South East Strategic Reservoir Option

Preliminary Environmental Information Report

Appendix 7.1 - Preliminary assessment of effects for Terrestrial ecology

Date: October 2025

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1 Preliminary assessment of effects

1.1 Introduction

1.1.1 This Appendix sets out the preliminary assessment of effects for Terrestrial ecology, receptor by receptor, for the construction and operation stages respectively. The appendix is split into tables that list effects that are initially anticipated to be significant and tables that list effects that are not initially anticipated to be significant. The judgement of significance has been made assuming that embedded design mitigation and standard good practice mitigation relevant to Terrestrial ecology is applied (these are summarised in this Appendix with further detail provided in the Draft commitments register in Appendix 2.2). Nevertheless, the assessment assumes that additional mitigation is not applied, as the viability, nature and extent of any additional mitigation measures is not confirmed at this stage in the EIA process. As a result, consideration of residual effects (those that remain after the implementation of all mitigation, including additional mitigation) has not been completed for the PEI report, and will be reported in the ES.

1.1.2 Each receptor assessed for this aspect in the preliminary assessment is listed in the 'Baseline conditions' section of the associated PEI Report chapter, and also within the tables in this appendix. Each receptor has been assigned an Area ID which relates to the spatial extent of the receptor assessed. Where these have been spatially defined for the PEI Report, these are shown in figures cross-referenced from the 'Baseline conditions' section.

1.1.3 Each effect assessed has been assigned a unique identifier, the Effect ID.

1.1.4 The tables identify the following for each effect:

- Receptor name, Effect ID and sensitivity category
- Project components and activities giving rise to the effect
- Relevant embedded design mitigation and standard good practice mitigation (with unique Commitment ID, which relates to Appendix 2.2: Draft commitments register)
- Initial category of effect significance, including whether it is adverse, beneficial or neutral (taking account of embedded design mitigation and standard good practice measures)
- Description and duration of the effect
- Any additional mitigation and monitoring identified at this stage (with unique Commitment ID, to enable cross reference to the measures noted in Section 7.10: Next steps of applicable aspect chapters).

1.2 Likely significant construction effects

Table 1.1 Initial likely significant effects during construction (with embedded and standard good practice mitigation applied, but prior to additional mitigation)

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Oxford Meadows SAC [TEC-234] (**Very High**)	Most / all project components	Off-site transport movements	(ED-05) Use of rail to transport bulk construction materials, if practicable. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment. (SGP-20) Off-site Construction Traffic Management Measures.	**Significant** Adverse	**Air quality changes**: Oxford Meadows Special Areas of Conservation (SAC) is designated for its lowland hay meadows. Such habitats can be highly sensitive to air pollution, particularly nitrogen-based compounds emitted by road traffic potentially associated with construction heavy duty vehicle movements following the A34 trunk road. These pollutants can have significant ecological impacts, even at low concentrations, especially when deposition occurs over long periods. Nitrogen deposition can lead to the dominance of competitive species, altering habitat structure while acidifying pollutants can change soil pH, affecting nutrient availability and microbial communities, with knock-on effects for plant health and regeneration. It is not fully assessed whether screening thresholds for the SAC will be exceeded as a result of the Project and this effect pathway is included on a precautionary basis at PEIR. (Long-term)	(AM-76) Additional mitigation which may result from the Habitats Regulation Assessment.
Barrow Farm Fen SSSI [TEC-213] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment.	**Significant** Adverse	**Air quality changes**: Barrow Farm Fen SSSI supports calcareous fen and other habitats that can be highly sensitive to air pollution, particularly nitrogen-based pollutants such as nitrogen dioxide and ammonia, which may be frequently emitted during construction activities. These pollutants can affect the habitats and species for which the SSSI are designated. Nitrogen deposition from vehicle and plant can alter soil chemistry and plant community composition, and ammonia associated with dust and emissions from construction can exacerbate nitrogen enrichment. Particulate matter generated by construction activities can result in pollutant deposition and physically damage vegetation. Habitats are often adapted to nutrient-poor conditions and nitrogen deposition can lead to the dominance of competitive species, altering habitat structure. Acidifying pollutants can change soil pH, affecting nutrient availability and microbial communities, with knock-on effects for plant health and regeneration. (Long-term)	No additional mitigation has been confirmed at this stage, however, mitigation measures are being actively explored as the design and EIA progresses.
Barrow Farm Fen SSSI [TEC-214] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-06) Standard good practice measures for managing ecology impacts.	**Significant** Adverse	**Hydrological changes**: Barrow Farm Fen SSSI supports calcareous fen and associated wetland habitats, it is considered hydrologically sensitive, relying on specific water regimes to maintain its ecological integrity. Construction activities disrupt natural drainage patterns through land grading, watercourse crossings, and the installation of impermeable surfaces or associated increased runoff, erosion, and sedimentation in adjacent sites. Excavation, piling, and dewatering may alter groundwater tables or flow paths, particularly critical for sites that support Groundwater Dependent Terrestrial Ecosystems (GWDTEs). Construction runoff may carry	No additional mitigation has been confirmed at this stage, however, mitigation measures are being actively explored as the design and EIA progresses.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					pollutants, including hydrocarbons, heavy metals, and fine sediments, into hydrologically connected sites, degrading water quality or smothering aquatic and wetland vegetation. Sustained hydrological disruption may compromise the ecological coherence of the SSSI, undermining its ability to support the species and habitats for which it was designated. (Long-term)	
Culham Brake SSSI [TEC-218] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-06) Standard good practice measures for managing ecology impacts.	**Significant** Adverse	**Hydrological changes:** Culham Brake SSSI supports willow carr habitats which are considered hydrologically sensitive, relying on specific water regimes to maintain their ecological integrity. Construction activities disrupt natural drainage patterns through land grading, watercourse crossings, and the installation of impermeable surfaces or associated increased runoff, erosion, and sedimentation in adjacent sites. Excavation, piling, and dewatering may alter groundwater tables or flow paths, particularly critical for sites that support Groundwater Dependent Terrestrial Ecosystems (GWDTEs). Construction runoff may carry pollutants, including hydrocarbons, heavy metals, and fine sediments, into hydrologically connected sites, degrading water quality or smothering aquatic and wetland vegetation. Sustained hydrological disruption may compromise the ecological coherence of the SSSI undermining its ability to support the species and habitats for which the site is designated. (Long-term)	No additional mitigation has been confirmed at this stage, however, mitigation measures are being actively explored as the design and EIA progresses.
Frilford Heath, Ponds and Fens SSSI [TEC-173] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment.	**Significant** Adverse	**Air quality changes:** Frilford Heath, Ponds and Fens SSSI comprises acid grassland, heathland and fen habitats with exceptionally diverse flora and fauna. Such habitats and species can be highly sensitive to air pollution, particularly nitrogen-based pollutants such as nitrogen dioxide and ammonia, which may be emitted during construction activities. Nitrogen deposition from vehicle and plant can alter soil chemistry and plant community composition, and ammonia associated with dust and emissions from construction sites can exacerbate nitrogen enrichment. Particulate matter generated by construction activities can physically damage vegetation and contribute to pollutant deposition. Sensitive habitats adapted to nutrient-poor conditions can be susceptible to nitrogen deposition leading to the dominance of competitive species, altering habitat structure. Acidifying pollutants can change soil pH, affecting nutrient availability and microbial communities, with knock-on effects for plant health and regeneration. (Long-term)	No additional mitigation has been confirmed at this stage, however, mitigation measures are being actively explored as the design and EIA progresses.
Frilford Heath, Ponds and Fens SSSI [TEC-174] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources.	**Significant** Adverse	**Hydrological changes:** Frilford Heath, Ponds and Fens SSSI comprises acid grassland, heathland and fen habitats with exceptionally diverse flora and fauna. The fen and wetland communities rely on specific water regimes to maintain their ecological integrity. Construction activities disrupt natural drainage patterns through land grading, watercourse crossings, and the	No additional mitigation has been confirmed at this stage, however, mitigation measures are being actively explored as the design and EIA progresses.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-06) Standard good practice measures for managing ecology impacts.		installation of impermeable surfaces or associated increased runoff, erosion, and sedimentation in adjacent sites. Excavation, piling, and dewatering may alter groundwater tables or flow paths, particularly critical for Groundwater Dependent Terrestrial Ecosystems (GWDTEs). Construction runoff may carry pollutants, including hydrocarbons, heavy metals, and sediments, into hydrologically connected sites, degrading water quality or smothering aquatic and wetland vegetation. Sustained hydrological disruption may compromise the ecological coherence of the SSSI, undermining its ability to support the species and habitats for which it was designated. (Long-term)	
Cowslip Meadow LWS [TEC-131] (**Moderate**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment. (SGP-23) Standard good practice dust mitigation measures. (SGP-24) Standard good practice measures for minimising vehicle, plant and machinery emissions.	**Significant** Adverse	**Air quality changes:** Cowslip Meadow LWS comprises lowland meadows adjacent to the Letcombe Brook, partially within the order limits c.400m from construction areas. Air quality changes and air pollution during construction may lead to long-term habitat degradation, biodiversity loss and ecosystem disruption. Excess nitrogen from ammonia and nitrogen oxides arising from vehicle emissions may leads to nutrient enrichment, altering plant communities in nitrogen-sensitive habitats. Pollutants such as sulphur dioxide and nitrogen oxides may also contribute to acid deposition, which can degrade soil and water quality. Air pollution may affect key ecological processes and weaken habitat resilience, making sites more vulnerable to environmental stressors. Dust accumulation on plant surfaces from construction can reduce photosynthesis, impair respiration, and hinder growth, particularly in sensitive terrestrial and aquatic habitats, leading to gradual habitat degradation. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Cowslip Meadow LWS [TEC-132] (**Moderate**)	Most / all project components	Most / all project activities (construction)	(ED-04) Design the Project to reduce the need to import material as far as practicable. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-08) Standard good practice measures for controlling and treating INNS.	**Significant** Adverse	**Introduction and spread of INNS**: Cowslip Meadow LWS comprises lowland meadows adjacent to the Letcombe Brook. The LWS is located within the order limits however would be retained and not directly impacted by construction activities. Construction activities can however inadvertently introduce and facilitate the spread of invasive non-native species (INNS) to on-site LWS, potentially leading to significant ecological impacts. INNS often outcompete native flora reducing biodiversity and altering habitat composition affecting the ecological integrity of these habitats. Some invasive species modify soil structure, nutrient cycles, and hydrology, leading to long-term habitat deterioration. Machinery, soil movement, and water runoff can transport INNS beyond the construction site, affecting adjacent LWS as well as those on-site. (Long-term)	(AM-73) Investigate, assess and remediate contaminated land.
Marcham Salt Spring LWS [TEC-155] (**Moderate**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (ED-41) Construction stage surface water management.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Marcham Salt Spring LWS historically supported salt springs and now supports a number of salt conditions and a wider wetland community. No physical loss of the LWS from construction is envisaged however land use change may affect its integrity and ecological value.	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-34) Land that is only required temporarily during construction to be reinstated.		Fragmentation of the LWS resulting from construction activities such as vegetation clearance, topsoil stripping and earthworks. Loss of connectivity between habitats within and outside of the LWS may disrupt dependant species. Habitats within the site may also provide essential ecosystem services, habitat degradation reduces these functions. Construction activities may also lead to soil erosion, nutrient depletion, and water contamination. This affects both terrestrial and aquatic ecosystems, reducing their ability to support flora and fauna species. The Project construction phase will deliver direct habitat creation and enhancement adjacent to the LWS which is likely to provide connectivity benefits once established. (Long-term)	
Marcham Salt Spring LWS [TEC-156] (**Moderate**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment. (SGP-23) Standard good practice dust mitigation measures. (SGP-24) Standard good practice measures for minimising vehicle, plant and machinery emissions.	**Significant** Adverse	**Air quality changes:** Marcham Salt Spring LWS historically supported salt springs and now supports associated species and a wider wetland community. The LWS is located within proximity to construction areas. Air quality changes and air pollution during construction may lead to long-term habitat degradation, biodiversity loss and ecosystem disruption. Excess nitrogen from ammonia and nitrogen oxides arising from vehicle emissions may leads to nutrient enrichment, altering plant communities in nitrogen-sensitive habitats. Pollutants such as sulphur dioxide and nitrogen oxides may also contribute to acid deposition, which can degrade soil and water quality. Air pollution may affect key ecological processes and weaken habitat resilience, making sites more vulnerable to environmental stressors. Dust accumulation on plant surfaces from construction can reduce photosynthesis, impair respiration, and hinder growth, particularly in sensitive terrestrial and aquatic habitats, leading to gradual habitat degradation. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Marcham Salt Spring LWS [TEC-157] (**Moderate**)	Most / all project components	Most / all project activities (construction)	(ED-04) Design the Project to reduce the need to import material as far as practicable. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-08) Standard good practice measures for controlling and treating INNS.	**Significant** Adverse	**Introduction and spread of INNS**: Marcham Salt Spring LWS historically supported salt springs and now supports a number of salt conditions and a wider wetland community. The LWS is located within the order limits however would be retained and not directly impacted by construction activities. Construction activities can however inadvertently introduce and facilitate the spread of invasive non-native species (INNS) to on-site LWS, potentially leading to significant ecological impacts. INNS often outcompete native flora reducing biodiversity and altering habitat composition affecting the ecological integrity of these habitats. Some invasive species modify soil structure, nutrient cycles, and hydrology, leading to long-term habitat deterioration. Machinery, soil movement, and water runoff can transport INNS beyond the construction site, affecting adjacent LWS as well as those on-site. (Long-term)	(AM-73) Investigate, assess and remediate contaminated land.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Marcham Salt Spring LWS [TEC-158] (**Moderate**)	Most / all project components	Most / all project activities (construction)	(ED-41) Construction stage surface water management. (SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Hydrological changes:** Marcham Salt Spring LWS historically supported salt springs and now supports a number of salt specialist species and a wider wetland community. Such habitats may be hydrologically sensitive, relying on specific water regimes to maintain their ecological integrity. Construction activities may disrupt natural drainage patterns through land grading, installation of impermeable surfaces or associated increased runoff, erosion, and sedimentation. Excavation, piling, and dewatering may alter groundwater tables or flow paths, particularly critical for Groundwater Dependent Terrestrial Ecosystems. Construction runoff may carry pollutants, including hydrocarbons, heavy metals, and sediments, into hydrologically connected sites, degrading water quality or smothering aquatic and wetland vegetation. Sustained hydrological disruption may compromise the ecological coherence of the LWS, undermining its ability to support the species and habitats for which it is designated. (Long-term)	(AM-35) Water quality monitoring and subsequent remedial activities where these are required.
The Cuttings and Hutchins Copse LWS [TEC-167] (**Moderate**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (ED-41) Construction stage surface water management. (SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-34) Land that is only required temporarily during construction to be reinstated.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: The Cuttings and Hutchins Copse LWS comprises a series of ponds and a mature deciduous woodland belt adjacent to the railway. No physical loss of the LWS from construction is envisaged however land use change may affect its integrity and ecological value. Fragmentation of the site resulting from construction activities such as vegetation clearance, topsoil stripping and earthworks, and loss of connectivity between habitats within and outside of the LWS may disrupt species dependent on them. Habitats within the site may also provide essential ecosystem services, habitat degradation reduces these functions. Construction activities may also lead to soil erosion, nutrient depletion, and water contamination. This affects both terrestrial and aquatic ecosystems, reducing their ability to support flora and fauna species. The Project construction phase will deliver direct habitat creation and enhancement adjacent to the LWS which is likely to provide connectivity benefits once established. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
The Cuttings and Hutchins Copse LWS [TEC-168] (**Moderate**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment.	**Significant** Adverse	**Air quality changes:** The Cuttings and Hutchins Copse LWS comprises a series of ponds and a mature deciduous woodland belt adjacent to the railway. The LWS is located directly adjacent to construction areas. Air quality changes and air pollution during construction may lead to long-term habitat degradation, biodiversity loss and ecosystem disruption. Excess nitrogen from ammonia and nitrogen oxides arising from vehicle emissions may leads to nutrient enrichment, altering plant communities in nitrogen-sensitive habitats. Pollutants such as sulphur dioxide and nitrogen oxides may also contribute to acid deposition, which can degrade soil and water quality. Air pollution may affect key ecological	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-23) Standard good practice dust mitigation measures. (SGP-24) Standard good practice measures for minimising vehicle, plant and machinery emissions.		processes and weaken habitat resilience, making sites more vulnerable to environmental stressors. Dust accumulation on plant surfaces from construction can reduce photosynthesis, impair respiration, and hinder growth, particularly in sensitive terrestrial and aquatic habitats, leading to gradual habitat degradation. (Long-term)	
The Cuttings and Hutchins Copse LWS [TEC-169] (**Moderate**)	Most / all project components	Most / all project activities (construction)	(ED-04) Design the Project to reduce the need to import material as far as practicable. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-08) Standard good practice measures for controlling and treating INNS.	**Significant** Adverse	**Introduction and spread of INNS**: The Cuttings and Hutchins Copse LWS comprises a series of ponds and a mature deciduous woodland belt adjacent to the railway. The LWS is located directly adjacent to construction areas. Construction activities can inadvertently introduce and facilitate the spread of invasive non-native species (INNS) to on-site LWS, potentially leading to significant ecological impacts. INNS often outcompete native flora reducing biodiversity and altering habitat composition affecting the ecological integrity of these habitats. Some invasive species modify soil structure, nutrient cycles, and hydrology, leading to long-term habitat deterioration. Machinery, soil movement, and water runoff can transport INNS beyond the construction site, potentially affecting the adjacent LWS. (Long-term)	(AM-73) Investigate, assess and remediate contaminated land.
The Cuttings and Hutchins Copse LWS [TEC-170] (**Moderate**)	Most / all project components	Most / all project activities (construction)	(ED-41) Construction stage surface water management. (SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Hydrological changes:** The Cuttings and Hutchins Copse LWS comprises a series of ponds and a mature deciduous woodland belt adjacent to the railway. The LWS is located directly adjacent to construction areas and may be hydrologically sensitive, relying on specific water regimes to maintain ecological integrity. Construction activities may disrupt natural drainage patterns through land grading, installation of impermeable surfaces or associated increased runoff, erosion, and sedimentation. Excavation, piling, and dewatering may alter groundwater tables or flow paths, particularly critical for Groundwater Dependent Terrestrial Ecosystems. Construction runoff may carry pollutants, including hydrocarbons, heavy metals, and sediments, into hydrologically connected sites, degrading water quality or smothering aquatic and wetland vegetation. Sustained hydrological disruption may compromise the ecological coherence of the LWS, undermining its ability to support the species and habitats for which it is designated. (Long-term)	(AM-35) Water quality monitoring and subsequent remedial activities where these are required.
Ancient woodland [TEC-226] (**High**)	Ground-mounted solar (solar farm reprovision)	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Air quality changes**: Air quality effects and air pollution during construction may significantly affect ancient woodlands leading to long-term degradation, biodiversity loss and ecosystem disruption. Elevated levels of nitrogen from ammonia and nitrogen oxides arising from vehicle emissions may alter soil chemistry, leading to nutrient imbalances, changes in plant communities and reduced tree resilience. Pollutants such as sulphur dioxide may cause leaf discoloration, reduced photosynthetic efficiency, and increased	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-11) Standard good practice measures to protect trees during construction. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment. (SGP-23) Standard good practice dust mitigation measures.		susceptibility to pests and diseases. Dust accumulation on leaf surfaces from construction activities can reduce photosynthesis, impair respiration, and hinder growth while persistent dust pollution can lead to gradual degradation and increase vulnerability to wider pressures. Ancient woodlands support a wide range of species, including fungi, invertebrates, mammals and birds, and lichens. Air pollution disrupts these ecological relationships and may lead to additional biodiversity loss. (Medium-term)	
Ancient woodland [TEC-227] (**High**)	Ground-mounted solar (solar farm reprovision)	Most / all project activities (construction)	(SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Hydrological changes**: Hydrological changes arising from construction activities (including watercourse diversion and alteration to surface water drainage routes), land-use modifications and associated water management practices may affect ancient woodlands, affecting their ecological integrity and resilience. Construction projects can significantly alter hydrological conditions, affecting the ecological integrity of these habitats, modifying surface and groundwater flow and leading to changes in water dependent hydrology including through increased runoff. Pollution from construction materials, sedimentation, and chemical runoff can degrade water quality, affecting freshwater ecosystems and species reliant on clean water and excessive water abstraction and potential contamination from construction sites may impact groundwater-dependent habitats. (Medium-term)	(AM-35) Water quality monitoring and subsequent remedial activities where these are required. (AM-75) Species / habitat specific mitigation strategy. (AM-73) Investigate, assess and remediate contaminated land.
Ancient woodland [TEC-228] (**High**)	Ground-mounted solar (solar farm reprovision)	General construction activities	(ED-04) Design the Project to reduce the need to import material as far as practicable. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-08) Standard good practice measures for controlling and treating INNS.	**Significant** Adverse	**Introduction and spread of INNS**: Construction activities can inadvertently introduce and facilitate the spread of invasive non-native species (INNS), potentially leading to significant ecological impacts. INNS often outcompete native flora reducing biodiversity and altering habitat composition affecting the ecological integrity of these habitats. Some invasive species modify soil structure, nutrient cycles, and hydrology, leading to long-term habitat deterioration. Machinery, soil movement, and water runoff can transport INNS beyond the construction site, affecting adjacent ancient woodlands over extensive areas. (Long-term)	(AM-73) Investigate, assess and remediate contaminated land.
Ancient/veteran trees [TEC-115] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts.	**Significant** Adverse	**Habitat loss and modification**: Loss and modification of ancient and veteran trees due to construction activities and land use change may affect their survival and ecological value. Fragmentation of woodland habitats including the destruction of surrounding habitats may reduce connectivity, limiting species movement and diminishing ecological resilience. Soil compaction and root damage	(AM-75) Species / habitat specific mitigation strategy. (AM-79) Compensation for the loss of ancient and veteran trees.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.		arising from construction and land use changes may contribute to soil degradation, affecting tree health and longevity. Ancient and veteran trees further support a wide range of species, including fungi, invertebrates, bats and birds. The loss or decline of these trees may therefore contribute to broader biodiversity loss, with associated wildlife populations decreasing as a result. (Long-term)	
Ancient/veteran trees [TEC-116] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment. (SGP-23) Standard good practice dust mitigation measures.	**Significant** Adverse	**Air quality changes:** Air quality effects and air pollution during construction may significantly affect ancient and veteran trees, leading to long-term degradation, biodiversity loss and ecosystem disruption. Elevated levels of nitrogen from ammonia and nitrogen oxides arising from vehicle emissions may alter soil chemistry, leading to nutrient imbalances and reduced tree resilience. Pollutants such as sulphur dioxide may cause leaf discoloration, reduced photosynthetic efficiency, and increased susceptibility to pests and diseases. Dust accumulation on leaf surfaces from construction activities can reduce photosynthesis, impair respiration, and hinder growth while persistent dust pollution can lead to gradual degradation and increase vulnerability to wider pressures. Ancient and veteran trees support a wide range of species, including fungi, invertebrates, mammals and birds, and lichens. Air pollution disrupts these ecological relationships and may lead to additional biodiversity loss. (Long-term)	(AM-75) Species / habitat specific mitigation strategy. (AM-79) Compensation for the loss of ancient and veteran trees.
Habitats of Principal Importance [TEC-111] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-34) Land that is only required temporarily during construction to be reinstated. (SGP-35) Design of temporary crossings during construction to maintain function and integrity of watercourses.	**Significant** Adverse	**Habitat loss and modification**: HPI loss and modification due to construction activities and land use change may affect their integrity and ecological value. The destruction and fragmentation of HPI resulting from construction activities such as vegetation and topsoil stripping, or altering habitats through management including mowing, rolling, or ploughing may lead to population declines in species that rely on these habitats. Loss of connectivity between habitat patches disrupts species dependent on them while many HPI also provide essential ecosystem services, such as flood mitigation, carbon sequestration, and pollination. Habitat degradation reduces these functions, reduces their ability to adapt to climate fluctuations and construction activities may lead to soil erosion, nutrient depletion, and water contamination. This affects both terrestrial and aquatic ecosystems, reducing their ability to support protected and notable species. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Habitats of Principal Importance [TEC-112] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment. (SGP-21) On-site Construction Traffic Management Measures. (SGP-23) Standard good practice dust mitigation measures.	**Significant** Adverse	**Air quality changes:** Air quality effects and air pollution during construction may significantly affect HPIs, leading to long-term habitat degradation. Excess nitrogen from ammonia and nitrogen oxides arising from vehicle emissions may leads to nutrient enrichment, altering plant communities in nitrogen-sensitive habitats. Pollutants such as sulphur dioxide and nitrogen oxides may also contribute to acid deposition, which can degrade soil and water quality, impacting species adapted to low-nutrient conditions. Persistent exposure to air pollutants can weaken habitat resilience, making HPIs more vulnerable to other environmental stressors. Dust accumulation on plant surfaces from construction activities can reduce photosynthesis, impair respiration, and hinder growth, particularly in sensitive habitats and can enter water bodies, affecting aquatic habitats. Persistent dust pollution can lead to gradual habitat degradation and increase vulnerability to wider pressures. (Long-term)	(AM-73) Investigate, assess and remediate contaminated land. (AM-75) Species / habitat specific mitigation strategy.
Habitats of Principal Importance [TEC-113] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-35) Design of temporary crossings during construction to maintain function and integrity of watercourses.	**Significant** Adverse	**Hydrological changes**: Hydrological changes arising from construction activities (including watercourse diversion and alteration to surface water drainage routes), land-use modifications and associated water management practices may affect HPIs, affecting their ecological integrity and resilience. Construction projects can significantly alter hydrological conditions, affecting the ecological integrity of these habitats, modifying surface and groundwater flow and leading to changes in water dependent hydrology including through increased runoff. Pollution from construction materials, sedimentation, and chemical runoff can degrade water quality, affecting freshwater ecosystems and species reliant on clean water and excessive water abstraction and potential contamination from construction sites may impact groundwater-dependent habitats. (Long-term)	(AM-35) Water quality monitoring and subsequent remedial activities where these are required. (AM-75) Species / habitat specific mitigation strategy.
Habitats of Principal Importance [TEC-114] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-04) Design the Project to reduce the need to import material as far as practicable. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Introduction and spread of INNS**: Construction activities can inadvertently introduce and facilitate the spread of invasive non-native species (INNS), potentially leading to significant ecological impacts. INNS often outcompete native flora reducing biodiversity and altering habitat composition affecting the ecological integrity of these habitats. Some invasive species modify soil structure, nutrient cycles, and hydrology, leading to long-term habitat deterioration. Machinery, soil movement, and water runoff can transport INNS beyond the construction site, affecting adjacent HPIs over extensive areas. (Long-term)	(AM-73) Investigate, assess and remediate contaminated land.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-08) Standard good practice measures for controlling and treating INNS.			
Badger [TEC-3] (**Low**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-25) Apply measures including Best Practicable Means to reduce construction noise and vibration.	**Significant** Adverse	**Habitat loss/gain, fragmentation or modification**: The construction phase of the Project will result in habitat loss and the loss of badger setts and foraging habitat. Displacement from clan territories can result in increased competition, reduced foraging efficiency, and elevated stress. Habitat fragmentation can result in barrier effects which divide territories, limit sett access, and inhibit dispersal increasing risks of genetic isolation and mortality risks, while habitat modification can result in sett disturbance and alter resource availability. The Early Works will deliver habitat creation and enhancement, as these establish they are likely to provide greater foraging opportunities for badgers than the predominant habitats lost i.e. arable. There would also be connectivity benefits; improving landscape connectivity to facilitate movement, which will likely contribute to genetic exchange between local badger populations. Habitat gain will be aligned with the biodiversity net gain strategy and Priority Areas for Biodiversity. (Permanent)	(AM-75) Species / habitat specific mitigation strategy.
Badger [TEC-4] (**Low**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-25) Apply measures including Best Practicable Means to reduce construction noise and vibration. (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: The construction phase of the Project including Early Works and Main Works will result in disturbance of badger setts (where these are present) and foraging habitat. Disturbance can result in displacement from clan territories and result in increased competition, reduced foraging efficiency, and elevated stress. Disturbance may arise from all forms of construction activity and also lighting of retained habitats. The construction phase of the Project as part of Early Works will deliver habitat creation and enhancement, as these establish they are likely to provide greater foraging opportunities for badgers than the predominant habitats lost i.e. arable. There would also be connectivity benefits; improving landscape connectivity to facilitate movement, which will likely contribute to genetic exchange between local badger populations., however this may also lead to disturbance of badgers and setts in the short term. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Badger [TEC-5] (**Low**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-26) Carry out construction works during standard working hours	**Significant** Adverse	**Mortality and injury**: The construction phase of the Project will result in habitat loss and the loss of badger setts and foraging habitat. Displacement from clan territories can result in increased competition, reduced foraging efficiency, anthropogenic conflict and elevated stress which may lead to mortality. Habitat fragmentation can result in barrier effects which give rise to mortality risks, notably through the provision of temporary or permanent highways and vehicle movements. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(where reasonably practicable).			
Bat species - Species considered widespread and abundant within southern England [TEC-13] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Widespread species such as pipistrelles are known for their relative adaptability; however the direct loss of habitat can remove essential resources for bats, including roosting sites within trees or built structures, and foraging areas particularly around woodlands, hedgerows, riparian corridors, and grasslands. Fragmentation of previously connected habitats may lead to the disruption of commuting routes between roosts and foraging grounds, and in some cases may lead to isolation of sub-populations and disproportionately affect species such as brown long-eared bats, which rely on dark, sheltered corridors. Habitat modification can deter light-sensitive species whilst over-management or intensive landscaping can reduce insect prey abundance leading to shifts in community composition and long-term population decline. The Early Works will also deliver habitat creation and enhancement which is likely to provide opportunities for bat species including connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Bat species - Species considered widespread and abundant within southern England [TEC-14] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-25) Apply measures including Best Practicable Means to reduce construction noise and vibration. (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: While some but not all widespread and abundant bat species in southern England (particularly pipistrelle species) demonstrate a degree of tolerance to urban and semi-urban environments, they remain highly sensitive to roost disturbance. Light- and noise-sensitive species are more likely to be affected by temporary or sustained construction disturbance. Disturbance of bats from a range of construction impacts including vibration within day roosts, maternity roosts, or hibernation sites may cause abandonment of the roost and affect the rearing of young. Disruption of commuting and foraging, for example from construction lighting, can cause avoidance of key commuting routes, particularly in more light-sensitive species and can lead to reduced use of nearby foraging habitat, lowering feeding efficiency and increasing energy expenditure. When disturbance occurs during key periods (e.g. breeding season or pre-hibernation fattening) it may further affect population viability. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Bat species - Species considered widespread and abundant within southern England [TEC-15] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Mortality and Injury**: Construction activities may pose a direct risk of mortality or injury to bats where roosts are present within buildings or other structures subject for demolition and trees subject to felling, or alteration of structures and management of trees. Where roosts are present, construction activities can lead to crushing or entrapment during structural works and can extend to fatal disturbance during sensitive times (notably during hibernation or maternity periods). In some rare cases mortality and injury may result from machinery operation, groundworks or piling activities which impact underground or crevice roosts.	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					(Long-term)	
Bat species – Rarer or restricted distribution within southern England [TEC-21] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Bat species that are scarce in terms of local population density are more likely to be vulnerable to population declines as they have more fragmented local populations and a greater dependence on complex habitat mosaics and stable roosting environments than more adaptable abundant bat species. The direct loss of habitat can remove essential resources, including roosting sites within trees or built structures, and foraging areas. Fragmentation of previously connected habitats may lead to the disruption of commuting routes between roosts and foraging grounds, leading to isolation of sub-populations (notably light sensitive species which rely on dark corridors, or those adapted to forage in specific habitats). Habitat modification can deter light-sensitive species whilst intensive landscaping can reduce insect prey abundance. The Early Works will also deliver habitat creation and enhancement which is likely to provide opportunities for bat species including connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Bat species – Rarer or restricted distribution within southern England [TEC-22] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-26) Carry out construction works during standard working hours (where reasonably practicable). (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: Bat species that are scarce in terms of local population density are more likely to be vulnerable to population declines as they have more fragmented local populations and a greater dependence on complex habitat mosaics and stable roosting environments than more adaptable abundant bat species. Light- and noise-sensitive species are more likely to be affected by temporary or sustained construction disturbance. Disturbance of bats including from noise and vibration within day roosts, maternity roosts, or hibernation sites may cause abandonment of the roost and affect the rearing of young. Disruption of commuting and foraging can cause avoidance of key commuting routes, particularly in more light-sensitive species and can lead to reduced use of nearby foraging habitat, lowering feeding efficiency and increasing energy expenditure. When disturbance occurs during key periods (e.g. breeding season or pre-hibernation fattening) it may further affect population viability. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Bat species – Rarer or restricted distribution within southern England [TEC-23] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Mortality and injury**: Construction activities may pose a direct risk of mortality or injury to bats where roosts are present within buildings or other structures subject for demolition and trees subject to felling, or alteration of structures and management of trees. Where roosts are present, construction activities can lead to crushing or entrapment during structural works and can extend to fatal disturbance during sensitive times (notably during hibernation or maternity periods). In some rare cases mortality and injury may result from machinery operation, groundworks or piling activities which impact underground or crevice roosts.	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					(Long-term)	
Bat species - Rarest annex II species and very rare [TEC-25] (**Very High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Bat species that are very rare and only occasionally encountered or rely on habitats and roost sites of very restricted distribution, are more likely to be vulnerable to population declines as they have more fragmented local populations and a greater dependence on complex habitat mosaics and stable roosting environments than more adaptable abundant bat species. The direct loss of habitat can remove essential resources, including roosting sites within trees or built structures, and foraging areas. Fragmentation of previously connected habitats may lead to the disruption of commuting routes between important sites for reproductive success and hibernation roosts, leading to isolation of sub-populations. Habitat modification can deter light-sensitive species whilst intensive landscaping can reduce insect prey abundance. The Early Works will also deliver habitat creation and enhancement which is likely to provide opportunities for bat species including connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Bat species – Rarest annex II species and very rare [TEC-26] (**Very High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-26) Carry out construction works during standard working hours (where reasonably practicable). (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: Bat species that are very rare in southern England are more likely to be vulnerable to population declines as they have more fragmented local populations and a greater dependence on complex habitat mosaics and stable roosting environments than more adaptable abundant bat species. Disturbance of bats including from construction noise and vibration within day roosts, maternity roosts, or hibernation sites may cause abandonment of the roost and affect the rearing of young and for rarest bat species where few roosts exist within southern England this can lead to more widespread population effects. Disruption of commuting and foraging can cause avoidance of key commuting routes, particularly in more light-sensitive species and can lead to reduced use of nearby foraging habitat, lowering feeding efficiency and increasing energy expenditure. When disturbance occurs during key periods (e.g. breeding season) it may further affect individuals and population viability. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Bat species – Rarest annex II species and very rare [TEC-27] (**Very High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Mortality and Injury**: Construction activities may pose a direct risk of mortality or injury to bats where roosts are present within buildings or other structures subject for demolition and trees subject to felling, or alteration of structures and management of trees. Where roosts are present, construction activities can lead to crushing or entrapment during structural works and can extend to fatal disturbance during sensitive times (notably during hibernation or maternity periods). In some rare cases mortality and injury may result from machinery operation, groundworks or piling activities which impact underground or crevice roosts.	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					(Long-term)	
Bat species – Species considered widespread but not as abundant within southern England [TEC-17] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Bat species which, while widespread, are relatively scarce in terms of local population densities are more likely to have a greater dependence on complex habitat mosaics and stable roosting environments than more adaptable abundant bat species and the direct loss of habitat can remove essential resources, including roosting sites within trees or built structures and foraging areas. Fragmentation of previously connected habitats may lead to the disruption of commuting routes between roosts and foraging grounds, may lead to isolation of sub-populations and disproportionately affect light sensitive species or those adapted to forage in specific habitats. Habitat modification can deter light-sensitive species whilst intensive landscaping can reduce insect prey abundance leading to shifts in community composition and population decline. The Early Works will also deliver habitat creation and enhancement which is likely to provide opportunities for bat species including connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Bat species – Species considered widespread but not as abundant within southern England [TEC-18] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-25) Apply measures including Best Practicable Means to reduce construction noise and vibration. (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: Bat species that, while widespread, are relatively scarce in terms of local population density remain highly sensitive to roost disturbance. Light- and noise-sensitive species are more likely to be affected by temporary or sustained construction disturbance. Disturbance of bats including from noise and vibration within day roosts, maternity roosts, or hibernation sites may cause abandonment of the roost and affect the rearing of young. Disruption of commuting and foraging, for example from construction lighting, can cause avoidance of key commuting routes, particularly in more light-sensitive species and can lead to reduced use of nearby foraging habitat, lowering feeding efficiency and increasing energy expenditure. When disturbance occurs around specific foraging habitats of value to a specific bat species within this group or during key periods (e.g. breeding season or pre-hibernation fattening) it may further affect individual fitness and population viability. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Bat species – Species considered widespread but not as abundant within southern England [TEC-19] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Mortality and Injury**: Construction activities may pose a direct risk of mortality or injury to bats where roosts are present within buildings or other structures subject for demolition and trees subject to felling, or alteration of structures and management of trees. Where roosts are present, construction activities can lead to crushing or entrapment during structural works and can extend to fatal disturbance during sensitive times (notably during hibernation or maternity periods). In some rare cases mortality and injury may result from machinery operation, groundworks or piling activities which impact underground or crevice roosts.	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					(Long-term)	
Birds – Barn Owl [TEC-101] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-34) Land that is only required temporarily during construction to be reinstated.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Barn owls are notably reliant on open habitats that support small mammal prey, particularly rough grassland, unmanaged field margins, and linear features such as hedgerows. Loss of these habitats due to construction and land management reduces the availability of foraging grounds and may lead to local declines or displacement. The loss of traditional nesting sites (for example, old barns and tree cavities) including through demolition of buildings can remove essential breeding opportunities. Fragmentation of foraging habitat, particularly field margins and hedgerow networks may significantly impact barn owl movement and territory viability. Modification of habitats that reduce prey abundance can degrade habitat suitability even where structural features remain. In addition construction and land use change may introduce barriers to movement. The construction phase of the Project will deliver direct habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds - Barn Owl [TEC-102] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-25) Apply measures including Best Practicable Means to reduce construction noise and vibration. (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: Barn owls are highly sensitive to disturbance near nest and roost sites. Regular human activity in close proximity, especially that arising from construction activities (including noise, vibration, and visual disturbance near nest or roost sites), can lead to site abandonment, particularly during incubation and early chick-rearing stages. As predominantly crepuscular/nocturnal foragers, they also require undisturbed, dark environments to hunt effectively. Light pollution and night-time noise may reduce foraging efficiency or cause avoidance of otherwise suitable areas. Displacement from traditional nesting or foraging sites due to repeated disturbance can increase energetic costs and exposure to road mortality, as birds are forced to range more widely or use suboptimal habitats. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – Barn Owl [TEC-103] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Mortality and injury**: Mortality and injury from anthropogenic sources including construction and land management activities may have a disproportionately large impact on population viability due to the barn owl's relatively low breeding productivity and reliance on adult survival for population stability. Road traffic mortality is a notable cause of death in barn owl populations in southern England, especially where linear roadside verges provide foraging habitat that draws owls into contact with vehicles. Mortality from rodenticides, if used during construction phases, may also have sub-lethal effects on breeding success and	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					behaviour. Direct mortality reduces local population sizes and can disproportionately affect vulnerable species while injury may impair survival and reproductive success, leading to longer-term population declines. (Long-term)	
Birds - Curlew [TEC-106] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-34) Land that is only required temporarily during construction to be reinstated.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Breeding curlews in southern England depend on open, low-intensity habitats and require adjacent areas with damp soils and invertebrate-rich feeding grounds. Loss of these habitats due to construction activities and land management at even a small-scale may lead to entire sites becoming unsuitable. Fragmentation of breeding habitat reduces connectivity between territories and increases the risk of local extinctions, especially as curlew have low reproductive success. Fragmentation also increases exposure to disturbance, and predation which may negatively affect breeding productivity. Habitat modifications have severe impacts on curlew habitat suitability and conversion of wet grassland to arable or intensive pasture, cessation of traditional grazing, and reduction in sward heterogeneity can make breeding and foraging areas unsuitable. The construction phase of the Project will deliver direct habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds - Curlew [TEC-107] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-25) Apply measures including Best Practicable Means to reduce construction noise and vibration. (SGP-26) Carry out construction works during standard working hours (where reasonably practicable). (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: Even low levels of repeated disturbance can significantly affect curlew behaviour and the effects associated with construction may therefore have an impact at increased distances from construction activities (including noise, vibration, and visual disturbance). During breeding, adults may leave nests for prolonged periods in response to perceived threats, increasing the risk of predation or egg chilling. Disturbance during the pre-laying or chick-rearing periods may force pairs to abandon territories altogether. Curlews are especially sensitive during this breeding season (typically March to July), when disturbance near nesting territories can cause nest abandonment, reduced chick survival, or displacement from otherwise suitable habitat. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds - Curlew [TEC-108] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts.	**Significant** Adverse	**Mortality and injury**: Mortality and injury from anthropogenic sources including construction and land management activities represent a key pressure on curlew, potentially affecting local population dynamics and conservation status. The causes of	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-07) Timing of construction works to reduce ecological impacts.		mortality and injury among curlew populations arising during construction includes collisions with vehicles and infrastructure, site clearance or agricultural operations such as vegetation and topsoil stripping, mowing, rolling, or ploughing during the nesting season, and increased opportunities for predation. Direct mortality reduces local population sizes and can disproportionately affect vulnerable species while injury may impair survival and reproductive success, leading to longer-term population declines. As a long-lived species with delayed maturity and low reproductive output, curlew populations are especially sensitive to even modest increases in adult or juvenile mortality. (Long-term)	
Birds – Schedule 1 [TEC-66] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: The direct loss of semi-natural and structurally diverse habitats to construction activities can lead to the displacement of Schedule 1 bird species reliant on specific nesting or foraging resources. Particularly vulnerable are farmland specialists, wetland breeders and declining woodland species. Fragmentation of suitable habitat during construction or changes in land management may disrupt ecological connectivity, limit territory size, and reduce access to critical resources. Species with large home ranges or low dispersal ability may be particularly affected, lowering breeding success and long-term site fidelity. Isolated habitat patches may support fewer species and lower population viability and changes to habitat structure or function can render habitats unsuitable or less productive for Schedule 1 birds, notably in rarer habitats. The construction phase of the Project will deliver direct habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds - Schedule 1 [TEC-67] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: Schedule 1 birds are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance can arise from a variety of sources associated with construction and land use changes, including noise and vibration, vehicle traffic, artificial lighting and visual disturbance. Seasonal sensitivity is heightened during breeding and wintering periods, when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds - Schedule 1 [TEC-68] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts.	**Significant** Adverse	**Mortality and injury**: Mortality and injury from anthropogenic sources including construction and land management activities represent a key pressure on Schedule 1 bird populations, potentially affecting local population dynamics and conservation	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-07) Timing of construction works to reduce ecological impacts.		status. Common causes of mortality and injury among bird populations include collisions with vehicles and infrastructure, poisoning and contamination and direct human disturbance. Direct mortality reduces local population sizes and can disproportionately affect vulnerable species while injury may impair survival and reproductive success, leading to longer-term population declines. Species with low reproductive rates or limited distributions are especially susceptible to population-level impacts from even small increases in mortality. (Long-term)	
Birds – BoCC Amber List species [TEC-76] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: The direct loss of semi-natural and structurally diverse habitats to construction activities can lead to the displacement of BoCC Amber List bird species reliant on specific nesting or foraging resources. Particularly vulnerable are farmland specialists, wetland breeders and declining woodland species. Fragmentation of suitable habitat during construction or changes in land management may disrupt ecological connectivity, limit territory size, and reduce access to critical resources. Species with large home ranges or low dispersal ability may be particularly affected, lowering breeding success and long-term site fidelity. Isolated habitat patches may support fewer species and lower population viability and changes to habitat structure or function can render habitats unsuitable or less productive for Amber List birds, notably in rarer habitats. The construction phase of the Project will deliver direct habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – BoCC Amber List species [TEC-77] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-26) Carry out construction works during standard working hours (where reasonably practicable). (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: BoCC Amber List species are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance can arise from a variety of sources associated with construction and land use changes, including noise and vibration, vehicle traffic, artificial lighting and visual disturbance. Seasonal sensitivity is heightened during breeding and wintering periods, when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Birds – BoCC Amber List species [TEC-78] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Mortality and injury**: Mortality and injury from anthropogenic sources including construction and land management activities represent a key pressure on BoCC Amber List bird populations, potentially affecting local population dynamics and conservation status. Common causes of mortality and injury among bird populations include collisions with vehicles and infrastructure, poisoning and contamination and direct human disturbance. Direct mortality reduces local population sizes and can disproportionately affect vulnerable species while injury may impair survival and reproductive success, leading to longer-term population declines. Species with low reproductive rates or limited distributions are especially susceptible to population-level impacts from even small increases in mortality. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – BoCC Red List species [TEC-71] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: The direct loss of semi-natural and structurally diverse habitats to construction activities can lead to the displacement of BoCC Red List bird species reliant on specific nesting or foraging resources. Particularly vulnerable are farmland specialists, wetland breeders and declining woodland species. Fragmentation of suitable habitat during construction or changes in land management may disrupt ecological connectivity, limit territory size, and reduce access to critical resources. Species with large home ranges or low dispersal ability may be particularly affected, lowering breeding success and long-term site fidelity. Isolated habitat patches may support fewer species and lower population viability and changes to habitat structure or function can render habitats unsuitable or less productive for BoCC Red List birds, notably in rarer habitats The construction phase of the Project will deliver direct habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – BoCC Red List species [TEC-72] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: BoCC Red List species are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance can arise from a variety of sources associated with construction and land use changes, including noise and vibration, vehicle traffic, artificial lighting and visual disturbance. Seasonal sensitivity is heightened during breeding and wintering periods, when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Birds – BoCC Red List species [TEC-73] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Mortality and injury**: Mortality and injury from anthropogenic sources including construction and land management activities represent a key pressure on Red List bird populations, potentially affecting local population dynamics and conservation status. Common causes of mortality and injury among bird populations include collisions with vehicles and infrastructure, poisoning and contamination and resulting from direct human disturbance. Direct mortality reduces local population sizes and can disproportionately affect vulnerable species while injury may impair survival and reproductive success, leading to longer-term population declines. Species with low reproductive rates or limited distributions are especially susceptible to population-level impacts from even small increases in mortality. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – Breeding [TEC-91] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: The direct loss of semi-natural and structurally diverse habitats to construction activities can lead to the displacement of breeding bird species reliant on specific nesting or foraging resources. Particularly vulnerable are farmland specialists, wetland breeders and declining woodland species. Fragmentation of suitable habitat during construction or changes in land management may disrupt ecological connectivity, limit territory size, and reduce access to resources. Species with large home ranges or low dispersal ability may be particularly affected, lowering breeding success and long-term site fidelity. Isolated habitat patches may support fewer species and lower population viability and changes to habitat structure or function can render habitats unsuitable or less productive for breeding birds. The construction phase of the Project will deliver direct habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – Breeding [TEC-92] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-25) Apply measures including Best Practicable Means to reduce construction noise and vibration.	**Significant** Adverse	**Disturbance**: Breeding birds are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance can arise from a variety of sources associated with construction and land use changes, including noise and vibration, vehicle traffic, artificial lighting and visual disturbance. Seasonal sensitivity is heightened during breeding periods, when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-51) Reduce light spill from construction.			
Birds – Breeding [TEC-93] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Mortality and injury**: Mortality and injury from anthropogenic sources including construction and land management activities represent a key pressure on bird populations, potentially affecting local population dynamics and conservation status. Common causes of mortality and injury among bird populations include collisions with vehicles and infrastructure, construction site clearance or agricultural operations such as vegetation and topsoil stripping, mowing, rolling, or ploughing during sensitive periods, and increased opportunities for predation. Direct mortality reduces local population sizes and can disproportionately affect vulnerable species while injury may impair survival and reproductive success, leading to longer-term population declines. Species with low reproductive rates or limited distributions are especially susceptible to population-level impacts from even small increases in mortality. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – Farmland Bird Assemblage [TEC-81] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-34) Land that is only required temporarily during construction to be reinstated.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: The direct loss of semi-natural and structurally diverse habitats to construction activities can lead to the displacement of farmland bird species reliant on specific nesting or foraging resources. Particularly vulnerable are farmland specialists, wetland breeders and declining woodland species. Fragmentation of suitable habitat during construction or changes in land management may disrupt ecological connectivity, limit territory size, and reduce access to critical resources. Species with large home ranges or low dispersal ability may be particularly affected, lowering breeding success and long-term site fidelity. Isolated habitat patches may support fewer species and lower population viability and changes to habitat structure or function can render habitats unsuitable or less productive for farmland birds, notably seasonal habitats. The construction phase of the Project will deliver direct habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – Farmland Bird Assemblage [TEC-82] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-25) Apply measures including Best Practicable Means to reduce construction noise and vibration.	**Significant** Adverse	**Disturbance**: Farmland bird assemblages are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance can arise from a variety of sources associated with construction and land use changes, including noise and vibration, vehicle traffic, artificial lighting and visual disturbance. Seasonal sensitivity is heightened during breeding and wintering periods, when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-51) Reduce light spill from construction.		particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Long-term)	
Birds – Farmland Bird Assemblage [TEC-83] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Mortality and injury**: Mortality and injury from anthropogenic sources including construction and land management activities represent a key pressure on bird populations, potentially affecting local population dynamics and conservation status. Common causes of mortality and injury among bird populations include collisions with vehicles and infrastructure, construction site clearance or agricultural operations such as vegetation and topsoil stripping, mowing, rolling, or ploughing during sensitive periods, and increased opportunities for predation. Direct mortality reduces local population sizes and can disproportionately affect vulnerable species while injury may impair survival and reproductive success, leading to longer-term population declines. Species with low reproductive rates or limited distributions are especially susceptible to population-level impacts from even small increases in mortality. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – Passage [TEC-96] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: The direct loss of semi-natural and structurally diverse habitats to construction activities can lead to the displacement of passage bird species reliant on specific foraging resources. Particularly vulnerable are declining species with a dependence on specific, vulnerable habitats. Fragmentation of suitable habitat during construction or changes in land management may disrupt ecological connectivity, limit territory size, and reduce access to resources. Species with large home ranges or low dispersal ability may be particularly affected, lowering passage success and long-term site fidelity. Isolated habitat patches may support fewer species and lower population viability and changes to habitat structure or function can render habitats unsuitable or less productive for passage birds. The construction phase of the Project will deliver direct habitat creation and enhancement which is likely to also provide connectivity and seasonal resource benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – Passage [TEC-97] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-25) Apply measures including Best Practicable	**Significant** Adverse	**Disturbance**: Passage bird species are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance can arise from a variety of sources associated with construction and land use changes, including noise and vibration, vehicle traffic, artificial lighting and visual disturbance. Seasonal sensitivity is heightened during the key passage periods, when birds are most reliant on undisturbed foraging and roost areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics.	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			Means to reduce construction noise and vibration. (SGP-51) Reduce light spill from construction.		(Long-term)	
Birds – Passage [TEC-98] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Mortality and injury**: Mortality and injury from anthropogenic sources including construction and land management activities represent a key pressure on bird populations, potentially affecting local population dynamics and conservation status. Common causes of mortality and injury among bird populations include collisions with vehicles and infrastructure, construction site clearance or agricultural operations such as vegetation and topsoil stripping, mowing, rolling, or ploughing during sensitive periods, and increased opportunities for predation. Direct mortality reduces local population sizes and can disproportionately affect vulnerable species while injury may impair survival and reproductive success, leading to longer-term population declines. Species with low reproductive rates or limited distributions are especially susceptible to population-level impacts from even small increases in mortality. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – Wintering [TEC-86] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: The direct loss of semi-natural and structurally diverse habitats to construction activities can lead to the displacement of wintering bird assemblages reliant on specific nesting or foraging resources. Particularly vulnerable are farmland specialists and declining species associated with habitats of limited distribution. Fragmentation of suitable habitat during construction or changes in land management may disrupt ecological connectivity, limit territory size, and reduce access to resources. Species with large home ranges or low dispersal ability may be particularly affected, lowering breeding success and long-term site fidelity. Isolated habitat patches may support fewer species and lower population viability and changes to habitat structure or function can render habitats unsuitable or less productive for wintering birds. The construction phase of the Project will deliver direct habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Birds – Wintering [TEC-87] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-25) Apply measures including Best Practicable Means to reduce	**Significant** Adverse	**Disturbance**: Wintering birds are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance can arise from a variety of sources associated with construction and land use changes, including noise and vibration, vehicle traffic, artificial lighting and visual disturbance. Seasonal sensitivity is heightened during the key wintering period, when birds are most reliant on undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			construction noise and vibration. (SGP-26) Carry out construction works during standard working hours (where reasonably practicable). (SGP-51) Reduce light spill from construction.		tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Long-term)	
Birds – Wintering [TEC-88] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Mortality and injury**: Mortality and injury from anthropogenic sources including construction and land management activities represent a key pressure on bird populations, potentially affecting local population dynamics and conservation status. Common causes of mortality and injury among bird populations include collisions with vehicles and infrastructure, construction site clearance or agricultural operations such as vegetation and topsoil stripping, mowing, rolling, or ploughing during sensitive periods, and increased opportunities for predation. Direct mortality reduces local population sizes and can disproportionately affect vulnerable species while injury may impair survival and reproductive success, leading to longer-term population declines. Species with low reproductive rates or limited distributions are especially susceptible to population-level impacts from even small increases in mortality. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Great crested newt [TEC-37] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Great crested newts require a network of suitable breeding ponds and connected terrestrial habitat for foraging, shelter, and hibernation. The species is sensitive to changes in habitat, particularly within proximity to breeding ponds. During construction work, the loss of ponds or adjacent terrestrial habitat can result in reduced breeding success through loss of aquatic egg-laying habitat and the loss of foraging and refuge areas. Fragmentation of habitats can isolate populations; disrupt dispersal routes between breeding ponds and terrestrial habitats; and alter metapopulation structure due to the limited mobility of the species and its dependence on landscape connectivity. Changes to the structure, management, or condition of aquatic or terrestrial habitats can reduce habitat suitability and encourage presence of fish or invasive species. The construction phase of the Project will deliver habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Great crested newt [TEC-40] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-03) Standard good practice measures for works within or adjacent to waterbodies.	**Significant** Adverse	**Mortality and injury**: Great crested newt populations are highly sensitive to increases in mortality and injury arising from construction activities and site clearance, particularly during periods of high activity in spring and autumn, and where they are already fragmented or in decline. The species' susceptibility to	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.		disruption to metapopulation dynamics, particularly where dispersal between ponds is essential for population stability, can magnify even smaller impacts. Due to the species' low reproductive rate and reliance on long-term habitat stability, effects such as injury or stress can lead to reduced fitness, increased vulnerability to disease and predation, and lower reproductive output whilst the mortality of young can further compromise population recovery. Localised population decline may occur where mortality exceeds natural replacement rates. This can be particularly severe in isolated populations, where recolonisation potential is limited. (Long-term)	
Hazel dormouse [TEC-8] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Should hazel dormice be confirmed as present within draft Order limits, the construction phase of the Project will lead to the loss of suitable habitats and a decline in local population size. Fragmentation of retained habitats may reduce habitat connectivity, which can result in reduced opportunities for dormouse movement and genetic exchange especially as arboreal connections and the loss or severance of linear features (such as hedgerows, wooded corridors) can isolate populations and increase their vulnerability to local extinction. Changes to habitat structure, such as canopy thinning, understorey clearance, or inappropriate hedgerow management, can degrade habitat quality and may impact survival and breeding success. The construction phase of the Project as part of Early Works will also deliver habitat creation which is likely to provide opportunities for hazel dormice including connectivity benefits, enhancing landscape permeability to facilitate species movement. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Hazel dormouse [TEC-9] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-26) Carry out construction works during standard working hours (where reasonably practicable). (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: Should hazel dormice be confirmed as present within draft Order limits, the construction phase of the Project will at times and across widespread locations require heavy machinery, excavation, or vehicular movement which can cause noise and vibration that may disturb dormice, particularly during the active season (indicatively, April–October). Disturbance during this period can disrupt foraging, nesting, and breeding behaviour, potentially leading to nest abandonment or reduced reproductive success. During hibernation (indicatively, November–March), dormice are highly vulnerable to disturbance, which can cause premature activity, significant energy loss and increased mortality. Artificial lighting from night-time construction work may deter nocturnal activity for the species, which is primarily crepuscular and nocturnal, reduce activity levels and increase vulnerability to predators, thereby affecting feeding efficiency and population viability. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Hazel dormouse [TEC-10] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Mortality and Injury**: Should hazel dormice be confirmed as present within draft Order limits, the construction phase of the Project, notably vegetation clearance, groundworks, tree felling or hedgerow removal would lead to risks of injuring or killing hazel dormice. Dormice may be present in suitable habitat during both the active season (broadly, April–October) and the hibernation period (broadly, November–March). Hibernating individuals may be concealed at ground level in leaf litter or among tree roots, making them difficult to detect prior to works. The use of construction machinery and site traffic during the construction phase may risk mortality or injury of individuals and their nests. The loss of nests can also affect the ability of hazel dormice to survive due to loss of shelter and protection from predators or weather extremes. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Natterjack toad [TEC-42] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Natterjack toads rely on a combination of early-successional terrestrial habitat and ephemeral, shallow breeding pools in open landscapes. The loss of habitat components due to construction activities and site clearance can impact population viability, including the loss of breeding sites, resulting in reduced reproduction and the loss of foraging and refuge habitat. Due to their limited dispersal range and habitat specificity, even small-scale habitat loss can result in long-term population decline or local extinction. Fragmentation and modification of suitable habitat can restrict movement between breeding and terrestrial habitats, cause functional degradation that renders breeding pools unsuitable; or isolate breeding populations due to physical or ecological barriers, notably on remnant populations confined to small habitat patches. The construction phase of the Project will deliver habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Natterjack toad [TEC-43] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Mortality and injury**: Natterjack toad populations are highly sensitive to increases in mortality and injury due to construction activities and site clearance, particularly during periods of high activity may reduce chorus size and calling activity, directly affecting mate attraction and spawning success. The species' susceptibility due to limited distribution, small and often isolated populations, and specific ecological requirements, can magnify even smaller impacts. Due to the species' highly localised occurrence and dependence on site-level habitat quality, effects such as injury or stress can magnify effects of reduced fitness, increased vulnerability to disease and predation and lower reproductive output whilst the mortality of young can further compromise population recovery. Localised population decline may occur where mortality exceeds natural replacement rates. This can be particularly severe in isolated populations, where recolonisation potential is limited. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Notable vascular plants [TEC-118] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-34) Land that is only required temporarily during construction to be reinstated.	**Significant** Adverse	**Habitat loss and modification**: Habitat loss and modification due to construction activities and land use change are among the most significant drivers of vascular plant decline in England. These pressures result in both direct and indirect impacts on plant populations, particularly those with narrow ecological requirements or limited dispersal capabilities. Habitat loss may lead to the contraction of species' ranges and the isolation of populations, especially critical for species confined to rare or declining habitats such as species-rich grasslands. Fragmentation disproportionately affects species with poor dispersal mechanisms and those reliant on specific microhabitats while habitat modification, such as drainage and changes in land management may alter soil chemistry, hydrology, and light availability. These changes can render habitats unsuitable for sensitive species. The construction phase of the Project will deliver direct habitat creation and enhancement which may provide new habitat opportunities. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Notable vascular plants [TEC-119] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment. (SGP-23) Standard good practice dust mitigation measures. (SGP-24) Standard good practice measures for minimising vehicle, plant and machinery emissions.	**Significant** Adverse	**Air quality changes:** Air quality effects and air pollution during construction may significantly affect notable vascular plants, leading to long-term degradation, biodiversity loss and ecosystem disruption. Elevated levels of nitrogen from ammonia and nitrogen oxides arising from vehicle emissions may alter soil chemistry, leading to nutrient imbalances and reduced plant resilience. Pollutants such as sulphur dioxide may cause leaf discoloration, reduced photosynthetic efficiency, and increased susceptibility to pests and diseases. Dust accumulation on leaf surfaces from construction activities can reduce photosynthesis, impair respiration, and hinder growth while persistent dust pollution can lead to gradual degradation and increase vulnerability to wider pressures. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Notable vascular plants [TEC-120] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-06) Standard good practice measures for managing ecology impacts.	**Significant** Adverse	**Hydrological changes**: Hydrological changes arising from construction activities, land-use modifications and associated water management practices may affect the persistence and ecological integrity of notable vascular plant populations in England. Construction projects can significantly alter hydrological conditions, modifying surface and groundwater flow and leading to changes in water dependent plant communities including through increased runoff. Pollution from construction materials, sedimentation, and chemical runoff can degrade water quality while hydrological modification can fragment suitable microhabitats, reducing the availability of niche conditions required by species with narrow	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-07) Timing of construction works to reduce ecological impacts.		ecological tolerances. This may have notable effects on floodplain meadows and calcareous fens where impact pathways lead to significant changes. (Long-term)	
Notable vascular plants [TEC-121] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-04) Design the Project to reduce the need to import material as far as practicable. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-08) Standard good practice measures for controlling and treating INNS.	**Significant** Adverse	**Introduction and spread of INNS**: Construction activities can inadvertently introduce and facilitate the spread of invasive non-native species (INNS), potentially leading to significant ecological impacts when equipment and materials are moved between and within sites. INNS often outcompete native flora including notable vascular plants, reducing biodiversity and altering habitat composition affecting the ecological integrity of these habitats. Some invasive species modify soil structure, nutrient cycles, and hydrology, leading to long-term habitat deterioration. Machinery, soil movement, and water runoff can transport INNS beyond the construction site, affecting adjacent notable vascular pant communities over extensive areas. (Long-term)	(AM-73) Investigate, assess and remediate contaminated land.
Other amphibians [TEC-45] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Common amphibians are widespread in England, occurring in both rural and urban landscapes. While relatively adaptable, these species are dependent on the availability of suitable breeding ponds and structurally diverse terrestrial habitats. Loss due to construction activities and site clearance of either aquatic or terrestrial habitat can have significant impacts on local amphibian populations as breeding pond loss directly reduces reproductive opportunities and can lead to the local extinction of populations. Fragmentation of habitat can disrupt seasonal amphibian movements through barriers to migration between ponds and terrestrial habitats and isolation of populations. Modification of habitats can also reduce habitat suitability and can contribute to gradual population decline, especially when combined with other pressures. The construction phase of the Project will deliver habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Other amphibians [TEC-46] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Mortality and injury**: Common amphibian species in England are generally widespread and not subject to strict legal protection, however they may remain vulnerable to local population decline as a result of mortality and injury due to construction activities and site clearance, including local extinction in the face of repeated or large-scale injury and mortality events, especially in intensively managed landscapes. Impacts are most severe where populations are already under pressure from habitat loss or isolation and can arise from direct mortality of adults, particularly during the breeding season or migratory movements, which reduces the number of individuals available to reproduce in a given year; reduced recruitment resulting from the injury or death of juveniles	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					undermining long-term population sustainability, and disruption of seasonal movements contributing to the failure of local populations. (Long-term)	
Otter [TEC-48] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-35) Design of temporary crossings during construction to maintain function and integrity of watercourses.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Otters depend on extensive, high-quality habitats and the loss of these habitats can significantly affect their ecology and population viability. The loss of riparian vegetation and undisturbed banks may remove key shelter, resting, and breeding sites, reducing territory suitability. The loss aquatic habitat can reduce prey abundance (including fish and amphibians). Otters require large, linear territories and fragmentation of this habitat can impede natural movements and reduce access to key resources. Modification of habitat such as riparian vegetation and watercourse flow regimes may render habitat unsuitable or degrade its ecological function. Impacts arising from habitat change or fragmentation are rarely confined to a small spatial scale, due to the species' large home ranges and dependence on continuous, high-quality corridors. The Early Works will also deliver habitat creation and enhancement which is likely to provide opportunities for otter including connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Otter [TEC-49] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-35) Design of temporary crossings during construction to maintain	**Significant** Adverse	**Hydrological changes**: Otters rely on stable, clean, and well-connected watercourses to support their foraging, movement, and breeding. Hydrological changes arising during large scale construction activities that disrupt these functions (including watercourse diversion) can lead to habitat degradation, reduced prey abundance, increased energetic costs, and ultimately displacement or local population decline. Changes to natural flow regimes including reduced flow volumes resulting in limited prey availability, flow fluctuations which disrupt seasonal resource availability and the Loss of marginal habitats for foraging and shelter opportunities may all result in adverse effects. Hydrological changes that interrupt or alter natural connections between waterbodies can affect otter movements and landscape-scale habitat use can result in loss of connectivity, including to high-value seasonal foraging areas, such as ditches, and wetlands. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			function and integrity of watercourses.			
Otter [TEC-50] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: Otter are widespread in England but sensitive to human disturbance. Activities associated with construction, and agricultural operations near watercourses can disturb otters, particularly at holts, lying-up sites, and breeding/natal sites. Elevated noise levels from machinery or construction works can cause otters to avoid key habitats while artificial lighting can deter nocturnal movements, particularly near barrier crossings, feeding areas, and resting sites. Works to watercourses, including diversion, restoration, habitat creation and realignment can disrupt otter behaviour and reduce access to key foraging or sheltering sites and overall disturbance can cause otters to abandon holts, especially during sensitive periods such as breeding and rearing young and repeated or prolonged disturbance can reduce reproductive success by affecting deterring use of natal sites. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Otter [TEC-51] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Mortality and injury**: The leading cause of recorded otter mortality in England is road traffic collisions. Most incidents occur near water crossings, culverts, and bridges. Accidental killing or injury may occur if holts or lying-up sites are damaged or destroyed during site clearance, excavation, or piling activities and watercourse activities such as dredging, de-silting, or bank reinforcement may cause direct harm to otters or their resting places. Drainage pipes, fencing, fish traps, or other infrastructure may pose a risk of trapping or injuring otters, especially juveniles while indirect mortality can arise from contamination of prey species or water quality deterioration due to run-off, chemicals, or sewage. The loss of individuals, especially breeding adults, can impact local population viability and impact recruitment and local population sustainability while the mortality of dominant individuals may lead to disruption of established territories and social dynamics. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Reptiles [TEC-53] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Common reptile species are vulnerable to habitat loss, fragmentation, and modification, all of which are key drivers of local population decline. The loss of suitable habitat during construction, notably rough grassland, scrub, hedgerows, and brownfield mosaics, and the loss of key microhabitats (e.g. basking areas, hibernacula, egg-laying sites) can render a site functionally unsuitable. Habitat fragmentation can sever ecological connectivity, leading to smaller, more vulnerable subpopulations more susceptible to local extinction. The introduction of barriers may increase mortality risk during dispersal, particularly in species such as the grass snake, which ranges widely. Changes to habitat structure through management, where it leads to excessive shading, mowing and loss of refugia can also reduce the carrying capacity of sites. The	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					construction phase of the Project will deliver habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	
Reptiles [TEC-54] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Disturbance**: While common reptile species can show some tolerance to disturbance, they are still sensitive to sustained or high-intensity pressures, especially during key life stages. Construction activities including site clearance, excavation, earthworks, and movement of machinery can disturb reptiles in situ; artificial lighting can deter species from using certain areas; and persistent noise may displace reptiles from preferred basking or nesting sites. Repeated disturbance result in abandonment of important microhabitats such as hibernacula, basking spots, or egg-laying areas and can result in higher energy demands and increased vulnerability to predation. Reptiles are sensitive to disturbance during the active season (March–October), particularly during spring emergence, mating, egg-laying (grass snake and common lizard), and juvenile dispersal. During hibernation (typically November–February) however, disturbance to hibernacula (e.g. through excavation or ground compaction) can be fatal. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Reptiles [TEC-55] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Mortality and injury**: Reptile populations are vulnerable to local decline due to mortality and injury resulting from construction activities and land-use change. Site clearance and groundworks especially vegetation clearance and excavation, if carried out during the active season, can result in direct injury or death. The tracking of heavy equipment and movement of materials pose a risk to reptiles sheltering in low vegetation, rubble, or soil. Road traffic within or adjacent to suitable reptile habitat may lead to significant mortality, especially for grass snakes which may range over wider areas, while reptiles may also become trapped in trenches, excavations, fencing, or other features if left open overnight or without appropriate escape routes. Loss of individuals, particularly breeding adults, can significantly reduce the size and resilience of local populations. And injury and mortality during dispersal can hinder genetic exchange between populations, exacerbating the effects of habitat fragmentation. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Species of Principal Importance [TEC-57] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: The scoped-in Species of Principal Importance are vulnerable to habitat loss, fragmentation, and modification, which will all be a notable factor in local population decline. The loss of suitable habitat can render a site functionally unsuitable while habitat fragmentation can sever ecological connectivity, leading to smaller, more vulnerable subpopulations more susceptible to local extinction. The introduction of barriers may increase mortality risk during dispersal, particularly in species which ranges widely. Changes to habitat structure through management, especially for species dependent on seasonal habitat management, can also reduce the carrying	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-12) Standard good practice measures for establishment of trees and other planting. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment.		capacity of sites. The construction phase of the Project will deliver habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	
Species of Principal Importance [TEC-58] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-25) Apply measures including Best Practicable Means to reduce construction noise and vibration. (SGP-26) Carry out construction works during standard working hours (where reasonably practicable). (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: While the scoped-in Species of Principal Importance can show some tolerance to disturbance, they are still sensitive to sustained or high-intensity pressures, especially during key life stages. Construction activities including site clearance, excavation, earthworks, and movement of machinery can disturb species in resting places or nests; artificial lighting can deter nocturnal species from using certain areas; and persistent noise may displace species from resting sites. Repeated disturbance may result in abandonment of resting sites and can result in higher energy demands and increased vulnerability to predation. These species are sensitive to disturbance seasonally, particularly during mating, and caring for juveniles. During hibernation for hedgehog (typically November–February) however, disturbance to hibernacula (e.g. through habitat clearance or alteration) can be fatal. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Species of Principal Importance [TEC-59] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment.	**Significant** Adverse	**Mortality and injury**: The scoped-in Species of Principal Importance populations are vulnerable to local decline due to mortality and injury resulting from construction activities and land-use change. Site clearance and groundworks especially vegetation clearance and excavation can result in direct injury or death. Road traffic within or adjacent to suitable reptile habitat may lead to significant mortality, especially for species which may range over wider areas, while individuals may also become trapped in trenches, excavations, fencing, or other features if left open overnight or without appropriate escape routes. Loss of individuals, particularly breeding adults, can significantly reduce the size and resilience of local populations. Injury and mortality during dispersal can hinder genetic exchange between populations, exacerbating the effects of habitat fragmentation. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Terrestrial Invertebrates [TEC-62] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Terrestrial invertebrate species are often dependent on highly specific habitat features and when these are affected by construction activities leading to loss, change or degradation it can place invertebrate populations at heightened risk. Species with narrow habitat requirements including specialist butterflies, beetles, or solitary bees, are disproportionately affected due to their dependence on specific plant hosts, substrates, or microclimates. Fragmentation of habitat patches reduces landscape connectivity, impeding the dispersal of less mobile species and small, isolated populations are more vulnerable to local extinction and less able to track shifting resources. Modification of habitat structure, including overgrazing, scrub encroachment, or inappropriate cutting regimes may eliminate important microhabitats. The construction phase of the Project will deliver direct habitat creation and enhancement which is likely to also provide connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Terrestrial Invertebrates [TEC-63] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-11) Standard good practice measures to protect trees during construction. (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Mortality and injury**: Terrestrial invertebrate species are vulnerable to mortality and injury arising from construction and land-use change. Site clearance and groundworks including vegetation removal and topsoil stripping can result in significant invertebrate mortality, particularly for soil-dwelling species, pupae, and overwintering individuals. Compression of soil, contamination, and crushing from heavy machinery may kill or injure species such as ground beetles, bees, ants, and earthworms. Mowing and flailing, particularly in the active season (spring to late summer), can destroy invertebrates at all life stages. Insecticide, herbicide, pesticide and other industrial and household chemical use can cause both direct toxicity and sub-lethal effects. Artificial lighting near development sites can increase mortality of nocturnal invertebrates through disorientation, predation risk, and disruption of feeding and mating behaviours. Loss of keystone species can also result in cascading ecological effects. (Long-term)	(AM-75) Species / habitat specific mitigation strategy. (AM-73) Investigate, assess and remediate contaminated land.
Water vole [TEC-30] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-03) Standard good practice measures for works within or adjacent to waterbodies.	**Significant** Adverse	**Hydrological changes**: Water vole are closely associated with slow-flowing and still freshwater habitats and dependent on stable hydrological conditions for the establishment and maintenance of burrows and foraging habitat. Hydrological changes resulting from construction activities can impact habitat quality, availability, and stability, and may lead to displacement or population decline. Hydrological changes may result in water level fluctuation, expose burrow entrances, increasing the risk of predation and abandonment, or elevated or fluctuating water levels which cause flooding of burrows, leading to direct mortality or forcing individuals to relocate. Alteration of natural flow patterns, such as increased peak flows or unnaturally rapid drawdowns, can lead to bank erosion, loss of marginal vegetation, and reduced habitat stability as well as altering in-channel, marginal and floodplain habitats and	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			(SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-35) Design of temporary crossings during construction to maintain function and integrity of watercourses.		sediment mobilisation. These changes may compromise the availability of both foraging and burrowing sites. (Long-term)	
Water vole [TEC-31] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-51) Reduce light spill from construction.	**Significant** Adverse	**Disturbance**: Water voles are sensitive to disturbance, especially when breeding and over-wintering. Disturbance can arise from construction works including noise, vibration, increased human presence, and the use of machinery in or near suitable habitat. Water voles may abandon otherwise suitable habitat when disturbed, particularly where activity is prolonged or occurs close to burrows. Displacement can lead to increased energy expenditure, reduced access to food, and heightened vulnerability to predators. Disturbance during the breeding season may result in abandonment of litters or nesting sites, reducing reproductive success and disturbing over-wintering individuals may lead to increased mortality. Repeated disturbance or high levels of activity can act as a barrier to movement, fragmenting riparian corridors and may also cause water voles to avoid key areas of habitat, leading to underuse of available foraging resources or territories and potentially reducing the carrying capacity of the site. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.
Water vole [TEC-32] (**High**)	Most / all project components	Most / all project activities (construction)	(SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts.	**Significant** Adverse	**Mortality and injury**: Water vole populations are highly sensitive to increases in mortality and injury, particularly where they are already fragmented or in decline. The species' reliance on linear habitats and specific ecological requirements means that even small-scale losses can have disproportionately large impacts. During construction works, the loss of adults through injury or death can disrupt breeding success, especially in small populations where each individual represents a significant proportion of the reproductive pool. Injury or stress can lead to reduced fitness, increased vulnerability to disease and predation, and lower reproductive output whilst the mortality of dependent young during the breeding season can result in the immediate loss of a generation, further compromising population recovery. Localised population decline may occur where mortality exceeds natural replacement rates. This can be particularly severe in isolated populations, where recolonisation potential is limited. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Water vole [TEC-29] (**High**)	Most / all project components	Most / all project activities (construction)	(ED-27) Provision of Project Priority Areas for Biodiversity. (SGP-02) Standard good practice measures to reduce the impacts to surface and groundwater resources. (SGP-03) Standard good practice measures for works within or adjacent to waterbodies. (SGP-06) Standard good practice measures for managing ecology impacts. (SGP-07) Timing of construction works to reduce ecological impacts. (SGP-35) Design of temporary crossings during construction to maintain function and integrity of watercourses.	**Significant** Adverse	**Habitat loss / gain, fragmentation, and modification**: Water voles are highly dependent on dense marginal vegetation and suitable bank conditions for nesting and food. Loss of these features can result in displacement, increased mortality, and local population extinction. Removal or disturbance of bankside vegetation or in-channel works can lead to the loss of burrowing and foraging habitat. Water voles rely on linear habitat connectivity along watercourses for dispersal and colonisation. Fragmentation of riparian corridors through culverting, barriers, or isolation of water bodies can prevent or reduce recolonisation potential and increase vulnerability to predation or adverse conditions. Changes to bank structure, vegetation composition, or management may render otherwise suitable habitat unusable. These impacts may act cumulatively, especially where mink predation is a threat. The Early Works will also deliver habitat creation and enhancement which is likely to provide opportunities for water vole including connectivity benefits. (Long-term)	(AM-75) Species / habitat specific mitigation strategy.

1.3 Likely significant operation effects

Table 1.2 Initial likely significant effects during operation (with embedded and standard good practice mitigation applied, but prior to additional mitigation)

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Oxford Meadows SAC [TEC-124] (**Very High**)	Most / all project components	Workforce and visitor vehicle movements	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Air quality changes:** Oxford Meadows Special Areas of Conservation (SAC) is designated for its lowland hay meadows. Such habitats can be highly sensitive to air pollution, particularly nitrogen-based compounds emitted by road traffic potentially associated with any significant increase in staff and visitor vehicle movements. These pollutants can have significant ecological impacts, even at low concentrations, especially when deposition occurs over long periods. Nitrogen deposition can lead to the dominance of competitive species, altering habitat structure while acidifying pollutants can change soil pH, affecting nutrient availability and microbial communities, with knock-on effects for plant health and regeneration. It is not fully assessed whether screening thresholds for the SAC will be exceeded as a result of the Project and this effect pathway is included on a precautionary basis at PEIR. (Permanent)	(AM-29) Encourage public transport / active travel use. (AM-76) Additional mitigation which may result from the Habitats Regulation Assessment.
Barrow Farm Fen SSSI [TEC-215] (**High**)	Most / all project components	Workforce and visitor vehicle movements	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Air quality changes:** Barrow Farm Fen SSSI supports calcareous fen and other habitats that can be highly sensitive to air pollution, particularly nitrogen-based compounds emitted by road traffic potentially associated with any significant increase in staff and visitor vehicle movements. These pollutants can have significant ecological impacts, even at low concentrations, especially when deposition occurs over long periods. Nitrogen oxides emitted from vehicle exhausts contribute to nitrogen deposition and ammonia can also be emitted from catalytic converters. Particulate matter including from tyre wear, brake dust and exhaust emissions can settle on vegetation and soil, affecting plant health and soil chemistry. Nitrogen deposition can lead to the dominance of competitive species, altering habitat structure while acidifying pollutants can change soil pH, affecting nutrient availability and microbial communities, with knock-on effects for plant health and regeneration. (Long-term)	(AM-29) Encourage public transport / active travel use.
Barrow Farm Fen SSSI [TEC-216] (**High**)	Most / all project components	Most / all project activities (operation)	(ED-43) Asset design manages water table variability.	**Significant** Adverse	**Hydrological changes:** Barrow Farm Fen SSSI supports calcareous fen and associated wetland habitats which are considered dependent on specific hydrological conditions. Site management activities including vegetation clearance, drainage maintenance, watercourse realignment or infrastructure upgrades can potentially have consequences for designated site integrity within catchments. Maintenance or modification of ditches, culverts, or land drains can lower water tables, particularly in proximity to wetland sites, affecting flow-dependent ecosystems such as floodplain meadows and riparian or wet woodlands. Hydrological changes can shift plant community composition, reduce habitat suitability for specialist	(AM-20) Measures to reduce effects on aquatic ecology during operation. (AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-35) Water quality monitoring and subsequent remedial activities where these are required.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					species, and promote encroachment by invasive or generalist species. Sustained or cumulative hydrological impacts can compromise the ecological coherence of the SSSI, undermining it ability to support the sensitive habitats and species for which it is designated. (Permanent)	
Culham Brake SSSI [TEC-220] (**High**)	Most / all project components	Most / all project activities (operation)	(ED-43) Asset design manages water table variability.	**Significant** Adverse	**Hydrological changes:** Culham Brake SSSI supports willow carr habitats which are considered dependent on specific hydrological conditions. Site management activities including vegetation clearance, drainage maintenance, watercourse realignment or infrastructure upgrades can potentially have consequences for designated site integrity within catchments. Maintenance or modification of ditches, culverts, or land drains can lower water tables, particularly in proximity to wetland sites, affecting flow-dependent ecosystems such as floodplain meadows and riparian or wet woodlands. Hydrological changes can shift plant community composition, reduce habitat suitability for specialist species, and promote encroachment by invasive or generalist species. Sustained or cumulative hydrological impacts can compromise the ecological coherence of the SSSI, undermining it ability to support the sensitive habitats and associated species for which it is designated. (Permanent)	(AM-20) Measures to reduce effects on aquatic ecology during operation. (AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-35) Water quality monitoring and subsequent remedial activities where these are required.
Frilford Heath, Ponds and Fens SSSI [TEC-175] (**High**)	Most / all project components	Workforce and visitor vehicle movements	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Air quality changes:** Frilford Heath, Ponds and Fens SSSI comprises acid grassland, heathland and fen habitats. Such habitats can be highly sensitive to air pollution, particularly nitrogen-based compounds emitted by road traffic potentially associated with any significant increase in staff and visitor vehicle movements. These pollutants can have significant ecological impacts, even at low concentrations, especially when deposition occurs over long periods. Nitrogen oxides emitted from vehicle exhausts contribute to nitrogen deposition and ammonia can also be emitted from catalytic converters. Particulate matter including from tyre wear, brake dust and exhaust emissions can settle on vegetation and soil, affecting plant health and soil chemistry. Nitrogen deposition can lead to the dominance of competitive species, altering habitat structure while acidifying pollutants can change soil pH, affecting nutrient availability and microbial communities, with knock-on effects for plant health and regeneration. (Long-term)	(AM-29) Encourage public transport / active travel use.
Frilford Heath, Ponds and Fens SSSI [TEC-176] (**High**)	Most / all project components	Most / all project activities (operation)	(ED-43) Asset design manages water table variability.	**Significant** Adverse	**Hydrological changes:** Frilford Heath, Ponds and Fens SSSI comprises acid grassland, heathland and fen habitats with exceptionally diverse flora and fauna. The fen and wetland communities rely on specific hydrological conditions. Site management activities including vegetation clearance, drainage maintenance, watercourse realignment or infrastructure upgrades can potentially have consequences for designated site integrity within catchments. Maintenance or modification of ditches, culverts, or land drains can lower water tables, particularly in proximity to	(AM-20) Measures to reduce effects on aquatic ecology during operation. (AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-35) Water quality monitoring and subsequent remedial activities where these are required.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					wetland sites, affecting flow-dependent ecosystems. Hydrological changes can shift plant community composition, reduce habitat suitability for specialist species, and promote encroachment by invasive or generalist species. Sustained or cumulative hydrological impacts can compromise the ecological coherence of the SSSI, undermining its ability to support the sensitive habitats and species for which it is designated. (Permanent)	
Marcham Salt Spring LWS [TEC-160] (**Moderate**)	Most / all project components	Most / all project activities (operation)	(ED-42) Operation stage surface water management.	**Significant** Adverse	**Hydrological changes:** Marcham Salt Spring LWS historically supported salt springs and associated species within a wider wetland community. Such habitats may be hydrologically sensitive, relying on specific water regimes to maintain their ecological integrity. Site management activities including vegetation clearance, drainage maintenance, watercourse realignment or infrastructure upgrades can potentially have consequences for designated site integrity within catchments. Maintenance or modification of ditches, culverts, or land drains can lower water tables, particularly in proximity to wetland sites, affecting flow-dependent ecosystems. Hydrological changes can shift plant community composition, reduce habitat suitability for specialist species, and promote encroachment by invasive or generalist species. Sustained or cumulative hydrological impacts can compromise the ecological coherence of the SSSI, undermining its ability to support the sensitive habitats and species for which it is designated. (Permanent)	(AM-20) Measures to reduce effects on aquatic ecology during operation. (AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-17) Measures to manage and protect water flows in the watercourses. (AM-35) Water quality monitoring and subsequent remedial activities where these are required.
The Cuttings and Hutchins Copse LWS [TEC-171] (**Moderate**)	Most / all project components	Workforce and visitor vehicle movements	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Air quality changes:** The Cuttings and Hutchins Copse LWS will be retained, however will be directly adjacent to the realigned Hanney Road (currently c.900m away). The LWS may be sensitive to air pollution, particularly nitrogen-based compounds emitted by traffic potentially associated with the realigned road and any significant increase in vehicle movements. These pollutants can have significant ecological impacts, especially when deposition occurs over long periods. Vehicle related nitrogen deposition and ammonia emissions can also contribute to nitrogen enrichment. Particulate matter including from tyre wear, brake dust, and exhaust emissions can settle on vegetation and soil, affecting plant health and soil chemistry. Nitrogen deposition can lead to the dominance of competitive species, altering habitat structure while acidifying pollutants can change soil pH, affecting nutrient availability and microbial communities, with knock-on effects for plant health and regeneration. (Permanent)	No additional mitigation required as the effect is not significant.
The Cuttings and Hutchins Copse LWS [TEC-172] (**Moderate**)	Most / all project components	Most / all project activities (operation)	(ED-42) Operation stage surface water management.	**Significant** Adverse	**Hydrological changes:** The Cuttings and Hutchins Copse LWS comprises a series of ponds and a mature deciduous woodland belt adjacent to the railway. The LWS is within the order limits and will be directly adjacent to the realigned Hanney Road and may be hydrologically sensitive, relying on specific water regimes to maintain ecological integrity. Site management activities including vegetation	(AM-20) Measures to reduce effects on aquatic ecology during operation. (AM-21) Measures to reduce effects on terrestrial ecology during operation.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					clearance, drainage maintenance, watercourse realignment, or infrastructure upgrades can potentially have consequences for designated site integrity within catchments. Hydrological changes can shift plant community composition, reduce habitat suitability for specialist species, and promote encroachment by invasive or generalist species. Sustained or cumulative hydrological impacts can compromise the ecological coherence of habitats such as those within the LWS, undermining its ability to support the habitats and species for which they were designated. (Permanent)	(AM-17) Measures to manage and protect water flows in the watercourses. (AM-35) Water quality monitoring and subsequent remedial activities where these are required.
The Cuttings and Hutchins Copse LWS [TEC-229] (**Moderate**)	Most / all project components	Most / all project activities (operation)	(ED-20) Reduce the impact of the Steventon to East Hanney road diversion on environmental receptors. (ED-48) Designated ecological site protection from direct disturbance.	**Significant** Adverse	**Recreational pressures**: The Cuttings and Hutchins Copse LWS comprises a series of ponds and a mature deciduous woodland belt adjacent to the railway. The Cuttings and Hutchins Copse LWS will be retained, however will be directly adjacent to the realigned Hanney Road (currently c.900m away), and within the belt of habitats created around the reservoir. Given the proximity to these access points there is potential for increased public access and associated recreational pressures upon the habitats and species of the LWS. This can include trampling, increase nutrients through dog fouling, disturbance of species and litter. This could result in degradation of the habitats and an associated reduction in species diversity and distribution. (Permanent)	No additional mitigation has been confirmed at this stage, however, mitigation measures are being actively explored as the design and EIA progresses.
Ancient/veteran trees [TEC-117] (**High**)	Most / all project components	Most / all project activities (operation)	(ED-27) Provision of Project Priority Areas for Biodiversity. (ED-42) Operation stage surface water management. (ED-43) Asset design manages water table variability.	**Significant** Adverse	**Hydrological changes:** Ancient and veteran trees are vulnerable to hydrological changes driven by alteration of their physical environment and land-use pressures during the operation of the Project. Changes to hydrology from site management which result in prolonged dry periods may reduce soil moisture availability, impairing root function and increasing susceptibility to pests and diseases. Ancient and veteran trees with extensive but shallow root systems may be particularly sensitive to fluctuations in groundwater levels. Conversely, Increased waterlogging of soils may reduce oxygen availability to roots, also promoting root rot. Flooding may also destabilise trees, especially those with compromised structural integrity due to age or decay and increased surface runoff can erode soil around root zones, while heavy machinery use during wet conditions can compact soils, further limiting water infiltration and root respiration. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-27) Long term management and maintenance of planting and habitats. (AM-17) Measures to manage and protect water flows in the watercourses. (AM-75) Species / habitat specific mitigation strategy. (AM-79) Compensation for the loss of ancient and veteran trees.
Badger [TEC-6] (**Low**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: The operation phase of the Project may result in disturbance of badger setts (where these are present) and foraging habitat. Disturbance can result in displacement from clan territories and result in increased competition, reduced foraging efficiency, and elevated stress. The operation phase will introduce public recreational access to areas of the site as well as new land management and maintenance practices which have the potential to lead to disturbance. New permanent lighting of newly created or	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
		and recreation facilities Presence (of project components)			retained habitats may also lead to disturbance effects on badger setts or foraging in those locations. (Permanent)	
Badger [TEC-7] (**Low**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Presence (of project components)	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury**: The operation phase of the Project will introduce public recreational access to areas of the site as well as new permanent highways and vehicle movements which have the potential to lead to mortality and injury. In addition new engineered structures will be created which could introduce risks of entrapment. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Bat species - Species considered widespread and abundant within southern England [TEC-16] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: While some widespread and abundant bat species in southern England (particularly pipistrelle species) demonstrate a degree of tolerance to urban and semi-urban environments, they remain highly sensitive to roost disturbance. Increased public access (including recreational paths and open space networks) and new highways may result in increased human activity near or within foraging and roosting areas, artificial lighting from streetlights, vehicles, and associated infrastructure, and noise and vibration from vehicular traffic and maintenance works. Disturbance may affect new or retained roost sites as well as dark linear corridors such as hedgerows, treelines, and watercourses which bats use to navigate between roosts and feeding grounds with light- and noise-sensitive species more likely to be affected. Such effects can lead to delayed emergence from roosts and/or reduced foraging time, increased energy expenditure, reduced reproductive success and individual survival longevity. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Bat species – Rarer or restricted distribution within southern England [TEC-24] (**High**)	Most / all project components	Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Maintenance	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Bat species that are relatively scarce in terms of local population density are considered highly sensitive to roost disturbance. Increased public access (including recreational paths and open space networks) and new highways may result in increased human activity near or within foraging and roosting areas, artificial lighting from streetlights, vehicles, and associated infrastructure, and noise and vibration from vehicular traffic and maintenance works. Disturbance may affect new or retained roost sites as well as dark linear corridors such as hedgerows, treelines, and watercourses which bats use to navigate between roosts and feeding grounds with light- and noise-sensitive species and those that depend on specific roost or foraging sites more likely to be	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					affected. Such effects can lead to delayed emergence from roosts and/or reduced foraging time, increased energy expenditure, reduced reproductive success and individual survival longevity. (Permanent)	
Bat species – Rarest annex II species and very rare [TEC-28] (**Very High**)	Most / all project components	Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Maintenance	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Bat species that are that are very rare in southern England are considered highly sensitive to roost disturbance. Increased public access (including recreational paths and open space networks) and new highways may result in increased human activity near or within foraging and roosting areas, artificial lighting from streetlights, vehicles, and associated infrastructure, and noise and vibration from vehicular traffic and maintenance works. Disturbance may affect new or retained roost sites as well as dark linear corridors which bats use to navigate between roosts and feeding grounds with light- and noise-sensitive species and those that depend on specific roost or foraging sites more likely to be affected. Such effects can lead to delayed emergence from roosts and/or reduced foraging time, increased energy expenditure, reduced reproductive success and individual survival longevity. For rarest bat species this can lead to more widespread population and distribution effects. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Bat species – Species considered widespread but not as abundant within southern England [TEC-20] (**High**)	Most / all project components	Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Maintenance	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Bat species which, while widespread, are relatively scarce in terms of local population density are considered highly sensitive to roost disturbance. Increased public access (including recreational paths and open space networks) and new highways may result in increased human activity near or within foraging and roosting areas, artificial lighting from streetlights, vehicles, and associated infrastructure, and noise and vibration from vehicular traffic and maintenance works. Disturbance may affect new or retained roost sites as well as dark linear corridors such as hedgerows, treelines, and watercourses which bats use to navigate between roosts and feeding grounds with light- and noise-sensitive species and those that depend on specific roost or foraging sites are more likely to be affected. Such effects can lead to delayed emergence from roosts and/or reduced foraging time, increased energy expenditure, reduced reproductive success and individual survival longevity. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds – Barn Owl [TEC-104] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Barn owl are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance may arise from a variety of sources associated with operation and land management, including recreational activities (walking, dog-walking, cycling), operational noise, vehicle traffic, and especially, artificial lighting. Seasonal sensitivity is heightened during breeding periods when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while specific habitat requirements,	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
		Presence (of project components)			crepuscular/nocturnal behaviour, use of traditional roost sites and low tolerance for human presence can mean barn owl are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Permanent)	
Birds – Barn Owl [TEC-105] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Presence (of project components)	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site and management measures which may result in increased foot traffic and associated disturbance. Routine land management operations can cause injury or mortality, notably pest control using rodenticides. In addition, new engineered structures will be created which could introduce risks of bird strike and mortality or injury. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds - Curlew [TEC-109] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Presence (of project components)	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance:** Curlew are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance may arise from a variety of sources associated with operation and land management, including recreational activities (walking, dog-walking, cycling), operational noise, vehicle traffic, artificial lighting, and increased presence of domestic predators. Seasonal sensitivity is heightened during breeding periods, when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while disturbance near nesting territories can cause nest abandonment, reduced chick survival. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds - Curlew [TEC-110] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Presence (of project components)	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site and management measures which may result in increased foot traffic and associated disturbance as well as predation risks resulting from dogs off leads. Routine land management operations can cause injury or mortality, notably land management operations such as mowing, rolling, or ploughing during the nesting season. In addition, new engineered structures will be created which could introduce risks of bird strike and mortality or injury. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds – Schedule 1 [TEC-69] (**High**)	Most / all project components	Most / all project activities (operation)	(ED-60) Design project and lighting strategy to reduce	**Significant** Adverse	**Disturbance**: Schedule 1 birds are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance may	(AM-21) Measures to reduce effects on terrestrial ecology during operation.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			light spill from permanent facilities.		arise from a variety of sources associated with operation and land management, including recreational activities (walking, dog-walking, cycling), operational noise, vehicle traffic, artificial lighting, and increased presence of domestic predators. Seasonal sensitivity is heightened during breeding and wintering periods, when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Permanent)	(AM-75) Species / habitat specific mitigation strategy.
Birds – Schedule 1 [TEC-70] (**High**)	Most / all project components	Presence (of project components) Maintenance Use of publicly accessible areas and recreation facilities Workforce and visitor vehicle movements	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site and management measures which may result in increased foot traffic and associated disturbance and predation risks including dogs off leads. Routine land management operations can cause injury or mortality, including mowing and other mechanical management. In addition, new engineered structures will be created which could introduce risks of bird strike and mortality or injury. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds – BoCC Amber List species [TEC-79] (**High**)	Most / all project components	Maintenance Use of publicly accessible areas and recreation facilities Presence (of project components)	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: BoCC Amber List species are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance may arise from a variety of sources associated with operation and land management, including recreational activities (walking, dog-walking, cycling), operational noise, vehicle traffic, artificial lighting, and increased presence of domestic predators. Seasonal sensitivity is heightened during breeding and wintering periods, when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds – BoCC Amber List species [TEC-80] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site and management measures which may result in increased foot traffic and associated disturbance and predation risks including dogs off leads. Routine land management operations can cause injury or mortality, including mowing and other mechanical management. In addition, new engineered structures will be created which could introduce risks of bird strike and mortality or injury.	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
		and recreation facilities Presence (of project components)			(Permanent)	
Birds – BoCC Red List species [TEC-74] (**High**)	Most / all project components	Maintenance Presence (of project components) Use of publicly accessible areas and recreation facilities	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Red List bird species are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance may arise from a variety of sources associated with operation and land management, including recreational activities (walking, dog-walking, cycling), operational noise, vehicle traffic, artificial lighting, and increased presence of domestic predators. Seasonal sensitivity is heightened during breeding and wintering periods, when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds – BoCC Red List species [TEC-75] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Presence (of project components)	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site and management measures which may result in increased foot traffic and associated disturbance and predation risks including dogs off leads. Routine land management operations can cause injury or mortality, including mowing and other mechanical management. In addition, new engineered structures will be created which could introduce risks of bird strike and mortality or injury. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds – Breeding [TEC-94] (**High**)	Most / all project components	Maintenance Presence (of project components) Use of publicly accessible areas and recreation facilities	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Breeding birds are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance may arise from a variety of sources associated with operation and land management, including recreational activities (walking, dog-walking, cycling), operational noise, vehicle traffic, artificial lighting, and increased presence of domestic predators. Seasonal sensitivity is heightened during key breeding periods, when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics.	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					(Permanent)	
Birds – Breeding [TEC-95] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Presence (of project components)	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site and management measures which may result in increased foot traffic and associated disturbance and predation risks including dogs off leads. Routine land management operations can cause injury or mortality, including mowing and other mechanical management. In addition, new engineered structures will be created which could introduce risks of bird strike and mortality or injury. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds – Farmland Bird Assemblage [TEC-84] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Presence (of project components)	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Farmland bird assemblages are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance may arise from a variety of sources associated with operation and land management, including recreational activities (walking, dog-walking, cycling), operational noise, vehicle traffic, artificial lighting, and increased presence of domestic predators. Seasonal sensitivity is heightened during breeding and wintering periods, when birds are most reliant on secure nesting sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds – Farmland Bird Assemblage [TEC-85] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Presence (of project components)	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site and management measures which may result in increased foot traffic and associated disturbance and predation risks including dogs off leads. Routine land management operations can cause injury or mortality, including mowing and other mechanical management. In addition, new engineered structures will be created which could introduce risks of bird strike and mortality or injury. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds – Passage [TEC-99] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Passage bird species are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance may arise from a variety of sources associated with operation and land management, including recreational activities (walking, dog-walking, cycling), operational noise, vehicle traffic, artificial lighting, and	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
		Use of publicly accessible areas and recreation facilities Presence (of project components)			increased presence of domestic predators. Seasonal sensitivity is heightened during the key passage periods, when birds are most reliant on secure undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Permanent)	
Birds – Passage [TEC-100] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Presence (of project components)	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site and management measures which may result in increased foot traffic and associated disturbance and predation risks including dogs off leads. Routine land management operations can cause injury or mortality, including mowing and other mechanical management. In addition, new engineered structures will be created which could introduce risks of bird strike and mortality or injury. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds – Wintering [TEC-89] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities Presence (of project components)	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Wintering birds are vulnerable to a range of anthropogenic disturbances that can adversely affect their behaviour, distribution, and population viability. Disturbance may arise from a variety of sources associated with operation and land management, including recreational activities (walking, dog-walking, cycling), operational noise, vehicle traffic, artificial lighting, and increased presence of domestic predators. Seasonal sensitivity is heightened during the wintering period, when birds are most reliant on secure roost sites and undisturbed foraging areas. Disturbance may lead to displacement from preferred habitats and reduced feeding efficiency, while species with specific habitat requirements or low tolerance for human presence are particularly sensitive. Frequent disturbance can lower survival rates, ultimately impacting local population dynamics. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Birds – Wintering [TEC-90] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site and management measures which may result in increased foot traffic and associated disturbance and predation risks including dogs off leads. Routine land management operations can cause injury or mortality, including mowing and other mechanical management. In addition, new engineered structures will be created which could introduce risks of bird strike and mortality or injury. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
		Presence (of project components)				
Great crested newt [TEC-41] (**High**)	Most / all project components	Most / all project activities (operation)	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site as well as new permanent highways and vehicle movements which have the potential to lead to mortality and injury. In addition new engineered structures will be created which could introduce risks of entrapment. (Permanent)	(AM-20) Measures to reduce effects on aquatic ecology during operation. (AM-21) Measures to reduce effects on terrestrial ecology during operation.
Hazel dormouse [TEC-11] (**High**)	Most / all project components	Most / all project activities (operation)	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Should hazel dormice be confirmed as present within draft Order limits, the operation phase of the Project may result in disturbance of hazel dormice and associated foraging habitat. The operation phase will introduce public recreational access to areas of the site as well as new land management and maintenance practices which have the potential to lead to disturbance. During the dormouse active period (indicatively April – October) disturbance can disrupt foraging, nesting, and breeding behaviour. During hibernation (indicatively, November–March), dormice are highly vulnerable to disturbance, which can lead to significant energy loss and increased mortality risk. Artificial lighting from new roads and publicly accessible areas may deter nocturnal activity for the species; increased lighting near nesting or foraging sites may reduce activity levels and increase vulnerability to predators, affecting feeding efficiency and population viability. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Hazel dormouse [TEC-12] (**High**)	Most / all project components	Most / all project activities (operation)	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Mortality and Injury:** Should hazel dormice be confirmed as likely present within draft Order limits, the operation phase of the Project will introduce public recreational access to areas of the site as well as new permanent highways and vehicle movements which have the potential to lead to mortality and injury. In addition, new habitat management techniques to achieve operational, public access or wider conservation outcomes have the potential to result in the loss of nests or foraging resources which can also affect the ability of hazel dormice to survive due to loss of shelter and protection from predators or weather extremes and loss of sufficient food sources. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Natterjack toad [TEC-44] (**High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site as well as new permanent highways and vehicle movements which have the potential to lead to mortality and injury. In addition new engineered structures will be created which could introduce risks of entrapment. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-20) Measures to reduce effects on aquatic ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Other amphibians [TEC-47] (**High**)	Most / all project components	Most / all project activities (operation)	(ED-60) Design project and lighting strategy to reduce	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site as well as new permanent highways and vehicle movements which have the	(AM-21) Measures to reduce effects on terrestrial ecology during operation.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
			light spill from permanent facilities.		potential to lead to mortality and injury. In addition new engineered structures will be created which could introduce risks of entrapment. (Permanent)	(AM-20) Measures to reduce effects on aquatic ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Otter [TEC-52] (**High**)	Most / all project components	Most / all project activities (operation)	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Otter are widespread in England but sensitive to human disturbance. Activities such as recreation (e.g. walking, angling, boating), and agricultural or land management operations near watercourses can disturb otters, particularly at holts, lying-up sites, and breeding/natal sites. Elevated noise levels from machinery or site operations can cause otters to avoid key habitats while artificial lighting can deter nocturnal movements, particularly near barrier crossings, feeding areas, and resting sites. Activities near riverbanks can disrupt otter behaviour and reduce access to key foraging or sheltering sites and overall disturbance can cause otters to abandon holts, especially during sensitive periods such as breeding and rearing young and repeated or prolonged disturbance can reduce reproductive success by affecting deterring use of natal sites. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-20) Measures to reduce effects on aquatic ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Reptiles [TEC-56] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements Use of publicly accessible areas and recreation facilities	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site as well as new permanent highways and vehicle movements which have the potential to lead to mortality and injury. Routine land management operations can cause injury or mortality, including mowing and other mechanical management. In addition, new engineered structures will be created which could introduce risks of entrapment. (Permanent)	(AM-20) Measures to reduce effects on aquatic ecology during operation. (AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Species of Principal Importance [TEC-60] (**High**)	Most / all project components	Maintenance Use of publicly accessible areas and recreation facilities Workforce and visitor vehicle movements	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: The scoped-in Species of Principal Importance are widespread in England but sensitive to human disturbance. Activities such as recreation (e.g. walking, angling, boating), and agricultural or land management operations can disturb these species, particularly at resting places, nests and hibernation sites. Elevated noise levels from machinery or site operations can cause individuals to avoid key habitats while artificial lighting can deter nocturnal movements. Activities within important habitats can disrupt behaviour and reduce access to key foraging or sheltering sites and overall disturbance can cause abandonment of sites, especially during sensitive periods such as breeding and rearing young. Repeated or prolonged disturbance can reduce reproductive success. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Species of Principal Importance [TEC-61] (**High**)	Most / all project components	Maintenance Workforce and visitor vehicle movements	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site as well as new permanent highways and vehicle movements which have the potential to lead to mortality and injury. Routine land management operations can cause injury or mortality, including mowing and other	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
		Use of publicly accessible areas and recreation facilities			mechanical management and especially damage to hibernation sites. In addition, new engineered structures will be created which could introduce risks of entrapment. (Permanent)	
Terrestrial Invertebrates [TEC-65] (**High**)	Most / all project components	Maintenance Use of publicly accessible areas and recreation facilities	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Mortality and injury:** The operation phase of the Project will introduce public recreational access to areas of the site and management measures which may result in increased foot traffic, and trampling which can degrade habitat structure, compact soil, and disrupt surface-dwelling species and their microhabitats. Chemical use can cause both direct toxicity and sub-lethal effects while artificial lighting near development sites can increase mortality of nocturnal invertebrates (e.g. moths) through disorientation, predation risk, and disruption of feeding and mating behaviours. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Terrestrial Invertebrates [TEC-64] (**High**)	Most / all project components Lighting (permanent)	Maintenance Use of publicly accessible areas and recreation facilities	(ED-60) Design project and lighting strategy to reduce light spill from permanent facilities.	**Significant** Adverse	**Disturbance**: Terrestrial invertebrate species can be highly sensitive to both physical and sensory disturbance. Increased levels of recreational use, foot traffic, and trampling can degrade habitat structure, compact soil, and disrupt surface-dwelling species and their microhabitats. Artificial illumination, particularly from security or street lighting, can disorient nocturnal invertebrates (including moths and beetles), increase predation risk, disrupt mating and feeding behaviours, and lead to population declines. Repeated low-level disturbance from vehicle movement or machinery near sensitive habitats (e.g. bare ground or nesting sites) can affect soil-dwelling and burrowing species such as ground beetles, solitary bees, and ants. Many invertebrates are highly sensitive to changes in microclimatic conditions and may abandon disturbed areas, leading to localised population loss. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-75) Species / habitat specific mitigation strategy.
Water vole [TEC-33] (**High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Significant** Adverse	**Disturbance**: The introduction of persistent human activity such as dog-walking, recreational use of green space, or footpath proximity may cause water voles to avoid otherwise suitable habitat. Although water vole are primarily found in rural and semi-natural environments, they may also be found in urban and peri-urban settings where suitable riparian habitat persists and this suggests some tolerance of routine disturbance effects. Despite being found in these locations, water vole populations remain vulnerable to frequent and chronic disturbance, which can significantly affect their survival, behaviour, and long-term viability. Disturbed individuals may spend more time in exposed positions, increasing predation. General disturbance impacts are often cumulative and can degrade the ecological functionality of habitat even where it appears superficially suitable. These effects may be especially pronounced where populations are already small, isolated, or subject to concurrent pressures. (Permanent)	(AM-21) Measures to reduce effects on terrestrial ecology during operation. (AM-20) Measures to reduce effects on aquatic ecology during operation. (AM-75) Species / habitat specific mitigation strategy.

1.4 Likely non-significant construction effects

Table 1.3 Initial likely non-significant effects during construction (with embedded and standard good practice mitigation applied, but prior to additional mitigation)

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Cothill Fen SAC & SSSI [TEC-230] (**Very High**)	Most / all project components	Off-site transport movements Site personnel influx / job creation	(ED-05) Use of rail to transport bulk construction materials, if practicable. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment. (SGP-20) Off-site Construction Traffic Management Measures.	**Not Significant** Adverse	**Air quality changes:** Cothill Fen supports habitats which are known to be sensitive to nitrogen-based pollutants such as nitrogen dioxide and ammonia, which may be emitted during construction activities. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality changes to Cothill Fen are unlikely to result in significant effects, due to a combination of the geographical location (off site and away from major highways) and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. Embedded mitigation and avoidance measures (for example, construction vehicle route selection and the use of rail) are considered likely to avoid exceedances of site-relevant screening thresholds for adverse effects or will be able to mitigate effects to avoid damage and degradation of the site. (Long-term)	No additional mitigation required as the effect is not significant.
Cothill Fen SAC & SSSI [TEC-231] (**Very High**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Hydrological changes**: Cothill Fen supports habitats which are known to be sensitive to hydrology, and construction activities in close proximity can alter groundwater tables or flow paths, particularly critical for designations that support Groundwater Dependent Terrestrial Ecosystems (GWDTEs). Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of hydrological changes to Cothill Fen are absent, and the project is unlikely to result in significant effects due to a combination of the geographical location of the designation (off site and upstream within the catchment, without a groundwater impact pathway) and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	No additional mitigation required as the effect is not significant.
Hackpen Hill SAC [TEC-241] (**Very High**)	Most / all project components	Off-site transport movements	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Air quality changes**: Hackpen Hill supports habitats which are sensitive to nitrogen-based pollutants such as nitrogen dioxide and ammonia which can be emitted during construction activities. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality changes to Little Wittenham are unlikely to result in significant effects. The SAC is off site and away from major highways (in excess of air quality screening distances), and the limited changes resulting from the Project result in the designated site likely being outside the Project zone of influence. Embedded measures (for example, construction vehicle route selection and the use of rail) are considered	No additional mitigation required as the effect is not significant.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					likely to avoid exceedances of site-relevant screening thresholds for adverse effects. (Long-term)	
Hackpen Hill SAC [TEC-242] (**Very High**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Hydrological changes**: Hackpen Hill SAC is a hill top site at a notable elevation within the region. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of hydrological changes to Hackpen Hill are absent, and the project is unlikely to result in significant effects due to a combination of the geographical location of the designation (off site and upstream within the catchment, without a groundwater impact pathway) and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	No additional mitigation required as the effect is not significant.
Little Wittenham SAC & SSSI [TEC-237] (**Very High**)	Most / all project components	Most / all project activities (construction)	(ED-05) Use of rail to transport bulk construction materials, if practicable. (SGP-19) Standard good practice measures to reduce impact of construction traffic on communities and the environment. (SGP-20) Off-site Construction Traffic Management Measures.	**Not Significant** Adverse	**Air quality changes**: Little Wittenham supports habitats which may be sensitive to nitrogen-based pollutants such as nitrogen dioxide and ammonia and can be emitted during construction activities. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality changes to Little Wittenham are unlikely to result in significant effects. Great crested newts are not known to be directly vulnerable to nitrogen effects; the SAC/SSSI is off site and away from major highways, and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. Embedded measures (for example, construction vehicle route selection and the use of rail) are considered likely to avoid exceedances of site-relevant screening thresholds for adverse effects. (Long-term)	No additional mitigation required as the effect is not significant.
Little Wittenham SAC & SSSI [TEC-238] (**Very High**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Hydrological changes**: Little Wittenham supports habitats which are known to be sensitive to hydrology, and construction activities in close proximity can alter groundwater tables or flow paths, particularly critical for supporting habitat associated with great crested newts. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of hydrological changes to Little Wittenham are absent, and the project is unlikely to result in significant effects due to a combination of the geographical location of the designation (off site and significantly elevated above the River Thames, without a groundwater impact pathway) and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	No additional mitigation required as the effect is not significant.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Oxford Meadows SAC [TEC-235] (**Very High**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Hydrological changes**: Oxford Meadows SAC supports habitats which are known to be sensitive to hydrology, and construction activities in close proximity can alter surface and groundwater tables or flow paths, particularly critical for designations that support Groundwater Dependent Terrestrial Ecosystems (GWDTEs) and water quality. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of hydrological changes to Oxford Meadows are absent, and the project is unlikely to result in significant effects due to a combination of the geographical location of the designation (off site and upstream within the catchment, without a groundwater impact pathway) and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	No additional mitigation required as the effect is not significant.
Cothill NNR [TEC-261] (**High**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for construction**: Cothill NNR is a small site, located within Unit 2 of the SSSI, close to Hitch Copse and somewhat centrally to the overall grouping of Cothill designations, further away from areas of development and highways than the extents of the SSSI and SAC. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Cothill NNR are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (not in close proximity to the Project; beyond indicative air quality screening distances from connected highways; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	No additional mitigation required as the effect is not significant.
Appleton Lower Common SSSI [TEC-253] (**High**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for construction**: Appleton Lower Common SSSI is located in proximity to the River Thames considerably upstream of Oxford and Northmoor Lock. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Appleton Lower Common are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	No additional mitigation required as the effect is not significant.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Culham Brake SSSI [TEC-249] (**High**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Air quality changes**: Culham Brake supports features which are sensitive to nitrogen-based pollutants such as nitrogen dioxide and ammonia which can be emitted during construction activities. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality changes to Culham Brake are unlikely to result in significant effects. The SSSI is off site and away from major highways (in excess of air quality screening distances), and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	No additional mitigation required as the effect is not significant.
Dry Sandford Pit SSSI [TEC-251] (**High**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for construction**: Dry Sandford Pit SSSI is located in proximity to Abingdon Airfield within the Sandford Brook catchment. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Dry Sandford Pit are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	No additional mitigation required as the effect is not significant.
Fernham Meadows SSSI [TEC-247] (**High**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for construction**: Fernham Meadows SSSI is located in proximity to the headwaters and within the floodplain of the River Ock, below the scarp of the Berkshire Downs. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Fernham Meadows are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	No additional mitigation required as the effect is not significant.
Hackpen, Warren & Gramp's Hill Downs SSSI [TEC-245] (**High**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for construction**: Hackpen, Warren & Gramp's Hill Downs SSSI is a hill top site at a notable elevation within the region. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment	No additional mitigation required as the effect is not significant.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					suggests impact pathways of air quality and hydrological changes to Hackpen Hill are absent, and the project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; beyond indicative air quality screening distances from connected highways; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	
Whitehorse Hill SSSI [TEC-255] (**High**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for construction**: Whitehorse Hill SSSI is located immediately above the headwaters of the River Ock, below the scarp of the Berkshire Downs significantly south and west of the draft Order limits. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Whitehorse Hill are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	No additional mitigation required as the effect is not significant.
Abbey Fishponds LNR [TEC-257] (**Moderate**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for construction**: Abbey Fishponds LNR is located within a residential area on the east side of Abingdon. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Abbey Fishponds are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	No additional mitigation required as the effect is not significant.
Mowbray Fields LNR [TEC-259] (**Moderate**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for construction**: Mowbray Fields LNR is located adjacent to residential areas on the south side of Didcot. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Mowbray Fields are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation	No additional mitigation required as the effect is not significant.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					(significant distance from the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and within a wholly different Operational Catchment of the Thames, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Long-term)	
Gozzards Ford Fen LWS [TEC-264] (**Moderate**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for construction:** Gozzards Ford Fen LWS is located in a rural location of the Sandford Brook, west of Abingdon Airfield. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways to Gozzards Ford Fen LWS are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (not in close proximity to the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence, whilst the features for which the site is designated are not likely to be altered by the Project. (Long-term)	No additional mitigation required as the effect is not significant.
Radley Gravel Pits LWS [TEC-263] (**Moderate**)	Most / all project components	Most / all project activities (construction)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for construction**: Radley Gravel Pits LWS is located adjacent to residential areas on the south side of Abingdon and the River Thames upstream of Abingdon Lock. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways to Radley Gravel Pits LWS are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (not in close proximity to the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence, whilst the features for which the site is designated as LWS are not likely to be sensitive to change. (Long-term)	No additional mitigation required as the effect is not significant.

1.5 Likely non-significant operation effects

Table 1.4 Initial likely non-significant effects during operation (with embedded and standard good practice mitigation applied, but prior to additional mitigation)

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Cothill Fen SAC & SSSI [TEC-232] (**Very High**)	Most / all project components	Workforce and visitor vehicle movements	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Air quality changes**: Cothill Fen supports habitats which are known to be sensitive to nitrogen-based pollutants such as nitrogen dioxide and ammonia, which may be emitted by traffic movements associated with the operation of the Project. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality changes to Cothill Fen are unlikely to result in significant effects, due to a combination of the geographical location (off site and away from major highways) and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. The Project does not introduce new residents and operational changes are considered likely to avoid exceedances of site-relevant screening thresholds for adverse effects or will be able to mitigate effects to avoid damage and degradation of the site. (Permanent)	No additional mitigation required as the effect is not significant.
Cothill Fen SAC & SSSI [TEC-233] (**Very High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Hydrological changes**: Cothill Fen supports habitats which are known to be sensitive to hydrology, and changes to water management activities in close proximity can alter groundwater tables or flow paths, particularly critical for designations that support Groundwater Dependent Terrestrial Ecosystems (GWDTEs). . Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of hydrological changes to Cothill Fen are absent. The project is unlikely to result in significant effects due to a combination of the geographical location of the designation (off site and upstream within the catchment, without a groundwater impact pathway) and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	No additional mitigation required as the effect is not significant.
Hackpen Hill SAC [TEC-243] (**Very High**)	Most / all project components	Workforce and visitor vehicle movements	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Air quality changes**: Hackpen Hill supports habitats which are sensitive to nitrogen-based pollutants such as nitrogen dioxide and ammonia which can be emitted by visitor and staff vehicle movements on the highway network. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality changes to Little Wittenham are unlikely to result in significant effects. The SAC is off site and away from major highways (in excess of air quality screening distances), and the limited changes resulting from the Project result in the designated site likely being outside the Project zone of influence. (Permanent)	No additional mitigation required as the effect is not significant.
Hackpen Hill SAC [TEC-244] (**Very High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Hydrological changes**: Hackpen Hill SAC is a hill top site at a notable elevation within the region. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of hydrological changes to Hackpen Hill are absent, and the project is unlikely to result in significant effects due to a combination of the geographical location of the designation (off site and upstream within the catchment, without a groundwater impact pathway) and the limited changes	No additional mitigation required as the effect is not significant.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					resulting from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	
Little Wittenham SAC & SSSI [TEC-239] (**Very High**)	Most / all project components	Workforce and visitor vehicle movements	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Air quality changes**: Little Wittenham supports habitats which may be sensitive to nitrogen-based pollutants such as nitrogen dioxide and ammonia and can be emitted from vehicle movements, including visitors to the Project and commuting staff. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality changes to Little Wittenham are unlikely to result in significant effects. Great crested newts are not known to be directly vulnerable to nitrogen effects; the SAC/SSSI is off site and away from major highways, and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	No additional mitigation required as the effect is not significant.
Little Wittenham SAC & SSSI [TEC-240] (**Very High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Hydrological changes**: Little Wittenham supports habitats which are known to be sensitive to hydrology, and alterations through management or catchment changes to surface water, groundwater tables or flow paths may affect supporting habitat associated with great crested newts. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of hydrological changes to Little Wittenham are absent. The project is unlikely to result in significant effects due to a combination of the geographical location of the designation (off site and significantly elevated above the River Thames, without a groundwater impact pathway) and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	No additional mitigation required as the effect is not significant.
Oxford Meadows SAC [TEC-236] (**Very High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Hydrological changes**: Oxford Meadows SAC supports habitats which are known to be sensitive to hydrology, and changes to water management activities can alter surface and groundwater tables or flow paths, particularly critical for designations that support Groundwater Dependent Terrestrial Ecosystems (GWDTEs), and water quality. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of hydrological changes to Oxford Meadows are absent, and the project is unlikely to result in significant effects due to a combination of the geographical location of the designation (off site and upstream within the catchment, without a groundwater impact pathway) and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	No additional mitigation required as the effect is not significant.
Cothill NNR [TEC-262] (**High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for operation**: Cothill NNR is a small site, located within Unit 2 of the SSSI, close to Hitch Copse and somewhat centrally to the overall grouping of Cothill designations, further away from areas of development and highways than the extents of the SSSI and SAC. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Cothill NNR are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (not in close proximity to the Project; beyond indicative air quality screening distances from connected highways; and upstream	No additional mitigation required as the effect is not significant.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	
Appleton Lower Common SSSI [TEC-254] (**High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for operation**: Appleton Lower Common SSSI is located in proximity to the River Thames considerably upstream of Oxford and Northmoor Lock. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Appleton Lower Common are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	No additional mitigation required as the effect is not significant.
Culham Brake SSSI [TEC-250] (**High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**Air quality changes**: Culham Brake supports features which are sensitive to nitrogen-based pollutants such as nitrogen dioxide and ammonia which can be emitted during vehicle movements associated with Project staff and visitors. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality changes to Culham Brake are unlikely to result in significant effects. The SSSI is off site and away from major highways (in excess of air quality screening distances), and the limited changes resulting from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	No additional mitigation required as the effect is not significant.
Dry Sandford Pit SSSI [TEC-252] (**High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for operation**: Dry Sandford Pit SSSI is located in proximity to Abingdon Airfield within the Sandford Brook catchment. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Dry Sandford Pit are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	No additional mitigation required as the effect is not significant.
Fernham Meadows SSSI [TEC-248] (**High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for operation**: Fernham Meadows SSSI is located in proximity to the headwaters and within the floodplain of the River Ock, below the scarp of the Berkshire Downs. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Fernham Meadows are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; not in proximity to connected	No additional mitigation required as the effect is not significant.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	
Hackpen, Warren & Gramp's Hill Downs SSSI [TEC-246] (**High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for operation**: Hackpen, Warren & Gramp's Hill Downs SSSI is a hill top site at a notable elevation within the region. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Hackpen Hill are absent, and the project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; beyond indicative air quality screening distances from connected highways; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. No impact pathway identified and designation not anticipated to be within Project zone of influence (Permanent)	No additional mitigation required as the effect is not significant.
Whitehorse Hill SSSI [TEC-256] (**High**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for operation**: Whitehorse Hill SSSI is located immediately above the headwaters of the River Ock, below the scarp of the Berkshire Downs significantly south and west of the draft Order limits. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Whitehorse Hill are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	No additional mitigation required as the effect is not significant.
Abbey Fishponds LNR [TEC-258] (**Moderate**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for operation**: Abbey Fishponds LNR is located within a residential area on the east side of Abingdon. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Abbey Fishponds are absent. The Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and upstream within the catchment, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	No additional mitigation required as the effect is not significant.
Mowbray Fields LNR [TEC-260] (**Moderate**)	Most / all project components	Most / all project activities (operation)	No embedded design or standard good practice mitigation identified at this stage.	**Not Significant** Adverse	**All scoped-in effect pathways for operation**: Mowbray Fields LNR is located adjacent to residential areas on the south side of Didcot. Whilst designs continue to develop and associated modelling of impact pathways is being refined, some uncertainty in assessment remains at the current time however current assessment suggests impact pathways of air quality and hydrological changes to Mowbray Fields are absent. The	No additional mitigation required as the effect is not significant.

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
					Project is unlikely to result in significant effects due to a combination of the geographical location of the designation (significant distance from the Project; not in proximity to connected highways other than minor roads unlikely to be associated with the Project Affected Road Network; and within a wholly different Operational Catchment of the Thames, without a groundwater impact pathway) and the limited changes arising from the Project resulting in the designated site likely being outside the Project zone of influence. (Permanent)	

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