A68 Soutra South to Oxton Road Improvement Scheme

Addendum to Environmental Statement

Prepared by:

mouchel

Scottish Borders COUNCIL

For:

TRANSPORT SCOTLAND

Document Control Sheet

Project Title	A68 Soutra South to Oxton Road Improvement Scheme
Report Title	Addendum to Environmental Statement
Revision	-
Status	Final
Control Date	10 January 2011

Record of Issue

Issue	Status	Author	Date	Check	Date	Authorised	Date
1	First Draft	R McEvan A Morris C Nisbet	Jan 2011	D Murphy R McEvan	Jan 2011	P Frankland	Jan 2011
2	Final	R McEvan A Morris C Nisbet	Mar 2011	D Murphy R McEvan	Mar 2011	P Frankland	Mar 2011

Distribution

Organisation	Contact	Copies
Transport Scotland	Yvette Sheppard/Sandy Jamieson	1 electronic
Mouchel	Rachel McEvan	1 electronic
Scottish Borders Council	David Murphy	1 electronic

Quality Assurance

All Mouchel Limited environmental specialists are members of an appropriate professional institution and adhere to that institution's code of conduct. Mouchel Limited has an environmental management system based on the principles of ISO14001 and has a quality management system accredited to ISO9001.

Disclaimer

This Report is presented to Transport Scotland and may not be used or relied on by any other person or by the client in relation to any other matters not covered specifically by the scope of this Report.

Notwithstanding anything to the contrary contained in the report, Mouchel Limited is obliged to exercise reasonable skill, care and diligence in the performance of the services required by Transport Scotland and Mouchel Limited shall not be liable except to the extent that it has failed to exercise reasonable skill, care and diligence, and this report shall be read and construed accordingly.

This Report has been prepared by Mouchel Limited. No individual is personally liable in connection with the preparation of this Report. By receiving this Report and acting on it, the client or any other person accepts that no individual is personally liable whether in contract, tort, for breach of statutory duty or otherwise.

.

Contents

List of Figures and Appendices

1 Introduction

1.1 Background

In August 2008 an Environmental Statement (ES) was published for the A68 Soutra South to Oxton Road Improvement Scheme. The ES was prepared in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 11. Since publication of the ES, a change in baseline environmental conditions has necessitated amendments to certain components of the proposed scheme.

An addendum is therefore required to supplement the ES. This document provides such an addendum to consider the changes to the scheme since publication of the ES. It provides an assessment of the environmental impacts of the proposed changes, together with details of any additional mitigation or changes to the mitigation set out in the ES to address any adverse impact.

This report should be read in conjunction with the ES. Where a matter contained or referenced to in the ES is not referred to in this document the conclusions and assessments in the ES are unchanged in that respect.

1.2 Requirement for this Addendum

The proposed changes to the road improvement scheme were subject to a screening exercise to determine whether or not an addendum to the ES would be required. In accordance with Transport Scotland procedures a Record of Determination (ROD) was therefore prepared. The ROD concluded that although the changes to the scheme do not require any alteration to the main line improvement, they do relate to side road changes and require more significant river erosion protection works in proximity of a European designated nature conservation site – the River Tweed SAC. It was therefore deemed appropriate to prepare an addendum to the ES, focussing only on those aspects of the environment affected by the proposed changes.

1.3 Scope of the Addendum

As part of the ROD process, the changes to the road improvement scheme have been considered for each technical topic discussed in the ES, to identify those which are affected and hence which need to be included in the addendum report. The outcome of this process determined that the addendum would include assessment of the changes in relation to the following DMRB Volume 11 topics:

- Land Use.
- Landscape Effects.
- Ecology and Nature Conservation.
- Road Drainage and the Water Environment.

It was considered that there would be no change to the assessment previously undertaken and presented in the ES for the other Volume 11 technical topics.

There will be additional disturbance to the Headshaw Burn during erosion protection works, however this will be included under the Water Environment and Ecology sections of the addendum and a separate section on Disruption due to Construction is therefore not proposed.

1.4 Structure of the Addendum

This addendum report is structured into the following sections:

Section 1 provides an introduction, including the requirement for, scope and structure of the addendum.

Section 2 presents an overview of the proposed scheme together with a description of the changes assessed in the addendum.

Section 3 summarises the methodology adopted to carry out the environmental assessment presented in the addendum.

Sections 4 to 7 provides the environmental assessment of the relevant DMRB subject areas (with subsections on assessment methods, baseline conditions, predicted impacts, mitigation measures and residual impacts).

Section 8 provides a summary of the environmental impacts resulting from the proposed changes.

Section 9 summarises any additional mitigation measures, over and above that presented in the ES, or any changes to the mitigation previously set out in the ES.

Section 10 lists the references used throughout the report.

Section 11 contains relevant figures associated with technical topics.

Section 12 contains the appendices.

1.5 Comments on Addendum

A public consultation period of 6 weeks follows the date of publication of the Road Orders and the accompanying ES Addendum to enable interested parties to present their views or comments to the Scottish Ministers before a decision is made.

2 Scheme Overview and Description of Changes

2.1 Scheme Overview

The location of the A68 Soutra South to Oxton Improvement Scheme is illustrated in Figure 1.1.

The proposed scheme comprises of a widened and straightened carriageway located between the foot of Soutra Hill climbing lane to the north end of the differential acceleration lane (DAL) at Carfraemill Roundabout, a distance of approximately 2.15 km, plus improvements to side roads and farm/residential accesses. There is a changeover section at the C84 junction to Oxton. The changeover incorporates a ghost-island right turning lane for the C84 junction. North of the changeover there is dedicated southbound overtaking for 1260 m. South of the changeover the existing DAL is extended to provide 400 m of dedicated northbound overtaking.

The new carriageway configuration will comprise alternating Wide Single 2+1 (WS2+1). The WS2+1 consists of a wide single carriageway with two lanes in one direction providing dedicated overtaking opportunity and one lane in the opposite direction with overtaking prohibited in that direction. Overtaking will be provided in both northbound and southbound directions.

As part of the scheme, it will be necessary to close up the existing D47/5 Carfrae junction with the southbound A68 at the northern extent of the scheme. A new access road and junction will be provided approximately 100 m to the south of the existing junction in order to maintain access to the A68. The C83 Oxton junction with the A68 at this location will also require to be closed to vehicles. In order to maintain a link between the D47/5 and the C83 however, a pedestrian, equestrian and cyclist underpass will be provided in order to provide continued access to recreational users across the A68 at this location.

The existing Annfield Bridge at this D47/5 – C83 junction will remain in place in order to avoid severe environmental damage to the Headshaw Burn, although the existing bridge will require extending works in order to widen the A68 sufficiently to carry a WS2+1 arrangement. Widening works have been scheduled to take place opposite the southbound carriageway (on the northeast of the existing A68).

Due to the closure of the C83 junction with the A68 (to vehicles), a new side road will be constructed between the C84 and the C83 to allow traffic to exit the A68 at the C84 and travel to the D8/5 Hartside\Threeburnfold and the D1/5 Kirktonhill roads without passing through the village of Oxton. The existing private access to Riggsyde off the trunk road will be stopped up and a new means of access will be provided from the new side road linking the C84 and the C83. The new side road also provides access to adjacent farmland and will involve the construction of a new bridge across the Headshaw Burn.

The scheme proposals are presented in Figures 2.1a, 2.1b and 2.1c.

2.2 Description of the Changes

As a result of high rainfall events, in August and September 2008 and in the winter of 2009/ 2010, significant erosion and meandering has occurred along several reaches of the Headshaw Burn. This has necessitated changes to the scheme components, since publication of the Environmental Statement. These changes are as follows:

2.2.1 Side road realignment and Riggsyde access realignment (see Figure 2.2)

As indicated above, the new side road proposed as part of the road improvement scheme includes a new bridge crossing of the Headshaw Burn. The reach of the Headshaw Burn to be crossed by the new bridge, as detailed in the ES, has been subject to extensive erosion, as illustrated in Plate 1 below.

Plate 1: Erosion on Headshaw Burn downstream of Annfield Bridge at point of bridge crossing, looking downstream

Various options were considered to deal with this erosion. These included realigning the proposed side road to cross the burn at a more stable location, increasing the span of the proposed bridge to accommodate the erosion, realigning the burn back onto its original course and the option to remove the new side road from the scheme altogether. However following a brief appraisal of the options available it was decided that the bridge position be moved approximately 50 m upstream to a point which the burn is at least risk of erosion in the future. Erosion protection will be incorporated around the new bridge to protect the abutments, extending upstream and downstream of the bridge crossing.

The proposed erosion protection, illustrated on Figure 2.3 comprise rip rap placed around the toe of the bridge abutments on both sides of the channel. Geotextile will be placed under the rip rap to ensure continuity and integrity of the protection. The rip rap will be placed along the side of the abutments that are perpendicular to the channel and will face the greatest force during flood flows. It will also be placed on the downstream side of the abutment to reduce the potential for scour associated with the generation of eddies on the downstream side of the bridge. The rip rap will be boulder sized, and locally sourced. A combination of geotextile, rock rolls and coir rolls will also be installed along both banks of the burn for approximately 30 m upstream of the new bridge crossing, underneath the bridge and approximately 10 m downstream (60 m in total).

It is also proposed to realign the proposed private access road to Riggsyde, as shown on Figure 2.2, to provide an alignment that fits better with the existing landscape. This change has been requested by the owners of Riggsyde and as it will butt into the existing hillside it is considered that it will have a reduced visual impact on the property.

2.2.2 Erosion protection on the Headshaw Burn upstream and downstream of Annfield Bridge (see Figure 2.4)

Recent bankside erosion has occurred upstream of the Annfield Inn Bridge as illustrated in Plates 2 and 3 below.

Due to the close proximity of this erosion to the existing and proposed realigned A68, works are required to reinforce the banks and to protect them from future erosion which would put the road at risk.

Plate 2: Erosion on Headshaw Burn upstream of Annfield Inn Bridge, looking upstream

Plate 3: Erosion on Headshaw Burn upstream of Annfield Inn Bridge, looking downstream with A68 in background

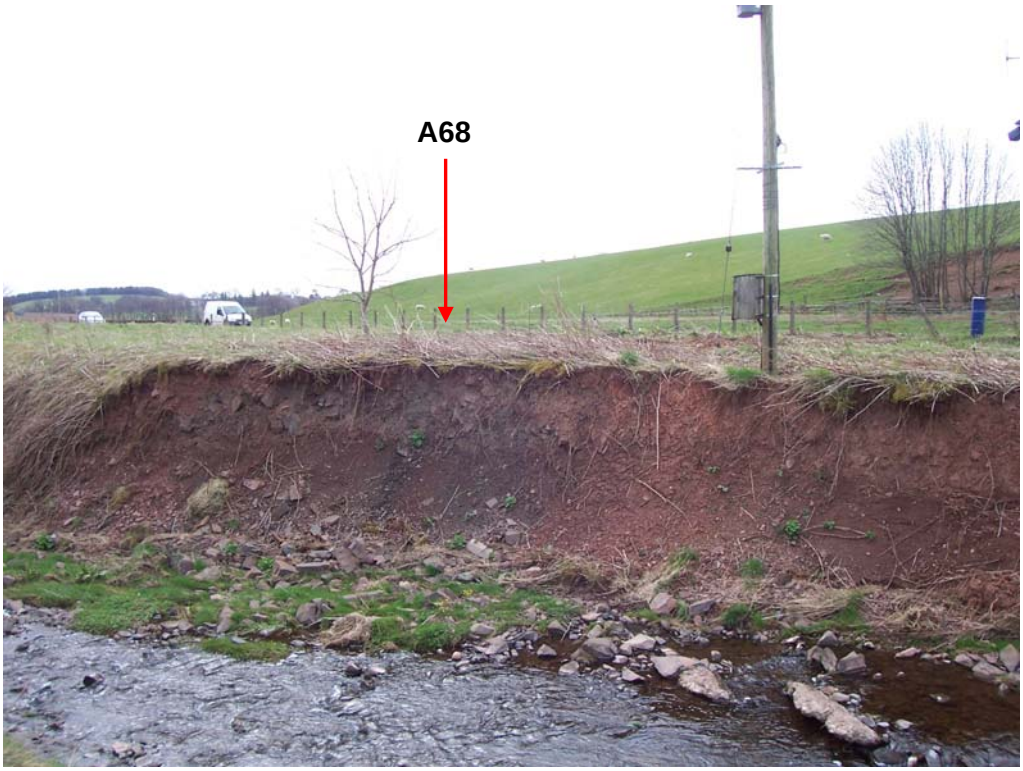

Figure 2.4 shows details of the proposed bank erosion protection measures.

The bank protection will extend from the area of maximum erosion in the top left of Figure 2.4 (Plate 2) to the Annfield Inn Bridge.

A combination of interlocking sheet piles, synthetic geotextile, filled rock rolls and pre-vegetated coir rolls will be installed as part of three different methods of protection adopted along approximately a 200 m stretch of the burn. At the main point of erosion, around 180 m upstream of Annfield Inn Bridge, approximately 40 m of sheet piles will be required on the outside of the meander bend extending 2 m upstream of where the erosion starts to the point of inflexion at the transition of the two bends. Rock rolls and coir rolls will be embedded into the existing watercourse to face off the piles and the backfill to the sheet piles will be strengthened by the geotextile. Immediately upstream and downstream of the sheet piling, a combination of the geotextile, rock rolls and coir rolls will be used to provide the necessary erosion protection. In these areas the rock/coir rolls will be underlain with the geotextile, which will cover the whole height of the banks, securely fastened with staples/stakes throughout and anchored at the top of the embankment in a constructed trench which is to be backfilled and compacted. The bottom of the banks of the final 100 m of burn immediately upstream of the Annfield Inn Bridge are to be protected with rock rolls and coir rolls.

Rock rolls (large gravel to small cobble-sized stones held together within braided polyethylene yarn) will be installed as a revetment to protect the toe of the river bank.

They will be embedded into the existing watercourse and embankment. It is proposed that 2-3 rock rolls in conjunction with 1 coir roll will be stacked on top of each other to increase the height of protection on the bank. The pre-vegetated coir rolls (a mix of native wetland plants held together within polyethylene yarn) will be installed alongside the rock rolls as a way of ensuring that the rock roll vegetation becomes established as quickly as possible to provide an organic revetment.

A further section of the Headshaw Burn requires protection downstream of Annfield Bridge and on the west side of the A68 where the Headshaw Burn has migrated towards the toe of the A68 where it is starting to erode it (as shown in Plate 4 below).

Plate 4: Erosion on Headshaw Burn downstream of Annfield Bridge

In this location, a combination of geotextile, rock rolls and coir rolls is proposed as indicated on Figure 2.4.

3 General Approach to the Assessment

3.1 Overview

The assessment of environmental impacts associated with the scheme changes has been undertaken in accordance the methodology set out in the ES (section 3.2.3) and therefore considered the following for each technical topic being considered:

- identification of baseline conditions in proximity of the proposed changes;
- consideration of potential impacts and an assessment of impact significance, taking into account sensitivity of resources and magnitude of impact;
- identification of mitigation measures to address the impacts identified; and
- assessment of the significance of residual impacts.

3.2 Baseline Information

In order to inform the assessment of the changes proposed, baseline information presented in the ES has been reviewed and updated where applicable through consultation with relevant organisations and field survey.

Baseline information only of relevance to the proposed changes is presented in this addendum.

3.3 Consultations

The following organisations have been consulted regarding the proposed changes:

- Scottish Natural Heritage (SNH) – site meetings and written correspondence.
- Scottish Environment Protection Agency (SEPA) – site meetings and written correspondence.
- Tweed Foundation – the Tweed Foundation were informed of the progress with the scheme and the need to undertake erosion protection measures on the Headshaw Burn. They were invited to attend a site meeting with SEPA/SNH but were not present. The Foundation has also been contacted by email for the Addendum and a response is currently awaited.

Written correspondence with SEPA and SNH is included in Appendix 1 and this relates to discussions regarding the realigned side road and also the erosion protection requirements further upstream.

Upon consideration of the proposed changes, it was not considered necessary to consult with any other parties, but rather to focus on the above organisations that have an interest in works within and adjacent to the Headshaw Burn.

3.4 Field Survey

Ecological surveys were undertaken to update the previous surveys that were carried out for the ES during 2004 and 2005.

Terrestrial ecology update surveys were undertaken during May 2010 for bats, otter (*Lutra lutra*), red squirrel (*Sciurus vulgaris*), water vole (*Arvicola terrestris*) and badger (*Meles meles*) along the footprint of entire scheme and an additional buffer zone of 50 m. Where the any watercourses are crossed, an additional buffer of 250 m upstream and downstream of any crossing was also surveyed for sign of otter and water vole. The areas surveyed included the location of the proposed changes.

Aquatic surveys and assessment were also carried out during May 2010 along the Headshaw Burn and Leader water and these comprised the following:

- River Habitat Survey.
- Aquatic flora.
- Benthic invertebrate fauna.
- Fish fauna.

3.5 Impact Assessment Methodology

The assessment of impacts is based on a standard method generally used by EIA practitioners which involves an analysis of relevant receptor sensitivity (importance or value), the impact magnitude and significance of impact. This relates to the impact assessment criteria set out in the ES. A summary of impact assessment criteria specific to each topic covered by this addendum is provided in the relevant sections.

It should be noted that the DMRB Volume 11 is currently being revised and guidance on specific technical topics has been revised since the publication of the ES in 2008. Where appropriate the updated guidance has been used for the assessment presented in this addendum, however, in order to maintain consistency with the original ES terminology, impact assessment criteria generally follows that established for the ES.

4 Land Use

4.1 Introduction

This Chapter provides an assessment of the potential effects of the proposed scheme changes, detailed in Chapter 2, on existing and future land use based on the guidelines set out in DMRB Volume 11, Section 3, Part 6 (1993 and amendments). It should be read in conjunction with Chapter 7 of the ES.

The main effects considered are land-take and the effects on private property and agricultural land. These are the only aspects that may potentially be affected by the scheme changes.

In addition, a review of the most recent planning documentation (the Finalised Local Plan, Core Paths Plan and relevant planning applications/consents) is undertaken to establish if any development land or planning applications/consents are now applicable, since ES publication.

4.2 Methodology

Baseline information on land use in proximity of the proposed changes was obtained through review of information contained within the ES, which was collated by desk study, consultations and site walkovers. As detailed in Chapter 3, this information was updated where necessary based on more recent site inspection and review of the Finalised Local Plan, Core Paths Plan and relevant planning applications/consents.

In terms of assessment of land use impacts, the methodology as set out in the ES and in Chapter 3 of this addendum has been used. This involves an analysis of relevant receptor value, the impact magnitude and the significance of impact.

The scaling systems used for land use, as provided in section 7.2.2.of the ES, are as follows:

- Receptor value – high, medium and low.
- Magnitude of impact – major, moderate, slight and negligible.
- Significance of impact (determined as a combination of sensitivity and magnitude) – negligible, slight, moderate and major.

For full details of the criteria applicable to each of the above levels of receptor sensitivity and magnitude of impact, and for details how these are combined to determine the significance of impacts, refer to Chapter 7 (Tables 7.1, 7.2 & 7.3) of the ES.

4.3 Baseline Conditions

4.3.1 Private Property

There are two areas of private, non-agricultural land, within the proximity of the scheme changes. The first area is a small single residential property known as Riggsyde

(0.11ha) adjacent to the A68, marked number 11 and shaded in purple on Figure 4.1. The only access to this property is directly from the A68 which will be affected by the proposed scheme. This property also includes an agricultural field (3.19ha) which is informally let to a local farmer for grazing. The land associated with Riggsyde is assessed as being of medium value in terms of land use.

The second area (0.6ha) of non-agricultural land, marked number 13 and shaded in pink on Figure 4.1, located adjacent to the A68 at the north end of the proposed scheme, includes a small area (0.2ha) of immature mixed hardwood planting known as Henry's Wood. This was planted in the early nineties on an area of land previously used as a site compound for construction of the existing climbing lane on the A68, and is privately owned by the occupier of Channelkirk Cottage, Oxton. This land is assessed as being of low value in terms of land use.

4.3.2 Community Land

Chapter 7 of the ES reported that no community land had been identified within the study area. However, although unaffected by the scheme changes, there has been a recent change to the baseline conditions that will be impacted upon by the scheme as a whole. The change affects a 5ha field which forms part of Justicehall and is marked number 5 and shaded in grey on Figure 4.1. The field is located between Riggsyde (marked number 11 and shaded in purple on Figure 4.1) and the Leader Water.

This field was previously used to host the Oxton Games, a one-day athletics event that took place annually in either June or July. The Oxton Games were discontinued in the mid-1990s, however following a 13 year absence the games took place in 2010 and are planned again for July 2011. As the Oxton Games are part of the Border Athletic calendar and are attended by athletes from the local area as well as the wider area, this land is assessed as being of regional/local importance and therefore medium value.

4.3.3 Development Land

The review of the Finalised Local Plan, Core Paths Plan and relevant planning applications/consents did not identify any proposed development land with the study area.

4.3.4 Agricultural Land

In terms of assessment for agriculture, the methodology as set out in the ES has been used. The land capability for agriculture of the area is shown on Figure 4.2.

The land which the realigned new side road will cross is categorised as Class 4_1 and 4_2 Land Capability for Agriculture (under the Macaulay Institute classification scheme) and is predominantly used for livestock grazing. Field boundaries are defined by post and wire fences and defunct hawthorn or beech hedges. This land is assessed as being of medium value in terms of land use.

Individual farm holdings are shown on Figure 4.1. The farm holdings affected by the realignment of the new side road are Kirktonhill and Carfrae (areas numbered 2 & 3).

4.4 Assessment of Changes

The potential impacts of the scheme changes are as follows:

- Loss of MLURI Class 4_1 grazing land associated with private access to Riggsyde.
- Loss of private woodland at Henry's Wood.
- Loss of MLURI Class 4_1 agricultural land associated with Carfrae Farm.
- Loss of MLURI Class 4_1 and 4_2 agricultural land associated with Kirktonhill Farm.

The potential impacts associated with the change in baseline conditions (i.e. re-emergence of the Oxton Games) are as follows:

- Loss of Class 4_1 agricultural land associated with Justicehall, which is used by the community one day a year for the Oxton Games.

4.4.1 Private Property

The proposed private access to Riggsyde has been realigned at the request of the land/property owners (see Figure 2.2). Although the realigned access is considered to have a reduced visual impact on Riggsyde, it does result in a slightly greater loss of the grazing land (MLURI Class 4_1) associated with the property. In total the loss of land has increased from 1.15ha to 1.21ha (a 0.06ha increase from the previous alignment of the property access reported in the ES), therefore reducing the total area of land associated with the property from 3.19ha at present to 1.98ha. The impact magnitude of this loss of land is still considered to be moderate adverse, as reported in the ES. Combining this with the site's medium sensitivity gives rise to a moderate adverse impact significance.

Due to the need to access the Headshaw Burn to construct the proposed erosion protection measures there will be additional loss of land adjacent to Headshaw Burn, which includes Henry's Wood, the only other area of private, non-agricultural land within the study area. The total area of land which includes Henry's Wood will be reduced from approximately 0.6ha to 0.3ha. Henry's Wood consists of approximately 0.2ha of this area and this will be lost completely (see Figure 2.4). The impact magnitude of this loss of land is considered to be major adverse, but in a very localised context. Combining this with the site's low sensitivity gives rise to a moderate adverse impact significance.

4.4.2 Community Land

The provision of the proposed new side road requires the acquisition of a small area of the field used for the Oxton Games. Only a small corner (approximately 0.13ha) of this field, which equates to approximately 2.7% of its total area, will be lost as a result of the scheme. It is not considered that this loss of land will not significantly affect its use therefore the impact magnitude is considered to be slight adverse. Combining this with the site's medium value/sensitivity gives rise to a slight adverse impact significance.

4.4.3 Development Land

There remains no impact on development land as a result of the scheme or the scheme changes.

4.4.4 Agricultural Land

The realignment of the proposed new side road will result in a negligible increase (approximately 0.3ha) in the loss of land (MLURI Class 4_1 and 4_2) associated with the Carfrae and Kirktonhill Farms. This additional land is predominantly around the proposed burn crossing where additional land is required to construct the associated erosion protection measures. It is considered that the impact magnitude of this loss of agricultural land remains slight adverse (as assessed in the ES), therefore when combined with the medium value of the land this gives rise to a slight adverse impact significance.

The other impact of the road realignment relates to the increase in severance on the two fields located either side of the Headshaw Burn. Moving the road north reduces the size of the two fields to the north of the road and isolates a slightly greater area of land between the side road and the Mountmill Burn. The two fields affected by this increased severance are marked on Figure 2.2. The field to the west of the Headshaw Burn is a 3.5ha field forming part of Kirktonhill Farm, and the field to the east is a 7.8ha field forming part of Carfrae Farm. The impact magnitude of this severance is considered to be slight adverse. Combining this with the site's medium value gives rise to slight adverse impact significance.

The viability of both Cafrae and Kirktonhill farms will not be affected by this increased land take or severance.

4.5 Mitigation

Mitigation as set out in section 7.5 of the ES will be adopted. Additional mitigation measures to offset the loss of land from Henry's Wood due to the incorporation of erosion protection along the Headshaw Burn comprises the following:

- Henry's Wood will be replanted, during the construction phase, with an appropriate mix of species in consultation with the existing landowner, and any surplus land will be offered back to the original landowner. Additional planting will also be provided on the opposite side of Headshaw Burn in this area.

4.6 Residual Impact

The residual impacts with the mitigation in place remain unchanged from that reported in Chapter 7 (section 7.6) of the ES. The only exception being the addition of the impacts on Community Land, following the re-establishment of the Oxton Games at Justicehall.

Table 4.1 below shows the residual impacts of the aspects affected by the recent scheme changes and changes in baseline conditions.

Table 4.1. Land Use Impacts With and Without Mitigation.

Land Use	Impact Without Mitigation	Impact With Mitigation (Residual Impact)
Private Property		
Land Take - Riggsyde	Moderate adverse	Slight adverse
Land Take - Henry's Wood	Moderate adverse	Slight adverse
Community Land		
Land Take – Justicehall (Oxton Games)	Slight adverse	Slight adverse
Agricultural Land		
Land Take - New Side Road	Slight adverse	Slight adverse

5 Landscape Effects

5.1 Introduction

This chapter includes consideration of both landscape and visual issues for the proposed scheme changes based on DMRB Volume 11 guidelines. It should be read in conjunction with Chapter 9 (Landscape Effects) of the ES.

5.2 Methodology

Baseline information relevant to the landscape and visual assessments in proximity of the proposed changes was obtained through review of information contained within the ES, which was collated by desk study, consultations and site walkovers. This information was updated where necessary based on more recent site inspection.

In terms of assessment of the landscape effects, the methodology as set out in the ES has been used. This involves an analysis of relevant receptor sensitivity, the impact magnitude and the significance of impact.

The scaling systems used for both landscape and visual issues, as provided in sections 9.1 and 9.2 of the ES, are as follows:

- Receptor sensitivity – high, medium and low.
- Magnitude of impact – major, moderate, slight and negligible.
- Significance of impact (determined as a combination of sensitivity and magnitude) – negligible, slight, slight/moderate, moderate, major/moderate and major.

For full details of the criteria applicable to each of the above levels of receptor sensitivity and magnitude of impact, and for details how these are combined to determine the significance of impacts, refer to Chapter 9 (Tables 9.1, 9.2, 9.3, 9.4, 9.6, 9.7 & 9.8) of the ES.

5.3 Baseline Conditions

The original study area for the scheme covers approximately 200ha and lies north of the Carfraemill roundabout either side of the A68 trunk road for a distance of approximately 2.6 km. The study area and the various landscape features and visual receptors are shown on Figure 5.1.

The landscape features in the vicinity of the scheme changes include:

- Low lying grassland near to the Headshaw Burn/Leader Water.
- Henry's Wood.
- The Headshaw Burn.

The existing landscape is attractive, but it is neither rare nor unusual in the Scottish Borders. The main characteristic of the area is that it is the transitional area at the

head of the Leader valley between the wider agricultural valley and the hills, with important views to the north and south. Given the focus beyond this immediate area, the value of this area and its sensitivity to change are assessed as being medium.

A summary of the landscape attributes is provided in Table 5.1 below.

Table 5.1 Summary of Landscape Attributes

Landscape Attributes	Description
Positive Character	The site is an attractive upper river valley with good views to north and south
Negative Character	The A68 is a disturbance in the area
Landscape Sensitivity	Medium
Likely Landscape Trends	Increased traffic, which may happen over time could reduce visual and environmental amenity
Likely Trends (Do Minimum)	If traffic increased this would reduce visual amenity
Landscape Value and Public Perception	This is an attractive landscape, with particular ecological value associated with the river.

The visual receptors in the vicinity of the scheme changes include:

- Riggsyde.
- A68 Trunk Road.
- C83 Side Road.

5.4 Assessment of Changes

5.4.1 Realignment of New Side Road

The realignment of the new side road affects the northern section of the road between approximately Ch 500 and Ch 950 (See Figure 2.2). At around Ch 500 the proposed side road is realigned to the north and crosses the Headshaw Burn at Ch 750, approximately 50 m upstream of the original proposal (assessed in the ES), before it ties into the C83 minor road just before Ch 1000. The southern most section of the new side road (Ch 0 to Ch 500) will still follow the line of existing hedgerows / trees, fitting with the existing lines of the landscape.

As reported in the ES, the northern most section of the new side road will be visible briefly from the southbound carriageway of the A68, as it will be on embankment between approximately Ch 550 and Ch 800. However, due to the topography of the land in this area and the fact that the realigned road crosses the Headshaw Burn further upstream, the new road, although on a similar size embankment as proposed originally, will sit approximately 1m higher than the original proposal as it crosses the burn. However the proposal to plant a hedge on the northeast side of the new side

road along its entire length will screen the new road and its embankment from the A68 and Riggsyde.

The private access to Riggsyde has also been realigned (as shown on Figure 2.2) at the request of the property owners. The realigned access will butt into the existing hillside and therefore is considered to have a reduced visual impact on the property.

The visual impact of the new side road and private access to Riggsyde on the existing landscape character would be comparable to that presented in the ES, i.e. of slight magnitude on receptors of medium sensitivity. The significance of the change is therefore assessed as slight / moderate adverse, as per the assessment in the ES.

5.4.2 Erosion Protection Measures

The erosion protection measure will have a landscape impact on the riparian corridor of the Headshaw Burn. The burn bank will have to be stripped of topsoil, and graded to an appropriate slope in some localised areas, to allow the installation of the geotextile. In these areas, the banks will be reinstated with an appropriate grass seed mix.

The small area of woodland (approximately 2,000 m^2) known as Henry's Wood will be removed to allow access to construct the erosion protection measures upstream of the Annfield Inn Bridge. This will be replaced with woodland planting on either side of the burn. The total area of this replacement woodland planting will be approximately 2,500 m^2.

The landscape sensitivity of the areas affected by the erosion protection measures are considered to be low. The magnitude of the impact is assessed as major therefore when combined with the low sensitivity, the significance of this additional impact is moderate adverse for these localised areas.

There is also a positive landscape/amenity impact to be had in longer term due to the incorporation of the erosion protection, which will provide restoration/enhancement benefits to the riparian zone through initial installation of pre-vegetated coir rolls. This will not only provide a source of initial vegetation but will also allow natural colonisation to occur.

5.5 Mitigation

The general landscape design principles as set out in section 9.4 of the ES will be applied. The revised landscape mitigation for the scheme is shown on the indicative landscape plans, Figures 5.2, 5.3 and 5.4. These Figures supersede Figures 9.2, 9.3 and 9.4 contained in the ES. A summary of the landscape mitigation changes/additions is given below:

- Hedge adjacent to the new side road is realigned to match the realigned side road.
- Additional riparian planting adjacent to the Headshaw Burn to replace Henry's Wood (removed to enable access to construct the erosion protection measures).

- Reinstatement of disturbed sections of the Headshaw Burn banks.

No landscape mitigation, other than the reinstatement of disturbed areas, is proposed adjacent to the realigned Riggsyde access road. Preliminary proposals were discussed with the property owners but these have been removed at their request. Possible accommodation works landscaping may be developed at a later date in consultation with the owners.

5.6 Residual Impact

The residual impacts with the mitigation in place remain unchanged from that reported in Chapter 9 (section 9.5) of the ES.

The assessment of the residual impacts includes assessing the landscape and visual impact of the proposed scheme, taking into account the above mitigation in the winter, fifteen years following the scheme opening. It indicates that appropriate mitigation measures as recommended above will reduce the significance of the visual and landscape impact of the scheme to negligible and therefore not significant overall.

The existing adverse impact of the road in the area will not be significantly changed, but there will be an opportunity to increase visual amenity and biodiversity by improving the hedgerows through planting enhancements, and carrying out additional woodland planting.

6 Ecology and Nature Conservation

6.1 Introduction

Due to the passage of time and changes in the site conditions since publication of the ES for the A68 Soutra South to Oxton Road Improvement Scheme, Mouchel were commissioned to produce undertake update ecological surveys and to prepare survey reports to inform the baseline assessment. This included for both the terrestrial and aquatic elements for the proposed scheme (Mouchel, 2010) in order to assess the ecological value of the study area and to fully inform the mitigation process.

As well as detailed desktop studies in order to determine statutory, non-statutory, and Water Framework Directive (WFD) classifications, specific terrestrial surveys were undertaken for bats, otter, red squirrel, water vole and badger. Aquatic ecology was assessed in more detail, during the update ecology work undertaken in 2010.

This chapter of the Addendum summarises the results of the original ES (AMEC, 2008), and the 2010 update ecology work. It then makes an assessment of the changes to the scheme proposals and re-assesses these changes for possible further mitigation/ecological recommendations. It should be read in conjunction with Chapter 8 of the ES.

It should be noted that a separate assessment of the scheme under the Habitat Regulations has also been undertaken.

6.2 Methodology

Baseline information relevant to the ecology in proximity of the proposed changes was obtained through review of information contained within the ES, which was collated by desk study, consultations and site survey. This information was updated where necessary based on more recent site inspection.

6.2.1 Ecological Surveys undertaken for the ES

Surveys for the following species were conducted for the existing ES (AMEC, 2008):

- Extended Phase 1 Habitat Survey,
- Bats (*Chiroptera*),
- Badger (*Meles meles*),
- Otter (*Lutra lutra*),
- Water vole (*Arvicola terrestris*), and
- Red squirrel (*Sciurus vulgaris*).

Further details for the methodologies employed for each specific survey can be found in Appendices 7 and 8 of the ES.

6.2.2 Update Ecology Survey

In order to ascertain any changes in the baseline conditions and further assess changes to the scheme, update surveys for aforementioned protected mammal species were undertaken in 2010. Surveys were carried out along the footprint of the entire scheme and an additional buffer zone of 50 m. Where watercourses are crossed, an additional buffer of 250 m upstream and downstream of any crossing was also surveyed for sign of otter and water vole. The areas surveyed included the location of the proposed changes.

Further details of the survey methodologies are presented in the Update Ecology Report (Mouchel, July 2010) provided as Appendix 2 to this addendum.

6.2.3 Additional Aquatic Ecology Survey

A desk top study was completed in order to identify any statutory, non-statutory or designated/classified sites, relevant to the aquatic environment, within the study area. Specific site surveys were then carried out along the Headshaw Burn and Leader water to appraise the specific aquatic conditions in terms of ecological value. These included;

- River Habitat Survey (RHS),
- Aquatic Flora Survey,
- Benthic Invertebrate Fauna,
- Fish Fauna (Electrofishing).

An assessment of the hydromorphological, chemical and physico-chemical conditions was also made using existing data and data/parameters recorded during the RHS and targeted species surveys.

Further details of the aquatic survey methodologies are presented in the Ecological Baseline Appraisal Report (Mouchel, June 2010) provided as Appendix 3 to this addendum.

6.2.4 Impact Assessment Methodology

The method used for determining the ecological value of the site, species and habitats follows that outlined in Appendix 6 of the existing ES. Full details of the methods for ecological impact assessment are also provided in Appendix 6 of the ES and summarised below.

The assessment of ecological impacts involves an analysis of relevant receptor value, the impact magnitude and the significance of impact. The grading systems used, as provided in section 8.2.3 and Appendix 6 of the ES, are based on the following:

- Ecological receptor value – international, national, regional, local and negligible.
- Magnitude of impact – positive, major negative, intermediate negative, minor negative and neutral.

- Significance of impact (determined as a combination of sensitivity and magnitude) – beneficial, neutral, slight, moderate, major and critical.

For full details of the criteria applicable to each of the above levels of receptor sensitivity and magnitude of impact, and for details how these are combined to determine the significance of impacts, refer to Appendix 6 of the ES.

6.3 Baseline Conditions and Evaluation

6.3.1 Changes in the Scheme

Since the publication of the ES (AMEC, 2008) there have been some amendments to the proposals. These comprise the realignment of a new side road linking the A68 to the D47/5 at Carfrae Junction; the realigning of the Riggsyde access road; and a series of erosion protection measures on the Headshaw Burn. A detailed description of these changes is provided in Section 2.2 of this document.

6.3.2 Existing ES (AMEC, 2008)

River Tweed SAC & SSSI

The main ecological concerns identified in the ES related to the three water courses (Leader Water, Headshaw Burn and Mountmill Burn) within the scheme footprint which are all included within the River Tweed Special Area of Conservation (SAC) as designated under the EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna.

The River Tweed SAC is particularly noted for its biological interest, which includes Atlantic salmon (*Salmo salar*), river lamprey (*Lampetra fluviatilis*), brook lamprey (*Lampetra planeri*), sea lamprey (*Petromyzon marinus*), European otter and as a watercourse characterised by *Ranunculion fluitantis* and *Callitricho – Batrachion* communities.

In addition to its Natura 2000 status, the River Tweed is also cited as a Site of Special Scientific Interest (SSSI) for its biological interest. The Leader Water which flows into the River Tweed approximately 19km south of Oxton is also designated as part of the River Tweed SSSI.

Due to the European and National designations for the River Tweed SAC/SSSI (including the Headshaw Burn, Mountmill Burn, Kelphope Burn, Hillhouse Burn and Leader Water) it was assessed as being of **International** value.

Phase 1 Habitat Survey

The extended phase 1 habitat survey revealed the presence (both through the desk study and field survey) of several species of flora of conservation value either in or near the study area for the entire scheme. These included juniper (*Juniperus communis*), greater-tussock sedge (*Carex paniculata*) and a lichen (*Bacidia incompta*). It should be noted that neither these species nor the *Ranunculion fluitantis* and *Callitricho – Batrachion* vegetation community, which is a qualifying feature of the River Tweed SAC, were recorded within the footprint of the scheme. In addition, no invasive flora

was recorded during the phase 1 habitat study. As such the flora was assessed as being of **Local** value.

The habitats in the proximity of the proposed side road and Riggsyde access realignments, together with those in the location of the proposed erosion protection on the Headshaw Burn (see Sections 2.2.1 & 2.2.2) are of little to no botanical interest and considered to be of **Negligible** value.

Bats

Two structures lying within or adjacent to the footprint of the scheme were identified as being of low-moderate bat roosting potential. A corrugated iron shed associated with Riggsyde Cottage (Grid reference NT 49889 54017) was reported by the owner to contain bats. On close inspection no roosting bats and only a single bat dropping was located on the roof of the building. The shed was considered to be of low bat roost potential due to its construction and absence of loft void. The stone bridge (Annfield Inn Bridge) spanning the Headshaw Burn at the D47/5 Cafrae Road (grid reference NT49342 54608) was considered to have low-moderate bat potential due to gaps in stonework from a lack of mortar on the underside. However, no roosting bats were recorded in this structure. The above structures were assessed as not currently supporting roosting bats and so considered of **Local** conservation interest only.

Otter

Evidence of otter activity was found extensively throughout the study area. A non-breeding otter holt (see Figure 2.4) was identified on the Headshaw Burn, upstream of Annfield Inn Bridge and within 30 m of the development and adjacent to the proposed erosion protection (grid reference NT49272 54675). Although no other otter places of rest were recorded within 50 m of the footprint of the proposed scheme, otter are a qualifying feature of the River Tweed SAC, the study area was assessed to be of **International** value for the local otter population.

Badger

Evidence of badger activity was recorded within the study area during the initial ES surveys, with as many as nine badger setts located within the wider study area. However, no badger setts were located within 50 m of any part of the proposed scheme footprint. 12 badger road traffic accidents were reported within 2km of the footprint of the scheme, of which one was on the existing A68 at Annfield Bridge and another on the D47/5 where the stone bridge crosses the Headshaw Burn. No other badger crossing points were identified within the footprint of the scheme.

The wider study area was assessed as being of **Local** value for badger due to suitable habitat and moderately high levels of badger activity. The habitats within the footprint of the scheme were assessed to be of **Negligible** value due to the disturbance from the existing carriageway.

Water Vole and Red Squirrel

No confirmed evidence of either water vole or red squirrel activity was found during the survey. The burrows found along the Headshaw Burn (located approximately 100 m

upstream and 100 m downstream of Annfield Bridge) are not considered to be evidence of water vole. Possible evidence of squirrel activity in the form of a single stripped pine cone, was recorded within the study area at the foot of Hillhouse Road but this could not be confirmed as either red or grey squirrel foraging remains. No further evidence of squirrel activity was found during the survey. The habitats within the footprint of the scheme were considered to be unsuitable for these species and, as such, the area considered to be of **Negligible** value.

6.3.3 Update Ecology Survey (Mouchel, July 2010)

Bats

The update survey supported the findings of the original surveys reported in the ES in that the only structures lying within or adjacent to the footprint of the scheme with the potential to support roosting bats are the buildings associated with Riggsyde Cottage and the stone bridge spanning the Headshaw Burn at the D47/5 road. The **Local** ecological value previously awarded is supported by the findings of the update survey.

No additional evidence of bats or features with the potential to support roosting bats was recorded in the vicinity of the proposed side road and Riggsyde access realignments, or in the location of the proposed erosion protection on the Headshaw Burn (see Sections 2.2.1 & 2.2.2)

Otter

The otter holt recorded in the existing ES was still present at the time of the update ecology survey. Runs were still present leading from the holt, but no other evidence, such as spraints or prints, confirmed its current use by otter. The current assessment supports the **International** value awarded to otter.

No additional otter places of rest were recorded in the vicinity of the proposed side road and Riggsyde access realignments, or in the location of the proposed erosion protection on the Headshaw Burn.

Badger

No additional badger setts were found within the study area. Evidence of badger activity was found in the form of a single latrine recorded on the Kings Road to the west of the D47/5 Road and a footprint in a field to the north of the scheme between the D47/5 Road and Riggsyde. The current assessment supports the **Local** value awarded to badger in the wider study area, and the reduced **Negligible** value of the habitats within the footprint of the scheme.

No additional badger activity was recorded in the vicinity of the proposed side road and Riggsyde access realignments, or in the location of the proposed erosion protection on the Headshaw Burn.

Water Vole and Red Squirrel

No evidence water vole was found during the update survey. Although, the burrows found on the Headshaw Burn during the earlier surveys for the ES were located again,

it is considered that they are more likely to be that of field vole (*Microtus agrestis*) or bank vole (*Clethrionomys glareolus*).

No evidence of red squirrel was recorded during the ecological update survey.

The update survey supports the **Negligible** value previously awarded for these species.

6.3.4 Additional Aquatic Ecology Survey

River Habitat Survey (RHS), aquatic flora, benthic invertebrate and fish fauna assessments were undertaken as part of the additional aquatic ecology survey work. The results of this work is summarised below and full details are provided in the Ecological Baseline Appraisal Report (Mouchel, June 2010).

RHS

Two RHS surveys were undertaken at the study area, one on the Headshaw Burn and another on the Leader Water.

The character of the Headshaw Burn is relatively diverse, with variation evident in the flow structure, in-channel and bank features and substrate which combine to provide plentiful habitat opportunities for a diverse assemblage of aquatic flora and fauna.

The riparian habitat and adjacent land-use are largely comprised of pastoral agriculture. The riparian habitat is largely dominated by simple or uniform vegetation with the extent of trees limited to isolated individuals. The aquatic flora recorded within during RHS was diverse and abundant, with three species groups recorded as extensive over the survey reach, and a further four species groups recorded as present. The *Ranunculion fluitantis* and *Callitricho – Batrachion* vegetation community, which is a qualifying feature of the River Tweed SAC, was not recorded.

There are a number of artificial structures within the watercourse in the study area, which have notable impacts upon the watercourse and riparian habitat. The river is culverted beneath the existing A68 (a large oversized culvert crossing known as Annfield Bridge) and a stone bridge (Annfield Inn Bridge) carries the D47/5 across the watercourse. Further to these, an artificial bank extends for c. 100 m downstream of Annfield Bridge, providing erosion defence to the local road (C83) and ends with a series of three intermediate weirs, each of which contains a pool at the downstream end. The presence of these modifications within the river channel resulted in a HMS for the RHS reach which related to a Habitat Modification Class of *"Severely Modified"*. Based on this evidence the Headshaw Burn river habitat within the study area is considered to be of **Local** value.

The character of the Leader Water is relatively diverse, with variation in the flow structure and substrate evident and the presence of a small number of in-channel features. The diversity in flow structure, substrate and in-channel features creates a number of different habitats in the watercourse to support diverse assemblages of aquatic flora and fauna.

The riparian habitat and adjacent land-use are considered to be relatively typical of an upland headwater in this location, with pastoral agriculture dominating the floodplain. A small water treatment plant also present. The riparian habitat is largely dominated by simple or uniform vegetation, with the extent of trees limited to isolated individuals. The aquatic flora present in the channel was relatively diverse, with two species groups recorded as extensive over the survey reach and a further three groups recorded as being present.

There are very few artificial structures within the Leader Water in the study area, with only one recorded within the RHS reach and a further two within the study area. A ford, located on the watercourse on the outskirts of Oxton (grid reference NS 44910 53721) has been constructed to provide access across the river to the water treatment works, with the bed and banks in this location consisting of concrete material. The structures outside of the RHS reach are two bridges, one carrying the C84 road to Oxton and the other carrying the A68. The presence of the ford within the river channel of the RHS reach resulted in a HMS for the reach which related to a Habitat Modification Class of *"Obviously Modified"*. Based on this evidence the Leader Water river habitat within the study area is considered to be of **Local** value.

Aquatic Flora

The aquatic flora survey at each watercourse recorded one vascular plant dock (*Rumex* sp.) and two bryophyte species, a moss (*Dicranella palustris*) and a red algae (*Lemanea sp.*). Based on this evidence the aquatic flora within the study area is considered to be of **Local** value. It should be noted that the *Ranunculion fluitantis* and *Callitricho – Batrachion* vegetation community, which is a qualifying feature of the River Tweed SAC, was not recorded within the study area.

Benthic Invertebrates

Each of the sample locations exhibited a high number of taxon and BMWP score, however the ASPT scores were slightly lower. Each of these would indicate that the benthic invertebrate population present exhibits a very low level of disturbance given the high proportion of sensitive species present within the samples, identified by the high BMWP scores attained for each sample location. However, the modification within the Headshaw Burn is undoubtedly going to have impacted upon the species in this watercourse. Consequently, the benthic invertebrate fauna for the Headshaw Burn is considered to be of *Good* status under the WFD and the Leader Water is considered to be of *High* status. Based on this evidence the benthic invertebrate assemblage within the study area is considered to be of **Local** value.

Fish Fauna

The field survey identified that the surveyed reaches of the Headshaw Burn and Leader Water are dominated by salmonid species, with brown trout the most abundant. 68 brown trout (*Salmo trutta*) and a single European eel (*Anguilla anguilla*) were recorded on the Headshaw Burn. 4 Atlantic Salmon, 123 brown trout, 5 sea trout, 1 European eel, 5 adult brook lamprey and 2 juvenile river/ brook lamprey were recorded at the sample site on the Leader Water. The age class of salmonids included fry, parr and some smolts recorded on both watercourses. As Atlantic salmon and lamprey were

recorded and are qualifying features of the River Tweed SAC, the study area has been evaluated as being of **International** value for fish fauna.

6.4 Significant Impacts

This section describes the potentially ecologically significant impacts associated with the scheme.

6.4.1 Pollution of Watercourses

There is the potential for pollution of the Headshaw Burn (and Leader Water) from construction activities such as chemical spill, or sedimentation from excavation and implementation of the new proposed erosion protection, or from the provision of the new side road. This may result in a reduction in water quality and impact upon flora and fauna, most notably otter and Atlantic salmon and lamprey. In the absence of mitigation, the risk of pollution has been assessed as a potential impact of major negative magnitude and major significance.

6.4.2 Potential Impacts of In-stream Works on Fish Fauna

There is the potential for the disturbance of salmonid and lamprey spawning/nursery habitat and activity resulting from in-stream construction works (namely the provision of new erosion protection on the Headshaw Burn). This could result in habitat loss, disturbance and mortality to qualifying features of the River Tweed SAC. In addition, in-stream works could obstruct fish passage to and from spawning grounds. As such, in the absence of mitigation this is assessed as a potential impact of major negative magnitude and major significance.

6.4.3 Disturbance to Otter

There is the potential to cause disturbance to any otters using the holt located upstream of Annfield Inn Bridge (see Figure 2.4) through the installation of the proposed erosion protection measures in this area during the construction phase. It should be noted that due to recent erosion, new erosion protection measures are proposed in the immediate vicinity of this holt. In the absence of mitigation, disturbance to the otter holt during construction has been assessed as a potential impact of intermediate negative magnitude and moderate significance.

The channel of the Headshaw Burn will remain open during the construction of the erosion protection measures and there will be no works at night when otter are most likely to be active. Disturbance to otter movement along the watercourse during construction is therefore not considered to be an issue. Commuting routes will also still be open following construction.

The new side road bridge will be set back from the banks of the burn as per the previous alignment and therefore otter will still able to pass along the burn.

6.4.4 Physical Disturbance to the Riparian Corridor

For the new side road bridge, which crosses the Headshaw Burn, the new bridge abutments will be set back from the watercourse and its banks. This will ensure protection of the SAC's banks and watercourse channel from construction works, thereby reducing the impact upon the physical habitat.

With the exception of the area of erosion closest to the A68 Trunk Road, where sheet piles are required, all the erosion protection measures will allow vegetation to establish and therefore maintain and protect existing habitat. Planting will be undertaken on the bank above the sheet piles so that vegetation cascades over the piles and this will afford some screening and ecological benefit. Riparian planting is also proposed upstream of Annfield Inn Bridge in order to create a more ecologically diverse riparian zone. Species of plants utilised will be of local provenance and appropriate to the headwaters of the Tweed Catchment.

Construction of the erosion protection measures will result in disturbance to the existing riparian banks and channel of the Headshaw Burn. It should, however, be noted that due to the recent erosion on the watercourse, the banks in the area where works are proposed generally comprise bare loose earth which does not afford a high degree of biodiversity. However, high energy shingle/eroding banks do provide important habitat for invertebrates and some of these areas will be retained. The incorporation of erosion protection, which will include pre-vegetated coir rolls, will provide an initial source of plant material and will also allow for natural colonisation of the banks. There will be disturbance to the channel of the burn during construction but careful restoration will take place post construction.

It is considered that once fully constructed, the erosion protection measures, which will be designed and implemented in accordance with SEPA/SNH's guidance and the approved Construction Method Statement, will have no significant impact on the geomorphology/hydrology of the burn.

The overall potential immediate impact of the erosion protection measures on the burn are assessed as intermediate negative magnitude and slight significance. However, new planting/colonisation will improve biodiversity and encourage wildlife colonisation thus resulting in an overall impact of a neutral magnitude and of beneficial significance.

6.4.5 Terrestrial habitat loss/disturbance

There will be some loss of terrestrial habitat due to the footprint of the new side road but this habitat is the same as that present in the area of the original location of the side road and bridge crossing, as assessed in the ES, and the area lost is comparable. Therefore no change in this non-significant impact is predicted.

6.5 Mitigation

This section describes the specific mitigation outlined in the existing ES, the updated ecological survey reports (see Appendices 2 and 3) and in the Construction Method Statement (Mouchel, January 2011). The mitigation set out relates the scheme as a whole and this will ameliorate any significant predicted impacts to Ecology and Nature Conservation at the study area.

6.5.1 Pre-construction Survey

Pre-site clearance ecological surveys shall be carried out throughout all areas demarcated under the Land Made Available for construction to determine whether any protected species are present and whether any additional mitigation might be required.

Surveys specific to the areas of the proposed changes include otter and breeding birds. Should the above surveys identify the presence of any additional otter holts or couches to those already reported, SNH and the Scottish Government will be informed and mitigation measures implemented where required.

Bankside areas to be affected will be surveyed for the presence of suitable bird nesting habitat. Where such habitat is identified, these areas will be made unsuitable for nesting birds (assuming that no birds have not already begun nesting) so that disturbance will be avoided once the time comes to carry out the works. Immediately prior to erosion protection works commencing, areas affected will be re-surveyed to ensure that no nesting birds would be disturbed.

Prior to the completion of any works that could disturb the Headshaw Burn at the Annfield Bridge, new side road bridge or as part of the erosion protection measures, a pre-construction habitat assessment of the watercourse will be completed by an aquatic ecologist. Once all in-river works are complete, the habitat assessment will be repeated to ensure that the baseline conditions have not been impacted upon (e.g. no large deposits of silts, construction debris and rubbish, acceptable re-instatement of the river and banks etc.). Any issues will be raised and rectified by the contractor at this time.

6.5.2 Pollution Control Measures

The drainage design for this mainline scheme will incorporate Sustainable Urban Drainage Systems (SUDS) comprising of filter drains, swales and detention ponds as described in the ES. These measures will allow any spillages to be contained within the detention ponds and swales to prevent spillages of fuel, oil and other contaminants from reaching the Headshaw Burn and subsequently, the Leader Water and River Tweed.

For the new side road, the drainage will comprise of filter drainage along the edge of the road, which will aid filtration of any surface water prior to discharge at one specific area comprising of two separate trench soakaways which will provide secondary filtration prior to the water being absorbed into the surrounding ground. This will not only prevent pollution to the Mountmill Burn and Headshaw Burn, but it shall provide protection of the surrounding ground water resources.

The CMS will be implemented to ensure that the potential risks to receiving waters are minimised. This will include, for instance, measures to avoid / minimise potential risks from fuel and other chemical spills. A Pollution Incident Response Plan will be included as part of the Environmental Management Plan, to ensure that impacts from any potential accidental spill is reduced to a minimum.

Site compound locations will be confirmed by the contractor but will be located at least 10 m from any watercourse as well as being out with any area that is vulnerable to flooding.

Each pile of stored material will be covered with a waterproof material (e.g. tarpaulin) to keep it dry and prevent weathering. Any surface water or pollutants gathering within

the bunded area will be drained using pumps, and bowsers will be employed to take and dispose of the discharge to pollution control facilities (if sediment contaminated only) or off-site to an appropriate disposal site (if contaminated with other forms of pollutants such as oil, fuel or concrete). The detailed drainage design and installation of pollution facilities will be agreed with SEPA during the detailed design of the scheme. When the stored material is required for backfilling / restoration of the river bed, the material will be transported to the Annfield Bridge during dry weather and used immediately. No temporary storage of material will be allowed out with the site compound.

Straw bales will be placed in suitable localised areas as required immediately downstream of the works, to help filter and reduce the impact of any bed material disturbed whilst working in the watercourse. An absorbent oil boom will also be available for quick deployment downstream, across the surface of the watercourse, in the event of an oil or fuel spillage directly or indirectly entering the watercourse.

The implementation of these measures will not only lessen the likelihood of a pollution event but will also reduce this residual impact to minor negative magnitude and neutral significance.

6.5.3 Protection of Fish Fauna

The CMS focuses on in-river engineering requirements, particularly the extension works at Annfield Bridge / Headshaw Burn, and mitigation measures are contained in this document. These measures will be further developed by the Contractor and Method Statements produced for individual works in advance of construction. Measures to be incorporated will include only completing in-river engineering work during the months of July/August (and September if necessary) in order to protect the spawning gravels and fry, and also the provision of free passage to fish at all times. This mitigation is also likely to be a requirement within the in-river engineering licence that will be issued by SEPA as part of the Controlled Activities Regulations.

Any fish trapped behind the temporary sheet piles required to create dry working areas will be rescued before pumping water behind the piles into the adjacent field to allow it to filter and drain naturally back into the watercourse. This process will be carried out by experienced fisheries biologists and in consultation with the River Tweed Commission.

On completion of the in-river and bankside works, the river bed will be re-instated using the alluvial gravels removed at the start of these works and banks will be re-profiled/re-established in line with the surrounding and previously existing banks (using the same soil in order for acceptable vegetation establishment).

If shoals of fish are noted at any time within the vicinity of the in-river works, work will stop immediately and the site ecologist will be informed.

A Contingency Plan will be produced, which will contain the contact details of the site ecologist, the River Tweed Commission, SEPA and SNH to ensure that relevant bodies

are informed of all incidents that may impact upon fish, particularly salmon or lamprey populations.

With the implementation of the agreed CMS, adequate pollution prevention measures, appropriate methods and timing of construction works and under conditions of a licence granted under CAR, the residual impact on fish fauna is assessed as minor negative magnitude and neutral significance.

6.5.4 Protection of Otter

An otter holt has previously been identified on the Headshaw Burn within 30 m of the proposed road widening works north of Annfield Bridge (see Figure 2.4). A European protected species (EPS) licence will therefore be applied for and granted from the Scottish Government Landscape and Habitats Team in advance of any activities/works on site.

An exclusion/buffer zone utilising robust fencing, i.e. “Herras” type (“Netlon” or similar shall not be permitted), will be erected along the banks of the Headshaw Burn in the location between the holt and any construction activity to provide physical protection around the otter holt. This fencing will be sited at 30 m in distance from the holt, allowing road construction activity to only proceed outwith this distance. No scrub or vegetation clearance or access by site vehicle/personnel shall be permitted within this exclusion zone (with the exception of works for erosion protection – see below). Where the holt is located closer to the existing and proposed road improvements, the exclusion zone will be as large as possible (approximately 15 m at closest point). Activities within 20 m of the exclusion zone at this location will be minimised to essential works and traffic movements.

Work within the immediate vicinity of the otter holt is required as part of the proposed channel bank erosion protection measures upstream of Annfield Inn Bridge. Access within the exclusion zone to undertake these works will be restricted to works essential to that area. Access along the top of the bank of Headshaw Burn, through the exclusion zone, is required to undertake the erosion protection works upstream of the holt. This access will be limited to what is essential to undertake the works and fencing will be erected through the exclusion zone, 5 m back from the top of the burn bank.

Coir and rock rolls are to be placed along the bank where the otter holt is located. The height of the rolls will therefore be restricted so that the holt and access to it is not impeded either during the construction period or upon completion of the works. It is anticipated that the holt will need to be monitored prior to and during construction of the erosion protection measures, as determined under the EPS licence conditions.

Security/traffic management lighting shall be directed away from watercourses at all times. Works adjacent to the watercourse (within 30 m of the holt) will be restricted to daylight working (no working will be permitted within 2 hours before dark or 2 hours after light).

Chemicals (other than those directly used as a construction material and in their final format e.g. concrete or bitumen) shall only be used in designated areas and shall not be permitted within at least 30 m of any watercourse or otter holt/couch.

The implementation of these measures will reduce the impact of disturbance on the otter holt to minor negative magnitude and neutral significance.

6.6 Residual Impact Summary

The above mitigation measures will result in the minimisation of adverse ecological impacts arising from the A68 South Soutra to Oxton Improvement Scheme, and the maximisation of any biodiversity benefits arising from implementation of the scheme. The overall residual impacts, after the implementation of the mitigation will result in no significant negative impacts.

Impacts of a positive magnitude and beneficial significance remain as a result of riparian planting, erosion protection allowing vegetation to re-establish on previously unstable banks.

7 Road Drainage and the Water Environment

7.1 Introduction

This chapter details the road drainage and water environment assessment undertaken in relation to the proposed scheme changes. It should be read in conjunction with Chapter 13 (Road Drainage and the Water Environment) of the ES, which provides details of the road drainage and water environment assessment undertaken for the full scheme, prior to the recent changes described in Chapter 2 of this addendum.

An assessment of the changes in impacts on the drainage and water environment during the construction period (i.e. additional disturbance to the Headshaw Burn during the construction of the erosion protection works) is also provided in this Chapter.

7.2 Methodology

7.2.1 Baseline Methods

Areas of water quality and/or drainage importance in proximity of the proposed changes were identified from a review of information contained within the ES, which was collated by desk study and from consultations with the Scottish Environmental Protection Agency (SEPA), Scottish Natural Heritage (SNH), the Tweed Foundation and SBC. This information was updated where necessary based on more recent desk study and site inspection.

7.2.2 Impact Assessment Methods

To maintain consistency with Chapter 13 of the ES, this chapter follows the guidelines set out in Part 10, Volume 11 of the DMRB (HA 216/06, May 2006). It should however be noted that Part 10 HA216/06 was superseded in November 2009 by Part 10 HD45/09.

In terms of assessment of impacts, the methodology as set out in Chapter 13 of the ES has been used. This involves an analysis of relevant receptor value/sensitivity (i.e. importance), the impact magnitude and the significance of impact.

The scaling systems used for road drainage and the water environment, as provided in section 13.2.2 of the ES, are as follows:

- Receptor value/sensitivity (i.e. importance) – very high, high, medium and low.
- Magnitude of impact – major, moderate or minor beneficial, neutral or major, moderate or minor adverse.
- Significance of impact (determined as a combination of sensitivity and magnitude) – neutral, slight, slight/moderate, moderate, moderate/large, large, large/very large and very large.

For full details of the criteria applicable to each of the above levels of site importance and magnitude of impact, and for details how these are combined to determine the significance of impacts, refer to Chapter 13 (Tables 13.1, 13.2 & 13.3) of the ES.

7.3 Baseline Conditions

7.3.1 Road Drainage

The route of the proposed new side road is a greenfield site consisting of agricultural land, therefore no known road drainage exists along the route.

The A68 road drainage, although affected by the scheme, is not affected by the proposed scheme changes.

7.3.2 Surface Water

A plan of the study area showing the locations of watercourses is provided in Figure 7.1.

The main watercourse within the vicinity of the proposed scheme is the Headshaw Burn. Flowing generally in a southeasterly direction, it is located on the east side of the A68 at the northern end of the road improvement scheme in close proximity to the road, crossing to the west side (under the Annfield Bridge) just south of the C83 Kirktonhill junction. Approximately 50 m downstream of the crossing point, it diverges away from the road to converge with Mountmill Burn where it then becomes the Leader Water. The Leader Water flows, in a general southeasterly direction, roughly parallel with the A68, at an offset of between 250 m and 100 m. There is a small un-named burn which joins the Leader Water from the northern side of the road, 50 m west of Carfraemill Roundabout. The Leader Water is then joined on the east side by the Kelphope Burn, south of Carfraemill Roundabout.

During preparation of the ES, SEPA advised that the Water Quality Classification of Mountmill Burn was A1 (excellent) and that of the Leader Water below the confluence of the Mountmill Burn was Class A2 (very good). The Headshaw Burn was not classified at the time but SEPA suggested it may be assumed that the water quality would be A1/A2. SEPA also indicated that, in terms of the Water Framework Directive 2000/60/EC (WFD) criteria, given the high water quality and the remoteness of the watercourses from population centres they were assumed to be of high/pristine status. Further information gathered for this addendum indicates that the Leader Water is currently classified as being of *moderate* status (based on 2008 SEPA data, see Appendix 3). The watercourse fails to meet good ecological status (required under the WFD by 2015) as a result of increased phosphorus input from diffuse sources. The Headshaw Burn remains unclassified under the WFD criteria.

The Leader Water and Headshaw Burn are both designated as Salmonid waters under the Surface Waters (Fishlife) (Classification) (Scotland) Directions 2007, and fall within the River Tweed designation.

The Leader Water, Headshaw Burn and Mountmill Burn are included in the River Tweed Special Area of Conservation (SAC), designated under the EC Directive

92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna. The River Tweed is also a Site of Special Scientific Interest (SSSI). Further details of these designations are provided in the ES. The Tweed Foundation has confirmed that the Leader Water in the Oxton area contains salmon, brown trout and is likely to contain lamprey, and this is reflected by the A1/A2 water classification. Recent aquatic survey (see Appendix 3) identified brown trout and eel in the Headshaw Burn and Atlantic salmon, brown trout, sea trout, eel, adult brook lamprey and juvenile brook/river lamprey on the Leader Water.

Therefore, in accordance with Table 13.1 of the ES, the Headshaw Burn and the Leader Water are assessed as being of very high value.

7.3.3 Groundwater

SEPA has indicated that in terms of ground water protection, the area in the vicinity of the proposed scheme is of medium vulnerability. This corresponds to Chapter 14 (Geology and Soils) of the ES which describes the drift strata as alluvial and boulder clay deposits overlying mainly sedimentary rocks. The lower Devonian conglomerate strata are locally important aquifers where the flow of groundwater is primarily in fissures and other discontinuities.

A borehole is known to be located at NGR 351100 653500 (Carfraemill Borehole), approximately 450m east north east of the Oxton Junction. The borehole is believed to be in use for water extraction, installed in the Lower Devonian strata and to have a rest water level of 1.25m above ground level (agl) due to artesian conditions. SEPA are not aware of any other boreholes within a 2 km radius of the site. It should be noted that although an abstraction-licensing regime is now in place in Scotland (The Water Environment (Controlled Activities) (Scotland) Regulations 2005), SEPA may not yet be aware of all abstractions in the vicinity of the site (operators of abstractions of $<10m^3$/day are not required to contact SEPA if they comply with the General Binding Rules (GBR).

There are no other reported private water supplies, sensitive to water pollution, in the area.

Chapter 14 of the ES reports that from the Geotechnical Investigations undertaken in September / October 2005 and October 2007, the mean water levels are around 3 m below ground level (bgl).

In accordance with Table 13.1 of the ES, the groundwater is assessed as being of medium importance.

7.3.4 Flooding

Figure 7.2 shows SEPA's indicative river flooding map for the area. It shows the flood outline for an event with a 0.5% annual probability of occurrence (1 in 200 year event). Although this mapping is only indicative, it was used as the basis for further investigation.

Since publication of the ES in 2008 a more detailed Flood Risk Assessment (FRA) was carried out to inform the response to concerns raised by one of the local landowners. The FRA was finalised and a report produced in February 2010. This FRA was subsequently updated to incorporate the realignment of the proposed new side road and a revised report was completed in January 2011.

The assessment of flood risk was undertaken using topographical data, hydrological assessment and a HEC-RAS hydraulic computer model. Extreme water levels in the Headshaw Burn, Leader Water, Mountmill Burn and Kelphope Burn were calculated for a range of return periods. The flood outline for the 200 year and 200 year (+20% climate change allowance) events have been mapped more accurately than the SEPA mapping. The flood outline for the 200 year (+20% climate change allowance) event is shown on Figure 7.3. The flood risk assessment also considered the following:

- The extent to which the proposed improvement works are at risk of flooding.
- The adequacy of the design of the proposed new (side road) bridge over the Headshaw Burn.
- The potential for the development of the road to exacerbate flood risk elsewhere.
- Informing the wider detailed design and options for mitigating flood risk.

Figure 7.3 shows that there are flood plains associated with the Headshaw Burn, Mountmill Burn and the Leader Water, and that these currently affect the agricultural fields through which the proposed new side road will pass. The flood plain associated with the Headshaw Burn also currently affects the agricultural field adjacent to the southbound lane of the A68, which results in this field and the A68 itself becoming flooded.

The other potential flood risk areas do not affect the immediate A68 corridor within the scheme limits as there is a two to four metre level difference between the risk area and the carriageway. The remaining land within the indicative flood plain is agricultural land and as there is a low probability of residential and industrial properties flooding, the Importance of Flood Risk is assessed as being low.

7.3.5 Accidental Spillage

On any traffic carrying road there is the potential for the pollution of watercourses and groundwater supplies from accidental spillages of harmful chemicals and materials caused by road traffic accidents.

Calculations for the probability of a serious accidental spillage on any length of road are based on traffic flows, percentage of Heavy Goods Vehicles (HGV) and the layout of the carriageway and its junctions.

The probability of a serious accidental spillage occurring in the design year (2025) with the existing road configuration in place (i.e. do-minimum scenario) was calculated in the ES using the equation given in Annex I, HA216/06 Method D of the DMRB Volume

11. The calculations are included in Appendix 14 of the ES and the results are summarised in Table 7.1 below.

Table 7.1. Assessment of Pollution Impacts from Accidental Spillages.

Option	Risk	Return Period
Existing Road Configuration	1.79 x10^{-4}/year	5586

The DMRB indicates that the acceptable risk of a pollution incident should normally be 1 in 200 years where a spillage could affect a protected area for conservation (i.e. the River Tweed SAC).

The return period of 1 in 5586 years, as calculated in the ES, therefore indicates that the risk of pollution as a result of the existing road configuration (i.e. do-minimum scenario) is well below any level that would be significant. It should be noted that, due to delays during scheme preparation, the design year is now 2028. However due to the very low risk of pollution and the fact that the change in design year will have very little impact on the results, the calculations have not been updated.

As an accidental spillage incident would impact on the surface water and groundwater attributes of this site, the importance of each were used in the assessment of the predicted impact significance.

7.4 Assessment of Changes

7.4.1 Road Drainage

The road drainage changes associated with realignment of the proposed new side road, which involve replacing the previously proposed reed bed with two separate trench soakaways (as indicated on Figure 7.5), have been assessed as having no effect on the potential water environment impacts of the scheme, as described in the ES. This is due to the road surface area and therefore run-off volumes being unaffected by the change. The assessment of the road drainage impacts on surface water and groundwater therefore remain as detailed in Chapter 13 (section 13.4.1) of the ES. These are summarised below.

Surface Water

Water quality predictions were made in Section 13.4.1 of the ES and these will be unchanged by the realignment of the proposed new side road. The magnitude of impact on the surface water quality as a result of pollutant run-off is therefore concluded to remain as negligible adverse. This combined with the very high value of the affected watercourses (Headshaw Burn and Leader Water), gives a neutral impact significance.

Groundwater

In the ES, the risk of impact of pollution on groundwater was assessed as medium for the road improvement scheme as a whole. This related to a magnitude of pollution impact on groundwater of moderate adverse, which combined with the medium importance value gave a moderate adverse impact significance. This conclusion could

also be applied to the new scheme as the risk assessment criteria applied is the same as reported in the ES. However, due to the very low levels of traffic predicted to use the new side road (approximately 100 AADT), this moderate adverse effect is considered to reduce to slight/moderate or even slight significance.

7.4.2 Accidental Spillage

As detailed in Section 7.3.5 above, the probability of an accidental spillage on any length of road is dependant on traffic flow, HGV percentages and the layout of the carriageway and junctions. Therefore the minor realignment of the proposed new side road, which has predicted traffic flows of around 100 AADT, has no effect on the calculations carried out in Chapter 13 (section 13.4.2) of the ES, for the probability of a serious accidental spillage occurring with the proposed scheme in place.

The probability of a serious accidental spillage occurring with the proposed scheme in place, calculated using the equation given in Annex 1, HA216/06 method D – "Assessment of Pollution Impacts from Accidental Spillages", remains as given in Appendix 14 of the ES. The results are shown in Table 7.2 below.

Table 7.2. Assessment of Pollution Impacts from Accidental Spillage.

Option	Risk	Return Period
Proposed Scheme	1.69×10^{-4}/year	5581 years

As mentioned in section 7.3.5, the DMRB indicates that a return period of 1 in 200 years is an acceptable risk where a spillage could affect a protected area for conservation (i.e. the River Tweed SAC). The magnitude of impact compared to the existing situation is considered to remain as negligible adverse, therefore the overall impacts on both the groundwater and surface water attributes of this site remain neutral.

7.4.3 Physical Disturbance of Surface Waters

Annfield Bridge Extension

The bridge extension is unaffected by the proposed scheme changes and therefore the overall impact significance of the extension remains as neutral.

New Side Road Bridge

Due to the realignment of the proposed new side road the proposed new bridge over the Headshaw Burn will be located approximately 50 m upstream of its previously proposed location. As shown on Figure 2.3, the design of this bridge is unchanged from the original proposal; with the abutments being set back a distance from the burn so that construction works will not interfere with the burn in any way. Therefore once constructed, the new bridge will not have a significant impact on either the water quality of the burn or the drainage of the area. Disruption due to Construction is covered in section 7.4.5.

The impact of the new side road bridge on Headshaw Burn is considered to be of negligible adverse magnitude and combined with the very high site value the overall impact significance is neutral. This is unchanged from the impact of the bridge in its original location, as assessed in the ES.

Erosion Protection Measures

As described in Section 2.2, bank erosion protection measures are required at three locations along the Headshaw Burn. These are required as a result of recent channel bank erosion and will provide the protection necessary to prevent further erosion in these areas. As shown on Figures 2.3 and 2.4, the locations include a 200 m stretch immediately upstream of Annfield Inn Bridge, a localised area just downstream of Annfield Bridge and a 60 m section at the proposed new side road bridge crossing.

Upstream of Annfield Inn Bridge a combination of interlocking sheet piles, synthetic geotextile, filled rock rolls and pre-vegetated coir rolls will be installed as part of three different methods of erosion protection adopted along the 200 m stretch of the burn.

At the localised area of erosion protection, downstream of Annfield Bridge, and in the areas associated with the proposed new bridge, a combination of synthetic geotextile, rock rolls and coir rolls will be installed. These will be installed in the same way as the area upstream of Annfield Inn Bridge.

The abutments of the new bridge will be further protected by rip rap, which will be placed around the toe of the bridge abutments on both sides of the channel. The geotextile will be placed under the rip rap to ensure continuity and integrity of the protection and the rip rap will be placed along the side of the abutments that are perpendicular to the channel as these will face the greatest force during flood event.

Although the riparian corridor will be altered in the localised areas of erosion protection, it is considered that once fully constructed, the erosion protection measures, which will be designed and implemented in accordance with SEPA/SNH's guidance and the approved Construction Method Statement, will have no significant impact on either the water quality of the burn or the drainage of the area. It is further considered that there will be no perceivable changes to the watercourse's geomorphology/hydrology as a result of these measures.

By restoring eroded sections of the existing burn banks and stabilising further areas, it is considered that the measures will provide some benefits in the long term, in that the biodiversity value of the riparian corridor will be increased.

The impact of the measures on the Headshaw Burn is considered to be of negligible adverse magnitude and combined with the very high site value the overall impact significance is neutral.

Potential ecological implications of the erosion protection measures are discussed in Chapter 6 (Ecology and Nature Conservation).

7.4.4 Flooding

As detailed in Section 7.3.4, the FRA report (January 2011) assessed the impact of the scheme on flood risk. This report and the original FRA report (February 2010) were submitted to SEPA and Scottish Borders Council (SBC), with both organisations confirming that the proposals are acceptable to them in terms of flood risk. A summary of the flood risk impacts are detailed below.

The proposed realigned new side road encroaches within the 200 year flood outline. However the road will be constructed on a small embankment of sufficient height and therefore is not at risk of flooding. The road is also very lightly trafficked therefore if it is ever flooded during an extreme event, the impact of this would be minor.

As a consequence of the new side road encroaching on the flood plain, there is a loss of flood water storage capacity. The worst case impact is where the new side road serves as an impervious embankment (i.e. cutting off portions of the northerly floodplain). In this case, a lost floodable volume of approximately 3285 m^3 for the 200 year flood event has been estimated as a result of the proposed new side road footprint and the cutting off of the northerly floodplain. This results in a predicted increase in water levels by up to 14 mm on the Leader Water and 235 mm on a localised area of the Mountmill Burn (100 m upstream of confluence with the Headshaw Burn).

In addition the provision of the proposed D47/5 realignment will cut off part of the flood plain to the north of the A68 and effectively contain the flows within the channel. Cutting off this part of the flood plain will prevent the A68 Trunk Road from being flooding during severe flood events. However this results in an estimated lost floodable volume of approximately 953 m^3 for the 200 year flood event, which results in flood levels on the Headshaw Burn increasing by up to 235mm between the Annfield Bridge and the confluence with the Mountmill Burn, and up to 430mm on the 60m stretch upstream of Annfield Bridge.

It should be noted that a 1 in 200 year flood event is an extreme event, and the increases in water levels would be less during more regular flood events.

The FRA identified that there will be no impact on the flood plain along the Leader Water, downstream of the C84 road bridge, and along the Headshaw Burn, upstream of the D47/5 road bridge and therefore no increase in flood risk to residential or industrial properties. This is due to the two road bridges restricting the flow. In addition the assessment also demonstrated that, within the affected area, there would be minimal impact on the extent/outline of the remaining flood plain.

The loss of flood plain and the predicted increase in flood levels on the Leader Water is assessed as having a minor adverse impact magnitude, and when combined with the low importance of the flood risk in this area, results in a neutral impact significance.

The predicted increases in flood levels on the Mountmill and Headshaw Burns are assessed as having a major adverse impact, therefore when combined with the low importance of the flood risk in this area, results in a slight/moderate impact

significance. However it should be noted that this impact is offset by the removal of the flood risk to the A68 Trunk Road.

The FRA also demonstrated that the design of the proposed new side road bridge over the Headshaw Burn is adequate.

7.4.5 Disruption due to Construction

Additional temporary in-river works are necessary for the construction of the proposed erosion protection measures. This gives rise to greater potential for impacts on the hydrological characteristics and water quality of the Headshaw Burn and the Leader Water and their associated catchment areas during the construction period. This may occur due to the following:

- Temporary disruption to hydrological flows during construction (i.e. temporarily restricting/diverting flows to create dry working areas).
- Accidental spillage / mobilisation of sediments into local watercourses.
- Accidental spillage of liquid contaminants into local watercourses.
- Inputs of leachate derived from on-site stored construction materials.

As per the original scheme assessed in the ES, there is also a risk of pollution, e.g. release of suspended solids and spillages, to the Headshaw Burn and the Leader Water during construction of the new side road bridge across the Headshaw Burn.

With the addition of the erosion protection measures, the overall construction phase impacts upon surface water resources are assessed as predicted in the ES, i.e. remaining as moderate / large adverse, although there is always a risk of major adverse impacts associated with serious spillages. This is based on the proximity of the Headshaw Burn and the Leader Water to construction activity where potentially contaminative materials will be used. Potential impacts upon groundwater during the construction phase are anticipated to be neutral. No additional cumulative impact due to the incorporation of the erosion protection measures is predicted, as specific measures to protect water quality and to minimise the risk of impact will be implemented. A separate Construction Method Statement has been prepared which sets out these measures.

7.5 Mitigation

7.5.1 Road Drainage

No additional mitigation measures to that detailed in Chapter 13 of the ES are required, however recent guidance and best practice, such as CIRIA C697 - The SUDS Manual, CIRIA Report 142 - Control of Pollution from Highway Drainage Discharges and all relevant PPG's will be followed during the design and implementation of the scheme.

Minor alterations have been made to the new side road preliminary drainage design to accommodate its realignment. The minor change involves replacing the previously proposed reed bed with two separate trench soakaways. Due to the small areas and

the very low traffic flows involved, this change will have no affect on the quality or quantity of discharge. Details of the revised preliminary drainage designs are shown on Figures 7.4, 7.5 and 7.6. Consultations with SEPA will continue throughout the detailed design and construction of the drainage regime and requirements of the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR) implemented as appropriate.

7.5.2 Physical Disturbance of Surface Waters

New Side Road Bridge

As the revised design of the new bridge will avoid any work within the watercourse, no mitigation measures are required in this respect. However, best practice techniques (e.g. application of SEPA's Pollution Prevention Guidelines (PPG) and pollution control measures) will be applied, as appropriate for working near watercourses.

Erosion Protection Measures

The outline design of the erosion protection measures has been undertaken in close consultation with both SEPA and SNH, and has been developed following a number discussions and site meetings. A separate Construction Method Statement has been prepared and this outlines measures to be implemented during these works to protect the water quality and ecology of watercourses.

The detailed design and construction of the measures will be in accordance with the Water Framework Directive and SEPA's licensing requirements for the protection, improvement and sustainable use of watercourses in the area. Following the guidance of SEPA and the continued consultation with them, SNH and the Tweed Foundation, any adverse impacts on water quality will be minimised.

Given the negligible adverse magnitude of the anticipated impacts and the very high value of the site, mitigation measures will ensure the significance of the impacts remain as low as possible.

7.5.3 Flooding

It has not been possible to fully compensate for lost flood volumes in accordance with current guidelines (Scottish Planning Policy (SPP) (2010)). However it should be noted that if volumetric compensation storage was implemented there would be notable impacts upon areas of productive pasture land which could take a number of years to return to its former quality.

The mitigation measures that are proposed to reduce the impact on flood risk are shown on Figures 7.7, 7.8 and 7.9, and are summarised below:

- Minimising of the new side road footprint.
- Connector pipes underneath the new side road to allow connectivity between the northern and southern side of the flood plain.

- Porous road embankment is provided for two sections where the embankment height allows such measures to be incorporated. This provides floodplain connectivity and also reduces displaced flood volumes.
- The new bridge over the Headshaw Burn is designed with the large span, and thus minimising impact on the flood plain.

The implementation of the above mitigation measures maintains the flood plain to the north of the new side road and therefore reduces the lost floodable volume associated with the realigned new side road to approximately 1250 m^3 for the 200 year flood event. This reduction in lost floodable volume results in an estimated 1 mm reduction in water levels along the Leader Water during a 200 year event.

In addition, cutting off the flood plain to the north of the A68 by providing the D47/5 side road realignment will remove the risk of flooding on the A68 Trunk Road.

The residual flood impacts remain localised and with there being no change in the flood levels downstream of the C84 road bridge or upstream of the D47/5 road bridge, they do not include any material increases in flood risk to existing residential or industrial properties. Furthermore the flood plain outline/extent within the affected area remains relatively unchanged. Full details of the pre- and post-development flood extents and levels are given in the FRA report (January 2011).

With the mitigation measures in place the impact on flood risk associated with the Leader Water is still assessed as having a minor adverse magnitude, therefore when combined with the low importance of the flood risk in this area, results in a neutral impact significance.

As the predicted increase in flood levels on the Mountmill and Headshaw Burns remain unchanged with the mitigation measures in place, the flood risk associated with these watercourses is still assessed as having a major adverse impact, therefore when combined with the low importance of the flood risk in this area, results in a slight/moderate impact significance.

As detailed in Section 7.4.4, the scheme proposals, including the proposed flood risk mitigation measures, have been reviewed and approved by both SEPA and Scottish Borders Council in line with their responsibilities under Flood Risk Management (Scotland) Act 2009.

7.5.4 Disruption due to Construction

Appropriate engineering techniques and timings will be adopted as part of the implementation of all in-river engineering works. This is to prevent changes in flow dynamics, adverse scouring, avoid the fish breeding / spawning seasons and to allow the safe passage of migratory fish within the watercourse.

In order to safeguard against potentially adverse impacts on water quality and drainage, all works during the construction phase will be carried out in line with best

practice guidelines, including SEPA's Special Requirements such as SEPA's Engineering in the Water Environment Good Practice Guide: Temporary Construction Methods (2009), and all relevant PPGs. SEPA will be consulted to determine the number, type and scale of prevention measures required. Development of procedures as part of an Environmental Management Plan will provide a mechanism to control potential impacts. A Construction Method Statement has also been produced as part of the appropriate assessment process completed in accordance with the Habitats Regulations. This further sets out the mechanisms for undertaking the works and for protecting water quality.

Mitigation measures applying to the scheme as a whole and particularly important when working adjacent to and within the watercourse include the following:

- Appropriate storage for on-site materials to prevent potentially contaminating spillage events.
- The provision of temporary silt traps, containment bunds and storage reservoirs of adequate size, in order to prevent sediments entering local watercourses and to minimise soil erosion and ensure compliance with the Water Environment (Oil Storage) (Scotland) Regulations 2006.
- The provision of clearly defined 'no access' areas indicated on site plans and on site adjacent to sensitive watercourses, along with the installation of protective fencing to prevent unauthorised staff, plant and machinery access.
- A Contingency Plan / Pollution Incident Response Plan to ensure that the risk of accidental spillages is minimised and that procedures for containment are in place prior to the commencement of site operations. This will be passed to SNH and SEPA for comment and approval prior to any works.
- A water quality control monitoring procedure to include monitoring at a number of locations along the Headshaw Burn and Leader Water throughout the construction corridor and upstream and downstream of discharge points. This will be agreed with SNH and SEPA prior to any works.

Mitigation in relation to ecological aspects is outlined in Chapter 6.

7.6 Residual Impact

Adherence to SEPA guidelines and application of the above mitigation measures during the implementation of the proposed erosion protection measures will result in a residual neutral impact on water quality and hydrological impacts upon the Headshaw Burn, Leader Water and associated catchments. Residual impact for groundwater remains at neutral. This is unchanged from impacts of the scheme assessed in the 2008 ES, prior to the recent scheme changes.

In addition to the residual neutral flood risk impacts identified in the 2008 ES, the FRA report (January 2011) identified that there are residual slight/moderate impacts on the Headshaw Burn and Mountmill Burn. However the cause of this impact (realigned

D47/5 side road) also has a beneficial impact in that the risk of flooding to the A68 Trunk Road is reduced.

Additional residual impacts as a result of the scheme changes and from additional information identified in the FRA report (January 2011) are identified in Table 7.3 below. The degree of impact stated relates to the impact significance.

Table 7.3 Additional Impacts upon water resources with and without mitigation

Predicted Impact	Without Mitigation	With Mitigation
Erosion Protection Measures	Neutral	Neutral
Erosion Protection Measures - Disruption due to Construction	Moderate/Large Adverse	Neutral
Flood Risk – Leader Water Flood Plain	Neutral	Neutral
Flood Risk – Headshaw & Mountmill Burn Flood Plains	Slight/Moderate Adverse	Slight/Moderate Adverse

8 Summary of Environmental Impacts

8.1 Introduction

This chapter presents a summary of the key environmental impacts associated with the changes proposed.

8.2 Supplementary Environmental Impact Table

A Supplementary Environmental Impact Table (Table 8.1) has been prepared and this presents the main predicted residual impacts associated with the proposed changes in summarised form. This table supplements that already presented in the ES for the main scheme and highlights any new impacts as well as indicating where an existing impact has changed from previously assessed in the ES. Where no impact that is discussed in Chapters 4 to 7 is listed in the table, there is no change from the ES.

The table includes the following:

- Description of the potential impact;
- Sensitivity / value of the receptor;
- Significance of impact without mitigation;
- Mitigation measure(s) to address specified impact;
- Significance of the impact with mitigation in place; and
- Duration of the impact.

A description of likely effects for the 'do nothing' should the scheme not be developed has also been included.

The mitigation measures reference in Table 8.1 are described in more detail in Chapters 4 to 7 and are summarised into a Schedule of Environmental Mitigation Measures (see Section 9 – Supplementary Schedule of Environmental Commitments). Cross-referencing between the two tables is provided by the reference numbers noted in bold.

Table 8.1: Supplementary Environmental Impacts

WITH PROPOSED SCHEME						DO NOTHING
Description of Potential Impact	**Sensitivity /Value of Receptor**	**Significance of Impact Without Mitigation**	**Mitigation Measure Reference/s (see Table 9.1)**	**Significance of Impact With Mitigation**	**Beneficial or Adverse** **Duration of Impact (long, medium or short term)**	**Description of Predicted Effects**
Land Use						
Henry's Wood – land take	Low	Moderate	L1	Slight	Adverse (Long Term)	No change to existing situation, but risk of loss of land due to bank erosion in the future.
Justicehall (Oxton Games) – Land Take	Medium	Slight		Slight	Adverse (Long Term)	No change to existing situation.
Landscape Effects						
Loss of Henry's Wood	Low	Moderate	LV1	Slight	Adverse (Long Term)	No change to existing situation.
Landscape impact on riparian corridor due to erosion protection measures	Low	Moderate	LV1, LV3	Slight	Adverse (Short Term) Beneficial (Long Term)	Burn banks are likely to suffer from erosion.
Ecology and Nature Conservation						
Risk of pollution of watercourses	International	Major	E1, E4	Neutral	Adverse (Short – medium term)	No change to existing situation.
Impacts of in-stream works on fish fauna	International	Major	E1, E3, E5, E5	Neutral	Adverse (Short – medium term)	No change to existing situation.
Disturbance to otter holt	International	Moderate	E2, E6, E7	Neutral	Adverse (Short term)	No change to existing situation, but risk of bank erosion in the future which may put the holt at risk.

WITH PROPOSED SCHEME						DO NOTHING
Description of Potential Impact	**Sensitivity /Value of Receptor**	**Significance of Impact Without Mitigation**	**Mitigation Measure Reference/s (see Table 9.1)**	**Significance of Impact With Mitigation**	**Beneficial or Adverse** **Duration of Impact (long, medium or short term)**	**Description of Predicted Effects**
Ecological impact on riparian corridor due to erosion protection measures	Local	Slight	E3, E8	Neutral	Adverse (Short Term) Beneficial (Long Term)	No change to existing situation, but risk of bank erosion in the future which may put the holt at risk.
Road Drainage and the Water Environment						
Erosion protection measures, once constructed	Very High	Neutral	W1	Neutral	N/A	Continued bank erosion resulting in loss of land and risk to A68 Trunk Road
Erosion protection measures – disruption during construction	Very High	Moderate / Large Adverse	W2, W3	Neutral	N/A	Continued bank erosion resulting in loss of land and risk to A68 Trunk Road
Flood Risk – Leader Water flood plain	Low	Neutral	W4	Neutral	N/A	Continued flooding of agricultural land during large flood events.
Flood Risk – Headshaw & Mountmill Burn flood plains	Low	Slight/Moderate Adverse		Slight/ Moderate	Adverse (Long Term)	Continued flooding of A68 Trunk Road and agricultural land during large flood events.

9 Summary of Mitigation Measures

9.1 Introduction

All mitigation measures identified in the addendum will be incorporated into the Method Statements and the Contractor's Environmental Management System (EMS). These tools, along with the contents of the Environmental Statement provide a mechanism to ensure compliance with environmental commitments. In particular, legal and other environmental requirements will be defined, and responsibilities and requirements will be established to ensure, firstly, their implementation; secondly, monitoring procedures to check their implementation; and thirdly, any specific consultation requirements to ensure that mitigation measures are implemented and adhered to properly.

9.2 Supplementary Mitigation Measures

The purpose of the Supplementary Schedule of Environmental Commitments (Table 9.1) is to collate mitigation measures identified throughout the addendum for ease of reference. It summaries both new mitigation, additional to that presented in Chapter 18 of the ES and also indicates where mitigation previously outlined in the ES needs to be extended or revised. It provides a record of commitments that the Contractor will be obliged to adhere to throughout the Contract period, although it is recognised that there may be a need to revise or supplement the commitments by agreement between the successful Contractor, SBC / TS and other interested parties. The following information is provided in Table 9.1:

- the specification of the mitigation measure;
- the objective of mitigation;
- the location and timing of the mitigation;
- any monitoring requirements; and
- any consultation required.

Table 9.1: Supplementary Schedule of Environmental Commitments

Ref. No.	Mitigation Measure	Objective of Mitigation	Location and Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
Land Use					
L1	Re-plant trees at Henry's Wood and plant additional trees on opposite side of Headshaw Burn, and offer any surplus land back to existing owner.	To minimise loss/disturbance of land and maintain existing land use as far as possible.	Areas where erosion protection measures are proposed (Henry's Wood). During detailed design and construction.	Standard maintenance period for landscaping.	Liaison with landowner.
Landscape					
LV1	Re-plant trees at Henry's Wood and enhance riparian corridor with additional planting.	To reduce overall landscape impacts.	Areas where erosion protection measures are proposed. During detailed design and construction.	Standard maintenance period for landscaping.	Liaison with landowner.
LV2	Realign hedge planting to match new side road alignment.	To reduce overall landscape impacts.	Along side road. During detailed design and construction.	Standard maintenance period for landscaping.	N/A
LV3	Reinstate disturbed sections of Headshaw Burn banks.	To reduce overall landscape impacts.	Headshaw Burn. During and post construction.	N/A	N/A
Ecology and Nature Conservation					
E1	Incorporation of SUDS, Construction Method Statement and Pollution Response Plan (as part of Environmental Management Plan)	To avoid, prevent and reduce the risk of pollution to watercourses.	Location of SUDS to be confirmed. Pollution prevention in vicinity of watercourses. To be implemented pre and during construction.	Regular monitoring of water quality by Ecological Clerk of Works (ECoW) during construction (each day when on site, down stream of in-stream construction activities).	SEPA. But only in unlikely event of pollution incident.
E2	Pre-construction surveys for otter and birds for works affecting Headshaw Burn.	To avoid disturbance to otter and birds during construction period.	Headshaw Burn. Pre-construction.	Carried out by ecologist/ECoW.	N/A

Ref. No.	Mitigation Measure	Objective of Mitigation	Location and Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
E3	Pre- and post-construction habitat assessments of Headshaw Burn	To ensure that baseline conditions have not been impacted on.	Headshaw Burn. Pre-construction.	Carried out by aquatic ecologist.	N/A
E4	Apply pollution control measures as set out in Construction Method Statement.	To mitigate risk of water quality deterioration and impact on aquatic ecology.	With and in vicinity of watercourses. During site clearance and construction.	Monitored by ECoW.	SEPA.
E5	Complete in-river works during July/August (and September if necessary). Follow requirements laid out in Construction Method Statement.	To avoid sensitive periods for fish fauna.	Headshaw Burn. During site clearance and construction.	Monitored by ECoW.	N/A
E6	Application for otter disturbance licence from Scottish Government Landscape and Habitats Team. Follow requirements laid out in Construction Method Statement.	To reduce disturbance of otter.	Apply for otter licence pre-construction. Follow requirements within vicinity of otter holt, located upstream of Annfield Bridge, during construction.	To be determined as part of disturbance licence.	Scottish Government and SNH re. licence and any required monitoring.
E7	Follow general otter protection requirements laid out in Construction Method Statement.	To reduce disturbance of otter.	Headshaw Burn. During site clearance and construction.	Monitored by ECoW.	N/A
E8	Riparian planting and erosion protection allowing vegetation to re-establish on previously unstable banks.	To enhance floral diversity and encourage faunal colonisation.	Along sections of the Headshaw Burn upstream and downstream of Annfield Bridge.	N/A	Consult with ECoW and landscape specialist.
Road Drainage and the Water Environment					
W1	Design erosion protection measures in consultation with SEPA and SNH to ensure measures minimise long term impact on the watercourse.	To minimise long term impact on the watercourse.	3No. erosion protection locations on Headshaw Burn. During detailed design.	N/A	SEPA and SNH.

Ref. No.	Mitigation Measure	Objective of Mitigation	Location and Timing of Mitigation Measure	Monitoring Requirements	Additional Consultation Required
W2	Appropriate engineering techniques and timings adopted for erosion protection measures, as identified in approved Construction Method Statement.	To prevent adverse scouring, protect water quality, protect fish during spawning/breeding seasons, meet with Controlled Activities licence and allow fish/otter passage.	3No. erosion protection locations on Headshaw Burn. During construction.	Monitored by ECoW.	SEPA and SNH.
W3	Apply pollution control measures as set out in Construction Method Statement.	To mitigate risk of water quality deterioration and impact on aquatic ecology.	With and in vicinity of watercourses. During site clearance and construction.	Monitored by ECoW.	SEPA.
W4	Provide connector pipes under new side road, provide porous road embankment where height of side road embankment allows.	To allow floodplain connectivity.	Side road embankments. During detailed design and construction.	N/A	N/A

10 References

AMEC (2008). A68 Soutra South to Oxton Road Improvement Scheme: Stage 3 Environmental Statement. Transport Scotland.

AMEC (2008). A68 Soutra South to Oxton Road Improvement Scheme: Construction Method Statement. Transport Scotland.

Mouchel Ltd (2010). A68 Soutra South to Oxton Road Improvement Scheme: Construction Method Statement. Transport Scotland.

Mouchel Ltd (2011). A68 Soutra South to Oxton Road Improvement: Flood Risk Assessment. Transport Scotland.

Mouchel Ltd (November 2010) A68 Soutra South to Oxton Improvement Scheme - Headshaw Burn Bank Protection. Transport Scotland.

Included as Appendices

Mouchel Ltd (June 2010). A68 Soutra South to Oxton Road Improvement Scheme – Ecological Baseline Appraisal Report. Transport Scotland.

Mouchel Ltd (July 2010). A68 Soutra South to Oxton Road Improvement Scheme – Update Terrestrial Ecology Report. Transport Scotland.

11 Figures

12 Appendices