Norwich Western Link

Environmental Statement

Chapter 3: Description of Scheme

Appendix 3.4: Mitigation Route Map

Author: WSP

Document Reference 3.03.04

Version Number: 00

Date: March 2024

Contents

1 Proposed Mitigation, Compensation, Monitoring or Other Measures 4
1.2 General 4
1.3 Air Quality 5
1.4 Noise and Vibration 7
1.5 Biodiversity 9
1.6 Bats 11
1.7 Cultural Heritage 14
1.8 Landscape and Visual 17
1.9 Arboriculture 19
1.10 Road Drainage and Water Environment 20
1.11 Climate Change Greenhouse Gasses & Resilience 21
1.12 People and Human Health 24
1.13 Materials 25
1.14 Geology and Soils 27
1.15 Traffic and Transport 31

Tables

Table 1-1 Summary of General proposed mitigation, monitoring, other measures, and management plans 4
Table 1-2 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Air Quality 5
Table 1-3 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Noise and Vibration 7
Table 1-4 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Biodiversity 9
Table 1-5 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Bats 11
Table 1-6 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Cultural Heritage 14
Table 1-7 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Landscape and Visual 17
Table 1-8 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Arboriculture 19

Table 1-9 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Road Drainage and Water Environment 20

Table 1-10 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Climate Change Greenhouse Gases & Resilience 21

Table 1-11 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to People and Human Health..... 24

Table 1-12 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Materials 25

Table 1-13 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Geology and Soils 27

Table 1-14 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Traffic and Transport 31

1 Proposed Mitigation, Compensation, Monitoring or Other Measures

1.1.1 The purpose of this document is to summarise the proposed mitigation, monitoring or other measures to prevent, offset and/or minimise the effects of the Proposed Scheme and map out the respective management plans that will be implemented.

1.2 General

Table 1-1 Summary of General proposed mitigation, monitoring, other measures, and management plans

Receptor	Construction /Operation	Effect to be mitigated	Specific Mitigation/Compensation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Construction impact receptors (All)	Construction	Management process for environmental incidents and communications.	Environmental incidents identified by any member of the Project Team will be entered into an Environmental Log (a log of incidents that can be inspected by the client or others as appropriate). As part of the CEMP, the Environmental Manager shall develop an incident response plan in line with the sensitive receptors identified in the Environmental Statement and its own environmental management system and risk assessments. A communications plan will be drafted by the Principal Contractor and agreed by the Client in advance of the construction phase.	Monitored by the Environmental Manager during Construction. Monitored by the Environmental Manager during Construction.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to include measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with. The OCEMP outlines the requirement for an **Incident Log** and **Communications Plan**.

1.3 Air Quality

Table 1-2 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Air Quality

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation/Compensation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Air Quality Sensitive Receptors to Dust: • Residential/Human receptors • Ecological receptors • Veteran trees (within 200m of Site Boundary)	Construction	Fugitive releases of construction-phase dust. Soiling/discolouration of exposed surfaces.	Before commencing each phase of works the Principal Contractor will be required to prepare a Dust Management Plan (DMP). The DMP will clearly identify the sensitive receptors within 200m of the works, mitigation measures to be applied and procedures for their implementation and management. The DMP will detail the name and contact details of person(s) accountable for air quality and dust issues on the Site. 'Best Practicable Means' include but are not limited to: • Storage of potentially dusty materials as far as practicable from sensitive receptors and with appropriate screening/containment to minimise dust emissions; • Promptly clear any spillages of potentially dusty materials; • minimise material drop heights and avoid double handling; • Avoid burning of any materials; • Enforcement of vehicle speed limits on site; • Regular inspection and maintenance of haul road surfaces; • Damping down of unpaved surfaces during dry conditions to minimise dust emissions; • Ensure all loads of potentially dusty materials leaving the site are covered to prevent dust emissions/loss of materials during transit; • Regular inspection and cleansing of all paved surfaces including the public highway in the vicinity of site access points; and • Vacuum sweepers used for cleaning of hard paving/public highway as deemed required. The mitigation measures are outlined in Section 4.1 of the Outline CEMP (Document Reference 3.03.01).	The contractor will be required to routinely monitor the effectiveness of dust mitigation. Regular inspections will be undertaken to monitor dust by the environmental manager, site supervisor or clerk of works. The frequency of monitoring will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. All dust and air quality complaints are to be logged and investigated to identify cause(s) and ensure remedial measures are put in place and that these are effective.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to include measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with. The **Dust Management Plan** is a requirement within the **OCEMP**.

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation/Compensation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Ecological receptors • designated sites • veteran trees	Operation	Impacts of NOx, NH3, and nitrogen deposition.	Implementation of an Air Quality Compensation Strategy to compensate against deterioration of ancient woodland and ancient and veteran trees due to changes in air quality in the operational phase. The Draft Air Quality Compensation Strategy (Document Reference 6.01.00) encompasses survey information available to date and takes into consideration current liaisons with landowners and sets out the key outcomes to be achieved by the Final Air Quality Compensation Strategy in compensating for the above impacts and , which will be developed collaboratively with landowners, County Planning Authority (CPA) and Natural England. The Applicant will prepare a Final Air Quality Compensation Strategy to be approved by the CPA– this will be secured through an appropriately worded planning condition should the CPA grant planning permission for the Proposed Scheme. The Final Compensation Strategy will detail the measures to be implemented to deliver the outcomes set out in the draft strategy, proportionate to the impacts attributed to the final detailed design of the Proposed Scheme. Once the compensation measures have been assessed for their viability, and confirmed through the Final Air Quality Compensation Strategy, all proposed enhancements including an appropriate monitoring strategy will be set out in the Landscape and Ecological Management Plan (LEMP).	The Final Air Quality Compensation Strategy will set out an appropriate monitoring strategy. This would outline the period anticipated for the beneficial effects of any compensation to be evident, plus the monitoring schedule to effectively manage any compensation instigated. Triggers for management to ensure any enhancement measures are effective will also be established within the Final Air Quality Compensation Strategy.	Approval of (and compliance with) a Final **Air Quality Compensation Strategy** to be secured through an appropriately worded planning condition should the CPA grant planning permission for the Proposed Scheme. Production of a **Landscape and Ecological Management Plan (LEMP)** for approval by the CPA, consistent with the Ecological Mitigation Strategy and the Air Quality Compensation Strategy, secured by Planning Condition. The Planning Condition will also require compliance with the approved LEMP.

1.4 Noise and Vibration

Table 1-3 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Noise and Vibration

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation/Compensation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Residential properties and other sensitive buildings	Construction	On-site construction Noise & Vibration	Mitigation measures have been included in the OCEMP (Document Reference 3.03.01) which will inform the Contractor's CEMP during the construction phase. Best Practicable Means (BPM) as defined in the Control of Pollution Act 1974 should be adopted throughout the Proposed Scheme. The most relevant and specific commitments with respect to noise and vibration include but are not limited to: • All construction plant used on the site will be in good working order and certificates of inspection and maintenance will be held on Site and available upon request; • All plant items should be properly maintained and operated according to manufacturers' recommendations and in such a manner as to avoid causing excessive noise and vibration; • As far as reasonably practicable, all plant items should be sited so that noise and vibration at nearby sensitive properties is minimised; • All plant items operating intermittently on the site should be shut down in the intervening periods; • All pneumatic tools should be fitted with silencers or mufflers where practicable; • No loud music or loud radios will be played on the site; • Construction vehicles should not idle on local roads waiting to enter the site; • Works (including deliveries) would be programmed such that the requirement for working outside normal working hours is minimised; • Where construction works are occurring within 50m of a residential property, if appropriate, temporary environmental noise barriers will be installed around plant items to provide screening; and • The importance of noise and vibration and its potential to affect those living and working nearby will be included in the general induction training for the site and specific training will be given to staff who will have particular responsibility for managing noise and vibration during construction. The mitigation measures are outlined in Section 4.8 of the OCEMP (Document Reference 3.03.01).	Construction works to be monitored on site to ensure best practicable means and other appropriate mitigation measures are being adhered to. Should any noise complaints be raised during the construction period, this should be flagged with the Community Liaison Officer and be addressed appropriately in line with the complaint's procedure.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to include measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with.
Residential properties and other sensitive buildings	Construction	On-site construction Noise & Vibration	In advance of the commencement of the main works on site, Section 61 Consent (in line with the Control of Pollution Act, 1974) will be sought from Broadland District Council. The purpose of the Section 61 consent will be to agree appropriate noise and vibration controls and mitigation measures, once greater details are known about the construction working methods that will be adopted on Site. The Section 61 application will also identify the need for any additional mitigation measures.	The scope of any noise and/or vibration monitoring will be agreed with Broadland District Council as part of the Section 61 consent that the contractor will apply for.	**Section 61 Consent**.

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation/Compensation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Residential properties and other sensitive buildings	Operation	On-site construction Noise & Vibration	The Proposed Scheme alignment considered minimising passing close to residential receptors where practicable and this is demonstrated by the very few receptors within the detailed calculation area. Extensive earthworks have been included for the Proposed Scheme, either constructing the road in cutting or earth bunds parallel to the route which will visually screen the road from nearby receptors and provide noise benefits to receptors. The pavement surface type can impact on the noise levels produced by vehicles. For the entire Proposed Scheme, a low noise surface will be used. For context, at speeds above 75 Kilometres per hour (kph), a low noise road surface will be 3 decibels quieter than a standard hot rolled asphalt surface type (based on the road surface corrections provided in Design Manual of Roads and Bridges LA 111). Finally, an approximately 1.2m tall acoustic barrier is proposed for the entire length of both carriageways of the River Wensum Viaduct.	Not applicable	The design embedded mitigation will be secured through design features of the Scheme included in the Application including as requirement in the Planning Conditions and Plans.

1.5 Biodiversity

Table 1-4 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Biodiversity

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation/Compensation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Biodiversity Receptors	Construction/ operation	In the absence of mitigation, the Proposed Scheme has the potential to give rise to the following effects: • Mortality and / or injury of protected and notable species; • Disturbance of protected and notable species. • Permanent and temporary removal of habitats; • Permanent and temporary degradation of habitats; and • Construction activities within the Proposed Scheme could potentially result in the spread of invasive non-native species into areas they do not currently occupy in the terrestrial and aquatic environments.	Mitigation for Biodiversity is presented in section 4.3 of the Outline Construction Environmental Management Plan (OCEMP) and Chapter 10: Biodiversity, Appendix 10.32: Ecological Mitigation Strategy (Document Reference 3.10.32). A Construction Lighting Management Plan (CLMP) will be included in the Construction Environment Management Plan. This plan will detail the mitigation measures that are to be implemented to reduce adverse effects from on-site lighting. To address the risk of spreading invasive non-native plant and animal species an invasive species strategy would be produced by the Principal Contractor.	Ecological monitoring surveys would be required to assess the efficacy of the mitigation. Monitoring will be targeted to mitigation actions that will require ongoing consideration of success and management of specific measures. The monitoring of retained vegetation features is referenced in the Landscape and Visual table below. Monitoring requirements during construction activities are stated in the OCEMP for the Proposed Scheme. The following specific measures relating to monitoring for the duration of the operational phase of the Proposed Scheme will be presented within a Landscape Ecological Management Plan (LEMP). **Habitats** A survey of landscape and habitat creation areas including reinstated, created, and enhanced habitats would be completed in years 1, 3, 5, 10, 20 and 30 following the completion of the construction phase. This would assess the success of habitat mitigation measures. **Watercourses** River Condition Assessments of existing watercourse and enhancement watercourses will be carried out in years 1, 3, 5, 10, 20 and 30 (in accordance with Biodiversity Net Gain guidance) following the completion of the construction phase. This would assess the success of aquatic habitat mitigation measures and enhancements. **Water Vole** As per the Water Vole licence, targeted Water Vole surveys of watercourses and waterbodies within the Proposed Scheme would be completed for three years post-construction, beginning indicatively in spring 2027. The first survey in spring 2027 will look to confirm establishment of good quality habitat for Water Vole and search for signs of Water Voles in the enhanced habitats of the connected watercourses to confirm use of the new culvert. Subsequent surveys will monitor habitat condition and connectivity through the new culvert and search for signs of Water Vole in all watercourses, which will include carrying out latrine counts to assess relative population density. **Barn Owl** Barn Owl surveys of existing nesting sites and newly installed barn owl boxes should be undertaken in years 1, 3 and 5 following the completion of construction mitigation works. **Badger** Badgers will also be surveyed during the operation period to ensure any licence conditions are met. **Desmoulin's Whorl Snail** A minimum of five years monitoring post-construction of newly created or enhanced ditch habitat to assess the success of habitat mitigation measures and enhancements.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to include measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with . Production of a **Landscape and Ecological Management Plan (LEMP)** for approval by the CPA, consistent with the Ecological Mitigation Strategy, secured by Planning Condition. The Planning Condition will also require compliance with the approved LEMP. Where the mitigation and monitoring relate to a species covered by a species mitigation licence, the mitigation will be secured through the appropriate licensing regime. The Principal Contractor will implement the Construction Lighting Management Plan (**CLMP**) and **Invasive species strategy** approved as part of the Detailed Construction Environmental Management Plan.

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation/Compensation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Habitat	Construction/ Operation	Habitat requiring mitigation, replacement, enhancement, and compensation.	Habitat creation will be managed through a LEMP, including appropriate management, maintenance and monitoring for ecologically-led habitat creation. The LEMP will be a live document informed by the submitted Ecological Mitigation Strategy: • mitigation, compensation (save for those set out in the Air Quality Compensation Strategy) and enhancement works for protected / notable habitats and species; • habitat creation and enhancement measures; and • management and monitoring requirements The LEMP will include information such as establishment periods (including creation (with reference to the construction programme), monitoring, maintenance, and management activities), and long term (30 year) management and maintenance, to be consistent with the measures and outcomes set out in the Ecological Mitigation Strategy.	Newly created planting to be subject to management and monitoring in accordance with the LEMP.	Production of a **LEMP** for approval by the CPA, consistent with the Ecological Mitigation Strategy, secured by Planning Condition. The Planning Condition will also require compliance with the approved LEMP.
Ecological receptors - designated sites - veteran trees	Operation	Impacts of NO_x, NH_3, and nitrogen deposition.	Air Quality Compensation Strategy – See Air Quality Table above.	As above.	Approval of (and compliance with) a Final **Air Quality Compensation Strategy** be secured through an appropriately worded planning condition should the CPA grant planning permission for the Proposed Scheme.
Ecological receptors • European Protected Species	Construction	Mortality injury and/or disturbance of protected and notable species.	**Water Vole European Protected Species Mitigation License (EPSML)** A Natural England mitigation licence will be required to conserve individuals for the duration of construction. **Badger Mitigation Licence** Works will occur under a Badger Licence as necessary. A draft licence for Badger was submitted to Natural England in 2022 for their review and comment prior to the submission of the full licence application for this species. **Otter Mitigation EPSML (TBC)** If pre-construction surveys identified otter breeding was confirmed and exclusion zones were not possible, works would be undertaken in accordance with a European Protected Species Mitigation Licence to derogate the legislation protecting otters (except during periods of active breeding). As part of the licence, appropriate compensation would be provided to ensure that alternative habitat is provided in advance of the impact occurring.	Implementation to be supervised by the Named Ecologist on the licences.	A **Water Vole EPSML** and **Badger Mitigation Licence** and **Otter EPSML (TBC)** to be granted by Natural England in advance on consented works.
Biodiversity Receptors	Operation	Adverse impacts on Biodiversity Receptors.	The design of the Proposed Scheme, where possible, has been included for embedded mitigation to avoid potential adverse effects to biodiversity. The Embedded Mitigation includes: • Landscape planting as part of the Scheme design; • The provision of a viaduct over the River Wensum providing a considered architectural design for the viaduct. The design of the viaduct structure comprises a ten-span single-deck weathering steel trapezoidal box girder bridge with a reinforced concrete deck slab. The span arrangement responds well to the constraints of the site by minimising the number of piers within the floodplain. Additionally, a 1.2m acoustic barrier proposed for the entire length of both carriageways of the River Wensum viaduct will provide noise mitigation for ecological features; • Green bridges are proposed to provide multi-functional connections east to west, across the Proposed Scheme. The green bridges have been designed in response to their setting, to replicate as far as is practicable, the conditions which enable use/navigation by wildlife such as linear vegetation and 'dark' corridors, to ensure continued use of these routes; • Drainage systems designed to intercept and divert run-off away from watercourses and floodplains, most notably the River Wensum; • Where culverts are required, these will be 'oversized' culverts wherever feasible to encourage the passage of otter, water vole, fish, aquatic invertebrates, and plants; and • The provision of earth bunds within the design, which will provide screening from noise.	Not applicable	The design embedded mitigation will be secured through design features of the Scheme included in the Application including as a requirement in the Planning Conditions and Plans.

1.6 Bats

Table 1-5 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Bats

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation/Compensation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Bats	Construction/ operation	In the absence of mitigation, the Proposed Scheme has the potential to give rise to the following effects: • Mortality and / or injury of protected and notable species; • Disturbance of protected and notable species; • Permanent and temporary removal of habitats; and • Permanent and temporary degradation of habitats.	The Outline Bat Mitigation Strategy provided in Appendix 11.6 (Document reference 3.11.06) details the Additional Mitigation measures, which are summarised below. • Production of and adherence to a tree-felling protocol; • Provision of compensatory roosting resource in the form of bat boxes and creation of veteran features; • Temporary Flight Lines to be installed where known flightpaths will be removed; • Adherence to a Bat Noise Monitoring and Management Plan (BNMMP); • Adherence to a Construction Lighting Management Plan (CLMP) delivered as part of the Detailed Construction Environmental Management Plan approved by the CPA; • Habitat creation and improvement measures to account for habitat losses as set out in the Ecological Mitigation Strategy and delivered pursuant to the LEMP approved by the CPA; and • Habitat improvement measures to account for air quality impacts as set out in the Draft Air Quality Compensation Strategy and delivered pursuant to the Final Air Quality Compensation Strategy approved by the CPA. This strategy will be finalised (to be consistent with the Outline Bat Mitigation Strategy) alongside the bat EPSML application required for the Proposed Scheme to be approved by Natural England.	See next row.	Finalisation of Bat Mitigation Strategy to be consistent with the Outline Bat Mitigation Strategy as part of the Bat **EPSML** application to be approved by Natural England.

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation/Compensation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Bats	Construction/ operation	In the absence of mitigation, the Proposed Scheme has the potential to give rise to the following effects: • Mortality and / or injury of protected and notable species; • Disturbance of protected and notable species; • Permanent and temporary removal of habitats; and • Permanent and temporary degradation of habitats.	Bat ecological monitoring surveys would be required to assess the efficacy of the mitigation and to confirm the findings of the impact assessment. It will establish whether the proposed mitigation and compensation measures are effective in maintaining the bat species present, including woodland specialist species at a favourable conservation status. An Outline Bat Monitoring Strategy (Document Reference 3.11.06) has been produced and will be developed and form part of the suite of documents to inform the required EPSML application to be approved by Natural England. Implementation would be overseen by the Named Ecologist and completed during and post-construction.	As per Outline Bat Monitoring Strategy.	Finalisation of the Bat Monitoring Strategy to be consistent with the Outline Bat Mitigation Strategy as part of the Bat **EPSML** application to be approved by Natural England.

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation/Compensation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Bats	Operation	Adverse impacts on Bats	The Outline Bat Mitigation Strategy (Document reference 3.11.06) also details the Embedded Mitigation measures. The Embedded Mitigation includes: • Designing the River Wensum Viaduct to maximise landscape permeability, allowing continued bat movement beneath the Proposed Scheme along the river corridor. Additionally, a 1.2m environmental barrier, designed for acoustic performance, will run along the entire length of both carriageways minimises disturbance from noise on adjacent habitats; • Providing green bridges and underpasses as multi-functional connections east to west, across the Proposed Scheme. Each has been designed for its setting to maintain, as far as is practicable, existing flight paths (linear vegetation and dark corridors) to facilitate continued use; • Including an additional underpass, located at Ringland Lane (chainage 1700 – 1800); • Landscape planting to provide foraging and commuting habitats as part of the Proposed Scheme design; • Including additional landscape treatments where the road is in cutting; • Drainage systems designed to intercept and divert run-off away from watercourses and floodplains, most notably the River Wensum, which is a foraging area for a number of species recorded within the Site Boundary; and • Adopting a 'low noise' road.	As per Outline Bat Monitoring Strategy.	Finalisation of Bat Mitigation Strategy to be consistent with the Outline Bat Mitigation Strategy as part of the Bat **EPSML** application to be approved by Natural England. Production of a **LEMP** for approval by the CPA, consistent with the Ecological Mitigation Strategy, secured by Planning Condition. The Planning Condition will also require compliance with the approved LEMP.

1.7 Cultural Heritage

Table 1-6 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Cultural Heritage

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Buried heritage/archaeology assets	Construction	Damage / loss of archaeological remains.	The scope of an Archaeological Mitigation Strategy will need to be agreed with the County Planning Authority's (CPA) archaeological advisor prior to commencement. The location and extent of archaeological mitigation (including archaeological protection measures during construction) will be determined in consultation with the CPA's archaeological advisor. It is anticipated that this would likely comprise the following measures: • Targeted excavation to record archaeological remains of high significance prior to the commencement of any site preparation works (e.g. topsoil stripping, haul road construction) in areas evaluated containing Iron Age, Romano-British, medieval and post-medieval activity will require investigating in Trial Trenches TT05, TT07, TT10 and TT20 (see Written Scheme of Investigation for Archaeological Mitigation Works (Document Reference: 3.08.04)); • Archaeological trial trenching is required in an area previously inaccessible due to land use constraints and development to the scheme boundary. An appropriate Archaeology Mitigation Strategy for any significant archaeological remains will then be formulated in consultation with the County Archaeologist; and • All archaeological work will be completed in accordance with Written Scheme of Investigation(s) (Document Reference: 3.08.04), which will be approved by the CPA's County Archaeologist. The mitigation measures are outlined in Section 4.2 of the **OCEMP** (Document Reference 3.03.01).	The location and extent of archaeological mitigation and monitoring (including archaeological protection measures during construction) will be determined in consultation with the CPA's County archaeologist through the Archaeological Mitigation Strategy. To be identified through the Archaeology Mitigation Strategy. Supervision through an archaeological watching brief will be undertaken for certain activities.	An **Archaeology Mitigation Strategy** will be agreed with the County Archaeologist, which is secured by Planning Condition. All archaeological work will be completed in accordance with **Written Scheme of Investigation**(s), which will be approved by the CPA's County Archaeologist, which is secured by Planning Condition.

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Paleoenvironmental remains in the Wensum Valley and tributary of the Tud (Foxburrow Stream)	Construction	Damage / loss of paleoarchaeological remains.	The OCEMP (Document Reference 3.03.01) requires the following monitoring measures: Monitoring of ground works under archaeological supervision and control (Archaeological watching brief) in Water Framework Directive Mitigation areas where channel and bank reprofiling is proposed near a probable medieval moated homestead and in the area of the Foxburrow stream. Monitoring of works under archaeological supervision and control within woodland at the Attlebridge Airfield may be required to record WW2 remains on land currently wooded and inhabited by bats. Dependent upon the results of the Deposit Model there is the potential that purposive boreholes may be required within the Wensum Valley. The nature and scope of this work will be determined in consultation with the CPA's County Archaeologist.	Archaeological watching brief.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to includes measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with. Any borehole investigation will be completed in accordance with **Written Scheme of Investigation**(s), which will be approved by the CPA's County Archaeologist, which is secured by Planning Condition.

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Built Heritage Assets and Above-Ground Assets	Operational	Damage from construction phase vibration impacts.	The Grade II listed Barn 50m north west of Low Farm, together with the dairy barn and farmhouse (presumed to be curtilage listed for assessment purposes) comprise the above ground heritage assets closest to the Proposed Scheme. The Applicant, would monitor potential construction impacts from noise, vibration, and traffic through the installation of Tell-Tale crack monitors and if necessary, carry out remedial action. This commitment is set out in section 4.2 of the **OCEMP** (Document Reference 3.03.01).	Tell-Tale crack monitors.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to includes measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with.

1.8 Landscape and Visual

Table 1-7 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Landscape and Visual

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Landscape character and visual receptors	Construction	Construction related activities: • Increased road use; • Visual intrusion on landscape; and • Reduction in tranquillity.	An OCEMP (Document Reference 3.03.01) has been included in the Planning Application to outline the key mitigation principals. The key measures in the OCEMP relevant to landscape character and visual amenity are outlined in Section 4.6 and include (but not limited to); • No materials of any kind to be stored, dumped or discharged outside of designated construction areas; • Mitigation measures will be put in place to prevent mud or stones from the construction traffic; • No fires on site; • Use of hoardings of a suitable colour to integrate into the surrounding landscape shall be considered to provide screening of main construction works from any residential receptors and PRoW users; • Tidy site management to reduce visual clutter associated with the works; • The use of construction lighting (when required) to involve the use of well located, modern light fittings in accordance with best practice to minimise light intrusion to surrounding sensitive receptors, including consideration of the direction of the lighting; • Plant to be located in a site compound or in a suitable secured area when not in use; • Work cabins to be sited as to minimise visual impact on nearby receptors; • It is essential that any landscape management only be carried out by competent and qualified individuals; and • Appropriate location, organisation and phasing of construction activities. Measures will be applied to clear areas for construction as close as possible to works commencing and top soiling, seeding, and planting will be undertaken as soon as practicable, within seasonal constraints, after sections of work are complete. As far as practicable, plant and material storage areas will be sited to avoid landscape and visual impact.	Construction works to be monitored on site to ensure best practicable means and other appropriate mitigation measures are being adhered to.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to includes measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Landscape character and visual receptors	Operation	• Visual intrusion of Proposed Scheme into existing rural views; • Exposure of Proposed Scheme to immediate landscape; • Loss of established field pattern; and • Loss of existing vegetation.	Newly created planting is subject to management and monitoring in accordance with the LEMP. As illustrated on the Landscape Plans (Document Reference 2.07.00), a robust landscape-led approach to the Proposed Scheme has been employed. This will ensure that it is successfully integrated into the landscape and that it responds positively to the recommendations of the relevant published landscape character assessments. In broad terms, the aims of the proposed landscape mitigation measures are: • To create carefully considered landscaped bunds along the Proposed Scheme to minimise the impact on visual amenity of nearby visual receptors; • To incorporate landscape mitigation planting to provide screening and visual amenity reduce adverse effects on landscape character and visual amenity; • To assimilate the Proposed Scheme into the surrounding landscape; • To protect the existing landscape features where possible and incorporate the new landscape features into the wider landscape framework with reference to published landscape character assessments; and • To create an attractive setting for the Proposed Scheme. The key features of the proposed primary landscape mitigation planting measures include: • Existing trees and established areas of existing vegetation are proposed to be retained and enhanced where possible including existing woodland and Fakenham Road Roadside Nature Reserve; • New specimen tree planting to provide instant visual screening at several locations; • New woodland and scrub planting to enhance visual amenity of the Proposed Scheme and respond positively to the local character; • Areas of species rich seeding to enhance visual amenity; • New understory planting to create habitat for wildlife and provide visual containment; • Instant hedge, native hedge, and native hedge with trees; and • Meadow grass for wet soils and wetland scrub. The design of the Scheme includes mitigation embedded into the Proposed Scheme design to avoid potential adverse landscape and visual effects. The mitigation includes: • Providing a considered architectural design for the viaduct with a sinuous and simplistic appearance which complements its rural landscape setting. The span arrangement responds well to the constraints of the site by minimising the number of piers within the floodplain, whilst ensuring visual continuity in their spacing. The span arrangement also allows for the opportunity to limit the depth of bridge deck. The shallow and flat nature of the Wensum Valley informed a preference for shallow construction forms and constant depth to avoid being overbearing visually in the landscape; • Ringland Lane underbridge has been designed in line with those used on the Broadland Northway (formally the Northern Distributor Road) for visual continuity and consistency of maintenance operations. Detailing of this structure ensures it complements the rural setting; and • Overbridges are proposed to provide multi-functional connections east to west, across the scheme. The Overbridges have been designed in response to their setting, to replicate as so far as is practicable, the conditions which enable use/navigation by wildlife such as linear vegetation and 'dark' corridors, to ensure continued use of these routes.	Newly created planting is subject to management and monitoring in accordance with the LEMP.	Series 3000 Specification and production of a **LEMP** for approval by the CPA, consistent with the Ecological Mitigation Strategy, secured by Planning Condition. The Planning Condition will also require compliance with the approved LEMP. The design embedded mitigation will be secured through design features of the Scheme included in the Application including as requirement in the Planning Conditions and Plans.

1.9 Arboriculture

Table 1-8 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Arboriculture

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Trees	Construction	Loss / damage to trees	The Principal Contractor will include the Arboricultural Method Statement (AMS) in the Detailed CEMP(s) during construction phase where activities require tree protection. An Outline AMS (Document Reference 3.03.01d) in appended to the OCEMP. • Clearly mark trees and vegetation that are to be retained and included within the CEMP(s) which can be shown and communicated to staff during construction; • Trees and vegetation to be retained are to be protected using protective fencing in accordance with BS5387:2012 where necessary – See Appendix F Outline Arboricultural Method Statement; • No storage of equipment or materials in areas of retained vegetation or in the Root Protection Area of retained trees; • Monitoring the effectiveness and suitability of root protection fencing ensuring no impacts to trees that are to be retained; and • The loss of irreplaceable habitat cannot be mitigated but compensation measures have been identified, including retention of felled material as monoliths and deadwood habitat, new woodland planting, including enhancement of connectivity, and enhancement to existing woodland.	Once works commence the Environmental Manager (or project arboriculturist if designated) would undertake a programme of monitoring. The frequency of any monitoring would be determined by the intensity and proximity of works to trees to record the effectiveness of protective measures and would be flexible enough to accommodate changes in the scheduling of tasks as they occur on the site.	Final AMS to be included with the Detailed Construction Environmental Management Plan, to be consistent with the measures in the Outline AMS.

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Trees	Operation	Impact to Airport operations.	New planting proposals will conform with the Wildlife Hazard Risk Assessment (WHRA) report and its management plan.	Not applicable	Delivery of this secured by Planning Condition.

1.10 Road Drainage and Water Environment

Table 1-9 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Road Drainage and Water Environment

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Water Environment/flood risk areas	Construction	These measures relate to the impacts identified in the Road Drainage and Water Environment chapter and associated appendices such as the WFD, Geomorphology, Flood Riak and HEWRAT.	An OCEMP (Document Reference 3.03.01) has been included in the Planning Application to outline the key mitigation principals. The key measures in the OCEMP relevant to Road Drainage and Water Environment are outlined in Section 4.11. Measures regarding surface water management during the construction of the Proposed Scheme are detailed in the Surface Water Drainage Strategy (Document Reference: 4.04.00) including management of overland flows and treatment measures of surface water runoff. The Principal Contractor will be required to produce a Flood Risk Management Action Plan/ Method Statement which will provide details of the response to an impending flood. Flood risk activity permits (FRAPs) will be required for the construction of elements of the Scheme within 8m of the River Wensum or hose elements within the floodplain which are not covered by the planning application. Appropriate methods statements will be required as part of the permit applications. The drainage design will comply with the Drainage Strategy(Document Reference: 4.04.00). Enhancement/mitigation for the Water Framework Directive assessment will be required as outlined in Appendix 12.3: Water Framework Directive Assessment (Document Reference 3.12.03) and the areas illustrated on the Essential Environmental Mitigation Plan (Document Reference 2.11.00).	Monitoring of water quality would be undertaken during and following the works as set out in the OCEMP. The following are location-specific monitoring requirements for the River Wensum area: • Monitoring of implementation of specific WFD mitigation control measures as set out in the WFD report, Sub Appendix E: WFD Classification Data (Document Reference: 3.12.03e); • Monitoring of water quality during and following the works; • Scheduled ecological survey work during and following the works, related to WFD / SAC features of the River Wensum; and • Maintain records of any incidents (including spills or non-compliance with controls) and report to regulators (if required by conditions of consents or other agreement).	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to include measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with**.** Requirement for a **Flood Risk Activity Permits.** Requirement for a **Flood Risk Management Action Plan.** **Surface Water Drainage Strategy** (Document Reference 2.13.00). **Drainage Strategy** (Document Reference 4.04.00). Enhancement/mitigation for the Water Framework Directive included in a **LEMP** for approval by the CPA, consistent with the Ecological Mitigation Strategy, secured by Planning Condition. The Planning Condition will also require compliance with the approved LEMP.

1.11 Climate Change Greenhouse Gasses & Resilience

Table 1-10 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Climate Change Greenhouse Gases & Resilience

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Greenhouse gasses levels/climate	Construction	Greenhouse gas emission from construction activity and material use.	The Principal Contractor has committed to the following measures to reduce carbon emissions further during the construction phase of the Proposed Scheme: Article I. Adopting the London Low Emission Construction Partnership requirements for vehicles involved in construction activities; Article II. Following the Non-Road Mobile Machinery (NRMM) Practical Guidance which sets the emission standards for carbon monoxide, hydrocarbons, oxides of nitrogen and particulate matter for diesel engines; Article III. Promoting the use of start-stop technology plant on site; Article IV. Implementation of a network of electricity sockets to feed a fleet of electric site vehicles where practicable; Article V. Maximising the re-use of site won materials for earthworks and pavements; Article VI. Using solar panels for site lighting where practicable; Article VII. Showing preference for energy providers that use 100% renewable sources of electricity; Article VIII. Maximising the use of local suppliers; and Producing a Carbon Management Plan.	Monitoring of implementation during construction phase where applicable such as environmental audits.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to includes measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with. **Carbon Management Plan.**
Greenhouse gasses levels/climate	Construction	Greenhouse gas emission from construction activity and material use.	The Principal Contractor is actively exploring the feasibility of additional measures to reduce carbon emissions further during the construction phase of the Proposed Scheme. These measures are outline in 4.5.3 of the OCEMP. The Detailed CEMP will include measures or similar measures to these, which will be developed by the Principal Contractor to continue to minimise the greenhouse gas impact of the Proposed Scheme. The measures ultimately employed will be dependent on practicability and effectiveness and be updated with developments in best practice. All these initiatives are currently under evaluation and will need to comply with all applicable policies and project requirements before implementation, including design requirements, cost efficiency and environmental standards.	Not applicable at this time.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to includes measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with.

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Construction activity/Site Operatives	Construction	Impact on the Proposed works and construction activity as a result of extreme climatic event due to become more frequent and intense with climate change.	The following mitigation has informed the climate resilience assessment and will be required for resilience during the construction phase where appropriate: • Use of admixtures to maintain water/cement ratio during construction, thus enabling increase in consistency; • Identify opportunities to use CEM 1 (cement grade using unblended cement) during construction to increase the rate and heat of hydration and reduce curing time, although careful consideration and testing must be given to reduction in concrete strength but under certain situations this may be an applicable approach; • Risk during construction of reduced working periods and delays from extreme temperature events is deemed to be very low, with no legal maximum temperature in the UK. However, efforts will be made to manage site working hours to avoid working in hotter times of day during construction during extreme weather; • Provide appropriate protection to all UV resistant materials during construction; • Provide appropriate curing methods for concrete during construction; • Carry out site testing of materials during construction to optimise moisture content and therefore ensure stability of any structures / embankments; • Ensure welfare facilities are cooled. Periodic rest breaks to be taken during the hottest part of the day; • Provide shade for workers in exposed areas during hot weather; • Use personal protective equipment to reduce exposure to UV radiation – light coloured, long-sleeved clothing, sun cream, sun hats; • Review weather forecast and manage construction works to avoid working at heights, during high wind or storm events when conditions are unsuitable; and Use localised water pumps to pump water off site and ensure water levels in excavations do not exceed critical levels.	Not applicable at this time.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to include measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with. The design embedded mitigation with be secured through design features of the Scheme included in the Application including as a requirement in the Planning Conditions and Plans.

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Construction activity/Site Operatives	Construction	Impact on the Proposed works and construction activity as a result of extreme climatic event due to become more frequent and intense with climate change.	Measures have been included in the development of the design to ensure the Proposed Scheme is resilient to projected climate change in relation to precipitation, temperature, wind, water quality, and soils. These measures include (but are not limited to): • Scheme components designed to accommodate increases in precipitation and storm events. For example, the drainage system is designed to attenuate/infiltrate highway drainage from the 1 in 2-year event to the 1 in 100-year rainfall event with a 45% allowance for climate change; • Scheme components designed to accommodate extremes of temperature. For example, proprietary bearings and expansion joints are proposed to accommodate thermal movements on the Wensum Viaduct; • Scheme components design to accommodate wind events. For example, compliance with appropriate structure design standards and setting back of tree planting from the carriageway edge; and • An earthwork and planting design that accounts for projected climatic changes such as choice of planting stock. Climate Resilience Embedded mitigation is detailed in **Chapter 16: Climate Resilience** (Document Reference: 3.16.00) Table 16-14.	Not applicable at this time.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to includes measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with.

1.12 People and Human Health

Table 1-11 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to People and Human Health

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Private property and housing; community land and assets; development land and businesses; agricultural land holdings; walkers, cyclists, and horse-riders; and human health	Construction	Potential effects on private property and housing; community land and assets; development land and businesses; agricultural land holdings; walkers, cyclists, and horse-riders; and human health.	The measures incorporated into the design proposals and to be adopted by the Principal Contractor to avoid, reduce, or remedy potential impacts include: • Access to residential properties will remain open, where practicable along their current alignments. Alternative access will be provided throughout construction phase if current access is inhibited. Access protocols will be agreed in advance between the Principal Contractor and affected residents to ensure safe passage and will be added to a Construction Traffic Management Plan (CTMP); • Where there would be any temporary or permanent diversions or closures to public rights of way during construction, the Applicant would seek to provide a diversion where feasible. The Applicant will consult with the local authority access officer and Traffic Regulation Orders (TRO) will be applied for where traffic regulation is necessary; • The Applicant would seek to provide alternative access to Mid Norfolk Shooting Ground and Khora Yoga if existing access is inhibited, with discussion to be organised by the Principal Contractor with the business premises to determine alternative access if required. Access measures regarding temporary supervised traffic control to the business premises would be added to a Construction Traffic Management Plan (CTMP). The Applicant will aim to ensure visitors can access Mid Norfolk Shooting Ground and Khora Yoga; and • A section of the Marriott's Way circular (on carriageway leisure route) will be diverted away from the Site Boundary during construction and reconnect to the rest of the on-carriageway leisure route where possible. The diversionary route will incorporate good practice with regards to safety where possible and seek to maintain the same standards of accessibility for users. Contractor should seek to identify a safe diversionary route based on the requirement stated in the LTN 1/20 Cycle infrastructure design.		The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to include measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with. Implementation of a Construction Traffic Management Plan (**CTMP**).

1.13 Materials

Table 1-12 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Materials

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Material resources and Waste facilities	Construction	The disposal of construction waste has the potential to have a significant environmental impact due to the nature of the material, the limited future capacity at local landfills, the increased heavy vehicle traffic movements, and the consumption of virgin raw materials. Furthermore, the nature of the material and limited local disposal capacity will result in the need to transport waste substantial distances to waste treatment / disposal locations.	Waste produced on-site will be subject to the Duty of Care under the *Environmental Protection Act (1990)* and the *Waste (England and Wales) Regulations (2011)*. The transportation of waste to and from the Site will comply with the Duty of Care requirements. The waste hierarchy will promote legal compliance and provide guidance on best practice, monitoring and reporting of Construction and demolition waste. • Materials and waste management is approached from the point of view of sustainable development. The drivers inherent into this approach are: o Establishment of a circular economy in terms of materials and waste where products and materials are recovered and regenerated at the end of each service life; o Waste as a resource which underpins the drive for a circular economy. This involves changing a mindset from managing waste to one of increasing resource productivity; o The Waste Hierarchy set out by the Waste Framework Directive (2008/98/EC) which outlines and details the action to reduce the production and disposal of waste; and o The Proximity Principle highlighting the need to manage, treat and/or dispose of wastes in reasonable proximity to their point of generation. The Principal Contractor will implement a Site Waste Management Plan (SWMP), to ensure that all hazardous wastes are collected, transported, stored, and disposed of in a manner that protects human health and the environment. Details for management of contaminated arisings and hazardous materials and waste can be found in the Design Site Waste Management Plan (DSWMP) (Document Reference 3.03.01b) appended to the OCMEP which gives further information on methods and best practice.	As outlined in the DSWMP: An Environmental Manager will be appointed / nominated by the Principal Contractor and will be responsible for instructing workers, for implementing and documenting the results of the SWMP, and for monitoring the effectiveness and accuracy of waste documentation produced during the course of site activities. Any Waste Contractor that removes waste from Proposed Scheme must be registered with the Environment Agency. The production, reuse, and recycling of waste on Proposed Scheme is to be monitored and reported on a monthly basis to be able to identify trends in waste creation and to identify opportunities for reducing waste or increasing the rate of recycling. Waste management targets will be set and agreed between these parties (as established through planning); continual progress against these will be measured, monitored, and reported by the Principal Contractor at a frequency agreed with the client. Skips shall be monitored to ensure that cross-contamination of segregated waste does not occur.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to include measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with. The Principal Contractor will implement a Site Waste Management Plan (**SWMP**).

Receptor	Construction /Operation	Effect to be Mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Material resources	Construction	Use and wastage of materials which are a finite resource.	Materials will be sourced locally where possible. The design incorporates reuse of excavated arisings as fill in embankments and in environmental bunds for the Proposed Scheme. The cut and fill balance on the scheme produces a surplus of excavated earthworks; these arisings will be recovered and reused in high value applications on other (off-site) construction schemes where feasible. In addition, a proportion of the excavated arisings will be treated on site and reused in the form of stabilised sub-base to further reduce the requirement for imported fill. Beyond this, the Principal Contractor is actively exploring the potential for site-won arisings to be reused as structural fill at some locations, in order to achieve an earthworks balance and to reduce, as far as practicable, the import of aggregate and disposal of waste to landfill. It should be noted that this approach is subject to final design development and specifications compliance. An Outline Materials Management Plan (Document Reference: 3.03.01c) is appended to the OCEMP.	As outlined in the DSWMP: An Environmental Manager will be appointed / nominated by the Principal Contractor and will be responsible for instructing workers, for implementing and documenting the results of the SWMP, and for monitoring the effectiveness and accuracy of waste documentation produced during the course of site activities. Any Waste Contractor that removes waste from Proposed Scheme must be registered with the Environment Agency. The production, reuse, and recycling of waste on Proposed Scheme is to be monitored and reported on a monthly basis to be able to identify trends in waste creation and to identify opportunities for reducing waste or increasing the rate of recycling. Waste management targets will be set and agreed between these parties (as established through planning); continual progress against these will be measured, monitored, and reported by the Principal Contractor at a frequency agreed with the client. Skips shall be monitored to ensure that cross-contamination of segregated waste does not occur.	The Principal Contractor will be required to implement **Materials Management Plan**.

1.14 Geology and Soils

Table 1-13 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Geology and soils

	Construction / Operation	Likely Effects Prior to Mitigation	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation / Monitoring is Secured
Construction Workers Third Party Neighbours	Construction	Pre-existing contamination within underlying soils/groundwater.	Mitigation in relation to Geology & Soils are outline in Section 4.7 on the OCEMP. The following measures should be incorporated within a CEMP: • Construction workers would be required to wear PPE such as gloves and face masks (where appropriate) to prevent dermal contact and inhalation or ingestion. Appropriate site hygiene facilities will be put in place and the presence of contaminants, and the associated risks, will be explained to ground workers before they begin work; • Water can be sprayed onto material being worked to damp down any potentially contaminated dust and prevent it from becoming airborne where it may affect construction workers. Wheel washing of site vehicles will be implemented to prevent tracking of contaminated material off-site; • Fuel storage on-site to be carried out under best practice i.e., integrally bunded containers. Plant refuelling to be carried out using best practice techniques and any spills to be controlled with spill kit. • Dust suppression measures (e.g., damping down) will be implemented to minimise the potential for dust generation; and • Within areas determined to be Medium risk within the Detailed UXO Risk Assessment Peer Review, a UXO Engineer should be retained on-site in order to detect for excavations and earthworks and safely manage UXO items, prior to and during construction. Ground investigation and risk assessment will be carried out within areas of temporary land take to identify potential contaminant linkages prior to commencement of the Construction Phase in line with British Standards (BS) 10175 (2011+A2:2017), Investigation of Potentially Contaminated Sites - Code of Practice (Ref 13.42) and Land Contamination Risk Management (LCRM) (Ref 13.29) guidance. Should the ground investigation identify contaminant linkages then a Remediation Strategy will be produced, outlining the mitigation measures required in order to manage any residual risks to human health receptors. Any recommendations specific to the construction phase should be followed. Any remediation undertaken would be validated and report on within a Verification Report to provide confidence that it has been undertaken with the agreed strategy. There is a possibility that previously unidentified contamination may be encountered within soils and groundwater during construction works. A watching brief for ground contamination will be maintained. If visually contaminated or odorous material is encountered during the works, the assistance of a suitably qualified and experienced person (a geo-environmental engineer) will be sought.	Mitigation measures included within the CPP should be subject to monitoring and updating (if required) including Watching Brief for unexpected contamination. Further in-situ UXO monitoring (e.g., magnetometer surveys) during earthworks may be required.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to include measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with. Should the ground investigation identify contaminant linkages then a **Remediation Strategy** will be produced.

Receptor	Construction / Operation	Likely Effects Prior to Mitigation	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation / Monitoring is Secured
Underlying groundwater and nearby surface water features	Construction	Potential effects on Controlled Waters and GWDTE.	During the construction phase, risks posed to Controlled Waters from potential sources of contamination will be accounted for within a Construction Environmental Management Plan (CEMP) prepared by the appointed Principal Contractor. Within this document a number of mitigation measures protective of Controlled Waters should be detailed such as the specification of on-site fuel storage (i.e., integrally bunded containers). Ground investigation and risk assessment will be carried out within areas of temporary land take to identify potential contaminant linkages prior to commencement of the Construction Phase in line with British Standards (BS) 10175 (2011+A2:2017), Investigation of Potentially Contaminated Sites - Code of Practice (Ref 13.42) and Land Contamination Risk Management (LCRM) guidance (Ref 13.29). Should the ground investigation identify contaminant linkages then a Remediation Strategy will be produced, outlining the mitigation measures required in order to manage any residual risks to human health receptors. Any recommendations specific to the construction phase should be followed. Any remediation undertaken would be validated and report on within a Verification Report to provide confidence that it has been undertaken with the agreed strategy. There is a possibility that previously unidentified contamination may be encountered within soils and groundwater during construction works. A watching brief for ground contamination will be maintained. If visually contaminated or odorous material is encountered during the works, the assistance of a suitably qualified and experienced person (a geo-environmental engineer) will be sought. If Site-won material is to be reused across the Proposed Scheme, this should be undertaken in accordance with a Materials Management Plan (MMP), in accordance with CL:AIRE Definition of Waste: Code of Practice. This will ensure the chemical suitability of the placement of soils at depth (i.e., potentially in contact with underlying groundwater) or within close proximity to sensitive receptors i.e., embankments associated with surface water features that fall within the Site Boundary. A Piling Risk Assessment would be produced to outline measures to protect the underlying aquifers during construction and mitigate risk of creating preferential pathways for potential contamination.	Piling risk assessment should be undertaken.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to include measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with. The Principal Contractor will be required to implement an **MMP.**

Receptor	Construction / Operation	Likely Effects Prior to Mitigation	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation / Monitoring is Secured
Agricultural Soils	Construction	Loss and damage of agricultural soils.	For areas of Grade 3 agricultural land within the Red Line Boundary which have not been subject to a Detailed ALC Survey a Soil Resource Survey will be undertaken to inform how they may best be managed, protected, or re-used. This survey will also determine the proportion of Grade 3a (BMV) and Grade 3b (non-BMV). Site-won material is to be reused across the Proposed Scheme, this will be undertaken in accordance with a Materials Management Plan (MMP), in accordance with CL:AIRE Definition of Waste: Code of Practice. For areas of temporary land take, a Soil Handling Management Plan would be produced prior to any enabling or construction works commencing. This will describe best practice methods to reduce impacts to soil during handling and would be informed by site-specific soil and climatological data. This would include details on stripping methods, stockpiling requirements, appropriate management (including weather conditions during handling, seeding of stockpiles, stockpile heights etc) and reinstatement. Works should also be undertaken in compliance with Defra's Construction Code of Practice (Ref 13.43). Highly organic soils, including Loamy Peat and Peat Loam, were present in the area surveyed. Although not as sensitive as peat these will be less resilient than more minerogenic soils and therefore will require careful management. The organic soils present will also have a high carbon content. Although the materials have not met the definition of peat, conservatively a peat carbon assessment is provided in Chapter 15: Climate Greenhouse Gases (Document Reference: 3.15.00). In addition, best practice construction methods would be included in the CEMP to provide methods of minimising the loss or reduction of soil functions (i.e., dust mitigation measures).	Mitigation measures detailed within the CEMP should be subject to monitoring and updating (if required).	The Principal Contractor will be required to implement a **SHMP**. The Principal Contractor will be required to implement an **MMP**.

Receptor	Construction / Operation	Likely Effects Prior to Mitigation	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation / Monitoring is Secured
Soil Function	Construction & Operation	Impact on soil resource and function	If Site-won material is to be reused across the Proposed Scheme, this should be undertaken in accordance with a Materials Management Plan (MMP), in accordance with CL:AIRE Definition of Waste: Code of Practice. A Soil Handling Management Plan would be produced prior to any enabling or construction works commencing. This will describe best practice methods to reduce impacts to soil during handling and would be informed by site-specific soil and climatological data. This would include details on stripping methods, stockpiling requirements, appropriate management (including weather conditions during handling, seeding of stockpiles, stockpile heights etc) and reinstatement. Works should also be undertaken in compliance with Defra's Construction Code of Practice (Ref 13.43). Measures outlined within Annex E and Appendix K of the IEMA A New Perspective on Land and Soil in Environmental Impact Assessment guidance (Ref 13.25) should also be followed by the Contractor. For the ancillary roads, the 'floating haulage route' method should be used for the movement of vehicles used for peaty soils handling. Other low-impact measures should be used for handling peaty soils, such as the use of low ground pressure vehicles and other equipment. Although the peaty soils are not considered to meet the definition of peat, conservatively a Peat Management Plan (PMM) should be produced, and control measures should be considered prior to construction regarding potential dewatering activities associated with the construction of the viaduct. A dewatering license may also be required for this activity, further information is included within Chapter 12: Road Drainage and the Water Environment (Document Reference: 3.12.00).	Mitigation measures detailed within the CEMP should be subject to monitoring and updating (if required).	The Principal Contractor will be required to implement a **MMP** and **PMM**.

1.15 Traffic and Transport

Table 1-14 Summary of proposed mitigation, monitoring, other measures, and management plans relevant to Traffic and Transport

Receptor	Construction /Operation	Effect to be mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Road users and NMU route users	Construction	Traffic and transport effects of the construction of the Proposed Scheme on the road network.	To mitigate the traffic and transport effects of the construction of the Proposed Scheme the CEMP will include a Construction Traffic Management Plan (CTMP). This will set out measures that the Principal Contractor will be required to comply with, including: • Construction Traffic Routing Restrictions; • Hours of operation; • Site Clearance; • Vehicle Cleaning Facilities; • Site Access and Amenities plan; • Contractor parking; • Construction Period, Phasing and Hours of Site Operation; • Laydown Areas; • Scheduling; and • Monitoring and Review. Consideration will be given to the localised temporary widening of Marl Hill Road during construction phase if required, to enable Heavy Goods Vehicles to pass each other safely. It is proposed to use variable message signage on the A1067 an A47 routes to alert drivers to road closures and diversions. Construction Traffic Management Plan (CTMP) – this covers the detail of what traffic is planned to use the network and what restrictions affect construction traffic/mitigation measures. Construction Staff Travel Plan – this explains travel options available to construction workers and measures to minimise staff traffic impacts on the surrounding highway network.	Post opening traffic monitoring – this is an area wide monitoring regime (possibly consisting of permanently installed traffic monitoring equipment or periodic ATC surveys) on the surrounding network. This is expected to cover the villages where traffic mitigation measures are proposed – area north of A1067 and south of A47.	The measures outlined in the **OCEMP** are secured through Planning Condition which will require the Detailed Construction Environmental Management Plan to include measures consistent with the measures in the OCEMP and for that Detailed Construction Environmental Management Plan to be complied with. The Principal Contractor will be required to implement a **CTMP**. The Principal Contractor will be required to implement a **Construction Worker Travel Plan**.

Receptor	Construction /Operation	Effect to be mitigated	Specific Mitigation Measures	Proposed Monitoring	How the Mitigation/Monitoring is Secured
Road users and NMU route users	Construction/ Operation	Traffic and transport effects of the construction of the Proposed Scheme on the road network.	A Sustainable Transport Strategy (Document Reference 4.02.00) has been prepared that encompasses the proposals for NMU provision and the proposed treatment for existing side roads that cross the Proposed Scheme alignment within the Red Line Boundary. In addition, the Sustainable Transport Strategy includes additional enhancement measures referred to as 'Complementary Sustainable Transport Measures. A Non-Motorised User Strategy (Document Reference 4.01.04) has been developed and will be implemented in the immediate vicinity of the Proposed Scheme. These works consist of a network of new and enhanced Public Rights of Way (PROW) connecting up the existing fragmented and sparse existing PROW network around the Proposed Scheme and mitigating severance caused by the scheme with the provision of new green bridges and underpasses crossing the scheme which accessible to Non-Motorised Users.	Post opening traffic monitoring – this is an area wide monitoring regime (possibly consisting of permanently installed traffic monitoring equipment or periodic ATC surveys) on the surrounding network. This is expected to cover the villages where traffic mitigation measures are proposed – area north of A1067 and south of A47.	The Principal Contractor will be required to implement a **Non-Motorised User Strategy**. The Principal Contractor will be required to implement a **Sustainable Transport Strategy**.