3 Alternatives Considered

3.1 Introduction

3.1.1 EIA regulations require consideration of the main alternatives studied, and an indication of the main reasons for choices made, taking into account potential environmental impacts.

3.1.2 This chapter briefly discusses the background to alternative mainline alignment and junction options considered during previous DMRB Stage 1 and Stage 2 assessments for Project 8, Dalwhinnie to Crubenmore and summarises the reasons for the preferred route selected.

3.2 DMRB Stage 1

3.2.1 DMRB Stage 1 focused on identifying a preferred corridor for A9 Dualling. As explained in **Chapter 1**, PES and SEA assessments identified and considered route-wide constraints and issues. The assessments considered three high-level, strategic alternative dualling corridor options:

(1) On-line widening – dualling along the existing A9 single carriageway sections, to tie in with the existing dualled sections

(2) On-line widening with some near off-line dualling – dualling along the existing A9 route, with near off-line dualling where constraints dictated

(3) Offline alternative route corridor options – dualling via seven possible alternative routes to the existing A9, as highlighted in **Figure 3-1** below.

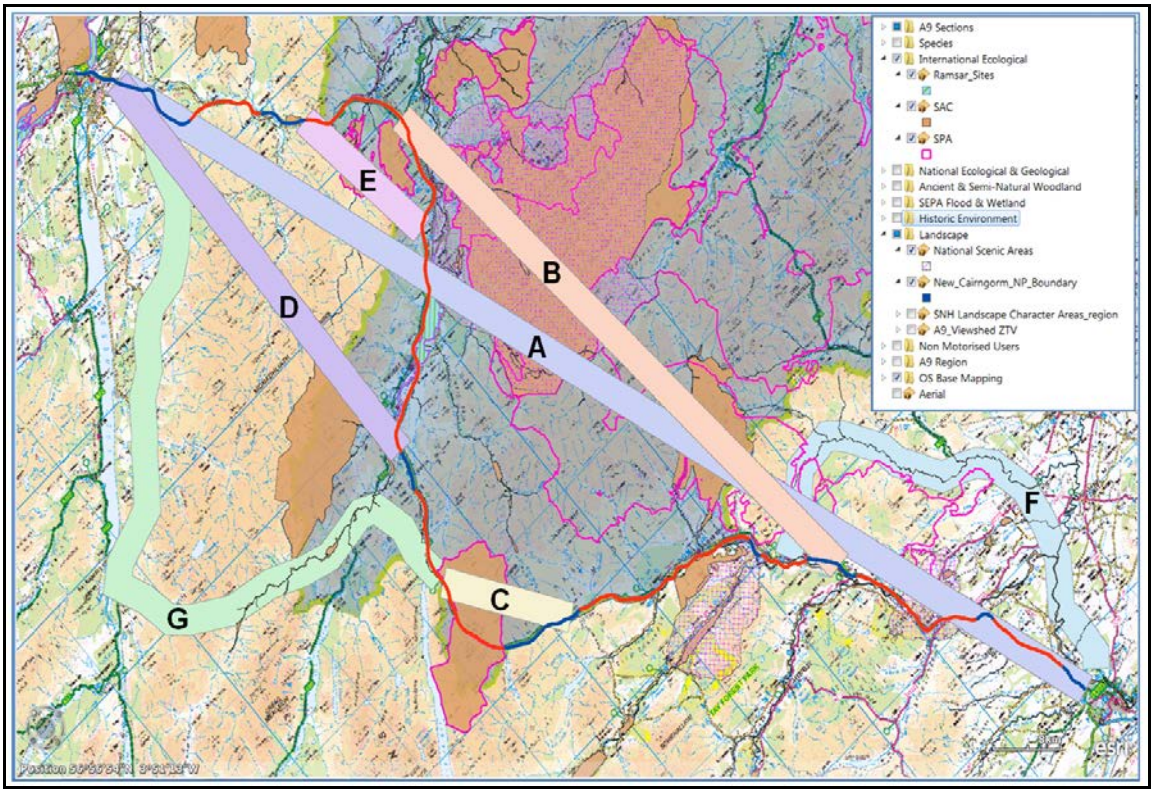

Figure 3-1: Alternative route corridors (A-G) considered via DMRB Stage 1 PES and SEA

3.2.2 As the Scottish Government's 2011 IIP committed to A9 dualling, a 'do nothing' option was not considered. The DMRB Stage 1 Reports, identified that on-line dualling, generally following the route of the existing A9, was the most suitable option.

3.2.3 An on-line dualling corridor was identified as a 200m-wide corridor centred on the existing A9. However, it was noted that the 200m-wide corridor represented an indicative 'soft' boundary that could be extended locally, depending on constraints encountered at later design and environmental assessment stages.

3.2.4 DMRB Stage 1 reports note that the A9 is to be designed as a Category 7A dual carriageway, and therefore only grade separated junctions were to be permitted, with isolated left-in, left-out junctions where a feasible alternative did not exist. Existing at grade junctions were to be upgraded or closed to prevent right turn manoeuvres across the carriageway. DMRB Stage 1 therefore identified the need for a new grade separated junction to service Dalwhinnie and connect to the A889.

3.3 DMRB Stage 2 – Mainline Options Assessment

Initial Mainline Review

3.3.2 Following the selection of the preferred online dualling corridor via DMRB Stage 1, the further development of dualling proposals moved from the strategic, route-wide level of consideration, to distinct project-specific considerations. For Project 8, Dalwhinnie to Crubenmore, a preliminary range of three mainline alignment options were initially developed for DMRB Stage 2 assessment:

- Widening to the east of the existing A9
- Widening to the west of the existing A9
- Widening to both sides of the A9 (symmetrical widening)

3.3.3 These designs complied with a design speed of 120 kph, in accordance with DMRB TD 9/93 Highway Link Design, and the stated requirement for a Category 7A all-purpose dual carriageway.

3.3.4 Each of these options was produced to test where current dualling design standards might or might not be achievable, within the surrounding topographical constraints, and to identify where any significant environmental constraints might or might not be avoidable.

3.3.5 Each initial mainline option was divided into 1.5km lengths and assessed against engineering and environmental constraints. The alignments were reviewed against known constraints, to make an initial identification of the following:

- Lengths of the A9 where significant constraints were such that a clear decision could be taken to widen on one side only
- Lengths of the A9 where the combination of constraints was such that a clear decision could not be made, and widening to either side would have to be considered and further assessed to compare constraints and opportunities
- Lengths of the A9 where alternative options further removed from the existing mainline alignment were identified as having potential merits, therefore these were to be included for assessment of impacts and opportunities

3.3.6 Due to the need to keep the A9 open during construction, fully symmetrical widening was generally discounted from further consideration and the number of transitions required from east to west was also carefully considered to keep them to a minimum.

3.3.7 The outcome of this initial assessment was a series of recommendations on where dualling should be considered to the east or west of the existing route to avoid significant constraints.

Mainline Options

3.3.8 Following the initial mainline review, a series of mainline alignment options were developed to a level of detail suitable for comparative assessment between options, such that the Proposed Scheme could be established within the preferred DMRB Stage 1 corridor. Options were sufficiently developed to indicate the approximate dimensions of embankments and cuttings and the locations of principal structures.

3.3.9 At this stage, the Project 8 extent was divided into four distinct assessment 'sections'. Each section was defined using highway 'chainage' (ch.) referencing to indicate the location of elements of the Proposed Scheme. Project 8 chainage begins at the southern extent at ch. 20,000 and is generally discussed in 50m increments from south to north.

- Section 1 – ch. 20,000 to 21,750
- Section 2 – ch. 21,750 to 24,300
- Section 3 – ch. 24,300 to 28,750
- Section 4 – ch. 28,750 to tie in with the existing Crubenmore dual carriageway at approximate ch. 31,050

3.3.10 The mainline alignment options that were developed for the DMRB Stage 2 assessment are illustrated in **Figure 3-2** and described below. Sections 1 and 4 were single option sections (referred to as Options 1a and 4a), whereas Section 2 had three options (2a, 2b, 2c) and Section 3 had two options (3a and 3b).

Section 1 – Option 1a

3.3.11 Section 1 ran from the start of Project 8, at the interface with the northern extent of Project 7 Glen Garry to Dalwhinnie, to a point slightly north of the existing Dalwhinnie junction. The River Truim (designated as part of the River Spey SAC) is a predominant feature through this area and the primary reason for mainline widening being confined to the east, i.e. the southbound carriageway side.

Section 2 – Options 2a, 2b and 2c

3.3.12 The topography and constraints through Section 2 were such that mainline options to either side of the existing carriageway were considered. **Table 3-1** summarises the three options.

Table 3-1: DMRB Stage 2 mainline options, Project 8, Section 2

DMRB Stage 2 mainline	Design
Option 2a	Online widening to the east, i.e. southbound carriageway side
Option 2b	Online widening to the west, i.e. northbound carriageway side
Option 2c	Offline widening to the east, i.e. split carriageway on the southbound side – developed as separation of carriageways potentially reduced the need to realign the SSE Aqueduct

Section 3 – Options 3a and 3b

3.3.13 Section 3 passes the settlement of Cuaich; this section is generally located on a hillside (sloping from east to west), crossing several watercourses and coming close in a number of locations to the HML railway. Several constraints, including the River Truim (River Spey SAC), Cuaich and the railway, dictated that widening should be to the east of the existing mainline.

Table 3-2: Section 3 options

DMRB Stage 2 mainline	Summary
Option 3a	Online widening to the east, i.e. southbound carriageway side
Option 3b	Offline widening to the east, i.e. split carriageway on the southbound side – developed as separation of carriageways potentially helped address hill slopes and watercourse crossing issues

Section 4 – Option 4a

3.3.14 The single option 4a in Section 4 was dictated by the HML railway and River Truim constraints to the west and steep hill slopes to the east. The alignment option begins with dualling to the east (southbound) side before transitioning to the west (northbound) side to tie in with the existing dualled section at Crubenmore.

DMRB Stage 2 Preferred Mainline Option

3.3.15 Due to the multiple options available in Section 2 and Section 3, a total of six combined mainline options were available for DMRB Stage 2 consideration, as outlined in **Table 3-3** and shown on **Figure 3-2.**

Table 3-3: Combined mainline options (DMRB Stage 2)

Mainline Option No.	Section 1 Option	Section 2 Option	Section 3 Option	Section 4 Option
Mainline 1	1a	2a	3a	4a
Mainline 2	1a	2a	3b	4a
Mainline 3	1a	2b	3a	4a
Mainline 4	1a	2b	3b	4a
Mainline 5	1a	2c	3a	4a
Mainline 6	1a	2c	3b	4a

3.3.16 Within Section 2, Option 2a had the lowest material import requirements and smaller scale cuttings and embankments which resulted in lower predicted levels of impact on local peat and potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) areas.

3.3.17 Option 2a aligned new construction on the opposite side of the A9 from visual receptors at Dalwhinnie, thereby minimising predicted impacts versus Option 2b, which would require construction on the west side, facing Dalwhinnie.

3.3.18 Option 2a also maintains the route within a relatively narrow corridor when compared to Option 2c (offline), and therefore minimised predicted impacts on the Phoines Estate sporting activities and operations.

3.3.19 By maintaining construction activity on the east side, Option 2a simplifies construction stage traffic management in that it reduces the need for additional carriageway crossovers between Sections 1, 2 and 3.

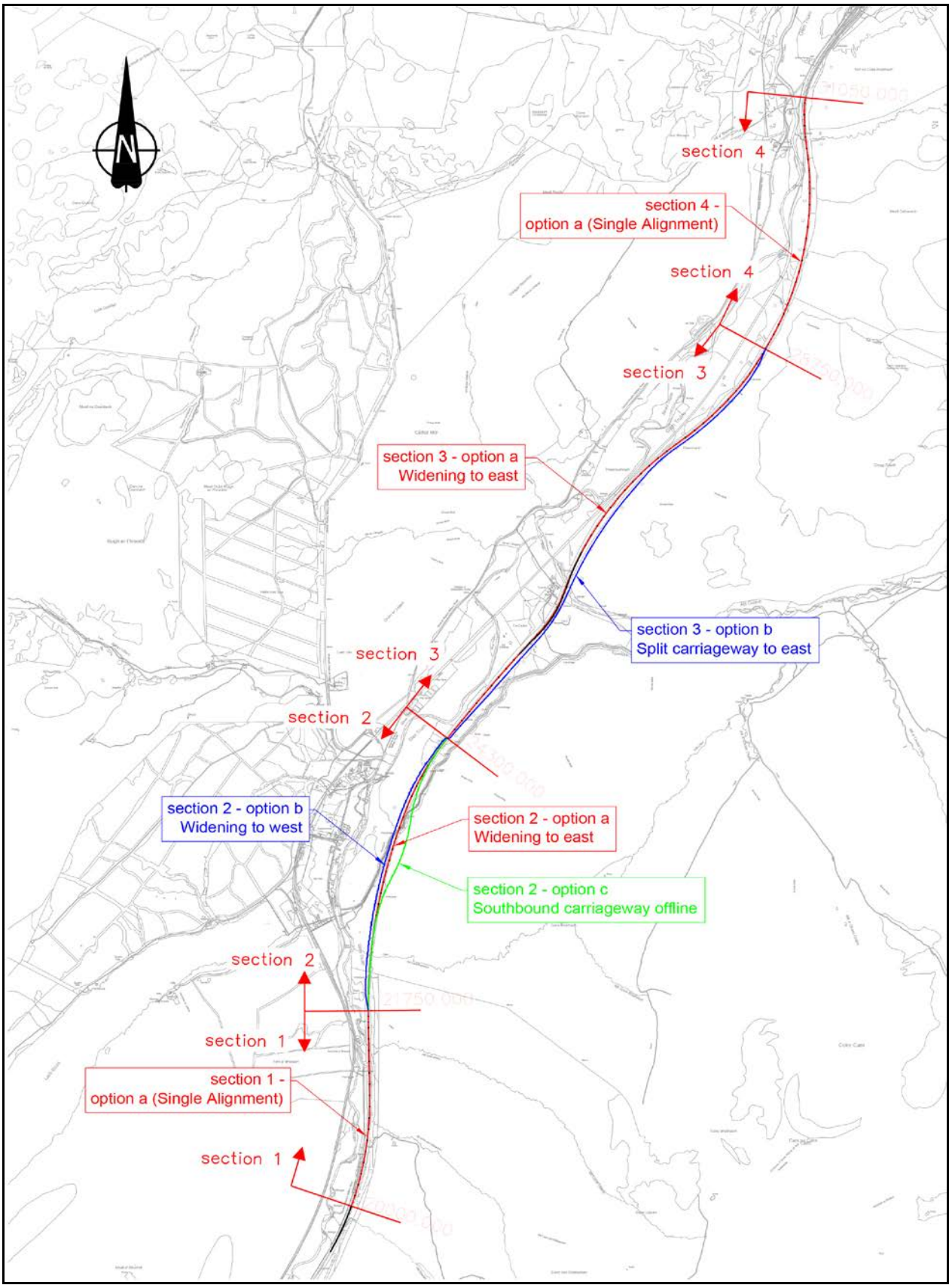

Figure 3-2: Project 8 mainline sections and options assessed at DMRB Stage 2

3.3.20 Within Section 3, Option 3a had the lowest material import requirements and smaller scale cuttings and embankments which resulted in lower predicted levels of impact on local peat and potential GWDTE areas.

3.3.21 Option 3a also maintained the route within a relatively narrow corridor when compared to Option 3b (offline), and therefore minimised predicted impacts on the Phoines Estate sporting activities and operations.

3.3.22 As a result of the DMRB Stage 2 assessments, followed by Route Selection Workshops, alignment options 2a and 3a were recommended as the preferred options through Sections 2 and 3 respectively. When added to the single options developed through Sections 1 and 4, combined Mainline Option 1 (incorporating options 1a, 2a, 3a and 4a) was selected as the preferred mainline option to be taken forward to DMRB Stage 3 for further design detailing and environmental impact assessment.

3.4 DMRB Stage 2 – Dalwhinnie Junction Options Assessment

Initial Junction Review

3.4.2 At the outset of DMRB Stage 2, a wide range of preliminary junction options were developed to consider the broad range of issues associated with retaining provision in proximity to the existing Dalwhinnie A9/ A889 Junction, or providing a new junction to the south, or to the north, of the SSE Aqueduct crossing. Given the range of possible locations and layouts, a series of split junction options were also considered.

3.4.3 In total, 32 initial layouts were developed across the various location options (north/ south of SSE Aqueduct or split location). Each preliminary location and layout option was considered in terms of potential effects or issues related to biodiversity (e.g. encroachment into designated sites), landscape, accessibility/ severance, potential impacts on property constraints and flood plain encroachment. The environmental review was coupled with an engineering review, to sift through and enable the removal of a number of options on the basis that layouts:

- were either very similar, or had very minor differences, and could be consolidated into a single option
- would require a deviation from design standards compliance, so could be removed from further consideration
- were clearly more constrained by significant engineering or environmental issues

3.4.4 Following this initial review, 15 layout options, across the three principal locations, were taken forward for preliminary public consultation events and meetings in Dalwhinnie. Consultation feedback received was recorded and incorporated into the junction options sifting process.

3.4.5 The final stage of initial junction options sifting focused on environment, engineering, safety and accessibility issues, including public consultation feedback; following which, a shortlisted range of five junction options were taken forward for further DMRB Stage 2 design development and assessment, as summarised in **Table 3-4** and **Figure 3-3** below. All five options selected were located to the south of the SSE Aqueduct.

Table 3-4: Dalwhinnie junction options taken through DMRB Stage 2 comparative assessment

Junction Option	Description
23	Single location incorporating loop layout, with overbridge (link road over mainline)
26	Single location incorporating dumbbell layout with underbridge (link road under mainline)
27	Single location incorporating staggered diamond layout with underbridge (link road under mainline)
29	Single location incorporating loop layout with underbridge (link road under mainline)
31	Split location in proximity to existing junction location (south of Dalwhinnie) on northbound carriageway, and a loop layout on the southbound carriageway, with underbridge (link road under mainline)

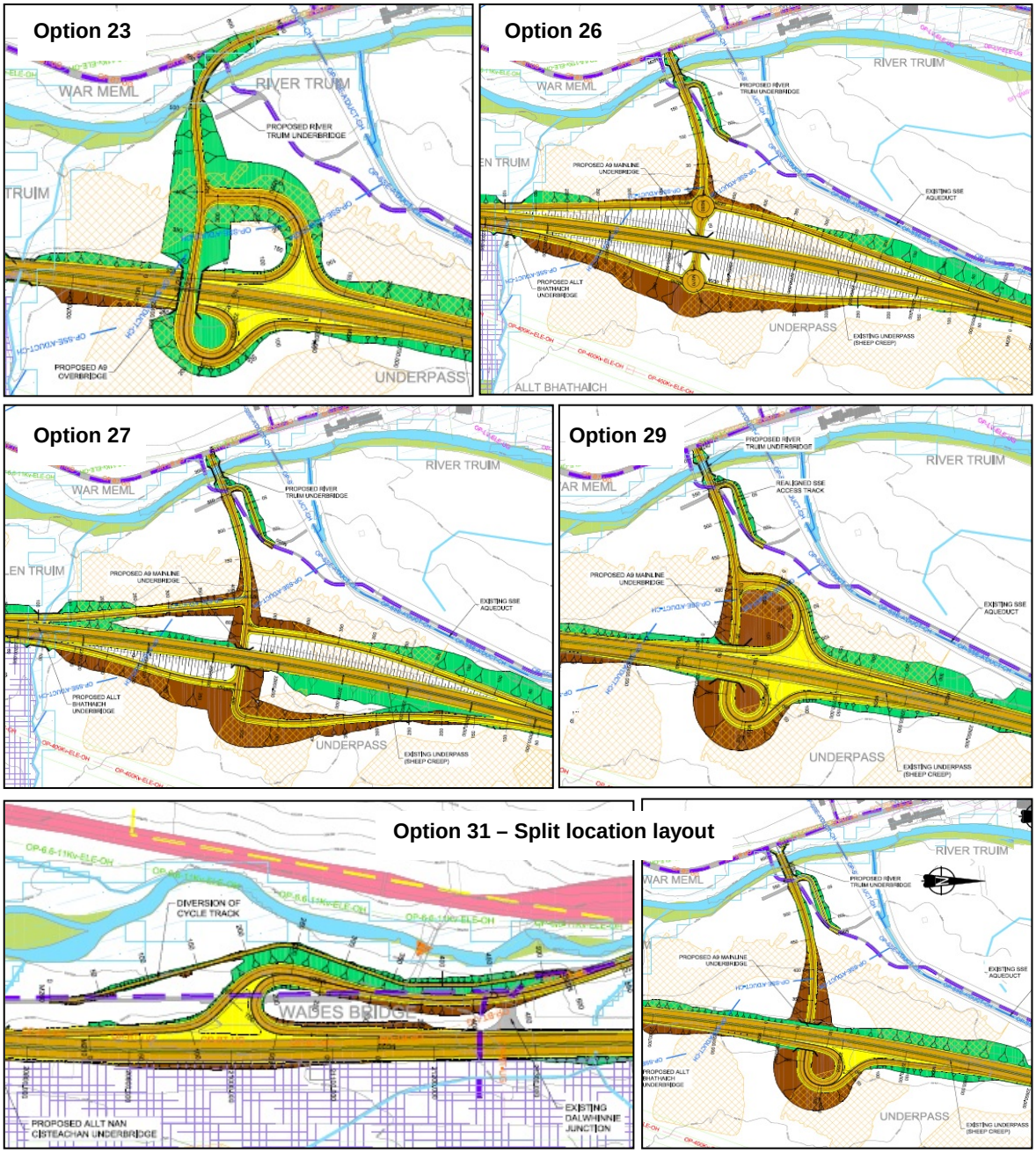

Figure 3-3: Dalwhinnie junction options taken through DMRB Stage 2 comparative assessment

3.4.6 Junction options located to the north of the SSE Aqueduct were eliminated principally due to identified difficulties in crossing a much wider floodplain, with limited opportunity to mitigate

landscape and visual impacts, and significant costs of longer multi-span bridges required to cross the Truim floodplain. There were also a range of traffic movement and noise disturbance issues, with connections into Dalwhinnie much closer to local residential properties.

DMRB Stage 2 Junction Options Assessment

3.4.7 The DMRB Stage 2 assessment of the five shortlisted Dalwhinnie Junction options identified that either of Junction Options 27 and 29 were preferable when compared against the other options.

3.4.8 Option 23 was rejected principally due to the inclusion of a bridge over the mainline; which was not favoured under landscape and visual assessment. Option 26 included roundabouts, so was discounted as these could require the introduction of new lighting in the Cairngorms National Park. The split layout Option 31 was not favoured due to winter operation concerns, the northbound access proximity to the River Spey SAC, flood plain and Wades Bridge, and the need to re-route the National Cycle Network in the affected area.

3.4.9 When Junction Options 27 and 29 were compared directly, it was considered that the diamond layout (Option 27) would offer greater opportunity for mitigation planting to screen views from Dalwhinnie and other receptors. The Option 29 loop layout was less favoured by CNPA.

3.4.10 Following consultation with the A9 Dualling Environmental Steering Group, public consultation and Preferred Route Workshops, Junction Option 27 (staggered diamond with underbridge layout) was recommended as the preferred junction option to serve Dalwhinnie and the A889.

3.5 DMRB Stage 2 – Preferred Options

3.5.1 Following DMRB Stage 2 engineering, environmental and economic assessments, combined Mainline Option 1 and Dalwhinnie Junction Option 27 were selected as the preferred route options. The preferred route alignment and Dalwhinnie Junction location and layout was shared via public exhibition in Dalwhinnie in March 2016, before progression to DMRB Stage 3 design development and assessment.

3.5.2 The DMRB Stage 3 design development process, i.e. progression from Stage 2 to include drainage networks and SuDS, watercourse crossing structures and culverts, accesses and alternative connections, is discussed in the following chapter of this ES, and the Proposed Scheme being assessed and considered under the EIA is described in **Chapter 5.**

3.5.3 Note that **Chapter 4**, explains that in the intervening period between DMRB Stage 2 preferred options selection, and DMRB Stage 3 design finalisation, the Dalwhinnie Junction layout underwent a further review to consider the merits of a more compact form of junction layout, rather than the full staggered diamond layout.

3.5.4 The more compact form of junction layout was considered to determine whether such layouts offered any engineering, environmental and economic benefits in terms of reducing the overall scale of works required, whilst still providing full functionality for all traffic movements. The outcome of the review was that a reduced scale layout was achievable and would be beneficial, for example, in terms of reduced footprint in the floodplain and excavation in peat habitats. However, a more compact form would require loop arrangements, albeit at a reduced scale from those considered under Option 29 at DMRB Stage 2. The potential change to a compact form junction was communicated via consultations in Dalwhinnie and with the Environmental Steering Group. It was then agreed with Transport Scotland as a revised preferred option for the Dalwhinnie Junction for further development and assessment through DMRB Stage 3.