Appendix A12.7: Impact Assessment Tables

1.1 Introduction

1.1.1. This appendix presents the impact assessment tables for all biodiversity receptors.

1.1.2. To provide additional context, a summary of the legal framework, baseline and importance of each ecological feature is presented in Annex 1.

1.1.3. This appendix has the following outline:

- Impact Assessment: Construction; and
- Impact Assessment: Operation

1.2 Impact Assessment

Construction Impacts and Effects

1.1.4. Effects on biodiversity resources during construction of the proposed scheme have been identified taking account of the indicative construction methods and timelines (Chapter 6: The Proposed Scheme), as discussed in paragraphs 12.4.8 and 12.4.9 of Chapter 12 (Biodiversity).

1.1.5. Impacts on biodiversity resources during the construction phase with and without mitigation, and a summary of residual impacts are set out in Table A12.7-1.

Table A12.7-1: Predicted Residual Environmental Effects during Construction

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
River Tay SAC (including River Braan) (Figure 12.1) Importance: international	**Changes in surface water quality:** Run-off and sediment release from construction related activities	Throughout the proposed scheme, particularly at the following key crossings and outfall locations: ▪ ch-140- ch-120 Birnam Burn ▪ ch3440-ch3490 Inchewan Burn ▪ ch4300-ch4350 River Braan bridge ▪ ch4930-ch4950 Mill Stream culvert ▪ ch7450-ch7650 River Tay Bridge ▪ ch800 Outfall A ▪ ch2800 Outfall B2 ▪ ch4200 Outfall D ▪ ch5600 Outfall G ▪ ch7100 Outfall H ▪ ch7900 Outfall I	Pollution of SAC aquatic habitat leading to reduced water quality and increased deposition of particulate matter resulting in modification of submerged habitat. These impacts have been assessed in detail in Chapter 19: Road Drainage and the Water Environment. Depending on the magnitude of the pollution event, this effect could be adverse and permanent; and alter the key characteristics and integrity of the biodiversity resource. This includes adversely affecting the known population of Atlantic salmon and lamprey species. Level of impact: adverse major	Very Large (**Significant**)	Mitigated through compliance of **Mitigation Items SMC-W1, SMC-W3**, **SMC-W4, SMC-W7, and SMC-LV1** including the following specific measures: ▪ installation of temporary drainage systems/SuDS (or equivalent) including pre-earthworks drainage; ▪ the adoption of silt fences, check dams, settlement lagoons, soakaways and other sediment trap structures as appropriate; ▪ protecting soil stockpiles using bunds, silt fencing and peripheral cut-off ditches, and location of stockpiles at distances of >10m; ▪ restoration of bare surfaces (seeding and planting) throughout the construction period as soon as possible after the work has been completed; ▪ 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; ▪ minimise length of channel disturbed and size of working corridor, with use of silt fences or bunds where appropriate to prevent sediment being washed into water features; and ▪ limit the amount of tracking adjacent to watercourses and avoid creation of new flow paths between exposed areas and new or existing channels. In addition, the existing River Braan crossing will be encapsulated during demolition to prevent pollution of the watercourse, and an encapsulated crash deck will be used during construction at Birnam Glen and Inchewan Burn Bridge. If needed, pollution control measures can be put in place from the east bank of the River Tay south of the River Tay crossing.	Slight (Not significant)
	Direct habitat loss: Temporary loss of 0.17ha of aquatic habitat (non-qualifying feature) within the SAC due to	▪ ch-140- ch-120 Birnam Burn ▪ ch3440-ch3490 Inchewan Burn ▪ ch4300-ch4350 River Braan bridge	A temporary reduction in the extent of habitat, or alteration of the habitat, within the SAC reducing the capacity to support SAC qualifying interests. The temporary loss would represent 0.005% of the total area of the SAC.	Slight (Not Significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with **Mitigation Item SMC-W1**, **SMC-W3**, **SMC-W4** and **P02-E16**. In addition, natural bed material will be retained and replaced on completion of construction works (**Mitigation Item P02-E16**) **Mitigation Item SMC-E9** will also be adhered to.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	de-watering of areas required for construction of outfalls and bridges.	▪ ch4930-ch4950 Mill Stream culvert ▪ ch7450-ch7650 River Tay Bridge ▪ ch800 Outfall A ▪ ch3100 Outfall B2 ▪ ch4200 Outfall D ▪ ch5600 Outfall G ▪ ch7100 Outfall H ▪ ch7900 Outfall I	This effect would be adverse, short-term and reversible; and would not alter the key characteristics and integrity of the biodiversity resource. Level of impact: adverse negligible			
	Direct habitat loss: Temporary loss of 0.69a of terrestrial habitat (non-qualifying feature) within the SAC	▪ ch4450-ch4700 ▪ ch4700-5060 ▪ ch3100 ▪ ch2300-2600 ▪ ch900-950	A temporary reduction in the extent of habitat within the SAC within this site of international importance. This effect would be adverse, medium-term and reversible; and would not alter the key characteristics and integrity of the biodiversity resource. Level of impact: adverse negligible	Slight (Not Significant)	No specific mitigation is required for this non-significant effect. However any effects will be further mitigated through compliance with **Mitigation Items SMC-S1**, **SMC-LV1**, **SMC-W3** and **P02-E16**. **Mitigation Item SMC-E9** will also be adhered to. Additionally, terrestrial areas within the SAC temporarily required for construction will be returned to their former habitat type using species appropriate to the local environment and of local provenance.	Slight (Not significant)
Ancient woodland (including ancient and veteran trees) (Figure 12.5) Importance: national	**Air quality impacts:** Nitrogen and ammonia deposition, and generation of dust from construction activities.	Throughout the proposed scheme	Degradation of woodland habitat, leading to reductions in the health of plants and changes to community compositions. Alterations to species composition could have implications for edge effects protecting the interior of ancient woodland habitat. This effect would be adverse, short-term and reversible; and would not alter the key characteristics of the biodiversity resource. Level of impact: adverse negligible	Slight (Not Significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice **Mitigation Items SMC-AQ1**, **SMC-AQ2** and **SMC-AQ3**, including dust suppression methods.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	Transfer of Invasive Non-native Species (INNS) during construction, including Himalayan balsam (*Impatiens glandulifera*) and rhododendron (*Rhododendron ponticum*).	Throughout the proposed scheme	INNS can reduce the species richness and biodiversity within a habitat as they can rapidly out-compete native species. This can lead to wider impacts on the local ecosystem and an overall decline in biodiversity. This effect would be adverse and permanent without management, with the potential for the effect to spread beyond the scope of the initial impact area. This effect would alter the integrity and key characteristics of the biodiversity resource. Level of impact: adverse major	Very large (**Significant**)	This adverse effect of very large significance would be mitigated through compliance with **Mitigation Items SMC-S1** and **SMC-E1**. Additional measures to prevent the spread of INNS will be covered in detail in an Ecological Management Plan, as per **Mitigation Item SMC-E15** which is to be produced by the Contractor as part of the CEMP.	Neutral (Not significant)
Woodland and Forest (broadleaved and coniferous; non-Ancient Woodland Inventory (AWI)) (w1c6, w1f, w1f7, w1g, w1h, w1h5, w1h6, w2b, w2c) Importance: regional	**Air quality impacts:** Generation of dust from construction activities.	Throughout the proposed scheme	Degradation of habitat leading to changes in health of plants and community compositions. This effect would be adverse, short-term and reversible; and would not alter the key characteristics of the biodiversity resource. Level of Impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice **Mitigation Items SMC-AQ1**, **SMC-AQ2** and **SMC-AQ3**, including dust suppression methods.	Neutral (Not significant)
	Transfer of INNS during construction, including Himalayan balsam and rhododendron.	Throughout the proposed scheme	INNS can reduce the species richness and biodiversity within a habitat as they can rapidly out-compete native species. This can lead to wider impacts on the local ecosystem and an overall decline in biodiversity. This effect would be adverse and permanent without management, with the potential for the effect to spread beyond the scope of the initial impact area. This effect would alter the integrity and key characteristics of the biodiversity resource. Level of impact: adverse major	Large (**Significant**)	This adverse effect of large significance would be mitigated through compliance with **Mitigation Items SMC-S1** and **SMC-E1**. Additional measures to prevent the spread of INNS will be covered in detail in an Ecological Management Plan, as per **Mitigation Item SMC-E15** which is to be produced by the Contractor as part of the CEMP	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
Scrub: gorse scrub, mixed scrub) (h3e, h3h) Importance: local	**Air quality impacts:** Generation of dust from construction activities.	Throughout the proposed scheme	Degradation of habitat leading to changes in health of plants and community compositions. This effect would be adverse, short-term and reversible; and would not alter the key characteristics of the biodiversity resource. Level of Impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice **Mitigation Items SMC-AQ1** and **SMC-AQ2**.	Neutral (Not significant)
	Transfer of INNS during construction, including Himalayan balsam and rhododendron.	Throughout the proposed scheme	INNS can reduce the species richness and biodiversity within a habitat as they can rapidly out-compete native species. This can lead to wider impacts on the local ecosystem and an overall decline in biodiversity. This effect would be adverse and permanent without management, with the potential for the effect to spread beyond the scope of the initial impact area. This effect would alter the integrity and key characteristics of the biodiversity resource. Level of impact: adverse major	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with **Mitigation Items SMC-S1 and SMC-E1.** Additional measures to prevent the spread of INNS will be covered in detail in an Ecological Management Plan, as per **Mitigation Item SMC-E15** which is to be produced by the Contractor as part of the CEMP	Neutral (Not significant)
Acid grassland: Bracken and other lowland acid grassland (g1c, g1d) Importance: local	**Air quality impacts:** Generation of dust and other pollutants from construction activities.	Throughout the proposed scheme	Degradation of habitat leading to changes in health of plants and community compositions. This effect would be adverse, short-term and reversible; and would not alter the key characteristics of the biodiversity resource. Level of Impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice **Mitigation Items SMC-AQ1** and **SMC-AQ2**.	Neutral (Not significant)
	Transfer of INNS during construction, including Himalayan balsam	Throughout the proposed scheme	INNS can reduce the species richness and biodiversity within a habitat as they can rapidly out-compete native species. This can lead to wider impacts on the local ecosystem and an overall decline in biodiversity.	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with **Mitigation Items SMC-E1** and **SMC-E15**. Additional measures to prevent the spread of INNS will be covered in detail in an Ecological Management Plan, as per **Mitigation Item SMC-E15** which is to be produced by the Contractor as part of the CEMP	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	and rhododendron.		This effect would be adverse and permanent without management, with the potential for the effect to spread beyond the scope of the initial impact area. This effect would alter the integrity and key characteristics of the biodiversity resource. Level of impact: adverse major			
Neutral grassland: Other neutral grassland, *Arrhenatherum* neutral grassland and *Holcus-Juncus* neutral grassland (g3c, g3c5, g3c8) Importance: local	**Air quality impacts:** Generation of dust and other pollutants from construction activities.	Throughout the proposed scheme	Degradation of habitat leading to changes in health of plants and community compositions. This effect would be adverse, short-term and reversible; and would not alter the key characteristics of the biodiversity resource. Level of Impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice **Mitigation Items SMC-AQ1** and **SMC-AQ2**.	Neutral (Not significant)
	Transfer of INNS during construction, including Himalayan balsam and rhododendron.	Throughout the proposed scheme	INNS can reduce the species richness and biodiversity within a habitat as they can rapidly out-compete native species. This can lead to wider impacts on the local ecosystem and an overall decline in biodiversity. This effect would be adverse and permanent without management, with the potential for the effect to spread beyond the scope of the initial impact area. This effect would alter the integrity and key characteristics of the biodiversity resource. Level of impact: adverse major	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with **Mitigation Items SMC-E1** and **SMC-E15**. Additional measures to prevent the spread of INNS will be covered in detail in an Ecological Management Plan, as per **Mitigation Item SMC-E15** which is to be produced by the Contractor as part of the CEMP	Neutral (Not significant)
Rivers and lakes (non-priority) (r2b) Importance: authority area	**Changes in surface water quality:** Run-off from construction-related activities	Watercourses throughout the proposed scheme	Degradation of available habitat due to smothering of substrates, changes to water quality and reduced capacity to support aquatic receptors. Depending on the magnitude of the pollution event, this effect could be	Moderate (**Significant**)	Mitigated through compliance of **Mitigation Items SMC-W1, SMC-W3**, **SMC-W4, SMC-W7, and SMC-LV1** including the following specific measures: ▪ installation of temporary drainage systems/SuDS (or equivalent) including pre-earthworks drainage; ▪ the adoption of silt fences, check dams, settlement lagoons, soakaways and other sediment trap structures as appropriate;	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	including sediment, chemical, and hydrocarbon loads from accidental spillage.		adverse and permanent; and alter the key characteristics and integrity of the biodiversity resource Level of Impact: adverse major		▪ protecting soil stockpiles using bunds, silt fencing and peripheral cut-off ditches, and location of stockpiles at distances of >10m; ▪ restoration of bare surfaces (seeding and planting) throughout the construction period as soon as possible after the work has been completed; ▪ 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; ▪ minimise length of channel disturbed and size of working corridor, with use of silt fences or bunds where appropriate to prevent sediment being washed into water features; and ▪ limit the amount of tracking adjacent to watercourses and avoid creation of new flow paths between exposed areas and new or existing channels.	
Atlantic salmon (*Salmo salar*) River lamprey (*Lampetra fluviatilis*) Brook lamprey (*Lampetra planeri*) Sea lamprey (*Petromyzon marinus*) European eel (*Anguilla anguilla*) Importance: international	**Injury or mortality:** Temporary loss of aquatic habitat due to de-watering of areas required for construction.	Watercourses throughout the proposed scheme	Temporary de-watering to create dry works areas may result in injury or direct mortality of individuals in localised areas. The local populations will recover from this effect relatively quickly. The effect on the population would be adverse, short-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Moderate (**Significant**)	This impact of moderate significance would be mitigated through compliance with standard best practice and **Mitigation Items SMC-E4** and **SMC-E5**, and **SMC-W4.** Additional measures to be covered in detail in a Species Management Plan (SMP), as per **Mitigation Item SMC-S1**, will include **Mitigation Items P02-E55**, **P02-E56**, **P02-E57**, specifically ▪ In-stream works will be undertaken between July and mid-October inclusive to avoid the sensitive periods for fish spawning and emergence. If in-stream works are required outwith this period, a working method will be agreed with NatureScot. In-stream works will comply with Scottish Environment Protection Agency (SEPA) Good Practice Guidance – Temporary Construction Methods (WAT-SG-29) (SEPA, 2009). ▪ 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. ▪ Water flow/passage will be sufficiently maintained to permit movement of Atlantic salmon, brook lamprey, river lamprey, sea lamprey and brown/sea trout past areas of dewatering and/or significant alteration of water movement during any construction works within the watercourses. Suitable temporary channels 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 form entering pumps.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	Disturbance: Disturbance from noise, vibration or lighting associated with construction activities.	Watercourses throughout the proposed scheme	Noise, vibration and lighting associated with construction activities may cause a barrier effect on migrating fish, causing temporary fragmentation of habitat and reducing fish movement within the channel. The effect of habitat fragmentation would be adverse but short-term and reversible. Noise and vibration may also lead to physical damage in the auditory receptors of sensitive species. The effect of physical damage would be adverse and could produce a permanent effect on impacted individuals. Level of impact: adverse minor	Moderate (**Significant**)	▪ This impact of moderate significance would be mitigated through compliance with standard best practice and measures to be covered in detail in an SMP, as per **Mitigation Item SMC-S1**. This will include the following: Noise and vibration will be minimised by working back from the riverbank 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). In addition, soft-start techniques will be applied to piling work procedures to enable sensitive species to evacuate the area. (**Mitigation Item P02-E49**) ▪ In-stream works will be undertaken between July and mid-October inclusive to avoid the sensitive periods for FWPM spawning and fish spawning and emergence. If in-stream works are required outwith this period, a working method will be agreed with NatureScot. In-stream works will comply with SEPA Good Practice Guidance – Temporary Construction Methods (WAT-SG-29) (SEPA, 2009). (**Mitigation Item P02-E55**) ▪ No pile driving will be undertaken within 100m of the River Tay SAC between mid-October and June inclusive. (**Mitigation Item P02-E56**) ▪ In-stream and bankside works will be restricted to daylight hours. Where working during darkness is required, a working method will be agreed with NatureScot and directional and/or shielded lighting will be utilised to minimise light-spill and angle light away from watercourses. (**Mitigation Item P02-E58**) ▪ Where directional lighting cannot be used and light spill cannot be controlled during construction, temporary screening will be provided to protect fish commuting routes through maintaining areas of darkness along at least one section of affected watercourses. (**Mitigation Item P02-E59**)	Slight (Not significant)
	Changes in water quality: Sediment release and run-off from construction-related activities leading to chemical, sediment and hydrocarbon loads from	Watercourses throughout the proposed scheme	The release of sediment or construction-related run-off may reduce water quality, leading to degradation of habitat quality, a reduction in habitat availability and decreased habitat suitability to support key life stages. The effect would be adverse, short-term and reversible and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Moderate (**Significant**)	This impact of moderate significance would be mitigated through compliance with standard best practice and **Mitigation Items SMC-W2, SMC-W3**, **SMC-W4** and **SMC-W7**. Additional measures to be covered in detail in a SMP, as per **Mitigation Item SMC-S1**, will include: ▪ An Ecological Clerk of Work (ECoW) will be present on site prior to and during potentially sensitive works (e.g. installation/removal of in-channel structures) to continually monitor conditions and extent of run-off. Toolbox talks with contractors on environmental sensitives and implementation of mitigation will be conducted. The ECoW will regularly inspect pollution controls and construction sites as appropriate. An	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	accidental spillage.				agreed working area will be established prior to the start of works which will avoid sensitive fish habitat and FWPM. (**Mitigation Item P02-E54**). ▪ A Silt Control Management Plan (SCMP) will be developed and implemented. (**Mitigation Item P02-E58**) ▪ the ECoW will regularly inspect on-site pollution controls and site compounds as appropriate; and ▪ a toolbox talk, covering environmental sensitives and the implementation of mitigation, will be provided to all relevant site staff in advance of sensitive works.	
Freshwater pearl mussel (*Margaritifera margaritifera*) Importance: International	**Injury or mortality:** In-stream construction activities	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	In-stream construction and de-watering activities could result in potential injury or mortality of individuals as a result of changing habitat conditions that reduce habitat suitability or direct collisions with construction vehicles. The effect on the population would be adverse, short-term and reversible; and could potentially alter the integrity of the biodiversity resource. Level of impact: adverse major	Very large (**Significant**)	This impact of large significance would be mitigated through compliance with standard best practice and Mitigation Items **SMC-E2, SMC-E4, SMC-E6** and **SMC-E9**. Additional measures to be covered in detail in a SMP, as per **Mitigation Item SMC-S1**, will include: ▪ A FWPM Management Plan (including Emergency Action Plan) will be developed. As a part of this plan, prior to works commencing, all suitable habitat in the area around in-stream works and bankside vegetation clearance will be surveyed, to include a photographic record, to confirm the presence of FWPM. Upon discovery of any previously unrecorded FWPM, all works that could affect the FWPM will immediately cease. Works will not begin until the appropriate mitigation measures have been implemented and NatureScot has been consulted (**Mitigation Item P02-E57**). ▪ In-stream works will be undertaken between July and mid-October inclusive to avoid the sensitive periods for FWPM spawning . If in-stream works are required outwith this period, a working method will be agreed with NatureScot. In-stream works will comply with SEPA Good Practice Guidance – Temporary Construction Methods (WAT-SG-29) (SEPA, 2009). (**Mitigation Item P02-E55**)	Slight (Not significant)
	Disturbance: Disturbance from noise, vibration or lighting associated with construction activities	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Vibration from construction activities may lead to physiological stress and reduced fitness of individuals, given their reduced capacity to evade areas of disturbance. This effect would be adverse, medium-term and reversible.	Large (**Significant**)	This impact of large significance would be mitigated thought compliance with standard best practice and **Mitigation Items SMC-E2** and **SMC-E3**. Additional measures to be covered in detail in a SMP, as per **Mitigation Item SMC-S1**, will include: ▪ In-stream works will be undertaken between July and mid-October inclusive to avoid the most sensitive periods for FWPM spawning in the River Tay. If in-channel works are required within the sensitive period, the working method will be agreed with NatureScot. All in-stream works will comply with SEPA's Good Practice Guidance – Temporary	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
			Disturbance of Atlantic salmon or brown/sea trout (the host species for the FWPM glochidia larval stage) as a result of noise, vibration or construction lighting may reduce FWPM reproductive success. This effect would be adverse, medium-term as previous and reversible. Level of impact: Adverse moderate		Construction Methods (WAT-SG-29) (SEPA, 2009). (**Mitigation Item P02-E55**) ▪ Noise and vibration will be minimised by working back from the riverbank 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). In addition, soft-start techniques will be applied to piling work procedures to enable sensitive species to evacuate the area. (**Mitigation Item SMC-E3**) ▪ No pile driving will be undertaken within 100m of the River Tay SAC between mid-October and June inclusive. (**Mitigation Item P02-E56**) ▪ In-stream and bankside works will be restricted to daylight hours. Where working during darkness is required, a working method will be agreed with NatureScot and directional and/or shielded lighting will be utilised to minimise light-spill and angle light away from watercourses. (**Mitigation Item P02-E58**) ▪ Where directional lighting cannot be used and light spill cannot be controlled during construction, temporary screening will be provided to protect fish commuting routes through maintaining areas of darkness along at least one section of affected watercourses. (**Mitigation Item P02-E59**) ▪ Bankside vegetation would be retained in confirmed FWPM locations. Where removal is essential, trees are to be pollarded, retaining as much height and as many overhanging branches as possible. Where this is not possible, removal would be by cutting trees down rather than extraction. The ECoW would be present on site during any pollarding or cutting of trees (**Mitigation Item P02-E66**). ▪ Bankside vegetation to be reinstated as soon as possible upon completion of construction (**Mitigation Item P02-E67**).	
	Changes in water quality: Sediment release and run-off from construction-related activities leading to chemical, sediment and hydrocarbon loads from accidental spillage	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	The release of sediment or run-off as a consequence of construction activities may reduce water quality and degrade available habitat, leading to mortality of individuals and reduced recruitment within the FWPM population. The effect would be adverse, medium-term and reversible. Level of impact: Adverse moderate	Large (**Significant**)	This impact of large significance would be mitigated through compliance with standard best practice and **Mitigation Items SMC-W2, SMC-W3, SMC-W4** and **SMC-W7**. Additional measures to be covered in detail in a SMP, as per **Mitigation Item SMC-S1**, will include: ▪ An ECoW will be present on site prior to and during potentially sensitive works (e.g. installation/removal of in-channel structures) to continually monitor channel conditions. Toolbox talks, covering environmental sensitivities and targeted mitigation, will be given to contractors in advance of any sensitive works. The ECoW will regularly inspect pollution control measures and site compounds as appropriate.	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	and habitat degradation.				▪ A Silt Control Management Plan (SCMP) will be developed and implemented throughout the works programme (**Mitigation Item P02-E58**). This will include the following measures: ▪ Appropriate controls for construction site run-off and sedimentation; ▪ Regular inspection and monitoring of receiving water features; ▪ Oils and fuels to be stored appropriately; ▪ Any flocculants considered necessary to aid in the settlement of fine suspended solids, such as clay particles, must first be approved by SEPA; and, ▪ Any additional measures required following consultation or licensing discussions with SEPA. ▪ The contractor will monitor the weather and river levels (as published by SEPA) to assess the potential for high flows or spate events during sensitive works. Where high flows are anticipated, works will be avoided in the first instance. If this is not possible, the ECoW will conduct spot-checks of sediment levels at least once a day. ▪ Where sediments exceed safe thresholds for FWPM (determined through monitoring) an Emergency Action Plan (produced as part of the FWPM Protection Plan) detailing how mussels will be protected, rapid installation of temporary barriers or temporary removal of FWPM (under licence) for example, will be enacted. Where fine sediment has infiltrated the substrate or persistent sediment loading is evident, temporary translocation of FWPM may be required. Translocation (if necessary) will follow guidelines for translocation as outlined in Killeen and Moorkens (2016).	
Brown trout/sea trout (*Salmo trutta*) Importance: national	**Injury or mortality:** Temporary loss of aquatic habitat due to de-watering of areas required for construction.	Watercourses throughout the proposed scheme	Temporary de-watering to create dry works areas may result in injury or direct mortality of individuals in localised areas. The local populations will recover from this effect relatively quickly. The effect on the population would be adverse, short-term and irreversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Moderate (**Significant**)	This impact of moderate significance would be mitigated through compliance with standard best practice and **Mitigation Items SMC-E4** and **SMC-E5**, and **SMC-W4.** Additional measures to be covered in detail in a Species Management Plan (SMP), as per **Mitigation Item SMC-S1**, will include **Mitigation Items P02-E55**, **P02-E56**, **P02-E57**, specifically ▪ In-stream works will be undertaken between July and mid-October inclusive to avoid the sensitive periods for fish spawning and emergence. If in-stream works are required outwith this period, a working method will be agreed with NatureScot. In-stream works will comply with Scottish Environment Protection Agency (SEPA) Good Practice Guidance – Temporary Construction Methods (WAT-SG-29) (SEPA, 2009).	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
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. Water flow/passage will be sufficiently maintained to permit movement of Atlantic salmon, brook lamprey, river lamprey, sea lamprey and brown/sea trout past areas of dewatering and/or significant alteration of water movement during any construction works within the watercourses. Suitable temporary channels 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 form entering pumps.	
	Disturbance: Disturbance from noise, vibration or lighting associated with construction activities.	Watercourses throughout the proposed scheme	Noise, vibration and lighting associated with construction activities may cause a barrier effect on migrating fish, causing temporary fragmentation of habitat and reducing fish movement within the channel. The effect of habitat fragmentation would be adverse but short-term and reversible. Noise and vibration may also lead to physical damage in the auditory receptors of sensitive species. The effect of physical damage would be adverse and could produce a permanent effect on impacted individuals. Level of impact: adverse minor	Moderate (**Significant**)	▪ This impact of moderate significance would be mitigated through compliance with standard best practice and measures to be covered in detail in an SMP, as per **Mitigation Item SMC-S1**. This will include the following: Noise and vibration will be minimised by working back from the riverbank 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). In addition, soft-start techniques will be applied to piling work procedures to enable sensitive species to evacuate the area. (**Mitigation Item P02-E49**) ▪ In-stream works will be undertaken between July and mid-October inclusive where possible to avoid the sensitive periods for FWPM spawning and fish spawning and emergence. If in-stream works are required outwith this period, a working method will be agreed with NatureScot. In-stream works will comply with SEPA Good Practice Guidance – Temporary Construction Methods (WAT-SG-29) (SEPA, 2009). (**Mitigation Item P02-E55**) ▪ No pile driving will be undertaken within 100m of the River Tay SAC between mid-October and June inclusive. (**Mitigation Item P02-E56**) ▪ In-stream and bankside works will be restricted to daylight hours. Where working during darkness is required, a working method will be agreed with NatureScot and directional and/or shielded lighting will be utilised to minimise light-spill and angle light away from watercourses. (**Mitigation Item P02-E58**) Where directional lighting cannot be used and light spill cannot be controlled during construction, temporary screening will be provided to protect fish commuting routes through maintaining areas of darkness along at least one section of affected watercourses. (**Mitigation Item P02-E59**)	Neutral (Not significant)
	Changes in water quality:	Watercourses throughout the proposed scheme	The release of sediment or construction-related run-off may reduce water quality, leading to degradation of habitat	Moderate (**Significant**)	This impact of moderate significance would be mitigated through compliance with standard best practice and **Mitigation Items SMC-W2, SMC-W3**, **SMC-W4** and **SMC-W7**.	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	Sediment release and run-off from construction-related activities leading to chemical, sediment and hydrocarbon loads from accidental spillage.		quality, a reduction in habitat availability and decreased habitat suitability to support key life stages. The effect would be adverse, short-term and reversible and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor		Additional measures to be covered in detail in a SMP, as per **Mitigation Item SMC-S1**, will include: ▪ An Ecological Clerk of Work (ECoW) will be present on site prior to and during potentially sensitive works (e.g. installation/removal of in-channel structures) to continually monitor conditions and extent of run-off. Toolbox talks with contractors on environmental sensitives and implementation of mitigation will be conducted. The ECoW will regularly inspect pollution controls and construction sites as appropriate. An agreed working area will be established prior to the start of works which will avoid sensitive fish habitat and FWPM. (**Mitigation Item P02-E54**). ▪ A Silt Control Management Plan (SCMP) will be developed and implemented. (**Mitigation Item P02-E58**) ▪ the ECoW will regularly inspect on-site pollution controls and site compounds as appropriate; and a toolbox talk, covering environmental sensitives and the implementation of mitigation, will be provided to all relevant site staff in advance of sensitive works.	
Otter (*Lutra lutra*) Importance: international	**Injury and mortality:** Construction-related activities including vehicle movement, culvert and watercourse crossing construction, bridge demolition and construction, and creation of excavations including those for SuDS.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Potential direct injury or mortality of individuals moving through the site from collisions, or entrapment in uncovered excavations, pipes or machinery. This effect is unlikely to occur in sufficient numbers to affect the wider population and the local population will recover and recruit from this effect. The effect on the population would be adverse, short-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with **Mitigation Items SMC-E1**, **SMC-E9**, and **SMC-E14.** In addition, the following measures would be adhered to: ▪ Pre-construction surveys will be undertaken to verify and, where required, update the baseline (**Mitigation Item SMC-E1**). ▪ The destruction of any holts or couches identified during pre-construction surveys will be conducted under licence following consultation with NatureScot (**Mitigation Item SMC-E6**). ▪ Construction compounds, storage areas, temporary access tracks, and other temporary land-take required for construction, will be sited at least 10m from watercourse banks (except for those required for culvert, bridge and outfall works) (**Mitigation Item SMC-W2**). ▪ 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 sensitively to prevent mammals from gaining access and will be closed at night (**Mitigation item SMC-E13**). ▪ Working during hours of darkness will be avoided in sensitive areas (**Mitigation item P02-E38**) would reduce risk of collisions with site plant.	Slight (Not significant)
	Injury and mortality:	For specific locations see Appendix A12.4	Current survey results show that no otter places of shelter are due to be lost to the	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with the following:	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	Destruction of otter holts	(Confidential Biodiversity Resources).	proposed scheme, however there is potential for destruction of otter holts. Suitable alternative habitat for otter is ubiquitous throughout the study area. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor		▪ Pre-construction surveys will be undertaken to verify and, where required, update the baseline (**Mitigation Item SMC-E1**). ▪ The destruction of any holts or couches identified during pre-construction surveys will be conducted under licence following consultation with NatureScot (**Mitigation Item SMC-E6**); and ▪ A replacement artificial holt would be provided for any active holt destroyed to accommodate the construction of the proposed scheme, following consultation with NatureScot. Additionally, if significant disturbance of any holt is anticipated, a temporary closure may be considered, in consultation with NatureScot. (**Mitigation Item P02-E42**).	
	Fragmentation/ severance: Temporary loss of riparian and watercourse habitat due to construction of outfalls, bridge crossings and culvert extensions.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Severance of otter commuting routes leading to habitat fragmentation and temporary loss of habitat by preventing otter from moving freely within and between areas of habitat. This impact would be restricted to a small area of suitable habitat within the vicinity of the proposed scheme but would potentially result in greater use of less suitable crossing points. This effect would be adverse, short-term and reversible; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse moderate	Large (**Significant**)	This adverse effect of large significance would be mitigated through compliance with **Mitigation Items SMC-E6** and **SMC-E10** . In addition, the following measures will be adhered to: ▪ Provision will be made to ensure that watercourses are accessible to otters during construction. This may include, where practicable: ensuring one bank of a watercourse remains open and accessible to otter at all times; culverts and bridges will remain open to movement at night; and one side of a double-celled culvert will remain open at all times. (**Mitigation Item P02-E36**)	Slight (Not significant)
	Disturbance: Noise, vibrations, increased visual disturbance and light spill associated with construction-related activities including bridge, embankment and drainage works.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Disturbance of otter foraging, commuting and using places of shelter, including thirty holts and thirty-one couches, leading to avoidance of key places of shelter and rest. The disturbance would not be at a level that would cause declines in the wider otter population as resting sites are not limited within the study area, and otter are widespread in the catchment. This effect would be adverse, short-term and reversible; and would potentially alter the integrity of the biodiversity resource.	Large (**Significant**)	This adverse effect of large significance would be mitigated through compliance with **Mitigation Items SMC-E1**, **SMC-E6**, **SMC-E10**, **SMC-NV2** and **SMC-LV4**. To ensure compliance with species protection legislation and best practice guidance, additional measures to be covered in detail in a SMP (**Mitigation Item SMC-S1**), as per **Mitigation Items P02-E35 to P02-E38**, will include: ▪ If piling is required to be undertaken within 100m of an otter holt or couch (or 200m if breeding), soft-starts of machinery will be applied to encourage otter to evacuate the area prior to commencement of works that day and **Mitigation Item SMC-E6** will need to be adhered to where relevant; ▪ Working during hours of darkness will be avoided in sensitive areas, where possible, such as within 30m of otter resting sites. If this cannot be avoided, any lighting will be angled away from all otter resting sites	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
			Level of impact: adverse moderate		and areas of activity; directional and/or cowled lighting would be used to prevent light-spill. Where directional lighting cannot be used and light spill cannot be controlled during construction, temporary screening will be provided to protect otter resting sites and riparian habitat through maintaining areas of darkness.	
	Changes in surface water quality: Run-off from construction-related activities including sediment, chemical, and hydrocarbon loads from accidental spillage.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Pollution of watercourses resulting in reduced prey availability, leading to a decline in foraging habitat quality. This effect would be adverse and, depending on the nature and magnitude of the pollution event, could be short-term and reversible; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse moderate	Large (**Significant**)	This adverse effect of large significance would be mitigated through compliance with **Mitigation Items SMC-W3**, **SMC-W4**, and **SMC-W7**.	Slight (Not significant)
Beaver (*Castor fiber*) Importance: national	**Injury and mortality:** Construction-related activities including vehicle movement, culvert and watercourse crossing construction, bridge demolition and construction, and creation of excavations including those for SuDS.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Potential direct injury or mortality of individuals moving through the site from collisions, or entrapment in uncovered excavations, pipes or machinery. This effect is unlikely to occur in sufficient numbers to affect the wider population and the local population will recover and recruit from this effect. The effect on the population would be adverse, short-term and reversible; and would potentially alter the integrity of the biodiversity resource in the short-term. Level of impact: adverse moderate	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance **Mitigation Items SMC-E1**, **SMC-E9.** In addition, the following measures would be adhered to: ▪ Pre-construction surveys will be undertaken to verify and, where required, update the baseline (**Mitigation Item SMC-E1**). ▪ The destruction of any lodges identified during pre-construction surveys will be conducted under licence following consultation with NatureScot (**Mitigation Item SMC-E6**) ▪ Construction compounds, storage areas, temporary access tracks, and other temporary land-take required for construction, will be sited at least 10m from watercourse banks (except for those required for culvert, bridge and outfall works) (**Mitigation Item SMC-W2**). ▪ 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 sensitively to prevent mammals from gaining access and will be closed at night (**Mitigation item SMC-E13**). ▪ Working during hours of darkness will be avoided in sensitive areas (**Mitigation item P02-E38**) would reduce risk of collisions with site plant.	Slight (Not significant)
	Disturbance: Noise, vibrations, increased visual	For locations see Appendix A12.4 (Confidential	Disturbance of beaver using places of shelter, including three burrows, leading	Large (**Significant**)	This adverse effect of large significance would be mitigated through compliance with **Mitigation Items SMC-E1**, **SMC-E6**, **SMC-E10**, **SMC-NV2** and **SMC-LV4**.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	disturbance and light spill associated with construction-related activities including bridge, embankment and drainage works.	Biodiversity Resources)	to avoidance of key places of shelter and rest. The disturbance would not be at a level that would cause declines in the beaver population as resting sites are not limited within the study area, and beaver are widespread in the catchment. This effect would be adverse, short-term and reversible; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse moderate		To ensure compliance with species protection legislation and best practice guidance, additional measures to be covered in detail in a SMP (**Mitigation Item SMC-S1**), as per **Mitigation Items P02-E36 to P02-E39**, will include: ▪ If piling is required to be undertaken within 100m of a beaver lodge (or 200m if breeding), soft-starts of machinery will be applied to encourage beaver to evacuate the area prior to commencement of works that day and **Mitigation Item SMC-E6** will need to be adhered to where relevant; ▪ Working during hours of darkness will be avoided in sensitive areas, where possible, such as within 30m of beaver resting sites. If this cannot be avoided, any lighting will be angled away from all beaver resting sites and areas of activity; directional and/or cowled lighting would be used to prevent light-spill. Where directional lighting cannot be used and light spill cannot be controlled during construction, temporary screening will be provided to protect beaver resting sites and riparian habitat through maintaining areas of darkness.	
	Fragmentation/ severance: Temporary loss of riparian and watercourse habitat due to construction of outfalls, bridge crossings and culvert extensions.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Severance of beaver commuting routes leading to habitat fragmentation and temporary loss of habitat by preventing beaver from moving freely within and between areas of habitat. This impact would be restricted to a small area of suitable habitat within the vicinity of the proposed scheme but would potentially result in greater use of less suitable crossing points. This effect would be adverse, short-term and reversible; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse moderate	Moderate (**Significant**)	This adverse effect of large significance would be mitigated through compliance with **Mitigation Items SMC-E6** and **SMC-E10** . In addition, the following measures will be adhered to: Provision will be made to ensure that watercourses are accessible to otters during construction. This may include, where practicable: ensuring one bank of a watercourse remains open and accessible to beaver at all times; culverts and bridges will remain open to movement at night; and one side of a double-celled culvert will remain open at all times. (**Mitigation Item P02-E36**)	Slight (Not significant)
	Disturbance: Noise, vibrations and light spill associated with construction-related activities including bridge, embankment and drainage works.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Disturbance of foraging and commuting beaver leading to avoidance of commuting routes and foraging areas; however, resources for beaver are ubiquitous within the study area. This effect would be adverse, short-term and reversible; and would not alter the integrity of the biodiversity resource.	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, to ensure compliance with species protection legislation and best practice guidance, the following mitigation items will be adhered to: **Mitigation Items SMC-E1**, **SMC-E6**, **SMC-E10**, **SMC-NV2, SMC-LV4**, **SMC-S1**, and **P02-E35 to P02-E39**.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
			Level of impact: adverse negligible			
	Changes in surface water quality: Run-off from construction-related activities including sediment, chemical, and hydrocarbon loads from accidental spillage.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Pollution of watercourses resulting in reduced food availability, leading to a decline in foraging habitat quality. This effect would be adverse and, depending on the nature and magnitude of the pollution event, could be short-term and reversible; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse moderate	Moderate (**Significant**)	This adverse effect of large significance would be mitigated through compliance with **Mitigation Items SMC-W3**, **SMC-W4**, and **SMC-W7**.	Slight (Not significant)
Bats (all species) Importance: regional	**Injury and mortality:** Construction-related activities, including vehicle movement, site/vegetation clearance and building/structure demolition throughout the proposed scheme.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Potential direct mortality of individuals during removal of roosting habitat. This effect is unlikely to occur in sufficient numbers to affect the wider populations and the local populations will recover and recruit from this effect. The effect on populations would be adverse, long-term and reversible; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse moderate	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with **Mitigation Items SMC-E1**, **SMC-E2**, **SMC-E6**, **SMC-E7** and **SMC-E8**. To ensure compliance with species protection legislation and best practice guidance, additional mitigation would include: ▪ Works which will destroy a roost or cause temporary or permanent exclusion of bats from a roost, or if there is likely to be disturbance which could cause a bat to abandon a roost either temporarily or permanently, will not be undertaken without a licence in place from NatureScot. A destruction and/or a disturbance licence for works affecting confirmed roosts will be required prior to commencement (**Mitigation Item P02-E19**). ▪ A licenced bat ecologist will supervise any works for which a development licence for bats is required in accordance with the conditions of the development licence. All works and mitigation, including the exclusion of bats from confirmed bat roosts, will be undertaken in accordance with the development licence as agreed with NatureScot. It is anticipated such development licences will only allow exclusions to be fitted between April and October and be in place for a minimum of 14 days prior to demolition; once the 14-day period has finished, the roosts will be permanently blocked and/or destroyed (**Mitigation Item SMC-E1**; **Mitigation Item P02-E20**). Additional mitigation will be detailed in a SMP (**Mitigation Item SMC-S1**).	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	Injury/mortality and loss of roosts: Destruction of confirmed/potential roosts to accommodate replacement of habitat with structures that form the footprint of the proposed scheme (bridges, road and associated cuttings/embankments).	For locations see Appendix A12.4 (Confidential Biodiversity Resources) Tree felling throughout the proposed scheme	Permanent loss of eleven roosts (four buildings, four structures and 3 trees) and 65 trees with bat roosting potential . This could result in the permanent loss of maternity roosting habitat. This effect would be adverse and permanent; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse major	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with measures detailed in the SMP to be prepared as part of the contract documents (**Mitigation Item SMC-S1**). The destruction of any confirmed roosts will be conducted under licence following consultation with Nature Scot (**Mitigation Items SMC-E6**). The loss of suitable roosting locations in trees, buildings and structures under the proposed scheme would be mitigated for through the provision of suitable alternative roosting habitat, such as bat boxes or tree veteranisation and a dedicated bat roost structure as follows (**Mitigation Item P02-E22**): ▪ Three bat boxes, or suitable roosting features, to be installed for every PRF-M tree lost. ▪ Three bat boxes, or suitable roosting features, to be installed for every building and structure lost with bat potential. ▪ Bat boxes, or suitable roosting features, will be installed in each of five areas identified as being suitable locations for replacement roost habitat; the proportion of features installed in each of the five areas would take into account the size of the replacement roost habitat areas along with the proximity to confirmed roosts or potential roost features being lost. ▪ A dedicated roost compensation structure (such as a timber pole with 1FS Schwegler bat boxes, or similar, mounted on it suitable for a large number of bats) would be installed in/near the woodland to the south of Inver and the River Braan). This would provide alternative roosting locations for the summer soprano pipistrelle roosts to be destroyed at BB 2.42a and BB 2.42b. This would also provide possible satellite roost opportunities for the large maternity roost at BB 2.81c. ▪ All replacement bat roost habitat would be installed prior to roosts or potential roost features in trees, buildings and structures being removed or destroyed.	Slight (Not significant)
	Disturbance: Light spill, noise and vibration due to construction related activities, noise.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Temporary disturbance of bats, including 56 known roosts (identified within 30m scheme) and numerous high potential trees, structures and buildings within and adjacent to the footprint of the proposed scheme. This could lead to the abandonment of roost sites and increased energy expenditure during roosting periods. This effect would be adverse, short-term and reversible; but would potentially	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with **Mitigation Items SMC-S1**, **EMC-E9**, **SMC-E10**, **SMC-NV2** and **SMC-LV4**. To ensure compliance with species protection legislation and best practice guidance, additional mitigation would include **Mitigation Item P02-E19**, **P02-E23**, specifically: ▪ works which will destroy a roost or cause temporary or permanent exclusion of bats from a roost, or if there is likely to be disturbance which could cause a bat to abandon a roost either temporarily or permanently, will not be undertaken without a licence in place from NatureScot. A	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
			alter the integrity of the biodiversity resource. Level of impact: adverse moderate		destruction and/or a disturbance licence for works affecting confirmed roosts will be required prior to commencement; and ▪ Where high noise generating activity such as piling must take place within 100m of known maternity and hibernation roosts this must be done outside sensitive periods. For maternity roosts this would avoid the maternity season (May to August) and for hibernation roosts this would avoid the peak hibernation period (December to February).	
	Fragmentation/ severance Light spill and construction-related activities associated with construction/ demolition of watercourse crossings (bridges and culverts) and underpasses.	Throughout the proposed scheme.	Potential temporary severance of commuting routes leading to increased commuting distances and individuals using less suitable crossing points of the A9. This would potentially lead to an increased risk of mortality of individuals from road-traffic-related incidents. The increased mortality is unlikely to occur in sufficient numbers to affect the wider populations and the local populations will recover and recruit from this effect. The effect on the populations would be adverse, short-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, to ensure compliance with species protection legislation and best practice guidance, a construction lighting plan and method statement will be developed by the contractor, taking into account guidance on lighting from the Bat Conservation Trust (BCT and ILP, 2023) (**Mitigation Item SMC-E10**).	Slight (Not significant)
	Fragmentation/ severance: Temporary obstruction and/or loss of commuting routes.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Potential temporary severance of an important commuting route. With the potential to impact a large summer roost and/or maternity roosts. The habitat severance would potentially result in reduced access to good quality foraging habitat and could lead to the abandonment of roost sites and increased energy expenditure during roosting periods. The effect on populations would be adverse, long-term and reversible; and would potentially alter the integrity of the biodiversity resource.	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with the following mitigation item: ▪ Retention of commuting routes through culverts, underpasses and under bridges, and through retention of key linear woodland features, such that movement between areas of habitat is maintained (**Mitigation Item P02-E24**))	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
			Level of impact: adverse moderate			
Badger (*Meles meles*) Importance: regional	**Injury and mortality:** Construction-related activities including vehicle movement and creation of excavations.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Potential direct injury or mortality of individuals moving through the site from collisions, or entrapment in uncovered excavations, pipes or machinery. This effect is unlikely to occur in sufficient numbers to affect the wider population and the local population will recover and recruit from this effect. The effect on the population would be adverse, long-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse negligible	Neutral (Not significant)	No significant mitigation is required or this non-significant effect. However, for compliance with animal welfare legislation, the following items will be complied with: **SMC-E1**, **SMC-E6**, **SMC-E9**, **SMC-E13** and **SMC-E14.**	Neutral (Not significant)
	Injury and mortality: Destruction of setts to accommodate construction of structures that form the footprint of the proposed scheme (road and associated cuttings/embankments).	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Loss of one inactive outlier sett. The loss of this sett would be permanent; however, due to low activity levels at this sett, it is considered unlikely to alter the integrity of the social group and as the social group can excavate further setts, the effect on the biodiversity resource is temporary. Habitat suitable for sett excavation is ubiquitous within the study area. This effect would be adverse and short-term; and would not alter the integrity of the biodiversity resource. Level of impact: adverse negligible	Neutral (Not significant)	No specific mitigation is required for this non-significant effect. However, for compliance with animal welfare legislation, and if this effect is determined to increase following updated baseline surveys, it would be mitigated through compliance with the following: ▪ pre-construction surveys will be undertaken to verify and, where required, update the baseline (**Mitigation Item SMC-E1**); ▪ Works which will cause damage or disturbance to badger setts (e.g., machinery working within 30m of sett entrances or more disturbing works such as piling out to 100m) will not be undertaken without a development licence from NatureScot. Disturbance distances vary by the type of activity and local setting and would be confirmed by the ECoW; where there is potential for disturbance a precautionary approach would be taken and a licence obtained (**Mitigation Items SMC-E6**). ▪ If following pre-construction surveys a main sett or other significant sett likely to be used for breeding, is found under the footprint of the proposed scheme, or which due to the nature of works will be at risk from partial destruction or significant disturbance, a licences for destruction or temporary closure would be obtained. Detailed bait marking surveys would be undertaken where necessary to inform the territory of the main/breeding sett. Where necessary, and agreed through consultation with NatureScot, an artificial replacement sett would be installed at least six months prior to closure of a main sett. Closure of any badger sett would only be undertaken following a minimum of three weeks of monitoring to determine use by badgers.	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
					Where setts are found to be in use a licence would be obtained from NatureScot. Closure would only be undertaken between late-June to late-November inclusive.	
	Disturbance: Noise, vibrations, increased visual disturbance and light spill associated with construction-related activities.	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Temporary disturbance of badgers, including one subsidiary sett and one outlier sett, leading to avoidance of key places of shelter and rest and a change in the distribution of local population(s). This effect has the potential to be long-term if setts are abandoned due to construction-related disturbance; therefore, this effect would be adverse, long-term and reversible; but it would not alter the integrity of the biodiversity resource. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with **Mitigation Items SMC-E1**, **SMC-E6**, **SMC-E9**, **SMC-E10**, **SMC-NV2** and **SMC-LV4**. To ensure compliance with species protection legislation and best practice guidance, additional measures to be covered in detail in a SMP (**Mitigation Item SMC-S1**), as per **Mitigation Item P02-E27**, will include: ▪ Works which will cause damage or disturbance to badger setts (e.g., machinery working within 30m of sett entrances or more disturbing works such as piling out to 100m) will not be undertaken without a development licence from NatureScot. Disturbance distances vary by the type of activity and local setting and would be confirmed by the ECoW; where there is potential for disturbance a precautionary approach would be taken and a licence obtained (Mitigation Items SMC-E6). ▪ Light will be angled away from all active setts and areas of significant badger activity and directional and/or cowled lighting will be used to prevent light-spill. A 30m protection zone will be maintained around all active setts, where practicable.	Neutral (Not significant)
	Fragmentation/severance: Temporary loss of badger habitat to accommodate construction	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Severance of badger commuting routes leading to habitat fragmentation and temporary loss of habitat. This effect would be adverse, short-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, to ensure compliance with species protection legislation and best practice guidance, it would be mitigated through compliance with **Mitigation Item P02-E27**.	Neutral (Not significant)
Breeding birds (excluding Schedule 1 species)	**Disturbance and mortality:** Construction-related activities, including vehicle movement and vegetation clearance.	Throughout the proposed scheme	Construction activities have the potential to impact nesting birds though temporary increases in noise, vibration and visual disturbance. This would constitute disturbance and could negatively impact the survival, range and abundance of certain species, although susceptibility to disturbance does vary	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with **Mitigation Item SMC-E7**, **SMC-E8**, **SMC-E9**, **SMC-E10, P02-E29 and P02-E30**.	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
Importance: regional			between species, from total avoidance through to rapid habituation. The effects of visual disturbance from mobile construction teams would vary spatially and temporally, depending on the activity being undertaken. As this is a linear project, the works would typically be transient in most locations. This effect is unlikely to occur in sufficient numbers to permanently affect the wider population and the local population will recover and recruit from this effect. This effect will be long-term due to implications from failure to reproduce. Therefore, this effect would be adverse, long-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor			
	Habitat loss: Temporary loss of habitat to accommodate construction	Throughout the proposed scheme	Temporary reduction in availability of habitat (including woodland, scrub, grassland) for food, breeding and shelter throughout the proposed scheme. Fragmentation and displacement of bird species through temporary loss of habitat. Suitable alternative habitat for breeding birds is ubiquitous throughout the study area. This effect would be adverse, medium- to long-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through replacement planting, including the planting of woodland, scrub, hedgerow and species-rich grassland as shown on Figure 10.6.	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
Schedule 1 birds Importance: regional	**Disturbance:** Noise, lighting, increased visual disturbance and vibrations associated with construction-related activities	Woodland throughout the proposed scheme. For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Disturbance of Schedule 1 species which could influence breeding success, feeding behaviour and if disturbance becomes continuing could lead to abandonment of nest during that season. This effect would be long-term and adverse. Level of impact: adverse moderate	Moderate (**Significant**)	The following mitigation items will be adhered to, as well as Mitigation Item **SMC-S1** and compliance with **Mitigation Item SMC-E9**. In addition, the following mitigation item will be followed (**Mitigation Item P02-E28**) ▪ Works which disturb any bird listed on Schedule 1 whilst it is building a nest, or is on it, or near a nest containing eggs or young will not be undertaken. Appropriate disturbance buffers following best practice guidance will be adhered to (Goodship and Furness, 2022). See also **Mitigation Item P02-E31 – P02-E33**.	Neutral (Not significant)
	Injury and mortality: Removal of breeding bird habitat to accommodate construction.	Woodland and riparian habitats throughout the proposed scheme. For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Direct mortality and injury due to vegetation clearance during the breeding season. This effect is unlikely to occur in sufficient numbers to permanently affect the wider population and the local population will recover and recruit from this effect. This effect will be long-term due to implications from failure to reproduce. Alternative breeding habitat is ubiquitous throughout the study area and existing known breeding areas are only minimally impacted by the proposed scheme. Therefore, this effect would be adverse, long-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with **SMC-E7**, **SMC-E8** and **SMC-E9.**	Neutral (Not significant)
	Direct habitat loss: Removal of breeding bird habitat to accommodate construction.	Woodland and riparian habitat throughout the proposed scheme. For locations see Appendix A12.4 (Confidential	Temporary reduction in availability of habitat (woodland and riparian habitats) for food, breeding and shelter throughout the proposed scheme. Fragmentation and displacement of individuals through temporary loss of habitat. This effect would be adverse, medium- to long- term and reversible; and would	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through replacement planting, including the planting of coniferous woodland species (**Mitigation Item P02-E34**) as shown on Figure 10.6.	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
		Biodiversity Resources)	not alter the integrity of the biodiversity resource. Level of impact: adverse minor			
Pine marten (*Martes martes*) Importance: regional	**Injury and mortality:** Construction-related activities including vehicle movement and tree felling.	Throughout the proposed scheme	Potential direct injury or mortality of individuals moving through the site from: collisions; entrapment in uncovered excavations, pipes or machinery; or vegetation clearance and tree felling. This effect is unlikely to occur in sufficient numbers to affect the wider population and the local population will recover and recruit from this effect. This effect would be adverse, long-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with **Mitigation Item SMC-E1**, **SMC-E6**, **SMC-E8**, and **SMC-E10**. Additional measures to be covered in detail in a SMP (**Mitigation Item SMC-S1**) will include **Mitigation Items P02-E44**, **P02-E45 and P02-E46**: ▪ Pre-works checks (see **Mitigation Item SMC-E1**) would take place at least three weeks prior to construction and repeated again at least two days prior to any vegetation clearance taking place to identify any active pine marten dens. ▪ Exclusion zones would be marked around dens following NatureScot guidance. Any works required within these exclusion zones would be supervised by an ECoW and, where necessary, will be carried out under a development licence from NatureScot. Exclusion zones will follow the latest NatureScot guidance or be agreed in consultation with NatureScot. ▪ Site clearances will avoid the breeding season for pine marten (March to June inclusive). Where this is not possible, pre-construction surveys will be undertaken (see **Mitigation Item SMC-E1**) and protection zones will be established around any dens found. If the disturbance or destruction of dens is required, works would be conducted under a development licence from NatureScot.	Neutral (Not significant)
	Injury and mortality and loss of dens: Replacement of woodland with structures that form the footprint of the proposed scheme (road and associated cuttings/embankments).	Broadleaved and mixed semi-natural woodland and broadleaved plantation woodland (including woodland listed on the AWI): ▪ ch-576 to ch200 ▪ ch300 to ch400 ▪ ch1350 to ch1550 ▪ ch1750 to ch2500	Destruction of any dens identified during pre-works checks and permanent reduction in availability of this habitat to pine marten that rely on it for food, shelter and breeding. Suitable alternative habitat for pine marten is ubiquitous throughout the study area; and, as pine marten have large home ranges, the proportion of the home ranges of the local pine marten populations effected will likely be limited. However, loss of important habitat within home ranges may occur.	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with the following: ▪ Pre-construction surveys will be undertaken to verify and, where required, update the baseline (**Mitigation Item SMC-E1**). ▪ The loss of areas identified as pine marten habitat will be replaced through the landscape and ecological mitigation planting design (Figure 10.6). Trees of different age and species composition will be planted, for example Scot's pine, birch and alder, as appropriate, and incorporated into Habitat Management Plans (**Mitigation Items SMC-S1** and **P02-E47**). ▪ The destruction of pine marten dens identified during pre-construction surveys and pre-works checks will be conducted under licence following consultation with NatureScot (**Mitigation Item SMC-E6**). ▪ Artificial pine marten den boxes will be erected in areas of retained woodland close to the proposed scheme prior to tree clearance to compensate for lost habitat. These will be erected and positioned under	Slight (Not significant) During the growth phase of landscape planting, an adverse residual significant effect is predicted due to loss and fragmentation of habitat. However, this impact would be temporary, albeit long-term, in

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
		▪ ch2600 to ch3300 ▪ ch3400 to ch3800 ▪ ch3900 to ch5750 ▪ ch5950 to ch6100 ▪ ch6400 to ch6600 ▪ ch6900 to ch7100 ▪ ch7350 to ch7500 ▪ ch7600 to ch8000 Coniferous plantation woodland: ▪ ch700 to ch1100 ▪ ch1200 to ch1350 ▪ ch1750 to ch2100 ▪ ch2400 to ch2600 ▪ ch5600 to ch5750 ▪ ch5950 to ch7450	This effect would be adverse and permanent; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse major		direction of an ECoW and will be monitored post habitat clearance to determine maintenance requirements and record use which would be reported to Transport Scotland. The location of woodland habitat identified for erection of replacement den boxes is shown on Figure 10.6 (**Mitigation Item P02-E49**).	nature and once cover is established no residual significant effects are predicted.
	Fragmentation/ severance: Temporary loss of habitat to accommodate construction	Throughout the proposed scheme	Loss of woodland resulting in habitat fragmentation and temporary reduction in availability of habitat to pine marten that rely on it for food, shelter and breeding. Suitable alternative habitat for pine marten is ubiquitous throughout the study area.	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through woodland retention (see Figure 10.6) and construction of culverts with mammal provision and DMUs (**Mitigation Item P02-E48**).	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
			This effect would be adverse, long-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse negligible			
	Direct habitat loss: Temporary loss of habitat to accommodate construction	Throughout the proposed scheme	Temporary reduction in availability of woodland habitat (approximately 43ha of woodland, including AWI) to pine marten that rely on it for food, shelter and breeding. Suitable alternative habitat for pine marten is ubiquitous throughout the study area. This effect would be adverse, long-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through woodland retention (see Figure 10.6), and through compliance with species protection legislation and best practice guidance including the woodland creation.	Neutral (Not significant)
	Disturbance: Noise, vibration, increased visual disturbance and light spill associated with construction-related activities.	Throughout the proposed scheme	Disturbance from construction-related activities leading to avoidance of key habitats for foraging and denning, and potential displacement of local populations. Suitable alternative habitat for pine marten is ubiquitous within the study area. This effect would be adverse, short-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with species protection legislation and best practice guidance including **Mitigation Items SMC-E1**, **SMC-E6**, **SMC-E9**, **SMC-E10**, **SMC-NV2** and **SMC-LV4**.	Neutral (Not significant)
Red squirrel (*Scirurus vulgaris*) Importance: regional	**Injury and mortality:** Construction-related activities including vehicle movement and tree felling.	Woodland throughout the proposed scheme	Potential direct injury or mortality of individuals moving through the site from: collisions; entrapment in uncovered excavations, pipes or machinery; or vegetation clearance and tree felling. This effect is unlikely to occur in sufficient numbers to affect the wider population and the local population will recover and recruit from this effect.	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with **Mitigation Item SMC-E1**, **SMC-E6**, **SMC-E8**, and **SMC-10**. Additional measures to be covered in detail in a SMP (**Mitigation Item SMC-S1**) will include **Mitigation Items P02-E44**, **P02-E45** and **P02-E46**: ▪ No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through woodland retention (see Figure 10.6) and construction of culverts with mammal provision and DMUs (Mitigation Item P02-E48). ▪ Site clearances will avoid the breeding season for red squirrel (February to September inclusive). Where this is not possible, pre-construction	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
			This effect would be adverse, long-term and reversible; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse moderate		surveys will be undertaken (see **Mitigation Item SMC-E1**) and protection zones will be established around any dreys found. If the disturbance or destruction of dreys is required, works would be conducted under a development licence from NatureScot.	
	Habitat loss: Replacement of woodland with structures that form the footprint of the proposed scheme (road and associated cuttings/embankments).	Broadleaved and mixed semi-natural woodland and broadleaved plantation woodland: ▪ ch-576 to ch-200 ▪ ch-300 to ch400 ▪ ch1350 to ch1550 ▪ ch1750 to ch2500 ▪ ch2600 to ch3300 ▪ ch3400 to ch3800 ▪ ch3900 to ch5750 ▪ ch5950 to ch6100 ▪ ch6400 to ch6600 ▪ ch6900 to ch7100 ▪ ch7350 to ch7500 ▪ ch7600 to ch8000 Coniferous plantation woodland:	Destruction of any dreys identified during pre-works checks and permanent reduction in availability of this habitat to red squirrel that rely on it for food, shelter and breeding. Suitable alternative habitat for red squirrel is ubiquitous throughout the study area. However, red squirrel home ranges are small and the amount of woodland lost throughout the proposed scheme could greatly affect the home ranges of the local population. This effect would be adverse and permanent; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse major	Large (**Significant**)	This adverse effect of large significance, and compliance with animal welfare legislation, would be mitigated through compliance with the following: ▪ Pre-construction surveys will be undertaken to verify and, where required, update the baseline (**Mitigation Item SMC-E1**); ▪ The loss of areas identified as pine marten and/or red squirrel habitat would be replaced through the landscape and ecological mitigation planting design (Figure 10.6). Trees of different age and species composition would be planted, for example Scot's pine (*Pinus sylvestris*), birch (*Betula pendula*) and alder (*Alnus fruticosus*), as appropriate. Each lost red squirrel drey/den will be replaced by one red squirrel nest box (**Mitigation Item P02-E47**). ▪ The destruction of red squirrel dreys identified during pre-construction surveys and pre-works checks will be conducted under licence following consultation with NatureScot (**Mitigation Item SMC-E6**). ▪ Artificial squirrel drey boxes will be erected in areas of retained woodland close to the proposed scheme prior to tree clearance to compensate for lost habitat. These will be erected and positioned under direction of an ECoW and will be monitored post habitat clearance to determine maintenance requirements and record use which would be reported to Transport Scotland. The location of woodland habitat identified for erection of replacement drey boxes is shown on Figure 10.6 (**Mitigation Item P02-E49**).	Slight (Not significant) During the growth phase of landscape planting, an adverse residual significant effect is predicted due to loss and fragmentation of habitat. However, this impact would be temporary, albeit long-term in nature, and once cover is established no residual significant effects are predicted.

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
		▪ ch700 to ch1100 ▪ ch1200 to ch1350 ▪ ch1750 to ch2100 ▪ ch2400 to ch2600 ▪ ch5600 to ch5750 ch5950 to ch7450				
	Fragmentation/ severance: Temporary loss of habitat to accommodate construction	Woodland throughout the proposed scheme	Loss of woodland resulting in habitat fragmentation and temporary reduction in availability of habitat to pine marten that rely on it for food, shelter and breeding. Suitable alternative habitat for red squirrel is ubiquitous throughout the study area. This effect would be adverse, long-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through woodland retention (see Figure 10.6) and construction of culverts with mammal provision and DMUs (**Mitigation Item P02-E48**).	Neutral (Not significant)
	Direct habitat loss: Temporary loss of habitat to accommodate construction	Woodland throughout the proposed scheme	Temporary reduction in availability of this habitat to red squirrel that rely on it for food, shelter and breeding. Suitable alternative habitat for red squirrel is ubiquitous throughout the study area. This effect would be adverse, long-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with species protection legislation and best practice guidance including the woodland creation and compliance with **Mitigation Item SMC-E9**.	Neutral (Not significant)
	Disturbance: Noise, vibration and light spill associated with construction-related activities.	Woodland throughout the proposed scheme	Disturbance from construction-related activities leading to avoidance of key habitats for foraging and sheltering, and potential displacement of local populations. Suitable alternative habitat for red squirrel is ubiquitous within the study area.	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, to ensure compliance with species protection legislation and best practice guidance, it would be mitigated through compliance with **Mitigation Items SMC-E1**, **SMC-E6**, **SMC-E9**, **SMC-E10**, **SMC-NV2** and **SMC-LV4**.	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
			This effect would be adverse, short-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse negligible			
Reptiles: adder (*Vipera berus*), slow worm (*Anguis fragilis*) and common lizard (*Zootoca vivipara*) Importance: regional	**Injury and mortality:** Construction-related activities including vehicle movement, vegetation clearance and topsoil stripping.	Throughout the proposed scheme	Potential direct mortality of individuals. Only a small amount of habitat is suitable for reptiles within the study area. There is a high likelihood that construction activities will impact this limited habitat and, therefore, mortality of individuals could lead to an overall decline and extinction of isolated populations. This effect could be adverse and permanent; and would alter the integrity of the biodiversity resource. Level of impact: adverse major	Large (**Significant**)	This adverse effect of large significance would be mitigated through compliance with the following measures by the Contractor prior to vegetation clearance and topsoil stripping of reptile habitat (**Mitigation Item P02-E50**): ▪ The loss of areas identified as Key Reptile Sites and isolated reptile sites would be replaced through landscape and ecological planting and dedicated habitat creation (to be provided pre-construction). A reptile translocation receptor site would be located at ch1350-1650, which would include appropriately located hibernacula (hibernation sites) (see Figure 10.6). ▪ Exclusion fencing would be installed around Key Reptile Sites where reptile are to be captured and translocated out of the proposed scheme to prevent reptiles from moving back into Key Reptile Areas prior to soil stripping. The requirement for exclusion fencing would be determined by the ECoW. ▪ Where suitable habitat exists but translocation is not considered necessary (for example, where there is safe habitat nearby for reptile to move to), reptiles and amphibians would be encouraged to move out of the proposed scheme by phased strimming of habitat during the active season (April to September). Where potential hibernacula are present, including but not limited to drystone walls, dense tussocks of grass and log piles, these would be removed during the early part of the active season followed by phased stimming within the same season.	Neutral (Not significant)
	Direct habitat loss: Temporary loss of habitat to accommodate construction	Throughout the proposed scheme	Temporary reduction in availability of habitat for reptiles throughout the proposed scheme. This effect would be adverse, short-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, compliance with **Mitigation Item P02-E50** will further mitigate any effects, specifically: ▪ The loss of areas identified as Key Reptile Sites and isolated reptile sites would be replaced through landscape and ecological planting and dedicated habitat creation (to be provided pre-construction). A reptile translocation receptor site would be located at ch1350-1650, which would include appropriately located hibernacula (hibernation sites) (see Figure 10.6).	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Construction						
	Disturbance: Noise, vibration and increase visual disturbance associated with construction-related activities.	Throughout the proposed scheme	Disturbance of individuals from construction-related activities resulting in displacement. This effect would be adverse, short-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor.	Slight (Not significant)	No specific mitigation is required for this non-significant effect; however, it would be mitigated through compliance with **Mitigation Item SMC-NV2** and **SMC-E9**.	Neutral (Not significant)
Terrestrial invertebrates Importance: local	**Direct habitat loss:** Temporary loss of habitat to accommodate construction	Throughout the proposed scheme	Temporary reduction in availability of habitat including woodland (including ancient woodland), grassland and scrub for terrestrial invertebrates for all life stages. This effect would be adverse, short-term and reversible; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect.	Neutral (Not significant)
	Direct mortality: Construction-related activities including vehicle movement, vegetation clearance and topsoil stripping.	Throughout the proposed scheme	Potential direct mortality of individuals, including egg/larval stages. This effect could be adverse and permanent; and would alter the integrity of the biodiversity resource. Level of impact: adverse major	Slight (Not significant)	No specific mitigation is required for this non-significant effect.	Neutral (Not significant)
	Disturbance: Noise, vibration and lighting associated with construction-related activities.	Throughout the proposed scheme	Potential disturbance of individuals resulting from lighting, vibrations and noise during construction. This effect could be adverse and short-term; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect.	Neutral (Not significant)

1.3 Operation Impacts and Effects

1.1.6. Effects on biodiversity resources during operation of the proposed scheme have been identified taking account of the indicative construction methods and timelines, as discussed in paragraphs 12.4.10-12.4.12 of Chapter 12 (Biodiversity).

1.1.7. Impacts on biodiversity resources during the operational phase with and without mitigation, and a summary of residual impacts are set out in Table A12.7-2.

Table A12.7-2: Predicted Residual Environmental Effects during Operation

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
River Tay SAC (including River Braan) Importance: international	**Direct habitat loss:** Replacement of 0.47ha SAC terrestrial and aquatic habitats (0.006% of the SAC) with structures that form the footprint of the proposed scheme (embankments, bridges, outfalls and retaining walls). ▪ 0.15ha aquatic habitat ▪ 0.32ha terrestrial habitat	▪ ch800 Outfall A ▪ ch3100 Outfall B2 ▪ ch4200 Outfall D ▪ ch4350 ▪ ch4700-ch4970 ▪ ch4950 ▪ ch5030 ▪ ch5110 ▪ ch5600 Outfall G ▪ ch6870 ▪ ch7100 Outfall H ▪ ch7900 Outfall I	Permanent reduction in the extent of available habitat within the SAC. This effect would be permanent and adverse; however, the area of habitat loss is considered negligible given the amount of habitat available and there will be no affect the integrity of the SAC. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with **Mitigation Item SMC-W1**, **SMC-W3**, **SMC-W4**. Additionally, terrestrial areas within the SAC temporarily required for construction will be returned to their former habitat type using species appropriate to the local environment and of local provenance.	Slight (Not significant)
	Changes in surface water quality: Operational discharges from mainline drainage	Throughout the proposed scheme, particularly at the following key crossings and outfall locations: ▪ ch-140- ch-120 Birnam Burn ▪ ch3440-ch3490 Inchewan Burn ▪ ch4300-ch4350 River Braan Crossing ▪ ch4930-ch4950 Mill Stream culvert ▪ ch7450-ch7650 River Tay Bridge ▪ ch800 Outfall A ▪ ch2800 Outfall B2 ▪ ch4200 Outfall D ▪ ch5600 Outfall G ▪ ch7100 Outfall H ▪ ch7900 Outfall I	Increased run-off volumes and contaminants leading to increased pollution and, therefore, decreased water quality of the SAC. Embedded mitigation within the proposed scheme will ensure road surface run-off will be subject to treatment via SuDS ponds/basins. See **Mitigation Item SMC-W17** for more details. The locations of ponds/basins can be seen on Figure 10.6. There will be no adverse effect to the River Tay SAC from this impact. Level of impact: negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
	Habitat degradation: Shading of riverbed under footprint of the proposed scheme.	▪ ch4300-ch4350 River Braan bridge ▪ ch7450-ch7650 River Tay bridge	Change in habitat composition under the footprint of the proposed scheme through increased shading of the riverbeds. This effect would be adverse and permanent; however, the area of habitat affected is negligible (<0.002% of the SAC). Given the amount of remaining SAC habitat available, and the fact that the shading will note present a barrier to species moving throughout the SAC, there is an overall negligible effect which will not adversely affect the integrity of the SAC. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice.	Slight (Not significant)
	Changes in hydrology: Changes in hydrology due to new crossing and outfalls, and removal of existing structures.	▪ ch-140- ch-120 Birnam Burn ▪ ch3440-ch3490 Inchewan Burn ▪ ch4300-ch4350 River Braan Crossing ▪ ch4930-ch4950 Mill Stream culvert ▪ ch7450-ch7650 River Tay Bridge ▪ ch800 Outfall A ▪ ch2800 Outfall B2 ▪ ch4200 Outfall D ▪ ch5600 Outfall G ▪ ch7100 Outfall H ▪ ch7900 Outfall I	Altered habitat due to changes in flows around outfalls, extended crossings and removal of existing structures. This effect would be adverse and permanent; however, the area of habitat affected by changes in hydrology will be negligible, given the amount of habitat available, and will not adversely affect the integrity of the SAC. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with **Mitigation Items SMC-W14** and **SMC-W15**.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
Ancient woodland Importance: national	**Direct habitat loss:** Replacement of 29.02ha of ancient woodland with structures that form the footprint of the proposed scheme (bridges, road, associated cutting/embankments and retaining walls). Loss of wooded AWI habitat of approximately: ▪ 0.08ha – 3 'Other' ▪ 11.11ha – 2b Long-Established (of plantation origin) ▪ 6.73ha – 2a Ancient (of semi-natural origin) ▪ 11.10ha –1a Ancient (of semi-natural origin)	Ancient woodland throughout the proposed scheme (see Figure 12.4)	Permanent reduction in ancient woodland habitat and associated plant and soil biota communities, as well as reduction in availability of this habitat to animal species that rely on it for food, shelter and breeding. This effect would be adverse and permanent; and would alter the integrity and key characteristics of the biodiversity resource. Level of impact: adverse major	Very large (**Significant**)	Mitigation for loss of AWI woodland, in terms of functionality, biodiversity and habitat connectivity, will be undertaken as follows: ▪ sites for compensation have been identified using outputs from the Woodland Connectivity – Ancient Woodland Compensation Strategy (Transport Scotland, 2016). These sites have the best potential for creating ecologically functioning units and for connecting existing ancient woodland sites, thus reducing ancient woodland fragmentation in the landscape (**Mitigation Item P02-E18**). Compensation planting will include the following: ▪ species mixes will reflect native woodland mixes to replace non-native plantations and maximise biodiversity benefit; ▪ ancient woodland soil will be stored appropriately and re-used where appropriate to maintain soil fungal biodiversity and provide a seed bank to promote the re-establishment of ancient woodland ground flora (see **Mitigation Item SMC-LV5** for more details);	**Moderate (Significant)** This effect is predicted to remain following mitigation as ancient woodland habitat will take longer than the lifespan of the proposed scheme to establish. An ancient woodland compensation strategy is provided in Appendix A12.6.

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
					▪ management will be undertaken in AWI woodland that is to be retained which will include the retention of dead and fallen wood; and ▪ development of an AWI-specific Habitat Management Plan (**Mitigation Item SMC-S1**). The locations of sites selected for compensatory planting are detailed in Appendix A12.6 (Woodland Strategy) and shown on Figure 12.14 and Figure 10.6.	
	Air quality impacts: Nitrogen deposition from vehicles during operation	Ancient woodland throughout the proposed scheme (see Figure 12.4)	Degradation of the condition of woodland leading to loss of nitrogen sensitive species. (See Appendix A12.5: Ecology Air Quality Assessment) Level of impact: adverse minor	Neutral (Not significant)	No specific mitigation is required for this non-significant effect.	Neutral (Not significant)
Woodland and Forest (broadleaved, mixed and coniferous; non-AWI) (w1c6, w1f, w1f7, w1g, w1h, w1h5, w1h6, w2b, w2c)) Importance: regional	**Direct habitat loss:** Replacement of 13.76ha of broadleaved, mixed and coniferous non-AWI woodland habitats with structures that form the footprint of the proposed scheme (bridges, road, associated cutting/embankments and retaining walls).	ch-300 to ch0 ch0 to ch400 ch1900 to ch2400 ch2400 to ch2600 ch2600 to ch3300 ch3400 to ch3800 ch3900 to ch5450 ch7400 to ch7450 ch7600 to ch7700	Permanent reduction in broadleaved and mixed non-AWI woodland habitat and associated plant and soil biota communities, as well as reduction in availability of this habitat to animal species that rely on it for food, shelter and breeding. Permanent reduction in non-AWI coniferous plantation woodland habitat and associated plant and soil biota communities, as well as reduction in availability of this habitat to animal species that	Large (**Significant**)	The loss of woodland habitat will be replaced through woodland creation and landscape planting, as set out in the Woodland Strategy (Appendix A12.6). Locations of woodland and other ecological planting are shown on Figure 10.6.	Moderate (**Significant**) During the growth phase of landscape planting, an adverse residual significant effect is predicted due to loss and fragmentation of habitat. However, this impact would be temporary, albeit long-term, in nature and once cover is established no residual significant effects are predicted.

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			rely on it for food, shelter and breeding. This effect would be adverse and permanent; and would alter the integrity and key characteristics of the biodiversity resource. Level of impact: adverse major			
Scrub: gorse scrub, mixed scrub) (h3e, h3h) Importance: local	**Direct habitat loss:** Replacement of 6.52ha of scrub habitat with structures that form the footprint of the proposed scheme (road and associated cutting/embankments and retaining walls).	ch1600 to ch1750 ch1900 to ch2100 ch2400 to ch2900 ch5000 to ch5250 ch7800 to ch8200	Permanent reduction in scrub habitat leading to a reduction in availability of this habitat to animal species that reply on it for food, shelter and breeding. This effect would be adverse and permanent; and would alter the integrity and key characteristics of the biodiversity resources. Level of impact: adverse moderate	Slight (Not significant)	The loss of scrub habitat will be replaced through landscape and ecological planting, as shown on Figure 10.6.	Neutral (Not significant)
Acid grassland: Bracken and other lowland acid grassland (g1c, g1d) Importance: local	**Direct habitat loss:** Replacement of 6.95ha of grassland habitat with structures that form the footprint of the proposed scheme (road and associated cutting/embankments and retaining walls).	Throughout the proposed scheme	Permanent reduction in grassland habitat leading to a reduction in availability of this habitat to animal species that reply on it for food, shelter and breeding. This effect would be adverse and permanent; and would alter the integrity and key characteristics of the biodiversity resources. Level of impact: adverse moderate	Slight (Not significant)	The loss of grassland habitat will be replaced through landscape and ecological planting, as shown on Figure 10.6.	Neutral (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
Neutral grassland: Other neutral grassland, Arrhenatherum neutral grassland and Holcus-Juncus neutral grassland (g3c, g3c5, g3c8) Importance: local	**Direct habitat loss:** Replacement of 20.44ha of grassland habitat with structures that form the footprint of the proposed scheme (road and associated cutting/embankments and retaining walls).	Throughout the proposed scheme	Permanent reduction in grassland habitat leading to a reduction in availability of this habitat to animal species that reply on it for food, shelter and breeding. This effect would be adverse and permanent; and would alter the integrity and key characteristics of the biodiversity resources. Level of impact: adverse major	Slight (Not significant)	The loss of grassland habitat will be replaced through landscape and ecological planting, as shown on Figure 10.6.	Neutral (Not significant)
Rivers and lakes (priority and non-priority) (r2b) Importance: authority area	**Changes in surface water quality:** Pollution from road run-off.	Mill Stream, Inchewan Burn and unnamed minor watercourses	Increased run-off volumes and contaminants leading to a decrease in water quality. Embedded mitigation within the proposed scheme will ensure road surface run-off will be subject to treatment via SuDS ponds/basins. See **Mitigation Item SMC-W17** for more details. The locations of ponds/basins can be seen on Figure 10.6. There will be no adverse effect to watercourses from this impact. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice.	Neutral (Not significant)
Atlantic salmon Lamprey species European eel Importance: international	**Changes in surface water quality:** Pollution from road run-off	All watercourses throughout the proposed scheme.	Increased run-off volumes and contaminants leading to a decrease in water quality and habitat alterations (e.g. impacts on spawning and juvenile supporting habitat),	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			resulting in reduced reproductive success. Embedded mitigation within the proposed scheme will ensure road surface run-off will be subject to treatment via SuDS ponds/basins. See **Mitigation Item SMC-W17** for more details. The locations of ponds/basins can be seen on Figure 10.6. There will be no adverse effect to fish species from this impact. Level of impact: adverse negligible			
	Changes in hydrology: Changes in hydrology and shading from structures that form the footprint of the proposed scheme (bridges, culverts and outfalls).	All watercourses throughout the proposed scheme.	Altered habitat (e.g. spawning and juvenile supporting habitat) resulting in reduced reproductive success. The effect would be permanent, and adverse; however, the changes are expected to be localised and small in scale. Level of impact: adverse negligible	Neutral (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with Mitigation Items **SMC-W14** and **SMC-W15**.	Neutral (Not significant)
Freshwater pearl mussel Importance: international	**Changes in surface water quality:** Pollution from road run-off throughout the proposed scheme.	Throughout the River Tay catchment See Appendix A12.4 (Confidential Biodiversity Resources)	Increased run-off volumes and contaminants leading to decreased water quality and altered habitat, resulting in reduced population size. Embedded mitigation within the proposed scheme will ensure road surface run-off will be subject to treatment via SuDS ponds/basins. See **Mitigation Item SMC-W17** for	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			more details. The locations of ponds/basins can be seen on Figure 10.6. Level of impact: adverse negligible			
	Direct habitat loss: Loss of habitat from structures that form the footprint of the proposed scheme (outfalls).	▪ ch800 Outfall A ▪ ch2800 Outfall B2 ▪ ch4200 Outfall D ▪ ch5600 Outfall G ▪ ch7100 Outfall H ▪ ch7900 Outfall I	Reduction in availability of suitable habitat. Where possible, outfalls have been sited to avoid areas of suitable habitat for fresh water pearl mussel. Therefore, although the effect would be permanent and adverse, the amount of suitable habitat loss would not be significant. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect.	Slight (Not significant)
Brown trout/sea trout Importance: national	**Changes in surface water quality:** Pollution from road run-off	All watercourses throughout the proposed scheme.	Increased run-off volumes and contaminants leading to a decrease in water quality and habitat alterations (e.g. impacts on spawning and juvenile supporting habitat), resulting in reduced reproductive success. Embedded mitigation within the proposed scheme will ensure road surface run-off will be subject to treatment via SuDS ponds/basins. See **Mitigation Item SMC-W17** for more details. The locations of ponds/basins can be seen on Figure 10.6. There will be no adverse effect to fish species from this impact.	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			Level of impact: adverse negligible			
	Changes in hydrology: Changes in hydrology and shading from structures that form the footprint of the proposed scheme (bridges, culverts and outfalls).	All watercourses throughout the proposed scheme.	Altered habitat (e.g. spawning and juvenile supporting habitat) resulting in reduced reproductive success. Potential for disturbance and habitat fragmentation through changes in light/shade. The effect would be permanent, and adverse; however, the changes are expected to be localised and small in scale. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with Mitigation Items **SMC-W14** and **SMC-W15**.	Slight (Not significant)
Otter Importance: international	**Injury and mortality:** Increased road footprint including new carriageway, junctions and access tracks within the vicinity of watercourses.	For specific locations see Appendix A12.4 (Confidential Biodiversity Resources).	Increased risk of direct mortality of individuals through road-traffic-related incidents due to the widened carriageway increasing the distance for otter to cross to safety. This effect is unlikely to occur in sufficient numbers to affect the wider population and the local population will recruit and recover from individual direct mortality of otters. However, the increased risk associated with individuals attempting to cross the road will be permanent. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource	Moderate (**Significant**)	This adverse effect of moderate significance, and compliance with animal welfare legislation, would be mitigated through the following: ▪ mammal-resistant 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 (**Mitigation Item P02-E39**); ▪ fragmentation of habitat caused by an increased road footprint and mammal-resistant fencing will be prevented during operation by retention of commuting routes or creation of suitable	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			Level of impact: adverse minor		crossing points, including culverts suitable for passage by mammals and dry mammal underpasses, so movement between areas of habitat can be maintained (**Mitigation Item P02-E40**); and ▪ landscape planting and woodland retention designed to encourage use of crossing points, including culverts suitable for passage by mammals and dry mammal underpasses, so movement between areas of habitat can be maintained (**Mitigation Item P02-E41**).	
	Direct habitat loss: Replacement of terrestrial habitat with structures that form the footprint of the proposed scheme (bridges, road, associated cutting/embankments, bank stabilisation and retaining walls)	For specific locations see Appendix A12.4 (Confidential Biodiversity Resources).	Reduction of foraging and terrestrial sheltering habitat. Suitable alternative habitat for otter is ubiquitous throughout the study area. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with the following: ▪ fragmentation of habitat will be prevented during operation by retention of commuting routes or creation of suitable crossing points, including culverts suitable for passage by mammals and dry mammal underpasses, so movement between areas of habitat can be maintained (**Mitigation Item P02-E40**); and ▪ operational lighting will be designed to be minimised	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
					at crossing points (**Mitigation Item P02-E43**).	
	Changes in surface water quality: Increased road run-off associated with increased road traffic	For specific locations see Appendix A12.4 (Confidential Biodiversity Resources).	Embedded mitigation within the proposed scheme will ensure road surface run-off will be subject to treatment via SuDS ponds/basins. See **Mitigation Item SMC-W17** for more details. The locations of ponds/basins can be seen on Figure 10.6. There will be no adverse effect to otter from this impact. Level of impact: adverse negligible	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with standard best practice.	Slight (Not significant)
Beaver Importance: national	**Injury and mortality:** Increased road footprint including new carriageway, junctions and access tracks within the vicinity of watercourses.	For specific locations see Appendix A12.4 (Confidential Biodiversity Resources).	Increased risk of direct mortality of individuals through road-traffic-related incidents due to the widened carriageway. This effect is unlikely to occur in sufficient numbers to affect the wider population and the local population will recruit and recover from individual direct mortality of beavers. However, the increased risk associated with individuals attempting to cross the road will be permanent. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Moderate (**Significant**)	This adverse effect of moderate significance, and compliance with animal welfare legislation, would be mitigated through the following: ▪ mammal-resistant 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 (**Mitigation Item P02-E39**); ▪ fragmentation of habitat caused by an increased road footprint and mammal-resistant fencing will be prevented during operation by retention of commuting routes or creation of suitable crossing points, including	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
					culverts suitable for passage by mammals and dry mammal underpasses, so movement between areas of habitat can be maintained (**Mitigation Item P02-E40**); and ▪ landscape planting and woodland retention designed to encourage use of crossing points, including culverts suitable for passage by mammals and dry mammal underpasses, so movement between areas of habitat can be maintained (**Mitigation Item P02-E41**).	
	Direct habitat loss: Replacement of bankside habitat with structures that form the footprint of the proposed scheme (culverts, bank protection and embankments).	For specific locations see Appendix A12.4 (Confidential Biodiversity Resources).	Reduction of foraging and burrow/lodge habitat with potential for destruction of structures/burrows. Current survey results show that no beaver places of shelter are due to be lost to the proposed scheme. Resources for beaver are ubiquitous within the study area. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with **Mitigation Items SMC-E1** and **SMC-E6**.	Slight (Not significant)
	Changes in surface water quality: Increased road run-off reaching watercourses,	For specific locations see Appendix A12.4 (Confidential Biodiversity Resources).	Embedded mitigation within the proposed scheme will ensure road surface run-off will be subject to treatment	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
	associated with increased road traffic.		via SuDS ponds/basins. See **Mitigation Item SMC-W17** for more details. The locations of ponds/basins can be seen on Figure 10.6. There will be no adverse effect to otter from this impact. Level of impact: adverse negligible		mitigated through compliance with standard best practice.	
Bats (all species) Importance: regional	**Fragmentation/severance:** Modification/replacement of structures that form the footprint of the proposed scheme (bridges, road and associated cutting/embankments and retaining walls).	Throughout the proposed scheme, and at the following specific locations: ▪ ch3450 (Inchewan Burn) ▪ ch4350 (River Braan) ▪ ch4950 (Mill Stream)	Severance of commuting routes leading to increased commuting distances and individuals using less suitable crossing points of the A9. This would lead to a permanent increased risk of mortality of individuals from road-traffic-related incidents. The effect on the populations would be adverse and permanent; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse major	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through compliance with **Mitigation Item P02-E25** and **Mitigation Item P02-E26**, including: ▪ no/minimal lighting in identified bat commuting corridors; ▪ replacement and creation of bat commuting hop-overs through planting of heavy standard trees at specified locations shown in Figure 10.6; ▪ provision of new underpasses, including the Murthly Estate Bridge and Dunkeld & Birnam Underpass; and ▪ landscape planting designed to encourage use of crossing points.	Slight (Not significant)
	Direct habitat loss: Replacement of habitat with structures that form the footprint of the proposed	Throughout the proposed scheme.	Reduction in availability of foraging habitat. Suitable alternative foraging habitat is	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However,	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
	scheme (bridges, and road and associated cutting/embankments).		ubiquitous throughout the study area. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor		any effects will be further mitigated through: ▪ woodland planting as shown on Figure 10.6; and ▪ landscape planting around SuDS to create suitable habitat for foraging bats and to encourage higher flight lines to prevent vehicle collisions (**Mitigation Item P02-E26**).	
	Fragmentation/severance: New Murthly Estate Underbridge structure during operation of the of the proposed scheme.	ch900	There is no crossing structure for the existing A9 between Birnam and ch-120 where there is a culvert passable for mammals for WF001 (Birnam Burn). This stretch of the existing A9 does, however, have records of Wildlife Vehicle Incidents (WVIs). The Murthly Estate Underbridge at ch900 will introduce a novel crossing structure with low traffic levels that will make the proposed scheme permeable at this location for badger, pine marten, red squirrel, wildcat, bat species, deer species, and other mammals. This structure will be unlit and will have a planting at the entrances and, combined with mammal-resistant fencing, will reduce WVIs along this section of the proposed scheme by providing a novel commuting corridor and reducing habitat severance from the existing A9. It would increase the amount of	Large (**Significant**)	This beneficial effect of large significance would be provided by the proposed scheme if the design of the Murthly Estate Bridge adheres to the following (**Mitigation Item P02-E53**): ▪ the underbridge will be unlit; ▪ the embankments leading to the entrances of the underbridge will be vegetated to shelter and direct wildlife using it as a crossing point; ▪ if there are drains within the underbridge, the design will include gully pot ladders and wildlife curbs; and noise and light from the road and traffic should be minimised, potentially through noise barriers above the entrances.	**Moderate beneficial (Significant)**

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			available habitat for some species and increase genetic exchange between previously unconnected groups. This effect would be beneficial and permanent; and would beneficially alter the integrity of the biodiversity resource. Level of impact: beneficial major			
Badger Importance: regional	**Injury and mortality:** Increased road footprint including new carriageway, junctions and access tracks.	For specific locations see Appendix A12.4 (Confidential Biodiversity Resources).	Increased risk of direct mortality of individuals through road-traffic-related incidents due to the widened carriageway. This effect is unlikely to occur in sufficient numbers to affect the wider population. The local population will recover and recruit from this effect, but as badger presence is limited along the proposed scheme, loss of individuals may cause social groups to relocate. The increased risk associated with individuals attempting to cross the road will be permanent. This effect would be adverse and permanent; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse major	Large (**Significant**)	This adverse effect of large significance, and compliance with animal welfare legislation, would be mitigated through the following (**Mitigation Item P02-E27**): ▪ Dry mammal underpasses, culverts (with ledges if required) and overbridges, which provide suitable passage for mammals including badger, will be provided to increase permeability of the proposed scheme to badgers. Details and specifications will be provided in a SMP for badger. The SMP will detail post-construction maintenance along with monitoring requirements to determine the structures' effectiveness. ▪ Where badger are considered likely to use structures, a minimum of 100m mammal resistant	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
					fencing on both north and south bound sides of the road would be installed either side of underpasses, culverts and overbridges to direct badger towards structures. ▪ The loss of areas identified as badger habitat would be replaced through the landscape and ecological mitigation planting as shown on Figure 10.6.	
	Fragmentation/severance: New Murthly Estate Bridge structure during operation of the of the proposed scheme.	ch900	There is no crossing structure for the existing A9 between Birnam and ch-120 where there is a culvert passable for mammals for WF001 (Birnam Burn). This stretch of the existing A9 does, however, have records of Wildlife Vehicle Incidents (WVIs). The Murthly Estate Underbridge at ch900 will introduce a novel crossing structure with low traffic levels that will make the proposed scheme permeable at this location for badger, pine marten, red squirrel, wildcat, bat species, deer species, and other mammals. This structure will be unlit and will have a planting at the entrances and, combined with mammal-resistant fencing, will reduce WVIs along this section of the proposed scheme by providing a novel commuting corridor and	Large (**Significant**)	This beneficial effect of large significance would be provided by the proposed scheme if the design of the Murthly Estate Bridge adheres to the following (**Mitigation Item P02-E53**): ▪ the underbridge will be unlit; ▪ the embankments leading to the entrances of the underbridge will be vegetated to shelter and direct wildlife using it as a crossing point; ▪ if there are drains within the underbridge, the design will include gully pot ladders and wildlife curbs; and ▪ noise and light from the road and traffic should be minimised, potentially through noise barriers above the entrances.	**Moderate beneficial (Significant)**

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			reducing habitat severance from the existing A9. It would increase the amount of available habitat for some species and increase genetic exchange between previously unconnected groups. This effect would be beneficial and permanent; and would beneficially alter the integrity of the biodiversity resource. Level of impact: beneficial major			
	Direct habitat loss: Replacement of habitat with structures that form the footprint of the proposed scheme (road and associated cuttings/embankments).	See Appendix A12.4 (Confidential Biodiversity Resources)	Permanent reduction in availability of foraging habitat. Suitable alternative foraging habitat is common throughout the study area. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated with **Mitigation Item P02-E16** and **Mitigation Item P02-E27**, including: ▪ the loss of areas identified as badger habitat will be replaced through the landscape and ecological mitigation planting as shown on Figure 10.6; and ▪ the destruction of any active sett will be conducted under licence, following consultation with NatureScot.	Slight (Not significant)
Breeding birds (excluding Schedule 1 species) Importance: regional	**Direct habitat loss:** Replacement of breeding bird habitat with structures that form the footprint of the proposed scheme (road and associated cuttings/embankments).	Throughout the proposed scheme.	Permanent reduction in suitable nesting habitat which could result in reduced breeding success in the short-term and a permanent reduction in the carrying capacity of the local area.	Moderate (**Significant**)	This adverse effect of moderate significance would be mitigated through the following: ▪ the loss of areas identified as breeding bird habitat will be replaced through landscape and ecological	Slight (Not significant) During the growth phase of landscape planting, an adverse residual significant effect is predicted due to loss of habitat. However, this impact would be temporary,

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			This effect would be adverse and permanent; and would potentially alter the integrity of the biodiversity resource. Level of impact: adverse major		planting along the proposed scheme and offsetting, including the planting of woodland, scrub, hedgerow and species-rich grassland as shown of Figure 10.6.	albeit long-term, in nature and once cover is established no residual significant effects are predicted.
	Injury and mortality: Increased road footprint including new carriageway, junctions and access tracks.	Throughout the proposed scheme.	Increased risk of direct mortality of individuals through road-traffic-related incidents due to the widened carriageway. This effect is unlikely to occur in sufficient numbers to affect the wider populations. The local populations will recover and recruit from this effect. The increased risk associated with individuals attempting to cross the road will be permanent. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through landscape and ecology planting.	Slight (Not significant)
Schedule 1 birds Importance: regional	**Direct habitat loss:** Replacement of breeding bird habitat with structures that form the footprint of the proposed scheme (road and associated cuttings/embankments).	See Appendix A12.4 (Confidential Biodiversity Resources)	Permanent reduction in suitable nesting habitat which could result in reduced breeding success in the short-term and a permanent reduction in the carrying capacity of the local area. This effect would be adverse and permanent; however, it would not alter the integrity of the biodiversity resource.	Slight (Not significant)	This adverse effect of slight significance is not material in the decision-making process; however, it would be mitigated through compliance with **Mitigation Item SMC-E9 and P02-E35**.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			Level of impact: adverse minor			
	Injury and mortality: Increased road footprint including new carriageway, junctions and access tracks.	See Appendix A12.4 (Confidential Biodiversity Resources)	Increased risk of direct mortality of individuals through road-traffic-related incidents due to the widened carriageway. This effect is unlikely to occur in sufficient numbers to affect the wider populations. The local populations will recover and recruit from this effect. The increased risk associated with individuals attempting to cross the road will be permanent. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through compliance with animal welfare legislation and mitigation planting for other species as shown on Figure 10.6.	Slight (Not significant)
Pine marten Importance: regional	**Fragmentation/severance:** New Murthly Estate Underbridge structure during operation of the of the proposed scheme.	ch900	There is no crossing structure for the existing A9 between Birnam and ch-120 where there is a culvert passable for mammals for WF001 (Birnam Burn). This stretch of the existing A9 does, however, have records of Wildlife Vehicle Incidents (WVIs). The Murthly Estate Underbridge	Large (**Significant**)	This beneficial effect of large significance would be provided by the proposed scheme if the design of the Murthly Estate Underbridge adheres to the following (**Mitigation Item P02-E53**): ▪ the underbridge will be unlit;	**Moderate beneficial (Significant)**

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			at ch900 will introduce a novel crossing structure with low traffic levels that will make the proposed scheme permeable at this location for badger, pine marten, red squirrel, wildcat, bat species, deer species, and other mammals. This structure will be unlit and will have a planting at the entrances and, combined with mammal-resistant fencing, will reduce WVIs along this section of the proposed scheme by providing a novel commuting corridor and reducing habitat severance from the existing A9. It would increase the amount of available habitat for some species and increase genetic exchange between previously unconnected groups. This effect would be beneficial and permanent; and would beneficially alter the integrity of the biodiversity resource. Level of impact: beneficial major		▪ the embankments leading to the entrances of the underbridge will be vegetated to shelter and direct wildlife using it as a crossing point; ▪ if there are drains within the underbridge, the design will include gully pot ladders and wildlife curbs; and noise and light from the road and traffic should be minimised, potentially through noise barriers above the entrances.	
	Fragmentation/severance: Replacement of woodland with structures that form the footprint of the proposed scheme (road and associated cuttings/embankments).	Semi-natural broadleaved woodland throughout the scheme.	Permanent fragmentation in semi-natural broadleaved woodland habitat leading to habit severance for species that are intolerant to crossing open spaces, such as pine marten.	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through landscape and ecology planting.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			Suitable alternative habitat for pine marten is ubiquitous throughout the study area. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor			
Red squirrel Importance: regional	**Fragmentation/severance:** Replacement of woodland with structures that form the footprint of the proposed scheme (road and associated cuttings/embankments).	Semi-natural broadleaved woodland throughout the scheme.	Permanent fragmentation in semi-natural broadleaved woodland habitat leading to habit severance for species that that are intolerant to crossing open spaces, such as red squirrel. Suitable alternative habitat for red squirrel is ubiquitous throughout the study area. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through landscape and ecology planting.	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
	Fragmentation/severance: New Murthly Estate Bridge structure during operation of the of the proposed scheme.	ch900	There is no crossing structure for the existing A9 between Birnam and ch-120 where there is a culvert passable for mammals for WF001 (Birnam Burn). This stretch of the existing A9 does, however, have records of Wildlife Vehicle Incidents (WVIs). The Murthly Estate Bridge at ch900 will introduce a novel crossing structure with low traffic levels that will make the proposed scheme permeable at this location for badger, pine marten, red squirrel, wildcat, bat species, deer species, and other mammals. This structure will be unlit and will have a planting at the entrances and, combined with mammal-resistant fencing, will reduce WVIs along this section of the proposed scheme by providing a novel commuting corridor and reducing habitat severance from the existing A9. It would increase the amount of available habitat for some species and increase genetic exchange between previously unconnected groups. This effect would be beneficial and permanent; and would beneficially alter the integrity of the biodiversity resource.	Large (**Significant**)	This beneficial effect of large significance would be provided by the proposed scheme if the design of the Murthly Estate Underbridge adheres to the following (**Mitigation Item P02-E53**): ▪ the underbridge will be unlit; ▪ the embankments leading to the entrances of the underbridge will be vegetated to shelter and direct wildlife using it as a crossing point; ▪ if there are drains within the underbridge, the design will include gully pot ladders and wildlife curbs; and ▪ noise and light from the road and traffic should be minimised, potentially through noise barriers above the entrances.	**Moderate beneficial (Significant)**

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			Level of impact: beneficial major			
Reptiles: adder, slow worm and common lizard (Figure 12.16) Importance: regional	**Fragmentation/severance:** Replacement of reptile habitats with structures that form the footprint of the Birnam Junction (road and associated cuttings/embankments).	ch1600-2000	Permanent fragmentation of habitat and severance of habitat use through replacement of habitat with the Birnam Junction. This could lead to population inbreeding and reduction in foraging habitat, basking locations and refugia; and ultimately a reduction in population carrying capacity of the habitat which could lead to populations becoming unviable, leading to local extinction. This effect would be adverse and permanent; and would potentially alter the integrity of the biodiversity resource.	Large (**Significant**)	This adverse effect of large significance would be mitigated through compliance with the following (**Mitigation Item P02-E50**): ▪ The loss of areas identified as Key Reptile Sites and isolated reptile sites would be replaced through landscape and ecological planting and dedicated habitat creation (to be provided pre-construction). A reptile translocation receptor site would be located at ch1350-1650, which would include appropriately located	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
			Level of impact: adverse major		hibernacula (hibernation sites) (Figure 10.6). ▪ Fragmentation of reptile and amphibian habitat between ch1400 and ch2100 would be prevented during operation of the proposed scheme by creation of a suitable herpetofauna crossing structure, with herpetofauna guide fencing, at the Birnam Junction (ch1900). ▪ Features such as rock piles and other suitable areas of insolation would be used to provide basking opportunities for reptiles, where appropriate, within the native grassland planted around SuDS.	
	Direct habitat loss: Replacement of reptile habitats with structures that form the footprint of the proposed scheme (bridges, road and associated cuttings/embankments).	▪ ch1600-2100 ▪ ch5800-6150 ▪ ch6850-7000 ▪ ch7700-8400	Permanent reduction in approximately 6.8ha of reptile habitat, including loss of KRS and IRS, resulting in a reduction in population carrying capacity of the habitat and ultimately leading to local population extinction. This effect would be adverse and permanent; and would alter the integrity of the biodiversity resource. Level of impact: adverse major	Large (**Significant**)	Compliance with **Mitigation Item P02-E50**, as described below, will mitigate for impacts on reptiles during operation. ▪ The loss of areas identified as KRS and IRS will be replaced through landscape and ecological planting and dedicated habitat creation (to be provided pre-construction for reptile translocation receptor sites), including creating appropriately located hibernacula (hibernation sites) (Figure 10.6).	Slight (Not significant)

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
					Additional enhancement of areas used for reptile translocation pre-construction will include: ▪ areas of insolation (sun exposure) with varied topography; ▪ shelter from the elements, such as wind breaks consisting of woodland edges, wet and dry habitats, gullies and ditches; ▪ hibernation sites such as gorse/birch root systems, rocky crevices and grass tussocks (example species of tufted hair grass); ▪ habitats that support prey species for reptiles, for example insects, soft bodied invertebrates and small mammals; ▪ shelter from predators; ▪ breeding habitat that is structurally diverse; ▪ habitat connectivity; and ▪ ecotones (interfaces between habitats and transitional zones). Furthermore, features such as rock piles, and other suitable areas of insolation, will be used to provide basking opportunities for reptiles where appropriate within the grassland planted around SuDS.	

Biodiversity Resource and Importance	Potential Impact	Location of Impact	Potential Effect and Level of Impact (pre-mitigation)	Effect Significance Category (pre-mitigation)	Mitigation	Residual Effect and Significance (post-mitigation)
Operation						
Terrestrial invertebrates Importance: local	**Direct habitat loss:** Replacement of habitats suitable for invertebrates, including woodland (including ancient woodland), grassland and scrub, with structures that form the footprint of the proposed scheme (bridges, road and associated cuttings/embankments).	Throughout the proposed scheme.	Permanent reduction in suitable habitat for invertebrates. This effect would be adverse and permanent; and would not alter the integrity of the biodiversity resource. Level of impact: adverse minor	Slight (Not significant)	No specific mitigation is required for this non-significant effect. However, any effects will be further mitigated through landscape and ecology planting, including mitigation for loss of AWI woodland.	Slight (Not significant)

Annex 1: Legal status, baseline and evaluation

1.1.8. Table A12.7-3 presents the legal status, baseline (from desk study and site surveys) and evaluation of terrestrial and aquatic biodiversity resources. A summary is presented in Table 12.6 of Chapter 12 (Biodiversity).

Table A12.7-3: Legal status, baseline and evaluation of terrestrial and aquatic biodiversity resources

Biodiversity Resource	Legal/BAP Status	Baseline	Justification for Evaluation of Resource	Importance
Designated Sites				
River Tay SAC (including the River Tay (WF06) and the River Braan (WF11)) (UK0030312)	European site under The Conservation (Natural Habitats &c.) Regulations 1994 (as amended in Scotland). Listed as a key site in the Tayside LBAP (Water and Wetland Ecosystems). The River Tay and River Braan are SEPA Water Framework Directive designated watercourses.	The River Tay SAC is an internationally designated site, selected for its clear-water lakes, and populations of Atlantic salmon, river lamprey, brook lamprey, sea lamprey and otter (NatureScot, 2020h). The River Tay is the largest SAC designated for Atlantic salmon in the UK. 4.95ha of this statutory designated site falls within the footprint of the proposed scheme (Figure 12.1), which is approximately 0.05% of the SAC. The proposed scheme crosses the site twice: at the River Braan (ch4330-ch4350) and the main stem of the River Tay (ch7500-ch7600). Riparian woodland within the site's boundary is also underneath the footprint of the proposed scheme. The River Tay was assigned Good Ecological Potential in the 2018 Water Framework Directive assessment, however it was subsequently assigned Poor Ecological Potential in 2020. The River Braan has been assigned Good Ecological Potential since 2018. Suitable habitat to support Atlantic salmon, river lamprey, brook lamprey, sea lamprey and otter was observed throughout the proposed scheme.	The River Tay SAC is an internationally designated site.	International
Habitats and Ecosystems				
Ancient woodland Woodland listed on the AWI Categories 1a and 2a (ancient of semi-natural origin), 1b and 2b (LEPO) and 3 (other on Roy map) veteran trees, and ancient trees	Scottish Biodiversity List (SBL) priority habitat (including a variety of semi-natural broadleaved woodland types and plantation woodland). Previously woodland listed on the AWI which is an SBL priority habitat.	Approximately 853.01ha of habitat listed on the AWI within 500m of the main the proposed scheme (excluding the 'off-site' mitigation areas at Muir of Thorn and Gelly Wood). Ancient semi-natural woodland accounts for 38%, long established woodland of plantation origin (LEPO) accounts for 58%, and the remainder (4%) categorised as other woodland. Under the footprint of the proposed scheme there is a total of 29.02ha of woodland listed on the AWI. The 'off-site' mitigation areas at Muir of Thorn and Gelly Wood connect to the wider network of woodland in the areas south of the proposed scheme, with 122.5ha of habitat listed on the AWI within 500m of these areas. Four veteran trees are located under the footprint of the proposed scheme.	Ancient woodland (including veteran trees), both semi-natural and plantation woodland of ancient origin are not readily replaceable if lost. These habitats have value for the species they support, and for habitat connectivity. There are some habitats listed on the AWI where trees have been felled, but which may retain biodiversity value. Therefore, areas which may retain indicator species and properties of ancient woodland have been assessed.	National
Woodland and forest: broadleaved and mixed woodland, and coniferous woodland (w1c6, w1f7, w1f, w1g, w1h, w1h5, w1h6, w2b, w2c)	Upland oakwood, upland mixed ashwood and planted coniferous woodlands are listed as priority habitats in the Tayside LBAP	The desk-based assessment of the NWSS (Scottish Forestry, 2014) identified approximately 465.3ha of woodland listed on the NWSS within 500m of the main extent of the proposed scheme. Of this 205.6ha is plantation on ancient woodland site (PAWS) and approximately 226.7ha is native and nearly-native woodland. Under the footprint of the proposed scheme there is approximately 26ha of woodland identified on the NWSS. Of this, approximately 18.6ha is PAWS and 6.3ha is native and nearly native woodland. The remaining area is open land habitat. The 'off-site' mitigation areas at Muir of Thorn and Gelly Wood connect to the wider network of woodland in the areas south of the proposed scheme, with 53.06ha woodland listed on the NWSS within 500m of these areas. The A9 Dualling Programme route-wide Phase 1 habitat survey recorded 102.55ha of broadleaved and mixed woodland within a 150m radius of the proposed scheme (Transport Scotland, 2015a).	Various broadleaved woodland habitats, and coniferous woodland, are listed as priority habitats in the Tayside LBAP. Non-priority broadleaved and mixed woodland habitats can also provide important habitat for red squirrel, pine marten and crossbill, which are listed as priority species in the Tayside LBAP.	Regional

Biodiversity Resource	Legal/BAP Status	Baseline	Justification for Evaluation of Resource	Importance
non-AWI woodland		A total of 13.76ha of non-AWI woodland habitats were recorded under the footprint of the proposed scheme. Details are provided in Appendix A12.3 (Detailed Survey Methods and Baseline Data) and Figure 12.3.		
Rivers and lakes (non-priority) (r2b)	Tayside LBAP lists rivers and burns as priority habitats	Inchewan Burn (WF08) discharges into the River Tay SAC but is not a component of the designated site. An unnamed cascade is present approximately 200m upstream of the A9 crossing point on Inchewan Burn (at Ordnance Survey (OS) grid reference NO 02938 41570), forming a natural in-stream barrier that is considered impassable to fish under most (if not all) flow conditions. The Tay District Salmon Fisheries Board (2013) undertook electrofishing and a fish habitat surveys in 2013. Juvenile Atlantic salmon were observed throughout the watercourse downstream of the waterfall and spawning habitat was observed in the lower reaches of the burn. Mill Stream is a small watercourse that discharges directly into the River Tay. The watercourse has been engineered to support a former mill and contains a reinforced bed and embankment downstream of the existing A9. All other watercourses are small (⩽2m wide), with predominantly boulder and cobble substrates and run flows. The majority of small watercourses have been artificially modified with bed and/or bank reinforcement. No supporting habitat for fish species of conservation interest or FWPM was identified in Mill Stream and unnamed or minor watercourses (Birnam Burn (WF01); WF02; WF05A; WF09; WF12A; WF12B; WF13; WF14; WF16 and WF18).	The main watercourse associated with the proposed scheme is the River Tay which is designated as an SAC and comprises a priority habitat (r2a). The River Braan falls partially within the SAC and is also classified as a priority habitat. These habitats are assessed under River Tay SAC. Inchewan Burn provides limited habitat to support mixed age classes of fish species of conservation interest, however there is sparse and low-quality spawning habitat and a barrier to upstream migration (under the majority of flow conditions) 150m upstream of the existing A9. The watercourse is therefore not considered of functional significance to the Atlantic salmon population of the River Tay SAC in the context of the overall habitat within River Tay catchment. Mill Stream (WF12) and unnamed or minor watercourses are crossed by the scheme (Birnam Burn (WF01); WF02; WF05A; WF09; WF12A; WF12B; WF13; WF14; WF16 and WF18). Historic channel modifications, low flows and limited morphological features reduce habitat suitability for aquatic receptors these waterbodies. Most flow directly into the River Tay SAC but provide no suitable habitat for fish species of conservation interest. In addition, the watercourses provide some habitat for other protected species including otter (qualifying interest of the River Tay SAC), beaver, birds and bats.	Authority area
Scrub: gorse scrub, mixed scrub) (h3e, h3h)	None, supporting habitat for other important biodiversity resources.	The A9 Dualling Programme route-wide Phase 1 habitat survey recorded 7.70ha of scrub habitat within a 150m radius of the proposed scheme (Transport Scotland, 2015a). A total of 6.52ha of scrub is found under the footprint of the proposed scheme. Two key areas of scrub are found on the southbound banks of the A9 north of the Tay Crossing and an area of felled AWI woodland between the B867 and A9 south of Birnam. Scrub provides important habitat for a variety of protected species including reptiles and birds, including those listed as priority in the Tayside LBAP.	Scrub provides important habitat for a variety of species listed as priority in the Tayside LBAP, including reptiles, invertebrates and birds.	Local
Acid grassland: Bracken and other acid grassland (non-	None, supporting habitat for other important biodiversity resources.	Small areas of acid grassland, primarily bracken (g1c) are present within the study area adjacent to the proposed scheme. Most of these areas were adjacent to coniferous woodland or on clearfell sites. Acid grassland is also the dominant grassland habitat present at the offsite areas (Gelly Wood and	Grassland habitats, particularly when connected to woodland and scrub, offer suitable habitats for a variety of protected species including reptiles, badger, birds and invertebrates.	Local

Biodiversity Resource	Legal/BAP Status	Baseline	Justification for Evaluation of Resource	Importance
priority habitat) (g1c, g1d)		Muir of Thorn). Bracken and other acid grassland sites provide suitable habitat for a range of species, offering food and cover for mammals, bird reptiles and invertebrates.		
Neutral grassland (non-priority habitat): Other neutral grassland, *Arrhenatherum* neutral grassland and *Holcus-Juncus* neutral grassland (g3c, g3c5, g3c8)	None, supporting habitat for other important biodiversity resources.	Neutral grassland (g3c, g3c5, g3c8) is one of the dominant grassland habitat types within the study area comprising approximately 21ha of the habitats within the proposed scheme boundary. Other neutral grassland (g3c) is a type that is typically widespread in the lowlands, around farmland and built-up areas. The grassland comprised common and widespread grass species, but also stands of the tall herb species rosebay willowherb (*Chamaenerion angustifolium*).Most of the grassland was located within the A9 and railway corridor, such as on embankments, cuttings and visibility splays. Other areas included clearfell sites, wayleave areas and fields for horse grazing.	Grassland habitats, particularly when connected to woodland and scrub, offer suitable habitats for a variety of protected species including reptiles, badger, birds and invertebrates.	Local
Cropland: Other cereal crops, other non-cereal crops and temporary grass and cover leys. (c1b, c1c7, c1d8)	None, supporting habitat for other important biodiversity resources.	This habitat type accounts for <5% of the total area surveyed. Cereal crops (c1c7) were recorded in a field to the east of Birnam and potato crop (c1d8) was recorded in a field south of the Tay Bridge. An area of temporary grass (c1b) comprising timothy (*Phleum pratense*) crop was recorded adjacent to Inver Wood, south of the Tay Bridge.	Cropland can offer suitable habitats for a variety of protected species; however, is not essential in supporting the viability of these populations and does not enrich the habitat resource within the local context	Less than Local
Sparsely vegetated land : Other inland rock (s1d)	None, supporting habitat for other important biodiversity resources.	Sparsely vegetated land is recorded within the inactive quarry in Inver Wood. This areas is colonised by broom and ruderal species, with some larch and Douglas fir (*Pseudotsuga menziesii*) seedlings also present.	The sparsely vegetated land within the inactive quarry offers suitable habitat for reptiles, and other protected species. However, it is not essential in supporting the viability of these populations and does not enrich the habitat resource within the local context.	Less than local
Grassland: modified (g4)	None, supporting habitat for other important biodiversity resources.	Modified grassland (g4) is present within the study area, mostly as roadside verges and other improved grassland areas. This habitat type is associated primarily with urban habitats and is intensively managed.	This habitat is not essential to support protected species and is not considered to enrich the habitat resource in the local context.	Less than local
Urban: built up areas and gardens (u1b5, u1b6, u1c, u1d, u1e)	None	The majority of urban habitats recorded are associated with Birnam, Little Dunkeld and Inver and the existing road network, including the A9.	This habitat is not essential to support protected species and is not considered to enrich the habitat resource in the local context.	Less than local
Species				
Atlantic salmon	Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. The Conservation of Salmon (Scotland) Regulations 2016.	**Desk Study** TDSFB advised via the A9 ESG that Atlantic salmon are widespread within the River Tay catchment (Transport Scotland, 2015b). The River Tay SAC has favourable conservation status for Atlantic salmon (NatureScot, 2014h). Marine Scotland have proposed that the River Tay SAC remains a Grade 1 classified system in 2021, under the Conservation of Salmon (Scotland) Regulations 2016 (Marine Scotland, 2020b).	Atlantic salmon is a qualifying feature of the River Tay SAC and favourable conservation status of the species must be maintained. Widespread throughout the study area and the wider Tay catchment. Evidence of suitable habitat to support all key life stages on the main stem of the River Tay and within major tributaries.	International

Biodiversity Resource	Legal/BAP Status	Baseline	Justification for Evaluation of Resource	Importance
	Listed under Schedule 3 of the Conservation (Natural Habitats &c) Regulations 1994 (as amended). A qualifying feature of the River Tay SAC. Listed on the SBL. Listed as a protected species in the Tayside LBAP Biodiversity List.	Atlantic salmon have been recorded within the River Braan between the A9 crossing and Inver Bridge within the last ten years (National Biodiversity Network (NBN), 2024). **Site Study** Suitable supporting habitat for mixed age classes was identified throughout the River Tay and within sections of the River Braan and Inchewan Burn. Optimal spawning habitat was observed within the River Tay and River Braan and sub-optimal, poor quality habitat was observed within Inchewan Burn. Targeted redd count surveys (as per technique described in Youngson *et al*. (2007) were undertaken on Inchewan Burn and no evidence of spawning salmonids was observed.	Atlantic salmon function as a host for FWPM glochidia.	
River lamprey Brook lamprey Sea lamprey	Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. Listed on the SBL. Listed as a protected species in the Tayside LBAP Biodiversity List.	**Desk Study** Lamprey (both sea lamprey and others not identified to species level) have been recorded within the River Tay within the last 20 years (NBN, 2024). The River Tay SAC has favourable conservation status for the distribution and density of all species of lamprey (Watt *et al*., 2008). **Site Survey** Supporting habitat for adult and juvenile lamprey was recorded during aquatic habitat assessments. The areas around Murthly and Dunkeld offer a concentrated area of important lamprey habitat within the Tay Catchment. Suitable supporting habitat for lamprey juveniles was also observed during FWPM surveys.	River, brook and sea lamprey are qualifying features of the River Tay SAC and favourable conservation status of the species must be maintained. Suitable supporting habitat for mixed age classes of lamprey is present throughout much of the River Tay catchment. Recent records of lamprey from within the River Tay evidence their presence within the study area.	International
Brown trout/sea trout	Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. Sea trout are listed on the SBL. Brown trout are listed on the Tayside LBAP Biodiversity List.	**Desk Study** There are historic records of brown/sea trout within the River Tay (NBN, 2024). TDSFB 2019-2020 annual report recorded annual sea trout rod catches ranging from 1000-1500 per annum over the last 10 years (TDSFB, 2020). **Site Survey** Supporting habitat for mixed age classes of brown/sea trout was identified throughout the study area during site surveys.	Suitable supporting habitat is present throughout most of the River Tay catchment. The brown/sea trout population is likely to be widespread and rod catches for sea trout suggest a moderate sea trout population. Brown/sea trout function as a host species for FWPM glochidia.	National
European eel	European Commission (2007) Council Regulation (1100/2007/EC) Establishing measures for the recovery of the stock of European eel. The Eel Management Plan for Scotland was published in 2010 (DEFRA, 2010) Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003.	**Desk Study** There are historic records of European eel within the River Tay, adjacent to the proposed scheme (NBN, 2024). **Site Survey** Suitable habitat for European eel was identified during aquatic habitat assessments. Incidental observations of European eels during FWPM surveys.	Supporting habitat is present throughout much of the River Tay catchment. There are historical records of European eel within the River Tay.	International

Biodiversity Resource	Legal/BAP Status	Baseline	Justification for Evaluation of Resource	Importance
	Listed on the SBL. Critically Endangered on the IUCN Red List (Jacoby and Gollock, 2014).			
Freshwater pearl mussel	Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (WCA). Listed under Annex II of Council Directive 92/43/EEC. Listed on the SBL. Listed as a protected species in the Tayside LBAP Biodiversity List. Critically Endangered in Europe on the IUCN Red List (Moorkens, E., 2024).	**Desk Study** FWPM were recorded in the River Tay during surveys to inform DMRB Stage 2 (Transport Scotland, 2014). FWPM were also recorded in the River Braan during surveys that were undertaken to inform a hydroelectric scheme proposal (SKM, 2013). **Site Survey** Targeted FWPM surveys found a mixed recruiting population of FWPM within the River Tay.	Both FWPM and their salmonid hosts are widespread throughout the study area. There is suitable FWPM supporting habitat throughout the River Tay catchment.	International
Otter	European Protected Species (EPS) under The Conservation (Natural Habitats &c.) Regulations 1994 (as amended in Scotland). A qualifying feature of the River Tay SAC. Listed on the SBL and as a protected species in the Tayside LBAP Biodiversity List. Listed as Vulnerable in Scotland in the IUCN Red List for Britain's Terrestrial Mammals (Mathews and Harrower, 2020).	**Desk Study** Several records within the last ten years were identified within the 10km study area (NBN, 2020); and otter is at carrying capacity (i.e. maximum population size of the species that the environment can sustain indefinitely, taking account of food, habitat availability, etc.) within the River Tay SAC area and the wider catchment (Strachan, 2007). Otter presence and active resting sites were confirmed within the study area during site surveys for the DMRB Stage 2 Assessment (Transport Scotland, 2020). **Site Survey** Twenty-one holts and 21 couches were recorded within the study area, in addition to field signs including spraints and prints (Figure 12.13). Full survey results are provided in Table A12.4-3 in Appendix A12.4 (Confidential Biodiversity Resources).	Otter is a qualifying feature of the River Tay SAC and favourable conservation status of the species must be maintained, including population, distribution, supporting habitat, and lack of significant disturbance. Otter is at carrying capacity within the River Tay SAC area and the wider catchment (Strachan, 2007).	International
Beaver	EPS under The Conservation (Natural Habitats &c.) Regulations 1994 (as amended in Scotland). Listed as Endangered in Scotland in the IUCN Red	**Desk Study** Site surveys undertaken for the DMRB Stage 2 Assessment (Transport Scotland, 2021) recorded beaver presence throughout the study area in the River Tay SAC. Campbell-Palmer *et al*. (2018) reported two separate territories within the study area during 2019-2018 surveys. **Site Survey**	Beaver was granted status as an EPS in May 2019 and the species' expansion throughout the River Tay catchment has been rapid: increasing from approximately 146 individuals in Tayside in 2012 to approximately 433 individuals in 2018 (Campbell-Palmer *et al*., 2018). The population in Tayside is the largest in Scotland, with 73 territories recorded	National

Biodiversity Resource	Legal/BAP Status	Baseline	Justification for Evaluation of Resource	Importance
	List for Britain's Terrestrial Mammals (Mathews and Harrower, 2020).	Twenty burrows and seven lodges were recorded within the study area, in addition to field signs including feeding signs, felled trees, food caches, footprints, slides and channels (Figure 12.14). Full survey results are provided in Table A12.4-3 in Appendix A12.4 (Confidential Biodiversity Resources).	along the River Tay during the 2017-2018 NatureScot Survey of the Tayside area beaver population (Campbell-Palmer *et al*., 2018).	
Bats (all species)	All UK bat species are EPS under The Conservation (Natural Habitats &c.) Regulations 1994 (as amended in Scotland). All nine species that occur in Scotland are listed on the SBL. These include Brandt's bat, whiskered bat, noctule bat, Nathusius' pipistrelle and the five listed below. Brown long-eared bat, Natterer's bat, Daubenton's bat, and soprano pipistrelle and common pipistrelle bat are listed as protected species in the Tayside LBAP Biodiversity List.	**Desk Study** Six species were identified within the 10km study area including common and soprano pipistrelle, brown long-eared bat, Daubenton's bat, Natterer's bat, and noctule. The site surveys for the DMRB Stage 2 Assessment identified 184 trees, 44 buildings and eight structures with the potential to support roosts (classified as per Collins, 2016) within 50m of the proposed scheme; and an additional five buildings and one structure were confirmed as roosts. **Site Survey** Seven of Scotland's nine bat species were recorded within the study area: including common, Nathusius's and soprano pipistrelle, brown long-eared bat, Daubenton's bat, Natterer's bat, and noctule. Fifty-three confirmed roosts were identified within 50m of the proposed scheme: 40 in buildings, seven in structures and six in trees. Of these, 14 were located within 10m of the proposed scheme. Three additional possible roosts within 50m of the proposed scheme were identified: two in buildings located 10-30m from the proposed scheme, another additional possible roost was identified within a structure within the footprint of the proposed scheme. Twelve roosts were small roosts of rarer species (brown long-eared bat and *Myotis* sp. (likely Daubenton's bat and Natterer's bat)). No roosts for the rarest species (noctule and Nathusius' pipistrelle) were recorded. Full survey results are provided in Table 5 in Appendix A12.3 (Detailed Survey Methods and Baseline Data).	Five of the seven bat species identified during site survey visits, and within the NBN desk-based assessment 10km study area, are widespread and found throughout Scotland. These are common pipistrelle, soprano pipistrelle, Daubenton's bat, Natterer's bat, and brown long-eared bat. Noctule bat was also identified during site survey visits and the desk-based assessment and is generally regarded as being at the northern extent of its range within the study area (JNCC, 2019). Nathusius' pipistrelle was not identified during the desk study; however it is generally considered a migrant species and there are fewer records of this species than other pipistrelle bats in Scotland. Daubenton's bat, Natterer's bat and brown long-eared bat are categorised by Wray *et al*. (2010) as being rarer bat species in Scotland, each with a population of between 10,000 and 100,000. Noctule bat and Nathusius' pipistrelle are categorised as a rarest bat species in Scotland with a population of under 10,000 (Wray *et al*., 2010).	Regional
Badger	Protection of Badgers Act 1992 (as amended). Listed as protected species in the Tayside LBAP Biodiversity List.	**Desk Study** Several historical records were identified within the 10km study area (NBN, 2024); and Scottish Badgers provided records in 2015 and 2017 of badger presence in the study area. Active setts were recorded during DMRB Stage 2 Assessment (Transport Scotland, 2021). **Site Survey** A total of one main (partially used), one main (disused), one annexe/main (used), three subsidiary setts (disused) and nine outliers (disused) were recorded. Full survey results are provided in Table 1 in Appendix A12.4 (Confidential Biodiversity Resources).	Badger is widespread throughout the UK and Scotland and contributes to the maintenance of biodiversity at a regional level. Legal requirements to comply with animal welfare legislation would be the main driver for mitigation of impacts on this species.	Regional
Breeding birds (excluding Schedule 1 species)	Birds of Conservation Concern (Stanbury et al., 2021). Species listed on the SBL and as protected species in the Tayside LBAP Biodiversity List.	**Desk Study** Bird Atlas 2007-11 indicates a total of 116 species with breeding evidence in the vicinity of the proposed scheme (within 2km and 10km tetrads) including Schedule 1 species and BirdTrack data between 2020-2024 indicates 132 species in the vicinity of the proposed scheme (within 2km and 10km tetrads) during the breeding season including Schedule 1 species (British Trust for Ornithology, 2024a-b). **Site Survey**	Eight of the 17 breeding species recorded during site surveys were listed as species of conservation concern, either red-listed or amber-listed.	Regional

Biodiversity Resource	Legal/BAP Status	Baseline	Justification for Evaluation of Resource	Importance
		A total of 64 species were recorded during the site surveys, including incidental records, of which 17 were confirmed to have bred. Full survey results are detailed in Appendix A12.3 (Detailed Survey Methods and Baseline Data).		
Schedule 1 birds	Schedule 1 of the WCA Listed under Annex 1 of the Council Directive 2009/147/EC (European Union, 2009) Several species listed on the SBL and as a protected species in the Tayside LBAP Biodiversity List.	**Desk Study** Bird Atlas 2007-11 indicates a total of 116 species with breeding evidence in the vicinity of the proposed scheme (within 2km and 10km tetrads) including Schedule 1 species and BirdTrack data between 2020-2024 indicates 132 species in the vicinity of the proposed scheme (within 2km and 10km tetrads) during the breeding season including Schedule 1 species (British Trust for Ornithology, 2024a-b). **Site Survey** The study area supports breeding Schedule 1 species. Peregrine, goshawk, barn owl, kingfisher and crossbill have been recorded. Habitats within the study area provide nesting and foraging habitat for these species. ▪ One peregrine nest was recorded within the survey area, approximately 300m from the proposed scheme. Three chicks fledged from this nest in 2019. Further details are in Appendix A12.4 (Confidential Biodiversity Resources). ▪ A total of 55 records of crossbill were made within the survey area; with 51 observations recorded during targeted crossbill surveys and four during breeding bird surveys. Full survey results are detailed in Appendix A12.4 (Confidential Biodiversity Resources).	The study area supports breeding Schedule 1 species, afforded additional protection under the WCA 1981 (as amended). Peregrine, goshawk, kingfisher, osprey, red kite, honey buzzard and crossbill have been recorded during surveys. Habitats within the study area, and the wider area, provide nesting and/or foraging habitat for these species.	Regional
Pine marten	Schedule 5 and 6 of the WCA. Listed on the SBL and as a protected species in the Tayside LBAP Biodiversity List.	**Desk Study** There are 28 records of pine marten within 10km of the proposed scheme. **Site Survey** There were no sightings of pine marten during site surveys. One potential den site was identified (not confirmed) during site surveys. One potential den was recorded, and several potential field signs were incidentally recorded during habitat surveys at the 'off-site' mitigation areas at Gelly Wood and Muir of Thorn in 2025. Full survey results are detailed in Appendix A12.3 (Detailed Survey Methods and Baseline Data).	Pine marten is widespread throughout Scotland and has continued to expand its range throughout Perthshire and Tayside, since being confirmed to have re-colonised the area in the early 1990s (Balharry et al., 1996; Croose et al., 2013).	Regional
Red squirrel	Schedule 5 and 6 of the WCA. Listed on the SBL as a species for which conservation action is needed and as a protected species in the Tayside LBAP Biodiversity List. Listed as Near Threatened in Scotland in the IUCN Red List for Britain's Terrestrial	**Desk Study** The data search returned over 5000 records of red squirrel within 10km of the proposed scheme. **Site Survey** Both red squirrel and grey squirrel were recorded within the study area during site surveys. Suitable habitat is ubiquitous throughout the study area. 44 squirrel dreys, potentially used by either red or grey squirrels, were recorded during the site surveys. There were 19 sightings of red squirrel, one WVI, and numerous feeding signs recorded throughout the study area during the surveys. In addition, live sightings, dreys and feeding stations were incidentally during other surveys. Survey results are detailed in Appendix A12.3 (Detailed Survey Methods and Baseline Data).	Red squirrel is widespread throughout Scotland despite declines in populations and range. The proposed scheme is immediately north of the Scottish Strategy for Red Squirrel Conservation (The Scottish Squirrel Group, 2015) proposed highland red squirrel protection line. Abundant foraging and breeding opportunities exist within large areas of mature coniferous plantations and good quality mixed woodlands, with connectivity between woodlands.	Regional

Biodiversity Resource	Legal/BAP Status	Baseline	Justification for Evaluation of Resource	Importance
	Mammals (Mathews and Harrower, 2020).			
Reptiles: adder, slow worm, and common lizard	Schedule 5 of the WCA. Listed on the SBL. Adder, slow worm, and common lizard are listed as key species in the Tayside LBAP.	**Desk Study** Historical records of adder, slow worm and common lizard were scarce within the 10km study area (NBN, 2024) but all three species were recorded in the study area during site surveys for the DMRB Stage 2 Assessment (Transport Scotland, 2021). **Site Survey** Reptile presence was confirmed at ten of the eleven sites that were subject to ACO surveys. One site was identified as a potential reptile site, however no reptiles were found. Incidental observations of common lizard and adder were also recorded within the proposed scheme footprint in 2015 and 2020. Common lizard were also recorded in the 'off-site' mitigation areas at Muir of Thorn and Gelly Wood in 2025. Full survey results are detailed in Appendix A12.3 (Detailed Survey Methods and Baseline Data).	Adder, slow worm and common lizard have decreasing population trends and are listed as being of conservation importance within the Tayside LBAP (Tayside Biodiversity Partnership, 2016). McInerny and Minting (2016) state that Scotland is host to an important population of adder in comparison to the declining population in the rest of the UK.	Regional
Terrestrial invertebrates	Schedule 5 of the WCA. Listed on the SBL.	**Desk Study** Six species of invertebrate listed on the SBL were identified during desk study within the study area. Habitats within the study area provide suitable habitat for all life stages for a range of invertebrates including species listed on the Tayside LBAP.	Terrestrial invertebrates rely on a wide range of habitats, including grassland, scrub and woodland, as well as urban features such as walls and buildings. These species enrich these habitats at a local scale.	Local

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