

3 Alternatives Considered

3.1 Introduction

- 3.1.1 The 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 and junction options considered during previous DMRB Stage 1 and Stage 2 assessments for Project 7, 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) Off-line alternative route options – dualling via seven possible alternative routes to the existing A9, as highlighted in **Figure 3-1** below:

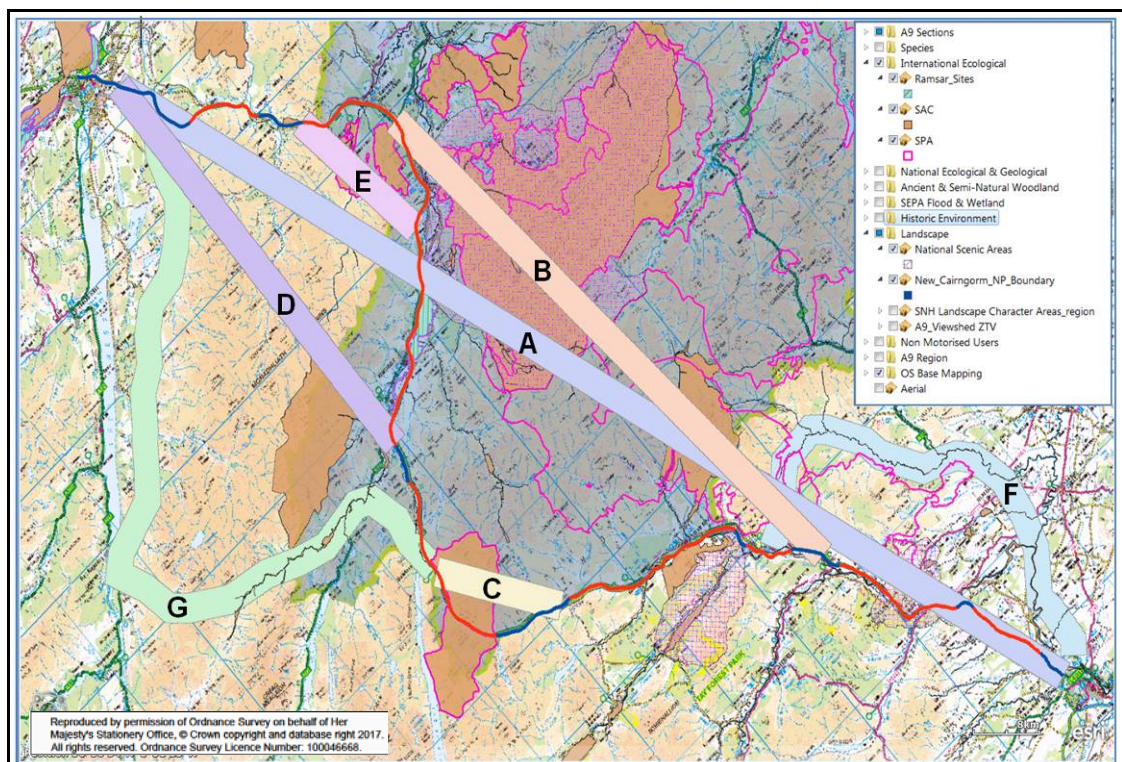


Figure 3-1: Alternative route corridors (A-G) considered via DMRB Stage 1 PES and SEA

- 3.2.2 As the Scottish Government's 2011 IIP committed to A9 dualling, consideration of 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 The DMRB Stage 1 Reports noted that the A9 is to be designed as a Category 7A dual carriageway, and therefore only grade-separated junctions are to be permitted, with isolated left-in/ left-out junctions where a feasible alternative does not exist. Existing at-grade junctions are to be upgraded or closed to prevent right turn manoeuvres across the carriageway.

3.3 DMRB Stage 2 - Mainline Options Assessment

Initial Review

- 3.3.1 DMRB Stage 1 selected an online corridor as preferred for the A9 Dualling Programme. This therefore informed the development and assessment of a preliminary range of three Project 7 mainline alignment options which were initially considered at DMRB Stage 2:
- 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)
- 3.3.2 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.
- 3.3.3 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.
- 3.3.4 Each mainline alignment option was divided into 1.5 km 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 set further away from the existing mainline alignment were identified as having potential merits, therefore to be included for assessment of impacts and opportunities
- 3.3.5 Due to the need to keep the A9 open during construction, 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.
- 3.3.6 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

- 3.3.7 Following the initial mainline review, a series of mainline alignment options were developed to a level of detail suitable for comparative assessment between options, so 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.
- 3.3.8 At this stage, the Project 7 extent was divided into four distinct assessment ‘sections’, with a tie-in to the north and the south. The mainline options that were developed for the DMRB Stage 2 environmental assessment are illustrated in **Figure 3-2** and described below.

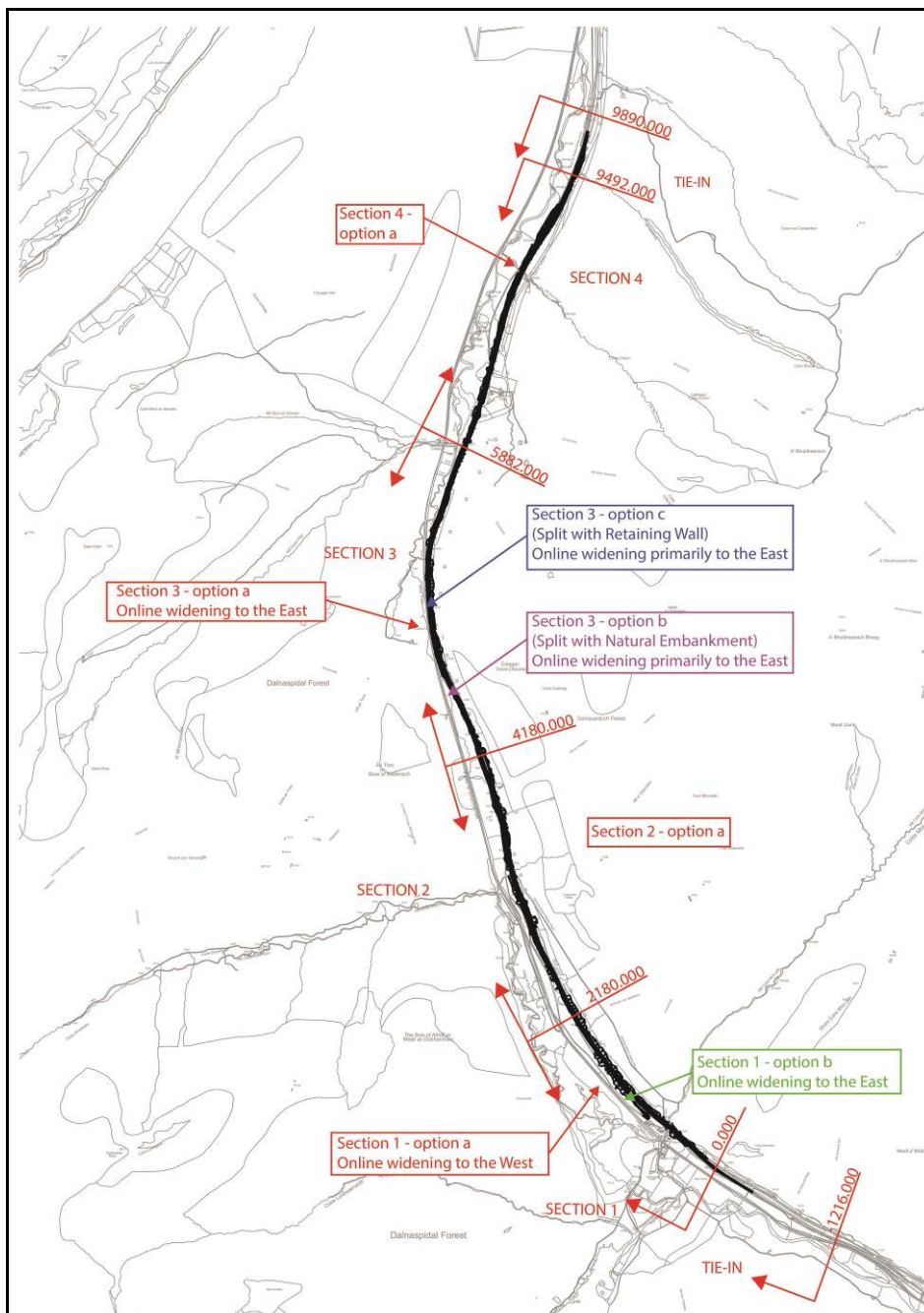


Figure 3-2: Project 7 – DMRB Stage 2 sections, chainages and options

3.3.9 Each section was defined using ‘chainage’ (ch.) referencing to indicate the location of elements of the scheme. Project 7 begins at the southern extent at ch. 0 (with the southern tie-indicated by minus ch. figures) and proceeds to:

- tie-in at the south – ch. - 900 to ch.0
- section 1 – ch. 0 to 2,180
- section 2 – ch. 2,180 to 4,180
- section 3 – ch. 4,180 to 6,882
- section 4 – ch. 6,882 to 9,500
- tie-in at the north (to Project 8) - ch. 9,500 to 9,741

Section 1 – Options 1a and 1b

3.3.10 Section 1 is constrained to the east by environmental designations (Drumochter Hills SPA and SAC), and to the west by Dalnaspidal properties and the HML railway. The Drumochter Hills SSSI is a constraint to the west and east of the existing carriageway.

3.3.11 The alignment through this section was also constrained by the requirement to tie into the adjacent existing dual carriageway to the south. The topography and constraints through this area are such that widening to either side was considered feasible. **Table 3-1** summarises the two options:

Table 3-1: Section 1 Options

Section 1	Design
Option 1a	Online widening to the west, i.e. northbound carriageway
Option 1b	Online widening to the east, i.e. southbound carriageway

Section 2 – Option 2a

3.3.12 The Drumochter Hills SPA and SAC remain a constraint to the east, with the SSSI to both the east and the west. To the east, the BDL is a constraint as it is in closer proximity to the A9. The area to the west is less constrained, with the HML railway being further from the road.

3.3.13 These constraints led to widening to the west, i.e. northbound carriageway, being considered as the only option.

Section 3 – Options 3a, 3b and 3c

3.3.14 Section 3 runs through Drumochter Pass. The topography in this section is at its most severe with steep sloping ground to the east and west.

3.3.15 The BDL line is adjacent to the A9 to the east and the HML railway and NCN7 are directly adjacent to the west.

3.3.16 The topography and constraints through this area are such that a number of different alternatives were considered, as summarised in **Table 3-2** below.

Table 3-2: Section 3 Options

Section 3	Design
Option 3a	Online widening to the east, i.e. southbound carriageway
Option 3b	Online widening primarily to the east, i.e. southbound carriageway The northbound and southbound carriageways were split by a natural earthworks embankment.
Option 3c	Online widening primarily to the east, i.e. southbound carriageway The northbound and southbound carriageways were split by an engineered slope or retaining wall

Section 4 – Option 4a

- 3.3.17 The topography is less severe in Section 4; the HML railway veers away to the west and the BDL line veers off to the east. However, there is a need to maintain access to Balsporran Cottages to the west, and Drumochter Lodge to the east.
- 3.3.18 The River Truim (designated as part of the River Spey SAC) becomes a constraint in the northern half of Section 4 as it meanders close to the west, between the HML and the existing A9.
- 3.3.19 Based on the initial mainline alignment review work, Section 4 was recommended for a combination of northbound and southbound widening. The reason for recommending this was to initially minimise encroachment into the Drumochter Hills SAC (on the east side) by widening to the northbound side; before transitioning to widening to the southbound side (the east) predominantly to avoid the River Truim/ River Spey SAC (to the west) and to minimise encroachment into the associated functional floodplain.
- 3.3.20 These constraints led to a single, online widening to the west, option being developed for the southern part of Section 4, before transitioning to online widening to the east in the northern portion of Section 4.

DMRB Stage 2 Preferred Mainline Option

- 3.3.21 Due to the multiple options available in Section 1 and Section 3, a total of six combined mainline options were considered during DMRB Stage 2, as outlined in **Table 3-3**.

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	as above	3b	as above
Mainline 3	1a	as above	3c	as above
Mainline 4	1b	as above	3a	as above
Mainline 5	1b	as above	3b	as above
Mainline 6	1b	as above	3c	as above

- 3.3.22 In terms of environmental issues, option 1b was favoured as it moved the A9 mainline further from key property constraints and visual receptors at Dalnaspidal. Option 1b also reduced impacts on NCN7, and there were marginal differences between the options on protected habitats within designated site boundaries. Option 1b does not require the import of fill material and in fact generates a surplus of fill material, providing a greater benefit to the overall balance of earthworks when mainline options were combined. This resulted in all mainlines incorporating option 1b providing significant cost reductions.

- 3.3.23 Based on the full DMRB Stage 2 assessment, for Section 3 it was recommended that a split carriageway is provided with a natural earthwork slope between the northbound and southbound carriageways (Option 3b). The reasons for recommending this are as follows:
- Option 3a had a standard all-purpose dual carriageway cross section, resulting in a large rock cut between the mainline and the existing BDL
 - Option 3c was considered less desirable due to the need for a retained edge which is considered to offer little benefit
- 3.3.24 Further refinement at DMRB Stage 3 was anticipated to provide design improvements, with benefits in constructability and contribution to an earthworks balance across the scheme. It was therefore determined that elements of this section may benefit from the use of a standard cross section (Option 3a) where constraints permit. However, overall, Option 3b was preferred.
- 3.3.25 As a result of the DMRB Stage 2 assessments, followed by Route Selection Workshops, combined Mainline Option 5 (incorporating options 1b, 2a, 3b 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 (EIA).

Initial Junction Review

- 3.3.26 The DMRB Stage 1 Preliminary Engineering Study identified that the distance between the proposed new grade separated junctions at Bruar (Project 5) and Dalwhinnie (Project 8) is approximately 30km and would therefore require an additional junction. Dalnaspidal was recommended as a location for a new junction. Further work carried out as part of the DMRB Stage 2 Assessment validated that conclusion.
- 3.3.27 A range of junction layout proposals were developed for Dalnaspidal, and each was adjusted as required to fit with either of mainline option 1a or 1b. Preliminary sifting assessments removed options from further consideration due to engineering complexity or proximity to constraint issues, e.g. proximity to the Beauly to Denny power line or to Dalnaspidal properties. Six full grade separated junction options (as are typically required for Category 7A dual carriageways) were taken to public exhibition consultation in June 2015.
- 3.3.28 Public feedback stressed concern over the scale of the six junction options presented, and associated impacts on Dalnaspidal residents and nature conservation sites in proximity. This led to consideration of an additional range of compact form junction options (requiring a departure from the Category 7A standard) for Dalnaspidal.
- 3.3.29 The four options that were taken through the DMRB Stage 2 environmental assessment process are listed in **Table 3-4** and **Figure 3-3** below. Note that junction option 12 was a full grade separated junction (previously shown to the public), which was kept in to provide a base case comparator for the compact form junctions.

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

Junction Option	Description
Junction 12	Full Grade Separated 'Diamond' Junction Layout
Junction 20	Compact form Left-in/Left-out Junction with Local Grade Separation
Junction 21	Compact form Left-in/Left-out Junction with Local Grade Separation
Junction 22	Compact form Left-in/Left-out Junction with Local Grade Separation



Figure 3-3: Dalnaspidal Junction options taken through DMRB Stage 2 comparative assessment

DMRB Stage 2 Junction Options Assessment

- 3.3.30 The DMRB Stage 2 assessment found that Junction Option 21 had the least adverse impacts. Following consultation with the A9 Dualling ESG, public consultation and Preferred Route Workshops, Junction Option 21 was recommended as the preferred junction option to serve Dalnaspidal and was taken forward to DMRB Stage 3 for further design development and EIA.

3.4 DMRB Stage 2 - Preferred Options

- 3.4.1 To summarise, following DMRB Stage 2 Engineering, Environmental and Economic assessments, Mainline Option 5 and Dalnaspidal Junction Option 21 were selected as the preferred route options to be taken forward to DMRB Stage 3.
- 3.4.2 It should be noted however, that it was identified that opportunities could be taken during DMRB Stage 3 to use a combination of option 3a and 3b to bring the benefits from both a standard cross section (i.e. option 3a), and a split carriageway (i.e. option 3b) through the Pass of Drumochter section where possible.
- 3.4.3 The preferred route alignment and Dalnaspidal Junction location and layout was shared via public exhibition in Dalwhinnie in November 2016, before progression to DMRB Stage 3 design development and assessment.
- 3.4.4 The DMRB Stage 3 design development process, i.e. progression from Stage 2 to include drainage networks and Sustainable Drainage Systems (SuDS), watercourse crossing structures and culverts, accesses and alternative connections, is discussed in the following Chapter of this ES, and the Proposed Scheme being considered through the EIA is presented and described in **Chapter 5**.

3.5 References

- 3.5.1 Relevant references for introductory Chapters 1 to 7 of this ES are compiled and listed at the end of Chapter 7.

