommended that a programme of archaeological investigations be conducted in area of new land take to a strategy to be agreed with HS. Any sites identified would be fully recorded by an archaeologist if they could not be preserved in situ, therefore offsetting the impact.*	*The mitigation would offset the impact.*	*Potentially significant direct impacts would occur.*
Disruption Due to Construction				
Details of effects and mitigation associated with construction are reported within specific sections of this table.				

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
Ecology and Nature Conservation				
Terrestrial Habitats	Woodland and trees: Habitat fragmentation and reduction in habitat connectivity, effects on European Protected Species such as bats. Dense and scattered scrub: Loss of foraging and nesting habitat for breeding birds. Hedgerows: Loss of habitat connectivity, wildlife corridors and direct impacts upon species rich and species poor hedgerows. Grassland and marsh: Direct loss of grassland, particularly road verges. Overall: Loss of habitats and potential impacts upon watercourses. Not significant negative at the site/local level and certain to happen.	Mitigation measures suggested to protect the terrestrial habitats on site are: Direct habitat loss will be minimised where this is possible within the design of the Scheme. As the priority habitat along this corridor any impacts on woodlands will need to be minimised. This would take the form of avoiding direct intervention into woodland areas, and minimising any edge disturbance. Wherever possible mature trees should be retained, particularly around Trynlaw. Where removal or arboricultural works are to be undertaken, the trees will be subject to assessment with regard particularly to their bat roost potential and nesting bird potential. Impacts arising	Net reduction in semi-natural habitats.	Not significant negative at the site/local level: certain.

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
		from tree and scrub removal should be mitigated by compensatory planting where possible; *New road edges should include consideration of re-creating links or planting additional hedgerows. Landscape planting will be undertaken along the length of the Scheme, and further details of this are detailed in the Chapter 7 – Landscape and Visual Effects. The trees, scrub and any grassland mixes specified will be native species and have local provenance, in accordance with best practice;* *On site storage of chemical, fuel or construction materials shall be limited to those needed for immediate construction. All surplus materials will be removed from the works site as soon as their immediate purpose has been*		

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
		concluded; *The storage and construction compounds must be located within areas agreed with the Scheme ecologist, and clearly marked and fenced if necessary, to avoid incursion into ecologically sensitive habitats;*		
Watercourses	*Discharge of sediments and possible pollutants to surrounding watercourses during construction and operation. Potential for operational impact upon watercourses.* *Overall: Not-significant negative at the local level: unlikely.*	*Contractors will implement SEPA Pollution Prevention Guidelines (PPGs), including PPG2, PPG5, and PPG6 during the construction period, to safeguard the aquatic ecology interest of the watercourses within the site. CIRIA Report SP156. Control of Water Pollution from Construction Sites – Guide to Good Practice will also be referred to. Contractors will also have to comply with the regulatory controls of the Water Environment (Controlled Activities) (Scotland)*	*Minimised risk of negative impacts.*	*Not-significant negative at the local level: unlikely.*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
		Regulations 2005; Sustainable Urban Drainage System (SUDS) principles should be applied at suitable locations to trap operational related run-off to watercourses. It is anticipated that the requirement for SUDS systems, and exact locations will be decided in agreement with SEPA in accordance with the technical guidance set out in CIRIA Report C521 "Sustainable Urban Drainage Systems (SUDS) – a design manual for Scotland and Northern Ireland". This is likely to include provision of SUDS ponds at Bogend Toll Junction and Symington Junction. Other sections, which flow directly to watercourses, may be drained through carrier drains, which will provide some attenuation of the flows in advance of the outfalls, and some settlement of grit and other deposits will		

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
		be achieved within the gullies. Before each outfall there may be a requirement for bypass type fuel/oil interceptors providing primary treatment for the flows in advance of discharge to a watercourse (see Chapter 12). *The discharge of polluted waters will be avoided. Pollution contingency plans will be developed, including employment of silt traps. These should include designated members of staff to deal with emergencies if they arise;*		
Breeding Birds	*Outside the breeding season: Direct impacts from removal of foraging habitat and disturbance to birds. Removal of habitat may decrease attractiveness of area to birds, and alter population dynamics. Indirect impacts due to construction noise and*	*To avoid impacts, all tree or scrub removal should be undertaken outwith the breeding bird season, which is regarded as being between mid-March and August.* *Vegetation and tree removal should be avoided and minimised where possible. Landscape planting will be*	*Net-removal of breeding bird habitat.*	*Not significant negative at the regional/local: likely.*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
	lighting. Operational impacts not anticipated as birds already acclimatised to traffic in area. Overall: Not significant negative at the regional/local: likely.	*undertaken around the proposed Scheme to compensate for the loss of potential breeding habitat and further details of this will be provided in the landscape chapter. These plants should be native and of local provenance.*		
Otters	*Potential for direct impacts on the otters themselves or their rest areas due to construction/operational activity. Indirect impacts due to construction related traffic. Operation impacts may occur due to otters crossing new roads. Overall: Not significant negative at the regional level and extremely unlikely to happen.*	*The Scheme ecologist should conduct pre-construction checks for otter activity along the Pow and Dow's Burn. These checks should continue throughout the construction period. Should otter shelters be found, there are provisions in the legislation to allow actions to take place under licence that would otherwise contravene the law. Site compounds where lighting is used should be located well away from any of the watercourses, the Pow Burn in particular, so that the lighting does not disturb otter activity*	*No impacts after mitigation anticipated.*	*Not significant negative at the regional level and extremely unlikely to happen.*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
		during the hours of darkness. Site staff should be made aware of the potential presence of otters crossing roads within the Scheme area and on nearby roads, which can be included in the site induction "Toolbox talk". Otter signage would be appropriate measure, to alert vehicle travellers to the likely presence of otters at key locations.		
Water Voles	While water voles were not found in the survey area, they may move in by the time construction is underway and may found during pre-construction checks. This may then result in direct impacts on the water voles, their burrows, or their suitable habitat due to site clearance construction activity. Operational impacts not anticipated. Overall: Not significant	The Scheme ecologist should conduct pre-construction checks for water vole activity along the Pow and Dow's Burn, so see if they are utilising habitat on the site in close proximity to any of the construction activities, particularly along Dow's Burn.	No impacts after mitigation anticipated.	Not significant negative at the regional level: extremely unlikely.

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
	negative at the regional level: extremely unlikely.			
Bats	*a) The permanent and irreversible loss/disturbance of roosting bats through tree felling. Not significant negative at the regional level: unlikely.*	*As many deciduous trees as possible should be retained to provide potential bat roost habitat. Continuous strips of woodland should be maintained, in order to provide corridors for bats to access their foraging sites. If mature trees are to be felled, they should be checked immediately prior to felling by a bat specialist.*	*No impacts after mitigation anticipated.*	*Not significant negative at the regional level: unlikely*
	b) Permanent and irreversible loss of bat forage habitat. Not significant negative at the regional level: unlikely. *Operational impacts not anticipated as bats already acclimatised to traffic in area.*		*Net-removal of bat foraging habitat.*	*Not significant negative at the regional level: unlikely.*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	***Summary Of Effects Before Mitigation***	***Mitigation***	***Summary Of Effects After Mitigation***	***Significance Of Residual Effects***
Badgers	*Destruction of one outlier sett, currently disused. Significant (in the absence of mitigation) at the regional level and likely to happen.*	*Refer to Confidential Annex for detailed information: Licence from SNH, Ecological Clerk of Works required on site.*	*Removal of disused outlier sett.*	*Not significant negative at the regional level: likely.*
	Removal of badger habitat. Not significant at the regional level and likely.	*Minimise land-take required. Pre-construction checks required.*	*Minimal impacts on badger foraging habitat.*	*Not significant at the regional level and likely.*
Landscape Effects				
Landscape Character	*There will be an adverse impact on the landscape character as the structures and link roads are anomalous to the existing landscape character*	*Reduce the impact of the new roads and structures by additional hedge and tree planting to reflect the existing landscape character*	*Moderate adverse*	*As the planting matures and the construction effects are lost, the residual effects should be negligible.*
Properties at Bogend Toll	*Substantial impact to the visual amenity during the works and immediately following completion of works.*	*Attempt to minimise impact by sympathetic alignment of link roads, materials selection and new hedgerow / tree planting.*	*Moderate adverse*	*Minor adverse impact on visual amenity*
Properties in Symington	*No direct views of the works, but significant impact to visual amenity when accessing Symington*	*Minimise impact by landscape planting to reduce the effects due to the new structures and link roads*	*Moderate overall adverse impact on the visual amenity*	*Negligible adverse impact once mitigation measures blend the works into the surrounding landscape character*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
Properties close to A77 corridor	*There will be considerable disturbance during the works, especially to those who presently access directly onto the A77, but who will be accessed via link roads following the development.*	*Improve the visual appearance of these properties by removing the A77 accesses. Access will be via a series of link roads, which will be hedge and tree planted to reflect the surrounding landscape charachter.*	*Minor adverse*	*Some changes to the landscape pattern and the means of access to these properties. Negligible overall adverse impact.*
Properties with medium distance views of the work	*The works will be visible from a number of locations, as aberrations in the visual appearance of the landscape*	*The structures and link roads will be planted with hedgerows and trees to soften the impact and reflect the surrounding landscape character*	*Minor adverse*	*Some changes to the landscape pattern and the means of access to these properties. Negligible overall adverse impact.*
Properties with long distance views of the works	*The works will be visible from a number of locations, as aberrations in the visual appearance of the landscape*	*The structures and link roads will be planted with hedgerows and trees to soften the impact and reflect the surrounding landscape character*	*Negligible adverse*	*Some changes to the landscape pattern and the means of access to these properties. Negligible overall adverse impact.*
Users of the A77 (vehicular)	*The most obvious features will be the 2 bridged access arrangements. There will be fewer breaks in the central reservations and side accesses*	*Planting of the embankments will soften the impact of the bridges.*	*The minor works (central reservations and accesses) will be minor beneficial. The link roads will be largely screened or not visible from the carriageway. The bridges will have a lasting visual impact, as a feature of the road corridor..*	*Minor beneficial once the hedgerow and tree planting matures.*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
Land Use				
Agricultural land.	Potential severance of field boundaries and accesses due to permanent land take of approximately 8.3ha	Keep area of land take require for scheme to minimum. Avoid severance of fields and access.	The mitigation measures would lessen the impact of any agricultural land take.	Minor Adverse.
Residential Properties	Permanent land take of small areas of residential gardens.	Compensation. Landscaping. Minimise land take.	Residential land will be permanently removed from private garden use.	None predicted
Traffic Noise and Vibration				
Construction Noise	Moderate adverse impact at small number of properties along Kilmarnock Road, Whitelees, during construction of new access road. At most minor adverse at properties in the vicinity of Symington and Bogend Toll junctions	Use of site boundary noise barriers during construction of the new access road at the rear of properties on Kilmarnock Road, Whitelees	Reduction of predicted worst case construction noise levels to below South Ayrshire guidelines at all locations	Minor adverse
Traffic Noise	Long term adverse impact at 379 properties, negligible at 321, minor at 46, and moderate at 12. Long term	None recommended, moderate increases occur at properties along an existing side road where noise barriers	N/A	Overall ranked as negligible in the long term

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
	beneficial impact at 46 properties, 35 negligible and 11 minor.	*would be impractical*		
Traffic Vibration	*Negligible*	*None recommended*	*Negligible*	*Negligible*
Pedestrians, Cyclists, Equestrians and Community Effects				
B730 Bogend Toll Junction	*Temporary disturbance to access to/from B730.*	*Use of temporary traffic lights to control flow of traffic on B730 onto the A77.*	*There may be slight increases in journey time due to no turning point as a result of central reservation being closed up. However, the bridge will improve safety greatly.*	*Minor impact*
New stretch of carriageway between Bogend Toll and Whitelees	*Temporary disturbance to unclassified road at Whitelees to the A77.*	*Use of temporary traffic lights to control flow of traffic on already existing unclassified road.*	*The only access point to the northbound A77 is via the Bogend Toll or the Jeanfield overbridge. Existing access and central reserves stopped up.*	*Minor impact*
New stretch of road between Helentongate Farm Compound and Jeanfield.	*Temporary disturbance to unclassified road between Symington Road South and Symington Road North.*	*Use of temporary traffic lights to control flow of traffic during construction of new road where it meets unclassified road opposite Trynlaw.*	*No access from this new stretch of road onto unclassified road to Trynlaw. North and southbound traffic only have access at new Jeanfield overbridge.*	*Minor impact*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
New stretch of road from Symington Road North to Trynlaw, that rejoins the A77.	*Temporary disturbance to existing junction at Trynlaw.*	*Use of temporary traffic lights to control flow of traffic where it crosses existing road at Trynlaw.*	*Access points via Trynlaw and Symington Road North onto A77 to be stopped up. Traffic from Trynlaw and Symington Road North have to access A77 via Symington Road South. This will add on to the overall journey time.*	*Minor impact*
New junction on the north side of Symington Road South.	*Temporary disturbance to A77 during construction of overbridge.*	*Temporary traffic lights to control flow of traffic on A77.*	*Access to A77 southbound via overbridge.*	*Minor impact*
A new short stretch of road to be improved between Symington Road South and the existing unclassified road heading south towards Templands Cottage.	*Temporary disturbance to Symington Road South during construction phase of new stretch of road.*	*Use of traffic lights to control vehicular flows during road construction.*	*Access to Symington Road South is still available but the access point to the A77 has been closed up. Access to the A77 has to be via Symington Road South carriageway.*	*Minor impact*
New road from the C134 to Hansel Village,	*Temporary disturbance to existing road at Hansel Village.*	*Use of traffic lights to control vehicular flows during road construction.*	*Unclassified road access point to be closed up. Only access point to/from Hansel Village to*	*Minor impact*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
new internal access road, and private access road.			*A77 is via C134.*	
New stretch of road between Underwood Junction and Brocket	*Temporary disturbance to access from Rosemount during construction.*	*Use of temporary traffic lights to control traffic at Rosemount where new road meets existing road.*	*Access only available to A77 at Brocket and northbound traffic will have to travel to Dutch House Roundabout and double back.*	*Minor impact*
Vehicle Travellers				
N/A	*N/A*	*N/A*	*N/A*	*N/A*
Water Quality and Drainage				
Surrounding watercourses	*Sediment mobilisation and spillage or discharge of other pollutants in watercourses (Construction Phase)*	*Consideration should be given to creating the SUDS ponds at the outset of construction work, and these can then be used to treat construction stage site runoff prior to discharge.* *The Contractor shall implement best practice guidance as detailed in PPG's published by SEPA and CIRIA*	*Potential effects will be minimised*	*Minor Adverse*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
		Report C532, as a minimum. The Contractor shall produce a site management plan covering working around watercourse and minimisation of site runoff.		
Infrastructure surrounding watercourse crossings	*Flood risk to surrounding land from development (Construction Phase)*	*The contractor should ensure that runoff from the site is monitored and that, as noted above, consideration should be given to directing the construction stage runoff to the treatment ponds for attenuation purposes before being discharged.*	*Potential effects will be minimised*	*Negligible Adverse*
Surrounding watercourses	*Alteration / addition of watercourse crossings (Construction Phase)*	*Where the works come close to an existing watercourse channel, the contractor should set out exclusion zones around each watercourse where there is the danger that machinery or construction material could encroach on the banks of a watercourse. Surface water runoff from the*	*Potential effects will be minimised*	*Negligible Adverse*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
		site should be controlled on a catchment-by-catchment basis, i.e. runoff should be maintained within its natural catchment. See notes above regarding attenuation measures. The Contractor will need to liase with SEPA regarding the need for temporary discharge licences under the Controlled Activity Regulations.		
Groundwater under the proposed scheme	*Potential disturbance of groundwater movement (Construction Phase)*	*The Contractor should include a procedure in his method statements for controlling groundwater in the drift deposits. This should include a SEPA approved strategy for disposing of groundwater from such operations e.g. treatment and attenuation before discharge to a local watercourse or ground recharge. Both of these may require a licence under the Controlled Activities Regulations.*	*Potential effects will be minimised*	*Negligible to Minor Adverse*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
Groundwater under the proposed scheme	*Potential contamination to shallow groundwater (Construction Phase)*	*The Contractor should manage the works in accordance with the best practice guidance provided in the SEPA Pollution Prevention Guidelines and CIRIA Report C532* *The Contractor should implement drainage control measures at the site to prevent areas of standing surface water that could become contaminated. Where collection of water at the site is unavoidable, provision should be made for this water to be treated before discharge. The Contractor would need to liase with SEPA regarding any proposed discharge in respect to the Controlled Activities Regulations.*	*Potential effects will be minimised*	*Negligible to Minor Adverse*
Surrounding watercourses	*Discharge of road runoff to watercourses (Operational Phase)*	*The new sections of road are to incorporate SUDS principles, by providing two levels of treatment and*	*Potential effects will be minimised*	*Negligible to Minor Adverse*

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
		attenuation to the road runoff. The proposed road alignment and profile has been designed to improve safety and hence reduce the risk of serious accidents and attendant spillages.		
Surrounding watercourses	Discharge of pollutants from other road and infrastructure maintenance (Operational Phase)	Works to road infrastructure should be completed under an approved method statement and should include best practice measures (including the SEPA Pollution Prevention Guidelines) to reduce the risk of significant of major spillages to watercourses.	Potential effects will be minimised	Negligible Adverse
Infrastructure surrounding watercourse crossings	Flood Risk to surrounding land from development (Operational Phase)	The designers should ensure that the rates of release of the surface water runoff from the treatment ponds are in accordance with the guidance provided in CIRIA Report C697 for acceptable rates of Greenfield runoff acceptable.	Potential effects will be minimised	Negligible Adverse
Surrounding	Runoff from the scheme into	The designers should ensure	Potential effects will be	Negligible Adverse

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
watercourses	watercourses (Operation Phase)	that the rates of release of the surface water runoff from the SUDS ponds are in accordance with the guidance provided in CIRIA Report C697 for allowable rates of Greenfield runoff.	minimised	
Surrounding watercourses	Alteration to land drainage patterns (Construction and Operation Phase)	Overland flows will be collected in shallow ditches / swales at the foot of embankments and discharged to nearest watercourse or drainage feature as existing, thereby retaining the water within its current drainage catchment and minimising hydrological changes to each watercourse.	Potential effects will be minimised	Negligible Adverse
Groundwater under the proposed scheme	Potential disturbance of groundwater movement from the new road construction (Operational Phase)	None included at this stage.	Potential effects will be minimised	Negligible to Minor Adverse
Groundwater under the proposed scheme	Potential contamination to shallow groundwater (Operational Phase)	The scheme design already incorporates linear soak-away features (i.e. filter drains) and two levels of SUDS treatment for the road runoff.	Potential effects will be minimised	Negligible / Minor Adverse to Minor / Moderate Adverse

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
Geology and Soils				
Geomorphology	Construction of the scheme will have adverse impact on the topography of the area due to embankment construction, excavation and structure construction.	No measures Landscaping and re-planting will be undertaken to merge new earthworks with existing land.	Landscape altered to accommodate the scheme alignment	Negligible residual effect
Agriculture	Loss of agricultural soils from site operations and construction of the scheme.	Stripping topsoil and managing stockpiles for reuse. Consultation with farmers. Organise plant movements to minimise loss or damage to agricultural soils.	Minimisation of agricultural soil removed from site.	Negligible residual effect
Drift Deposits	Compaction of superficial geology.	No measures	Varying magnitudes of consolidation to the superficial geology	Negligible residual effect
Bedrock	Minor changes to solid geology due to excavation and possible piling for bridge structures. Possible grouting to suspected mine workings (to be confirmed by ground investigation).	No measures	Change in Bedrock profile at selected locations. Grouting, if required, would increase the stability of the area.	Negligible residual effect
Groundwater	Possible contamination of groundwater from site	Pollution control measures to deal with leachates from	Groundwater in accordance water quality standards during	Negligible residual effect

Table 15.1: Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
	operations. Potential to encounter water in suspected mine workings.	contaminated soils. Silt management to deal with run-off dewatering of excavations. Mine water arising from mine workings (if encountered) to be contained and treated prior to discharge.	and after site operations.	
Policy and Plans				
N/A				

APPENDIX H

NON TECHNICAL SUMMARY & FIGURES 1.1 –1.2 (SYMINGTON JUNCTION & BOGEND TOLL JUNCTION)

Hansel Village

Replace text for description of works- the first sentence will be replaced with the following:

There are two existing northern accesses in and out the developed area. The most western will be closed, retaining, slightly widening and improving the eastern access, and a new access link east to west across the Village will be built to allow access across to the residential properties on the west. This will be an in/out access. The new access link runs adjacent the commercial/work buildings. A new bus layby will be developed close to where the northern access on west side will be closed. The improved entrance will involve increasing the width of the entrance- the existing entrance wall will have some partial removal, then reinstatement of entrance gate features, and some minor hedge removal, with the majority of boundary trees being retained.

Water Resources

The Water Resources section of the Non-Technical Summary (pp 8-9) is deleted and replaced with:

This chapter assessed the potential effects on water resources as a result of the proposed development. In the context of these proposals the significant water resources are: the surface watercourses and the groundwater.

A brief summary of the predicted residual effects from the proposals is noted below.

***Surface Water Quality** – during construction a number of control measures should be put in place to reduce the potential for significant quantities of sediment or other typical construction pollutants being discharged via drains into watercourses. These measures are considered to be current best practice within the industry, and when implemented with good site management, no significant adverse effects are predicted. During operation road runoff from the new junctions and side roads will be collected and passed to primary treatment using filter drains or grassed swales alongside the road and then most runoff will also pass to a second level of treatment in the form of treatment ponds before being discharged to surrounding watercourses. Based on the inclusion of these treatment measures, there is not predicted to be any significant adverse effects on the existing water quality of the surrounding watercourses as a result of the proposals.*

Flooding *– none of the works will take place within or immediately adjacent to existing watercourse channels. Additionally, none of the works will be located within existing areas that are known to or are predicted to flood after heavy rainfall. Therefore, there are not predicted to be any significant adverse effects on the surrounding properties or land with respect to flooding as a result of the proposals.*

Geomorphology *(form and structure of watercourses) and* ***Hydrology*** *(flow within watercourses) – none of the works will take place within or immediately adjacent to existing watercourse channels, with the exception of one new culvert over a small drainage ditch. The road runoff from the new junctions and side roads will be discharged to a number of existing outfalls into surrounding watercourses. Attenuation will be provided within the proposed drainage infrastructure to ensure that the rate of discharge is appropriate to the watercourse being discharged into. Based on the above, there are not predicted to be any significant adverse effects on the geomorphology or hydrology of the surrounding watercourses as a result of the proposals.*

Groundwater *– there will be a limited intrusion below the groundwater level from the foundations for the proposed overbridges, but these are not predicted to have any significant adverse effects on the overall movement of groundwater in the area. During construction a number of control measures should be put in place to reduce the potential for significant quantities of typical construction pollutants passing into the groundwater. These measures are considered to be current best practice within the industry, and when implemented with good site management, no significant adverse effects are predicted on the quality of the groundwater. Impacts on groundwater quality during the operation of the proposed junctions and side roads are predicted to be minimal, based on the road runoff treatment measures provided, and the proposals are not predicted to have a significant adverse effect on the local groundwater quality.*

With the implementation of the primary mitigation measures detailed in Chapter 12 of the Environmental Statement Addendum, it is predicted that there will be no significant impacts on the water resources.