

## **21 Schedule of Environmental Commitments**

### **21.1 Introduction**

- 21.1.1 As described throughout this ES, the design of the proposed scheme has been progressed taking account of identified environmental constraints and considerations, enabling reduction or avoidance of potential environmental impacts where practicable. This chapter summarises the additional mitigation measures identified in the ES, which are considered necessary to avoid; reduce; or offset potential impacts.
- 21.1.2 The purpose of the following Schedule of Environmental Commitments is to collate mitigation measures, both for ease of reference and for use by the Contractor. These mitigation measures are those identified within Chapters 8 to 18 of this ES (Table 21.2 to 21.11), as well as four overarching mitigation items (Table 21.1). A description, location, and purpose of each mitigation item is given. The tables also state whether consultation or approval with a consultee is required.
- 21.1.3 The timing of mitigation varies and may be a design requirement, or implemented prior to construction, during construction and/or during operation of the proposed scheme. The stated mitigation measures have been identified through the EIA process, and whilst some of these are also necessary to achieve separate legislative compliance (e.g. protected species licences), they are included as they still encompass mitigation commitments of this ES.

**Table 21.1: General Standard Construction Mitigation**

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Standard A9 Mitigation</b>					
<b>SMC-S1</b>	Throughout proposed scheme	Pre-Construction & Construction	<p>A Construction Environmental Management Plan (CEMP) will be prepared by the Contractor. The CEMP will set out how the Contractor intends to operate the construction site, including construction-related mitigation measures identified below in Tables 21.2 to 21.11. The relevant section(s) of the CEMP will be in place prior to the start of construction work.</p> <p>The CEMP will include, but not be limited to, subsidiary plans relating to: land (including a specific Soil Management Plan), geology and land contamination; surface water and groundwater (including a Flood Response and Pollution Incident Response Plan); ecology (Ecological Management Plan which will include specific Species Protection Plans and Habitat Management Plans); landscape, cultural heritage, air quality and noise and vibration.</p>	To provide a framework for the implementation of construction activities in accordance with the environmental commitments and mitigation measures in the ES. It will be developed and evolve to avoid, reduce or mitigate construction impacts on the environment and the surrounding community.	Consultation with the relevant local authorities, other statutory bodies and regulatory authorities (Refer to Tables 21.2-21.11).
<b>SMC-S2</b>	Throughout proposed scheme	Pre-Construction & Construction	<p>Prior to construction an Environmental Coordinator and team of suitably qualified Environmental Clerk of Works (EnvCoW) (i.e. professionally qualified in a relevant environmental discipline) will be appointed by the Contractor. The EnvCoW(s) will report to the Environmental Coordinator and be present on site, as required, during the construction period to monitor the implementation of the mitigation measures identified and ensure that activities are carried out in such a manner to prevent or reduce impacts on the environment.</p>	To monitor the implementation of the mitigation measures identified and ensure that activities are carried out in such a manner to prevent or reduce impacts on the environment.	Approval by Transport Scotland.
<b>SMC-S3</b>	Throughout proposed scheme	Pre-Construction & Construction	<p>Throughout the construction period the Contractor will, as required, contribute towards the overall communications strategy for the A9 Dualling Programme.</p> <p>As part of this the Contractor will appoint a Community Liaison Officer supported by a liaison team as necessary who will:</p> <ul style="list-style-type: none"> <li>liaise with the following: relevant local authorities; other statutory bodies and regulatory authorities; community councils and relevant community groups; and businesses and residents in local communities affected by the construction works;</li> <li>notify occupiers of nearby properties a minimum of two weeks in advance of the nature and anticipated duration of planned construction works that may affect them;</li> <li>support the production of project communications such as the project website and newsletters; and</li> <li>establish a dedicated Freephone telephone helpline together with a dedicated email address and postal address for enquiries and complaints during the construction phase. The relevant contact numbers, email and postal addresses will as a minimum be displayed on signs around the construction site and will be published on the project website. Enquiries and complaints will be logged in a register and appropriate action will be taken in response to any complaints.</li> </ul>	To inform stakeholders and consultees throughout the construction period.	Consultation with the relevant local authorities, other statutory bodies and regulatory authorities, community councils and relevant community groups, and businesses and residents in local communities affected by the construction works.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>SMC-S4</b>	Throughout proposed scheme	Construction	The Contractor will ensure that all site workers receive adequate environmental training relevant to their role prior to working on the construction site, including specific environmental project inductions and 'toolbox talks' on best practice construction methods as appropriate.	To ensure site workers are aware of best practice construction methods, mitigation measures and how they are implemented.	None required

**Table 21.2: People and Communities – Community and Private Assets**

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Standard A9 Mitigation</b>					
<b>SMC-CP1</b>	Throughout proposed scheme	Pre-Construction & Construction	Access to/from residential, commercial and industrial and agricultural, forestry and sporting assets will be maintained throughout the construction period by means of signed diversions, where necessary. The estimated duration and location of these diversions will be communicated to affected parties, a minimum 2 weeks in advance, before they are put in place.	To maintain access to/from residential, commercial and industrial and agricultural, forestry and sporting assets.	None required
<b>SMC-CP2</b>	Throughout proposed scheme	Construction & Operation/Post-Construction	Existing access arrangements to agricultural and forestry land outwith the land made available (LMA) boundary will not be prevented by the construction works during or post construction, unless alternative access is provided.	To maintain access to/from residential, commercial and agricultural/forestry land.	None required
<b>SMC-CP3</b>	Throughout proposed scheme	Pre-Construction	Consultation with affected landowners and occupiers will be undertaken on the location and timing of planned construction works to reduce disturbance, as far as practicable, taking into account the overall construction programme.	To reduce disturbance on affected landowners.	Consultation with affected landowners and occupiers.
<b>SMC-CP4</b>	All agricultural land	Pre-Construction	Notice of intention to commence construction work will be provided to owners and occupiers of agricultural land adjacent to the proposed scheme before works commence.	To ensure owners and occupiers of agricultural land adjacent to the proposed scheme are informed of the intention to commence construction work prior to works commencing.	None required
<b>SMC-CP5</b>	All agricultural land	Construction	Where practicable, temporary construction compounds that are required outwith the LMA boundary will not be sited on prime agricultural land or on areas of woodland and forestry.	To reduce potential impacts arising from temporary construction compounds on prime agricultural land or on areas of woodland and forestry.	None required
<b>SMC-CP6</b>	All agricultural land	Construction & Operation	Where appropriate, temporary fences will be provided during construction for the health and safety of the public and animals. Fencing of working areas will be to a standard adequate for excluding any livestock kept on adjoining land. Access by non-authorised personnel will not be permitted, unless prior permission is granted by the Contractor(s).	For the health and safety of the public and animals and to prevent unauthorised site access.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>SMC-CP7</b>	All agricultural land	Construction	Where boundary features (e.g. fences, walls and hedges) require temporary or permanent alteration to allow construction, these will be reinstated with appropriate materials to provide a secure boundary.	To provide a secure boundary and reduce disruption to agriculture.	None required
<b>SMC-CP8</b>	Throughout proposed scheme	Construction	Soil resources will be managed in accordance with the 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' (Defra, 2009). This will include the careful excavation, storage and replacement of topsoil and subsoil.	To ensure that soil mitigation measures are fully implemented and soil resources are protected.	None required
<b>SMC-CP9</b>	All agricultural land	Construction	Reasonable precautions will be taken during construction to avoid the spreading of soil-borne pests and diseases; animal and crop diseases; tree pests and diseases; and invasive species. A biosecurity protocol will be developed by the Contractor in consultation with the Animal and Plant Health Agency, the Scottish Government's Environment and Forestry Directorate and the Scottish Government's Agriculture, Food and Rural Communities Directorate, taking cognisance of relevant UK and Scottish Government biosecurity guidance.	To avoid the spreading of soil-borne pests and diseases; animal and crop diseases; tree pests and diseases; and invasive species.	Consultation with the Animal and Plant Health Agency, the Scottish Government's Environment and Forestry Directorate and the Scottish Government's Agriculture, Food and Rural Communities Directorate.
<b>SMC-CP10</b>	Throughout proposed scheme	Pre-Construction	Pre-construction drainage surveys will be undertaken to reduce the likelihood of damage or disturbance to field and forestry drainage systems during construction. Where required, the integrity of the drainage system will be secured by the Contractor as part of pre-construction drainage works. Repairing and reinstatement of drains affected by construction will be agreed with the landowner/occupier to ensure that land capability is maintained and the risk of flooding is not exacerbated.	To reduce the likelihood of damage or disturbance to field and forestry drainage systems during construction.	Consultation with affected landowners and occupiers.
<b>SMC-CP11</b>	Throughout proposed scheme	Pre-Construction	Water supplies for livestock will be identified pre-construction and where supplies are lost or access is compromised by any construction works, temporary and/or permanent alternative supplies will be provided as agreed with the landowner/occupier.	To reduce disruption to landowners/occupiers.	Consultation with affected landowners and occupiers.
<b>SMC-CP12</b>	Throughout proposed scheme	Post-Construction/ Operation	LMA that is declared surplus following completion of construction of the proposed scheme (including redundant road pavement and/or access tracks) will be offered back to former owners or their successors in accordance with the Crichton Down Rules.	To return surplus land to former owners or their successors in accordance with the Crichton Down Rules.	Consultation with affected landowners and occupiers.
<b>SMC-CP13</b>	Throughout proposed scheme	Construction	Where there are sporting or fishing rights adjacent to the working area, reasonable endeavours will be taken to minimise interference with enjoyment of them while recognising the primary objective to maintain a safe working environment for both contractors and users of the land and water.	To reduce interference or enjoyment of sport/fishing while maintaining a safe working environment for both contractors and users of the land and water.	None required
<b>SMC-CP14</b>	Throughout proposed scheme	Pre-Construction	Where stands of trees are to be affected an arboricultural and/or windthrow assessment will be undertaken pre-construction by the Contractor. Tree surgery and/or felling will be carried out as necessary to ensure the safety of land and infrastructure.	To address safety risk to land within the proposed scheme and reduce impacts to forestry.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>SMC-CP15</b>	Throughout proposed scheme	Post-Construction/ Operation	On completion of works, any land required temporarily for construction works will be reinstated as far as practicable and in line with mitigation plans. A record of condition survey is to be undertaken of any land to be returned to agriculture, to ensure all land is restored as near to its original condition as is reasonably practicable.	To ensure appropriate restoration of land following completion of proposed scheme.	None required
<b>Project Specific Mitigation</b>					
<b>P05-CP16</b>	Throughout proposed scheme	Construction	Consideration will be given by Transport Scotland to the replacement of existing roadside signage on the proposed scheme for certain businesses whose access has changed and whose business is particularly dependent upon vehicular movements from the A9.	To reduce disruption to businesses where access arrangements have changed as a result of the proposed scheme.	None required
<b>P05-CP17</b>	Flood compensatory storage areas and graded out embankments	Post-Construction/ Operation	Where areas of land within the CPO are identified as being surplus and having the potential to be returned to agriculture following construction of the proposed scheme, for example flood compensatory storage areas and graded out embankment slopes, these shall be offered back to the former owner for return to agricultural/forestry use following imposition of appropriate burdens by Transport Scotland.	To reduce disruption to landowners/occupiers, minimise permanent land-take and reduce agricultural impacts.	Affected landowners and occupiers.
<b>P05-CP18</b>	All agricultural land	Construction	Where field access points require temporary or permanent alteration as a result of construction, alternative field access will be provided in consultation with the land owner/occupier. Where recessed field access from local roads is identified as being required, this shall be provided.	To reduce disruption to landowners/occupiers.	Consultation with affected landowners and occupiers.
<b>P05-CP19</b>	All forestry	Pre-Construction	Where individual stands of trees and woodland compartments will be affected, and risk of windthrow or damage to root protection areas has been identified as a safety risk to land within the proposed scheme, appropriate mitigation will be applied to address safety risk to land within the proposed scheme. Any felling to create a windfirm edge or stabilise trees will take account of potential ecological, landscape and visual impacts and designed where feasible to maximise ecological, landscape and visual opportunities.	To address safety risk to land within the proposed scheme and reduce impacts to forestry and maximise ecological, landscape and visual opportunities.	None required
<b>P05-CP20</b>	All forestry	Pre-Construction	Where individual stands of trees and woodland compartments will be affected, and where there are no windthrow or landscape/visual issues, a tree protection plan will be prepared and tree felling restricted to that necessary to allow the safe construction and operation of the proposed scheme.	To allow the safe construction and operation of the proposed scheme while protecting trees.	None required
<b>P05-CP21</b>	Forestry areas throughout proposed scheme	Pre-Construction	Tree felling will be avoided where possible in areas of woodland identified as having the potential to be retained for landscape and visual purposes (areas to be retained identified in Figure 13.5), taking cognisance of the tree protection plan and/or windthrow assessment.	To reduce landscape and/or visual impacts.	None required

**Table 21.3: People and Communities – All Travellers**

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Standard A9 Mitigation</b>					
<b>SMC-AT1</b>	Throughout proposed scheme	Construction	The construction programme will minimise the length of closures or restrictions of access for NMUs as far as reasonably practicable	To minimise length of closures or restrictions of access for NMUs.	None required
<b>SMC-AT2</b>	Throughout proposed scheme	Construction	Where practicable, temporary diversion routes and/or assisted crossings will be provided to maintain safe access for NMUs throughout the construction works. Any closure or re-routing of routes used by NMUs will take cognisance of the 'Roads for All: Good Practice Guides for Roads' (Transport Scotland, 2013). These will be agreed in advance with the relevant local authorities and will be clearly indicated with signage as appropriate.	To maintain safe access for NMUs throughout the construction works.	Any closures will be agreed with Transport Scotland (Rights of Way), CNPA and/or PKC (local and core paths).
<b>SMC-AT3</b>	Throughout proposed scheme	Pre-Construction	In consultation with the relevant Roads Authority and public transport provider, bus stops affected by the works will be relocated safely with a safe access route provided for NMUs.	To maintain access to Public Transport facilities.	Consultation with the relevant Roads Authority and public transport provider.
<b>SMC-AT4</b>	Throughout proposed scheme	Construction	The Contractor will produce a traffic management plan that will include measures to avoid or reduce disruption to the road traffic, and in accordance with the Traffic Signs Manual (Department of Transport, 2009). The plan will include consideration of the timing of works, the location of haul roads to reduce site traffic on the public roads and a well maintained traffic management system with sweeping of roads to reduce construction debris on the carriageway.	To avoid or reduce disruption to the road traffic.	None required
<b>SMC-AT5</b>	Throughout proposed scheme	Construction	Reasonable precautions will be taken by the Contractor to avoid or reduce road closures. One lane in each direction will be provided for A9 traffic during peak hours (Mon to Fri) except in exceptional circumstances and for closures which are pre-approved by Transport Scotland e.g. those required during blasting.	To avoid or reduce road closures and resulting disruptions to traffic.	Approval required from transport Scotland in the event of required A9 lane closures.
<b>SMC-AT6</b>	Throughout proposed scheme	Construction	Road diversions will be clearly indicated with road markings and signage as appropriate. Any road closures will be notified in advance through road signage and appropriate signage will be provided for the duration of the closure. The Contractor will also be responsible for identifying any notable changes in patterns of road network use during construction, where such changes may cause significant disruption elsewhere (such as drivers re-routing away from the A9), and will review and update traffic management provisions as appropriate in discussion with Transport Scotland.	To reduce disruption to the road users.	None required
<b>SMC-AT7</b>	Throughout proposed scheme	Construction	Appropriate lighting will be provided during any necessary night-time working, taking into account the requirements of <b>Mitigation Items SMC-E10 and SMC-LV4</b> .	To mitigate potential impacts on driver stress such as fear of potential accidents due to inadequate lighting provision.	None required
<b>SMC-AT8</b>	NMU facilities	Construction	Access for NMUs will be maintained and improved in accordance with the following principles: <ul style="list-style-type: none"> <li>The requirements of the Equality Act 2010 and 'Roads for All: Good Practice Guides for</li> </ul>	To maintain access for NMUs and provide appropriate facilities based	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			<p>Roads' (Transport Scotland, 2013) shall be incorporated into the proposed scheme wherever practicable; e.g. any bridges, ramps or footpaths will not present potential barriers to disabled people such as the gradient or surfacing.</p> <ul style="list-style-type: none"> <li>NMU access shall be provided in accordance with the objectives set out in the A9 Dualling NMU Access Strategy (Transport Scotland, 2016).</li> <li>Surfacing of any new paths including alongside roads will be considered on a case by case basis, taking into account factors such as safety, the type of user and should comply with current standards.</li> <li>Safety of paths will be considered in accordance with the outcome of the Road Restraints Risk Assessment Process and may require provision of barriers.</li> <li>New cycleways/footpaths will use non-frost susceptible materials to reduce risk of degradation.</li> </ul>	on use and improve access for NMUs.	
<i>n/a (note)</i>	<i>n/a</i>	<i>n/a</i>	<i>Further to the above, the mitigation items detailed in Table 21.7 (Landscape and Visual), Table 21.9 (Air Quality) and Table 21.10 (Noise and Vibration) will reduce the adverse amenity impacts on NMU and vehicle travellers during construction.</i>	<i>To reduce the adverse amenity impacts on NMU and vehicle travellers during construction.</i>	<i>n/a</i>
<b>Project Specific Mitigation</b>					
<b>P05-AT9</b>	Tulach Hill underpass and associated paths (JLA2 and JLA3) (Paths112 and 113)	Pre-Construction & Construction	Provision for equestrians, including path widening and installation of appropriate signage and dismounting facilities on the approaches to each structure. New signage to direct NMUs to underpass and provision of cycle gutter alongside steps.	To maintain access for NMUs and provide specific facilities for cyclists and equestrians. To maintain and improve access for NMUs.	None required
<b>P05-AT10</b>	Allt Bhaic crossing and associated paths (JLA5) (Paths 116a and 117) /Calvine underpass and associated paths (JLA8 and JLA9) (Paths 129 and 130)/Clunes Lodge underpass and associated path (JLA10) (Path 134)/ Dalnamein Lodge underpass	Pre-Construction & Construction	Provision for equestrians, including path widening and installation of appropriate signage and dismounting facilities on the approaches to each structure. New signage to direct NMUs to underpass.	To maintain access for NMUs and provide specific facilities for equestrians. To maintain and improve access for NMUs.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
	(JLA12 and JLA13) (Paths 135 and 137)				
<b>P05-AT11</b>	NCR7 at B847/B8079 junction (NCR7)/ NCR7 at B847/ Tomchitchen access track junction (NCR7)	Pre-Construction & Construction	Provision of appropriate signage to direct cyclists to jug-handle arrangement.	To maintain access for NMUs and provide specific facilities for cyclists. To maintain and improve access for NMUs while improving safety.	None required

**Table 21.4: Geology, Soils, Contaminated Land and Groundwater**

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Standard A9 Mitigation</b>					
<b>SMC-G1</b>	Throughout proposed scheme	Pre-Construction	Prior to construction, consultation will be undertaken with the relevant local authorities and SEPA regarding works in relation to land affected by contamination to support the obligations set out in 'Planning Advice Note 33: Development of Contaminated Land' (Scottish Government, 2000). Any remedial action undertaken in relation to land affected by contamination will be carried out under the appropriate remediation licencing.	To reduce impacts from contaminated land sources.	Consultation with PKC and SEPA as required.
<b>SMC-G2</b>	Throughout proposed scheme	Pre-Construction	Prior to construction and where potential contamination has been identified, further site investigations sufficient to determine the extent and type of contaminants present will be undertaken as necessary to inform identification of appropriate construction methods and any additional mitigation.	To determine the extent and type of contaminants present and to inform identification of appropriate construction methods and any additional mitigation.	None required
<b>SMC-G3</b>	Throughout proposed scheme	Pre-Construction & Construction	Prior to construction, appropriate health and safety and waste management procedures for working with potentially contaminated soils will be established. Waste management procedures will take account of inter alia: Waste Management Licence (Scotland) Regulations 2011 (as amended by the Waste Management Licensing (Scotland) Amendment Regulations 2016), HSE Guidance Note MS31 (HSE, 2012) and the Health and Safety Commission Approved Code of Practice and Guidance Note. These procedures will be implemented as appropriate during construction.	To ensure appropriate health and safety and waste management procedures for working with potentially contaminated soils are followed.	None required
<b>SMC-G4</b>	Throughout proposed scheme	Construction & Post-Construction/ Operation	Risks to construction and maintenance staff working with/near contaminated land will be mitigated by the implementation of <b>Mitigation Item SMC-G3</b> in combination with the adoption of appropriate systems of work, including personal protective equipment (PPE) as a last resort. In the event that unrecorded contamination is encountered, works should be stopped and the working procedures reassessed to confirm the working methods remain appropriate. Construction staff will be trained to identify asbestos containing material.	To reduce impacts from contaminated land sources and confirm the safety of construction and maintenance staff.	None required



Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>SMC-G5</b>	Throughout proposed scheme	Construction	Appropriate training will be provided for personnel involved in earthworks activities to enable implementation of a watching brief to identify presence of previously unidentified contamination.	To identify potential presence of previously unidentified contamination.	None required
<b>SMC-G6</b>	Throughout proposed scheme	Pre-Construction & Construction	Where required, landowner consultation and site visits will be undertaken to confirm the location of septic tanks and associated infrastructure. Where septic tanks are located within the LMA they will be relocated subject to discussion and agreement with the affected landowner(s).	To mitigate the loss of any septic tanks.	Approval from landowners.
<b>SMC-G7</b>	Throughout proposed scheme	Construction	To prevent cross contamination and pollution from piling works undertaken in areas of land affected by contamination, the Contractor will undertake a Piling Risk Assessment and adhere to appropriate guidance including the 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention, National Groundwater and Contaminated Land Centre Report NC/99/77'.	To prevent cross contamination and pollution from piling works undertaken in areas of land affected by contamination.	None required
<b>SMC-G8</b>	Throughout proposed scheme	Construction	Excavated soils deemed unsuitable for reuse will be assessed in line with the 'Waste Classification: Guidance on the Classification and Assessment of Waste' (Technical Guidance WM3) (Natural Resources Wales, SEPA, Northern Ireland Environment Agency, Environment Agency, May 2015) to determine whether they are hazardous or non-hazardous. This will establish the most appropriate and cost effective waste stream for the waste materials.	To determine whether disposed soils are hazardous or non-hazardous.	None required
<b>SMC-G9</b>	Throughout proposed scheme	Pre-Construction	To maximise the reuse of site-won materials on-site (and minimise the need for disposal of waste in line with the principles of the "Waste Hierarchy") whilst ensuring that no risks are posed to human health nor the water environment a soil reuse assessment will be undertaken prior to construction. The soil reuse assessment will identify any potential risks posed to both human health and the water environment from potentially contaminated soils reused throughout the proposed scheme.	To identify any potential risks posed to human health and the water environment. In addition, this mitigation item would maximise re-use of site-won materials on-site and minimise the need for disposal of waste in line with the principles of the "Waste Hierarchy" through re-use of excavation arisings (refer to <b>Mitigation Item SMC-M3</b> ).	None required
<b>SMC-G10</b>	Throughout proposed scheme	Construction	Where peat is encountered during construction, it will be excavated, stored and re-used if possible, taking cognisance of 'Development on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste' (Scottish Renewables and SEPA, 2012) and The Waste Management Licensing (Scotland) Regulations 2011. This will be captured in a Peat Management Plan that will be developed by the Contractor.	To comply with relevant waste management practices under The Waste Management Licensing (Scotland) Regulations 2011 and reduce impacts on peatlands.	Consultation with SEPA
<b>SMC-G11</b>	Throughout proposed scheme	Pre-Construction & Construction	Where concrete materials are proposed to be used, appropriate guidance such as 'Building Research Establishment (BRE) SD1:2005' and 'British Standard (BS) BS8500' should be followed to ensure that ground conditions are appropriate for the use of concrete at each given location.	To ensure that ground conditions are appropriate for the use of concrete at each given location.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>SMC-G12</b>	Contamination sources: KP-C13, KP-C15, KP-C17, KP-17, KP-C18, KP-C21, KP-C22, KP-C25, PGG-C5, PGG-C6, PGG-C7, PGG-C8, PGG-C33	Pre-Construction, Construction & Post-Construction/ Operation	Where potential pollutant pathways for ground gas have been identified, a ground gas monitoring programme will be developed prior to construction in adherence to 'BS 8485:2015 - Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'. This will include an assessment of gassing issues following receipt of additional ground gas monitoring results at selected boreholes.  Appropriate working methods will be developed and adopted during below ground site construction works (including piling works and excavations). This should include as a minimum, gas monitoring undertaken prior to any entry into excavations, confined spaces or below ground structures and use of PPE as a last resort.  If ground gas issues are identified during construction, further post construction monitoring will be undertaken and/or appropriate gas protection measures will be incorporated into the final design.	To mitigate against potential impacts on human health during construction and Off Site Receptors (Local residents, transient traffic (foot, road and rail traffic) in the surrounding area) due to ground gas.	None required
<b>SMC-G13</b>	Throughout proposed scheme	Construction	Unless it can be demonstrated by the Contractor via a Quantitative Risk Assessment that no water quality impacts will occur due to leaching from SuDS retention ponds and detention basins, operational SuDS features will be lined.	To mitigate against potential impacts on water quality due to leaching from SuDS features.	SEPA
<b>SMC-G14</b>	Throughout proposed scheme	Construction	Storage of excavated soils and made ground will be minimised on site (spatially and in duration) and storage areas will be appropriately lined, with adequate drainage management in place.	To ensure that no polluted water percolates into the ground or contaminated runoff is generated.	None required
<b>SMC-G15</b>	Throughout proposed scheme	Pre-Construction	Risk assessments will be undertaken before explosives can be used on site.	To minimise or control the impact of blasting on bedrock geology.	None required
<i>n/a (note)</i>	<i>n/a</i>	<i>n/a</i>	<i>Further to the above, the implementation of mitigation items detailed in Table 21.5 (Road Drainage and the Water Environment) and Table 21.9 (Air Quality) will help mitigate impacts resulting from the water pollution risk to groundwater and avoid the creation of a statutory nuisance associated with dust and air pollution when working with contaminated land.</i>	<i>To mitigate the water pollution risk to groundwater and avoid the creation of a statutory nuisance associated with dust and air pollution when working with contaminated land.</i>	<i>n/a</i>
<b>Project Specific Mitigation</b>					
<b>P05-G16</b>	Throughout proposed scheme	Construction	A detailed rope access inspection will be required to identify potential mitigation measures for existing rock slopes of concern that will not be reworked. Such measures might include simple maintenance; for example, scaling of the rock slopes to remove rock debris, potential failure blocks and other material from the face, and clearing or widening of existing rock traps. However, in some cases, measures such as the installation of rock dowels or bolts may need to be implemented locally to stabilise specific blocks of concern.	To identify any mitigation required to stabilise existing rock slopes.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-G17</b>	Glen Garry SSSI/Geological Conservation Review Site	Construction	During construction, the Contractor will liaise with SNH/BGS/Transport Scotland to refine measures to enhance the Glen Garry SSSI/GCR areas. Proposed enhancement measures have been discussed with SNH and BGS and will include: <ul style="list-style-type: none"> <li>clearing vegetation to refresh Glen Garry SSSI areas as part of the construction works of the proposed scheme;</li> <li>'signature' blocks of material to be taken off site and used for educational purposes; and</li> <li>SNH/BGS having the opportunity to survey and document the rock exposures during and immediately following construction using photographs of the newly exposed and reworked areas of rocks once completed, for geological mapping update purposes.</li> </ul>	To offset potential impacts on the Glen Garry SSSI/GCR areas.	Consultation with SNH and BGS.
<b>P05-G18</b>	Throughout proposed scheme	Pre-Construction	Additional groundwater quality investigations will be undertaken in areas of cuttings intercepting the water table, where necessary. This will be the basis for a risk assessment to be carried out, including assessment of risks from migration of groundwater. Where required, water treatment will be put in place prior to discharge.	To inform a risk assessment.	None required
<b>P05-G19</b>	Throughout proposed scheme	Pre-Construction	A number of proposed excavation areas are expected to intercept groundwater. The potential volume of groundwater drainage will be considered in the context of potential need for groundwater abstraction CAR licences prior to works commencing.	Compliance with CAR licensing to protect the water environment.	Approval required from SEPA.
<b>P05-G20</b>	Cuttings W6, W12 and CS5	Pre-Construction	Additional GI is required in vicinity of cuttings W5, W6, W9, W12, W20, CS1, CS4, CS5, CS7, CP14 and CH9 to confirm the conclusions of the initial settlement assessment.	To confirm the ground conditions and the outcome of the differential settlement assessment.	None required
<b>P05-G21</b>	Throughout proposed scheme	Construction	Groundwater intercepted by cuttings may need to be treated prior to being discharged, as there was evidence of elevated mercury and speciated hydrocarbons and PAHs in some sampled boreholes. A Groundwater Disposal Strategy will be developed by the Contractor during the construction phase and will form part of submissions to support CAR Licences.	Protection of the Water Environment.	Consultation with SEPA.
<b>P05-G22</b>	Private Water Supplies: PGG-S2; PGG-PWS4; PGG-PWS3; PGG-PWS5; and PGG-PWS1. (Figure 10.1)	Pre-Construction & Construction	The five groundwater fed Private Water Supplies (PWS) identified as potentially at risk in Chapter 10 (Geology, Soils, Contaminated Land and Groundwater) will be monitored. Standard mitigation measures related to the protection of the water environment (W6, W7 and W8) will also offer protection of the groundwater environment. Should a significant impact on a PWS be confirmed, an alternative source of water will be provided. To this effect, the Contractor will be required to prepare a supply-specific monitoring plan and mitigation strategy in communication with affected land owners and in consultation with SEPA.	To safeguard private water supplies.	Inform land owners of monitoring results and consult over alternative source of water if applicable.
<b>P05-G23</b>	Throughout proposed scheme	Construction	Pipe networks identified as being at potential risk will be protected during construction by the Contractor. This will be achieved by the Contractor confirming the exact location of the pipeline by digging and incorporating protective measures to ensure that the infrastructure does not get damaged during construction and in the long-term by the proposed scheme.	To safeguard the pipe network.	None required

For details of the Water Feature (WF) locations in Table 21.5, refer to Chapter 11 (Road Drainage and the Water Environment) and Figure 11.1.

**Table 21.5: Road Drainage and the Water Environment**

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Standard A9 Mitigation</b>					
<b>SMC-W1</b>	Throughout proposed scheme	Design, Pre-Construction & Construction	In relation to authorisations under CAR, the Contractor will be required to provide a detailed Construction Method Statement which will include proposed mitigation measures for specific activities including any requirements identified through the pre-CAR application consultation process.	To mitigate construction impacts on the water environment.	CAR applications require approval from SEPA.
<b>SMC-W2</b>	Throughout proposed scheme	Pre-Construction & Construction	<p>In relation to flood risk, the Contractor will implement the following mitigation measures during construction:</p> <ul style="list-style-type: none"> <li>• The Flood Response Plan (as part of the CEMP, refer to <b>Mitigation Item SMC-S1</b> in Table 21.1 of Chapter 21 (Schedule of Environmental Commitments)) will set out the following mitigation measures to be implemented when working within the functional floodplain (defined here as the 0.5% AEP (200-year) flood extent): <ul style="list-style-type: none"> <li>➢ Routinely check the MET office Weather Warnings and the SEPA Floodline alert service for potential storm events (or snow melt), flood alerts and warnings relevant to the area of the construction works.</li> <li>➢ During periods of heavy rainfall or extended periods of wet weather (in the immediate locality or wider river catchment) river levels will be monitored using for example SEPA Water Level Data when available/visual inspection of water features. The Contractor will assess any change from base flow condition and be familiar with the normal dry weather flow conditions for the water feature, and be familiar with the likely hydrological response of the water feature to heavy rainfall (in terms of time to peak, likely flood extents) and windows of opportunity to respond should river levels rise.</li> <li>➢ Should flooding be predicted, works close or within the water features should be immediately withdrawn (if practicable) from high risk areas (defined as: within the channel or within the bankfull channel zone - usually the 50% (2-year) AEP flood extent). Works should retreat to above the 10% AEP (10-year) flood extent) with monitoring and alerts for further mobilisation outside the functional floodplain should river levels continue to rise.</li> </ul> </li> <li>• Plant and materials will be stored in areas outside the functional floodplain where practicable, with the aim for temporary construction works to be resistant or resilient to flooding impacts, to minimise/prevent movement or damage during potential flooding events. Where this is not possible, agreement will be required with the Environmental Clerk of Works (EnvCoW).</li> <li>• Stockpiling of material within the functional floodplain, if unavoidable, will be carefully controlled with limits to the extent of stockpiling within an area, to prevent compartmentalisation of the floodplain, and stockpiles will be located &gt;10m from</li> </ul>	To reduce the risk of flooding impacts on construction works.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			<p>watercourse banks.</p> <ul style="list-style-type: none"> <li>Temporary drainage systems will be implemented to alleviate localised surface water flood risk and prevent obstruction of existing surface runoff pathways. Where practicable, temporary haul routes will be located outside of the functional floodplain.</li> </ul>		
<b>SMC-W3</b>	Throughout proposed scheme	Pre-Construction, Construction & Post-Construction/ Operation	<p>In relation to construction site runoff and sedimentation, the Contractor will adhere to GPPs/PGGs (SEPA, 2006-2017) and other good practice guidance (Table 11.1), and implement appropriate measures which will include, but may not be limited to:</p> <ul style="list-style-type: none"> <li>avoiding unnecessary stockpiling of materials and exposure of bare surfaces, limiting topsoil stripping to areas where bulk earthworks are immediately programmed;</li> <li>installation of temporary drainage systems/SuDS systems (or equivalent) including pre-earthworks drainage;</li> <li>pre-earthworks drainage/SuDS with appropriate outfalls to be in place prior to any earthworks activities;</li> <li>treatment facilities to be scheduled for construction early in the programme, to allow settlement and treatment of any pollutants contained in site runoff and to control the rate of flow before water is discharged into a receiving watercourse;</li> <li>the adoption of silt fences, check dams, settlement lagoons, soakaways and other sediment trap structures as appropriate;</li> <li>the maintenance and regrading of haulage route surfaces where issues are encountered with the breakdown of the existing surface and generation of fine sediment;</li> <li>provision of wheel washes at appropriate locations (in terms of proposed construction activities) and &gt;10m from water features;</li> <li>protecting soil stockpiles using bunds, silt fencing and peripheral cut-off ditches, and location of stockpiles at distances &gt;10m from water features; and</li> <li>restoration of bare surfaces (seeding and planting) throughout the construction period as soon as possible after the work has been completed, or protecting exposed ground with geotextiles if to be left exposed.</li> </ul>	To implement appropriate controls for site runoff and sedimentation and reduce impacts on the water environment.	<p>If flocculants are considered necessary to aid settlement of fine suspended solids, such as clay particles, the chemicals used must first be approved by SEPA.</p> <p>Where required, temporary discharge consents to be obtained from SEPA through the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended).</p>
<b>SMC-W4</b>	Throughout proposed scheme	Pre-Construction & Construction	<p>In relation to in-channel working, the Contractor will adhere to GPPs/PPGs (SEPA, 2006-2017) and other good practice guidance (Table 11.1), and implement appropriate measures which will include, but may not be limited to:</p> <ul style="list-style-type: none"> <li>undertaking in-channel works during low flow periods (i.e. when flows are at or below the mean average) as far as reasonably practicable to reduce the potential for sediment release and scour;</li> <li>no in-channel working during the salmonid spawning seasons unless permitted within any CAR license;</li> <li>minimise the length of channel disturbed and size of working corridor, with the use of silt fences or bunds where appropriate to prevent sediment being washed into the water feature;</li> <li>limit the removal of vegetation from the riparian corridor, and retaining vegetated buffer zone wherever reasonably practicable; and</li> </ul>	To reduce impacts on the water environment during in-channel working.	Method statements for any in-channel working require approval by SEPA.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			<ul style="list-style-type: none"> <li>limit the amount of tracking adjacent to watercourses and avoid creation of new flow paths between exposed areas and new or existing channels.</li> </ul>		
<b>SMC-W5</b>	Throughout proposed scheme	Construction	<p>Where channel realignment is necessary, the Contractor will adhere to good practice guidance (Table 11.1) and implement appropriate measures which will include, but may not be limited to:</p> <ul style="list-style-type: none"> <li>Once a new channel is constructed, the flow should, where practicable, be diverted from the existing channel to the new course under normal/low flow conditions;</li> <li>diverting flow to a new channel should be timed to avoid forecast heavy rainfall events at the location and higher up in the catchment (the optimum time will be the spring and early summer months to allow vegetation establishment to help stabilise the new channel banks);</li> <li>with offline realignments, the flow will be diverted with a steady release of water into the newly constructed realignment to avoid entrainment of fine sediment or erosion of the new channel; and</li> <li>any proposed realignment works will be supervised by a suitably qualified fluvial geomorphologist.</li> </ul>	To reduce impacts on the water environment where channel realignment is proposed.	Consultation with SEPA.
<b>SMC-W6</b>	Throughout proposed scheme	Construction	<p>In relation to refuelling and storage of fuels, the Contractor will adhere to GPPs/PPGs (SEPA, 2006-2017) and other good practice guidance (Table 11.1), and implement appropriate measures which will include, but may not be limited to:</p> <ul style="list-style-type: none"> <li>only designated trained and competent operatives will be authorised to refuel plant;</li> <li>refuelling will be undertaken at designated refuelling areas (e.g. on hardstanding, with spill kits available, and &gt;10m from water features) where practicable;</li> <li>appropriate measures will be adopted to avoid spillages (refer to <b>Mitigation Item SMC-W7</b>); and</li> <li>compliance with the Pollution Incident Control Plan (refer to <b>Mitigation Item SMC-S1</b>).</li> </ul>	To avoid spillages and reduce impacts on the water environment in relation to refuelling.	None required
<b>SMC-W7</b>	Throughout proposed scheme	Construction	<p>In relation to oil/fuel leaks and spillages, the Contractor will adhere to GPPs/PPGs (SEPA, 2006-2017) and other good practice guidance (Table 11.1), and implement appropriate measures which will include, but may not be limited to:</p> <ul style="list-style-type: none"> <li>stationary plant will be fitted with drip trays and emptied regularly;</li> <li>plant machinery will be regularly inspected for leaks with maintenance as required;</li> <li>spillage kits will be stored at key locations on-site and detailed within the Construction Environmental Management Plan (CEMP) (refer to <b>Mitigation Item SMC-S1</b>); and</li> <li>construction activities will comply with the Pollution Incident Control Plan (refer to <b>Mitigation Item SMC-S1</b>).</li> </ul>	To reduce impacts on the water environment in relation to oil/fuel leaks and spillages.	None required
<b>SMC-W8</b>	Throughout proposed scheme	Construction	<p>In relation to chemical storage, handling and reuse, the Contractor will adhere to GPPs/PPGs (SEPA, 2006-2017) and other good practice guidance (Table 11.1), and implement appropriate measures which will include, but may not be limited to:</p> <ul style="list-style-type: none"> <li>chemical, fuel and oil storage will be undertaken within a site compound, which will be located on stable ground at a low risk of flooding and &gt;10m from any watercourse;</li> </ul>	To reduce impacts on the water environment in relation to chemical storage, handling and reuse.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			<ul style="list-style-type: none"> <li>chemical, fuel and oil stores will be locked and sited on an impervious base within a secured bund with 110% of the storage capacity; and</li> <li>pesticides, including herbicides, will only be used if there are no alternative practicable measures, and will be used in accordance with CAR requirements, the manufacturer's instructions and application rates.</li> </ul>		
<b>SMC-W9</b>	Throughout proposed scheme	Construction	<p>In relation to concrete, cement and grout, the Contractor will adhere to GPPs/PPGs (SEPA, 2006-2017) and other good practice guidance (Table 11.1), and implement appropriate measures which will include, but may not be limited to:</p> <ul style="list-style-type: none"> <li>concrete mixing and washing areas will: <ul style="list-style-type: none"> <li>➢ be located more than 10m from water bodies;</li> <li>➢ have settlement and re-circulation systems for water reuse; and</li> <li>➢ have a contained area for washing out and cleaning of concrete batching plant or ready-mix lorries.</li> </ul> </li> <li>wash-water will not be discharged to the water environment and will be disposed of appropriately either to the foul sewer (with permission from Scottish Water), or through containment and disposal to an authorised site;</li> <li>where concrete pouring is required within a channel, a dry working area will be created;</li> <li>where concrete pouring is required within 10m of a water feature or over a water feature, appropriate protection will be put in place to prevent spills entering the channel (e.g. isolation of working area, protective sheeting); and</li> <li>quick setting products (cement, concrete and grout) will be used for structures that are in or near to watercourses.</li> </ul>	To reduce impacts on the water environment in relation to concrete, cement and grout.	Permission required from Scottish Water. Consultation with SEPA.
<b>SMC-W10</b>	Site Compound/ Facilities	Construction	Sewage from site facilities will be disposed of appropriately either to a foul sewer (with the permission of Scottish Water) or via appropriate treatment and discharge as agreed with SEPA in advance of construction and in accordance with 'PPG04 Treatment and Disposal of Sewage' (SEPA, 2003 – 2013).	To ensure sewage from site facilities is disposed of appropriately.	Permission required from Scottish Water for disposal to foul sewer or SEPA, in advance of construction, for appropriate treatment and discharge to a water course.
<b>SMC-W11</b>	Throughout proposed scheme	Construction	<p>In relation to service diversions and to avoid damage to existing services from excavations and ground penetration, including temporary severance of public and private water supplies through damage to infrastructure, the Contractor will:</p> <ul style="list-style-type: none"> <li>locate and map all private or public water supply assets and other service infrastructure prior to construction;</li> <li>take measures to prevent damage to services and to avoid pollution during service diversions, excavations and ground works; and</li> <li>provide a temporary alternative water supply (e.g. bottled or tankered) if services are to be disrupted or diverted by the works.</li> </ul>	To mitigate service diversions and disruptions from excavations and ground penetration.	Consultation with SEPA

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>SMC-W12</b>	Throughout proposed scheme	Construction	For works within areas identified as potentially containing contaminated land and sediment the Contractor will reduce the risk of surface water pollution to an acceptably low level through: <ul style="list-style-type: none"> <li>further site investigation to determine the level of contamination prior to construction to beginning;</li> <li>the installation of temporary treatment facilities to enable removal of pollutants from surface waters; and</li> <li>adoption of mitigation measures relating to contaminated land as outlined in Table 21.4.</li> </ul>	To reduce risk of surface water pollution from areas identified as potentially contaminated land to an acceptably low level.	Details of any temporary treatment measures to be agreed with SEPA prior to commencement of construction.
<b>SMC-W13</b>	Throughout proposed scheme	Design	In relation to bank reinforcement, design principles and mitigation measures will adhere to good practice (SEPA, 2008a), which will include, but may not be limited to: <ul style="list-style-type: none"> <li>non-engineering solutions and green engineering (e.g. vegetation, geotextile matting) to be the preference during options appraisal;</li> <li>requirements for grey engineering to control/prevent scour (e.g. rock armour, rip-rap, gabion baskets) to be minimised; and</li> <li>post project appraisal to identify if there are issues that can be investigated and addressed at an early stage.</li> </ul>	To reduce impacts of in-channel structures on the water environment.	Consultation with SEPA.
<b>SMC-W14</b>	Throughout proposed scheme	Design	In relation to outfalls, specimen and detailed design will ensure compliance with good practice (e.g. CIRIA, 2015b; The Highways Agency et al., 2004; SEPA, 2008b), which will include, but may not be limited to: <ul style="list-style-type: none"> <li>directing each outfall downstream to minimise impacts to flow patterns;</li> <li>avoiding projecting the outfall into the watercourse channel;</li> <li>avoid installation of outfalls at locations of known historical channel migration;</li> <li>avoid positioning in flow convergence zones or where there is evidence of active bank erosion/instability;</li> <li>directing an outfall away from the banks of a river to minimise any potential risk of erosion (particularly on the opposite bank);</li> <li>minimising the size/extent of the outfall headwall where possible to reduce the potential impact on the banks; and</li> <li>post project appraisal to identify if there are issues that can be investigated and addressed at an early stage.</li> </ul>	To reduce impacts of outfalls on the water environment.	Consultation with SEPA.
<b>SMC-W15</b>	Throughout proposed scheme	Design	In relation to watercourse crossings, specimen and detailed design will ensure compliance with good practice (SEPA, 2010a), which will include, but may not be limited to: <ul style="list-style-type: none"> <li>Detailed design will mitigate flood risk impacts through appropriate hydraulic design of culvert structures. Flood risk will be assessed against the 0.5%AEP (200-year) plus an allowance for climate change design flood event. Detailed design will mitigate any loss of existing floodplain storage volume, where required, by appropriate provision of compensatory storage. Where culvert extension is not practicable or presents adverse impact on the water environment, appropriately designed replacement culverts may be</li> </ul>	To reduce impacts of culverts on the water environment.	Consultation with SEPA.



Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			<p>installed.</p> <ul style="list-style-type: none"> <li>• Detailed design will mitigate impacts on the water environment through appropriate design of culvert structures and watercourse modifications (e.g. realignments) with respect to fluvial geomorphology, and both riparian and aquatic ecology.</li> <li>• Detailed design of culverts and associated watercourse modifications will incorporate wherever practical: <ul style="list-style-type: none"> <li>➢ adherence to design standards and good practice guidance (Table 11.1; Chapter 11 (Road Drainage and the Water Environment));</li> <li>➢ allowance for the appropriate conveyance of water and sediment for a range of flows (including at low flow conditions);</li> <li>➢ maintenance of the existing channel gradient to avoid erosion at the head (upstream) or tail (downstream) end of a culvert;</li> <li>➢ avoidance of reduction of watercourse length through shortening of watercourse planform;</li> <li>➢ minimisation of culvert length;</li> <li>➢ close alignment of the culvert with the existing water feature;</li> <li>➢ depressing the invert of culverts to allow for formation of a more natural bed (embedment of the culvert invert to a depth of at least 0.15m to 0.3m); and</li> <li>➢ roughening of culvert inverts to help reduce water velocities.</li> </ul> </li> <li>• Post project appraisal of watercourse crossings will be undertaken to identify if there are issues that can be investigated and addressed at an early stage.</li> </ul>		
<b>SMC-W16</b>	Throughout proposed scheme	Design & Construction	<p>In relation to channel realignments, specimen and detailed design will ensure compliance with good practice, which will include, but may not be limited to:</p> <ul style="list-style-type: none"> <li>• minimising the length of the realignment, with the existing gradient maintained where possible;</li> <li>• design of the realignment in accordance with channel type and gradient;</li> <li>• if required, low flow channels or other design features to reduce the potential for siltation and provide an opportunity to improve the geomorphology of the water feature;</li> <li>• realignment designs will be led by a suitably qualified fluvial geomorphologist;</li> <li>• where realignments result in an increase or decrease of channel gradient, the following principles will be applied: <ul style="list-style-type: none"> <li>➢ an increased gradient within the channel (resulting in higher stream energies) will require mitigation in the form of energy dissipation, which could include the creation of a step-pool sequence; boulder bed-checks; plunge pools at culvert outlets; and/or; increased sinuosity; and</li> <li>➢ a decrease in gradient within the channel will require mitigation in the form of the construction of a low flow channel to minimise the impacts on locally varying flow conditions and reduce the risk of siltation of the channel.</li> </ul> </li> <li>• Post project appraisal to identify if there are issues that can be investigated and</li> </ul>	To reduce impacts of channel realignment on the water environment.	Consultation with SEPA.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			addressed at an early stage.		
<b>SMC-W17</b>	Throughout proposed scheme	Design & Construction	<p>In relation to SuDS, the following mitigation measures will be implemented:</p> <ul style="list-style-type: none"> <li>• detailed design to adhere to design standards and good practice guidance (Table 11.1 of Chapter 11 Road Drainage and the Water Environment), including The SuDS Manual (CIRIA, 2015) and SuDS for Roads (SCOTS, 2010);</li> <li>• for each drainage run, a minimum of two levels of SuDS treatment within a 'treatment train' (see Table 11.18 for further details) to limit the volume of discharge and risk to water quality;</li> <li>• management of vegetation within ponds and drains through grass cutting, pruning of any marginal or aquatic vegetation (as appropriate to the SuDS component) and removal of any nuisance plants, especially trees;</li> <li>• SuDS retention ponds will be designed with an impermeable liner to maintain a body of standing water and provide treatment volume;</li> <li>• inspect inlets, outlets, banksides, structures and pipework for any blockage and/or structural damage and remediate where appropriate; and</li> <li>• regular inspection and removal of accumulated sediment, litter and debris from inlets, outlets, drains and ponds to avoid sub-optimal operation of SuDS; and</li> <li>• adherence to the maintenance plans specific to each SuDS component type as detailed within The SuDS Manual (CIRIA, 2015b).</li> </ul>	To reduce impacts of drainage discharges on the water environment.	Where required, authorisation for the road drainage discharge under CAR would be obtained from SEPA.
<b>Project Specific Mitigation</b>					
<b>P05-W18</b>	Throughout proposed scheme	Pre-construction	<p>Measures to control sources of suspected sediment and other contaminants will be set out within a site specific Sediment Management and Pollution Prevention Plan (or similar such document), that will be submitted to SEPA for approval prior to construction as part of the CAR authorisation process for site discharges. Specific measures will include, but need not be limited to:</p> <ul style="list-style-type: none"> <li>• Soil stripping schedule and plans which show how the works will be phased to avoid unnecessary stockpiling of materials and exposure of bare surfaces.</li> <li>• Minimisation of soil stripping and bank disturbance activities. Frequent use of weather forecasts should be made to inform the timing of specific activities.</li> <li>• Rapid restoration of areas of exposed ground, including implementing reseeding plans during the growing season (spring to autumn). Geotextiles, mulch and the roughening of exposed ground would be adopted where reseeding cannot be rapidly undertaken.</li> <li>• Proposed protection (bunds or silt fencing) for stockpiles, which will be located out with the 0.5% AEP (200 year) floodplain (as modelled by Jacobs), at a distance of &gt;50m from any water features and over stable and flat ground (as far as reasonably practicable).</li> <li>• Minimisation of the extent, length and gradient of drainage ditches, and erosion control measures within the ditches to include lining and check dams.</li> <li>• Use of an appropriate grade of material on temporary haul routes that will be clean, have a limited fines content and will be durable under heavy trafficking; this may necessitate</li> </ul>	To control sources of suspected sediment and other contaminants.	Approval required from SEPA for any required use of flocculants.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			<p>importing appropriate material if the on-site sources are assessed as being inadequate.</p> <ul style="list-style-type: none"> <li>• Frequent monitoring of the condition of haul routes, and maintenance and regrading as necessary.</li> <li>• Use of biodegradable fuels, oils and chemicals on site, as far as reasonably practicable. If flocculants are considered necessary to aid settlement of fine suspended solids, such as clay particles, only natural organic flocculants will be used for surface water treatment, and permission will be obtained from SEPA for the use of such chemicals.</li> <li>• A protection buffer distance of 50m from any surface water feature would be applied to all handling, storage and use of oils, fuels and chemicals (including concrete batching), as far as reasonably practicable.</li> <li>• Protocols will be developed for ceasing or reducing construction activities during periods of high rainfall to reduce the risks of erosion, sedimentation and pollution.</li> </ul>		
<b>P05-W19</b>	Throughout proposed scheme	Pre-construction	<p>Specific measures to remove suspended sediment and other contaminants from construction runoff will be included within a site specific Surface Water Management Plan (or similar such document) that would be approved by SEPA prior to construction as part of the CAR authorisation process for site discharges. Specific measures will include, but need not be limited to:</p> <ul style="list-style-type: none"> <li>• Provision of temporary drainage measures during construction which will take into consideration the phasing of works, topography, land available for treatment of surface water and the location of surface water features.</li> <li>• Construction runoff will be discharged to land via temporary treatment measures (e.g. settlement ponds and/or soakaways) at frequent intervals along the working corridor to prevent unmanageable volumes of untreated runoff collecting at a single location.</li> <li>• Prior to the completion of operational SuDS, direct discharge of construction phase drainage (including pre-earthworks drainage) to watercourses will be avoided, with an appropriate filter strip (10m where practicable) maintained between any drainage discharges and watercourses. Daily inspections of buffer strips will be undertaken during periods of high rainfall to ensure surface flow pathways do not develop.</li> <li>• For instances where the levels of fine sediment and volume of surface water cannot be treated using conventional methods, including where topography or land available is a constraint, an alternative treatment procedure may be used which could include: the use of portable settlement tanks, flocculants or dynamic separators.</li> <li>• Settlement features will be sized appropriately to accommodate the maximum volume of run-off that would be reasonably expected to occur on any occasion during the period of construction (as to be agreed with SEPA).</li> <li>• All features associated with the temporary drainage system, including settlement ponds, settlement tanks, ditches and silt traps, will be maintained in a good state of repair and monitored and inspected by the Contractor.</li> <li>• Requirements for surface water management and pollution prevention, including maintenance, monitoring and inspection requirements of temporary drainage systems will be communicated to all relevant staff on site by the Contractor.</li> </ul>	To reduce impacts from suspended sediment and other contaminants on the water environment.	Approval of the Surface Water Management Plans is required from SEPA.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-W20</b>	Throughout proposed scheme	Pre-construction	<p>To measure the effectiveness of implemented mitigation measures in protecting downstream water quality and aquatic ecological interests, monitoring protocols during the construction phase will be developed within a site specific Water Quality Monitoring Plan, which will be submitted to SEPA for approval prior to construction. This will include, but need not be limited to:</p> <ul style="list-style-type: none"> <li>• Appointment of a suitably qualified (minimum of 3 years' experience supervising construction sites, monitoring water quality and drainage design) Hydrological Clerk of Works (HCoW), who will review the scheduling of earthworks, storage of materials, implementation of drainage and surface water treatment measures, and undertake monitoring of water quality. The HCoW will be provided with the authority to stop works and implement remedial action with immediate effect.</li> <li>• Water quality monitoring one year prior to construction, during construction and one year post construction. The monitoring regime to include monthly laboratory analysis, visual inspections and real time monitoring.</li> <li>• Water quality criteria and standards to be achieved for all site discharges during construction, and sampling locations, to be agreed in consultation with SEPA and SNH. The contractor will ensure compliance with these standards through the adoption of standard mitigation (<b>Mitigation Items SMC-W1 to SMC-W17</b>), and <b>Mitigation Items P05-W18 and P05-W19</b>.</li> <li>• Real-time monitoring of electrical conductivity and turbidity to detect suspended solid concentrations in exceedance of baseline levels. An automated alert system would alert the HCoW and site staff of any pollution incidents, informing where further sampling is required to confirm compliance with the limits agreed with SEPA, and allow remedial actions to be implemented at specific locations.</li> </ul>	To measure the effectiveness of implemented mitigation measures in protecting downstream water quality and aquatic ecological interests.	Approval of the Water Quality Monitoring Plan is required from SEPA.
<b>P05-W21</b>	Throughout proposed scheme	Pre-construction	<p>To ensure the protection of surface water fed PWS a site specific Private Water Supply Protection Plan will be developed and submitted to SEPA for approval prior to construction. This will include, but need not be limited to:</p> <ul style="list-style-type: none"> <li>• Identification and mapping of all PWS sources and infrastructure that could be impacted by the proposed scheme.</li> <li>• Development of a PWS water quality monitoring programme preconstruction, during construction and post construction.</li> <li>• Development of a PWS contingency plan including provision of an emergency hotline telephone and arrangements for an alternative water supply (tankers or similar).</li> <li>• Providing affected properties with a temporary alternative supply (e.g. bottled or tankered water) during construction, temporary disruptions or temporary diversions.</li> </ul>	To ensure the protection of water resources.	Approval of the Private Water Supply Protection Plan is required from SEPA.
<b>P05-W22</b>	WF132, WF134 and WF136	Construction	Careful phasing of works will be required on WF136, WF134 and WF132 to avoid flood risk to the residential properties in Calvine in the event of a flood event. A temporary diversion of the existing culvert at WF132 will be required to be constructed in advance of replacement of any of the existing culverts. As the new culverts are constructed in turn, flows from these watercourses will be diverted through this temporary culvert, or over-pumped via this routing during flood flow conditions. This will allow work to proceed on the	To protect properties at risk of flooding.	Consultation with SEPA.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			3 new culverts which can be in turn completed and re-diverted to the respective channels.		
<b>P05-W23</b>	ALL	Construction	Construction drainage systems/SuDS will be implemented prior to any significant earthworks to control/attenuate/treat runoff during construction. Regular maintenance of construction SuDS and associated outfalls will be undertaken to ensure the basins are not susceptible to flood damage, and that flood risk is not increased locally during construction. In advance of extreme flood events (e.g. 0.5% AEP (200-year) + CC event), in stream working areas would be evacuated and allowed to flood to prevent any increases in flood levels from constriction of flows.	To control/attenuate runoff during construction.	Consultation with SEPA.
<b>P05-W24</b>	WF100	Construction	To avoid exacerbating bank erosion, construction works will remain 10m from the River Garry where possible. Exceptions include where works are required within the channel; but these will be avoided during heavy rainfall or flood events.  In-stream works will be minimised by the use of a dry working area. Any pumping or abstraction from the dry working area will require adequate treatment as per the standards detailed under <b>Mitigation Item P05-W19</b> . Works involving disturbance of the channel bed will not be permitted prior to the establishment of a dry working area.  In addition, a rapid evacuation plan will be required including daily weather updates and a response plan to ensure that in the event of rising water levels, plant and personnel can rapidly vacate in stream working areas.	To reduce risk of bank erosion to WF100 (River Garry).	Consultation with SEPA.
<b>P05-W25</b>	WF111	Construction	As part of the proposed channel realignment, any natural bed substrate removed during construction will be stored for re-use in the proposed small diversion and cascade to tie-in with the culvert inlet.	To replicate the natural bed, minimise waste and improve functionality of the water feature.	Consultation with SEPA.
<b>P05-W26</b>	WF115	Construction	During construction, the tracking of machinery along the banks (left bank in particular) will be avoided to reduce the potential for excessive erosion. Removal of the existing structure is likely to require in-channel works. As a result, erosion control measures such as creating a dry-working area, replanting of the banks prior to completion of works, and steady release of flows into the new channel will be implemented.	To reduce the potential for excessive erosion to river banks (WF115).	None required
<b>P05-W27</b>	WF92 and WF89	Operation	To achieve a 'neutral' flood risk impact and allow for the safe operation of the proposed scheme during the 0.5%AEP (200-year) plus climate change event, the following will be undertaken: <ul style="list-style-type: none"> <li>• Replace the existing WF92 culvert with a new culvert that will throttle the pass-forward flow to mirror the existing situation and achieve a 'neutral' flood risk impact downstream.</li> <li>• Divert surcharged floodwater from the WF92 crossing to the Allt Giraig (WF89) watercourse via a 0.7m diameter concrete pipe, to prevent uncontrolled flooding upstream and flood risk to the proposed scheme. Construct a new outfall to discharge surcharged flows from WF92 into the Allt Giraig (WF89).</li> <li>• Provide a new dry mammal underpass adjacent to WF92 to provide mammal connectivity, should it prove impractical to include mammal ledges within the new culvert.</li> </ul>	Forms part of managing the overall flood risk impacts whilst enabling the land to be available for the landowner to use when not flooded.	Consultation with SEPA.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P05-W28	WF156	Operation	Culvert (under the U521) downstream of the proposed scheme to be cleared of debris to minimise flood risk to the local road.	To reduce flood risk to the local road from WF 156.	Consultation with SEPA.
P05-W29	WF100	Operation	Design of the Essangal Underbridge scour protection will include approximately 0.9m of natural bed material above the scour protection. The scour protection will have a smooth transition with the natural bed morphology (as far as practicable). The upstream and downstream extent of the scour protection will be angled downwards to tie in with the existing bed profile, minimising scour risk of the natural bed. Specific mitigation for the River Garry Underbridge will include re-planting of vegetation around outfall structures ( <b>Mitigation Item P05-LV9</b> ) and tying in with natural vegetation, including planting of trees where they are removed for enabling works.	To reduce the risk of erosion and replicate the natural bed of the water feature.	Consultation with SEPA
P05-W30	WF89	Operation	Create flow pathways to the channel of the water feature from the outfalls located at the top of the steep valley to prevent erosion of the slopes. Re-establish riparian vegetation.	To reduce the risk of erosion.	Consultation with SEPA.
P05-W31	WF102	Operation	Creation of a 'natural' step-pool sequence using boulders to tie-in the existing channel to the new inlet upstream. Re-establish riparian vegetation.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
P05-W32	WF103 and WF104	Operation	Re-grade upstream length between side road culvert and main carriageway culvert to tie-in the water feature with the new inlet. Use of natural step-pool sequence (i.e. using boulders to form steps) to grade the channel and minimise potential for scour. Re-establish an appropriately vegetated riparian corridor, particularly where trees have been removed.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
P05-W33	WF108, WF149, WF158 and WF164	Operation	Re-establish riparian vegetation along realigned channel, particularly tree lining.	To reduce the risk of erosion.	Consultation with SEPA.
P05-W34	WF111	Operation	Re-grade upstream length to tie-in the water feature with the new inlet. Use of natural step-pool sequence (i.e. using boulders to form steps) to grade the channel and minimise potential for scour. Diversion will have a natural planform, tying in with the side road culvert.	To replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
P05-W35	WF115	Operation	Sensitive design of channel cross-section to allow for low and high flows. Tie-in of the new channel cross-section to the upstream and downstream sections of the existing water feature to minimise potential erosion. Fencing along channel margins to prevent the erosion of bank tops from livestock trampling, limiting erosion of earth banks and providing a buffer along the water feature. Further information on fencing requirements is detailed in <b>Mitigation Items SMC-CP6 and SMC-CP7</b> .	To reduce the risk of erosion.	Consultation with SEPA.
P05-W36	WF131	Operation	Reinstatement of catchpit at culvert inlet.	To reduce risk of culvert blockage.	Consultation with SEPA.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P05-W37	WF132 and WF134	Operation	Channel downstream of culvert outlet to be regraded using a natural step-pool cascade to prevent potential for scour. Channel tie-in upstream of culvert inlet to include at least two natural step-pools to minimise potential for scour.	To reduce potential for scour of water feature.	Consultation with SEPA.
P05-W38	WF151	Operation	Tie-in the culvert extension with a step-pool sequence downstream to reduce and even out the gradient changes, preventing excessive erosion. Detailed design of the channel realignment to create a channel suitable for the gradient and prevent excessive erosion. The naturalised channel and removal of existing concrete bed will also mitigate for the proposed concrete culvert.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
P05-W39	WF154	Operation	Replacement of existing cascade with a natural step-pool cascade, removing hard engineering. Tie-in new culvert outlet with existing channel using step-pools within the design to check the gradient.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
P05-W40	WF156	Operation	Design of diversion and step-pool cascade to be as natural as possible (i.e. natural materials and morphology). Hard (grey) engineering solutions to be avoided. Replacement box culvert to include baffles (300mm high) to create a naturalised bed.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
P05-W41	WF100 and WF178	Operation	Operational SuDS based on DMRB Stage 3 design: Treatment Train 1 comprising filter drains and a detention basin. The calculated treatment efficiencies are provided in Appendix A11.6 (Water Quality). These calculations have been used in the HAWRAT Step 3 routine runoff assessment. This treatment train will be adopted for drainage runs D(2), J(2).	To provide run-off treatment and protect the water environment.	Consultation with SEPA.
P05-W42	WF89, WF98, WF99 and WF100	Operation	Operational SuDS based on DMRB Stage 3 design: Treatment Train 2 comprising filter drains and a retention pond (wet). The calculated treatment efficiencies are provided in Appendix A11.6 (Water Quality). These calculations have been used in the HAWRAT Step 3 routine runoff assessment. This treatment train will be adopted for drainage runs D(1), E(1) + E(2), I, J(1), K and L.	To provide run-off treatment and protect the water environment.	Consultation with SEPA.
P05-W43	WF 98, WF100, WF115, WF158, WF164 and WF167	Operation	Operational SuDS based on DMRB Stage 3 design: Treatment Train 3 comprising filter drains and a wetland. Two levels of treatment are required due to the combined effects of two road drainage outfalls in close proximity to salmonid spawning habitat. The calculated treatment efficiencies are provided in Appendix A11.6 (Water Quality). These calculations have been used in the HAWRAT Step 3 routine runoff assessment. This treatment train will be adopted for drainage runs C, F, G, H, M, N, O, P, Q, R and S.	To provide run-off treatment and protect the water environment.	Consultation with SEPA.
P05-W44	WF114	Operation	Upstream of the main carriageway culvert re-grade channel with a natural step-pool sequence (cascade) avoiding use of hard engineering. Culvert invert to be tied into natural channel bed using natural substrate (using that removed during construction). Baffles (approximately 300mm) to be placed through new culvert on alternating sides extending approximately 0.5m from edge to centre of culvert. Creation of a scour pool downstream	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			of new outlet recommended.		
<b>P05-W45</b>	WF87	Operation	Re-establish riparian vegetation along realigned channel bed of new extended culvert to include baffles to encourage deposition of natural material. Baffle to be 300mm deep. Channel realignment to re-use bed substrate removed from existing channel to recreate a natural cross-section. Realignment would mimic step-pool sequence from existing water feature.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
<b>P05-W46</b>	WF98	Operation	Re-establish riparian vegetation along realigned channel. Set-back bridge abutments for new and extended bridge as far back as practicable from back top. Sensitive design of right bank re-profiling to allow for access track under existing bridge. Use of soft engineering to protect asset and prevent erosion. Removal of debris (man-made) and some select woody material from the upstream channel to improve channel capacity and minimise potential erosion of the banks.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
<b>P05-W47</b>	WF121	Operation	New cascade upstream of main carriageway culvert inlet to be formed of a natural step-pool cascade.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
<b>P05-W48</b>	WF140	Operation	Cascade upstream of new culvert inlet would be designed with a natural step-pool sequence. Maintain length of water feature where possible.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
<b>P05-W49</b>	WF159	Operation	Tie-in to the inlet and outlet to remove ineffective reinforcement and re-creating a natural channel to provide betterment and a more stable channel. Diversion to mimic upstream channel characteristics with a naturalised design, limiting use of hard engineering.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
<b>P05-W50</b>	WF167	Operation	To reduce the impact of the extended bridge abutments at WF88/167 any sediment or established deposits removed from the river bed would be reintroduced to ensure it remained within the catchment.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	Consultation with SEPA.
<b>P05-W51</b>	WF100	Operation	Between approximately ch9900 and ch10500, a requirement has been identified to protect the proposed scheme from potential channel migration and erosion from the River Garry (WF100) at this location. The proposed solution would be a gravity wall combined with a rock armour toe which would be constructed at the rear of the verge adjacent to the proposed southbound carriageway. The exact details of the protection works will be influenced by the ground conditions and in particular the presence, or otherwise, of bedrock at river bed level. They will also be influenced by the presence, or otherwise, of a solution to safeguard the existing A9 that is currently being investigated by the Trunk Road Operator. A further phase of detailed ground investigation will be undertaken and details of	To reduce the risk of erosion and to safeguard the dualled carriageway.	Consultation with SEPA.



Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			any measures implemented to protect the existing A9 will be given to the Contractor, to inform the detailed design of the mitigation for the proposed scheme.		
<b>P05-W52</b>	Throughout the proposed scheme	Operation	For tier 3 accesses (unpaved access tracks), an operational SuDS arrangement will consist of open drains or infiltration trenches (where they can be accommodated adjacent to the access track), followed by dispersal of collected runoff over dense vegetation, to allow for natural infiltration into groundwater.	To provide run-off treatment and protect the water environment.	None required

**Table 21.6: Ecology and Nature Conservation**

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Standard A9 Mitigation</b>					
<b>SMC-E1</b>	Throughout proposed scheme	Pre-Construction	Pre-construction surveys will be undertaken to verify and, where required, update the baseline ecological conditions set out in the ES. The scope of the pre-construction surveys will be confirmed with SNH prior to them being undertaken.	To update the baseline ecological conditions set out in the ES.	SNH
<b>SMC-E2</b>	Throughout proposed scheme	Pre-Construction	<p>Prior to construction a suitably qualified (or team of suitably qualified) Ecological Clerk of Works (ECoW) will be appointed by the Contractor and will be responsible for implementation of the Ecological Management Plan. The ECoW will:</p> <ul style="list-style-type: none"> <li>• provide ecological advice over the entire construction programme;</li> <li>• undertake or oversee 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; and</li> <li>• monitor the implementation of the mitigation measures during the construction phase to ensure compliance with protected species legislation and commitments within the ES.</li> </ul> <p>The ECoW will be a member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and will have previous experience in similar ECoW roles. All ECoWs will be approved by Transport Scotland to be appropriately qualified for the role and compliance will be monitored by the employer's ecologist. The ECoW will be appointed in advance of the main construction programme commencing to ensure pre-construction surveys are undertaken and any advance mitigation measures required are implemented.</p>	To ensure the implementation of the Ecological Management Plan.	Consultation with the relevant salmon fisheries board.
<b>SMC-E3</b>	At watercourses throughout proposed scheme	Construction	Noise and vibration will be reduced by working back from the river bank where possible or working within a dry area to avoid implications to fish, such as behavioural changes e.g. avoidance of areas or physical damage e.g. to hearing. In addition, soft-start techniques will be applied to piling work procedures to enable sensitive species to evacuate the area.	To protect fish species from noise and vibration.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>SMC-E4</b>	At watercourses throughout proposed scheme	Construction	Where areas are required to be temporarily dewatered to permit construction activities, fish will be removed by means of electrofishing and relocated prior to dewatering (SFCC, 2007).	To protect fish species during de-watering of watercourse sections and in-stream works.	CAR Licence approved by SEPA
<b>SMC-E5</b>	At watercourses throughout proposed scheme	Construction	Water flow/passage will be sufficiently maintained to permit movement of all fish species past areas of dewatering and/or significant alteration of water movement during any construction works within the watercourses. Suitable temporary channels or gravity fed flumes/pipes may be implemented so that movement between areas of habitat can be maintained. Where any over pumping is required, screens will be used to prevent fish from entering pumps.	To protect fish species during de-watering of watercourse sections and in-stream works.	CAR Licence approved by SEPA
<b>SMC-E6</b>	Throughout proposed scheme	Pre-Construction	The Contractor will obtain and comply with the requirements of any protected species derogation licences in respect of works necessary to construct the proposed scheme that are likely to breach applicable conservation legislation. Licensing may be for the UK and/or European protected species.	To comply with conservation legislation.	SNH
<b>SMC-E7</b>	Throughout proposed scheme	Pre-Construction & Construction	Tree felling and vegetation clearance to be reduced as far as practicable and undertaken outside the core bird nesting season (01 March to 31 August) to avoid damage or destruction of occupied nests or harm to breeding birds. If this cannot be achieved, works within the core bird nesting season will require an inspection of vegetation to be cleared for nesting birds by a suitably qualified ecologist no more than 24 hours prior to any works being undertaken. If any nesting birds are identified during the survey, they will be left in situ for their entire nesting period until the young birds have fledged. Alternative approaches to the work will need to be proposed e.g. leaving an exclusion zone around the nest to avoid disturbance.  All cleared vegetation will be rendered unsuitable for nesting birds, for example, by covering or chipping depending on the end purpose of the vegetation, or will be removed from the works area.	To protect habitat and fauna during bird nesting season.	None required
<b>SMC-E8</b>	Throughout proposed scheme	Pre-Construction & Construction	Any tree felling will be carried out by experienced contractors to reduce direct mortality of protected species according to agreed felling methods between contractors and the ECoW.	To protect fauna during removal of habitat.	None required
<b>SMC-E9</b>	Throughout proposed scheme	Pre-Construction, Construction & Post-Construction	Plant and personnel will be constrained to a prescribed working corridor through the use of, where practicable, temporary barriers to minimise the damage to habitats and potential direct mortality and disturbance to animals located within and adjacent to the proposed scheme working corridor.	To protect habitats and fauna.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>SMC-E10</b>	Throughout proposed scheme	Construction	A construction lighting plan and method statement will be developed by the Contractor. The plan, as part of the Species Protection Plans, will detail specific mitigation requirements and taking into account guidance on lighting (e.g. Bat Conservation Trust (2009), Institution of Lighting Professionals (2011) and The Royal Commission on Environmental Pollution (2009)). The construction lighting design will take into account the need to avoid illuminating sensitive fish and mammal (e.g. for bats, otter and badger) habitats in locations such as: adjacent to watercourses; along woodland edges; and, where there is known activity identified through pre-construction ecological surveys (refer to <b>Mitigation Item SMC-E1</b> ). Where this is not possible the Contractor will agree any exceptions with SNH.	To protect sensitive mammal habitats from illumination.	Exceptions to be agreed with SNH
<b>SMC-E11</b>	Throughout proposed scheme	Construction	During construction trees will be protected in line with guidelines provided in 'BS 5837 Trees in relation to Construction' (British Standards Institution, 2012). This includes the following: <ul style="list-style-type: none"> <li>• establishment of Root Protection Areas (RPA);</li> <li>• protective fencing will be erected around the RPA to reduce risks associated with vehicles trafficking over roots system or beneath canopies;</li> <li>• selective removal of lower branches of trees to reduce risk of damage by construction plant and vehicles;</li> <li>• prevent soil compaction measures; and</li> <li>• maintain vegetation buffer strips (where practicable).</li> </ul>	To comply with guidelines provided in 'BS 5837 Trees in relation to Construction' (British Standards Institute, 2012).	None required
<b>SMC-E12</b>	Throughout proposed scheme	Construction & Post-Construction	Planting will be undertaken to replace any trees that were intended to be retained which are felled or die as a result of construction works. The size, species and location of replacement trees will be approved by Transport Scotland and other relevant stakeholders.	Replacement of trees lost that are to be retained.	Transport Scotland and other relevant stakeholders
<b>SMC-E13</b>	Throughout proposed scheme	Construction	Trenches, holes and pits will be kept covered at night or provide a means of escape for mammals that may become entrapped. Gates to compound areas will be designed to prevent mammals from gaining access and will be closed at night.	To avoid mammals becoming entrapped in and around compound areas during construction.	None required
<b>SMC-E14</b>	Throughout proposed scheme	Construction	Temporary mammal-resistant fencing will be provided around construction compounds following a specification agreed through consultation with Transport Scotland.	To avoid mammals becoming entrapped in and around compound areas during construction.	Transport Scotland
<b>SMC-E15</b>	Throughout proposed scheme	Construction	The Contractor will describe within the CEMP ( <b>Mitigation Item SMC-S1</b> ) the biosecurity strategy to be implemented for the appropriate treatment of invasive, non-native species (INNS). The strategy will set out appropriate construction, handling, treatment and disposal procedures to prevent the spread of INNS in line with recognised best practice.	To prevent the spread of INNS.	None required
<i>n/a (note)</i>	Throughout proposed scheme	Construction	<i>Further to the above, the mitigation detailed in Table 21.5 (Road Drainage and the Water Environment), Table 21.7 (Landscape and Visual), Table 21.9 (Air Quality) and Table 21.10 (Noise and Vibration) will be implemented to protect aquatic and terrestrial habitats and species.</i>	<i>To protect aquatic and terrestrial habitats and species.</i>	<i>n/a</i>

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Project Specific Mitigation</b>					
<b>P05-E16</b>	River Garry (WF100) <ul style="list-style-type: none"> <li>• Essangal Underbridge ch4200-4350</li> <li>• ch10550</li> <li>• ch11370 (outfalls)</li> <li>• ch12470</li> </ul>	Construction Post-Construction	Existing bed material will be stored and kept clean. Bed material will be reinstated where appropriate (on top of bridge foundations and scour protection) to ensure that the habitat is returned to a similar state.	To mitigate alteration of riverbed habitat in the River Tay SAC.	None required.
<b>P05-E17</b>	River Garry (WF100) <ul style="list-style-type: none"> <li>• ch4100-4340 (Essangal Underbridge)</li> <li>• ch9000</li> <li>• ch10500</li> <li>• ch10560-10610</li> <li>• ch11250-11350 (River Garry Underbridge)</li> </ul>	Post-Construction	River Tay SAC areas temporarily required for construction will be returned to their former habitat type, by the Contractor. Areas of terrestrial habitat within the River Tay SAC boundary used for construction activities will be returned using species appropriate to the local environment and of local provenance. Seeding and planting of bare ground areas will be undertaken as soon as possible after the completion of construction works. Appropriate measures, such as the use of geo-textile matting, will be put into place should vegetation establishment be delayed to prevent sediment entering watercourses.	To mitigate temporary loss of terrestrial River Tay SAC habitat.	None required.
<b>P05-E18</b>	<ul style="list-style-type: none"> <li>• ch3800-4260</li> <li>• ch10590-10710</li> </ul>	Post-Construction	<p>The Aldclune and Invervack Meadows SSSI is designated for its grassland. Rather than reinstate the woodland lost as part of the proposed scheme, calcareous grassland will be created on the road embankment. Seed collection from appropriate parts of the SSSI within the CPO will be sown in the temporary land-take area. A management strategy/habitat restoration plan will be adopted by the Contractor, and will be agreed in consultation with SNH and other relevant stakeholders, to start the process of improvement of the SSSI's condition and prevent further deterioration. Details of the management strategy will be included in Habitat Management Plans (<b>Mitigation Item SMC-S1</b>).</p> <p>Any seeding and planting of bare ground areas will be undertaken as soon as possible after the completion of construction works using plants of local provenance. Appropriate measures to prevent sedimentation of watercourses should vegetation establishment be delayed, such as the use of geo-textile matting, will be put into place.</p>	To mitigate temporary loss of terrestrial Aldclune & Invervack Meadows SSSI areas to accommodate construction.	SNH and other relevant stakeholders (to develop an appropriate habitat restoration plan where the current habitat type does not correspond with the qualifying feature of the SSSI).

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-E19</b>	River Garry (WF100) at Essangal Underbridge ch4200-4350	Construction	To mitigate impacts on Atlantic salmon and brook lamprey during the construction of the Essangal Underbridge the following measures will be adhered to: <ul style="list-style-type: none"> <li>• in-stream works and all drilling and piling operations carried out within 100m of the river will be undertaken between December and April inclusive to avoid the most sensitive period for fish at this location;</li> <li>• the de-watered working area will avoid the holding pool for Atlantic salmon (the area of deep water below the 115m contour); and</li> <li>• in-stream works will comply with SEPA Good Practice Guidance – Temporary Construction Methods (WAT-SG-29) (SEPA, 2009a).</li> </ul>	To mitigate effects of de-watering of the River Garry and in-stream works during construction on Atlantic salmon and brook lamprey.	None required.
<b>P05-E20</b>	Atlantic salmon and brook lamprey: <ul style="list-style-type: none"> <li>• Allt Bhaic (WF115) ch9160</li> <li>• Allt Anndeir (WF158) ch19720-19850</li> <li>• ch10550</li> <li>• ch11370</li> <li>• ch12470</li> <li>• ch14800</li> <li>• ch15350</li> <li>• ch16300</li> </ul> Brown/sea trout: at watercourses throughout proposed scheme	Construction	In-stream works and all drilling and piling operations carried out within 100m of the watercourse will be undertaken between July and mid-October inclusive to avoid the most sensitive period for fish at these locations. In-stream works will comply with SEPA Good Practice Guidance – Temporary Construction Methods (WAT-SG-29) (SEPA, 2009a).	To mitigate effects of de-watering of watercourse sections and in-stream works during construction on Atlantic salmon, brook lamprey and brown/sea trout.	None required.
<b>P05-E21</b>	Watercourses throughout the proposed scheme	Construction	Construction compounds, storage areas, temporary access tracks etc. (except for culvert, bridge and outfall works) will be at least 10m from watercourse banks	To mitigate direct mortality of otter.	Not required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-E22</b>	Suitable habitat throughout proposed scheme (Figures 12.4, 12.8 and 12.9)	Construction	Severance and fragmentation of habitat used by otter, badger, beaver, pine marten and red squirrel will be reduced during construction by retention of commuting routes, for example constructing culverts with mammal provision and dry mammal underpasses early in the construction process.	To mitigate disturbance and fragmentation of otter, badger, beaver, pine marten and red squirrel caused by construction related activities.	Not required.
<b>P05-E23</b>	For locations see Confidential Appendix A12.3 and Figure 12.8	Construction	Piling/drilling will not be undertaken within 100m of an otter resting site or during the hours of darkness unless undertaken under a protected species derogation licence.	To mitigate disturbance of otter caused by construction related activities.	Approval from SNH if a protected species derogation licence is needed.
<b>P05-E24</b>	For locations see Confidential Appendix A12.3 and Figure 12.8	Construction	Installation of screening (e.g. chestnut paling) to segregate otter resting sites from construction areas for the duration of works and daily inspections of resting sites, as determined by the ECoW.	To mitigate disturbance of otter caused by construction related activities.	Not required.
<b>P05-E25</b>	Suitable habitat throughout the proposed scheme (Figures 12.5 and 12.6)	Construction	Severance of bat habitat will be reduced during construction by retention of commuting routes through culverts and underpasses, such that movement between areas of habitat is maintained.	To retain commuting routes for bats through culverts and underpasses.	Not required.
<b>P05-E26</b>	For locations see Confidential Appendix A12.3	Pre-Construction Construction	Temporary measures will be undertaken to discourage barn owl nesting during construction. These measures must be undertaken prior to commencement of work and outside the breeding season (March to August inclusive). Measures will include: <ul style="list-style-type: none"> <li>securely covering openings into the building with plywood panels focussing on specific features of the building where barn owls have bred or might offer potential nest sites; and</li> <li>provision of alternative nest sites to mitigate for the loss of this nest site.</li> </ul>	To avoid disturbance of Schedule 1 species (barn owl).	None required.
<b>P05-E27</b>	For locations see Confidential Appendix A12.3	Pre-Construction Construction	If barn owl are already nesting in the building prior to construction, or a new nest is identified, a suitable protection zone will be placed around the nest. Construction work within the protection zone will not take place between the months of March to August inclusive.	To mitigate disturbance of Schedule 1 species (barn owl).	None required.
<b>P05-E28</b>	For locations see Confidential Appendix A12.3	Construction	Construction work near barn owl nests should avoid taking place during the hours of darkness when barn owls are largely active.	To mitigate disturbance of Schedule 1 species (barn owl).	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-E29</b>	For locations see Confidential Appendix A12.3	Construction	Barn owl nests will be visually screened, for example, by the use of high fine mesh netting which will prevent encroachment and shield birds visually from sudden changes in activity levels.	To mitigate disturbance of Schedule 1 species (barn owl).	None required.
<b>P05-E30</b>	<ul style="list-style-type: none"> <li>ch6280-6750</li> <li>ch13980-14910</li> <li>ch16550-16900</li> <li>ch22000-22100</li> </ul>	Pre-Construction	<p>Black grouse-specific surveys will be undertaken to confirm location(s) and monitor activity at known lek sites within 500m of the proposed scheme immediately prior to works undertaken March-May inclusive.</p> <p>Upon completion of black grouse-specific surveys a species management plan will be implemented as required based upon survey results. As a minimum the plan will include:</p> <ul style="list-style-type: none"> <li>suitable protection zones will be established around known leks between March and May (inclusive);</li> <li>works will only take place within the protection zones during daylight hours, restricted to between two hours after sunrise and two hours before sunset; and</li> <li>a year-round consideration of active lek sites and any potential impacts due to the programmed works.</li> </ul>	To mitigate disturbance of black grouse during lekking.	None required.
<b>P05-E31</b>	<ul style="list-style-type: none"> <li>ch6280-6750</li> <li>ch13980-14910</li> <li>ch16550-16900</li> <li>ch22000-22100</li> </ul>	Pre-Construction Construction	Replacement habitat and tree planting will not be located at known black grouse lek sites.	To mitigate disturbance of black grouse during lekking and abandonment of lek sites.	None required.
<b>P05-E32</b>	See Confidential Appendix A12.3	Pre-Construction Construction	<p>The following mitigation measures for hen harrier will be followed:</p> <ul style="list-style-type: none"> <li>hen harrier-specific surveys will be undertaken to identify any active breeding locations (typically March-August inclusive) within 500m of the proposed scheme; and</li> <li>if any active breeding hen harrier locations are found a species management plan will be implemented. The plan will include suitable protection zones in consultation with SNH.</li> </ul>	To mitigate disturbance of Schedule 1 species (hen harrier).	SNH
<b>P05-E33</b>	Suitable woodland habitat throughout the proposed scheme (Figure 12.9)	Pre-Construction Construction	No more than three weeks prior to the commencement of site clearance, and again at least two days prior to clearance, pre-construction surveys will be undertaken to identify active pine marten dens and red squirrel dreys.	To mitigate direct mortality of pine marten and red squirrel.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-E34</b>	Suitable woodland habitat throughout the proposed scheme (Figure 12.9)	Pre-Construction Construction	Exclusion zones will be marked around dens/dreys. Exclusion zones will be to the following distances: <ul style="list-style-type: none"> <li>• pine marten: 100m for breeding dens and 30m for non-breeding dens; and</li> <li>• red squirrel: 30m for breeding dreys and 5m for non-breeding dreys.</li> </ul>	To mitigate direct mortality of pine marten and red squirrel	None required.
<b>P05-E35</b>	Suitable woodland habitat throughout the proposed scheme (Figure 12.9)	Pre-Construction Construction	Site clearance affecting pine marten and red squirrel habitat should be timed to avoid breeding seasons (March to June inclusive for pine marten and February to September inclusive for red squirrel).	To mitigate direct mortality of pine marten and red squirrel.	None required.
<b>P05-E36</b>	Key reptile sites throughout the proposed scheme (Figure 12.10)	Pre-Construction	The following measures will be adhered to by the Contractor prior to vegetation clearance of reptile habitat: <ul style="list-style-type: none"> <li>• pre-construction surveys to understand the population size and distribution of reptiles in Key Reptile Sites (KRS);</li> <li>• translocation areas (Figure 13.5) will be created for KRS prior to site clearance;</li> <li>• exclusion fencing will be installed around KRS areas that are to be lost and individuals will be captured by hand with use of artificial cover objects (ACOs) and pitfall traps;</li> <li>• captured individuals will then be translocated from KRS into created areas;</li> <li>• exclusion fencing will be installed between works and translocation areas;</li> <li>• phased strimming of favourable reptile habitat will take place during hibernation season (November to February inclusive) following fingertip searches when necessary and under the direction of an ECoW; and</li> <li>• soil stripping and removal of potential hibernacula, including but not limited to drystone walls, dense tussocks of grass and log piles, will take place outwith hibernation season.</li> </ul>	To mitigate potential direct mortality of reptiles.	None required.
<b>P05-E37</b>	Watercourses throughout the proposed scheme	Design, Pre-Construction Construction	New structures (and extended structures where possible) and outfalls will be designed to minimise changes to current flow rates and velocities and in accordance with the following guidance: <ul style="list-style-type: none"> <li>• SEPA Good Practice Guide for Bank Protection Rivers and Lochs (WAT-ST-23) (SEPA, 2008a);</li> <li>• SEPA Good Practice Guide for River Crossings (WAT-SG-25) (SEPA, 2010a);</li> <li>• CIRIA Culvert Design and Operation Guide (C689) (CIRIA) 2010; and</li> <li>• SEPA Good Practice Guide for Intakes and Outfalls (WAT-SG-28) (SEPA, 2008b).</li> </ul>	To mitigate the loss and alteration of aquatic habitat to accommodate the proposed scheme.	None required.
<b>P05-E38</b>	Throughout the proposed scheme.	Construction	To prevent pollution of water features from road run-off during operation, SEPA PPG / GPP 1, 5, 6, 21, 22 and 26 (SEPA, 2003, 2017) will be abided by.	To protect the water environment and freshwater ecology.	None required.



Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-E39</b>	Candidate sites for woodland compensation can be seen on Figure 12.14 and Figure 13.5.	Pre-construction, Construction & Operation	<p>Candidate sites for woodland compensation planting have been identified. The sites identified are those which currently do not have tree cover but which, when planted with appropriate native woodland species, maximise the biodiversity benefit of the planting; maintain connectivity or reconnect existing AWI sites; and maximise opportunities to maintain functionality of local ancient woodland communities within the route corridor, thus reducing ancient woodland fragmentation in the landscape.</p> <p>Compensation planting will include the following:</p> <ul style="list-style-type: none"> <li>• species mixes that will reflect native woodland mixes to replace non-native plantations and maximise biodiversity benefit;</li> <li>• the retrieval, storage and deployment methods of ancient woodland soil that will be re-used to maintain fungal and invertebrate biodiversity and provide a seed bank to promote the re-establishment of ancient woodland ground flora (see <b>Mitigation Item SMC-LV5</b> for more details);</li> <li>• monitoring and management strategies, which will include maintenance and replacement of the planting, including missing and damaged trees, or those that are failing to make satisfactory growth during operation of the proposed scheme; and</li> <li>• management strategies that will be undertaken in AWI woodland that is to be retained within the CPO during the course of the construction contract and maintenance and establishment period. These will include the retention of dead and fallen wood and will be the responsibility of the Contractor and, in the longer-term, of the trunk road operating company.</li> </ul>	To mitigate for the functions and importance of the woodland in respect of habitat connectivity and carrying capacity for other species.	None required.
<b>P05-E40</b>	Throughout the proposed scheme (Figure 13.5)	Pre-construction, Construction & Operation	The loss of woodland will be replaced through landscape and ecological planting, additional to compensation planting for ancient woodland loss, as shown on Figure 13.5.	To mitigate the loss of woodland.	None required.
<b>P05-E41</b>	Candidate sites for woodland compensation and replacement reptile habitat are shown on Figure 13.5.	Pre-construction, Construction & Operation	<p>In areas of more agriculturally improved habitat identified for woodland compensation and replacement reptile habitat, dwarf shrub heath and acid grassland vegetation will be encouraged to create upland habitat mosaics, which will provide added benefit of habitat for the small dark yellow underwing moth. Soil analysis will be undertaken to inform the requirement for additional management, such as soil stripping or cultivation to create suitable soil conditions.</p> <p>The locations of candidate sites for woodland compensation and replacement reptile habitat can be seen on Figure 13.5.</p>	To mitigate the loss of dry dwarf shrub heath/acid grassland mosaic habitats.	None required.
<b>P05-E42</b>	Throughout the proposed scheme (Figure 13.5)	Pre-construction, Construction & Operation	The loss of areas identified as other habitat will be replaced through woodland and riparian planting as shown on Figure 13.5.	To mitigate the loss of other foraging habitat and fragmentation of connecting habitats.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-E43</b>	The locations of crossing points are shown on Figure 13.5	Pre-construction, Construction & Operation	Fragmentation of habitat will be reduced during operation by retention of commuting routes through creation of suitable crossing points, including culverts with mammal provision and dry mammal underpasses, so movement between areas of habitat can be maintained. Post-construction monitoring to determine the effectiveness of the crossing structures will be undertaken.	To mitigate potential direct mortality of otter and badger.	None required.
<b>P05-E44</b>	The location of mammal fencing is shown on Figure 13.5	Construction & Operation	Mammal fencing will be provided to prevent access onto the road and will be positioned in such a way that mammals will be directed to safe crossing points. Fencing will follow SNH guidance, Otters and Development (SNH, 2008) and Badgers and Development (SNH, 2001).	To mitigate potential direct mortality of otter, wildcat and badger.	None required.
<b>P05-E45</b>	Throughout the proposed scheme (Figure 13.5)	Pre-construction, Construction & Operation	The landscape and ecological mitigation planting design (Figure 13.5) will be followed to encourage use of crossing points.	To mitigate potential direct mortality of otter, wildcat and badger.	None required.
<b>P05-E46</b>	<ul style="list-style-type: none"> <li>• ch1200</li> <li>• ch1260</li> <li>• ch1500</li> <li>• ch2240</li> <li>• ch3360</li> <li>• ch4300</li> <li>• ch6450</li> <li>• ch8410</li> <li>• ch8670</li> <li>• ch9190</li> <li>• ch10150</li> <li>• ch11300</li> <li>• ch12470</li> <li>• ch13420</li> <li>• ch15090</li> <li>• ch16160</li> <li>• ch16500</li> <li>• ch18240</li> <li>• ch19830</li> <li>• ch22000</li> </ul> (Figure 13.5)	Construction & Operation	Fragmentation of habitat will be reduced during operation by retention of commuting routes through creation of crossing points suitable for wildcat, including culverts with mammal provision, so movement between areas of habitat can be maintained	To mitigate potential direct mortality of wildcat.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P05-E47	Throughout the proposed scheme (Figure 13.5)	Pre-construction, Construction & Operation	The loss of areas identified as badger habitat will be replaced through the landscape and ecological mitigation planting design (Figure 13.5).	To mitigate the loss of badger setts and foraging habitat under the footprint of the proposed scheme.	None required.
P05-E48	Throughout the proposed scheme (Figure 13.5)	Operation	Fragmentation of habitat will be reduced during operation by retention of commuting routes and minimising operational lighting at crossing points used by bats so movement between areas of habitat can be maintained.	To mitigate potential direct mortality of bats.	None required.
P05-E49	Throughout the proposed scheme (Figure 13.5)	Pre-construction, Construction & Operation	Habitat loss and fragmentation of existing habitat will be mitigated by woodland retention and landscape planting as shown on Figure 13.5. This will include: <ul style="list-style-type: none"> <li>• planting around SuDS basins to create suitable habitat for foraging bats which will encourage higher flight lines to prevent vehicle collisions; and</li> <li>• planting and woodland retention designed to encourage use of crossing points so movement between areas of habitat can be maintained.</li> </ul>	To mitigate bat habitat loss, fragmentation of habitat for commuting and reduced availability of foraging resources under the footprint of the proposed scheme.	None required.
P05-E50	Retained woodland habitat identified for erection of bat boxes and landscape planting is shown on Figure 13.5.	Pre-construction, Construction & Operation	The loss of bat roost trees and individual trees identified as having high bat potential will be mitigated by the provision of bat boxes designed for trees, for example Schwegler 1FF and 2F boxes. Three bat boxes will be provided as mitigation for each roost tree or high potential tree lost under the footprint of the proposed scheme. Bat boxes will be monitored post tree felling to determine uptake and success reported to SNH and Transport Scotland. The locations of retained woodland habitat identified for erection of bat boxes and landscape and ecological planting are shown on Figure 13.5.	To mitigate the loss of roosts and potential roost habitat under the footprint of the proposed scheme.	None required.
P05-E51	Throughout the proposed scheme (Figure 13.5)	Pre-construction, Construction & Operation	The loss of breeding bird habitat will be replaced through the landscape and ecological mitigation planting design (Figure 13.5). The landscape and ecological mitigation planting design has incorporated a variety of breeding bird habitats including the planting of woodland, scrub, hedgerow and species rich grassland.	To mitigate the loss of suitable breeding habitat, which could result in reduced breeding success, under the footprint of the proposed scheme.	None required.
P05-E52	Throughout the proposed scheme (Figure 13.5)	Pre-construction, Construction & Operation	The loss of areas identified as pine marten and red squirrel habitat will be replaced through the landscape and ecological mitigation planting design (Figure 13.5). Trees of different age and species composition will be planted, for example Scots pine, birch and alder, and as incorporated into Habitat Management Plans.	To mitigate the loss of and fragmentation of pine marten and red squirrel habitat under the footprint of the proposed scheme.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-E53</b>	Woodland habitat identified for erection of replacement breeding and nest boxes is shown on Figure 13.5	Pre-construction, Construction & Operation	Each lost pine marten den will be replaced by a breeding box. The replacement breeding boxes will be: <ul style="list-style-type: none"> <li>erected and positioned under direction of an ECoW prior to tree felling;</li> <li>erected in suitable areas of pine marten woodland habitat; and</li> <li>monitored post tree felling to determine uptake and success reported to SNH and Transport Scotland.</li> </ul>	To mitigate the loss of and fragmentation of pine marten and red squirrel habitat under the footprint of the proposed scheme.	None required pre-implementation of mitigation. Uptake and success reported to SNH and Transport Scotland.
<b>P05-E54</b>	Woodland habitat identified for erection of replacement breeding and nest boxes is shown on Figure 13.5	Pre-construction, Construction & Operation	Each lost drey will be replaced by a red squirrel nest box. The replacement nest boxes will be: <ul style="list-style-type: none"> <li>erected and positioned under direction of an ECoW prior to tree felling;</li> <li>erected in suitable areas of red squirrel woodland habitat; and</li> <li>monitored post tree felling to determine uptake and success reported to SNH and Transport Scotland.</li> </ul>	To mitigate the loss of and fragmentation of pine marten and red squirrel habitat under the footprint of the proposed scheme.	None required pre-implementation of mitigation. Uptake and success reported to SNH and Transport Scotland.
<b>P05-E55</b>	Replacement reptile habitat locations are shown on Figure 13.5.	Pre-construction, Construction & Operation	The loss of areas identified as Key Reptile Site (KRS) will be replaced through landscape and ecological planting and habitat creation, including appropriately located hibernacula (hibernation sites), which will be detailed in a Species Protection Plan. The Species Protection Plan will include details of: <ul style="list-style-type: none"> <li>areas of insolation (sun exposure) with varied topography;</li> <li>areas sheltered from the elements, such as wind breaks consisting of woodland edges, wet and dry habitats, gullies and ditches;</li> <li>hibernation sites such as gorse/birch root systems, rocky crevices and purple moor-grass tussocks;</li> <li>habitats that support prey species for reptiles, for example insects, soft bodied invertebrates and small mammals;</li> <li>areas sheltered from predators;</li> <li>breeding habitat that is structurally diverse;</li> <li>areas that support habitat connectivity; and</li> <li>ecotones (interfaces between habitats and transitional zones).</li> </ul>	To mitigate the loss of reptile habitat under the footprint of the proposed scheme.	

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-E56</b>	<ul style="list-style-type: none"> <li>ch12240</li> </ul>	Pre-construction, Construction & Operation	<p>To mitigate for the loss of habitat and field gentian, measures to protect the plants will be undertaken and will be detailed in a Species Protection Plan.</p> <p>The Species Protection Plan could include details to:</p> <ul style="list-style-type: none"> <li>monitor plants to understand their ecology and population to identify a suitable translocation area(s);</li> <li>remove turf to translocation area(s);</li> <li>collect and grow seeds prior to planting in translocation area(s); and</li> <li>monitor translocation area(s).</li> </ul> <p>The construction timetable of the proposed scheme will dictate when the above will be undertaken.</p>	To mitigate the loss of habitat and field gentian leading to a long-term, negative effect (reduction) on the population under the footprint of the proposed scheme.	None required.

**Table 21.7: Landscape and Visual**

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Standard A9 Mitigation</b>					
<b>SMC-LV1</b>	Throughout proposed scheme	Construction	The construction programme will be kept to the minimum practicable time to reduce the duration of any landscape and visual impacts and areas will be cleared for construction as close as possible to works commencing and topsoiling, reseeding and planting shall be undertaken as soon as practicable after sections of work are complete.	To reduce the duration of any landscape and visual impacts.	None required
<b>SMC-LV2</b>	Throughout proposed scheme	Pre-Construction & Construction	As far as practicable, construction plant and materials storage areas will be appropriately sited to minimise their landscape and visual impact.	To reduce landscape and visual impact of plant and material storage areas.	None required
<b>SMC-LV3</b>	Throughout proposed scheme	Construction	Construction sites will be kept tidy (e.g. free of litter and debris).	To reduce visual impact of construction sites.	None required
<b>SMC-LV4</b>	Throughout proposed scheme	Construction	Work during hours of darkness will be avoided as far as practicable, and where necessary, directed lighting will be used to minimise light pollution/glare. Lighting levels will be kept to the minimum necessary for security and safety.	To reduce light pollution/glare during night-time working.	None required
<b>SMC-LV5</b>	Throughout proposed scheme	Construction	<p>To protect soil quality for the purposes of landscape planting, the following measures will be implemented:</p> <ul style="list-style-type: none"> <li>Uncontaminated topsoil for re-use shall be stored in un-compacted mounds no more than 2m in height, and stored separately from subsoil material. Topsoil stripped from areas designated as Ancient Woodland shall be stored separately to all other topsoil and sub-soil material, in un-compacted mounds no more than 2m in height.</li> <li>Stripped topsoil shall be used in areas of the same proposed vegetation type to utilise the existing natural seed bank.</li> </ul>	To protect soil quality for the purposes of landscape planting.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			<ul style="list-style-type: none"> <li>Subsoil in planting areas shall be replaced after construction and ripped to a minimum of 450 mm prior to topsoiling and planting.</li> <li>Proposed planting areas in existing arable and pasture land, not subject to construction activity, will be ripped to 600 mm to alleviate compaction.</li> </ul>		
<b>SMC-LV6</b>	Throughout proposed scheme	Construction	The construction will be managed such that the loss of any existing woodland, scrub, heath, mire, grassland vegetation, marshland, swamps and isolated trees and shrubs not affected by the permanent works is minimised.	To limit vegetation loss as far as practicable.	None required
<b>SMC-LV7</b>	Throughout proposed scheme	Pre-Construction	All existing trees and shrubs not affected by the construction of the permanent works shall be fenced off with a suitable type of temporary fencing in accordance with BS5837. Fencing shall extend to the drip line of the tree canopies (unless otherwise agreed by an arboricultural advisor), and shall be erected prior to any construction activities in that area and shall remain for the entire period of construction in that area.	To protect existing trees and shrubs unaffected by the proposed scheme.	None required
<i>n/a (note)</i>	<i>n/a</i>	<i>n/a</i>	<i>Further to the above, Mitigation Items SMC-E7 and SMC-E8 (as detailed in Table 6: Ecology and Nature Conservation) will be implemented to protect vegetation which is identified to be retained.</i>	<i>To protect vegetation which is identified to be retained.</i>	<i>n/a</i>
<b>Project Specific Mitigation</b>					
<b>P05-LV8</b>	Throughout proposed scheme	Design, Pre-Construction Construction	<p>Earthworks design will aim to minimise the impact of cuttings and embankment slopes and to allow integration of the proposed scheme with surrounding land through:</p> <ul style="list-style-type: none"> <li>use of retaining walls or engineered slopes where appropriate to avoid extensive cuttings into hill slopes or large embankments that 'chase the slope' and increase the disturbance of the landscape;</li> <li>where soil nailed cutting slopes are required, the soil nail heads will be recessed so that they are not visible and the design will include for sufficient topsoil depths in order to support the proposed planting and seeding, which would establish to cover the nail heads and any mesh that may be required;</li> <li>where rock cuttings are required, create rock formations with irregular faces of varied height, angle and form to reflect the structure of the local bedrock;</li> <li>sensitive grading and profiling of all earthworks where possible to improve integration with the surrounding landform, modifying embankment and cutting slopes to reflect and tie smoothly into existing natural landform and to allow land to be returned to its previous use where appropriate;</li> <li>softening changes in slope at junctions and overbridges by smoothing out transitions;</li> <li>rounding off top and bottom of cuttings and embankments;</li> <li>varying gradients along and across the length of slopes; and</li> <li>modification of SuDS earthworks in order to improve integration with the surrounding landform.</li> </ul>	To reduce the impact of cuttings and embankment slopes and to allow integration of the proposed scheme with surrounding land.	None required
<b>P05-LV9</b>	Throughout proposed scheme	Design, Pre-Construction &	SuDS features required as part of the drainage system of the proposed scheme provide the opportunity to create new beneficial features within the landscape and habitat for wildlife. Their design shall comply with Appendix A13.7 (SuDS Design Principles) and	To mitigate visual intrusion of SuDS features and to enhance their visual amenity	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
		Construction	include the following: <ul style="list-style-type: none"> <li>• Where practicable SuDS features should be sited within naturally low areas and designed to look as natural as possible.</li> <li>• Their earthworks will be designed to integrate naturalistically with the surrounding landform. Abrupt changes in slope, sharp angles and steep side slopes will generally be avoided.</li> <li>• Boundary fencing, where required around SuDS features, will be designed to be as unobtrusive as possible.</li> <li>• Planting of native tree and shrub species will help screen proposed fencing, outfall and inlet structures, enhance wildlife habitat and provide visual interest.</li> <li>• Open ground in the areas around proposed SuDS features will be seeded with native grasses and wildflowers or heathland vegetation, as appropriate, to provide added wildlife habitat and visual interest.</li> <li>• The margins of SuDS features will be planted with native aquatic, emergent and marginal plant species (e.g. greater bird's-foot trefoil, yellow iris, white water-lily, purple-loosestrife and meadowsweet) to help integrate them with the surrounding landscape and enhance their visual amenity and wildlife value).</li> </ul>	and wildlife value.	
<b>P05-LV10</b>	Structures throughout the proposed scheme	Design & Construction	The design of structures, such as bridges and retaining walls along the length of the proposed scheme and aspects of the landscape design will be informed by specialist aesthetic advice to reduce impacts on both landscape and visual receptors. While the measures to be adopted will be confirmed at the detailed design stage, mitigation could include use of natural stone-type wall finishes and stone aprons beneath underbridges and NMU underpasses, a patterned or relief finish of retaining walls and bridges and refinement of the design process in order to achieve slender, elegant and well-proportioned structures. A natural stone-type finish is proposed for the Tulach Hill Underpass.	To reduce impacts on both landscape and visual receptors.	None required
<b>P05-LV11</b>	Throughout proposed scheme	Pre-Construction & Construction	Retention of existing trees and vegetation and incorporation with new planting proposals. Trees only to be removed where demonstrated that this is required for construction or for safety.	To retain existing trees and vegetation wherever possible.	None required
<b>P05-LV12</b>	Throughout proposed scheme	Pre-Construction & Construction	Planting to replace trees lost during construction of the proposed scheme, including in areas designated as ancient woodland.	To mitigate impacts of felling and woodland loss.	SNH to be consulted on development of contract documents.
<b>P05-LV13</b>	Throughout proposed scheme	Pre-Construction & Construction	Enhancement of biodiversity through the use of native species, providing new wildlife habitats, connectivity with existing woodland and complementing existing adjacent habitats.	To provide new wildlife habitats, connectivity with existing woodland and complement existing adjacent habitats.	SNH to be consulted on development of contract documents.
<b>P05-LV14</b>	Throughout proposed scheme	Pre-Construction & Construction	Planting at junctions and bridges to help assimilate the landform and structures into the surrounding landscape.	To assimilate junctions and bridges into the surrounding landscape.	SNH to be consulted on development of contract documents.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P05-LV15	Throughout proposed scheme	Pre-Construction & Construction	Planting to provide screening to reduce visual impacts of the road, structures and vehicle headlights.	To provide screening and reduce visual impacts of the road, structures and vehicle headlights.	SNH to be consulted on development of contract documents.
P05-LV16	Throughout proposed scheme	Pre-Construction & Construction	Planting severed field corners and landlocked areas for landscape mitigation as appropriate.	To reduce impacts on agriculture operations.	None required
P05-LV17	Throughout proposed scheme	Pre-Construction & Construction	Proposed planting mixes will be based on native species, proven by established presence within the local area and adapted to local conditions and planting would be monitored for a minimum of five years after construction with annual replacement of any failed planting with stock of a suitable age so as to achieve full establishment and the required level of mitigation / impact reduction by summer 15 years after opening. Species mixes to be used within the CNP will be agreed in consultation with CNPA and will be determined at detailed design.	To ensure planting mixes are appropriate and in-keeping with local area.	Agreement with CNPA
P05-LV18	Throughout proposed scheme	Design, Pre-Construction & Construction	For disturbed soft areas and road verges, different seed mixes will be used, dependent on location and use as suggested below: <ul style="list-style-type: none"> <li>• Visibility Splay Mix: for use in road verges and other areas where grass needs to be kept short for forward visibility, being low-maintenance, fast-establishing and tolerant of traffic and salt spray.</li> <li>• Species-rich Grassland Mix: suited for use in all other areas disturbed by construction works, consisting of a mixture of native, non-invasive grasses and wildflower species to reflect locally occurring semi-natural flora. As well as enhancing biodiversity and visual interest along the proposed scheme, this type of grassland will require minimal maintenance. Example wild flower species of local provenance, which would have the added benefit of being a nectar rich plant, include common bird's-foot trefoil, greater bird's-foot trefoil, devil's-bit scabious, wild thyme, meadow buttercup and oxeye daisy. Appropriate mixes could be neutral, calcareous, dry, wet, highland or lowland and should be developed further for the specific location and conditions at detailed design stage.</li> <li>• Wetland Grassland Mix: suited for use in SuDS and areas around culverts that are likely to experience wet conditions. Example species of local provenance, which would have the added benefit of being an invertebrate food or structural plant, include greater bird's-foot trefoil, common knapweed, devil's-bit scabious, sneezewort, meadowsweet and lesser spearwort.</li> </ul>	To ensure seed mixes are appropriate and suited to locations.	Consultation with CNPA.
P05-LV19	Throughout proposed scheme	Pre-Construction & Construction	Planting will be applied within the road corridor in order to enhance the experience of travelling along the proposed scheme by maintaining important open views and creating views of a variety of woodland types. The species composition of such planting will take account of aspects such as natural woodland characteristics typical in the locality and designed landscape features.	To enhance the experience of travelling along the proposed scheme.	Consultation with CNPA.



Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
n/a (note)	n/a	n/a	Further to the above, <b>Mitigation Items P05-W29, P05-W30, P05-W31, P05-W32 and P05-W33</b> (as detailed in Table 21.5) will be implemented to reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the water feature.	n/a

**Table 21.8: Cultural Heritage**

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Standard A9 Mitigation</b>					
<b>SMC-CH1</b>	Throughout the proposed scheme	Construction	The Contractor will consult with the relevant local authority and Transport Scotland's historic environment advisor should any archaeological or cultural heritage finds or sites be discovered or revealed during construction to enable appropriate measures to be implemented to mitigate potential impacts	To enable appropriate mitigation measures to be implemented to mitigate impacts on assets found during construction.	Relevant local authority Transport Scotland's cultural heritage advisor.  HES if affecting Scheduled Monument, Category A Listed Building, Historic Battlefield or Garden & Designed Landscape.
<b>Project Specific Mitigation</b>					
<b>P05-CH2</b>	Old Faskally Cairn (Asset 331) and Dalnamein Lodge Shielings (Site of Asset 480)	Pre-Construction	A Level 3 landscape survey record (English Heritage, 2007) of Old Faskally Cairn (Asset 331) and Dalnamein Lodge Shielings (Asset 480) will be undertaken to document the current form and condition of this cultural heritage asset. A Level 3 record provides an enhanced and integrated, multi-disciplinary record. It will comprise an account of the site and its landscape setting accompanied by a full range of measured and annotated drawings as well as photographs and reconstruction/phased diagrams and an accurate measured survey plan alongside three-dimensional data. As part of the mitigation, a report on the results of the Level 3 landscape survey records will be prepared and submitted to the Perth & Kinross Historic Environment Record and the National Record of the Historic Environment, along with an ordered archive which will be submitted to an appropriate repository.	To make a permanent record of Old Faskally Cairn and Dalnamein Lodge Shielings.	Perth & Kinross Heritage Trust, Transport Scotland's cultural heritage advisor.
<b>P05-CH3</b>	Throughout the proposed scheme	Pre-Construction	Archaeological trial trenching in advance of construction to include known archaeological remains, areas of archaeological potential and blank areas (where no archaeological remains have been identified). Archaeological trial trenching in advance of construction of affected areas of Killiecrankie Battlefield (HLT 23) will also be undertaken.	To inform the nature, scope and scale of mitigation required in these areas.	Perth & Kinross Heritage Trust, Transport Scotland's cultural heritage advisor.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-CH4</b>	Refer to description	Pre-Construction	<p>Archaeological excavation will be undertaken in advance of construction on Old Faskally Cairn (Asset 331), Luragbeath Lime Kiln (Site of) (Asset 379), Dalnamein Lodge Shielings (Site of) (Asset 480), Balchroic Field Boundaries and Pits (Asset 770), Aldclune Possible Structures and Enclosures (Asset 771), Clunebeg Possible Structures and Enclosures (Asset 772) and Dalreoch Possible Structures and Enclosures (Asset 773).</p> <p>Archaeological excavation in advance of construction of unknown archaeological remains identified by trial trenching (or the metal detecting within Killiecrankie Battlefield (HLT 23)) at locations to be agreed with Perth and Kinross Heritage Trust, Transport Scotland's cultural heritage advisor and HES (if mitigation includes Scheduled Monuments, Historic Battlefields or Garden &amp; Designed Landscapes).</p>	To make a permanent record of any affected archaeological remains.	Perth & Kinross Heritage Trust, Transport Scotland's cultural heritage advisor.
<b>P05-CH5</b>	Throughout the proposed scheme	Pre-Construction & Construction	<p>Strip, map and sample in advance of construction to mitigate the impact on Calvine Camp (Asset 442), Crom Bhruthach Farmstead (Site of) (Asset 472), Old Faskally Possible Structures (Asset 768), Old Faskally Possible Structures 1 (Asset 769).</p> <p>Archaeological strip map and sample in advance of construction of unknown archaeological remains identified by trial trenching (or the metal detecting within Killiecrankie Battlefield (HLT 23)) at locations to be agreed with Perth and Kinross Heritage Trust, Transport Scotland's cultural heritage advisor and HES (if mitigation includes Scheduled Monuments, Historic Battlefields or Garden &amp; Designed Landscapes).</p>	To make a permanent record of any affected previously unknown archaeological remains.	Perth & Kinross Heritage Trust, Transport Scotland's cultural heritage advisor.
<b>P05-CH6</b>	Throughout the proposed scheme	Construction	<p>Archaeological watching brief during construction on Dunkeld – Inverness Military Road (Asset 456), Clunes Lodge/Clunes Township (Site of) (Asset 466), Clunes Lodge Township (Site of) (Asset 468) and Allt nan Cuinneag Township (Site of) (Asset 571).</p> <p>Archaeological watching brief on unknown archaeological remains identified by trial trenching (or the metal detecting within Killiecrankie Battlefield (HLT 23)) at locations to be agreed with Perth and Kinross Heritage Trust, Transport Scotland's cultural heritage advisor and HES (if mitigation includes Scheduled Monuments, Historic Battlefields or Garden &amp; Designed Landscapes).</p>	To make a permanent record of any affected previously unknown archaeological remains.	Perth & Kinross Heritage Trust, Transport Scotland's cultural heritage advisor.
<b>P05-CH7</b>	Shierglas Farmhouse (Asset 365)	Pre-Construction	<ul style="list-style-type: none"> <li>• A dilapidation survey including record photographs of Shierglas Farmhouse (Asset 365) and surrounding buildings.</li> <li>• Vibration monitoring transducers installed around Shierglas Farmhouse (Asset 365) in locations advised by a vibration specialist and a base log of vibration information gathered. These transducers will also be used to monitor vibration and ensure works remain below an appropriate threshold to be determined by the Contractor.</li> <li>• If it is safe to do so, installation of survey retro-reflective targets on Shierglas Farmhouse (Asset 365) to record the current verticality at the corners and areas thought to be at significant risk, such as the chimneys. These locations will be monitored frequently throughout the construction works for indications of potential movement.</li> <li>• Blasting schedules obtained from the quarry operator and construction works to be halted during quarry blasting in the vicinity of Shierglas Farmhouse (Asset 365).</li> <li>• Following monitoring it may be a requirement that during construction the speed limit of construction traffic in the vicinity of Shierglas Farmhouse (Asset 365) is lowered.</li> </ul> <p>Sources of increased vibration propagation from construction ramps, potholes, changes</p>	To prevent accidental damage to Shierglas Farmhouse (Asset 365).	HES and Perth & Kinross Heritage Trust, Transport Scotland's cultural heritage advisors.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			to surface level. The use of road plates to temporarily cover excavations in the vicinity of the farmhouse would be avoided.		
<b>P05-CH8</b>	Shierglas Farmhouse (Asset 365)	Construction	<ul style="list-style-type: none"> <li>Shierglas Farmhouse (Asset 365) will also be securely fenced off, using Heras-type fencing, for the duration of construction, and identified on the Construction Environmental Management Plan in order to avoid accidental damage (<b>Mitigation Item SMC-S1</b>).</li> </ul>	To avoid accidental damage to Shierglas Farmhouse.	HES and Perth & Kinross Heritage Trust, Transport Scotland's cultural heritage advisors.
<b>P05-CH9</b>	Gardens and Designed Landscapes – retaining core elements (HLT 8) Blair Castle GDL (HLT 21) Killiecrankie Battlefield (HLT 23)	Pre-Construction	A Level 2 landscape survey (English Heritage, 2007) in advance of construction of those areas of Gardens and Designed Landscapes – retaining core elements (HLT 8), Blair Castle GDL (HLT 21) and Killiecrankie Battlefield (HLT 23) affected by construction of the proposed scheme. A Level 2 record provides a descriptive and interpretative record that is both metrically accurate and analytical, and includes the core monument record, a written account, survey drawings and ground photography.	To record the current form and condition of the areas of the Historic Landscapes affected by construction. The results of the survey will be used to identify areas that will be subject to archaeological trial trenching ( <b>Mitigation Item P05-CH3</b> ).	HES and Perth & Kinross Heritage Trust, Transport Scotland's cultural heritage advisors.
<b>P05-CH10</b>	Killiecrankie Battlefield (HLT 23)	Pre-Construction	An archaeological metal detecting survey in advance of construction of the affected areas of Killiecrankie Battlefield (HLT 23), including preparation of a report on the results of the survey and preparation and submission of an ordered archive.	To recover any archaeological material relating to Killiecrankie Battlefield. The results of the survey will be used to identify areas that will be subject to archaeological trial trenching.	HES and Perth & Kinross Heritage Trust, Transport Scotland's cultural heritage advisors.
<b>P05-CH11</b>	Refer to description	Construction	Prior to the start of any works in their vicinity, Urrard House Walled Garden and Bothies (Asset 343), Essangal Lime Kiln (Asset 369), Clach Na H'Iobairt Standing Stone, 300m east of Pitagowan (Asset 446), Chrombaidh Bridge (Asset 461), Dalnamein New Bridge (Asset 481), Old Bridge over Allt Andeir (Asset 484) and Geallaidh Bridge (Asset 492) will be securely fenced off, using Heras-type fencing, for the duration of construction, and will be identified on the Construction Environmental Management Plan. ( <b>Mitigation Item SMC-S1</b> ).	To avoid accidental damage to specific cultural heritage assets.	None required
<b>P05-CH12</b>	Refer to description	Pre-Construction & Construction	Essangal Lime Kiln (Asset 369), Chrombaidh Bridge (Asset 461), Dalnamein New Bridge (Asset 481) and Old Bridge over Allt Andeir (Asset 484) will be subject to a photographic record to document its existing setting, including the preparation of a report on the results of the survey and the preparation and submission of an ordered archive.	To record the current condition of Essangal Lime Kiln, Chrombaidh Bridge, Dalnamein New Bridge and Old Bridge over Allt Andeir.	HES and Perth & Kinross Heritage Trust, Transport Scotland's cultural heritage advisors.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>P05-CH14</b>	Throughout the proposed scheme	Pre-Construction & Construction	All cultural heritage mitigation will include a programme of assessment, reporting, analysis, publication and dissemination of results commensurate with the value of the archaeological remains, historic buildings and historic landscapes affected. This will include the preparation of reports which will be prepared and submitted to the Perth & Kinross Historic Environment Record and the National Record of the Historic Environment, along with ordered archives which will be submitted to an appropriate repository.	To ensure appropriate reporting and dissemination of the results.	HES and Perth & Kinross Heritage Trust, Transport Scotland's cultural heritage advisors.
<b>P05-CH15</b>	Killiecrankie Battlefield	Pre-Construction & Construction	Based on the guidance provided by Managing Change in the Historic Environment: Historic Battlefields (HES, 2016), opportunities to offset the effects on Killiecrankie Battlefield through measures such as increased interpretation and/or additional research to increase the ability to understand the battlefield will be explored with interested parties including Historic Environment Scotland, the National Trust for Scotland and the Perth and Kinross Heritage Trust.	To offset the residual effects on Killiecrankie Battlefield (HLT 23).	Historic Environment Scotland, the National Trust for Scotland and the Perth & Kinross Heritage Trust.

**Table 21.9: Air Quality**

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Standard A9 Mitigation</b>					
<b>SMC-AQ1</b>	Throughout proposed scheme	Construction	In relation to minimising fugitive dust emissions from earthworks, material storage and concrete batching the following mitigation items will be implemented: <ul style="list-style-type: none"> <li>• stockpiles and mounds will be at a suitable angle of repose to prevent material slippage, will be enclosed or securely sheeted, and/or kept damped as necessary during dry weather;</li> <li>• the surfaces of any long-term stockpiles which give rise to a risk of dust or air pollution will be covered with appropriate sheeting or will be treated to stabilise the surfaces;</li> <li>• mixing of large quantities of concrete will be carried out only in enclosed or shielded areas;</li> <li>• all handling areas will be maintained in a dust free state as far as is practicable with sprinklers and hoses used to prevent dust escaping from the site boundaries; and</li> <li>• procedures will be established so that the site is regularly inspected for spillage of dusty or potentially dusty materials and any such spillage will be dealt with promptly where necessary to prevent dust nuisance.</li> </ul>	To reduce fugitive dust emissions from earthworks, material storage and concrete batching.	None required
<b>SMC-AQ2</b>	Throughout proposed scheme	Construction	In relation to minimising dust from vehicle movements within the site the following mitigation items will be implemented: <ul style="list-style-type: none"> <li>• the Contractor will employ appropriate measures, such as covering materials deliveries or loads entering and leaving the construction site by a fixed cover or sheeting appropriately fixed and suitable for the purposes of preventing materials and dust spillage;</li> <li>• where unsurfaced routes are identified as creating dust emissions during periods of dry</li> </ul>	To reduce dust from vehicle movements.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			weather, surfaces will be regularly dampened down using water bowsers; and <ul style="list-style-type: none"> <li>appropriate speed limits will be established and enforced over all unmade surfaces.</li> </ul>		
<b>SMC-AQ3</b>	Throughout proposed scheme	Construction	In relation to appropriate cleaning of public roads the following mitigation items will be implemented: <ul style="list-style-type: none"> <li>wheel washing facilities will be installed as required and heavy vehicles will be required to use the facilities prior to leaving the site;</li> <li>subject to approval from the Roads Authority, public roads immediately outside the site entrance will be cleaned using vacuum sweeper brushes and other specialised road cleaning equipment as necessary to maintain an appropriate state of cleanliness; and</li> <li>roads and footpaths adjacent to the proposed scheme will be cleaned, with damping if necessary.</li> </ul>	To reduce potential of dust from public roads.	Approval required from the Roads Authority.

**Table 21.10: Noise and Vibration**

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Standard A9 Mitigation</b>					
<b>SMC-NV1</b>	Throughout proposed scheme	Pre-Construction & Construction	A scheme of noise and vibration monitoring will be agreed with the relevant Environmental Health Department, and noise and vibration limits will be contained within the Construction Environmental Management Plan (refer to <b>Mitigation Item SMC-S1</b> ). The Contractor will be required to develop and implement a Noise and Vibration Management Plan to meet these requirements.	To predict the noise and vibration levels during the construction of the proposed scheme. It will include the design of receptor specific mitigation, over and above the standard mitigation detailed in <b>Mitigation Item SMC-NV2</b> , where required.	The relevant Environmental Health Department.
<b>SMC-NV2</b>	Throughout proposed scheme	Pre-Construction & Construction	Best Practicable Means will be used to limit the level of noise to which operators and others in the vicinity of site operations would be exposed. This includes the following: <ul style="list-style-type: none"> <li>the hours of working will be planned and account will be taken of the effects of noise upon persons in areas surrounding site operations and upon persons working on site, taking into account the nature of land use in the areas concerned, the duration of work and the likely consequence of any lengthening of work periods;</li> <li>any work outside of normal working hours will be agreed with the relevant local authority;</li> <li>where reasonably practicable, quiet working methods will be employed, including use of the most suitable plant, reasonable hours of working for noisy operations, and economy and speed of operations;</li> <li>permanent noise mitigation measures such as acoustic screens and earthwork bunds are to be constructed as early as practical;</li> </ul>	To reduce, as far as practicable, the level of noise to which operators and others in the vicinity of site operations would be exposed.	The relevant Local Authority if any working outwith normal working hours.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			<ul style="list-style-type: none"> <li>noise will be controlled at source, for example, by modification of existing plant/equipment, its use and location and ensuring maintenance of all noise-generating equipment;</li> <li>the spread of noise will be limited, i.e. by distance between source and receiver and/or screening;</li> <li>on-site noise levels will be monitored regularly, particularly if changes in machinery or project designs are introduced, by a suitably qualified person appointed specifically for the purpose. A method of noise measurement would be agreed with the local authority prior to the commencement of site works;</li> <li>on those parts of a site where high levels of noise are likely to be a hazard to persons working on the site, prominent warning notices will be displayed and, where necessary, ear protectors will be provided;</li> <li>proper use of plant with respect to minimising noise emissions and regular maintenance in line with plant manuals;</li> <li>where practicable, vehicles and mechanical plant used for the purpose of the works will be fitted with effective exhaust silencers and will be maintained in good, efficient working order;</li> <li>where appropriate, inherently quiet plant will be selected. All major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers;</li> <li>machines in intermittent use will be shut down in the intervening periods between work or throttled down to a minimum;</li> <li>all ancillary plant such as generators, compressors and pumps will be positioned so as to cause minimum noise disturbance. If necessary, acoustic barriers or enclosures will be provided; and</li> <li>adherence to the codes of practice for construction working and piling given in British Standard 'BS 5228:2009+A1:2014' and the guidance given therein minimising noise emissions from the site.</li> </ul> <p>In addition, PKC would be consulted regarding any proposed working out-with normal working hours.</p>		
<i>n/a (note)</i>			<p><i>In addition to the above, <b>Mitigation Item SMC-S3</b> will also mitigate potential for noise disturbance through the overall communications strategy for the A9 Dualling Programme and appointed Community Liaison Officer and liaison team.</i></p>		
<b>Project Specific Mitigation</b>					
<b>P05-NV3</b>	Dalnacardoch Lodge (as shown in Figure 17.9)	Pre-Construction & Construction	Provision of 300m of low noise road surface to be applied to the existing A9 carriageways, as shown in Figure 17.9, to mitigate significant impacts at Dalnacardoch Lodge.	To reduce potential noise impacts at Dalnacardoch Lodge.	None required

**Table 21.21: Materials**

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>Standard A9 Mitigation</b>					
<b>SMC-M1</b>	Throughout proposed scheme	Pre-Construction & Construction	<p>Prior to construction a Site Waste Management Plan (SWMP) will be developed as part of the CEMP (see <b>Mitigation Item SMC-S1</b>) to set out how all construction phase materials will be managed and it will be updated regularly during the construction of the proposed scheme. The SWMP will identify, prior to the start of construction works, the types and likely quantities of wastes that may be generated and it will set out, in an auditable manner, how waste will be reduced, re-used, managed and disposed of in accordance with relevant Zero Waste Scotland Guidance. The SWMP will include specific materials management and soil management plans developed under voluntary and industry regulated Codes of Practice including:</p> <ul style="list-style-type: none"> <li>• Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (DEFRA, 2009);</li> <li>• Land Remediation and Waste Management Guidelines (SEPA, 2009b); and</li> <li>• Promoting the Sustainable Re-use of Greenfield Soils in Construction (SEPA, 2010b).</li> <li>• Appropriate waste minimisation and associated KPI targets will also be included.</li> </ul>	To set out how all construction phase materials will be managed.	Consultation and approval from the Local Authority and/or SEPA as applicable to regulatory requirements.
<b>SMC-M2</b>	Throughout proposed scheme	Pre-Construction & Construction	The Contractor will comply with all relevant waste legislation in relation to waste handling, storage, transport and disposal (e.g. The Waste Framework Directive) and consultation with SEPA for advice on waste practice, licences and exemptions where appropriate.	To ensure waste handling, storage, transport and disposal is compliant with all relevant waste legislation.	Consultation with SEPA.
<b>SMC-M3</b>	Throughout proposed scheme	Pre-Construction, Construction	The Contractor will apply the principles of the 'Waste Hierarchy' (Prevention, Preparing for Re-use, Recycling, Other Recovery, Disposal) to minimise waste generation, maximise re-use of site-won materials on-site and minimise the need for disposal of waste. Where re-use is not possible within the proposed scheme, alternative re-use and recycling options will be sought off-site with disposal the final option, with clear justification of options provided.	To reduce waste generation, maximise re-use of site-won materials on-site and reduce the need for disposal of waste.	None required
<b>SMC-M4</b>	Throughout proposed scheme	Pre-Construction & Construction	The Contractor will implement Zero Waste Scotland's Design for Resource Efficient Construction Principles.	To make the best use of materials, over the lifecycle of the proposed scheme's built assets, to reduce embodied carbon emissions.	None required
<b>SMC-M5</b>	Throughout proposed scheme	Pre-Construction & Construction	The key material elements (i.e. aggregates, asphalt, cement, precast concrete products, ready-mixed concrete and steel) used within the proposed scheme shall be specified to be responsibly sourced.	To reduce impacts associated with the extraction and manufacture of materials.	None required
<b>SMC-M6</b>	Throughout proposed scheme	Pre-Construction & Construction	All timber and timber products shall be sourced from independently verifiable legal and sustainable sources.	To reduce impacts associated with the extraction and manufacture of materials.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
<b>SMC-M7</b>	Throughout proposed scheme	Design Pre-Construction Construction	Alternatives to primary aggregates shall be investigated, including opportunities to use recycled or secondary aggregates in the construction of the proposed scheme; either sourced from construction, demolition and excavation waste obtained on-site or off-site; or secondary aggregates obtained from a non-construction or post-consumer or industrial by-product source.	To reduce impacts associated with the extraction, manufacture and transport of materials and to reduce waste generation, maximise re-use of site-won materials on-site and reduce the need for disposal of waste.	None required
<i>n/a (note)</i>	<i>n/a</i>	<i>n/a</i>	<i>Further to the above, the following mitigation items detailed in Table 21.2 (Community and Private Assets), Table 21.4 (Geology, Soils and Contaminated Land), Table 21.5 (Road Drainage and the Water Environment) and Table 21.9 (Air Quality) will be implemented to ensure the appropriate management and handling of materials: <b>Mitigation Items SMC-CP8, SMC-G3, SMC-G8, SMC-G9, SMC-G10, SMC-G14, SMC-W2, SMC-W6 to SMC-W10, SMC-AQ1 and SMC-AQ2.</b></i>	<i>To ensure the appropriate management and handling of materials.</i>	<i>n/a</i>



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