

5 The Proposed Scheme

5.1 Introduction

- 5.1.1 This chapter provides a description of the DMRB Stage 3 proposed scheme design as assessed and reported in this ES, including a summary of the likely methods and programme of its construction.
- 5.1.2 Background is also provided in this chapter on the anticipated procurement process, Transport Scotland's sustainable development policy for the A9, and on existing and projected traffic conditions.

5.2 Background

Scheme Procurement

- 5.2.1 It is likely that the proposed scheme will be procured by means of a Design and Build (D&B) type contract. Under the terms of this contract type, the Contractor will undertake both the detailed design and construction of the proposed scheme. Responsibility for operating and maintaining the trunk road would remain with the Scottish Government. Responsibility for operating and maintaining side roads would remain with Perth & Kinross Council on completion of the proposed scheme. Both the Scottish Government and Perth & Kinross Council may appoint agents to operate and maintain the respective road networks on their behalf.
- 5.2.2 Under the D&B type contract, a specimen (outline) design is prepared for the proposed scheme, which the appointed Contractor(s) can optimise as the detailed design is developed. Such optimisation must be within the constraints imposed by the ES including: The Schedule of Environmental Commitments (Chapter 21) which contain the mitigation measures identified through the EIA process, Statutory Orders (such as land acquisition) and any specific limits set within the contract documents. This will ensure that the detailed design will be implemented in compliance with this ES.
- 5.2.3 Optimisation of the proposed scheme design will still be deemed to comply with this ES provided that any design changes have been subject to environmental review to ensure that the residual impacts would not be greater than those reported in this ES, and subject to Transport Scotland's acceptance of the design changes and findings of any such review.

Sustainable Development Policy

- 5.2.4 Consideration of sustainable development issues have and will continue to form an important element of all activities undertaken in the proposed scheme's life cycle, including:
- project design and appraisal;
 - procurement;
 - construction;
 - maintenance; and
 - operation (and decommissioning).
- 5.2.5 The A9 Dualling SEA Post Adoption Statement (Transport Scotland, 2014) included a range of Environmental Design Principles, based on a review of relevant plans, policies and strategies. The agreed environmental principles were reported in full through the Post Adoption Statement. These environmental principles include several of particular relevance to sustainable development, with some key examples provided below:
- promote local/sustainable sourcing of materials;
 - promote sustainable design and innovation to reduce material consumption;
 - avoid and minimise waste generation; and
 - maximise re-use of material resources and use of recycled materials.

5.2.6 The A9 Dualling Sustainability Strategy (Transport Scotland, 2016a) aims to deliver the A9 dualling programme as a model of modern infrastructure development, with sustainability embedded through all stages of the delivery process. The sustainability vision for the A9 dualling programme is to deliver:

‘An A9 that connects people, business and communities, respects the natural environment of the corridor and makes a contribution to creating a successful and sustainable Scotland.’

5.3 Traffic Conditions

5.3.1 The existing traffic conditions of the current A9 carriageway are noted in Section 2.5 (Local Context for Dualling) of Chapter 2 (Need for the Scheme), based on 2015 modelled data.

5.3.2 The proposed scheme as part of the A9 dualling programme is classed as the ‘Do-Something’ scenario. Traffic forecasting techniques were applied to enable the traffic impacts of the A9 Dualling to be considered against the ‘Do-Minimum’ scenario (i.e. if the proposed scheme were not to proceed). Traffic projections were provided as the latest available (2014 outputs of the Transport Model for Scotland (TMfS)). TMfS is a strategic modelling tool, developed and made available by Transport Scotland for the purposes of assessing the influences of land-use and transport policies on traffic demand.

5.3.3 The flow in 2041, 15 years after the first full year of operation (2026) of the proposed scheme, includes the effect of the full A9 dualling programme and is considered to represent the most robust (worst-case scenario) figures for the purposes of the EIA as reported in this ES. Table 5.1 details the Do-Minimum and Do-Something traffic flows on the Pitlochry to Killiecrankie section of the A9 Dualling Programme.

Table 5.1: AADT Traffic Flows for Pitlochry to Killiecrankie (Two-way flows)

Location	Do-Minimum			Do-Something	
	Year 2015	Year 2026	Year 2041	Year 2026	2041
Start of proposed scheme (south of the A924 Pitlochry South Junction)	14,600	17,000	17,700	22,000	23,100
A9 between the A924 Pitlochry South and the C452 Foss Road junctions	10,100	11,600	11,700	15,700	16,000
A9 between the C452 Foss Road junctions and the A924 Pitlochry North Junction	10,200	11,700	11,800	15,900	16,100
End of the proposed scheme (north of the A924 Pitlochry North Junction)	10,100	11,600	11,600	15,800	16,000

Number of trips rounded to the nearest 100 (Source: Jacobs 2016)

5.4 Description of the Proposed Scheme

5.4.1 An overview of the proposed scheme design assessed within this ES is shown on Figure 5.1. Throughout this ES, references are made to chainage (shortened to ‘ch’, for example ch1500), which is a reference to the number of metres from the starting point of the proposed scheme, from south to north. Chainages are also shown on the ES Figures and referred to in the following description.

5.4.2 As explained in Chapter 3 (Alternatives Considered), the preferred route for the proposed scheme was identified following the DMRB Stage 2 assessments, which included an assessment of the potential environmental constraints associated with a number of route options. This was then subject to iterative design development as summarised in Chapter 4 (Iterative Design Development), taking into account the recommendations of environmental specialists, input from the consultation process, and the results of traffic, structural, geotechnical and drainage studies.

5.4.3 The existing 5.7km single carriageway section of the A9 from Pitlochry to Killiecrankie is to be widened to a D2AP (dual carriageway rural all-purpose). It has been designed as a DMRB Category 7A road with design speed of 120kph, in accordance with DMRB Volume 6, Section 1, Part 1, TD9/93 – Amendment No 1: Highway Link Design (Highways Agency et al, 2002). The dualling provides two

lanes in each direction, separated by a central reserve and road verges; a more detailed description is provided in the following section.

A9 Mainline Carriageway Widening

5.4.4 The A9 Dualling: Pitlochry to Killiecrankie involves widening of the A9 over three distinct sections:

- South of Pitlochry to north of the A924 Pitlochry South junction (ch90 to ch1400), consisting predominantly of northbound widening of the single carriageway and improvements to the existing dual carriageway over approximately 700m. The proposed scheme will generally be constructed on embankments within this section, much of which will be located within the extents of the River Tummel floodplain.
- North of the A924 Pitlochry South junction to south of the C452 Clunie-Foss Road junction (ch1400 to ch3400), a best-fit alignment consisting of northbound widening switching to southbound widening of the single carriageway.
- North of the C452 Clunie-Foss Road junction to the existing dualled section at the Pass of Killiecrankie (ch3400 to ch6450), southbound widening, following the Clunie Underbridge across Loch Faskally. Upon reaching the northern side of the loch, there would be an offline alignment to the east of the existing A9 with lengths of large cutting on the east side and embankment on the west side. After the Allt an Aghastair watercourse crossing (approximately ch5500), the route would realign with the existing A9 and connects into the existing dualled A9 section at the Pass of Killiecrankie.

5.4.5 The mainline will comprise of a dual carriageway with 2.5m verges and two lanes of 3.65m width in each direction, plus a 1m hardstrip to both the inside and outside lanes in each direction and a 2.5m central reserve separating each carriageway. Both the verge and central reserve will be widened as necessary for visibility. Technical engineering detail on the carriageway cross-sections utilised within the DMRB Stage 3 design are provided within the DMRB Stage 3 Scheme Assessment Report Part 2: Engineering, Traffic and Economic Assessment (Jacobs, 2017).

5.4.6 The existing A9 mainline has numerous direct accesses linking to side roads and to land and properties along the route. Once this is upgraded to dual carriageway the majority of these will be stopped up to meet the desired design and safety standards. As explained in paragraphs 5.4.8 to 5.4.13 below, alternative access from the A9 mainline will be provided by two new grade separated junctions, four left in/left out turnings, and via the existing road network.

A9 Junction Provision

5.4.7 There are two grade separated junctions to be provided as part of the proposed scheme:

- Pitlochry South Junction (ch300-ch700) incorporates a grade separated junction and retains a similar layout to the existing junction. It will allow for northbound travellers to exit the A9 onto the A924 via an existing underbridge and for travellers heading south to join the A9 southbound carriageway from the A924; and
- Pitlochry North Junction (ch4600-ch6200) incorporates a grade separated junction with the northbound and southbound slip roads forming a diamond arrangement. The northbound slip roads tie in to the local road with a T-junction and the southbound tie in to the local road is via a roundabout.

5.4.8 There are four at-grade junctions/accesses to be provided as part of the proposed scheme, as follows:

- Left in/Left out to C452 Foss Road (ch2700, southbound side);
- Left in/Left out to C452 Clunie-Foss Road (ch3490, southbound side);
- Left in/Left out to Pitlochry Estates (ch3750, northbound side); and
- Left in/Left out to Kennels Cottage (ch6770, southbound side).

Side Road Amendments/Upgrades

- 5.4.9 Side roads will be upgraded as necessary to provide access from the existing road network to the mainline of the proposed scheme via the proposed junctions. Upgrades may involve simple resurfacing or may require realignment and other improvements.
- 5.4.10 Table 5.2 details the side road upgrades forming part of the proposed scheme. Chapter 8 (People and Communities: Community and Private Assets) outlines the expected diversions residential areas and commercial/industrial businesses would undergo as a result of the side road amendments.

Table 5.2: Proposed Side Road Amendments

Side road name	Approximate mainline chainage	Cross-section
C452 Foss Road	ch2700	Left in/left out junction - 5.7m wide carriageway (approx.) with 1m hardstrips and 2m verges.
C452 Clunie-Foss Road	ch3490	Left in/left out junction - 6m wide carriageway (approx.) with 1m hardstrips and 2m verges.

Access to Land and Properties

- 5.4.11 A number of rural properties, including farms, are located along the proposed scheme. Through consultation with residents and landowners, revised accesses are proposed to tie into the existing road network or onto the A9 carriageway via either the four left in/left out at-grade junctions/accesses as described above or via Rob Roy Way Underpass.
- 5.4.12 Table 5.3 details the revised access provision forming part of the proposed scheme.

Table 5.3: Proposed Access Amendments

Access name	Approximate mainline chainage	Cross-section
Dalshian Farm Access Track	ch0	As existing: 1.0m verges, 3.5m carriageway.
Littleton of Fonab to Middleton of Fonab Access Track	ch1900	As existing: 1.0m verges, 3.5m carriageway.
Rob Roy Way Underpass (Middleton of Fonab to Foss Road)	ch2500	As existing: 1.0m verges, 3.5m carriageway (carriageway widening provided).
Pitlochry Estate Direct Access	ch3750	As existing.
Tay Forest Access Track	ch6770	1.0m verges, 3.5m carriageway.
Kennel Cottage Access Track	ch6770	As existing: 0.5m verge, 2.5m carriageway

Pedestrian, Cyclist and Equestrian Provision

- 5.4.13 Alternative and new NMU path alignments, which include provision for pedestrians, cyclists and equestrians, have been considered throughout the design process and form part of the proposed scheme design. The NMU Access Strategy (Transport Scotland, 2016b) sets out several objectives with regards to NMU access provision as part of the A9 Dualling Programme which have been considered throughout the design development of the proposed scheme. This links back to Objective 3 outlined in Section 2.4 (A9 Dualling Programme Review) (Chapter 2: Need for the Scheme), providing the ability to 'facilitate active travel within the corridor' of the proposed scheme.
- 5.4.14 The paths that currently cross the existing A9 were derived from the Perth & Kinross Council (PKC), Core Path Plans (PKC, 2012), Right of Way data from Scotways, and local designated and undesignated paths identified by Jacobs and through consultation. The path realignments and new alignments are summarised below and illustrated in Figure 9.2. Further details are provided in Chapter 9 (People and Communities: All Travellers):
- ch50 to ch950: local path realignment (Dalshian Farm Access Track);
 - ch2450: Core Path PLRY/6 and Right of Way TP56 redirected through new underpass, Rob Roy Way underpass, and realigned along new footway adjacent to Foss Road;
 - ch2700 to ch3270: local path realignment;

- ch3400 to ch3770: local path realignment; and
- ch4600 to ch4700: local path diversion.

Underbridge Structures

- 5.4.15 As indicated in the preceding paragraphs, underbridges will be required at certain locations, associated primarily with grade separated junctions or the need to maintain existing access over or under the A9.
- 5.4.16 The structures design will be informed by strategic design guidance currently being prepared for the wider programme of A9 dualling, and is anticipated to include the following key requirements:
- open aspect / open span arrangement;
 - low bridge abutment heights;
 - leaf piers not to be used;
 - no piers in the central reserve; and
 - patterned profile type finish on all exposed vertical concrete surfaces.
- 5.4.17 As described in Chapter 4 (Iterative Design Development), the design of the proposed scheme retains the existing A9 crossing of the River Tummel (ch1000) as the southbound carriageway while a new bow string arch structure would be used as the northbound carriageway. Images 5.1 and 5.2 illustrate the design of the Tummel Crossing, additional information on the likely construction methods for the Tummel Underbridge is provided in Appendix A5.1 (Construction Information).



Image 5.1 Artist impression of the proposed Tummel Crossing

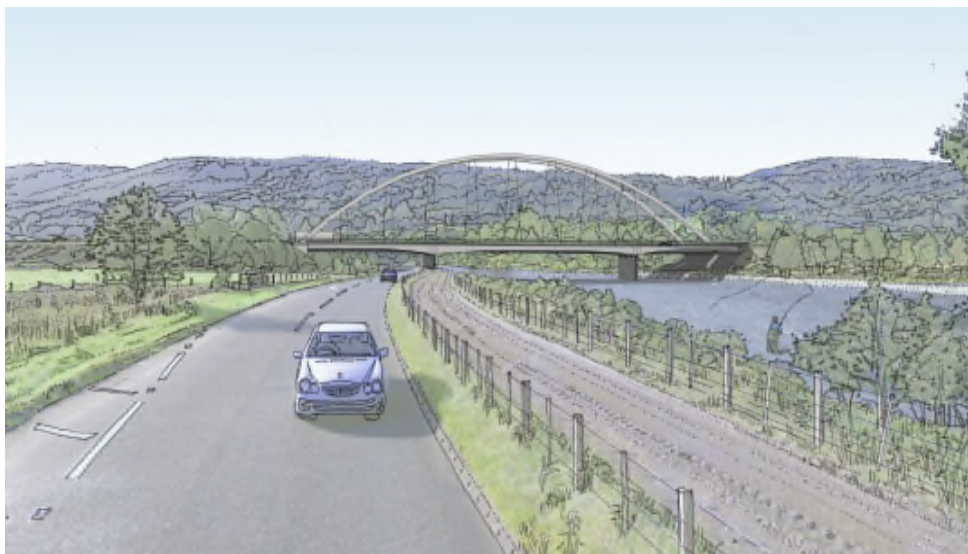


Image 5.2 Artist impression of the proposed Tummel Crossing (view from the A924)

- 5.4.18 Further north, the existing A9 structure crossing Loch Faskally (ch4250) would be retained as the northbound carriageway, while the proposed new structure, Clunie Underbridge (ch4250) would be constructed to accommodate southbound traffic. Image 5.3 shows Clunie Underbridge. Additional information on the likely construction methods for the Clunie Underbridges is provided in Appendix A5.1 (Construction Information).

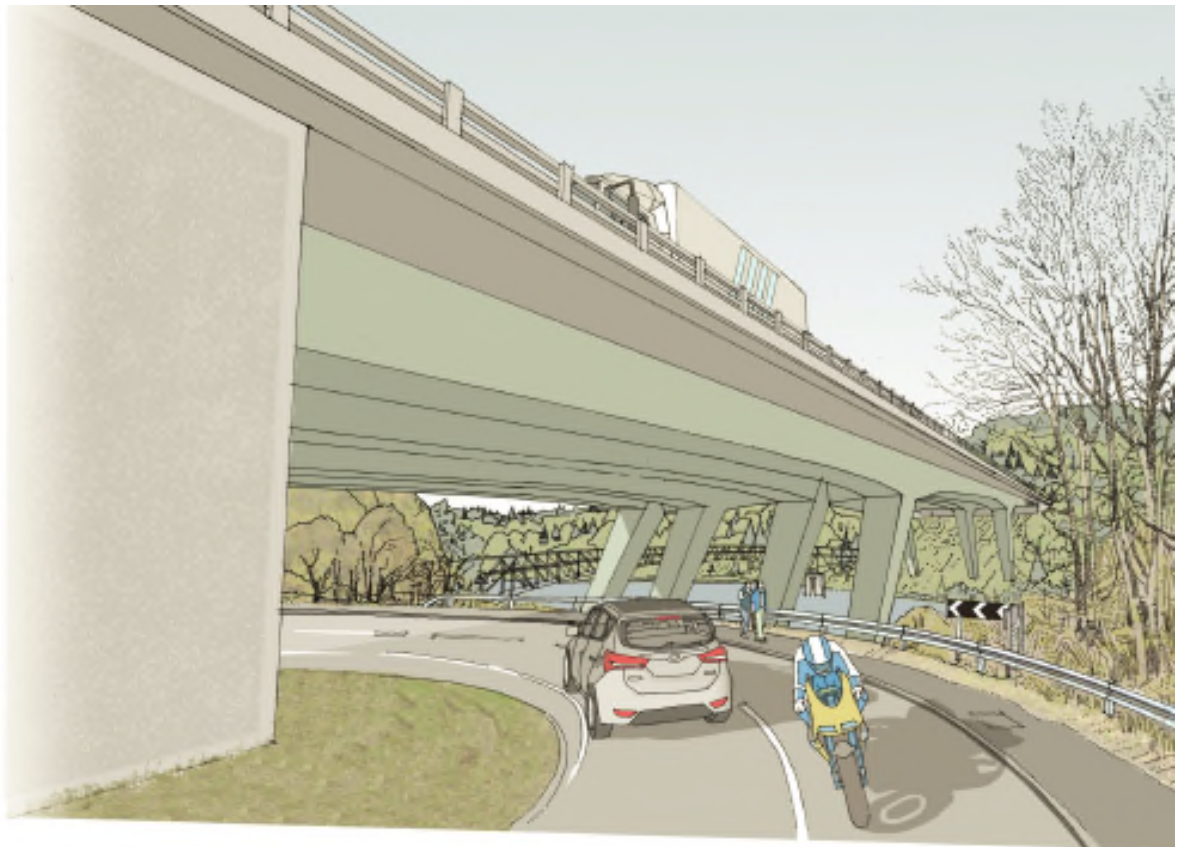


Image 5.3 Artist impression of the proposed Loch Faskally Crossing (view from C452 Clunie-Foss Road)

Earthworks

Cuttings and Embankments

- 5.4.19 Where the completed A9 carriageway is higher or lower than the surrounding ground level, embankments or cuttings will be required. Reducing the gradient of embankments (referred to as ‘grading out’) has been considered along the route to reflect local landform and aspects such as surrounding land use or other environmental constraints. Similarly, cuttings have been designed to take account of their visibility for road users and others along the A9 corridor. Available ground investigation information indicates that rock will be encountered in areas requiring excavation and may require blasting to achieve proposed levels. Further information on the design of embankments and cuttings is provided in Chapter 13 (Landscape).
- 5.4.20 The location (chainages) of cuttings and embankments in the DMRB Stage 3 design are shown on Figure 5.1, and summarised in Table 5.4 and Table 5.5 respectively.

Table 5.4: Cuttings in DMRB Stage 3 Design

Feature	Chainage		Anticipated Max Height (m)	Anticipated Slope Gradient
	From (m)	To (m)		
N-C1	ch1610	ch1710	8.0	1V:4H
	ch1710	ch1800	7.0	1V:3H
N-C2	ch1870	ch1900	5.0	1V:2H
	ch1900	ch1990	10.5	1V:3H
	ch1900	ch2100	16.5	1V:2.5H
	ch2100	ch2210	9.0	1V:3H

Feature	Chainage		Anticipated Max Height (m)	Anticipated Slope Gradient
	From (m)	To (m)		
N-C3	ch2760	ch2900	3.0	1V: 2H
N-C4	ch3020	ch3080	1.5	1V: 6H
N-C5	ch4890	ch4960	7.5	1V:3H
S-C1	ch4840	ch4960	23.0	1V: 2H
S-C2	ch5220	ch5390	18	1V: 2.5H
	ch5390	ch5500	21.5	1V: 2H
	ch5500	ch6000	36.0	1V: 2.5H
S-C3	ch6040	ch6360	2.5	1V: 2H

Table 5.5: Embankments in DMRB Stage 3 Design

Feature	Chainage		Anticipated Max Height (m)	Anticipated Slope Gradient
	From (m)	To (m)		
N-E1	ch90	ch420	6.5	1V: 2H
N-E2	ch480	ch650	8.5	1V: 2H
	ch650	ch730	8.0	1V: 3H
	ch730	ch830	5.0	1V: 2H
	ch830	ch900	7.0	1V: 3H
N-E3	ch1060	ch1310	8.0	1V: 2H
	ch1310	ch1400	9.5	1V: 3H
	ch1400	ch1540	9.0	1V: 2H
N-E4	ch1580	ch1610	3.32	1V: 2H
N-E5	ch1800	ch1870	8.0	1V: 2H
N-E6	ch3200	ch3220	2.0	1V :4H
N-E7	ch4360	ch4510	1.0	1V: 2H
N-E8	ch4540	ch4610	4.0	1V :4H
	ch4610	ch4700	6.0	1V :3H
N-E9	ch4780	ch4810	11.0	1V: 2H
	ch4810	ch4880	10.0	1V :4H
N-E10	ch4970	ch5080	19.0	1V :3H
	ch5080	ch5380	18.0	Variable - 1V: 2H Max
N-E11	ch5440	ch5580	6.0	1V :3H
	ch5580	ch5910	7.0	1V: 2H
	ch5910	ch6030	8.5	1V :2.86H
	ch6030	ch6310	7.5	1V :3H
	ch6310	ch6440	0.5	1V: 2H
S-E1	ch90	ch750	8.0	1V: 2H
	ch750	ch820	7.0	1V: 1.5V
S-E2	ch1160	ch1560	12.5	1V: 2H
S-E3	ch1600	ch1650	4.5	1V: 2H
	ch1650	ch1700	2.0	1V: 4H
	ch1700	ch1950	10.0	1V: 2H
	ch1950	ch2010	1.0	1V: 6H
	ch2010	ch2300	1.0	1V: 3H
S-E4	ch2580	ch2880	1.0	1V: 4H
S-E5	ch4340	ch4500	20.0	1V: 2H
S-E6	ch4540	ch4620	12.0	1V: 2H
S-E7	ch4680	ch4840	9.0	1V: 2H

Feature	Chainage		Anticipated Max Height (m)	Anticipated Slope Gradient
	From (m)	To (m)		
S-E8	ch4960	ch5220	2.0	1V: 2H
S-E9	ch6000	ch6040	2.0	1V: 2H

Earthworks Balance

- 5.4.21 A summary of the estimated earthworks quantities for construction of the proposed scheme is provided in Table 5.6, with further details of material use and management of waste during construction provide in Chapter 17 (Materials).

Table 5.6: Estimated Earthworks Volumes*

Import/Export	Volume (m ³)
Total Acceptable Cut Available (excl. Topsoil)	734,800
Total Fill Required (excl. Topsoil)	886,800
Total Imported Fill Required	152,000
Total Acceptable Topsoil Available	107,100
Total Topsoil Required	77,600
Surplus Acceptable Topsoil Available	29,500

*Based on preliminary GI results assumes 90% acceptability.

Fencing and Environmental Barriers

Fencing

- 5.4.22 To secure the land area acquired for the implementation of the proposed scheme, temporary fencing will be erected prior to the commencement of construction, where appropriate. There is likely to be a requirement for stock-proof fencing in some areas, where pasture land bounds the proposed scheme.
- 5.4.23 On completion of the works alternative methods of signifying property boundaries may include the planting of hedgerows or the construction of walls. However, it is important to note that much of the existing A9 is not fenced and a highway fence that would stretch the full length of the proposed scheme is not a requirement for an all-purpose A-class road.

Environmental Barriers

- 5.4.24 Environmental barriers are required to reduce the potential impacts of the proposed scheme at specific locations. Where a requirement has been identified within this ES, environmental barriers will be incorporated to provide mitigation for mammals (including otter and badger fencing) or noise attenuation. These are described respectively in Chapter 12 (Ecology and Nature Conservation) and Chapter 17 (Noise and Vibration).

Drainage Design and Watercourse Crossings

- 5.4.25 The proposed drainage design and proposals for watercourse crossings take into consideration the Water Environment (Controlled Activities) Regulations 2011 (CAR) (Scottish Government, 2011b). These regulations require certain licences to be sought for design and construction activities affecting watercourses, including engineering works (culverts and bridges) and discharges (outfalls, attenuation and treatment). The watercourse crossings and drainage design have been discussed with the SEPA in the context of CAR requirements and further details are contained in Chapter 11 (Road Drainage and Water Environment) and Appendix A11.8 (Watercourse Crossing Report).
- 5.4.26 It is currently intended that Transport Scotland will provide the Contractor(s) with draft CAR licence applications based on the DMRB Stage 3 design. The appointed Contractor(s) will have responsibility for submitting finalised applications and securing CAR authorisation based on their detailed design.

Drainage Design and Flooding

- 5.4.27 The drainage design for the proposed scheme has been developed in accordance with SuDS guidance and through consultation with SEPA and PKC. In certain areas along the existing A9 there are lengths of filter drain in the verges that provide initial (one SuDS level) of treatment for some of the run-off from the road and/or adjacent earthworks slopes. Construction drainage is discussed in Appendix A5.1 (Construction Information).
- 5.4.28 A minimum of two levels of SuDS is intended to be included for all mainline outfalls in agreement with SEPA and SNH. There are five drainage runs (A, B, D1, E and F) associated with the proposed scheme where two levels of treatment using conventional SuDS have not been possible. This is due to the relevant drainage runs being constrained by fluvial flood extent, ancient woodland and topography, with subsequent associated impacts on flood risk, ecology and landscape from the adoption of conventional SuDS (e.g. a basin). However, additional levels of treatment are achieved on these runs through the adoption of proprietary (i.e. non-conventional) SuDS, which includes vortex separator chambers and geocellular storage. SEPA has been consulted on the drainage proposals and additional information is provided in Chapter 11 (Road Drainage and Water Environment).
- 5.4.29 The proposed drainage system makes use of filter drains to provide most of the carriageway drainage. Exceptions to this include kerbed areas, such as junctions and bridge decks where gullies or combined kerb and drainage units would be used to collect surface water. As part of the drainage system, a series of retention ponds are included in the proposed scheme design to delay the discharge of surface water to watercourses and remove pollutants by providing water storage.
- 5.4.30 Pre-earthworks drainage consisting of shallow filter drains or lined ditches would be used to collect run-off from adjacent land and field drains. The proposed pre-earthworks drainage system will accommodate a short duration, high intensity 10% AEP (1-year) rainfall event, without surcharging. The proposed pre-earthworks drainage design will also ensure the 20% AEP (5-year) rainfall event will not exceed the chamber cover and flood the carriageway. A 20% allowance for the effects of climate change has been incorporated into the pre-earthworks drainage design.
- 5.4.31 All run-off from the proposed scheme will be collected and treated via the proposed drainage system prior to discharge. For new outfalls, SuDS are designed to treat and attenuate the peak flow from the new highway drainage system during a 0.5% AEP (200-year) rainfall event, including a 20% allowance for climate change ('plus CC'). Four proposed drainage runs (A, B, E and F) will not provide attenuation to the full 0.5% AEP (200-year) plus CC standard due to the inability to accommodate conventional SuDS (e.g. a basin) within the drainage runs (refer to paragraph 5.4.29). However, attenuation storage and peak run-off rate reduction will be provided on these catchments through the adoption of filter drains as a level of treatment. In addition, the receiving watercourses (River Tummel, Loch Faskally) are not deemed sensitive to a reduced attenuation standard due to their high flows ($Q_{95} > 19\text{m}^3/\text{s}$) and the lack of attenuation currently afforded within the existing A9 drainage.

Watercourse Crossings

- 5.4.32 Wherever possible, watercourses will be maintained along their existing line. There are numerous existing watercourses that pass underneath the existing A9 carriageway, and these crossings will generally be extended or replaced in their current location.
- 5.4.33 The detailed design of these watercourse crossing structures would be developed by the appointed Contractor, subject to suitable provision being made for flood flows and ecological and geomorphological mitigation, and compliance with the environmental commitments detailed within this ES. Additional information is provided in Chapter 11 (Road Drainage and the Water Environment), Appendix A11.8 (Watercourse Crossing Report) and Chapter 12 (Ecology and Nature Conservation).

Traffic Signs and Lighting

Traffic Signs

- 5.4.34 Traffic signage required for the proposed scheme would be prepared to the relevant design standards. The detailed design of this element of the works would be the responsibility of the appointed

Contractor(s), and subject to compliance with the contract documents. As part of the design process, the Contractor would consult Transport Scotland and the local roads authorities.

Lighting

- 5.4.35 A lighting appraisal was carried out as part of the DMRB Stage 3 engineering assessment to assess the need and economic value of providing road lighting from Pitlochry to Killiecrankie. The existing route is currently not lit, and generally from an environmental perspective it is preferable to avoid road lighting in rural areas, as this increases visual intrusion at night.
- 5.4.36 The DMRB Stage 3 appraisal concluded that it is not necessary to provide lighting along the whole route. For safety reasons and to achieve compliance with DMRB TD22/06 'Layout of Grade Separated Junctions' it is required that lighting is provided only at Pitlochry North Junction, where the slip road meets with the local road network. Furthermore, it is proposed to light the Rob Roy Underpass and also part of the Middleton of Fonab Cottages access track. Further detailed design will seek to minimise lighting impacts at these locations.

5.5 Construction Methods and Programme

- 5.5.1 This section provides a brief overview of the envisaged construction programme and typical construction activities. Typical construction methods for these activities and the construction assumptions made for the purposes of this ES are provided in Appendix A5.1 (Construction Information). This section sets out a possible construction sequence for the proposed scheme, however, the design and construction process adopted by the appointed Contractor may vary from that described in this outline methodology. The appointed Contractor would be permitted to change the construction process and duration of each works element provided that environmental impacts are no greater than those described in this ES, and that commitments given in this ES are adhered to (or measures providing equivalent mitigation, subject to agreement with Transport Scotland).
- 5.5.2 It is currently anticipated that construction will not commence before 2019 and is expected to have duration of 3-3.5years.

Outline Construction Programme

- 5.5.3 To assist the EIA process, the duration of construction activities has been estimated. It is difficult to determine a precise timescale for each element of the works as this will ultimately be determined by a number of factors such as the commencement date of the works, and the construction methods proposed by the appointed Contractor. An outline of the possible timing for the works is indicated in Table 5.7.

Table 5.7: Indicative Construction Works Timescales*

Phase Number	Timescale
Phase 1	
Mobilisation	April – June 2019
Traffic Management	June 2019
Southern tie-in to Pitlochry South Junction (incl. Tummel Underbridge)	June 2019 – October 2021
Tummel to Clunie (incl. Clunie Underbridge)	June 2019 – September 2020
Pitlochry North Junction to Tie-in	June 2019 – May 2021
Phase 2	
Reconfiguration of traffic management in advance of Phase 3	May 2021
Southern tie-in to Pitlochry South Junction (incl. Tummel Underbridge).	May 2021 – October 2021
Tummel to Clunie (incl. Clunie Underbridge)	May 2021 – January 2022
Pitlochry North Junction to Tie-in	May 2021 – November 2021

Phase Number	Timescale
Phase 3	
Crossover and Remaining Sections of Mainline and Tie-Ins	January 2022
Tummel to Clunie (incl. Clunie Underbridge)	January 2022 – March 2022
Pitlochry North Junction to Tie-in	January 2022 – February 2022
Road opening	March 2022

* For the purposes of assessment an indicative start date of 1st April 2019 has been used.

Typical Construction Activities

5.5.4 The key elements of the construction works have been broken down to facilitate the assessment of potential environmental effects. The construction activities associated with the proposed scheme are outlined in Table 5.8.

Table 5.8: Typical Construction Activities

Section	Construction Activities
Advance Works	<ul style="list-style-type: none"> • Environmental mitigation to be implemented in advance of the main construction contract. • Advance services diversions. • Building demolitions. • Archaeological investigations and excavations. • Site Clearance.
Roadworks	<ul style="list-style-type: none"> • Site establishment and plant compounds at strategic locations. • Temporary and permanent fencing. • Site clearance and demolition. • Temporary and permanent surface water outfalls. • Service diversions. • Topsoil stripping and storage. • Pre-earthworks drainage. • Earthworks (cuttings and embankments). • Environmental bunds and landscaping. • Drainage, service ducts and chambers. • Topsoil spreading, seeding and turfing. • Pavement construction. • Roadwork finishes including safety barriers, signs, road markings. • Accommodation works.
Structures	<ul style="list-style-type: none"> • Construction of river crossings. • Bridge construction. • Culvert construction. • Retaining wall construction.
Environmental	<ul style="list-style-type: none"> • Earthworks mitigation. • Landscape and ecological mitigation planting.
Temporary Works	<ul style="list-style-type: none"> • Temporary works to facilitate bridge construction. • Temporary carriageway to maintain traffic flows where roads are narrow or are affected by construction of the scheme. • Narrow lanes, contraflows or lane / road closures. • River or stream diversions to facilitate culvert construction. • Temporary balancing ponds at drainage outfalls.
Maintenance	<ul style="list-style-type: none"> • Landscaping maintenance. • Pavement rehabilitation and other routine maintenance and defects repair works. • Winter maintenance.

Construction Compounds

- 5.5.5 The location of construction compounds is unknown at this stage, as these will be determined by the appointed Contractor depending on the phasing and execution of the works. However, where possible these would be located close to the proposed works where there is suitable access.
- 5.5.6 The proposed scheme is to be progressed under the Roads (Scotland) Act 1984. The appointed Contractor may wish to acquire additional land for construction compounds outside the land identified on the Compulsory Purchase Orders (CPOs). In this case, a separate planning application or a number of planning applications for the construction compounds may be required. This would also apply to any other land that may be required beyond the CPO for related activities such as temporary access routes/haul roads.
- 5.5.7 The construction compounds would provide workplace/welfare facilities (e.g. toilets, staff areas), and parking for office based staff and site operatives. In addition, stores and workshop areas (located within or near the compounds) would be provided for the construction phase.

Environmental Mitigation

- 5.5.8 The appointed Contractor would be required to implement all relevant environmental mitigation measures at the appropriate time. These would include a range of measures to avoid or reduce construction and operational impacts.
- 5.5.9 Where practicable, physical environmental mitigation features, such as earthworks, would be constructed soon after the completion of the main engineering elements. Earthworks slopes and verges would be topsoiled and seeded/planted early to minimise the risk of sediment-laden run-off, which may affect the carriageway drainage system and create a potential pollution risk to watercourses. Planting works and ecological habitat creation areas are seasonally dependent and these may be left until later in the construction period following completion of the main works.

5.6 Land Acquisition

- 5.6.1 Most construction work would take place within the limit of the land made available (LMA) to the appointed Contractor as defined within the contract documents, an indicative LMA is shown on Figure 5.2, which has informed the habitat and woodland loss calculations undertaken for assessment purposes in this ES.
- 5.6.2 As explained in paragraph 5.5.5, construction compounds may be located outwith the purchased land. The land made available would include land acquired under CPO, land to which the Scottish Ministers already has ownership of or access to, or other areas the appointed Contractor has acquired by landowner agreement to facilitate construction of the works.
- 5.6.3 The land to be acquired for the proposed scheme includes land necessary to construct the proposed scheme and associated infrastructure and to undertake essential environmental mitigation measures.
- 5.6.4 The appointed Contractor may wish to utilise other areas of land not covered by the CPO. In such an instance, the appointed Contractor would have to secure the use of these areas by agreement and through separate planning applications, where appropriate. As the requirement and potential location of such areas is currently unknown, it has not been possible to include an assessment of the effects of them within this ES.

Loss of Designated Areas

River Tay SAC

- 5.6.5 Following design refinement to avoid the River Tay SAC where possible, the DMRB Stage 3 design requires approximately 2.21ha of temporary and permanent loss of terrestrial and aquatic habitats of the River Tay SAC. The majority of this would be required to facilitate the construction of the proposed scheme (2.19ha) which would be returned to their former habitat type post-construction.

- 5.6.6 Approximately 222m² of River Tay SAC habitat is predicted to be lost as a result of the proposed scheme's construction (Table 5.9). Approximately 62m² would be lost as a result of outfalls/discharge points. However, approximately 13m² of this would be to create small channels between the outfall headwalls and Loch Faskally and would therefore be 'altered' habitat rather than a permanent loss. The remaining 160m² of habitat to be lost comprises woodland and grassland habitat at Pitlochry South Junction and the Clunie Underbridge.
- 5.6.7 Details of the permanent River Tay SAC habitat loss as a result of the proposed scheme are provided in Table 5.9.

Table 5.9 Permanent River Tay SAC habitat loss as a result of the proposed scheme

Location (approx.)	Habitat Type	Area (approx.)		Item of Infrastructure / Notes
		ha	m ²	
ch400-ch600 (drainage outfall)	Aquatic & Terrestrial (riverbank)	<0.01	40	Outfall (River Tummel)
ch950 (drainage outfall)	Aquatic & Terrestrial (riverbank)	<0.01	9	CPO area to facilitate works and under crossing
ch850 (Pitlochry South Junction – Field Access)	Terrestrial	0.01	100	Field access. Includes approximately 10m ² SAC within Highway Boundary
ch4320-ch4340 (drainage outfalls)	Aquatic & Terrestrial (riverbank)	<0.01	13	Construction of small channels between outfall headwalls and Loch Faskally
ch4320-ch4340 (Clunie Underbridge)	Aquatic & Terrestrial (riverbank)	<0.01	60	CPO area for bridge foundations.
Total		0.02	222	

Ancient Woodland

- 5.6.8 Following design refinement to avoid ancient woodland (designated as AWI) where possible, the DMRB Stage 3 design results in approximately 16.8ha of ancient woodland loss. However, the proposed scheme includes 18.55ha of compensatory planting as shown on Figure 13.5 and detailed in Table 12.14 of Chapter 12 (Ecology and Natural Conservation). The planting proposed is in seven broad areas of variable size distributed along the proposed scheme. The areas have been selected to maximise the biodiversity benefit of planting; maintain connectivity of existing AWI sites, and maximise opportunities to maintain functionality of local ancient woodland communities throughout the route corridor. It is also proposed that soil from high quality AWI sites will be re-used as appropriate to maintain fungal and invertebrate microbial biodiversity and provide a seed bank.

5.7 References

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