



**Haweswater Aqueduct Resilience Programme - Proposed Bowland
Section**

Environmental Statement

Volume 4

Appendix 3.2: Construction Code of Practice

June 2021



Water for the North West



Haweswater Aqueduct Resilience Programme - Proposed Bowland Section

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1. Introduction

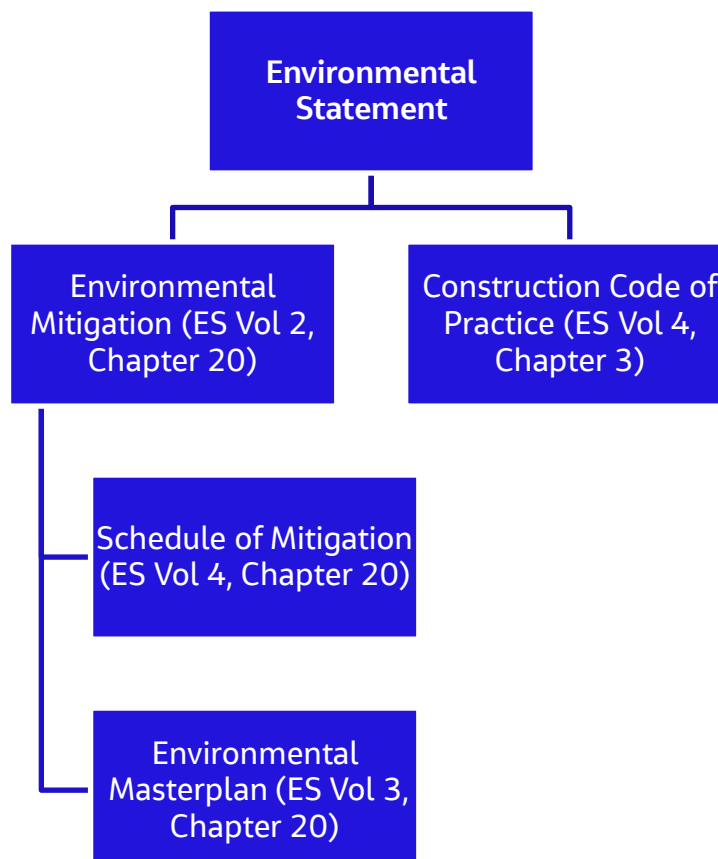
1.1 Background

- 1) The Construction Code of Practice (CCoP) has been produced to support the Environmental Impact Assessment (EIA) for the Haweswater Aqueduct Resilience Programme (HARP) under the Town and Country Planning Act 1990. The CCoP outlines the environmental control measures, standards and other mitigation measures identified to reduce the potential impact of the Proposed Programme of Works.
- 2) The CCoP sets out a series of proposed measures and standards of work, which would be applied by the Contractor throughout the construction period to:
 - Provide effective planning, management and control during construction to control potential impacts upon people, businesses and the natural and historic environment
 - Provide the mechanisms to engage with the local community and their representatives throughout the construction period.
- 3) The HARP extends across seven local planning authorities. The CCoP provides a consistent approach to the management of construction activities across the individual tunnel sections.

1.2 Relationship with Other Documents in the Environmental Statement

- 4) The CCoP forms part of the Environmental Statement (ES) and sits within Volume 4, Chapter 3. The main document is supplemented by site specific mitigation which includes the Schedule of Mitigation and Environmental Masterplans (ES Volume 3, Chapter 20).

Illustration 1: Relationship with other documents in the Environmental Statement



1.3 Structure of this Document

- 5) This document comprises the following sections:
- **Introduction (Section 1)** – Purpose of the document and structure
 - **Environmental Management (Section 2)** - outlines how all environmental requirements would be managed during the construction period through to reinstatement
 - **Communications and community/stakeholder liaison (Section 3)** – outlines the communications strategy to be implemented with the affected communities and relevant stakeholders during construction
 - **General Site Operations (Section 4)** – outlines general management standards/procedures to be applied across all construction sites
 - **General Requirements by environmental topic (Section 5)** – sets out the general measures that will be implemented to limit the disturbance from construction activities and reduce the environmental impact as far as reasonably practicable. For ease of reference and consistency this follows the chapter structure outlined within the supporting Environmental Statements.

2. Environmental Management

2.1 Environmental Impact Assessment

- 6) The Proposed Programme of Works involves the construction of five replacement aqueduct tunnel sections totalling approximately 53 km. Each of the individual aqueduct sections are considered to be standalone 'projects' for the purposes of the Environmental Impact Assessment (EIA) Regulations and the assessment of environmental effects.
- 7) An EIA has therefore been undertaken for each of the individual aqueduct sections and an ES has been prepared for each in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

2.2 Environmental Management System

- 8) The Contractor would be required to develop and implement an environmental management system (EMS) consistent with ISO 14001, BS 8555 or the Eco-Management and Audit Scheme (EMAS).
- 9) The Contractor's EMS will detail the procedures to deliver and monitor compliance with all the environmental requirements of the contract and all relevant legislation, standards, regulations and consents.

2.3 Key Environmental Personnel

- 10) The Contractor would provide an environmental team to provide advice, guidance and supervision of the environmental management requirements of the Proposed Programme of Works to their wider design and construction teams, and would include the following roles:
 - Lead Environmental Planner
 - Lead Ecologist
 - Lead Landscape Architect
 - Lead Environmental Construction Advisor
 - Specialist environmental services as required (e.g. Arboricultural Clerk of Works (ACoW), air quality, archaeologists, asbestos, Ecological Clerk of Works (ECoW), Environmental Clerk of Works (EnvCoW), environmental permitting, landscaping, laboratory testing, geo-environmental, hydrogeology, odour, noise, tree surgeons etc.).

2.4 Site Surveys

- 11) Prior to any construction, the Proposed Programme of Works site surveys would be updated by a qualified and competent ecologist (scope to be agreed with United Utilities). All ecological constraints would be identified and addressed, including any requirements for protected species licences with appropriate control measures put in place, in accordance with the requirements of the ES and individual site consent/approval requirements.
- 12) Where locations have been identified for further archaeological investigation (such as a watching brief), a suitably qualified archaeologist would be engaged to carry out the work in liaison with the relevant authorities.
- 13) Condition surveys would be carried out of all land and key features such as hedgerows and stone walls (with a photographic record) to help inform the reinstatement.
- 14) Surveys of existing land drainage would be carried out by a Land Drainage Consultant and drainage plans developed in accordance with Section 5.3 of this document.

2.5 Permits, Certification & Consents

- 15) As part of the Contractor's Quality Assurance procedures, the Contractor would establish and implement a system of internal permits, consents and certificates prior to commencing construction.
- 16) The Contractor would also apply for any third party consents in consultation with the stakeholders relevant to each local authority or specific application including those listed below:
 - Local Planning Authority biodiversity, landscape, environmental health, tree, heritage and conservation officers
 - Environment Agency
 - Natural England
 - Lead Local Flood Authority (LLFA)
 - Highways
 - Historic England
 - Public Rights of Way.

2.6 Construction Environmental Management Plan

- 17) The Contractor would produce and implement site specific Construction Environmental Management Plans (CEMPs) in full accordance with the CCoP and in consultation with the local authority and relevant stakeholders. The CEMP would demonstrate how the CCoP would be implemented by the Contractor through its EMS.
- 18) The CEMP would cover overarching general site operations and overall management of the construction works. It would include, but would not be limited to, details of the controls over general site layout and operations, working hours, site lighting and security, emergency planning and response, nuisance prevention, tree protection and surface water management.
- 19) The CEMP would be a live document that would be updated and refined by the Contractor as required in response to the changing needs of the works during construction. The Contractor would agree alterations in the scope of the CEMP in consultation with relevant stakeholders.
- 20) It would set out the Contractor's arrangements to provide supervisory and site personnel with adequate training relevant to their roles prior to being employed on the construction site.
- 21) It would also include details of those responsible for the effective implementation of the plan and would also set out the procedures to be implemented to monitor compliance with the plan during construction.

2.7 Environmental Training

- 22) All on-site personnel including engineers and construction workers would be trained in the requirements of the CEMP to ensure they are fully aware of their responsibilities, and the importance of compliance with the CEMP would be explained. Visitors to the construction area would be informed of the safeguards they must adopt including exclusion from any sensitive areas.

2.8 Environmental Site Inspections

- 23) Environmental monitoring and inspections would be undertaken by the Contractor. Specific details with respect to the location and frequency of the monitoring and inspections would be defined within the CEMP and, where applicable, agreed in consultation with the relevant stakeholders prior to commencement of the works.

3. Communications and Community/Stakeholder Liaison

- 24) United Utilities views customer service as being fundamental to the successful delivery of the Proposed Programme of Works. United Utilities would deliver a proactive approach to communications and engagement, to keep customers and stakeholders engaged and informed.
- 25) The Contractor would take responsibility for customer service and communication when planning and carrying out any work. The Contractor would adhere to Unities Utilities Guaranteed Standard of Service (GSS) and would achieve this through a managed process, supported by senior management input and information processes to continually assess progress and measure success.
- 26) The Contractor would develop a Stakeholder and Customer Communications Management Plan which would be regularly updated throughout the duration of work. The plan would set clear objectives and processes on how the work will be delivered to mitigate impacts to customers, whilst striving to build stronger stakeholder relationships.
- 27) The Contractor would also provide community/stakeholder relations personnel, who would be focussed on proactively engaging with the community/stakeholders. Identifying, preparing and arranging the distribution of timely communications to ensure advance information about the work in the area is provided. These include (but are not limited to):
- Letters
 - Leaflets and flyers
 - Customer surveys and questionnaires
 - Site appraisal forms
 - Newsletters
 - Public exhibition material
 - Stakeholder meeting notices and minutes.
- 28) United Utilities Priority Services (PS) scheme is a register for customers who have a disability or special requirement. Where the PS scheme identifies affected customers within the planning application boundary, the Contractor would ensure this is included in the Customer Communications Plan and the necessary process followed in order to address any specific service requirements.

4. General Site Operations

4.1 Introduction

29) The following section provides a breakdown of the general site management/procedures the Contractor would apply across all site construction areas throughout delivery of the Proposed Programme of Works.

4.2 Working Hours

30) The proposed activities at the work sites are varied and include construction of major shafts, tunnels and other activities that would be constructed over extended periods of time and would include periods of working on a continuous 24 hour, seven days a week basis. General site working hours for the following construction activities are summarised below.

4.2.1 Tunnelling

- Tunnelling works up to 24 hours per day, 7 days a week.

4.2.2 Above Ground Works to Support Tunnelling at Launch Sites Only

- Up to 24 hours per day, 7 days per week above ground support to tunnelling including maintenance, refuelling and storage, of arisings.

4.2.3 Above Ground Works Elsewhere

- Monday to Friday 07:00 to 19:00. Deliveries (including movements of waste) subject to restricted hours within this period. See Chapter 3 of the ES for the relevant Section for more information
- Saturday 07:00 to 13:00. Deliveries (including movement of waste) subject to restricted hours within this period. See Chapter 3 of the ES for the relevant Section for more information
- No works Sunday, unless by exception. No deliveries
- No works Bank Holidays, unless by exception. No deliveries

4.2.4 Connections to Existing Infrastructure

- 24 hours per day, 7 days per week during four week full supply outages including two four week partial outages with up to 24 hours per day, 7 days per week working at each point of connection to the existing network between April and October
- Exceptions to the above would only be permitted by agreement with the relevant planning authority.

4.3 General Housekeeping and Construction Site Layout

31) All working areas would be maintained in good order throughout construction and follow the high-level principles set out below:

- All temporary working areas would be fenced to demarcate the working area from members of the public and to prevent animals from straying onto a working area. The fencing, would be regularly inspected, repaired and replaced as necessary
- Working areas would be kept in a tidy condition
- All waste would be identified, quantified and appropriately segregated. Site waste that is susceptible to spreading would be covered or stored in secure containers
- Each welfare facility and compound would have waste disposal facilities that are regularly emptied and maintained
- Discharge of site run-off to ditches, watercourses, drains, sewers or soakaways to be suitably treated and agreed with the appropriate regulatory authority/body

- Adequate welfare facilities would be provided on-site for staff.

4.4 Hoardings, Fencing and Screening

- 32) All compound areas would be secured with either 2.4 m high hoarding or 2 m high 'heras' type fencing which would be agreed with the Local Planning Authority. Stock proof post and wire fencing would also be used to demarcate temporary accesses and laydown areas where appropriate.

4.5 Lighting

- 33) The Contractor would develop and implement lighting controls as part of their CEMP and in line with the Lighting Management Plans submitted with the planning applications.

- 34) The following standards and guidance documents have informed the Lighting Management Plans relating to construction and operational lighting for temporary construction compounds:

4.5.1 British Standards

- BS 5489 – 2020 Code of practice for the design of road lighting – Part 1: Lighting of Roads and Public amenity areas
- BS EN 13201 – 2003 Road lighting- Part 2 - performance requirements
- BS EN 12464 – 2014 Light and lighting of workplaces- Part 2- outdoor workplaces.

4.5.2 Local Policy

- Dark Skies Policy.

4.5.3 Other Regulations

- ILE/CIBSE/HSG
- ILP. GN01: 2020 Guidance Notes for the Reduction of Obtrusive Light
- ILP Bats and Lighting in the UK (2019)
- ILP – High masts for lighting and CCTV - Professional Lighting Guide (PLG) 07 (2013 edition)
- CIBSE Building Regulations Approved Document L2B (with particular reference to metering and CIBSE TM39).

- 35) Compliance with these requirements requires the proper design of all construction lighting however temporary, including:

- Appropriate assessments of receptors and impact monitoring
- The use of appropriate lighting fixtures, heights, hoods / cowls and louvres
- The use of timers
- The use of sensor operated systems
- The use of red bat friendly LED lighting technology.

4.6 Security

- 36) Levels of security would vary depending on the work being undertaken and the location. The Contractor would ensure that temporary construction compounds including offices are adequately secured to protect the public and prevent unauthorised entry to the site, this may include perimeter fencing or hoarding, site lighting, security guards, CCTV, perimeter security etc. With regards to CCTV the location and direction of view would be considered to prevent intrusion into residential properties. Access to the temporary construction compounds would be via specified entry points only and all personnel would be asked to report to the site office for health and safety and security reasons.

4.7 Fire Prevention and Control

- 37) All construction sites and associated accommodation and welfare facilities would have appropriate plans and management controls in place to prevent fires.

4.8 Extreme Weather Events

- 38) The Contractor would develop response plans to mitigate the impacts of extreme weather events and related conditions during construction. The Contractor would use a short to medium-range weather forecasting service from the Met Office or other approved meteorological data and weather forecast provider to inform short to medium-term programme management, environmental control and mitigation measures. The Contractor would register with the Environment Agency's Floodline Warnings Direct service in areas of flood risk.
- 39) The Contractor would ensure appropriate measures within this CCoP are implemented and, as appropriate, additional measures to ensure the resilience of the proposed mitigation of impacts during extreme weather events (see Section 5.3.1 for measures required in the event of a flood).
- 40) The Contractor's EMS would consider all measures deemed necessary and appropriate to manage extreme weather events and would specifically cover training of personnel and prevention and monitoring arrangements. As appropriate, method statements would also consider extreme weather events where risks have been identified.

4.9 Pollution Incident Control

- 41) The Contractor would develop and implement appropriate measures to control the risk of pollution due to construction works, materials and extreme weather events. This would include a Pollution Incident Control Plan, as part of the CEMP, which recognises the risk of pollution from construction activities and presents proactive management practices to ensure that any pollution incident that may occur, such as a diesel spillage, is minimised, controlled, reported to relevant parties and remediated. The plan would define the criteria for implementing the relevant measures.
- 42) The Pollution Incident Control Plan would contain:
- An assessment of the type of materials to be used and the risk of contamination
 - Specifics on the storage and use of hazardous materials, with the aim of preventing and containing spills and releases
 - Specifics on pollution prevention for sites on or adjacent to the rivers and watercourses
 - Specifics on the degrees of containment which take account of the nature of the materials and the sensitivity of the environment
 - Procedures to be adopted in the event of a pollution incident, to contain and limit any adverse effects
 - Procedures and appropriate information required in the event of any incident such as a spillage or release of a potentially hazardous material
 - Systems for notifying appropriate emergency services, authorities, the Employer and the Contractor's personnel
 - Arrangements for notifying appropriate statutory bodies and local authorities of pollution incidents, where required to by legislation
 - Standby equipment and materials.

5. General Requirements by Environmental Topic

5.1 Introduction

43) For ease of reference, this section follows the sequence of topics in the ES and presents the general construction requirements. This section links to embedded mitigation defined within the ES against each topic area which would be applied across all working areas throughout the delivery of the Proposed Programme of Works.

5.2 Landscape and Arboriculture

5.2.1 Landscape Management – General Provisions

44) The Contractor would implement a series of controls to protect landscape features such as trees, hedgerows and dry-stone walls in rural and urban areas from construction activities. The following measures would be implemented (in agreement with the local planning authority):

- A combination of tree protection measures would be specified in a Site Specific Arboricultural Method Statement (SS-AMS). In conjunction with a SS-AMS, a Tree Protection Plan (TPP) would be produced. (A TPP shows areas of existing trees and vegetation within the construction site to be retained (and protected), and those to be removed)
- The involvement of arboricultural and ecological specialists as required, in relation to vegetation clearance, tree works and the protection or creation of new habitats
- Tree removal would be implemented in line with recommendations of the Arboricultural Impact Assessment (AIA) and indicatively show on the Preliminary Trees at Risk Plan
- A plant specification including schedule of species, numbers, size and planting method to be used and provision of specified species and source of origin, including details of plant nursery used
- A programme for undertaking planting works and appointment of clerk of works to ensure delivery meets requirements of specification and planning requirements
- Protection of existing and new areas of planting
- Inspection of new planting by a landscape architect
- Landscape features adjacent to the construction site including dry-stone walls, hedgerows, ditches and streams would be retained and protected by a suitable machinery/plant exclusion zone. Where works within this zone are required, e.g. for drainage installation, appropriate risk assessments and method statements would be prepared to limit impacts and implemented in the presence of the clerk of works
- Temporary removal, handling, storage and transplanting of any vegetation which is to be re-used, relocated or transplanted
- Provision of suitable specialist landscape management staff with specific responsibility for monitoring and supervising the landscape works (e.g. works in relation to the clearance of vegetation, topsoil and subsoil stripping, handling, storage and replacement, works to trees, grass seeding, protective fencing, the planting of trees and shrubs and the creation of new wildlife habitats)
- Height of topsoil storage mounds would be limited to 3 m, to protect soil health and its suitability for re-use.

5.2.2 Tree Works and Protection of Trees

45) The Contractor would be required to employ an Arboricultural Clerk of Works (ACoW) to oversee works relating to the protection of trees. Retained trees would be protected in line with the recommendations in *BS 5837:2012 - Trees in relation to design, demolition and construction* and any additional requirements of the landowner or planning authority.

- 46) Where tree surgery is required it would be carried out by suitably qualified and accredited tree surgeons in accordance with *BS 3998:2010 - Tree Work Recommendations* and current good practice guidelines.
- 47) The following measures would be implemented (where required):
- Provision of appropriate protective fencing to reduce the risks associated with vehicles passing over root systems or beneath canopies
 - Measures to prevent compaction of soils including undisturbed woodland soils
 - Maintenance of vegetation buffer strips, where reasonably practicable
 - Selective removal of lower branches, where removal would not unbalance the remaining tree, to reduce the risk of damage by construction plant and vehicles
 - Standard guidance for working within root protection zones, including procedures to follow in the event that significant roots are uncovered during work
 - Provision of contractor induction, toolbox talks or other briefing of best practice for working close to retained aged and veteran trees and areas of retained ancient woodland, and watching briefs as appropriate
 - Any tree surgery and felling operations would comply with the recommendations in *BS 3998:2010 - Tree work Recommendations*, as appropriate.

5.2.3 Tree Planting and Landscaping

- 48) Trees intended to be retained which die as a consequence of construction works would be replaced. Where reasonably practicable, the size and species of replacement trees would be selected in agreement with the landowner and where relevant the local planning authority.
- 49) Planting and other landscape measures would be implemented as early as is reasonably practicable where there is no conflict with construction activities or other requirements of the Proposed Programme of Works. The Contractor would be required to consider where measures can be implemented early and programme the landscape works accordingly. Locations for landscape measures would relate to the findings of the ES as shown in the EMP (Volume 3, Figure 20.1), and would be aimed at the protection and mitigation of adverse effects on sensitive and valued landscape features and characteristics.
- 50) The supply, storage, handling, planting and maintenance of new planting would be undertaken in accordance with appropriate British Standards, including *BS 8545:2014 - Trees: from nursery to independence in the landscape. Recommendations*; *BS 5837:2012, Trees in relation to design, demolition and construction. Recommendations*; *BS 3998:2010, Treework. Recommendations*; and *BS 4428, Code of practice for general landscape operations (excluding hard surfaces), and other appropriate guidance including the UK Forestry Standard and the UK Woodland Assurance Standard*. Any trees or shrubs planted shall be maintained appropriately and frequently to ensure healthy establishment and to meet the expectations of agreed landscape plans. Any trees or shrubs which die after planting shall be replaced to ensure long term delivery and attainment of the landscape management plan and all commitments.

5.2.4 Reinstatement

- 51) Habitats, trees, shrubs, grasslands would be planted, seeded and established by appropriate aftercare including replacement of dead/dying individual plants in line with requirements set out and agreed with the relevant Local Planning Authority. The Contractor would be required to return agricultural land to the owner or tenant for their productive use as soon as practicable after reinstatement of the works.

5.3 Water Environment

5.3.1 Flood Risk

5.3.1.1 Flood Risk - General Provisions

- 52) The Contractor would follow the below general guidance concerning the management of flood risk:
- Prepare a Flood Response Plan which identifies the areas that are likely to flood and the actions that should be taken to ensure onsite safety
 - Sign up to any Environment Agency's Floodline Warning Direct Service
 - Consult with the Environment Agency when working within a river, or when work would be within 8 m of a main river to ensure the activities are appropriately permitted (where applicable)
 - Consult with the LLFA when working within or adjacent to a watercourse which does not form part of the main river (includes streams, drains and ditches, and passages through which water flows) to ensure the activities are appropriately permitted (where applicable)
 - Monitor water levels when working within or near watercourses
 - Prepare emergency evacuation plans for each construction area in advance of a Flood Warning or following rapid rises in river level or continuous heavy rainfall, identifying safe access and egress routes and refuge points
 - Provide standby pumping equipment to allow removal of surface water runoff that enters the working area
 - Ensure site drainage is only discharged to a local sewer as a last resort and with prior agreement from United Utilities
 - Contact the Environment Agency during a flooding event greater in magnitude than the temporary works are designed to, particularly where receptors could be at increased risk of flooding.

5.3.1.2 Temporary Works

- 53) Temporary works would be protected from, or resilient to, flooding during a high-risk event. Temporary works do not increase the risk of flooding beyond the site during a similar event.
- 54) The Contractor would provide measures to mitigate the risk of flooding using the below mitigation principles as a starting point:
- Review local groundwater data prior to extensive excavations
 - Where dewatering of excavations is undertaken, discharge overland or to a watercourse (with appropriate treatment where necessary) at the runoff rate agreed with the Environment Agency
 - Locate stockpiles outside of areas susceptible to prominent surface water flows. Where this is not practicable, stockpiles would be constructed with regular spaces between heaps to preserve existing low points and flow paths, and to prevent surface water backing up behind the structure or being re-directed elsewhere
 - Store excavated materials outside of the floodplain. Excavated material would only be placed in 'at risk areas' when required for use
 - Construct haul roads and access roads as close to ground level as practicable when crossing the floodplain
 - Construct temporary drainage measures along access road / temporary diversion edges to collect runoff and direct to treatment facilities to reduce risk of silt laden run-off.

5.3.1.3 Discharges of Groundwater from Dewatering Activities

- 55) Discharges of groundwater from the dewatering of tunnelling or other deep excavations would be subject to an environmental permit from the relevant Risk Management Authority (RMA) i.e. the Environment Agency or relevant LLFA.
- 56) An abstraction license from the Environment Agency would be required for abstractions of more than 20 m³ per day.
- 57) Discharges would be controlled to a flow rate or regime at which it would not pose a risk of flooding downstream and monitoring of water quality would also be undertaken. Suitable treatment of all pumped water generated from de-watering during construction activities prior to discharging to surface water.

5.3.1.4 Temporary Drainage

- 58) The Contractor would assess requirements for management of surface water runoff from construction working areas. Discharge rates would be agreed with the relevant RMA and sufficient control and treatment would be provided to achieve these rates as part of the construction works.
- 59) Drainage along linear features such as tracks, and sections of open cut trench would need to maintain natural catchments through use of cross drains and check dams as appropriate.

5.3.1.5 Works Within or Adjacent to Watercourses

- 60) Works within or adjacent to watercourses would be subject to an environmental permit from the relevant RMA i.e. the Environment Agency or relevant Lead Local Flood Authority.
- 61) Culverts would be designed in accordance with the principles identified within *CIRIA C786*. This does not identify specific requirements for flow capacity but does identify general principles which are summarised below:
 - Consultation would be undertaken with key stakeholders such as the landowner and the consenting organisation to determine any specific requirements regarding design standard. Factors that would be considered include safety; hydrology and hydraulics; whole-life cost and carbon; environment and geomorphology; structural performance; conveyance of debris; and constructability
 - Culvert bed slopes and cross-sectional areas would be similar to that of the watercourse channel
 - Minimum pipe sizes are summarised in Table 12.2 of *CIRIA C786*. These would be adhered to in order to reduce the risk of blockage.
- 62) The Contractor would design temporary works, which involve the diversion of a watercourse (e.g. fluming or over-pumping), to convey the design flood event to be agreed with the relevant regulator. The same general principles for the sizing of culverts would apply.
- 63) The Contractor would design cofferdams and other in-river temporary works to minimise the impact on river conveyance, maintain fish passage and prevented from flooding internally.
- 64) Where temporary access crossings include the use of culvert, these would be designed in accordance with CIRIA and Environment Agency guidance and would convey the peak flow during a design flood event, to be agreed with the relevant regulator. Multiple pipes should not be used, where reasonably practicable, to reduce the risk of blockage.
- 65) Where temporary access crossings include the use of bridges, design the soffit above the peak water level during the design flood event plus 600 mm freeboard to be agreed with the Environment Agency. Bridge piers should not be located within the watercourse.

5.3.1.6 General Site Activities

66) The Contractor would:

- Minimise trafficking and loading of unprotected site areas. Protect large site areas subject to heavy traffic loads with methods to alleviate soil compaction post works, as soil compaction could lead to an increased runoff rate
- Store construction materials outside of the floodplain. Construction material would only be placed in 'at risk areas' when required for use
- Locate offices and other site facilities away from the functional floodplain.

5.3.2 Water Quality

5.3.2.1 Site Runoff and Surface Water Quality - General Provisions

67) The Contractor would follow the below general guidance concerning the management of site runoff and sedimentation to protect surface water quality during the construction period:

- Monitor weather forecasts and water levels to determine events that could significantly increase runoff
- The timing of any works that could increase sediment loadings to receiving watercourses via direct connection or surface water runoff to be considered. For example, undertaking earthworks during periods of dry weather where practicable
- Designated refuelling areas would be lined or bunded to prevent the escape or infiltration to the ground of contaminated runoff or accidental spillage incidents
- Avoid works, in or on the floodplains of Main Rivers and Ordinary Watercourses. Where this is not practicable, a minimum distance of 10 m between the works and the banks of the watercourse would be maintained where practicable
- Construction SuDS to be appropriately sized to avoid overtopping and potentially entering surface water features (floc and siltbusters should be considered where appropriate)
- Site drainage would receive at least two levels of treatment, in line with best practice, through construction SuDS prior to discharge to surface water features
- Conduct regular inspections of all features and undertake maintenance as necessary, particularly in anticipation of and after a prolonged heavy rainfall event. Provide adequate stockpiles of material that can be deployed when needed (i.e. silt fencing / clean stone)
- Contact the Environment Agency during a flooding event greater in magnitude than the temporary works are designed to, particularly where receptors could be at increased risk of degradation of water quality
- Identify potential pollution sources on-site and if these cannot be removed, then implement mitigation measures to reduce the risk to the surface water environment
- Identify the location of all watercourses, ponds, wetlands and drainage pathways for surface water within the construction envelope prior to the commencement of construction
- Where practicable, avoid vehicle tracking over areas that are at an increased risk of erosion and thus present a risk of increased sediment loadings entering surface water features. If these areas cannot be avoided, then the contractor should implement soil stability techniques such as the use of temporary surfacing (e.g. trackway) to decrease the erosion risk
- On-site welfare facilities would be adequately designed and maintained to ensure all sewage is disposed of appropriately. This could take the form of an on-site septic tank with soakaway, or tankering and off-site disposal depending on the suitability of the site for a soakaway. Any discharge requirements would comply with relevant regulatory requirements.

5.3.2.2 Temporary Earthworks

- 68) The Contractor would provide measures to mitigate the risk to the surface water environment from temporary earthworks using the mitigation principles outlined above and in the flood risk section of this report, in addition, the following mitigation measures would be applied:
- Where practicable, soil mounds and aggregate stockpiles would be seeded to prevent silt run-off and causing additional fine sediment mobilisation via runoff during high rainfall events
 - Stockpiles should be bladed as to decrease risk of mass movement of soil which could directly enter watercourses
 - Where practicable, temporary drainage measures should include the use of interceptor drains or silt socks to allow filtering of fine sediment prior to entering construction SuDS
 - Where practicable, maintain vegetation between the construction areas and watercourses. This would act as a buffer strip for fine sediment. Where no vegetation currently exists or for additional protection silt fencing or similar methods would be employed.

5.3.2.3 Temporary Drainage

- 69) The Contractor would assess requirements for management of surface water runoff from working areas. Sediment traps, settlement ponds and buffer strips would be incorporated into the drainage system as necessary and would serve the dual purpose of attenuating flows, by slowing the flow of runoff through the drainage system, and allowing sediment to settle before being discharged.
- 70) Drainage receiving runoff, which is expected to contain sediment, would be directed towards a suitable sized temporary settlement pond or other facility that provides sufficient treatment before being discharged to a watercourse. These should be inspected regularly as part of the monitoring works for fine sediment build up and blockages which would reduce the effectiveness of the filter.
- 71) Construction SuDS would be appropriately designed for the volume of drainage and the level of treatment required prior to discharge. To reduce the impact on the natural hydrological regime, the site drainage would mimic the greenfield runoff response using sustainable drainage principles.
- 72) For all suggested control measures, regular inspection and maintenance would be necessary, particularly after prolonged heavy rainfall.
- 73) Sediment traps would be installed in the drainage system and could take the form of terram fences or clean stone.
- 74) If required, flocculants could be used to treat runoff. They are effective at removing suspended sediment from water, but they can also have effects on water chemistry and consultation would be undertaken with the EA prior to the use of flocculants.

5.3.2.4 Control and Storage of Fuel

- 75) Any spillage of fuel presents a risk to the surface water environment and can originate from activities including refuelling, inadequate fuel storage facilities, leaking pipework, poorly maintained plant and mechanical failure. In addition to the measures already outlined in the CCoP to minimise the risk of hydrocarbon pollution to the surface water environment the contractor would comply with the Pollution Incident Control Plan (or equivalent) – see Section 4.9 for guidance.

5.3.2.5 Use of Concrete

- 76) Concrete can pose a high pollution risk to surface water, due to its high pH and corrosive nature. Increasing pH levels within surface water features can have significant impacts on biodiversity and water quality. In addition to the measures already outlined in the CCoP to minimise the risk of concrete pollution to the surface water environment the contractor would:
- Locate concrete mixing and washing areas more than 10 m from any water features and Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

- Have settlement and re-circulation systems for water reuse
- Frequently monitor wash out areas and record findings to prevent releases into the environment.

5.3.3 Geomorphology

5.3.3.1 Geomorphology - General Provisions

77) Where practicable, the Contractor would:

- Establish a working buffer of at least 10 m from watercourses (including banks and riparian zone)
- Minimise the removal of riparian vegetation in order to maintain bank stability and minimise habitat loss. Should riparian vegetation need to be removed, it would be reinstated with vegetation of similar age and type
- Collect, store (without contamination) and reinstate bed substrate post-scheme if alteration of the existing bed is required. Where re-use of substrate is not possible, substrates would be matched to local material
- Use of greener solutions, including naturally occurring materials, stone (e.g. rip-rap) and/or locally sourced hardwood for reinstatement. If the channel requires more engineered solutions it would be sympathetic to the local landscape
- Use natural materials (boulders, ideally buried) for bed scour protection as opposed to smooth concrete to increase roughness, maintain flow diversity and reduce the risk of transferring the risk of scour downstream
- Reinstatement of the channel cross-section and vegetated riparian corridor following crossings and/or modifications to minimise effects on the fluvial geomorphology following construction
- Minimise duration of, and need for, in-channel working to reduce risk of bed compaction, disruption of flow processes, and bank erosion
- Manage sediment and discharge to watercourses in a way that provides appropriate scour protection measures and minimises fine sediment supply and risk of local channel change (e.g. scour).

5.3.3.2 Channel Realignments

78) Channel realignments would be subject to an environmental permit from the relevant RMA i.e. the Environment Agency or relevant LLFA. The following would be required:

- With offline realignments, the flow would be diverted with a steady release of water into the newly constructed realignment to avoid entrainment of fine sediment or erosion of the new channel
- The length of the channel to be realigned would be minimised
- The existing channel gradient would be maintained where practicable the gradient of the realigned channel should match the existing channel gradient
- Where an increased gradient within the channel is necessary, mitigation in the form of energy dissipation would be required
- Where a decrease in gradient within the channel is necessary, mitigation in the form of the construction of a low flow channel would be required, to minimise the impacts on locally varying flow conditions and reduce the risk of siltation of the channel
- Once a new channel is constructed, the flow would be diverted from the existing channel to the new course under normal/low flow conditions. Diverting flow to a new channel would be timed to avoid heavy rainfall at the location and higher up in the catchment.

5.3.3.3 Outfalls

79) Any temporary or permanent outfalls would be subject to an environmental permit from the relevant RMA i.e. the Environment Agency or relevant LLFA.

- 80) For outfalls, design would follow good practice guidance (e.g. *CIRIA C786*), and consider:
- Directing outfalls downstream to minimise impacts to flow patterns and erosion of opposite bank
 - Outfalls should not project into the channel to minimise risk of localised bed scour
 - Avoid installation of outfalls at locations of known historical channel migration
 - Avoid positioning in flow convergence zones (e.g. at a confluence or opposite an existing outfall, or where there is evidence of active bank erosion/instability)
 - Minimising the size/extent of the outfall headwalls to reduce the potential impact on the banks.

5.3.3.4 Culverts

- 81) Any temporary or permanent culverts would be subject to an environmental permit from the relevant RMA i.e. the Environment Agency or relevant LLFA.
- 82) For new culverts required for watercourse crossings, design would follow good practice guidance (e.g. *CIRIA C689*), and consider:
- Allowance for the appropriate conveyance of water and sediment for a range of flows (including at low flow conditions)
 - Where existing culverts require modification, maintenance of the existing channel gradient to avoid erosion at the head (upstream) or tail (downstream) end of a culvert
 - Avoiding reduction of watercourse length through shortening of watercourse planform by following the alignment of the existing watercourse
 - Minimise length of culverting required
 - Depressing the invert of culverts to allow for formation of a more natural bed (embedment of the culvert invert to a depth of at least 0.15 m)
 - Roughening of culvert inverts to help reduce water velocities
 - Where culverts would be built online, consideration is required of the design and implementation of temporary bypass channels. Temporary works such as pipes or over-pumping would be used where a temporary bypass channel cannot be constructed.

5.3.4 Groundwater

5.3.4.1 Groundwater – General Provisions

- 83) In addition to measures of relevance to groundwater captured in the flood and water quality sections above, the contractor would:
- Establish a working buffer of at least 15 m from GWDTEs where practicable
 - Minimise excavation depths and lengths as part of access road designs where practicable
 - In areas requiring trenching, minimise the time the trench is open. The required dewatering of the trench would be undertaken only as and when necessary to enable safe working and preparation for pipe installation
 - In areas requiring trenching, install water stops (or stanks) at intervals through the pipe bedding and side fill as required
 - Obtain groundwater abstraction or transfer licenses where required as per “*Water management: abstract or impound water*” guidance¹ for temporary construction dewatering activities as required.

¹ Environment Agency (2014) Water management: abstract or impound water guidance. [Online]. Available at: <https://www.gov.uk/guidance/water-management-abstract-or-impound-water> [Accessed: 22-10-2020]

5.3.4.2 Groundwater Abstractions

- 84) Private water supplies (PWS) would be monitored before and during construction.
- 85) Where the Contractor assessment identifies that a PWS is at significant risk of impact then an enhanced monitoring regime would be agreed with the landowner to ensure that any issues are identified and actioned as soon as possible.
- 86) Should any unforeseen active PWS pipe networks or other associated infrastructure be disrupted by the proposed work, these would be repaired or replaced, and an alternative source of water would be provided until the impacted Private Water Supply is operational.

5.4 Ecology

5.4.1 Ecological Management – General Provisions

- 87) The Contractor would be required to manage impacts from construction on ecological resources. Mitigation would be provided in line with the requirements agreed as part of the planning permission and would be implemented by the Contractor.
- 88) Site specific ecological management measures would include the following, as appropriate:
- Summary of features of interest for all known areas of nature conservation interest (as identified within the ES) which may be affected due to construction
 - Plans showing the locations of all known areas of nature conservation interest that may be affected due to construction, including access routes
 - Provision of guidance on ecological best practice methods to be followed to mitigate potential ecological effects during construction
 - Plans showing the location for all fences/barriers to be erected for the purpose of controlling animal movements during and after construction (e.g. deer, badger otter and amphibian fencing)
 - Plans showing the location of any ecological features which are to be created/ installed prior to construction (e.g. bat roosting features/boxes, otter holts)
 - Procedures to be adopted in the event of unanticipated discovery or disturbance of protected species or important habitats
 - Procedures to be implemented in the event of a pollution incident, where this occurs on or adjacent to a designated nature conservation site or where protected or notable species are known to be present, or other habitats and features of ecological importance
 - European protected species (e.g. great crested newt, white clawed crayfish, dormouse, otter and bats) and other protected and/or notable species (e.g. badgers, breeding birds, freshwater fish - including migratory species and their migration patterns, water vole, white-clawed crayfish, common reptiles and invertebrates) managed as agreed with Natural England through the relevant Wildlife License and through the relevant mitigation measures agreed as part of the planning permission
 - Schedule 9 (*Wildlife and Countryside Act 1981*) invasive species, such as Japanese knotweed) to be managed as required.
- 89) The Contractor would aim to reduce any habitat loss by keeping the working area to the minimum required for construction.

5.4.2 Measures to Reduce Potential Impacts on Ecological Resources

- 90) Management measures for potential ecological impacts are addressed in other sections of this document and are not repeated here. These include measures relating to:
- Protection of retained habitat, including trees (see Section 5.2)
 - Control of dust (see Section 5.1.1)
 - Control of water quality (see Section 5.3)
 - Control of noise and vibration (see Section 5.9)
 - Lighting (see Section 4.5).
- 91) The programming of construction works would take account of the requirements set out in the ES, other relevant documents and ecological best practice guidance.
- 92) In particular, the timing of construction works would be undertaken with due regard to the following:
- Site clearance works – to mitigate potential impacts on protected and/or notable species

- Vegetation removal would be undertaken outside the bird nesting season, or only undertaken where survey within 48 hours confirms no impacts on nesting birds
 - Works within watercourses – to mitigate potential impacts on plants, migratory fish, mammals, birds, amphibians and invertebrates.
- 93) In addition to the measures described in other sections, management of construction activities to minimise ecological effects would include, where relevant:
- Provision of appropriate watching briefs to be implemented during construction works
 - Open excavations would be covered overnight or a means of egress provided (such as a sloping profile at one end or a suitably angled plank of wood) to prevent wildlife from becoming trapped
 - Relocation or translocation of species, soils and plant material
 - Wherever practicable, arisings from tree lopping or felling and hedgerow or scrub removal would be used to create habitat piles of dead and decaying wood, ground-based and standing dead wood
 - Removal of any trees with bat roost suitability would be offset through the provision of bat boxes installed onto suitable retained trees. Bat boxes would be installed before tree removal
 - Reinstatement of any areas of temporary habitat loss and any arrangements necessary for displaced species to maintain long-term conservation status of those species concerned
 - Restoration and replacement planting (e.g. trees, hedgerows, scrub, grassland and riparian vegetation) to reinstate any retained habitats adversely affected during construction.
- 94) Prior to and during construction, there would be consultation with Natural England, the Environment Agency, local wildlife trusts and planning authorities as appropriate.

5.4.3 Statutory Designated Sites, Non-Statutory Sites, Protected Habitats and Species

- 95) The Contractor would be required to manage impacts upon all statutory designated sites of ecological interest (including Sites of Special Scientific Interest), non-statutory sites of ecological interest and other areas of notable habitat.
- 96) The Contractor would be required to obtain and comply with the requirements of any wildlife licences, including all protected species licences necessary for the Proposed Programme of Works.

5.4.4 Control of Invasive and Non-Native Species

- 97) Appropriate construction, handling, treatment and disposal procedures would be implemented in relation to these and any other species listed in Schedule 9, Part I or Part II of Section 62 of the *Wildlife and Countryside Act 1981*, as amended, or the *Weeds Act 1959* to prevent the spread of such species. Advice in the Environment Agency's publication *Managing invasive non-native plants (April 2010)* would also be referenced in determining the strategy.
- 98) Route-wide measures would be implemented to promote bio-security and minimise the risk that invasive non-native species and diseases are spread or introduced as a consequence of the Proposed Programme of Works.
- 99) Removal of invasive species would take account of ecological best practice guidance and appropriate measures would be taken to identify and protect other features of environmental importance (e.g. heritage assets).

5.4.5 Monitoring

- 100) The Contractor would define a programme for undertaking ecological surveys prior to, during and after construction. The surveys would be used to verify the baseline ecological conditions described in the ES, to refine the mitigation and control measures required during construction as appropriate and to provide appropriate monitoring during construction.

- 101) The Contractor would be required to undertake appropriate monitoring of the consequences of construction works on ecological resources and of the effectiveness of the management measures designed to control ecological effects, associated with works that may affect protected or notable species, statutory designated or non-statutory sites of ecological interest.

5.5 Cultural Heritage

5.5.1 Cultural Heritage Management – General Provisions

- 102) The Contractor would manage the impact of construction works on cultural heritage assets, including:
- **Designated assets:** scheduled monuments, listed buildings, registered parks and gardens, conservation areas and registered historic battlefields
 - **Non-designated assets:** archaeological and palaeo-environmental remains including geological deposits that may contain evidence of the human past, historic landscapes and historic buildings and the built environment and locally designated assets.
- 103) The Contractor would carry out works in such a way as to ensure that disturbance to all heritage assets is managed in accordance with accepted historic environment good practice and, where disturbance cannot reasonably be avoided, is controlled and limited as far as reasonably practicable. As part of the Contractor's CEMP, a historic environment element would be developed for the management of the archaeological and heritage works during construction and would include the following:
- Confirmation of locations and descriptions of all known cultural heritage assets within and adjacent to construction works, including restrictions to construction methods to protect cultural heritage assets
 - Development of a historic environment investigation programme detailing the implementation of archaeological and heritage investigation and recording works prior to and during construction
 - Monitoring of compliance against the programme of historic environment investigation and to record works using appropriately qualified environmental management staff
 - All archaeological, built heritage and historic landscape intervention, recording, analysis, dissemination and archiving would be undertaken by a suitably qualified and demonstrably experienced archaeologist
 - Historic England and the local authorities would be consulted as appropriate through all stages of the implementation of the programme of historic environment works.

5.5.2 Treasure Act

- 104) During the course of construction, if artefacts are located that are deemed by their material content or context to be treasure, as defined by the *Treasure Act 1996*, then all necessary measures to comply with the requirements of the Act and any project specific requirements will be implemented.

5.5.3 Measures in Relation to Unexpected Discoveries of Heritage Assets

- 105) Should heritage assets of potential national importance be unexpectedly revealed during construction, the procedure for the unexpected discovery of archaeological remains of national importance would be agreed with Historic England and the relevant local authorities.
- 106) Mitigation or investigation and recording would include the following, as appropriate:
- Investigation and assessment of discoveries to determine their significance, if this cannot be determined from the asset as found
 - Assessment of potential impacts to inform the design of appropriate mitigation or investigation and recording measures
 - Preparation of a Written Scheme of Investigation for any stage of archaeological work required
 - Excavation, recording and reporting on any discoveries
 - Recording and implementing measures to preserve any discoveries in situ, if required or if appropriate.

5.5.4 Monitoring

- 107) The Contractor would be required to implement appropriate monitoring of the consequences of construction work, as required, on all cultural heritage assets (designated and non-designated) to ensure the effectiveness of management measures and compliance with agreed approaches to construction activities and cultural heritage assets.
- 108) Risk assessments identifying appropriate surveys, for example, structural or condition surveys and vibration monitoring would be undertaken at locations of archaeological or built heritage interest adjacent to the construction site prior to, during and following construction works. The risk assessments would include, but not be limited to, specific assets identified in the ES.

5.6 Soils, Geology and Land Quality

- 109) This section sets out a series of commitments and principles which would be followed to mitigate potential adverse effects identified within the Soils, Geology and Land Quality chapter of the Environmental Statements, relating to land contamination and soil management.

5.6.1 Land Contamination Management

- 110) The Contractor would assess and manage land contamination in accordance with the draft *Land Contamination: Risk Management* (EA, 2019)² and *Model Procedures for the Management of Land Contamination (CLR11)* (EA, 2004)³. This would include intrusive ground investigation, followed by human health and controlled waters risk assessment as required. Where necessary, remediation would be undertaken to address unacceptable risks, with an appropriate strategy, implementation plan, verification and monitoring, which would be agreed with the relevant local authorities and Environment Agency.
- 111) For construction workers engaged in tunnelling activities, the principal effects are those associated with working in asphyxiant or explosive atmospheres. Tunnelling operations and machinery would be of a bespoke design to mitigate these risks, but in addition, bespoke and highly specific robust risk assessments procedures would be required for tunnelling operations.
- 112) An Unexpected Contamination Plan would be produced in advance of any earthworks or construction activities involving ground disturbance. This would include processes and procedures to deal with unforeseen contamination and manage immediate risks to human health and the environment, and prevent the further spread of contamination. Specific protocols would be developed for dealing with potential asbestos-containing materials.
- 113) Pollution prevention measures and environmental controls to prevent the creation of any new contamination during the works would be managed via the CEMP to be developed in advance of the works (refer to Section 4.9 on pollution prevention control).

5.6.2 Soil Management

5.6.2.1 Overarching Principles

- 114) The Environmental Clerk of Works (EnvCoW) or similar would provide supervision of soil management in accordance with the principles set out within this document and in respect of the Soil Management Plan.
- 115) The Contractor would where practicable, follow guidance within the *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites Good Practice Guide for Handling Soils*.
- 116) Soil resource surveys would be undertaken prior to earthworks commencing, with the locations and scopes determined by the EnvCoW or similar. Existing drainage and water supplies that may be affected by the works would be identified in advance of construction.
- 117) A Soil Management Plan would be produced, incorporating the results of these surveys, in accordance with the *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites*
- 118) A soil profile typically consists of topsoil (an A horizon), subsoil (one or more B horizons) and parent material (one or more C horizons). The soil management controls set out in the following sub-sections would be followed by the Contractor, and apply to topsoils and subsoils.

² Environment Agency (2020) Land Contamination: Risk Management. [Online] Available from: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm> [Accessed: 22-10-2020]

³ Environment Agency (2004) Model Procedures for the Management of Land Contamination (CLR 11). [Online] Available from: <https://www.gov.uk/government/publications/withdrawn-model-procedures-for-the-management-of-land-contamination-clr11> [Accessed: 22-10-2020]

5.6.2.2 General Measures

- Agricultural drainage and water supplies for irrigation and livestock drinking water that would be disturbed by construction would be maintained or replaced with a system of equal utility
- The full depth of topsoil would be stripped from areas to be disturbed by construction, such as where haul roads, compounds and subsoil stockpiles are to be located, and from areas where topsoil would otherwise be sealed by development
- Subsoils would be stripped as required for restoration in agricultural land and landscaping, where the designs necessitate subsoil stripping (e.g. in areas of cut), or the EnvCoW or similar determines it to be necessary to mitigate impacts on the resource during construction
- Topsoil and subsoil to be handled or trafficked would be free of standing water and the ground will not be frozen. Soils will only be handled when they are in a reasonably dry and friable state, below the plastic limit as determined by appropriate criteria to be specified in the Soil Resource Plan.

5.6.2.3 Soil Stripping

- Vegetation would be cleared from any areas to be stripped of soil and wherever topsoil or subsoil would be stored. Areas to be used for storing subsoils or other materials would first be stripped of topsoil
- Topsoils and subsoils, as well as soils of distinctly different types or composition would be stripped separately and segregated during storage and reinstatement
- The depth of stripping for each soil horizon would be determined by the EnvCoW or similar based on available site-specific information, published soil types and observed changes in soil properties during site works such as distinct colour changes. The total strip depth would be determined by the construction and landscaping designs
- Soil stripping would be undertaken using tracked 360° excavators. Where transportation to the stockpile location is required, the soil would be loaded into dump trucks.

5.6.2.4 Soil Storage

- Topsoils and subsoils would be stockpiled as close to where they were stripped from as practicable, outwith root protection areas and at least 10 m from any watercourses
- Soil would be transported directly to its stockpile location after stripping, and once the stockpile has been formed, the soil would remain in the stockpile until it is reused at its final destination. Interim stockpiles would not be used, unless unavoidable, to minimise double-handling of soils
- Soils would be loose-tipped into heaps in the stockpile locations by the excavators or dump trucks. The stockpiles would be formed and shaped to create shallow gradients to facilitate the shedding of rainwater and prevent ponding and infiltration
- Soil stockpiles would have slopes of 1 in 2 (approximately 25 °) or less
- Maximum permissible stockpile heights would be specified within the Soil Management Plan, but would not exceed 4 m for topsoil and 6 m for subsoil and would be kept as low as practicable
- Where soils would be stored for longer than six months, stockpiles would be seeded with an appropriate low-maintenance seed mix and measures taken to control weeds. As some soils are likely to be stored for up to six years at construction compound sites, these measures will be required
- The locations, volumes and contents of all stockpiles would be clearly recorded. Marker posts would be placed adjacent to the stockpiles to indicate all stockpile contents
- Once the stockpile has been formed the area would be cordoned off with secure fencing to prevent any disturbance by other activities. No wheeled vehicles would run on stockpiles of soil that is to be reused

- The stockpiles would be monitored for signs of ponding, as indicated by standing water, and erosion. Where it occurs, temporary drainage measures, regrading and/or silt fencing would be put into effect.

5.6.2.5 Soil Reinstatement

- Where land is to be reinstated to its former use, such as for agricultural restoration or playing fields, soils would be reinstated to their pre-disturbance depths and quality as far as practicable, with reference to pre-construction soil resource survey results as applicable
- All surfaces to receive topsoil or subsoil would be inspected and all obstacles, such as wire, rope, wood, metal, plastic and concrete debris, and any temporary roads, surfacing or building materials, would be removed from site before the soils are reinstated
- Soils would be reinstated by loose-tipping, with a tracked excavator if no transportation is required, or otherwise with dump trucks. Either way, an excavator would spread the soil to its specified thickness
- Appropriate decompaction measures would be undertaken during reinstatement for topsoils, subsoils and their receiving substrates, including loosening with ripping equipment.

5.7 Materials and Waste

5.7.1 Site Waste Management Plan

- 119) The Contractor would develop a Site Waste Management Plan (SWMP) which will set the framework for the management of wastes generated during the construction process.
- 120) The aim of the SWMP would be to minimise the volume of waste generated and maximise resource efficiency by applying the waste hierarchy (reduce – reuse – recycle – energy recovery - responsible disposal).
- 121) The SWMP would be a live document, detailing the decisions taken during the planning and design stages to minimise waste and set objectives and targets for the main waste types. It will also identify the following:
- Responsibilities within the construction team for waste management
 - The types, quantities and location of waste likely to be generated
 - Classification of all waste
 - Measures to be adopted during construction to manage and minimise waste generated
 - Opportunities for recycling and/or reuse
 - Proposed treatment and disposal sites together with details of their Environmental Permit
 - Details of the waste carriers and off-site treatment and disposal sites to be used
 - Proposed action to address challenges identified for the next stages of development
 - Provisions for staff training and use of the SWMP.
- 122) It would record each movement of waste (including the reuse or recycling of materials on-site) in accordance with the *Waste (England and Wales) Regulations 2011* (and its amendments) and the arrangements for auditing the actions of other parties in the waste handling chain. Waste would only be transported by appropriately licensed carriers. The SWMP would be updated as the scheme progresses.

5.7.2 Segregation and Storage of Waste

- 123) During the construction period there are a variety of materials which would need to be stored in designated areas across the Proposed Programme of Works. Inappropriate storage and/or accidental spillages of these materials could cause pollution.
- 124) The following measures would be employed by the Contractor within the SWMP:
- Provision would be made for the recycling of wastes including scrap metal, timber, paper, cardboard, plastics, toner cartridges, batteries in addition to waste oils from equipment and machinery where local schemes are available
 - Skips and other storage receptacles used for the containment of construction, demolition and excavation waste would be colour-coded in line with the generic scheme developed by the Institution of Civil Engineers. They would also have appropriate signage to facilitate separation of waste for re-use, recycling or disposal and the separation of inert, hazardous and non-hazardous wastes. Plastic sheeting would be used to prevent leaching from waste soils and aggregates where these are not contained within skips or other storage receptacles
 - Skips and storage receptacles would be sheeted, or otherwise remain lidded or closed, when waste is not being deposited into them. They would also be covered to prevent the escape of waste whilst in transit and loaded for maximum payload efficiency
 - Mixing inert, hazardous and non-hazardous wastes, either whilst stored on-site or upon collection, would not be permitted

- Liquid wastes would be stored on hard-surfaced areas with secondary containment systems to prevent spillages

5.7.3 Management of Excavated Materials and Waste

- 125) Waste disposal would be carried out in accordance with the *Waste (England and Wales) Regulations 2011* and *Waste Management: The Duty of Care – A Code of Practice (1996)* or subsequent amendments, as appropriate to current legislation.
- 126) Excavated material that is uncontaminated (or can be remediated to a suitable standard and can be used for site engineering and restoration purposes) would be managed in accordance with the controls specified by the *CL:AIRE Definition of Waste: Development Industry Code of Practice* or in accordance with an appropriate environmental permit or exemption from permitting.
- 127) Materials Management Plans (MMPs) would be developed by the Contractor describing the methods for re-using material at specific sites or a cluster of sites. The movement and placement of materials would be as described in the MMP tracking system and recorded in a verification report for each site.
- 128) The MMP must be produced prior to excavation and the following would be included by the Contractor within the MMP
- Details of the parties that will be involved with the implementation of the MMP
 - A description of the materials in terms of potential use and relative quantities of each category
 - The specification for use of materials against which proposed materials will be assessed, underpinned by an appropriate risk assessment related to the place where they are to be used
 - Details of where and, if appropriate, how these materials will be stored
 - Details of the intended final destination and use of these materials
 - Details of how these materials are to be tracked
 - Contingency arrangements that must be put in place prior to movement of these materials
 - Verification Plan.
- 129) This would help to maximise opportunities for re-use of excavated material and comply with the measures set out under the *CL:AIRE Code of Practice*. If the requirements of the MMP are complied with the material will not be waste.

5.7.4 Management of Materials for Construction

- 130) The Contractor would set out the principles for procurement and specification of materials to prevent waste and promote use of sustainably sourced materials and products.

5.7.5 Monitoring

- 131) The Contractor would be required to undertake regular audit and inspection of waste management activities to ensure compliance with the requirements of this CCoP and statutory controls.
- The Contractor would be required to undertake regular audit and inspection of waste management activities to ensure compliance with the requirements of this CCoP, statutory controls and other nominated undertaker policies and procedures relevant to the management of surplus excavated material and waste.

5.8 Public Access and Recreation

5.8.1 Public Rights of Way

- 133) The majority of public rights of way affected by the works are located in or adjacent to the construction compounds. The contractor shall seek the consent of the relevant rights of way officer to divert footpaths as required to avoid the need for closure of any PRowWs during the construction programme. (It is acknowledged that it may be necessary to suspend access to PRowWs for very short periods (days) to enable necessary works such as gates and styles to be installed).
- 134) All closures would be agreed with the relevant regulators and stakeholders. Where possible, alternative routes would be identified using existing public rights of way or public highways. Safety warning signage would be used to make construction workers and members of the public aware of the footpath crossing / construction works.
- 135) The Construction Traffic Management Plan (CTMP) identifies strategies the contractor would take to manage traffic movements, including pedestrians, cyclists and horse riders on the existing roads and PRowWs adjoining the roads. The Contractor would develop these post determination and agree with the relevant officers.

5.9 Transport Planning

5.9.1 Traffic Management – General Provisions

- 136) During construction works, the Contractor would be required to minimise and manage the impacts from construction traffic on the local community and users of the surrounding transport network.

5.9.2 Construction Traffic Management Plans

- 137) Preliminary site-specific Construction Traffic Management Plans (CTMP) have been prepared and submitted with each of the planning applications. The Contractor would further develop these post determination and agree in writing with the relevant Local Authority.

5.10 Noise and Vibration

5.10.1 Noise and Vibration Management – General Provisions

- 138) The works would be carried out in accordance with Best Practicable Means (BPM) as defined in Section 72 of the *Control of Pollution Act 1974* (HMSO, 1974) and in accordance with the recommendations of BS 5228 part 1 (BSI, 2014) and part 2 (BSI, 2014).
- 139) The Contractor would undertake a risk assessment prior to commencing works, based on the latest construction methodology and design information and used to update/supplement the assessments presented in the ES.
- 140) The Contractor would develop and implement a site noise and vibration control strategy in order to minimise construction noise and vibration emissions at nearby receptors. Where appropriate, this may include agreeing noise and vibration limits at receptors. This strategy would be documented in the CEMP and agreed with the Local Planning Authority.
- 141) The mitigation measures outlined below would be employed by the Contractor as required:
- Where possible works would be programmed to take place on weekdays during general site working hours as set out in Section 4.2.
 - Construction plant would be operated and maintained appropriately, having regard to the manufacturer's recommendations or using other appropriate operation and maintenance programmes that reduce noise and vibration emissions. All vehicles and plant would be switched off when not in use
 - Vehicle and mechanical plant would be fitted with effective exhaust silencers, to be maintained in good working order and operated in such a manner as to minimise noise emissions
 - The positioning of construction plant and activities to minimise noise at sensitive locations, for example locating generators away from the site boundary if there are nearby properties or community assets
 - The use of silencers on pneumatic tools
 - The use, where necessary, of effective sound reducing enclosures or barriers
 - Design and use of site hoardings and temporary noise barriers, where necessary, to provide noise screening (with a surface density in excess of 7 kg/m²). This would include, where necessary, works outside of the main compound (e.g. open cut works, piling or connections), during vegetation removal, and during noisy activities within compounds (e.g. piling), when such activities are in close proximity to sensitive receptors. In addition, subject to final generator installation, consideration of barriers to attenuate generators at the Newton-in-Bowland Compound
 - Keep haul roads well maintained and avoid steep gradients
 - Start- up plant and equipment sequentially and avoid start up and run down of plant in the vicinity of sensitive properties where possible
 - Consideration would be given to the use of low amplitude vibration settings or non-vibratory compaction techniques close to sensitive properties. Piling methods adopted during construction would be selected to minimise potential noise and vibration impacts where practicable, for example adopting auger bore (continuous flight auger, CFA) methods rather than vibratory sheet piling methods where ground conditions allow. Community engagement to give notice of when activities would take place and their duration, as well as the measures in place to reduce nuisance
 - Prior to any works commencing, structural surveys would be undertaken at properties identified to be subject to vibration impacts during the works. Properties would be initially identified from the ES, with the list kept under review through the detailed design stage once construction methods are fixed. Risk assessments would be undertaken by the construction contractor when appointed to the Proposed Programme of Works. The structural surveys would be undertaken by an independent

structural engineer. The surveys would be used to determine whether a building is in any way structurally unsound and also inform construction working methods.

5.10.2 Noise and Vibration Monitoring

- 142) Noise and vibration sensitive locations adjacent to the construction site areas would be identified in consultation with the relevant Environmental Health Officer(s).
- 143) Baseline noise and vibration monitoring (e.g. prior to the commencement of construction) and monitoring during construction would be undertaken where appropriate, based on the findings of the Contractor's risk assessments.

5.11 Air Quality

5.11.1 Air Quality Management – General Provisions

144) The Contractor would control and limit dust, air pollution, odour and exhaust emissions as far as reasonably practicable and in accordance with best practicable means. This would include the following, as required:

- Reference to the general site management and good housekeeping procedures (relevant to limiting dust and air pollution)
- Dust and air pollution monitoring measures to be employed during construction
- Measures relevant to control risks associated with dust
- Construction plant would be operated and maintained appropriately, having regard to the manufacturer's recommendations or using other appropriate operation and maintenance programmes that are aimed at minimising exhaust emissions of pollutants
- All vehicles and plant would where practicable be switched off when not in use
- The Contractor shall either deploy diesel generating sets which comply with EU Stage V emissions standards or demonstrate to the satisfaction of the local planning authority that alternative combinations and specifications of static power generation plant result in a 'no environmentally worse than' outcome in regard to air quality impacts when compared with outcomes described in the Environmental Statement. Reason: in the interests of avoiding significant air quality impacts from generator emissions, as defined in the Environmental Statement.

145) References to relevant publications which should be considered include:

- Institute of Air Quality Management (IAQM) *Guidance for the assessment of dust from demolition and construction*⁴
- IAQM *Air Quality Monitoring in the Vicinity of Demolition and Construction Sites*⁵.

5.11.2 Measures to Reduce Potential Impacts on Air Quality

146) Under the requirements of the Environmental Protection Act 1990 the Contractor shall have a duty to avoid emissions of dust from the construction areas that have the potential to give rise to a *statutory nuisance* at nearby properties. In addition, the Contractor shall take all reasonable steps to minimise release of emissions to air from general construction activities, materials handling and storage, and from stationary and mobile plant. In some cases it may be necessary not only to monitor fugitive dust emissions and other emissions to air, but also to implement mitigation measures to control pollution risks at source. The Contractor shall therefore prepare and submit to the local authority for approval an Air Quality Management Plan based on the final, detailed construction proposals at each compound location, and the anticipated working practices and schedule of plant and machinery which could give rise to breaches of air quality standards, or to statutory nuisance incidents. The Air Quality Management Plan should be based on *Guidance for the assessment of dust from demolition and construction*⁶ and *Air Quality Monitoring in the Vicinity of Demolition and Construction Sites*⁷, with clauses adopted or discounted as appropriate for the particular circumstances at each compound.

⁴ Institute of Air Quality Management (IAQM) (2014) *Guidance for the assessment of dust from demolition and construction*

⁵ IAQM (2018) *Air Quality Monitoring in the Vicinity of Demolition and Construction Sites*

⁶ IAQM (2014) *op. cit.*

⁷ IAQM (2018) *op. cit.*