

5. The Proposed Scheme

5.1. Introduction

- 5.1.1. This chapter describes the key components and construction activities associated with the Proposed Scheme, the layout of which is shown in Figure 5.1a-c and 5.3a-h. These comprise the mainline alignment, junctions, side roads, structures, drainage, landscape proposals, land take, environmental mitigation measures and anticipated methods and programme of construction.
- 5.1.2. The information provided is based on the design of the Proposed Scheme at DMRB Stage 3.
- 5.1.3. The Proposed Scheme is expected to be procured by means of a Design & Build (D&B) type contract. Under the terms of this contract, 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 The Highland Council on completion of the Proposed Scheme.
- 5.1.4. Under a 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 Environmental Statement (ES).
- 5.1.5. 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 findings of any such review.

5.2. Existing Conditions

Existing Road Network

- 5.2.1. The existing road network is shown on Figure 5.2a-c.
- 5.2.2. The majority of the existing trunk road is a single carriageway 7.3m wide with 0.7m hardstrips. However, there is a Wide Single Carriageway 2+1 (WS2+1) between the Moy Rail Bridge and the Lynebeg Junction that was constructed in 2010. The WS2+1 is approximately 0.8km long and it provides an overtaking lane for northbound vehicles.
- 5.2.3. There are 5 local roads that have junctions with the A9, as outlined below:
- The B9154 (Dalmagarry Road - Scatraig via Moy) runs from its junction with the A9 to the south of Moy and heads north through the village of Moy. To the north of Moy the road passes under the Highland Main Line railway which has a height restriction of 4.3m. The road then heads northwards for a further 7km until it re-joins the A9 at Scatraig North. The B9154 was the original A9 before the current alignment was constructed in the 1970s. The B9154 is a single carriageway approximately 7m wide.
 - The C1121 (Freeburn – Tomatin – Findhorn - Kyllachy – Garbole Road) runs from its junction with the A9 at Tomatin in a south westerly direction passing through the village of Tomatin up the Strathdearn valley. The C1121 is a narrow single carriageway with varying widths of around 5m.

- The U2786 (Shennachie Road - Ruthven) is a narrow single lane carriageway with passing places and has varying widths with a minimum width of 3m. The U2786 serves around eight properties and is the only access to these properties.
- The U2864 (Lynebeg Road, Moy) is a narrow single lane carriageway with passing places and has varying widths with a minimum width of 3m. The U2864 on the west side of the A9 serves seven properties and a water treatment storage tank and is the only access to these properties. The property of Moybeg Cottage and land between the A9 and the railway access the B9154 through a narrow underpass that passes under the Highland Main Line railway (Lynebeg railway underpass), this underpass is approximately 3m high and 3.6m wide.
- The U2856 runs from its junction with the A9 on the existing dual carriageway (to the south of Tomatin) northwards to its junction with the C1121 to the north of Findhorn Bridge for a distance of 2.9km. The U2856 is part of the old A9 and is approximately 7m wide.

Existing Junctions and Accesses

5.2.4. The A9, within the scheme extents (including outwith the existing single carriageway section), has four junctions with the local road network:

- B9154 at Moy South – this junction has a ghost island for northbound traffic requiring to turn right onto the B9154
- C1121 at Tomatin North – this junction has a southbound ghost island for vehicles turning right onto the C1121 and also has a northbound direct taper for northbound vehicles turning into the junction
- U2786 – this junction to Ruthven is a simple T-junction with a 1m hatched strip in the centre of the A9 to alert drivers on the approaches to the junction
- U2864 – this junction at Lynebeg was formerly a crossroads with access to the east and the B9154 but was amended to a simple T-junction following the construction of a WS 2+1 overtaking to the south of the junction in 2010. There is a southbound ghost island for vehicles wishing to turn right into the U2864

5.2.5. There are seven private accesses that directly join the A9 within the scheme extents as detailed below:

- a pumping station access located on the A9 southbound carriageway, 400m south of the Tomatin North Junction, which connects to a small single lane track with steep vertical grade leading to the Tomatin Distillery pumping station
- Tigh An Allt access located on the A9 southbound carriageway approximately 400m north of the Tomatin North Junction and provides access to the A9 for this private residence
- Invereen access located approximately 600m north of Tigh An Allt and provides connection to adjacent farm land; there is also an existing cattle underpass of the A9 close to the A9 at-grade access to Invereen farm
- Dalmagarry Quarry access located on the A9 southbound carriageway approximately 450m north of Invereen access and provides access to the recently re-opened quarry
- Dalmagarry Farm access 500m south of the B9154 Moy South and forms a crossroads with the A9, with the western arm providing an agricultural access track to land west of the A9 and the eastern arm access to a farm; the farm also has a cattle creep beneath the A9 bridge over the Dalmagarry Burn (the cattle creep being adjacent to the burn and allowing livestock to be moved beneath the A9)

- approximately 550m south of the Lynebeg Junction there is a gated access on the southbound side of the A9 that gives access to an area of land which is more routinely accessed from Moy (it is understood this access is only used occasionally by large vehicles which cannot pass under the Lynebeg railway arch)
- an access on the single carriageway section of the A9 which provides access to forestry land, the existing Farr Wind Farm, the Farr Hydro scheme and the proposed Glen Kyllachy Wind Farm (a ghost right turn lane is provided on the A9 for traffic turning right from the north)

5.2.6. There are a further five field accesses that access the A9 and that are understood to be occasionally used.

5.2.7. Outwith the existing single carriageway, there is one junction and one access with the A9 that are included in this report as amendments to them have been incorporated into the Proposed Scheme:

- the U2856 (Tomatin South Junction) junction to the south of Tomatin is located on the existing dual carriageway and has a gap in the central reservation allowing vehicles to carry out all manoeuvres north and south - the junction has a diverge lane for northbound vehicles but has no facility for vehicles turning right from the A9 southbound
- a forestry access junction on the existing dual carriageway (to the north of the single carriageway extents) that forms a simple T-junction with the A9 northbound carriageway with no gap in the central reservation

Existing Structures

5.2.8. There are 4 bridges, 1 footbridge and 24 culverts on the A9 within the Proposed Scheme extents. The bridges are at Tomatin House underpass, Allt na Frithe watercourse, Dalmagarry Burn and the Highland Main Line railway (Moy Rail Bridge) and comprise single span structures with span lengths ranging from 4.5m to 20m. There is also an underpass of the Highland Main Line railway at Lynebeg.

5.2.9. The Millennium Footbridge is located to the north of Dalmagarry Farm and is a single span timber structure that carries a roadside footpath / cycleway over a watercourse.

5.2.10. Culverts under the A9 range from approximately 0.5 to 3.5m diameter.

Existing Lay-bys and Bus Stops

5.2.11. There are currently a number of parking/bus stop lay-bys within the Proposed Scheme extents, as summarised in Table 5.1 and locations shown on Figure 5.2a-c.

Table 5.1: Existing Lay-bys

Lay-by Number	Direction	Type	Description
160 and Bus Lay-by 14	Southbound	A + Bus Lay-by	North of Tomatin Junction includes Bus Stop
Bus Lay-by 13	Northbound	Bus Lay-by	North of Tomatin Junction
160A	Northbound	A	North of Tigh An Allt
161	Southbound	B	South of Access to the Quarry
162	Northbound	A	South of Dalmagarry Farm
Bus Lay-by 15	Northbound	Bus Lay-by	North of Dalmagarry Farm

Lay-by Number	Direction	Type	Description
Bus Lay-by 16	Southbound	Bus Lay-by	North of Dalmagarry Farm
163	Southbound	B	North of the B9154 Junction
168	Northbound	A	South of the Forestry Access Road

Non-Motorised Users

- 5.2.12. The NCN Route 7 from Sunderland to Inverness passes through the Scheme. The route runs through Tomatin via the C1121 and heads north on the local road where it joins a segregated path on the northbound verge of the A9. The route continues north until it crosses to the southbound verge of the A9 at the Dalmagarry Burn crossing. It then continues north on the southbound verge of the A9 to the Moy Junction where it heads northwards on the B9154.
- 5.2.13. There are two formal at-grade NMU crossing points of the A9: at the Lynebeg Junction where NMUs can access either Lynebeg or Moy and at Dalmagarry Farm where the existing NCN Route 7 crosses the A9 just to the south of the farm.
- 5.2.14. Other tracks that can be accessed from the A9 are described in Chapter 9 (People and Communities: Effects on All Travellers).

Traffic Data

- 5.2.15. The traffic volume for the Tomatin to Moy section of the A9 has been obtained from the 2014 Automatic Traffic Count (ATC) data provided by Transport Scotland. The two way traffic volume, obtained from the counter site north of the Moy Railway Bridge was 10,941 AADT in 2014.
- 5.2.16. Between 2008 and 2015 there were 26 recorded collisions within the extents of the Tomatin and Moy scheme. One was fatal, three were classed as 'serious' and 22 were classed as 'slight' (Transport Scotland Integrated Road Information System (IRIS)ⁱ. There have been no recorded accidents on the local roads within the extent of the scheme.

5.3. Principal Design Components

- 5.3.1. The Proposed Scheme will involve upgrading the existing A9 single carriageway road between Tomatin and Moy (a length of approximately 9.6km) to dual carriageway standard. Two 7.3 metres wide carriageways with 1 metre hard strips, 2.5 metres wide verges and a minimum 2.5 metre central reserve (with local widening to achieve sight distance where required) will be provided. A number of existing junctions with the A9 will be closed.
- 5.3.2. The proposed mainline alignment is described in Section 5.4 below.
- 5.3.3. There will be one grade separated junction (GSJ) at the southern end of the scheme providing access to Tomatin village. A new side road adjacent to the southbound carriageway of the dualled A9 will connect into the junction, and this will provide access from the GSJ to an existing road (U2846 Ruthven Road) which currently has an at grade junction with the A9.
- 5.3.4. Three Left-in/Left-out junctions (LILO) will be provided, one off the southbound carriageway of the dualled A9 at Moy (close to an existing at grade junction with the A9), one off the northbound carriageway at Lynebeg (also close to an existing at grade

junction with the A9) and another on the A9 northbound carriageway at an existing forestry access (within a section of the A9 that is already dualled).

- 5.3.5. Details of these junctions are provided below in Section 5.5.
- 5.3.6. New structures will be constructed to replace existing structures at the A9 Dalmagarry Burn crossing, the A9 Moy railway crossing, the A9 underpass at Lynebeg and the railway underpass at Lynebeg. These structures are described below in Section 5.7.
- 5.3.7. To accommodate the alignment of the dual carriageway and avoid impacting the Highland Main Line railway, a section of the Dalmagarry Burn will be realigned. This requires diverting the burn downstream of the existing Dalmagarry rail bridge to accommodate the A9 crossing and road drainage attenuation features adjacent to a low point in the A9. Details of the burn realignment are described in Section 5.12 below.
- 5.3.8. The scheme general layout is shown in Figures 5.1a-c and 5.3a-h. Indicative designs for key structures are shown in Figures 5.4 to 5.14, with a typical culvert detail provided as Figure 5.15a-b. Landscape proposals and environmental mitigation are shown in Figure 13.8a-v.

5.4. Proposed Mainline Alignment

- 5.4.1. The Proposed Scheme layout is shown in Figures 5.1a-c and 5.3a-h.
- 5.4.2. The mainline alignment involves widening to the southbound side of the existing A9 for the first 1.7km where it will then crossover to the northbound side for the remaining length of the scheme to chainage 9600m.
- 5.4.3. From the southern end of the scheme, the mainline alignment commences from the northern extent of the existing dual carriageway from Slochd before easing offline to run adjacent to the existing southbound verge. Vertically the alignment follows the existing topography to fall to a low point in the vicinity of the existing Allt na Frithe watercourse.
- 5.4.4. North of Allt na Frithe, the mainline rises adjacent to the southbound carriageway prior to reaching a high point at Invereen before falling to a low point south of Dalmagarry Burn. At Invereen the mainline crosses over the existing A9 to utilise the existing wide verge within the current highway boundary, whilst avoiding impacts upon the Highland Main Line railway.
- 5.4.5. At Dalmagarry the mainline will diverge offline between the Highland Main Line railway and the existing A9 Dalmagarry Burn crossing, raising the finished road levels relative to the existing A9.
- 5.4.6. North of Dalmagarry, towards the Moy rail bridge, the mainline rises steadily adjacent to the existing northbound carriageway, prior to crossing the Highland Main Line railway at Moy. The existing rail structure will be replaced.
- 5.4.7. From Moy rail crossing, the mainline continues adjacent to the existing northbound verge prior to tying into the existing A9 dual carriageway at the northern end of the scheme.
- 5.4.8. North of Moy the vertical alignment gently varies, generally following the vertical alignment of the existing A9, with a high point approximately 500m north of the Moy rail crossing and a low point at Allt na Slanaich prior to rising to tie into the existing dual carriageway levels.

5.5. Proposed Junctions

- 5.5.1. The existing junctions and access that connect directly onto the A9 will either be closed or upgraded as part of the Proposed Scheme. The following five new junctions are included in the Scheme design.

Tomatin Grade Separated Junction

- 5.5.2. A GSJ is proposed at Tomatin (see Figures 5.3b and 5.4) to replace the current at grade junction between the C1121 and the A9 and will be an all-movements junction allowing access from the A9 to Tomatin village, the Ruthven community and the Strathdearn area. The new GSJ will be located to the south of the existing junction and will take the form of a compact GSJ (loop layout). It is proposed to include a new road that connects the existing C1121 (from Tomatin) to the new junction. The link road will pass under the A9, via a new underbridge, allowing access to both sides of the A9 and the Ruthven area.

Moy Left-in/Left-out

- 5.5.3. In order to allow access to Dalmagarry Farm, Moy and the existing B9154, a LILO, including auxiliary diverge lanes, will be constructed on the A9 southbound carriageway in a similar location to the existing B9154 junction with the A9 (see Figure 5.3d). A link road to Dalmagarry Farm will be included from this junction.
- 5.5.4. A bus lay-by is proposed on the B9154 at Moy LILLO, see Figure 5.1b.

Lynebeg Left-in/Left-out

- 5.5.5. In order to allow access to residential properties at Lynebeg a LILLO is proposed on the A9 northbound carriageway in the vicinity of Lynebeg and the forestry/wind farm access (see Figure 5.3f). The LILLO allows large vehicles to access Lynebeg and the commercial operations west of the A9 directly from the A9 in a northbound direction. This arrangement also provides a vehicular route between Moy and the A9 northbound carriageway and allows access to Moy from the A9 northbound.

Forestry/Wind Farm Left-in/Left-out

- 5.5.6. To allow wind farm and forestry access to existing tracks to the west of the A9, a LILLO junction will be provided to/from the A9 northbound carriageway within a section of the A9 that is already dualled, to the north of the existing single carriageway section (see Figure 5.3h). This is an existing access (currently referred to as Grey Gates) which will be improved to meet current road design standards. The new junction will allow access to the existing Farr Wind Farm, Farr Hydro scheme, the proposed Glen Kyllachy wind farm and the Forestry Commission land.

Tomatin South

- 5.5.7. The current at grade junction which is on the existing dual carriageway will be amended to allow left in/left out movements only to/from the northbound carriageway to the U2856 (see Figure 5.3a). Vehicles will use this junction to access Tomatin and the Strathdearn glen. The junction will also allow northbound heavy vehicles to access the A9 and avoid travelling through Tomatin village. The existing central reserve gap will be closed to prevent unsafe right turn manoeuvres and minor improvements will be made to the merge and diverge provisions.

5.6. Local Roads

Tomatin GSJ to the C1121 Tomatin Road

- 5.6.1. The C1121 that runs through Tomatin village will connect to the A9 via a junction to the link road that connects to the Tomatin GSJ (see Figure 5.3b). There will be a right turn ghost island at this new junction to allow vehicles to turn off the C1121 safely. An improved junction will be provided to the Tomatin distillery and a bus turning facility also included close to the GSJ location.
- 5.6.2. To the south of Tomatin village there will be a bus turning facility constructed to allow southbound buses to turn around and access the A9 southbound carriageway at Tomatin grade separated junction.
- 5.6.3. The U2852 road will be extended along the existing C1121 to its junction with the GSJ.

Ruthven Tomatin Link Road

- 5.6.4. As indicated on Figures 5.3b-c, on the east side of the Tomatin GSJ, adjacent to the southbound A9 carriageway, a new unclassified single-track link road (with passing places) is proposed that will run northwards parallel to the new dual carriageway connecting to the existing Ruthven Road (U2786) in the vicinity of Dalmagarry Quarry. The road will extend over 2km and will comprise a 3.3m wide single carriageway with passing places a maximum of 150m apart. All existing accesses on the eastern side of the A9 between Tomatin and Ruthven Road (i.e. Dalmagarry Quarry, Invereen Farm, Tigh An Allt and the Tomatin Distillery pumping station) will be connected to this new link road which would provide access to the A9 via the Tomatin Junction.

Ruthven Moy Link Road

- 5.6.5. As indicated on Figure 5.3d, the existing Ruthven Road (U2786) will be extended northwards to a junction with the Moy LILo. The road will be a 3.3m wide single carriageway with passing places a maximum of 150m apart. There will be new accesses along this road to allow access to Dalmagarry Farm, the land to the west of the A9 and railway and fields to the east of the LILo. Moy to Lynebeg Link
- 5.6.6. The B9154 will be connected to the A9 southbound carriageway by the new LILo junction. The northbound junction of the B9154 at Scatraig will be unaffected. To access the A9 northbound carriageway vehicles will turn off the B9154 at Lynebeg and use the LILo at Lynebeg via the U2864.
- 5.6.7. To maintain connectivity between the communities of Moy and Lynebeg and to allow traffic from the two communities to travel north towards Inverness on the dualled A9, a link road will be provided (see Figure 5.3f). This will link the Lynebeg LILo to the B9154 via a new underpass of the A9 (see section 5.7) and a new railway arch (replacing an existing railway underpass) (see section 5.7). The link will also allow large vehicles from the south to access Moy and also access for large vehicles to Moybeg which is located to the east of the A9 (between the A9 and the railway line). The road linking the LILo to the B9154 will accommodate 2-way traffic and also provide access for NMUs.
- 5.6.8. A bus lay-by is proposed on the B9154 just north of where the Moy to Lynebeg Link joins the B9154.

5.7. Proposed Structures

5.7.1. The following new structures are included in the Scheme design.

A9 1240 Tomatin House Underpass

5.7.2. The existing corrugated steel buried structure is to be retained or replaced and extended by approximately 5m matching the existing structure type and material (see Figure 5.3b). This structure will carry the new A9 mainline over the existing private access to Tomatin House. The substructure is proposed to be 78m in length.

A9 1245 Tomatin Junction Underpass

5.7.3. This structure forms part of the Tomatin GSJ and is a single span integral portal frame type bridge (see Figure 5.3b).

5.7.4. An indicative general arrangement drawing of the structure is shown on Figure 5.4.

A9 1250 Allt Na Frithe

5.7.5. This proposed portal frame structure will carry the new A9 mainline across the Allt Na Frithe watercourse (see Figure 5.3b). The structure will also carry the proposed Ruthven Link Road. The new structure requires the realignment of the Allt Na Frithe watercourse and will include mammal passages on either side of the watercourse running through the structure. Access to the structure for maintenance inspection purposes will be required, and although the form of this access has yet to be agreed, it is anticipated that a stepped access from the A9 verge would be created.

5.7.6. An indicative general arrangement drawing of the structure is shown on Figure 5.5.

A9 1260 Dalmagarry Bridge

5.7.7. A new bridge to accommodate the dualled A9 will span the Dalmagarry Burn (see Figure 5.3d). The bridge will replace the existing structure, which will be demolished.

5.7.8. The proposed bridge is a single clear span structure and will accommodate 3.5m minimum headroom requirements (for the maintenance and inspection of the bridge and also for light agricultural vehicles and NMUs).

5.7.9. The bridge will provide vehicle access for Dalmagarry Farm and NMU access to the land to the west of the Highland Main Line railway.

5.7.10. An indicative general arrangement drawing of the structure is shown on Figure 5.7a.

1260 ARB1 Dalmagarry Access Bridge

5.7.11. This new structure will be a clear span bridge located to the west of the railway and crossing the Dalmagarry Burn (see Figure 5.3d). It will provide NMU access to the NCN7 and farm vehicle access to land west of the railway line.

5.7.12. An indicative general arrangement drawing of the structure is shown on Figure 5.7b.

1260 SRB1 Ruthven Moy Link Road Bridge

- 5.7.13. This new clear span structure will be located to the east of the A9 carrying the proposed Ruthven Moy Link Road over the Dalmagarry Burn (see Figure 5.3d). An indicative general arrangement drawing of the structure is shown on Figure 5.7c.

A9 1270 Moy Railway Bridge

- 5.7.14. A new bridge spanning the Highland Main Line railway is proposed (see Figure 5.3e). This structure will replace the current bridge that carries the existing single-carriageway A9. The existing structure will be demolished under a temporary closure of the railway line (a 54hr blockade is anticipated).
- 5.7.15. The proposed structure consists of a single span that will accommodate a future doubling of the existing single line railway track.
- 5.7.16. An existing culvert within the footprint of the proposed bridge carries water under the railway, the flow continuing under the existing A9. The water that it carries is cess drainage and run-off which flows along the toe of the railway embankment. Because of the proposed A9 embankment, it is not possible to retain the culvert in its existing location and so 2 new culverts will be required on an alignment beyond the end of the proposed bridge.
- 5.7.17. An access track (improvement of an existing track) with an unbound surface will be provided from the B9154 to the bridge abutment for maintenance inspection purposes.
- 5.7.18. An indicative general arrangement drawing of the structure is shown on Figure 5.8a-b.

A9 1273 Lynebeg Underpass

- 5.7.19. Currently there is an unclassified junction at Lynebeg on the west side of the A9 located approximately 3km north of the B1954 junction. The A9 at the junction has a right turn ghost island for southbound traffic. The junction serves several residential properties at Lynebeg.
- 5.7.20. The existing access is to be removed. The proposed access to and from Lynebeg will be from the B9154 using the new Lynebeg Rail Underpass of the Highland Main Line railway (see description below). A new road link and underpass beneath the A9 will serve Lynebeg. A LILO junction arrangement will be provided at Lynebeg off the northbound A9 for traffic wishing to head north towards Inverness on the dualled A9.
- 5.7.21. The proposed underpass structure (see Figure 5.3f) has a headroom of 5.3m.
- 5.7.22. An indicative general arrangement drawing of the structure is shown on Figure 5.10.

A9 1273 RB1 Lynebeg Rail Underpass

- 5.7.23. The Moy to Lynebeg Link (see section 5.6) will include a new structure to accommodate a 4.3m underpass of the Highland Main Line railway.
- 5.7.24. The existing masonry arch bridge is to be demolished and replaced with a precast concrete modular portal structure (see Figure 5.3f). The structure will have a headroom of 4.3m and will accommodate the future possibility of dual tracking and electrification of the rail line.

- 5.7.25. Consultation with Network Rail is also ongoing to discuss disruption to rail service during construction. It is proposed that following advance works, the demolition of the existing bridge and installation of the new bridge will take place under a temporary closure of the railway line (a 54hr blockade is currently proposed).
- 5.7.26. An indicative general arrangement drawing of the structure is shown on Figure 5.11.

Culverts

- 5.7.27. All watercourses crossing the proposed mainline will require a culvert and these have been sized to accommodate the required flood design flows of 1 in 200 year plus climate change, plus an appropriate freeboard allowance. All of the existing corrugated steel pipe culverts will be replaced. The new culverts will consist of reinforced precast concrete box or portal construction thus minimising construction and maintenance operations. Portal frame culverts are proposed on the Allt Dubhag, Caochan na h-Eaglais, Allt Loinne Moire, Allt na Slanaich and Allt Creag Bheithin watercourses.
- 5.7.28. Culvert locations are shown on Figure 5.3a-h with indicative general arrangement drawings of the structure key watercourse crossings in Figures 5.5, 5.6, 5.7, 5.9, 5.12, 5.13 and 5.14. Typical indicative culvert detail is also shown in Figure 5.15a-b.
- 5.7.29. Culverts with natural beds will be constructed, where possible. Where box culverts are being constructed, 300mm of suitable bed material is proposed. Mammal ledges will also be installed where required and will be designed to meet the 1 in 25 year flood level.
- 5.7.30. The majority of the culverts will be constructed offline from the existing culverts in order to maintain flows of the watercourses during construction. Minor local watercourse diversions at the inlets and outlets will also be necessary to allow offline construction. Cascades and plunge pools have been indicatively identified where required.
- 5.7.31. Access to culverts for maintenance inspection purposes will be provided either from stepped accesses from a hardstanding area in the verge of the A9 (currently proposed at just one location) or via SuDS ponds maintenance tracks or local roads.

5.8. Non-Motorised User Provisions

- 5.8.1. Tomatin House underpass (see Figure 5.3b) is to be retained and extended and will remain accessible to non-motorised users.
- 5.8.2. There will be a footpath under the A9 at Tomatin GSJ. Footways and a new footbridge will also connect Tomatin Distillery to the nearby bus turning circle stop/turning facility.
- 5.8.3. NCN7 will follow a similar alignment to the existing route to the west of the A9 (see Figure 5.3b-d). From Tomatin NCN7 will follow the existing route along the C1121 and then along a new alignment beside the northbound verge as a segregated route, with access shared only with occasional estate vehicles and Network Rail maintenance vehicles. At Dalmagarry, the route will pass under the railway via the existing south and north underpasses and cross the A9 via the new underpass within the Dalmagarry Burn bridge crossing. It will then link to the B9154 via the new farm access road and Moy LILO.
- 5.8.4. The new Dalmagarry Farm access track (see Figure 5.3c-d) will connect NMUs from Ruthven Road to the B9154, the new bus stop lay-by at the Moy LILO junction and to NMU routes to the west of the A9 (including NCN7 and hill tracks) via the new underpass within the Dalmagarry Burn bridge crossing.

- 5.8.5. The Moy to Lynebeg link road (see Figure 5.3f) will allow access for NMUs between Moy and the existing Right of Way (RoW) (to the west of the A9) which crosses the moorland from Lynebeg to the forestry / wind farm access track further north. This link requires a short realignment of the current RoW (where it crosses at grade with the A9) to allow it to pass beneath the new A9 underpass proposed at Lynebeg. A shared use path will be included as part of the Moy to Lynebeg link through the Lynebeg A9 underpass and the Lynebeg rail underpass connecting to the B9154.
- 5.8.6. The proposed new A9 northbound lay-by (see Section 5.9) will provide access for NMUs to the existing forestry / wind farm access track / General Wade's Military Road.

5.9. Proposed Lay-bys and Bus Stops

- 5.9.1. All existing lay-bys and bus stops on the A9 within the Proposed Scheme extents will be closed. Current DMRB standards do not permit the provision of lay-bys at these locations due to various constraints including mainline alignment and junction proximity.
- 5.9.2. It is proposed to close two lay-bys (one northbound and one southbound) on the existing dual carriageway to the south of the Tomatin GSJ because of their close proximity to the junction and another lay-by to the north of the Tomatin South junction on the northbound carriageway again because of its close proximity to the junction.
- 5.9.3. Two new lay-bys (Type A with merge taper) will be constructed, one on the northbound carriageway of the dualled A9 at chainage 8150-8400 and the other on the southbound carriageway at chainage 7370-7600, as indicated on Figures 5.3g and 5.3f respectively. An indicative illustration of the two lay-bys is provided as Figure 13.8v.
- 5.9.4. The new A9 northbound lay-by will be designed to be of sufficient size to accommodate parking for those wishing to access the forestry tracks to the east of the A9. A path linking from the lay-by to the forestry track will be provided.
- 5.9.5. In addition, a parking facility will be provided off the Moy LILO on the spur road to Dalmagarry Farm to provide public parking for access to NCN7 and NMU routes to the east of the A9, via the new underpass at Dalmagarry Burn and the existing railway underpass.
- 5.9.6. Two new bus stops/turning circles will be constructed in Tomatin village, one toward the southern end of the village (shown on Figure 5.3a) at the Clune Road Junction to allow buses to turn, that would previously have turned southbound using the Tomatin South Junction. The other bus turning facility is immediately to the north of the Tomatin GSJ (shown on Figure 5.3b) to allow quick access to the A9 for express buses and winter maintenance vehicles. A new path will be constructed adjacent to the C1112 linking the bus stop at the GSJ to residential properties just to the north and to Tomatin Distillery.
- 5.9.7. New bus stop lay-bys will also be constructed on the B9154 off the Moy LILO and in Moy village where the Moy to Lynebeg link connects to the B9154, as indicated on Figure 5.1b.

5.10. Proposed Traffic Signs and Lighting

- 5.10.1. Traffic signage requirements and detailing will be developed at the detailed design stage in accordance with relevant design standards and will include bilingual signing in Gaelic. The appointed contractor(s) will consult with Transport Scotland and The Highland Council with regard to traffic signage.



- 5.10.2. The location of an advance direction sign to the south of the Tomatin GSJ has been included within the design (see Figure 5.3a) to allow for verge widening in places. Variable message signs will also be provided in advance of the GSJ.
- 5.10.3. No lighting is currently proposed within the Scheme.

5.11. Proposed Road Drainage

- 5.11.1. At present, the existing drainage networks discharge unattenuated flows from the existing A9 road corridor. Generally kerbs, gullies and carrier pipes direct road runoff to the nearest watercourse, with the exception of the WS 2+1 section of road where over the edge drainage is provided into filter drains and then into to the nearest watercourse.
- 5.11.2. The Proposed Scheme will incorporate a new road drainage system. The road drainage layout is shown on Figure 5.10a-k, with a typical retention pond detail provided as Figure 5.17.
- 5.11.3. Surface water runoff to the Proposed Scheme road drainage system derives from the road cross-section, including the carriageway and verges, together with the associated earthworks. Additional surface flow from runoff draining towards the Proposed Scheme from land outside the road corridor will be kept separate from the road drainage system where practicable.

A9 Carriageway and Junctions

- 5.11.4. The A9 carriageway is proposed to be drained by the use of filter drains, catchpits, and carrier drains. Surface water channels are proposed in certain areas of the A9 mainline in order to achieve clearance above culverts. Road gullies or combined drainage and kerb blocks are proposed to drain the carriageway at lay-bys, overbridges, and other kerbed sections of carriageway.
- 5.11.5. The 12 networks draining the proposed A9 mainline (see Figure 5.10a-k) will be subject to at least two levels of treatment (as shown in Table 5.2 below), typically comprising filter drains and retention ponds, prior to discharge to surface waters. Filter drains will generally be unlined in accordance with DMRB standards, but may be lined with an impermeable membrane in some embankment areas to reduce the risk of exfiltration and seepage within the embankment, subject to further review at detailed design stage. Opportunities to incorporate set-back outfalls, in the form of a short ditch or swale, have been considered where appropriate in order to provide additional water quality and habitat benefits.

Table 5.2: A9 Mainline Proposed Treatment

Drainage Network ID	Receiving Watercourse	Proposed Treatment
1-A	River Findhorn	Filter Drains, Swales & Retention Pond
2-A	Allt na Frithe	Filter Drains & Retention Pond
3-A	Allt Dubhag	Filter Drains & Retention Pond
4-A	Dalmagarry Burn	Filter Drains & Retention Pond
4-B	Dalmagarry Burn	Filter Drains & Retention Pond
5-A	Funtack Burn Trib 3	Filter Drains & 2 No. Retention Ponds
6-A	Funtack Burn Trib 6	Filter Drains & 2 No. Retention Ponds
7-A	Caochan na h-Eaglais	Filter Drains & Retention Pond
8-A	Allt Loinne Moire	Filter Drains & Retention Pond

9-A	Allt Creag Bheithin Trib 2	Filter Drains & SF Wetland
1-A	River Findhorn	Filter Drains, Swales & Retention Pond
2-A	Allt na Frithe	Filter Drains & Retention Pond

- 5.11.6. Network 1A discharges into the River Findhorn approximately 100m upstream of the Tomatin Distillery abstraction intake. Although the preliminary routine runoff assessment indicated no treatment is required, a three stage treatment train, comprising filter drains, ditches, and retention pond, has been incorporated into the design to provide an extra degree of protection to the abstraction. An overflow currently exists on the existing network immediately north of the Tomatin House Underpass. Minor modifications are proposed to this overflow to allow the first flush to be directed to Retention Pond 1A to further contribute to protection of the abstraction, whilst maintaining existing hydrology as close as possible for larger storm events (Figure 5.10c).
- 5.11.7. A third level of treatment, consisting of a retention pond, is proposed for Networks 5A & 6A to further contribute to minimising predicted impacts to the receiving watercourse.

Side Roads and Access Tracks

- 5.11.8. The general guidance in SEPA Regulatory Method WAT-RM-08 and the SuDS Manual's Simple Index Approach (SIA) has been taken into consideration for the treatment levels provided on side roads and access tracks. A minimum of two levels of treatment are proposed for the Tomatin Link Road, Ruthven Link Road, and Lynebeg Link Road (all lightly trafficked C class or unclassified roads) as follows:
- Tomatin Link Road will form part of Mainline Network 1A where three levels of treatment are proposed, including filter drains, ditches, and a retention pond, before discharging to the River Findhorn (Figure 5.10c).
 - Ruthven Link Road is proposed to be drained via verge edge filter strips and ditches prior to discharging to several tributary drains of the Findhorn and the Dalmagarry Burn (Figure 5.10c-e).
 - Moy to Lynebeg Link Road to the west of the A9 is proposed to drain via filter drains to an infiltration basin.
 - Moy to Lynebeg Link Road to the east of the A9 is proposed to drain via filter drains and a vortex separator prior to discharging to a tributary drain of the Funtack Burn (Figure 5.10g-h).
- 5.11.9. In accordance with the Simple Index Approach, the following methods of treatment are proposed for the scheme's access tracks:
- Dalmagarry Farm Access Track is proposed to drain primarily via filter drains prior to discharging to the Funtack Burn via a swale or ditch in the form of a set-back outfall.
 - The Windfarm Access track is proposed to drain primarily via ditches and swales to the Allt Creag Bheithin and the Midlairgs Burn. The Windfarm Access LILO will drain via filter drains and retention pond to the Midlairgs Burn.
 - The SuDS pond access tracks are proposed to drain via ditches and/or swales/grassed channels to: the River Findhorn; the Allt na Frithe; the Allt Dubhag; the Dalmagarry Burn; various tributary drains of the Funtack Burn; the Caochan na h-Eaglais; and the Allt Creag Bheithin, Allt na Slanaich, and several of their tributaries. Where the access tracks are in close proximity to the mainline SuDs ponds, they may drain into the ponds themselves.

Earthworks/Land Drainage

- 5.11.10. A series of pre-earthworks ditches will be used to control surface water run-off from embankments, cuttings, existing hillside etc. and where existing ground profiles require them to act as cut off drains in order to contribute to controlling run-off.
- 5.11.11. Greenfield runoff from embankment slopes will discharge to filter drains or ditches constructed at the toe of embankments. In addition where seepages are envisaged, earthworks slopes are proposed to be drained via filter trenches.
- 5.11.12. Ditches will require to be lined as appropriate to suit velocity and longitudinal gradients for scour and erosion control.

Attenuation SuDS

- 5.11.13. Retention ponds or infiltration basins are proposed for catchment areas requiring control of peak flow and discharge volume. A sediment forebay is proposed for all ponds and basins to allow coarse sediments to settle out.
- 5.11.14. Retention ponds include a number of micro-pools to create a wetland environment of variable depth with suitable planting to provide pollution reduction and habitat creation for birds and invertebrates. Permanent treatment volumes within detention ponds have been sized in accordance with the SuDS Manual (C753, 2015)ⁱⁱ variable rainfall depth method, which aims to treat runoff from 90% of all rainfall events.
- 5.11.15. SuDS access tracks are provided in close proximity to the inlet and outlet wherever possible, and the pond geometry also aims to include a berm around the perimeter of the pond of sufficient width and gradient to allow access to pedestrians and mini excavators. Other features include aquatic benches around the perimeter of micro-pools where aquatic and emergent vegetation can be established. The aquatic benches also provide a safety zone before deeper open water is reached.

5.12. Proposed Watercourse Crossings and Diversions

- 5.12.1. Single span bridges are required at certain watercourse crossings within the Proposed Scheme. Where a clear span structure has not been deemed necessary, an extended or new culvert will be required. Good practice design for culverts includes: a natural bed substrate, a low flow channel, allowance for fish passage, bank protection where necessary, appropriate inlet and outlet structures and provides scour pools at the outlet of the culvert to dissipate energy and provide resting areas for fish.
- 5.12.2. Many of the new or extended crossings may require some adjustment of the watercourse planform to align the existing watercourse through the proposed culvert or bridge. These realignments may be relatively short, however they will be designed and constructed with consideration to fish passage, sediment movements and bank erosion.

Dalmagarry Burn

- 5.12.1. The Proposed Scheme requires realignment of a section of the Dalmagarry Burn in the Dalmagarry Farm area. The realigned channel will reflect a natural length and size to accommodate the existing flow and sediment regime. This will promote natural functioning of the channel and floodplain and therefore morphological and habitat diversity.
- 5.12.2. The existing length of the burn to be realigned (it should be noted that this watercourse has been historically straightened) is approximately 640m, with the proposed realignment length being approximately 665m (4% longer). This is dictated to a certain degree by the A9 crossing point and the road embankment pushing the river c.40m to

the north east, but the realignment will also include a natural sinuosity to encourage natural processes (erosion and deposition) which more closely reflects the pre-straightened length. The channel width will vary between 10 and 20m, before narrowing slightly at the downstream end of the diversion just upstream of where it returns to its existing alignment. The wider channel upstream will accommodate the large gravel deposits immediately downstream of the existing A9 crossing of the burn.

- 5.12.3. Further details regarding watercourse crossing and diversions are provided in Appendix A11.1.

5.13. Proposed Flood Compensation

- 5.13.1. The Proposed Scheme crosses the 200 year floodplain of the Allt Creag Bheithin resulting in a loss of floodplain storage. New watercourse crossings will allow the Allt Creag Bheithin, Allt na Slanaich and two tributaries of the Allt Creag Bheithin to pass under the new road.
- 5.13.2. Two flood storage areas are to be located upstream of culverts A9 1273 C31 and A9 1273 C28. The opening area of the proposed culvert A9 1273 C31 which has been set to 2m x 2m controls flow and pushes water into the two storage areas. Culvert A9 1273 C28 is proposed to be set at 3 No. 1.85m high x 1.80m wide barrels.
- 5.13.3. The two storage areas have capacities of 2000 m³ and 1000 m³ at the 200 year flow and are directly connected to the Allt Creag Bheithin channel upstream of culvert A9 1273 C31. The basins will fill when flow overtops the banks of the main watercourse channel and will drain as the level in the channel drops below bank level. Following flood events the storage basins will be inspected and sediment and debris will be removed to ensure that their capacity for flood storage is maintained.

5.14. Proposed Earthworks

- 5.14.1. Embankments or cuttings are required where the Proposed Scheme is higher or lower than the surrounding ground level. The slope gradient of embankments has been considered in order to achieve a best fit with the landscape, with slope profiles steepened or slackened in several locations. Details of proposed slope gradients are provided in Chapter 13 (Landscape) and in Appendix A13.1.

5.15. Proposed Fencing and Environmental Barriers

- 5.15.1. Any deer fencing along the road boundary over the extents where it currently exists will be replaced to the current standards.
- 5.15.2. Temporary fencing will be erected where required prior to the commencement of construction to secure the area, and this will be determined by the appointed contractor.
- 5.15.3. Where a requirement has been identified within this ES, environmental barriers will be incorporated to provide mitigation for mammals (for example otter fencing). Refer to Chapter 12 (Ecology) and Chapter 21 (Schedule of Environmental Commitments) and Figures 13.8a-s.

5.16. Proposed Road Surfacing

- 5.16.1. A Low Noise Road Surface will be applied to the new dual carriageway within the Proposed Scheme extents. The surface material will provide a road surface correction of

-3.5dB(A). The final specification will be in accordance with current standards and Transport Scotland requirements.

5.17. Construction

- 5.17.1. This section provides an overview of the envisaged construction programme and typical construction activities.
- 5.17.2. 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, timescales and duration of each works element provided that environmental impacts are no greater than those described in the ES, and that commitments given in the ES are adhered to (or measures providing equivalent mitigation, subject to agreement with Transport Scotland).

Construction Period

- 5.17.3. The EIA assumes that construction will commence in 2020 and continue for an estimated 30 months, on a continuous basis. The commencement date is dependent on the duration of statutory processes and procurement.

Construction Programme

- 5.17.4. The Contractor will be required to provide a detailed programme prior to commencement of the works. This will set out:
- the overall period of construction
 - programming of the key elements and phases of construction
 - the duration of each element and phase
- 5.17.5. The programme will be required to be regularly updated to reflect any changes in programmed activities and will provide the basis for notification to residents and local communities where sensitive activities would be likely to involve temporary disturbance to access or non-routine events such as blasting of rock.

Outline Construction Programme

- 5.17.6. Initial constructability reviews have indicated that construction could be sub-divided into four main works sections, with construction activity in each of these areas being programmed in separate phases:
- South tie-in to Dalmagarry (Tomatin) – the most southerly located section includes widening of existing carriageway from the start chainage 390 to a point south of Dalmagarry farm chainage 3200, upgrade of the existing Tomatin south junction, and construction of the new Tomatin GSJ
 - Dalmagarry area – immediately north of the Tomatin section chainage 3200, Dalmagarry is proposed to include widening of existing carriageway from the south end of the farm to a point immediately south of the existing A9/B9154 junction chainage 4000. Notably, this section of the works also includes the realignment of Dalmagarry Burn as well as the dual carriageway burn crossing structure
 - Moy Rail Bridge area – immediately north of Moy South chainage 5200, Moy North is proposed to include widening of existing carriageway from north of the new rail crossing to the end chainage incorporating the Lynebeg LILO and the associated side

road. Notably the works at Lynebeg include construction of two principal structures; a new structure carrying the A9 over the link road between Moy and Lynebeg (Lynebeg Underpass) and a replacement of an existing rail structure (Lynebeg Rail Underpass).

- Moy Rail to North Tie-in – immediately north of the Dalmagarry section chainage 4000, Moy South is proposed to include widening of existing carriageway from the existing A9/B9154 junction to a point north of new rail crossing chainage 5200. This section of the works will also include construction of the new Moy Left-in/Left-out (LILO) and the new rail crossing structure

5.17.7. Sub-dividing the construction works into separate phases will reduce the impact on road users and neighbouring communities.

5.17.8. For the purposes of the environmental assessment the approximate duration of construction activities has been estimated and an outline of the possible timing of works indicated in Table 5.3 below.

Table 5.3: Indicative Timescales for Construction

Works Activity / Section	Estimated Duration
Traffic Management	30 months, as required
South Tie-in to Dalmagarry	30 months
Dalmagarry Area	30 months
Moy Rail Bridge Area	20 months
Moy Rail to North Tie-in	20 months

Typical Construction Activities

5.17.9. Key construction activities associated with the Proposed Scheme are indicated in Table 5.4 below.

Table 5.4: Indicative Construction Activities

Section	Construction Activities
Possible 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
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 railway structures · Bridge construction, including river crossings



Section	Construction Activities
	<ul style="list-style-type: none"> • Culvert construction • Retaining wall construction
Environmental	<ul style="list-style-type: none"> • Earthworks mitigation • Landscape and ecological mitigation planting • Permanent diversion of watercourses • Peat restoration
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 • Temporary diversion of watercourses to facilitate culvert construction • Temporary construction drainage.
Maintenance	<ul style="list-style-type: none"> • Landscaping maintenance • Pavement rehabilitation and other routine maintenance and defects repair works

Working Hours

- 5.17.10. Normal working hours are anticipated to be Monday to Friday 0700 to 1900hr, Saturday 0700 to 1200, and no Sunday working. Any work carried out with these times would need to be agreed with The Highland Council.
- 5.17.11. The contractor may wish to carry out certain operations outside of these hours. For example, the construction of bridges over minor roads may involve temporary road closures to facilitate the lifting into position of prefabricated elements or temporary occupations/closures of the railway to construct new structures. These hours may need to be restricted. Such extensions beyond normal working hours would be dependent on the contractor's proposed methods of construction, and subject to agreements with Transport Scotland and The Highland Council Environmental Health Officers (EHO).
- 5.17.12. Normal working hours may also need to be reduced/restricted to shorter time periods in certain areas/for certain activities - for example to avoid impact on sensitive ecological receptors, working after dusk or before dawn may not be permitted.

Land Requirements

- 5.17.13. Most construction work will take place within the limits of the land made available (LMA) to the contractor as defined within the contract documents. The LMA has informed the land take, habitat and woodland loss calculations undertaken for assessment purposes in this ES. This includes land for all the permanent works as well as land for construction phase SuDs and watercourse realignments. Land for topsoil and peat storage has not been identified within the LMA as this will be a matter for the Contractor to determine based on their construction methodology and the mitigation principles set out in the ES. The final LMA would include land acquired under Compulsory Purchase Order (CPO), land to which the Scottish Ministers already have ownership of or access, and other areas the Contractor has acquired by agreement to facilitate construction.
- 5.17.14. The land to be acquired includes land necessary to construct the Proposed Scheme and associated infrastructure and to undertake essential environmental mitigation measures. However, the appointed contractor may (depending on the phasing and execution of works) determine the need for additional areas of land such as for site compounds, topsoil storage areas and other areas required for construction. Should land be required outside of the land made available, this would be secured through separate agreement/planning permission by the appointed contractor. 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 the ES.

Construction Site Compounds, Site Offices and Storage Areas

- 5.17.15. In order to carry out the construction works, it may be necessary for the contractor to negotiate separate agreements with landowners to provide land temporarily for the duration of the works. This approach may be taken by the contractor to provide site compounds including offices, stores, accommodation areas, car/plant parking, construction working areas and topsoil storage.
- 5.17.16. Specific areas of land for temporary SuDS ponds, construction areas for Lynebeg Rail and Dalmagarry Burn structures, and areas for access are required for construction of the scheme, and are therefore included within the assumed LMA to construct the Proposed Scheme.
- 5.17.17. The area identified for potential use to allow offline construction of the new Lynebeg railway bridge is located next to the southbound lane of the B9154, approximately 100m northwest of the existing Lynebeg masonry arched rail structure and 150m south of the Lachlan Mackintosh memorial site. Similarly, an additional pocket of land has been included in the LMA at Dalmagarry Farm for construction of the Dalmagarry Burn structure.
- 5.17.18. In the case of other areas that will be required, e.g. for site compound(s), topsoil/peat storage, access routes and haul roads, it is considered that a number of alternative areas could be utilised. Therefore, the exact location(s) for these has not been determined nor assessed as these will be considered by the Contractor at a later stage, within the restrictions imposed by the Contract, Environmental Statement and where necessary taking cognisance of the requirements of the Local Planning Authority.
- 5.17.19. Where practicable Contractors' site offices, compounds and storage areas will be located close to the proposed works where there is suitable access and potential environmental impacts are minimised. It is considered that there are several suitable areas for Contractors' compounds in the vicinity of the Proposed Scheme.
- 5.17.20. When establishing compound areas, the Contractor will generally strip any topsoil and establish an area of hard-standing to accommodate the offices, car parks and welfare facilities. Main compounds will generally require connections to mains water, foul water, and electricity and telecommunications networks.
- 5.17.21. Following completion of construction, compounds or temporary construction areas within the LMA will be reinstated by the Contractor in accordance with the contract and ES requirements. Areas acquired by the Contractor outside the LMA will be reinstated to the satisfaction of the affected landowner and Local Planning Authority as required.

Construction Environmental Controls

- 5.17.22. The environmental performance of the Contractor throughout the works would be defined and controlled through a Construction Environmental Management Plan (CEMP), Peat Management Plan (PMP), Site Waste Management Plan (SWMP) and Pollution Prevention Plan (PPP), which shall be developed by the Contractor. These will comply with current legislation and regulations and industry best practice, and require consultation with statutory consultees where relevant.
- 5.17.23. The CEMP will outline the proposed measures to minimise and mitigate the construction impacts of the Proposed Scheme in accordance with the ES. The measures will address

management of construction related traffic, noise and dust suppression, working margins and methods related to historic features, sensitive habitats and species and watercourses.

- 5.17.24. The Contractor's Site Manager will ensure that environmental considerations are included in risk assessments, method statements, work instructions and field control sheets and will ensure these are communicated to those undertaking the work. No work will commence on site before method statements and risk assessments have been approved by the appropriate person. The Contractor's Environmental Manager/Clerk of Works will be responsible for co-ordinating and managing all environmental activities during the construction phase.
- 5.17.25. All activities on site will be reviewed against the requirements of these management plans via an integrated risk assessment and method statements procedure. The Contractor's Site Manager will review environmental risks associated with the construction process and appropriate control measures included in method statements and field control sheets.
- 5.17.26. Regular audits will be completed by the Contractor to verify that the project is compliant with the established CEMP, contractual requirements and legislation.
- 5.17.27. The Contractor's Environmental Manager will carry out regular assessments of the project's environmental performance.

Traffic Management

- 5.17.28. The Contractor will be required to develop and agree a Traffic Management Plan (TMP) with Transport Scotland and its Maintenance Operating Contractor, Police Scotland, and The Highland Council and other directly affected stakeholders for the duration of the contract. The plan will identify proposals for the principal phases of the works and individual construction activities which will potentially involve disruption to existing vehicular and pedestrian access in specific locations along the construction corridor.
- 5.17.29. Some temporary road closures may be unavoidable during construction to allow for realignments and/or bridge construction. This will only be allowed if other traffic management options are impractical and also if alternative access is available.
- 5.17.30. The proposed works are generally located on the existing A9 trunk road, so most construction traffic will use this route. While it is desirable that all construction related access should be via the A9 trunk road it will be necessary to provide some access from the side road network. The extent and purpose that other roads can be used for construction purposes by the Contractor will be restricted. The contract will contain specific restrictions regarding traffic management and routing of vehicles to and from the site. Routes not available to the contractor will be agreed with The Highland Council and stipulated in the contract.
- 5.17.31. There will be the requirement for the construction of sections of temporary carriageway in order to maintain traffic flows during construction. The contractor shall minimise heavy plant crossings and minimise cross-overs along the scheme limits but will require to maintain access to properties along the scheme extents.

Temporary Lighting

- 5.17.32. Temporary site lighting during construction will generally be required as follows:
- at the Contractor's compounds for security and safe movement of staff during winter mornings and evenings
 - at locations where there is currently no lighting, but lighting is required as a safety measure under temporary traffic management (e.g. at carriageway crossovers, contraflows, etc.)
 - for night time activities or winter afternoon activities
- 5.17.33. Any lighting will take cognisance of environmental requirements, particularly with regard to minimising disturbance of protected species.

Temporary Fencing

- 5.17.34. The land area to be occupied by the construction works will be identified accurately on the ground, by surveying and installing appropriate pegs and posts, prior to the works commencing. The area defined will be the land acquired for the permanent works, temporary access and SuDS, and any other areas that the Contractor has acquired by agreement to facilitate construction of the works.
- 5.17.35. The working area will be secured for the purposes of health and safety or environmental protection. This may be achieved either by installation of temporary fencing or installation of the permanent fenceline in advance of adjacent works being constructed.
- 5.17.36. There may be sections of fencing designed to a higher specification for the protection of retained vegetation and the exclusion of otters, deer, and other wildlife where required. Environmental fencing (e.g. otter fencing) extends below ground level and therefore requires an element of excavation which will be undertaken using a small excavator or by hand digging.
- 5.17.37. Other specific fencing that may be required temporarily will include higher security fences at compounds or where additional security of the works is required.

Earthworks Balance and Materials Requirements

- 5.17.38. The Proposed Scheme includes significant sections of cutting and embankment which have been designed to minimise the impact on the surrounding topography whilst achieving the required design standards. Where practicable, excavated material will be re-used in areas of proposed fill.
- 5.17.39. Major earthworks are required to accommodate the new structure proposed to cross Dalmagarry Burn and the new rail crossing structure at the south end of Moy.
- 5.17.40. Other movements of natural earth and made ground will be needed to construct the new drainage systems, including ditches and attenuation ponds.
- 5.17.41. The principal earthworks process involves excavation of soils in cuttings and transportation of the excavated soil to neighbouring zones where embankments are required. Deposition in the fill areas will be built up by depositing the material and using bulldozers to place it in layers which are then compacted by rollers. This process is repeated until embankments are built to the road formation level.
- 5.17.42. The Proposed Scheme estimated earthwork balance indicates a short fall of engineered materials, and additional quantities will need to be imported to site.

5.17.43. A summary of the estimated quantities (based on the engineering assessment) is detailed in Tables 5.5 to 5.7 below.

Table 5.5: Summary of Estimated Excavation Quantities

Soil Class	Quantity (m ³)
Acceptable excavation	628,819
Unacceptable excavation	55,769
Topsoil	178,818
Total	863,406

Table 5.6: Summary of Estimated Fill Quantities

Soil Class	Quantity (m ³)
Acceptable fill	803,550
Landscaping fill	215,757
Total	1,019,307

Table 5.7: Summary of Estimated Earthworks Balance

Import / Export	Quantity (m ³)
Estimated Import	272,315
Estimated Export	55,769

5.17.44. A review of results from the ground investigation indicates that significant volumes of peat, topsoil, glacial till and granular fill which is suitable for re-use will be excavated. Some form of treatment, e.g. lime/cement stabilisation, may be required to reduce the moisture content of the weathered glacial till so that it is suitable for re-use as embankment fill material.

5.17.45. Excavated peat and peaty soils across the scheme will, depending on suitability, be re-used as part of the landscape proposals. This is further detailed in Appendix A10.2 Outline Soil and Peat Management Plan.

5.17.46. Wherever possible, site derived materials for re-use in structural or landscape earthworks will be directly transferred from areas of cut to areas of fill. Where there is a requirement for temporary stockpiling of materials they will be appropriately stored (i.e. so that they do not degrade) in designated and contained areas away from sensitive locations such as marshy areas, watercourses, flood areas, or close to property, where dust during dry periods could be disruptive to local residents.

Disposal and Import of Materials

5.17.47. Appendix A10.2 Outline Soil and Peat Management Plan sets out the approach to the re-use of excavated materials within the Proposed Scheme boundary. It also outlines potential opportunities for re-use of peat material within off-site restoration areas that were identified during the assessment, however based on current estimates all of the soil and peat excavated as part of the Proposed Scheme could be used for the required landscaping within the scheme boundary.

5.17.48. The identification of approved receptor sites for the disposal of any excess materials associated with earthworks that is unsuitable for re-use and the import of bulk materials

required to make up design levels will be the responsibility of the Contactor. The Contractor will be required to meet all legal obligations relating to licensing and planning approvals.

- 5.17.49. Where such import and export of materials is required, haulage routes will be subject to agreement under the required project Traffic Management Plan. Specific consideration will be given to the potential sensitivity of communities located along potential haul routes.

Drainage

- 5.17.50. It is envisaged that the main carriageway drains will be installed by conventional open trenching techniques.
- 5.17.51. Trenchless installation techniques may be used for deep drains. Trenchless installation techniques offer several benefits such as reducing the size of the construction footprint, reduction in the duration of the works, a reduction in the amount of material moved to/from or stored on site, reduced ground disturbance and settlement, reduction in noise levels, and are statistically safer to install than conventional open trenching.

Construction Phase SUDS

- 5.17.52. To control run-off and prevent pollution of watercourses, temporary drainage will be required prior to the construction of the permanent drainage system, particularly during earthworks operations. Pre-earthworks drainage such as ditches and trenches which are proposed to intercept flows from external catchments, will be installed in advance to keep earthworks as dry as possible.
- 5.17.53. The following activities are envisaged to aid erosion and sediment control during construction:
- construction of pre-earthworks diversion drains/ditches
 - construction of sediment settlement basins where required to provide for temporary retention of runoff from disturbance areas - during construction the land allocated for permanent operational SuDs ponds may be used for construction SuDS, however these areas should be fully rehabilitated before being put into permanent operational use
 - construction of collection drains (downslope of or within disturbance areas), bunds and slope drains where required to convey runoff to sediment basins or other storages
 - construction of sediment fences and straw bale filters (downslope of disturbance and stockpile areas) where required
- 5.17.54. Erosion and sediment control measures will be undertaken as part of the Contractor's temporary works to suit their proposed construction phasing and works programme. Notwithstanding the foregoing, indicative estimates of sediment basin sizes have been calculated to help identify areas of land that will be required by the Contractor for the purposes of erosion and sediment control during construction, and these have informed the definition of the LMA for construction of the Proposed Scheme.
- 5.17.55. These land areas have been allowed for within the Proposed Scheme boundary, as shown in Figure 5.18a-c. The following methods/assumptions have been used in the calculations:
- measures set out in Mitigation Item W3 would be implemented

- pre-earthworks drainage ditches and diversions would be constructed early in the programme to isolate the working area from off-site runoff
- areas allocated for permanent SuDs ponds would be used early in the programme for construction of surface water and sediment control (these areas would be fully rehabilitated before being put into operational use)
- temporary collection drains (downslope of or within disturbance areas), bunds and slope drains would be constructed where required, to convey runoff to construction sediment control basins or other storages
- indicative sizing of the sediment settlement basins has included both a sediment storage volume and a settling volume (estimates of sediment storage volumes have been calculated using the Revised Universal Soil Loss Equation (RUSLE), with a typical clean-out period of 3 months, and the settling volume has been based on the 10 year return period hydraulic volume, as per the guidance in CIRIA C648; to aid settlement a minimum depth of 600mm is also assumed for the settling volume, with a minimum total basin depth of 1500mm plus 250mm freeboard allowance)
- for areas where low clay content has been anticipated a positive discharge, via a perforated riser pipe/chamber enwrapped with a geotextile separator and trash screen cover, has been assumed (this minimises the size of sediment basins and land-take required)
- for areas of higher clay content the sediment settlement basins are assumed to be dammed without a positive discharge, and therefore result in much larger basins
- flocculant dosing may be required to aid settlement of fine suspended solids, such as clay particles, prior to discharge (the chemicals used should be approved by SEPA beforehand)
- areas of land to accommodate the proposed indicative settlement basins have been identified close to the majority of watercourses crossed by the Proposed Scheme

5.17.56. However due to the following limitations, no guarantee can be provided as to the adequacy of the proposed land made available for sediment control purposes:

- the RUSLE equation is an empirical formula which is widely used overseas but has had limited use in the UK, therefore very little of the required mapped data exists for UK soils
- proportions of sand, silt and clay fines have been estimated based on available Ground Investigation (GI) information - the fines content for imported bulk earthworks material, chosen by the contractor, has been assumed
- soil loss is highly dependent on in-situ fines content – due to the limited GI to date there is a risk of unknown ground conditions which may require larger storage basins and more land-take than estimated
- the Contractor's choice of fill material, phasing of work, and earthworks programme are unknown
- exceptional weather conditions cannot be anticipated

5.17.57. It is recognised that the Contractor may use a different approach to the management of construction surface water and sediment control, however the Contractor is required to manage construction surface water and sediment in an appropriate manner within the Proposed Scheme boundary.

Piling and Blasting

- 5.17.58. Localised rock cuts are likely to be required north of Moy Rail Bridge adjacent to the A9 northbound carriageway. This may require some localised rock blasting if the extent of the final rock cut necessitates, otherwise mechanical excavation would be deployed to remove the rock.
- 5.17.59. Due to poor ground conditions around several major structures including Moy Rail Bridge, Tomatin Junction Underpass and Dalmagarry Crossing, piled foundations are likely to be required. This would be confirmed once more detailed ground investigations have been undertaken.

Structures

- 5.17.60. Bridge construction shall be carried out in the following (generalised) sequence and be undertaken in a safe manner that seeks to minimise disruption to existing traffic:
- temporary access routes/haul roads constructed to facilitate access for vehicles including heavy plant to the site; erection of a satellite compound
 - all existing utilities/services near the proposed bridge shall be diverted and/or protected as required
 - traffic management (as required) installed on the existing A9 mainline e.g. localised re-routing, narrowing of carriageway lanes and installation of temporary vehicle containment to create necessary clearances required for safe installation of the temporary works for excavation and construction of proposed structure
 - temporary works will be constructed
 - install pile foundations where necessary; construct pile caps and erect the abutments and the wing walls
 - partially construct the abutment crossheads and prepare for placing beams
 - place precast beams onto mortar beds on the partially constructed crossheads
 - install backfill drainage
 - construct deck slab, diaphragms, parapet cantilevers and remainder of crossheads
 - erect vehicle parapets above edge beams
 - install proprietary waterproofing system to deck and down back of abutment crossheads
 - backfill/compact remainder of the abutments
 - reinstate diverted utilities/services as required
 - install verges, carriageway and footways
 - topsoiling/seeding/planting
- 5.17.61. The following construction sequence is assumed for large culverts (2.5m x 2.5m or greater). Most culverts will be constructed in 2 phases.
- temporary access routes/haul roads constructed to facilitate access for vehicles including heavy plant to site
 - excavation to formation level (where site constraints dictate that the culvert must be constructed in two halves, to allow continued flow of traffic, then sheet piling is to be installed to retain/ support the carriageway)

- cast blinding for foundations
- piling to formation level if required
- construct foundations/pile caps
- place precast culvert sections as per manufacturers' installation guidance
- place bedding material where required
- apply two coats of bitumen paint to all buried surfaces and install backfill drainage
- backfill each abutment simultaneously with required material
- place fill over deck to road pavement level
- divert watercourse through new structure
- infill existing structure or demolish
- finishes (i.e. parapets, kerbing, ducting, concrete to footpaths, drainage, surfacing, etc.)

Moy Rail Bridge

5.17.62. The phasing of the works to construct the Moy Rail Bridge are outlined below:

Initial Works

- construct Moy Rail South culvert and Moy Rail North Culvert. (construction envisaged to occur during railway possession proposed to construct Lynebeg Rail Bridge)
- form a drainage ditch at the toe of the southwest embankment to divert hillside run-off to Moy Rail South Culvert
- form a temporary collection pond to collect the existing A9 Drainage and northwest hillside run-off; pump the collected water north through the existing Moy Rail bridge to Moy North Culvert for discharge to the local water course
- undertake the in-filling of the now redundant existing rail culvert located directly under the proposed bridge
- install temporary works at the tip of the southeast existing wingwall and demolish the wingwall as appropriate

Main Works

- strip top soil and excavate to founding level
- cast concrete strip foundations
- cast columns to crosshead beam level and install the precast surrounds as appropriate
- erect reinforced soil wall on both abutments and bring up the highway embankments
- cast the lower half of the crosshead beams and land the deck beams
- cast the deck and parapets
- cast the southwest and southeast ground beams (lifting operations would be undertaken under night time possessions of the railway)
- apply waterproofing, finish embankments and lay surfacing
- install VRS system and temporary restraint system on the north edge of the deck (At the Phasing construction joint)

- divert traffic off the existing rail bridge onto the northbound carriageway of the new deck
- demolish existing Moy Rail Bridge and regrade existing embankment local to the existing bridge
- in-fill the temporary collection pond and finalise the reinforced soil walls and highway embankments
- cast the remaining lower half of the crosshead beams and land the remaining beams
- cast the remaining deck and parapets
- cast the northwest and northeast ground beams (lifting operations would be undertaken under night time possessions of the railway)
- apply waterproofing, finish embankments and lay surfacing
- install VRS system and open fully to traffic

Lynebeg Rail Structure

- 5.17.63. It is proposed that the entire portal frame will be cast as a single monolithic structure (minus wingwalls) at a temporary construction site within the field just off the B9154 and approximately 100m west of the final bridge location. From this location, the bridge will be carried by a Self-Propelled Modular Transporter (SPMT), along the B9154 to the final bridge site where it will be lowered into position on prepared ground.
- 5.17.64. The outline construction methodology for this structure is assumed to be:
- prepare laydown area for precast concrete part and establish site huts and compound
 - complete advanced works to prepare site for main works during a 54 hour possession
 - begin railway possession and remove tracks / ballast
 - excavate fill evenly from above and behind existing masonry arch
 - mobilise the main crane in at the existing junction of the side road and the B9154
 - demolish the existing masonry arch, abutments, wingwalls and foundations
 - excavate to formation level and prepare formation
 - erect the precast portal unit and tape joints
 - bring up sufficient backfill to enable the wingwalls to be landed
 - land the precast wingwalls and complete waterproofing rear and top of structure
 - finalise the railway embankment and install edge protection
 - lay ballast / track and perform track checks
 - reopen the railway
 - complete post possession tasks such as carriageway surfacing, wingwall masonry facing and demobilisation from site

Road Construction

- 5.17.65. Construction of the road pavement will involve importing sub-base (crushed stone material forming the lower layer of the pavement) and bituminous materials to the site from quarries or bitumen plants. The contract will permit the use of recycled road pavement materials into the new road pavement layers where it is demonstrated they meet the contract requirements.

- 5.17.66. Construction of new A9 road pavement will involve importing sub-base (crushed stone material forming the lower layer of the pavement) and bituminous materials to the site from quarries or bitumen plants. The delivery vehicles for such materials and other specialist plant required to construct a pavement will be large and routing of such plant will be detailed within the TMP. The works will be programmed to minimise disruption to adjacent property.
- 5.17.67. Following pavement construction, safety barriers will be installed. Posts and barriers are delivered to the site and safety barrier installation then involves driving steel posts into the ground or excavating small footings and placing concrete into which the posts are set. The barriers are bolted to the posts and fixed to small concrete anchorages.
- 5.17.68. Sign installation will involve excavation for the concrete foundations, and setting the posts. The sign faces are then fixed to the sign posts. Some signs may be lit and will require cabling to be passed through the service ducts installed as described previously.
- 5.17.69. Variable Message Signs (VMS) are proposed to be provided approximately 1 mile in advance of Tomatin GSJ. VMS installation will involve excavation for the concrete foundations and these concrete foundations will extend above ground level. The supporting column is then fixed to the concrete foundation and the VMS display box is then attached to the supporting column. Associated cabinets and hard standing areas will be constructed at ground level at each location.

5.18. References

-
- ⁱ Transport Scotland (2008-2014); Transport Scotland's Integrated Roads Information System (IRIS) Accident Data.
 - ⁱⁱ CIRIA (2015); The SuDS Manual (C753).