A47/A11 Thickthorn Junction

Scheme Number: TR010037

Volume 7
7.4 Environmental Management Plan (First Iteration)

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

March 2022

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

The A47/A11 Thickthorn Junction Development Consent Order 202[x]

ENVIRONMENTAL STATEMENT
Report to Inform Habitats Regulations Assessment

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Rev 0	March 2021	Application Issue
Rev 1	December 2021	Deadline 4 Issue
Rev 2	January 2022	Deadline 4 Issue
Rev 3	March 2022	Deadline 8 Issue

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1. Introduction and background

1.1.1. Highways England (the Applicant) has submitted an application under Section 37 of the Planning Act 2008 (the 2008 Act) to the Secretary of State via the Planning Inspectorate (the Inspectorate) for an order to grant a development consent order (DCO) for the A47/A11 Thickthorn Junction (hereafter referred to as 'the Proposed Scheme').

1.1.2. This document is the Environmental Management Plan (EMP) (First iteration - design) for the Proposed Scheme. The purpose of the EMP (design) is to manage the environmental effects of the Proposed Scheme as identified within the Environmental Statement (ES) and to demonstrate compliance with environmental legislation. The environmental actions and commitments specified in the EMP will be secured by the requirements in the Development Consent Order (DCO) (**TR010037/APP/3.1**) (**REP3-002**), ensuring that they will be provided as part of the Proposed Scheme.

1.1.3. This EMP is based on the current design for which DCO is being applied. It has been prepared in accordance with the following:

- The Environmental Statement (ES) (**TR010037/APP/6.1**)[1] (**APP-038**-**APP-124**, **REP3-006 and REP3-008)**
- Design Manual for Roads and Bridges (DMRB) LA 120 Environmental management plans[2]
- Asset Data Management Manual (ADMM) v11.0 Parts 2 and 3 (in particular for Environmental Information System (EnvIS) requirements)[3]

1.1.4. Galliford Try is the Principal Contractor for the Proposed Scheme, and will hereby be referred to as the Principal Contractor (PC) throughout this EMP.

1.1.5. The EMP is a live document that evolves with iterations. This iteration refers to outline environmental management plans to be developed into full management plans, and also indicates plans that will need to be developed by the PC prior to construction. These include:

- Outline site waste management plan (**TR010037/APP/6.3**) (**APP-107**)
- Outline traffic management plan (**TR010037/APP/7.5**) (**APP-129**)
- Outline Landscape and Ecology Management Plan (Annex B.6 of this EMP) (APP-128)

[1] Highways England (2020) A11/A47 Thickthorn Junction Environmental Statement TR010037/APP/6.1
[2] Highways England (2020) Design Manual for Roads and Bridges LA 120 Environmental management plans (Revision 1) [online] available at: [redacted] (last accessed 30 September 2020).

[3] ADMM v11 Part 2 – Requirements and Additional Information

[redacted]

- Outline Construction Noise and Dust Management Plan (Appendix B of this EMP)

1.1.6. Following the Secretary of State's approval of the DCO for the Proposed Scheme, the EMP will be updated, a minimum of two times, to reference specific requirements relating to the various phases of construction. The following environmental management plans will be prepared as part of the second iteration:

- Annex B.1 Materials Management Plan (MMP)
- Annex B.2 Soil Management Plan (SMP)
- Annex B.3 Construction Noise and Dust Management Plan
- Annex B.4 Construction Communications Strategy
- Annex B.5 Landscape and Ecology Management Plan (LEMP)
- Annex B.6 Biosecurity Management Plan
- Annex B.7 Water Monitoring and Management Plan
- Annex B.8 Detailed Heritage Written Scheme of Investigation (WSI) (Mitigation Strategy)
- Annex B.9 Temporary Surface Water Drainage Strategy
- Annex B.10 INNS Management Plan
- Annex B.11 Operational UXO Emergency Response Plan

1.1.7. The second iteration (Construction) of the EMP shall be updated by the Principal Contractor (Galliford Try) once the design and construction plans have been finalised. The 3rd iteration of the EMP will be refined at the end of the construction stage to support future management and operation.

1.2. Purpose of this EMP

1.2.1. The EMP shall provide clear and concise information which states how the mitigation and management of environmental effects will be delivered and maintained and assigns responsibility for undertaking the described actions in this report and the ES.

1.2.2. The EMP:

- identifies roles and responsibilities
- identifies risks, their associated control measures, compliance and corrective actions
- establishes procedures for communication, monitoring, audit mechanisms and reporting of control measures
- would be reviewed regularly to ensure it is achieving the environmental protection required
- provides a clear audit trail outlining the modifications from any previous iteration

1.2.3. This EMP takes due consideration of the documents submitted to the Planning Inspectorate and assessments undertaken on behalf of Highways England, as well as the DCO for the Proposed Scheme itself. It identifies mitigation and environmental issues associated with the stages of the project. The EMP sets out the control of environmental effects through all lifecycle stages from the design stage. Table 1.1 outlines the requirements.

Table 1. 1: Delivery schedule and update requirement of EMP

Project Stage	EMP iteration	Produced / refined
Design	First iteration of EMP (formerly outline EMP) produced during the design stage for the preferred option.	Produced
Construction (refined for the consented project)	Second iteration of EMP (formerly construction EMP) refined during the construction stage for the consented project, in advance of construction.	Refined
End of construction	Third iteration of EMP (formerly handover EMP) building on the construction EMP refined at the end of the construction stage to support future management and operation.	Refined

Source: Design Manual for Roads and Bridges, LA 120 Environmental management plan (Revision 1), table 2.2

1.3. The Proposed Scheme

Location

1.3.1. The A47/A11 Thickthorn Junction is located approximately 5.6km to the southwest of Norwich and forms part of the main arterial highway route connecting Norwich and Great Yarmouth. The Proposed Scheme site location is shown on Figure 1.1 **(TR010037/APP/6.2)** (**APP-053**).

1.3.2. The land immediately to the north-east, southeast, and southwest quadrants of the existing A47/A11 Thickthorn Junction is currently predominantly agricultural land, although some parcels of land to the northeast and southeast have the benefit of planning permission for housing developments. The land in the northwest quadrant accommodates Thickthorn Park and Ride and Thickthorn Services comprising a hotel, a restaurant, an electricity substation and a petrol filling station.

1.3.3. There are several residential properties are located to the north-west of the junction on the B1172 Norwich Road, and to the north-east along the Old Newmarket Road. The Cringleford residential area is located is less than 500m to the north and east of the existing junction.

Programme

1.3.4. Two indicative construction programmes utilising different construction methods for the Proposed Scheme have been informed by the PC. The construction methods identified for sections of the Proposed Scheme (A11-A47 connector road underpasses) are a push box method or top down construction.

1.3.5. During the detailed design stage for the Proposed Scheme, the PC will refine the construction programme.

1.3.6. Current start of works is scheduled for August 2022. Main works are scheduled to start in January 2023. Construction is anticipated to take approximately 23 months. Early ecological works will be required to be undertaken pre-construction.

1.3.7. Enabling and site preparation work would be largely carried out during Phase 0, with the main works carried out during Phases 1 to 7 before final compound removal in Phase 8.

Programme – box push method

1.3.8. Construction is anticipated to take approximately 23 months. This would be carried out in phases, so not all sections of the Proposed Scheme would be under construction for the full period.

1.3.9. The proposed phases of construction are set out in Table 1-1 (Construction phasing programme). Early works to facilitate vegetation clearance, water vole habitat creation and water vole translocation would occur seasonally prior to works commencing on site. Enabling and site preparation work would be largely carried out during Phase 0, with the main works carried out during Phases 1 to 7 before final compound removal.

Table 1.2: Construction phasing programme (box push method)

Phase	Activity	Estimated Programme	Working hours
EW	Early Works	Six months	Predominantly daytime works.
0	Site preparation	One month	Predominantly daytime works.
1	Utility diversions Commence construction of new **Cantley Lane** footbridge **(Cringleford)** across A47. Minimal traffic management on A47 Commence excavation for box slide construction Commence construction to Cantley Lane link road, drainage basins and Cantley Stream culverts	Three months	Predominantly daytime works.
2	Cantley Lane link road / Cantley Lane junction improvements Cantley Lane / B1172 Norwich Road junction improvements A11-A47 link road underpass excavation. Installation of new **Cantley Lane** footbridge **(Cringleford)** bridge Removal of existing footbridge Install Cantley Stream culvert,	Eight months	Predominantly daytime works. Overnight works required to install new all user bridge and remove existing footbridge, ties in for Cantley Lane link road / B1172 Norwich Road

Phase	Activity	Estimated Programme	Working hours
	Works to widen the roundabout at existing Thickthorn Junction Construct boxes ready to 'push' into place		
3	Push box preparation, continued works to A11-A47 link road	Two months	Predominantly daytime works.
4	Undertake installation of preconstructed underpass boxes Reconstruct carriageways to reopen to traffic	Two months	Predominantly daytime works. Overnight works required to install preconstructed underpass boxes
5	Complete underpass construction on A11-A47 link road Works to dedicated left turn from A47 to A11	Nine months	Predominantly daytime works, overnight works required to complete A47 tie ins.
6	Complete A11-A47 link road A47 tie ins. Finishing works to A11 and A47, structures, road signage, road markings, vehicle restraint system (VRS)	One month	Predominantly daytime works, overnight works required remove traffic management
7	Compound removal	One month	Predominantly daytime works. Overnight works if required

Programme – top down construction

1.3.10. Construction is anticipated to take approximately 23 months. This would be carried out in phases, so not all sections of the Proposed Scheme would be under construction for the full period.

1.3.11. The proposed phases of construction are set out in Table 1-2 (Construction phasing programme). Early works to facilitate vegetation clearance, water vole habitat creation and water vole translocation would occur seasonally prior to works commencing on site. Enabling and site preparation work would be largely carried out during Phase 0, with the main works carried out during Phases 1 to 7 before compound removal.

Table 1.3: Construction phasing programme (top down construction)

Phase	Activity	Estimated Programme	Working hours
EW	Early Works	Six months	Predominantly daytime works.
0	Site preparation	One month	Predominantly daytime works.
1	Utility diversions Commence construction of new Cantley Lane footbridge (Cringleford) across A47. Minimal traffic management on A47	Three months	Predominantly daytime works.

Phase	Activity	Estimated Programme	Working hours
2	Commence new offline Cantley Lane Link including A11 overbridge Works to inner lanes of the existing A47/A11Thickthorn roundabout and B1172 Norwich Road approach into roundabout Construct widening to A11 to allow underpass to commence Begin construction of A11 underpass & associated earthworks Continue construction of new A47 footbridge abutments and approaches	Three months	Predominantly daytime works. Overnight A11 closures to allow tie in to temporary carriageways
3	Continue Phase 2 works Install new **Cantley Lane** footbridge **(Cringleford)** bridge and finalise approaches Remove now redundant footbridge under weekend closure	One month	Predominantly daytime works. Weekend closure to remove existing footbridge
4	Continue offline Cantley Lane Link including A11 overbridge Continue works to inner lanes of existing A47/A11 Thickthorn roundabout Widen A47 East bound on slip / east bound A47 carriageway Commence construction of A47 underpass	Six months	Predominantly daytime works. Overnight works required to for A11 structures and deck pours.
5	Complete offline Cantley Lane link road including A11 overbridge Move TM on A11 traffic to use newly constructed half of S02 in temporary lanes Commence works to existing A47/A11 Thickthorn roundabout outer lanes between A11 southbound and A47 westbound (dedicated A47 Westbound lane onto A11 southbound)	Two months	Predominantly daytime works.
6	Complete A11northbound off slip & road into S02 Continue S02 second half construction Move TM on A47 to enable second half of S04 to commence	Six and a half months	Predominantly daytime works.

Phase	Activity	Estimated Programme	Working hours
7	Complete offline A11 to A47 off slip northbound Complete carriageways over S02 & S04 Finishing works	Four months	Predominantly daytime works. Overnight works required to complete tie ins to A11-A47 link road
8	Compound removal	One month	Predominantly daytime works.

The need for the Proposed Scheme

1.3.12. The existing A47 provides a connection for people, places, businesses and enables access to employment, healthcare, education and other community assets.

1.3.13. Currently, the existing A47/A11 Thickthorn Junction experiences high levels of congestion during peak hours, predominantly between the A11 eastbound to A47 eastbound and A47 westbound to A11 westbound. This is in addition to congestion on the A11 in both directions during peak hours (08:00 – 09:00 and 17:00 – 18:00).

1.3.14. Traffic studies have shown that congestion is predicted to get worse due to the following:

- Proposed growth in residential development in the Cringleford and Hethersett areas, which can lead to more vehicles on the road
- Increasing traffic is outgrowing the capacity of the road, causing tailbacks and delays

1.3.15. If nothing is done to improve capacity at the A47/A11 Thickthorn Junction, demand from road users is expected to exceed capacity in the vicinity of Cringleford and Hethersett due to committed developments at both locations. Increased congestion in future years is likely to constrain economic growth in Norwich and South Norfolk and reduce user satisfaction.

1.3.16. In developing the Proposed Scheme, the aim is to address these issues by improving the traffic flow, reducing journey times on the route, increasing the route safety and resilience, provide capacity for growth and provide mitigation against environmental impacts of the A47. The Proposed Scheme is also intended to support economic growth by supporting employment and residential development opportunities in Norwich and South Norfolk.

Outline of proposed works

1.3.17. Key elements of the Proposed Scheme include:

- A single-lane free-flowing connector road joining the A11 eastbound to A47 eastbound via two underpasses (under the A11 and A47 respectively).
- Improvements to the junction:
  - Widening the existing slip road on the A47 westbound and building a dedicated left-hand free flow lane to the A11 westbound
  - Widening the southern section of the roundabout from three lanes to four
  - New traffic lights on the approach to / from the junction with the B1172 Norwich Road
  - New road surface, new road signs and road markings throughout the Thickthorn Junction
- Removal of the Cantley Lane South direct connections between the A11 and A47 exit slip roads.
- A new link road connecting Cantley Lane South with the B1172 Norwich Road to the north and construction of two new bridges. The new link road it will have a 40mph speed limit.
- From the Thickthorn junction to Hethersett, a 40mph speed limit on the B1172 Norwich Road and a new junction connecting to Cantley Lane link road.
- A 30mph speed limit on Cantley Lane South.
- A new junction connecting Cantley Lane South to Cantley Lane link road.
- The existing Cantley Stream and access track will be realigned and one new stream culvert constructed.
- A new footbridge over the A47 for walkers, cyclists and horse riders approximately 45m east of the existing footbridge, which will be demolished. The footbridge will have higher railings to improve safety for horse riders.
- Paths for walking and cycling proposed along the new Cantley Lane link road giving access to local amenities and links to other recreational routes.
- Access to the Thickthorn Park and Ride from the Cantley Lane link road for walkers and cyclists.
- New drainage systems including:
  - New outfalls to the Cantley Stream
  - Dry ditches to maintain overland flow paths
  - New attenuation basins with pollution control devices to control discharges to local watercourses
- Compounds, material storage areas and temporary vehicle parking located within the Proposed Scheme DCO boundary when construction is taking place.
- Diverting or installing new utilities infrastructure, such as electricity cables, water pipelines and electronic communications cables.

- Environmental measures embedded into the Proposed Scheme design to reduce the environmental effects and deliver wider benefits, such as low noise road surfaces, planting and new mammal and reptile habitats.

1.3.18. A detailed description of the Proposed Scheme is provided in Chapter 2 (The proposed scheme) of the ES (**TR010037/APP/6.1**) (**APP-039**).

1.3.19. An Environmental Masterplan (**TR010037/APP/6.8**) (**APP-128**)has been prepared for the Proposed Scheme. Works must be implemented in accordance with the Environmental Masterplan, to minimise the effects associated with landscape and visual, cultural heritage setting, noise and biodiversity. The Proposed Scheme once operational will reflect the environmental design.

Objectives of the Proposed Scheme

1.3.20. The Proposed scheme aims to meet the following objectives:

Supporting economic growth

1.3.21. The Proposed Scheme aims to reduce congestion related delay, improve journey time reliability and increase the overall capacity of the A47. This will help contribute to sustainable economic growth supporting regional housing and economic growth in Norwich and the surrounding areas.

A safer and reliable network

1.3.22. The Proposed Scheme aims to make the network safer for motorists and for those living near the junction by improving operational safety issues at the Thickthorn Junction.

A more free-flowing network

1.3.23. The Proposed Scheme aims to increase the resilience of the Thickthorn junction to cope with incidents such as collisions, breakdowns, maintenance and extreme weather. In addition, the Proposed Scheme aims to reduce vehicular delay and improve journey time reliability, making journey times more predictable and movement at the junction more free-flowing.

Improved environment

1.3.24. The Proposed Scheme aims to protect the environment by minimising adverse impacts and where possible, deliver benefits.

An accessible and integrated network

1.3.25. The Proposed Scheme considers local communities and their access to roads. The Proposed Scheme provides a safer route between communities for cyclists, walkers, horse riders and other vulnerable uses of the network.

Value for money

1.3.26. To ensure that the Proposed Scheme is affordable and delivers good value for money

2. Team roles and responsibilities

2.1.1. This EMP has been prepared by environmental professionals as part of the Principal Designer team. The authors are appropriately qualified and have a demonstrable knowledge, experience and competence in the environmental management field. Reference should be made to the competent expert sections given within the relevant Environmental Statement Chapters **(TR010037/APP/6.1)** (**APP-038 – APP-052**).

2.2. Site roles and responsibilities

2.2.1. The site-based roles and the organisation of responsibilities in relation to environmental management are summarised below. The PC will be required to delegate responsibilities to onsite personnel within key areas of the site and compounds. The delegation of responsibility will be clearly identified within relevant documents and site files and will be allocated to a suitably qualified person. Key role personnel will be approved by Highways England.

2.3. Project management organisation

2.3.1. Overseeing management of the Proposed Scheme will be directed by Highways England and any appointed Employer's Agent for the Proposed Scheme. Highways England will delegate some site supervision roles and procure specialist consultants to supervise, monitor or check the PC's Method Statements and sensitive activities where required. The key scheme roles for Highways England and the PC are listed in Table 2.1. Individual names and contact details will need to be confirmed and inserted where applicable by Highways England and the PC once appointed and confirmed.

Table 2-1 : General site contacts and responsibilities

Role	Stage of Project involvement	Contact and organisation	Telephone	Email
Highways England Project Manager	All	Victoria Pardoe Project Manager Highways England	[DETAILS REDACTED]	[DETAILS REDACTED]
PC Design / Technical Manager	PCF (Highways England Project Control Framework) Stage 3 (Preliminary Design) – Stage 6 (Construction, commissioning and handover)	Kevin Stacey Project Manager Galliford Try	[DETAILS REDACTED]	[DETAILS REDACTED]
PC Senior Site Manager	PCF Stage 5 (construction Preparation) – Stage 6	[TBC] Galliford Try	[TBC]	[TBC]
PC Site Supervisors	Stage 5 - 6	[TBC] Galliford Try	[TBC]	[TBC]
PC Regional H&S Manager	Stage 5 - 6	[TBC] Galliford Try	[TBC]	[TBC]
PC Regional Environmental & Sustainability Manager	Stage 5 - 6	[TBC] Galliford Try	[TBC]	[TBC]
PC H&S Advisor	Stage 5 - 6	[TBC] Galliford Try	[TBC]	[TBC]
Waste Champion	Stage 5 - 6	[TBC]	[TBC]	[TBC]
Spill Responders	Stage 5 - 6	Galliford Try	[TBC]	[TBC]
PC Environmental Specialist (s)	Stage 5 - 6	[TBC]	[TBC]	[TBC]

[Note: Individual names and contact details will need to be inserted into Table 2-1 by Highways England and PC].

2.4. Environmental management responsibilities

2.4.1. The PC is responsible for producing the full EMP once the design and construction plans have been finalised.

2.4.2. Highways England and delegated consultants acting on their behalf, PC and subcontractors are all responsible for complying with the Proposed Scheme's environmental policies, relevant environmental legislation and regulations. It is a requirement that all persons on site will be made aware of their duty of care to the environment and will be provided with sufficient training, supervision or instruction through site inductions, toolbox talks (TBTs) and specific method statements as necessary.

2.4.3. Responsibilities for the site environmental management will be delegated to key personnel by the PC who will manage all reporting and monitoring of environmental mitigation during the contract period. Where required, environmental specialists will be consulted to provide advice on specific issues or site activities, in consultation with the PC. The main environmental roles and responsibilities are shown in Table 2-2.

Table 2-2: Overview of role responsibilities

Role	Responsibility
Highways England Project Manager	Oversee implementation of Proposed Scheme and the individuals undertaking specific roles and duties. To be reported to as per Contract requirements and internal organisation Environmental Management System (EMS).
PC Design / Technical Manager	Ensure that designs are carried out in compliance with the relevant legislation, the PC's Environmental Policy and Standards, guidelines, approved codes of practice and other requirements including adherence to Applicant standards and the commitments in the Environmental Management Plan. Ensure that regular design reviews and assessments are jointly undertaken with the design and operational staff, as appropriate. Ensure competency assessments are carried out where design consultants are employed
PC Senior Site Manager	Be aware of the environmental statutory requirements affecting site activities and seek further advice, if necessary. Ensure that all site environmental permissions are obtained and conformance the conditions defined within these permissions. Ensure that environmental risk assessments are effectively monitored, reviewed and communicated. Organise and plan workplaces so work is conducted in accordance with the PC's Environmental Standards. Identify the environmental requirements within method statements and ensure that they are produced and reviewed on time. Identify method statements' required distribution (e.g. foremen, supervisors, operatives) and ensure that they are followed and controlled, as appropriate. Ensure adequate supplies of environmental control equipment (e.g., spill response equipment) are available and are appropriately used. Accompany all Regulatory enforcement officers during any site visits. Ensure all new employees, contractors and visitors, including delivery drivers, are instructed on project specific environmental requirements. Ensure site specific environmental training needs are identified and training programmes are undertaken for all levels of site staff and contractors. Ensure all Supervisors and contractors are aware of their environmental responsibilities. Report any significant environmental incidents, disciplinary action or enforcing bodies' visits to the Health & Safety (H&S) Advisor.
PC Site Supervisors	Be aware of the environmental statutory requirements affecting operations and seek further advice, if necessary. Ensure all new employees, contractors and visitors, including delivery drivers, are instructed on project specific environmental requirements.

Role	Responsibility
	Ensure that all relevant persons are briefed on the contents of environmental risk assessments / method statements and monitor operatives (including contractors) for compliance. Ensure that an adequate supply of environmental control equipment (e.g., spill response equipment) is kept on the site and implement disciplinary procedures against any employee who abuses or does not make full use of this equipment, when required. In conjunction with the Senior Site Manager plan environmental standards into work activities. In conjunction with the Senior Site Manager discuss environmental matters with all supervisors, including contractors, on a regular basis. Ensure all PC inspections are carried out as prescribed in the Company Health & Safety (H&S) management system. Make full use of the services of the H&S Advisors and co-operate with them to achieve the PC's Environmental Standards. Follow PC Environmental Standards and report any problems in achieving these standards to the Senior Site Manager and H&S Advisor. Ensure that the requirements of all environmental risk assessments are brought to the attention of all operatives involved, including contractors. Actively encourage employees to report environmental problems as soon as they are discovered or if they are anticipated in the future. Ensure compliance with HE standards the commitments within this EMP.
PC Regional H&S Manager	Liaise with Business Unit Managers on operational environmental issues. Assist project management to ensure that the Proposed Scheme meet the PC's Environmental Standards. Ensure the collation of environmental performance information, as provided by workplace management. Where working practices are observed that pose a significant environmental risk, ensure that, where possible, the activity is stopped; inform site and Business Unit management immediately; provide appropriate support, advice and assistance in identifying and implementing the necessary remedial actions. Ensure that the relevant manager is advised if operations are not achieving the PC's Environmental Standards, and further advise the Operations Director, Business Unit Managing Director and Head of Health and Safety, as appropriate. Assist Business Units in the environmental performance management of contractors. Ensure that significant environmental incidents are reported promptly to the Business Unit Directors, Head of Health and Safety and regulators, as appropriate. Investigate all environmental incidents as required by the PC's Environmental Standards and make known and discuss any significant findings / recommendations within the Business, as appropriate.

Role	Responsibility
	In conjunction with the operational staff, identify areas / operations that require specific environmental improvement and assist in the organising or undertaking of such improvements, as appropriate. Provide feedback to the Environmental Manager on the effectiveness of the H&S management systems and any improvements necessary. Assist Head of Health and Safety and Environmental Manager in maintaining high corporate environmental management standards
PC Regional Environmental & Sustainability Manager	Where working practices are observed that pose a significant environmental risk, ensure that, where possible, the activity is stopped; inform site and Business Unit management immediately; provide appropriate support, advice and assistance in identifying and implementing the necessary remedial actions. Provide specialist environmental input to operational staff through advice, guidance and support e.g., on environmental legislation and industry best environmental practice. Provide detailed support / guidance in the planning stages of a new project e.g., review the adequacy of environmental risk assessments. Liaise with Business Unit Managers on operational environmental issues. Provide information in the form of instructions, Best Practice Guidance, Codes of Practice, Environmental Information Sheets etc., as appropriate, and ensure operational staff are provided with C&I communications on effective environmental working practices and alerts. Assist operational staff in the review of environmentally high-risk contractors' method statements, provide appropriate assistance in assessing other environmentally related method statements, and monitor the implementation of the same in the workplace, as appropriate. Ensure that the relevant manager is advised if operations are not achieving the PC's environmental standards, and further advise the Operations Director, Business Unit Managing Director and C&I Head of Health and Safety, as appropriate. Assist project management through advice, information, training and encouragement as appropriate to ensure that the Proposed Scheme continually the PC's environmental standards. Promote involvement in environmental management of all operational staff by discussion, briefings, training sessions and effective communication. Assist in the investigation of all environmental incidents as required by the PC's Environmental Standards and make known and discuss any significant findings / recommendations. Ensure that significant environmental incidents are reported promptly to the Business Unit Directors, Head of Health and Safety and regulators, as appropriate. Ensure communication with the regulators regarding all relevant environmental inspections and incidents. In conjunction with the operational staff, identify areas / operations that require specific environmental improvement and assist in the organising or undertaking of such improvements, as appropriate.

Role	Responsibility
	Provide Highways England with Quarterly Carbon figures as required.
PC H&S Advisor	Where working practices are observed that pose a significant environmental risk, ensure that, where possible, the activity is stopped; inform site and Business Unit management immediately; provide appropriate support, advice and assistance in identifying and implementing the necessary remedial actions. Liaise with Business Unit Managers on operational environmental issues. Provide detailed support / guidance in the planning stages of a new project e.g., preparing the project environmental plans. Provide information in the form of instructions, Best Practice Guidance, Codes of Practice, Environmental Information Sheets etc., as appropriate, and ensure operational staff are provided with communications on effective environmental working practices and alerts. Collate environmental information, as provided by workplace management, for monthly reports. Assist operational staff in the review of environmentally high-risk contractors' method statements, provide appropriate assistance in assessing other environmentally related method statements, and monitor the implementation of the same in the workplace, as appropriate. Ensure that the relevant manager is advised if operations are not achieving the PC's environmental standards, and further advise the Operations Director, Business Unit Managing Director and Head of Health and Safety, as appropriate. Assist project management through advice, information, training and encouragement as appropriate to ensure that the Proposed Scheme continually meet the PC's environmental standards. Promote involvement in environmental management of all operational staff by discussion, briefings, training sessions and effective communication. Ensure induction instructions are reviewed regularly for relevance to current operations and ensure that they are being effectively communicated. Ensure that all staff, including office based personnel, receives appropriate environmental training and instruction. Monitor the Business Units to ensure that all staff, including office based personnel, receive appropriate environmental training and instructions. Assist Business Units in the environmental performance management of contractors. Ensure that significant environmental incidents are reported promptly to the Business Unit Directors, Head of Health and Safety and regulators, as appropriate. Assist in the investigation of all environmental incidents as required by the PC's Environmental Standards and make known and discuss any significant findings / recommendations. Ensure communication with regulators regarding all relevant environmental inspections and incidents.

Role	Responsibility
	Carry out environmental inspections at all workplaces on a regular basis, as appropriate, to ensure compliance with the PC's Environmental Policy and Standards. In conjunction with the operational staff, identify areas / operations that require specific environmental improvement and assist in the organising or undertaking of such improvements, as appropriate. Provide feedback to the Environmental Manager on the effectiveness of the H&S management system and any improvements necessary.
Waste Champion	Drive waste performance improvement including on-site materials and waste management practices. Verify the validity of disposal site permits, licenses and / or exemptions. Ensure that the PC's waste transfer note is completed in full for all non-hazardous waste streams removed from site for reuse, recycling and / or disposal. Ensure that hazardous waste consignment notes are fully completed for hazardous waste streams removed from site.
Spill Responders	Ensure spill response equipment is available and well maintained. Respond to any spill incident that occurs on-site as long as it is safe to do so. Complete an Environmental Incident Report following any spill incident.
PC Environmental Specialist (s)	Contamination and Remediation Specialist • To provide specialist spill response services to the Proposed Scheme in the event of a significant spill incident. • To remove waste spill clean-up materials and to provide the site team with all waste duty of care paperwork associated with the disposal of waste spill clean-up materials. Waste Contractor • Refer to the Site Waste Management Plan (SWMP) Ecologist • Conduct Phase 1 Habitat Survey(s) where the presence of protected ecological resources are known / suspected • Conduct extended Phase 2 Habitat Survey(s) to assess the potential presence of protected fauna and / or flora; if required as a result of a Phase 1 Habitat Survey • Conduct protected faunal species surveys where their presence has been identified

Role	Responsibility
	• Develop / review method statement(s) for the management of protected species that includes all relevant recommendations made within ecological surveys • Liaise with ecological regulatory bodies to ensure the suitability of method statements • Obtain and fully implement the conditions of a European Protected Species Licence i.e., Development Licence, if required • Implement with the assistance of the site team all physical and management controls, defined with method statements and licences, to protect known flora / fauna • Monitor site works to assure conformance with method statements and / or licences. • Regularly discuss progress and issues with the Senior Site Manager. Archaeologist • Develop and submit a method statement to regulatory bodies for works that may impact known or suspected cultural heritage assets. • Obtain in conjunction with the Senior Site Manager all relevant regulatory permissions. • Implement with the assistance of the site team all physical and management controls, defined with method statements and licences, to protect known or suspected cultural heritage assets from construction activities. • Conduct an archaeological Watching Brief to monitor construction activities in areas of known or suspected cultural heritage assets. • Report the identification of any cultural heritage asset to the relevant regulatory body. • Recommend site works be suspended if cultural heritage assets are identified. • Regularly discuss progress and issues with the Senior Site Manager. Arboriculturist • Conduct tree felling / surgery works as per the scope of contract. • Ensure permission (i.e., section 211 Notice / Tree Felling Licence) is in place for works to protected trees; otherwise, do not proceed with works. • Regularly discuss progress and issues with the Senior Site Manager. Landscape Manager • To supervise planting and compliance with the Environmental Masterplan

Role	Responsibility
	• To supervise aftercare monitoring Noise & Vibration specialist • Compliance with the EMP including real-time monitoring

3. Record of environmental actions and commitments

3.1. Introduction

3.1.1. The Record of Environmental Actions and Commitments (REAC) contained in Table 3-1 identifies the environmental commitments included within the Environmental Statement (ES) **(TR010037/APP/6.1)** (**APP-038 – APP-124, REP3-006 and REP3-008)** to address the potential environmental effects of the Proposed Scheme.

3.1.2. The REAC will be updated as the Proposed Scheme progresses and will be finalised at the end of construction on completion of the Proposed Scheme where it will be developed into the 3rd iteration of the EMP (end of construction). This is the main vehicle for passing essential environmental information and crucially to the body responsible for the future maintenance and operation of the asset.

Table 3-1 : Record of environmental actions and commitments

Ref	Source of Action Document Ref	Objective	Action (including specific location if applicable)	Assumptions (on which the action is based)	Achievement criteria and reporting requirement (if applicable)	How the action is to be implemented	Responsible person(s)	When P= Pre-construction C=Construction O=Operation A=All	Completion Record
General (G)									
G1	ES – Chapter 2	Hours of working	Construction works will take place mainly during the daytime. Construction works outside of normal construction hours of 07:00-19:00 weekdays and 07:00-19:00 on Saturdays shall be minimised as far as practicable. Where works outside of these hours are unavoidable, the Contractor will consult with the local planning authority, and agree appropriate methods of mitigation that account for the location of works, hours of work and expected duration.	Indicative Information from the PC EIA - noise and vibration assessment	Regular site audits	Contractual responsibilities between Highways England and the PC	PC	P C	Initial: Signed:
G2	General ES	Reduce light disturbance for sensitive receptors	**During works:** Lighting shall be at the minimum luminosity necessary and low energy consumption fittings used. Lighting must comply with the Institute of Lighting Professionals Guidance Notes for the Reduction of Obtrusive Light GN016 and the provisions of BS 5489 Code of practice for the design of road lighting, where applicable. Lighting shall be directional, and positioned sympathetically, to minimise light spill and disturbance for sensitive receptors. Night lighting will only take place in areas that have had vegetation cleared during the daytime. **During operation:** All proposed operational mitigation will be designed to minimise light spill onto residential properties and habitats which support commuting and foraging bats. Where lighting columns back onto residential properties and/or sensitive receptors, backlight shields or similar mitigation will be required to mitigate significant effects. Lighting at the junction will be designed with backlight shields and LED bulbs to reduce light spill onto habitats which support commuting and foraging bats.	Sensitive receptors within the vicinity of the site (as identified in Appendix 7.7 (**TR010037/APP/6.3**) (**APP-086**)	Regular site audits and compliance with EMP (**TR010037/APP/7.4**) (**APP-128**)	Contractual responsibilities between Highways England and the Principal Contractor.	PC	P C	Initial: Signed:
G3	General ES	Avoidance of double handling of materials	Material deliveries shall be programmed in advance as far as practicable and on an “as required” basis to avoid temporary storage and double handling on site.	Construction	Compliance with a Materials Management Plan	Contractual responsibilities between Highways England and the PC	PC	P	Initial: Signed:
G4	General ES	Ensure traffic flows on the existing A47 and local roads are maintained during construction	The PC will prepare a Traffic Management Plan to manage the routing of construction traffic based on the outline Traffic Management Plan **(TR010037/APP/7.5)** (**APP-129**). Stakeholders including Norfolk CC and Royal Mail need to be acknowledged as a consultee on construction traffic management document and referenced in the list of parties that will be notified on closures and diversions during the construction period. Appropriate traffic management measures will be put in place to ensure that traffic flows on the existing A47 and other local roads are maintained, whilst allowing safe working at the interface between the existing road network and the Proposed Scheme. Routing of deliveries where possible and practicable will be along the existing A47. The PC will seek to reduce worker vehicle movements and HGV movements, particularly at peak periods.	Local road and existing A47 is used regularly	Compliance with the Outline Traffic Management Plan (**TR010037/APP/7.5**) (**APP-129**) submitted as part of the DCO application	Contractual responsibilities between Highways England and the Principal Contractor	PC	P C	Initial: Signed:

Ref	Source of Action Document Ref	Objective	Action (including specific location if applicable)	Assumptions (on which the action is based)	Achievement criteria and reporting requirement (if applicable)	How the action is to be implemented	Responsible person(s)	When P= Pre-construction C=Construction O=Operation A=All	Completion Record
G5	General ES	To reduce the visual impacts of the construction works for nearby sensitive receptors	To reduce visual effects of the Proposed Scheme during construction The Principal Contractor will employ considered approach to minimise visual impact, for example: • keeping a tidy and organised site • temporary storage of soil mounds in linear bunds in locations where this would be beneficial to the visual screening of construction works • soil storage mounds managed in accordance with series 600 to assist visual integration of earthworks • protection of retained vegetation in accordance with British Standard (BS) 5837:2012 • materials being delivered on an 'as needed' basis to prevent unnecessary stockpiles	Construction works can be visually intrusive	Compliance with the Environmental Masterplan (**TR010037/APP/6.8**) (**APP-123**) submitted as part of the DCO application	Contractual responsibilities between Highways England and the Principal Contractor	PC	P C	Initial: Signed:
G6	General ES	Protection of protected species during construction	During construction, toolbox talks, and other briefings will be carried out to ensure operatives can: • Identify habitats suitable for protected species, individual species themselves, and understand measures required when these species are encountered. In the event that any protected or priority species which were not previously identified in the Environmental Statement (ES) (or any nesting birds) are found during construction, the works in the vicinity of the identified species must cease and it be reported immediately to the Ecological Clerk of Works (ECoW).	Ecology surveys have indicated the presence of protected species	The PC will update the EMP with Toolbox talks. The PC will comply with the requirements of the EMP (**TR010037/APP/7.4**) (**APP-128**)	Contractual responsibilities between Highways England and the Principal Contractor, and Requirement 7 of the DCO.	PC	P C	Initial: Signed:
G7	General ES	Ensure positive community relations	Communication with local residents will take place during construction to highlight potential periods of disruption. This will be agreed in advance but could be undertaken via newsletters, the Highways England scheme webpage, or an appointed Community Liaison Officer. The Highways England Customer Contact Centre will be available to deal with queries and complaints from the public. An information line will be staffed and a complaint management system in place, used on other major infrastructure projects, to ensure complaints are investigated, action is taken and the complainant receives a response. A Community Relations Officer will be appointed who will be responsible for these specific tasks will prepare a community relations strategy to outline how these tasks will be undertaken. A forum will be established to disseminate construction information to the consultees.	Consultation with the local community	National Considerate Constructor's Scheme [4]and establish a forum to disseminate construction information to the consultees. A community relations strategy is to be produced at the pre-construction stage.	Contractual responsibilities between Highways England and the Principal Contractor	PC	P C	Initial: Signed:
G8	General ES	To ensure all proposed embedded environmental mitigation elements retain their	Construction to take place in accordance with the Environmental Masterplan (**TR010037/APP/6.8**) (**APP-123**) which will be submitted as part of the DCO application. Where design amendments within the vertical and horizontal limits of deviation are required, environmental mitigation measures such	Potential for mitigation bunds to lose their function as noise / landscape /	Compliance with the Environmental Masterplan (**TR010037/APP/6.8**) (**APP-123**) submitted as part of the DCO application	Contractual responsibilities between Highways England and the Principal Contractor, and	PC	P C	Initial: Signed:

[4] National Considerate Constructors Scheme is a not-for-profit, independent organisation founded to raise standards in the construction industry. Construction sites, companies and suppliers voluntarily register with the Scheme and agree to abide by the Code of Considerate Practice, designed to encourage best practice beyond statutory requirements

Ref	Source of Action Document Ref	Objective	Action (including specific location if applicable)	Assumptions (on which the action is based)	Achievement criteria and reporting requirement (if applicable)	How the action is to be implemented	Responsible person(s)	When P= Pre-construction C=Construction O=Operation A=All	Completion Record
		function not withstanding any design amendments within the vertical and horizontal limits of deviation.	as noise bunds and barriers will undergo the same vertical and horizontal changes to ensure mitigation measures are still effective.	visual screening.		the requirements of the DCO.			
G9	General ES	EMP refinement	The PC will further develop the EMP prior to commencement of works based on the current EMP. It will include the implementation of industry standard practice and control measures for environmental impacts. Any design changes which require an update to mitigation proposed will be updated in the second iteration of the EMP.	Not applicable	The EMP will be updated by the PC once the design and construction plans have been finalised and prior to commencement of construction. The 3rd iteration of the EMP will be refined at the end of the construction stage to support future management and operation of the Proposed Scheme	Contractual responsibilities between Highways England and the Principal Contractor.	PC	P C	Initial: Signed:
G10	General ES	Protection of local network.	Wheel washing facilities will be installed at all compounds and material storage areas to mitigate the risk of construction material fouling the local network. This may involve a simple coarse gravel running surface or jet wash, or in the case of a heavily used exit point, wheel washers.	The local road network is used by construction traffic	Installation and use of facilities.	Contractual responsibilities between Highways England and the Principal Contractor.	PC	P C	Initial: Signed:
G11	General ES	Utilities diversion	Safe digging practices and suitable permitting will be applied during the works, along with thorough site investigations prior to the works, as non-intrusive survey methods seldom manage to locate plastic mains. National Grid Electrical Transmission 400kV overhead lines & towers cross the Scheme. Measures to maintain access & minimum safe clearance to be incorporated into the design.	Diversion of utilities required as part of the Proposed Scheme	Regular monitoring and inspection to ensure the assets are protected	Contractual responsibilities between Highways England and the Principal Contractor.	PC	P C	Initial: Signed:
G12	General ES	Site restoration	Pre-works photography to be undertaken to prior to any construction works to provide a detailed baseline record. Photography to be used to demonstrate site restoration and replanting has been successful.	Site restoration	Monitoring and comparison of the site restoration post construction	Undertaking of pre works photography by PC	PC	C O	Initial: Signed:
Air Quality (AQ)									
AQ1	Air quality (ES Chapter 5)	To limit and control emissions to air during construction on sensitive receptors	Based on a construction dust risk potential of high for the project, the following activities are recommended to monitor the effectiveness of the proposed mitigation measures which will be included in the EMP: • Development of dust management plan with measures to monitor effectiveness of mitigation as part of the EMP • Daily onsite and off-site inspections to be included in EMP • Record of complaints/exceptional dust events to be included in EMP	Community receptors and ecological designated sites sensitive to changes in dust within the vicinity of the Proposed Scheme (noted in Chapter 5 of the ES **(TR010037/APP/6.1)** (**APP-042**)and presented in ES Figure 5.1	No justified complaints of dust nuisance from receptors in the vicinity of the Proposed Scheme.	Regular Site Audits	PC	P C	Initial: Signed:

Ref	Source of Action Document Ref	Objective	Action (including specific location if applicable)	Assumptions (on which the action is based)	Achievement criteria and reporting requirement (if applicable)	How the action is to be implemented	Responsible person(s)	When P= Pre-construction C=Construction O=Operation A=All	Completion Record
				(TR010037/APP/6.2) (APP-055).					
Cultural Heritage (CH)									
CH1	Cultural Heritage (ES Chapter 6)	To limit impacts on the setting and location of heritage assets and historic landscape	Sensitive vegetation planting design along the route corridor and proposed junctions to screen and enhance the setting of heritage receptors (Scheduled monument, 'Two Tumuli at Big Wood')	EIA - Cultural heritage assessment	Compliance with the Environmental Masterplan (**TR010037/APP/6.8**) (**APP-123**) submitted as part of the DCO application	Environmental Masterplan Landscape and planting design	PC will liaise with specialist	P C	Initial: Signed:
CH2	Cultural Heritage (ES Chapter 6)	Protection of heritage assets during construction	Assets in the DCO boundary are to be excluded from the works and will be recorded and protected during construction (for example with HERAS fencing). This refers to the Milestone No.4 (Grade II listed building NHLE1050573), located on the B1172 Norwich Road. Condition surveys shall be undertaken for the Milestone No.4 (Grade II listed building NHLE1050573), located on the B1172 Norwich Road and in close proximity to construction works to obtain a baseline for regular condition monitoring. Protocols will be established following best practice guidance to ensure vibration levels are kept within acceptable tolerances (as defined in BS 5228-2), to avoid damage, and to halt or alter works methodology should tolerances be exceeded. Construction integrated recording is recommended for all remaining areas of known archaeological potential.	EIA - Cultural heritage assessment	Regular monitoring and inspection to ensure the assets are protected The scope of protection of heritage assets during the construction will be agreed where appropriate with Norfolk County Council (NCC) Environmental Services, Broadland District Council Conservation Officer and Historic England before construction	Highways England chosen Archaeological specialist will liaise with Principal Contractor	PC Design Team	P C	Initial: Signed:
CH3	Cultural Heritage (ES Chapter 6)	Preservation in-situ of known and potential archaeological resources during the final design phase	The final layout for temporary structures, services, haul routes, storage methods etc. will have regard to heritage value of the known and potential archaeological resource within the footprint of the Proposed Scheme and preserve remains where possible by excluding open areas from works with appropriate fencing. The heritage value of the known and potential archaeological resource within the footprint of the Proposed Scheme lies in its potential to contribute to the regional research framework objectives. Preservation by record would be an appropriate method to mitigate adverse effects. Identified remains are not of such complexity and sensitivity that preservation in situ would be necessary. However, good practice dictates that where remains need not be disturbed, they will be protected to ensure they are preserved for the future.	EIA - Cultural heritage assessment	Scope of mitigation required to be included in the Detailed Heritage Written Scheme of Investigation (Mitigation Strategy) and agreed with Norwich County Council Environmental Services (NCCES)	Highways England chosen Archaeological specialist will liaise with PC Detailed Heritage Written Scheme of Investigation (Mitigation Strategy)	PC Design Team	P C	Initial: Signed:
CH4	Cultural Heritage (ES Chapter 6)	To deal with unexpected archaeological discoveries during construction	During and prior to construction, a protocol for unexpected archaeological discoveries will be developed as part of the WSI (Mitigation Strategy). This protocol will be agreed with Historic England and NCCES in advance and is likely to include: • Toolbox talks or other instruction methods to allow operatives to identify potential archaeological remains • Protocols for protection, recording, and archiving of relevant finds • Protocols and communications plans for temporarily halting works and consulting with the relevant stakeholders in the	EIA - Cultural heritage assessment	Information to be included in the WSI and agreed with Norfolk County Council Environmental Services.	Highways England chosen Archaeological specialist will liaise with Principal Contractor	PC Highways England	P C	Initial: Signed:

Ref	Source of Action Document Ref	Objective	Action (including specific location if applicable)	Assumptions (on which the action is based)	Achievement criteria and reporting requirement (if applicable)	How the action is to be implemented	Responsible person(s)	When P= Pre-construction C=Construction O=Operation A=All	Completion Record
			event of unexpected remains of high or very high value / sensitivity. Protocols and communications plans will be included in the WSI (Mitigation Strategy). • Monitoring of any protection measures would be undertaken during construction to ensure that they remain effective including regular inspections of temporary fencing. During construction, works surrounding the Scheduled Monument to the east of the Proposed Scheme will be archaeologically monitored to deal with the occurrence of unexpected archaeological finds associated with the Scheduled Monument						
CH5	Cultural Heritage (ES Chapter 6)	Mitigation of impact on known and potential archaeological remains	A Detailed Heritage WSI (Mitigation Strategy) will be prepared by an archaeological specialist and will include the methodology for all archaeological mitigation required All recording and conservation measures will be captured within the DHWSI which will be agreed NCCES The heritage value of the known and potential archaeological resource within the footprint of the Proposed Scheme lies in its potential to contribute to the regional research framework objectives. Preservation by record will be an appropriate method to mitigate adverse effects. Identified remains are not of such complexity and sensitivity that preservation in situ would be necessary. However, good practice dictates that where remains need not be disturbed, they shall be protected to ensure they are preserved for the future. Throughout detailed design, proposals for temporary structures, services, haul routes, storage methods etc should have regard to this and preserve remains where reasonably practicable by excluding open areas from works with appropriate fencing. Archaeological excavation in advance of construction will be undertaken for: • any groundworks required within Thickthorn Park (MNF33732), and the known multi-period archaeological assets in it (MNF65378, MNF11820, MNF59885, MNF18186) • any groundworks required to the south of Thickthorn Junction (THK02 'Area C') • any groundworks required in the vicinity of the 'Two Tumuli in Big Wood' (scheduled monument NHLE1003977) This will comprise archaeological excavation and recording, comprising an archaeologist monitoring specific works areas. In the event that archaeological remains are identified the archaeologist would halt works and implement appropriate levels of recording, sampling and assessment.	EIA - Cultural heritage assessment	Consultation with the Local Authority Archaeology Advisor (Norfolk County Council) and Historic England. Production of a WSI. Appointment of an archaeological subcontractor to undertake the agreed works.	Contractual responsibilities between Highways England and the Principal Contractor, and the Requirements of the DCO.	PC will liaise with specialist	P C (Reporting may continue into the operation Phase)	Initial: Signed:
CH6	Cultural Heritage (ES Chapter 6)	Reduce impact upon buried archaeological remains.	Avoid ground disturbance in areas of temporary use, such as haul routes and compounds, by using protective solutions. These may include • In situ stabilising materials • Track matting, geotextile, bog mats or an alternative protective solution	EIA - Cultural heritage assessment	Results of watching briefs and/or archaeological trenching to facilitate management of compounds and haul routes across proposed compound areas.	Highways England chosen Archaeological specialist will liaise with Principal Contractor	PC Design Team	P C	Initial: Signed:

Ref	Source of Action Document Ref	Objective	Action (including specific location if applicable)	Assumptions (on which the action is based)	Achievement criteria and reporting requirement (if applicable)	How the action is to be implemented	Responsible person(s)	When P= Pre-construction C=Construction O=Operation A=All	Completion Record
			• Imprted granular materials						
CH7	Cultural Heritage (ES Chapter 6)	To limit the visual impact during construction activities	Due to the sensitive setting impact, existing vegetation is to be retained where possible, and in line with the Environmental Masterplan, during the construction around the Scheduled Monument (Two Tumuli in Big Wood)	EIA - Cultural heritage assessment	Compliance with the Environmental Masterplan (**TR010037/APP/6.8**) (**APP-123**) submitted as part of the DCO application	Contractual responsibilities between Highways England and the PC	PC	C	Initial: Signed
CH8	Cultural Heritage (ES Chapter 6)	Mitigation of impact on known and potential paleoenvironmental remains	Depending on the results of geoarchaeological monitoring, programmed for Spring 2021 in the area of the proposed Cantley Stream diversion, a programme of palaeoenvironmental mitigation may be required. The aims of palaeoenvironmental mitigation will be to (a) analyse stratigraphy and retrieve samples for laboratory analyses and dating (b) assess the potential for/location and age and significance of any buried land surfaces preserved within the DCO boundary. The scope of palaeoenvironmental evaluation works will be specified in a written in a Written Scheme of Investigation (WSI) which will be agreed with Historic England and NCCES.	EIA - Cultural heritage assessment	Strategy for appropriate mitigation will be developed in consultation with Historic England and NCCES	Highways England chosen Archaeological specialist will liaise with PC	PC Design Team	P C	Initial: Signed:
CH9	Cultural Heritage (ES Chapter 6)	Provision of heritage information board on Cantley Lane Link Road	A heritage information board to provide an explanation of the history and significance of the scheduled monument, set in the context of the wider contemporary prehistoric landscape from the vantage point on Cantley Lane Link Road.	EIA Cultural heritage assessment	Strategy for appropriate mitigation will be developed in consultation with Historic England and NCCES	Highways England chosen Archaeological specialist will liaise with PC	PC Design Team	P C	Initial: Signed:
Landscape and Visual (LV)									
LV1	Landscape and visual (ES Chapter 7)	To ensure the enhancement of the landscape character and visual effects	The maintenance of mitigation such as planting and seeding after the construction period will be the responsibility of Highways England ensuring all proposed mitigation reaches maturity Planting and seeding, proposed as mitigation for landscape and visual effects, would be maintained in order to achieve their full establishment throughout the construction contract. This will be detailed in the landscape and ecology management plan produced during detailed design and reported in the second iteration of the EMP (Construction)	Sensitive landscape and visual receptors and ecology receptors within close proximity to the Proposed Scheme.	Successfully implement Environmental Masterplan (**TR010037/APP/6.8**) (**APP-123**) and compliance with the Landscape and Ecology Management Plan.	To be implemented by Highways England, the Principal Contractor and Sweco.	PC Highways England	O	Initial: Signed:
LV2	Landscape and visual (ES Chapter 7)	To limit the impact of construction on existing trees and vegetation to be retained	The Principal Contractor will engage an arboricultural consultant to complete the following in advance of works: • complete an arboricultural method statement. The method statement shall include, but are not limited to the following: ○ Tree protection measures in compliance with BS5837:2012 (Trees in relation to design, demolition, and construction – Recommendations) during the construction phase. ○ Maintenance and monitoring requirements of the tree protection measures ○ Schedule of trees to be removed and retained in compliance with **TR010037/APP/6.8** (**APP-128**) Environmental Masterplan and **TR010037/APP/6.3** (**APP-123**) Appendix 7.6 Arboricultural Impact Assessment (**APP-085**)	EIA - Landscape and visual impact assessment	Compliance with the Environmental Masterplan (**TR010037/APP/6.8**) (**APP-123**) submitted as part of the DCO application. All proposed landscape and visual mitigation measures to be implemented by the year of opening with planting to have established by year 15	Regular site inspections to be implemented by the Principal Contractor and the Proposed Scheme Arboriculturalist	PC and the Proposed Scheme arboriculturalist	C	Initial: Signed:

Ref	Source of Action Document Ref	Objective	Action (including specific location if applicable)	Assumptions (on which the action is based)	Achievement criteria and reporting requirement (if applicable)	How the action is to be implemented	Responsible person(s)	When P= Pre-construction C=Construction O=Operation A=All	Completion Record
			○ Tree root protection zones ○ Contingency plan (chemical spillage, collision, emergency access to the root protection zone) • monitor tree protection measures on site. This shall include, but are not limited to the following: ○ Checking the robustness and positioning of tree protection fencing. ○ Checking that no materials or plant are stored within the tree root protection zones All trees to be retained or removed are identified within the Arboricultural Impact Assessment.						
LV3	Landscape and visual (ES Chapter 7)	Protection and enhancement of the landscape character and sense of place Replanting to mitigate loss of trees	Retain or replace and reinforce existing vegetation where this contributes to the distinctive qualities of the landscape. Select plant and grass species appropriate to the locality and with consideration of seasonal variations. Refer to Environmental Masterplan **TR010037/APP/6.8** (**APP-123**) for detail of planting proposals	EIA – Landscape and visual impact assessment	Environmental Masterplan (**TR010037/APP/6.8**) (**APP-123**)	Regular site inspections and audits	PC	P C	Initial: Signed:
Biodiversity (B)									
B1	Biodiversity (ES Chapter 8)	To ensure data on Protected Species is valid and robust	European Protected Species surveys remain valid for a period of two years after completion. Where a protected species survey was undertaken over this time period and construction works has not yet commenced, the PC will appoint a suitably qualified ecologist to update the survey information and undertake a pre-construction site survey to identify the presence of potential protected species on site.	Protected Species will move around site and survey information greater than two years may not reflect current situation.	If updated surveys are required, the suitably qualified ecologists shall prepare an updated report including mitigation (if required). The report shall be agreed with Natural England and a copy provided to the Local Authority Biodiversity Officer.	Contractual responsibilities between Highways England and the PC	PC will liaise with specialist	P	Initial: Signed:
B2	Biodiversity (ES Chapter 8)	To avoid disturbance to species during site clearance and construction activities	Pre-construction ecological surveys are required prior to any site clearance by an Ecological Clerk of Works (ECoW) and prior to vegetation clearance. If any protected species are found, they will be moved to a safe suitable area. Timings will be stipulated in the Landscape and Ecology Management Plan (LEMP). Tool-box talks will be given by the on-site ECoW to contractors and site operatives to raise awareness.	EIA – Biodiversity assessment	Pre-clearance ecological surveys	On-site monitoring LEMP	PC will liaise with specialist	P	Initial: Signed:
B3	Biodiversity (ES Chapter 8)	To prevent or minimise the impact of nuisance or pollution impact during construction activities	Construction best practice in relation to pollution prevention and water management as set out in Construction Industry research and Information Association (CIRIA) Guidelines ((Soubry (2001), Murnane et al. (2006), Charles and Edwards (2015)), and the Environment Agency's approach to groundwater protection (Environment Agency, 2017) and groundwater protection guides (Environment Agency, 2017 a), as required under the Water Framework Directive. Drainage around the main compound will follow construction good practice to minimise or prevent risk of pollution incident.	EIA - Biodiversity assessments	Pre-construction surveys	EMP Dust management plan LEMP	PC will liaise with specialist	P C	Initial: Signed:

Ref	Source of Action Document Ref	Objective	Action (including specific location if applicable)	Assumptions (on which the action is based)	Achievement criteria and reporting requirement (if applicable)	How the action is to be implemented	Responsible person(s)	When P= Pre-construction C=Construction O=Operation A=All	Completion Record
			Construction vehicles will be excluded from driving over species rich grassland (as shown on Figure 8.2 (Designated Sites) (**TR010037/APP/6.2**) (**APP-068**)). If this is not possible, heavy duty ground protection shall be installed to protect the soil and turf. Night lighting during construction will be directed away from sensitive biodiversity resources as identified in the LEMP. Where possible, lighting will be designed with backlight shields and LED bulbs, directional, and positioned sympathetically, to minimise light spill and disturbance for sensitive receptors including notable habitats.						
B4	Biodiversity (ES Chapter 8)	To avoid disturbance on Priority habitats including mature and veteran trees, hedgerows	Any hedgerow deemed species rich or 'important' will be translocated and not lost, with locations provided in the LEMP. During the detailed design of the Proposed Scheme, it will be investigated if works can be altered to avoid impact to important hedgerows. Species poor hedgerows will be gap filled to increase species diversity and quality across the site. New species rich hedgerows with trees will be planted in addition to deciduous woodland Areas of temporary land clearance will be replanted with native trees and shrubs and species-rich grassland illustrated by the Environmental Masterplan (**TR010037/APP/6.8**) (**APP-123**). Pollution during construction will be mitigated by using best practice methods for pollution prevention and water management. Monitoring during construction will also be implemented and will be outlined within the temporary surface water drainage strategy..	Ecological surveys	Compliance with Environmental Masterplan (**TR010037/APP/6.8)** (**APP-123**)	To be implemented by the Principal Contractor	PC	P C	Initial: Signed:
B5	Biodiversity (ES Chapter 8)	To avoid disturbance on Protected Species and habitat for bats	Disturbance and destruction of bat roosts to be fully mitigated as it requires a Natural England licence. This will include the installation of bat boxes on retained mature trees prior to enabling works. Works close to roosts will be undertaken under supervision from a bat licence holder registered with Natural England. Disturbance from noise will be mitigated including, but not limited to the following: • using temporary noise barriers, • quieter plant, • leaving a buffer zone around sensitive receptors • reducing time on noisy activities. Vibration will be reduced with early warning, pre-condition surveys, short work durations, and vibration monitoring. Works near trees and that may disturb roosting bats in buildings as identified by the suitably qualified ecologist or ECoW will be undertaken under supervision from a registered bat licence holder. Implementation and adherence to the Construction noise management plan will mitigate any potential noise disturbance. Lighting will be directional, and positioned sympathetically, to minimise light spill and disturbance for sensitive receptors including foraging bats.	EIA - ecological surveys	Precautionary method statement Crossing points to be monitored during operation and if required, changes to the EMP can be made.	Licence requirements LEMP	PC will liaise with specialist	A	Initial: Signed:

Ref	Source of Action Document Ref	Objective	Action (including specific location if applicable)	Assumptions (on which the action is based)	Achievement criteria and reporting requirement (if applicable)	How the action is to be implemented	Responsible person(s)	When P= Pre-construction C=Construction O=Operation A=All	Completion Record
			Habitat loss and severance from the larger footprint of the new road will be mitigated in a phased manner as construction progresses. For example, on completion of one part of the Proposed Scheme the section will be planted up upon completion. This will be outlined in the detailed Landscape and Ecological Management Plan. The addition of a 3m high environmental barrier between the existing A47 and the proposed A11-A47 connector road will help maintain the current higher bat flight path over the slip road and encourage bats to fly above traffic, reducing potential for road casualties. Furthermore, the retaining of trees at the end of Cantley Lane South will extend the crossing point.						
B6	ES – CH8	To limit impact on Protected Species – Water Voles Otter, badger	Works must be more than 5m from the top of the banks of the Cantley Stream. An ECoW will conduct a toolbox talk for all site personnel (including sub-contractors) prior to commencement of works. All excavations to be covered at night or a ramp left in so animals can climb out. Night lighting during construction will be directed away from sensitive features and should not affect this species. The culverts across the Proposed Scheme will be designed with suitable ledges to enable otter to pass through and fenced to prevent otter crossing Cantley Lane. Riparian planting in water vole receptor areas will be undertaken at least one growing season before the water voles are dispersed or translocated. Where water voles will be disturbed through the works (during the installation of outfalls) they will be displaced using habitat manipulation between 15th February and 15th April under supervision of a licensed ecologist. In the area where the proposed route crosses the stream or the stream is realigned, the water voles will be trapped out and translocated under Natural England licence. The water voles will be trapped out and translocated by suitably qualified ecologists in springtime to a receptor area that has previously been enhanced with vegetation and allowed to mature so the site is suitable to receive the water voles. This will be undertaken in accordance with the water vole licence method statement. Water vole mesh fencing will be erected in the area of the river where the water voles have been moved from during the duration of the works there. Water vole fencing will be checked weekly and repairs undertaken as necessary. Fencing will be removed from these areas as soon as works have finished. The location of fencing required will be outlined in the water vole licence method statement. Lighting will be directional, and positioned sympathetically, to minimise light spill and disturbance for sensitive receptors including water vole.	Loss of habitat as a result of the Proposed Scheme. Impact on Protected Species	Compliance with the Natural England licence, compliance with Environmental Masterplan **TR010037/APP/6.8,** (**APP-123**) **r**egular site audits and adherence to mitigation measures in the EMP (**TR010037/APP/7.4**) (**APP-128**)	Contractual responsibilities between Highways England and the Principal Contractor, and the Requirements of the DCO.	PC, Highways England and suitably qualified ecologist	P C	Initial: Signed:

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			Pollution during construction will be mitigated using best practice methods for pollution prevention and water management. Surface water monitoring during construction will also be implemented and will be outlined within the temporary surface water drainage strategy within the EMP. Disturbance from noise will be mitigated including, but not limited to the following: • using temporary noise barriers, • quieter plant, • leaving a buffer zone around sensitive receptors • reducing time on noisy activities. Vibration will be reduced with early warning, pre-condition surveys, short work durations, and vibration monitoring. As part of the water vole licence, post relocation of the water voles into the on-site receptor area, water vole monitoring surveys will commence the same year for a minimum of three years, or longer if necessary, to confirm an overall conservation benefit. If a reduction is observed, further mitigation may be required.						
B7	ES – CH8	To avoid disturbance on wintering birds and breeding birds, barn owl	Timing of vegetation clearance works is to take place outside of the bird nesting season (March to end of August inclusive), as far as practicable. If vegetation clearance goes into nesting season, the areas to be cleared will be checked by an ECoW immediately prior to clearance. Any nests or young must be avoided until the birds have fledged. Birds may be nesting in trees, hedgerows, grassland, arable and on water. The oLEMP will be developed into the LEMP which will detail the areas to clear and where pre-clearance ecological surveys need to be undertaken. Areas of temporary land clearance will be remediated with native trees and shrubs and species-rich grassland Installation of bird nest boxes suitable for tit species, kestrel, sparrowhawk, barn owl, tawny owl and little owl will be installed in suitably retained habitat which will help mitigate the loss of existing habitat. Bird boxes will be installed on remaining trees at a density of between 10 and 40 nest boxes per hectare. Areas of temporary land clearance will be remediated with hedgerows, native trees, shrubs, ponds, and species-rich grassland. Installation of barn owl boxes close to suitable rough grassland will help in enhancing the area for the species. If required, implementation of ten skylark plots in fields alongside new carriageway to create additional nesting capacity. Planting as shown on the Environmental Masterplan (**TR010037/APP/6.8**) along the new Cantley Link Road north west of the A11 will assist in preventing barn owls nesting in Thickthorn Hall being impacted by traffic when flying from or to the nest. Creation of kingfisher nesting banks at each of the proposed attenuation basins and two mallard nest tubes are to be installed at each basin.	Loss of habitat as a result of the Proposed Scheme.	Compliance with Environmental Masterplan **TR010037/APP/6.8** (**APP-123**)	Contractual responsibilities between Highways England and the Principal Contractor, and the Requirements of the DCO.	PC, Highways England	P C	Initial: Signed:

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			Implementation and adherence to the Construction Noise Management Plan will mitigate any potential noise and vibration disturbance. Night lighting during construction will be directed away from sensitive biodiversity resources as far as possible. Disturbance from noise will be mitigated including, but not limited to the following: • using temporary noise barriers, • quieter plant, • leaving a buffer zone around sensitive receptors • reducing time on noisy activities. Real-time noise monitoring will be provided on sites where there are sensitive ecological receptors. Vibration will be reduced with early warning, pre-condition surveys, short work durations, and vibration monitoring. (Chapter 11, Noise and vibration) Night lighting during construction will be directed away from sensitive features and should not affect these species. Creation of areas of rough grassland where possible as part of the landscape plans to mitigate the loss of suitable habitat. Installation of barn owl boxes close to suitable rough grassland will help in enhancing the area for the species Implementation and adherence to the Construction noise and dust management plan will mitigate any potential noise disturbance. Bat crossing point section and woodland and tree planting will assist birds in flying high over the A47. Nutrient poor habitats adjacent to the roads will help reduce the amount of scrub which will reduce foraging habitat on roadsides, results in a potential decrease in road casualties. Light spill will increase around Thickthorn Junction and overbridges. Woodland planting has been included in the environmental masterplan to reduce the effects of permanent lighting in these areas. Lighting will be designed with backlight shields and LED bulbs to reduce light spill onto habitats.					
B8	ES – CH8	To limit the impacts on mammals , terrestrial invertebrates, aquatic invertebrates and other notable species during construction (reptiles, common toad, hedgehog)	Suitable habitats will be searched by an Ecological Clerk of Works (ECoW) prior to vegetation clearance. If any are found, they will be moved to a safe suitable area. The suitable area for relocation will be provided in the detailed LEMP. Site clearance (excavation) will commence when reptiles are active during March to October inclusive. Implementation and adherence to the construction noise and dust management plan will mitigate any potential noise disturbance. Areas of temporary land clearance will be replanted with native trees and shrubs and species-rich grassland. Construction will take place mainly throughout the daytime, and night lighting will only take place in areas that have had vegetation cleared during the daytime.	Mammals are likely to move within the Proposed Scheme DCO boundary	Regular site audits and supervision of vegetation clearance Adherence to the EMP, Construction noise and dust management plan and Temporary surface water management plan	Contractual responsibilities between Highways England and the Principal Contractor	PC	P C	Initial: Signed:

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			During construction, toolbox talks and other briefings will be carried out to ensure operatives can identify habitats suitable for protected species, individual species themselves, and understand measures required when these species are encountered. Construction areas are to be fenced off and all excavations will either be covered at night, or a ramp left in, so animals can climb out. Species rich grassland and woodland habitat will be provided as part of the landscape design which will mitigate the loss of existing habitat. In the event that any protected or priority species which were not previously identified in the Environmental Statement (ES) **TR010037/APP/6.1** are found during construction activities, works in the vicinity of the identified species must cease and it be reported immediately to the Ecological Clerk of Works Implementation and adherence to the Construction Noise Management Plan will mitigate any potential noise and vibration disturbance. Night lighting during construction will be directed away from sensitive biodiversity resources as far as possible. Disturbance from noise will be mitigated including, but not limited to the following: • using temporary noise barriers, • quieter plant, • leaving a buffer zone around sensitive receptors • reducing time on noisy activities. Real-time noise monitoring will be provided on sites where there are sensitive ecological receptors. Vibration will be reduced with early warning, pre-condition surveys, short work durations, and vibration monitoring. (Chapter 11, Noise and vibration) Night lighting during construction will be directed away from sensitive features and should not affect these species. All veteran trees to be retained shall be protected with a suitable buffer zone Best practice methods for pollution prevention will be adhered to during construction activities. Reptile enhancement will be undertaken behind Cantley Lane South area consisting of the installation of a reptile hibernacula, hummocky landscaping and planting of scrub and grassy areas. The installation of attenuation ponds and improved planting in Cantley Stream as part of the drainage design will mitigate for loss of aquatic invertebrate habitat The provision of appropriate drainage system within the design including vegetated attenuation ponds will treat potential run off and mitigate any potential impact to mammals.					

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			Surface water monitoring during construction will also be implemented and will be outlined within the temporary surface water drainage strategy within the EMP. Light spill will increase around Thickthorn Junction and the overbridges. Woodland planting has been included in the environmental masterplan to reduce the effects of permanent lighting on sensitive ecological receptors. Lighting will be designed with backlight shields and LED bulbs to reduce light spill onto habitats.						
B9	ES-CH8	Protection of designated ecological receptors (SSSI, LNR and CWS)	Pollution during construction will be mitigated by using best practice methods for pollution prevention and water management. Monitoring during construction will also be implemented and will be outlined within the temporary surface water drainage strategy within the EMP.	Ecological surveys and ES- CH13 RDWE **TR010037/APP/6.1** (**APP-050**)	Regular site audits and adherence to mitigation measures in the EMP (**TR010037/APP/6.8**) (**APP-128**) and Temporary surface water management plan	PC	PC	P C	Initial: Signed:
B10	ES – CH8	Protection of retained trees	All veteran and mature trees will be protected with a suitable buffer zone to ensure they are not damaged during the construction phase. Where trees are to be retained, a Root Protection Area (RPA) will be applied. All works are restricted to areas outside the RPA. Any veteran trees which are removed as part of the vegetation clearance process will be relocated to nearby suitable woodland parcels to provide suitable habitat for invertebrates. Areas of land clearance will be replanted with native trees in compliance with the Environmental Masterplan **TR010037/APP/6.8** (**APP-123**) The Principal Contractor will engage a suitably qualified arboricultural consultant to carry out any pre-construction surveys and works as required. This contractor will provide a Method Statement to comply with current best practices (as detailed in BS 3998: Tree Works- Recommendations) (LV2)	Trees to be retained are within close proximity to the works.	Regular site audits and adherence to the Arboricultural Method Statement (**TR010037/APP/7.4**) (**APP-085**)	To be implemented by the PCand the Proposed Scheme Arboriculturalist	PC and the Proposed Scheme arboriculturalist	C	Initial: Signed:
B11	ES – CH8	Protection of the botany within Meadow Farm CWS	Where possible construction vehicles will be excluded from driving over the Meadow Farm Meadows grassland. If this is not possible, heavy duty ground protection will be installed to protect the soil and turf. No new drainage will be inserted into the CWS. Where the trench is to be dug through the CWS as part of the installation of UKPN electric cable, the turf and sub soil must be used in the backfilling to maintain the pre-existing seedbank. Turf strips shall be removed first and stored in situ, and spoil will be stored in-situ on a tarpaulin and bunded to prevent it washing into nearby watercourses.	Ecological and drainage surveys	Compliance with the EMP (**TR010037/APP/7.4**) (**APP-128**) Regular site audits	To be implemented by the Principal Contractor	PC	C	Initial: Signed:
B12	ES – CH8	To limit transfer of diseases during construction	The transfer of diseases during construction will be mitigated by implementation of a Biosecurity Management Plan (updated in the second iteration of the EMP) which will be provided by the Principal Contractor prior to construction commencing works on site.	Not applicable.	Compliance with Biosecurity Management Plan contained within the EMP (**TR010037/APP/7.4**) (**APP-128**)	Contractual responsibilities between Highways England and the PC, and the Requirements of the DCO.	PC	P C	Initial: Signed:

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B13	Biodiversity (ES Chapter 8)	To prevent or minimise the introduction or spread of Invasive Non Native Species (INNS) during construction	The introduction or spread of INNS during construction will be mitigated by implementation of an INNS Management Plan. This will contain knowledge of appropriate treatment methods to ensure that construction proceeds within the legal framework to ensure prevention of spread both within and beyond the DCO boundaries.	EIA - Biodiversity assessment and surveys	Pre-construction surveys	INNS Management Plan	PC	P C	Initial: Signed:
B14	ES – CH8	To protect Great Crested Newts (GCN)	Prior to construction works, a suitably qualified ecologist will undertake further GCN survey to determine the presence of the species across the study area. (Due to Covid-19 restrictions in 2020, GCN surveys are partially incomplete). If GCN are identified within 500m of the works, then they would need to be trapped and translocation to a suitable receptor site that are located within the DCO boundary but outside of the working areas will be undertaken. In some cases, this will be into newly created habitats. This will be done under licence from Natural England prior to construction in specific areas identified during surveys. All excavations to be covered at night or a ramp left in so animals can climb out. Great crested newt presence or absence (eDNA) surveys will be undertaken for two years post construction as part of the monitoring required in the mitigation licence.	A complete survey of GCN was not completed prior to DCO submission due to restrictions during Covid-19.	A GCN survey and associated report will be undertaken by a suitably qualified ecologist. GCN surveys must be undertaken between April-June inclusive	Contractual responsibilities between Highways England and the PC, and the Requirements of the DCO.	PC and suitably qualified ecologist	P C O	Initial: Signed:
B15	ES – CH8	To limit the impacts on fish species during construction	Where works are to be undertaken in water, an ECoW will be present to check for fish. If fish are detected, a fish rescue will be required prior to instream works. If required, fish rescue will be undertaken by a two person team using battery powered electric fishing equipment. Prior to fishing, stop nets will be deployed manually upstream and downstream of each survey site location to isolate the survey reach. These nets will be fastened to the river bank using tree trunks where possible or weights if necessary. The electric fishing team will work systematically along the survey section of the watercourse to be dewatered with all fish captured identified, counted and measured to the nearest mm (fork length) prior to being released upstream of the site. All equipment will be disinfected before arriving at the site. Full details on these requirements will be provided in the second iteration of the EMP.	The potential for Cantley Stream to support fish species.	Compliance with the Ecology Management Plan contained within the EMP (**TR010037/APP/7.4**) (**APP-128**)	Contractual responsibilities between Highways England and the PC	PC, Detailed Design team and suitably qualified ecologist	C	Initial: Signed:
B16	ES – CH8	To monitor Protected Species - post mitigation	Post-development monitoring will be required for newly created habitats and protected species and will be detailed in the Ecology Management Plan. Habitats, bird and bat boxes will be monitored and managed for five years after they have been created. Further details of the monitoring to be undertaken can be found in the Ecology Management Plan. Should a GCN mitigation licence be required (depending on the results of the surveys to be done preconstruction), monitoring may be required for between two- and four-years post construction as part of the licence.	The design of the Proposed Scheme has incorporated new habitat, bird and bat boxes	Compliance with the Ecology Management Plan contained within the EMP (**TR010037/APP/7.4**) (**APP-128**)	Contractual responsibilities between Highways England and the PC	PC, Detailed Design team and suitably qualified ecologist	O	Initial: Signed:
Geology and Soils (GS)									

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GS1	Geology and soils (ES Chapter 9)	To ensure identified risks associated with contamination are appropriately managed and minimised	Measures will include (but not be limited to): • Ensuring adequate space for storage of topsoil and subsoil which must be segregated during excavation. • Protection of watercourses from entry of polluting matter. • Stripping, storing, and reinstating of soils using best practice measures to minimise the risk of degradation to soils. • Controls during construction for identification of unexpected contamination (these controls will be determined during the second iteration of the EMP). Suppression of odour and dust using best practice measures.	EIA – Geology and soils assessment	On-site monitoring	On-site monitoring	PC will liaise with specialist	P C	Initial: Signed:
GS2	ES – CH10	To manage the potential risks associated with made ground	Potential ground-gases and vapours in confined spaces during construction will be monitored. A ground gas risk assessment and management strategy for working in confined spaces and excavations. Inclusion of a break layer between contaminated materials and areas of soft landscaping to remove the pathway between contamination and receptors. Gas protection installed into service ducting in areas where ground gas production is considered to be a potential risk. Measures will include (but not be limited to): • Monitoring of potential ground-gases and vapours in confined spaces during construction. • Design of in-ground structures to appropriate concrete design class. If any previously unidentified contaminated land is encountered during the monitoring of earthworks then a suitably experienced and qualified specialist should be notified and appropriate actions taken to assess and address any associated risks. Actions may include; • sampling and assessment of soils to understand suitability for use. • remediation of unsuitable materials either by on-site treatment, off-site treatment, or off-site disposal. • assessment of mitigation strategies to enable contaminated soils to be re-used for example, inclusion of break layer to remove the pathway between contamination and sensitive receptors.	EIA – Geology and soils assessment	On-site monitoring	Health & Safety Method Statements	PC	P C	Initial: Signed:
GS3	Geology and Soils (ES Chapter 9)	To manage the impacts on soils from temporary and permanent land take	The Principal Contractor will prepare a Soil Management Plan (SMP) incorporating guidance provided by the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009). The SMP will be produced to ensure the use of best practice measures for soil handling. The SMP will include a Soil Resource Plan and a Soil Handling Strategy informed by a soil resource survey. The re-use of excavated soils (on or off the site) during construction shall be governed by a Materials Management Plan (MMP) prepared by the Principal Contractor.	EIA – Geology and soils assessment	On-site monitoring	Soil Management Plan (SMP) including a Soil Resource Plan and a Soil Handling Strategy Materials Management Plan (MMP)	PC will liaise with specialist	P C	Initial: Signed::

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			The MMP shall be developed in accordance with the CL:AIRE Definition of Waste Code of Practice (DoW CoP), Version 2, 2011. This approach offers the most effective method of ensuring materials can be re-used on or off the Proposed Scheme. Measures will be secured in a Materials Management Plan (MMP) and will include (but not be limited to): • Minimisation of over-excavation of soils • Ensure that soils from permanent land take areas are reused within the Proposed Scheme where possible, as identified in the MMP • Where there are excess soils generated, these will be saved and reused outside the Proposed Scheme where there are opportunities to do so, in accordance with the MMP • Restoration of temporary land take areas to their former condition, based on pre-construction site surveys. Construction vehicles will be confined to designated haul routes where possible Suitability for re-use requires chemical and geotechnical assessment to demonstrate that surplus materials do not constitute waste. The MMP will detail the procedures and measures to be implemented to classify, track, store, re-use and dispose of all excavated materials encountered during the construction phase. The SMP and MMP would outline areas of soil to be protected from earthworks and construction activities; the areas and types of topsoil and subsoil to be stripped, haul routes, stockpile locations; the methods for stripping, stockpiling, re-spreading and ameliorating landscape soils and restoring temporary land take areas, and a cut and fill balance to ensure as much material as possible is re-used in the Proposed Scheme. All affected soil will be stripped, including topsoil and subsoil, and stored separately. Soil stripping, handling and storage will be monitored/audited to ensure that it follows the procedures outlined in the SMP. Following the reinstatement of the temporary land take, there would be a programme of monitoring of soil conditions to identify if there are soil problems which need to be remediated. This would include an assessment of the problem and design of a suitable remediation strategy such as subsoiling or drainage followed by crop establishment. Where necessary for protection from earthworks and construction activities, agricultural soils will be stripped, stored and replaced to their baseline condition, as far as possible.					
GS4	Geology and Soils (ES Chapter 9)	To manage unexploded ordnance (UXO)	Following mitigation measures will be secured in the Operational UXO Emergency Response Plan: 1. Operational UXO Emergency Response Plan. Appropriate site management documentation shall be held on site containing procedures and guidance for the actions that will be taken in the event of a suspected or real UXO is discovered.	Not applicable	On-site monitoring	Soil Management Plan (SMP) including a Soil Resource Plan and a Soil Handling Strategy Materials Management Plan	PC and On-call EOD engineer	P C	Initial: Signed:

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			2. UXO safety and awareness briefings. All personnel working on the Proposed Scheme shall receive a briefing on the identification of UXO and actions that will be taken (see point 1). Information shall be held on site and displayed on notice boards. On-call engineer. An on-call explosive ordnance specialist shall be retained to identify UXO and to provide advice on the appropriate course of action in the event of suspected or identified UXO finds.			(MMP) Operational UXO Emergency Response Plan			
GS5	Geology and Soils (ES Chapter 9)	To maximise the re-use of suitable geological resources while minimising waste generated	Where there are excess soils generated, some may be saved and reused outside the Proposed Scheme where there are opportunities to do so and where such reuse is permitted.	EIA – Geology and soils assessment	Detailed in the MMP (**TR010037/APP/7.4**). (**APP-128**)	Contractual responsibilities between Highways England and the Principal Contractor	PC	C	Initial: Signed:
GS6	Geology and Soils (ES Chapter 9)	Minimising impact to agricultural land Re-instatement of the area to the same quality as the pre-construction phase.	Construction compound and working areas will include a clear demarcation (fence) of the construction area and prevent access onto adjacent areas of agricultural land that could result in further compaction or damage of soils. Construction vehicles will be confined to designated haul routes to reduce potential risk of compaction of soil where operationally feasible. The area required for temporary land take to accommodate the main and satellite construction compounds will be reinstated to as far as practicable to a standard based on pre-construction agricultural site surveys.	Construction works can damage soils or cause compaction	Compliance with the EMP (**TR010037/APP/7.4**) (**APP-128**) and outline Traffic Management Plan (**TR010037/APP/7.5**) (**APP-128**). Agricultural survey to confirm land use.	Contractual responsibilities between Highways England and the PC	PC	P C	Initial: Signed:
Material assets and Waste (M)									
M1	Material assets and waste (ES Chapter 10)	Responsible sourcing of materials	Design for re-use and recovery by identifying, securing and using materials that already exist on the Proposed Scheme, or can be sourced responsibly from other projects. Maximising the use of renewable materials and materials with recycled content. Design for offsite construction by maximising the use of prefabricated structures and components, where feasible, encouraging a process assembly rather than construction on the site. Use of material logistics planning to manage procurement, storage and use of material assets and minimise damage, over ordering and wastage. EMP (second iteration) to provide detailed information on the duty of care documents that will be needed, such as the waste transfer notes and consignment notes, as well as strategies to be implemented to minimise waste generation and increase re-use and recycle. MMP (developed in accordance with the CL:AIRE Definition of Waste Code of Practice (DoW CoP), Version 2, 2011 to monitor and track the movement, storage and placement of imported soils and stones. Appropriate project key performance indicators (KPI) to be set. A construction and demolition waste recovery and or recycling rate of 70% will be set.	EIA –Material assessment	Compliance with the EMP (**TR010037/APP/7.4**) (**APP-128**). including the MMP, SMP, SWMP,	EMP (second iteration), SMP, MMP, SWMP	PC will liaise with specialist	P C	Initial: Signed:

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			Use of renewable materials and materials with recycled content in line with the east of England region's 31% target. Measures to encourage local and responsible resourcing of material assets (for example through adoption of Buildings Research Establishment (BRE) developed BES 6001). Where required, import of clean naturally occurring soils and stones from another development site would be undertaken in accordance with a Materials Management Plan (MMP						
M2	ES Chapter 10 Material assets and waste	To maximise the re-use of suitable geological resources and to adopt good waste management practices and follow the waste hierarchy	The Principal Contractor shall develop a Site Waste Management Plan (SWMP). The SWMP shall monitor the quantities and types of waste generated, as well as the duty of care information for the contractors transferring the waste and the sites the waste is taken to for management. An outline SWMP for the Proposed Scheme is provided in Appendix 10.3 of the ES (APP-107). The EMP and SWMP require the Principal Contractor to adopt best practice in the management of construction waste to reduce waste generation and subsequent landfill disposal. Mitigation measures shall include: Consideration, in accordance with the waste hierarchy, to the re-use of waste generated onsite before it is transported off-site for re-use or disposal. Use of site won materials or recycled material assets within the Proposed Scheme DCO boundary without the need for treatment and without the need for waste exemption or the application of the CL:AIRE Definition of Waste Code of Practice (DoW CoP), Version 2, 2011 Re-use of site won excavated materials within the Proposed Scheme DCO boundary without the need for treatment, and by meeting waste exemption, or CL:AIRE DoW CoP criteria. The adoption of good practice in construction waste management in accordance with the principles outlined in WRAP guidance document Achieving good practice Waste Minimisation and Management, Guidance for construction clients, design teams and contractors. These may include: • Re-use and recycling of materials offsite where re-use within the Proposed Scheme DCO boundary is not possible. • Use of material logistics planning to manage procurement, storage and use of material assets and minimise damage, over ordering and wastage. • Measures to encourage local and responsible resourcing of material assets (for example through adoption of BES 6001 Responsible Sourcing of Construction Products and efficiencies by minimal ordering of materials. • A requirement for waste to be appropriately segregated and stored or stockpiled onsite by waste type, to ensure waste remains in a suitable condition to be re-used. • A requirement for wastes that cannot be reused or recycled on site to be transported only to appropriately permitted recycling or disposal sites.	Not applicable	Completion of the SWMP (**TR010037/APP/6.3**) (**APP-107**). to be contained within future iterations of the EMP (**TR010037/APP/7.4**) (**APP-128**).	Contractual responsibilities between Highways England and the PC	PC	P C	Initial: Signed:

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M3	Material assets and waste (ES Chapter 10)	To explore all options for reuse of surplus material	Consider re-use of suitable surplus excavated material outside of the Proposed Scheme construction boundary where permitted and practicable. For example, on local developments concurrent to the construction phase of the Proposed Scheme, such as the Block Fen and Langwood Fen restoration schemes and quarry restoration. Consider use of surplus recycled or recovered materials in community projects. For example, utilising recycled mulch from tree felling on any adjacent community facilities. Wastes that cannot be reused or recycled on site to be transported only to appropriately permitted recycling or disposal sites. Engineering plan configurations and layouts that show how the most effective use of materials assets (including site-won arisings) can be achieved.	EIA - Materials assessment	Appropriate project KPI set in MA1. Where required, export of site-won clean naturally occurring soils and stones to another development site would be undertaken in accordance with the MMP. Implementation of the SWMP.	EMP as detailed in MA1. MMP (developed in accordance with the CL:AIRE DoW CoP) as detailed in MA1. Monitoring of waste generation during construction via the SWMP as detailed in MA2.	PC will liaise with specialist	P C	Initial: Signed:
Noise and Vibration (N)									
N1	ES – CH11	Reduction of construction noise	The Principal Contractor will develop a construction noise and dust management plan to manage likely significant environmental effects. Construction noise shall be limited to less than the noise SOAEL (Significant Observed Adverse Effect Level) values presented in the ES Appendix 11.1 – 11.5 Construction noise assessment) (**TR010037/APP/6.3**) (**APP-109**) In support of limiting and controlling noise during construction, the Principal Contractor may use, *inter alia*, the following good working practices to minimise impacts on community and ecological receptors: • Restrict construction working hours to 07:00-19:00 on weekdays and 07:00-19:00 on Saturdays as far as practicable. Night-time and weekend working hours to be determined in discussion with the LPA (including Section 61 prior consent applications where necessary) • Select quieter plant where possible • Ensure equipment is maintained, in good working order, and is used in accordance with the manufacturer's instructions • Set time restrictions to certain noisy and vibratory activities such as earthworks and surfacing. • Use equipment that is fitted with silencers or mufflers • Manage deliveries to site to reduce risk of queuing traffic where practicable • Do not leave plant running unnecessarily • Plant with highly directional sound emissions shall be angled so that the direction of highest sound emissions does not face towards receptors where possible • Materials to be lowered instead of dropped from height • Alternative reversing warning systems such as white noise alarms shall be employed where practicable • The PC shall promote and advise members of the construction team during toolbox talk briefings on quieter working methods	EIA - Noise impact assessment	On site monitoring	Real time noise and vibration monitoring EMP (**TR010037/APP/7.4**) (**APP-128**). Traffic Management Plan (**TR010037/APP/7.5**) (**APP-129**). Construction Noise Management Plan (**TR010037/APP/7.4**) (**APP-128**). Construction Communication Strategy (**TR010037/APP/7.4**) (**APP-128**).	PC will liaise with specialist	P C	Initial: Signed:

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			• Any fixed plant such as generators shall be positioned at least 20m from nearest receptor or another suitable distance if not practical, from nearest receptor and shall have temporary/mobile noise screens erected around them where possible and necessary. • Effective communication with local community receptors especially in advance of planned noisy and vibratory activities. • Use more than one temporary traffic diversion routes for different closures and use A roads for HGV traffic, as far as practicable. • Limit the number of construction related traffic as far as practicable and use the existing A47, the proposed roads as required. Avoid local roads as far as practicable. • Vibrating rollers are proposed for use during earthworks, road formation and surfacing works. It is assumed that any vibratory rollers used during construction will have two vibrating drums, a maximum drum vibration amplitude of 0.5 mm and a drum width of 1m. This assumption is based on professional judgement and works on previous schemes. Based on the outline construction information, it is expected that all piling will be rotary bored and will occur only during the structure formation construction stages. The outline construction programme has been reviewed to determine the risk of a significant effect occurring, in accordance with DMRB LA 111. Where the risk of a likely significant effect is identified, monitoring and further detailed assessment works will be required by the Principal Contractor, in discussion with the local authority to agree the final plant proposals and work durations.					
N2	ES – CH11	To limit and control vibration during construction activities	Where vibration levels are predicted to exceed SOAEL (where works occur within 30m of residential properties at R9, R10 (Bridge Cottages, Meadow Farm Cottages, and 128 Cantley Lane) and R11 (102, 104, 106, 108 Cantley Lane)), the contractor shall: • Undertake further detailed assessments of construction vibration demonstrating how significant effects due to vibration are avoided; this assessment shall be prepared by the Principal Contractor for agreement with the local authority. • Carry these works out only during the daytime • Inform the occupiers of the likely times and duration of works • Monitor the vibration levels. Real-time alerts can be provided to notify the Contractor when vibration from works approaches the defined SOAEL levels, at which time methods of work can be altered • Carry out a building condition survey for the residential receptors to identify any sensitive aspects of the building and to ensure the current status of the building is recorded.	Sensitive receptors within the vicinity of the Proposed Scheme.	Mitigation measures to be included in the EMP Construction noise management plan (**TR010037/APP/7.4**) (**APP-128**).	Contractual responsibilities between Highways England and the PC	PC	P C	Initial: Signed:
N3	ES – CH11	To ensure that significant effects due to construction noise at	Mitigation measures in the form of temporary noise barriers or site hoarding shall be provided at the areas represented by the residential receptors R04 (North Side Farm, 8 Meadow Farm Drive, Cringleford), R06 (Cringleford residential extension development), R08 (Travelodge, Thickthorn Services), R9, Thickthorn Cottages	EIA - noise impact assessment.	Mitigation measures in the EMP Construction noise management plan (**TR010037/APP/7.4**) (**APP-128**).	Contractual responsibilities between Highways	PC	P C	Initial: Signed:

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		sensitive receptors are avoided	R10 (Bridge Cottages, Meadow Farm Cottages, and 128 Cantley Lane), R11 (102, 104, 106, 108 Cantley Lane) and R12 (110, 112, 114, 116, 118, 120, 122, 124 Cantley Lane). This is only necessary where construction activity in the vicinity of the receptor will exceed 10 days or nights in any 15 consecutive days or nights; or for a total number of days exceeding 40 in any six consecutive months. Where possible, the height of the temporary noise barrier shall be sufficient so that the construction noise source is not visible from the receptors.. Temporary noise barriers shall have a minimum mass per unit of area of at least 7 kg/m2 with no gaps at the joints or perimeter. The height of the temporary noise barrier shall be sufficient to completely hide the construction noise source from the receptors, where practicable. The precise locations of the temporary barriers is to be determined by the contractor and confirmed to the local authority as part of a Section 61 prior consent application where necessary In addition, real-time noise monitoring is required at a selected number of locations, sufficient to represent receptor R10 during phases 11 and 12, which are the S46 culvert works. Real-time alerts can be provided to notify the Contractor when noise from works approaches the defined SOAEL levels, at which time methods of work can be altered.	Sensitive receptors within the vicinity of the Proposed Scheme.		England and the PC			
N4	ES – CH11	To limit and control construction traffic noise and vibration	In order to avoid potential significant effects, construction related traffic can use the A47, A11 and B1172 as required, provided that the maximum number of HGV movements described in ES Chapter 11 Noise and vibration, Table 2.3 (**TR010037/APP6.1**) (**APP-048)** are not exceeded. For temporary traffic diversion routes, the noise mitigation measures include the use of more than one diversion route for different closures. The proposals include four different diversion routes to spread any potential increases in traffic and associated roadside noise levels on these roads, particularly during periods of required night-time diversions. For each principal diversion, the Principal Contractor shall review the possibility of temporary traffic management and diversion routes to follow the least noise sensitive routes. Residents along routes likely to be affected by night-time traffic diversions for several days shall notified in advance of these diversions coming into operation.	Sensitive receptors within the vicinity of the Proposed Scheme.	Mitigation measures in the EMP Construction noise management plan (**TR010037/APP/7.4**) (**APP-128**).	Contractual responsibilities between Highways England and the PC	PC	P C	Initial: Signed:
N5	Noise and vibration (ES Chapter 11)	Reduction of operational noise	The A11-A47 connector road, and the Cantley Lane Link Road (except on the overbridges) shall be surfaced with a low-noise road surface. The surface material shall be specified to reduce road traffic noise when compared with conventional surfacing. Hot rolled asphalt is proposed for the Cantley Lane link road overbridges.	Design intervention	Adherence to Detailed Design drawings and Specification.	Environmental Masterplan	PC	C	Initial: Signed:
Population and Human Health (PHH)									
PH1	ES – CH12	To maintain accessibility during construction	Access to the site of Thickthorn park and ride is likely to be impacted as a result of the construction works. Residents may experience some disturbance with local access due to compound locations and site access. The compound locations assessed in the EIA are considered optimal and the Principal	Local traffic and WCHs will still require access around the area.	Implementation of measures outlined in the Traffic Management Plan (**TR010037/APP/7.5**) (**APP-129**).	Contractual responsibilities between Highways England and the PC	The Principal Contractor	P C	Initial: Signed:

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			Contractor will implement measures to mitigate impacts following accepted good construction practice. Construction is likely to cause severance for road users as a result of temporary diversions (during construction of the A47 and A11 underpasses). Traffic management sequencing is needed to maintain traffic flows in the area. This will be detailed in the Outline Traffic Management Plan (**TR010037/APP/7.5**) (**APP-129**).						
PH2	Population and human health (ES Chapter 12)	To minimise disruption to access for local residents during construction and to keep them informed	Traffic management measures, including footway diversions, will be in place to maintain safe access whilst construction is underway. The PC will agree all temporary diversion routes with Norfolk County Council. Appropriate signage for all closures or diversions will be used to provide sufficient notice of such closures or diversions. The local community will be kept informed during construction and to highlight potential periods of disruption. This will be agreed in advance via an appointed Community Liaison Officer. Highways England Customer Contact Centre will be available to deal with queries and complaints from the public. An information line will be staffed and a complaint management system in place, used on other major infrastructure projects, to ensure complaints are investigated, action is taken and the complainant receives a response	EIA – Population and human health assessment	Community Liaison Officer checks	Traffic Management Plan (**TR010037/APP/7.5**) (**APP-129**). Highways England scheme web-page	PC and Community Liaison Officer	P C	Initial: Signed:
PH3	Population and human health (ES Chapter 12)	To prevent any disruption and severance of existing accessibility	Provision of either new or improved combined footways/cycleways to provide continuous links for WCH and maintaining connectivity between communities. Crossing facilities will also be provided where required to facilitate connections to existing infrastructure.	EIA – Population and human health assessment	Approval as part of DCO process	Design intervention	PC	P	Initial: Signed:
Road Drainage and the Water Environment (RD)									
RD1	Road drainage and the water environment (ES Chapter 13)	To minimise the potential to impact of accidental spillages and leakages on sediment-sensitive surface water features and protect the aquatic environment during construction.	Appropriate storage of construction materials, including bunding of storage tanks, use of silt fencing and covering stockpiles. Spill kits will be located on sites near to ordinary watercourses or drainage ditches and within the works compounds and staff will be trained in their use. Emergency response procedures to handle any leakages or spillages of potentially contaminating substances Where construction activities are scheduled in areas of agriculture, best practice construction methods are to be applied to prevent the mobilisation of nitrate and phosphate. Intwood Stream and the River Yare is designated as a Nitrate Vulnerable Zone for surface water and for groundwater. Appropriate storage of construction materials in areas of high or increased aquifer vulnerability (bunding, silt fencing and covering of stockpiles if required), provision of spill kits adjacent to excavation areas, and inclusion of emergency response procedures for spillages of potentially contaminating substances. Existing road drainage soakaways no longer required as part of the proposed drainage design shall be backfilled. Temporary drainage from the main construction compound would typically be collected within a ditch surrounding the compound and redirected to settlement ponds before being discharged to either a surface watercourse or ground. Discharges to groundwater (or sewer and surface water) must only be made with the appropriate	EIA & Geomorphological assessment	Compliance with the EMP (**TR010037/APP/7.4**) (**APP-128**). Temporary surface water drainage strategy Requirements to be confirmed with the Environment Agency and Norfolk County Council.	Surface water and groundwater monitoring prior to, during and after the construction phase due to the presence of sensitive ecological receptors and sediment sensitive water bodies Adhere to CIRIA guidelines on control of water pollution on linear construction sites (C648) and environmental best practice on site (C741) EMP (to be updated with emergency response procedures and temporary surface	PC	P C	Initial: Signed:

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			consents or permits in place. Any non-compliant discharges would be collected and disposed of off-site at a licensed facility.			water drainage strategy).			
RD2	Road drainage and the water environment (ES Chapter 13	To prevent increased flood risk to people and property and to manage pollution risks most commonly associated with increased sediment loading	All construction activities within, over or adjacent to a watercourse, and the construction of scheme drainage will minimise adverse changes to existing surface water environment including flood risk. No pollution pathways will be created between the construction sites, including material lay down areas, and ordinary watercourses or drainage ditches. Measures shall be implemented to prevent surface water runoff containing suspended sediment reaching ordinary watercourses or drainage ditches through overland flow during rainfall events. This shall include an appropriate treatment train to prevent accidental spillages reaching groundwater, remove sediment and other contaminants as well as attenuating runoff. A temporary surface water drainage strategy shall be incorporated into the EMP prepared by the Principal Contractor to prevent increased flood risk to people and property elsewhere, and to manage pollution risks most commonly associated with increased sediment loading. The potential increase in flood risk and negative impacts on surface water receptors shall be managed by the implementation of the construction-phase drainage system, where the construction will take place offline. Where possible, permanent drainage systems may be constructed in the early stages of the Proposed Scheme. •	EIA - Flood risk assessment	Implementation of a temporary surface water drainage strategy which will adopt SuDS principles with an appropriate treatment train to prevent accidental spillages reaching groundwater, remove sediment and other contaminants as well as attenuating runoff and providing water treatment	Contractual responsibilities between Highways England and the PC Adhere to CIRIA guidelines on control of water pollution on linear construction sites (C648) and environmental best practice on site (C741) EMP (to be updated with emergency response procedures and temporary works water drainage strategy).	PC	P C	Initial: Signed:
RD3	Road drainage and the water environment (ES Chapter 13	Ordinary watercourse consent	There are construction activities planned immediately adjacent to a number of ordinary watercourses or drainage ditches. As such, consent from Norfolk County Council shall be obtained in advance and where necessary to allow works to be carried out.	EIA - Flood risk assessment	Agreement with Norfolk County Council regarding the construction activities in close proximity to the ordinary watercourses	Contractual responsibilities between Highways England and the PC Consent requirements	PC	P C	Initial: Signed:
RD4	Road drainage and the water environment (ES Chapter 13	To minimise impacts on water quality (and ensure minimal loss of habitat or biodiversity) of the Cantley Stream and associated downstream designated sites	The realignment of Cantley Stream and the construction of the proposed outfalls, culvert, underpass extension and natural catchment drainage shall be constructed at the first phases of the phased construction plan. The new river channel and Cantley Lane South culvert shall be constructed off-line. In-river sediment controls (for example, straw matting) during the connection of the stream diversion with the existing stream shall be used Reconnection of the new alignment with the existing stream shall be undertaken during low flows to minimise sediment transport. The new culvert at Cantley Lane South must maximise freeboard, include a soft sediment bed and a mammal shelf to maintain habitat connectivity.	EIA - Flood risk assessment and geomorphological assessment	Phased construction plan Compliance with the flood risk assessment (Appendix 13.1) **(TR010037/APP/6.3)** (**REP3-009**) Monitoring during construction phase	Contractual responsibilities between Highways England and the PC Review of detailed design and construction method statements by Environment Agency, Natural England and Norfolk County Council	PC	P C	Initial: Signed:

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			The A11 Cantley Stream underpass extension must be extended using a similar aperture and should incorporate a soft sediment at the base of the watercourse similar to that in the existing culvert. The realigned reach of Cantley Stream (including the new culvert at Cantley Lane South and the A11 Cantley Stream Underpass) must retain a similar channel length and gradient to the existing stream. In addition, the realigned reach must provide replacement water vole habitat and maximise freeboard at the new culvert. To provide a preferred water depth of at least 30cm throughout the full length of the diverted reach of Cantley Stream, riffle and pool structures must be provided within the channel. This will maintain the preferred water depths (at low flows) and morphological characteristics of the stream that support the existing aquatic ecology including the known water vole population and mitigate against any impacts. Where the realigned stream meets the existing stream to the east of Cantley Lane South, a section (approximately 38m) of the existing stream will be restored to provide backwater habitat for water vole and other species. The design of the measures would be undertaken at detailed design stage in consultation with the Environment Agency, Norfolk County Council and other stakeholders. Riparian planting to mitigate against loss of habitat during construction. Construction activities, such as the extension of A11 Cantley Stream underpass, the Cantley Lane South culvert and the Cantley Stream realignment, occur within the fluvial floodplain of Cantley Stream, shall be constructed in a phased manner to avoid an increase in flood risk. Monitoring of Cantley Stream must be carried out prior to and during the construction phase. This includes visual assessments for oil and silt, as well as watercourse monitoring using portable field indicator equipment. Whilst construction is in progress, Cantley Stream must be monitored at locations up and downstream of the works within and adjacent to the watercourse, including the installation of continuous turbidity or total suspended solids monitor probes. Monitoring requirements shall be discussed and agreed with the Environment Agency and Norfolk County Council prior to construction and these requirements shall be outlined in the water monitoring and management plan in the EMP					
RD5	Road drainage and the water environment (ES Chapter 13	To mitigate any potential impacts of culverting on flood risk, geomorphology and biodiversity including the Water	New or extended culverts at A11 and Cantley Lane South to be designed in accordance with appropriate standards including DMRB and Ciria Culvert Design & Operation Guide Presence of otters and water voles in this area requires culverts to include dry ledges for continued access and movement and a natural sediment bed at the base of the culvert to maintain connectivity.	EIA - Flood risk assessment, water quality assessment and geomorphological assessment	Design interventions, compliance with Water Vole licence	Confirmation of WFD mitigation required with the Environment Agency.	PC	P C	Initial: Signed:

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		Framework Directive							
RD6	Road drainage and the water environment (ES Chapter 13	To protect existing assets	The diversion of Anglian Water main water pipe is currently proposed to be directionally drilled at a depth of 1.4m from the highway verge and carriageway, and 1.7m from arable land. Should the foul sewer diversion be required, it is currently proposed this will be directionally drilled at a depth of 2m across the Proposed Scheme. Where the diversion goes under Cantley Stream, a phased construction shall be implemented, where the construction shall be undertaken offline. The diversion shall be undertaken before the new realigned Cantley Stream is constructed. Once this is complete the diversion can be constructed under the existing stream once that is offline. This would minimise any to increase in flood risk to sensitive receptors elsewhere and manage pollution risks.	EIA - Flood risk assessment	Phased construction plan Compliance with the flood risk assessment (Appendix 13.1) **(TR010037/APP/6.3)** (**REP3-009**)	Contractual responsibilities between Highways England and the PC	PC	P C	Initial: Signed:
RD7	Road drainage and the water environment (ES Chapter 13	To protect the underlying groundwater in high risk areas	High risk construction areas for groundwater receptors include the A11 – A47 connector road cutting, areas adjacent to Cantley Stream and the satellite compound between A11 and Cantley Lane. Best practice construction methods are to be applied to prevent infiltration to ground and contamination of groundwater in these areas.	EIA-hydrogeological assessment	Compliance with the EMP (**TR010037/APP/7.4**) (**APP-128**).	PC	PC	P C	Initial: Signed:
RD8	Road drainage and the water environment (ES Chapter 13	Groundwater control requirements	Groundwater isolation techniques must be used in preference to dewatering, especially adjacent to Cantley Stream (structure S01A). Dewatering may be required for the Ward's Wood Underpass structure. A dewatering licence will likely be required which will require confirmation of dewatering rates and completion of a hydrogeological impact assessment Groundwater monitoring will also be required (as per dewatering requirements above). Groundwater monitoring (levels and quality) between the dewatering location (S02) and downgradient receptors (abstractions and designated sites including lowland fen) will be an essential requirement for this. Dewatering discharge points must minimise impacts to both the groundwater catchment (in terms of resource) and the receiving water body (water quality). Discharges must only be made with the appropriate consents or permits in place and any non-compliant discharges would be collected and disposed of off-site at a licensed facility.	EIA-hydrogeological assessment	Further GI scheduled to confirm dewatering requirements in area of Ward's Wood Underpass structure. Further consultation with the EA will be required once dewatering requirements are confirmed.	PC	PC and Proposed Scheme Environmental Specialist	P C O	Initial: Signed:
RD9	Road drainage and the water environment (ES Chapter 13	Permanent placement of below-ground structures i.e: piles, underpasses resulting in redirection of flows which may result in a loss of groundwater supply to	Subsurface structures below the water table will be designed as far as is practicable to minimise adverse changes to the existing hydrogeological regime and thereby minimise affects to applicable receptors. Construction method statements and risk assessments must be approved by the Environment Agency where construction activities are likely to intercept the Chalk saturated aquifer, especially adjacent to Cantley Stream. The used of additives within grouts (such as for Wards Wood Underpass) must be approved by the Environment Agency.	EIA - hydrogeological assessment	Construction method statements RDWE team to identify potential at risk abstractions and identify locations for ongoing monitoring. Construction method statements Groundwater monitoring	PC	PC and Proposed Scheme Environmental Specialist	P C	Initial: Signed:

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		downgradient receptors.	The construction method statements must include the use of best practice methods to minimise creation of contamination pathways and generation of suspended solids. Monitoring of down-gradient receptors must also be undertaken before, during and after construction. A water features survey must be required undertaken to identify locations of unlicensed abstractions. A Foundation Works Risk Assessment (FWRA) shall be undertaken prior to commencement of any foundation construction. The design and construction of piled foundations should aim to minimise the potential to impact on groundwater supply or groundwater quality by adoption of the following mitigation measures: • Piling design will be selected to appropriately minimise disturbance to groundwater flows and thus supply to indirect receptors • Piling method will minimise the generation of suspended solids that may impact nearby indirect receptors • Piling method will minimise creation of preferential pathways between aquifer unit, where more than one saturated aquifer unit is likely to be encountered. • A piling risk assessment shall be undertaken prior to commencement of the works. Environment Agency guidance on minimising pollution risk due to piling should be adhered to (Environment Agency, no date; 2001; and Westcott *et al.*, 2001). Construction materials will be chosen appropriately to minimise groundwater contamination via direct contact Design of below ground structures and associated assessments to be updated once supplementary GI data is made available. Discharges must only be made with the appropriate consents or permits in place and any non-compliant discharges would be collected and disposed of off-site at a licensed facility. Monitoring of groundwater features at risk from pollution shall be carried out prior to and during the construction phase, subject to confirmation with the Environment Agency. This would comprise groundwater level and quality monitoring at suitable points between activities on site that may result in groundwater impacts and the down-gradient receptors identified that are at risk of these impacts. Activities likely to require groundwater monitoring include any construction activities intercepting the Chalk aquifer, especially those identified as having the potential to intercept baseflow to Cantley Stream, those identified as having the potential to impact on groundwater quality at down-gradient receptors, and dewatering activities.					

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RD10	Road drainage and the water environment (ES Chapter 13)	To protect potable water supplies, designated sites and the groundwater environment	Obtain an abstraction licence from the Environment Agency for any unavoidable construction dewatering at rates of: • >50m3/d if the dewatering works for the whole scheme will last for 6 consecutive months or less. • >20m3/d if the dewatering works for the whole scheme will last in excess of 6 consecutive months. A discharge consent may also be required, depending on the receiving waterbody for discharge water. Groundwater monitoring prior to, during and after the construction phase due to the presence of sensitive potable water supply and ecological receptors. This will confirm inflow rates, groundwater level & quality information and production of a hydrogeological impact assessment report required as part of the abstraction licence application process – to be approved by the Environment Agency (process can take >12 months). This will require a water features survey to confirm details of unlicensed abstractions / additional water features in vicinity of dewatering activities.	EIA – hydrogeological assessment	Inspections, audits and reporting of effectiveness of control measures	Licence requirements (including groundwater monitoring)	PC will liaise with specialist	P C	Initial: Signed:
RD11	Road drainage and the water environment (ES Chapter 13	To minimise the potential impact of routine runoff and accidental spillages on the waterbodies, watercourses, potable water supplies and aquatic environment during operation.	The road drainage design shall consider groundwater levels to ensure no discharges via infiltration features or unlined road drainage occur either directly into the saturated aquifer or where there is less than one metre between the infiltration feature and the seasonal maximum water level. Separate sealed carrier drain systems with road gully collection must be used instead of unlined drainage systems where cuttings may intercept the Chalk principal aquifer. Baseline water quality monitoring shall be undertaken to ensure no impacts arise from the proposed drainage design to groundwater receptors including GWDTE sites and Cantley Steam. Any additional infiltration features are subject to further ground investigation, infiltration testing and risk assessments before inclusion in the drainage design.	EIA Sensitive ecological sites within the vicinity of the Proposed Scheme	Compliance with the design, EMP (**TR010037/APP/7.4**) (**APP-128**) and monitoring	Contractual responsibilities between Highways England and the PC	PC and Proposed Scheme hydrologist	P C	Initial: Signed:
RD12	Road drainage and the water environment (ES Chapter 13	Measures to minimise changes in overland flow associated with the A11-A47 link rod and Cantley Lane South link road	Measures include the implementation of a construction-phase drainage system to manage the increased flood risk and negative impacts on surface water receptors. This shall also include dry culverts or cross drains to maintain natural flood flow pathways where they are intercepted by the Proposed Scheme. The natural catchment drainage shall be constructed at the start of the phased construction plan. A temporary surface water drainage strategy shall be incorporated into the EMP to prevent increased flood risk to people and property elsewhere, and to manage pollution risks most commonly associated with increased sediment loading.	EIA Sensitive ecological sites within the vicinity of the Proposed Scheme	Compliance with the EMP (**TR010037/APP/7.4**) (**APP-128**). phased construction plan and temporary drainage surface strategy Requirements to be confirmed with Norfolk County Council.	Contractual responsibilities between Highways England and the PC	PC	P C	Initial: Signed:
RD13	Road drainage and the water environme	To ensure there is no increase in surface water run-off and	During construction, increased flood risk and negative impacts on surface water receptors can be caused by: • extreme rainfall events • by the compaction of soils	Sensitive ecological sites within the vicinity of the	Design interventions Compliance with the temporary drainage strategy	Contractual responsibilities between Highways	PC	P C	Initial: Signed:

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	nt (ES Chapter 13	peak flow rates	• watercourse realignment • an increase in hard standing areas • alteration of ground elevations and alteration of overland flow pathways. This can lead to an increase in the flow rate and volume or a change in the direction of surface water runoff. Any increase in surface water runoff is to be attenuated using oversized pipes and attenuation ponds. Vegetated attenuation ponds will be constructed north of the A11 and to the south of the A47/A11 Thickthorn Junction to provide water quality treatment. Existing surface water pathways for overland flows are to be maintained or facilitated through interception using appropriately designed collection drains and cross-drains. Cross-drains must be designed to convey a 1 in 100-year flow including an additional 40% climate change allowance in order to maintain connectivity of surface water flooding pathways and to mitigate against any increase in flood risk Any increase in runoff associated with the alteration of ground elevation due to the earthwork bunds located south of the A47/A11 Thickthorn Junction will be intercepted using appropriately designed drains at the base of the bund. A temporary water drainage strategy shall be incorporated into the EMP to prevent increased flood risk to people and property elsewhere, and to manage pollution risks most commonly associated with increased sediment loading. Permanent drainage systems may be constructed in the early stages of the Proposed Scheme where feasible.	Proposed Scheme		England and the PC			
RD14	Road drainage and the water environment (ES Chapter 13	To minimise the potential to impact on either groundwater or surface water from temporary drainage during construction	Temporary drainage for construction compounds will be designed to follow good practice to minimise or prevent impact on the surrounding water environment. Discharges to groundwater (or sewer and surface water) must only be made with the appropriate consents or permits in place. Any non-compliant discharges would be collected and disposed of off-site at a licensed facility. The construction compound situated between the A11 and Cantley Lane is in an area of higher groundwater risk and infiltration to ground is to be avoided here.	Sensitive ecological sites within the vicinity of the Proposed Scheme	Compliance with the temporary drainage surface strategy	Contractual responsibilities between Highways England and the PC	PC	P C	Initial: Signed:
RD15	Road drainage and the water environment (ES Chapter 13)	To minimise any operational increase in flood risk and deterioration of aquatic environment / Water Framework Directive status during operation	Any increase in surface water runoff shall be attenuated using oversized pipes and vegetated attenuation ponds. The drainage is designed to attenuate new drainage systems to the greenfield runoff rate up to a 1 in 100-year rainfall event including a 40% climate change allowance. For existing drainage systems that are modified as part of the Proposed Scheme, there must be no increase in existing runoff rate. The new culvert will have a minimum freeboard of 428mm. Surface water monitoring prior to, during and after the construction phase due to the presence of sensitive ecological receptors and sediment sensitive water bodies. Drainage Strategy and Flood Risk Assessment including hydraulic modelling to be approved by the Environment Agency, Lead Local	EIA – and supporting assessments	Inspections and audits with general monitoring will be incorporated into EMP (**TR010037/APP/6.8**) (**APP-128**).	Through Permit and Consent Requirements	PC will liaise with specialist	O	Initial: Signed:

Ref	Source of Action Document Ref	Objective	Action (including specific location if applicable)	Assumptions (on which the action is based)	Achievement criteria and reporting requirement (if applicable)	How the action is to be implemented	Responsible person(s)	When P= Pre-construction C=Construction O=Operation A=All	Completion Record
			Flood Authority (Norfolk County Council) and Norfolk Rivers Internal Drainage Board. Construction method statements and detailed design drawings to be approved by the Environment Agency, Norfolk Rivers District Internal Drainage Board and Norfolk County Council (the Lead Local Flood Authority) as required by their respective consenting and approvals prior to construction works. Realigned Cantley Stream to maintain average gradient and stream length of existing reach. Inclusion of pools and riffles to increase geomorphic complexity and provide replacement water vole habitat. Creation of approximately 38m of backwater channel and riparian habitat using severed existing Cantley Stream downstream of Cantley Lane South. Areas of riparian planting along Cantley Stream as indicated on the Environmental Master Plan **(TR010037/APP/6.8)** Riparian planting to river banks adjacent to outfalls. Outfalls will not impact on flow conveyance (set back from the bank) and will include soft-engineered erosion protection measures.					
RD16	Road drainage and the water environment (ES Chapter 13	To minimise the risk of erosion of the watercourse banks and bed from the proposed new outfalls (relating to the culverts and river realignment)	To minimise the risk of channel instability and subsequent erosion of the watercourse banks and bed due to the discharge from the proposed outfalls, flow rates and velocities must be kept to a minimum. Scour protection downstream of the outfall must be provided to ensure the risk of erosion is minimised. The proposed outfalls must be set back into the bank to minimise the impact on flow conveyance and minimise the impact of erosion and scouring of river bed and banks. Utilities diversions should be installed, by directional drilling, at a depth to avoid any risk of bed and channel destabilisation.	EIA - geomorphological assessment	Inspections and audits with general monitoring will be incorporated into EMP (**TR010037/APP/7.4**) (**APP-128**).	Design intervention	PC	C	Initial: Signed:
RD17	Road drainage and the water environment (ES Chapter 13)	To minimise the potential impact of routine runoff and accidental spillages on the waterbodies, watercourses, potable water supplies and aquatic environment during operation.	The Proposed Scheme design incorporates treatment of road drainage prior to discharging to the Cantley Stream, which could include carrier drains and vegetated detention basins.	RD10	Road drainage and the water environment (ES Chapter 13) **(TR010037/APP/6.1)** (**APP-050**)	To minimise the potential impact of routine runoff and accidental spillages on the waterbodies, watercourses, potable water supplies and aquatic environment during operation.	PC	C	Initial: Signed:
RD18	Road drainage and the water environment (ES Chapter 13	To minimise to an acceptable level any potential effects on the groundwater environment associated with horizontal directional drilling (HDD)	HDD method statement to take account and offer mitigation measures of any associated potential risks to the hydrogeological environment. This will be agreed with the EA in advance of any HDD being undertaken.	EIA – and supporting assessments	EA acceptance of HDD method statements.	EA review.	PC	PC	Initial: Signed:

Ref	Source of Action Document Ref	Objective	Action (including specific location if applicable)	Assumptions (on which the action is based)	Achievement criteria and reporting requirement (if applicable)	How the action is to be implemented	Responsible person(s)	When P= Pre-construction C=Construction O=Operation A=All	Completion Record
		construction activities.							
Climate (C)									
C1	ES - CH14	Evaluate the final carbon emissions	In accordance with the DMRB LA 114, projects shall seek to minimise carbon emissions as far as possible in all cases in order to contribute to the UK's net reduction in carbon emissions. Mitigation of effects on climate (i.e. carbon emissions associated with the Proposed Scheme) take place throughout the design process in accordance with the principles of PAS 2080: Carbon Management in Infrastructure, i.e. baselining, target setting and monitoring. Monitoring of carbon emissions associated with the construction of the Proposed Scheme will be undertaken as per Highways England requirements using the HE Carbon Tool to meet their key performance indicator "Carbon dioxide equivalents (or CO2e) in tonnes associated with the Supply Chain's activities" (Highways England 2019).	Not applicable.	As built and construction activity data.	Recording of construction activity, material deliveries, plant used and fuel consumption.	PC	A	Initial: Signed:
C2	ES- CH14	Reduce carbon emissions	The largest carbon areas of the Proposed Scheme include Earthworks, Pavement and Drainage series of the bill of quantities. These areas will be communicated with the design team to ensure efficiencies can be made before the Proposed Scheme reaches Stage 5.	Carbon calculations	As built and construction activity data.	The Design team will review the Carbon calculations at detailed design stage using the HE Carbon Tool	Design team in consultation with the PC and Highways England	P	Initial: Signed:
C3	ES-CH14	Evaluate climate change projections	No significant adverse effects as a result of climate have been identified therefore no monitoring is required. However, it is noted that climate change projections are likely to change within the appraisal period of the Proposed Scheme, therefore the vulnerability of the Proposed Scheme to such changes will be reviewed as and when updated projections become available.	Climate change projections are anticipated to change.	Revised projections as required using the HE Carbon Tool	The Design team will review the Carbon calculations at detailed design stage using the HE Carbon Tool detailed design stage.	Design team in consultation with the PC and Highways England	P	Initial: Signed:

4. Consents and permissions

4.1. Consents and licences position statements

4.1.1. A Consents and Licences Position Statement **(TR010037/APP/3.3)** (**APP-109**) has been submitted as part of the application, which sets out the Highways England's intended strategy for obtaining the consents and associated agreements needed to implement the Proposed Scheme. It lists the consents and agreements which are expected to be necessary to implement the Proposed Scheme and confirms how these consents will be obtained (subject to the Proposed Scheme attaining development consent).

4.1.2. This chapter outlines the consents, permissions and agreements that will be, or will likely be, sought by the Highways England or the PC, insofar as they relate to the environmental aspects of the Proposed Scheme.

[Note: This chapter will need to be updated for the EMP to cover developments through the detailed design and construction planning phase, and thought the construction phase, in order to capture all relevant items.

4.2. Consents and licences

4.2.1. As outlined in the Consents and Licences Position Statement **(TR010037/APP/3.3)** (**APP-109**) the principal consent for the Proposed Scheme will be the DCO. The DCO process provides development consent for the works and enable land acquisition, along with many consents and powers to be dealt with at the same time.

4.2.2. Several additional consents and permissions that may also need to be sought separately from the DCO are outlined in the Consents and Licences Position Statement **(TR010037/APP/3.3)** (**APP-109**)**.** These additional consents and permissions are noted in Table 4-1. It is the responsibility of the PC and the appropriate appointed specialist to obtain these licences.

Table 4-1 : Consents and Permissions that may be required to deliver the EMP

Type	Consent / Licence Agreement and Legislation	Consenting Authority	Requirement
Protected Species Licences (bats and water voles and if required post survey, GCN)	European Protected Species Licence under The Conservation of Habitat and Species Regulations 2017 (the Habitats Regulations); Wildlife and Countryside Act 1981 (as amended)	Natural England	To be confirmed following completion of environmental surveys and implement relevant licence conditions prior to works commencing

Type	Consent / Licence Agreement and Legislation	Consenting Authority	Requirement
Temporary and permanent works affecting the flow in ordinary watercourses	Land Drainage Act 1991 Section 23	Lead Local Flood Authority (Norfolk County Council)	Land Drainage Consent application will be required to allow for any temporary or permanent works that may affect the flow of an ordinary watercourse (i.e. all watercourses/ ditches that can convey water at times (except Main Rivers))
Temporary water discharge activities (this does not apply to operational discharges from the highway).	Environmental Permitting (England and Wales) Regulations 2016 (as amended)	Environment Agency	Water discharge permits are required for the discharge or entry of any poisonous, noxious or polluting matter, waste matter, trade or sewerage effluent to any inland freshwater, coastal waters or territorial waters.
Groundwater dewatering during construction at works	Abstraction Licence Water Resources (Abstraction and Impounding) Regulations 2008 & Water Abstraction and Impounding (Exemptions) Regulations 2017). Discharge of water from dewatering operations (Environmental Permitting (England and Wales) Regulations 2016, as amended).	Environment Agency	Works within the saturated aquifer may require dewatering. Dewatering volumes above 100m3/day require a transfer or abstraction licence. A licensing exemption limit may be reduced to 50m3/day (for 6 or less consecutive months) or >20m^3/day (for over 6 consecutive months), depending on whether there are conservation sites within 500m or springs, wells or boreholes used to supply water for any lawful use within 250m of the proposed abstraction. Licensing will be subject to further impact assessments on any identified receptors. PC to confirm whether required and PC or subcontractor to apply for consent prior to works starting.
Water discharges during groundwater dewatering activities	Environmental Permit Water Resources (Abstraction and Impounding) Regulations 2008 & Water Abstraction and Impounding (Exemptions) Regulations 2017). Discharge of water from dewatering operations (Environmental Permitting (England and	Environment Agency	Discharging of dewatered volumes may also require a bespoke discharge permit. Treatment measures may be required depending on the quality of water abstracted, and the receiving waterbody. PC or subcontractor to apply for permit prior to works starting.

Type	Consent / Licence Agreement and Legislation	Consenting Authority	Requirement
	Wales) Regulations 2010).		
Diversion of watercourses	Water Resources Act 1991	Environment Agency	Construction activities planned for the diversion of watercourses prior to works starting.
Trade effluent consent (e.g. welfare facilities)	Water Industry Act 1991	Environment Agency	To discharge trade effluent into a public sewer a trade effluent consent is required from the Sewerage Undertaker responsible for the upkeep of the public sewer. Anglian Water is the Sewerage Undertaker in the east of England.
Waste and materials	Mobile plant licence The Environmental Permitting (England and Wales) Regulations 2016 (as amended)	Local authority Environment Agency	If the PC or sub-contractor does not have their own mobile plant permit.
Waste and materials	Exemptions for operations such as U1 (import of waste for use in construction) and T15 (crushing of aerosols to minimise hazardous waste) (if exemption limits can be met). (Environmental Permitting) England and Wales) Regulations 2016	Environment Agency	For importation and treatment of limited quantities and types of material site. May be required depending on nature of activities taking place during construction.
Waste and materials	CL:aire Materials Management Plan. CL:aire (2001) Definition of Waste: Development Industry Code of Practice (V.2) (DoW COP).	Environment Agency	It is considered that the majority of soil materials excavated during the works could be reused within order limits following guidance in CL:aire (2001) Definition of Waste: Development Industry Code of Practice (V.2) (DoW COP).
Waste and materials	Environmental permit or registered exemption Pollution Prevention and Control Act 1999 The Environmental Permitting (England and Wales) Regulations 2016 (as amended)	Environment Agency	For the treatment or re-use of waste on site. PC or subcontractor to apply for permit or exemption prior to works starting.
Noise and vibration during the construction stage	Section 61 prior consent for work on construction sites Control of Pollution Act 1974	Local authority	Consent would provide Highways England from protection from subsequent action by the local authority under Section 61 of the

Type	Consent / Licence Agreement and Legislation	Consenting Authority	Requirement
	(if proposed by the contractor)		Control of Pollution Act 1974 or under Section 80 of the Environmental Protection Act 1990. The prior consent is required if a construction phase is expected to exceed the duration which would cause an adverse impact to the identified receptor.
Consent for felling of trees	Felling Licence – Forestry Act 1967	Local authority/Forestry Commission	Powers for removal of trees for construction of the Proposed Scheme including trees protected by Tree Preservation Orders are sought within the draft DCO (TR010037/APP/3.1). However, trees that are felled for purposes other than construction (for instance ecological enhancement) may require further approval from the Forestry Commission or local authority under a Felling Licence. This involves notifying the Forestry Commission in advance of felling such trees. Certain tree felling can be carried out under an exemption that limitations apply so Felling Licences may be required.

5. Environmental asset data and as built drawings

5.1. Introduction

5.1.1. The requirements for the Highways England environmental information system (EnvIS) for this Proposed Scheme are identified in the Asset Data Management Manual (ADMM) version 11 part 2 Requirements and additional information April 2020 [5].

5.1.2. This document specifies requirements for asset data management, detailed guidance, information and descriptions of each highway asset type including environmental assets. ADMM part 2.1 Generic asset data requirements section 2.1.7 describes it as:

5.1.3. “a system for defining and categorising the man-made or natural assets within and surrounding the Strategic Road Network (SRN). EnvIS contains environmental data and is displayed in the Highways Agency Geographical Information System (HAGIS).”

5.1.4. The data within EnvIS identifies the asset, location, condition and broad management requirements. It is also used in the review and reporting of the environmental performance of both Highways England and its service providers.

5.1.5. In accordance with DMRB LA 120 Environmental management plans, this section has been refined to include relevant data as specified in the design stage EMP.

5.2. Environmental data types

5.2.1. ADMM part 2.2 Asset class specific requirements section 13 Environmental, environmental inventory data describes each environmental asset on the Proposed Scheme in terms of what it is, where it is and what it does.

5.2.2. The full asset data requirements for each asset sub-class can be found in ADMM section 13.4 Environmental inventory data.

5.2.3. The environmental inventory asset data will be broken down by point, line or polygon features into GIS environmental inventory.

[5] Highways England Asset Management Development Group – ADMM Part 2 – Requirements and Additional Information

5.3. Collection and submission of EnvIS data

5.3.1. ADMM states that environmental data will be collected and amended over time in a cycle of continual improvement.

5.3.2. Achieving this continual improvement requires adherence to regular and specific data submission targets, ensuring those data submissions are of the required standard. The phasing of data submissions is to be agreed by the PC with Highways England. It is proposed that environmental data is submitted on completion of:

- site surveys for example ecological and arboricultural
- site clearance
- construction activities including for example seeding and planting

5.3.3. Prior to the preparation and submission of as-built data Galliford Try must request an extract of the existing environmental data. To do this a shapefile polygon of the scheme extents shall be supplied to the EnvIS support mailbox identified in the ADMM. This extract should then be used to identify any assets that have been removed or amended by the scheme to inform the central database accordingly.

5.3.4. For major projects aligning with the Highways England Project Control Framework (PCF), the key milestone to be achieved for data handover is Milestone 2 - Stages 6 (Construction, commissioning and handover) and 7 (closeout).

5.3.5. Final as-built environmental inventory should be submitted by the end of PCF Stages 6 and 7. The EMP for handover will not be signed off by the Highways England Environment Group regional environmental advisor without confirmation that environmental data has been submitted and fully validated.

5.3.6. Full details can be found in the ADMM.

5.4. Further surveys to be obtained prior to construction

5.4.1. The following surveys are to be obtained prior to construction commencing on site

- Agricultural Land Classification survey
- Soil Resource survey
- Archaeological trenching over the remaining identified areas
- Supplementary ground investigation

- Pre-construction excavation for any groundworks required within Thickthorn Park and the known multi-period archaeological assets in it , south of Thickthorn Junction (THK02 ‘Area C’) and in the vicinity of the scheduled monument ‘Two Tumuli in Big Wood’
- Pre-works photography for site condition
- Pre construction ecological surveys including
  - Botanical Survey
  - Bat roost and crossing point
  - Great Crested Newt (where postponed in 2020 due to COVID-19)
  - Polecat
  - Badger
  - Otter
  - Water vole
  - Wintering birds
  - Breeding birds
  - Vegetation clearance
  - Barn owl
  - Hobby
  - Reptile
- Arboricultural
- Surface water monitoring
- Groundwater monitoring

6. Details of maintenance and EMP monitoring activities

6.1.1. The section sets out the systems required for monitoring, inspecting, reporting and auditing the environmental requirements set out in the ES and EMP REAC submitted at DCO.

6.1.2. In accordance with DMRB LA 120 Environmental management plans, this section also refines the following aspects of maintenance and EMP for construction monitoring activities where known as follows:

- procedures for monitoring and reviewing compliance including inspection, audit frequency and reporting
- assessment criteria to identify success (evaluation)
- procedures for rectification of breaching or failings of EMP for construction measures (correction)

6.2. Environmental monitoring activities

6.2.1. The ES (**TR010037/APP/6.1**) (**APP-038**-**APP-124**, **REP3-006 and REP3-008)**and REAC set out a number of requirements for environmental monitoring to ensure that the identified mitigation measures and actions can be tracked and closed out when completed. Some of these are specific such as noise monitoring, others are more general and will be covered by regular inspections and audits.

6.2.2. Full details are shown in the updated REAC at section 3 Table 3-1. A summary of the environmental monitoring requirements including inspection, auditing and reporting requirements is presented at Table 6-1 below.

Table 6-1 : Environmental monitoring requirements

REAC Reference	Objective	Source of Monitoring requirements	Summary of individual inspection, auditing and reporting requirements
G12	Monitoring	Mitigation included in ES chapter 7 Landscape and visual **(TR010037/APP/6.1) (APP-044)**	Pre-works photography to be undertaken to prior to any construction works to provide a detailed baseline record. Photography to be used to demonstrate site restoration and replanting has been successful.
AQ1	Limit impacts to air quality	IAQM Guidance on the assessment of dust from demolition and construction and Section 79 (9) of the Environmental Protection Act 1990	Regular site audits Compliance with Construction noise and dust management plan (Annex B.3 of this EMP)
CH3	Preservation in-situ of known and potential archaeological	Consultation with the Local Authority Archaeology Advisor (Norfolk County Council) and Historic England to	Monitoring requirements identified in the Written Scheme of Investigation. Toolbox talks that include instruction methods to allow operatives to identify

REAC Reference	Objective	Source of Monitoring requirements	Summary of individual inspection, auditing and reporting requirements
	resources during the final design phase	agree Written Scheme of Investigation Production of a WSI. Appointment of an archaeological subcontractor to undertake the agreed works (which will include monitoring)	potential archaeological remains Regular site audits Publication of results of archaeological works.
CH8	Mitigation of impact on known and potential paleoenvironmental remains	Mitigation included in ES chapter 6 Cultural heritage **(TR010037/APP/6.1) (APP-043)**	The aims of palaeoenvironmental mitigation will be to (a) analyse stratigraphy and retrieve samples for laboratory analyses and dating (b) assess the potential for/location and age and significance of any buried land surfaces preserved within the DCO boundary. The scope of palaeoenvironmental evaluation works will be specified in a written in a Written Scheme of Investigation (WSI) which will be agreed with Historic England and NCCES. Toolbox talks that include instruction methods to allow operatives to identify potential archaeological remains Regular site audits Publication of results of archaeological works.
LV1	Ensuring planting reaches maturity	Mitigation included in ES chapter 7 Landscape and visual **(TR010037/APP/6.1) (APP-044)**	The maintenance of mitigation such as planting and seeding will be the responsibility of Highways England ensuring all proposed mitigation reaches maturity . Planting and seeding is covered by the 12 month defect period post opening. Further details are proposed in the Environmental Masterplan **(TR010037/APP/6.8) (APP-123)**
LV2	Protection of retained trees and vegetation	Mitigation included in ES chapter 7 Landscape and visual **(TR010037/APP/6.1) (APP-044)** and Environmental Masterplan **(TR010037/APP/6.8) (APP-123)**	Monitor tree protection measures as per the Arboricultural method statement
LV4	Monitoring	Mitigation included in ES chapter 7 Landscape and visual and ES Chapter 8 Biodiversity **(TR010037/APP/6.1) (APP-045)**	Post-development monitoring will be required for newly created habitat Further details will be identified as part of the Environmental Masterplan **(TR010037/APP/6.8) (APP-123)** and Landscape and ecology management plan
B5	Protection of Bats and bat roosts	Mitigation included in ES Chapter 8 Biodiversity **(TR010037/APP/6.1) (APP-045)**	Works near roosts will be undertaken under supervision from a registered bat licence holder.

REAC Reference	Objective	Source of Monitoring requirements	Summary of individual inspection, auditing and reporting requirements
			Species to be licensed, will be monitored as part of the respective licence for the requisite length of time after construction completion.
B6	Protection of water voles, otter, badger	Mitigation included in ES Chapter 8 Biodiversity **(TR010037/APP/6.1) (APP-045)**.	A water vole licence from Natural England will be needed for translocation of water voles during stream realignment works. Species to be licensed, will be monitored as part of the respective licence for the requisite length of time after construction completion. Road casualty surveys will be required for five years post construction to assess ongoing impacts on badger on the site to assess whether mitigation provided is effective in reducing impacts on these species
B7	Protection of breeding, wintering and nesting birds, barn owl, limiting impacts on mammals , terrestrial invertebrates, aquatic invertebrates and other notable species	Mitigation included in ES Chapter 8 Biodiversity **(TR010037/APP/6.1) (APP-045)**..	Timing of vegetation clearance to outside of the breeding season which runs from March to August (inclusive) to minimise the risk of mortality of breeding birds. If inside of this season, vegetation clearance will be undertaken under the supervision of an Ecological Clerk of Works (ECoW). Monitoring during vegetation clearance and during construction where required will be undertaken by an Ecological Clerk of Works Post-development monitoring will be required for newly created habitats and protected species and will be detailed in an Ecology Management Plan. Habitats, bird and bat boxes will be monitored and managed for five years after they have been created. Road casualty surveys will be required for five years post construction to assess ongoing impacts on barn owl on the site to assess whether mitigation provided is effective in reducing impacts on these species
B14	To monitor protected species (GCN) – post mitigation	Mitigation included in ES Chapter 8 Biodiversity **(TR010037/APP/6.1) (APP-045)**.	Should a GCN mitigation licence be required (depending on the results of the surveys to be done preconstruction), monitoring may be required for between two- and four-years post construction as part of the licence.
GS2	To manage the potential risks associated with made ground and localised areas of infilled ground	Mitigation included in ES Chapter 9 Geology and soils **(TR010037/APP/6.1) (APP-046)**.	Monitoring of potential ground-gases and vapours in confined spaces during construction.

REAC Reference	Objective	Source of Monitoring requirements	Summary of individual inspection, auditing and reporting requirements
	underlying the Proposed Scheme		
GS3	Protection of site soils	Mitigation included in ES Chapter 9 Geology and soils **(TR010037/APP/6.1) (APP-046)**.	Soil stripping, handling and storage will be monitored / audited to ensure that if follows procedures outlined in the Soil Management Plan and Materials Management Plan.
M1	Monitoring waste recovery rate and proportion of secondary and recycled aggregate	Mitigation included in ES Chapter 10 Materials and Waste **(TR010037/APP/6.1) (APP-047)**.	The PC shall develop a Site Waste Management Plan. The SWMP shall include procedures for monitoring the overall construction waste recovery rate and the proportion of secondary and recycled aggregate used in the Proposed Scheme, in order to confirm the assessment of materials impacts.
N1-N5	Reduce noise and vibration at sensitive receptors	Mitigation included in ES Chapter 11 Noise and vibration **(TR010037/APP/6.1) (APP-048)**.	Regular site audits and compliance with the construction noise management plan Monitoring for construction noise and vibration shall include the following: Measurement of noise during relevant construction activity at positions that represent receptor R10. Measurement of vibration during piling or vibratory rolling where these works occur within 30m of receptors representative of receptors R9, R10 and R11. Verification that specific noise and vibration mitigation measures are in place for activities where there is potential for likely significant effects to occur in their absence. Checking that noise and vibration management procedures and practices are sufficient to ensure that significant adverse effects are avoided.
RD1, RD4, RD8, RD9, RD10, RD11	To minimise potential impacts to the water environment during construction	Mitigation included in ES Chapter 13 Road drainage and the water environment **(TR010037/APP/6.1) (APP-050)**.	Surface water and groundwater monitoring prior to, during and after the construction phase due to the presence of sensitive ecological receptors and sediment sensitive water bodies.

[Note: This section should be updated for the second iteration (Development phase (Construction Preparation)) to describe the construction staff training procedures which will include providing staff with a summary of the environmental aspects of the projects; awareness of EMP contents; a site inductions; and on-site training.]

6.3. Inspection, reporting and auditing requirements

6.3.1. The PC shall ensure compliance with the requirements of the ES, REAC, the EMP for construction and associated management plans and method statements, environmental legislation and regulations as well as any Highways England or statutory obligations.

6.3.2. The environmental performance of the monitoring requirements identified in Table 3-1 will be continuously inspected, reported and audited by the PC via the following methods:

- Regular site audits and monitoring will be undertaken by the environmental manager, the ecological clerk of works (ECoW), archaeological clerk of works (ACoW) or the arboricultural consultant as appropriate.
- Ecological activities under licence and works with European protected species can only be undertaken by a suitably licensed ecologist.
- Site safety and environmental reviews (SSERs) will be carried out by members of the construction team. There will be a requirement to complete a specified number of SSERs per month depending on the type of work ongoing.
- PC general foremen and engineers will inspect their work areas on a daily basis.
- Spot checks by the PC construction team will be undertaken of supply chain briefings, risk assessments, method statements, check sheets and permits.
- Periodic audits and checks by the PC regional environmental advisor and environment and sustainability manager.
- Periodic reviews will be undertaken by PC construction team of all relevant management plans, method statements and risk assessments.

6.3.3. There will be a central filing system in place for any checklists, inspection reports, monitoring records, consents, permits, waste transfer notes and consignment notes in line with the PC's business management system. This documentation will be used to demonstrate compliance with the requirements of this EMP for construction.

6.4. Evaluation and control process

6.4.1. There will be an evaluation process established by Highways England and the PC to review the success of all monitoring and mitigation requirements identified in Table 6-1 and any other requirements arising.

6.4.2. The evaluation process will include a description of any difficulties encountered in the delivery of measures to mitigate and manage the environmental effects. It

will also include the main uncertainties arising from any forecasting of measures to mitigate and manage the environmental effects.

6.5. Corrective actions

6.5.1. There will also be the establishment of procedures for control measures and correction actions. Any findings and environmental data will be shared with the appropriate team on a periodic basis to ensure that any corrective and remedial action required is undertaken in a timely manner with a date of completion agreed. The health and safety team will also analyse the findings and data for any arising trends. Pro-active actions such as methodology reviews, re-briefings and toolbox talks will be implemented based on the trends of the data.

6.5.2. The PC site staff will produce site diaries which will include the recording of corrective actions. In addition, the health and safety site advisor will complete a monthly site safety and environment report which are kept on the internal shared Viewpoint document management system.

6.5.3. The PC's standards shall be rigorously implemented and incorporate the following requirements shown at Table 6-2 under ISO 14001. The Galliford Try Environmental Standards within Galliford Try's Environmental Management Systems are also provided in Table 6.2.

Table 6-2 : ISO 14001 Standards

ISO14001 Standard	Principal Contractor Standard
HS&E-STD-E03	Ecological management
HS&E-STD-E04	Environmental emergency preparedness and response
HS&E-STD-E05	Project environmental design
HS&E-STD-E06	Environmental risk assessment

7. Induction, training and briefing procedures for staff

7.1.1. The PC will ensure that all personnel conducting environmental tasks are suitably qualified and experienced for the roles and responsibilities that they are employed to undertake.

7.1.2. The PC will be responsible for site inductions and training of all personnel including visitors, full time staff and supply chain providers.

7.1.3. The PC will work in accordance with their business management system to ensure compliance with the International Organisation for Standardisation (ISO) 14001 requirements as listed at Table 6-2.

7.1.4. The PC environment policy statement will be clearly displayed, and all personnel will be made aware of it, along with the relevant environmental legislation and the contents of the REAC.

7.1.5. In accordance with DMRB LA 120 Environmental management plans, this section of the EMP for construction is required to refine the following aspects of induction, training and briefing:

- A summary of the environmental aspects of the Proposed Scheme
- Awareness of EMP for construction contents
- Site induction
- On-site training

7.2. Site induction

7.2.1. Prior to commencing work on site, all personnel will be required to attend a site induction where the PC will communicate the environmental objectives and requirements of the Proposed Scheme, as well as the responsibilities of the workforce.

7.2.2. The site induction will cover the topics relating to the environment to a level of sufficient detail for the workforce and appropriate to the work being undertaken. Topics will include but are not limited to:

- A summary of the environmental aspects of the Proposed Scheme
- An introduction to the EMP for construction
- Environmental site rules
- Preventing nuisance (noise, dust, vibration and odours)
- Communication with road users, affected landowners and stakeholders

- Earthworks and excavations
- Site traffic protocols
- Spill kit use and locations
- Refuelling, mechanical repairs and site maintenance
- Chemical handling and storage
- Emergency spill procedures
- Tree root protection areas
- Waste and energy management
- Reporting of environmental observations and suggestions
- Biodiversity protection and enhancement
- Works in the vicinity of the watercourse
- Heritage and archaeology assets

7.3. On-site training

7.3.1. Those undertaking any activities that could result in an adverse environmental impact will receive additional training which shall be led by the environmental Manager or environmental or ecological clerk of works. This training will include reference to the importance of adhering to the contents of this EMP for construction and the potential consequences of departure from any specified method statements.

7.3.2. The PC will establish a regime of toolbox talks in agreement with the supply chain. An indicative list of appropriate toolbox talks is provided in the table below. More topics will be added to this list in Table 7-1 as necessary as construction progresses.

Table 7-1 : Toolbox talks titles

PC Reference	Toolbox Talk title
HS&S-TBT-C04-301	Archaeology
HS&S-TBT-E03-301	Tree protection
HS&S-TBT-E03-302	Japanese knotweed
HS&S-TBT-E03-303	Himalayan balsam
HS&S-TBT-E03-304	Giant hogweed
HS&S-TBT-E03-305	Bats
HS&S-TBT-E03-306	Badgers
HS&S-TBT-E03-307	Great crested newts

PC Reference	Toolbox Talk title
HS&S-TBT-E03-309	Slow worms
HS&S-TBT-E03-310	Water voles
HS&S-TBT-E03-311	Birds
HS&S-TBT-E03-312	New Zealand pygmy weed
HS&S-TBT-E03-317	Hazel dormice
HS&S-TBT-E03-319	Bees
HS&S-TBT-E04-301	Spill control
HS&S-TBT-E04-302	Petrol, diesel and oils
HS&S-TBT-L03-301	Re-useable soil resources on-site
HS&S-TBT-L03-302	Soil planning and management
HS&S-TBT-L03-303	Stripping topsoil
HS&S-TBT-L03-304	Stripping sub-soil
HS&S-TBT-L03-305	Stockpiling soil
HS&S-TBT-L03-306	Spreading soil
HS&S-TBT-L03-307	Sourcing topsoil
HS&S-TBT-L03-308	Manufacturing topsoil
HS&S-TBT-L03-309	Soil aftercare
HS&S-TBT-L03-310	Use of surplus soil
HS&S-TBT-L03-311	Working with previously developed land
HS&S-TBT-N02-301	Dust and air quality
HS&S-TBT-N02-302	Noise and vibration
HS&S-TBT-N02-303	Be a good neighbour
HS&S-TBT-R02-301	Materials management and housekeeping
HS&S-TBT-R02-302	Energy conservation – construction site good practice
HS&S-TBT-R02-303	Timber procurement
HS&S-TBT-W01-301	Waste management
HS&S-TBT-W01-302	Storage of waste
HS&S-TBT-W01-303	Waste segregation
HS&S-TBT-W05-301	Water pollution prevention

PC Reference	Toolbox Talk title
HS&S-TBT- W05-302	Water pollution – silt
HS&S-TBT- W05-303	Water pollution – cement and concrete
HS&S-TBT- W05-304	Pumping and overpumping
HS&S-TBT- W05-305	Washing down plant and machinery
HS&S-TBT- W05-306	Bentonite

7.3.3. Any members of workforce disregarding any health, safety or environmental rules and arrangements detailed in this EMP will (in the first instance) receive a written warning from the project director and re-briefed as appropriate.

7.4. Criteria for evaluation of training effectiveness

7.4.1. Continuous monitoring of environmental performance will take place via regular Site Safety and Environmental Reviews (SSERs), which establishes employees' and subcontractors' compliance to the requirements of the EMS, this EMP, and the Client and statutory obligations.

[Note: This section should be updated at the next milestone stage (Development phase (Construction Preparation)) to describe the construction staff training procedures which will include providing staff with a summary of the environmental aspects of the projects; awareness of EMP contents; a site inductions; and on-site training.]

8. References and glossary

8.1. References

8.1.1. References are included as footnotes in the text.

8.2. Glossary

Table 8-1 : Glossary

Terms or abbreviation	Definition
ACoW	Archaeological Clerk of Works
ADMM	Asset Data Management Manual (Highway England)
CDM 2015	The Construction (Design and Management) Regulations 2015
CLRA	Contaminated land risk assessment
COSHH	Control of Substances Hazardous to Health Regulations 2002 as amended
DCO	Development consent order
DIP	Delivery integration partner
DIO	Defence Infrastructure Organisation
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
ECoW	Ecological clerk of works
EHO	Environmental health officer
EIA	Environmental impact assessment
EMP for construction	Environmental management plan for the construction stage
EPS	European protected species
ES	Environmental Statement
HE	Highways England
ISO 140001	International Organisation for Standardisation Standard for Environmental management systems
MCHW	Manual of Contract Documents for Highways Works
MMP	Materials management plan
NE	Natural England
PCF	Project Control Framework – Highways England's process for managing projects
PRoW	Public rights of way

Terms or abbreviation	Definition
RDP	Regional delivery partnership
REAC	Record of environmental actions and commitments
RNAS	Royal naval air station
RPG	Registered park and garden
SAC	Special area of conservation
SMP	Soil management plan
SoS	Secretary of State for Transport
SRN	Strategic road network
SSSI	Site of special scientific interest
SWMP	Site waste management plan
TBT	Toolbox talk – A short presentation to the workforce on any aspect of the Proposed Scheme including health, safety, wellbeing or environment.
WSI	Written scheme of investigation

Annex A. Constraints maps

Annex B. Relevant management plans

To be produced prior to construction (in the second iteration of the EMP) by the Principal Contractor. This section will include:

- Annex B.1 Materials Management Plan (MMP)
- Annex B.2 Soil Management Plan
- Annex B.3 Construction Noise and Dust Management Plan
- Annex B.4 Construction Communication Strategy
- Annex B.5 Landscape and Ecology Management Plan (LEMP)
- Annex B.6 Biosecurity Management Plan
- Annex B.7 Water Monitoring and Management Plan
- Annex B.8 Detailed Heritage Written Scheme of Investigation (DHWSI) (Mitigation Strategy)
- Annex B.9 Temporary Surface Water Drainage Strategy
- Annex B.10 INNS Management Plan
- Annex B.11 Operational UXO Emergency Response Plan

NOTE: that the outline Site Waste Management Plan (**TR010037/APP/6.3**) and outline Traffic Management Plan (**TR010037/APP/7.5**) are separate documents as part of the DCO submission. These are to be progressed as part of the second iteration of the EMP in parallel with the annexes listed above.

B.3 Construction Noise and Dust Management Plan

The Institute of Air Quality Management (IAQM)[6] recommends that the following hierarchy principles (drawn from similar well-established mitigation hierarchies used for EIA development and for dealing with pollution exposure in workplace/occupational situations) be used as the basis for mitigating the operational air quality impacts associated with general development schemes. This hierarchy is suitable both for impacts caused by a potentially polluting new development, and for the impact of exposure of new occupants of a development proposed in an area of existing poor air quality.

I. Preference should be given to preventing or avoiding exposure/impacts to the pollutant in the first place by eliminating or isolating potential sources or by replacing sources or activities with alternatives. This is usually best achieved through taking air quality considerations into account at the development scheme design stage.

II. Reduction and minimisation of exposure/impacts should next be considered once all options for prevention/avoidance have been implemented so far as is reasonably practicable (both technically and economically). To achieve this reduction/ minimisation, preference should be given first to:

    a. mitigation measures that act on the source; before

    b. mitigation measures that act on the pathway, which in turn should take preference over

    c. mitigation measures at or close to the point of receptor exposure all subject to the efficacy, cost and practicability of the available solutions. In each case, measures that are designed or engineered to operate passively are preferred to active measures that require continual intervention, management or a change in people's behaviours.

III. Off-setting a new development's air quality impact by proportionately contributing to air quality improvements elsewhere (including those identified in air quality action plans and low emission strategies) should only be considered once the solutions for preventing/avoiding, and then for reducing/minimising, the development-specific impacts have been exhausted. Even then, offsetting should be limited to measures that are likely to have a beneficial impact on air quality in the vicinity of the development site. It is not appropriate to attempt to offset local air quality impacts by measures that may have some effect remote from the vicinity of the development site.

IV. These will be progressed by the contractor when implementing the Construction Noise and Dust Management Plan.

[6] IAQM. (2018). *Mitigation of Development Air Quality Impacts.* Available: [redacted] Last accessed 18.02.2021.

B.5 Landscape and Ecology Management Plan

A Landscape and Ecology Management Plan (LEMP) is to be produced by the appointed Landscape Architect and Ecologist prior to construction. This should take the form of a Series 3000 Landscape and Ecology[7] drawings. The Series 3000 specifies the landscape construction and maintenance works required for the contracted works.

Specified elements within the Series 3000 should include timings, frequency, preparatory works, materials, tools, reference drawings, procedures, responsibilities and exclusions required for the contractor to implement, establish and maintain the Scheme. It is recommended that the Series 3000 document is made up of the following aspects detailed within Table B.1:

Table B.1: LEMP Structure

Chapter	Indicative contents / aim of chapter

Introduction	• Scheme description
	• Objectives of the LEMP
	  ○ The LEMP will provide information on the management of landscape and ecological elements within the site boundary during its operation. The LEMP will identify the landscape and ecological mitigation measures set out in the Environmental Statement for the Scheme and provide information on how the measures will be delivered through landscape works and management in the future to ensure the objectives of the Scheme are achieved. It should be noted that the LEMP is intended to be a "live" document and to evolve during the construction process.
	  ○ The LEMP will identify the management types and maintenance objectives for the five-year aftercare period as well as providing a long-term management strategy with the long-term aim of creating a sustainable landscape and habitat areas.
	• Roles and responsibilities

ENVIS requirements	This section will address EnvIS (Environmental Information System) as Highways England's primary tool for the recording of environmental assets, and the prescription of environmental management actions. Environmental design data will be submitted to Highways England in accordance with IAN 84/10 to provide a useful mechanism to review the progress and performance of environmental objectives in the future.
Landscape and Ecological Context	Landscape Character and Visual Context and general mitigation approach. Ecological Context and general mitigation approach.
Landscape and Environmental objectives and functions	Definition of landscape elements and landscape and environmental function in line with LD 117 for each element (planting type or other environmental mitigation feature) relevant to the Scheme for example Species Rich Grassland or ecological feature such as hibernacula.

[7] Highways England (2001) Manual of Contract Documents for Highway Works Volume 1 Specification for Highway Works: Series 3000 Landscape and Ecology [online] available at: [redacted]

Chapter	Indicative contents / aim of chapter

Landscape and Ecological Management	• Reference to Series 3000 for detailed specification of actions to be undertaken during implementation and maintenance of planting during aftercare period.
	• Landscape Management
	• Management actions and frequency of actions required for each landscape element within scheme boundary.
	• Pre-construction and construction phase habitat and species mitigation measures, including those required under Natural England development licences. These include:
	  ○ Pre-construction or update surveys;
	  ○ Creation or enhancement of habitats as receptor areas for species, to include installation of features such as wildlife boxes and hibernacula;
	  ○ Exclusion of species such as great crested newts, reptiles barn owls and badgers from the works area, where necessary;
	  ○ Sensitive timing and method of habitat removal, to include destructive searches where appropriate and retention of soils for seedbank translocation of sensitive habitats;
	  ○ Implementation of temporary mitigation measures, such as fencing/ demarcation of retained habitats and buffers around sensitive receptors;
	  ○ Implementation of measures to ensure continued habitat connectivity during construction, such as dead hedging;
	  ○ Ecological Clerk of Works responsibilities;
	  ○ Toolbox talks to site personnel;
	  ○ Supervision of installation of permanent mitigation features such as the badger tunnel; amphibian ladders; wildlife boxes (additional to those mentioned above) and bat house;
	• Post construction management actions and frequency of actions required for ecological mitigation interventions, to include
	  ○ Creation of habitat areas;
	  ○ Management of retained and created habitats up to 5 years post Scheme construction to optimise benefits for protected and notable species;
	  ○ Monitoring of species for up to 5 years post Scheme construction including great crested newts, water voles, bats, reptiles, barn owls and badgers.

Annex C. Environmental method statement

To be produced prior to construction by the Principal Contractor. This section should include:

- Precautionary Method Statement – Bats
- Precautionary Method Statement – Water Voles
- Precautionary Method Statement – Veteran Trees
- Precautionary Method Statement – Important Hedgerows
- Arboricultural method statement
- Health and safety method statement
- Foundation works risk assessment
- Water vole licence method statement
- Construction method statement for water

Annex D. Emergency procedures and record of environmental incidents

To be produced prior to construction by the Principal Contractor. This section should include:

- Confirmation of procedures in the event of an environmental emergency.

A record of environmental incidents (in table format) if occurred to include the following information:

- Date and location of the incident
- Details of the reporting procedure followed
- Description of the incident and relevant legislation
- Remedial actions
- Lessons learnt
- Details of any contact with enforcing bodies.

ENVIRONMENTAL INCIDENT REPORT FORM
HS&S-FRM-A01-02

Business Unit:	
Project Name & Number	**Date & Time of Incident:**
Site Contact & Tel. No.	**Reported By:**

SIGNIFICANT INCIDENT ☐

Definition:

- *Any release to land, water or air resulting in a breach of an environmental regulation*
- *A spill of a hazardous material that cannot be controlled or has entered, or could enter, a drain or watercourse*
- *Damage to protected flora, fauna or protected habitats and conservation areas*
- *Receipt of any enforcement action from a regulatory body.*

MINOR INCIDENT ☐

Definition:

- Any emission of dust, odour, noise, vibration and / or light to the external environment such that it results in a complaint from project and / or non-project personnel
- A spill of a hazardous material that can be controlled or has not entered, and cannot enter, a drain or watercourse
- Any action that has the potential to cause a negative visual impact e.g., mud on the public highway; poor soil management that could result in poor agricultural or amenity reinstatement standards.

UNEXPECTED ENVIRONMENTAL FIND ☐

Definition: *An environmental event that has affected construction progress but was identified before any environmental legislation was breached; hence, allowing time for corrective action(s) to be made e.g., discovery of nesting birds; protected flora / fauna; archaeology; contaminated land; fly-tipped waste.* ***N.B. This would not apply if preconstruction surveys / inspections were <u>not</u> conducted but, if had been conducted, would have identified the problem before construction works commenced.***

Type of impact / issue: *(Tick all that apply)*

Emission / Discharge	Spill to Water ☐	Spill to Land ☐	Emission to Air ☐	Waste on Land ☐	
	Other ☐:				
Environmental Damage	Archaeology ☐	Cultural Heritage ☐	Ecology ☐	Materials ☐	
	Other ☐:				
Nuisance	Noise ☐	Dust ☐	Odour ☐	Light ☐	Vibration ☐
	Other ☐:				
Unexpected Environmental Find	Ecology ☐	Cultural Heritage ☐	Water ☐	Land ☐	Waste ☐
	Other ☐:				

Was the identified incident the result of a complaint from an external party?	Yes ☐ No ☐

ENVIRONMENTAL INCIDENT REPORT FORM
HS&S-FRM-A01-02

A. Description & Cause: *(Include types / quantities / volumes, if appropriate)*			
B. Immediate Corrective Actions Taken *(Detail action(s) taken; contacts made and by whom)*			
Date Corrective Actions Closed Out:		*Closed Out By:*	
C. Details of any Environmental / Reputational Damage:			
D. Remedial / Preventative Action(s) – *Actions to stop the incident from reoccurring:*			
Date to be Completed:		*By Whom:*	
Date Closed Out:		*Closed Out By:*	

Copies of this form should be sent to:

- **Business Unit Management**
- **Local HS&SAdvisor**
- **Local Environment Manager**

Annex E. Copy of evaluation of change register

To be produced during DCO examination by the design team. This section should include:

- A record of any design changes after the completion of the Environmental Statement.
- A description as to how these design changes have been assessed and any environmental actions required as a result of these changes (e.g. further environmental survey required).

Annex F. Final environmental investigation and monitoring reports

To be produced prior to construction by the Principal Contractor. This section should include:

- Copies of relevant reports (relating to protected species/ habitats and cultural heritage investigations, and any environmental monitoring reports) or cross reference to the locations of these easily if accessible elsewhere.