A11.3 Ecological Mitigation Protocol

1.1 This appendix details standard mitigation referenced in Chapter 11 (Habitats and Biodiversity). This mitigation is in addition to specific mitigation and will be implemented through the Construction Environmental Management Plan (CEMP) (Section 11.5.9 in Chapter 11: Habitats and Biodiversity) throughout the entire proposed Scheme **(Mitigation Item GR1 + GR2)**. The mitigation is set out in three tables; for mitigation which will be implemented during the pre-construction phase (Table 1), that which will be undertaken to mitigate for impacts associated with the construction phase (Table 2), and that which will be undertaken to mitigate for impacts associated with operation of the proposed Scheme (Table 3).

1.2 Mitigation items and activities identified for specific locations are set out in Table 11.1 of Chapter 11 (Habitats and Biodiversity) – for example, the locations for woodland planting, bat box provision and mammal crossing points. Locations are also indicated on Figure 9.5.

1.3 As indicated, mitigation will be implemented through the CEMP which will set out the intended methods of effectively managing potential environmental impacts resulting from construction of the proposed Scheme. It will include, but not be limited to, plans to control airborne, surface water, sediment and other pollution risks, a biosecurity plan, and the management of noise and vibration.

1.4 The ecological clerk of works (ECoW) will supervise the construction works, undertake pre-construction surveys for protected species in the areas affected by the proposed Scheme and ensure mitigation measures are implemented to avoid and reduce impacts on ecological features.

1.5 During both the construction and operational phases, Scottish Environment Protection Agency (SEPA) Pollution Prevention Guidance notes (PPGs) will be adhered to at all times as detailed in Table 2 and 3. Additionally, other relevant standard guidance and good practice guidelines will be taken into account as specified in the tables. Furthermore, the operational design with incorporate Sustainable Drainage Systems e.g. Basin and Pond (hereafter referred to as SUDS) to manage road runoff and avoid associated impacts, via elements such as filter drains, swales, detention basins and retention ponds. This is indicated in Table 3.

Table 1: Standard Mitigation for Habitats and Species to be Implemented During the Pre-construction Phase

Features Potentially Affected	Potential Impacts/Impact Pathway	Mitigation
This table specifies mitigation items which are required to be undertaken during the pre-construction phase. These items are required to mitigate for impacts to habitats and species arising from activities undertaken prior to construction, such as ground investigation works, and also for impacts arising during the construction and operational phases of the proposed Scheme.		
Badger Bats Pine marten Red squirrel Otter Freshwater fish (Atlantic salmon, European eel and lamprey sp.)	• Pollution from runoff. • Mortality of species from vehicle movements and vegetation clearance. • Disturbance from noise, vibration and light spill. • Loss of habitat. • Severance of habitat	*Species Protection Plans* • Species Protection Plans for European Protected Species (EPS) and other species of conservation interest (such as, but not limited to, badger) will be developed by in consultation with Scottish Natural Heritage (SNH), and other relevant stakeholders as necessary.
Badger Bats Pine marten Red squirrel Otter Freshwater fish (Atlantic salmon, European eel and lamprey sp.)	• Mortality of species from vegetation clearance. • Disturbance from noise, vibration and light spill. • Habitat loss and fragmentation of aquatic habitats from dewatering. • Mortality of aquatic species from dewatering and instream works. • Loss of habitat. Severance of habitat.	*Pre-construction Surveys* • Pre-construction surveys for protected species under the footprint of the proposed Scheme (or as determined in the Species Protection Plans) will be undertaken. • Surveys will inform the need for any protected species licences required and/or any additional measures to be undertaken to obtain the necessary licences, including any requirement for additional surveys such as for bat hibernations roosts • Locations of protected species will be communicated to construction staff in strict confidence to ensure no direct mortality of protected species during site clearance, and allow for the development of additional mitigation should it be required.
Terrestrial and aquatic habitats	• Loss of habitat • Spread of Invasive Non-native Species (INNS).	*Habitat and Invasive Species Management Plans* • Habitat Management Plans (HMPs) will be prepared for habitats of conservation interest (Ancient Woodland Inventory (AWI) and other woodland) as part of the CEMP. The HMPs will identify strategies and procedures to protect and manage habitats of conservation interest and will be updated as necessary. • An Invasive Species/Biosecurity Management Plan will be drawn up and agreed with SNH in advance of works commencing. The plan will include measures to prevent the spread of invasive species. • Areas of retained habitat will be clearly demarcated using fencing and signs.
Terrestrial and aquatic habitats	• Spread of INNS.	*Pre-construction Surveys* • Pre-construction surveys for INNS under the footprint of the proposed Scheme (or as determined in Invasive Species/Biosecurity Management Plan) will be undertaken. • Surveys will inform the need for any additional measures to be undertaken to manage INNS. • Locations of INNS will be clearly demarcated and communicated to construction staff to prevent their transfer, and allow for the

Features Potentially Affected	Potential Impacts/Impact Pathway	Mitigation
		development of additional mitigation should it be required.

Table 2: Standard Mitigation for Impacts to Habitats and Species associated with the Construction Phase

Features Potentially Affected	Potential Impacts	Mitigation
All features	• Pollution from runoff. • Mortality of species from vehicle movements and vegetation clearance. • Disturbance from noise, vibration and light spill. • Spread of INNS. • Loss of habitat. • Severance of habitat.	*Site Management* • Site management practices will be implemented to avoid or reduce the risks of secondary impacts on habitat and species in the vicinity of the proposed Scheme and may include, but not be limited to: o designated refuelling stations; o speed limit restrictions; and o defined working hours.
		Locations of Compounds and Work Areas • Works compounds, storage sites, access roads and any other temporary work areas will be located at least: o 30m from any sensitive sites (such as birds' nests or otter resting sites); and o 10m from water features, or at an agreed sensitive distance as advised by the ECoW. o Any works within the above distances must be subject to consultation with SNH, and undertaken under licence where applicable.
		Working Corridor • Temporary barriers may be used to create a working corridor for plant and personnel, which will minimise: o damage of habitats (including pollution); o prevent transfer of INNS via biosecurity site management; and o direct mortality and disturbance to animals located within and adjacent to the proposed Scheme working corridor.
All protected species including: Badger Bats Pine marten Red squirrel Otter Freshwater fish (Atlantic salmon, European eel and lamprey sp.)	All impacts on protected species including: • mortality; • disturbance; • habitat loss/fragmentation; and • pollution risks.	*Species Protection Plans* • Species Protection Plans for EPS and other species of conservation interest (such as, but not limited to, badger) will be implemented in consultation with SNH, and other relevant stakeholders as necessary. Plans will be updated and amended as required during the construction programme. • The ECoW will provide Toolbox Talks to all appointed contractors which will advise of the residual risk of protected species presence and the requirement to stop work should they be encountered.

Features Potentially Affected	Potential Impacts	Mitigation
All features including: Habitats Badger Bats Birds Pine marten Red squirrel Otter	• Habitat loss/fragmentation. • Mortality of species from vegetation clearance.	*Minimisation of Habitat Loss* Habitat loss will be reduced by: • restriction of felling and vegetation clearance activities to the minimum area necessary for works, as defined by the Compulsory Purchase Order (CPO) and developed in the design process; • clearly demarcating areas of retained vegetation and retained dead wood habitat with fencing and signs; • the removal of habitat in line with legislation applicable to features identified in the vicinity. Please refer to feature specific mitigation; and • relocation of dead standing, fallen and felled timber (where its removal is necessary), to areas of newly created woodland habitat, or adjacent habitats within the CPO. Relocated deadwood will be placed in areas of partial shade, where practicable.
Bats	• Mortality. • Habitat loss (roosts and foraging/commuting).	*Bat Roost Assessments, Exclusions and Replacements* • Demolition/felling of any confirmed roosts will be conducted under licence following consultation with SNH. Methods may include: exclusion of roosts, soft stripping of slates and sectional felling of trees. • Where required, the loss of roosting opportunities will be offset by the provision of replacement roost habitat, in consultation with SNH (for example, bat boxes erected during construction). The species, seasonal and dimensional requirements of replacement roost habitat will be determined by surveys.
Bats Birds Red squirrel	• Mortality of species from vegetation clearance. • Disturbance from noise and vibration.	*Site Clearance including Tree Felling* • Outwith red squirrel habitats, vegetation clearance will take place between September and February to avoid sensitive times for birds (typically March to August inclusive). In red squirrel habitats, vegetation clearance will take place between October and January (inclusive). • Where clearance must be undertaken, pre-works checks will be undertaken to identify active dreys or nests no more than two days prior to tree felling works. If found, clearance must be postponed until kittens/chicks have left the drey/nest. • Any clearance works undertaken in red squirrel/bird breeding habitat during the periods identified above will be supervised by an ECoW who will also undertake the pre-works check. Removal of active or inactive dreys will be carried out under a derogation licence from SNH. Clearance of areas shown to be free from nesting birds must be undertaken within 24 hours. If nesting birds are present, clearance cannot take place until the birds are fully fledged. • Any tree felling will be carried out by experienced contractors according to agreed felling methods and any licensing conditions to reduce direct mortality of protected species (bats, red squirrel). • Any methods required to exclude and deter birds from breeding in working areas will be developed in consultation with SNH and implemented ahead of the breeding bird season. • All cleared material will be rendered unsuitable for nesting birds or removed from the works area.
Reptiles	• Mortality of species from vegetation clearance.	*Site Clearance* • Habitat clearance in areas where reptile presence has been confirmed will be conducted under the direction and supervision of an ECoW. This will entail cutting the vegetation in stages over two days using a strimmer or brush cutter.
Badger Otter	• Mortality of species from entrapment.	*Mammal Entrapment* • All trenches, holes and pits will be kept covered at night or provide a means of escape for mammals that may become entrapped. • Temporary mammal resistant fencing will be provided around construction compounds following a specification agreed through

Features Potentially Affected	Potential Impacts	Mitigation
Pine marten Red squirrel		consultation with SNH. • Compound gates will be sensitively designed to prevent mammals from gaining access to compounds and will be closed at night.
Watercourses Fish species Otter	• Pollution from runoff • Mortality of aquatic species from instream works and dewatering. • Habitat loss and fragmentation of aquatic habitats. • Disturbance from noise, vibration and light spill. • Discontinuity of flow from installation of culverts. • Changes in hydrology affecting habitat functioning and migration of fish.	*Protection of Watercourses and Associated Species* • Drainage systems are to be designed so as to prevent otter entering and becoming trapped. • Where watercourse realignments are unavoidable, habitat creation and enhancement have been incorporated into designs through the inclusion of meander bends and riparian zones, where appropriate. • Abide by SEPA PPGs and specifically the following items: o During construction, abide by PPG 1 (SEPA 2013), PPG 3 (SEPA 2006), PPG 5 (SEPA 2007), PPG 6 (SEPA 2012), PPG 21 (SEPA 2009b) and PPG 22 (SEPA 2011). o Surface and foul water will be appropriately drained and stored. These control measures must be in place before earthworks commence. o Chemicals, oils and fuels will be kept safely stored and away from drainage systems and waste will be appropriately managed. o Plant and machinery must not be fuelled within 10m of drainage systems, or as advised by the ECoW. o Sites will be restored fully on completion of works and will adhere to below, with respect to preventing pollution incidents near drainage systems. o Emergency procedures and spillage kits must be available and construction staff must be familiar with emergency procedures. • The design and creation of new, extended or upgraded culverts will take into account the relevant guidelines in relation to otter, European eel, Atlantic salmon and other migratory fish species. Guidelines include: o SEPA Good Practice Guidelines for Temporary Construction Methods (SEPA 2009a); o SEPA Good Practice Guide for River Crossings (SEPA 2010); o SEPA Position Statement (SEPA 2015); o Design Manual for Roads and Bridges (DMRB) Volume 4, Section 2, Part 7, Design of Outfalls Culvert Details (Highways Agency, Scottish Executive, Welsh Assembly Government and The Department for Regional Development Northern Ireland 2004); o Culvert Design and Operation Guide (C689) (CIRIA 2010); o Elver and Eel Passes (EA 2011); and o The River Restoration Centre Manual of River Restoration Techniques (River Restoration Centre 2013).
Badger Bats Otter Pine marten Red squirrel	• Disturbance from light spill.	*Construction Lighting* • A lighting plan will be developed for low light conditions and during the hours of darkness. The use of construction lighting will be in accordance with BS 5489 requirements and applicable guidance on lighting (e.g. Bat Conservation Trust (2009, 2014) and Institute of Lighting Engineers (2011)). This will include, but not be limited to: o avoidance of working during the hours of darkness where possible; o the use of directional lighting, especially in areas of sensitive habitat (such as bat roosts or badger setts); and o preventative measures (e.g. installation of shields, hoods or limiting the height of lighting columns).
Badger	• Fragmentation of habitat for	*Mammal Crossing Points*

Features Potentially Affected	Potential Impacts	Mitigation
Bats Otter Pine marten	terrestrial species. • Mortality of species from operational traffic flow.	• Severance and fragmentation of habitat will be prevented during construction by retention of commuting routes or creation of suitable crossing points so movement between areas of habitat can be maintained wherever possible. • Existing mammal-proof fencing will be reinstated where removed for construction activities. • Temporary mammal-proof fencing will to deter mammals from accessing construction areas and direct them to safe crossing points.
Deer	• Injury or mortality of from vehicle collisions	*Deer Fencing* • Any existing deer fencing removed during pre-construction or construction will be repaired or replaced. • Undertake a deer collision risk assessment, and implement any fencing identified as required through this process (as explained in Chapter 9 (Landscape)).
Terrestrial and aquatic habitats	• Spread of INNS	• The Invasive Species/Biosecurity Management Plan will be implemented. For example, an ECoW will be on site during the treatment and/or removal of any INNS. • Earth movements from one site to another will be minimised to avoid cross-contamination with INNS.
All features	• No significant impacts arising from air pollution based on use of standard site management practices	*Air Pollution* • Dust management procedures will be detailed within the CEMP to prevent adverse effects such as the build-up of dust on trees and scrub vegetation will be implemented. Measures will include the following: o Minimising the size and duration of exposed ground and soil stockpiles from which the water drains. o Dampening down construction areas and material stockpiles (especially when weather conditions are dry and windy). o Use of cutting equipment that utilise water dust suppression (e.g. Abrasive disc cutters). o Significant material stockpiles to be enclosed as far as practicable. o Concrete batching to be only carried out in enclosed or shielded areas. o Enforcement of appropriate speed limits on haul roads. o Implementing regular dampening down of unsurfaced site and access roads using water bowsers, particularly during dry, windy conditions. o Provision of wheel washing facilities at site exits.
Watercourses Fish species Otter	• Pollution from runoff • Mortality of aquatic species from instream works and dewatering. • Habitat loss and fragmentation of aquatic habitats. • Disturbance from noise, vibration and light spill. • Discontinuity of flow from installation of culverts. • Changes in hydrology affecting habitat functioning and migration of	*Protection of Watercourses and Associated Species* • Drainage systems are to be designed so as to prevent otter entering and becoming trapped. • Abide by SEPA PPGs and specifically the following items: o Abide by PPG 1 (SEPA 2013), PPG 3 (SEPA 2006), PPG 5 (SEPA 2007), PPG 6 (SEPA 2012), PPG 21 (SEPA 2009b) and PPG 22 (SEPA 2011). o Surface and foul water will be appropriately drained and stored. These control measures must be in place before earthworks commence. o Chemicals, oils and fuels will be kept safely stored and away from drainage systems and waste will be appropriately managed. o Plant and machinery must not be fuelled within 10mof drainage systems. o Sites will be restored fully on completion of works and will adhere to below, with respect to preventing pollution incidents near drainage systems.

Features Potentially Affected	Potential Impacts	Mitigation
	fish.	o Emergency procedures and spillage kits must be available and construction staff must be familiar with emergency procedures. • The extent of areas affected by culverts, watercourse realignment and dewatering will be minimised as far as practical. • Best practice guidance will be adhered to when working within watercourses with key fish species (SEPA 2010 and Scottish Government 2012). • In-channel works and piling will avoid salmonid and lamprey spawning and salmonid egg incubation periods and will be undertaken during months of least sensitivity (July to mid-October inclusive). Any works required to be undertaken in June, consultation will be undertaken with the Findhorn, Lossie and Nairn Fisheries Trust and SNH. Soft-start techniques are to be applied to piling work procedures to encourage sensitive species to evacuate the area. • Removal and relocation of fish from channels to be dewatered for construction of culverts, realignments or bridges will be conducted in line with established guidance or in consultation with SNH and SEPA. • Where practicable, temporary diversion channels will be used instead of over pumping/siphons and gravity/flume pipes to maintain habitat connectivity during construction works in water features which require dewatering and to prevent death or injury to fauna. Where over pumping is required, pumps will be screened to reduce this effect. • Temporary diversion channels will be created with suitable sized replacement substrate or transplanted substrate from the section being dewatered, making sure that the size and flow in the diversion channel is as near to the existing channel as possible. The temporary channel will be designed by a competent person with appropriate experience to ensure it functions fully. Where possible, damming of watercourses will be avoided during construction works. • Watercourse substrate in the working area will be removed and stored for reuse. Where this is not possible, imported materials for use as rip rap or stream bed will be appropriate for the location (e.g. the material will be free from invasive plants or animals and be of correct pH).

Table 3: Standard Mitigation for Impacts to Habitats and Species associated with the Operational Phase

Features Potentially Affected	Potential Impacts	Mitigation
Badgers Bats Otter Pine marten	• Fragmentation of habitat for terrestrial species. • Habitat loss for terrestrial species. • Mortality of species from operational traffic flow.	*Mammal Crossing Points* • Severance and fragmentation of habitat will be prevented during operation by retention of commuting routes or creation of suitable crossing points so movement between areas of habitat can be maintained. • Offsetting the loss of valuable commuting habitats will occur through habitat creation, as identified in Table 11.11 of Chapter 11 (Habitats and Biodiversity) and Figure 9.5. • New mammal-proof fencing will provided at locations indicated in Table 11.11 of Chapter 11 (Habitats and Biodiversity) and Figure 9.5, to deter mammals from accessing the highway and direct them to safe crossing points.
Badgers Bats Otter Pine marten	• Fragmentation of habitat for terrestrial species. • Habitat loss for terrestrial species. • Mortality of species from operational traffic flow.	*Habitat Replacement* • Replacement habitats will be managed during the aftercare and operation phase of the proposed Scheme. • Management and maintenance of roadside verges will be undertaken to maintain and enhance floral diversity and to improve the linkages between similar habitats along the route corridor.

Features Potentially Affected	Potential Impacts	Mitigation
Deer	• Injury or mortality of from vehicle collisions	• Implementation of any fencing as identified by the deer collision risk assessment (as explained in Chapter 9 (Landscape)).
Terrestrial habitats	• Habitat loss for terrestrial species. • Fragmentation of habitat for terrestrial species.	*Habitat Replacement* • Offsetting the loss of ecologically important habitats will occur through habitat creation including roadside planting, where appropriate, and has been integrated with landscape planting. It has been designed, where practicable, to fill in existing gaps in linear vegetation features, adjoin or connect existing blocks of woodland or act as stepping stones between habitat areas (Entwistle *et al*. 2001). • Habitat connectivity will be enhanced through the reinstatement of appropriate linear features (such as hedgerows along the boundary of the proposed Scheme) as identified in Table 11.11 of Chapter 11 (Habitats and Biodiversity) and Figure 9.5. • Landscape planting and newly created habitat will be comprised of locally obtained native species of local provenance, and will comprise a mixture of species. • Sowing/planting should be undertaken in the appropriate planting season and as soon as possible following completion of the works to reduce the likelihood of colonisation by INNS which are of lower value to wildlife. • Replacement habitats will be managed during the aftercare and operation phase of the proposed Scheme. • Management and maintenance of roadside verges will be undertaken to maintain and enhance floral diversity and to improve the linkages between similar habitats along the route corridor.
Watercourses Fish species Otter	• Habitat loss and fragmentation of aquatic habitats. • Habitat loss and fragmentation of aquatic habitats. • Discontinuity of flow from installation of culverts. • Changes in hydrology affecting habitat functioning and migration of fish.	*Protection of Watercourses and Associated Species* • Drainage systems are to be designed so as to prevent otter entering and becoming trapped. • The extent of areas affected by culverts and watercourse realignment will be minimised as far as practicable. • In areas of watercourse realignment, habitat creation and enhancement will be incorporated into designs through the inclusion of meander bends and riparian zones, where appropriate. Locations are identified in Table 11.11 of Chapter 11 (Habitats and Biodiversity) and Figure 9.5. • The design and creation of new, extended or upgraded culverts will take into account the relevant guidelines in relation to otter, European eel, Atlantic salmon and other migratory fish species. Guidelines include: o SEPA Good Practice Guidelines for Temporary Construction Methods (SEPA 2009a) o SEPA Good Practice Guide for River Crossings (SEPA 2010); o SEPA Position Statement (SEPA 2015); o DMRB Volume 4, Section 2, Part 7, Design of Outfalls Culvert Details (Highways Agency, Scottish Executive, Welsh Assembly Government and The Department for Regional Development Northern Ireland 2004); o Culvert Design and Operation Guide (C689) (CIRIA 2010); o Elver and Eel Passes (EA 2011); and o The River Restoration Centre Manual of River Restoration Techniques (River Restoration Centre 2013).
All features including: Terrestrial and aquatic habitats; Badgers	• Pollution from runoff during operation.	*Road Drainage (Runoff)* • Road runoff will be treated using SUDS techniques including elements such as filter drains, swales, detention basins and retention ponds according to SEPA PPG guidelines as detailed above under Construction (SEPA 2003). To prevent pollution of water features during operation, PPG 1 (SEPA 2013), PPG 5 (SEPA 2007), PPG 21 (SEPA 2009b) and PPG 22 (SEPA 2011) will be abided by.

Features Potentially Affected	Potential Impacts	Mitigation
Fish species Otter Pine marten		• Drainage systems must be suitably fenced to prevent otter (or other animals) entering and becoming trapped. • Vegetation buffer strips around roads, SUDS and other infrastructure are to be maintained. • Maintenance works to drainage systems, culverts, bridges and channels will use a containment system as detailed in PPG 5 (SEPA 2007) where practical to prevent dust, debris and wastewater entering the water feature. SEPA PPG 5 (SEPA 2007) will be abided by. • Where there is a potential for oil leakage or spillage, SEPA PPG 3 (SEPA 2006) will be abided by. • New outfalls will be designed according to the SEPA Good Practice Guide for Intakes and Outfalls (SEPA 2008).

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