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Environmental Impact Assessment Record of Determination

M9 10–11 5 Forth

Contents

Project Details

Description

BEAR Scotland has been commissioned by Transport Scotland to carry out scour remediation works at the M9 10–11 5 Forth bridge. The right bank below the M9 has been severely scoured, which has since exposed utility services and caused the local footpath to partially collapse.

The project brief is to undertake remediation works to restore the right embankment to its original state using rock armour/rip rap and reinstate the footpath to a safe width.

Construction activities include:

- potential installation and erection of temporary works (cofferdams) within watercourse (to be confirmed by sub-contractor),
- excavation of existing embankment/footpath (approx. 33 m^2),
- temporary bracing for exposed services (with appropriate brackets as per utility stakeholders' specifications),
- installation of additional concrete bag-work (3 no. rows, estimated 20 m in length),
- concrete installed above sandbags (0.25 m),
- encase service as per BT specification documents,
- install footpath (F1, F2 or F3) above new embankment,
- recreation of embankment,
- installation of geotextile mattress,
- remove existing debris within watercourse and embankment,
- install riprap as per CIRIA C742.

The works are currently programmed to be completed within the 2023/2024 financial year. Works are expected to be completed over ten days (08:30 – 17:30). Traffic Management (TM) is not required on the M9 mainline as all works are restricted to below the carriageway. Alternative pedestrian routes will be included in pedestrian TM, diverting pedestrians and non-motorised users (NMUs) over the adjacent A84 road pedestrian walkway.

Location

The M9 10–11 5 Forth bridge is located on the M9 approximately 2.8 km northwest of Stirling, with land use surrounding the bridge dominated by transport infrastructure and agricultural land (Figure 1).

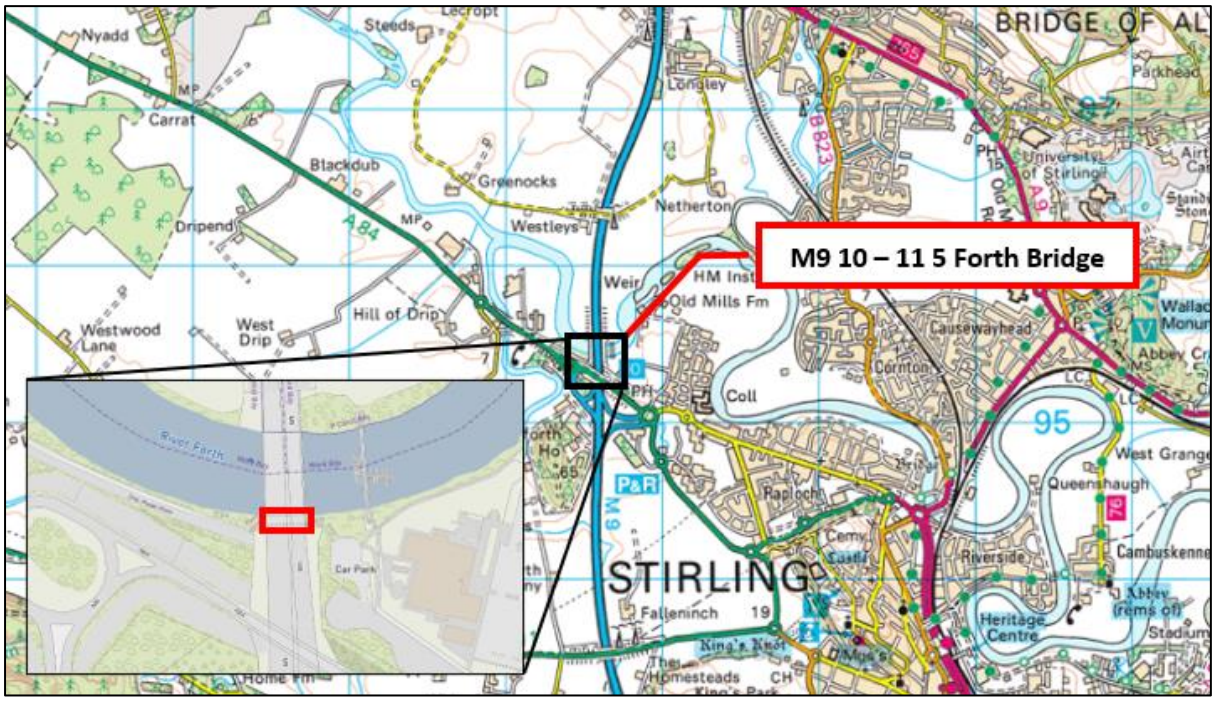

Figure 1. Location of M9 10–11 5 Forth bridge. Source: Asset Management Performance System (AMPS). © Europa Technologies Ltd. Contains Ordnance Survey data © Crown copyright and database right 2018.

Figure 2. M9 10–11 5 Forth Bridge. Source: BEAR Scotland

Description of local environment

Air quality

The scheme lies within the boundary of Stirling Council, which has no Air Quality Management Areas (AQMAs) within its administrative boundary. The nearest AQMA, 'Grangemouth', lies within the Falkirk Council administrative boundary approx. 18.6 km southeast of the bridge and has been declared for sulphur dioxide (SO_2).

There are no sites registered on the Scottish Pollutant Release Inventory (SPRI) for air pollutant releases within 1 km of the scheme.

Baseline air quality at the scheme location is mainly influenced by vehicles travelling along the motorway. Secondary sources are likely derived from vehicles travelling along the local road network and day-to-day agricultural land management activities.

Cultural heritage

The PastMap and Historic Environment Scotland (HES) online mapping tools records eleven undesignated cultural heritage assets (UCHA) within 300 m of the bridge, one of which pertains to the M9 10–11 5 Forth bridge. There is no connectivity between the scheme and the remaining UCHAs, e.g., the nearest lies 10 m south of the scheme.

Landscape and visual effects

The scheme is not situated within a 'sensitive area' designated for landscape features e.g., National Park (NP), National Scenic Area (NSA).

The Landscape Character Type (LCT) within the study area is 'Carselands' (no. 153) (Scottish Landscape Character Types). The 'Carselands' LCT is characterised by flat, open, large scale carselands of open agricultural land, with a lack of settlement.

Land use within 2 km of the scheme extents is categorised into the following: (i) motorway and major roads, (ii) freshwater area, (iii) rectilinear fields and farms, (iv) urban area, (v) designed landscape, (vi) plantation, and (vii) recreation area.

Views from the right embankment consist of the riparian habitat and the River Forth, in addition to limited urban development and agricultural fields.

The national scale land capability for agriculture classifies land surrounding the M9 10–11 5 Forth bridge as 'Class 3.2' – land capable of average production though high yields of barley, oats and grass can be obtained (grass leys are common).

Land surrounding the bridge lacks any dense or high vegetation cover, with no woodland registered on the Ancient Woodland Inventory Scotland and no trees on the Native Woodland Survey of Scotland with connectivity to the scheme extents.

There are also no trees protected by a Tree Preservation Order (TPO) with connectivity to the scheme extents.

Biodiversity

The NatureScot Sitelink online mapping tools identifies that the River Forth forms part of the River Teith Special Area of Conservation (SAC) (EU Site Code: UK0030263).

The scheme is not situated within a Local Nature Conservation Site (LNCS) or Local Nature Reserve (LNR) designated for biodiversity features.

The National Biodiversity Network (NBN) online mapping tool records three mammal species of conservation importance within 2 km of the scheme (within last 10-years) within 10 km grid square NS79.

A Preliminary Ecological Appraisal (PEA) and updated site walkover survey were undertaken on 10th May 2022 and 10th August 2022. The PEA did not note any permanent habitat for any mammal species of conservation importance, within the area of likely construction disturbance. The surrounding trees do offer some suitable habitat for nesting birds, but works will take place away from areas where birds are likely to nest.

A search of the NBN online mapping tool records Japanese knotweed (*Fallopia japonica*), Giant Hogweed (*Heracleum mantegazzianum*) and Himalayan Balsam (*Impatiens glandulifera*) (all invasive non-native species (INNS)) within 2 km of the scheme (in last 10-years). The nearest record pertains to Giant Hogweed approx. 0.3 km south of the scheme (2016). A search of the Asset Management Performance System (AMPS) showed no INNS, injurious weeds (as listed under the Weeds Act 1959) or invasive native perennials (as listed in the Trunk Road Inventory Manual) within the motorway boundary scheme extents. The PEA identified several pockets of Himalayan balsam within the scheme extents.

Geology and soils

The scheme is not located within a Geological Conservation Review Site (GCRS) and there are no Local Geodiversity Sites (LGS) with connectivity to the scheme extents.

The National Soil Map of Scotland online mapping tool records the Generalised Soil Type and Major Soil Group in the study area is Gleys.

The British Geological Survey online mapping tool records that the superficial geology underlying the scheme is comprised of Raised Tidal Flat Deposits of Holocene Age (silt and clay). The bedrock underlying the scheme is comprised of Sheriffmuir Sandstone member (sandstone).

There is no evidence of historical industrial processes or the storage of hazardous materials that could have given rise to significant land contamination.

Material assets and waste

The proposed works are required for scour repairs and reinstatement of the footpath. Materials used will consist of:

- Asphaltic material (TS2010)
- Rip rap
- Backfill
- Geotextile membrane
- Concrete and concrete bags

Equipment used will consist of:

- Small planer and roller
- Digger
- Teddy picker

The main waste for these works is likely to consist of footpath planings, (European Waste Code 17-03-02) and concrete (European Waste Code 17-01-01). Quantities are unknown.

The scheme is executed by the operating company as site operations e.g. 'As-of-Right' scheme of value less than £350,000. As a result, a Site Waste Management Plan (SWMP) is not required.

Noise and vibration

Works are not located within a Candidate Noise Management Area (CNMA) or Candidate Quiet Area (CQA).

The day-time modelled noise levels within the scheme extents ranges between 75 and > 80 decibels, with levels dropping to between 65 and 70 decibels at the nearest property (business premise).

Baseline noise levels are mainly influenced by vehicles travelling along the motorway. Secondary sources are likely derived from vehicles travelling along the local road network and day-to-day agricultural land management activities.

Population and human health

The scheme lies approx. 2.8 km northwest of Stirling, with land use surrounding the M9 10–11 5 Forth bridge dominated by transport infrastructure and agricultural land.

Only one business premise lies within 300 m of the bridge. The business premise lies 80 m east of the scheme and has no screening from the M9 10–11 5 Forth bridge. There are no sensitive receptors/land uses within 300 m of the bridge.

One Core Path (ID: 6151) passes through the public car park 20 m east of the scheme, which is connected to the scheme extents via the local footpath that runs along the right embankment of the M9 10–11 5 Forth bridge. Street lighting is absent throughout the scheme extents.

The M9 road corridor, at the location of the M9 10–11 5 Forth bridge, is a two-lane motorway with a continual hard shoulder and the national speed limit applying throughout. The Annual Average Daily Traffic (AADT) flow (2021 data) (Road traffic statistic) is 31,255 (ID: 40702) and is comprised of:

- 38 two wheeled motor vehicles,
- 22,709 cars and taxis,
- 0 pedal cycles,
- 69 bus and coaches,
- 5,121 Light Goods Vehicles (LGVs), and
- 3,320 Heavy Goods Vehicles (HGVs).

There are no congestion issues noted at the M9 10–11 5 Forth bridge during the proposed working hours.

Road drainage and the water environment

The Scottish Environment Protection Agency (SEPA) River Basin Management Plan online mapping tool records that the River Forth (below R. Teith confluence), a classified surface waterbody (ID: 4700), is spanned by the motorway within the scheme extents. The River Forth (below R. Teith confluence) is a river in the River Forth catchment of the Scotland river basin district and has a main stem approx. 5.7 km in length. The River Forth (below R. Teith confluence) has been assigned a Water Framework Directive 2000/60/EC (WFD) overall classification of ‘Moderate’, an overall ecological classification of ‘Moderate’, and a classification of ‘High’ for fish migration (SEPA).

There are no other surface waterbodies which share direct connectivity with the scheme extents.

The works lie on the ‘Callander’ and ‘Teith and Forth Valleys’ groundwater bodies, which have both been classified as ‘Good’. These groundwater bodies are also classified as Drinking Water Protected Areas.

The works do not lie within a Nitrate Vulnerable Zone.

The SEPA indicative surface water online flood mapping tool records that the River Forth (below R. Teith confluence) is at a high risk of fluvial flooding (i.e., each year the area has a 10% chance of flooding).

Road drainage on the M9 above the River Forth is provided by roadside gullies.

Climate

The Climate Change (Scotland) Act 2009 sets out the target and vision set by the Scottish Government for tackling and responding to climate change (The Climate Change (Scotland) Act 2009). The Act includes a target of reducing CO2 emissions by 80% before 2050 (from the baseline year 1990). The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 amended the Climate Change (Scotland) Act 2009 to bring the target of reaching net-zero emissions in Scotland forward to 2045 (Climate Change (Emissions Reduction Targets) (Scotland) Act 2019).

The Scottish Government has since published its indicative Nationally Determined Contribution (iNDC) to set out how it will reach net-zero emissions by 2045, working to reduce emissions of all major greenhouse gases by at least 75% by 2030 (Scotland's contribution to the Paris Agreement: indicative Nationally Determined Contribution - gov.scot (www.gov.scot)). By 2040, the Scottish Government is committed to reducing emissions by 90%, with the aim of reaching net-zero by 2045 at the latest.

Transport Scotland is committed to reducing carbon across Scotland’s transport network and this commitment is being enacted through the Mission Zero for Transport (Mission Zero for transport | Transport Scotland). Transport is the largest contributor to harmful climate emissions in Scotland. In response to the climate emergency, Transport Scotland are committed to reducing their emissions by 75% by 2030 and to a legally binding target of net-zero by 2045.

Policies and plans

This Record of Determination has been undertaken in accordance with all relevant regulations, guidance, policies and plans, notably including the Environment and Sustainability Discipline of the Design Manual for Roads and Bridges (Design Manual for Roads and Bridges (DMRB)) and Transport Scotland's Environmental Impact Assessment Guidance (Guidance - Environmental Impact Assessments for road projects (transport.gov.scot)).

Description of main environmental impacts and proposed mitigation

Air quality

During the construction phase, activities undertaken on site could potentially have some minor localised and short-term air quality impacts in proximity to the works. The construction phase will, for example, require a range of ancillary plant, vehicles, and non-road mobile machinery (NRMM) which will contribute to local dust and air pollutants.

However, the scheme is not located within an AQMA and there are no sites registered on the SPRI which could contribute to a cumulative impact. Dust, particulate matter, and exhaust emissions (DPMEE) associated with the construction phase will be localised to the works footprint and of a short duration.

Upon completion of the works, no residual air quality impacts are anticipated.

Proposed air quality mitigation measures:

- Activities which have the potential to produce DPMEE (e.g., cutting and grinding of materials) will be undertaken downwind (if possible) and at least 10 m from the River Forth, reducing the potential for DPMEE to be released into the river (and by association the River Teith SAC).
- Cutting, grinding, and sawing equipment (if required) will be fitted or used in conjunction with suitable dust suppression techniques e.g., local exhaust ventilation system that fits directly onto tools.
- Ancillary plant, vehicles and NRMM will have been regularly maintained, paying attention to the integrity of exhaust systems.
- Ancillary plant, vehicles and NRMM will be switched off when stationary to prevent exhaust emissions (e.g., there will be no idling vehicles).
- Where practicable, if powered generators are required, the use of mains electricity or battery powered ancillary plant will be considered in place of diesel or petrol alternatives.
- Materials that have a potential to produce dust will be removed from site as soon as possible.
- Regular monitoring (e.g., by engineer or Clerk of Works) will take place when DPMEE generating activities are occurring. In the unlikely event that unacceptable DPMEE are emanating from the site, the operation will, where practicable, be modified and re-checked to verify that the corrective action has been effective. Actions to be considered include: (a) minimizing cutting and grinding on-site, (b) reducing the operating hours, (c) changing the method of working, etc.

Cultural heritage

Scour repair works are not expected to have an adverse impact on cultural heritage as there are no cultural heritage assets with connectivity to the scheme e.g. the nearest feature, a UCHA, pertains to the M9 10–11 5 Forth bridge, which will not be impacted by the works.

With the implementation of mitigation detailed below, the proposed works impacts on cultural heritage during the construction period are assessed to be negligible in magnitude.

Upon completion of the works, no residual impacts on cultural heritage are anticipated.

Proposed cultural heritage mitigation measures:

- All site personnel will be briefed on the importance of archaeological finds, will remain vigilant and will inform the site supervisor where potential finds are made. If there are any unexpected archaeological finds, all works will temporarily stop, the area will be cordoned off and BEAR Scotland's Environmental Team contacted for advice.
- People, ancillary plant, vehicles, NRMM and materials will be restricted to areas of made/engineered ground (as much as is reasonably practicable). Where access outwith made/engineered ground is required for the safe and effective completion of the scheme, the area will be reduced as much as is reasonably practicable, and ideally will be accessed on foot.
- If a change to the construction programme onsite is required that necessitates additional earthworks or vegetation clearance, BEAR Scotland's Environmental Team will be contacted.

Landscape and visual effects

There will be a short-term impact on the landscape character and visual amenity of the site as a result of the presence of construction plant, vehicles, and site personnel.

However, the scheme is not situated within a 'sensitive area' designated for landscape features e.g., NP, NSA, etc, and there is no requirement for permanent (or temporary) land-take, accommodation works, site clearance or locally gained resources. There is also no requirement for earthworks or destruction or removal of vegetation, and there will be no loss or deterioration of woodland or veteran / notable trees e.g., trees protected by a TPO.

Upon completion of the works, no residual impacts are anticipated e.g., the works only involve reinstating approx. 50 m of the right embankment.

Considering the nature, duration, size, and scale of the scheme, and with implementation of mitigation detailed below, impacts on landscape are assessed as temporary negligible adverse in magnitude.

Proposed landscape and visual effects mitigation measures:

- Construction vehicles will not be left in places where soil or vegetation can be damaged (where possible). If damage to road verge occurs this will be lightly cultivated or graded (upon completion of the works) to allow natural recolonization by local species and promote integration with existing landscape character.
- The site will be monitored regularly for signs of litter and other potential contaminants and litter will be removed before and after works take place.
- The site will be left clean and tidy following construction.

Biodiversity

A Habitats Regulations Appraisal (HRA) screening could not rule out the potential for Likely Significant Effects (LSE) on the River Teith SAC's conservation objectives. An Appropriate Assessment (AA) was therefore undertaken to determine the risk of potential impacts on the SAC as a result of the works, and identify any mitigation required to protect the integrity of the site and the qualifying interests. Potential impacts on the SAC as a result of the works highlighted in the HRA are as follows:

- Despite habitat quality for lamprey and salmonids being of poor quality on the right bank of the River Forth, low numbers of fish have been noted and therefore reduction in species density of lamprey and salmonids could not be ruled out.
- Lamprey and salmon could also be disturbed by the placement of rip rap or potential installation of a dry working area.

The AA concluded that there is sufficient information and assessment evidence to conclude that with mitigation in place, the risk of an Adverse Effect on Site Integrity (AESI) of the River Teith SAC can be excluded. The NatureScot Area Officer for the Scottish Borders has stated in regard to the HRA that they agree there will be LSE on the qualifying interests of the SAC, however the proposal will not adversely affect the integrity of the site given mitigation measures proposed in the following 'Biodiversity' and 'Road drainage and the water environment' sections.

The PEA did not note any permanent habitat for any mammal species of conservation importance within the area of likely construction disturbance.

There is no requirement for the destruction or removal of vegetation, permanent (or temporary) land-take, accommodation works, site clearance or locally gained resources. As such, the works do not involve any permanent physical altering or removal of habitat or result in permanent habitat fragmentation.

A temporary short-term increase in noise levels may cause disturbance to local wildlife. The works will, for example, require a range of ancillary plant, vehicles and NRMM which will emit noise and create potential disturbance. The works will also require delivery of materials and the presence of personnel to facilitate installation of the cofferdam and embankment/footpath restoration. However, the number of construction vehicles and construction operatives required on site is low given the

scale and scope of works. In addition, any species in the area are likely to be accustomed to noise and visual disturbance pertaining to vehicle movement on the M9 and the scheme is of short duration (10 days) and will be undertaken utilising a day-time working pattern (negating the requirement for artificial lighting). The potential for significant species disturbance within the area of likely construction disturbance is therefore somewhat diminished.

Considering the nature, duration, size, and scale of the scheme, and with implementation of mitigation detailed below, the proposed work impacts on biodiversity throughout the construction period are therefore assessed to be temporary minor adverse in magnitude.

Upon completion of the works, no residual impacts are anticipated in relation to biodiversity.

Proposed biodiversity mitigation measures:

- All mitigation measures detailed within ‘Air quality’, ‘Noise and vibration’ and ‘Road drainage and water environment’ will be adhered to.
- All site personnel will be made aware of the proximity and protected status of the River Teith SAC.
- To reduce disturbance, standard construction hours will be during the daytime, Monday to Friday. If any works are required outwith the agreed working hours, BEAR Scotland’s Environmental Team will be contacted to discuss.
- Consultation with the Forth District Salmon Fishery Board was undertaken, which determined that all in-water working must be undertaken between 1st June and 30th September 2023, due to the sensitivity of spawning fish outwith these months and the requirements of an undisturbed habitat.
- As in-water works are required, a fish rescue will be undertaken prior to works commencing, including installation of cofferdam/dry working area. If a dry-working area is not implemented, fish rescues ahead of the excavator will be undertaken on a daily basis for the works in river whilst ensuring that there are no movements back into the area by lamprey.
- Any unsupervised excavations/trenches > 0.5 m deep will be covered or have ramps installed when left unsupervised at the end of a working day.
- An Environmental Clerk of Works (EnvCoW), appointed by BEAR, will visit the site during the mobilisation period to deliver toolbox talks. The EnvCoW will also undertake a pre-works check (approx. 14 days before works commence) of the surrounding area. The EnvCoW will also supervise operations onsite during the works to ensure appropriate environmental safeguards are being adhered to.
- Measures to minimise impacts on fish passage will be implemented, including:
    - Free flowing passage for fish will be maintained at all times throughout the River Forth.
    - Appropriate silt mitigation measures (e.g., silt fencing, strawbales) will be in place to prevent pollution downstream.

    - Where practicable, machinery will not be operated from within the River Forth and will be operated from the embankments.

- Ancillary plant, vehicles, and NRMM, will be stored (when not in use) at the site compound (located on the local council road). If fencing is utilised at the compound (or anywhere else), a gap of 200 mm from ground level will be provided, allowing free passage for mammals and preventing entrapment.
- Works will not directly impact upon the depositional bar feature noted on the left bank, where it is estimated that there are several thousand lampreys present.
- Site personnel will remain vigilant for the presence of any protected species throughout the works period. Should a protected species be noted during construction, works will temporarily halt until the species has sufficiently moved on. Any sightings of protected species will be reported to the BEAR Scotland Environmental Team.
- Historical records have shown that Beaver (*Castor fiber*) are present and active throughout the River Forth at the scheme location. Toolbox Talk TTN-097 Working with Beavers will therefore be briefed prior to works commencing.
- All equipment stored onsite will be checked at the start of each workday to ensure mammal species are not present. Any storage containers/plant within the compound will also be secured overnight to prevent exploration by mammal species. Any areas where an animal could become trapped (e.g., storage containers) will also be covered at the end of each working day, to avoid mammals falling in and becoming trapped.
- The Contractor will employ ‘soft-start’ techniques for all noisy activity to avoid sudden and unexpected disturbance during works. Each time the activity is started up after a period of inactivity, the noise levels will be gradually increased over a period of 30 minutes to permit animals (and birds) to move away from the disturbance.
- Toolbox Talk TTN-009 Working with Injurious Weeds & Invasive Plants will be briefed prior to works commencing. Site personnel will be briefed on the location of the Himalayan balsam that is recorded onsite and will remain vigilant for the presence of any other potentially unrecorded instances of invasive or injurious weeds in road verges throughout the works period.
- A 10 m exclusion zone will be erected (where practicable) (e.g., by use of ticker-tape or similar) where Himalayan balsam is present, the aim being to exclude the workforce (ancillary plant, vehicles, NRMM, materials, etc.) and prevent the spread of INNS.
- Appropriate biosecurity controls will be in place for all ancillary plant, vehicles, machinery and personnel accessing and consequently leaving the working area e.g., footwear wash station and wheel washes prior to leaving site.
- People, ancillary plant, vehicles, NRMM and materials will be restricted to areas of made/engineered ground (as much as is reasonably practicable). If during works unforeseen access to the surrounding environment is required, works will cease in this area and BEAR Scotland’s Environmental Team will be contacted to allow consideration of potential environmental effects.

- BEAR Scotland's Environmental Team will be contacted to allow consideration of potential environmental effects if: (i) unforeseen site clearance is required, (ii) unplanned works must be undertaken outwith the carriageway boundary, (iii) there is any deviation from the agreed plan, programme and/or method of working, (iv) nesting birds are found onsite.
- BEAR Scotland's Control Room will be contacted if there is a pollution incident.

Geology and soils

Bridge schemes have the potential to impact upon the geology and soils through direct and indirect impacts on sensitive sites, loss or sterilisation of mineral deposits or soil resources, disturbance of contaminated land, or surcharging of ground which may accelerate erosion and subsidence.

However, works are minor in nature and are restricted to restoration of the right embankment to its original state using rock armour/rip rap and reinstatement of the footpath to a safe width, with all works restricted to the right embankment of the River Forth. The work corridor is also not located within a GCRS, geological SSSI or LGS.

Considering the nature of the scheme, and with implementation of the mitigation detailed below, the potential for impact on geology and soils within the area of likely construction disturbance is somewhat diminished. The proposed works impacts on geology and soils throughout the construction period are therefore assessed to be negligible in magnitude.

Upon completion of the works, no residual impacts are anticipated in relation to geology and soils.

Proposed mitigation measures:

- Any areas of exposed soil/bare earth/damaged verge as a result of the scour repair works will be reinstated and re-seeded once the works are complete.

Material assets and waste

Minimising impacts arising from construction materials are focussed upon making the most efficient use of materials onsite to reduce the need for imported primary materials and minimise the creation and disposal of waste through (i) reduction, (ii) re-use, and (iii) recycling. Potential impacts have been assessed for both the construction and operational phases of this scheme. It is anticipated that most material impacts are likely to arise during construction, though long-term residual impacts could occur post construction during the operational phase e.g., during the disposal of materials arising from routine maintenance operations.

Considering the nature, duration, size and scale of the scheme, and with implementation of the mitigation detailed below, the proposed works impacts on material assets and waste throughout the construction period are therefore assessed to be temporary negligible adverse in magnitude.

Upon completion of the works, no residual impacts are anticipated on materials or waste.

Proposed material and waste mitigation measures:

- Good materials management methods (e.g., 'just-in-time' delivery) will be implemented wherever possible.
- If any soil is required to be removed from site, waste classification testing will be undertaken and confirmation of acceptance by the waste receiver obtained prior to the movement of soil.
- Care will be taken to order the correct quantity of rip rap/rock armour to prevent the disposal of unused materials.
- The Contractor will comply with all 'Duty of Care' requirements, ensuring that all surplus materials and waste are stored, transported, treated, used, and disposed of safely without endangering human health or harming the environment. Material transfer notes and/or waste exemption certificates will also be completed/retained.
- Designated areas will be identified within which all materials and personnel, including construction compound, will be contained to limit environmental disturbance during construction works. This will include a designated area (if required) for segregation and reuse of waste materials.
- The selection of areas for materials stockpiling will avoid sensitive locations such as road drainage and the River Forth. Stockpiled materials with leachate potential, for example, will be stored away from road drainage to prevent cross-contamination with other materials, wastes, or groundwater.
- Materials will be stored with the appropriate security to prevent loss, theft, or vandalism.
- All temporary road signs and traffic cones will be removed from site on completion of works.
- Wastewater from welfare facilities (if required) will be subject to effluent treatment followed by tanker removal.
- If hazardous substances are used onsite, each substance will be subject to assessment under the Control of Substances Hazardous to Health (COSHH) Regulations 2002. Hazardous substances will also be clearly labelled, and disposed of, in line with COSHH safety data sheets and the Special Waste Regulations 1996. Special waste will also not be mixed with general waste and/or other recyclables.

Noise and vibration

Activities undertaken on site could potentially have some localised and short-term noise impacts in proximity to the works. The scour remediation works will, for example, require a range of ancillary plant, vehicles and NRMM for installation of rip rap. Noise will also be generated by use of hammers, unloading of materials, etc. As a result, there is potential for noise and vibration effects.

However, the works are not located within a CNMA or CQA. In addition, there are no residential properties within 300 m of the scheme. Works will also be completed over 10 days utilising a daytime working pattern and will be undertaken from beneath road level. Works with the potential to induce worst-case scenario noise and vibration (hammers, unloading of materials, etc.) will also be intermittent, temporary, and short-lived. The potential for disturbance will therefore be somewhat diminished.

Considering the likely sources of noise and vibration, the distance from the point of generation to NSRs, the nature, duration, size and scale of the scheme, and with implementation of the mitigation detailed below, it is unlikely that noise and vibration associated with the works will lead to significant impacts, disruption and/or complaints. The proposed scheme is therefore anticipated to result in temporary minor adverse noise impacts.

Proposed noise mitigation measures:

- If unacceptable noise is emanating from the site the operation will, where possible, be modified and re-checked to verify that the corrective action has been effective. Actions to be considered include (a) minimizing cutting and grinding on-site, (b) reducing the operating hours, (c) repositioning equipment, (d) changing the method of working etc. Corrective actions will be actioned through the non-conformance reporting procedure, which ensures a root-cause analysis is carried out on each incident. The non-conformance procedure also ensures that appropriate corrective and preventative action measures are agreed and implemented in a timely fashion with all parties, and are recorded and actioned through to closeout, and fully auditable and traceable.
- Ancillary plant, vehicles and NRMM with directional noise characteristic will (where practical) be shut down in intervening periods between site operations.
- The use of jackhammers, chipping hammers, etc. (if required) will be avoided (except where there is an overriding justification), and if used will be fitted with mufflers or silencers of the type recommended by the manufacturer.
- Drop heights from vehicles and NRMM will be kept to a minimum to minimise noise when unloading.
- All ancillary plant, vehicles and NRMM used onsite will have been regularly maintained, paying attention to the integrity of silencers and acoustic enclosures.
- All compressors will be ‘sound-reduced’ models fitted with properly lined and sealed acoustic covers which will be kept closed when in use.
- HGV, site vehicles and NRMM will be switched to the minimum setting required by HSE and, where possible, will utilise ‘broadband non-tonal’ or ‘directional sound reversing’ alarms. Speed limits will also be reduced through the works.

Population and human health

During construction, activities undertaken on site have the potential to have temporary adverse impacts on local residents, vehicle travellers, and NMUs. However, the scheme does not require permanent (or temporary) land-take,

accommodation works, site clearance or locally gained resources, and there is no requirement for a Compulsory Purchase Order (CPO).

TM on the M9 is not required as all works are restricted to below the carriageway.

Considering the nature, duration, size and scale of the scheme, and with implementation of the mitigation described below, impacts on population and human health are assessed as temporary minor adverse in magnitude.

Upon completion of the works, no residual impacts are anticipated in relation to population and human health:

Proposed population and human health mitigation measures:

- Alternative pedestrian routes will be included in the TM setup, diverting pedestrians and NMUs over the adjacent A84 road pedestrian walkway.
- Where appropriate, a communication strategy (e.g., social media, consultation with local authority and other stakeholders, letter drop etc.) will be initiated to keep local residents and/or businesses informed of the proposed working schedule, particularly the times and durations of noisy construction activities. The communication strategy will also provide a 24-hour contact number for the BEAR Scotland Control Room.

Road drainage and the water environment

During scour repair works, there is potential for temporary adverse impacts on the water environment. Potential changes in water quality e.g., from pollution events (either by accidental spillage of sediments, particulate matter, chemicals, fuels or by mobilisation of these in surface water caused by rain) during works have the potential to have a direct or indirect effect on the River Forth and by association the River Teith SAC. The River Forth is shown on the 1:50,000 scale Ordnance Survey map and bank protection works are required. The works therefore fall under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR). A CAR Simple Licence (CAR/S/5004547) has therefore been granted from the Scottish Environment Protection Agency (SEPA) for works to proceed.

Ancillary plant, vehicles and NRMM will also be stored in the compound and the accidental release of pollutants is also extremely unlikely. Pollution prevention measures, for example, will also be enforced onsite and Pollution Prevention Guidance (PPGs) and Guidance for Pollution Prevention (GGP) will be strictly adhered to, reducing the likelihood of a loss of containment occurring.

Considering the nature, duration, size and scale of the scheme, and with implementation of the mitigation detailed below, the proposed works impacts on the road drainage and water environment are assessed as temporary negligible adverse in magnitude.

Upon completion of the works, no residual impacts are anticipated in relation to the road drainage and water environment.

Proposed road drainage and water environment mitigation measures:

- All conditions of the CAR Simple Licence will be integrated into the SEMP. A copy of the CAR licence will also be retained onsite and made available for inspection as required. Works will not be permitted to commence until SEPA have confirmed the conditions of the simple licence.
- Straw bales/silt curtain (or similar) will be placed downstream of the works in the River Forth to prevent silt in runoff discharging downstream during works. Sediment/silt arisings that have accumulated upstream of the straw bales/silt curtain will also be carefully removed and properly disposed of. The straw-bales/silt curtain will be removed as soon as possible after they are no longer needed.
- All in-water actives will be undertaken in such a manner that do not introduce excess sediment into the watercourse. This will include, but not be limited to:
    - Rip-rap will be appropriately cleaned prior to being installed.
    - Rip-rap will be installed in such a way that reduces drop heights and limits any 'kick-up' of sediment.
    - Each in-water activity will have appropriate activity specific silt mitigation installed.
    - Vehicle movements in the watercourse will be minimised.
    - When vehicle movements are required in the watercourse, an oil boom will be installed across the watercourse.
- The Contractor (once appointed) will submit a RAMS (for approval) detailing how pollution control measures will be managed (including any silt mitigation, and how the dry-working area will be installed, inspected and maintained to prevent failure during the work). The Contractor will also inspect the silt mitigation measures and dry-working area daily for leakage and general deterioration and will take immediate remedial action to rectify any defects.
- If required, prior to constructing the temporary cofferdam, the following should be noted:
    - The temporary cofferdam (or similar) will be designed by a competent person, taking into account:
        - the reduction in channel capacity (for flood risk);
        - the potential increase in flow velocity (for adjacent bed and bank erosion and toe scour);
        - changes in flow patterns (for adjacent bed and bank erosion and toe scour);
        - fluctuations in water level (for adequate freeboard);
        - channel substrate (to avoid installation problems);
        - alignment of the cofferdam, particularly at the upstream and downstream ends where bank erosion can be induced.
    - A fish rescue will be undertaken prior to the area being dewatered.

  - When the works are complete, but before the barrier is removed, all materials, debris, tools, plant and equipment will be removed from the work area. The area will be checked thoroughly for spillages or potential pollution sources and any pollution issues remediated immediately.
  - The works area will be re-watered before removing the cofferdam to avoid sudden ingress of water causing erosion of the replaced bed or bank material. When re-watering, the pump inlets will be screened to prevent intake of fish or other aquatic animals (if required).
  - A competent person will be made responsible for monitoring the temporary cofferdam at regular time intervals. This will include: (i) water levels (upstream, downstream), (ii) bank and bed erosion at the upstream and downstream ends, (iii) channel stability, and (iv) debris accumulation.

- The abstraction or transfers of water, the washing of tools in, or discharges to the River Forth will not be permitted.
- Compliance with the conditions of SEPA's GBR 9 will limit the risk of pollution impacts:
  - Machinery will only operate in water where it is impracticable for it to operate on dry land.
  - Refuelling will take place at least 10 m away from any surface water.
  - Any static plant or equipment used within 10m of surface water will be positioned on a suitable drip tray with capacity for 110% of the fuel tank supplying the static plant or equipment.
  - Machinery used in or near surface water will not leak any oil.
  - Washing of any machinery will take place at least 10 m away from any surface water and the washings will not be allowed to enter any surface water.
  - Following the operation of the machinery, any damage caused by the operation to the bed and banks of the surface water will be repaired, including re-establishing vegetation on any areas of bare earth on the banks resulting from the operation, either by covering the area with grass turfs or lining them with a biodegradable geotextile and seeding.
- Concrete mixing and washing areas will be sited 10 m from the River Forth and road drainage entry points. The washing out and cleaning of concrete batching plant will be undertaken within a contained area, and wash waters will be collected and contained for authorised disposal off site. Wash waters from concrete works will not be discharged into the River Forth.

- The Contractor will monitor the weather forecast and flows/water levels throughout the works, and during periods of extreme weather or high flow events, the works will be temporarily postponed. The Contractor will also have a contingency plan in place if damage to cofferdam occurs.
- All site personnel will be fully briefed in silt management procedures and briefed on their responsibilities. This will be achieved through delivery Toolbox Talk TTN-012 Water Pollution - Silt prior to works commencing onsite.
- All site personnel will be made aware of site spillage response procedures and in the event of a spill, all works associated with the spill will stop, and the incident reported to the Site Supervisor. Small spills that did not leave the site boundary and are cleaned up without material environmental harm or residual environmental impact would most likely not be required to be notified to SEPA or other authorities. However, all such incidents will to be recorded and reported to BEAR Scotland's Environmental Team. In the event of a 'serious incident', SEPA will be notified without delay. Such notification will include: (i) the time and duration of the incident, (ii) a description of the cause of the incident, (iii) any effect on the environment as a result of the incident, and (iv) any measures taken to minimise or mitigate the effect and prevent a recurrence.
- All waste, vehicles, ancillary plant, NRMM and fuels will be stored in the compound(s) or laydown area and will be secured and located, if space is available, at least 10 m from drainage entry points and the River Forth, in order to comply with GPP 5 'works and maintenance in or near water'. Refuelling will only be undertaken at designated refuelling areas (e.g., on hardstanding, with spill kits available, and >10 m from drainage entry points and the River Forth, where practicable). Spill kits will also be available within all site vehicles and spill kits will be replenished onsite when required. Only designated trained and competent operatives will be authorised to refuel plant. Generators, and other ancillary plant and NRMM, where there is a risk of leakage of oil or fuel, will have internal bunding or will have a secondary containment system placed beneath them that meets 110% capacity requirements. Containment systems will also be emptied regularly. All waste, vehicles, ancillary plant, NRMM and fuels will also be stored in a manner that ensures they are protected from damage by collision or extremes of weather.
- Regular visual pollution inspections of the designated laydown area and work site will be conducted (e.g., site walkover by engineer or Site Supervisor), especially during periods of heavy rain.
- All vehicles and NRMM onsite will have been regularly maintained, paying attention to the integrity of oil tanks, coolant systems, gaskets etc. A checklist will be present to make sure that the checks have been carried out.

Climate

BEAR Scotland, working on behalf of Transport Scotland, undertake carbon monitoring of major projects and operational activities. Emissions from activities are recorded using Transport Scotland's Carbon Management System. BEAR Scotland also undertakes resource efficiency activities to manage and reduce emissions

contributing to climate change. The scour remediation works will also extend the maintenance intervals required for future works. In doing so, the service life of the M9 10–11 5 Forth bridge is also extended.

During works there is potential for impacts as a result of the emission of greenhouse gases through the use of equipment, vehicles, and NRMM, material use and production, and transportation of material/waste. However, considering the nature, duration, size and scale of the scheme, and the mitigation detailed below, the risk of significant impacts to climate are considered to be negligible adverse in magnitude.

Upon completion of the proposed scheme no residual impacts are anticipated on the climate.

Proposed climate mitigation measures:

- Local contractors and suppliers will be used as far as practicable to reduce fuel use and greenhouse gas emitted as part of the works.
- BEAR Scotland will adhere to its Carbon Management Policy.
- Where possible, waste will be removed to local waste management facilities.

Vulnerability of the project to Major Accidents and Disasters

Works are taking place in summer (June) when historically the River Forth flow levels are low, therefore the risk of flooding during the scheme is minimised.

The works compound will be located on the local council road (Drip Road West), 10 m south of the River Forth, and access to the site will be gained via the council road. TM for pedestrians will be required and will divert pedestrians over the adjacent A84 road pedestrian walkway. TM is not required on the live lanes of the M9. As such, the proposed works impacts on road traffic accidents is assessed to be of negligible magnitude.

A Site Environmental Management Plan (SEMP) will be produced by BEAR Scotland which sets out a framework to reduce the risk of adverse impacts from construction activities on sensitive environmental receptors. The Contractor will comply with all conditions of the SEMP during works and may be subject to audit throughout the contract.

Considering the above, the vulnerability of the project to risks of major accidents and disasters is considered to be low.

Assessment of cumulative effects

The proposed works are not anticipated to result in significant environmental effects. Due to the nature of the proposed works, no cumulative effects are anticipated with any other developments in the vicinity. Any future BEAR Scotland schemes will be programmed to take into account already-programmed works and as such, any cumulative effect will be limited.

A search of the Stirling Council Planning Portal (Map Search) identified no planning applications within 300 m of the scheme, therefore no cumulative impacts are anticipated from the works being undertaken at M9 10–11 5 Forth bridge.

Assessments of the environmental effects

This assessment has identified potential effects on the environmental receptor, biodiversity.

An HRA was undertaken and has shown that there is sufficient information and assessment evidence to conclude that the proposed scheme, with the implementation of mitigation and control measures, will not result in any AESI. Consultation with NatureScot on the outcome of the AA also confirmed no AESI given mitigation and control measures outlined above.

Statement of case in support of a Determination that a statutory EIA is not required

This is a relevant project in terms of section 55A(16) of the Roads (Scotland) Act 1984 as it is a project for the improvement of a road and the completed works (together with any area occupied by apparatus, equipment, machinery, materials, plant, spoil heaps, or other such facilities or stores required during the period of construction) are situated in the River Teith SAC, which is a sensitive area within the meaning of regulation 2(1) of the Environmental Impact Assessment (Scotland) Regulations 1999.

The project has been subject to screening using the Annex III criteria to determine whether a formal Environmental Impact Assessment (EIA) is required under the Roads (Scotland) Act 1984 (as amended by The Roads (Scotland) Act 1984 (Environmental Impact Assessment) Regulations 2017). Screening using Annex III criteria, reference to consultations undertaken, and review of available information has not identified the need for a statutory EIA.

The project will not have significant effects on the environment by virtue of factors such as:

Characteristics of the scheme:

- The total working area is less than 1 ha.
- Works are restricted to restoration of the right embankment to its original state using rock armour/rip rap and reinstate the footpath to a safe width.
- Works are programmed to only take 10 days to complete, utilising a daytime working pattern. During the 10-day construction period, the M9 will remain open, with pedestrians and NMUs diverted via the A84 walkway.

- If a dry-working area/cofferdam is created, a fish rescue will be undertaken prior to the area being drained. If a dry working area is not required, fish rescues will be undertaken daily, ahead of the excavator.
- Works are not expected to result in significant disturbance to protected species that may be present in the wider area.
- No in-combination effects have been identified.
- The risk of major accidents or disasters is considered to be low.
- The stabilisation works will improve safety on the bridge and protect against future deterioration of the structure. Consequently, carrying out these works now will reduce the need for major works at a future date. This in turn will minimize the extent of work required on the M9 10–11 5 Forth bridge. In doing so, the service life of the structure is also extended.

Location of the scheme:

- Although the works are located within the River Forth (and by association the River Teith SAC), the HRA has confirmed that the works will not result in AESI on the qualifying features of the SAC.
- The scheme is not located within any areas designated for landscape interests.
- The scheme does not lie within any sites of historical, cultural, or archaeological significance.
- Land use will not change as a result of the works.
- The works do not require any private land acquisition.
- The scheme does not lie within any sites designated for geology or soils.
- The scheme is not located within a densely populated area.

Characteristics of potential impacts of the scheme:

- Any potential impacts of the works are expected to be temporary, short-term, not significant, and limited to the construction phase.
- The dry-working area, with silt-trap measures in place, will reduce the likelihood of significant quantities of dust, earth, particulate matter etc. from entering the River Teith SAC.
- With good practice pollution prevention measures implemented onsite, there is a negligible risk of a pollution event e.g., compliance with the SEMP.
- Works are restricted to restoration of the right embankment and footpath, therefore there is no change to the vulnerability of the road to the risk or severity of major accidents/disasters that would impact on the environment.
- No impacts on the environment are expected during the operational phase as a result of the works.

Annex A

"sensitive area" means any of the following:

- land notified under sections 3(1) or 5(1) (sites of special scientific interest) of the Nature Conservation (Scotland) Act 2004
- land in respect of which an order has been made under section 23 (nature conservation orders) of the Nature Conservation (Scotland) Act 2004
- a European site within the meaning of regulation 10 of the Conservation (Natural Habitats, &c.) Regulations 1994
- a property appearing in the World Heritage List kept under article 11(2) of the 1972 UNESCO Convention for the Protection of the World Cultural and Natural Heritage
- a scheduled monument within the meaning of the Ancient Monuments and Archaeological Areas Act 1979
- a National Scenic Area as designated by a direction made by the Scottish Ministers under section 263A of the Town and Country Planning (Scotland) Act 1997
- an area designated as a National Park by a designation order made by the Scottish Ministers under section 6(1) of the National Parks (Scotland) Act 2000.

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