Appendix 5.1

Construction Details

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1 Construction Overview

1.1.1 This Appendix provides an overview of potential construction requirements for the Proposed Scheme. This information was prepared based on the DMRB Stage 3 design to provide a set of assumptions for the purposes of assessing potential construction impacts as reported in this ES, taking account of the outline constructability review undertaken as part of the DMRB Stage 3 work.

1.1.2 It should be noted that the detailed design of the Proposed Scheme, and the construction programme and methodology, will be determined by the appointed design and build (D and B) Contractor, within the constraints of the contract and the requirements of the ES (i.e. resulting in the stated residual impacts).

1.1.3 The main construction activities required for the Proposed Scheme are expected to include:

- Site clearance
- Stock proof fencing (and other fencing)
- Utility diversions
- Pre-earthworks drainage and construction stage SuDs
- Earthworks (cut/ fill)
- Material transfer via haul roads and temporary bridges
- Rock cut
- Temporary materials stockpiling and lay-down
- Watercourse diversions and culverts
- Drainage networks, including SuDs basin and outfall installation
- Earthworks rolling and compaction
- Road pavement
- Central reserve works
- Structures demolition
- Bridge construction
- Retaining wall construction
- Ancillary roadworks, such as safety barrier, road markings, signage, ITS and ducting
- Landforming and landscape works
- Site restoration (ecological and landscape mitigation works)
- Active traffic management.

1.1.4 Whilst a summary of these activities is provided in **Chapter 5**, details relating to the likely programme of works, phasing and construction activities are set out in this Appendix. These represent the assumptions on which the Environmental Impact Assessment (EIA) has been based.

2 General Site Operations

2.1 Safety and Security

2.1.1 Throughout the course of the works the Contractor will manage the Health and Safety of the site in accordance with the requirements and principles of all current applicable Health and Safety legislation, including the Construction (Design and Management) Regulations 2015, the Health and Safety at Work etc. Act 1974, the Management of Health and Safety at Work Regulations 1999, and the Workplace (Health, Safety and Welfare) Regulations 1992, and will ensure the safety of the public, site personnel, site operators, and visitors.

2.2 Working Hours

2.2.1 Anticipated 'typical' working hours of the Contractor will be agreed with Transport Scotland and The Highland Council Environmental Health Officer (EHO), but for the purposes of assessment are assumed to be as set out below:

- 07:30 to 18:00 on weekdays (Monday to Friday)
- 08:00 to 13:00 on Saturdays
- no Sunday working.

2.2.2 The above range applies to summer hours, when it is likely to be necessary to maximise the available good weather conditions for carrying out earthworks activities (as poor weather can adversely affect the condition of the material being used and the condition of haul routes). Winter hours will generally be shorter, due to the seasonal restriction on activities that can be carried out efficiently and the length of daylight available.

2.2.3 It is anticipated that some work will be required outside the normal working hours for exceptional activities (such as those that can only take place when traffic flows are low), subject to agreement with Transport Scotland and The Highland Council. These include:

- weekend work to complete critical phases of road construction and surfacing
- overnight closures for placing of bridge beams over existing carriageways or rail lines
- overnight work to facilitate temporary traffic management layouts
- non-disruptive railway possessions to complete structures, pipe boring and blasting operations.

2.3 Site Lighting

2.3.1 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
- along temporary access roads
- 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.

2.3.2 Maintenance of road lighting at locations where the layout of construction areas is to be changed will be provided by mobile lighting towers or by use of columns in temporary locations.

3 Construction Programme

3.1 Overall Programme

3.1.1 The EIA of the Proposed Scheme has been undertaken based on an anticipated construction programme of 3 years for River Spey crossing works and approx. 3.5 years overall. A detailed construction programme will be developed by the Principal Contractor; however, the assessment considers that the following timescales (which may overlap during the overall construction phase) will apply:

Earthworks Each Proposed Scheme section length is likely to take a complete earthworks season, i.e. 12 months, excluding holiday periods and periods of severe adverse weather. In this, a single section might be, for example, the length of mainline between Crubenmore and the Newtonmore junction or from Newtonmore junction to the B970 (south of Kingussie and the Insh Marshes).

Bridges It is expected that watercourse crossings (bridges) on sections which require parallel widening will be constructed in parallel with earthworks operations. Some bridges over rail lines and other roads may require specific programming to minimise disruption.

It is estimated that construction of the new River Spey bridge will take approximately 2 years; however, when combined with approach embankment works and removal of the existing River Spey bridge, the total timescale for Spey crossing works is estimated at 3 years.

Pavement Works Paving would typically be targeted during warmer months (i.e. when the ambient temperature is at or above 5°C); on this basis, completion of paving works is estimated to take approx. 2 years across the Proposed Scheme extents.

3.2 Phasing

3.2.1 The Proposed Scheme requires online parallel widening to the east (southbound) side from chainage (ch.) 40,000 heading north to approximate ch. 48,881. From there, the carriageway crosses the Insh Marshes and River Spey offline and to the east of the existing crossing. After crossing the River Spey at ch. 52,812, the dualling alignment switches to the west (northbound) side and ties in with the existing Kincraig to Dalraddy dual carriageway at ch. 56,650.

3.2.2 Online widening presents buildability issues due to the presence of live traffic in proximity to the construction work force, resulting in the need for substantial traffic management. Based on an online parallel widening approach the following construction phases are anticipated:

- Mobilisation/ Early Works Phase
- Phase 1 Major bridge construction (River Spey bridge and Highland Main Line rail bridges)
- Phase 2(S) Main Works (southbound carriageway from ch. 40,000 to ch. 49,950 and Newtonmore Grade Separated Junction (GSJ))
- Phase 3(N) Main Works (northbound carriageway from ch. 51,700 to ch. 56,650)
- Phase 4(S) Main Works (southbound carriageway and Kingussie GSJ)
- Phase 4(N) Main Works (northbound carriageway and Kingussie GSJ)
- Phase 3(S) Main Works (southbound carriageway from ch. 51,700 to ch. 56,650)
- Phase 2(N) Main Works (northbound carriageway from ch. 40,000 to ch. 49,950 and Newtonmore GSJ)

3.2.3 The northbound/ southbound splits noted are anticipated due to predicted earthworks balance operations, where material excavations from one phase are used as fill materials in a later phase.

3.2.4 Construction phasing will be subject to the following:

- speed restrictions to 40 mph, with lane width reductions, are likely to be introduced to improve safety for construction workers and ease traffic flow on existing A9 carriageway
- in certain locations, works may be restricted or even excluded during particularly sensitive ecological periods, e.g. salmon spawning, breeding bird seasons, etc.
- offline works including downstream SuDS features, outfalls and access tracks will not necessarily affect traffic management beyond above descriptions

3.2.5 Phase 1 initiates the construction of the largest and most complex bridges on the Proposed Scheme. For example, the construction of bridges over Highland Main Line (HML) railway at Glentruim and Kingussie will be subject to programming constraints associated with the availability of 'railway possession windows' and therefore longer periods need to be considered for their construction. Although longer periods must be set aside for construction over railways, actual construction activity associated with these structures will take place in bursts of activity working around the requirements of the "live" railway.

3.2.6 The size and complexity of the River Spey bridge and the environmental constraints that may apply (e.g. breeding and wintering bird seasons) together with the possibility of inundation by flooding will impact on the time available to the Contractor to undertake construction. Construction of the River Spey bridge and embankment is therefore likely to be spread over a 3-year timescale.

3.2.7 Phases 2 and 3 represent the bulk of the Proposed Scheme works to complete sections of dualling, with programme durations expected to be 12 to 15 months per phase, excluding design lead in times. Phase 4 includes the works required in and around the Kingussie junction (excluding the Phase 1 bridge works), and the expected programme duration for this area is around 12 months. Works phases are likely to overlap, and active traffic management will be required to move vehicles from the existing A9 to new carriageway sections, to enable completion of later works phases on the existing carriageway footprint.

3.2.8 The estimated overall 3.5 year construction programme assumes inclusion of all works; however, seasonal constraints within designated nature conservation sites will influence on-site phasing. For example, it is considered that works to construct the new embankment and River Spey bridge at the Insh Marshes will commence with entry to the Insh Marshes National Nature Reserve area at the close of the breeding bird season in the first year of construction. Similarly, foundation piling works for bridge piers adjacent to the River Spey will be programmed in consultation with SNH to avoid adverse noise and vibration effects on spawning/ migrating salmon.

4 Construction Information

4.1 Plant and Equipment

4.1.1 It is assumed that the Contractor will use a variety of plant and equipment for the anticipated construction activities, as set out in **Table 4-1** below:

Table 4-1: Typical Construction Plant

Activity	Plant
1, Site Clearance	Petrol engine chain saw (sawing timber)
	Tracked Excavator
	Lorry
	Wheeled Excavator
2, Compound Construction	Wheeled Backhoe Loader
	Lorry
	Vibratory Roller
3, Compound Operation	Diesel Generator
	Dumper
	Wheeled Backhoe Loader
	Lorry
4, Stock Proofing	Tractor (towing trailer)
	Post Rammer
	Hand-held circular saw
	Nail Gun
5, Pre-Earthworks Drainage	Tracked Excavator
	Wheeled Mobile Crane
6, Earthworks General	Tracked Excavator
	Articulated Dump Truck
	Dozer (41t)
	Lorry
7, Earthworks, rolling and compaction	Mini excavator with hydraulic breaker
	Dozer (41t)
	Lorry
8, Rock Breaking	Pulveriser mounted on excavator
	Tracked Excavator
	Dozer (41t)
	Dump Truck
9, Sub Formation	Tracked Excavator
	Dozer (towing roller)
	Articulated Dump Truck
	Roller (rolling fill)
10, Drainage	Tracked Excavator
	Wheeled Mobile Crane
11, Paving	Asphalt Paver
	Vibratory compactor
	Lorry
	JCB Airmaster
	Pneumatic Breaker

Activity	Plant
12, Central Reserve	Dozer (towing roller)
	Wheeled Excavator
	Hand held Circular saw
13, Road Marking	Lorry
14, Signage	Hydraulic Hammer Rig
	Wheeled mobile crane
	Gas Cutter
	Lorry
15, Existing Structure Demolition	Petrol hand held Circular Saw
	Pulveriser mounted on excavator
	Wheeled mobile telescopic crane
	Lorry
16, Bridge Foundation Construction	Crawler Mounted Rig
	Tracked Excavator
	Concrete Pump & cement mixer truck
	Concrete Mixer Truck
	Petrol HH Circular Saw
	Lorry (44t)
	Wheeled mobile crane
	Wheeled mobile telescopic crane
	Diesel Generator
17, Bridge Abutment	Petrol hand held Circular Saw
	Wheeled mobile telescopic crane
	Lorry (44t)
	Tracked Excavator
	Concrete Mixer Truck & Truck Mounted Concrete Pump
	Poker Vibrator
	Vibratory Tamper
18, Bridge Deck	Lorry (44t)
	Wheeled mobile telescopic crane
	Concrete Mixer Truck & Truck Mounted Concrete Pump
	Compressor
	Poker Vibrator
	Vibratory Tamper

4.2 Anticipated Construction Activities

Site Clearance

4.2.2 Site clearance will involve the phased removal of existing vegetation such as required tree felling and removal of hedges, bushes and undergrowth; demolition of any built features to be removed; relocation of services; and removal of existing fencing.

4.2.3 **Chapter 12** sets out a number of ecological constraints to site clearance, which the Contractor will need to adhere to. These are also contained in the Schedule of Environmental Commitments (**Chapter 21**) and will inform the contract documents.

Site Establishment: Compounds

4.2.4 The Contractor will need to create works compounds to provide site accommodation for staff, i.e. parking, offices and welfare facilities, as well as areas for storage of materials and plant. At DMRB Stage 3 it is not possible to determine where a Contractor would prefer to locate works compounds, and this is left to the Contractor to agree with local landowners and secure any relevant permissions/ consents from environmental regulators and planning authorities. This would include any work required to level areas for site compounds, install any necessary services and create access and egress points. Works compounds are not therefore not considered as part of the Proposed Scheme under assessment.

4.2.5 The Proposed Scheme interfaces with local roads and conditions on the use of Local Authority maintained roads by construction traffic may be imposed by the relevant authorities, coupled with an agreed plan for damage reinstatement at the end of the construction period.

Stockpiling

4.2.6 Where material is excavated and re-used in the creation of permanent embankments and landforms, it will be stockpiled and/ or taken off-site for storage. It should be possible to incorporate the majority of excavated material (free of contamination) into areas of landscaping and landform to the required surface profile. Material which cannot be used on site will be sent to an appropriately licensed or registered exempt site elsewhere. Some materials (e.g. old pavement materials) may be reprocessed for recycling at a materials recovery facility.

Stock Proofing

4.2.7 Where required, temporary stock proof fencing will be erected, prior to construction. Typically, the aim is to delineate the works site and minimise risk of larger mammals (e.g. deer, sheep, horses or cattle) and people wandering onto active works areas. Temporary works fencing does not present a significant barrier for smaller mammals.

4.2.8 Fencing is typically erected following accurate ground surveys to delineate the areas required, prior to works commencing. It is anticipated that ground surveys will be undertaken along the line of the permanent and temporary works boundaries, as shown in **Drawings 5.2** to **5.13** (in **Volume 3**). Whilst additional land may be acquired through the Compulsory Purchase Order (CPO) process for mitigation purposes, the Contractor will determine, in consultation with the adjacent landowner, the extent of temporary stock-proof fencing required.

4.2.9 Works on the Proposed Scheme are required adjacent to the Kingussie Highland Wildlife Park (HWP). The HWP operates under the terms of its zoological license, with a two-fence boundary. There is a 5m buffer between the two fences, and in some locations the inner fence is electrified. Security of the HWP is of paramount importance and a localised realignment of the outer and inner fence is required to facilitate the works. It is expected that extensive planning and consultation by the Contractor with the Royal Zoological Society will precede any works adjacent to the HWP.

Construction Stage SuDS and Pre-Earthworks Drainage (PED)

4.2.10 The Scottish Environment Protection Agency (SEPA) noted through consultation with the A9 Dualling Environmental Steering Group (ESG), that the Proposed Scheme extents should ensure the provision of sufficient land for construction stage sediment controls, e.g. interceptor ditches, settlement lagoons and other appropriate SuDS features. Construction stage surface water runoff and drainage control arrangements will be prepared by the Contractor, including a Pollution Prevention Plan, required by SEPA, under Controlled Activities Regulations (CAR).

4.2.11 Whilst the design and installation of construction stage SuDS is the responsibility of the Contractor, the Proposed Scheme includes land for such treatment and attenuation facilities, which could be used to accommodate enhanced mechanical/ chemical settlement processes if local ground conditions are not suitable for infiltration processes.

4.2.12 Construction stage SuDS are likely to be located at natural low points in proximity to earthwork drains and at most watercourse crossings. Where space allows, construction SuDS will be in different locations from the proposed permanent SuDS features; however, it is recognised that phased use of permanent SuDS locations may be required.

4.2.13 Construction SuDS will likely require excavation of material, and stockpiling/ placement of fill, where SuDS basins are to be provided. In some cases where there is not sufficient space within the Proposed Scheme extents, temporary drainage tanks may be provided above ground.

4.2.14 Pre-Earthworks Drainage (PED) systems, are required to intercept hillside, cutting and embankment runoff. PED are predominantly provided by means of interceptor ditches at the top of cutting slopes and at the toe of embankment slopes to intercept sheet flows from adjacent natural catchments in advance of the embankment/ cutting slope. PED will be sized to accept flows from the contributing natural catchment and installed at a longitudinal gradient to discharge to a suitable receiving watercourse via an outfall. The use of PED to intercept flows from embankment slopes can help prevent flooding of adjacent land.

4.2.15 In the permanent situation, PED systems intercept 'clean' water, i.e. unaffected by road surface runoff, and does not require SuDS treatment. PED systems may therefore discharge directly to the nearest and most convenient local watercourse within the same natural catchment area. However, during construction, interceptor ditches at the toe of constructed embankments will be routed to construction SuDS to ensure settlement of sediment runoff before discharge.

Earthworks

4.2.16 In the first instance topsoil will be stripped off, typically undertaken in phases to a depth defined for each location. Topsoil is usually stockpiled on site near the point of reuse, but could be removed to storage, depending on the need for reused topsoil at any one time.

4.2.17 Embankments will be raised to specifications set out at the detailed design stage. The height of embankments will vary relative to local topography and the proposed finished road level.

4.2.18 The majority of Proposed Scheme embankments will be constructed using fill material generated on site from cutting operations, although a proportion of imported fill may also be required. Embankments constructed from site won material will generally be constructed with side slopes of between 1V:2H and 1V:3H, depending on the height of the embankment.

4.2.19 The Proposed Scheme crosses a number of areas of peat, made ground, silt or clay. Any such material encountered under embankments will typically be excavated and replaced with a suitable engineered fill to reduce settlement risks.

4.2.20 In areas where depth of peat exceeds 2m, it may be considered more economical to pile embankments, rather than excavate and replace the material. The depth of peat is only anticipated to exceed 2m in a few isolated localities. For the purposes of the assessments in **Chapter 10** (**Geology, Soils and Groundwater**) and **Chapter 18** (**Materials**), it is assumed that where peat is encountered beneath infrastructure along the route, it will be excavated and replaced.

4.2.21 Where large boulders and cobbles are present in glacial and alluvial deposits they may need to be broken up using hydraulic breakers or be over-excavated and removed. Excavations within peat and made ground are likely to require short-term support to ensure stability.

New Embankment and Removal of Existing Embankment in the National Nature Reserve

4.2.22 The A9 crosses the River Spey valley floor and Insh Marshes floodplain at Kingussie. The existing A9 embankment crosses the Insh Marshes National Nature Reserve (NNR) and the internationally designated Natura 2000 conservation site boundaries of the River Spey Special Area of Conservation (SAC), the Insh Marshes SAC, the River Spey-Insh Marshes Special Protection Area (SPA) and Ramsar site. The proposed replacement River Spey bridge (at approx. 290m) is longer than the existing bridge (approx. 138m) and spans the Natura 2000 areas. The proposed new embankment is therefore shorter than the existing embankment, but wider to accommodate the dual carriageway. The construction of the new embankment over the Insh Marshes requires the import of a significant amount of fill material (approximately 220,000m^3).

4.2.23 The existing A9 embankment is not available as a material source for construction of the new embankment as traffic flow will be maintained on the existing, until such time as the traffic can be moved across to the new southbound carriageway. However, it is considered that suitable material from the existing embankment could be used in final profiling of the new embankment and landscape profiling of other slopes within the scheme extents once traffic has been transferred.

4.2.24 Construction of the new embankment will require topsoil strip and ground excavation to a depth not less than 1m in order to replace with a suitable embankment 'starter layer', to facilitate drainage at the base of the embankment and, initially, to create a working access platform.

4.2.25 Embankment construction is likely to proceed until it reaches a level not at risk of inundation by periodic flooding experienced in the local River Spey floodplain (e.g. 1:10 or 1:30 flood level). At this level the partly constructed embankment will provide a haul road for movement of materials and machinery across the Insh Marshes to build the new bridge. The Contractor is also likely to temporarily extend the raised working embankment platform to ensure piling rig and crane access to the locations of the new bridge foundations.

4.2.26 The embankment will gain height in layers, benching into the existing embankment where required to achieve a suitable key between the existing and new construction. Where necessary, the new embankment will be surcharged with additional material, on a temporary basis, to ensure any settlement takes place before commencing road drainage and pavement operations.

4.2.27 When the new southbound carriageway is opened to traffic and the existing bridge is no longer required to haul earthworks or construction materials over the River Spey, the Contractor is likely to commence demolition of the existing River Spey bridge followed by the removal of the existing redundant embankment. As noted above, suitable material from this embankment will be reused locally and for example, could be used to finish the slopes of the new embankment. The area exposed by removal of the existing embankment will be reinstated to match the surrounding grassland; topsoils excavated in the Insh Marshes will be used to reinstate the former embankment footprint and to topsoil the slopes of the new embankment.

Material Transfer

4.2.28 Contractors typically use 40 tonne moxy-type vehicles for earthwork material movement. The number of earthmoving vehicles required will depend on phasing of works and whether material is stockpiled or excavated and placed directly in the works. The Proposed Scheme comprises parallel widening and this construction methodology inevitably requires the movement of earthworks materials from one side of the live carriageway to the other.

4.2.29 The Contractor is likely to employ several techniques to maximise efficient movement of bulk materials; including stockpiling (i.e. storing material on site), temporary under excavation in cuttings (i.e. only excavating material when it can be moved directly to its final destination), use of

borrow pits and potential in-situ treatment and improvement of excavated materials (e.g. poorer soils can be stabilised by chemical or physical treatment to improve material properties to enable reuse on site).

Contaminated Materials

4.2.30 The treatment of any hazardous materials encountered during site clearance and excavations will comply with specific contract requirements and will require an assessment in accordance with current health and safety regulations including the Control of Substances Hazardous to Health Regulations (COSHH) Regulations. Contaminated materials may have to be disposed of at an appropriately licensed waste management facility.

Rock Cuts and Rock Breaking

4.2.31 A preliminary assessment of predicted rock slope stability and rock excavations has indicated that 'ripping' to 'blasting' may be required, and it is assumed that most areas of competent rock on the Proposed Scheme can be excavated using blasting techniques. However, the proximity of the existing A9 could restrict the use of blasting in places, as could proximity to internationally designated nature conservation sites during particularly sensitive ecological seasons.

4.2.32 At Braes of Nuide, a rock cutting of approximately 30,000m^3 is required adjacent to, and running parallel with, the existing A9 live carriageway. Given the proximity to the live carriageway, safety of the workforce and road users will require special consideration. The main risks to safety include:

- Falling rock (during all operations)
- Equipment encroaching into the live traffic lane

4.2.33 It is assumed that a solid barrier next to the live running lane will prevent loose material falling onto the road and to create a safe working space between live traffic and the excavation area. If the rock face itself cannot be used to form a barrier, a temporary solid barrier and safety zone to separate the works from live traffic would be provided. In other locations, reduced lane widths will provide greater clearance to excavate rock, and nets may also be used to protect the running carriageway.

4.2.34 If blasting were to be considered, consultation on temporary closure of the A9 over short durations would be required. The rock cut required at Braes of Nuide is located between the major junctions at Newtonmore and Kingussie and therefore a suitable 'off peak' diversion route is available. The Contractor could therefore propose limited closure of the A9 to facilitate blasting and clear up operations in the evening or over weekends.

Drainage Networks

4.2.35 The road surface drainage network for the Proposed Scheme includes for roadside filter drains as a first level of treatment, passing to a detention basin as the second level of treatment. Where required, enhanced provision typically includes a micro-pool at the outlet and/ or a further swale (open, grassed channel) to the discharge outfall.

4.2.36 In spatially constrained areas, where SuDS detention basins are not achievable, underground storage tanks and vortex separators are included.

4.2.37 Constructing SuDS facilities (generally, basins and swales) will require excavation, potential fill and compaction to create a suitable surface. Construction of SuDS facilities and outfall channels should be programmed to occur early in the construction process, to allow landscaping to become established. Before runoff is allowed to flow through vegetated SuDS, they should be fully

established by planting or temporary erosion protection installed to prevent erosion of the sides and base, or the clogging of downstream components.

Service Diversions

4.2.38 It is possible that some service diversions will be undertaken in advance of the main construction works. However, some diversions are only likely to be possible once construction has reached a certain stage. Existing services may require temporary diversions as a result of disruption to apparatus during construction works. Temporary diversions will be put in place to minimise any disruption to the services being affected by the Proposed Scheme.

Road Pavement

4.2.39 The Proposed Scheme design assumes that a low noise running surface (LNRS) will be provided where the Proposed Scheme is located adjacent to residential properties or other areas where a need for low noise is identified in the ES. On the Proposed Scheme there are clusters of residential properties at Ralia, Ruthven, Kingussie and Lynchat all of which would benefit from the use of a low noise running surface. Wider provision of a LNRS may benefit more distant receptors and generally lessen the noise generated from the road surface over a wider area and therefore should be considered as a general provision over the full length of the Proposed Scheme.

4.2.40 A 35mm thick surface wearing course together with a 65mm thick binder course and 260mm base course have been adopted throughout the Scheme. The total flexible asphalt thickness achieved is 360mm. The road pavement will be built up in layers with the sub-base placed on top of a capping layer (where required), followed by base and binder and finally the running surface. Paving operations could involve a considerable amount of road transport, as the nearest paving batching plant is located near Inverness and the required accreditations for temporary on-site batching plants may be difficult to secure.

Roadworks Finishes

4.2.41 The Proposed Scheme will require road signs and markings in accordance with the Traffic Signs Manual, The Traffic Signs Regulations & General Directions (2016) and Local Transport Note 1/94 “The Design and Use of Directional Informatory Signs”. This will include directional signs, route confirmatory signs and some tourist signage. The installation of signage will require foundation excavation, concrete to set the signage posts and erection of the signs themselves. Road markings will be undertaken by standard road marking vehicles, prior to the carriageway opening to traffic.

4.2.42 Following pavement construction, safety barriers will be installed. Posts and barriers are delivered to site and safety barrier installation 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. Variable message signs (VMS) and CCTV camera installation will involve excavation for concrete foundations, which will extend above ground level in the case of the VMS. The supporting column is then fixed to the concrete foundation and the VMS display box is attached to the supporting column. CCTV cameras are typically mounted on a lattice support which is connected to the foundation. Associated cabinets and hard standing areas will be constructed at ground level at each location.

Accommodation Works

4.2.43 Accommodation works will include access roads, fences, walls, water supplies and other ancillary items agreed with landowners and other affected parties.

4.3 Structures Demolition and Construction

Mainline Structures

4.3.2 **Table 4-2** provides an overview of the Proposed Scheme structures.

Table 4-2: Main structures associated with the Proposed Scheme

Structure	Existing No. Spans	Proposed No. Spans	Span (m)	Proposed Form of Construction	Comments
Glentruim Rail Bridge	1	1	16.0	Replacement Structure - Fully integral portal (Concrete)	Increased span and headroom to allow for possible future HML upgrade (Overhead Line Electrification (OLE) and twin track)
Phoines Underpass (replaces Glen Truim Sheep Creep)	n/a	1	5.3	New Structure- Reinforced concrete box underpass	Upgrade to cater for vehicular traffic
Newtonmore Junction Underbridge	n/a	3	35.6	New Structure- 3 span prestressed beam open structure	Underbridge to introduce grade separation. 3 Span to allow for open aspect
Nuide Underpass (replaces Nuide Cattle Creep Underpass A9 960)	1	1	5.3	Replacement Structure - Reinforced concrete box underpass	Upgrade to cater for vehicular traffic
Inverton Underbridge A9 970	3	3	17.0	Replacement Structure - Concrete box culvert	Structure to be lengthened for access provision, upgrade to form of construction
Knappach Underpass A9 980	1	1	6.5	Replacement Structure - Reinforced concrete box underpass	Like for like replacement but with reduced skew to improve visibility and shorten length
Ruthven Road Underbridge A9 990	1	1	26.7	Replacement Structure - Fully integral portal (Concrete)	Larger span to improve access
River Spey Underbridge A9 1000	7	7	290	Replacement Structure – Continuous Steel Composite	Larger span to minimise impact on designated Natura sites
Kingussie Rail Underbridge A9 1010	1	1	21.2	Replacement Structure – Semi integral portal (Concrete)	Increased span and headroom to allow for future HML upgrade (OLE and twin track)
A86 Kerrow Underbridge A9 1020	3	3	41.0	Replacement Structure – Semi integral portal (Concrete)	Larger span to improve access and account for offline structure
Chapelpark Underpass A9 1030	1	1	5.3	Replacement Structure - Reinforced concrete box underpass	Upgrade to cater for vehicular traffic
Raitt's Burn Underbridge A9 1040	1	1	8.0	Replacement Structure - Reinforced concrete box culvert	Like for like replacement
Wildlife Park Underbridge A9 1050	1	1	11.7	Replacement Structure - Fully integral portal (Concrete)	Larger span to introduce footpath

4.3.3 **Table 4-3** provides an overview of the Proposed Scheme retaining wall structures.

Table 4-3: Retaining wall structures associated with the Proposed Scheme

Structure	Start Chainage	End Chainage	Proposed Solution	Length (m)	Max Retained Height (m)
C1137 Retention	40,640	40,710	Gravity retaining wall along northbound verge of C1137 single track road	70	7.5
Ralia Café mitigation (1)	42,535	42,605	L-shaped retaining wall along southbound verge of Raliabeag Road	70	1.95

Structure	Start Chainage	End Chainage	Proposed Solution	Length (m)	Max Retained Height (m)
Ralia Café mitigation (2)	42,625	42,665	L-shaped retaining wall along southbound verge of Raliabeag Road	40	1.35
Ralia Café mitigation (3)	42,685	42,775	L-shaped retaining wall along southbound verge of Raliabeag Road	90	1.7
A9 at Raliabeag	42,750	42,850	L-shaped retaining wall along southbound verge of Raliabeag Road	100	1.0
U3063 retention between the A9 and side road (1)	44,360	44,480	L-shaped retaining wall along southbound verge of U3063	120	1.0
U3063 retention between the A9 and side road (2)	44,700	44,730	L-shaped retaining wall along southbound verge of U3063	30	0.9
U3063 retention between the A9 and side road (3)	44,810	44,855	L-shaped retaining wall along southbound verge of U3063	45	2.1
U3063 retention between the A9 and side road (4)	45,055	45,130	L-shaped retaining wall along southbound verge of U3063	75	3.0
Raitt's Cave Layby	52,020	52,380	Gravity retaining wall at rear of layby	360	4.5
Lynchat retention between A9 and track	52,430	52,500	L-shaped retaining wall along northbound verge of track	70	1.2
Balavil Entrance Wall (1)	53,475	53,590	Gravity retaining wall along northbound verge of parallel cycle route	122	2.5
Balavil Entrance Wall (2)	53,610	53,685	Gravity retaining wall along northbound verge of parallel cycle route	80	2.5
Balavil Ha-Ha (1)	52,430	52,500	Gravity retaining wall along Balavil frontage to remove impact on historical woodland	115	3.5
Balavil Ha-Ha (2)	53,810	53,850	Gravity retaining wall along Balavil frontage to remove impact on historical woodland	40	3.5
HWP Service Road (1)	55,500	55,640	Soil Nailing at 55°	140	10.6
HWP Service Road (2)	55,710	55,950	Soil Nailing at 55°	240	7.0

4.3.4 With parallel widening and online replacement of existing structures, the new structure will be constructed in two halves to enable A9 traffic to continue running over the existing structure until the first half of the new structure is complete, and traffic can be transferred. The existing structure will then be taken down and the second half of the new structure completed to adjoin the first half.

4.3.5 This method of phased construction will require some form of temporary longitudinal support at the structure during construction, such as temporary retaining walls or soil nailing, which can be removed or left in-situ once the second half of the structure is complete.

4.3.6 It should be noted that the A86 Kerrow Road mainline underbridge and the new River Spey bridge are completely 'offline' and therefore need not be constructed in two halves. Offline construction enables traffic flow on the existing structure until the new structure is complete, traffic can then be transferred and the existing structure taken down. However, the Contractor will need to assess the load capacity of existing structures for construction use, and temporary alternatives may be required.

River Spey Bridge Construction

4.3.7 The new River Spey bridge is expected to comprise a 7-span steel continuous composite structure to carry the new A9 Trunk Road dual carriageway over the River Spey. The designed structure comprises four spans of 37.5m, an intermediate span of 45m, a main span over the river of 70m and an end or back span of 25m, giving a total structure length of approx. 290m (see **Figure 4-1**).

4.3.8 The bridge deck will comprise the northbound and southbound dual carriageway separated by a central reserve, consisting of two 7.3m wide carriageways with 1m wide hard strips, verges of 2.5m and a central reserve of 2.5m. Including parapet edge beam widths of 0.625m, the total structure width is 27.35m.

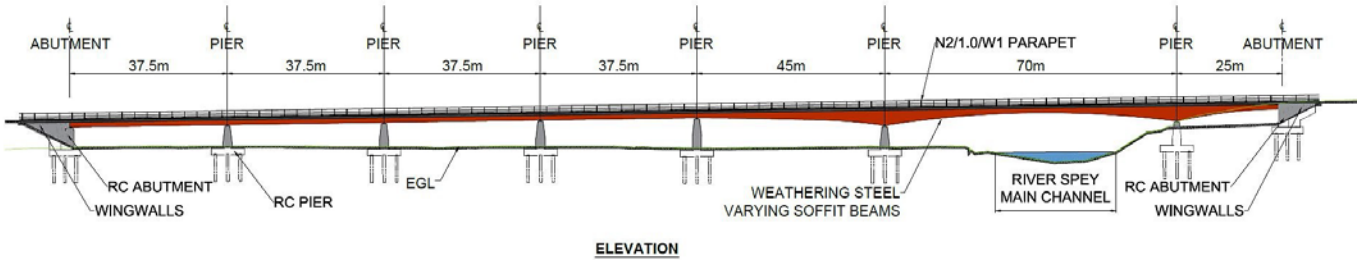

Figure 4-1: Spey Crossing Indicative Structure Cross-Section

4.3.9 Cross beams and bracings will be necessary at regular intervals throughout the structure, including over each of the supports. The structure will therefore need to be constructed in sections, and it is likely given the size of individual elements that the beams would be craned into place as braced pairs. Each span would then require site bolted splice connections. Outer joints will need to be site welded to ensure a flush finish.

4.3.10 The substructure will comprise a series of six intermediate reinforced concrete supports and full height cantilever abutments on piles. The design working life of the structure is 120 years.

Bridge Foundations

4.3.11 Preliminary ground investigation indicated that bedrock across the Insh Marshes is very deep and, on average, is approx. 80m to 90m below average ground level beneath the proposed pier locations. The sub-surface deposits comprise mostly of loose to dense sands and gravels with the occasional boulder interbedded with silt deposits. The ground water table is assumed to be close to ground level and is likely to only drop below ground level when the River Spey is low, and will rise when the River Spey is in spate. Such large depths to bedrock and the local ground conditions effectively indicate that the structure will require a driven pile solution to provide a suitable platform to found the bridge.

4.3.12 The piers and the abutments will terminate in a pilecap either founded at depth to avoid the possibility of future scour, or simply driven deep enough to allow for erosion or geomorphological re-profiling of the river channel over time. The driven piles could comprise a series of individual piles, driven vertically or inclined (on the existing River Spey bridge, driven piles were inclined at roughly at 1 in 3.5 angle and reached a maximum depth of approximately 48.8m to the north and 27.7m to the south). Modern piling rigs would easily achieve the same driven depths, with the expectation that deeper depths would provide for working load capacities in excess of 100 tonnes.

4.3.13 Periodic flooding of the River Spey and the presence of a high-water table are obvious challenges to foundation construction in the Insh Marshes, and it is expected that the pilecap foundation sites will be excavated within a temporary works cage constructed in steel sheet piles. It is expected that such open caissons will require pumping to remove groundwater or inundation water from the works areas in a flood event. The Contractor will be required to develop a surface water management plan and a flood incident response plan, including details on advance weather warnings to curtail work and remove plant and machinery to higher ground.

4.3.14 It is expected that the Contractor will raise the ground locally to provide a good working platform under the structure which would later be removed and the ground reinstated when the bridge is completed.

Existing River Spey Bridge Demolition

4.3.15 The existing River Spey bridge (Transport Scotland Reference: River Spey Bridge A9 1000 Grid Reference 276400, 800500) is a 7-span continuous steel composite structure which carries a single carriageway section of the A9 Trunk Road over the River Spey. The bridge has six 18m long spans with an additional main span of 30m over the River Spey. The width between parapet edge beams is approximately 12.3m along the length of the structure (see **Photograph 4-1**).

Photograph 4-1: Existing River Spey bridge

4.3.16 The existing bridge is a complex structure, and advance demolition process planning will facilitate the identification of measures to minimise the watercourse contamination, and a traffic management plan to account for maintaining adjacent live traffic.

4.3.17 The principal issues associated with bridge demolition in this environmentally sensitive area include:

1) means of removing the existing bridge sections
2) provision of temporary works to ensure that demolition debris does not fall into the River Spey, which is an environmentally designated site
3) methods for controlled demolition and removal of piers and foundation bases adjacent to the river channel
4) demolition and removal of the north abutment sheet pile wall (if required)
5) development of a suitable restoration plan for the site.

4.3.18 The following sections review each of these issues in turn.

Removing the existing bridge sections and ensuring debris does not fall into the River

4.3.19 There are two principal methods that the Contractor could employ to demolish the existing bridge. Demolition of the structural elements could be undertaken from either the existing A9 surface, or on the northbound (west) side of the bridge in the Insh Marshes. Taking each in turn:

- Use of small cranes on the existing carriageway and deck, requiring staged demolition of the concrete deck and steelwork. Demolition would be undertaken using the existing bridge footprint, limiting the need for wider access on third party land. This approach would require careful phasing of the operations for deck demolition. As the crane facilitating lifting is located on the redundant carriageway, the area for materials storage on the old A9 is limited by the crane, and therefore the superstructure would need to be removed in small pieces, possibly directly onto the back of flat bed trucks and removed from site to be further dismantled elsewhere.
- Use of a large crane for demolition sited on land adjacent to the bridge northbound side, allowing the full removal of the concrete deck prior to the steelwork removal. This requires land and space specifically for crane pads. This methodology would allow for concrete deck demolition and steelwork removal as separate operations. The demolished elements would be stored and further dismantled on the redundant A9 carriageway.

4.3.20 The use of small cranes on the existing carriageway is considered to be the more practical approach to demolition (avoids the need to install crane pads and access tracks in the Ruthven north compartment of the Insh Marshes NNR) and is the assumed method for the purposes of the EIA.

4.3.21 In practice, bridge demolition will require in-situ cutting and lifting of concrete deck elements, with mitigation measures in place to reduce the possibility of cutting debris entering the river. For example, scaffolding with catch netting or crash decks would help ensure that rubble does not fall into the River Spey and surrounding Insh Marshes during demolition. These would be located in the most appropriate positions (determined on site) and at suitable levels to limit the distance debris has to fall to help reduce dust. Soft mattress materials could also be employed to reduce noise levels and lessen the dynamic effects of falling loads onto crash decks.

4.3.22 Should hydrodemolition processes be used (cutting using high pressure water jets), the cutting residue (the 'mud') produced is typically contained and recycled through the cutting machinery; however, suitable containment systems would also need to be place in to prevent runoff to the River Spey.

Demolition and removal of foundation bases and sheet piles adjacent to the river channel

4.3.23 It is known that the original foundations were constructed in sheet pile caissons and it is expected that these could be used to allow demolition work to proceed from inside the safe operating area they provide. When the foundations are removed to at least 1m below the average ground level, the sheet piling could be pulled out or cut off below ground level and removed from site. The void created would be infilled with suitable fill material and the surface reinstated to match the surrounding grassland habitats.

4.3.24 Should full excavation not be possible from the dry bankside, a temporary sheet pile coffer dam may be required to provide a working area at the immediate water channel bankside. This would require temporary in-channel (bankside) works; however, all temporary works would be removed following completion of operations.

Agreement on a suitable restoration plan for the site

4.3.25 Any damage to the natural river banks and their surroundings will require to be restored. The Outline Habitat Management Plan (**Appendix 12.13**, **Volume 2**), includes provision for the area of the Insh Marshes disturbed by construction and demolition, and will be developed further by the appointed Contractor through consultation with the local landowner (RSPB) and Scottish Natural Heritage (SNH). Aspects of the restoration plan may also be of interest to the Cairngorms National Park Authority (CNPA) and the Spey Fishery Board (SFB) and these bodies should also be consulted where appropriate.

4.3.26 **Figure 4-2** to **Figure 4-5** below provide further descriptions on Spey bridge construction, anticipated access requirements and temporary piling rig and crane platforms. **Table 4-4** further below outlines an indicative phased construction programme, including access to the embankment and bridge construction areas, earthworks and piling operations, crane operations, removal of the existing bridge and embankment, and ground restoration works. The table also includes discussion of seasonal restrictions due to breeding/ wintering birds in the Insh Marshes, and salmon migration periods in the River Spey.

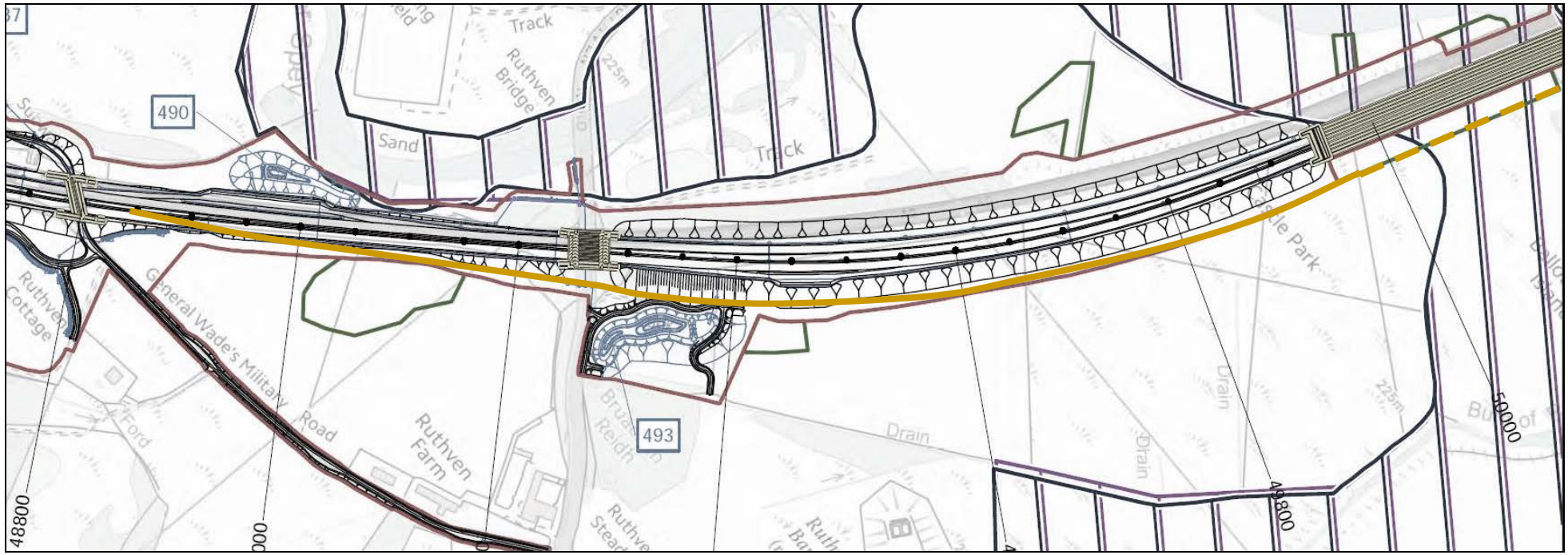

Figure 4-2: Indicative construction stage access route from just north of ch. 48,800, across B970 into Insh Marshes and alongside the existing A9 embankment

The anticipated construction stage access route is shown via the mustard coloured line in **Figure 4-2.** The solid line from approx. ch. 48,850 drops down from the current A9 to the east side of the B970 crossing at Ruthven Farm. Plant vehicles will cross the B970 (under traffic management control) and enter the Insh Marshes Nature Reserve area at approx. ch. 49,250.

The access route will run along the length of the new A9 embankment, requiring topsoil strip to 1m below ground level and infill with suitable materials to form the access and the base of the new embankment to prevent need for track removal and replacement. The access created will enable two-way traffic, with passing places where spatial constraints prevent full width.

The topsoil strip and infill access route will extend to the length of the new proposed embankment at approx. ch. 49,950 (solid mustard line). From there, and along the new bridge construction area (dashed mustard line), it is recommended that a suitable access platform for piling rigs and crane pads is constructed using a ground protection layer to minimise the need for topsoil strip and later reinstatement; however, this will be subject to contractor assessment of local ground conditions. The hatched areas shown represent the River Spey/ Insh Marshes Natura site boundaries.

Construction stage SuDS will be constructed with interceptor ditches alongside the track, and platform construction works, with suitable settlement facilities to capture sediments before discharge to the River Spey or connected watercourses. These will be subject to SEPA's Construction Site Licencing and Pollution Prevention Plan requirements.

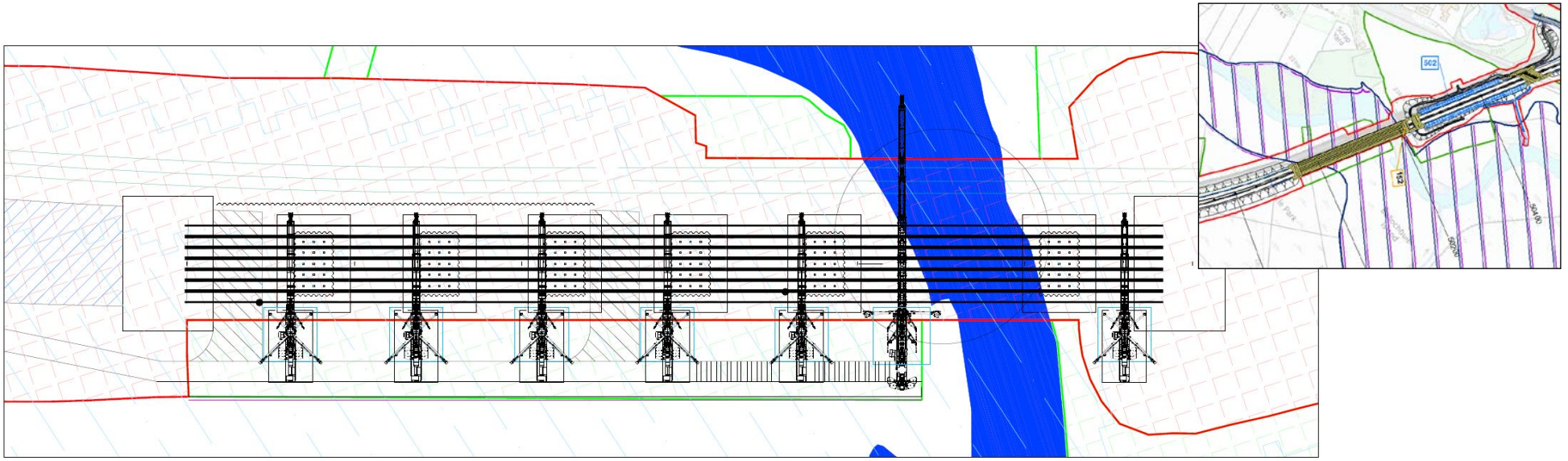

Figure 4-3: Indicative 750 tonne crane locations adjacent to each pier, with larger 1200 tonne crane for main bridge span across River Spey

Plan view showing 750 tonne crane and crane pad locations adjacent to new bridge piers (piers referenced as nos. 1-5 from south abutment to watercourse, and no. 6 on north bank).

A 1200 tonne crane is shown on the south bank of the watercourse to enable the larger lifts for the main bridge span. Crane locations referenced as nos. 1-6 on the south side of the watercourse (no. 6 is the 1200 tonne crane) and no. 7 on the northside. All new bridge construction stage crane works take place on the east (southbound) side of the existing A9 to prevent any need to lift materials over a live carriageway.

Note that the surface vegetation in the area beneath the new bridge and the crane locations is grassland and does not contain Habitats Directive Annex 1 qualifying habitats.

Note that flood relief pipes are indicated beneath the crane access platform between positions 4, 5 and 6; this is to enable crane operations to continue during lower intensity River Spey flooding events.

Note that the north bank pier (pier no. 6) is showing a slight overlap with the River Spey main channel; this is a function of the CAD tools setting standard working distances between pier support piles and pier sheet piles. This will be adjusted to avoid permanent in-channel works, as piling will be undertaken from the dry bank and not from within the watercourse.

It is possible that sheet piling will be required along the north river bank to provide a safe working area, i.e. to protect working areas from rising river levels during rainfall and flooding events. Sheet piles may also be required to protect the 1200 tonne crane pad; however, these would typically be installed during low flow periods to avoid in-channel works, and removed or cut off below ground level following completion of works.

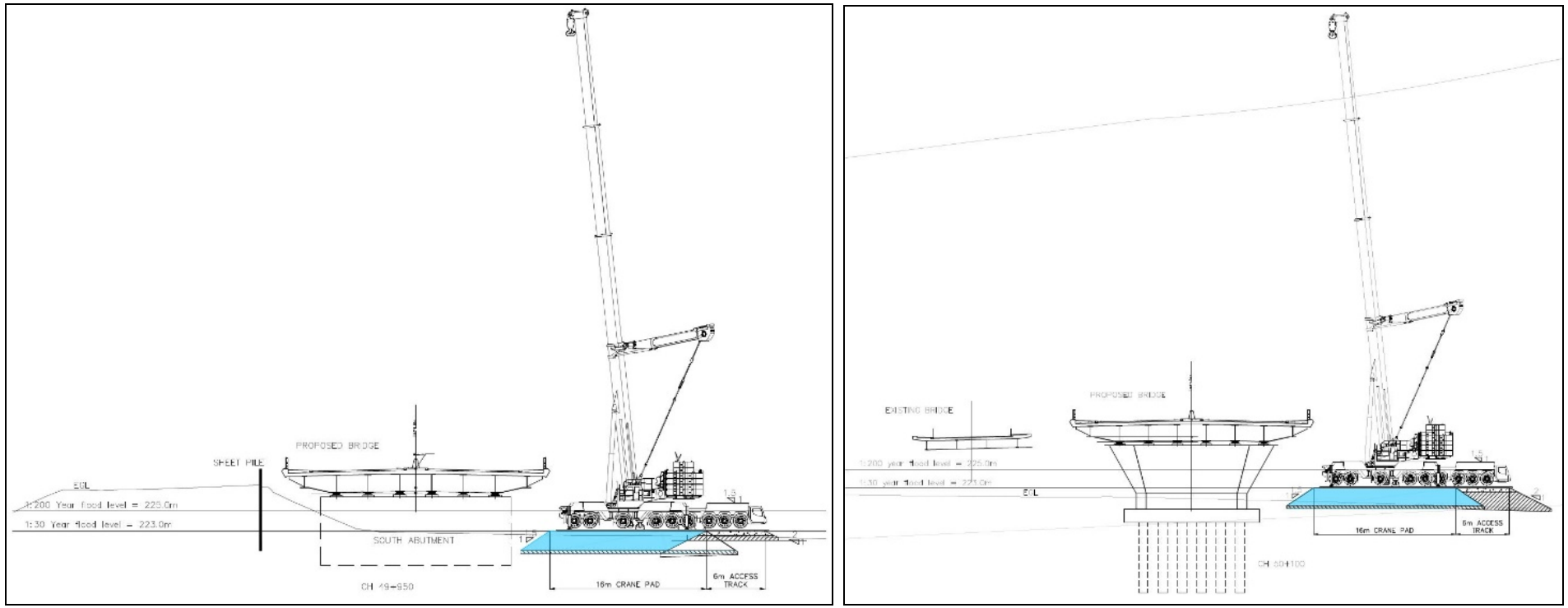

Figure 4-4: Cross sections showing existing embankment and bridge, new bridge position with crane pads temporarily raised above 1:30 flood level

To minimise risk of works delay due to more regular, but lower intensity River Spey flooding events, the new bridge area construction stage piling rig and crane access platform could potentially be raised up to the 1:30 year flood level.

Large cranes take time to assemble/ disassemble and cannot be moved whilst fully laden with counterbalance weights; therefore, it is considered likely that the contractor will opt to construct a raised working platform which minimises the downtime risk during expensive crane operations. However, this would be subject to detailed contractor programme planning, and lower flood levels (e.g. 1:10 year level) may be acceptable to the contractor if the crane operations are scheduled during low flow periods.

It is recommended that the access platform is constructed on a ground protection layer, with flood relief pipes, as the access platform materials will be removed and reused in the approach embankment following completion of crane operations; therefore, topsoil strip may not be required.

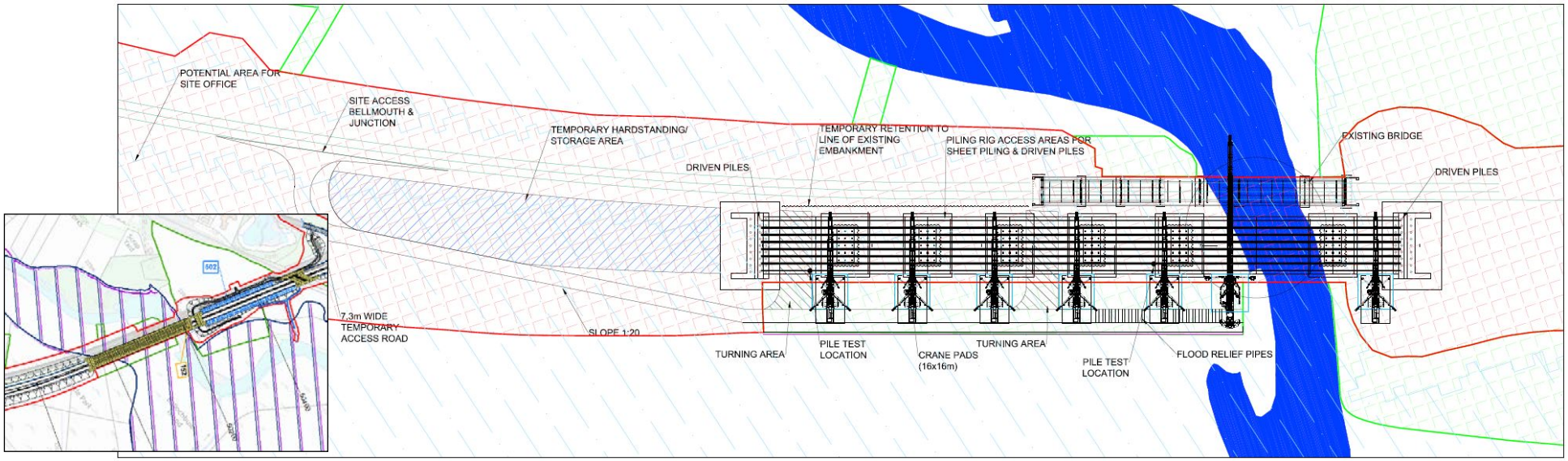

Figure 4-5: Indicative crane and steelwork access showing temporary access bellmouth from A9, and ramp created between existing and new A9 embankments

Figure 4-2 showed initial access taken from approx. ch. 48,850 and across the B970; however, for large cranes, steelwork and pre-fabricated sections of bridge deck, that would require a travel distance of more than 1.2km along the temporary track. It is therefore considered that the contractor will use the initial access to enable material transfers to build access platforms and bring in piling rigs; however, a second access may be created closer to the bridge location once the new embankment has been raised behind the new south abutment location.

This will enable materials laydown on the new embankment area behind the south abutment, if required, and significantly shorten the transport distance for large crane units. **Figure 4-5** shows a bell-mouth access from the existing A9, onto the new embankment with a ramp down to the new bridge construction area. The second access bellmouth would be anticipated between approx. ch. 49,600-49,800. **Figure 4-5** also shows turning areas between the south abutment and pier no. 1, and between piers 3 and 4.

The flood relief pipes are noted, and it is anticipated that the contractor may consider temporary installation of sheet pile retention to the toe of the existing embankment on the east side and from the south abutment of the existing A9 bridge, then between new pier locations 3 and 4, to 'train' flood water through the relief pipes to improve protection of the works areas. Temporary sheet piles would be removed following completion of works, or cut off at least 1m below ground level if removal is not possible.

Crane access platform materials will be removed and reused in the final filling and levelling of the new approach embankment. Ground restoration works will return the affected bridge works areas to grassland.

Table 4-4: Indicative Spey Crossing Construction Phasing

Phasing Ref	Construction Stage Operation	Estimated Timescale	Additional Information
South section of new Spey crossing construction			
(A)	Create access from A9 (approx. ch. 48,800) to B970 Create access from B970 to length of new embankment along base of existing embankment (topsoil strip, excavate to 1m bgl, infill with suitable materials) Install construction SuDS	12 wks/ 3 months	With reference to Figure 4-2, construction SuDS settlement facilities may utilise area identified for permanent SuDS 493 before discharge to Spey or local channels, subject to SEPA Construction Site Licence and Pollution Prevention Plan consultation Initial access to Insh Marshes National Nature Reserve from B970 after bird breeding season (March to August inclusive), in consultation with SNH
(B)	Create access to new bridge construction area (beyond end point of new embankment length) including ground protection and flood relief pipes	4 wks/ 1 month	Ground protection layer recommended to prevent topsoil strip and reduce subsequent restoration works requirements Flood relief pipes installed to enable floodwater passage through raised working platforms Installation during River Spey low flow conditions to prevent in-channel works, and subject to contractors' River Spey flood warning system to allow contractor to remove plant from site in advance of any flooding coming down catchment
(C)	Sheet piling to define pier working areas, to base of existing embankment and from existing abutment, to train flood water to protect works Raise bridge working area platform above 1:30 flood level and install supporting piles at crane pad locations (if necessary)	12 wks/ 3 months	Multiple sheet piling rigs may be used to reduce installation timescales Sheet piling to create new pier caissons which will enable pumped water removal to SuDS when required As above, sheet piling subject to River Spey low flow conditions and flood water warnings to prevent in-channel works No sheet piling works to be undertaken during hours of darkness so potential for associated noise barrier will be absent, enabling fish passage Given locally soft ground conditions, support piles may be required at crane pad locations to provide stable base for crane outriggers, unless alternative load spreading slabs or rafts are determined appropriate
(D)	Fill in new embankment behind and at south abutment Construct access bellmouth and ramp (approx. ch. 49,600-49,800) Conduct pile tests	7 wks/ 2 months	Embankment fill and access creation conducted in parallel with pier sheet pile works Complete within 7 months overall No ecological restrictions on embankment fill works or on creation of second access and ramp to new bridge construction area Soft start and noise reduction mitigation measures for piling operations have been identified
(E)	Piling operations - piers 1-5 and south abutment (assuming two piling rigs – circa 80-100 piles)	12 wks/ 3 months	Piling estimated to complete within 10 months overall Soft start and noise reduction mitigation measures for piling operations have been identified No piling works to be undertaken during hours of darkness so potential for associated noise barrier will be absent, enabling fish passage Should piling for piers 4 and 5 be required during bird breeding season (March to August inclusive), pre-works monitoring for wigeon presence and consultation with SNH is required to agree local controls on works exclusion zones or time periods
(F)	Pier 1-5 excavations, foundation formwork and in-situ concrete pouring Staged formwork and in-situ concrete pouring for Pier 1-5 'lifts'	42 wks/ 9 months	Pier foundations estimated to complete within Year 1 Pier lifts complete within 16 months overall No specific seasonal restrictions, works areas protected by sheet piles and caissons which will contain any poured concrete spillage and enable water/ sediment pumping to construction SuDS Works will be subject to contractors' River Spey flood warnings to enable effective removal of plant in advance

Phasing Ref	Construction Stage Operation	Estimated Timescale	Additional Information
(G)	South abutment settlement period with monitoring Local excavation (in new settled embankment) for south abutment Staged formwork and in-situ concrete pouring for south abutment Fit bearings to piers and south abutment	33 wks/ 7 months	In parallel with pier formation Estimated complete within 18 months overall As above, no specific seasonal restrictions, abutment works area protected by sheet piles and caissons which will contain any poured concrete spillage and enable water/ sediment pumping to temporary construction SuDS facilities Works will be subject to contractors' River Spey flood warning system to enable effective removal of plant in advance of higher level forecast flood events
(H)	Form crane pads for crane positions 1-6 Crane operations - 750 tonne crane Move crane to each position sequentially and fit steelwork for Spans 1-2-3-4-5	26 wks/ 6 months	Estimated complete within 23 months overall No specific seasonal restrictions, risk of bird strike with cranes during crane operations is considered negligible Crane pads expected above 1:30 flood level with flood relief pipes and sheet piles to minimise risk of wash out to works due to lower intensity River Spey flooding Phase C notes that supporting piles may be installed for crane pads unless alternative load spreading slabs or rafts are determined appropriate Works will be subject to contractors' River Spey flood warning system to enable effective removal of plant in advance of higher level forecast flood events
(I)	Backfill south abutment Crane operations - crane and fit deck units In-situ finishing - stitches, diaphragms, waterproofing, footways, services, parapets, joints, surfacing, white lining, etc.	30 wks/ 7 months	Estimated open new bridge to traffic approx. 2.5yrs from breaking ground on access to B970 As above, no specific seasonal restrictions, risk of bird strike with cranes during crane operations is considered negligible Crane pads expected above 1:30 flood level with flood relief pipes and sheet piles to minimise risk to works due to lower intensity River Spey flooding Works will be subject to contractors' River Spey flood warning system to enable effective removal of plant in advance of higher level flood events In-situ finishing will be at new bridge deck level and subject to spillage controls and containment via installed drainage and SuDS connections
North section of new Spey crossing – overlaps with south section construction			
(J)	Create access to north abutment and pier area from A9 southbound side (approx. ch. 50,400 into current Church of Scotland land parcel) Topsoil strip, excavate to 1m bgl, infill with suitable materials Install construction SuDS and ground protection to north revetment Build access platform on geogrid for piling	9 wks/ 2 months	Access works for northside of new crossing expected to be undertaken in parallel with south side access works Initial access to Insh Marshes National Nature Reserve after bird breeding season (March to August inclusive), in consultation with SNH Installation during River Spey low flow conditions to prevent in-channel works, and subject to contractors' River Spey flood water warning system to remove plant from site in advance of higher level flood events

Phasing Ref	Construction Stage Operation	Estimated Timescale	Additional Information
(K)	Sheet piling - north pier works area (avoiding in-channel works) and locally to existing embankment Raise bridge working area platform above 1:30 flood level, including installation of supporting piles for crane pads (if required) Form earthworks to embankment level behind north abutment location Conduct pile tests	12 wks/ 3 months	Sheet piling for north side works expected to be undertaken after or in parallel with south side sheet piling, depending on number of sheet pile rigs available Sheet piling subject to River Spey low-flow conditions and flood water warning system to safeguard in-channel works No sheet piling works to be undertaken during hours of darkness so the limited potential for associated noise barrier will be absent, enabling fish passage Given locally soft ground conditions, support piles may be required at crane pad locations to provide stable base for crane outriggers, unless alternative load spreading slabs or rafts are determined appropriate Soft start and noise reduction mitigation measures for piling operations have been identified
(L)	Piling operations - pier 6 and north abutment (assume use of same rigs as south piers – circa 40 piles)	5 wks/ 1 month	Due to larger piling rig required for pier piling, northside pier and abutment piling works are expected to follow completion of south side pier piling works (i.e. following south side phased item E) Soft start and noise reduction mitigation measures for piling operations have been identified No piling works to be undertaken during hours of darkness so potential for associated noise barrier will be absent, enabling fish passage Should piling for pier 6 and north abutment be required during bird breeding season (March to August inclusive), pre-works monitoring for wigeon presence and consultation with SNH is required to agree local controls on working exclusion zones or time periods
(M)	Pier 6 excavations, foundation formwork and in-situ concrete pouring Staged formwork and in-situ concrete pouring for Pier 6 'lifts'	11 wks/ 3 months	It is expected that concrete formwork will be moved between piers, therefore northside pier 6 formwork and concrete pouring is expected to follow completion of this work on the south side (i.e. following south side phased item F, to complete in conjunction with south side phased item G) Works areas protected by sheet piles and caissons which will contain any poured concrete spillage and enable water/ sediment pumping to temporary construction SuDS facilities Works will be subject to contractors' River Spey flood warning system to enable effective removal of plant in advance of flood events Should works for pier 6 and north abutment be required during bird breeding season (March to August inclusive), pre-works monitoring for wigeon presence and consultation with SNH is required to agree local controls on working exclusion zones or time periods
(N)	North abutment settlement period with monitoring Local excavation (in new settled embankment) for north abutment Staged formwork and in-situ concrete pouring for north abutment Fit bearings to piers and north abutment Backfill north abutment	26 wks/ 6 months	North abutment works area protected by sheet piles and caissons which will contain any poured concrete spillage and enable water/ sediment pumping to construction SuDS facilities Expected to be undertaken and completed in conjunction with southside abutment works (i.e. south side phased item G) As above, abutment works area protected by sheet piles and caissons which will contain any poured concrete spillage and enable water/ sediment pumping to temporary construction SuDS facilities Works will be subject to contractors' River Spey flood warning system to enable effective removal of plant in advance of flood events Should works for north abutment be required during bird breeding season (March to August inclusive), pre-works monitoring for wigeon presence and consultation with SNH is required to agree local controls on working exclusion zones or time periods

Phasing Ref	Construction Stage Operation	Estimated Timescale	Additional Information
(O)	Form crane pad for crane position 7 (north side) Crane operations - 750 tonne crane (assume same crane as south side) Move crane to position 7 and fit steelwork for spans at north abutment Crane operations - 1200 tonne crane Move crane to position 6 (south side) and fit steelwork for main span	10 wks/ 3 months	North side 750 tonne crane operations for steelwork installation undertaken after completion of south side steelwork operations - this crane will be relocated from south to north side Enables introduction of 1200 tonne crane to south side for main span steel work and deck lifts Risk of bird strike with cranes during crane operations is considered negligible Crane pads expected to be raised above 1:30 flood level with sheet piles to minimise risk to works from lower intensity River Spey flood events Phase K notes that supporting piles may be installed for crane pads unless alternative load spreading slabs or rafts are determined appropriate Works will be subject to contractors' River Spey flood warning system to enable effective removal of plant in advance of higher level flood events Should works for pier 6, north abutment and main span be required during bird breeding season (March to August inclusive), pre-works monitoring for wigeon presence and consultation with SNH is required to agree local controls on working exclusion zones or time periods
(P)	Crane operations - crane and fit deck units using mobile feeder cranes In-situ finishing - stitches, diaphragms, waterproofing, footways, services, parapets, joints, surfacing, white lining, etc.	3 wks/ 1 month	Pre-fabricated deck units to be installed using 1200 tonne, 750 tonne and mobile feeder cranes River Spey will be closed to river traffic during main span crane operations Risk of material/ debris ingress to River Spey during main span deck installation minimised via use of pre-fabricated deck units As above, risk of bird strike with cranes during crane operations is considered negligible Works will be subject to contractors' River Spey flood warning system to enable effective removal of plant in advance of higher level flood events Should deck craning works for pier 6 and north abutment be required during bird breeding season (March to August inclusive), pre-works monitoring for wigeon presence and consultation with SNH is required to agree local controls on working exclusion zones or time periods In-situ finishing will be at new bridge deck level and subject to spillage controls and containment via installed drainage and SuDS connections
Demolition and removal of existing Spey bridge and embankment			
(Q)	Transfer traffic to new bridge and divert services Ensure fixity of steel beams at north abutment Remove parapets and fit temp. edge protection Remove expansion joints, kerbs, surfacing and verge concrete	5 wks/ 1 month	Works undertaken on existing bridge at deck level or away from main River Spey channel at existing north abutment No specific seasonal access or ecological restrictions Demolition control catch netting or similar, expected to be installed for verge concrete removal to minimise risk of debris falling below (i.e. to protect site workers and River Spey) (see also Phase R below)

Phasing Ref	Construction Stage Operation	Estimated Timescale	Additional Information
(R)	Install scaffolding/ debris catchment system (crash deck) for phased removal of existing bridge spans 6, 7, 5, 4, 3, 2, 1 Demolish deck spans, dismantle bracing, lift beams, deconstruct and remove from site Remove bearings from all redundant pier supports Remove redundant span scaffolding Crane operations from existing carriageway	26 wks/ 6 months	Installation of deck removal scaffolding and debris protection begins 6-8 wks before traffic transfer to new bridge Deck spans will be cut into sections that can be removed using cranes located on existing carriageway (i.e. smaller than the 750 or 1200 tonne cranes used in new bridge installation) Deck slice deconstruction will take place on existing redundant carriageway, therefore no ground level breaking works anticipated for this phase of bridge demolition Debris catchment system required to minimise risk of material ingress to River Spey and to protect site workers Risk of bird strike with cranes during crane operations is considered negligible No in-channel works are expected, and no specific seasonal access or ecological restrictions are identified
(S)	Removal of redundant abutments, piers and foundations Create ramp from redundant A9 carriageway to ground level Remove south abutment and piles to 1m below finished ground level Adjust crash decks around piers for phased removal Demolish and remove pier crossbeams Demolish piers and remove sheet piling to 1m below finished ground level Remove north abutment and pier to 1m below finished ground level	18 wks/ 4 months	Phased removals of bridge deck items (R) and pier and abutment items (S) estimated to complete within six months overall Pier breaking will use conventional demolition/ wrecking plant, but may also include hydrodemolition techniques to cut reinforced concrete Cutting torches are also likely to be used to cut through existing sheet pile casings around foundation bases Ground level works will be subject to River Spey flood warnings to enable effective removal of plant in advance Hydrodemolition containment controls required to capture and feed runoff through construction SuDS sediment settlement or other appropriate facility before discharge to River Spey or connected watercourses Hydrodemolition controls will be detailed via Pollution Prevention Plan required under SEPA's Construction Site Licencing regime All demolished materials will be removed offsite via ramp to redundant A9 carriageway or other construction access maintained by the contractor Removal of existing bridge main span pier foundations (on south and north side river banks) may require temporary bankside in-channel works given immediate proximity to River Spey main channel, if removal is not entirely possible from the bankside Temporary coffer dam/ sheet piles may be introduced at the banksides to enable contained removal of foundation bases and existing sheet pile casings to 1m below finished ground level Such measures will require detailed method statements on installation and removal operation controls for agreement with SNH and SEPA No night-time works will be allowed for these operations, to minimise disruption to fish passage North side pier and abutment removals will be separated from existing identified downstream wigeon location by the new bridge; however, should these works be required during the bird breeding season (March to August inclusive), pre-works monitoring for wigeon presence and consultation with SNH is required to agree local controls on working exclusion zones or time periods
(T)	Make good ground to removed pier and abutment areas Removal of redundant embankment, and grading into new as required Removal of construction accesses with ground restoration Ground restoration to grassland	4 wks/ 1 month	Works phased to complete within 6 months of traffic transfer to new bridge In summary this results in estimated 3-year period for access, construction, demolition and ground restoration Ground level works will be subject to contractors' River Spey flood warning system to enable effective removal of plant in advance of higher level flood events No specific seasonal access or ecological restrictions for ground restoration works within scheme boundaries

Kingussie Rail Bridge Construction

Description of the Proposed Structure

4.3.27 The existing structure is shown in **Photograph 4-2** below. The proposed Kingussie Railway Underbridge is of pre-stressed concrete construction with a semi-integral joint detail over the abutments. The structure requires a semi-integral detail due to the large skew of approximately 44 degrees. The structure has a single span with a 14.6 m clear span (21.2 m skew). The deck consists of a 1.1 m running strip, 3.3 m access track, 3.8 m verge, 3.5 m junction taper, 9.3 m northbound carriageway, 3.5 m central reserve, 9.3 m southbound carriageway and 2.5 m verge. Including a 0.6 m allowance for the width of each parapet, the total width of the structure is 37.5 m.

Photograph 4-2: Existing Kingussie rail bridge

4.3.28 The beams will be pre-stressed concrete beams, supporting a reinforced concrete deck slab, probably Y3 beams at a spacing of 1.0 m. The total construction depth of 1.25 m consists of 0.9 m deep beams with a 200-mm thick deck slab and an allowance of 0.15 m for surfacing.

4.3.29 The structure has been extended to the east to allow for an access track for Church of Scotland who own parcels of land on either side of the A9. The access track will utilise the extended Kingussie Rail structure to cross the HML railway, run parallel to the A9 before passing underneath the A9 in front of the north abutment of the River Spey bridge.

4.3.30 A semi-integral joint will be used, with a concrete end screen running down the back of the beams thereby reducing the ingress of water onto the bearing shelf. The new bridge abutments will be offset from the rails by 4.85m providing sufficient horizontal clearance to avoid the need to design for impact loading. An allowance for future twin tracking has also been provided with the same clearance. The bridge has been positioned to assume twin tracking to the north and to avoid having to slew the tracks.

4.3.31 The vertical clearance through the structure is 5.8m. This is sufficient for future potential overhead electrification if required. The abutments require cantilever walls on a spread concrete foundation similar to the existing, and the expected design working life of the structure is 120 years.

Constructability Issues

4.3.32 A number of constructability issues have been raised around Kingussie Rail Bridge due to its proximity to the existing structure and the requirement for construction phasing. Working in and around the railway is also to be minimised wherever possible.

4.3.33 The replacement structure clashes with the existing structure and therefore will require construction phasing to ensure that traffic is maintained over the railway during dualling operations.

4.3.34 The southbound carriageway should be constructed first. This will require temporary works to retain the southbound carriageway embankment. When this is completed traffic should be transferred to the new partially-constructed bridge. The existing structure can then be demolished in its entirety.

4.3.35 During demolition of the existing structure care should be taken during works to remove the existing foundation bases as this could destabilise the track. It is possible that temporary works will be required in this location to allow the existing bases to be removed while maintaining support to the track. It is not possible to leave the existing structure bases in place as they clash with the new substructure bases.

4.3.36 After demolition of the existing structure is complete the northbound carriageway, junction taper and access track sections of the new structure can be completed.

Highland Wildlife Park Bridge Construction

4.3.37 The existing structure is shown in **Photograph 4-3** below. The new bridge required at the Highland Wildlife Park presents some design challenges from a buildability point of view. It is the only location on the Proposed Scheme where widening on both sides of the existing A9 alignment is required.

Photograph 4-3: Existing Wildlife Park bridge

4.3.38 A shared NMU track will be incorporated into the structure on the northbound side. Buildability issues arise as the structure cannot be extended any further to the northbound side due to the steep gradient of the access road into the Highland Wildlife Park which significantly reduces the available clearance for the structure. Therefore, the structure must be extended further to the

southbound side to allow for a running carriageway during construction and demolition with a sufficient construction gap.

4.3.39 The proposed construction phasing would first see the removal of the small retaining walls adjacent to the access road. This would allow for the new bridge to be constructed as close as possible to the existing structure, thereby minimising the final width of the bridge.

4.3.40 Major works would commence with the construction of the southbound carriageway with traffic running on the existing A9. The proposed southbound deck would have an approximate width of 9.7m with a minimum construction gap of 3.5m from the existing carriageway. This allows for a clear working width of 2.0m and 1.5m for any protruding reinforcement from the partially completed deck. The section shows the required minimum widths during construction; see **Figure 4-6**.

4.3.41 Construction of the southbound deck would be achieved using a crane placed on the new southbound carriageway to place the box sections on the southern half of the structure. A precast beam storage area would be required in close proximity to the structure on the southbound carriageway (see **Figure 4-6**). There may be a requirement for traffic control measures as the beams are lifted in. Alternatively, if the beams were lifted in overnight under a temporary closure of the access road, the crane could be positioned on the access road. It is noted that the Highland Wildlife Park operates every day except Christmas Day and therefore the timing of this operation would need to work around the park opening hours.

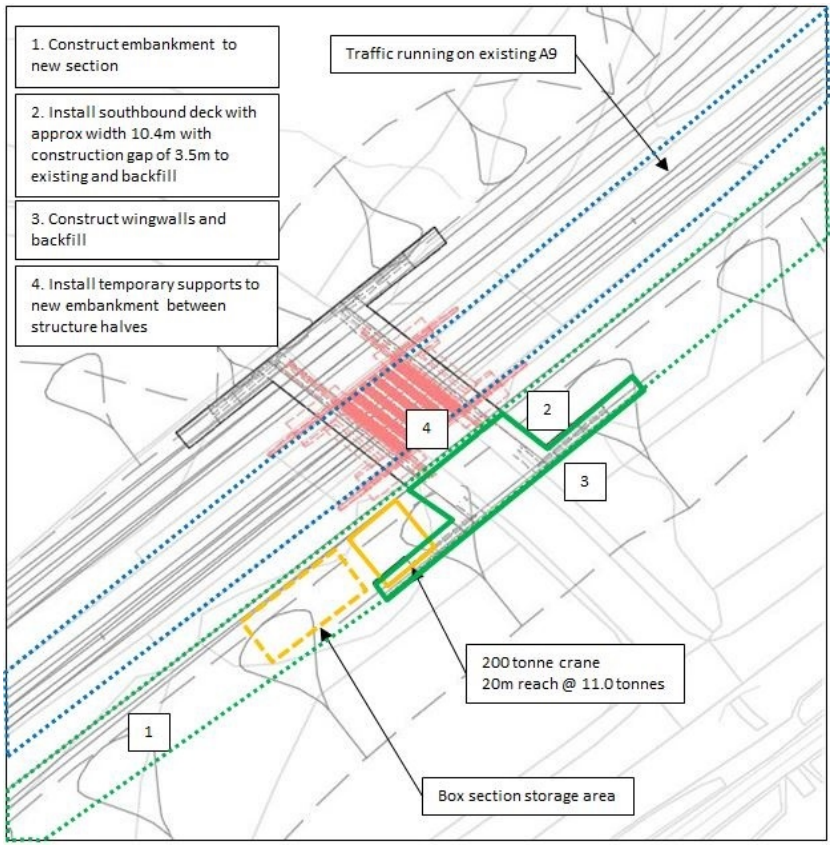

Figure 4-6: Phase 1 construction of Wildlife Park Underbridge

4.3.42 The southbound carriageway would then be completed and opened to traffic. Other structures in this area have tended to widen to the northbound side so traffic management would be required to switch from the northbound carriageway to the southbound in line with other works

down chainage. Temporary supports to the carriageway would be required along the western edge of the new embankment prior to any further works.

4.3.43 Once the southbound carriageway is complete and traffic has been transferred from the existing A9 to the new carriageway, a crane can be positioned on the existing A9 to perform the demolition and removal of the existing structure, shown in **Figure 4-7**. A storage area on the existing A9 carriageway would be available for temporary storage of material removed.

4.3.44 The crane can then be used to place the northern half of the new structure and to complete the northbound carriageway construction. For beam lifts in close proximity to the partially completed deck, night time working would be required using traffic control measures on any running traffic. Temporary supports between the two halves of the new structure would be removed prior to opening both carriageways to traffic; this is shown in **Figure 4-8**.

4.3.45 The temporary supports used for construction, such as temporary retaining walls or soil nailing can be removed or left in-situ when the structure is complete.

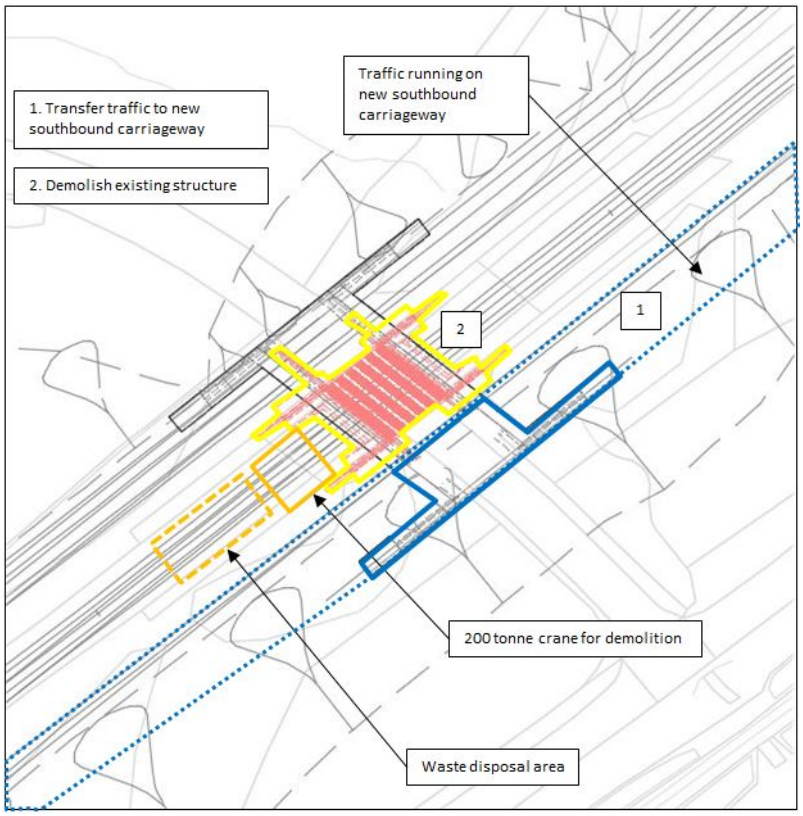

Figure 4-7: Phase 2 construction of Wildlife Park Underbridge

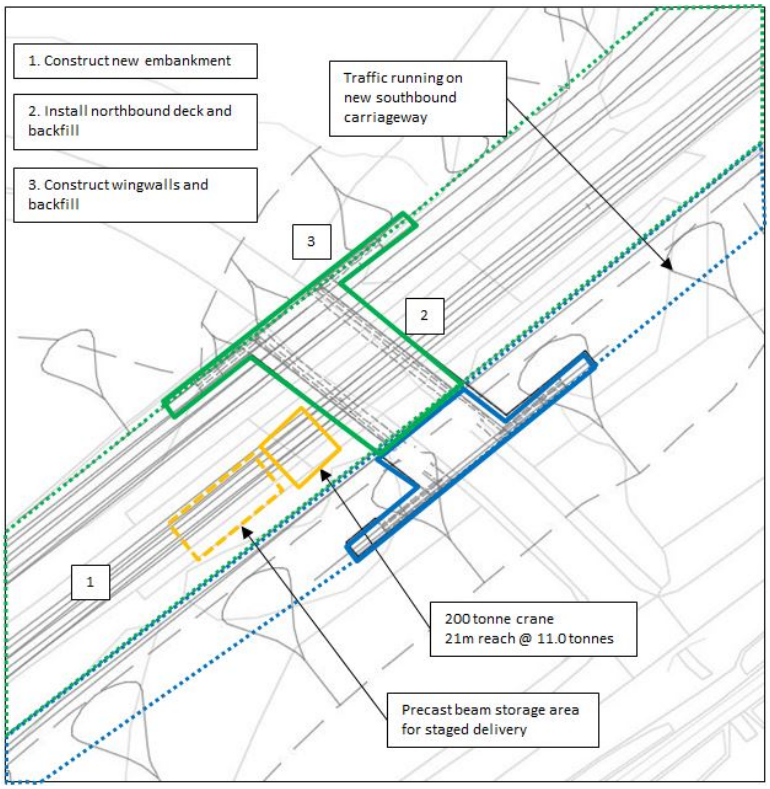

Figure 4-8: Phase 3 construction of Wildlife Park Underbridge

Watercourse diversions and crossings

4.3.46 Watercourse diversions and crossing will be completed in stages depending on the road construction arrangement and whether there is an on-line or off-line watercourse alignment. Construction sequencing options are included in **Figure 4-9** to **Figure 4-16** below.

4.3.47 When referring to the watercourse construction sequencing figures, refer to the following key:

- Red defines works being undertaken during that stage
- Cyan denotes existing culvert and watercourse
- Blue shows the final proposed design (culverts and diversions)
- Solid lines show the permanent works
- Dashed lines show temporary works
- Traffic flow is identified by the yellow arrows

4.3.48 All watercourse crossings will require careful management on site by the Contractor and sacrificial drainage may be required to enable watercourses to be temporarily diverted to construct the permanent crossings. Works close to watercourses are subject to the terms stated by SEPA and prescribed by the relevant Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), or CAR. Although it is noted that some construction activities may be authorised under the "General Binding Rules" and may not be viewed as activities which require a formal license. Consultation with SEPA is essential to ensure that measures are in place to control impacts on the water environment during construction and to ensure the finished works are delivered in accordance with the requirements of the license.

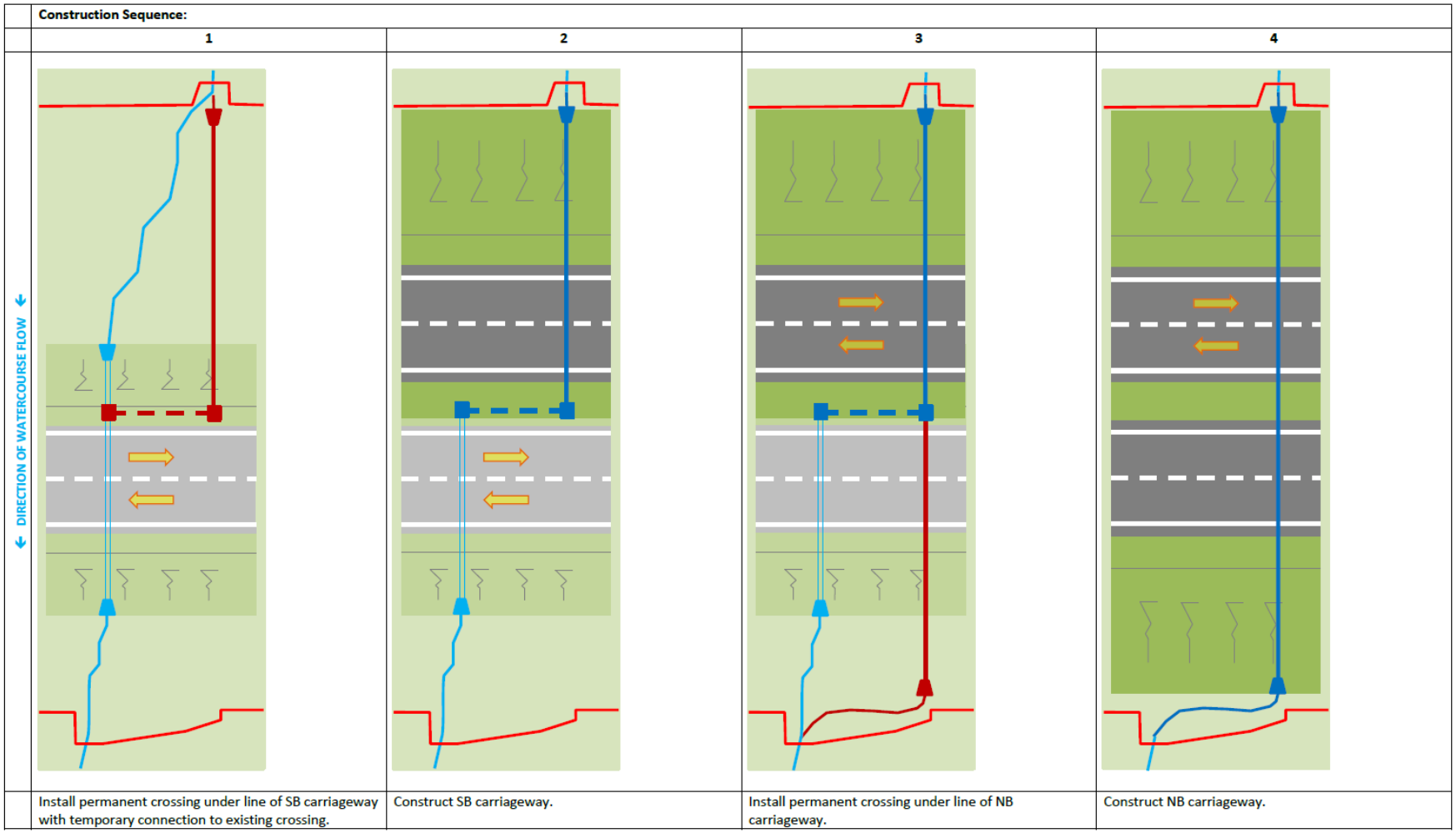

Figure 4-9: Widening to the east – road on embankment – off-line watercourse alignment

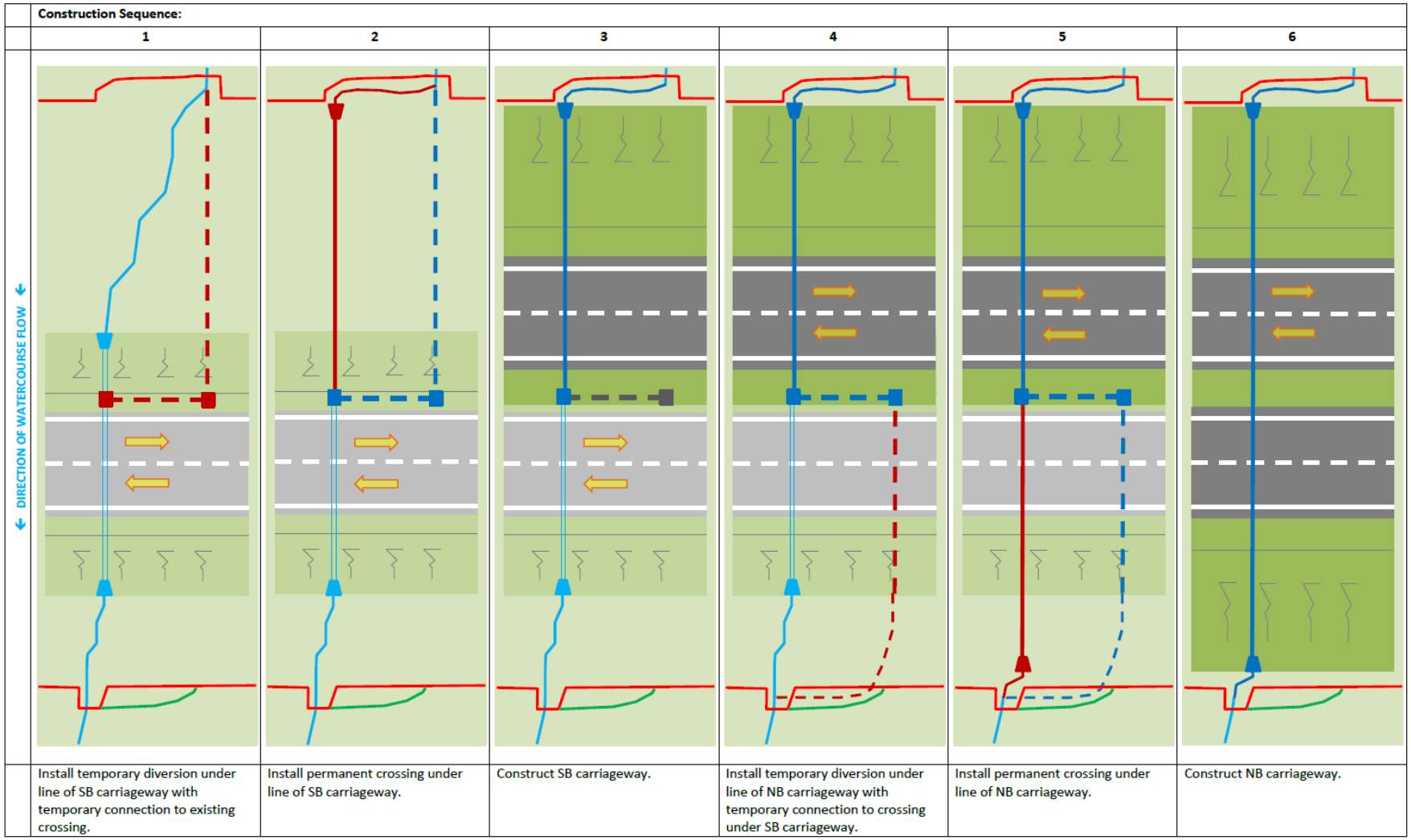

Figure 4-10: Widening to the east – road on embankment – on-line watercourse alignment

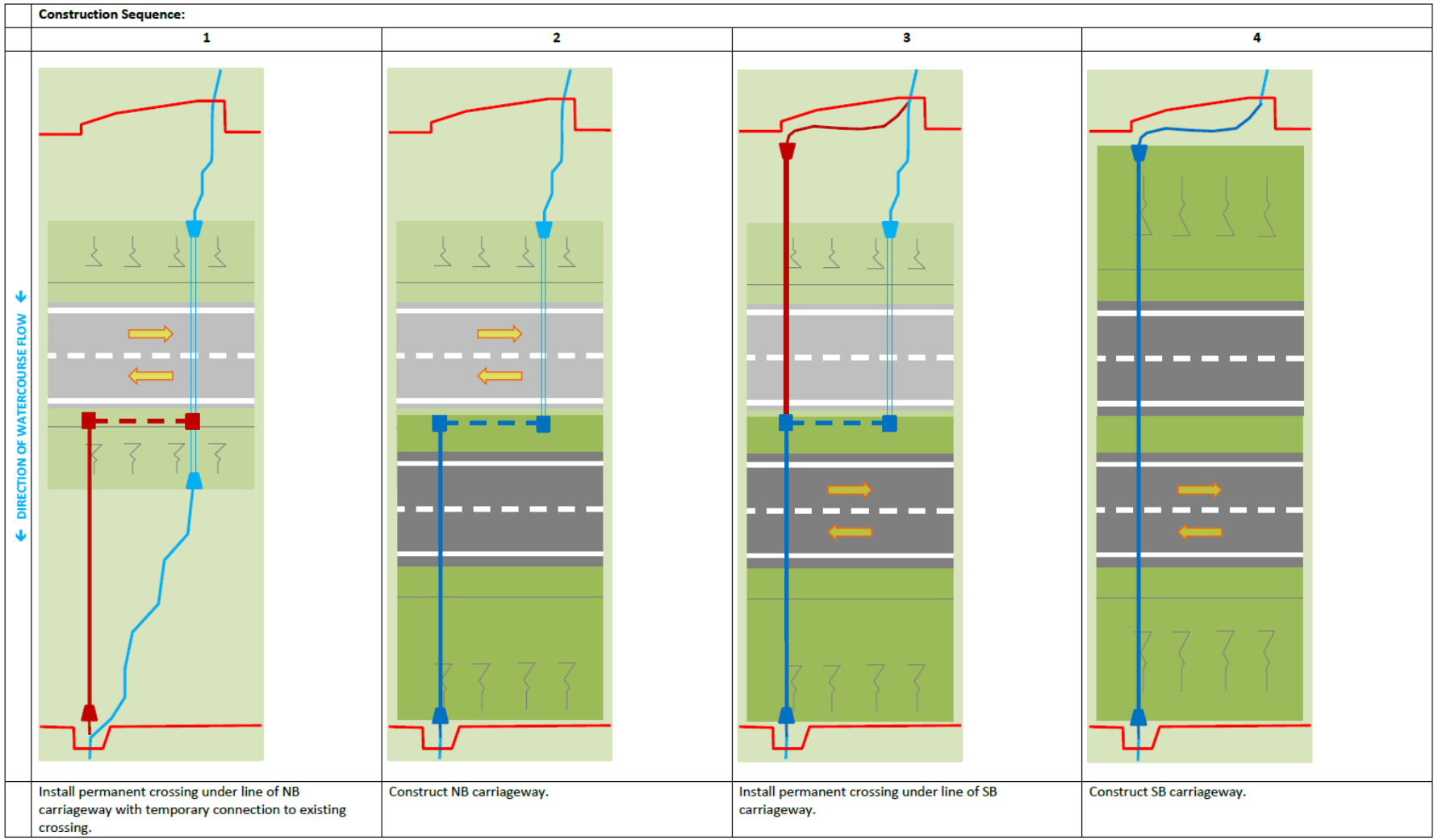

Figure 4-11: Widening to the west – road on embankment – off-line watercourse alignment

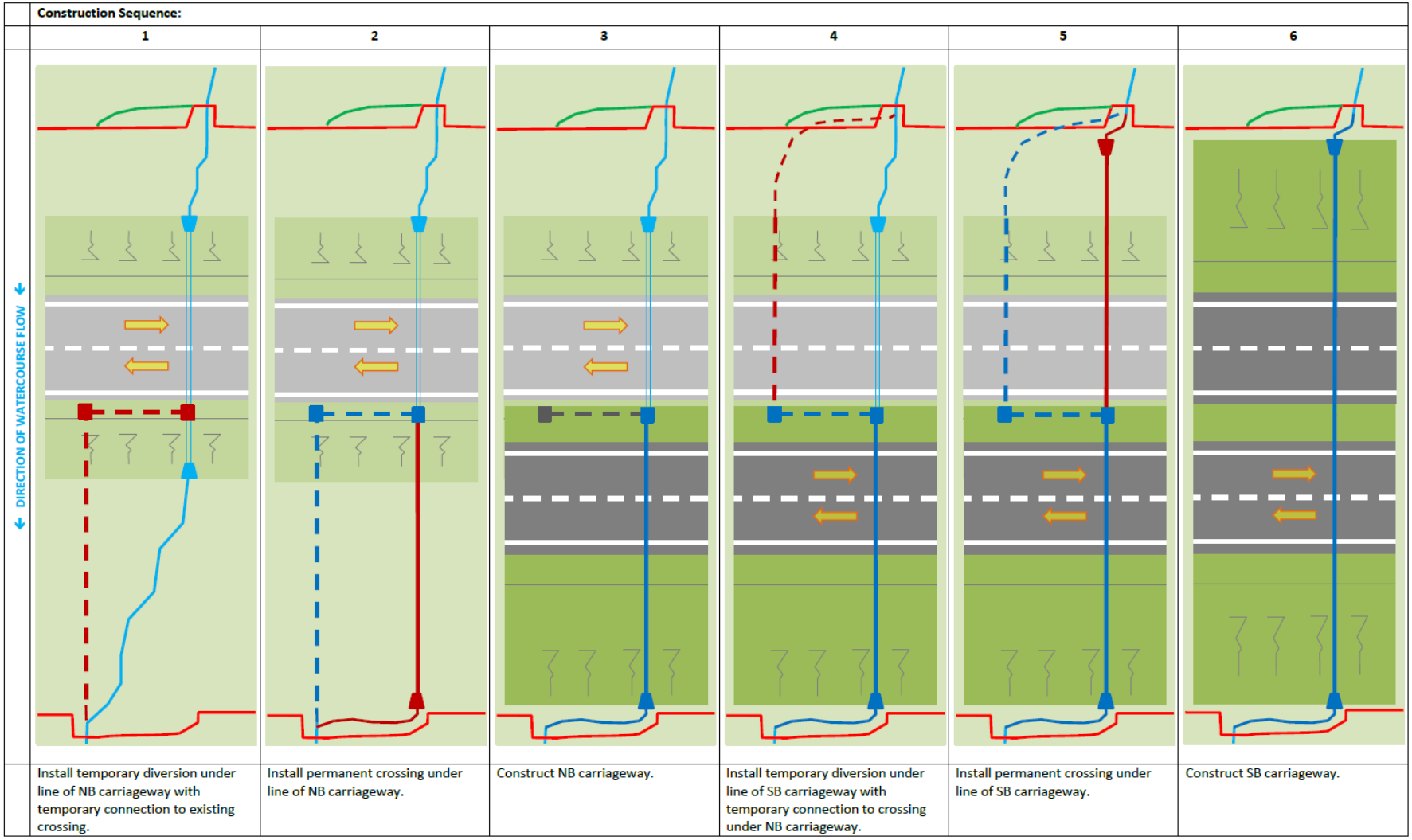

Figure 4-12: Widening to the west – road on embankment – on-line watercourse alignment

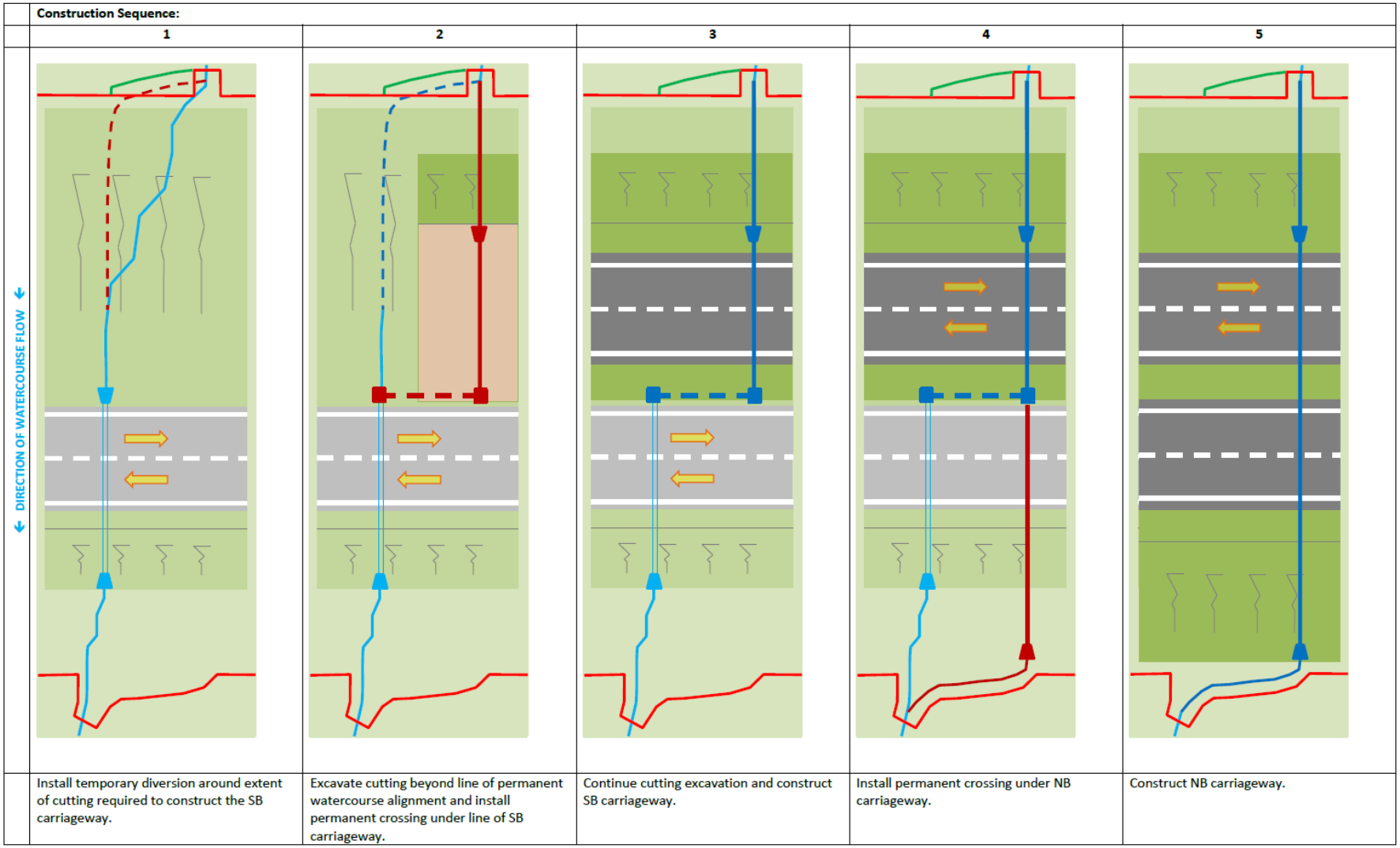

Figure 4-13: Widening to the east – road in cutting – off-line watercourse alignment

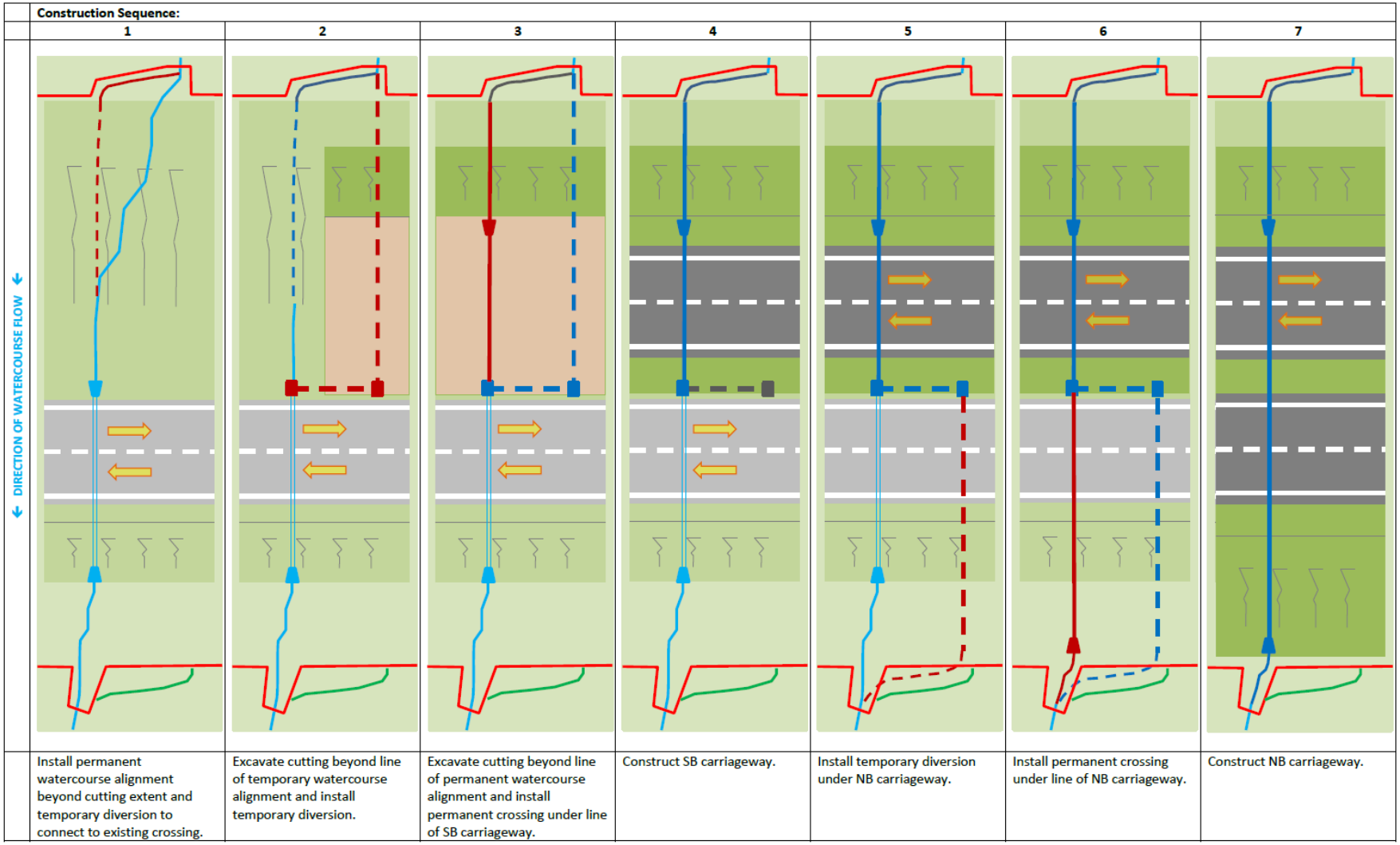

Figure 4-14: Widening to the east – road in cutting – on-line watercourse alignment

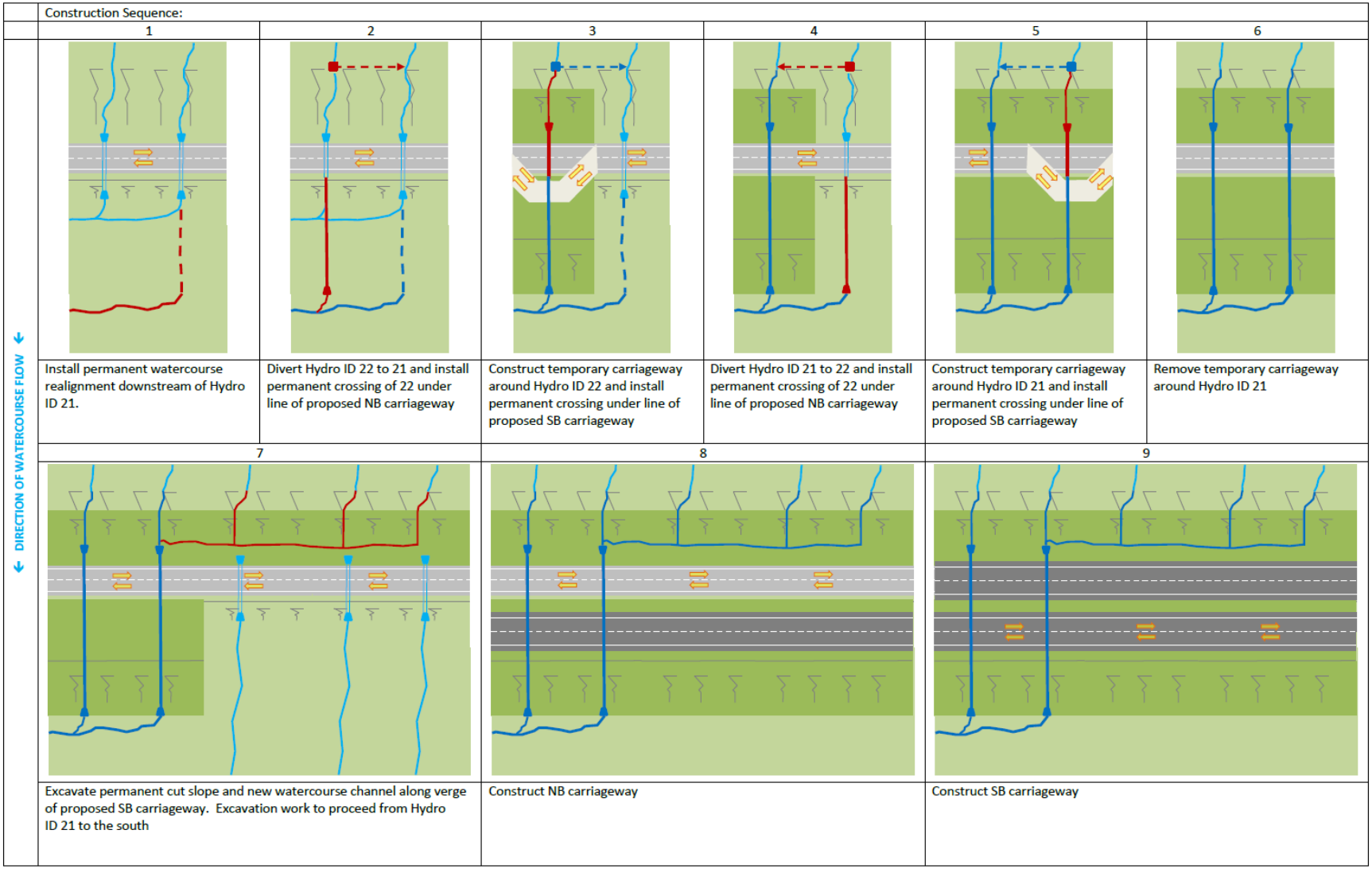

Figure 4-15: On-line watercourse alignment – widening to the east (road in cutting) and widening to the west (road on embankment)

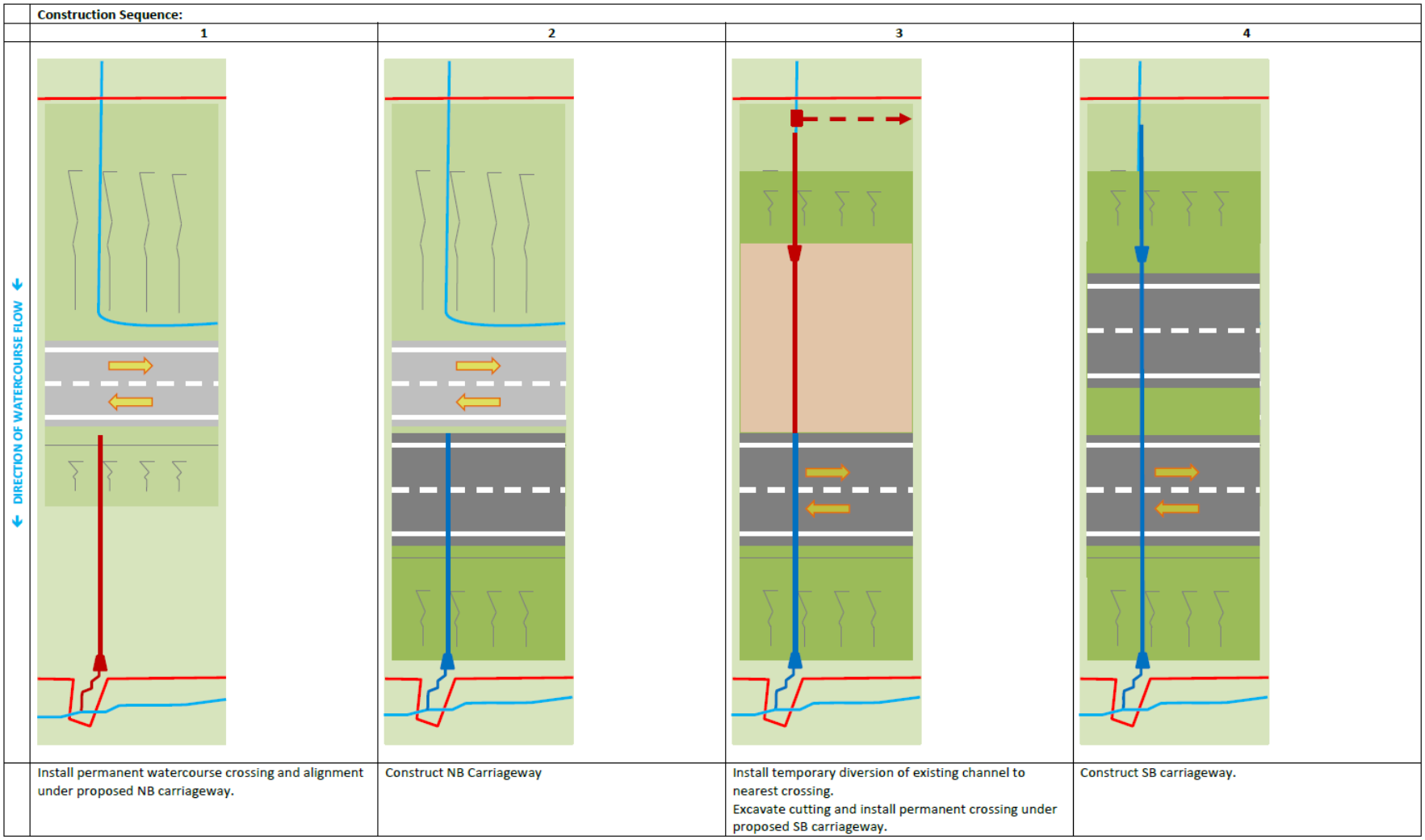

Figure 4-16: New watercourse crossing – widening to the east (road in cutting) and widening to the west (road on embankment)

Site Restoration (ecological and landscape mitigation works)

4.3.49 At the end of the construction phase the site will be cleared, surplus material will be removed, and temporary welfare cabins transported off site. The Contractor may choose to retain a smaller site welfare establishment for the landscape maintenance period but will generally downsize and undertake ground reinstatement across the bulk of their works areas.

4.3.50 The opening of the dual carriageway to traffic will generally mark a major milestone in the evolution of a project, but it does not mark the end of the "construction" phase. Generally, the landscaping introduced by the works is subject to a considerable establishment and maintenance period (post road opening) to ensure that the planting and seeding works result in the delivery of the planned landscape. This period might differ depending on the element of works under consideration; however, it typically extends to 5 years (post road opening) when it is expected that the ecological and landscape planting is established and self-sustaining.

4.3.51 The EIA assumes that all land within the temporary works boundary, subject to construction disturbance, will be re-instated by the Contractor, unless required for specific mitigation purposes as identified on **Drawings 6.1** to **6.12,** contained within **Volume 3**. As shown on these drawings, ecological and landscape mitigation works will be undertaken as and where required to mitigate for the impacts of the Proposed Scheme to ensure that the predicted residual impacts are realised.

Active Traffic Management

4.3.52 During the construction, temporary traffic management and restrictions are needed to provide safe access and working areas for the construction workers, and to permit safe passage of vehicles and NMUs, through and adjacent to the works.

4.3.53 These traffic restrictions must be carefully planned and managed and have to consider a variety of issues such as separating works areas from public access areas, temporary speed restrictions, the potential need for full closures for short durations, and temporary traffic signals.

4.3.54 The majority of the Proposed Scheme requires dualling to the east (southbound) side, i.e. from start ch. 40,000 to approximately ch. 49,950. The switch from east to east takes place between ch. 49,950 and ch. 51,700. From there, the dualling switches to the west (northbound) side. This minimises the number of transitions and helps keep A9 traffic flowing on the existing carriageway during the first phases of construction.

4.3.55 At the Newtonmore Junction it is anticipated that a temporary diversion to the west of the A9 would be constructed first and used to divert the existing A9 traffic. This would allow the compact junction to be constructed to the east and in provide for construction of the underpass structure. The current A9/ B9150 junction will continue to serve Newtonmore during this period, i.e. the existing junction will remain operational until traffic can use the new Newtonmore Junction, but subject to temporary closures if necessary.

4.3.56 It is envisaged that principal construction and traffic management phases will include:

- construction of southbound drainage networks, culverts, structures and carriageway with traffic flow on existing A9 carriageway. Construction of Newtonmore Junction with traffic flow, at least for a period of time, running on a temporary diversion of the existing A9. Temporary lane width and speed restrictions are likely to be required
- at the northern end, beyond ch. 51,700, construction of northbound drainage networks, culverts, structures and carriageway with traffic flow on existing A9. Temporary carriageway width and speed restrictions are likely to be required

- separate construction of the B970 Ruthven Road bridge, River Spey Bridge, Kingussie Rail underbridge and A86 Kerrow Road underbridge, which would precede all other works where traffic can switch from one side to the other
- offline works including downstream SuDS features, outfalls and access tracks will not necessarily affect traffic management beyond the above areas
- following completion of new carriageways, traffic will transfer, enabling works to progress on the existing A9 carriageway. This could be done by working on isolated sections but relative to the broader long phase lengths, as new structures are completed to enable works to the existing structures
- in certain locations, works may be restricted or even excluded during particularly sensitive ecological periods, e.g. salmon migration and spawning, or breeding bird seasons, as discussed in **Chapter 12**

4.3.57 Other temporary traffic management measures may be required, including:

- works access/ egress points throughout the Proposed Scheme extents
- temporary deceleration lanes to slow traffic in proximity to active works areas
- potential need for temporary roundabouts, to facilitate plant crossings or earthworks haulage from one side to the other, to access general fill and landscape fill stockpiles

4.4 Access During Construction

Temporary Access Roads/ Tracks

4.4.2 Various temporary access tracks may be required throughout the construction stage, for example, to enable access to install permanent drainage networks and outfalls, as well as to temporary construction SuDS and other areas. Land required for such temporary access has been considered within the temporary works boundary.

4.4.3 The Proposed Scheme incorporates sections of new or improved side roads and a significant length of new, extended or improved of access roads/ tracks, (see **Table 4-5** below).

4.4.4 The cross section of the proposed tracks and single-track access roads generally comprises 3.3 m access road/ track and 2 m verges. However, these are reduced where required to minimise impact on local constraints.

Table 4-5: Side Roads and Access Tracks

Proposal	Details	Length (m)	Width (m)
Extension to C1137 Glen Truim to Catlodge Road	Upgrade old A9 to single track with passing places	1155	3.3
C1137 extension to Ralia Cafe	Upgrade existing B9150 and northbound only diverge to 2-way road and improve to just north of Ralia Cafe	922	6.0
C1137 Extension through underpass to Phoines Lodge	Replace existing track	299	3.3
Realignment of B9150 at Ralia	Upgrade existing B9150 removal of old Newtonmore junction	120	6.0
U3063 improvements	U3063 improvements to incorporate passing places	1170	3.3
U3063 between the A9 and Nuide Farm (road upgrade)	U3063 improvements to incorporate passing places	366	varies

Proposal	Details	Length (m)	Width (m)
U3063 Northbound side access to Burn of Inverton	New access track	1405	3.3
U3063 Northbound side access to Keepers cottage	New access track	119	3.3
U3063 to Southbound side through underpass	New access track	128	3.3
U3063 Southbound side access to An Cnap	New access track	660	3.3
U3063 Southbound side access to Milton Burn	New access track	721	3.3
B970 Northbound side Knappach Underpass	New access track with passing places	280	3.3
B970 Southbound side access to Knappach Cottage	New access track with passing places	331	3.3
Access to Church of Scotland Land	New access track	800	3.3
Access from A86 to Kerrow Cottage	Resurface existing track	285	varies
Access from Kerrow Cottage to Craig Bhalg	New access track with passing places	450	3.3
Access to Balavil Estate from B9152	New access track	274	3.3
Balavil Estate internal access to Lynvoan	New access track	733	3.3
Balavil Estate LI/LO to Mains of Balavil	New access track	106	varies
Balavil Estate internal access to fields	New access track	369	3.3
Access to Croftcarnoch Properties	New access track	929	3.3

Access to Property and NMU Routes

4.4.5 There are 15 private access points, which serve both NMUs and local vehicular traffic directly off the existing A9. Through consultation it is understood that some of these access points are critical to residential, commercial and general outdoor access within the study area, as discussed in more detail in **Chapters 8** (**People and Communities, Community Private Assets**) and **9** (**People and Communities, Effects on All Travellers**). During construction, suitable access to property and NMU routes shall be maintained by the Contractor; however, during certain construction operations, temporary closures or diversions may be required.

5 Land Required for the Permanent Footprint

5.1.1 The main requirements for permanent land are as follows:

- land taken by footprint of the Proposed Scheme, including earthworks (i.e. land required to build embankments or excavate cuttings), to enable the safe construction and operation of the Proposed Scheme
- land to allow adequate drainage of the Proposed Scheme and the area through which it passes.

5.1.2 This includes land required for diversion of watercourses, drainage outfalls and SuDS features, arrangements for maintenance access, any compensatory storage areas to accommodate potential watercourse flood events, and land required for other environmental mitigation, such as landscape and ecological planting.

5.1.3 Other land may also be permanently acquired due to it becoming unusable or impractical to use as a direct result of the works.

6 Land Required in Addition to the Permanent Footprint

6.1.1 Additional land is required for construction to that required for the permanent footprint of the Proposed Scheme. The main requirements are described below.

6.2 Site Compounds for the Contractor and Others

6.2.1 Where possible these would be located close to the proposed works where there is suitable access. They would be used to accommodate offices for the Contractor as well as workshops, stores, welfare facilities and parking for cars and plant. These areas are not identified or considered within the EIA and would be subject to separate consenting/ approvals processes.

6.3 Additional Works Areas

6.3.1 Land may be required to allow the Contractor to gain safe access to the permanent works. This is usually where access is very restricted or where the works are adjacent to a live carriageway, such as when carrying out online widening works.

6.4 Temporary Diversions

6.4.1 In order to maintain traffic flows when undertaking works on the existing highway, such as a new bridge or carriageway tie-ins, the outline constructability review undertaken on the Proposed Scheme anticipates minor temporary diversions of traffic on the existing A9 carriageway and no major roads are expected to close during construction, other than for activities such as the installation of beams on new bridges over roads and possibly to facilitate rock blasting. It is expected that both the Newtonmore and Kingussie Junctions will generally remain operational throughout construction with minor diversions.

6.5 Other Works

6.5.1 Other works such as off-site planting will require land. Some environmental mitigation areas are located at some distance from the A9 and may not form part of the permanent infrastructure footprint; however, in these instances the selection of mitigation sites is informed by consideration of ecological suitability.

7 Public Access, Site Access and Traffic Management

7.1 Access Routes for Construction Traffic

7.1.1 The proposed works are generally located on the A9 trunk road network, so most construction traffic will be able to use the main highway network without restriction. However, the Contractor will be restricted as to the extent and purpose that the Contractor can use other roads for construction purposes. While it is desirable that all construction related access should be via the A9 it will be necessary to provide some access from the side road network. Routes not available to the Contractor will be as agreed by arrangement with the relevant authority.

7.2 Traffic Management Requirements

7.2.1 During construction, temporary traffic management will be required to undertake the works, whilst minimising disruption to users of the active road network.

7.2.2 Temporary traffic management will feature during construction at works close to or on existing roads, and at site access and egress points. Examples of measures include traffic cones, temporary signs and lighting, temporary speed restrictions, temporary diversions and contraflows.

7.3 Lane Requirements

7.3.1 In general, construction phasing and temporary traffic management proposals assume at least one lane in each direction will be available on the A9 at all times except for very specific short-term restrictions. Where considered appropriate, the Contractor will be required to provide a vehicle recovery service to promptly remove any broken-down vehicles within the temporary traffic management areas.

7.3.2 For the main routes, it is proposed to keep traffic on the normal carriageways, wherever possible, and if necessary using narrow lanes. It is also proposed to adopt a 40mph temporary speed limit through the main works areas.

7.3.3 It is generally considered that other routes including slip roads at major junctions be kept open during construction of the proposed works. This will, in some cases require construction of temporary alignments. It is also considered that all routes and accesses, not closed as part of the works, will be available or a suitable alternative will be provided, wherever feasible.

7.4 Working Restrictions

7.4.1 It is generally anticipated that the Proposed Scheme works will be constructed within the typical working hours as set out in **section 2.2**, with no requirement or intention for prolonged late night or 24 hour working. The only likely exceptions to this would be for activities such as the installation of beams on new bridges which could only be carried out during an overnight closure of the carriageways, or for critical tie-in works between existing and new carriageways or construction of structures adjacent to the HML railway requiring railway possessions to complete structures or undertake blasting operations. Where available, alternative diversion routes will apply during such night time closures, together with advance warning and publicity to help drivers to avoid these locations/dates if possible.

7.4.2 Road closures and diversions are likely to require a Temporary Traffic Order and be subject to approval by Transport Scotland, Police Scotland, and the Maintaining Authority.

7.4.3 Where night work is required in the vicinity of residential areas, the method of construction should keep noise levels to a practicable minimum.

7.5 Temporary or Permanent Road Closures or Diversions

7.5.1 Temporary road closures and diversions will be arranged through the relevant traffic authority following discussions with Transport Scotland, The Highland Council, Police Scotland and the Maintaining Agents. A Temporary Traffic Order giving the requisite notice will be prepared and a statutory notice placed in local newspapers.

7.5.2 Permanent road closures that occur as a consequence of the phasing for the construction of the Proposed Scheme, supported by the appropriate legal Orders, will be implemented following discussions with relevant parties and agreement of any temporary traffic arrangements.

7.6 Temporary Carriageway

7.6.1 Under the traffic management proposals in this Appendix, there may be a requirement to construct some sections of temporary carriageway. The need for these will be dependent on the Contractor's detailed design and their construction and traffic management methodology.

7.7 Approvals

7.7.1 The Contractor's detailed proposals for traffic management will only be confirmed after discussions with Transport Scotland, Police Scotland and the Maintaining Agents.

7.7.2 The Contractor will appoint a Traffic Safety Officer with responsibility for submitting traffic management layout drawings, method statements, etc. within the requisite notice period for discussion at regular traffic management meetings. The Traffic Safety Officer has responsibility to ensure that temporary traffic management operations are monitored and maintained.

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