

**Legend:**

- Proposed Pipeline Route
- 1km Area of Search
- CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
- CLAY, SILTY [UNLITHIFIED DEPOSITS CODING SCHEME]
- DIAMICTON
- GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
- GRAVEL, SAND AND SILT [UNLITHIFIED DEPOSITS CODING SCHEME]
- PEAT [UNLITHIFIED DEPOSITS CODING SCHEME]
- SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
- SAND, GRAVEL AND BOULDERS [UNLITHIFIED DEPOSITS CODING SCHEME]
- SAND, SILT AND CLAY [UNLITHIFIED DEPOSITS CODING SCHEME]
- SEDIMENT
- SILT [UNLITHIFIED DEPOSITS CODING SCHEME]
- SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
- WATER, TYPE UNSPECIFIED

Coordinate System: British National Grid  
Projection: Transverse Mercator  
Datum: OSGB 1936  
Units: Meter

03	06/05/2015	Updated Route	FC	DL	WH
02	14/04/2015	Updated Logo	FC	DL	WH
01	17/03/2015	Updated geology data	FC	DL	WH
Rev	Date	Description	Drn	Chk	App

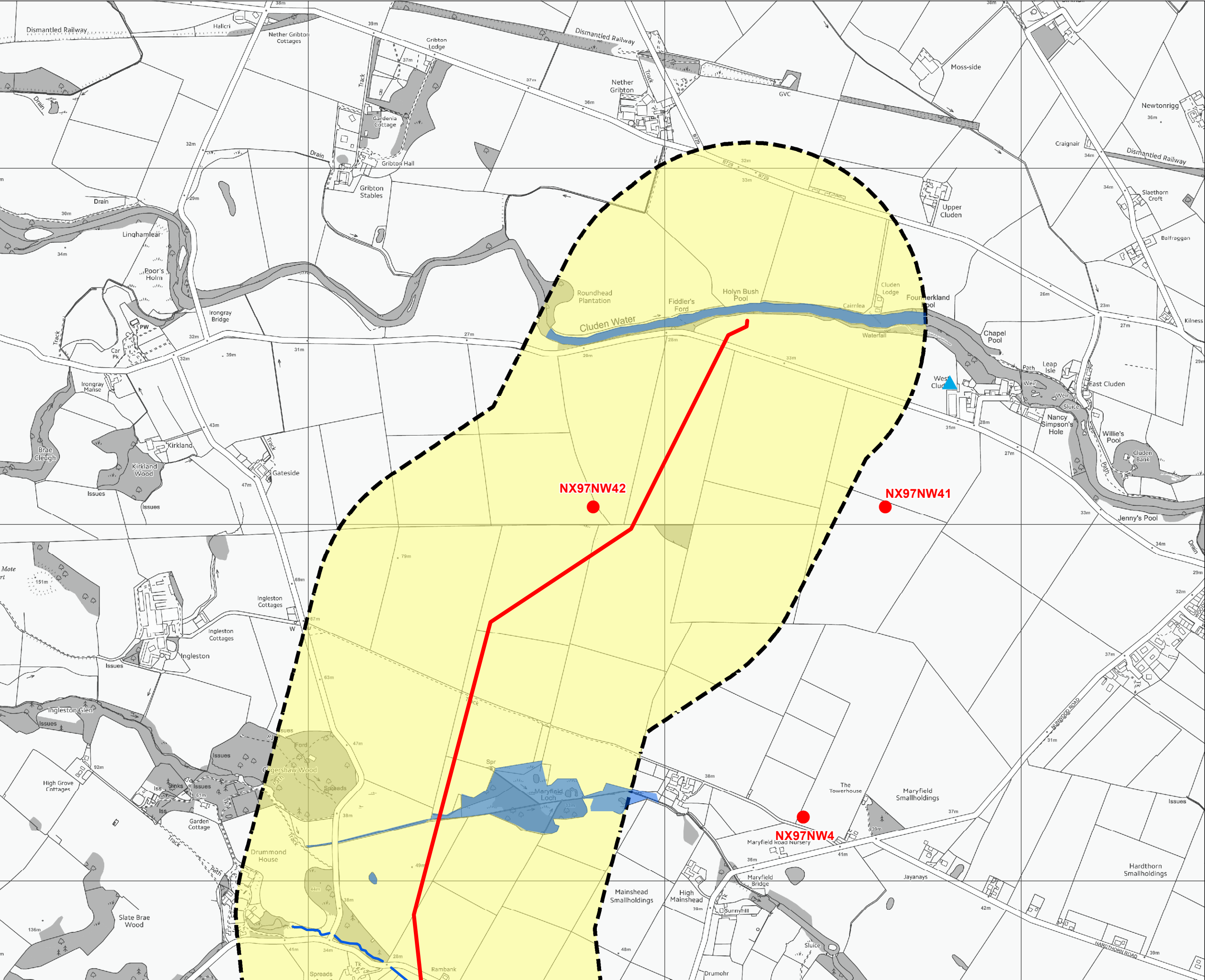
**Cluden to Lochfoot Pipeline**

TITLE: Figure 6.2 - Superficial Geology

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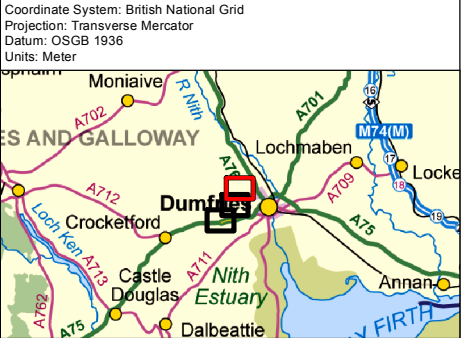
REV 03





**Legend:**

- Proposed Pipeline Route
- 1km Area of Search
- Issue
- Borehole
- Private Water Supply
- Fish Farm
- Hydrological feature identified in walkover survey
- Surface Water (Line)
- Surface Water (Area)
- Nitrate Vulnerable Zone



02	06/05/2015	Updated Route	FC	DF	JS
01	14/04/2015	Updated Logo	FC	DF	JS
00	03/03/2015	First Draft	FC	DF	JS
Rev	Date	Description	Drm	Chk	App

**Cluden to Lochfoot Pipeline**

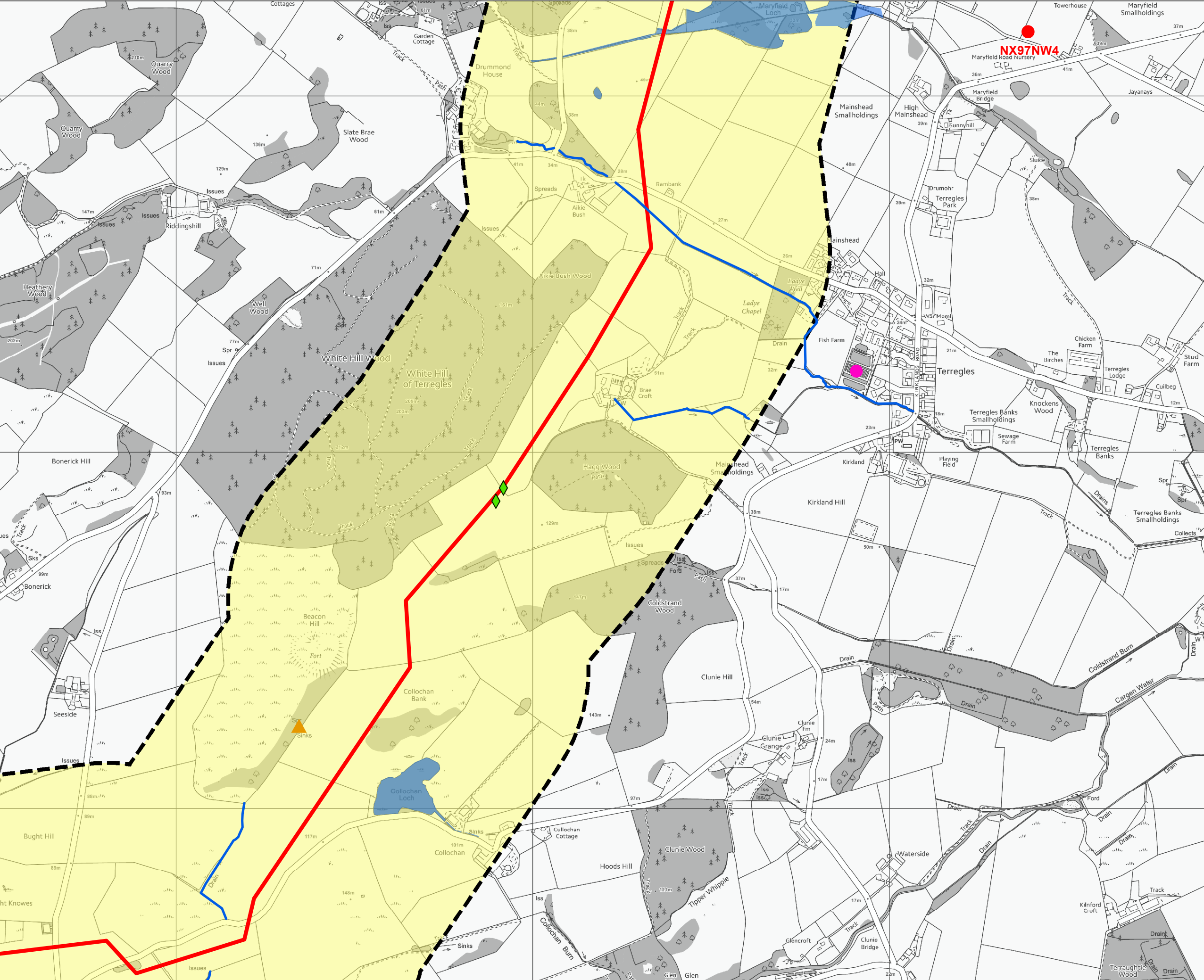
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TITLE: Figure 6.3: Hydrological and Hydrogeological Features  
Map 1 of 3

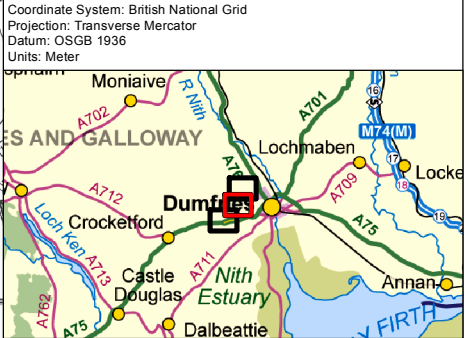
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Kilometres  
SCALE: 1:10,000 @ A3

REV 02





- Legend:**
- Proposed Pipeline Route
  - 1km Area of Search
  - Issue
  - Borehole
  - Private Water Supply
  - Fish Farm
  - Hydrological feature identified in walkover survey
  - Surface Water (Line)
  - Surface Water (Area)
  - Nitrate Vulnerable Zone



02	06/05/2015	Updated Route	FC	DF	JS
01	14/04/2015	Updated Logo	FC	DF	JS
00	03/03/2015	First Draft	FC	DF	JS
Rev	Date	Description	Drm	Chk	App

**Cluden to Lochfoot Pipeline**

TITLE: Figure 6.3: Hydrological and Hydrogeological Features  
Map 2 of 3

00.20.4

Kilometres

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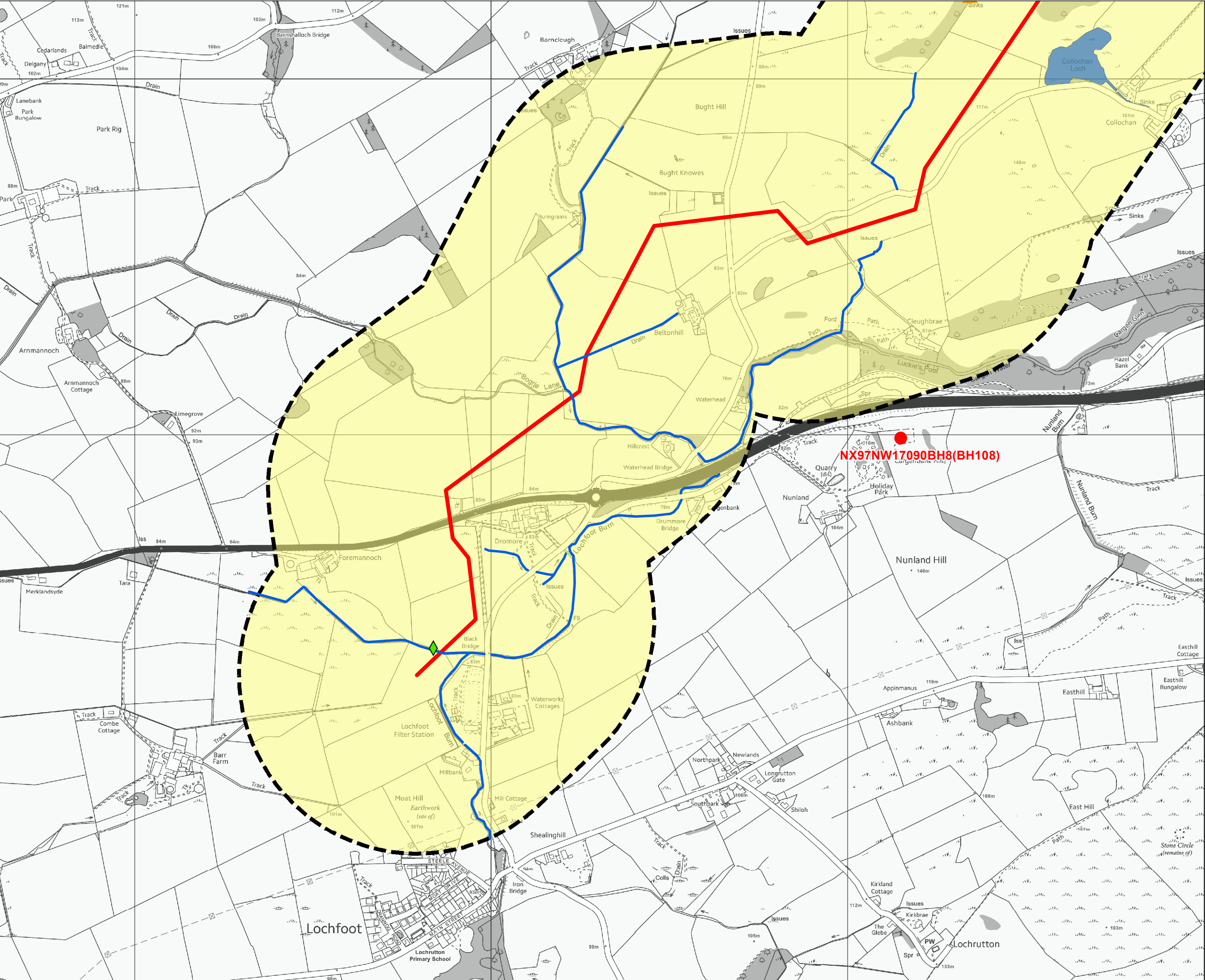
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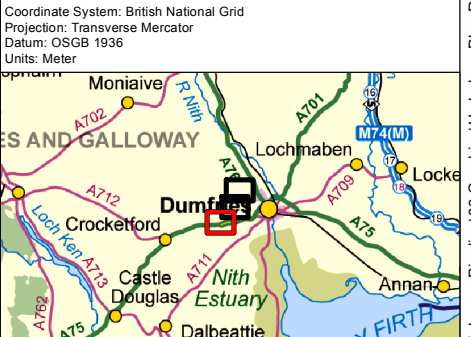
REV 02





**Legend:**

- Proposed Pipeline Route
- 1km Area of Search
- Issue
- Borehole
- Private Water Supply
- Fish Farm
- Hydrological feature identified in walkover survey
- Surface Water (Line)
- Surface Water (Area)
- Nitrate Vulnerable Zone



02	06/05/2015	Updated Route	FC	DF	JS
01	14/04/2015	Updated Logo	FC	DF	JS
00	03/03/2015	First Draft	FC	DF	JS
Rev	Date	Description	Drm	Chk	App

**Cluden to Lochfoot Pipeline**

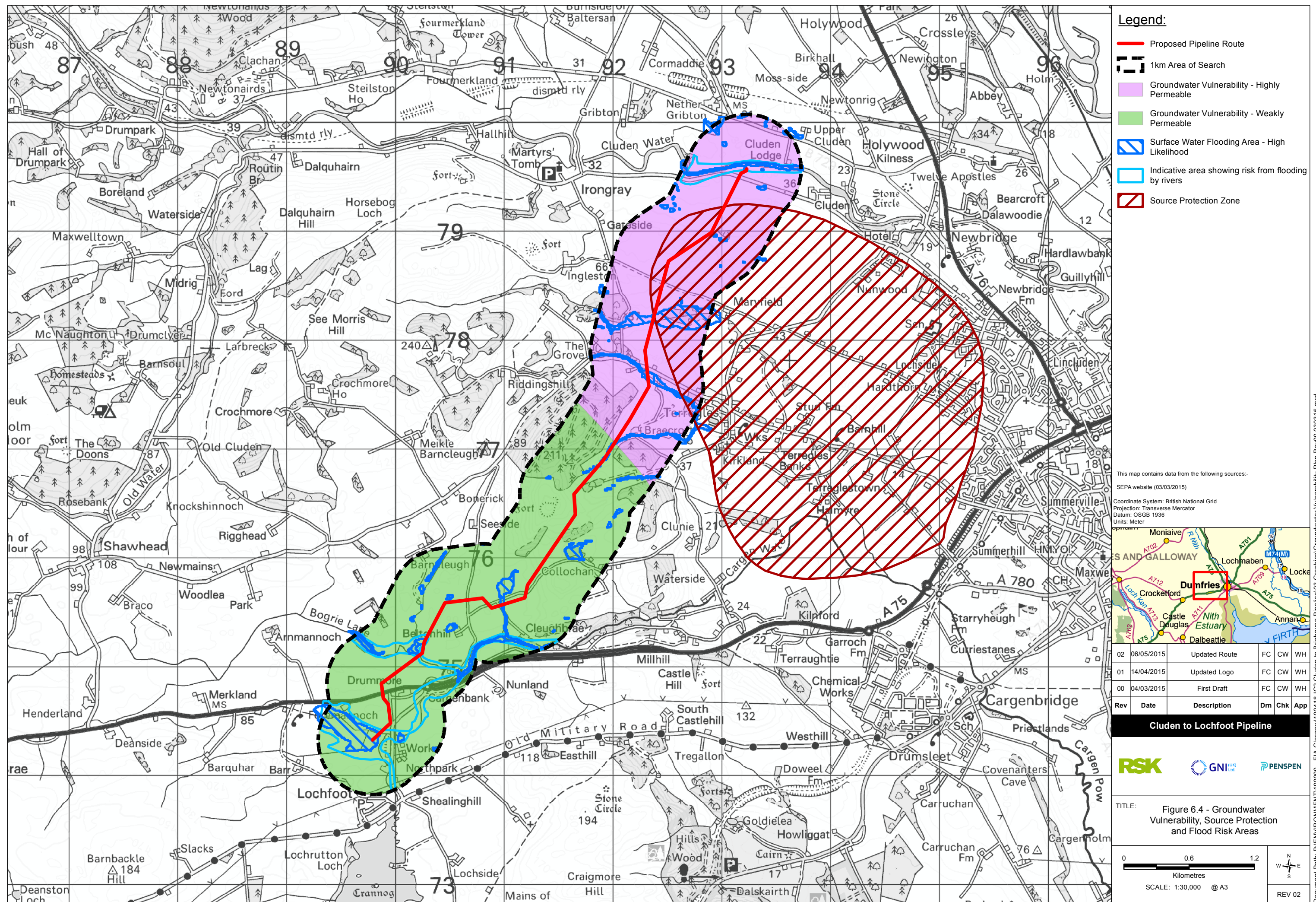
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**TITLE:** Figure 6.3: Hydrological and Hydrogeological Features  
Map 3 of 3

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REV 02







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## 7 ECOLOGY

### 7.1 Introduction

This section of the ES assesses the ecological impacts that may arise from construction of a gas pipeline by means of an ecological impact assessment (EcIA). This assessment follows principles set out in the guidelines for EcIA published by the Chartered Institute of Ecology and Environmental Management (IEEM 2006).

The specific sites and features of particular nature conservation importance close to the pipeline route are discussed first, along with the mitigation measures proposed to reduce these impacts. Finally, the significance of the residual impacts on nature conservation resources is presented at the end of the section.

Throughout route selection and refinement, emphasis has been placed on avoiding designated nature conservation sites and areas of semi-natural habitat wherever possible. However, as a result of on-going reviews of the alignment of the pipeline, minor re-routes may be necessary. Where this is the case, further surveys will be undertaken to ensure that all ecological constraints are taken into account as part of the continuing environmental impact assessment process.

This Section should be read in conjunction with the following supporting information:

- Appendix B contains a Badger Report with confidential information relating to sett locations.

### 7.2 Consultation

Table 7-1 summarises the consultation responses that have been received to date in relation to the ecological assessment methodology presented in this section.

**Table 7-1 Ecological Consultation Responses**

Consultee	Previous Consultation	Comment	Response to Consultation
Scottish Environmental Protection Agency (SEPA)	Meetings held on: 15.03.2007 03.07.2007 20.11.2007 25.11.2014 09.03.2015	Protection of Salmon Fisheries	Need for pre and post construction fish and aquatic invertebrate surveys. Project commitment to fish rescues during construction
		Protection of badgers, otters, water voles, bats, reptiles, red squirrels	Project commitment to undertake preconstruction surveys to check for badgers, otters, water voles, bats,



Consultee	Previous Consultation	Comment	Response to Consultation
			reptiles, red squirrels
		To avoid spread of American Signal Crayfish	Project commitment to implementation of strict Crayfish Method Statement
		To avoid spread of invasive plant species	Project commitment to undertake preconstruction surveys
Scottish Natural Heritage (SNH)	Meetings held on: 15.03.2007 02.07.2007 03.07.2007 20.11.2007 21.11.2007 25.11.2014 25.02.2015	To minimise impact on SACs and other designated sites	Project commitment to early reinstatement of fields used for winter grazing by geese
		Protection of Salmon Fisheries	Need for pre and post construction fish and aquatic invertebrate surveys. Project commitment to fish rescues during construction
		Protection of badgers, otters, water voles, bats, reptiles, red squirrels	Project commitment to undertake preconstruction surveys to check for badgers, otters, water voles, bats, reptiles, red squirrels
		To avoid spread of American Signal Crayfish	Project commitment to implementation of strict Crayfish Method Statement
		To avoid spread of invasive plant species (Japanese Knotweed,	Project commitment to undertake preconstruction surveys



Consultee	Previous Consultation	Comment	Response to Consultation
		Himalayan Balsam and Giant Hogweed)	
Nith District Salmon Fisheries Board		Protection of Salmon Fisheries	Need for pre and post construction fish and aquatic invertebrate surveys. Project commitment to fish rescues during construction

### 7.3 Legislation and Planning Policy Context

A number of legislative Acts and Directives provide legal protection to habitats and species that, together with national and local planning policies, aim to conserve biodiversity and nature conservation interest in the UK. The key natural heritage legislation, which underpins the conservation of habitats and species relevant to The Project is summarised in Table 7-2.

**Table 7-2 Relevant Nature Conservation Legislation**

Act/Regulation	Key Relevant Provisions
Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive)	Requires Member States to take measures for the conservation of wild birds by the designation of Special Protection Areas <sup>1</sup> (SPAs). Implementation was primarily through the <i>Wildlife and Countryside Act 1981</i> , but has since been amended by the Habitats Directive (below) and is now fully implemented in the UK through the <i>Conservation (Natural Habitats, &amp;c.) Regulations, 1994</i> (below)
Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive).	Contributes to the conservation of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species at favourable conservation status by the designation of Special Areas of Conservation <sup>2</sup> (SAC), and greater protection for various species. Great crested newt, otter and some bat species are listed in Annexes 2 and 4, while the bat species are listed in Annex 4 only. This Directive also modifies the Birds Directive
The Conservation (Natural Habitats, &c.) Regulations 1994 (as	The Habitats and Birds directives are implemented in the UK by the <i>Conservation (Natural Habitats, &amp;c.) Regulations, 1994</i> . These regulations make provision for the purpose of

<sup>1</sup> Special Protection Areas (SPAs) are strictly protected sites classified in accordance with Article 4 of the EC Birds Directive (Council Directive 79/409/EEC). They are classified for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species.

<sup>2</sup> Special Areas of Conservation (SACs) are strictly protected sites designated under the Habitats and Species Directive (92/43/EEC). Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds). Of the Annex I habitat types, 78 are believed to occur in the UK. Of the Annex II species, 43 are native to, and normally resident in, the UK ([www.jncc.gov.uk](http://www.jncc.gov.uk))



Act/Regulation	Key Relevant Provisions
amended)	implementing Council Directive 92/43/EEC on the conservation of natural habitats, wild fauna and flora. They introduce a review procedure for all plans and projects likely to significantly affect a European site, and licensing requirements for developments that may affect European species e.g. all bat species, otter and great crested newt.
The Wildlife and Countryside Act 1981 (as amended)	The <i>Wildlife and Countryside Act 1981</i> is enacted to implement the Birds Directive. Changes have since been made to the 1981 Act through the <i>Nature Conservation (Scotland) Act 2004</i> and the <i>Wildlife and Natural Environment Act 2011</i> (see below). The Act applies to the terrestrial environment and inshore waters (0-12 nautical miles), and categorises species and degree of protection within a number of Schedules: Schedule 1 – 4 (birds), Schedules 5 and 6 (animals) and Schedule 8 (plants). Species licenses are required for developments that go ahead that may affect these species.
Nature Conservation (Scotland) Act 2004 (as amended)	The <i>Nature Conservation (Scotland) Act 2004</i> sets out amendments to the <i>Wildlife and Countryside Act 1981</i> and the <i>Protection of Badgers Act 1992</i> . It places duties on public bodies in relation to the conservation of biodiversity to publish lists of species of flora, fauna and habitats of importance, increases protection for Sites of Special Scientific Interest <sup>3</sup> (SSSI) and strengthens the legal protection for threatened species.
Wildlife and Natural Environment (Scotland) Act 2011	The <i>Wildlife and Natural Environment (Scotland) Act 2011</i> amends the <i>Wildlife and Countryside Act 1981</i> , introducing a number of changes including new wildlife offences, changes to the licensing system for protected species, strengthens protection of badgers and arrangements for deer management.
Protection of Badgers Act, 1992 (as amended)	Protection of Badgers from taking, injuring, cruelty or killing. Prevention of interfering with Badger setts.

The current framework for biodiversity action planning in Scotland is provided in the 2020 Challenge for Scotland's Biodiversity - a strategy for the conservation and enhancement of biodiversity in Scotland (Scottish Government 2014) and Scottish Biodiversity List (SBL) which together help the Scottish Government meet their statutory duty to 'further the conservation of biodiversity' committed through the Nature Conservation (Scotland) Act 2004. As such, biodiversity features (including the presence of protected species) are a 'material consideration' to the planning process.

The SBL comprises habitats and species that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The Scottish Biodiversity List categorises habitats and species into specific actions including:

- conservation action needed;
- avoid negative impacts;
- watching brief only; and
- communicating with the public.

Local Biodiversity Action Plans (LBAPs) are implemented through planning policy that identifies habitats and species of particular value, or endangerment, at the local or regional

<sup>3</sup> A SSSI is an area that has been notified as being of special interest due to its flora, fauna or geological or physiographical features under the Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act, 2004



level. As such, LBAPs have no statutory status, but do provide a framework for implementing a planning authority's nature conservation duty. Within this Ecological Impact Assessment (EcIA), the Dumfries and Galloway BAP is considered.

Local Wildlife Sites (LWS) are sites of local nature conservation interest designated by Local Planning Authorities. Such sites are afforded a measure of protection in Local Development Plans.

## 7.4 Assessment Methodology

The impact assessment for ecology follows the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK, hereafter referred to as the IEEM Guidelines (2006). The guidelines are endorsed by organisations including Scottish Natural Heritage (SNH), Natural England, Environment Agency, Environment and Heritage Service, Association of Local Government Ecologists (ALGAE), Institute of Environmental Management and Assessment (IEMA), and the Wildlife Trusts.

The starting point for any assessment of impacts is to determine which receptors should be assessed in detail. Such ecological receptors should be:

- of sufficient value that impacts upon them may be significant (in terms of legislation or policy); and
- potentially vulnerable to significant impacts arising from the development (IEEM, 2006).

This approach is consistent with the EIA Regulations, which only require investigation of likely significant impacts.

This ecological assessment process included the following key stages:

- identifying the Zone of Influence (ZOI) arising from the whole lifespan of The Project;
- completing a background data search to obtain archived biological records for designated sites and species within the ZOI;
- using information collected from the background data search to identify potential ecological receptors likely to be affected and determine their value through field survey;
- identifying potential impacts on ecological receptors and determining likely significant impacts on the integrity or conservation status of the receptor;
- incorporation and evaluation of ecological enhancement and mitigation measures to avoid or reduce impacts, and compensation measures for any residual significant effects; and
- assessment of the overall significance of ecological effects arising from The Project.

#### **7.4.1      *Background Data Search***

To ensure a comprehensive desk-based assessment, information relating to nature conservation issues within the pipeline corridor (a 1km-wide corridor centred on the pipeline route) was collated from a range of statutory and non-statutory bodies. This has been used to help define the route and ensure that the design and construction of the pipeline avoids sensitive receptors, and minimises adverse impacts. This has included assimilating information on statutory and non-statutory wildlife sites, land cover, hedgerows, watercourses and protected species.

Information was collated from several sources including the Development Plans, Dumfries & Galloway Council and non-government organisations. Reference has also been made to Guidance Notes produced by SNH, and other Statutory Nature Conservation Organisations (SNCOs) where appropriate. A list of consultees and references can be found in Section 1.

The Dumfries and Galloway Biological Records Centre was contacted for records of protected sites and species within 2km of the pipeline route. The information requested comprised records of the following:

- statutory designated sites of ecological importance, such as Sites of Special Scientific Interest (SSSI);
- non-statutory designated sites of ecological importance, such as Sites of Importance for Nature Conservation and Ancient Woodland;
- records of protected species; and
- BAP species and habitats.

Scottish Badgers were also contacted for records of Badgers within 1km of the pipeline route.

The information gained has been used to help define areas of ecological significance, so as to avoid or minimise any adverse impacts.

#### **7.4.2      *Ecological Surveys***

A survey was initially undertaken within a 200 m-wide survey corridor, centred on the pipeline route during July 2007. The survey comprised an extended Phase I habitat and protected species survey, in order to identify any habitats likely to be of conservation value, and to investigate the presence (or likely presence) of protected species of plants and/or animals. A walkover survey was then completed in February 2015 in order to update previous survey results. This survey covered the 45 m working width (maximum proposed) plus 30 m either side.

As part of the surveys, the conservation value of the watercourses was assessed, particularly with regard to protected species, including Otters (*Lutra lutra*) and Water Voles (*Arvicola amphibius*). Detailed surveys for Otters and Water Voles were undertaken in 2007 and 2015 along watercourses which appeared to constitute suitable habitat for use by these species. The watercourses were surveyed 250 m either side of the crossing point.

During the surveys, the potential of habitats to support terrestrial and aquatic invertebrates was assessed. Any ponds or wetland features were assessed for their suitability for use by breeding amphibians, including Great Crested Newt. In addition, habitats of particular value for basking, hibernating and foraging reptiles were identified, and the value of the habitats for use by breeding birds was also assessed.



Structures potentially suitable for use by roosting/hibernating bats were identified, and all mature trees were carefully inspected to assess their likely occupancy by roosting or hibernating bats. In addition, features likely to be of particular value to foraging and commuting bats were also assessed. Trees were also searched for the presence of Red Squirrel (*Sciurus vulgaris*) dreys.

The presence and distribution of Badger (*Meles meles*) was investigated by searching for the characteristic signs of Badger activity, including the presence of: setts, latrines, paths, footprints, hairs and feeding signs. All Badger setts identified were classified according to their size, status and current level of activity, using the generally accepted categories of main, annexe, subsidiary and outlying setts.

In addition, signs of Brown Hare (*Lepus europaeus*) and incidental observations of these species were also recorded during the survey.

The walkover surveys also included searching for invasive plants and weeds as well as considering the potential for aquatic invasive animals.

Each of these investigations also included an assessment of the need for further surveys.

### 7.4.3 *Limitations*

During the 2007 survey one small section of the route at the northern end could not be fully surveyed as a result of access difficulties. However, this area could be accessed during the 2015 survey.

It was not possible to survey the whole survey corridor exhaustively for Badgers in 2007 because of the presence of a few small areas of particularly dense scrub. None of these areas are crossed by the pipeline route or lie within a distance that is considered likely to be significantly impacted upon by The Project. However all areas within the working width and 30 m buffer either side could be surveyed during the 2015 survey.

Identification and assessment of impacts and mitigation measures

Ecological Impact Assessment (EcIA) firstly involves evaluating ecological receptors with an emphasis on different aspects of value including designations, biodiversity value, potential value, secondary or supporting value, social value, economic value, legal protection and multi-functional features. Values are applied to the receptors within a defined geographical context; examples are given in Table 7-3.

**Table 7-3 Examples of the Potential Maximum Values of Receptors in a Geographical Context**

Receptor Value	Examples
International	<p>An internationally designated site or candidate site or an area which the statutory nature conservation organisation has determined meets the published selection criteria for such designation, irrespective of whether or not it has yet been notified.</p> <p>A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole.</p> <p>A European protected species listed in the <i>Conservation (Natural Habitats, &amp;c.) Regulations, 1994</i>.</p>
National	<p>A nationally designated site or a discrete area, which Scottish Natural Heritage has determined as meeting the published selection criteria for national designation (e.g. Site of Special Scientific Interest (SSSI) selection guidelines) irrespective of whether or not it has yet been</p>

Receptor Value	Examples
	<p>notified.</p> <p>A viable area of a Scottish Biodiversity List (SBL) habitat or smaller areas of such habitat which are essential to maintain the viability of a larger whole. Any regularly occurring population of a SBL species.</p>
Regional	<p>Viable areas of key habitat identified on the Regional BAP, but not identified on the Scottish Biodiversity List, or smaller areas of such habitat that are essential to maintain the viability of a larger whole.</p> <p>Any regularly occurring, locally significant population of a species listed as nationally scarce (present in 16-100 10km squares in the UK) or in a Regional Authority BAP on account of its regional rarity or localisation.</p> <p>A regularly occurring, locally significant number of a species identified as important (not identified on the Scottish Biodiversity List) on a regional basis.</p>
County	<p>County Council designated sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on defined ecological criteria and Wildlife Trust sites.</p> <p>Viable areas of habitat identified in a County BAP.</p> <p>A regularly occurring, locally significant number of a species identified as important (not identified as a Scottish Biodiversity List species) on a county/metropolitan basis.</p> <p>Semi-natural woodland greater than 0.5 ha which is considered to be in 'good condition'.</p>
District	<p>Semi-natural woodland greater than 0.25 ha which is considered to be in 'good condition' or greater than 0.5ha in unfavourable condition.</p> <p>Networks of inter-connected hedgerows including some species-rich hedgerows.</p> <p>Individual species-rich hedgerows or other ancient-countryside linear features.</p> <p>Any regularly occurring population of a nationally important species which is not threatened or rare in the region or county.</p> <p>Sites/features that are scarce within the District/Borough or which appreciably enrich the District/Borough habitat resource.</p> <p>Other features identified as wildlife corridors or migration routes.</p>
Local	<p>Semi-natural woodland smaller than 0.25 ha.</p> <p>Diverse or ecologically valuable hedgerows.</p> <p>Diverse or ecologically valuable grassland.</p> <p>Habitat included in an agri-environment scheme but not otherwise containing species or habitats listed above.</p> <p>Common species legally protected primarily for reasons of animal welfare (Badger, reptiles).</p> <p>Established semi-natural or artificial habitats of limited ecological value when assessed in isolation that nevertheless offer a range of opportunities for widespread and commonly occurring species within the wider landscape.</p>
Less than Local	<p>Features of value to the immediate area only.</p>



The next stage of an EcIA is to predict and characterise the likely changes to and impact on the ecological receptors identified. It is necessary to consider all of the following parameters;

- whether the change is positive or negative;
- the magnitude or severity of the change (in quantitative terms if possible);
- the extent of the area subject to a predicted impact;
- the duration the impact;
- whether impacts are reversible (either by natural process or the implementation of mitigation measures); or irreversible (where no recovery is possible within a reasonable timescale or else there is no intention to reverse the impact);
- the timing and frequency of the impact, e.g. conflicting with critical seasons or increasing impact through repetition

The CIEEM Guidelines also stress consideration of the likelihood that ‘a change/activity will occur and also the degree of confidence in the assessment of the impact on ecological structure and function’. Likelihood is then specified using the following terms:

- certain (95% probability or higher);
- probable (50-94% probability);
- unlikely (5-49% probability); or
- extremely unlikely (less than 5% probability).

Direct and indirect impacts are considered:

- direct impacts are changes directly attributable to an action such as the physical loss of a habitat or mortality in a particular species; and
- indirect impacts are changes attributable to an action that affects ecological receptors through effects on an intermediary ecosystem, process or receptor, e.g. an impact on an aquatic species downstream of an impact source due to runoff from construction entering the river catchment and affecting its prey.

The final step is to assess whether impacts are ecologically significant or not. In this EIA, we assess the significance of residual impacts, i.e. the significance of the impacts that are predicted to remain after the implementation of committed mitigation measures.

Significance is assessed solely on an ecological basis. An impact is described as significant if it affects the integrity or conservation status of an ecological receptor. Integrity is defined in the CIEEM guidelines as:

‘the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified.’

And based on the EC Habitats Directive conservation status can be defined as:

‘for habitats, conservation status is determined by the sum of the influences acting on the habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area; and for species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area.’

This approach determines whether or not an impact would result in a significant effect simply on the basis of how it affects the integrity of the receptor, and takes no account of the value of the receptor. An impact is then significant at the geographical level at which the ecological receptor has value, e.g. national for a SSSI. An impact that does not affect the integrity of a receptor may still be significant at some geographical level below that at which the receptor was deemed to be valuable, e.g. loss of common birds may not affect the integrity of an SPA valued at international level, but it may still be a significant impact at the local level.

The terms mitigation, compensation and enhancement are defined here as follows:

- mitigation is used to refer to measures to avoid, reduce or remedy a specific negative impact *in situ*. Mitigation is relevant for negative impacts assessed as being potentially significant (before mitigation) or where required to ensure compliance with legislation;
- compensation is used to refer to measures proposed in relation to specific negative impacts but where it is not possible to fully mitigate for negative impacts *in situ*. Compensation is relevant for negative impacts assessed as being significant or where required to ensure compliance with legislation; and
- enhancement is used to refer to measures that do not remedy the significant negative impacts but redress the overall balance of negative impact by creating other positive ecological impacts. Regardless of any negative impacts, enhancements are increasingly used to provide net ecological gain, this being a presumption of many planning policies.

## 7.5 Baseline Overview

### 7.5.1 *Statutory Designations*

There are no statutory protected sites within the pipeline corridor or within the 2km buffer from the centre point. The closest site is detailed in Table 7-4 below. This site is located some 3km west of the pipeline route and is designated for the habitat it supports (not a mobile receptor). As such, there will be no adverse impacts on this site, or its integrity, due to construction or operation of the pipeline. For completeness, its location is shown in Figure 7.1.



**Table 7-4 Relevant Nature Conservation Legislation**

Site Name	Designation	Proximity to route	Description
Lag Meadow	SSSI	Approx. 3km to west	<p>This site is one of the best examples of unimproved mesotrophic (neutral) grassland in the Nithsdale District and is the only grassland SSSI within Dumfries and Galloway managed as traditional hay meadow.</p> <p>The site is especially notable for the large extent of herb-rich Crested Dog's-tail Common Knapweed (<i>Cynosurus cristatus</i> – <i>Centaurea nigra</i>) grassland, a community that is both scarce within the region and declining nationally. This community consists of a rich variety of other grass species including Sweet Vernal Grass (<i>Anthoxanthum odoratum</i>), Soft Brome (<i>Bromus hordeaceus</i>) and Timothy (<i>Phleum pratense</i>), whilst Pignut (<i>Conopodium majus</i>), Lady's Mantle (<i>Alchemilla glabra</i>) and Yellow Rattle (<i>Rhinanthus minor</i>) are typical of the wide variety of herbaceous species present. Within the larger of the two hayfields, is an uncut grassy knoll dominated by Red Fescue (<i>Festuca rubra</i>), Common Bent (<i>Agrostis capillaries</i>) and the uncommon Meadow Oat-Grass (<i>Helictotrichon pratense</i>) with Knotted Clover (<i>Trifolium striatum</i>), Meadow Vetchling (<i>Lathyrus pratensis</i>) and Common Rockrose (<i>Helianthemum nummularium</i>) present.</p>

### 7.5.2 **Biodiversity Action Plan (BAP) and Section 74 Habitats and Species**

The SBL contains 40 terrestrial habitats and 1,947 terrestrial species. A large number of these habitats and species, as well as a number of additional, locally-important habitats and species have been listed in local Biodiversity Action Plans (BAP's) (e.g. Dumfries and Galloway BAP).

These LBAP habitats and species were considered during the Extended Phase 1 habitat and protected species' surveys and their potential presence was recorded.

In the following sections, all Target Notes and Animal Notes are described in Appendix C and shown on Figure 7.2.

### 7.5.3 **Trees and Woodland**

Ancient woodland inventories on SNH interactive map identify 51 named ancient woodlands within 2km of the centre point of the pipeline. Of these, 29 are described as

Long-Established (of plantation origin), 20 are Ancient (of semi-natural origin) and two are described as 'other'. The closest one to the pipeline route is 41m from the centre point of the proposed pipeline route. Their locations are shown on Figure 7.1.

The proposed pipeline route passes close to a number of woodlands and passes through some individual trees, and small groups of trees, along hedges and field boundaries. A summary of the woodlands is provided in Table 7-5 below.

These woodlands vary according to the underlying geology and hydrology, and largely comprise coniferous plantation of *Larix deciduas* (Larch) and *Picea sitchensis* (Sitka spruce) with some smaller areas of broadleaved woodland of *Acer pseudo-platanus* (Sycamore), *Betula pendula* (Birch), *Fraxinus excelsior* (Ash), *Pinus sylvestris* (Oak) and *Sorbus aucuparia* (Rowan). There is also a small area of damp/wet woodland dominated by *Alnus glutinosa* (Alder) and *Salix* spp. (Willow) associated with Maryfield Loch.

The understorey in these woods (particularly in the conifer plantations) is under-developed, comprising young trees and mature shrubs, mainly *Crataegus monogyna* (Hawthorn), *Cytisus scoparius* (Broom) and *Ulex europaeus* (Gorse). The ground flora in the woodlands was generally poor where livestock have access. Ferns were recorded throughout the woodlands, and were often abundant within the coniferous plantations.

**Table 7-5 Summary of Woodland Sites**

Location	Description	Importance/ Sensitivity
Maryfield Loch (30 m from pipeline route)	Wet woodland and scrub (possible Scottish Biodiversity List habitat)	County
North of Alkie Bush (60 m from pipeline route)	Two distinct sections, one coniferous plantation and other small sections of mixed woodland	Site
Alkie Bush Wood (60 m from pipeline route)	Coniferous plantation woodland with some broadleaved trees at edge	Site
White Hill Wood (60 m from pipeline route)	Coniferous plantation woodland	Site
Hagg Wood (50 m from pipeline route)	Coniferous plantation woodland	Site
Coldstrand Wood (280 m from pipeline route)	Coniferous plantation woodland	Site
Collochan Bank (80 m from pipeline route)	Broad-leaved woodland	Site
Adjacent to Hill Fort (70 m from pipeline route)	Broad-leaved woodland	Site
Bught Knowes (220 m from pipeline route)	Broad-leaved woodland	Site
Adjacent to Luckie's Pool (320 m from pipeline route)	Broad-leaved and coniferous woodland	Site
Adjacent to Bogrie Lane (510 m from pipeline route)	Broadleaved woodland	Site



Location	Description	Importance/ Sensitivity
pipeline route)		

In several locations along the pipeline route, particularly on old hedgerows, field boundaries and streambanks, groups and/or lines of mature and semi-mature trees and shrubs were recorded. The mature trees along the route are either *Fraxinus excelsior* (Ash) or *Pinus sylvestris* (Oak). It is possible that a few of these trees may require removal to facilitate the construction of the pipeline. As some of these trees are likely to be approaching Veteran status, they are considered to be significant at the Local level.

#### 7.5.4 Water Crossings and Waterbodies

The pipeline will cross no major rivers but will cross five small watercourses. These comprise small streams and drainage ditches, mainly spring fed and associated with field boundaries. Flows in many of these were low during the 2007 survey period and many were heavily poached. The water levels were higher in 2015 as the survey was undertaken in winter. In several locations water quality in the watercourses was affected by pollution and nutrient enrichment typically associated with agricultural grazing systems.

The majority of these watercourses supported limited amounts of submerged and emergent vegetation and were over-grazed or heavily shaded by hedgerows. Although the channel-forms of most of the streams did not appear to have been modified by past drainage works, or affected by on-going management, it nevertheless appeared likely that the majority of these streams would be of no more than 'Site' importance. The water crossings are summarised in Table 7-6 below and shown in Figure 7.2.

Cluden Water lies to the north of the pipeline route and will not be crossed by the pipeline. This is a larger river with strong flow and good depth of water. It is well vegetated on the southern bank.

**Table 7-6 Summary of Water Crossings**

Location	Description	SEPA Classification	Importance/Sen sitivity
RVX 01 Adjacent to Maryfield Loch	Small stream along good hedgerow feeds into Maryfield Loch and Willow Scrub area; hedge stops prior to crossing point (stream approx. 1–2m wide and <30cm deep)	Not classified	Site
RVX 02	Drainage ditch tributary of the Cargen Water; heavily vegetated banks of long grass and nettles; ditchwater very slow moving (approx. 0.5m wide and <15cm deep), heavily poached	Not classified but does run into the Cargen Water which is A2 – Good	Site
RVX 03 Bogie Lane	Stream reasonably fast flowing; banks vary from steep stone to shallow grass with significant poaching depending on adjacent field boundary access; crossing point has reasonably grassed banks with some rockier sections (stream approx. 3–4m wide in places and <0.5m deep)	Not classified but does run into the Cargen Water which is A2 – Good	Site

Location	Description	SEPA Classification	Importance/Sensitivity
R VX 04	Small drainage ditch; heavily vegetated banks of long grass and nettles; ditchwater very slow moving (approx. 30cm wide and <10cm deep). No water during the 2015 survey.	Not classified	Site
R VX 05 Lochfoot Burn	Stream; banks vegetated with grass and ruderals ( <i>Urtica dioica</i> (Nettle) and <i>Chamerion angustifolium</i> (Rosebay willowherb)); section of stream at crossing reasonably slow flowing but faster in other sections (approx. 1–2m wide and <0.5m deep)	C – Poor	Site

No field ponds were recorded within the proposed pipeline route. However, if the proposed re-route is adopted it will cross two small, ephemeral ponds. There is a single small loch (Collochan Loch) located 200 m to the south east of the proposed route. This is surrounded by *Phragmites* spp. (Reed species) and other wetland vegetation; however, this was not extensive and unlikely to attract any significant assemblage of wetland birds.

### 7.5.5 Hedgerows

In total, 13 hedgerows were assessed during the 2015 survey, all of which are classified as species-poor comprising primarily *Crataegus monogyna* (Hawthorn) with only two being *Prunus spinosa* (Blackthorn).

The hedgerows are primarily sparse and/or fragmented with only a few running the length of field boundaries. All hedgerows along the route of the proposed pipeline have been heavily trimmed and are of limited ecological value.

### 7.5.6 Grassland

The working width plus 30 m buffer crosses predominately improved grassland with a small area of species-poor semi-improved grassland in the middle of the route (*Target Note 1*). The improved grassland is dominated by *Festuca ovina* (Sheep's fescue) and *Lolium perenne* (Perennial ryegrass) while the semi-improved grassland comprises *Anthoxanthum odoratum* (Sweet Vernal Grass), *Poa Annua* (Annual Meadow grass) and (*Poa trivialis*) Rough Meadow grass.

Improved grassland has been variously affected by heavy grazing by sheep or cattle, drainage, the application of fertilisers, slurry or high doses of manure. Such areas have consequently lost many species associated with unimproved grassland, and support a very limited range of grasses. The grass species present are mainly those demanding nutrients and those resistant to heavy grazing. Due to their poor species diversity and ubiquitous nature, these habitats are considered to be of negligible conservation value considered important at the Site level only.

The current proposed pipeline route crosses a small area of wetland grassland in the south of the route opposite Dromore steading is very limited and comprises only *Juncus conglomerates* (Compact rush) (*Target Note 4*). Due to the small size and poor quality of this area of wet grassland, it would be classified as only of Site importance.

### 7.5.7 **Other**

There are several small areas of scrub along the route which comprise predominately *Ulex* spp. (Gorse) with *Cytisus scoparius* (Broom). These areas are sparse and species-poor considered important only at the Site level.

Field boundaries are delineated by in some fields by stone dykes which may have some value to biodiversity. Otherwise the boundaries are either hedgerows (as described above) or post and rail.

### 7.5.8 **Invasive Plant and Weeds**

No invasive species such as *Fallopia japonica* (Japanese knotweed), *Heracleum mantegazzenium* (Giant Hogweed), *Impatiens glandiflora* (Himalayan Balsam), *Rhododendron ponticum* (Rhododendron) have been identified along the 2007 or 2015 survey corridors.

### 7.5.9 **Amphibians**

Great Crested Newt (*Triturus cristatus*) and Natterjack Toad (*Epidalea calamita*) are both European Protected Species and are also listed on the SBL and Dumfries and Galloway LBAP as priority species. The Common Toad (*Bufo bufo*) is also listed on the SBL. Dumfries and Galloway Environmental Records Centre returned one record of Common Toad from 2009 within 2 km of the route as well as one record of Palmate Newt (*Lissotriton helveticus*) and one record of Smooth Newt (*Lissotriton vulgaris*), both from 2012. No records of Great Crested Newt or Natterjack Toad were returned from either the records centre or from the SNH interactive map from within 2 km of the route.

As agreed with SNH, Great Crested Newt presence/absence surveys were not considered necessary due to the lack of records of this species within 2km of the site and in the wider area. This species is not considered further in this section.

There is suitable habitat for Common Toad along the route. However, Natterjack Toads are not present in this area.

### 7.5.10 **Badger**

Badgers and their setts are protected by under the Protection of Badgers Act (1992).

Dumfries and Galloway Environmental Records Centre returned 59 records of Badger within 2 km of the route. These were all from between 2000 and 2014 making it clear Badgers are very active in this area. SNH interactive map holds no records of Badgers within 2km of the route since 1973.

The specific Badger report for the 2015 survey can be found in confidential Appendix B which includes the results of the surveys.

### 7.5.11 **Bats**

All species of bats and their roosting sites are protected by European wildlife law. All bat species found in Scotland are also on the Scottish Biodiversity List. The Dumfries and Galloway LBAP has lists eight species of bats as priority species namely: Brown Long-eared Bat (*Plecotus auritus*), Common Pipistrelle (*Pipistrellus pipistrellus*) Daubenton's bat (*Myotis daubentonii*), Leisler's bat (*Nyctalus leisleri*), Natterer's bat (*Myotis nattereri*), Noctule bat (*Nyctalus noctula*), Soprano Pipistrelle (*Pipistrellus pygmaeus*) and Whiskered bat (*Myotis mystacinus*). There are records on SNH interactive map of Common Pipistrelle, Noctule bat and Soprano Pipistrelle bat from within 2km of the pipeline route. Dumfries and Galloway Environmental Records Centre returned the following: 10 records of Noctule



bat from between 1998 and 2009, four records of Common Pipistrelle from between 1998 and 2005, 10 records of Soprano Pipistrelle from between 2005 and 2009 and one record of Brown Long-eared Bat from 2008. There are also additional bat records which are not determined to species.

The pipeline will cross a number of features with the potential to be used by commuting and foraging bats: stream and river corridors, tree lines, and hedgerows in particular. In addition, several other features, including the wetter grassland areas and to an extent cattle-grazed pasture, appear likely to attract foraging bats. Some of these features could be of importance to bats roosting in the route corridor and for bats commuting into the area from woodland edges nearby.

During the 2015 survey, five trees along the survey corridor were identified as containing features potentially suitable for use by roosting and/or hibernating bats. These trees are described in *Animal Notes 1 – 5* and shown on Figure 7.2.

The stone dykes along the route could also provide potential habitat for hibernating bats.

### **7.5.12      *Birds***

All wild birds in the UK are protected by the Wildlife and Countryside Act 1981 (as amended). Certain species are afforded greater protection for threats of disturbance (i.e. species listed in *Schedule 1* of the *Wildlife and Countryside Act 1981* (as amended)). Numerous records of notable bird species were returned by Dumfries and Galloway Environmental Records Centre from within 2 km of the route. A full list of these species can be seen in Appendix D.

During the surveys, suitable habitat for nesting birds was identified along the survey corridor including individual trees, hedgerows and scrub. There is also the possibility of ground nesting birds within the wetland grassland areas and Common Snipe (*Gallinago gallinago*) were observed along the route during the 2015 survey (*Animal Note 6*). Two disused nests were also seen during the 2015 survey, one in a *Picea sitchensis* (Sitka spruce) and one in a *Crataegus monogyna* (Hawthorn) hedge (*Target notes 7 and 8*).

A number of other bird species were recorded incidentally during the walkover surveys. These included Blue tit (*Cyanistes caeruleus*), Buzzard (*Buteo buteo*), Carrion Crow (*Corvus corone*), Chaffinch (*Fringilla coelebs*), Great Tit (*Parus major*), Grey Heron (*Ardea cinerea*), Kestrel (*Falco tinnunculus*), Magpie (*Pica pica*), Moorhen (*Gallinula chloropus*), Pheasant (*Phasianus colchicus*), Rook (*Corvus frugilegus*), Skylark (*Alauda arvensis*) and Sparrowhawk (*Accipiter nisus*). None of these species are listed on *Schedule 1* of the *Wildlife and Countryside Act 1981*, as amended however Kestrel is listed on the Dumfries and Galloway LBAP.

During the 2015 survey, a population of c.1000 Pink-footed Geese (*Anser brachyrhynchus*) were observed in a field at the south of the proposed route (*Target Note 9*). No feeding behaviour was observed and it is considered likely that they were taking rest in the field before continuing on their migration.

Given the season available and the generic nature of many of the potential impacts, no further general bird surveys are proposed to inform the ES. Instead, mitigation measures are proposed on a precautionary basis.

Given that many of the hedgerows, trees and fields are likely to be used by breeding birds (including ground-nesting species) and that some fields are likely to be used by Pink-footed Geese for resting in the winter, the route is best classified as of 'Local' nature conservation importance for birds.

### **7.5.13      *Fish***

It is clear that many rivers in this part of Scotland are particularly important for their fish populations. The importance of these fish populations are subsumed as part of the classification of the importance/sensitivity of the individual watercourses in Table 7.6.

The pipeline does not cross any rivers which are likely to contain valuable natural fish populations. However, the eastern end of the pipeline lies adjacent to Cluden Water, and Bogrie Lane (RVX 03, Figure 7.2) converges with the Cargen Water downstream of the proposed pipeline where fisheries' interest is of greater importance. In addition, there is a known Fish Farm at Terregles associated with the Burn running from the Grove to the Cargen Water (RVX 02, Figure 7.2). The classification of both Cargen Water and Cluden Water indicate their sensitivity in relation to possible fisheries' interest.

### **7.5.14      *Otter***

Otters, their holts and lay-up sites are protected by European wildlife law and the species is also listed on the Scottish Biodiversity List and the Dumfries and Galloway LBAP. There are multiple records of Otter on SNH interactive map from within 2km of the proposed pipeline route and Dumfries and Galloway Environmental Records Centre returned nine records of Otter from between 1978 and 2008. In Dumfries, Otter records can be found for the majority of rivers, streams and watercourses of any significant size including Cluden Water and Bogrie Lane. The Otter populations on some of the larger rivers in Dumfriesshire are considered to be of significant importance.

During the walkover surveys it was established that this pipeline does not cross any large watercourses which would constitute suitable habitat for Otters. Some of the smaller watercourses appeared to be suitable for use as dispersal routes or movement corridors, or seasonal foraging sites. However, none of these offered optimal habitat for Otters when compared with other riverine features in the local area. Therefore, it was considered unlikely that any Otters would be found along the route of the pipeline despite a thriving local population and a previous record from further upstream on Bogrie Lane.

The above assumption was confirmed by the results of the 2007 and 2015 surveys for Otters. No evidence of Otters on any of the streams or ditches being crossed, or any other waterbodies adjacent to the pipeline route, was recorded.

### **7.5.15      *Red Squirrel***

Red Squirrels are listed on the SBL as well as the Dumfries and Galloway BAP. Dumfries and Galloway Environmental Records Centre returned 19 records of Red Squirrel from between 2004 and 2013 within 2 km of the route although SNH interactive map holds no records of this species within 2km of the route although there is suitable habitat within woodland patches, albeit isolated.

A detailed search for dreys was not made in the woodland blocks as these are outwith the survey corridor and no dreys were recorded in individual trees along the pipeline route or within the buffer areas.

### **7.5.16      *Reptiles***

All widespread species of reptile found in Scotland are protected by UK wildlife law; and are also on the Scottish Biodiversity List. In addition, Adder (*Vipera berus*) is a priority species on the Dumfries and Galloway LBAP. There are records of Adder within the 10km square containing the site as well as records of Common Lizard (*Lacerta vivipara*) although no records of reptiles were returned by Dumfries and Galloway Environmental Records Centre for within 2 km of the route.

No incidental sightings of reptiles were made during the surveys (which did not include a detailed reptile presence-absence survey). The homogenous nature of the habitat makes it sub-optimal for reptiles which require habitat for foraging, commuting and basking. They may however use the boundary features including hedgerows and stone dykes.

#### 7.5.17 *Water Vole*

The Water Vole (*Arvicola amphibious*) is protected against disturbance in its burrows through UK wildlife law. The burrows themselves are also protected from damage under UK wildlife law. The Water Vole is listed on the Scottish Biodiversity List and the Dumfries and Galloway LBAP. There are no records of this species within 2km of the pipeline route.

Water Voles are not widely recorded in Dumfries and Galloway; however, the abundance of suitable habitat along ditches and streams within the region means that their presence cannot be discounted. A small number of the watercourses that would be crossed by the pipeline and some of the ponds close to the route corridor represented potentially suitable habitat for water voles although many were heavily poached. However, no signs of Water Vole activity were recorded during the 2007 or 2015 surveys.

#### 7.5.18 *Invasive Animal Species*

American Signal Crayfish (*Pacifastacus leniusculus*) are known to be present within a Loch to the south of the proposed route where they were originally introduced for fishing.

#### 7.5.19 *Other Species*

Pine Marten (*Martes martes*) are listed on the SBL. There are no records of this species from between 2 km of the route and the pipeline route will not affect any woodlands in which these species may be present.

Brown Hare (*Lepus europaeus*) are listed on the SBL as well as on the Dumfries and Galloway LBAP. Suitable habitat for Brown Hare was identified at intervals throughout the walkover survey corridor. Two Brown Hares were observed during the 2015 survey and it is likely that this species is widespread throughout the pipeline route.

Hedgehog (*Erinaceus europaeus*) and Polecat (*Mustela putorius*) are also listed on the Scottish Biodiversity List. There are records of Hedgehog from within 2km of the site but none of Polecat. There is limited suitable habitat on the route for Hedgehog, but there is abundant suitable habitat for Polecats; as well as a food source in terms Rabbits (*Oryctolagus cuniculus*).

Rabbit warrens were identified in several areas during the walkover surveys. Their locations are discussed within Appendix B as part of the Badger report.

All records returned by Dumfries and Galloway Environmental Records Centre are provided in Appendix D.

#### 7.5.20 *Summary Assessment of Nature Conservation Value*

Table 7-7 lists the nature conservation importance assigned to the valued ecological receptors acknowledged in this assessment.

**Table 7-7 Relevant Nature Conservation Legislation**

Ecological Receptor	Value in context of development	Comments
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Ecological Receptor	Value in context of development	Comments
<i>HABITATS</i>		
Wet woodland and scrub	County	Small area around Maryfield Loch, probably not large enough to be considered an SBL habitat but has local importance and likely to qualify as an LBAP habitat under native wet woodlands. Not within the pipeline route.
Broad-leaved Semi-natural Woodland	Local	Small areas of woodland outside the proposed route. These have the potential value to roosting and foraging/commuting bats and are listed on the LBAP therefore are of 'Local' importance. Not being affected by the pipeline.
Scattered Broad-leaved Trees	Local	Limited within the survey corridor but several have potential value to roosting and foraging/commuting bats and nesting birds. Some trees may require felling to facilitate pipeline. Veteran trees are listed on the LBAP and several trees along the route could be of such an age (over 100 yrs for Ash and over 300 years for Oak).
Stone Dykes	Local	This feature is listed on the LBAP as they are often associated with good species diversity. Stone dykes along the route are generally species poor but may provide habitat for reptiles, invertebrates and/or hibernating bats.
Watercourses	Site	The pipeline won't cross any major rivers and most watercourses are small streams and ditches. Farm ponds are listed on the LBAP however there are no ponds along the pipeline route which will be directly affected.
Coniferous Plantation Woodland	Site	Small area just outside the survey corridor but will not be affected by the pipeline. Considered too small and isolated to be classified as a LBAP feature under Coniferous Woodland.
Semi-improved Grassland	Site	Very small area which is heavily grazed and managed. Ubiquitous and species-poor grasslands of negligible conservation value.
Improved Grassland	Site	These areas are heavily grazed and managed. Ubiquitous and species-poor grasslands of negligible conservation value. Agriculturally improved grasslands are listed on the LBAP however as disturbance to these fields is temporary they are considered only as site importance.
Wet Grassland	Site	Dominated by rushes, small and poor quality therefore of little value to biodiversity and not considered to be an LBAP habitat.
Species-poor Hedgerow	Site	Species-poor hedgerows exist throughout the route and provide some nesting habitat for breeding birds. Not considered to be an LBAP habitat under Hedgerows due to poor species diversity.
Scrub	Site	Small, isolated areas with low species diversity.

Ecological Receptor	Value in context of development	Comments
<i>SPECIES</i>		
Birds – WCA Schedule 1 species	Up to County	No Schedule 1 species have been observed along the route but care must be taken during nesting bird season
Birds – other nesting birds	Up to County	Scottish Biodiversity List and LBAP species likely to be present, including Kestrel. Widespread in local area.
Otter	District	Watercourses on site likely to provide commuting habitat to Otters as they are known to be present in wider area. LBAP species.
Badger	Local	Evidence of Badger was found during surveys and the route is likely to be important in the local area.
Bats – Foraging and Commuting	Local	Hedgerows and other field boundaries and watercourses along the route likely to provide some value to foraging and commuting bats. Several species are listed on LBAP.
Fish	Local	The watercourses being crossed are unlikely to contain valuable fish populations but watercourses along the route flow into Cargen Water and Cluden Water which are valuable receptors.
Red Squirrel	Local	May be present in the wider area but unlikely to be affected by the works. LBAP species.
Reptiles	Local	May be present in low numbers within suitable habitat on the site and surrounding area. Adder is an LBAP species.
Water Vole	Local	No evidence on the site but suitable habitat and may be present in surrounding area. LBAP species.
Amphibians	Site	Common Toad likely to be present within watercourses on the site.
Bats – Tree Roosts	Site	Several mature trees along the route have the potential to support roosting bats. Potential tree roosts are available in the local area.

## 7.6 Assessment of Impacts

### 7.6.1 Introduction

This section uses the ecological baseline to identify all valued ecological receptors which may be affected by The Project. All potentially significant effects on ecological and nature conservation resources are discussed to inform appropriate mitigation measures in Section 7.7. These will minimise adverse affects and are considered in assessing the significance of the impacts. The significance of any impacts remaining after mitigation (i.e. residual impacts) is described in Section 7.8.

### 7.6.2 Generic Impacts – Construction

The majority of impacts of pipeline construction will be temporary, as habitats will be reinstated on completion of construction, and confined within the working width of the

pipeline. The working width will be generally 40m wide (45m maximum), but will be reduced where hedges and watercourses are crossed (see Section 3 for details of the working width).

Potential impacts on nature conservation resources resulting from construction of the pipeline will include:

- temporary removal of habitat and/or potential loss of species during pipeline installation;
- temporary loss of habitat through siting and subsequent removal of offices, compounds and storage areas of construction materials;
- temporary displacement of species;
- fragmentation of habitats or severance of ecological corridors during construction works;
- temporary impacts (e.g. noise and visual disturbance) on adjacent habitats (and the species that use them);
- changes in soil conditions through stockpiling, re-grading etc;
- environmental incidents and accidents (e.g. spillages, noise, fire and emissions);
- alterations to drainage regimes, which may affect wetland habitats in adjacent areas;
- rainwater runoff from hard-standing during construction
- physical damage to watercourses and downstream impacts as a result of sediment release and pollution; and
- modification of habitats and introduction of species as a result of traffic movements, re-instatement works and landscaping.

### **7.6.3      *Statutory Designated Sites***

No statutory designated sites will be affected by the construction of the pipeline.

### **7.6.4      *Non-Statutory Designated Sites***

No statutory designated sites will be affected by the construction of the pipeline.

### **7.6.5      *Trees and Woodland (Including Ancient Woodland)***

No woodlands will be affected by the works although a limited number of individual trees may require removal to allow topsoil stripping and installation of the pipeline. Mature trees will however be avoided as much as possible.

As the pipeline has been routed to avoid all areas of woodland and will not directly impact upon any woodland areas with only a limited number of individual trees being removed, impacts on these features are classified as negligible and not significant.

In the wet woodland area around Maryfield Loch, which is of 'County' importance, the pipeline may result in the alteration of the hydrological regime by impacting upon one of its feeder streams. Without mitigation, a temporary indirect negative impact is anticipated on this receptor.



## **7.6.6      *Water crossings and Waterbodies***

### **7.6.6.1      *Crossing of Watercourses***

It is intended that minor watercourses will be crossed using dry, open-cut techniques. However, the requirement to use trenchless techniques for any of the watercourse crossings cannot be discounted until such time as intrusive ground investigations are completed during the detailed design. Where dry, open-cut techniques are to be used, this will lead to the temporary removal of habitat associated with the excavation of the trench and the construction of a temporary flumed crossing (or equivalent). There is also the potential for pollution and increased sedimentation to affect downstream habitats.

For trenchless techniques, there is a very low risk of failure of these techniques, which could affect the integrity of the sub-strata of the river bed. However, there is also potential for sediment pollution arising from the break-out of drilling mud used during micro-tunnel crossings.

The potential impacts of such pollution on watercourses are discussed in Section 11. Whilst none of the watercourses are considered to be important in isolation, the sensitivity of downstream habitats, and the general requirement to ensure that the environmental quality of each watercourse is protected, means that impacts resulting from pollution incidents could result in indirect permanent significant impacts if suitable measures are not in place.

### **7.6.6.2      *Standing Waterbodies***

It is unlikely that there will be any direct impacts on standing waterbodies. However, as with watercourses crossed by the proposed pipeline, surface water runoff could affect the Collochan Loch if not controlled appropriately. Impacts upon this feature are anticipated to be negligible and not significant due to the likely short-term nature of the impact and low sensitivity of the receptor.

### **7.6.7 Hedgerows**

The impacts on hedgerows crossed by the route will be limited largely to temporary removal of habitat associated with forming the crossing. The rapidity with which a hedgerow section recovers to its original state, following replanting, will depend upon the age, diversity and management history of the individual hedgerow.

There will also be temporary impacts associated with fragmentation of the hedgerow network, which may have temporary, cumulative impacts on its use as a wildlife corridor. This is discussed below with regard to individual species.

The pipeline route only crosses species-poor hedgerows and impacts on hedgerows are anticipated to be negligible and not significant.

### **7.6.8 Grassland**

The main impacts of pipeline installation on grasslands are associated with vegetation removal and topsoil stripping to form the working width. There is also the potential in wet grasslands for adverse impacts on hydrology.

The current proposed pipeline may cross an area of wet grassland, however this is not anticipated to result in changes to the hydrological regime. There will be a temporary loss of vegetation within the working width allowing the potential for other vegetation to develop. Without mitigation there may therefore be a temporary negative impact on this habitat.

### **7.6.9 Stone Dykes**

Stone dykes along the route may provide suitable habitat for hibernating bats, reptiles and invertebrates. In addition, they may house a variety of bryophyte species.

Without mitigation there may be a direct negative impact on this receptor given the potential habitat provided by this feature.

### **7.6.10 Invasive Plants and Weeds**

No invasive or injurious species were recorded during either field survey. However, as the first survey was undertaken in 2007, and the 2015 survey was undertaken in the winter when they would not be obvious, there is a small risk that invasive plant species could still be present and may spread along the pipeline route as a result of the linear nature of pipeline construction. Other weed species may also set seed or otherwise become established in bare soil created as a result of the works, with the potential for them to spread into neighbouring areas.

As no evidence of such species along the pipeline route was found during the survey, impacts are considered likely to be negligible. However, due to the statutory importance placed on the control of these species, mitigation measures (in the form of a biosecurity plan) will be applied to ensure that the incidental spread of any species is avoided.

### **7.6.11 Badgers**

Given the relatively limited 'footprint' of the pipeline works in any one area, the temporary loss of foraging habitat will be insignificant to any of the resident Badger social groups.

No Badger setts were found within 30 m of the working areas, with the closest being c71 m away from the maximum working width area. Given these distances and the fact that the tunnels are extend away from the pipeline route, no damage to tunnels or disturbance to Badger is expected based on current evidence.

However, due to the high mobility of this species and the presence of suitable habitat along the pipeline route, this species could still move closer to the works area and without suitable mitigation works could have a significant impact.

#### **7.6.12        *Bats***

Construction of the pipeline will result in the creation of temporary gaps through vegetation along minor watercourses, field boundaries and hedgerows which could otherwise be important as potential commuting and foraging routes for bats.

The impact on bat commuting and foraging routes will vary between the species using these routes. Of particular interest are the slower-flying species such as Brown Long-eared Bats. These are more dependent on linear features for dispersal away from the roost because they rely on the protection (from predation and the elements) given by the tall vegetation of hedges and woodland-edge habitats.

There may also be fewer grassland invertebrates available to foraging bats than normal due to the temporary loss of grassland along the working width, and to possibly more intensive use of fields in the vicinity of the pipeline route due to the displacement of grazing stock from the fields on the pipeline route.

Loss of potential roost sites could occur if the trees identified as being potentially suitable for roosting bats are felled. The route of the pipeline will be fine-tuned to avoid trees that may contain bat roosts wherever possible. However, complete avoidance may not be practical. Bats may also use the stone dykes along the route for hibernating.

Without mitigation, there may be a temporary negative effect on foraging and commuting bats during construction and a permanent direct effect on roosting bats.

#### **7.6.13        *Birds***

Given the relatively limited area affected by the pipeline works in any one location, the direct impacts on nesting and foraging birds is likely to be limited. The main impacts on birds are discussed below.

The removal of hedgerow sections and tree lines will result in the loss of potential nest sites for birds. However, it is likely that other nest sites will exist within each bird territory. Also, the linear nature of the scheme limits the effect that it has on each habitat feature. The impact resulting from loss of potential nest sites is anticipated to be negligible.

Noise and visual disturbance is likely to cause a reduction in the numbers and assemblage of birds nesting close to the works' area. However, this is also expected to have a relatively insignificant effect in terms of the wider populations of birds.

There are unlikely to be any significant impacts on over-wintering populations of wildfowl and waders; construction work will be carried out generally from March to September before over-wintering geese arrive, and any works will be set back, in most circumstances, a minimum of 100 m from the river banks.

#### **7.6.14        *Fish***

Fish populations downstream may be affected, directly and indirectly, by pollution incidents and increases in turbidity caused by sediment-laden run-off entering the watercourse and/or disturbance to accumulated sediments and bed material. These impacts would be important if they affected spawning sites or sites of importance for early life stages of important species.



The duration of these impacts will, to some extent, depend upon their magnitude, since the siltation of valuable gravel or sandy substrates can have a lasting effect. However, in most cases these impacts are expected to be short term, as most dry open-cut watercourse crossings will be completed in one day, with the watercourse recovering within one or two seasons.

Localised disturbance could cause the displacement of individual fish and, more importantly, could interfere with the movement patterns of migratory species. Some fish, particularly Salmon (*Salmo salar*), can be impeded from moving upstream to spawn by sediment discharge, vibration and lighting at critical times and in critical locations. Other species and other life stages can suffer similar adverse impacts from disturbance associated with the installation of the pipe or the construction of temporary vehicle crossings, although impacts are likely to be small given that these works are generally completed in a few days.

All of the above impacts are likely to persist only for the duration of the construction works, although the failure of individual fish to spawn can have some more lasting impacts on small populations. Impacts through physical disturbance to fish are considered likely to be negligible. However, indirect effects resulting from pollution events could result in significant impacts.

Surveys for fish will be undertaken in summer 2015 to determine a baseline for the watercourses which will then be compared to post-construction monitoring survey results.

#### **7.6.15 Otters**

The results of the surveys indicate that direct impacts on Otters are unlikely to occur as no evidence of Otters was found within the survey corridor. The works are also unlikely to represent a significant barrier to Otter movement at night, as access along the bank will be maintained and night-time working is restricted to a few unavoidable operations.

Otters in the local area could potentially be affected indirectly through reductions in water quality as a result of pollution or siltation of the watercourses, which could reduce local availability of prey. Without mitigation and sufficient control on materials entering the watercourse, there may be a permanent negative effect on this species.

#### **7.6.16 Reptiles**

Direct impacts might be associated with potential injury or harm to individuals which could occur during vegetation clearance of the working areas including strimming of areas of grassland and removal of sections of hedgerow and stone dykes.

No permanent impact is expected as the habitat will only be temporarily disturbed and then reinstated. Without suitable mitigation, a temporary negative impact is anticipated on reptiles.

#### **7.6.17 Water Voles**

The results of the Water Vole surveys indicate that there will be no impact on this species as a result of the works proposed.

#### **7.6.18 Invasive Animal Species**

American Signal Crayfish are known to be present in a loch to the south of the proposed route and it is therefore possible that this invasive species may have migrated into some of the watercourses being crossed by the route.

This species is highly invasive and must not be spread from one area to another. Without suitable mitigation there could be a highly significant negative effect if this species are transported between watercourses.

## 7.7 Mitigation

### 7.7.1 *General*

A range of general mitigation measures will be incorporated into the detailed design and final alignment of the proposed pipeline. The range of methods to mitigate potential impacts on nature conservation resources primarily include:

- the pipeline has been routed wherever possible to avoid or minimise the impacts on features of nature conservation importance;
- the working width will be reduced, where necessary and practicable, in areas of nature conservation importance, to reduce the magnitude of any impacts and to avoid particular features of value;
- minor alterations will be made to the layout of the working width in order to avoid damage to particular features of nature conservation importance;
- vegetation removed during construction will be carefully reinstated in a way that takes into account its nature conservation value;
- good construction practices will be formalised in method statements; in this way the likelihood of accidental damage to features of nature conservation value will be minimised. Where necessary, specific method statements will be agreed in consultation with the appropriate consultees;
- measures will be taken to minimise adverse impacts on protected species, and other species and groups of nature conservation value. These measures will be agreed with appropriate consultees;
- potential impacts will be avoided, where practicable, through appropriate scheduling of work, for example avoiding vegetation clearance during the bird nesting season;
- at the commencement of the works, the working width will be fenced to prevent damage to adjacent habitats;
- during site inductions and tool-box talks for all staff, the particular constraints associated with nature conservation receptors along the route will be highlighted; in addition, appropriate signage will be erected to indicate features of nature conservation importance;
- compliance with the mitigation measures will be ensured through monitoring and auditing by both the Main Work Contractor (MWC) and GNI;
- measures will be implemented in order to minimise the potential for pollution and surface-water run-off polluting watercourses and waterbodies (see Section 6); and
- further surveys will be carried out as necessary to enable detailed mitigation measures to be fine-tuned and implemented, liaising with relevant consultees where appropriate.

## **7.7.2      *Water crossings and Waterbodies***

### **7.7.2.1      *Dry Open-cut Watercourse Crossings***

The crossing points will be chosen to minimise impacts and preserve valuable features as far as possible. As much bank-side vegetation and natural bank structure as possible will be retained, with trees and shrubs coppiced rather than grubbed up where this is practicable. Bank and bed materials removed for construction will be stored separately and replaced from where they were removed, to promote re-establishment of the original habitats.

Trees and shrubs removed will be replanted and the reinstated banks fenced off, where necessary, to prevent poaching. Geotextile matting will be used, wherever possible, to reinforce banks during reinstatement.

Measures to minimise impacts due to sediment release or pollution will be implemented as set out in Section 11. Dry open-cut crossings will be completed in the shortest possible time; generally within a single day.

Fish rescues at water crossing points will be carried out if required.

### **7.7.2.2      *Trenchless Watercourse Crossings***

Non-open-cut crossings avoid the need to disturb the banks and beds of watercourses in order to install the pipe. The non-open-cut crossings where possible will also be set back from the river, which will minimise impacts from noise and visual disturbance. However, a restricted area may be disturbed temporarily in order to provide vehicle access during construction.

Pollution prevention measures are detailed in Section 11, which will serve to minimise impacts in this regard. In addition, it is planned to construct the majority of the crossings between March and September. The duration of works would depend upon which technique is used and the length of the crossing, but will generally be between two and ten weeks.

If a break-out of drilling mud occurs, impacts will be minimised by reducing the pressure of the drilling mud being pumped down the drill, and by prompt identification. Bentonite is a non-toxic natural clay and so no impacts in regard to toxicity would be expected. In the very unlikely event of a failure of the watercourse bed e.g. bank or bed collapse, during a non-open-cut crossing, SEPA will be informed and measures taken to fill the hole immediately.

Detailed method statements will be developed for approval by SNH and SEPA for all the rivers crossed using these open-cut and non-open-cut techniques.

Specific mitigation relating to American Signal Crayfish is discussed in Section 7.7.11 below.

### **7.7.2.3      *Waterbodies***

The pipeline has been routed to avoid all standing waterbodies. The measures described in Section 11 will protect water quality in nearby waterbodies from sediment release and pollution during construction.

Where necessary, pre- and post-construction land drainage will be designed to ensure that pre-existing land drainage patterns are maintained (see Sections 3, 5 and 11). Water-stops, which are barriers inserted into the trench to prevent it acting as a conduit for groundwater, will be installed where necessary to minimise any changes in local hydrology.

### **7.7.3 Trees and Woodland (Including Ancient Woodland)**

The impact on woodlands, tree-lines and individual mature trees has been minimised by routing to avoid these features wherever possible or by routing through gaps, rides and areas of lower nature conservation value. The likely impacts, in terms of tree health, of works close to trees within the working width will be reviewed and, where necessary, remedial tree surgery will be undertaken to promote the long-term survival of large trees.

When drawing-up method statements for works close to trees, the MWC will refer to the National Joint Utilities Group Guidelines for the Planning Installation and Maintenance of Utility Services in Proximity to Trees (NJUG 10). Any works carried out on large trees will be undertaken by a suitably qualified tree surgeon and will be subject to the landowners'/occupiers' and consultees' approval and any necessary licence.

When making small-scale adjustments to the alignment of the pipeline and prior to trench excavation, particular attention will be given to the likely extent of tree roots. The location of pre- and post-construction land drains will also be adjusted to avoid or minimise damage to tree roots.

Large trees will be protected with temporary fencing erected where possible at least 1 m beyond the drip-line of the canopy. Where fencing would restrict the working width unacceptably or where it cannot be erected due to adjacent hedgerows, the maximum area possible will be fenced and measures taken to mitigate the impacts of working beneath the canopy of the trees. Mitigation may include bog matting and sand padding to spread the weight of machinery passing over the root area. This will help prevent the soil compaction that has a significant detrimental effect on tree health and survival.

Large trees will not be planted within 6 m of the pipeline to avoid damage of the pipe by tree roots. A range of shrub and understorey species will be used for planting close to and over the pipeline. Trees will be replaced on a 2:1 ratio.

### **7.7.4 Hedgerows**

The impact on hedgerows has been minimised, wherever possible, by routing the pipeline through existing gaps or sections that are of lower conservation value.

Where hedges cross the working width, the width will be increased where the hedge is crossed at a shallow angle, although the pipeline has been routed to keep such crossings to a minimum.

In addition, at non-open-cut road crossings and watercourse, where access only is required for plant and machinery, the width will be reduced. Further details and illustrations are given in Section 3.

In addition, other measures will be adopted to ameliorate the extent and duration of impact and to maintain the wildlife and landscape value of hedgerows as follows:

- any hedge banks or ditches that are disturbed during construction will be re-formed;
- re-planting of the hedge will reflect the original species mix and will use, where available, native species of local provenance. Some additional hawthorn plants may be included, where appropriate, to aid rapid establishment and thereby reduce the duration of visual impact;
- hedgerows will be replanted in an appropriate pattern so that they integrate with the structure of undisturbed sections;



- the soil from the hedge base will be removed and stored separately from the other topsoil in order to preserve the seed bank. The hedge-base soil will then be re-spread along the hedge-line after construction;
- all newly planted sections of hedgerow will be protected with rabbit-proof fencing or guards; and
- an aftercare programme for newly planted hedgerows will be developed and implemented. This will include appropriate weed control, maintenance of fencing, and replacement of any dead stock to ensure successful establishment.

#### **7.7.5 Grassland**

To protect the quality of the soil, topsoil and subsoil will be excavated and stored separately (as set out in Section 3). Where the route crosses improved grassland, areas will be re-seeded with an appropriate grass mix in consultation with the landowner/occupier.

If the pipeline route crosses through the small area of wet grassland toward the southern end of the route, measures will be taken to minimise any changes to the hydrological regime of this site through careful attention to the design of any replacement surface drainage schemes and by inserting barriers in the pipe trench, where necessary to maintain wet areas. If the wetland area cannot be avoided, a site-specific method statement will be drawn up, in consultation with SNH and specific seed mixes will be considered to facilitate reinstatement for the marshy grassland site.

#### **7.7.6 Stone Dykes**

Any sections of stone dykes to be removed along the pipeline route will be removed carefully by hand following a hand search by a qualified ecologist to reduce the chance of reptiles or amphibians being harmed.

The sections of stone will be stored at a safe distance from the route until works are complete and then reinstated carefully by hand.

The stone dykes will be dismantled only during the spring/summer months to ensure hibernating bats are not present.

#### **7.7.7 Invasive Plant and Weeds**

No locations of invasive weeds were recorded during the survey. However, due regard will be taken of the potential for such species to establish themselves prior to construction. Further surveys will be undertaken in the growing season prior to construction, and all locations of invasive species will be identified and marked where present, so that a schedule can be compiled for use in implementing agreed mitigation measures. These may include the placement of affected topsoil, subsoil and/or excavated material on a geotextile membrane, and the material temporarily fenced off inside quarantine areas. Where this is not possible it may be necessary to dispose of the topsoil and plants as Special Waste at a licensed landfill. Measures will be taken to prevent the spread of invasive species along the working width.

#### **7.7.8 Badgers**

No Badger setts will currently be affected by the works. However, pre-construction surveys for Badgers will be undertaken prior to works commencing to ensure there has been no change in Badger activity. Wherever practicable, the pipeline route will be altered to avoid any Badger setts and works within 30 m of any occupied setts.

Where impacts on setts are unavoidable, measures will be taken to minimise impacts on any resident Badgers, and all relevant operations will proceed under licence from SNH once suitable mitigation and compensation measures have been agreed.

Other mitigation measures for Badgers will include providing safe exit routes for animals should they fall into the trench overnight, particularly where Badger paths were recorded during the surveys.

#### **7.7.9        *Bats***

During the survey, five potentially suitable roost sites in mature trees were highlighted. The pipeline will be routed to avoid the vast majority of potential roosts in trees and mature trees generally. It is likely, therefore, that only a very small proportion of the trees that have been identified as potentially suitable for occupation by bats will be directly affected. As identified in Section 0 above, larger trees will be avoided as far as practicable, particularly those highlighted as suitable for bats or of Veteran status. If it is unavoidable that any have to be felled or require surgery, the trees will be inspected by a suitably licensed and experienced ecologist, through a climbing survey, for signs of use by bats.

Should it not be possible to confirm the absence of bats through a climbing survey, emergence surveys will be undertaken. Where the absence of a bat roost cannot be confirmed through either a tree-climbing survey or an emergence survey, the trees will be felled (or surgery undertaken) under the supervision of a licensed bat worker and outside of the times when hibernating bats or bats with dependent young could be present. Should the presence of a roost be identified, felling or surgery will take place under licence from Scottish Natural Heritage.

#### **7.7.10       *Birds***

Measures will be taken to minimise the likelihood of disturbance or mortality of nesting birds, their eggs or chicks. Wherever possible, this will be achieved by removing vegetation that could be used by nesting birds (particularly sections of hedgerow, scrub, tree lines and woodland) before the bird nesting season (March to August inclusive).

Where this is not possible, the use of mechanical devices such as visual scarers and ‘humming tape’ will be considered in high-risk locations, including locations where there is a high risk of ground-nesting birds in order to reduce the likelihood of birds establishing nests within or close to the working width.

Should it be necessary to remove vegetation within the bird nesting season, surveys of the habitat feature in question will be undertaken to confirm the absence of occupied nests. Should an occupied nest be identified, it will be retained within an appropriate buffer zone (determined on the basis of the species concerned and the location of the nest in the context of the surrounding vegetation), until it can be ascertained that any nestlings have fledged. Screening will be provided, if further mitigation is necessary, to reduce visual or noise disturbance for nesting and foraging riverine birds.

#### **7.7.11       *Fish***

There are no water crossings on this pipeline which support substantial fish populations. However, the various measures detailed in Section 11 to protect surface water quality will also help to minimise the potential impacts on fish populations.

Fish monitoring surveys and aquatic invertebrate monitoring will be undertaken pre-construction in summer 2015 as well as post-construction to determine differences in fish populations and associated water quality. The fish monitoring surveys will comprise

electrofishing surveys at locations where it is intended to cross watercourses. Surveys would be undertaken up and down catchment from these locations to provide a comprehensive index of fishery data. In addition, electrofishing surveys will also be undertaken at control sites beyond the potential zone of influence of the Project. Similarly, invertebrate monitoring will be undertaken at all sites where it is intended to cross watercourses and at control sites.

#### **7.7.12      *Otters***

In the absence of evidence to suggest that Otter populations exist along this section of the pipeline route, no specific mitigation is currently recommended for Otters. However, repeat surveys will be undertaken prior to construction.

Although no confirmed lying-up sites were identified during the initial ecological surveys, structures which could be used by Otters are present on watercourses throughout the pipeline route. Otters are highly mobile animals that generally use a variety of different structures as lying-up sites within their territories; the level of use of these sites can vary through the seasons. A repeat survey will be undertaken in parallel with the repeat Badger survey described in Section 7.7.8 above.

Wherever possible, works will not take place close to any Otter lying-up/resting site. Where this is unavoidable, measures will be taken to minimise impacts on any resident otters, through careful timing of the works. It is necessary for all relevant operations to be agreed with SNH, and operations will proceed under licence from SNH where appropriate.

In addition, supervised clearance using hand tools will be undertaken in areas of particularly dense scrub, which could not be surveyed exhaustively for Otter resting sites, and where such a site could remain undetected.

#### **7.7.13      *Reptiles***

A hand search and watching brief of any works area in suitable reptile habitat will be undertaken to minimise the risk of reptiles being harmed by the works, this will include hedgerows and stone dykes. Any animals found will be located to another suitable area of habitat away from the route.

#### **7.7.14      *Water Vole***

In the absence of evidence to suggest that Water Vole populations exist along the pipeline route and in the absence of desk-study information to indicate the likelihood of future occupancy of areas surveyed, no specific mitigation is currently recommended for Water Voles. A pre-construction survey will however be undertaken concurrently with the Otter survey.

#### **7.7.15      *Invasive Animal Species***

Following consultation with SNH and SEPA, it has been agreed that all watercourses crossed by the pipeline will be treated as if they contain American Signal Crayfish. A detailed Method Statement is provided in Appendix E, but effectively all machinery and footwear entering or leaving watercourses will be sprayed with an iodine based disinfectant and allowed to dry where possible. Construction of the pipeline will also progress from Cluden to Lochfoot, ie towards rivers known to already to infested.

#### **7.7.16      *Aftercare and Monitoring***

Fish monitoring surveys and aquatic inveterate monitoring will be undertaken post-construction (2017) to determine differences in fish populations and associated water quality from pre-construction monitoring.

All reinstatement measures will be discussed and agreed in advance with landowners/occupiers and statutory and non-statutory consultees before being incorporated into a Reinstatement Plan. The Reinstatement Plan will include details of soil handling, seed sources and mixes, plant sources and mixes and after-care regimes.

In areas identified as being of high ecological importance, temporary fencing will be retained until the habitat has sufficiently recovered in accordance with the Reinstatement Plan agreed with consultees and as confirmed by the ecologists undertaking post-construction monitoring.

The MWC will be responsible for the maintenance of all newly planted trees and hedges for a minimum of two years to ensure successful reinstatement. Thereafter, GNI will retain responsibility in perpetuity for reinstatement and drainage if any problems occur that are related to the presence of the pipeline.

In addition, GNI is committed to after-care and monitoring of sensitive habitats as would be reasonably expected of a developer.

### **7.8      *Summary of Residual Impacts and Significance***

Following the adoption of the mitigation measures it is considered that all predicted impacts will reduce to a scale considered to be insignificant. A summary of impacts, mitigation and residual impacts are detailed in Table 7-8.



**Table 7-8 Summary of Impacts and Mitigation Measures**

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
<b>During Construction</b>			
Crossing of Watercourses	The potential impacts of pollution on watercourses are discussed in Section 11. Whilst none of the watercourses are considered to be important in isolation, the sensitivity of downstream habitats, and the general requirement to ensure that the environmental quality of each watercourse is protected, means that impacts resulting from pollution incidents could result in indirect permanent significant impacts if suitable measures are not in place.	<p>It is the intention to cross watercourses using open-cut techniques. Depending on the nature conservation value of the watercourse, or for other reasons (for example, navigation and water supply protection) non-open-cut methods may be considered, subject to confirmation of suitable ground conditions.</p> <p>The crossing points will be chosen to minimise impacts and preserve valuable features as far as possible. As much bank-side vegetation and natural bank structure as possible will be retained, with trees and shrubs coppiced rather than grubbed up where this is practicable. Bank and bed materials removed for construction will be stored separately and replaced from where they were removed, to promote re-establishment of the original habitats. Trees and shrubs removed will be replanted and the reinstated banks fenced off, where necessary, to prevent poaching. Geotextile matting will be used, wherever possible, to reinforce banks during reinstatement.</p> <p>Fish rescues at water crossing points will be carried out if required.</p> <p>Detailed method statements will be developed for approval by SNH and SEPA for all the rivers crossed using these open-cut and non-open-cut techniques.</p>	<p>Where open-cut techniques are to be used, this will lead to the temporary removal of habitat associated with the excavation of the trench and the construction of a temporary flumed crossing (or equivalent). There is also the potential for pollution and increased sedimentation to affect downstream habitats.</p> <p>For non-open-cut techniques, there is a very low risk of failure of these techniques, which could affect the integrity of the sub-strata of the river bed. However, there is also potential for sediment pollution arising from the break-out of drilling mud used during horizontal directional drilling and micro-tunnel crossings.</p>
Standing Waterbodies	It is unlikely that there will be any direct impacts on standing waterbodies. However, as with watercourses crossed by the proposed pipeline, surface water runoff could affect the	The pipeline has been routed to avoid all standing waterbodies. The measures described in Section 11 will protect water quality in nearby waterbodies from	Following the adoption of the mitigation measures there are not anticipated to be any residual impacts.

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
	Collochan Loch if not controlled appropriately. Impacts upon this feature are anticipated to be negligible and not significant due to the likely short-term nature of the impact and low sensitivity of the receptor.	<p>sediment release and pollution during construction.</p> <p>Where necessary, pre- and post-construction land drainage will be designed to ensure that pre-existing land drainage patterns are maintained (see Sections 3, 5 and 11). Water-stops will be installed where necessary to minimise any changes in local hydrology.</p>	
Broad-leaved woodlands that are either ancient, comprise UK BAP habitats or are otherwise of particular importance	<p>The pipeline has been routed to avoid all areas of woodland and will not directly impact upon any woodland areas with only a limited number of individual trees being removed, impacts on these features are classified as negligible and not significant.</p> <p>In the wet woodland area around Maryfield Loch, which is of 'County' importance, the pipeline may result in the alteration of the hydrological regime by impacting upon one of its feeder streams. Without mitigation, a temporary indirect negative impact is anticipated on this receptor.</p>	<p>When drawing-up method statements for works close to trees, the MWC will refer to the National Joint Utilities Group Guidelines for the Planning Installation and Maintenance of Utility Services in Proximity to Trees (NJUG 10). Any works carried out on large trees will be undertaken by a suitably qualified tree surgeon and will be subject to the landowners'/occupiers' and consultees' approval and any necessary licence.</p> <p>Particular attention will be given to the likely extent of tree roots. The location of pre- and post-construction land drains will also be adjusted to avoid or minimise damage to tree roots.</p> <p>Large trees will be protected with temporary fencing erected where possible at least 1m beyond the drip-line of the canopy.</p> <p>Mitigation may include bog matting and sand padding to spread the weight of machinery passing over the root area. This will help prevent the soil compaction that has a significant detrimental effect on tree health and survival.</p> <p>Any sections of woodland removed will be replanted. However, large trees will not be planted within 6m of the pipeline to avoid damage of the pipe by tree roots. A range of shrub and understorey species will be used</p>	<p>The main impact on trees and woodland will be the removal of vegetation, and topsoil stripping, within the working width.</p> <p>Woodlands crossed will also be fragmented, in the short to medium term, into smaller areas and there may be damage from root severance of retained trees close to the working width.</p> <p>In the case of wet woodlands, there may be adverse impacts on hydrology.</p> <p>Impacts on individual trees, ground flora and associated habitats are likely to be relatively long-term impacts, due to the time that it takes for woodland to reach maturity.</p>

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
		for planting close to and over the pipeline.	
Hedgerows	The pipeline route only crosses species-poor hedgerows and impacts on hedgerows are anticipated to be negligible and not significant.	<p>The impact on hedgerows has been minimised, wherever possible, by routeing the pipeline through existing gaps or sections that are of lower conservation value.</p> <p>Any hedge banks or ditches that are disturbed during construction will be re-formed. Re-planting of the hedge will reflect the original species mix and an aftercare programme for newly planted hedgerows will be developed and implemented.</p>	<p>The impacts on hedgerows crossed by the route will be limited largely to temporary removal of habitat associated with forming the crossing.</p> <p>There will also be temporary impacts associated with fragmentation of the hedgerow network, which may have temporary, cumulative impacts on its use as a wildlife corridor.</p>
Grasslands	<p>The main impacts of pipeline installation on grasslands are associated with vegetation removal and topsoil stripping to form the working width. There is also the potential in wet grasslands for adverse impacts on hydrology.</p> <p>The current proposed pipeline may cross a small area of wet grassland however it is not anticipated that the hydrological regime will be changed. There will be a temporary loss of vegetation within the working width allowing the potential for other vegetation to develop. Without mitigation there may therefore be a temporary negative impact on this habitat.</p>	<p>To protect the quality of the soil, topsoil and subsoil will be excavated and stored separately (as set out in Section 3). Where the route crosses improved grassland, areas will be re-seeded with an appropriate grass mix in consultation with the landowner/occupier.</p> <p>If the pipeline route crosses through the small area of wet grassland toward the southern end of the route, measures will be taken to minimise any changes to the hydrological regime of this site through careful attention to the design of any replacement surface drainage schemes and by inserting barriers in the pipe trench, where necessary to maintain wet areas. If the wetland area cannot be avoided, a site-specific method statement will be drawn up, in consultation with SNH and specific seed mixes will be considered to facilitate reinstatement for the marshy grassland site.</p>	<p>Following re-seeding grasslands are expected to return to their previous condition.</p> <p>Following the adoption of the mitigation measures there are not anticipated to be any residual impacts to areas of wet grassland above and beyond those associated with topsoil stripping.</p>
Stone Dykes	Stone dykes along the route may provide suitable habitat for hibernating bats, reptiles and invertebrates. In addition, they may house a variety of bryophyte species.	Any sections of stone dykes to be removed along the pipeline route will be removed carefully by hand following a hand search by a qualified ecologist to reduce the chance of reptiles or amphibians being	The impacts on stone dykes crossed by the route will be limited largely to temporary removal of habitat associated with forming the crossing.

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
	Without mitigation there may be a direct negative impact on this receptor given the potential habitat provided by this feature.	<p>harmed.</p> <p>The sections of stone will be stored at a safe distance from the route until works are complete and then reinstated carefully by hand.</p> <p>The stone dykes will be dismantled only during the spring/summer months to ensure hibernating bats are not present.</p>	
Invasive Plants and Weeds	<p>While no invasive or injurious species were recorded during either field survey. There is a small risk that invasive plant species could still be present and may spread along the pipeline route as a result its linear nature. Other weed species may also set seed or otherwise become established in bare soil created as a result of the works, with the potential for them to spread into neighbouring areas.</p> <p>As no evidence of such species along the pipeline route was found during the survey, impacts are considered likely to be negligible.</p>	Further surveys will be undertaken in the growing season prior to construction, and all locations of invasive species will be identified and marked where present, so that a schedule can be compiled for use in implementing agreed mitigation measures. These may include the placement of affected topsoil, subsoil and/or excavated material on a geotextile membrane, and the material temporarily fenced off inside quarantine areas. Where this is not possible it may be necessary to dispose of the topsoil and plants as Special Waste at a licensed landfill.	Following mitigation measures, no further significant impacts are anticipated.
Badgers	<p>Given the relatively limited 'footprint' of the pipeline works in any one area, the temporary loss of foraging habitat will be insignificant to any of the resident Badger social groups.</p> <p>No Badger setts were found within 30 m of the working areas, with the closest being c71 m away from the maximum working width area. Given these distances and the fact that the tunnels extend away from the pipeline route, no damage to tunnels or disturbance to Badgers</p>	<p>Wherever practicable, the pipeline route will be altered to avoid badger setts, and works within 30m of any occupied setts.</p> <p>Where impacts on setts are unavoidable, measures will be taken to minimise impacts on any resident Badgers, and all relevant operations will proceed under licence from SNH once suitable mitigation and compensation measures have been agreed.</p> <p>Other mitigation measures for badgers will include providing safe exit routes for animals should they fall</p>	<p>Temporary loss of foraging habitat.</p> <p>Potential damage to setts where mitigating action is unavoidable.</p>



Aspect	Impact	Proposed Mitigation Measures	Residual Impact
	is expected based on current evidence.	into the trench overnight, particularly where abundant badger paths were recorded in the original surveys.	
Bats	<p>Construction of the pipeline will result in the creation of temporary gaps through vegetation along minor watercourses, field boundaries and hedgerows which could otherwise be important as potential commuting and foraging routes for bats.</p> <p>Without mitigation, there may be a temporary negative effect on foraging and commuting bats during construction and a permanent direct effect on roosting bats.</p>	<p>Given the potential importance of the hedgerow and woodland network in parts of the route, measures will be developed to maintain links between canopies overnight in order to maintain fly-ways. Hedges will be replanted immediately following construction and will be surrounded by fencing, which will also have the effect of maintaining fly-ways. Consideration will also be given to methods of accelerating the re-establishment of hedges that are important bat commuting routes.</p> <p>In addition, mitigation measures for bats will be included within the site-specific mitigation packages developed for other habitats such as woodlands, where relevant.</p>	Temporary impact on bat commuting and foraging routes.
Birds	<p>The removal of hedgerow sections and tree lines will result in the loss of potential nest sites for birds. However, it is likely that other nest sites will exist within each bird territory. Also, the linear nature of the scheme limits the effect that it has on each habitat feature. The impact resulting from loss of potential nest sites is anticipated to be negligible.</p> <p>Noise and visual disturbance is likely to cause a reduction in the numbers and assemblage of birds nesting close to the works' area. However, this is also expected to have a relatively insignificant effect in terms of the wider populations of birds.</p> <p>There are unlikely to be any significant impacts</p>	<p>Measures will be taken to minimise the likelihood of disturbance or mortality of nesting birds, their eggs or chicks. Wherever possible, this will be achieved by removing vegetation that could be used by nesting birds (particularly sections of hedgerow, scrub, tree lines and woodland) before the bird nesting season (March to August inclusive).</p> <p>Where this is not possible, the use of mechanical devices such as visual scarers and 'humming tape' will be considered in high-risk locations, including locations where there is a high risk of ground-nesting birds in order to reduce the likelihood of birds establishing nests within or close to the working width.</p>	Following mitigation measures, no further significant impacts are anticipated.

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
	on over-wintering populations of wildfowl and waders; construction work will be carried out generally from March to September before over-wintering geese arrive, and any works will be set back, in most circumstances, a minimum of 100 m from the river banks.		
Fish	<p>Fish populations downstream may be affected, directly and indirectly, by pollution incidents and increases in turbidity caused by sediment-laden run-off entering the watercourse and/or disturbance to accumulated sediments and bed material.</p> <p>These impacts are expected to be short term, as most dry open-cut watercourse crossings will be completed in one day, with the watercourse recovering within one or two seasons.</p> <p>Localised disturbance could cause the displacement of individual fish and, more importantly, could interfere with the movement patterns of migratory species. Impacts are likely to be small given that these works are generally completed in a few days.</p> <p>Impacts will only persist during the construction phase, although the failure of individual fish to spawn can have some more lasting impacts on small populations. Impacts through physical disturbance to fish are considered likely to be negligible. However, indirect effects resulting from pollution events could result in significant impacts.</p>	<p>There are no water crossings on this pipeline which support substantial fish populations. However, the various measures detailed in Section 11 to protect surface water quality will also help to minimise the potential impacts on fish populations.</p> <p>Detailed electrofishing and aquatic invertebrate surveys will be commissioned in 2015 (1 year prior to construction) to establish baseline. Further surveys proposed in 2017 (post construction) to monitor impacts.</p>	Following mitigation measures, no further significant impacts are anticipated.

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
Otters	The results of the surveys indicate that direct impacts on Otters are unlikely to occur as no evidence of Otters was found within the survey corridor.	In the absence of evidence to suggest that Otter populations exist along this section of the pipeline route, no specific mitigation is currently recommended for Otters. However, repeat surveys will be undertaken prior to construction.	Following mitigation measures, no further significant impacts are anticipated.
Reptiles	No permanent impact is expected as the habitat will only be temporarily disturbed and then reinstated. Without suitable mitigation, a temporary negative impact is anticipated on reptiles.	A hand search and watching brief of any works area in suitable reptile habitat will be undertaken to minimise the risk of reptiles being harmed by the works, this will include hedgerows and stone dykes. Any animals found will be located to another suitable area of habitat.	Following mitigation measures, no further significant impacts are anticipated.
Invasive Animal Species	<p>American Signal Crayfish are known to be present in a loch to the south of the proposed route and it is therefore possible that this invasive species may have migrated into some of the watercourses being crossed by the route.</p> <p>This species is highly invasive and must not be spread from one area to another. Without suitable mitigation there could be a highly significant negative effect if this species are transported between watercourses.</p>	All watercourses to be treated as if containing ASC. All machinery and footwear entering or leaving watercourses to be spayed with an iodine based disinfectant. Construction sequence from Cluden to Lockfoot.	Minor
<b>During Operation</b>			
Flora and Fauna	Following the adoption of the mitigation measures it is considered that all predicted impacts will reduce to a scale considered to be insignificant	<p>The MWC will be responsible for the maintenance of all newly planted trees and hedges for a minimum of two years to ensure successful reinstatement. Thereafter, GNI will retain responsibility in perpetuity for reinstatement and drainage if any problems occur that are related to the presence of the pipeline.</p> <p>In addition, GNI is committed to after-care and monitoring of sensitive habitats as would be</p>	Insignificant

Aspect	Impact	Proposed Mitigation Measures	Residual Impact
		reasonably expected of a developer.	



## 7.9 References

Dumfries and Galloway Local Biodiversity Action Plan  
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